

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION



Invitation for Bids

F.A.P. No. STP-3057(6)N
S.H.A. No. BC410005
CONTRACT NO. TR12317

CENTRAL AVENUE STREETScape AND
HARBOR POINT CONNECTOR BRIDGE
(DESIGN-BUILD)

Preliminary Submission

NOTICE TO BIDDERS

SUPPLEMENTAL BIDDING INSTRUCTION

The following instruction supplements the bidding information found elsewhere in the Bid Book and those referenced therein.

**EACH BIDDER IS HEREBY NOTIFIED THAT HE/SHE/IT MUST COMPLETELY
FILL IN THE ORIGINAL BID AND ALL REQUIRED AFFIDAVITS AND
DOCUMENTS LOCATED IN THE BID BOOK. THE ORIGINAL BID (WHICH MUST
REMAIN ATTACHED TO THE BID BOOK) PLUS THE FULLY COMPLETED
DUPLICATE BID MUST BE SUBMITTED IN THE BID ENVELOPE, IF ONE IS
PROVIDED FOR THAT PURPOSE.**

**FAILURE TO FOLLOW THESE SIMPLE DIRECTIONS WILL CAUSE YOUR BID TO
BE DECLARED UNRESPONSIVE AND THE BID WILL BE REJECTED BY THE
BOARD OF ESTIMATES.**

NOTICE TO CONTRACTORS

FHWA Form-47

The Federal Highway Administration has published a final rule that eliminates the requirement that contractors performing work on NHS projects valued at more than One Million dollars submit the form FHWA-47 Bid Price Data. Currently, the Administration includes a federal specification FHWA-1273 in all of our federally funded projects that contains this requirement. Therefore, based on the final rule Contractors are no longer required to submit the FHWA-47 form in accordance with the current language of the FHWA-1273 specification.

Environmental Stewardship

The Maryland State Highway Administration is committed to the development and maintenance of the Administration's highway system in an environmentally responsible manner. Therefore, Contractors are encouraged to consider the use of Administration-approved recycled and reclaimed materials in construction projects where practicable, and in accordance with the Plans and Specifications.

The Contractor is also encouraged to reuse, salvage, or recycle all generated waste materials to the extent possible. Materials that are easily recognizable, maintain their physical properties, meet the required material properties for recycling, are easily separated and transported, and have value as commodities are candidates for recycling. These types of materials generally include metals (steel, iron, copper, aluminum, bronze, etc.), plastics (cones, barrels, barricades, crash cushion plastic barrels, conduit, containers, etc.), aluminum poles and signs, electronic and electrical components, signals and signal components, topsoil, formwork, temporary falsework, brick, masonry, stone, wood, paper, and timber and yard waste from clearing and grubbing operations.

RESOLUTION
OF
THE BOARD OF ESTIMATES
OF
THE CITY OF BALTIMORE

WHEREAS, the Mayor and City Council of Baltimore, acting by and through the Board of Estimates pursuant to Article VI, Section 4 of the Charter of Baltimore City, 1964 Revision, as amended, is responsible for awarding contracts and supervising all purchasing by the City; and

WHEREAS, the Board of Estimates wishes to insure that all City contractors, subcontractors, and their agents and employees conduct themselves in accordance with established federal, state, and local laws.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF ESTIMATES OF BALTIMORE CITY, that the following policy, which has always been applicable to City contracts, be formally adopted by this Board to apply to all City contractors, subcontractors and their agents and employees:

1. Contractors, subcontractors, and their agents and employees may not engage in unfair labor practices as defined under The National Labor Relations Act and applicable federal regulations and state laws.

2. Contractors, subcontractors, and their agents may not threaten, harass, intimidate or in any way impede persons employed by them who on their own time exercise their rights to associate, speak, organize, or petition governmental officials with their grievances.

3. If the Board of Estimates determines that a contractor, subcontractor, or their agents have violated the policy set forth in this Resolution said contractor, or subcontractor, will be disqualified from bidding on City contracts, and if they are currently completing contracts, they will be found in default of their contracts.

4. A copy of this Resolution must be included in all City contracts.

5. This Resolution applies to all City contracts entered into after the date of its adoption and to each and every City contract, or subcontract in effect on the date of its adoption, and each department and agency of the City is charged with the responsibility of so notifying all present contractors, and subcontractors.

6. This Resolution takes effect immediately.

APPROVED BY THE BOARD OF ESTIMATES

(Signed)

Shirley A. Williams June 29,1994

Clerk

Date

Approved As To Form And
Legal Sufficiency This
28th Day of June, 1994

(Signed)Leslie S. Winner

Leslie S. Winner

Principal Counsel

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Council of Baltimore, or a Bid Bond executed on the Form as provided in the Bid or Proposal, for an amount which is determined by multiplying the Total Bid or Proposal submitted by five percent (5%).

The successful Bidder will be required to give both Performance Bond and Payment Bond in the amount of the Contract price.

The Board of Estimates reserves the right to reject any and all Bids and/or waive technical defects if in its judgement, the interest of the Mayor and City Council may so require.

Bid when filed shall be irrevocable. Attention of Bidders is called to the Minimum Wage Rates to be paid on this project.

All Contractors Bidding on this Contract must first be Prequalified by the City of Baltimore Contractor's Qualification Committee, 751 Eastern Avenue, Baltimore Maryland 21202, whose recommendations for an assigned Dollar Work Capacity Rating and Work Classification(s) are effective after ratification and confirmation by the Board of Estimates. Contractors will not be permitted to Bid for any single contract having a Dollar Value in excess of the Contractor's assigned Work Capacity Rating and will not be awarded any Contract if the Contract Dollar Value, when added to the Contractor's uncompleted backlog at time of award, exceeds the Contractor's Assigned Work Capacity Rating. Subcontractors intending to perform work in excess of \$25,000 on this Contract must have established Qualification for an adequate Work Capacity Rating and the necessary Work Classification(s) before they are permitted to commence work. **If a bid is submitted by a joint venture ("JV"), then in that event, the document that established the JV shall be submitted with the bid for verification purposes.**

Contractors whose Capacity Rating does not meet the lower limit of the Qualification Range, may obtain Plans and Proposals marked NOT FOR BIDDING PURPOSES.

BIDDERS SHALL BE RESTRICTED TO THOSE PREQUALIFIED IN THE FOLLOWING WORK CATEGORY: C03300 (CONCRETE CONSTRUCTION).

APPROVED:

Director,
Department of Transportation

APPROVED:

Chief, Transportation Engineering
& Construction Division

APPROVED:

Clerk, Board of Estimates

APPROVED:

Chief Solicitor



*Maryland Department of Transportation
State Highway Administration*

F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317

CONTRACT PROVISIONS

CONTRACTOR REGISTRATION REQUIREMENTS

1 of 1

CONTRACTOR REGISTRATION REQUIREMENTS

On all Federal-Aid funded contracts, the Administration is requiring that Contractors have an active Dun and Bradstreet Data Universal Numbering System (DUNS) and be registered in the Central Contractor Registration (CCR) database prior to Award of Contract.

The Contractor DUNS number is a unique nine-digit number issued by Dun & Bradstreet, followed by the optional 4 digit DUNS Plus number (reported as “999999999.9999”). A DUNS number can be obtained on-line at <http://fedgov.dnb.com/webform>.

The Central Contractor Registration is the primary registrant database for the U.S. Federal Government. CCR collects, validates, stores and disseminates data in support of agency acquisition missions. Contractors can register on-line at <https://www.bpn.gov/ccr/default.aspx>.

CONTRACT PROVISIONS

**MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
(MdMUTCD) REQUIREMENTS**

1 of 1

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

**MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL
DEVICES (MdMUTCD) REQUIREMENTS**

The 2011 Maryland Manual on Uniform Traffic Control Devices (MdMUTCD) is the legal State standard for traffic control devices. All traffic control devices (temporary or permanent) utilized on Administration projects shall be in conformance with the requirements provided in the 2011 Edition of the Administration's MdMUTCD for Streets and Highways.



CONTRACT PROVISIONS

(NCHRP) REPORT 350 AND MASH IMPLEMENTATION SCHEDULE

1 of 2

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

**NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)
REPORT 350 AND THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH)
IMPLEMENTATION SCHEDULE FOR DEVICES USED IN THE MAINTENANCE OF
TRAFFIC**

Except as otherwise specified in this Section, all items for the maintenance of traffic, including those listed under the following categories, shall be crashworthy in conformance with Level 3 or other Level as specified by the Engineer in conformance with the safety crash testing and performance criteria published in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" or the Manual for Assessing Safety Hardware (MASH). When conformance with NCHRP Report 350 or MASH is required, the Contractor shall provide the Engineer with the manufacturers' certifications that the devices comply with the specified criteria.

Unless specifically waived by an attachment to these Contract Provisions, devices must be approved by the Office of Traffic and Safety.

Category 1 Devices

These devices are cones, tubular markers, flexible delineator posts, and drums, all without any accessories or attachments, which are used for channelization and delineation.

Category 2 Devices

These devices are Type I, II, and III barricades; portable sign supports with signs; intrusion alarms; and drums, vertical panels, and cones, all with accessories or attachments.

Category 3 Devices

- (a) Truck Mounted Attenuators (TMAs) and Trailer Truck Mounted Attenuators (TTMAs).
- (b) Temporary Barrier.
 - (1) Concrete Barrier.
 - (2) Traffic Barrier W Beam and Water Filled Barrier.
 - (3) Steel/Aluminum Barrier.
- (c) Temporary End Treatments.

Category 4 Devices

These devices are area lighting supports, arrow panels, and portable variable message signs that are usually portable or trailer-mounted.

CONTRACT PROVISIONS

(NCHRP) REPORT 350 AND MASH IMPLEMENTATION SCHEDULE

WORK ZONE DEVICES	IMPLEMENTATION SCHEDULE TO CONFORM TO NCHRP REPORT 350 OR MASH CRITERIA
<p>CATEGORY 1 Cones, tubular markers, flexible delineator posts, and drums (all without any accessories or attachments)</p>	<p>All devices shall conform to NCHRP Report 350 or MASH criteria.</p>
<p>CATEGORY 2 Type I, II, and III barricades; portable signs supports with signs; intrusion alarms; and drums, vertical panels, and cones (all with accessories or attachments)</p>	<p>All devices shall conform to NCHRP Report 350 or MASH criteria.</p>
<p>CATEGORY 3 (a) Truck Mounted Attenuators (TMAs); Trailer Truck Mounted Attenuators (TTMAs) (b) Temporary Barriers (1) Concrete Barrier (2) Traffic Barrier W Beam and Water Filled Barrier (3) Steel/Aluminum Barrier (c) Temporary End Treatments</p>	<p>All devices shall conform to NCHRP Report 350 or MASH criteria.</p>
<p>CATEGORY 4 Portable trailer mounted devices including area lighting supports, arrow panels, and changeable message signs</p>	<p>The Contractor may use devices that do not conform to NCHRP Report 350 or MASH criteria, until compliance dates are established. Use of these devices shall comply with the provisions of Part 6 of the MUTCD.</p>



OCCUPYING WETLANDS/WATERWAYS FOR DESIGN-BUILD

The Contractor is hereby alerted to the importance of preserving waterways and wetland areas. The Administration, in conjunction with the various environmental agencies, has developed these Contract Documents so as to minimize or eliminate disturbance and damage to existing waterways and wetland areas. Any design changes must result in further avoidance and minimization of disturbance of wetlands and waterways. In order to accomplish this, the following must be rigidly adhered to:

- (a) Prior to performing any work on the project, the areas of wetland will be identified and marked by orange safety fence or as directed by the Engineer. All personnel of the Contractor or sub-contractors shall be alerted to these designated areas.
- (b) The Contractor or sub-contractors shall not impact any wetland or waterway, whether it be permanently or temporarily unless otherwise stipulated in the permit and approved as an authorized action by the appropriate regulatory agency. No fill shall be placed in these areas without an appropriate permit. No storage of equipment or materials will be allowed in wetlands.
- (c) The Contractor or sub-contractor shall not impact a wetland or waterway that is not covered by an existing wetland permit.
- (d) If the Contractor impacts any wetland or waterway for which they do not have a wetland permit, they shall be responsible for contacting the State Highway Administration's Environmental Programs Division prior to restoring the wetland areas and mitigating the wetland impacts to the full satisfaction of the environment regulatory agencies, which could include monetary compensation.
- (e) The cost of restoration and mitigation of the impacted areas shall be at no additional cost to the Administration.
- (f) The Design-Builder will prepare permit modifications at the conclusion design and at the conclusion of construction. The modification will be based on surveyed as-built plans and will include standard 8.5"x 11.0" plates and a revised Joint State/Federal Nontidal Wetlands and Waterways Permit application.
- (g) This Contract will include the oversight of an Environmental Monitor supplied by the Administration. His duties will be to make sure the Contractor abides by all conditions in the environmental permits. He will also assist the Contractor in developing ideas to minimize impacts to the wetlands. The Contractor will still be responsible for all violations occurring as stated above.

The importance of not abusing waterways and wetland areas cannot be overemphasized. It is possible that abuse of waterways and wetland areas could jeopardize the operation of the total Contract and could be cause for a shut-down. If a shut-down occurs because of the Contractor's failure to secure the required permits(i.e. the Contractor's method of work includes impacts not approved by previously acquired permits), the Contractor's negligence or operations, all costs and damages to the Contractor and to the State will be at the Contractor's expense. Non-compliance with these requirements will not be considered for an extension of Contract time.



BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
2. PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
3. DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIALS FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4. PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
5. REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6. RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
7. ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES:

ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARLEY (HORDEUM SP.), OATS (UNIOLA SP.) AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE

VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT



MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.

8. AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
9. TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:
 - A. USE I WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE DURING ANY YEAR.
 - B. USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THORUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
 - C. USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.
10. STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
11. CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the

provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of

employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these

special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work

classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for

determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that

the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed,

as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity

requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.



*Maryland Department of Transportation
State Highway Administration*

F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317

CONTRACT PROVISIONS

NOTICE TO CONTRACTORS MBE/DBE GOAL

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**NOTICE TO CONTRACTORS
CONCERNING THE MBE/DBE GOAL ON THIS CONTRACT**

The Maryland Department of Transportation is committed to providing the maximum amount of contracting opportunities to certified Minority Business Enterprises (MBEs) and Disadvantaged Business Enterprises (DBEs). The previously established policy excluded consideration of the cost of supplying structural steel for MBE/DBE participation since there were no structural steel manufacturers certified by MDOT. This exemption is no longer applicable since MBE/ DBE firms have been certified under this category.

The Administration reserves the right to verify the accuracy of the dollar value included on the Contractor's Affirmative Action Plan, including the value associated with the manufacture, supply, and installation of structural steel.



CONTRACT PROVISIONS

DBE FOR FEDERAL-AID CONTRACTS

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**AFFIRMATIVE ACTION REQUIREMENTS
UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES
FOR FEDERAL-AID CONTRACTS**

CONTRACT GOALS

FOR THE PURPOSE OF THIS CONTRACT, A GOAL OF **THIRTY (30)** PERCENT HAS BEEN ESTABLISHED FOR SOCIALLY AND ECONOMICALLY DISADVANTAGED BUSINESSES THAT ARE OWNED AND CONTROLLED BY – THOSE INDIVIDUALS WHO ARE BLACK AMERICANS, HISPANIC AMERICANS, ASIAN-PACIFIC AMERICANS, SUBCONTINENT ASIAN AMERICANS, NATIVE AMERICANS, OR WOMEN PURSUANT TO THE MARYLAND DEPARTMENT OF TRANSPORTATION (MDOT) MINORITY BUSINESS ENTERPRISE PROGRAM:

It is the policy of the Maryland Department of Transportation that disadvantaged business enterprises as defined in 49 CFR Part 26 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) shall have an equal opportunity to participate in the performance of the contracts financed in whole or in part with Federal funds under these agreements. Consequently, the disadvantaged business enterprise requirements of 49 CFR Part 26 and SAFETEA-LU apply to this agreement.

The bidder agrees to ensure that disadvantaged business enterprises as defined in 49 CFR Part 26 and SAFETEA-LU have an equal opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds provided under this agreement. In this regard, all bidders shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 and SAFETEA-LU to ensure that disadvantaged business enterprises have an equal opportunity to compete for and perform on Federally funded contracts. The Maryland Department of Transportation and their bidders shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this Contract.

A. GENERAL

For the purpose of these requirements, the following terms as defined below shall apply:

Administration Representative – A DBE/MBE Officer or employee of an Administration who enforces the laws and regulations pertaining to disadvantaged and minority business enterprise and contract compliance.

Affirmative Actions – Specific steps taken to eliminate discrimination and its effects, to ensure nondiscriminatory results and practices in the future, and to involve disadvantaged and minority business enterprises fully in contracts and programs.

Business Enterprises – Any legal entity which is organized in any form other than as a joint venture (e.g., sole proprietorship, partnership, corporation, etc.) to engage in lawful commercial transactions.

Certified Business – A business which by order of the Chair/MBE Advisory Council or his/hers designee, has been certified as a bona fide DBE/MBE. MDOT certification does not equate to a pre-qualification status.



CONTRACT PROVISIONS

DBE FOR FEDERAL-AID CONTRACTS

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DBE – Disadvantaged Business Enterprise – Reference 49 CFR, Part 26, Subpart A) a small business concern: (1) which is at least 51 percent owned by one or more socially and economically disadvantaged individuals. Where stock ownership is involved, the disadvantaged owner(s) shall own at least 51 percent of each class of voting stock and at least 51 percent of the aggregate of all classes of stock that have been issued (also applies to publicly owned businesses); and (2) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who have ownership. In this specification the terms MBE and DBE have the same meaning.

DBE/MBE Directory – A compilation of businesses certified by MDOT as disadvantaged, minority, or socially and economically disadvantaged businesses. The directory will be published annually with quarterly supplements. It will also be provided in automated format and on the Internet to be updated as changes are made.

DBE/MBE Participation Packet – The documents submitted by the bidder or proposer pursuant to the appropriate special bid provisions. The DBE/MBE Participation Packet consists of the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule, both of which must be submitted with your bid or initial price proposal. The DBE Participation Packet also includes the following documents, which shall be submitted after bids or proposals are opened: Outreach Efforts Compliance Statement (MDOT-OP-018-2), DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), MDOT Joint Venture Disclosure Affidavit (D-EEO-006), and Minority Contractor Unavailability Certificate (OOC46).

DBE/MBE Program – A program developed by MDOT to implement the requirements of Title 14, Subtitle 3 of the State Finance and Procurement Article, Annotated Code of Maryland; Title 10, Subtitle 3 of the State Finance and Procurement Article of the Annotated Code of Maryland for Leases of State-Owned Property; and 49 CFR, Part 26, Subparts A and C for all Federal Department of Transportation Financial Assistance Programs.

Director, Office of Equal Opportunity – The individual designated for the Administration’s overall MBE compliance.

Joint Venture – An association of a DBE/MBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills, and knowledge, and in which the DBE/MBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Small Business Administration (SBA) 8(a) Certification – The SBA 8(a) Certification Program is a Federal Program which establishes firms as disadvantaged and eligible for participation in the Federal SBA Program.

Socially and Economically Disadvantaged Individual Pursuant to 49 CFR, Part 26 – Those individuals who are citizens of the United States (or lawfully admitted permanent residents). For convenience, these individuals and groups are referred to as “minorities” in this document and who are:

1. Found by the MDOT to be socially and economically disadvantaged on a case-by-case basis;



CONTRACT PROVISIONS

DBE FOR FEDERAL-AID CONTRACTS

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2. Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged.
 - a. “Black Americans,” which includes persons having origins in any of the Black racial groups of Africa;
 - b. “Hispanic Americans,” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - c. “Native Americans,” which includes persons who are American Indian, Eskimos, Aleuts, or Native Hawaiians;
 - d. “Asian-Pacific Americans,” which included persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;
 - e. “Subcontinent Asian American,” which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - f. Women;
3. Only those persons whose personal net worth does not exceed \$750,000 may be found to be economically disadvantaged.

B. DBE/MBE and Good Faith Effort Requirements

1. This contract includes a DBE participation goal for subcontracting and/or procurement of materials and/or services. Bidders (or offerors) must make a good faith effort to meet the DBE participation goal **before bids or proposals are due**, including outreach efforts. A bid or initial proposal must include both a completed and executed Certified DBE Utilization and Fair Solicitation Affidavit and DBE Participation Schedule. The failure of a bidder to complete and submit these documents shall result in a determination that the bid is not responsive. The failure of an offeror to complete and submit these documents shall result in a determination that the proposal is not susceptible of being selected for award.
2. In making a good faith effort to achieve the DBE goal, prior to completing the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule and prior to submitting a bid or initial proposal the bidders (or offerors) including those bidders or offerors that are certified DBEs must:
 - a. Identify specific work categories within the scope of the procurement appropriate for subcontracting and/or procurement of materials and/or services;
 - b. **Solicit DBEs in writing at least 10 days before bids or initial proposals are due**, describing the identified work categories and providing instructions on how to bid on the subcontracts and/or procurement of materials and/or services;



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DBE FOR FEDERAL-AID CONTRACTS

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- c. Attempt to make personal contact with the DBEs solicited and to document these attempts;
 - d. Assist DBEs to fulfill, or to seek waiver of, bonding requirements; and
 - e. Attend prebid or other meetings the procurement agency schedules to publicize contracting opportunities to DBEs.
3. All firms bidding on a Federal-Aid Contract shall submit the name and address of all subcontractors, service providers and suppliers that submitted quotes on the Contract. All subcontractors, service providers and suppliers shall complete and submit the form entitled Contractor Information, to the Administration.
4. The bidder shall seek commitments from disadvantaged business enterprises by subcontracting and/or procurement of materials and/or services, the combined value of which equals or exceeds the appropriate percent (goal) of the total value of the prime contract. A bidder may count toward its DBE goals expenditures for materials and supplies obtained from DBE regular dealers and/or manufacturers provided that the DBEs assume the actual and contractual responsibility for the provision of the materials and supplies. The bidder may count its entire expenditure to a DBE manufacturer (i.e., a supplier that produces goods from raw materials or substantially alters them before resale). The bidder may count sixty (60) percent of its expenditures to a DBE regular dealer that is not a manufacturer, provided that the DBE supplier performs a commercially useful function in the supply process. The apparent low bidder shall submit to the Administration, within ten (10) business days after notification that it is the apparent low bidder, an acceptable Affirmative Action Plan for the utilization of Disadvantaged Business Enterprises in this Contract. The Contract will not be awarded without the Bidder's AAP being approved by the Administration.

The Affirmative Action Plan shall include as a minimum:

- a. The name of an employee designated as the bidder's liaison officer for minority affairs.
 - b. A complete DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), using contractors whose names appear in the DBE/MBE directory or who are otherwise certified by MDOT as being a disadvantaged business enterprise. Except as permitted by law and approved by the Administration, this affidavit shall include all DBE firms identified on the DBE Participation Schedule with a percentage of participation that meets or exceeds the percentage of participation indicated in the bid or initial proposal.
 - c. A completed Outreach Efforts Compliance Statement (MDOT-OP 018-2).
5. When a bidder intends to attain the appropriate goal for disadvantaged business enterprise participation by use of a joint venture, the bidder shall submit a Joint Venture Disclosure Affidavit (Form D-EEO-006-A) showing the extent of disadvantaged business participation. If a bidder intends to use a joint venture as a subcontractor to meet its goal, the affidavit shall be submitted through the bidder by the proposed subcontractor and be signed by all parties. A DBE, even in a joint venture arrangement shall be certified as a DBE by MDOT prior to being included in the Affirmative Action Plan.



CONTRACT PROVISIONS

DBE FOR FEDERAL-AID CONTRACTS

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6. Where the proposed DBE participation does not meet the DBE contract goals, sufficient evidence to demonstrate that the bidder has taken all necessary and reasonable steps to make a good faith effort to meet these goals shall be required.

7. Determination of Bid Responsiveness for Federal-Aid Contracts

If the bidder is unable to secure from DBEs by subcontracting and/or by procurement of materials and/or services, commitments which at least equal the appropriate percent (goal) of the values of the prime Contract at the time of bid, he shall request, in writing, a waiver of the unmet portion of the goal. This request must be initiated by checking the appropriate box on the Certified DBE Utilization and Fair Solicitation Affidavit submitted with the bid or initial proposal.

The waiver may be granted by the Administrator. To obtain approval of a waiver, the bidder shall submit the following information:

- a. A detailed statement of efforts made prior to bid to contact and negotiate with DBEs including: (i) the dates, names, addresses, and telephone numbers of DBEs who were contacted; (ii) a description of the information provided to DBEs requesting the plans, specifications, and anticipated time schedule for portions of the work to be performed and (iii) a detailed statement of the reasons why additional prospective agreements with DBEs were not reached;
 - b. A detailed statement of the efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goals;
 - c. For each DBE that the Contractor considers not qualified, but from which a bid has been received, a detailed statement of the reasons for the bidder's conclusion; and
 - d. For each DBE contacted but unavailable, (i) a Minority Contractor Unavailability Certificate (Form OOC46) signed by the disadvantaged business enterprise, or (ii) a statement from the bidder shall be submitted that states that the DBE refused to sign the Certificate.
- 8. Guidance concerning good faith efforts.** The following is a list of the types of actions and factors that will be used to determine the bidder's or offeror's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

- (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.



CONTRACT PROVISIONS
DBE FOR FEDERAL-AID CONTRACTS

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- (2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the bidder or offeror might otherwise prefer to perform these work items with its own forces.
- (3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (4) (a) Negotiating in good faith with interested DBEs. It is the bidder's or offeror's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation.

(b) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders and offerors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.
- (5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.
- (6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- (7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.



CONTRACT PROVISIONS
DBE FOR FEDERAL-AID CONTRACTS

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(9) In determining whether a bidder or offeror has made good faith efforts, you may take into account the performance of other bidders or offerors in meeting the contract goal. For example, when the apparent successful bidder or offeror fails to meet the contract goal, but others meet it, the Administration may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder or offeror could have met the goal. If the apparent successful bidder or offeror fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders or offerors, the Administration may view this, in conjunction with other factors, as evidence of the apparent successful bidder or offeror having made good faith efforts.

9. Bidder Use of DBE Special Services

The bidder shall consider, whenever possible, utilizing the services of minority-owned banks. Most minority banks are full-service corporations that can provide an array of financial services such as Treasury and Tax Loan fund accounts, time and demand deposit accounts, payroll services, and if needed, organization investment counseling.

10. Bidder Records

The bidder shall maintain records showing actions which have been taken to comply with procedures set forth herein.

11. Bidder Cooperation

The bidder shall cooperate with the Administration Representative in any reviews of the Contractor's procedures and practices with respect to DBEs which the Administration Representative may from time to time conduct.

12. Bidder DBE Modifications

During the life of the Contract, all plans to modify the approved DBE participation program will require the approval of the Administrator or his authorized representative. This shall include any changes to the items of work to be sublet or materials and services to be obtained which differ for those in the original DBE participation program. Any such request for revisions shall be directed to the appropriate District Engineer for their disposition.

C. RECORDS AND REPORTS

1. The Contractor shall keep such records as are necessary to determine compliance with its Minority Business Enterprise utilization obligations. The records kept by the Contractor shall be designed to indicate:
 - a. The name of disadvantaged and non-disadvantaged subcontractors and suppliers, the type of work materials or services being performed on or incorporated in this project, and the monetary value of such work materials or services.
 - b. Documentation of all correspondence, contacts, telephone calls, etc., to obtain the services of disadvantaged business enterprises on this project.



CONTRACT PROVISIONS
DBE FOR FEDERAL-AID CONTRACTS

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- c. The progress and efforts made in seeking out disadvantaged contractor organizations and individual disadvantaged contractors for work on this project.
 - 2. Information required to be submitted for Federally Assisted contracts in accordance with 49 CFR Part 26:
 - a. All bidders (not only the apparent successful bidder) shall provide the following information:
 - (1) The age of the bidding firm; and
 - (2) The annual gross receipts of the bidding firm.
 - b. All bidders (not only the apparent successful bidder) shall provide the following information for each firm quoting or considered as subcontractors:
 - (1) The name of firm; and
 - (2) The address of firm.
 - c. The Administration will contact each of the firms quoting or considered as subcontractors to obtain:
 - (1) The age of the firm; and
 - (2) The annual gross receipts of the firm

If this information already has been gathered by the Administration on a firm and it is current, it will not be requested.

- 3. The Contractor shall submit reports on a monthly basis of those contracts and other business transactions executed with disadvantaged business enterprises with respect to the records referred to in Subparagraph 1.a above, in such form, manner, and content as prescribed by the Administration. The reports shall be due monthly on the 15th calendar day of each month. If the Contractor cannot submit their report on time, they shall notify the Administration's Representative and request additional time to submit the report. Failure of the Contractor to report in a timely manner may result in a finding of noncompliance. Additional reports may be required by the Administration upon written request.
 - 4. To ensure compliance with the certified DBE contract participation goals, the Contractor shall:
 - a. Submit monthly, a report listing unpaid invoices, over 30 days, from all certified DBE subcontractors and the reason payment has not been made;
 - b. Include in its agreement with certified DBE subcontractors a requirement that the DBE subcontractors are to submit monthly to the Administration, a report identifying the prime Contractor and listing the following:
 - 1. Payment received from the Contractor in the preceding 30 days; and



CONTRACT PROVISIONS

DBE FOR FEDERAL-AID CONTRACTS

2. Invoices for which the subcontractor has not been paid.
5. All such records shall be retained for a period of three years following acceptance of final payment and shall be available for inspection by the U.S. Department of Transportation, the Maryland Department of Transportation, and the Administration.

D. ADMINISTRATIVE PROCEDURES FOR ENFORCEMENT

1. Whenever the Administration believes the prime Contractor or any subcontractor may not be operating in compliance with the terms of these provisions, the Administration Representative will conduct an investigation. If the Administration Representative finds the prime Contractor or any subcontractor not in compliance with these provisions, he will make a report of non-compliance and notify such Contractor in writing of the steps that will, in the judgment of the Administration, bring the Contractor into compliance. If the Contractor fails or refuses to comply fully with such steps, the Administration Representative will make a final report of noncompliance to the Administrator, who may direct the imposition of one or more of the sanctions listed below:
 - a. Suspension of work on a project, pending correction;
 - b. Withholding payment or a percentage thereof, pending correction;
 - c. Referral of DBE/MBE to MDOT Office of MBE for review for decertification or minority business fraud investigation;
 - d. Referral to MDOT Office of MBE for review/referral to the Attorney General's Office for review for initiation of debarment;
 - e. Referral to the Attorney General's Office for review for debarment or for criminal prosecution through the MDOT Office of General Counsel; or
 - f. Any other action as appropriate.

The Administrator will determine which sanction(s) should be imposed in order to promote the purpose of the MDOT DBE/MBE Program.

2. If the documents used to determine the status of a DBE contain false, misleading, or misrepresenting information, the matter may be referred to the MDOT Office of MBE for appropriate action.
3. Loss of DBE Certification
 - a. When a prime Contractor has made a commitment to use a DBE who has lost its certification but the subcontract has not been executed prior to the notice of loss of certification, the prime Contractor is required to obtain an eligible, certified DBE for the contract or demonstrate to MDOT that it has made a good faith effort to do so.
 - b. When a prime Contractor has executed a contract with a DBE subcontractor before the notice of loss of certification, the prime Contractor may continue to use the firm on the contract and may continue to receive credit towards its DBE goal, i.e., contract goal, for the work of that subcontractor.



CONTRACT PROVISIONS

DBE FOR FEDERAL-AID CONTRACTS

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- c. The work carried out by a DBE Prime Contractor would be counted by MDOT up to the loss of certification. The work performed after the loss of certification would not be considered DBE participation.
- d. When a DBE subcontractor has lost its certification, MDOT may not continue to count the DBE participation which takes place after the loss of certification as DBE work when counting participation towards the overall goal of the modal administration or the Department.
- e. If a DBEs loss of certification is the result of exceeding the size standards while performing on a contract, the DBE participation may be counted for both the contract goal and the overall goal.

E. SUBCONTRACTING.

Subcontracting by the Prime Contractor. Form B Request for Approval of Subcontractor shall be used by the Prime Contractor to request approval of a Subcontractor and also to ensure that a formal Subcontract has been or will be written and kept on file by the Prime Contractor. Completion and submittal of the form by the Prime Contractor acknowledges that the Administration's Contracting Officer may require the submission of the written Subcontract for review by the Administration and/or FHWA.

Lower Tier Subcontracting by an Approved Subcontractor. Form B Subcontractor's Request for Approval of Lower Tier Subcontractor shall be used by an Approved Subcontractor to request approval of a Lower Tier Subcontractor and also to ensure that a formal Subcontract has been or will be written and kept on file by the Subcontractor. Completion and submittal of the form by the Subcontractor acknowledges that the Administration's Contracting Officer may require the submission of the written Subcontract for review by the Administration and/or FHWA.

Form Acquisitions. Maryland State Highway Administration Form B may be acquired through the Administration's Contracts Award Team or District Office. All questions should be directed to the Office of Construction, Contracts Award Team.

It is the Administration's intention to randomly select during each calendar quarter a representative sample of written Subcontracts for review. This review will be conducted by the Office of Construction's Contracts Award Team.



CONTRACT PROVISIONS
MBE/DBE COMPLIANCE FIELD MEETING

MBE/DBE COMPLIANCE FIELD MEETING

A MBE/DBE compliance Field Meeting will be conducted to review the responsibilities of the Administration and the Contractor's personnel relative to MBE/DBE Compliance and documentation. The meeting will be held within two weeks after starting work on the project.

The Construction Project Engineer, who will notify the following of the date, time and location, will arrange the meeting. At least one week advanced notice will be required.

(a) City Representatives.

- (1) Director, Office of Equal Opportunity or Designee
- (2) Equal Opportunity Officer
- (3) Regional Constructional Engineer
- (4) Construction Project Engineer
- (5) Construction Inspection Division Inspector

(b) Contract Representatives.

- (1) Superintendent - Prime Contractor
- (2) Equal Opportunity Officer - Prime Contractor
- (3) Owner/Superintendent/Foreman MBE/ DBE - Subcontractor

The Construction Project Engineer and Equal Opportunity Representative will jointly conduct the meeting. The Contractor shall notify the appropriate subcontractors and ensure their attendance.



CONTRACT PROVISIONS
TRAFFIC CONTROL PLAN CERTIFICATION

1 of 1

TRAFFIC CONTROL PLAN CERTIFICATION FOR DESIGN-BUILD

PRIOR TO THE COMMENCEMENT OF WORK ON THIS PROJECT, THE SUCCESSFUL BIDDER WILL BE REQUIRED TO COMPLETE A TRAFFIC CONTROL PLAN CERTIFICATION, CONTAINING THE INFORMATION SHOWN BELOW. THE CERTIFICATION FORM WILL BE PROVIDED TO THE SUCCESSFUL BIDDER UPON AWARD OF THE CONTRACT.

The Administration's Traffic Control Plan (TCP) has been reviewed and the following course of action shall be followed:

Option 1 See Note Below

The TCP is accepted and shall be used on this project.

Option 2 See Note Below

The TCP is accepted; however, revisions and/or additions shall be submitted for approval in conformance with the Administration's Specifications 104.01.

Option 3

The TCP is not accepted and revision shall be submitted for approval in accordance with the Administration's Specifications 104.01.

It is understood that the effective implementation of the approved TCP is the responsibility of the Contractor. Minor modifications may be made by the Traffic Manager if field conditions warrant and prior concurrence is obtained from the Engineer. Significant changes to the TCP will be submitted to the Engineer in writing, for approval, in conformance with the Administration's Specifications 104.01.

(DATE)

(SIGNATURE)

(PRINT SIGNATURE)

(TITLE)

Note: Option 1 and 2 shall not be used on this project.
This is a Design-build project and the Design-Build Team must prepare a TCP based on the requirements in the Administrations Specifications 104.01.

CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS

1 of 4

PREVAILING WAGE
INSTRUCTIONS FOR THE CONTRACTOR

PAYROLLS.

Non-Federally Funded Contracts. The Division of Labor and Industry, Prevailing Wage Unit is requiring that all certified payroll records be submitted electronically. For instructions on how to register and submit go online to www.dllr.state.md.us/prevwage and follow the instructions for registering. The regulation addressing this change can be found at COMAR 21.11.11.02. For Non-Federally funded projects, which include prevailing wage rates, the prime Contractor and each subcontractor, shall submit the certified payroll electronically and provide one hard copy to the Project Engineer. All wages shall be paid in conformance with the State Finance and Procurement Article, Section 17-201-17-226 of the Annotated Code of Maryland and the Fair Labor Standards Amendments of 1974 (P.L. 93259). If the award amount of a Non-Federally funded job is less than \$500,000, the project will be exempt from prevailing wage requirements.

A review has been made of the wage conditions in the locality and, based on the information available, the wage rates and fringe payments listed are determined by the Commissioner of the Department of Labor and Industry to be prevailing for the Contract for the described classes of labor in conformance with the law. It shall be the responsibility of the Contractor to fully comply with the law and to contact the Office of the Commissioner of Labor and Industry for interpretation of the provisions of the law.

Federally Funded Contracts. For Federally funded projects, the prime Contractor and each subcontractor shall submit one copy of the certified payroll to the Project Engineer.

General Requirements for Federally and Non-Federally Funded Contracts. All payrolls are subject to the following requirements:

- (a) All payrolls shall be numbered, beginning at No. 1, and consecutively numbered through the end of the Contract.
- (b) Contract and FAP numbers shall be shown on all payrolls (as applicable).
- (c) All payroll submissions shall include:
 - (1) Federally Funded – employees’ full name, classification, and Individual Identifying Number (IIN) e.g. (last four digits of social security number). Refer to FHWA 1273 (IV),(3),(b)1) for further requirements related to weekly payrolls.
 - (2) Non-Federally Funded – employees’ full name, classification, address and social security number.

CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS

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- (d) All payrolls shall show the employee's basic hourly wage rate, overtime rate (if applicable), and the number of hours worked (tabulated both daily and weekly).
- (e) When fringe benefits are required, indicate separately the amount of employer contributions to fringe benefit funds and/or programs. The fringe benefits shall be individually identified, but may be tabulated on a separate sheet. When required fringe benefits are paid in cash, add the required fringe benefit amount to the basic hourly rate to obtain the total prevailing wage rate for the employee.
- (f) The employee's net pay and the itemized deductions shall be included in all payrolls.
- (g) A Contractor may make deductions that are required by law or required by a collective bargaining agreement (between the Contractor and a bona fide labor organization). Deductions are also permitted if they are identified in a written agreement between the employee and employer that was made at the beginning of employment, provided that the Contractor presents the agreement to the Administration before the employee begins working on the Contract. Each payroll shall also include the U.S. Department of Labor and Hour Public Contracts Division Statement of Compliance Form WH-347 (or its equivalent), signed by an appropriate official of the Contractor/subcontractor. The Contractor's name, address, and telephone number shall also be shown.
- (h) On Non-Federally funded projects, all apprentices shall be registered with the Maryland Apprenticeship and Training Council.
- (i) Contractors employing a classification of worker for which a wage rate was not included on the original wage decision, shall submit to either the Wage and Hour Team (Federally Funded) or Department of Labor and Licensing (DLLR), (Non-Federally Funded), a request for an additional classification and rate prior to the employee's employment at the project.
- (j) Payrolls for Non-Federally Funded projects shall be submitted within 14 calendar days after the end of each payroll period.
- (k) Payrolls for Federally Funded projects shall be submitted within 7 calendar days after the end of each payroll period.
- (l) Contractors and Subcontractors are required to maintain complete social security numbers and home addresses for employees. Government agencies are entitled to request or review all relevant payroll information, including social security numbers and addresses of employees. Contractors and Subcontractors are required to provide such information upon request.

CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS

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OVERTIME.

Non-Federally Funded Contracts. Overtime rates shall be paid by the prime Contractors and subcontractors under their Contracts and agreements with their employees, which in no event shall be less than time and a half the prevailing hourly rate of wages for all hours worked in excess of ten hours in any one calendar day or forty hours in any one calendar week and work performed on Sundays and legal holidays.

Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

Federally Funded Contracts. Overtime rates shall be paid as specified in Form FHWA 1273. Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

PENALTIES.

Non-Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance, pending receipt of the records. The Contractor shall be liable to the Administration for liquidated damages in the amount of \$10.00 for each calendar day the records are late.

The Contractor shall be liable to the Administration for liquidated damages in the amount of \$20.00 for each day that an employee is paid less than the prevailing wage.

Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance pending receipt of the records.

ADDITIONAL CLASSIFICATIONS.

Federally Funded Contracts. If the wage determination lacks a necessary classification the Prime Contractor is responsible to submit the request for the additional classification, with a proposed rate, to the State Highway Administration's Wage and Hour Team. The request is to include a copy of the projects wage determination.

Non-Federally Funded Contracts. If the wage determination lacks a necessary classification the Prime Contractor is responsible to submit the request for the additional classification, with a proposed rate, to the Department of Labor and Licensing (DLLR).

F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317

CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS

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INQUIRIES.

Request for information or questions shall be addressed to:

Wage Commission
10 N. Calvert Street, Room 915
Baltimore, MD 21202
Telephone: 410-396-4835
Fax: 410-396-8271

or

Baltimore Department of Transportation
Transportation Engineering and Construction Division
Wage and Hour Team
417 E. Fayette Street
Baltimore, MD 21202
Telephone: 410-396-6930
Fax: 410-547-8276

NOTICE TO BIDDERS

Schedules for Minimum Hourly Wages

The Bidder is hereby notified that all minimum hourly wage rates of the Mayor and City Council of Baltimore (Classification No. 2) and the United States Department of Labor Wage Determinations shall be in force on all Federally funded projects. However, if there is a conflict between the City and Federal wages, the highest wage rate shall prevail.

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CLASSIFICATION NO. 2

The following minimum hourly wage rates shall apply on all construction contracts in excess of Five Thousand Dollars (\$5,000) when such contracts involve work on highways and streets; and said work includes paving, repaving, construction and complete reconstruction. This classification also applies to repair, renovation or construction and reconstruction of viaducts and bridges predominately over land.

<u>JOURNEYMEN</u>	<u>HOURLY RATE</u>	<u>FRINGE BENEFITS</u>	<u>TOTAL</u>
Bricklayers	\$15.95	\$ 3.40	\$19.35
Carpenters/Piledriver	21.20	6.40	27.60
Concrete Masons (Finisher)	21.90	6.35	28.25
Electricians	18.20	4.725	22.925
Ironworkers			
Structural & Reinforcing	26.88	17.24	44.12
Fence Erectors	26.13	16.94	43.07
Laborer			
General Laborer: Flagman, Dumpmen, Spotters, Landscapers, Mulchers, Chain/Rodman	15.32	5.86	21.18
Construction Laborers: All Laborers Not Otherwise Classified	16.45	5.86	22.31
Semi-Skilled Laborers: Form Setter	16.83	5.86	22.69
Skilled Laborer: Concrete Surfacer	17.44	5.86	23.30
Painters			
Spray, Structural Steel, Steam Cleaning and Sandblasting	31.86	8.90	40.76
<u>POWER EQUIPMENT OPERATORS</u>			
<u>GROUP IA:</u> Cranes, gradalls, graders, long and ultra high reach excavators, excavators (over 120,000 lbs).	26.75	11.80	38.55
<u>GROUP I:</u> Excavators (other than 120,000 lbs. and mini excavators), boom trucks, challenger type equipment, bull dozers (regardless of sizes), batch plants, John Deere and case type loader backhoes (regardless of size), front end loaders (1 ¼ yards and over), batch plants, concrete mixing plants, concrete pavers, curb and gutter machines, concrete pumps, drill rigs, hoists, standard gauge locomotive, sub- grader, trenching machine, scrapers (regardless of size), tunnel mucking machines, compactor with attachments, milling machines, repair mechanics and welders.	25.75	11.80	37.55

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<u>JOURNEYMEN</u>	<u>HOURLY RATE</u>	<u>FRINGE BENEFITS</u>	<u>TOTAL</u>
GROUP II: Fuel/grease truck, power roller, mini-excavators, skid steer (with attachments), asphalt spreader, guard rail post pounder, concrete mixer (with slip), concrete spreader, ditch witch type trencher, narrow gauge locomotive, stone crusher, stone spreader, trucks (on and off road), snooper truck, bull float, power sweepers, front end loaders (1 yard and under), and articulating trucks.	\$24.85	\$11.80	\$36.65
GROUP III: Compressors, conveyors, firemen, grout pump, high-lift, fork lifts, light plants, Mighty Midget with compressor, space heaters, welding machines, well-drill, well-point systems, and all oilers.	22.79	11.80	34.59
Truck Drivers			
Dump Truck (Site Only)	14.44	4.60	19.04
Welder	Receives Rate For Craft Involved.		

APPRENTICESHIP RATES
PERCENTAGE OF JOURNEYMAN'S HOURLY RATE
PLUS FULL JOURNEYMAN'S FRINGE BENEFITS

CARPENTERS

First year	50
Second year	60
Third year	70
Fourth year	85

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CEMENT FINISHERS

First 500 hours	50
Second 500 hours	55
Third 500 hours	60
Fourth 500 hours	65
Fifth 500 hours	70
Sixth 500 hours	75
Seventh 500 hours	80
Eighth 500 hours	90

ELECTRICIANS

First 6 months	35
Second 6 months	40
Second year	45
Third year	55
Fourth year	65
Fifth year	75

IRONWORKERS

First 1,000 hours	50
Second 1,000 hours	55
Third 1,000 hours	60
Fourth 1,000 hours	70
Fifth 1,000 hours	80
Sixth 1,000 hours	90

PAINTERS

First 1,000 hours	60
Second 1,000 hours	65
Third 1,000 hours	70
Fourth 1,000 hours	75
Fifth 1,000 hours	80
Sixth 1,000 hours	85

POWER EQUIPMENT OPERATORS

First period	65
Second period	75
Third period	80

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LABORER'S WORK

Laborers may not assist mechanics in the performance of mechanics' work, nor use tools peculiar to established trades. Their work should be confined to the following manual tasks:

1. Digging and filling holes and trenches.
2. Loading, unloading and stockpiling materials.
3. Cleaning and sweeping.
4. Driving stakes.
5. Placing concrete and asphalt.
6. Stripping forms.
7. Ripping out material which is to be discarded.
8. Clearing and grubbing.

The above definition is to preclude inadvertent misclassification of laborers.

APPROVED BY BOARD OF ESTIMATES


Clerk to the Board of Estimates

DEC 12 2012

General Decision Number: MD130066 01/04/2013 MD66

Superseded General Decision Number: MD20120090

State: Maryland

Construction Type: Highway

County: Baltimore City County in Maryland.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Modification Number Publication Date

0 01/04/2013

SUMD2012-008 07/13/2012

	Rates	Fringes
CARPENTER.....	\$ 21.80	8.00
CEMENT MASON/CONCRETE FINISHER.....	\$ 23.30	7.00
ELECTRICIAN.....	\$ 34.60	15.72
IRONWORKER, REINFORCING.....	\$ 26.38	16.94
IRONWORKER.....	\$ 26.38	16.94
LABORER: Common or General.....	\$ 16.61	5.85
LABORER: Flagger.....	\$ 18.09	14.30
OPERATOR: Asphalt Spreader.....	\$ 18.32	7.10
OPERATOR: Backhoe.....	\$ 24.61	11.55
OPERATOR: Bobcat/Skid		
Steer/Skid Loader.....	\$ 23.47	11.55
OPERATOR: Boom.....	\$ 24.74	7.92
OPERATOR: Broom.....	\$ 21.85	8.70
OPERATOR: Bulldozer.....	\$ 25.43	11.55
OPERATOR: Crane.....	\$ 28.55	14.55
OPERATOR: Excavator.....	\$ 25.29	11.69
OPERATOR: Gradall.....	\$ 26.30	11.55
OPERATOR: Grader/Blade.....	\$ 26.30	11.55

OPERATOR: Loader.....	\$ 25.04	11.55
	Rates	Fringes
OPERATOR: Mechanic.....	\$ 25.86	11.55
OPERATOR: Milling Machine.....	\$ 25.30	11.55
OPERATOR: Paver, Includes		
Asphalt.....	\$ 24.40	11.55
OPERATOR: Piledriver.....	\$ 24.94	8.18
OPERATOR: Screed.....	\$ 16.48	4.17
OPERATOR: Sweeper.....	\$ 24.35	11.55
OPERATOR: Roller, Includes		
Asphalt.....	\$ 24.40	11.55
PAINTER.....	\$ 31.56	8.47
TRUCK DRIVER: Dump Truck.....	\$ 15.65	2.42
TRUCK DRIVER: Lowboy Truck.....	\$ 21.73	7.03
TRUCK DRIVER: TackTruck.....	\$ 21.44	7.03
TRUCK DRIVER: Tractor Haul		
Truck.....	\$ 23.49	0.00
TRUCK DRIVER: Water Truck.....	\$ 24.05	9.16

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005

07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates. 0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION



CONTRACT PROVISIONS

NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

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NOTICE OF ACTIONS REQUIRED FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidders attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as noted in Appendix A and B:

These goals are applicable to all the Contractors' construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this notification. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is noted in Appendix B.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (Executive Order 11246)

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;



CONTRACT PROVISIONS

NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

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- c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
- d. "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and,
 - (iv) American Indians or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
- 2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
- 3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
- 4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7.a through 7.p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goal in each craft during the period specified.
- 5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.



CONTRACT PROVISIONS

NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

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6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with reason therefore, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7.b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the



CONTRACT PROVISIONS

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- policy with all management personnel and with all minority and female employees at least once a year and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g.** Review, at least annually, the company's EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
 - h.** Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
 - i.** Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
 - j.** Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
 - k.** Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l.** Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m.** Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to insure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n.** Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o.** Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p.** Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
- 8.** Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7.a through 7.p). The efforts of a contractor



CONTRACT PROVISIONS

NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

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association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7.a through 7.p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractors shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at



CONTRACT PROVISIONS

NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

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which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

- 15.** Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents

(a.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

- 16.** The Contractor will receive at the time of Award Federal Form CC-257 for his use in reporting monthly the Affirmative Actions for minority and female which he has employed.



CONTRACT PROVISIONS
NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goals are applicable to the Contractor's aggregate on-site construction work force whether or not part of that work force is performing on a Federal or federally assisted construction contract or subcontract.

AREA COVERED: Nationwide

GOALS AND TIMETABLES

Timetable	Goals (percent)
From April 1, 1978 until March 31, 1979.....	3.1
From April 1, 1979 until March 31, 1980.....	5.0
From April 1, 1980 until further notice.....	6.9



CONTRACT PROVISIONS

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APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on-site construction work force, regardless of whether or not part of that work force is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work such contractors are required to comply with the applicable SMSA or EA goal contained in this appendix B-80.

State	Goal (percent)
Maryland:	
019 Baltimore, MD:	
SMSA Counties:	
0720 Baltimore, MD.....	23.0
MD Anne Arundel; MD Baltimore;	
MD Carroll; MD Harford;	
MD Howard; MD Baltimore City	
Non-SMSA Counties.....	23.6
MD Caroline; MD Dorchester;	
MD Kent; MD Queen Annes;	
MD Somerset; MD Talbot;	
MD Wicomico; MD Worcester	
Washington, DC:	
020 Washington, DC:	
SMSA Counties:	
8840 Washington, DC.....	28.0
MD Charles; MD Montgomery;	
MD Prince Georges	
Non-SMSA Counties.....	25.2
MD Calvert; MD Frederick	
MD St. Marys; MD Washington	
Pennsylvania	
Non-SMSA Counties.....	4.8
MD Allegany; MD Garrett	



CONTRACT PROVISIONS
TRAINING PROVISIONS

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TRAINING PROVISIONS

As part of the Contract's Equal Employment Opportunity Affirmative Action Program, on-the-job training shall be provided as follows:

The on-the-job training shall be aimed at developing full journeypersons in the type of trade or job classification involved. On this Contract X persons will be trained.

In the event that a Contractor subcontracts a portion of the Contract work, the Contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor, however, the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Provision. The Contractor shall also insure that this training Provision is physically included in each subcontract to insure that the workforce utilized by the subcontractor meet the goals for minority and female employment and training. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees in each classification shall be distributed among the work classifications on the basis of the Contractor's needs, minority and women employment goals specified for each trade in the Contract Provision, and the reasonable area of recruitment.

Prior to beginning construction, the Contractor shall submit to the City for approval a Manpower and Training Utilization (MTU) Schedule no later than at the preconstruction meeting.

The MTU schedule shall include:

1. The proposed training programs.
2. The number of trainees to be trained in each classification.
3. Anticipated starting and ending dates for training in each classification.

No Contract work may be undertaken until the City has accepted the schedule.

If the submitted training programs fail to meet the requirements as defined within these Provisions, the City will withhold one percent of the total category code one pay items from the payment due the Contractor. The Contractor shall submit a revised Manpower and Training Utilization Schedule when major changes in the Contract work schedule occur that substantially affect the previously submitted schedule.

The Contractor shall be credited for each trainee employee who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for the hourly cost of the trainee as specified in the schedule of prices.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Provision. The purpose for this objective is to insure a pool of qualified minorities and women to replace those journeypersons who, in the natural course of events will leave the workforce. The program will also provide opportunities to the minorities and women trainees in geographic areas where shortages in minority and women journeypersons are prevalent and recognized due to the Contractor's inability to meet the Equal Employment Opportunity goals specified in this Contract.



CONTRACT PROVISIONS
TRAINING PROVISIONS

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The training requirements of this Training Provision are not intended nor shall they be used to discriminate against any applicant for training, whether a member of a protected class or not. It is the Contractor's responsibility to demonstrate good faith efforts to ensure an adequate workforce representation of minorities and women in all job classifications on this Contract. Therefore, the Contractor shall consider the employment Contract goals set for minorities and females when enrolling trainees. The Contractor's utilization of the on-the-job training goals will be weighed when an Equal Employment Opportunity workforce compliance determination is made.

The Contractor shall make every effort to enroll minority and women trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minorities and women to the extent that these persons are available within a reasonable area of recruitment).

No employee shall be employed as a trainee in any classification which the individual has successfully completed a training program leading to journeyperson status or has been employed as a journeyperson. This includes a person gainfully employed as a journeyperson by virtue of informal on-the-job training. The Contractor should satisfy this requirement by including appropriate questions in the employee job application or by other suitable means. Regardless of the method used, the Contractor's records shall document the findings in each case. In the case of apprentices, evidence of indentureship and registration of the approved apprenticeship program shall be included in the Contractor's records.

The minimum length and type of training and rate for each classification shall be specified in the training program by the Contractor and approved by the City.

The City will approve any program specified in the City's On-The-Job Training Manual. The City will consider other programs if it is reasonably calculated that the programs conform to the Equal Employment Opportunity obligations of the Contract and will qualify the average trainee for journeyperson status in the specified classification by the end of the training period. Apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, and training programs approved by, but not necessarily sponsored by the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training will also be acceptable, provided that the program being offered is administered in a manner consistent with the Equal Employment obligation of Federal-aid highway construction Contracts and meets the minimum requirements of this Training Provision.

Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Unless otherwise specified, the Contractor will be reimbursed 80 cents per hour of training given an employee on this Contract in conformance with an approved training program. As approved by the Engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the Contractor received additional training program funds from other sources, provided that the other sources do not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above will only be made to the Contractor where the Contractor does one or more of the following and the trainees are concurrently employed on a Federal-aid project:



CONTRACT PROVISIONS
TRAINING PROVISIONS

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1. Contributes to the cost of the training.
2. Provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment will be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman is caused by the Contractor and evidences a lack of "good faith" on the part of the Contractor in meeting the requirements of this Training Provision. It is normally expected that a trainee will begin training on the project as soon as feasible after the start of work utilizing the skill involved and remain on the project as long as training opportunities exist in the work classification or until the program is completed. It is not required that all trainees be on board for the entire length of the Contract. A Contractor will have fulfilled their responsibilities under this Training Provision when:

1. Systematic and direct recruitment likely to yield qualified minority and women applicants is conducted through:
 - a. Public and private referral sources.
 - b. Advising the existing workforce of training opportunities.
 - c. Unions (if applicable).
2. Acceptable training has been provided to trainees enrolled in the program.
3. The number of specified trainees have completed the minimum hours required in an approved training program.
4. Trainees completing approved programs are retained in the workforce as journeymen.

The Contractor shall pay the trainees at least 60 percent of the appropriate minimum journeyman's hourly rate plus the full fringe benefits specified in the Contract for the first half of the training period, 75 percent for the third quarter of the training period plus full fringe benefits, and 90 percent for the last quarter of the training period plus full fringe benefits. However, in no case shall the total hourly rate be less than the U.S. Department of Labor's unskilled laborer wage rate for the project. In addition, all trainees shall be identified as such on the certified payroll.

The Contractor shall furnish the trainee a copy of the approved training program in which the trainee is enrolled. The Contractor shall provide each trainee with a certificate showing the type and length of training satisfactorily completed. The Contractor shall submit a Certificate to the trainee in the following instances:

1. Certificate of Completion when a trainee completes the total number of hours required to complete a training program.
2. Certificate of Training when a trainee does not totally complete the required program hours.

The Contractor shall provide for the maintenance of records and furnish periodic reports inclusive of the City's Contractor's Semiannual Training Reports, documenting his performance under this Training Provision. The Semiannual Training Report is to be submitted by the 10th of the month following the reporting period (July 10 and January 10).



CONTRACT PROVISIONS
TRAINING PROVISIONS

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If the Contractor fails to fully comply with these Training Provisions, the City's Representative will make a final report of non compliance to the Administrator, who may direct the imposition of one or both of the sanctions listed below:

1. Withholding a percentage of the progress payment.
2. Other action appropriate and/or within the discretion of the Administrator.



CONTRACT PROVISIONS
HIGH VISIBILITY SAFETY APPAREL POLICY

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NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

HIGH VISIBILITY SAFETY APPAREL POLICY

BACKGROUND. Research indicates that high visibility garments have a significant impact on the safety of employees who work on highways and rights-of-way. In addition, high visibility garments may help to prevent injuries and accidents and to make highway workers more visible to the motoring public, which ultimately improves traffic safety.

STATEMENT OF POLICY.

- (a) The High Visibility Safety Apparel Policy provides a standardized apparel program.
- (b) The program seeks to improve the visibility of all persons who work on Administration highways and rights-of-way.
- (c) All apparel shall contain the appropriate class identification label.
- (d) Compliance with this policy is retroactive and becomes effective immediately. All affected employees shall receive high visibility apparel awareness training.

APPLICABILITY. This policy applies to all Administration employees and all other persons who work on Administration highways and rights-of-way. All workers shall wear, at a minimum, Class 2 ANSI/ISEA 107/2004 apparel.

- (a) For Administration employees, this apparel shall have a fluorescent yellow-green background material color and be the outermost garment worn.
- (b) Retro-reflective material color for Administration employee apparel shall be silver or white and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment. The retro-reflective material may be contrasted by fluorescent orange background material not exceeding one and one half inches on either side of the retro-reflective material.
- (c) For non-Administration employees, this apparel shall be either fluorescent orange-red or fluorescent yellow-green background material color and be the outermost garment worn.
- (d) Retro-reflective material color for non-Administration employee apparel shall either be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment.



CONTRACT PROVISIONS
HIGH VISIBILITY SAFETY APPAREL POLICY

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REFERENCES.

- (a) ANSI/ISEA 107/2004 standard – American National Safety Institute/International Safety Equipment Association
- (b) MUTCD 2003 – Manual for Uniform Traffic Control Devices - Sections 6D.03B and 6E.02
- (c) Visibility Research – The VCTR 1989 report concludes that fluorescent colors, when compared with non-fluorescent colors, enhance the daytime conspicuity of worker clothing.

DEFINITIONS.

- (a) Apparel – The outermost high-visibility garment worn by employees who work on Administration highways and rights-of-way.
- (b) Highways – All roads owned by the Maryland Department of Transportation and maintained by the Administration.
- (c) High Visibility – The ability for workers to be distinguishable as human forms to be seen, day and night, at distances that allow equipment operators and motorists to see, recognize, and respond.

**CONTRACT PROVISIONS
SPECIFICATIONS**

CONTRACT NO. IFB_ContractNo

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SPECIFICATIONS

All work on this project shall conform to the Maryland Department of Transportation, State Highway Administration's Specifications entitled, "Standard Specifications for Construction and Materials" dated July 2008 revisions thereof, or additions thereto, and the Special Provisions included in this Invitation for Bids.

In the following sections of the "Standard Specifications for Construction and Materials." Dated July 2008, the word "Engineer" shall be taken to mean "Design-Build Engineer."

Category 100 Preliminary

Section 101.03.02	¶ 1, Line 1
Section 101.03.04	¶ 1, Line 2
Section 104.05.04	¶ 1, Line 6
Section 104.08.03	¶ 5, Line 2
Section 104.11.03	¶ 2, Line 5
Section 107.03.01	¶ 1, Line 1
Section 107.03.01	¶ 8, Line 1
Section 107.03.01	¶ 9, Line 2
Section 107.03.03	¶ 1, Line 2
Section 107.03.05	¶ 1, Line 4, 13
Section 107.03.06	¶ 7, Line 2

Category 200 Grading

Section 201.03.04	¶ 6, Line 2
Section 201.03.06	¶ 1, Line 4
Section 201.03.10	¶ 1, Line 5
Section 204.02.03	¶ 1, Line 1
Section 205.03	¶ 2, Line 2
Section 206.04.02	¶ 5, Line 2

Category 300 Drainage

Section 301.03	¶ 1, Line 2
Section 303.03.06	¶ 1, Line 2
Section 306.03.03	¶ 1, Line 6
Section 306.03.04	¶ 4, Line 2
Section 306.04.03	¶ 1, Line 1
Section 309.03.07	¶ 1, Line 2
Section 310.03.02	¶ 1, Line 7, 8
Section 314.02.03	¶ 1, Line 6

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Category 400 Structures

Section 402.03.04	¶ 2, Line 2
Section 410.03.09	¶ 1, Line 6
Section 411.03	¶ 1, Line 1, 7
Section 411.03	¶ 5, Line 1
Section 430.03.14	¶ 1, Line 6

Category 500 Paving

Section 507.03.05	¶ 5, Line 2
Section 507.03.08	¶ 1, Line 2
Section 522.03	¶ 1, Line 2

Category 600 Shoulders

Section 602.01	¶ 1, Line 4
Section 602.03.01	¶ 2, Line 7
Section 602.03.01	¶ 7, Line 3
Section 602.03.01	¶ 8, Line 3
Section 602.03.02	¶ 2, Line 3
Section 604.01	¶ 1, Line 3
Section 604.03.01	¶ 2, Line 4
Section 604.03.03	¶ 1, Line 4
Section 605.01	¶ 1, Line 3
Section 605.03.07	¶ 1, Line 10
Section 606.01	¶ 1, Line 3
Section 606.03.01	¶ 1, Line 7
Section 606.03.01	¶ 5, Line 3
Section 607.01	¶ 1, Line 3
Section 607.03.01	¶ 3, Line 3
Section 608.01	¶ 1, Line 3

Category 700 Landscaping

Section 701.01	¶ 1, Line 4
Section 701.03.01	¶ 2, Line 3, 6
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Section 705.01	¶ 1, Line 4
Section 706.01	¶ 1, Line 4
Section 707.01	¶ 1, Line 3
Section 708.01	¶ 1, Line 3
Section 709.01	¶ 1, Line 3

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Section 709.03.02	¶ 1, Line 3
Section 710.01	¶ 1, Line 4
Section 710.03.01	¶ 2, Line 4
Section 711.01	¶ 1, Line 4
Section 711.03.02	¶ 1, Line 3
Section 712.01	¶ 1, Line 4
Section 712.03.01	¶ 1, Line 2
Section 713.01	¶ 1, Line 5
Section 713.03.02	¶ 2, Line 2
Section 713.03.02	¶ 3, Line 1, 2, 8
Section 713.03.03	¶ 2, Line 1
Section 713.03.04	¶ 1, Line 3
Section 714.01	¶ 1, Line 2

Category 800 – Traffic

Section 801.01	¶ 1, Line 4
Section 804.03.03	¶ 1, Line 7
Section 804.03.03	¶ 2, Line 2
Section 810.03.04	¶ 1, Line 3

Category 900 – Materials

Section 902.11	¶ 6, Line 2
Section 910.02.02	¶ 2, Line 5
Section 910.02.03	¶ 1, Line 4
Section 915.01.06	¶ 1, Line 4, 7
Section 921.10	¶ 1, Line 3

SPECIAL PROVISIONS
PROJECT DESCRIPTION

F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317

PROJECT DESCRIPTION

Refer to TC Section 2.07.02, Project Description.

EMPLOYMENT AGENCY

Maryland Department of Human Resources is located at:

Talmadge Branch Building
1910 N. Broadway
Baltimore, Maryland 21213
Phone: (443) 423-6300

Saratoga State Center
311 W. Saratoga Street
Baltimore, Maryland 21201
Phone No. 410-767-7000

SPECIAL PROVISIONS
NOTICE TO CONTRACTOR

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NOTICE TO CONTRACTOR

PROJECT SCHEDULE. Section 109 shall only apply when a CPM Project Schedule item is included in the Schedule of Prices. Otherwise, all Project Schedules shall conform to Section 110.

NOTICE TO BIDDERS. The Proposal Form Packet in this Invitation for Bids requires the following information be submitted for the Bidder and each firm quoting or considered as subcontractors:

- (a) Name of firm.
- (b) Address of firm.
- (c) MBE, Non-MBE, DBE, or Non-DBE.
- (d) Age of firm.
- (e) Annual gross receipts per last calendar year.

Note that there are provisions for submitting copies for additional subcontractors, and that an “X” is required to indicate whether or not additional copies have been submitted.

AFFIRMATIVE ACTION PLAN (AAP) CONTRACT GOALS. In order to be in compliance with the revised MBE/DBE laws effective September 27, 2011 the bidder is required to complete the AAP information on pages 19, 20, 24, 25, 26 and 27 of 31 of the Contract Provisions, Proposal Form Packet—Federal, or complete the AAP information on pages 14, 15, 19, 20, 21, and 22 of 27 of the Contract Provisions, Proposal Form Packet—State, or complete the AAP information on pages 15, 16, 20, 21, 22, and 23 of 28 of the Contract Provisions, Proposal Form Packet—State Small Business Reserve Procurement. Failure to complete the information may be grounds for the bid to be declared non-responsive.

BOOK OF STANDARDS. Baltimore City, Detail Plates contained herein and/or State of Maryland, Department of Transportation, State Highway Administrations’ Standards for Highways and Incidental Structures, as called for or noted on the Plans or in the Special Provisions, shall be considered a part of the Contract Documents.

In any and all cases of conflict between the Standards and the Contract Documents, the Contract Documents shall govern but only to the extent of such conflict. Any reference in the contract Documents made to a Standard Number shall refer to the Book of Standards unless otherwise noted.

Copies of the Baltimore City Detail Plates which are applicable to this Contract are included herein.

REQUEST FOR INFORMATION. Refer to TC Section 2.08.02.

RIGHT-OF-WAY STATUS Where required to complete the scope of work for the project, the City will procure all necessary rights and deeds for access to and use of any property not owned by the Mayor and City Council or that is not located within the existing right-of-way or easements through the Baltimore City Department of Transportation. It is anticipated that any

SPECIAL PROVISIONS
NOTICE TO CONTRACTOR

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such right of way clearances will be obtained prior to the start of construction. The Contractor shall not proceed with work on private property until the City has completed its negotiations with the property holders.

REQUIRED PERMITS. Refer to TC Section 2.07.02.07 for permit information. All permits obtained by Baltimore City will be inserted here upon approval.

SPECIAL PROVISIONS
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SC-01 STAGING AREAS

Baltimore City Department of Transportation must approve all staging areas.

SC-02 NOISE REQUIREMENTS

The Contractor shall adhere to any City Noise requirements and Section 10.04-86 of the General Provisions or to Baltimore City Health Department Noise Control Ordinance No.108, whichever is more stringent. The use of all mechanical equipment will be prohibited between the hours of 11 PM and 7 AM.

SC-03 CITY WILL FURNISH NO MATERIALS

The City will furnish no material to the Contractor.

SC-04 PROTECTION OF EXISTING FEATURES

The Design-Builder shall take all necessary precautions to preserve all existing features outside of the limits of disturbance and shall restore to its pre-existing condition any area(s) damaged by his operations to the full satisfaction of the Engineer and the owner of the affected areas so damaged. Restoration of any areas damaged by the Design-Builder will be at his sole cost and expense.

SC-05 SALVAGEABLE MATERIALS

Existing granite curb, Belgian blocks, granite blocks and cobblestone removed from this project shall be salvaged and reused as required for landscaping. Those not to be reused shall be salvaged by the Design-Builder and delivered to the City's Maintenance Yard. The Design-Builder shall contact Brent Hooper 410-396-1113, forty-eight hours in advance of hauling to the location. Only the noted materials that are clean of any attached debris, or those without bituminous concrete debris attached, will be accepted. The noted material shall become property of the Department of Transportation Maintenance Division. The cost of the salvaging and hauling shall be incidental to the other items in the Contract.

SC-06 TRAFFIC SIGNAL CABLES AND EQUIPMENT

The Design-Builder is directed to protect and maintain service to the existing traffic poles, signal equipment and traffic signal control cables during roadway and utility construction. The Design-Builder will be responsible to reinstall these facilities if damaged at their own expense. The Design-Builder will be required to reinstall any traffic loop detectors that are affected by roadway, resurfacing, and sidewalk or utility construction.

The Design-Builder is required to contact Mr. Raj Sharma at 410.396.6892 and Mr. Glenn Michael at 410.396.9065, two weeks prior to construction and changes in signal operation. Contact Mr. Mike Harrington at 410.396.6892 for traffic signal timing related operation.

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SC-07 GENERAL ELECTRICAL WORK AND TESTING

1. This work shall consist of furnishing, installing, and testing of all applicable electrical items referred to in Category 800 items.
2. All materials and equipment installed as part of the permanent installation shall be new, UL listed, or labeled and shall conform to NFPA 70 (NEC), NESC, NEMA, IES, and local codes applicable to the area of installation.
3. Materials and equipment installed as part of the permanent installation shall also conform to AASHTO, ANSI, ASTM, EEI, IEEE and IPCEA codes applicable to the area of installation.
4. All installations shall conform to NFPA 70 (NEC), NESC, local utility company requirements, and State and local laws and ordinances governing the work. All the work shall be performed by or under the direct supervision of a licensed master electrician. The Design-Builder shall obtain and pay for all permits, licenses and inspection fees.
5. The Design-Builder shall supply all personnel and equipment required to successfully perform the following tests and shall furnish four certified copies of the complete test reports to Baltimore City.
6. Not less than 30 days prior to commencement of each required test, the Design-Builder shall submit to Baltimore City the types, styles or catalog numbers of all testing equipment to be used for the tests. A written certification shall be included stating when the testing equipment was last calibrated by a City approved testing agency. The calibration date shall be within 20 days of the date when the tests are to be performed. All tests are to be performed in the presence of Baltimore City representative.
 - (a) Any defects found in the completed materials installation and specified equipment performance or workmanship shall be repaired or replaced immediately at no cost to the City.

Ground resistance testing shall be conducted using a megger ground tester, using the null balance fall of potential method. Corrected readings greater than 25 ohms will not be accepted.

- (b) Circuit test to determine insulation resistance shall be performed on all cables of every circuit except those installed in lighting structures. The test shall conform to the City's testing requirements. Cable insulation resistance shall be a minimum of 10 megohms at 500 volts D.C. except loop detector wire and loop detector lead in shall have a minimum of 100 megohms at 500 volts D.C.

The Design-Builder shall demonstrate in a manner acceptable to Baltimore City that all conductors are continuous, free from short circuits and unspecified grounds, and that all circuits are properly connected as specified in the Contract Documents.

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- (c) A performance test using the design power source shall be conducted by the Design-Builder prior to acceptance. The electrical system, including automatic control equipment, shall be operated for 30 consecutive days without failure. If any component fails, it shall be immediately replaced and the test shall be continued. The Design-Builder shall record each fault, the method and date of correction of each, and the beginning and end of the 30-day test period. If more than 5 percent of any component fails during the test, the component shall be replaced and the 30-day test cycle for the entire system shall be restarted.
 - (d) An illumination test shall be conducted by the Design-Builder to determine the illumination characteristics of the roadway lighting installation. The test shall conform to procedures approved by the City.
- 7. The Design-Builder shall be responsible to maintain all new materials until satisfactorily tested and their operation accepted by Baltimore City.
 - 8. After completion of the project, the Design-Builder shall furnish to the City three (3) sets of green-lined drawings that show the exact location and sizes of all structures, cables, conduits, and manholes. One set shall be submitted to Baltimore City, Signal Engineering, and one set shall be submitted to the Street Lighting Section.

SC-08 STREET LIGHT CABLES

The Design-Builder's attention is directed to the fact that on these streets there is street light cable buried in the area. If the Design-Builder uncovers or damages a street cable or conduit during construction, the Design-Builder is required to immediately notify Street Lighting Maintenance, Engineering Section at (410) 396-1311 or (410) 396-4446 and BGE immediately. Street Lighting Maintenance would affect repairs or direct BGE to make safe conditions and/or replace cable prior to resuming construction. All such repairs shall be made at the Design-Builder's expense.

In areas the Design-Builder is to remove the footway where there is buried Street Light Cable, the Design-Builder is directed to notify BGE on 410-685-0123. BGE may elect to install new cable prior to the installation of the new footway.

The Design-Builder will be required to call BGE at least two (2) weeks in advance of the installation of new cable. The Design-Builder will be responsible for the cost of any repairs to the Street Light Cable which is damaged during construction operation except in the case where the Street Light Cable is directly encased in concrete curb and curb is to be excavated and repaired. The Design-Builder would be required to notify BGE immediately and allow BGE for reasonable time to make safe conditions and replace the cable.

Street lighting will be maintained throughout construction. In the event existing street lighting cannot be maintained or is interrupted because of the Design-Builder's activities (light poles knocked down, wires or cables inadvertently cut, etc.), the Design-Builder shall be required to

SPECIAL PROVISIONS
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provide temporary lighting and remove it after construction is complete or until permanent lighting is installed and operational.

The Design-Builder shall notify Baltimore City immediately of those situations where existing street lighting has been affected. The City Maintenance Section will effect repairs or direct the Design-Builder in the repair of the damage. The cost to make such repairs shall be borne by the Design-Builder.

SC-09 PUBLIC UTILITIES

Existing utilities have been generally located and shown on the Plans as they are believed to exist and have been determined with the best accuracy attainable from available record drawings and field surveys of visible surface features, and accessible vaults, manholes, inlets and associated structures. However, Baltimore City assumes no responsibility for the accuracy of said locations. The Design-Builder will be responsible for locating all existing utilities, and storm drain connections to the existing box culvert, etc. The Design-Builder shall also be responsible for coordinating his work with the work that others may be doing on utilities.

SC-10 MISS UTILITY

Before beginning any excavation, the Design-Builder shall give at least three (3) working days prior notice thereof, by contacting "MISS UTILITY" at 1.800.257.7777. The public service companies involved will thereafter mark the horizontal location of their underground facilities.

After the location marking has been performed by the public service companies and before beginning excavation operation, if the Design-Builder has reason to believe that a potential conflict may exist, he shall verify the actual location of the underground utilities by means of test pits. Prior to digging the test pits, the Design-Builder shall notify Baltimore City, who will advise the related utility owner.

SC-11 PROTECTION OF EXISTING STRUCTURES

Work in this contract includes open excavation adjacent to existing structures. Existing structures are not to be undermined or damaged. Use sheeting or any other means deemed appropriate to protect said structures in conformance with the contract Documents and as directed by Baltimore City. Existing structures include, but are not limited to, the following items:

1. Existing buildings in areas adjacent to and nearby the construction site.
2. Existing bridges, drains, and utilities, above, at, and below grade.

The cost of "Protection of Existing Structures" shall be included in the Design-Builder's lump-sum price for this Contract.

SPECIAL PROVISIONS
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SC-12 PARKING METERS

Existing parking meter heads will be removed by the City. The Design-Builder is required to notify the City at 410.396.7576, forty-eight (48) hours in advance of parking meter removal. The removal of the parking meter posts will not be measured but shall be included in and incidental to the pertinent excavation item.

SC-13 U.S. POSTAL SERVICE COLLECTION BOXES

The Design-Builder should be aware that there are U.S. Postal Service Collection boxes within the limits of construction which will need to be removed and replaced by the postal service in order to complete the work. The Design-Builder is required to notify Mr. William Neal of the U.S. Postal Service at 410.347.4259 at least one full week prior to removal. The Design-Builder must supply the collection box identification number and exact location in order to facilitate scheduling for removal.

SC-14 PAVEMENT MARKINGS ON ADJACENT ROADWAYS

In the event that the Design-Builder contributes to the deterioration of pavement markings on roadways adjacent to the project, Baltimore City may require the Design-Builder to provide pavement markings for the adjacent roadway.

The Design-Builder will be required to provide the markings in accordance with materials and construction methods approved by Baltimore City.

All materials, labor, equipment, testing, pavement preparations, and all other incidentals will not be measured for payment but shall be replaced at the Design-Builders expense.

SC-15 COOPERATION WITH MERCHANTS

The Design-Builder must cooperate at all times with the Merchants within the Project limits regarding all construction activities and must focus particular attention on providing and maintaining access for pedestrians, residents and property owners as well as to loading and unloading areas within the limits of construction at all times.

SC-16 ALARM SYSTEMS

The Design-Builder shall, through contacting the merchants, obtain a list of those Security Companies that are providing security service systems to the businesses within the project limits. The Design-Builder shall notify, prior to starting construction activities that are adjacent to or in front of these businesses, the respective security companies that provide the protection. In addition, the Design-Builder shall also notify the Fire and Police Departments in advance of all construction activities in any block and/or half block, so that they are alerted to the possibility of construction operating and/or unexpected utility cuts/failures that may activate existing alarm systems. Cost for this work to be included in the lump sum price for the Contract.

SPECIAL PROVISIONS
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SC-17 ABANDONED RAILROAD TRACK SYSTEMS

Track systems shown on the Conceptual Plans were derived from available information. It shall be the responsibility of the bidder during the preparation of his proposal to evaluate this information and conduct any investigations that he deems essential for the proper preparation of his bid.

Abandoned railroad track systems to be removed by the Design-Builder shall be understood to include but not necessarily be limited to, straight and curved track; switches and turn-outs; wooden, steel and concrete ties; yokes; earth, loose gravel, grouted gravel, and concrete ballast; miscellaneous metals including tie plates, fasteners, spikes, and tie rods; and grates, inlets and piping comprising track drainage systems.

The Design-Builder needs to be aware that existing wooden railroad ties may be contaminated with creosote and hence must be disposed of in accordance with all local, state and federal laws and regulations.

SC-18 GROUNDWATER

The reconstruction of Central Avenue will include the excavation and replacement of two concrete encased steel beam bridges. The prevailing groundwater elevations are generally located at or above the invert elevation of the existing storm drain. The Design-Builder is alerted for the need to include in their price proposal the following potential effects of the groundwater elevations and conditions, as stated in the Geotechnical Engineering Report, on the construction cost:

1. The potential for “boiling” of the bottom of excavations where hydrostatic pressures become unequal between the outside and inside of support of excavation systems.
2. The occurrence of pockets of trapped groundwater at elevations higher than the groundwater elevations measured in the test borings. Wet soils were encountered in numerous borings above the measured groundwater table.
3. The occurrence of artesian conditions in the vicinity of the intersection of XXX Street and Central Avenue. The test borings drilled at this location indicate a significant tendency for the soils to “run” when penetrated by the hollow stem augers during the test drilling. When penetrated, the silty sand and gravel soils “ran up” as much as six feet in the drilling augers. The use of a drilling mud, substantially more viscous than normal, was marginally successful in keeping the granular soils from being forced upward into the drilling augers. It is recommended the support of excavation systems be designed for hydrostatic pressures and penetrate the finer grained residual soils in order to seal off the granular, water bearing soils.
4. The occurrence of numerous active utilities located parallel to and perpendicular to the areas requiring excavation. These utilities are subject to failing due to horizontal or vertical movements of the surrounding soils. Any delays, costs, schedule impacts, or claims resulting

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from any conditions due to the affects of groundwater during the various excavation operations, including support of excavation, shall not be considered as basis for extra payment of any type.

SC-19 HAZARDOUS MATERIALS

Petroleum products were encountered during the test drilling program near the northeast corner of the intersection of Fleet Street and Central Avenue. Benzene, creosote and other hazardous materials were encountered during excavation in the Advanced Drain Repairs Contract (TR99049) at the intersection of Baltimore Street and Central Avenue. The Design-Builder is alerted that these materials may likely be encountered elsewhere within the limits of the Contract.

A report titled “Reconstruction of Central Avenue, Supplemental Site Investigation”, dated April 2003, has been completed for this project and is available for Design-Builder. As a result of this investigation, the scope of this contract shall also include addressing the potential handling and disposal of hazardous materials, including petroleum contaminated soil and water. It shall be the responsibility of the bidder during the preparation of his proposal to evaluate this information and conduct any investigations that he deems essential for the proper preparation of his bid.

SC-20 CONDUIT ROADWAY STRUCTURES

The Design-Builder’s attention is directed to the fact that during the construction operation in which the roadway paving or sidewalk is excavated around any existing Conduit Structure, the Roadway Structure may be upgraded utilizing the new type of Roadway Structure which will be supplied to the Design-Builder by the City (size 36” frame and cover only). The Design-Builder will be required to contact **Mr. Pete Swann** at 410-396-1263, two weeks prior to any excavation in which these Roadway Structures are involved.

SC-21 SAMPLING DEVICES AND TESTING EQUIPMENT

The Design-Builder is to provide all sampling devices and testing equipment as per Section 111 of the Specifications.

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INSERT: THE FOLLOWING:

GENERAL PROVISIONS – SECTION 1

DEFINITIONS AND TERMS

GP-1.01 GENERAL

All references to the Provisions of Article 21 of the Annotated Code of Maryland and the Provisions of Title 21 of “Comar” are inapplicable to the Contract and are incorporated by reference herein. Whenever Transit and Traffic is mentioned, it shall be construed to be Baltimore City, Department of Transportation.

Wherever in these General Provisions or in other Contract Documents the following terms or abbreviations are used, the meaning shall be as follows:

GP-1.02 ORGANIZATIONAL STRUCTURE

The Maryland Department of Transportation is composed of the following Administrations:

- (i) Mass Transit Administration
- (ii) State Highway Administration
- (iii) State Aviation Administration
- (iv) Motor Vehicle Administration
- (v) State Railroad Administration
- (vi) Office of Assistant Secretary, Administration
- (vii) Maryland Port Administration

GP-1.03 ORGANIZATIONAL DEFINITIONS (REFER ALSO TO GP-1.0-5)

Administration – The word “Administration” shall mean the State Highway Administration, Maryland Department of Transportation or Baltimore City, Department of Transportation, as appropriate.

Administrator - The Chief executive officer of an Administration.

Assistant District Engineer Construction (ADE) – Chief, Inspection, Department of Transportation

Chief Engineer, State Highway Administration – Director, Department of Transportation

City – Mayor and City Council of Baltimore or its duly authorized representative.

City Department – Shall mean Baltimore City, Department of Transportation

Construction Inspection Division – Shall mean Inspection, Department of Transportation.

Department – The word “Department shall mean the Maryland Department of Transportation.

Deputy Chief Engineer Construction – Chief, Inspection, Department of Transportation.

District Office – The words “District Office” shall mean “Baltimore City, Department of Transportation.

GENERAL PROVISIONS FOR DESIGN-BUILD

Engineer – Any person designated by the Administrator or the Director, Department of Transportation acting directly or through his duly authorized representative, such representative acting within the scope of the particular duties assigned to him or of the authority given him.

Inspector – The authorized representative of the Director, Department of Transportation, assigned to make detailed inspection or any or all portions of the work, or materials therefor.

Secretary - The chief executive officer of the Maryland Department of Transportation.

GP-1.04 ABBREVIATIONS

AAN	American Association of Nurserymen
AAPA	American Association of Port Authorities
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISI	American Iron and Steel Construction
ANSI	American National Standards Institute
ARA	American Railway Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
ASLA	American Society of Landscape Architects
ASME	American Society Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Transit Association
AWWA	American Water Works Association
AWS	American Welding Society
AWPA	American Wood Preservers Association
AGC	Associated General Contractor of America
BCOOT	Baltimore City Department of Transportation
BOCA	Building Officials Conference of America
COMAR	Code of Maryland Regulations
CRSI	Concrete Reinforcing Steel Institute
EI	Edison Electric Institute
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration, U.S. Department of Transportation
FCC	Federal Communications Commission
FHWA	Federal Highway Administration, U.S. Department of Transportation
FRA	Federal Railway Administration, U.S. Department of Transportation
FSS	Federal Specifications and Standards, General Services Administration
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineers Society
IPCEA	Insulated Power Cable Engineers Association
IRT	Institute for Rapid Transit
MBMA	Metal Building Manufacturers Association
MSMT	Maryland Standard Method of Test (as developed by the State Highway Administration)
MUTCD	Manual of Uniform Traffic Control Devices
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electrical Code

GENERAL PROVISIONS FOR DESIGN-BUILD

NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
RLMI	Reflector and Lamp Manufacturers Institute
SAE	Society of Automotive Engineers
SAWP	Society of American Wood Preservers
ULI	Underwriters Laboratories, Inc.
UMTA	Urban Mass Transportation Administration, U.S. Department of Transportation

GP-1.05 DEFINITIONS

Agreement - The Agreement between the Contractor and the City which is a document forming a part of the Contract.

Award - The decision of the City, with the concurrence of the State Highway Administration, to accept the proposal of the lowest responsible pre-qualified bidder.

Bid – A statement of price, terms of sale, and description of the supplies, services, or construction offered by a vendor to the City.

Bid Board - A bulletin board displayed in an area to which the public has access and on which is posted solicitations or announcements of availability of solicitations or both.

Bid Bond - See “**Proposal Guarantee**”

Bid Form - The approved form on which an Administration requires bids to be set forth and submitted.

Bidder – A person formally submitting a bid for the work contemplated, acting directly or through a duly authorized representative.

Board – Board of Estimates of Baltimore City (Mayor, City Comptroller, City Solicitor, President of the City Council and the Director, Department of Transportation.)

Business – A corporation, partnership, individual, sole proprietorship, joint venture, or any other legal entity through which commercial activity is conducted.

Calendar Day – Every day shown on the calendar, Saturdays, Sundays, and holidays included.

Change Notice – A written or an oral directive issued by the Engineer, directing a Contractor to make changes in the work.

Change Order – A written order, signed by the responsible Engineer, directing a Contractor to make changes which the changes clause of a Contract authorizes the Engineer to order, with or without the consent of the Contractor.

Charter – The Baltimore City Charter approved by the vote of the citizens of Baltimore City, November 5, 1918 and any and all amendments thereto.

City – Mayor and City Council of Baltimore, or their duly authorized representatives.

Construction - The process of building, adding, altering, converting, relocating, renovating, replacing or restoring of real property in which the State or City has an interest.

Contingent Item – Any item listed in the contract documents and included in the bid for the purpose of obtaining a contract price. Such bid constitutes tender of an exercisable option to incorporate such items into the work in accordance with stated terms at bid prices.

GENERAL PROVISIONS FOR DESIGN-BUILD

Wherever, in the Contract Documents, including the Plans and the Contract book, the term **Contingent** appears in describing and item or quantity of work, it is mandatory that the written approval and direction of the Engineer to be obtained, on an individual item basis, for use of the item for any quantity ascribed thereto prior to commencing work on such item or items.

Contract – Any agreement entered into by a State or City agency for the procurement of supplies, services, construction, or other item. It includes:

- (1) Awards and Notices of Award
- (2) Contracts of a fixed-price, cost-reimbursement, cost-plus-a-fixed-fee, fixed-price incentive, or cost-plus incentive fee type
- (3) Contracts providing for the issuance of job or task orders
- (4) Leases
- (5) Letter contracts
- (6) Purchase orders
- (7) Supplemental agreements with respect to any of these
- (8) Orders for additional work
- (9) Grants and
- (10) Engineering and other professional services as required

Contract does not include:

- (1) Collective bargaining agreements with employee organizations or
- (2) Medical, Medicare, Judicare, or similar reimbursement contracts for which users eligibility and cost are set by law or regulation.

Contract Documents – The written agreement executed between the City and the successful bidder, covering the performance of the work and furnishing of labor, equipment and materials, by which the Contractor is bound to perform the work and furnish the labor, equipment and material, and by which the city is obligated to compensate him therefor at the mutually established and accepted rate or price. The Contract shall include the Invitation for Bids, Notice to Contractor, Instructions to Bidders, Proposal, Contract Forms and Bonds, General Provisions, Specifications, all Special Provisions, all Technical Provisions, all Plans and Notice to Proceed; also any written Change Orders and Supplemental Agreements that are required to complete the construction of the work in an acceptable manner, including authorized extension thereof.

Contract Drawings – See “Plans”

Contract Item (Pay Item) – An item of work specifically described and for which a price, either unit or lump sum, is proved. It includes the performance of all work and the furnishing of all labor, equipment and materials, described herein or described in any Special Provisions.

Contract Modification – Any written alteration in the Specifications, delivery point, date of delivery, Contract period, price, quantity, or other provision of any existing Contract, whether accomplished in accordance with a Contract provision, or by mutual action of the parties to the Contract. It includes change orders, extra work orders, supplemental agreements, contract amendments, reinstatements, or options/renewals.

Contract Time or Completion Date – The number of working or calendar days shown in the Contract indicating the time allowed for the completion of the work. In case a calendar date of completion is shown in the Contract, in lieu of the number of working or calendar days, such work shall be completed by that date.

Contractor – Any person or firm having a contract with a City and State Agency. Contractor does not include employees with labor contract (collective bargaining agreements).

Controlling Operation – An operation of either major or minor proportions, which at the particular time under consideration, has a controlling effect on the progress of the project as a whole.

GENERAL PROVISIONS FOR DESIGN-BUILD

Day – Calendar day, unless otherwise designated.

District Engineer – Director, Department of Transportation

Easement – A grant of right of use of the property of an owner, for a certain purpose, at the wish of the grantee.

General Working Hours – Unless otherwise specified or directed by the Engineer, the regular working day shall begin no earlier than 7:00 a.m.

Highway Standards – The Book of Standards for Highway and Incidental Structures, edited by the State Highway Administration, with the latest incorporated revisions, issued on or before the date of advertisement of the Contract.

Invitation for Bids – Any document, whether attached or incorporated by reference, used for soliciting bids under procurement by competitive sealed bidding and small procurement procedures including requests for quotations.

Invitation for Quotation – Invitation for Bids.

Laboratory – The testing laboratory of the State Highway Administration (or other Administrations) or any other testing laboratory which may be designated by the Engineer.

Materials – Any substances specified for use in the construction of the project and its appurtenances.

Notice to Contractors – The Advertisement for Bids for all required work or materials. Such advertisement will indicate the location and magnitude, of the work to be done or the character and quantity of the material to be furnished and the time and place of the opening of bids.

Notice to Proceed – A written notice to the Contractor of the date on or before which he shall begin the prosecution of the work to be done under the Contract.

Payment Bond – Security guarantee, as stated in Baltimore City Charter, Article 6, that Contractor will pay in full, all bills and accounts for materials and labor used in work, as provided by law.

Performance Bond – Security, as stated in Baltimore City Charter Article 6, guaranteeing complete performance of Contract.

Person – Any individual, business, union, committee, club, or other organization.

Plans – The official drawings issued by the Administration as part of the Contract Documents, including those incorporated in the Contract Documents by reference.

Procurement Officer – Shall not apply to this Contract.

Proposal – The response by an offer or to a solicitation of the Department for construction. The response may include, but is not limited to, an offer's price and terms for the proposed contract, and description of technical expertise, work experience and other information as requested in the solicitation. As used herein, the word "**Proposal**" means "Bid".

Proposal Form – The approved form on which an Administration requires proposals to be set forth and submitted.

Proposal Guarantee – Certified check, bank cashier's check, bank treasurer's check, bid bond drawn upon a solvent clearing-house bank designed in the proposal, to be furnished by the offer as a guaranty of good faith to enter into a contract with the City, if the work on constructing the improvement is awarded to him.

Questionnaire – The approved form or forms upon which the Contractor shall furnish the information as to his ability to perform the work, his experience in similar work, the equipment to be used, and his financial condition as related to his ability to finance the work.

Responsible bidder or Offer – A person who has the capability, in all respects, to fully perform the Contract requirements, and the integrity and reliability which will assure good faith performance.

Responsive Bidder – A person who has submitted a bid under procurement by competitive sealed bidding which conforms in all material respects to the requirements contained in the Invitation for Bids.

Specification – A written description of functional characteristics, or the nature of a construction item to be procured. It may include a statement of any of the user’s requirements and may provide for inspection, testing, or preparation of a construction item before procurement.

Standard Specifications – A book of specifications intended for general application and repetitive use.

State – The State of Maryland, acting through its authorized representative.

Subcontractor - Any person undertaking the construction of a part of the work under the terms of the Contract, by virtue of an agreement with the Contractor, who prior to such undertaking, receives the consent of the surety and the approval of the Director, Department of Transportation.

Superintendent – The executive representative of the Contractor, authorized to receive and execute instructions from the Engineer, and who shall supervise and direct the construction.

Supplemental Agreement – Any Contract modification which is accomplished by the mutual action of the parties.

Surety – The corporate body bound with and for the Contractor for the full and complete performance of the Contract and for the payment of all debts pertaining to the work. When applying to the Bid Bond, it refers to the corporate body which engages to be responsible for the execution by the bidder, of a satisfactory Contract.

Third Tier Contracting – The process in which the Contractor subcontracts a portion of the Contract to a subcontractor who in turn subcontracts a portion of a subcontract to a third party. The latter action is termed entering into Third Tier Contract.

GENERAL PROVISIONS – SECTION 2

BIDDING REQUIREMENTS AND CONDITIONS

GP-2.01 BID IRREVOCABLE

Unless otherwise provided in the Invitation for Bids, bid prices are irrevocable for 180 days following bid opening.

After opening bids, the Director, Department of Transportation, may request bidders to extend the time during which the City may accept their bids, provided that, with regard to bids, no other change is permitted.

GP-2.02 CONTENTS OF BID FORMS

All papers included in, bound thereto, or attached to the bid form, are necessary parts thereof and shall not be detached, separated or altered. The Plans and Specifications referred to in the Specifications, and all other Contract Documents will be considered a part of the bid form, whether attached thereto or not.

GP-2.03 INTERPRETATION OF QUANTITIES IN BID SCHEDULE

Where designated as estimated quantities, the quantities in the prepared bid schedule are approximate only. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the Contract and as provided in **GP-4.04, Variations in Estimates Quantities**.

GP-2.04 SITE INVESTIGATION

The Contractor acknowledges that he has satisfied himself as to the conditions affecting the work, including but not restricted to, those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides or similar physical conditions at the site, conformation and conditions of the ground and the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an **inspection of the site** and including all exploratory information in possession of the City and State, as well as from information presented by the Drawings and Specifications made a part of this Contract. Any failure by the Contractor to acquaint himself with the available information shall not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work. The City and State assume no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the City and the State.

GP-2.05 TAXES – RESPONSIBILITY FOR PAYMENT, EXEMPTIONS, FORMS TO FILE, ETC.

(a) The Contractor is responsible for, and by submitting a bid agrees to pay, all retail sales, income, real estate, sales and use, transportation and special taxes applicable to and assessable against any materials, equipment, processes and operations incidental to or involved in the construction. The Contractor is responsible for ascertaining and acquainting himself with such taxes and making all necessary arrangements to pay same.

(b) The Contractor shall indicate its Federal Tax Identification or Social Security number on the face of each invoice billed to the City.

(c) Any payment under this Contract may be withheld until the Contractor and any subcontractors performing Duties under the Contract have paid all state taxes or other obligations due to the City and the State of Maryland. Taxes, or other obligations owed, shall be resolved either by set-off of the amount due the Contractor against the amounts due the City and the State or by direct payment.

GP-2.06 PREPARATION OF BID

- (a) The bidder shall submit his bid upon the blank forms furnished by the City. The bidder shall specify a price in dollars and cents for each pay item given, and shall show the products of the respective unit prices and quantities written in figures in the column provided for the purpose, together with the total amount of the bid obtained by adding the amounts of the several items.
- (b) The bid form(s) shall be filled out legibly in ink, or typed. The bid, if submitted by an individual, shall be signed by such member or members of the partnership as have authority to bind the partnership. If submitted by a corporation, the same shall be signed by an officer with authority to bind the corporation, and attested by the corporate secretary or an assistant corporate secretary. If not signed by an officer as aforesaid, there must be a copy attached of that portion of the by-laws or a copy of a Board resolution, duly certified by the corporate secretary, showing the authority of the person signing on behalf of the corporation. In lieu thereof, the corporation may file such evidence with the City, duly certified by the corporate secretary, together with a list of the names of the officers having authority to execute documents on behalf of the corporation, duly certified by the corporate secretary, which listing shall remain in full force and effect until such time as the City is advised, in writing, to the contrary. In any case, where a bid is signed by an Attorney-in-Fact, the same must be accompanied by a copy of the appointing document, duly certified. All bids shall be signed in ink. All erasures or alterations shall be initialed by the signer in ink.
- (c) **Bid Samples and Descriptive Literature.** If the Invitation for Bids requires the bidder to furnish samples or descriptive literature, they shall be submitted with the bid, unless the Invitation for Bids provides otherwise.
- (d) **Officers** shall identify those portions of their proposals which they deem to be confidential, proprietary information or trade secrets and provide any justification as to why such materials should not be disclosed by the City under the Maryland Public Information Act, Section 10-611 et seq. of the State Government Article of the Annotated Code of Maryland.

GP-2.07 PROPOSAL GUARANTY

- (a) No bid will be considered for any contract in excess of \$100,000 unless accompanied by a guaranty in an amount not less than 5% of the amount bid, or such amount as may be specified elsewhere in the bid documents. The guaranty shall be payable to the Mayor and City Council of Baltimore.
- (b) No proposals will be considered unless accompanied by a certified check, bank cashier's check, bid bond or bank treasurer's check, drawn on a solvent clearinghouse or bank, made payable to the Mayor and City Council of Baltimore, or cash, as specified in the Notice of Letting and Proposal form.

GP-2.08 DELIVERY OF BIDS

Each bid shall be submitted in a special envelope furnished by the City with the proposal form. The blank spaces on the envelope shall be filled in correctly so as to indicate its contents clearly. If forwarded by mail, the above mentioned envelope shall be enclosed in another, addressed the "City Comptroller, Room 204, City Hall, Baltimore, Maryland 21202", preferably by registered mail. If forwarded otherwise than by mail, it shall be delivered at the Office of the City Comptroller. Bids will be received until the time and date set in the Notice of Letting.

GP-2.09 COMMUNICATIONS AND INTERPRETATIONS - PRIOR TO BID OPENING

Any information regarding the requirements or the interpretation of any provision of the General Provisions Special General Provisions, Specifications or any part of the bidding document shall be requested, in writing from the Contract Administration of Department of Transportation, and delivered no later than ten days prior to the scheduled date of bid opening. Responses to questions or inquiries having any material affect on the bids shall be made by written addenda, or by written notice sent to all prospective bidders. **DO NOT MAKE VERBAL INQUIRIES.**

GENERAL PROVISIONS FOR DESIGN-BUILD

Any oral interpretations or oral pre-bid statements made by City or State employees or their representatives shall not be binding upon the City or State.

GP-2.10 AMENDMENTS TO INVITATION FOR BIDS

- (a) **Form.** Amendments to Invitations for Bids shall be in writing and identified as such.
- (b) **Acknowledgement.** Unless otherwise provided, the bidder shall acknowledge receipt of all amendments.

GP-2.11 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS

- (a) **Procedure.** Bids may be notified or withdrawn by written notice received in the office designated in the Invitation for Bids before the time and date set for bid opening. A telegraphic modification or withdrawal received by telephone from the receiving telegraph company office before the time and date set for bid opening shall be effective if the telegraph company confirms the telephone message by sending a written copy of the telegram showing that the message was received at the telegraph company's office before the time and date set for bid opening..
- (b) **Disposition of Bid Security.** If a bid is withdrawn in accordance with this regulation, the bid security, if any, shall be returned to the bidder.

GP-2.12 LATE BIDS, LATE WITHDRAWALS AND LATE MODIFICATIONS

- (a) **Policy.** Any bid received at the place designated in the solicitation after the time and date set for receipt of bids is late. Any request for withdrawal or request for modification received after the time and date set for opening of bids at the place designated for opening is late.
- (b) **Treatment.** A late bid, late request for modification, or late request for withdrawal may not be considered. Late bids will be returned to the bidder unopened. Upon written approval of the Comptroller's Office, exceptions may be made when a late bid, withdrawal, or modification is received before Contract award, and the bid, withdrawal, or modification would have been timely but for the action of inaction of personnel directing the procurement activity.

NOTE: Provision GP-2.12(b) does not apply to Federal Aid projects.

GP-2.13 OPENING AND RECORDING OF BIDS

Bids will be publicly opened by the Board of Estimates at the time and date set forth in the Notice of Letting, in Room 204, City Hall, 100 North Holliday Street, Baltimore, Maryland. Bidders or their authorized agents are invited to be present.

The Director, Department of Transportation, shall examine the bids to determine the validity of any request for nondisclosure of trade secrets and other proprietary data identified in writing. Confidential data, proprietary information, and trade secrets furnished by a bidder or officer may be disclosed to another City or State agency if there is a need for the information and may not be disclosed outside of State or City government except as provided by the Public Information Act or other applicable laws of this State.

GP-2.14 MISTAKES IN BIDS

Pursuant to, and in compliance with, the charter of Baltimore City (1964 revision, as amended), any recommendation which may be made by any municipal agency to the Board of Estimates as to the appropriate award to be made by the Board shall be advisory only and not binding upon the Board.

- (a) **Confirmation of Bid.** When the Director, Department of Transportation, knows or has reason to conclude that a mistake may have been made, the bidder may be required to confirm the bid.

GENERAL PROVISIONS FOR DESIGN-BUILD

Situations in which confirmation may be requested include obvious, apparent errors on the face of the bid or a bid unreasonably lower than the other bids submitted. If the bidder alleges mistake, the bid may be corrected or withdrawn only with the approval of the Board of Estimates, and if any of the following conditions are met:

(1) If the mistake and intended correction are clearly evident on the face of the bid document, the bid shall be corrected to the intended correct bid and may not be withdrawn. Examples of mistakes that may be clearly evident on the face of the bid document are typographical errors, errors in extending unit prices, transposition errors, and arithmetical errors.

(b) Mistakes Discovered After Award. Mistakes may not be corrected after award of the Contract except when the Board of Estimates makes a determination that it would be unconscionable not to allow the mistake to be corrected. Changes in bid prices or the total bid price are not permitted. Corrections shall be submitted to, and approved by, the City Law Department.

GP-2.15 MINOR IRREGULARITIES OR INFORMALITIES

Minor irregularities or informalities in bids, as defined below, may be waived if the Board of Estimates determines that it shall be in the City's best interest. The Board of Estimates may either give a bidder an opportunity to correct any deficiency resulting from a technicality or minor irregularity in his bid, or waive the deficiency where it is to the City's advantage to do so.

When, at any public opening of bids, a bid appears to be irregular, as herein specified, this fact may be announced when read. At the option of the Board of Estimates, said bid may be read as other bids and then referred to the Director, Department of Transportation, for consideration and appropriate action thereon in accordance with these General Provisions, Law and Regulation.

A minor irregularity is one which is merely a matter of form and not of substance or pertains to some immaterial or inconsequential defect or variation of a bid or proposal from the exact requirement of the solicitation, the correction or waiver of which would not be prejudicial to other bidders or offers. The defect or variation in the bid or proposal is immaterial and inconsequential when its significance as to price, quantity, quality or delivery is trivial or negligible when contrasted with the total cost or scope of the supplies or services being procured and the intent and meaning of the entire bid or proposal is clear.

GP-2.16 CANCELLATION OF INVITATION FOR BIDS

- (a)** A solicitation may be canceled in whole or in part before opening of bids when the City determines this action is fiscally advantageous or otherwise in its best interest.
- (b)** When a solicitation is canceled before bid opening, the bids shall be returned unopened to the vendors submitting them and notice of cancellation shall be included.

GP-2.17 REJECTION OF INDIVIDUAL BIDS OR PROPOSALS

- A. Any bid may be rejected in whole or in part when it is in the best interest of the City to do so.
- B. Reasons for rejection of a bid may include but are not limited to:
 - 1. The bid is not responsive i.e., it does not conform in all material respects to the solicitation.
 - 2. Unreasonable price;
 - 3. The bidder submitting the bid is determined to be non-responsible. A determination of non-responsibility may be made for, but is not limited to, any of the following reasons:
 - a. Bidder debarred or ineligible and the period of debarment or ineligibility not expired
 - b. The unit prices contained in a bid are unbalanced
 - c. Evidence of collusion among bidders

GENERAL PROVISIONS FOR DESIGN-BUILD

- d. Inadequate quantity and/or quality of experience, plant, equipment, financing, manpower or other resources required to perform the Contract
 - e. Bidder's workload which, in the judgement of the Engineer, might hinder or prevent the prompt completion of the subject work, it awarded.
 - f. Default by the bidder on other contracts
 - g. Failure to pay or satisfactorily settle all reasonable and just bills due for labor and material on prior or current contracts
 - h. The same person has an interest in more than one bid on a contract exclusive or being named by another bidder as a subcontractor
 - i. Failure to perform satisfactorily on other contracts awarded, and the conditions leading to unsatisfactory performance remain unresolved
 - j. Any other reason affecting the bidder's ability to perform or his record of business integrity
 - k. Not otherwise qualified and eligible to receive an award under applicable laws and regulations
- 4 . The bidder or officer fails to supply information to the Engineer promptly, after notification from the Engineer that such information is required in connection with a determination to be made pursuant to **GP-2.17**.

GP-2.18 REJECTION OF ALL BIDS

- (a) After opening of bids or proposals, but before award, all bids or proposals may be rejected in whole or in part if the Board of Estimates determines that this action is fiscally advantageous, or otherwise in the City's best interest.
- (b) A notice of rejection of all bids shall be sent to all vendors that submitted bids, and bids which have been opened shall be retained by the Board of Estimates.

GP-2.19 BID EVALUATION AND AWARD

The award of the Contract, if it is awarded, will be based on a determination of the Proposal that is the most advantageous to the City, taking into consideration the technical and price factors discussed in other parts of the documents, and provide the best opportunity to obtain the right Design-Build Team to assure a successful project.

The successful bidder will be notified, by letter mailed to the address shown on his proposal, that his bid has been accepted and that he has been awarded the Contract.

Prior to award, the bidder must submit a completed plan and equipment questionnaire and work capacity statement, under oath, on forms furnished by the Pre-qualification Committee. The forms must be fully completed and returned within ten days after date of receipt by the Contractor. The plan and equipment questionnaire must show the plan of procedure and the availability of sufficient equipment and qualified personnel. The work capacity statement shall show the volume of work actually being performed for the City and for others as of the bid date. The total dollar volume will be a charge against the Contractor's work capacity after credit for work performed has been allowed.

GP-2.20 TIE BIDS

- (a) **Definition** – Tie bids are responsive bids from responsible bidders that are identical in price, terms and conditions and which meet all the requirements and evaluation criteria set forth in the Invitation for Bids.
- (b) **Award** – In the instance of low tie bids and subject to the Board of Estimate's approval, a drawing may be conducted. A witness shall be present to verify the drawing and the result shall be certified on the bid tabulation sheet.

GP-2.21 MULTIPLE OR ALTERNATE BIDS

Unless multiple or alternate bids are requested in the solicitation, such bids may not be accepted. However, if bidder clearly indicates a base bid, it shall be considered for award as though it were the only bid submitted by the bidder.

GP-2.22 BID PROTESTS

A bid protest must be in writing and filed with the Board of Estimates, 204 City Hall, Baltimore, Maryland 21202. Oral objections, whether or not acted on, are not protests.

(a) Time of Filing

- (1) Bid protests shall be filed not later than 7 days after the basis for protest is known or should have been known, whichever is earlier.
- (2) Protests based on alleged improprieties in the solicitation which are apparent before the bid opening or the closing date for receipt of the Invitation for Bids shall be filed before the opening date or the closing date for receipt of the bids.

(b) Content of Written Protest

- (1) Name and address of protester
- (2) Bid contract number
- (3) Reasons for protest
- (4) Supporting exhibits, evidence or documents to support claim. If not available, within filing time, indicate expected availability date
- (5) Mark envelope “**Protest**”

GP-2.23 PREQUALIFICATION OF BIDDERS

All Contractors and Subcontractors desiring to bid on, or subcontract for, work constructed under the jurisdiction of the Baltimore City, Department of Transportation, State Highway Administration of Maryland, will be required to be pre-qualified with the City of Baltimore.

Only the bids of contractors who hold a pre-qualification certificate at the time of bid opening will be considered.

All applicants for pre-qualification are required to submit:

- (1) A Contractor’s Application with data
- (2) A Contractor’s financial statement
- (3) A completed Contractor’s Experience Questionnaire
- (4) A Facilities and Equipment list.

They must be filed with the Contractor’s Qualification Committee not less than thirty days prior to the opening date specified in the proposal.

A qualified contractor is one whose financial rating and classification has been determined by the Contractor’s Qualification Committee and ratified and confirmed by the Board of Estimates.

All contractors must submit an affirmative action plan and agree to comply with laws and regulations governing business relations with the City including requirements covering anti-discrimination, civil rights and minimum wage rates.

An accountant’s certificate must accompany the financial report and must be executed by a certified public accountant, of any state, in order for a contractor to be pre-qualified to bid on, or subcontract for, work estimated at \$1,000,000 or more.

The Board of Estimates reserves the right to reject the bid of any bidder who fails to furnish, promptly and properly, all the information required as aforesaid, when notified to do so.

Each bidder shall further qualify as otherwise specified in the Contract Documents.

A prospective bidder may purchase plans if his pre-qualification papers have been submitted at least thirty days prior to the opening date specified in the proposal. Material suppliers and other interested parties may obtain plans and proposals without filing a pre-qualification application. The proposals shall be marked **“not for bidding purposes”**.

GENERAL PROVISIONS – SECTION 3

AWARD AND EXECUTION OF CONTRACT

GP-3.01 AWARD OF CONTRACT (SEE GP-SECTION 2.19)

Written Notice of Award shall be sent to the successful bidder. A Notice of Award may be rescinded at any time prior to execution of the Contract by Board of Estimates.

GP-3.02 RETURN OF PROPOSAL GUARANTY

The checks of the unsuccessful bidders shall be returned to them within a reasonable time after opening the bids and awarding the Contract to the successful bidder. Upon the proper execution of the Contract, bond, and the furnishing of all required insurance policies, the check of the successful bidder will be returned to him. In the case of bid checks of less than \$5,000, which have been deposited by the City, reimbursement will be made by the City in the amount of said check, as indicated above.

GP-3.03 PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS

- (a) The successful bidder will be required to give a Performance Bond and a Payment Bond of a surety company to be approved by the Mayor of Baltimore City, doing business in the City of Baltimore, State of Maryland within ten days after the date of award of the Contract. The Performance Bond shall be in an amount not less than the Contract Price and the Payment Bond shall be in the amount of the Contract Price, as indicated on the form attached to the proposal forms and made a part of the Contract Documents.
- (b) Whenever the surety or sureties on the bonds furnished in accordance with the preceding paragraph shall be deemed by the Mayor and City Council to be insufficient or unsatisfactory, he may, at his discretion, within ten days after notice to that effect is mailed to the address of the Contractor, require the Contractor to furnish and deliver new bonds to the Mayor and City Council of Baltimore in the same penalty and on the same conditions, with surety satisfactory to the Mayor and City Council. This duty shall continue on the part of the Contractor whenever and so often as the Mayor and City Council shall require new bonds with a satisfactory surety or sureties. Upon failure of the Contractor to furnish the aforesaid new bonds with ten days after said notice is mailed to his address, the Mayor and City Council of Baltimore, through their proper agent or agents, may withhold all payments due to the Contractor and re-let the unfinished work at the expense of the Contractor, in any manner which it may deem best, to protect the interest of the City.

GP-3.04 EXECUTION OF CONTRACT

- (a) The Contract shall be effective only upon receipt by the City of the proper, executed Contract form, Performance and Payment Bonds and execution of the Contract by the City.
- (b) After a Notice of Award, as provided in **GP-3.01**, has been issued to a bidder, the City shall forward the formal Contract form and the appropriate forms for the Payment and Performance Bonds to the bidder for execution. The bidder will execute the Contract form and return same, together with fully executed Payment and Performance Bonds to the City within 10 days after receipt of same. After receipt of the properly executed Contract form and Payment and Performance Bonds, the City will execute the Contract within 60 days and forward the bidder a copy; provided, however, that the Board of Estimates has approved the Contract, if such approval is required.

GP-3.05 FAILURE TO EXECUTE CONTRACT

Failure of the Bidder to execute the Contract and file acceptable security as defined in **GP-3.03** within the time allowed shall be just cause for the annulment of the award and the forfeiture of the proposal guaranty, which shall become the property of the City, not as a penalty, but in liquidation of damages sustained. Award may then be made to

the next lowest responsive, responsible bidder or the work may be re-advertised and constructed under contract, or otherwise, as the City may decide.

GENERAL PROVISIONS – SECTION 4

SCOPE OF WORK

GP-4.01 INTENT OF CONTRACT

- (a) The Contractor shall (within specified tolerances) perform all work in accordance with the lines, grades, typical Cross sections, dimensions and other data shown on the Plans, or as modified by written orders, including the furnishing of all materials, implements, machinery, equipment, tools, supplies, transportation, labor, and all other things necessary to the satisfactory prosecution and completion of the project in full compliance with the Contract requirements.
- (b) The documents composing the Contract Documents are intended to be complementary and to describe the construction and completion of the work. Anything mentioned in the Specifications and not shown on the Contract Drawings, or shown on the Contract Drawings and not mentioned in the Specifications, shall be of like effect as if shown in both.
- (c) Omissions from the Drawings or Specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the Drawings and Specifications, which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details or work. They shall be performed as if fully and correctly set forth and described in the Drawings and Specifications.

GP-4.02 ENTIRE CONTRACT

The Contract Documents represent the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations or agreements, either written or oral.

GP-4.03 DIFFERING SITE CONDITIONS

- (a) The contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of:
 - (1) Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents or;
 - (2) Physical conditions of an unusual nature at the site, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for this Contract. The Engineer shall promptly investigate the conditions, and if he finds that such conditions do materially differ and cause a change in the Contractor's cost or the time required for performance of any part of the work under the Contract (whether or not changed as result of such conditions), an equitable adjustment shall be made and the Contract accordingly modified in writing.
- (b) No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above, provided however, the time prescribe therefor may be extended by the City or State.
- (c) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

GP-4.04 CHANGES

- (a) The Engineer may, at any time and without notice to the sureties, if any, by written order designated or indicated to be a Change order, make any change in the work within the general scope of the Contract, including but not limited to changes:
 - (1) In the Specifications (including drawings and design)
 - (2) In the method or manner of performance of the work

GENERAL PROVISIONS FOR DESIGN-BUILD

- (3) In the City-furnished facilities, equipment, materials, services or site, or
- (4) Directing acceleration in the performance of the work

- (b) Any other written or oral order from the Engineer whose terms, as used in this Paragraph (b), shall include direction, instruction, interpretation or determination which causes any such change, shall be treated as a Change Order under this clause, provided that the Contractor gives the Engineer written notice stating the date, circumstances and source of the order and that the Contractor regards the order as a Change Order.

- (c) Except as provided above, no order, statement, or conduct of the Engineer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment hereunder.

- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under the Contract, whether or not changed by any order, an equitable adjustment shall be made and the Contract modified, in writing, accordingly; provided however, that except for claims based on effective Specifications, no claim for any change under (b) above, shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required; and provided further, that in the case of defective Specifications for which the State is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with such defective Specifications.

- (e) If the Contractor intends to assert a claim for an equitable adjustment under this clause, he shall, within 30 days after receipt of a written Change Order under (a) above, or the furnishings of written notice under (b) above, submit a written statement to the Engineer, setting for the general nature and monetary extent of such claim, unless this period is extended by the City/State. The statement of claim hereunder may be included in the notice under (b), above.

- (f) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after Final Payment under the Contract.

GP-4.05 NEGOTIATED PAYMENT PROVISION

If the Contractor is entitled to an equitable adjustment, the Contractor shall be allowed to add the following maximum percentages for overhead and profit to his costs for labor and materials:

- (a) Twenty percent may be added by the Contractor for overhead and profit for work performed by his own forces.

- (b) Fifteen percent may be added by the subcontractor for overhead and profit work performed by the subcontractor. The Contractor may add an additional 5% of the subcontractor's costs for direct labor and material.

The provisions of paragraphs (a) and (b) above apply only to price adjustments negotiated prior to completion of the added or changed work and do not apply to work performed on Force Account Work, as provided in **TC-7.03**.

GP-4.06 UNAUTHORIZED WORK

Work done contrary to, or regardless of, the instructions of the Engineer; work done beyond the lines and grades shown on the Contract Drawings, or as given; or any extra work done without written authority, will be considered as unauthorized and at the expense of the Contractor and will not be measured or paid for. Work so done may be ordered removed and replaced at the Contractor's expense.

GP-4.07 FINAL CLEANUP

Upon completion of the work specified in the Contract and before Final Payment will be made, the construction area and all other areas occupied by the Contractor during the construction of the Contract, other than those owned by him,

shall be cleaned of all surplus and discarded materials, spilled materials, excess materials left deposited on the permanent work as a result of the Contractor's operations, false work, rubbish and temporary structures and buildings that were placed thereon by the Contractor. The areas mentioned above, outside the normal pay limits for seeding, will be reshaped, seeded and mulched, or otherwise restored as directed by the Engineer, at the Contractor's expense.

GP-4.08 (RESERVED)

GENERAL PROVISIONS – SECTION 5

CONTROL OF THE WORK

GP-5.01 AUTHORITY OF THE ENGINEER

- (a) The Engineer shall decide all questions which may arise as to the quality and acceptability of materials furnished and work performed, as to the rate of progress of the work, all questions which may arise as to the interpretation of any or all Plans and Specifications, and all questions as to the acceptable fulfillment of the Contract by the Contractor.
- (b) The Engineer shall determine the amount and quantity of work performed and materials which are to be paid for under the Contract.
- (c) The Engineer shall have the authority to suspend the work, wholly or in part, due to the failure of the Contractor to carry out provisions of the Contract.

GP-5.02 CONFORMITY WITH CONTRACT REQUIREMENTS

All work performed and all materials furnished shall be in conformance with the Contract requirements.

If the Engineer finds the materials or the finished product in which the materials are used, or the work performed, are not in reasonably close conformance with the Contract requirements and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced, or otherwise corrected, by and at the expense of the Contractor.

If the Engineer finds the materials or the finished product in which the materials are used are not in conformity with the Contract requirements but that acceptable work has been produced, he shall make a determination if the works shall be accepted. The Engineer will document the basis of acceptance by a Change Order which will provide for an appropriate adjustment in the Contract price. Any action taken pursuant to this paragraph may not result in an increase to the Contract price.

GP-5.03 DISCREPANCIES IN THE CONTRACT DOCUMENTS

If the Contractor discovers any discrepancies in the Contract Documents, he shall immediately notify the Engineer. The Engineer will make such corrections and interpretations as may be necessary for fulfilling the intent of the Contract.

GP-5.04 COOPERATION BY CONTRACTOR

The Contractor will keep one complete set of Contract Documents on the project site at all times.

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer and his inspectors in every way possible.

The Contractor shall assign to the Contract, as his agent, a competent superintendent capable of communicating in English, capable of reading and thoroughly understanding the Contract Documents and thoroughly experienced in the type of work being performed, who shall receive instructions from the Engineer or his authorized representatives. The superintendent shall have full authority to execute the order or directions of the engineer without delay and to promptly supply such materials, equipment, tools, labor and incidentals as may be required. This superintendence shall be furnished irrespective of the amount of work sublet. The superintendent shall be on the project site at all times when the work is in progress.

GP-5.05 COOPERATION WITH UTILITIES

Where an existing utility is encountered which is not indicated or which is determined to be a different utility than that indicated, the Contractor shall promptly notify the Engineer who will determine the owner of the utility and its disposition. Utilities which are relocated by the utility company for the convenience of the Contractor shall be relocated at the sole expense of the Contractor.

It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions and that no additional compensation will be allowed for delays, inconvenience or damage sustained by him due to any interference from the utility appurtenances or the operation of moving them.

The Contractor shall have responsibility for notifying all affected utility companies prior to the need for performing any work on their utilities and shall cooperate with them in achieving the desired result. All damage to utilities caused by the Contractor's operations shall be the responsibility of the Contractor.

The Contractor's attention is directed to Sections **GP-7.11**, **GP-7.13** and **GP-7.17** of the Specifications regarding utilities.

The Contractor shall take into consideration the adjustment and relocation of installations by public utilities in areas within the limits of the Contract. The Contractor's attention is directed to utility work as described elsewhere in the Special Provisions.

Existing utilities have been generally located and shown on the Plans as they are believed to exist and have been determined with the best accuracy attainable from available record drawings and field surveys of visible surface features and accessible vaults, manholes, inlets and associated structures. However, the City, Administration and the Baltimore City, Department of Transportation assume no responsibility for the accuracy of the locations or completeness of the information. The Contractor will be responsible for locating all existing utilities, the safety of same and shall make good, at his own expense, any damage due to his operations. The Contractor shall also be responsible for coordinating his work with the work that others may be doing on utilities.

The existence of drains and utilities other than those shown on the Contract Plans is not known. If, during approved construction operations, the Contractor should encounter additional drains or utilities, he shall immediately notify the Engineer and take all necessary and proper steps to protect the continuance of service of such drains and utilities.

All existing drains and utilities not shown to be abandoned under this Contract shall be maintained in service throughout the life of the Contract.

All private utility work will be performed by the utility company or agency owning or operating the utility lines, except for work specifically shown on the Plans or included in this project.

The contractor's contacts with all privately owned utility companies and with the city bureaus and departments having jurisdiction over the various types of utilities affected by the Contract will be through the Engineer. The contractor is responsible for coordinating his work progressively with that of the various city utility forces and with that of privately owned utility companies making changes in their facilities, all with the approval of the Engineer, in such a manner that uninterrupted service is maintained.

The Contractor's attention is directed to the fact that he must, before starting any construction operations and after the completion of all placement and compaction of aggregate, notify the Baltimore Gas and Electric Company at (410) 234-7281 in order to allow them to conduct a gas leak survey. This notice must be given to BGE three (3) days in advance.

The Contractor must be on the job site to meet Baltimore Gas and Electric Company representative, where utilities are to be marked.

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The Contractor shall notify the Engineer, in writing, at least fourteen working days in advance of the time he plans to work on any specified utility relocation, in order to provide time for the Engineer to contact the City office, department, bureau, agency or privately-owned company having interest in, or jurisdiction over, the utility in question. In general, privately-owned utility companies will relocate their own facilities, whether located on private property outside the right-of-way, on rights-of-way acquired by the city, or in the beds of the City streets.

Presentation of the information shown on the Plans will not relieve the Contractor of his obligation to support and protect all utilities and structures encountered during the construction of the project and to make good for damages done to said utilities and structures to the total satisfaction of the Engineer.

The Contractor shall exercise caution when excavating and pile driving in the vicinity of utilities and shall notify the Engineer prior to beginning work near utilities. The Contractor must notify, through the Engineer, all private utilities ten days in advance at:

Miss Utility Phone: 1-800-257-7777

After location marking has been performed by the Public Service Companies and before beginning excavation operations, the Contractor shall verify the actual location of the underground utilities by means of Test Pits, as specified in Section 205 of the Specifications, if required by the Engineer. Prior to digging the Test Pits, the Contractor shall notify the Engineer, who will advise the related utility owner.

If any utility adjustments, either permanent or temporary, are necessary and are not specifically provided for in the Bid Documents, they will be done by the owners of the utilities. The Contractor shall cooperate to the fullest possible extent in such work.

No additional compensation will be allowed the Contractor for interruptions, special scheduling, changes in construction sequences, stage construction or changes in types of equipment used or made necessary by others performing work in connection with utilities.

The Contractor's attention is directed to the fact that there will be no additional compensation for service fees charged for marking and locating existing utilities. Any expenses likely to be insured by the Contractor as a result of such work, as well as cooperation with the owner's adjustments, shall be included in the Contract prices bid in the Proposal.

The Contractor shall exercise special care and caution in order to protect existing conduit. The Contractor shall not run heavy equipment over the existing lines and no materials are to be stored or placed over the lines.

When an adjustment is required to existing facilities, it is necessary that the existing facilities remain in service until such time as the adjustment is complete and placed in service. Also, when adjustments are required, scheduling shall be coordinated with the utility owners involved, to avoid any delay in the project.

The Contractor shall permit free and clear access to the various affected facilities by personnel of the utility owners for the purpose of inspection, maintenance, providing for additional service requirements and the construction of new facilities.

When personnel of the utility owners' outside party are working within the Limits of Work to be performed by the Contractor, the Contractor will not be relieved of his responsibility to prevent negligence on the part of his employees or agents. He shall be responsible for the maintenance and protection of the facilities, as provided under the Contract.

Work performed or furnished by any of the utility companies or agencies for the Contractor's convenience shall be paid for by the Contractor.

Prior to adjusting any Verizon manhole frames and covers, the Contractor shall notify through the Engineer, Verizon Telephone Company, 24 hours in advance, by calling Bill Bloemier at 410-393-6370 so that he can be present during the adjustment of the manhole frames and covers.

Where directed by the Engineer, existing pavement shall be cut along neat lines to perform the work.

GENERAL PROVISIONS FOR DESIGN-BUILD

Broken pavement and excess material shall be removed and disposed of in accordance with Section 206 of the Specifications.

All excavations and trenches shall be plated at the end of each workday and “**STEEL PLATES AHEAD**” warning signs displayed in advance. All Steel Plates that are installed as per **BC-576.17** must be clearly marked so that ownership is easily discernable.

The cost of materials, installation, removal and any welding which may be directed by the Engineer for the use of Temporary Steel Plate, as shown on Standard BC-576.17, will not be measured and paid for separately, but the cost thereof, shall be included in the priced bid for the contract.

The Contractor will not connect to any live electric or communication circuit of a Privately Owned Utility Company or with any City Utility Line, without specific **WRITTEN NOTIFICATION**.

Existing street lighting will remain in service until new lighting is installed and the removal and replacement of any lights for the Contractor’s convenience, will be at the Contractor’s expense.

GP-5.06 COOPERATION BETWEEN CONTRACTORS AND LOCATIONS

- (a) Separate contractors on adjoining or overlapping work shall be cooperative with each other as necessary. Such cooperation shall include:
 - (1) Arrangement and conduct of work
 - (2) Storage and disposal of materials, etc., by each in such a manner so as to not interfere with or hinder the progress of the work being performed by other contractors. Contiguous work shall be joined in an acceptable manner.
- (b) The Administration, the City and Baltimore City Department of Transportation, shall have the right, at any time, to contract for and perform other work on, near, over or under the work covered by this Contract. If a dispute arises among contractors, the Director, Department of Transportation, will decide which of the Engineers will have jurisdiction over said dispute. The contractor shall cooperate fully with such other contractors and carefully fit his own work to such other work as may be directed by the Engineer.
- (c) The Contractor agrees that in the event of dispute as to cooperation, the Engineer will act as referee. The contractor agrees to make no claims against the Administration or City for any inconvenience, delay or loss experienced by him because of the presence and operations of other contractors.

GP-5.07 AUTHORITY AND DUTIES OF INSPECTORS

Inspectors shall be authorized to inspect all work done and all material furnished. Inspection may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials to be used. The Inspector is not authorized to revoke, alter or waive any requirements of the Contractor, nor is he authorized to approve or accept any portion of the complete project. He is authorized to call the attention of the Contractor to any failure of the work or materials to conform to the Contract. He shall have the authority to reject materials or suspend the work until any questions at issue can be referred to and decided by the Engineer.

Inspectors shall perform their duties at such times and in such manner as will not unnecessarily impede progress on the Contract.

Inspectors shall in no case act as foremen or perform other duties for the Contractor, nor interfere with the management of the work by the latter. Any advice which the Inspector may give the Contractor shall not be construed as binding the Engineer in any way or releasing the Contractor from fulfilling all of the terms of the Contract.

GENERAL PROVISIONS FOR DESIGN-BUILD

Where there is disagreement between the Contractor or (his representative) and the Inspector, such as refusal by the Contractor to use properly approved material, performing work not in compliance with Plans and Specifications or refusing to suspend work until problems at issue can be referred to and decided by the Engineer, the inspector will immediately direct the Engineer's attention to the issues of disagreement. If the Contractor still refuses to make corrections, comply, or suspend work, the Engineer will prepare and deliver in writing to the Contractor, by mail or otherwise, an order suspending the work and explaining the reason for such shutdown. As soon as the Inspector is advised of the delivery of the shutdown order, the Inspector shall leave the site of the work. Any work performed during the inspector's absence will not be accepted or paid for and may be required to be removed and disposed of at the Contractor's expense. On local jurisdiction projects, the local jurisdiction representatives will be authorized to suspend work under the above noted conditions. It will be his responsibility to immediately notify the Chief Inspector, Department of Transportation of non-compliance with the Plans and Specifications.

GP-5.08 INSPECTION OF WORK

All materials and each part of detail of the work shall be subject, at all times, to inspection by the Engineer or his authorized representative. The Contractor will be held strictly to the materials, workmanship, and the diligent execution of the Contract. The inspection may include mill, plant or shop inspection. Any material furnished under the Contract is subject to inspection. The Engineer, or his representative, shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

The Contractor, at any time before acceptance of the work, shall remove or uncover portions of the finished work for inspection as may be directed by the Engineer. After examination, the Contractor shall restore said portions of the work to the standards required by the contract. Should the work exposed or examined prove acceptable, adjustments in Contract time and price will be made pursuant to Section **GP-4.06** for the uncovering or removing, and the replacing of the covering or making good of the parts removed. Should the work so exposed or examined prove unacceptable, the uncovering, or removing and replacing, shall be at the Contractor's expense.

When the United States Government or any railroad, corporation or other agency, is to pay a portion of the cost of the work covered by the Contract, their respective representatives shall have the right to inspect the work.

GP-5.09 REMOVAL OF DEFECTIVE WORK

All work and materials which do not conform to the requirements of the contract will be considered unacceptable unless otherwise determined acceptable under the provisions of **GP-5.02**.

Any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause-found to exist shall be removed and replaced by work and materials which shall conform to the Specifications or shall be remedied in an acceptable manner authorized by the Engineer.

Upon failure of the Contractor to comply promptly with any order of the Engineer made under these provisions, the engineer shall have authority to have defective work remedied or removed and replaced, and unauthorized work to be removed and to deduct the costs from any monies due or to become due the Contractor under the Contract.

GP-5.10 LOAD RESTRICTIONS

- (a) The Contractor shall comply with all State and local requirements pertaining to speed, size and weight of motor vehicles.
- (b) The City may indicate load restrictions in the Contract on any road structure within the vicinity of the project.
- (c) The Contractor shall take into account any and all posted bridges, the crossing of which might be contemplated by the work on the Contract. No loads in excess of posted limits will be allowed in the prosecution of the work on any Contract unless required permits are obtained from the appropriate State and local governmental agencies.

GENERAL PROVISIONS FOR DESIGN-BUILD

- (d) The Contractor shall consider possible detrimental effects of operating heavy paving and grading equipment adjacent to retaining walls, pipe culverts, arches, forms for concrete work, as well as construction existing prior to this Contract.
- (e) The Engineer shall have the right to limit passage of heavy equipment (plus loads) when such passage or usage is causing apparent or visible damage to embankments, paving, structures or any other property.
- (f) Within the Baltimore City limits, the Traffic Division of Baltimore City Department of Transportation has jurisdiction for oversize and overweight vehicle movement. Permits are obtainable from the Traffic Division.

GP-5.11 MAINTENANCE OF WORK DURING CONSTRUCTION

- (a) The Contractor shall maintain the work during construction and until acceptance. Maintenance shall constitute continuous and effective work prosecution with adequate equipment and forces, to the end that all parts of the work be kept in satisfactory condition at all times.
- (b) Particular attention shall be given to drainage, both permanent and temporary. The Contractor shall use all reasonable precautionary measures to avoid damage or loss that might result from accumulations and concentrations of drainage water and material carried by such water. Drainage shall be diverted or redirected, when necessary, to prevent damage to excavation, embankments, surfacing, structures of property. Suitable measures shall be taken by the Contractor to prevent the erosion of soil in all construction areas where the existing ground cover has been removed.
- (c) All cost of maintenance work during construction and before final acceptance shall be included in the price bid and the Contractor will not be paid an additional amount for such work, except as otherwise provided.
- (d) In the event that the Contractor's work is ordered shut down for failure to comply with the provisions of the Contract, the Contractor shall maintain the entire project as provided herein, and provide ingress and egress for local residents or tenants adjacent to the project site, for tenants of the project site and for the general public as may be necessary during the period of suspended work or until the Contract has been declared in default.
- (e) On projects where traffic flow is maintained, the Contractor shall be responsible for repair of all traffic damages to work either partially or totally completed until such time as the work is accepted by the Engineer. Responsible, as used here, shall mean the responsibility for restoration and the cost thereof, unless otherwise expressly provided for in the Special Provisions.

GP-5.12 FAILURE TO MAINTAIN ENTIRE PROJECT

Failure on the part of the contractor, at any time, to respond to the provisions of GP-5.11, will result in the Engineer immediately notifying the Contractor to comply with required maintenance provisions. In the event that the Contractor fails to proceed with corrections to unsatisfactory maintenance so as to conform to the provisions of GP-5.11 within 4 hours after receipt of such notice, the Engineer may notify the Contractor to suspend all other work on the Contract until such time as the unsatisfactory maintenance is corrected. In the event that the contractor fails to respond to a notice of unsatisfactory maintenance within 4 hours after receipt of said notice, the Engineer will immediately proceed with adequate forces and equipment to maintain the project and the entire cost of this maintenance will be deducted from monies due the Contractor on the next monthly estimate.

An appropriate deduction will be made from the Contractor's next Progress Estimate for each day, or portion thereof, that Maintenance of Traffic deficiencies exist and will continue until the deficiencies are corrected and accepted by the Engineer. Any portion of a day will be considered a full day deduction. The deduction will be equal to a pro rata share of the Contractor's lump sum price bid for Maintenance of Traffic or \$2000.00 per day, whichever is more. The

GENERAL PROVISIONS FOR DESIGN-BUILD

amount prorated will be the per diem amount established by using the Calendar Days (based upon Calendar Dates, when required divided into the total value of the bid item. The amount of monies deducted will be a permanent deduction and will not be recoverable. (After satisfactory correction of the deficiencies, payment of the Maintenance of Traffic lump sum item will resume.)

The above deduction will be assessed on the next Progress Estimate if the Contractor does not take action to correct the deficiencies and properly assume the responsibilities of maintaining the project (as determined by the Engineer) within four hours of receiving a notice to comply with the required Maintenance Provisions.

GP-5.13 ACCEPTANCE FOR MAINTENANCE

- (a) Partial Acceptance for Maintenance. If at any time during the performance of the work the Contractor substantially completes a unit or portion of the work, he may request the Engineer to make final inspection of that unit. If the Engineer finds, upon inspection, that the unit has been completed in compliance with the Contract, he may accept that unit as being completed and the Contractor may be relieved of further responsibility for that unit. Generally, partial acceptance for maintenance will only be considered when the City feels that such action is in the public interest. Partial acceptance shall in no way void or alter any of the items of the Contract.
- (b) Acceptance for Maintenance. Upon due notice from the contractor of presumptive completion of the entire project, the Engineer shall make an inspection. If all construction stipulated in or provided for by the Contract is found to have been completed, such inspection shall constitute the Final inspection, the Engineer shall make the acceptance as of that date, and the Contractor shall be notified of such acceptance in writing. After acceptance, the City will assume responsibility for maintenance except where otherwise provided by the Contract.
- (c) If, during any construction inspection, any work in whole or in part is found unsatisfactory, the Engineer shall make the Contractor aware of that work which is unsatisfactory and what will be required for final completion and acceptance for maintenance. The contractor shall, without delay, comply with and execute the Engineer's instructions. Upon completion of the work another inspection shall be made which shall constitute the Final Inspection if the work is then found to be satisfactory. In such event, the Engineer shall make the final acceptance and the Contractor shall be so notified. After final acceptance for maintenance, the City will assume responsibility for maintenance except where otherwise provided by the Contract.
- (d) Unless otherwise provided in the Contract, acceptance by the City shall be made as promptly as practicable after completion and inspection of all work required by the Contract or that portion of the work that the Engineer determines can be accepted separately. Acceptance shall be final and conclusive except as regards latent defects, fraud, such gross mistakes as may amount to fraud, or the City's rights under any warranty or guarantee, or any claims or counterclaims reserved by the City.

GP-5.14 AND GP-5.15 CLAIM AND DISPUTE

1. PROMPT NOTICE OF CLAIM OR DISPUTE

- (a.) Should the Contractor be of the opinion, at any time, that he is entitled to any additional contract time and/or compensation whatsoever exceeding the compensation stipulated in the Contract Documents in the form of damages, losses, costs and/or expenses, alleged to have been sustained, suffered or incurred by him in connection with the project, he shall in each instance request this fact to be entered on the project daily logs and within ten (10) calendar days thereafter shall file a written notice of the claim with the Engineer. Within thirty (30) days after this work is completed, the Contractor shall file a written itemized statement of the details and amount of each such claim of time, damage, loss, cost and/or expenses, and unless such notice, claim and statement shall be thus made and filed, in each instance, the Contractor's claim for such additional time and/or compensation shall be held and taken to be invalidated, and he shall not be entitled to any compensation whatsoever on account of such alleged claim of time, damage, loss, cost and/or expense. Reasonable extension of this thirty (30) calendar day period may be granted by the Engineer upon receipt of a request for such extension from the Contractor, accompanied by proof of his inability to obtain statements and/or other details due to circumstances beyond his control.

GENERAL PROVISIONS FOR DESIGN-BUILD

(b.) The conditions of this section shall be held and taken to constitute a condition precedent to the right of the Contractor to recover. They shall also apply to all claims by the Contractor in any way relating to the complete Project, even though claims and or work involved may be regarded as “outside the Contract.”

(c.) It is further understood and agreed, however, that nothing in this section shall be held or taken to enlarge in any way the rights of the Contractor or the obligations of the City under the Contract Documents.

2. INITIAL REVIEW OF CLAIM OR DISPUTE

(a.) The Inspector assigned to the Project, the Project Manager, the Construction Manager, and the Division Chief of Transportation Engineering and Construction Division (and/or any individual or entity designated by the Chief) shall each review the substance of the said claim and may request additional information from the Contractor.

(b.) Where appropriate the Division Chief may resolve the claim through negotiation.

(c.) The Division Chief may resolve the claim in whole or in part; or deny the claim in whole or in part. (d) Any claims that are denied in whole or in part, unless otherwise waived by the Contractor, may be appealed in writing by the Contractor to the Director, Department of Transportation within thirty (30) days.

3. REVIEW BY DIRECTOR OF THE DEPARTMENT OF TRANSPORTATION

(a.) Claims and/or disputes appealed to the Director, Department of Transportation shall be reviewed and resolved in a timely manner, which shall depend upon the complexity and circumstances of the claim(s).

(b.) The Director shall have all of the authority and powers to settle disputes that are enjoyed by the Division Chief to resolve the matter. Disputes and/or claims that are not resolved and/or settled by the Director of the Department of Transportation to the satisfaction of the Contractor, may be reserved by the Contractor for Final Review by the Director, Department of Public Works by giving written notification to the Director within thirty (30)days of the Decision of the Director of the Department of Transportation.

4.REVIEW BY THE DIRECTOR OF PUBLIC WORKS

(a.) The Director of Public Works shall act as the Hearing Officer and shall hold one (1) Administrative Hearing on the record at the conclusion of the work on the contract to resolve any and all claims and/or disputes which have been appealed to the Director, pursuant to these procedures.

(b.) The cost of transcription shall be borne equally among the parties.

(c.) The Decision of the Director is Final and Conclusive, but is subject to review on the record by a court of competent jurisdiction pursuant to the Baltimore City Charter.

GP-5.16 CONSTRUCTION NOISE ABATEMENT MEASURES

The Contractor shall comply with all federal, state and local noise control rules, regulations and ordinances which apply to work performed pursuant to the Contract and shall take such noise abatement measures that are necessary consisting of, but not limited to, the following:

- (a) Each internal combustion engine, used for any purpose on the job, or related to the job, shall be equipped with a properly operating muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without a muffler.
- (b) Maintenance of equipment to insure that noise is kept to a minimum.
- (c) Conducting truck loading, unloading and hauling operations so that noise is kept to a minimum.
- (d) Routing of construction equipment and vehicles carrying spoil, concrete or other materials over the streets that will cause the least disturbance to residents in the vicinity of the work. The Engineer

GENERAL PROVISIONS FOR DESIGN-BUILD

shall be advised in writing of the proposed haul routes prior to the Contractor securing a permit from the City of Baltimore, if a permit is required.

- (e) Limiting of pile-driving to hours between 8:00 am. and 6:00 p.m.
- (f) Placing or continuously operating diesel-powered equipment such as compressors and generators, in areas far from, or shielded from, noise-sensitive locations.
- (g) In cases where construction equipment is readily available which meets new equipment noise emission level standards provided by the Environmental Protection Agency, the Contractor shall be required to utilize only equipment meeting those standards on the project.
- (h) No operating hoisting or other steam engines, or other work of a noisy character, will be permitted between the hours of 11:00 p.m. and 7:00 a.m., except in case of emergency, and then only with the consent of the Engineer and to such extent as he may judge to be necessary, unless otherwise stated in the Special Provisions.

GP-5.17 ACCIDENTS

- (a) The Contractor shall provide equipment and medical facilities at the site as necessary to supply first aid services to anyone who may be injured in connection with the work.
- (b) The Contractor shall report all accidents whatsoever arising out of, or in connection with, the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damages, in writing to the Engineer, giving full details and statements of witnesses. In addition, if death, serious injuries or damages occur, the accident shall be reported immediately, by telephone or messenger or both, to the Engineer.
- (c) If any claim is made against the Contractor on account of any accident as a result of the work, the Contractor shall promptly report the facts in writing to the Engineer, giving full details

GP-5.18 MAINTAINING FLOW OF SEWERS AND DRAINS

The Contractor shall, at his own cost and expense, provide for and maintain the flow of all sewers, drains, house or inlet connections and all water courses which may be met with during the progress of the work. He shall not allow the contents of any sewer, drain, house, or inlet connection to flow into the trenches or the drains to be constructed under the Contract, except where written permission is given by the Engineer and shall, at his own cost and expense, immediately remove all offensive matter from the proximity of the work, using precautions in so doing, as may be directed by the Engineer.

GP-5.19 ADJACENT BUILDINGS AND PROPERTY

It shall be the Contractor's responsibility to support and protect all buildings and property on or adjacent to the project site against settlement and damage during construction operations by adequate shoring, bracing, sheeting, etc., acceptable to the Engineer. In case of any settlement or damage to buildings or property, the Contractor shall, at his own cost and expense, restore the buildings and property to a condition equal to that which existed before damage was incurred.

**GENERAL PROVISIONS – SECTION 6
CONTROL OF MATERIAL**

GP-6.01 GENERAL

All materials shall meet all quality requirements of the Contract. In order to expedite the inspection and testing of the materials, the Contractor shall notify the Engineer, in writing, of the sources from which he proposes to obtain all materials requiring approval, testing, inspection, or certification prior to incorporation into the work, as soon as possible after receipt of Notice of Award of the Contract.

GP-6.02 STORAGE AND HANDLING OF MATERIALS

Materials shall be stored as to assure the preservation of their quality and acceptability for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located as to facilitate their prompt inspection.

Approved portions of the right-of-way or project site may be used for storage purposes and for the placing of the Contractor's plant and equipment. Such storage areas must be restored to their original condition by the Contractor at his expense. Any additional space required must be provided by the Contractor at his expense.

Approval for off-site storage and partial payment for large fabricated items may be allowed if the criteria set forth in **GP-9.01** and **TC-7.02** are met.

Contractor will not be allowed to park or store passenger vehicles, trucks and or other equipment or materials of any type within the limits of the traffic lanes being used to maintain traffic. During active work operations in any stage of construction, the contractor may be allowed to store/stockpile materials and park only those vehicles that are required for construction activities in areas exterior to barricaded, fenced-off areas. However, the occupying of such areas shall be to the extent permitted by the Engineer. All materials shall be stored in a neat and workman like manner.

GP-6.03 UNACCEPTABLE MATERIALS

- (a) Materials represented by samples taken and tested in accordance with the specified tests and failing to meet required values shall be considered to be defective regardless of prior tests or approvals.
- (b) Unless otherwise allowed by the Engineer as set forth below, defective materials will be removed from the site and any tags, stamps or other marking implying conformance with specifications shall be removed or obliterated.
- (c) Where defects can be corrected, the Contractor may propose such corrective action as he deems appropriate to the Engineer. The Engineer may approve the corrective action but in so doing does not assume responsibility for the success thereof. Retests will be made to determine the acceptability of the material after corrective measures have been taken. No person other than the Engineer may change any provision of the Specifications or the Contract without written authorization.
- (d) The cost of replacing, correcting or removal of defective material will be the responsibility of the Contractor.
- (e) The cost of repairing or replacing other materials damaged by the installation, correcting or removal of defective materials will be the responsibility of the Contractor.

GP-6.04 CITY FURNISHED MATERIAL

The Contractor shall furnish all materials required to complete the work, except those specified to be furnished by the City. Materials furnished by the City will be delivered or made available to the Contractor at the point or points specified in the Special Provisions. The cost of handling and placing all materials after they are delivered to the Contractor shall be considered as included in the Contract price for the item for which they are used.

The Contractor will be held responsible for all materials delivered to him. Deductions will be made from any monies due him to make good any shortages and deficiencies, from any cause whatsoever, and for any damage which may occur after delivery and for any demurrage charges.

In cases where materials are supplied by the City and incorporated in the work by the Contractor, materials inspection and acceptance will not be a prerequisite for acceptance of the final product where the product pertains to these items.

GP-6.05 WATER SUPPLY

- (a) Where water from the City water mains is available, it will be supplied to the Contractor at the nearest available hydrant or outlet and no other water shall be used for any purpose connected with the Contract. The Contractor shall procure a fire hydrant permit (City contracts) for a fee as established by the Bureau of Water and Wastewater, Utility Billing Division. All water supplied from hydrants for the construction of the project shall be free, except for the cost of the permit and required deposits. Water from sources other than hydrants under permit, for which the Contractor is billed by the City or any other supplier, will not be considered a pay item under the Contract and shall be incidental to the various other items for which it is used. Deposits, which do not earn interest, on equipment (fire hydrant wrench, \$50.00; reducer cap and valve \$50.00) are refundable when equipment is returned undamaged. No improper, wasteful or undue use of the water will be permitted.
- (b) Where City water is not available, the Contractor shall, at his own cost and expense, provide such quantities of potable water as may be required for any and all purposes under the Contract. He shall supply sufficient drinking water to all his employees, but only from such sources as are approved by the Engineer and no other water shall be used for drinking purposes. Potable water is that meeting United States Public Standards.

GENERAL PROVISIONS – SECTION 7

LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

GP-7.01 LAWS TO BE OBSERVED

- (a) The Contractor shall keep fully informed of all federal, state and local laws, ordinances and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. He shall, at all times, observe and comply with all such laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the City and State, their agencies and representatives against any claim or liability arising from or based on the violation of any law, ordinance, regulation, order, or decree, whether by himself or his employees or subcontractors.
- (b) All requirements set forth in federal assistance instruments applicable to this Contract shall be satisfied.

GP-7.02 PERMITS AND LICENSES

- (a) The Contractor shall procure, at his own expense, such permits and licenses, as may be necessary in order to comply with federal, State and local laws, ordinances and regulations in performance of the work. He shall give all notices necessary and incidental to the due and lawful prosecution of the work.
- (b) Federal permits, from the U.S. Corps of Engineers, Environmental Protection Agency, and/or United States Coast Guard,, for erection of structures in tidal waters, will be obtained by the City. The Contractor shall comply with the requirements of such permits. Federal permits required by the Contractor for temporary structures such as docks, piers, anchorages, etc., must be applied for and obtained by the Contractor.
- (c) Minimum Wage Rates, Equal Employment Opportunity Forms and any other permits or forms required in the Contract documents to be posted at the work site shall be posted at the Contractor's trailer.

GP-7.03 PATENTED DEVICES, MATERIALS AND PROCESSES

If the Contractor is required or desires to use any design, device, material or process covered by letters of patent or copyright he shall provide for such use by suitable legal agreement with the patentee or owner and a copy of such agreement shall be filed with the Director, Department of Transportation. If no such agreement is made or filed, the Contractor and the surety shall indemnify and save harmless the City, State, any affected third party, or political subdivision from any and all claims for infringement by reason of the use of such patented design, device, material, process, trademark or copyright, and shall indemnify, protect and save harmless the State and city, their agencies, officers, agents and employees with respect to any claim, action, cost or judgement for patent, trademark or copyright infringement, arising out of purchase or use of materials, construction, supplies, equipment or services covered by this Contract.

GP-7.04 FEDERAL PARTICIPATION

When the United States Government pays all or any portion of a project, the work shall be subject to the inspection of the appropriate federal agency. Such inspection shall in no sense make the Federal Government a party to this Contract, and will not interfere, in any way, with the rights of either party hereunder.

GP-7.05 CONSTRUCTION SAFETY AND HEALTH STANDARDS

It is a condition of the Contract, and shall be made a condition of each subcontract entered into pursuant to this Contract, that the Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards and regulations (Title 29, Code of Federal Regulations, Part 1926, formerly Part 1518, as revised from time to time) promulgated by the United States Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standard Act, (83 Stat.96) and under any construction safety and health standards and regulations promulgated by the Commissioner of Labor and Industry in accordance with the Maryland Occupational Safety and Health Act, Article 89, Sections 28 through 49A, inclusive, Annotated Code of Maryland (as the same may be amended from time to time).

The Contractor and each subcontractor shall permit inspection, without delay and at any reasonable time, on any premises where the work is being performed, by a federal or state inspector authorized to investigate compliance with federal and State statutes and regulations. The Contractor agrees to correct any violations found during such inspection within a reasonable time after the issuance of any citation, unless he contests the validity thereof through the appropriate administrative and judicial process.

GP-7.06 PUBLIC CONVENIENCE AND SAFETY

The Contractor shall conduct the work in such a manner as to ensure the least obstruction of traffic. The Contractor shall provide for the convenience and safety of the general public, tenants and of residents in the vicinity of the improvement. Equipment and materials stored or stockpiled within the project limits shall be placed so as not to be hazardous to the traveling public and as approved by the Engineer. Snow removal on public travelways shall be the responsibility of the applicable government agency unless travel is prohibited through the construction zone. (Refer to Section 104 for Maintenance of Traffic) Sprinkling shall be performed at the direction of the Engineer. The Contractor shall, unless otherwise specified, provide and maintain in a safe condition, temporary approaches to and crossings of the project. Existing City facilities, planned to be removed, but which might be of service to the public during construction, are not to be disturbed until other and adequate provisions are made. Existing mailboxes shall be maintained or reset in positions accessible to the public and to mail deliveries during construction and, subsequent to construction, shall be placed at their final locations in a satisfactory condition. On City facilities occupied by railroad tracks, temporary platforms for the entrance and exit of passengers to and from the railway cars be provided and maintained in an approved manner by the Contractor.

Fire hydrants on or adjacent to the project shall be kept accessible to fire apparatus at all times and no material or obstruction shall be placed within fifteen feet of any hydrant. Footways, gutters, sewer inlets and portions of the project adjoining the work under construction shall not be obstructed more than is absolutely necessary. Work closed down for the winter or at any other times shall be left entirely accessible to fire apparatus.

The Contractor shall properly and carefully shore up or otherwise support all live water, sewer and gas pipes, underground electric cables, conduits, freestanding walls, etc. which may be encountered. He shall immediately notify the Engineer of such and request permission to protect the same. The Contractor shall provide sufficient, safe and proper facilities at all times for the inspection of the work.

GP-7.07 DETOURS

Detours may be indicated in the Contract Documents. At the Contractor's request, traffic may be detoured over approved routes along existing roads, when acceptable to the Engineer. Detours over existing City or State roads must be approved by the appropriate agency(s). All other detours will be the responsibility of the Contractor.

GP-7.08 BARRICADES AND WARNING SIGNS

The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Highways and other City facilities closed to vehicular traffic shall be protected by effective barricades, and obstructions shall be illuminated during hours of darkness with electric lights.

The Contractor shall erect warning signs at location in advance of any place on the project where operations may interfere with the use of the facility by vehicular traffic and at all other points where the new work crosses or coincides with an existing roadway or traffic lane(s). Warning signs shall be constructed and erected in accordance with the MUTCD and MD MUTCD, or as directed.

The Contractor shall furnish, erect and maintain warning and direction signs in the number required and at locations designated by the Engineer, throughout the limits of the project. For street and highway type traffic, signs shall conform, in every respect, to the requirements of the MUTCD and MD MUTCD for Streets and Highways. Signs must be adequately reflectorized in accordance with their use. (Refer to Subsection 104.08) No work may be performed or begun unless an adequate number of signs of the proper category are in place.

In cases where the Contractor's sequence of operations results in grade differentials which would be hazardous to vehicular traffic, the Contractor will, at the direction of the Engineer, provide suitable, substantial traffic barriers to the extent determined by the Engineer.

GP-7.09 FLAGGING OF MOTOR VEHICLE TRAFFIC

For all construction contracts requiring the flagging of motor vehicles licensed for operation on the highways of Maryland, flagging using paddles shall be conducted as specified in the MUTCD for Streets and Highways.

GP-7.10 MAINTENANCE OF TRAFFIC

The Contractor shall notify the Superintendent of Parking, in Baltimore City, at least 72 hours prior to excavating any block of sidewalk where parking meters are located. In the notification, the Contractor should state the location, date and time the work will start in order to allow time for the Baltimore City, Department of Transportation to bag or remove the heads of the parking meters.

Traffic control shall be in accordance with Maryland Department of Transportation Standards and the MUTCD.

The Contractor shall maintain existing traffic control devices and fixtures at all times. Any change to the aforementioned must be approved by the Traffic Division (Maryland Vehicle Law, Section 21-206; Baltimore City Code, Article 31, Section 5).

The Contractor shall contact, through the Engineer, the Traffic Division of the Department of Transportation three (3) weeks before construction begins and two (2) weeks prior to any changes to the Maintenance of Traffic plans.

All open excavations must be covered at the end of each work day by steel plates. STEEL PLATES AHEAD warning signs must be displayed in advance. The Contractor shall notify, through the Engineer, the Traffic Division of the Department of Transportation two (2) weeks prior to beginning any stage of the work.

All removal and reinstallation of Traffic Signs and Posts shall be coordinated through the Traffic Division at least five (5) working days prior to beginning work necessitating these actions.

GP-7.11 PRESERVATION AND RESTORATION OF PROPERTY

- (a) The Contractor shall not enter upon public property (outside of the right-of-way or project area) for any purpose without obtaining permission. He shall be responsible for the preservation of all public and private property, trees, monuments, signs, markers and fences thereon. He shall use every precaution necessary to prevent damage or injury thereto.

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All Baltimore City Department of Transportation signs and markers that are affected by the work shall carefully be removed and delivered to the Engineer when grading operations begin. The Contractor shall take suitable precaution to prevent damage to underground or overhead public utility structures; shall protect all land monuments and property markers from disturbance or damage until the Engineer has referenced their location; and shall replace them when and as directed by the Engineer.

Work operations shall be conducted in such a manner as not to interfere with the activities on private property. The Contractor shall obtain permission to enter on private property from the property owner no less than two weeks prior to entering the property.

- (b) The Contractor shall be held responsible for all damage or injury to property of any character during the prosecution of the work, resulting from any act, omission, neglect or misconduct in his manner or method of executing the work; or at any time due to defective work or materials. The Contractor shall not be released of the responsibility until the work shall have been completed and accepted. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the work or in consequence of the non-execution thereof on the part of the Contractor, he shall restore such property to a condition similar to or equal to that existing before such damage or injury, in an acceptable manner and at his own expense. In case of failure of the Contractor to restore the property or make good such damage or injury, the Engineer may upon forty-eight hours notice, proceed to repair, rebuild or otherwise restore the property as may be deemed necessary and the cost of the restoration will be deducted from any money due or which may become due the Contractor under the Contract.

GP-7.12 LAND, AIR AND WATER POLLUTION

- (a) The Contractor shall incorporate all permanent erosion control features into the work at the earliest practicable time as required by the Contract Documents. Temporary pollution control measures will be used to correct conditions that develop during construction that were not foreseen during design and which are needed prior to installation of permanent pollution control features or which are needed to control erosion that develops during normal construction but are not associated with permanent control features on the project.
- (b) The Contractor's attention is directed to the fact that temporary pollution may include measures outside the right-of-way or project site where such work is necessary as a direct result of project construction. The Engineer shall be kept informed of all off-site control measures taken by the Contractor. This shall not relieve the Contractor of the responsibility for the work.
- (c) In case of failure on the part of the Contractor to control erosion, pollution or siltation, the Engineer reserves the right to employ outside assistance or to use his own forces to provide the necessary corrective measures. All expenses incurred by the Engineer in the performance of such duties for the Contractor shall be withheld from monies becoming due to the Contractor.
- (d) Contractors and suppliers must submit evidence to the City that the governing Federal, State and local air pollution criteria will be met. The evidence and related documents will be retained by the City for on-site evaluation.
- (e) The Contractor shall be aware of the following in urbanized areas:

Upon notification by the Engineer that an air pollution alert stage exists which includes the area of construction, the Contractor shall halt the operation of all equipment larger than a pickup truck. If, in the opinion of the Engineer, lanes of traffic which are temporarily closed can be opened safely, they shall be immediately opened to facilitate the movement of traffic.

All construction operations shall cease during the emergency stage of the episode. The Contractor shall not resume normal operations after the emergency stage until directed to do so by the Engineer.

In preparing bids, prospective contractors shall consider the possibility of work interruptions due to air pollution alerts or emergencies and bid accordingly.

No additional compensation will be paid for equipment or labor idled during such work interruptions. Labor and equipment costs necessary to open or close traffic lanes for the duration of, or immediately after, such episodes shall be included in the lump sum bid for the Contract.

(f) Construction Phase Air Quality Impact

Maryland State regulations governing the control of air quality in the Baltimore Metropolitan Area, as contained in the Maryland State Department of Health and Mental Hygiene, Bureau of Air Quality Control, latest edition, do not permit any construction activities without taking reasonable precautions to prevent generated particles from becoming airborne. The Contractor may be required to observe the following precautions during construction.

- (1) Use of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, grading of roads or the clearing of land.
- (2) Application of asphalt, oil, water or suitable chemicals on dirt roads, materials stockpiles and other surfaces which can create airborne dust.
- (3) Installation and use of hoods, fans and dust collectors to enclose and vent the handling of dust materials.
- (4) Covering, at all times when in motion, open-bodied vehicles transporting materials likely to create air pollution. Alternate means may be employed to achieve the same results as would covering.
- (5) The paving of roadways and their maintenance in a clean condition.
- (6) The prompt removal from paved streets or earth of other material which has been transported there by trucks, earth-moving equipment or erosion by water.

In addition, all other established construction ordinances, codes, standards and criteria set by the governmental agencies will be observed during the construction period in order to keep air quality impact to a minimum.

GP-7.13 RESPONSIBILITY FOR DAMAGE CLAIMS

- (a) The Contractor shall indemnify and save harmless and shall require that each subcontractor shall indemnify and save harmless the Mayor and City Council of Baltimore, Baltimore City, Department of Transportation, State Highway Administration, Maryland Department of Transportation, their agents and representatives from all suits, actions, or claims of any character whatsoever brought on account of any injuries or damages, including death, sustained by any person or property in consequence of any neglect in safeguarding the work or through the use of unacceptable materials in the construction of the improvement, or on account of any act or omission by the said Contractor or subcontractor, his agents or employees or as a result of faulty, inadequate or improper storage or handling of explosives, or on account of any claims or amounts recovered for any infringement of patent, trademark, or copyright, or from any claims or amounts arising or recovered under the Workmen's Compensation Laws, or any other law, bylaw, ordinance, regulation, order or decree, whether by himself or his employees or subcontractors. The Contractor shall be responsible for all damage or injury to property of any character during the prosecution of the work which results from any act, omission, neglect or misconduct in the manner or method of executing the work or due to the non-execution of the work or at any time due to defective work or materials and said responsibility shall continue until the improvement is completed and accepted.

In the event Baltimore City, Department of Transportation, State Highway Administration or Maryland Department of Transportation or their representatives become subject to, or liable for any amounts, judgements, claims or losses resulting from the acts or omissions of the Contractor or subcontractor and his operations, the City shall have the right to retain any monies due or to become due to the Contractor or subcontractor until such suits, claims, losses etc., have been settled or otherwise disposed of and satisfactory evidence to that effect has been submitted to the Engineer.

- (b) The Contractor shall conduct his operations within the right-of-way of any railroad company fully within the rules, regulations and requirements of the railroad company. The Contractor shall be responsible for acquainting himself with the requirements of the railroad company.
- (c) The Contractor shall be held responsible for any accidents that may happen to the railroad company as a result of his operations.
- (d) The Contractor shall not be held responsible for any claims arising from accidents incurred because of any traffic/and or general use permitted during the time the project or any section thereof is open to traffic under the terms of **GP-7.15** except due to the negligence of his agents or employees.

GP-7.14 LIABILITY INSURANCE

1. By the date of execution of this Contract, the Contractor shall purchase and maintain during the life of this Contract insurance against claims for injuries to persons or damages to property which may arise from, or in connection with the performance of work hereunder by the Contractor, its agents, representatives, employees, and/or subcontractors. The cost of such insurance shall be paid by the Contractor or subcontractor. The Contractor shall furnish separate certificates of insurance and policy endorsements for each subcontractor as evidence of compliance with the insurance requirements of this Contract.

For all coverages: each insurance policy shall be written on an “Occurrence” form; except that insurance on a claims made form may be acceptable with prior City approval.

If coverage is approved and purchased on a “claims made” basis, the Contractor warrants continuation of coverage, either through policy renewals or the purchase of an extended discovery period from the date of contract termination, and/or conversion from “claims made” form to an “occurrence” coverage form.

(a) Insurance Generally

Original or certified copies of policies for any and all insurance called for in the Specifications shall be submitted to the Engineer by the Contractor at the time he returns the signed copies of the Contract Documents for execution by City officials. All policies, or certified copies thereof, shall carry (45) days cancellation notice to the Mayor and City Council of Baltimore.

The requiring of any and all insurance as set forth in these Specifications or elsewhere shall be in addition to and not in any way in substitution of all other protection provided under the Contract Documents.

No acceptance and/or approval of any insurance by the City and/or the Engineer shall be construed as relieving or excusing the Contractor or the Surety on his Bond from any liability or obligation imposed upon either or both of them by the provisions of the Contract Documents.

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(b) Compensation, Liability and Property Damage Insurance

Except as otherwise provided by law, the Contractor shall, at all times, maintain and keep in force such insurance as will protect him from claims under Worker’s Compensation Acts, and also such insurance as will protect him and the City Baltimore City, Department of Transportation and State Highway Administration and Maryland Department of Transportation from any other claims for damages for personal injuries, including death, as well as from claims for damages to any property of the City or of the public, which may arise from operations under the Contract, whether such operations be by the Contractor or any subcontractors or any one directly or indirectly employed by any of them.

Within ten days after the award of the Contract, the Contractor is required, in addition to any other forms of insurance or bonds required under the terms of the Contract and Specifications, to procure and maintain during the life of the Contract, the types of insurance in the amounts set forth below.

2. COMMERCIAL GENERAL LIABILITY INSURANCE

The Contractor shall purchase and maintain during the life of this Contract, Commercial General Liability Insurance, at limits of not less than One Million Dollars (\$1,000,000.00) per occurrence for all damages arising out of bodily injuries or death and property damage and with those policies with aggregate limits, a Three Million Dollar (\$3,000,000.00) aggregate limit is required. In case any work is subcontracted, the Contractor shall require the Subcontractor or anyone directly or indirectly employed by any of them to procure the same coverage.

Such insurance shall include:

- a. Products – Completed Operations Insurance
- b. Contractual Liability Insurance
- c. Premises and Operations Insurance

There shall be no exclusions pertaining to collapse of or damage to any building or structure, damage to underground property, or injury or damage arising out of blasting or explosion. The provision shall apply to operations by the Contractor or any Subcontractor in the performance of this Contract.

3. BUSINESS AUTOMOBILE LIABILITY INSURANCE

The Contractor shall purchase and maintain, during the life of this Contract, Business Automobile Liability Insurance, at al limit of not less than One Million Dollars (\$1,000,000) per occurrence for all damages arising out of bodily injuries or death and property damage. The Insurance shall apply to any owned , hired or non-owned automobiles used in the performance of this Contract.

4. SPECIAL HAZARDS INSURANCE

The Contractor shall purchase and maintain during the life of this Contract, Special Hazards Insurance in the event of the possibility of special hazards existing in the work contemplated. Such hazards shall be covered by insurance in amounts not less than those required for all other provisions of the Section (GP-7.14). If any special hazards, including hazardous material, are encountered during the performance of this Contract, the Contractor shall immediately notify the City. Prior to performing any further work involving hazards, the Contractor will immediately purchase insurance subject to City review and approval.

5. WORKER’S COMPENSATION

The Contractor shall purchase and maintain Worker’s Compensation coverage as required by the State of Maryland, as well as any similar coverage required for this work by applicable Federal or “Other States” State Law.

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6. DEDUCTIBLES AND SELF-INSURED RETENTIONS

Any deductibles or self-insured retentions must be declared to, and approved by, the City. The deductible and/or self-insured retention of the policies shall be wholly the responsibility of the Contractor.

7. OTHER INSURANCE PROVISIONS

The insurance policies required in the Contract are to contain, or be endorsed to contain, the following provisions:

a. General Liability Policies

1. The Mayor and City Council of Baltimore, its officers, officials, employees and agents (referred to as “City”) and the Maryland Department of Transportation and the State Highway Administration and their officers, officials, employees and agents (referred to as “State”) are to be covered as additional insureds as respects: liability arising out of activities performed by or on behalf of the Contractor in connection with this Contract.
2. To the extent of the Contractor’s negligence, the Contractor’s insurance coverage shall be primary insurance as respects the City and the State, their officers, officials, employees and agents. Any insurance and/or self-insurance maintained by the City, its officers, officials, employees or agents shall not contribute with the Contractor’s insurance or benefit the Contractor in any way.

b. All Policies

Coverage shall not be suspended, voided, canceled, reduced in coverage or in limits, except by the reduction of the applicable aggregate limit by claims paid, until after forty-five (45) days prior written notice has been given to the City. There will an exception for non-payment of premium, which is ten days notice of cancellation.

8. ACCEPTABILITY OF INSURERS

Unless otherwise approved by the City,

Insurance is to be placed with insurers with a Bests’ rating of no less than A:VIII, or, if not rated with Bests’ with minimum surpluses the equivalent of Bests’ surplus size VIII and must be licensed/approved to do business in the State of Maryland.

If any time the foregoing policies shall be or become unsatisfactory to the City, as to form, substance, or if a company issuing any such policy shall be or become unsatisfactory to the City, the Contractor shall, upon notice to that effect from the City, promptly obtain a new policy, and shall submit the same to the City, with appropriate certificates and endorsements, for approval.

9. VERIFICATION OF COVERAGE

At least ten days prior to the commencement of work, the Contractor shall furnish the City with verification of insurance and endorsements required by this Contract. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates and endorsements for each insurance policy are to be on forms approved by the City prior to the commencement of activities associated with this Contract. The City reserves the right to require complete, certified copies of all required insurance policies at any time, such evidence of insurance shall refer to the project name and contract number.

10. SUBCONTRACTORS

The Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates of insurance and policy endorsements for each subcontractor. Insurance coverages provided by Subcontractors as

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evidence of compliance with the insurance requirements of this Contract shall be subject to all of the requirements stated herein.

11. MUNICIPAL OR STATE AGENCY PROVISIONS

If the Contractor is a municipal entity or an agency of the State of Maryland and is self-insured for any of the above insurance requirements, a certification of self-insurance shall be attached hereto and be incorporated by reference and shall constitute compliance with this section.

GP-7.15 USE AND POSSESSION PRIOR TO COMPLETION

The City shall have the right to take possession of, or use, any completed or partially completed part of the work. Such possession of, or use, shall not be deemed an acceptance of any work not completed in accordance with the Contract. While the City is in possession, the Contractor shall be relieved of the responsibility for loss or damage to the portion of the work in possession of the City, other than that resulting from the Contractor's fault or negligence. If such prior possession or use by the City delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment in the Contract price or the time of completion will be made and the Contract shall be modified in writing accordingly.

GP-7.16 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

- (a) Except as provided elsewhere herein, until final acceptance of the work by the City, the Contractor shall have the charge and care of the work and shall take every reasonable precaution against injury or damage to any part of the work as a result of the action of the elements or from any other cause, whether rising from the execution or from the non-execution of the work.

The Contractor, except as provided elsewhere herein, shall rebuild, repair, restore and make good all injuries or damages to any portion of the work, occasioned by any of the above causes before final acceptance and shall bear the expense therefor. Material lost, or structures damaged, as a result of faulty temporary drainage during construction or due to the action of the elements, shall be replaced or repaired by the Contractor at no cost to the City.

The Contractor shall make good, or replace at his expense and as necessary, any City-furnished material which may be broken, lost through fire, theft, or otherwise damaged, or in any way made unfit for the purpose and use intended, subsequent to delivery to the Contractor by the City and prior to final acceptance of the work, even though such breakage, damage, loss or uselessness may result from causes beyond the control of the Contractor.

- (b) In case of suspension of work, for any cause whatever, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the work, provide for normal drainage and shall erect any temporary structures, signs or other facilities at his expense. During the period of suspension of work, the Contractor shall properly and continuously maintain, in an acceptable growing condition, all living material in newly established plantings, seedings and soddings furnished under this Contract, and shall take precautions to protect new growth and other important vegetative growth against injury.

GP-7.17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES

At points where the Contractor's operations are adjacent to properties of railway, telegraph, telephone, and power companies, or are adjacent to other property, damage to which might result in expense, loss or inconvenience to the owner, work shall not begin until all arrangements necessary for the protection thereof have been made by the Contractor.

The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication or rearrangement work may be reduced to a minimum and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption to utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the authority in the restoration of service. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

(a) **Utilities**

It shall be the Contractor's responsibility to support and protect all public or private utilities such as pipes, conduits and structures which will remain in place and in service during the term of the Contract, as indicated on the Plans. He shall also support and protect those which may be uncovered during construction or which may be installed by others during the work; and to meet all other conditions which may be encountered during construction.

In case of damage to any such pipes, conduits, or other structures, the Contractor shall, at his entire cost and expense, restore those utilities to a condition equal to that which existed before the damage was done.

(b) **Removal of Obstructions**

Should the location of any unknown gas or water pipe, public or private sewer or drain, conduit or other structure, in the opinion of the Engineer, require removal, realignment or change, such removal, realignment or change shall be without cost to the Contractor for the work of removal, realignment or change only. The Contractor shall strip, uncover, support and maintain the utility at his own cost and expense before such removal or before and after such realignment or change. The Contractor will only be entitled to claim damages or extra compensation on account of the removal, realignment or rearrangement of the same. The Contractor shall be entitled to an extension of time for the completion of the work equal to the time the Engineer shall determine the work has been delayed.

(c) **Protection, Shifting or Removal of Structures by Owners of Same**

The Contractor shall not cause any hindrance to, nor interfere with, any individual, City department, gas, railroad, street or railway or other company or companies in protecting, shifting, removing, replacing or repairing its or their mains, pipes, posts, poles, or other structures. The Contractor shall suffer the same individual, City department, gas, railroad, street, or other company or companies to take all such measures as they may deem wise or as may become necessary for the purpose aforesaid.

(d) **Obstructions**

In addition to showing the structures to be built and work to be done under the Contract, the plans show certain information obtained by the City regarding pipes, conduits, tracks, other structures and other conditions which exist along the lines of the work, both at and below ground surface. The City expressly disclaims any responsibility for the accuracy or completeness of said information and the

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Contractor will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information, said information being shown only for the convenience of the Contractor, who shall verify the information given to his own satisfaction. If the Contractor, in making up or submitting his bid, relies upon said information, he does so at his own risk. The giving of this information on the Contract Drawings does not relieve the Contractor of his obligation to support and protect all pipes, conduits, tracks and other structures which may be met with during the construction of the work, and to make good all damage done to such pipes, conduits, tracks and other structures as provided in the Specifications.

GP-7.18 PERSONAL LIABILITY OF PUBLIC OFFICIALS

There shall be no liability upon the Director, Department of Transportation, the Engineer or other authorized City or State employees, agents or representatives while carrying out any of the provisions of the Contract, or in exercising any power or authority granted to them by or within the scope of the Contract. The aforesaid individuals shall not be held liable either in a personal or official capacity, it being understood that in all such matters they act solely as agents and representatives of the City or State.

GP-7.19 NO WAIVER OF LEGAL RIGHTS

The Administration and the City shall not be precluded or estopped by any declaration, statement, measurement, estimate, or certificate made either before or after the completion and acceptance of the work and payment therefor, from showing that any such declaration, statement, measurement, estimate or certificate is untrue or is incorrectly made, nor from showing that the work or materials do not, in fact, conform to the Contract. The Administration and the City shall not be precluded or estopped, notwithstanding any such declaration, statement, measurement, estimate or certificate and payment in accordance therewith, from recovering from the Contractor or his sureties, or both, such damage as it may sustain by reason of his failure to comply with the terms of the Contract. Neither acceptance by the Administration or the City, or representative of the Administration and the City, nor payment for, or acceptance of, the whole or any part of the work, any extension of time, or any possession taken by the Administration or the City, shall operate as a waiver of any portion of the Contract or of any power herein reserved or of any right to damages.

The waiver of any breach of the Contract shall not be held to be a waiver of any previous or subsequent breach.

GP-7.20 NON-DISCRIMINATION

In accordance with the requirements of the State Finance and Procurement Article of the Annotated Code of Maryland and the laws of Baltimore City, the Contractor agrees that he will not discriminate in any manner against any employee or applicant because of political or religious opinion or affiliation, sex, race, creed, color, age or national origin. The Contractor further agrees that he will comply with any additional requirements with respect to non-discrimination which may be imposed by amendments to State and City laws.

The Contractor agrees to include a similar clause with respect to non-discrimination in all subcontracts, except subcontracts for standard commercial supplies or raw material. The Contractor and subcontractor or subcontractors agree to post, in conspicuous places available to employees and applicants for employment, notices setting forth the provisions of the non-discrimination clause or clauses. The Contractor agrees to comply with all applicable provisions of Executive Order 01.01.1976.05, issued July 9, 1976, and any amendment thereto, which is incorporated by reference herein, as though a part hereof.

Failure by the Contractor or subcontractor(s) to include the Contract provisions or to comply with the non-discrimination provisions set forth above shall be grounds for the City to exercise its remedies pursuant to the laws of the State of Maryland and Baltimore City.

The Contractor agrees that he will comply with the Civil Rights Act of 1964 and Section 202 of Executive Order 11246 of the President of the United States of America as amended by Executive Order 11375, as applicable.

The Contractor agrees that he will comply with any additional provisions as to non-discrimination specified elsewhere in the Contract Documents.

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The Contractor and all subcontractors shall not engage in any employment practice prohibited by the Baltimore City Code, 1983 Replacement Volume, as amended.

The Contractor or any subcontractor shall not attempt, directly or indirectly, to commit any unfair employment practice; aid, abet, incite, compel or coerce the commission of any unfair employment practice as defined herein; or obstruct or prevent any person from complying with the provisions of the Baltimore City Code, 1983 Replacement Volume, as amended. Failure to adhere to the above shall constitute an unlawful employment practice.

In the event that a complaint shall be made against the Contractor or a subcontractor by a person claiming to have been the subject of an unlawful employment practice, in that he has been discriminated against in respect of hire, tenure or promotion, then in consideration of the City forbearing to take any other action to establish the alleged violation of the foregoing provisions and to claim a breach of the Contract thereunder and asserting its rights and pursuing any other remedies it might have because of such breach, the Contractor agrees that upon the following procedure being followed, he will abide by the determination made thereunder as hereinafter provided:

- (a) The person aggrieved shall file his complaint, in writing, duly verified, with the Engineer within seven days after the alleged discriminatory act has occurred.
- (b) The Engineer shall thereupon promptly investigate the complaint and may effect an amicable settlement thereon including, but not limited to, restitution, reinstatement or promotion, or failing that, shall make a finding of probable cause for the said complaint, or lack of it.
- (c) If the finding of the Engineer shall be that the complaint lacked probable cause, then he is empowered to dismiss said complaint and no further action shall be taken in the matter by the City. If the Engineer finds probable cause for the complaint and fails to effect an amicable adjustment thereof, the complaint shall be submitted to the Director, Baltimore City Department of Transportation for his final determination, as referee with the same powers granted him in the Contract with respect to other disputes. If the final determination is that the Contractor or subcontractor, if any, is guilty of the discriminatory act charged, then the Contractor and/or his surety on his bond shall be liable to the discrimination for all wages which he shall have lost because of such discriminatory act, and

the amount of such lost wages shall be determined by the Director, Baltimore City Department of Transportation, whose decision thereof shall be final and conclusive on the Contractor, his surety, the subcontractor, if any, and the discriminatee; and if there shall be any balance then due from the City to the Contractor, the amount of wages so determined to be due to the discriminatee may be withheld by the City (in addition to any other sums to which the City may be entitled to withhold under the Contract) until restitution of lost wages have been made by the Contractor to the discriminatee in accordance with the determination of the Director, Baltimore City Department of Transportation. The Contractor further agrees that such discriminatee shall have a right of action against said Contractor and/or his surety on his bond to recover the amount of lost wages by suit in law, in any competent court of jurisdiction.

The Engineer and Director, Baltimore City Department of Transportation, may utilize the services and seek the advice of any other agency of the City or employee thereof to assist them in making their determination hereunder.

The procedure and remedy outlined above is not to be construed as in any way depriving any person alleged to have been the subject of an unlawful practice, as defined herein, from pursuing any remedy he may have under law; nor shall such procedure or remedy be construed as preempting the right of the Baltimore Community Relations Commission to take such action as it is authorized to and may deem proper under the law.

The Contractor agrees to insert the above provisions, with respect to unlawful employment practices, into each of his subcontracts and to obtain the agreement of all his subcontractors thereto and to the procedure set forth above.

A brief statement giving notice of the foregoing provisions, entitled "Prohibition against Discrimination", approved by the City Solicitor, shall be posted in conspicuous places at and about the job site and at any hiring hall or place of employment from which the Contractor or subcontractor hires employees to work on the job site.

GP-7.21 SANCTIONS UPON IMPROPER ACTS

All Contractors, including all officers, partners, principals or employees, shall be bound by and adhere to any and all federal, state and Baltimore City laws and resolutions and will be subject to the penalties and sanctions relating to:

- (a) The procurement of work to be done or payment to be made under this contract;
- (b) Contracts with persons convicted of bribery, attempted bribery or conspiracy to bribe;
- (c) Disqualification for unfair labor practices;
- (d) Collusion for the purpose of defrauding the Federal, State or City governments;
- (e) Disqualification, suspension, debarment and reinstatement and;
- (f) Any and all other laws or resolutions dealing with the bidding for and award of this Contract including, but not limited to, fraud, delinquent taxes, unfair labor practices, hours and wages, building codes and safety standards within the industry.

GP-7.22 NON-HIRING OF EMPLOYEES

No employee of the State of Maryland or City of Baltimore or any department, commission, agency or branch thereof, whose duties as such employee include matters relating to or affecting the Contract shall, while so employed, become or be an employee of the party or parties hereby contracting with the State of Maryland, City of Baltimore or any department, commission, agency or branch thereof.

GP-7.23 CHOICE OF LAW

The Parties to the Contract agree that:

- (a) This Contract was made and entered into in Maryland and under the laws of Maryland.
- (b) The laws and rules of Maryland and Baltimore City shall govern the resolution of any issue arising in connection with this Contract, including, but not limited to, all questions concerning the validity of the Contract, capacity of the parties to enter therein; modification or amendment thereto; and the rights and obligations of the parties hereunder.

GP-7.24 CONTINGENT FEE PROHIBITION

The Contractor warrants that he has not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee or agent working for him, to solicit or secure this Contract and that he has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee or agent any fee or any other consideration contingent on the making of this Contract.

GP-7.25 COST AND PRICE CERTIFICATION

- (a) The Contractor shall submit cost or price information and shall certify that, to the best of his knowledge, the information submitted is accurate, complete, and current as of a mutually agreed date prior to the date the price of any:
 - (1) Negotiated contract is determined, if the total Contract price is expected to exceed \$100,000 or a smaller amount set by the Engineer or;
 - (2) Change Order or Contract modification is determined which is expected to exceed \$100,000, or a smaller amount set by the Engineer.

- (b) The price, including profit or fee, shall be adjusted to exclude any significant price increase occurring because the Contractor furnished cost or price information which, as of the date agreed upon between the parties, was inaccurate, incomplete or not current.
- (c) The Contractor or subcontractor shall maintain books and records that relate to the cost or pricing data for 3 years from the date of final payment under the Contract, unless a different period is authorized in the Contract. Any cost and pricing information submitted in accordance with **GP-7.25** shall be subject to the provisions of **BALTIMORE CITY LAW, EXECUTIVE ORDERS AND RULES**.

GP-7.26 CORPORATE REGISTRATION AND TAX PAYMENT CERTIFICATION

Corporations are required to execute a Certification of Corporation Registration and Tax Payment in the form included in the Contract Documents.

GP-7.27 BUY AMERICAN STEEL ACT

If the Contractor desires to utilize foreign steel and cement for any of the applicable items contained in the project, the Contractor shall comply with Section 169 of the Highway Act of 1982.

All bidders must submit a bid using domestic products for all items in this Contract. If the bidder elects, and additional alternate bid may be submitted using foreign products on one or more of the specific items in this Contract.

The Contract, if awarded, will be awarded to the responsible bidder who submits the lowest total bid for the Contract based on furnishing domestic products unless the bid exceeds the lowest total bid based on furnishing foreign products by more than twenty-five percent. Foreign steel products will not be permitted to be used as a substitute for domestic ones after the bid has been awarded.

GP-7.28 MINORITY BUSINESS ENTERPRISE AND AFFIRMATIVE ACTION

- (a) This Contract is subject to Executive Order 01.01.1970.15, December 9, 1970; amended by Order 01.01.1976.05, July 9, 1976 (Code of Fair Practices). This Contract is also subject to the applicable provisions of Title 14, Subtitle 3 of the State Finance and Procurement Article of the Annotated Code of Maryland; and provisions of COMAR 11.01 which incorporate by reference the current revision of the Minority Business Enterprise Program. Copies of the Minority Business Enterprise Program may be obtained from the Department of Transportation Fair Practices Officer, P.O. Box 8755, BWI Airport, Maryland 21240. This Contract is also subject to all applicable Federal and State laws and regulations pertaining to Minority Business Enterprise and Affirmative Action.
- (b) To the extent any of the above laws or regulations are applicable to this Contract, they are specifically incorporated herein.
- (c) **THIRD TIER CONTRACTING** – Two conditions must be met before any administration may approve a third tier contracting arrangement which may be entered into to meet an MBE goal.
 - (1) The Administration awarding the Contract must be satisfied that there is no way, except by third tier contracting, that an MBE goal can be achieved; The Contractor must request of the Director, Department of Transportation, in writing, prior to the award of the Contract, that approval be granted for each third tier contract arrangement. The request must contain specifics as to why a third tier contracting arrangement should be approved.

An Administration approving a third tier contract should do so in writing, setting forth the parameters of the contract. All records of the contract will be maintained by the Administration granting approval.

Third tier contracting to meet an MBE goal is to be considered the exception and not the rule.

GP-7.29 PREVAILING WAGE CONTRACTS FOR PUBLIC WORKS

When all, or a portion of, the cost of a project is funded by the U.S. Government and the cost of the project exceeds \$2,000, the minimum wage rates and benefits paid to workmen under the Contract shall be those prevailing in the locality as determined by the Secretary of Labor pursuant to the Davis Bacon Act (40 U.S.C.27a to a-7) and Regulations (29 CFR. Part 5) promulgated thereunder. Davis-Bacon rates applicable to this agreement, if any, are specified elsewhere in the Contract Document.

The bidder is hereby notified that all Minimum Wage Rates of the Mayor and City Council of Baltimore and the United States Department of Labor Wage Determinations shall be in force on all federally funded projects. However, if there is a conflict between the City and Federal wage rates, the higher wage rate will prevail.

In the event that any laborer, mechanic, or apprentice shall be paid less than the compensation to which he is entitled hereunder, the Contractor shall make restitution to the employee for the amount due and shall forfeit and pay to the City a penalty in the amount of Twenty-Five Dollars per day for each employee so underpaid, provided, however, that no penalty shall be assessed for wage violations to any individual which amount to a total of less than One Dollar in any payroll period. Each day's violation shall constitute a separate offense.

The above paragraphs do not apply to the trainees required on most federal-aid projects. The trainees and training programs are approved and supervised by the E.E.O. section of the Baltimore City Department of Transportation.

The Contractor's attention is directed to the fact that BC DOT will impose the Liquidated Damages listed in F.H.W.A. Form PR 1273, as amended, in addition to the penalties imposed by City Ordinance 348, for Violations of the Contract Labor Provisions.

(a) Enforcement

- (1) It shall be the responsibility of the contracting agency to promptly examine all weekly project payrolls submitted by Contractors and subcontractors working on the job site for compliance with the provisions of this subsection and the regulations promulgated in pursuance thereof and to report any irregulars to the Minimum Wage Commission.
- (2) The Minimum Wage Commission shall cause investigations to be made to determine whether there has been compliance with the provisions of this subsection and the regulations promulgated thereunder and contained in the Contract. The Contractor and subcontractor shall permit representatives of the City to observe work being performed at the work site, to interview employees and to examine the books and records relating to the payrolls on the project being investigated to determine the correctness of classifications, ratios of apprentices to mechanics and payment of proper regular and overtime rates as required. Alleged violations shall be investigated promptly and statements, written or oral, made by an employee shall be treated as confidential and shall not be disclosed to this employer without the consent of the employee. If necessary for the enforcement of this subsection, the Minimum Wage Commission may issue subpoenas, compel the attendance and testimony of witnesses and the production of books, papers, records and documents relating to payroll records necessary for hearings, investigations and proceedings. Any subpoena shall be served by the Sheriff of Baltimore City or any of his deputies. In case of a disobedience to a subpoena, the Minimum Wage Commission may apply to a court of appropriate jurisdiction for an order requiring the attendance and testimony of witnesses and the production of books, papers, records and documents, as the case may be, as relevant or necessary for such hearings, investigations or proceedings of the Minimum Wage Commission, and any failure to obey such order of court may be punishable by the court as contempt thereof.

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- (3) In the event the Board of Estimates determines, upon the recommendation of the Minimum Wage Commission, after notice and hearing, that any Contractor or subcontractor has failed to pay the minimum wage rate or has otherwise violated the provisions of this subsection and that such failure was intentional, no contract shall be awarded to such Contractor or subcontractor, or to any firm, corporation or partnership in which such Contractor or subcontractor has an interest until one year has elapsed from the date of such determination. Any intentional violation of the provisions of this subsection is a misdemeanor, punishable upon conviction by a fine or not more than Five Hundred Dollars. Proceedings before the Minimum Wage Commission shall not be considered a pre-condition to criminal prosecution under this subsection.

(b) Classification

Every laborer, mechanic and apprentice shall be properly classified, according to his trade and skill into a classification specifically set forth in the Contract, which classification has been established by the Board of Estimates as provided herein.

© Minimum Wage

- (1) Every mechanic, laborer and apprentice shall be paid no less often than once a week, without deduction or rebate on any account (except such payroll deductions as are directed or permitted by law, by a collective bargaining agreement or by a specific written consent or authorization for an employee), the full amount due at the time of payment computed at wage rates not less than the minimum hourly wage rate established by the Board of Estimates and the Federal Department of Labor, both wage rates to be set forth in the Contract, the higher wage rate to govern. No hourly employee, other than an apprentice, working directly upon the site of the work shall be paid less than the amount established for the lowest classification on the project. If a copy of such minimum hourly rates is not posted, the Contractor shall forfeit, and pay to the City, a penalty in the amount of Ten Dollars per day for each day on which the copy is not posted. Each day's violation shall constitute a separate offense.
- (2) The Contractor and every subcontractor shall pay every laborer, mechanic or apprentice compensation at the overtime rates established by the Board of Estimates, which shall not be less than one and one-half times the regular hourly rates of pay, for all hours worked in excess of eight hours in any workday; on a Saturday, Sunday or a legal holiday designated as an overtime holiday by the Board of Estimates. No overtime hours, however, shall be compensated for more than once and overtime shall be paid only on the regular hourly rate of pay and not on fringe benefits or their cash equivalents.

(a) Payrolls and Basic Records

The Contractor shall submit three complete copies of his weekly project payrolls and the weekly project payrolls of each of his subcontractors, consecutively numbered, not later than fourteen days from the end of their respective payroll periods. Two copies shall be sent to the Baltimore City Department of Transportation Project Engineer, the other to the Minimum Wage Commission of Baltimore City where the same will be available for public inspection during regular business hours. The weekly project payrolls shall contain the name of the Contractor and the subcontractor, if any; a designation of the project and location; the name, social security number and occupation of each employee; his classification in accordance with the classification fixed in the Contract; a designation of laborer, mechanic or apprentice; the number of hours worked daily by said employee at straight time and overtime and his hourly wage rate for each, the gross wages paid to said employee per week, and such other data as may be required by the Board of Estimates from time to time. The Contractor shall be responsible for the submission of all subcontractor's payrolls covering work performed directly at the work site. Each copy of the payroll shall be accompanied by a statement signed by the Contractor or subcontractor, as the case may be, indicating that the payroll is established by the Contract Proposal as set forth in the Contract, that the rates contained therein are not less than those established by the Contract Proposal as set forth in the Contract, that the classification set forth for each laborer, mechanic or apprentice conforms with the work he performed and that the Contractor and the subcontractor, as the case may be, has complied with the provision of this subsection.

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(b) Apprentices

- (1) On any project which is operating under a contract pursuant to the provisions of this subtitle, only competent mechanics and their apprentices of the trades, crafts and occupations involved shall be employed by the Contractor and his subcontractors on the project, provided that for each such project, the ratio of mechanics to apprentices for each trade, craft or occupation shall be as established by the Maryland Apprenticeship and Training Council in connection with an approved apprenticeship program.
- (2) Nothing in this subtitle shall prevent the employment of laborers to perform work not ordinarily performed by a skilled mechanic or his apprentice of trade, craft, or occupations, but no person receiving the rate of pay which is the prevailing rate for laborers shall perform work ordinarily performed by any such skilled mechanic or apprentice of such trade, craft or occupation.
- (3) The term “**Apprentice**”, as used in this subtitle, means a person at least sixteen years of age who has entered a written agreement with an employer, or his agent, an association of employees or an organization of employers, or a joint committee representing both, which shall state the trade, craft or occupation which the apprentice is to be taught and the time at which the apprenticeship will begin and end, provided that whenever an apprentice is employed on any project which is operating under a contract pursuant to the provisions of the subtitle, the minimum wage commission shall be notified of such employment. All such apprenticeship agreements shall be approved by the Maryland Apprenticeship and Training Council and certification of such approval shall be furnished to the Minimum Wage Commission.
- (4) Where a laborer performs the work ordinarily performed by any skilled mechanic or his apprentice, he shall be paid, for the entire time he has performed such work, at the minimum hourly wage rate applicable to a skilled mechanic. In the event of underpayment, restitution shall be made by the Contractor to said employee and, in addition, the Contractor shall be subject to a penalty as hereinafter set forth. If the Contractor or subcontractor utilizes more apprentices than permitted under the ratio established by this subtitle or utilizes a laborer to perform the work of a skilled mechanic or his apprentice, the Contractor shall forfeit and pay to the City a penalty in the amount of Ten Dollars per day for each violation. Each day’s violation shall constitute a separate offense.

GP-7.30 SMALL BUSINESS PROCUREMENTS

The provisions of “COMAR” 21.11.01 pertaining to small business set-asides shall not apply to this Contract.

GP-7.31 PLANT PEST REGULATIONS

The indiscriminate movement of nursery stock, mulch, equipment and soil into and out of Maryland constitutes a potential hazard to State and National agriculture. It shall be the responsibility of the Contractor to comply with all applicable State and Federal plant pest regulations in the fulfillment of this Contract.

Regulations may be obtained through the following offices:

State Entomologist
 University of Maryland
 College Park, Maryland 20740
 Telephone: (301)927-3800 ext. 262

U.S. Department of Agriculture
 Agriculture Research Services
 Plant Pest Control Division
 Plant Industry Station
 Administration Building – Room 415
 Beltsville, Maryland 20705
 Telephone: (301) 474-5500 ext. 391

GENERAL PROVISIONS – SECTION 8

PROSECUTION AND PROGRESS

GP-8.01 SUBCONTRACTING

Except as may be provided elsewhere in the Contract, the Contractor to whom a contract is awarded shall perform, with his own organization and with the assistance of workmen under his immediate supervision, work of a value of not less than 50 percent of the total original value of the Contract.

No portion of the Contract shall be subcontracted, assigned or otherwise disposed of except with the written consent of Department of Transportation. Any assignment, subcontractor or other disposition of all or part of this Contract, without the express written consent of the Director, DOT, shall be null and void. Consent to subcontract, assign or otherwise dispose of any portion of the Contract shall not be construed to relieve the Contractor or surety of any responsibility for fulfilling all the requirements of the Contract.

The Contract shall incorporate by reference, or otherwise include, these General Provisions in every subcontract issued pursuant to or under this Contract, **AND SHALL REQUIRE THAT THE SAME REFERENCE OR INCLUSION BE CONTAINED IN EVERY SUBCONTRACT ENTERED INTO BY ANY OF ITS SUBCONTRACTORS.**

Subletting will be permitted within limits of the Specifications when prequalified subcontractors are proposed following the opening of bids. Requests for subletting by a Contractor must be accompanied by a work capacity statement, plan and equipment questionnaire. The consent of surety for each subcontractor is also requested.

Credit will be given, to the maximum permitted, for all approved subletting under the Specifications.

Only prequalified subcontractors will be approved to perform subcontract work.

In all contracts jointly bid, all contractors will be held jointly and severally responsible for the performance of the entire Contract.

GP-8.02 NOTICE TO PROCEED

After the Contract has been executed, the Baltimore City Department of Transportation will, within the time limit specified elsewhere in the Contract Documents, issue a Notice to Proceed to the Contractor. The notice will stipulate when the Contractor is expected to begin work. The specified Contract Time shall begin on the date stipulated in the Notice to Proceed or, if an earlier start is authorized in the Notice to Proceed, on the day work (other than the erection of the inspection office, construction stakeouts, and mobilization) actually starts.

GP-8.03 PROSECUTION OF THE WORK

- (a) The Contractor shall begin work promptly within the time specified by the Engineer and shall notify the Engineer at least 48 hours before starting the work.
- (b) After the work has been started, it shall be prosecuted continuously on all acceptable working days without stoppage until the entire Contract is completed.
- (c) Should the Contractor wish to discontinue prosecution of the work for any reason, the Contractor shall notify the Engineer of his intention to stop and shall also notify the Engineer at least 24 hours in advance of resuming operations. Said notification shall be confirmed in writing.

GENERAL PROVISIONS FOR DESIGN-BUILD

GP-8.04 PROGRESS SCHEDULE

It will be the Contractor's responsibility to submit, in writing, a schedule of operations to the Chief of Transportation Engineering and Construction Division, Department of Transportation, and to obtain his approval before any work is done under this Contract.

- (a) Within 30 days after Notice to Proceed, the Contractor shall furnish the Engineer a progress schedule showing the proposed order of work and indicating the time required for the completion of the work. The progress schedule shall be used to establish major construction operations and to check on the progress of the work. The Contractor shall submit revised progress schedules as directed by the Engineer.

The Contractor, at his option, may submit a revised schedule of operations for approval by Construction Management, Baltimore City Department of Transportation. The final responsibility for work scheduling shall rest with the Contractor.

- (b) If the Contractor fails to submit the progress schedule within the time prescribed, or revised schedules within the requested time, the Engineer may withhold approval of progress payment estimates until the Contractor submits the required progress schedules.
- (c) If, in the judgement of the Engineer, the Contractor falls behind the approved schedule, the Contractor shall action to improve his progress. The Contractor may be required to increase the number of shifts, initiate or increase overtime operations, increase days of work in the work week or increase the amount of construction plant or any combination of the above as will enable the Contractor to get back on schedule.

The Engineer may require the Contractor to prepare supplemental or revised progress schedules for his review and approval, detailing specific operational changes to be instituted by the Contractor to regain the approved schedule. Such supplementary or revised schedules shall be prepared and submitted to the Engineer at no additional cost to the City.

Failure of the Contractor to comply with the requirements of the Engineer under this provision shall be grounds for a determination that the Contractor is not prosecuting the work with due diligence so as to complete the work within the time specified. Should such a determination be made, the Engineer may terminate the Contractor's right to proceed with the work, or any part thereof, in accordance with **GP-8.08**.

- (c) If the project completion date is a calendar date or based on calendar days, the Engineer shall not grant partial or complete winter shutdowns. Bidders should take this into consideration in preparing their bids, including the steps contained in (c) above to increase progress.

(e) Progress Photographs

- (1) The Contractor shall supply professional-quality color photographs to the Baltimore City Department of Transportation, as herein described. Photos shall be taken at as many locations as necessary to show the entire job site, as selected by the Engineer, as to the locations of the most visible change to be affected by the Contract. Photographs must be made by a professional photographer, knowledgeable in construction.
- (2) Photographs for the Contract shall include progress at off-site fabricating outfitting facilities.
- (3) It's anticipated that the number of photographs to be taken per month will not be more than fifteen. Photographs shall be taken between the 1st and 10th of each month, when possible, and delivered within a reasonable amount of time, but no later than the 10th of the following month. The photographs shall be digital and stores on a CD and be delivered to the Baltimore City Department

GENERAL PROVISIONS FOR DESIGN-BUILD

of Transportation at 417 East Fayette Street, Baltimore, Maryland 21202. Each photograph must be associated with a description containing:

- i. Contract and F.A.P. numbers
- ii. Identification and name of contract
- iii. Name of contractor
- iv. A brief description of location taken (station no. and direction of view)
- v. Date taken
- vi. Name of photographer

The cost of photography, including all items noted above, shall be considered incidental to the lump sum bid price for the Contract.

GP-8.05 LIMITATIONS OF OPERATION

The Contractor shall perform the work in a manner and in a sequence that will assure the least interference with the public at all times.

GP-8.06 CHARACTER OF WORKMEN, METHODS AND EQUIPMENT

The Contractor shall employ sufficient labor and equipment for prosecuting the work to completion in the manner and time required by the Contract.

Workmen must have sufficient skill and experience to properly perform the work assigned to them. Workmen engaged in special work or skilled work shall have sufficient experience in such work, and in the operation of the equipment required, to perform the work properly and satisfactorily.

Any person employed by the Contractor or by any subcontractor who, in the opinion of the Engineer, does not perform his work in a proper manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed from the job by the Contractor or subcontractor employing such person and shall not be employed again, in any portion of the work, without the approval of the Engineer. Should the Contractor fail to remove such person, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may withhold payments which are, or may become, due on the Contract until a satisfactory understanding has been reached.

Equipment used on the work shall meet the requirements of the work and produce a satisfactory quality of work. The Engineer may order the removal and replacement of unsatisfactory equipment.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the Contract, the Contractor is free to use any methods or equipment that he demonstrates, to the satisfaction of the Engineer, that will accomplish the work in conformance with the requirements of the Contract.

When the Contract specifies that the construction be performed by the use of certain methods and equipment, those methods and equipment shall be used, unless otherwise authorized by the Engineer in writing. If the Contractor desires to use a method or type of equipment other than that specified in the Contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformance with Contract requirements.

If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substituted methods or equipment and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment for the construction items involved or in Contract Time, as the result of authorizing a change in methods or equipment under these provisions.

GENERAL PROVISIONS FOR DESIGN-BUILD

GP-8.07 SUSPENSION OF WORK

- (a) The Engineer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work for a period of time deemed appropriate by Engineer, for the convenience of the City
- (b) If the performance of all, or any part of, the work is suspended, delayed, or interrupted by an act of the Engineer in the administration of this Contract for an unreasonable period of time, or by his failure to act within the time specified in the Contract or, if no time is specified, within a reasonable time, an adjustment shall be made for any increase in the cost of performance of the Contract (excluding profit) caused by that unreasonable suspension, delay, or interruption. The Contract shall be modified, in writing, accordingly.

No adjustment shall be made under this clause for any suspension, delay or interruption in the event that the work would have been suspended, delayed or interrupted by another cause, including the fault or negligence of the Contractor or for which an adjustment is provided for or denied, under any other provisions of the Contract.

- (c) No claim under this clause shall be allowed:
 - (1) For any costs incurred more than 20 days before the Contractor has notified the Engineer, in writing, of the act (or failure to act) involved, (This requirement shall not apply to a claim resulting from a suspension order.) and,
 - (2) unless the claim, in an amount stated, is asserted, in writing, as soon as practicable after the termination of a suspension, delay or interruption, but no later than the date of final payment under the Contract.

GP-8.08 TERMINATION FOR DEFAULT; DAMAGES FOR DELAY; TIME EXTENSIONS

- (a) If the Contractor refuses to, or fails to, prosecute the work or any part thereof with such diligence as shall insure its completion within the time specified in this Contract, or any extension thereof; or fails to complete the work within the time specified, the City may, by written notice to the Contractor, terminate his right to proceed with the entire work or the part of the work which has been delayed. The City may take over the work and prosecute the same to completion and may take possession of, and utilize in completing the work, the materials, appliances and plant as may be on the site which are required and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, he and his sureties shall be liable for any damage to the City resulting from his refusal or failure to complete the work within the specified time.
- (b) If liquidated damages are provided in the Contract and the City terminates the Contractor's right to proceed, the resulting damage shall consist of such liquidated damages for so long a time as may be required for final completion of the work **AND ANY INCREASED COSTS INCURRED BY THE CITY IN COMPLETING THE WORK.**
- (c) If liquidated damages are provided in the Contract and if the City does not terminate the Contractor's right to proceed, the resulting damage shall consist of these liquidated damages until the work is completed and accepted.
- (d) The Contractor's right to proceed may not be terminated nor the Contractor charged with resulting damages if:
 - (1) Delay in the completion of the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of public enemy, acts of the City or State in either their sovereign or contractual capacity, acts of another capacity, acts of another contractor in the performance of a contract with the City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or

GENERAL PROVISIONS FOR DESIGN-BUILD

delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractor or suppliers; and

- (2) The Contractor, within 10 days from the beginning of any such delay (unless the Engineer grants a further period of time before the date of final payment under the Contract), notifies the Engineer, in writing, of the causes of delay. The Engineer shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgement, the findings of fact justify such an extension. His findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in **GP-5.15** of the Contract.
- (e) If, after the notice of termination of the Contractor's right to proceed under the provisions of this clause, it is determined that the Contractor was not in default under its provisions, or that the delay was excusable under its provisions, the rights and obligations of the parties shall be the same as if the notice had been issued pursuant to the clause, if the Contract contains a clause providing the termination of the Contract for the convenience of the City. If the Contract does not contain a clause providing for termination for convenience of the City, the Contract shall be equitably adjusted to compensate for the termination and the Contract shall be modified accordingly. Failure to agree to the adjustment shall constitute a dispute concerning a question of fact within the meaning of **GP-5.15, "Disputes"** clause of the Contract.
- (f) The rights and remedies of the City provided in this clause are in addition to any rights or remedies provided by law or elsewhere in the Contract.
- (g) The term "subcontractors or suppliers", as used in paragraph (d)(1), means subcontractors or supplier at any tier.

GP-8.09 LIQUIDATED DAMAGES

Time is an essential element of the Contract and it is important that the work be vigorously prosecuted until completion. For each day that any work shall remain uncompleted beyond the time specified in the Contract, the Contractor and his surety shall be liable for liquidated damages in the amount provided for in the solicitation, provided, however, that due account shall be taken of any adjustment of Completion Time modified by approved Change Orders.

GP-8.10 TERMINATION FOR CONVENIENCE OF THE CITY

- (a) Performance of work under the Contract may be terminated by the City in accordance with this clause, in whole or in part, whenever the Engineer shall determine that such termination is in the best interest of the City. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the Contract is terminated and the effective date of termination.
- (b) After receipt of Notice of Termination, except as otherwise directed by the Engineer, the Contractor shall:
 - (1) Stop work under the Contract on the date and to the extent specified in the Notice of Termination;
 - (2) Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of the portion of the work under the Contract that is not terminated;
 - (3) Terminate all orders and subcontracts to the extent that they relate to the work terminated by Notice of Termination;
 - (4) Assign to the City, in the manner, at the time, and to the extent directed by the Engineer, all of the right, title and interest under the terminated orders and subcontracts, in which case the City shall have the right to settle or pay any or all claims arising out of the termination of such orders and subcontracts;
 - (5) Settle all outstanding liabilities and all claims arising from the termination of orders and subcontracts with the approval or ratification of the Engineer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;
 - (6) Transfer title and deliver to the City in the manner, at the time and to the extent directed by the Engineer, fabricated or unfabricated parts, work in process, completed work, supplies and other

material produced as part of, or acquired in connection with, the performance of the work terminated by the Notice of Termination and the completed or partially completed plans, drawings, information and other property which, if the Contract had been completed, would have been required to be furnished to the City;

- (7) Use his best effort to sell, in the manner, at the times, to the extent and at the price directed or authorized by the Engineer, any property of the types referred to in (6), above. The Contractor will not be required to extend credit to any purchaser and, may acquire any such property under conditions prescribed by, and at a price approved by the Engineer, and provided further that the proceeds of any transfer or disposition of property shall be applied in reduction of any payments to be made by the City to the Contractor under the Contract or shall otherwise be credited to the price or cost of the work covered by the Contract, or paid in such other manner as the Engineer may direct;
- (8) Complete performance of such part of the work as may not have been terminated by the Notice of Termination; and take such action as may be necessary, or as the Engineer may direct, to protect and preserve the property related to this Contract which is in his possession and in which the City has, or may acquire, an interest. The Contractor may submit a list certified as to quantity and quality of any or all items of termination inventory not previously disposed of the engineer., exclusive of items the disposition of which have been directed or authorized by the Engineer, and may request the City to remove such items or to enter into a storage agreement covering them. Not later the 15 days thereafter, the City shall accept title to such items and remove them or enter into a storage agreement covering the same, provided that the list submitted shall be subject to verification by the Engineer upon removal, or if the items are stored, within 45 days from the date of submission of the list Any correction to list shall be made prior to final settlement and preserve the property related to this Contract which is in his possession and in which the City has, or may acquire, an interest. The Contractor may submit a list certified as to quantity and quality of any or all items of termination inventory not previously disposed of to the Engineer, exclusive of items the disposition of which have been directed or authorized by the Engineer, and may request the City to remove such items or to enter into a storage agreement covering them. Not later than 15 days thereafter, the City shall accept title to such items and remove them or enter into a storage agreement covering the same, provided that the list submitted shall be subject to verification by the Engineer upon removal, or if the items are stored, within 45 days from the date of submission of the list. Any correction to the list shall be made prior to final settlement.
- (c) After receipt of a Notice of Termination, the Contractor shall submit his termination claim to the Engineer, in the form and with the certification prescribed by the Engineer. The claim shall be submitted promptly, but in no event later than one year from the effective date of termination unless extensions, in writing, are granted by the Engineer at the request of the Contractor. Requests must be written and submitted within one year or in an authorized extension thereto. If the Engineer determines that the facts justify such action, he may act upon a termination claim at any time after the one-year period or extension thereto. Upon failure of the Contractor to submit his termination claim within the time allowed, the Engineer may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay the Contractor the amount determined.
- (d) Subject to the provisions of paragraph (c), the Contractor and the Engineer may agree upon the whole or any part of the amount to be paid to the Contractor by reason of the total or partial termination of work pursuant to this clause. The amount may include a reasonable allowance for profit on work done; provided, that the agreed amount, exclusive of settlement costs, shall not exceed the total Contract price, as reduced by the amount of payments otherwise made, and as further reduced by the Contract price for work not terminated. The Contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph (e) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Engineer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amounts which may be agreed upon to be paid to the Contractor pursuant to this paragraph.

GENERAL PROVISIONS FOR DESIGN-BUILD

(e) In the event of the failure of the Contractor and the Engineer to agree, as provided in paragraph (d), upon the entire amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Engineer shall pay the Contractor the following amounts, determined as follows, with no duplication of any amounts agreed to in accordance with paragraph (d).

- (1) With respect to all contract work performed before the effective date of the Notice of Termination, the total (without duplication of any items) of:
 - i. The cost of the work;
 - ii. The cost of settling and paying claims arising from the termination of work under subcontracts or orders as provided in paragraph (b)(5) above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractors before the effective date of the Notice of Termination of work under the Contract, which amounts shall be included in the cost of which payment is made under (a) above; and
 - iii. A sum, as profit on (a) above, determined by the Engineer to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed under this subdivision (c) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of a loss; and
- (2) The reasonable cost of the preservation and protection of property, incurred pursuant to paragraph (b)(9) above, and any other reasonable cost incidental to termination of work under this Contract, including expenses incidental to the determination of the amount due to the Contractor as the result of the termination of work under the Contract.

The total sum to be paid to the Contractor under (1) above, shall not exceed the total Contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of work not terminated. Except for normal spoilage, and except to the extent that the City shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under (1) above, the fair value, as determined by the Engineer, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the City, or to a buyer pursuant to paragraph (b)(7).

- (f) Costs claimed and agreed to shall be in accordance with applicable City, State and local laws, regulations and ordinances.
- (g) The Contractor shall the right of appeal under the clause of these Specification entitled “Disputes”, from any determination made by the Engineer, unless he ahs failed to submit his claim within the time provided herein and has failed to request an extension of time.

In any case where the Engineer has made a determination of the amount due Contractor, the City shall pay to the Contractor the following:

- (1) If there is no right of appeal hereunder or if no timely appeal has been made, the amount determined by the Engineer; or
 - (2) If an appeal has been taken, the amount finally determined by the Engineer.
- (h) In arriving at the amount due the Contractor under this clause, there shall be deducted:
- (i) All unliquidated advances, or other payments or accounts made to the Contractor, applicable to the terminated portion of the Contract.
 - (2) Any claim which the City may have against the Contractor in connection with the Contract,; and
 - (3) The agreed price for, or the proceeds of sale of, any materials, supplies or other things acquired by the Contractor or sold, pursuant to the provisions of this clause and not otherwise recovered by, or credited to, the City.

- (i) If the termination hereunder is partial, the Contractor may file a claim with the Engineer for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the Notice of Termination). Equitable adjustment, as may be agreed upon, shall be made in price or prices. Any claim by the Contractor for an equitable adjustment under this clause shall be asserted within ninety days from the effective date of the termination notice, unless an extension is granted in writing by the Engineer.
- (j) The City may from time to time, under such terms and conditions as it may determine, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of the Contract whenever, in the judgment of the Engineer, the aggregate of such payments shall be within the amount to which the Contractor would be entitled to hereunder.
- (k) Unless otherwise provided for in the Contract or by applicable statute, the Contractor shall, from the effective date of termination until three years after final settlement of the Contract, preserve and make available to the City, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under the Contract and relating to work terminated hereunder or, to the extent approved by the Engineer, photographs, microphotographs or other authentic reproductions thereof.

GP-8.11 SUCCESSFUL TERMINATION OF CONTRACTOR'S RESPONSIBILITY

A Contract will be considered as successfully fulfilled when the work has been completed in accordance with the terms of the Contract, when Final Acceptance has occurred, when Final Payment has been authorized, when all of the obligations of the Contractor and his surety have been complied with and when Final Payment has been made.

GENERAL PROVISIONS – SECTION 9

PAYMENT

GP-9.01 SCOPE OF PAYMENT

The payment of any partial estimate or of any retained percentage, except by and under the approved final estimate and voucher, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damages due to such defects.

Payment to the Contractor and any subcontractor with a lower tier subcontract under this section for materials on hand in no way will be construed as acceptance by the City of title to the material. Title shall remain with the Contractor until the project has been completed and accepted in accordance with **GP-5.13**.

The Contractor shall indicate his Federal Tax Identification Number or Social Security Number on the face of each invoice billed to the City.

On contracts in excess of \$25,000, the Contractor, and any subcontractor with a lower tier subcontract, prior to receiving a progress or final payment under the Contract, shall first certify in writing that he has made payment from proceeds of prior payments and that he will make timely payments from the proceeds of the progress

the final payment due him, to his subcontractors and suppliers in accordance with his contractual arrangements with them and State Finance and Procurement Article 17-106 and the laws of Baltimore City. This certification may be required by the Engineer for contracts of \$25,000 or less.

The Contractor shall also obtain from each subcontractor a certification that it has made payment from proceeds of prior payments to any of its lower tier subcontractors, and will make timely payments to its lower tier subcontractors and suppliers in accordance with its contractual arrangements with them. This certification is not required from subcontractors who have no lower tier subcontracts. These certifications may be required by the Director, Department of Transportation, for contracts of \$25,000 or less.

In addition to any other remedies provided by law or this Contract, any Contractor or subcontractor of any tier who fails to make payments required by the certifications set forth above within thirty days from the date such payment is due, shall be obligated to include with such payment, interest at the rate of 10% per annum from the date payment was due to the date the payment was actually made to the subcontractor or lower tier subcontractor.

GP-9.02 PROGRESS PAYMENTS

(a) Current Estimates

- (1) Lump Sum Contracts.** If requested by the Baltimore City Department of Transportation, the Contractor shall furnish an acceptable breakdown of the Lump Sum Contract price showing the amount included therein for each principal category of the work. The breakdown shall be in sufficient detail to provide a basis for estimating monthly progress payments.
- (2) Monthly Estimates.** Each month, the City will pay the Contractor for the Contract value of the work satisfactorily performed during the preceding calendar month, including authorized extras and additions, less 5%. The 5% of the total Contract value retained by the City will not be released until final payment unless partially released in a semi-final payment). Current estimates will be based upon the Engineer's estimate of work, including materials and/or equipment, complete in place, satisfactorily performed. For lump sum items, the Engineer's estimate shall be the proper fraction of the lump sum items satisfactorily performed during the preceding month. All quantities, estimates and fractions will be reasonably accurate approximations and are subject to correction, (a), in subsequent current estimates, (b), in any semi-final estimate, and (c), in final payment. Any and all partial payments may be withheld in the event requirements of the Specifications have not been

complied with by the Contractor. Should the Engineer or the Contractor be of the opinion that any estimates, quantities and/or fractions (either as to an individual current estimate or accumulations thereof) do not represent a reasonably accurate approximation of actual work, then details questioned shall be reviewed and any modifications will be incorporated in the next estimate.

- (3). **Retained Funds.** For the purpose of this Contract, Section TC-7.05 PROGRESS PAYMENTS, Subsection (a) Current Estimate, Paragraph (3) Variable Retainage of the State Specifications will not apply. The Contract value of work satisfactorily performed during the preceding calendar month will be paid to the Contractor, less 10%. When such 10% Retainage amounts to 5% of the total contract value, plus authorized extras and additions, no further Retainage will be deducted from the monthly payments due the Contractor. Pursuant to the City of Baltimore Guidelines for the Performance Evaluation of Design Consultants and Construction Contractors, a Contractor achieving two consecutive "A" evaluations can request that the retainage for the Contract be reduced from 5% to 1.5% at the 50% payment earned (excluding stored material) milestone. The request shall be accompanied by a document from the Surety indicating approval of said reduction. A Contractor shall remain eligible for this reduction in retainage by maintaining an "A" rating. If a subsequent evaluation is less than an "A" rating, 10% monthly retainage shall re-commence until retainage again amounts to 5% of the Contract value. Retainage will not be released until final payment (unless partially released in a semi final payment). When the amount earned during any month or period, less the appropriate retained percentage shall be less than Five Hundred Dollars (\$500.00). The appropriate retained percentage shall be deducted from each and every estimate made under the entire Contract and shall be retained until final completion of all work covered by the Contract, notwithstanding any provision to the contrary that may appear in the Contract documents. Upon completion of the contract, retainage due will be paid to the Contractor to the extent which the Contract is entitled.

(b)Semi-Final Estimate Payments

- (1) Upon completion of the project and the acceptance by the City of the project for maintenance, the City, at the Contractor's request and with consent of surety, will pay the Contractor, within 60 calendar days of said request, what is hereby known as a semi-final estimate payment. Such a semi-final estimate payment will be based upon **a**), quantities the City has computed and set up as proposed final quantities and **b**), a reasonably accurate estimate of those quantities for which the Baltimore City Department of Transportation has not yet completed computations. The quantities which the City sets forth as proposed final quantities shall be so designated. To arrive at the amount of semi-final estimate payment, there shall be deducted from the apparent estimated value of the Contract **a**), the total of all amounts previously paid to the Contractor as current estimates and **b**), sums deemed chargeable against the Contractor, properly deductible, including liquidated damages, and as a retainage, a sum not less than 1% of the total value of the Contract.
- (2) In cases where there has been substantial completion of the project and there are only inconsequential or minor work items remaining such as painting, seeding, mulching, or planting to be completed and such items cannot be completed for an extended period of time because of seasonal or weather conditions, a semi-final inspection shall be made and if the work completed is found to be satisfactory by the Baltimore City Department of Transportation, then there shall be deemed to the Partial Acceptance on the entire project except for the uncompleted work. The City, within 60 days of Partial Acceptance, upon request of the Contractor and with consent of surety, shall pay to the Contractor, what is hereby known as a partial semi-final estimate payment. Such a semi-final estimate payment will be based upon **a**), quantities the Baltimore City Department of Transportation has computed and set up as proposed final quantities and **b**), a reasonably accurate estimate of those quantities for which the Baltimore City Department of Transportation has not yet completed computations. The quantities the Baltimore City Department of Transportation sets forth as proposed final quantities shall be so designated.

To arrive at the amount of semi-final estimate payment, there shall be deducted from the estimated value of the Contract **a**), the total of all amounts previously paid to the Contractor as current

estimates, and **b**), sums deemed chargeable against the Contractor, properly deductible, including liquidated damages, and as a retainage, a sum equal to 1% of the total value of the Contract. (Said retainage is not to be less than \$2,000).

At the time of final payment, any retainage due from the time of payment of the semi-final estimate shall be paid to the Contractor.

GP-9.04 FINAL ACCEPTANCE AND FINAL PAYMENT

(a) When the Contractor has completed a Contract and it has been accepted for maintenance in accordance with the provisions of **GP-5.13**, the Baltimore City Department of Transportation will promptly proceed:

- (1) To make any necessary final surveys;
- (2) To complete any necessary computation of quantities; and
- (3) To submit to the Contractor, a tabulation of the proposed final quantities and a list of deficiencies which he is required to correct prior to the issuance of a materials clearance, within 60 days after final completion and acceptance of the project by the Engineer for maintenance. The tabulation will be accompanied by a statement setting forth the additional work performed under Change Orders and/or supplemental agreements; the authorized extension of time; the number of days which have been charged against the Contractor as having been used to complete the Contract; and any deductions, charges or liquidated damages which have been made or imposed.

(b) The Contractor shall have 30 calendar days, dating from the date upon which he receives the above mentioned tabulation from the Baltimore City Department of Transportation, in which to decide whether he will accept Final Payment upon such a basis and to notify the Baltimore City Department of Transportation, in writing, of his decision. The Contractor may request an additional period, up to ten calendar days, in which to notify the Baltimore City Department of Transportation of his decision.

If the Contractor notifies the Baltimore City Department of Transportation that he objects to Final Payment on such a basis, the notification shall outline the reasons for the objections.

(c) Upon receipt of a notification of acceptance as provided for in paragraph (b) above, final acceptance of a completed Contract will be contingent upon the following conditions:

- (1) The Baltimore City Department of Transportation's acceptance for maintenance.
- (2) The City's Materials Clearance Authorization.

When the above conditions have been met, the City will promptly proceed to prepare the Final Estimate and Final Payment forms and submit them to the Contractor. The forms shall show all data noted in Paragraph (a) above, together with deductions for all prior payments. The Contractor shall execute the forms and return them to the Baltimore City Department of Transportation within 30 calendar days from the date they are received for execution and payment. If signed forms are not received by the Baltimore City Department of Transportation within the specified time, the Baltimore City Department of Transportation will prepare duplicate forms for execution and payment. Such action by the Baltimore City Department of Transportation shall be deemed to constitute acceptance and Final Payment

(d) If, under the provision of Paragraph (b) above, the Contractor notifies the Baltimore City Department of Transportation his objections and non-acceptance of the data submitted to him, the Baltimore City Office sportation shall pay the Contractor a semi-final estimate, or an additional semi-final estimate in the event a semi-final estimate has already been paid, based upon the data noted in Paragraph (a) above, with deductions for all prior payments. A retainage equal to 1% of the total value of the Contract shall be withheld by the Baltimore City Department of Transportation.

(e) In the event the Contractor does not accept the data submitted to him as described in Paragraph (a)

above and/or has a claim outstanding filed in accordance with **GP-5.14**, the Engineer and the Contractor shall confer at mutually convenient times and endeavor to reconcile all points of disagreement expeditiously. If such reconciliation is accomplished, the Baltimore City Department of Transportation will promptly proceed with acceptance and Final Payment on the reconciled basis and in accordance with the provisions of Paragraph (c) above.

- (f) If the reconciliation is not accomplished by the Contractor and the Engineer, and the Contractor is still not satisfied, the Contractor must pursue review of the Engineer's decision in accordance with **GP-5.15**, "Disputes".

GP-9.05 LATE PAYMENTS

- (a) Payments for semi-final estimates shall be made within 30 days of the date when the amount becomes due and payable as evidenced by the signature of the Chief, Department of Transportation.

Payments for final estimates shall be made within 30 days of the date when the Contract amount becomes due and payable as evidenced by the signature of the Director, Department of Transportation.

- (b) A proper invoice shall include a description of the items or services provided, the date the goods were received or the inclusive dates the services were rendered, the Contract prices and retention, if any. It shall also include the basis for the billing, the Contract or Purchase Order number, the Contractor's Federal Tax Identification Number of Social Security Number and the name and address of the proper invoice recipient.

- (c) For the purposes of this Contract, an amount will not be deemed due and payable if:

- (1) The amount invoiced is inconsistent with the Contract.
- (2) The proper invoice has not been received by the person or office specified in the Contract.
- (3) The invoice, or performance under the contract, is in dispute or the Contractor has failed to otherwise comply with the provisions of the Contract.
- (4) Items or services have not been accepted.
- (5) The quantity of items delivered is less than the quantity invoiced.
- (6) The items or services do not meet the quality requirements of the Contract.
- (7) The Contract provides for progress payments and the proper invoice for the progress payment has not been submitted pursuant to the schedule contained in the Agreement.
- (8) The Contract provides for withholding a retainage and the invoice is for the retainage and all conditions for release of the retainage have not been met.
- (9) The Contractor has not submitted satisfactory documentation, or other evidence reasonably required by the Engineer or by the Contract, concerning performance under the Contract and compliance with its provisions.

**SPECIAL PROVISIONS
NOTICE TO CONTRACTOR**

NOTICE TO CONTRACTOR

EARLY SUBMISSIONS. The latest sentence of the first paragraph of TC-5.02, “No work shall be started before receipt of the Notice to Proceed” shall not apply to the following:

After notification to the Contractor from Baltimore City that the Contractor is the apparent successful bidder, the Contractor will be permitted to provide a written request to the Engineer to submit documentation for materials sources and working drawings for any items of work that have a long lead time and could jeopardize the project schedule. Upon written approval from the Engineer the Contractor may submit the applicable documentation to the Engineer.

Should the Contract not be awarded to the apparent successful bidder who meets the requirements of the Contract, GP-8.10 will apply for all costs accrued for the preparation and approval of the working drawings and any resultant materials purchase approved by Baltimore City and steel fabricated in conformance with the approved working drawings between the date the Contractor received notice of apparent successful bidder and the date of notice that the apparent successful bidder will not be awarded this Contract.

Should this Contract not be awarded to the apparent successful bidder due to failure of the Contractor to comply with all award and execution requirements, all costs accrued for the preparation of the specific items and any resultant material purchased and steel fabrication shall be borne by the Contractor.

Failure of the Contractor to submit the early submissions will not be basis for delaying issuance of the Notice to Proceed or be considered a reason for a time extension.

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TERMS AND CONDITIONS

TC SECTION 2

**BIDDING REQUIREMENTS AND CONDITIONS FOR COMPETITIVE SEALED
PROPOSALS (DESIGN-BUILD)**

TC-2.06 PARTNERING

DELETE: This entire section.

INSERT: The following:

Partnering on this project will be mandatory. The partnership will be structured to draw on the strengths of each organization through open communication, teamwork and cooperative action to identify and achieve mutual goals. The objective is to create an atmosphere of trust and honest dialogue among all stakeholders. This partnership will not change the legal relationship of the parties to the Contract nor relieve any party from any of the terms of the Contract.

The Baltimore City's Project Manager, the Project Design Engineer and the Design-Builder's management representative will organize a partnering project team. Persons recommended being on the team and guidelines for partnering are included in the Partnering Field Guide at www.mdqi.org.

The kick-off workshop meeting will be held soon after execution of the Contract. All stakeholders will attend the kick-off workshop to develop and commit to the Partnering Charter and Issue Resolution process. Follow-up meetings will be held monthly by the Design-Builder and Baltimore City, with other stakeholders attending as needed.

Measuring the partnering on the project is a key element to its success. All stakeholders will participate in the process. The Partnering Project Rating form will be completed monthly and then entered into Baltimore City's Partnering Data Base. Summaries of the ratings will then be shared with the team. Baltimore City's and Design-Builder's management team will review the partnering ratings and intervene if necessary on a monthly basis.

All cost of partnering meetings shall be included in the Design-Builder's lump-sum price for this Contract.

TC 2.07 REQUEST FOR PROPOSALS (RFP)

The Request for Proposals- Technical Proposal / Price Proposal for this Project is structured to provide the best overall value for Baltimore City. This Contract is a Lump Sum, design-build contract procured using the "Competitive Sealed Proposals" procurement method as defined in the Code of Maryland Regulations (COMAR) 21.05.03. The intent of Baltimore City is to award the Contract to the Proposer that submits the Proposal that is determined to be the most advantageous to Baltimore City considering the evaluation factors set forth in the RFP.

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Selection by the “Competitive Sealed Proposals” approach is a combination of the submitted Price Proposal and the submitted Technical Proposal score as determined by the Baltimore City Department of Transportation’s Proposal Evaluation Team. The submitted Price Proposal will NOT be considered until the evaluation for all Technical Proposals has been completed.

Baltimore City has a right to reject all proposals.

2.07.01 Design-Build Concept

Baltimore City Department of Transportation (referred hereafter as “Baltimore City” or “City”) is soliciting Technical Proposals and Price Proposals for the Central Avenue Streetscape and Harbor Point Connector Bridge, TR12317. This project is located in Baltimore City, Maryland. The basis of payment for this work will be “lump sum” which price shall include all costs associated with permitting, design and construction of the project in accordance with the requirements of this RFP.

The use of the term “Contractor” or “Design-Builder” within the Contract Documents furnished by Baltimore City shall be taken to mean Design-Build (D/B) Contractor. These terms are interchangeable.

The use of the term "Designer" or "Design-Build Engineer," within the Contract Documents furnished by Baltimore City, shall be taken to mean the Engineer of Record working for the Design-Build Contractor. The use of the term "Engineer," within the Contract Documents furnished by Baltimore City, shall be as defined in Section GP-1.03 of the General Provisions for Design-Build and other contract provisions included in this RFP.

2.07.01.1 Prequalification, Limitations on Participation by Certain Firms, and Conflicts of Interest:

1. All proposers participating on the Design-Build proposal shall be pre-qualified by the Office of Boards and Commissions in accordance with the policies in effect at the time of the proposal. At a minimum, the Principal Participant(s) and all named design firms and design subconsultants shall be prequalified as of the Statement of Qualifications submission date. Provided that all member firms of a joint venture are individually prequalified, the joint venture entity is not required to be pre-qualified.

2. Any person that has or will receive monetary compensation as a consultant or subconsultant under a contract with the City or Harbor East Development Corporation to develop the conceptual plan, RFP, and/or has been retained to review the City’s or Harbor East Development Corporation’s proposed contract documents or conduct value engineering analyses for this procurement, or any Person that is the employer of an individual that has been so retained, may not submit a Proposal for this procurement or be part of any Proposer submitting a proposal. The violation of this paragraph shall result in a Proposer not being considered responsive in the submission of its bid or proposal.

3. Participation by any of the following Persons on more than one Proposal will be deemed an organizational conflict of interest disqualifying the affected Proposers:

- i. Principal Participant, Designer, subconsultant responsible for performing more than 15% of the design

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- ii. Subcontractor responsible for performing more than 20% of the construction
- iii. an Affiliate of any such Person in i. and ii.

All Proposers affected by the conflict of interest will be disqualified, even if a Proposer is unaware of the conflict of interest, or if the Person or Affiliate causing the conflict is intended to have a different or lesser role than that described above. The violation of this paragraph shall result in a Proposer not being considered responsive in the submission of its bid or proposal.

4. By submitting its Proposal, each Proposer agrees that, if an organizational conflict of interest is thereafter discovered, the Proposer must make an immediate and full written disclosure to the City that includes a description of the action that the Proposer has taken or proposers to take to avoid or mitigate such conflicts. If an organizational conflict of interest is determined to exist, the City may, at its discretion, cancel the contract. If the Proposer was aware of an organizational conflict of interest prior to the award of the Contract and did not disclose the conflict to the City, the City may terminate the Contract for default.

5. Where it is found that the requirements of paragraph 2 or 3 of this Section would unreasonably restrict competition or limit the participation of specialty consultants, subconsultants, suppliers or construction firms, the contracting agency with approval from the Design Build Executive Committee may request the Board of Estimates to waive the relevant portions of this Section. Any such waiver shall be prominently indicated in the RFP.

The following is a list of consultants and/or subconsultants that have received monetary compensation under a contract with Baltimore City or Harbor East Development Corporation as design consultants to develop the concept plan, or have been retained by Baltimore City or Harbor East Development Corporation to perform construction phase services or a Value Engineering analysis on the behalf of Baltimore City for this procurement. Baltimore City makes no representations regarding the completeness of the list:

- A. Whitman, Requardt & Associates, LLP
- B. Mahan Rykiel Associates, Inc.
- C. Sabra, Wang & Associates, Inc.
- D. Rummel, Klepper & Kahl, LLP
- E. STV, Inc.
- F. Parsons Brinkerhoff
- G. Jacobs Engineering Group Inc.
- H. Ayers Saint & Gross Architects

Restrictions on participating in City procurements are also imposed by the Baltimore City Public Ethics Law (City Code Article 8). In relevant part:

- 1. If a person assisted the City in the drafting, development, or issuance of specifications, an invitation for bids, a request for proposals, a request for qualifications, or any other

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document related to a procurement, that person and anyone who employs that person is prohibited from (i) submitting a bid or other response for that procurement or (ii) assisting or representing another person who is submitting a bid or other response for that procurement. (Art. 8, § 6-38.)

2. A former City employee or official may not assist or represent a party in a case, contract, or other specific matter that involves the City if the matter is one in which the former City employee or official significantly participated while with the City. (Art. 8, § 6-22(a).)

A violation of either restriction subjects the offender(s) to various administrative and judicial sanctions. Administrative sanctions include (but are not limited to): (i) rejection of a bid or other response for a procurement and (ii) termination of a contract for cause.

Questions about the scope and applicability of these restrictions should be directed to the Baltimore City Ethics Board, 626 City Hall, Baltimore, Maryland 21202 (410-396-4730).

2.07.02 Project Description

The project consists of the design and construction of the Central Avenue Streetscape and Harbor Point Connector Bridge, TR12317. The project limits are from approximately 200 feet south of Baltimore Street to the Harbor Point development site. The scope of the project includes full-depth roadway reconstruction, sidewalk reconstruction, ADA-compliant pedestrian ramps and driveway entrances, storm drain, streetscape, electrical conduit ductbank, water and sanitary upgrade, street lighting, signal upgrade, ITS, signing and pavement markings, landscaping, replacement of existing Bridge Nos. BC 8019 on Aliceanna Street over Harford Run and BC 8020 on Fleet Street over Harford Run, as well as structural repairs and strengthening of existing Bridge Nos. BC 1555 on Central Avenue over Harford Run (located between Lancaster Street and Aliceanna Streets), BC 1255 on Central Avenue over Harford Run (located between Aliceanna and Fleet Streets), and the repair of existing small structure on Central Avenue over Harford Run (located between Fleet Street and Eastern Avenue). As an Alternative Technical Concept to the structural replacement, repair, and strengthening work to the specified structures, the Design-Builder may propose to construct a structural lining system within the maximum typical section limits as identified between Fleet Street and Lancaster Street. The contract also includes construction of a new bridge connecting Central Avenue at Lancaster Street to the proposed Harbor Point development site. The streets that cross Central Avenue transversely within the project limits shall tie in with the proposed grade of Central Avenue through pavement reconstruction or wedging/overlaying. The existing structure, BC8018 carrying Lancaster Street over Harford Run, requires strengthening to carry the modified profile of Central Avenue onto the Harbor Point Connector Bridge.

Of primary importance to Baltimore City for this project is the opening of the Harbor Point Connector Bridge by **June 2015**.

The overall concept design must be evaluated and design completed by the Design-Builder to ensure all project requirements are met including drainage and stormwater management all within the right of way. The completion of the project documents shall be performed by the

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Design-Builder and approved by Baltimore City, subject to language included elsewhere in this Request for Proposal.

The current status of aspects of the project is as outlined hereafter.

2.07.02.1 Survey

A contour surface model and topographic base map were prepared on the basis of data collector field surveys. This information is available in electronic format. All surveys were performed in the Baltimore City Survey Control System. The Design-Builder must obtain all additional survey data necessary for their design, construction, and verification of surface model for all design activities.

2.07.02.2 Plans

A set of conceptual plans for the proposed highway and bridge replacement construction, as well structural repairs to and strengthening of the existing bridges has been prepared in Microstation V8i. Files are available in electronic format. Baltimore City makes no guarantees regarding the accuracy or completeness of these plans.

2.07.02.4 Geotechnical

Baltimore City has obtained soil borings at selected locations along the project corridor and performed laboratory testing of the samples. The boring logs and laboratory test data are included as supplemental information as part of the Contract Documents. Additional borings and test data were taken to support unrelated work on the Harbor Point site by entities not associated with Baltimore City. This information is provided to supplement the information provided by the borings taken by Baltimore City.

The subsurface studies undertaken by Baltimore City were performed with reasonable care and recorded in good faith. Baltimore City considers the information Engineering Data and will stand behind its accuracy at the location it was taken. Baltimore City assumes no responsibility in respect to the sufficiency of the studies for design. The City assumes no responsibility for any of the data from the borings not initiated by the City. The Contractor will need to perform additional geotechnical testing and analysis to complete the project, and any permits, or permit modifications, required to conduct this work will be the responsibility of the Contractor. The Design-Build Team is responsible for performing a complete geotechnical program including additional borings, sampling, in-situ and laboratory testing, analysis, and design, as necessary to complete design and construction.

2.07.02.5 Utilities

All utility data of which Baltimore City is aware is reflected on the survey information and existing utility map. Additional utilities may be present in the area. Utility test hole data was field collected at single point locations. Once uncovered, the utility's horizontal and vertical location was verified using accurate survey techniques. Baltimore City considers this information Engineering Data and will

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stand behind its accuracy at the locations that it was taken. The Design-Builder is responsible for obtaining all information, including additional test holes, that will be required to complete the project design and construction. Baltimore City has conferred with the utility companies with facilities in this area concerning the potential impact of this project. The Design-Builder must coordinate and cooperate with other contractors that are expected to be relocating utilities during the construction of this Project. The Design-Builder is responsible for determining the status of all designs and relocations and for identifying all additional required relocations and for coordinating the design and construction of the utilities with the design and construction of the improvements of this Project.

2.07.02.6 Right of Way

All right of way will be cleared before Notice to Proceed is given. The Design-Builder may revise the roadway alignment and other details of the project to alter the limits of construction or disturbance, subject to environmental constraints, and Baltimore City's approval but all construction must be contained within the Right of Way and approved Temporary Construction Easements. The Design-Builder shall verify that Minor Adjustment Agreement has been obtained from each property owner whose property is adjacent to the sidewalk reconstruction and obtain from Baltimore City a copy of signed Minor Adjustment Agreement prior to excavation.

The Design-Builder will be responsible for acquiring, at its expense, all other rights in land needed for construction staging, yarding, construction, or otherwise.

2.07.02.7 Permits

The following permits and/or approvals are anticipated to be required for this project:

- Joint Federal / State MDSPGP-4 (from MDE and USACE)
- U. S. Coast Guard
- Critical Area Plan including Landscape Mitigation from City
- Approved tree removal permit and replanting plan from City Recreation and Parks Forestry Division
- Erosion and Sediment Control Approval (from Baltimore City DPW)
- Stormwater Management Permit (from Baltimore City DPW)
- NPDES Construction Activity Permit (MDE)
- Any and all necessary permits that pertain to treatment, storage and disposal of contaminated soil and groundwater produced during excavation and dewatering activities.

A permit for waters including wetland impacts is required for this project as are concurrent tree impact approvals with landscape mitigation planting requirements from the City. Changes to the Conceptual Plans may result in the need for permit and

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approved plan modifications in which case the Design-Build Team is responsible for supplying to Baltimore City all information needed in order to obtain approval and authorization from the regulatory agencies. The Design-Build Team shall be responsible for addressing any comments or issues the regulatory agencies and/or Administration may have, including those pertaining to avoidance and minimization measures. It is not the responsibility of, nor guaranteed by, Baltimore City that approval or authorization will be granted by the regulatory agencies.

Navigable tidal waters and affected trees were identified and delineated within the project area. Surveyed trees and boundaries of waterways are depicted on the Conceptual Plans, and will be provided to the Design-Build Team in electronic format as part of the Project Files. Impacts to all resources have been minimized. Due to minimal impact, no Environmental Monitor is anticipated at this time. However, if changes to the Conceptual Plans result in additional impact, an Environmental Monitor may be required by Baltimore City.

Changes to the Conceptual Plans may result in permit modifications (including the potential need for supplemental geotechnical investigations), which may or may not be approved. The Design-Build Team is responsible for supplying to Baltimore City all information needed to obtain any necessary permit modifications.

Status of Stormwater Management Review:

A Stormwater Management (SWM) concept design was developed by Baltimore City to establish Right of Way needs and to demonstrate to the City that all of the SWM needs of the project can be met within that right-of-way. The SWM methodology is currently under review by the City. Approval of the concept SWM report and a Letter of Intent is anticipated to be issued prior to Proposal Due Date. The Design-Build Team is responsible to finalize the SWM design and obtain the final approvals.

Status of Erosion and Sediment Control Approval and National Pollutant Discharge Elimination System Permit:

Except as noted below, no erosion and sediment control design has been developed by Baltimore City. The Design-Build Team is responsible for the preparation of final Erosion and Sediment Control Plans and obtaining final approvals from Baltimore City Department of Public Works.

Baltimore City has submitted a NOI form to MDE for this project. There are no guarantees that this NOI will be approved. The ultimate responsibility of submitting a NOI, getting approvals, and any amendments thereto shall be on the Design-Builder. Any delays resultant of obtaining NOI will be the sole responsibility of the Design-Builder.

Status of Joint Federal/State Application:

Baltimore City has applied for a Joint Federal/State Permit based on the current LOD impacts. The City anticipates having an approved permit for the impacts for this project based upon the proposed activities in the conceptual plans that are part of this

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RFP prior to the proposal submittal. Any impacts that are outside the current LOD or are in excess of the current assessment will have to be permitted by the Design-Builder. In such cases, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to the City for approval, who will then submit the modification request to the appropriate agency for approval.

Any resultant delays or changes to schedules or costs, whether direct, indirect or consequential, arising out of changes to the approved permit will be the responsibility of the Design-Builder.

Critical Area and Tree Impact Approvals:

Baltimore City has applied for Chesapeake Bay Critical Area Program, Forest Conservation Act, and Tree Removal Permit approvals concurrently from the City based on the current LOD impacts. The City anticipates having these authorizations for the impacts for this project based upon the proposed activities in the conceptual plans that are part of this RFP prior to the proposal submittal. Any impacts that are outside the current LOD or are in excess of the current assessment will have to be permitted by the Design-Builder. In such cases, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to the City for approval, who will then submit the modification request to the agencies for approval.

Any resultant delays or changes to schedules or costs, whether direct, indirect or consequential, arising out of changes to the approved permit will be the responsibility of the Design-Builder.

2.07.03 RFP Package

The following materials are being provided to all prospective bidders:

A. One copy of this RFP.

The following materials are being provided in electronic format on Baltimore City's website at <http://www.baltimorecity.gov/Government/AgenciesDepartments/Transportation/Downloads.aspx>. While individual files will be hosted at this website location, the following file will also be included "TR12317 Central Ave II Design Build Links.pdf." This document will comprehensively and logically group the individual files as well as provide their respective hyperlinks..

This material is considered Engineering Data and Baltimore City will stand behind its accuracy unless otherwise specified in the contract documents.

B. Survey/Topographic Files

- Topographic files
- Text files
- Existing Contour files

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- Triangle files
- Environmental Features file
- Existing Surface files
- Intergraph Output/Coordinate files
- C. Utility Files
 - Test Hole Information
- D. Right-of-Way
 - Existing Right-of-way file
 - Proposed Right-of-Way Line file
 - Right-of-way Plats
- E. Landscaping, Reforestation and/or Tree Removal Permit & Wetland Plates
- F. Appendices
 - Soil Survey Boring Logs
 - Soils Laboratory Test Results
 - Summary of Topsoil Results
 - Topography Tabulation
 - Existing and Proposed Traffic Data
 - Storm Drain Pipe Inspection Report
 - Available As-built or design plans for the existing bridges within the project limits.
 - Available biennial inspection reports for the project structures
 - Available plans for the proposed development at Harbor Point development.

The following materials are being provided in electronic format on a CD ROM. This material is considered Conceptual and Baltimore City makes no representation regarding its accuracy.

- G. Conceptual Plan Sheets
 - Title Sheet
 - Typical Section Sheets

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- Geometry Sheets
- Roadway Plan Sheets
- Roadway Profile Sheets (Existing roadway profile only)
- Structure Plans
- Miscellaneous Detail Sheets
- Utility Plan Sheets
- Landscape Plan Sheets

H. Design Files

- Horizontal Baseline
- Vertical Alignment file
- Shading file
- Border files
- Conceptual/Potential SWM area file

The following materials are being provided in electronic format on the afore-mentioned Baltimore City web site. This material is considered necessary for the Design-Build Team to submit a technical proposal, prepare a bid and/or finalize the Stormwater Management/Drainage designs.

I. Design-Builder's Information Forms (.docx or .pdf files)

- Proposed Key Staff Information (Form BC-1)
- Project Description (Form BC-2)
- Baltimore City Design-Build SOQ Key Staff Resume (Form BC-3)

J. Stormwater Management and Surface Drainage Information

- NOI Form (and attachment) submitted by City on XX/XX/13
- Concept Stormwater Management Report (.pdf file)
- BMP Checklists and As-Built Certification Formats
- DPW-DOT Stormwater Management MOU (Dated November 2012)

It is likely that most bidders will use plot drivers that differ from the drivers used to produce the provided plans. The manipulation of the drawing files to produce any requirements (as found

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elsewhere in the Invitation for Bids) for as-built plans will be the responsibility of the selected Design-Builder.

2.07.04 Description of Work

2.07.04.1 Engineering/Construction Services

The required engineering and construction services to be provided by the Design-Builder will include, but not be limited to:

- Roadway Design and Construction.
- Structural Design and Construction for All Bridges, Retaining Walls, Culverts, Manholes and any and all other incidental structures specifically required for this project.
- Hydraulic Analysis, Design, Construction and Agency Approval for Specific Structures identified in the Contract Documents.
- Temporary and Permanent Signing, Lighting, Signals, ITS, and Pavement Marking Design and Construction.
- Roadside Landscape Planting, Stormwater Management Landscape Planting, Reforestation Design and Construction of the aforementioned.
- Utility Coordination for utility modifications regardless of whether designed and/or constructed by the Design-Builder.
- Utility Design and Relocations
- Geotechnical Engineering.
- Storm Water Management (SWM) Design, Approval, Construction and As-Built Certification
- Erosion and Sediment Control (E&S) Design, Implementation and Approval.
- Engineering Studies and Reports required to meet the contract or permit requirements or to address any comments from Baltimore City or other agencies related to meeting or modifying the contract or permit requirements.
- General Coordination with Baltimore City and third parties impacted by the project (includes obtaining required approvals).
- Additional Data Collection (includes surveying, geotechnical, etc.).
- Produce Required Deliverables.
- Environmental Permit Activities (including obtaining permits as described herein).

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- Community Relations and Public Outreach.
- Traffic Control Design and Implementation including the preparation of a Traffic Management Plan (TMP).
- Maintenance of project site(s) including watering and dust control.
- Treatment, Storage and Disposal of contaminated soil and groundwater.
- Obtaining all required permit modifications from Baltimore City and appropriate regulatory agencies for any additional impacts to roadside trees, stormwater management, erosion and sediment control, or any other impacts not authorized by the original permits and approvals. Implementation of any required mitigation or remediation for additional impacts not included in the permits and approvals or due to any non-compliance with the permit conditions.
- Any other items required to successfully complete the project.

TC 2.08 PROPOSAL SUBMISSION REQUIREMENTS

2.08.01 Responsibilities of the Bidders

2.08.01.1 Review of RFP and Plans

Before submitting a proposal, the Prospective Bidder is responsible for examining the RFP and materials furnished to each prospective Design-Builder. The Design-Builder is responsible for all site investigation and preliminary design necessary to submit proposals and accept responsibility that their technical and price proposal is sufficient to complete all design and construction.

2.08.01.2 Site Investigation

The Design-Builders invited to submit a Price Proposal must first examine the entire project site that is in Baltimore City right-of-way. The Prospective Bidder is solely responsible for all site conditions discoverable from a reasonable site examination. A reasonable site examination includes all utility, structural, and/or geotechnical investigation that the Prospective Bidder determines is necessary to properly price the Work. If the Prospective Bidder determines, before submission of the proposals, that additional utility designation, structural, geotechnical and/or subsurface investigation or analysis are necessary to properly price the Work; it is the responsibility of the Prospective Bidder to perform such investigation and analysis at its expense. Baltimore City has performed a preliminary utility designation and geotechnical survey of the project site. The boring logs and test results have been included in the project files. The utility information is included in the data provided including utility test hole data included in the project files. It is the Bidder's responsibility to verify that information as part of its utility, structural and/or geotechnical investigation. The Technical Proposal and Price Proposal submission will be considered conclusive evidence that the Prospective Design-Build Team has determined that it has

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performed a reasonable site investigation to submit Technical Proposal and Price Proposal, necessary to design and construct the project.

All subsurface investigations performed by the Prospective Bidder, including sampling and laboratory testing, shall be performed by a Geotechnical firm experienced in subsurface investigations and in accordance with the 1988 AASHTO Manual on Subsurface Investigations, AASHTO Standards, the Maryland State Highway Administration Standard Specifications for Subsurface Explorations, MSMT Standards, the Maryland State Highway Administration Book of Standards for Highway and Incidental Structures, and ASTM Standards. The Prospective Bidder shall be responsible for utility clearance and any traffic control required for his investigation. The Prospective Bidder shall submit all Maintenance of Traffic concepts related to site investigation to Baltimore City for approval. Any investigative methods that pose a safety threat to the traveling public or have the potential to damage utilities shall not be used. Any borings or test holes taken in roadway or shoulder areas shall be backfilled and patched before the area is reopened to traffic. The Prospective Bidder shall restore to its current condition, any area of the site disturbed by his site investigation operations. If the Prospective Bidder encounters any abnormal conditions that indicate the presence of hazardous materials or toxic waste during his site investigation, he shall immediately suspend work in the area and notify Baltimore City. A Geotechnical Engineer who is registered in the State of Maryland shall supervise all subsurface investigations conducted by the Design-Builder.

2.08.01.3 Utility Coordination

Prior to submitting a Price Proposal, the Prospective Bidder must conduct utility research and coordination with all utility companies along with additional site research to determine:

- a. What utility relocation work is planned, what is the status and anticipated schedule impact of this work.
- b. What utility facilities actually exist within the project limits.
- c. What are the potential utility conflicts when performing the underground work.
- d. What additional utility relocation work must be included in their design and impact to the schedule that will result from the Design-Builder's activities.
- e. What permitting modifications result from additional utility relocations.

The Price Proposal must represent a thorough consideration of these elements.

2.08.01.4 Additional Structural Surveys

The Prospective Bidder will require additional structural surveys to confirm the location of the existing stone masonry abutments supporting Baltimore City Bridge Nos. BC 8019 (Alicenna Street) and BC 8020 (Fleet Street). The Design-Builder must account for these services within their project schedule and design submittals. It is the responsibility of the Prospective Bidder at its expense to obtain all additional

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information to confirm the location of these existing abutments and Baltimore City accepts no responsibility for the lack of this information.

2.08.01.5 Additional Surveys

The Prospective Bidder will require additional survey or topographic information (including utility locations). The Design-Builder must account for these services within their project schedule and design submittals. It is the responsibility of the Prospective Bidder at its expense to obtain all additional information and Baltimore City accepts no responsibility for the lack of this information.

2.08.01.6 Duty to Notify if Errors Discovered

Bidders shall not take advantage of any error, omission, or discrepancy in the RFP or related materials, including all Project information. If a Bidder discovers such an error, omission or discrepancy, he shall immediately notify Baltimore City in writing; failure to do such notification shall constitute a waiver of any claim based upon such error, omission, or discrepancy. After such notification, Baltimore City will confirm or modify the RFP in writing as Baltimore City determines may be necessary to fulfill the intent of the RFP.

2.08.02 Pre-Submittal Requirements

2.08.02.1 Communications During Proposal Preparation

The Chief of Contract Administration of Baltimore City Department of Transportation is the Procurement Officer for this RFQ, and shall be the City's single contact and source of information for this procurement.

The following rules of contact shall apply during the Contract procurement process, which begins upon the submittal of the SOQ, and will be completed with the execution of the Contract. These rules are designed to promote a fair, unbiased, and legally defensible procurement process. Contact includes face-to-face, telephone, facsimile, electronic-mail (e-mail), or formal written communication.

The specific rules of contact are as follows:

1. Section 11-205 of the State Finance and Procurement Article, Annotated Code of Maryland, prohibits and penalizes collusion in the State procurement process.
2. After submission of SOQs, neither a Proposer nor any of its team members may communicate with another Proposer or members of another Proposer's team with regard to the PROJECT or the Proposals. However, a Proposer may communicate with a Subcontractor that is on both its team and another Proposer's team, provided that each Proposer has obtained a written certification from the Subcontractor that it will not act as a conduit of information between the teams.
3. Unless otherwise specifically authorized by the Procurement Officer, a Proposer may contact Baltimore City only through the Procurement Officer and only in writing by facsimile or by e-mail and not orally or other mail delivery systems.

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The Proposer's contacts with Baltimore City shall be only through a single representative authorized to bind the Proposer.

4. Baltimore City normally will contact a Proposer in writing through the Proposer's designated representative.
5. Neither a Proposer nor its agents may contact the employees of Baltimore City Department of Transportation or other City agencies, including Department head, members of the evaluation team and any other person who will evaluate SOQs, regarding the PROJECT, except through the process identified above.
6. Any contact by a Proposer determined to be improper may result in disqualification of the Proposer.
7. Baltimore City will not be responsible for or bound by: (1) any oral communication, or (2) any other information or contact that occurs outside the official communication process specified herein, unless confirmed in writing by the Procurement Officer.

All requests for additional information or clarification of the RFP and any other communication concerning this Project shall be submitted via e-mail with return confirmation receipt. No verbal requests or personal visits will be honored. All written contacts shall be addressed to:

Ms. Laetitia Griffin
Contract Administration
Department of Transportation
Transportation Engineering and Construction Division
e-mail address: laetitia.griffin @baltimorecity.gov

Only e-mailed inquires will be accepted. No requests for additional information or clarification to any other Baltimore City office, consultant, or employee will be considered. Baltimore City will deliver copies of each question and response to all Proposers by e-mail. Each Proposer must acknowledge receipt of the e-mail communication. Baltimore City may rephrase questions as it deems appropriate and may consolidate similar questions. Multiple responses are anticipated. The last response will be posted not later than 7 days prior to the Proposal due date.

Only requests received by 4:00 p.m. EST on XXXXXX will be addressed. Questions will not be accepted by phone. Questions, only from the primary or secondary contact, must include the requestor's name, telephone number, e-mail address, and the Proposer he/she represents.

2.08.02.2 Addenda

Interpretations, clarifications or modifications to this RFP will be made by Addenda. Only interpretations, clarifications and answers to the questions included in Addenda or such writings shall be binding on Baltimore City.

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2.08.02.3 Request for Information (RFI)

Responses to all RFI's not part of an addendum, will be provided through email or posted on Baltimore City's website and shall be considered contractually binding. Baltimore City will provide a comprehensive list of questions and answers to the Reduced Candidate List at least 7 days prior to the proposal due date.

2.08.02.4 Substitutions

Proposers are advised that, in order for a Proposer to remain qualified to submit a Proposal after it has been placed on the Reduced Candidate List, its organization, including all Principal Participants, Specialty Subcontractors, and key management personnel identified in the Statement of Qualifications (SOQ), must remain intact for the duration of the procurement process. A Proposer may propose substitutions for participants after the SOQ submittal; however, such changes will require written approval by Baltimore City, which approval may be granted or withheld in Baltimore City's sole discretion. Requests for changes must be made in writing no later than thirty (30) calendar days prior to the due date for submittal of Proposals.

2.08.02.5 Compliance with Applicable Law

In connection with this RFP and the Contract, Proposers shall comply with all applicable laws in all aspects in connection with the procurement process of this PROJECT and in the performance of the Contract.

2.08.02.6 Alternative Technical Concepts

Baltimore City has chosen to use the alternative technical concept (ATC) process to allow innovation and flexibility to be incorporated into the Proposals and considered in making the selection decision, and to avoid delay's and potential conflicts in the design associated with deferring of technical concept reviews to the post-award period, and ultimately to obtain the best value for the public.

The ATC process allows Proposers to submit for pre-approval proposed alternatives to the RFP requirements. Baltimore City will not approve any ATC that entails a deviation from the requirements of the as-issued Contract Documents, unless Baltimore City determines, in its sole discretion, that the proposed end product based on the deviation is equal to or better than the end product absent the deviation and is permitted by the Permit Approvals and all pertinent third parties. **Baltimore City will not entertain any deviation to the prescribed Pavement Sections as defined in this RFP.**

Any ATC that has been pre-approved may be included in the Proposal, subject to the conditions set forth herein.

The ATC process may be used to allow a Proposer to submit technical concepts for review by Baltimore City to determine if those technical concepts are consistent with the requirements of the RFP documents. The ATC submittal should clearly stipulate this reason for the review.

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2.08.02.7 ATC Submittal and Review

The Proposer may submit an ATC for review by Baltimore City on or before **XXXXXX at 4:00 p.m.** (prevailing local time). Inquiries received after that date and time will not be accepted.

All ATCs shall be submitted in writing via email only to laetitia.griffin@baltimorecity.gov, with a cover letter clearly identifying the submittal as a request for review of an ATC. If the Proposer does not clearly designate its submittal as an ATC, the submission will not be treated as an ATC by Baltimore City

Baltimore City will review each ATC submitted. Additional full or half-sized hard copies of the ATC may be requested by Baltimore City. If an ATC is summarily approved or not approved, Baltimore City's comments will inform the Proposer that its technical concept appears to be generally acceptable, or Baltimore City will identify areas in which the approach appears to be incompatible with the Project requirements. If Baltimore City needs more information to determine whether or not the ATC will be approved or not approved, Baltimore City will submit written questions to the Proposer and/or request a one-on-one meeting in order to better understand the details of the ATC. Baltimore City may conditionally approve an ATC based on required revisions to a portion or portions of the ATC.

If an ATC is not approved or conditionally approved and the Proposer feels that the non-approval or the conditions for approval were due to an incorrect conclusion on the part of Baltimore City, it may re-submit the ATC for one additional review via email only to laetitia.griffin@baltimorecity.gov. If a re-submittal is made, it shall be accompanied by a cover letter clearly identifying such submission as an ATC submitted for an additional review.

The Proposer shall advise Baltimore City in its ATC if it believes a one-on-one meeting is appropriate.

Baltimore City will return its approval, non-approval, conditional approval, or additional questions pertaining to any specific ATC no later than two weeks after receipt of that ATC. If the Proposer does not receive a return response from Baltimore City within two weeks of Baltimore City's receipt of the ATC, the Proposer shall presume that Baltimore City has rejected the ATC.

2.08.02.8 Content of ATC Submittal

Each ATC submittal shall include five copies and shall include the following:

- A) Description: A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information such as product details (i.e. specifications, construction tolerances, special provisions), etc.
- B) Usage: Where and how the ATC would be used on the Project;
- C) Deviations: References to any requirements of the RFP Documents or to any elements of the Contract Documents which are inconsistent with the proposed ATC, an explanation of the nature of the proposed deviation and a request for approval of

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such deviations or a determination that the ATC is consistent with the requirements of the RFP Documents;

D) Analysis: An analysis justifying use of the ATC and why the deviations from the requirements of the RFP Documents should be allowed:

E) Impacts: Discussion of potential impacts on vehicular traffic, environmental impacts (favorable and unfavorable) identified on appropriate environmental documents, community impacts, safety and life-cycle Project and infrastructure costs (including impacts on the cost of repair and maintenance);

F) History: A detailed description of other projects where the ATC has been used under comparable circumstances, the success of such usage, and names and telephone numbers of project owners that can confirm such Statements:

G) Risks: A description of added risks to Baltimore City and other Persons associated with implementing the ATC;

H) Costs: An estimate of the ATC implementation costs to Baltimore City, the Design-Builder and other Persons; and

J) Price: An estimate of the impact of the ATC on the Proposal Price.

2.08.02.09 Determination By Baltimore City

Baltimore City will make one of the following determinations with respect to each properly submitted ATC:

A) The ATC is approved.

B) The ATC is not approved.

C) The ATC is not approved in its present form, but is approved subject to satisfaction, in Baltimore City's sole judgment, of specified conditions

D) The submittal does not qualify as an ATC but may be included in the Proposal without an ATC (i.e., the concept complies-with the RFP requirements)

E) The submittal does not qualify as an ATC and may not be included in the Proposal.

F) Decision on the ATC is pending receipt of additional information and/or one-on-one meeting

Approval of an ATC will constitute a change in the specific requirements of the Contract Documents associated with the approved ATC and for that specific Proposer. Should the Design-Builder be unable to obtain required approvals for any ATC incorporated into the Contract Documents, or if the concept otherwise proves to be infeasible, the Design-Builder will be required to conform to the original RFP requirements. Each Proposer, by submittal of its Proposal, acknowledges that the opportunity to submit ATCs was offered

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to all Proposers, and waives any right to object to Baltimore City's determinations regarding acceptability of ATCs.

2.08.02.10 Incorporation Into Proposal

Proposer may incorporate zero, one or more pre-approved ATCs into its Proposal including conditionally approved ATCs. If Baltimore City responded to an ATC by identifying conditions to approval, Proposer may not incorporate such ATC into the Proposal unless all conditions have been met. Copies of Baltimore City's ATC approval letters for each incorporated ATC shall be included in the Proposal. Proposals with or without ATCs will be evaluated against the same technical evaluation factors, and the inclusion of an ATC, including an ATC that provides technical enhancements, may or may not receive a higher technical rating.

Except for incorporating approved ATCs, the Proposal may not otherwise contain exceptions to or deviations from the requirements of the RFP Documents

2.08.02.11 ATC Confidentiality

ATCs properly submitted by a Proposer and all subsequent communications regarding its ATCs will be considered confidential. If a Proposer wishes to make any announcement or disclosure to third parties concerning any ATC, it shall first notify Baltimore City in writing of its intent to take such action, including details as to date and participants, and obtain Baltimore City's prior approval to do so.

2.08.02.12 One-On-One Meetings

Prior to or after submission of ATCs, Baltimore City may conduct one-on-one meetings with a Proposer to gain information or a better understanding regarding its ATC and to discuss issues and clarifications regarding the ATC. Baltimore City reserves the right to disclose to all Proposers any issues raised during the one-on-one meetings. However, Baltimore City will not disclose any information pertaining to an individual Proposer's ATCs or other technical concepts to other Proposers.

2.08.03 Proposal Delivery Formalities

2.08.03.1 Organization of Proposal Submittals

Prospective bidders shall organize submittal of their Technical Proposal and Price Proposal to match the organization specified in this RFP.

a. Separate Proposal Packages

Proposal submissions shall consist of two separate sealed packages, a Technical Proposal as described in TC Section 2.09 and a Price Proposal as described in TC Section 2.10.

b. Technical Proposal

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The Technical Proposal may be submitted in container(s) of the Prospective Bidder's choice provided that the material is neat, orderly, and incapable of inadvertent disassembly. Technical Proposal shall be submitted and bound using a three (3) ring binder with all pages numbered consecutively. Each container shall be clearly marked as follows:

Prospective Bidder's Name

Technical Proposal

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Central Avenue Streetscape and Harbor Point Connector Bridge

Container ___ of ____

c. Price Proposal

The Price Proposal shall be submitted on the Price Proposal Form supplied by Baltimore City and shall be delivered in a sealed envelope capable of holding 8½" x 11" documents without folding and clearly marked as follows:

Prospective Bidder's Name

Price Proposal

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Central Avenue Streetscape and Harbor Point Connector Bridge

Container ___ of ____

d. Proposal Guaranty

The Proposal Guaranty shall be delivered with the Price Proposal in a sealed business-sized envelope clearly marked as follows:

Prospective Bidder's Name

Proposal Guaranty

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e. Location and deadline for submittal of Technical and Price Proposals

Technical Proposals and Price Proposals must be delivered no later than **XXXXXX prior to 11 noon** (prevailing local time). The proposal must be delivered to the following location:

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Office of the Comptroller

Room 204, City Hall

Baltimore, Maryland 21202

f. Number of Copies

One original and seven (7) copies of the complete Technical Proposal shall be submitted. A single original of the Proposal Guaranty and a single original of the Price Proposal shall be submitted.

2.08.03.2 Effect of Submitting Proposal

Signing of the Design-Build Proposal Submission Form and Price Proposal Form, and delivery of the Proposal represents (a) an offer by the bidder to perform the Work for the Price submitted within the time(s) specified in accordance with all provisions of this RFP and (b) the Prospective bidder's agreement to all the provisions of the RFP and Contract governing requirements and procedures applicable through execution of the Design – Build Contract. **The Technical Proposal will become part of the Design – Build Contract.**

By so signing the above referenced terms and by delivering the Proposals, the Prospective Bidder makes the following affirmative representations.

- a. The bidder has reviewed all documents and undertaken all investigations that could significantly impact the cost, timeliness, quality, or performance of the Work. Specifically, the bidder has (a) carefully examined the RFP and all documents included or referenced therein, (b) carefully examined all available reports and data related to subsurface conditions, (c) become familiar with all applicable federal, state and local laws and regulations, (d) visited the site and made all reasonable visual investigations, and (e) correlated the information obtained from the above examinations and investigations.
- b. The bidder has given Baltimore City written notice of all errors, omissions, or discrepancies in the RFP in accordance with Section TC 2.08.01.
- c. The bidder has determined that the RFP are generally sufficient to convey an understanding of all terms and conditions that could significantly impact the cost, timeliness, quality, or performance of the Work.

2.08.03.3 Withdrawals and Resubmittals of Proposals

A bidder may withdraw Proposals after delivery, provided the request for such withdrawal is made in writing or in person before the date and time set for submission of Proposals. The bidder may revise and resubmit a Proposal so withdrawn before said date and time.

2.08.03.4 No Public Opening

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There will be no public opening of Proposals. After the Proposal Date, all Proposals will be opened in the presence of two or more Baltimore City employees and reviewed for completeness. A register of Proposals will be prepared that identifies each Proposer.

Neither the identity of any Proposer nor the register of Proposals will be publicly disclosed until after the Baltimore City Contract Administration makes a determination recommending award of the Contract.

TC-2.09 TECHNICAL PROPOSALS

General: The Technical Proposal submittal shall contain concise narrative descriptions and graphic illustrations, drawings, charts, plans and specifications that will enable Baltimore City to clearly understand and evaluate the capabilities of the Design - Build Team and the characteristics and benefits of the proposed technical solutions.

No Price Information: No price information of any kind shall be included in the Technical Proposal submittal.

Proposal Organization: Organization of the Technical Proposal shall comprise five parts, meet the specified page limitation, and correspond to the outline as follows:

- Cover Letter
- Project Understanding & Approach
- Project Management
- Project Schedule
- Legal and Financial Information

Format:

- Paper. The Technical Proposal submittal shall be submitted on 8.5"-by-11" paper printed back to back where practical. Charts, exhibits, and other illustrative and graphical information may be on 11"-by-17" paper, but must be folded to 8.5"-by-11", with the title block showing.
- Type Font and Margins. The type face of all narrative text shall be at least 11-pt, either Arial or Times New Roman font, and all page margins must be at least ½" from sides and 1" from top and bottom. All pages shall be sequentially numbered not including the cover letter.

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- Page Limits. The Technical Proposal submittal shall be limited to the number of pages defined below. No page limit will be imposed on the appendices, although the size of the appendix should be kept within reason.
- Finding tools, such as tables of contents and page dividers shall be utilized to make the submittals easily usable.

2.09.01 Cover Letter (Limit 2 Pages)

A Major Participant is defined as the legal entity, firm or company, individually or as a party in a joint venture or limited liability company or some other legal entity, that will be signatory to the Design – Build Contract with Baltimore City. Major Participant(s) will be expected to accept joint and several liability for performance of the Design – Build Contract. Major Participants are not design subconsultants, construction subcontractors or any other subcontractors to the legal entity that signs the Design – Build Contract. A cover letter, signed by all Major Participants must:

- a. Provide the names and the roles of all Major Participants and identify the lead design firm.
- b. Identify a single, primary point of contact for the Design-Build Team with address, phone number, fax number, cell phone number, and E-mail address where all communications from Baltimore City should be directed for the proposal and bidding phases and duration of the Contract. A secondary contact for the Design-Build Team shall be included (with the above information) for use when the primary contact is not available. The primary and/or secondary contact must be available 24 hours a day for the duration of the design and construction activities and during normal business hours during the bidding phase. **Baltimore City prefers that the primary and secondary points of contact are key staff members that will be directly involved during the proposal development, pre-bidding phase, design and construction stages.** In the event that the primary and secondary contact are not assuming their responsibility until after the bidding phase the Design-Build Team must identify the primary point of contact for the bidding phase. At least one of the key members must be involved in all phases.
- c. Include an affirmative declaration that to the best of each Major Participant’s knowledge and belief, the information supplied by said Participant is true and accurate.
- d. Include a general authorization for Baltimore City to confirm all information contained in the Technical Proposal.
- e. The Design-Build Team is alerted to their responsibility to confirm that all Design-Build Team members, suppliers, etc. have received all addenda. The Design-Build Team is solely responsible to ensure that their team has the correct information.

2.09.02 Project Understanding & Approach (Limit 12 Pages, 50 points)

2.09.02.01 Project Understanding

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- A. Owner project objectives: Provide your understanding of Baltimore City's major objectives for this project and your general plan to meet those objectives.
- B. Major project risks: Provide a risk assessment based on your understanding of the project and address the following issues:
- What are the three (3) major risks and challenges? What are the risks and challenges that the Design Build Team will be responsible for avoiding or mitigating? What risks and challenges will Baltimore City be responsible for?
 - What is your approach to ensure that the new bridge to Harbor Point will be open to traffic by June 2015? Assume a Notice to Proceed date of **February 2014**.
 - What steps would your team take to prevent/avoid utility conflicts and how will you resolve them when they are encountered? Will there be an additional cost, beyond the lump sum bid price, to Baltimore City for utility conflicts?
 - What is your approach to making sure that permits will not delay the project? Include a list of all permits required for the project as well as the approval agency and timeframe needed for each one.
 - What is your approach to addressing Stormwater Management requirements for the project? What aspects of your design will be environmentally sustainable?
 - The Phase 1 Environmental Site Assessment Report indicates that contaminated soil may be encountered between Lancaster Street and Bank Street. If contaminated soil is encountered, what measures would you take to ensure the contaminated soil is properly handled?
 - What impacts could the proposed Redline project by MTA have on this project and how would your team address them?

2.09.02.02 Bridge/Structural work

- What is your approach to replacing existing Baltimore City Bridge Nos. 8019 (Aliceanna Street) and 8020 (Fleet Street)?
- What is your approach to repairing and strengthening the existing culverts on Central Avenue between Fleet Street and Aliceanna Street (BC 1255) and Aliceanna Street and Lancaster Street (BC 1555)?
- What is your approach to reconstructing existing Baltimore City Bridge No. 8018 on Lancaster Street?
- What is your approach to investigating and evaluating the existing Central Avenue storm drain outfall in conjunction with the proposed Harbor Point Connector Bridge?

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- What is your approach to determining the type of foundation for the proposed Harbor Point Connector Bridge?
- What is your response to the proposed number of spans and length of spans shown in the plans for the proposed Harbor Point Connector Bridge?
- What is your approach to determining the type of superstructure for the proposed Harbor Point Connector Bridge?
- What is your approach to the life span and maintenance of the proposed Harbor Point Connector Bridge?

2.09.02.03 Maintenance of Traffic Approach

- What is your approach to maintaining vehicular traffic for the duration of the project?
- What is your approach to coordinating your work with adjacent project(s) when it comes to overlapping maintenance of traffic areas?
- What is your approach to maintaining pedestrian traffic, pedestrian safety, and meeting ADA requirements for the duration of the project?
- What is your approach to maintaining access to adjacent properties for the duration of the project?

2.09.03 Project Management (Limit 8 Pages, 30 points)

General: The Design-Build Team shall substantiate its ability to accomplish the Work by explaining its approach to project management, as well as its capability of providing the personnel, facilities, materials and equipment to complete the Project and meet schedule requirements.

A. Project Management Key Functions. Explain how the organization will perform the following functions:

- Communications Management: Document and control communications between the Design-Builder and its designers, suppliers and constructors, and between the Design-Builder and Baltimore City. Discussion shall include the planning and coordination of Design-Builder submittals to Baltimore City. Provide means and methods for communicating with the public, including community officials, stakeholders and the general public. Also, indicate your approach toward team building within the Design-Build Team., and expected benefits from participating in a formal Partnering Program with Baltimore City.

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- Coordination Management: Discuss how the Design-Builder will coordinate between this project and adjacent projects that are either ongoing or projects that are pending. Discussions shall include how the Design-Builder will share work zones and access to others. The Design-Builder's plan for coordination meetings shall also be discussed.
- Change Management: Discuss how the Design-Builder will advise and discuss with Baltimore City any potential changes in advance of any actual impact to the scope of work or the Contract for which the Design-Builder believes Baltimore City is responsible. In addition, discuss how the design firm will be involved and have decision-making authority with respect to any changes to the "Issued for Construction" drawings, and for inclusion of such changes in a complete set of as-built drawings and specifications.

B. Design and Construction Management:

Identify your planned approach to defining and sequencing the execution of construction work packages including planning and performing the construction of the following:

- a. Staging, material delivery/storage and office utilization
- b. Subcontractor plan to meet Project requirements.
- c. Wage rate compliance
- d. Site access
- e. Protection of completed works or works in progress during Construction
- f. Noise and dust control
- g. Utility coordination and relocations, including any planned shut downs
- h. Quality Control/Quality Assurance
- i. Safety and Health Management: Discuss your plan for safety management, including safety of the traveling public, and safety of site visitors.

2.09.04 Project Schedule (Limit 6 Pages, 20 points)

A. Design and Construction Summary Schedule

Submit an integrated Design and Construction Summary Schedule and supporting narrative that logically details tasks and timing of the work effort and provide a

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realistic projection of project events and the expected dates. The following criteria should be met and information provided as part of the summary schedule:

The schedule for design and construction will be task oriented, indicating dates by which milestones are to be achieved. The proposer may use a critical path scheduling approach and the schedules may be graphically presented.

- The schedule is to be an integrated and networked multi-layered schedule of project design and construction tasks. It should identify project events and the expected dates. These dates should be based on the calendar dates as the starting point and the logical flow of dates provided by calculating the addition of duration of all tasks using typical schedule networking tools.
- Each major task will be directly traceable to the requirements of the project.
- All tasks/activities in the schedule will be logically linked together showing predecessor/successor relationships.
- All critical path areas/dates or fast track areas will be clearly identified including any critical schedule dates indicated by Baltimore City in the schedule requirements of this RFP.
- The proposer will submit a rationale explaining how the schedule will be achieved including any perceived benefits to Baltimore City.

The Design and Construction Summary Schedule should have clear tracks for design, technical, schedule, management, permits, construction, etc. and the relationship will be presented in a way that provides Baltimore City the confidence and understanding that the project and its stages are structured to be executable within the timeframes provided and for the resources indicated. The Design and Construction Summary Schedule shall not exceed 250 tasks and shall represent the entire project execution from design through completion and Baltimore City's acceptance for maintenance.

Indicate your preliminary list of technical design submittals for Baltimore City/SHA review, and your plan for developing and providing these submittals. The deliverables shall be identified in the Design and Construction Summary Schedule submitted in the Technical Proposal.

The Design and Construction Summary Schedule completion date cannot exceed the date indicated in the Contract Time located elsewhere in this RFP. Upon execution of the contract, the Design-Builder will be held to the critical schedule dates presented in its technical proposal for the calculation of any deductions including, but not limited to, liquidated damages and disincentives.

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2.09.05 Legal & Financial Information (Limit 8 Pages Maximum, excluding copies of underlying team agreements)

The structure of the Legal and Financial information shall include:

A. Design - Build Team Organization. Briefly describe the proposed legal structure of the Design-Build Contractor and team, and provide copies of underlying agreement(s). Confidential price data may be excluded or eradicated from the organizational legal documents provided.

B. Liability: State whether Major Participant firm(s) who will be party to the prime design – build contract with Baltimore City will have joint and several liability, and how liability is being apportioned between other firms of the Design-Builder Team. Provide documentation that you have met the requirements for Professional Liability Insurance including agreements between participants.

C. Bonding Capability: Provide evidence that the Design-Builder entity is capable of obtaining a Performance Bond and a Payment Bond in accordance with the requirements in Maryland’s July 2008 Standard Specifications for Construction and Materials, GP – Section 3 and appropriate for the upper range of a Project Classification I as defined in Maryland’s Standard Specifications for Construction and Materials, Section TC 2.01.

Such evidence shall take the form of a letter from a surety company indicating that such capacity is anticipated to be available for the contracting entity. Letters indicating “unlimited” bonding capacity are not acceptable. The surety company providing such letter must be rated at least A- by two nationally recognized credit rating agencies or at least A-VII by A.M. Best & Company. The letter should recognize the firm’s backlog and work in progress in relation to its bonding capacity.

TC-2.10 PRICE PROPOSAL

2.10.01 General

Price Proposals will be accepted only from those Proposers invited by Baltimore City in writing to submit a proposal.

Bids shall be submitted on a lump sum basis, and shall include all engineering design, permitting, construction, labor, equipment and materials (with the exception of Price Adjustment for Asphalt Binder), incentives and all incidentals necessary to complete the design and construction of this project. In addition, a lump sum breakdown will be required as part of the Price Proposal submittal as defined in TC 7.10. The lump sum breakdown shall be submitted in a format of the Design-Build Teams (DBT) choice.

The line item bids for each of the items contained in the chart below and reflected on the schedule of prices shall be priced by the DBT. These items are subject to the individual limitations shown below and bid prices are not to exceed the maximum bid price as shown

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below. All payment adjustments and liquidated damages shall still apply as per the corresponding Special Provision with the exception that bids for these items will establish the maximum amount payable to the contractor.

Item Number	Quantities	Description	Unit Price	Maximum Bid Price
3001	1	Each of Severe Weather Event Incentive	\$xx,000.00	\$xx,000.00
5003	xxx,000	Each of Payment Adjustment for Hot Mix Asphalt Mixture	\$1.00	\$xxx,000.00

2.10.02 Contract Completion Incentive Procedure

N/A

2.10.03 Bid Irrevocable

The Contractor's bid prices are irrevocable for 180 days following receipt of the Price Proposal.

2.10.04 Proposal Guarantee

The Contractor's bid guarantee shall represent 5% of the bid amount in accordance with the provisions of GP 2.07 as included in the RFP documents.

2.10.05 Liquidated Damages

In the event a complete usable facility is not provided by the calendar date, a liquidated damage will be charged in accordance with the provisions of GP 8.09. The dollar amount of liquidated damages is stated on page 30 of 30 in the Proposal Form of the Invitation for Bids. Baltimore City will be the sole approving authority in determining when the project is considered a usable facility.

TC 2.11 EVALUATION OF PROPOSALS, BID OPENING AND SELECTION

2.11.01 Best Value Process

The Technical Proposal will be evaluated on the technical evaluation factors identified in TC Section 2.09. A Proposal Evaluation Team will determine the pass/fail status and overall

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technical rating of each Proposal. After evaluating the Price Proposal, the Proposal Evaluation Team will prepare a recommendation to the Chief of the Transportation Engineering & Construction Division indicating which Proposal is the most advantageous to Baltimore City (i.e., represents the best value). The Chief, together with the Director, will then assess the Proposal Evaluation Team's recommendation and make a final determination as to which Proposal is the most advantageous to Baltimore City considering the technical and price factors set forth in this document.

When determining which Design-Build Team's submittal is the most advantageous to Baltimore City, the Technical and Price Proposals are evaluated separately. A numerical score will be assigned to each proposal by the Proposal Evaluation Team collectively. When arriving at the total score for each DBT, the price proposal is weighted at 60% and technical proposal is weighted at 40%, as defined in Baltimore City's Board of Estimates Policy Regarding the Use of Design-Build Project Delivery.

2.11.02 Evaluation of Technical Proposals

The following elements of the Technical Proposal will be evaluated and rated on their content, accuracy and presentation.

- Project Understanding and Approach
- Project Management
- Project Schedule

The following will be evaluated on a Pass/Fail basis and will be based on the clarity and completeness of information provided, as well as the stability and collective capabilities of the Design - Build team relative to this Project to perform as an integrated team. Each Proposal must achieve a rating of "Pass" on any "Pass/Fail" factor listed in Section 2.09.06 to receive further consideration. Failure to achieve a "Pass" rating on any "Pass/Fail" factor will result in the Proposal being declared NOT RESPONSIBLE, the price proposal will not be rated and the Proposer will be disqualified.

- Legal & Financial Information

2.11.02.1 Other

The pass/fail requirements include provision of all required forms included in the Proposal Package, properly completed and signed (if required).

2.11.02.2 Technical Proposal Evaluation Team

Baltimore City will assemble a Proposal Evaluation Team consisting of key staff from appropriate offices. The Evaluation Teams will review the Technical Proposals to verify that all requirements of the RFP have been met, and to evaluate the proposals based on the evaluation factors.

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2.11.02.3 Evaluation Process

Members of the Proposal Evaluation Team will evaluate elements of the Technical Proposals as listed in 2.09.02 through 2.09.04.

2.11.02.4 Evaluation Factors

The technical evaluation factors and the overall Technical Proposal will be rated by a scoring method. The total score assigned to each technical evaluation factor is indicated in 2.09.02 through 2.09.04.

2.11.03 Evaluation of Price Proposals

Price evaluations will be performed based on the Proposal Price as reflected in the Schedule of Prices, the Cost Breakdown as defined in TC Section 7.10, price accuracy, completeness and reasonableness.

Each Price Proposal shall specify the lump sum for which Work will be performed according to the RFP. In addition, a lump sum breakdown will be required as part of the Price Proposal submittal as defined in TC 7.10. The lump sum breakdown shall be submitted in a format of the Design-Build Teams choice.

Baltimore City reserves the right to reject any Proposal if it determines that the Price Proposal is unacceptable, including a determination that the Proposal is significantly unbalanced or front end loaded to the potential detriment of Baltimore City.

An unbalanced Proposal is considered to be one (a) which is front-loaded or (b) for which the line item amounts or amounts shown in the Cost Breakdown do not reflect reasonable actual costs plus a reasonable proportionate share of the Proposer's anticipated profit, overhead costs, and other indirect costs which are anticipated for the performance of the items in question.

A Price Proposal shall be deemed unacceptable if Baltimore City determines, in its sole discretion that it fails to conform to the conditions of the RFP in any manner. A Price Proposal may be unacceptable if it:

- A) Is significantly unbalanced relative to the scope of work;
- B) Does not provide all information in conformance with the RFP, and/or
- C) Contains inaccurate, incomplete, and/or unreasonable prices on the Cost Breakdown

2.11.04 Communications

Baltimore City may engage in communications with the Proposers after receipt of Proposals, allowing Proposers to provide clarifications to their Proposals or otherwise to address issues that might prevent the Proposal from being placed in the Competitive Range. This process will be initiated by delivery of a written request from Baltimore City to the Proposer identifying the information needed and a date and time by which the information must be provided. The Proposer shall provide the requested information in writing by the date and time indicated. If the

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requested information is not timely received, the Proposer's ratings may be adversely affected and/or Proposal may be declared unacceptable.

Baltimore City may waive technical irregularities in the proposal of the Proposer that does not alter the quality or quantity of the information provided.

2.11.05 Competitive Range

The term "Competitive Range" means a list of the most highly rated Proposals, based on initial Technical Proposal ratings and evaluations of Price Proposals that are judged by the Proposal Evaluation Team to be reasonably susceptible of being selected for award. The Competitive Range is based on the rating of each Technical Proposal and evaluation of each Price Proposal against all evaluation criteria.

Proposals that would not be included in the Competitive Range and would be excluded from further consideration include:

- A) Any Proposal that, even after review of supplemental information or clarification provided by the Proposer in response to a City request does not pass the pass/fail evaluation factors;
- B) A Proposal that, after the evaluation, is determined to not be responsive or responsible.

Baltimore City will determine the Competitive Range after a careful analysis of the Technical and Price Proposals. Proposals will not be excluded from further consideration if the Proposers have a reasonable chance of being placed in the Competitive Range if meaningful discussions are conducted and appropriate improvements are achieved.

2.11.06 Discussions

Baltimore City reserves the right to make an award without Discussions. However, Baltimore City may, at its sole discretion, conduct Discussions (that is written or oral exchanges) with the Proposers in the Competitive Range, with the intent of allowing the Proposers to revise their Proposals.

2.11.06.1 Purpose

If Baltimore City decides to engage in Discussions, the areas of Discussions may include the following:

- A) Attempting to resolve any uncertainties and obtaining any significant additional understanding concerning the Proposal;
- B) Resolving any suspected mistakes by calling them to the attention of the Proposers as specifically as possible without disclosing information concerning other competing Proposals or the evaluation process;

2.11.06.2 Procedures

The following specific procedures will apply to Discussions:

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- A) Discussions will only be conducted with Proposers in the Competitive Range. If Discussions are held, they will be held with all Proposers in the Competitive Range;
- B) Information disclosed by Proposers in the Competitive Range during Discussions will not be made public until after execution of the Contract;
- C) Discussions may be written and/or oral, and more than one round of Discussions may be conducted; and
- D) No disclosure will be made of any information derived from a Proposal of, or from discussions with, another Proposer.

2.11.06.3 Prohibited Contact

During Discussions, Baltimore City personnel involved in the acquisition shall not engage in the following conduct:

- A) Revealing a Proposer's technical solution, including unique technology, innovative and unique uses of commercial items, or any information that would compromise a Proposer's intellectual property to another Proposer;
- B) Revealing a Proposer's price without that Proposer's permission. However, Baltimore City may inform a Proposer that its price is considered by Baltimore City to be unbalanced based upon the Scope of Work and may provide information regarding the analysis supporting that conclusion;
- C) Revealing the names of individuals providing references information about a Proposer's past performance; or
- D) Revealing selection information in violation of Baltimore City's procurement policies and the laws of the State.

2.11.07 Proposal Revisions

Although Baltimore City reserves the right to hold Discussions and request proposal revisions and Best and Final Offers (BAFO) when in the best interest of Baltimore City, it is under no obligation to do so. Baltimore City may make its selection and award based on the initial Proposals as submitted.

At the conclusion of Discussions (if held), Baltimore City will request a proposal revision or BAFOs from all Proposers in the Competitive Range to provide Proposers an opportunity to revise their Proposals (both the Technical Proposal and Price Proposal), following initial evaluation of the Proposals. The request for proposal revision or BAFOs will allow adequate time, as determined by Baltimore City, for the Proposers to revise their Proposals. Upon receipt of the proposal revisions or BAFOs, the process of evaluation will be repeated. The process will consider the revised information and re-evaluate and revise ratings as appropriate.

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Baltimore City may require more than one series of proposal revision submissions followed by a request for a BAFO submission, but only if Baltimore City makes a written determination that it is in its best interest to conduct additional Discussions following receipt of proposal revisions or to change its requirements and require another BAFO submission.

2.11.08 Determination of Successful Proposer

In accordance with COMAR 21.05.03.03(F), award of the Contract based on a determination of the Proposal that is the most advantageous to Baltimore City, taking into consideration the technical and price factors discussed above, provides the best opportunity to obtain the right Design-Build Team to assure a successful Project.

The technical proposal will become part of the contract documents and all concept ideas provided to Baltimore City are expected to be included in the price proposal, final plan, design and construction phases. Baltimore City or successful bidder may use ideas and approaches excluding proprietary or protected information.

NOTE: All materials, conferences, proposals and other matters related to this project shall remain confidential until the contract is executed with the successful DB Team. However, Baltimore City does reserve the right to use the knowledge of good ideas of one team in discussions with the successful Team unless that one team elects not to receive a stipend.

TC-2.12 AWARD AND EXECUTION OF CONTRACT

All conditions of award and execution procedures will be in accordance with GP-Section 3 and GP-Section 2.19.

The Design-Builder will be given Notice to Proceed after Execution of the Contract has been completed. At this point, additional field investigation may continue and design work may proceed with payment to be made as outlined in TC Section 7

Baltimore City understands the probability that the successful bidder will need to start design activities as soon as possible after notification as the apparent successful bidder and prior to issuance of the Notice to Proceed. Baltimore City understands this approach is an effort to maximize the available time for construction activities. Baltimore City also recognizes the benefits to the public by providing an opportunity to accelerate project activities and project completion. It is reasonable that these design activities should not place the Design-Builder at risk should Baltimore City not issue a Notice to Proceed for events outside of the control of the Design-Builder.

Actual construction work may not begin until the additional requirements specified elsewhere in this RFP/IFB have been satisfied, including but not limited to receipt of erosion and sediment control plan approval, permits, design approval including appropriate maintenance of traffic approval, and pre-construction conference.

TC-2.13 STIPEND

Baltimore City understands that firms invited to submit price proposals on Design-build projects may incur higher than normal bid preparation costs in their engineering effort to submit responsive bids for the project. Such efforts are likely to involve geotechnical investigations,

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development of horizontal and vertical geometry, development of concept design plans, cross sections, field surveys, stormwater management investigation, preliminary storm drain design, development of extensive design details to establish materials and quantities to prepare and submit a bid.

A stipend in the amount of **\$35,000.00** will be paid to each Proposer meeting both of the following terms and conditions:

- A) Its Proposal(including any BAFO) is acceptable, and
- B) Its Proposal (including any BAFO) was not selected for award or it was awarded the Contract but the Contract was terminated prior to issuance of a notice to proceed for Baltimore City's convenience.

Those firms invited to submit Price Proposals will be required to sign a contract with Baltimore City for payment of the stipend in exchange for electronic copy and hard copy of all documents used to develop the price proposal.

In payment for the services covered by this Agreement, the Design-Build Team agrees that all materials, electronic files, marked up drawings, cross sections, quantity lists and other material used in the development and submission of the price proposal will become the property of Baltimore City and may be used in any manner at their discretion without any additional compensation to the Design-Build Team. **Three completed, signed originals of the enclosed Agreement must be submitted to Ms. Laetitia Griffin of Baltimore City DOT, in the time frame outlined in the Stipend Agreement, Section 2.2(a).**

One original invoice signed (in blue ink) and two copies along with supporting engineering materials noted above must be submitted to Ms. Laetitia Griffin of Baltimore City DOT, in the time frame outlined in the Stipend Agreement, Section 2.3.

As noted in the Stipend Agreement, Section 2.3, Invoices and supporting engineering work for stipend payment shall not be submitted until notification from Baltimore City that the contract has been awarded or there has been a cancellation of the procurement. Invoices must be received within 30 days of said notification by Baltimore City to be honored for payment. Invoices received prior to notification from Baltimore City will not be processed for payment.

Invoices shall contain the following information:

Invoice # - created by the Design-Build Team

Federal Tax I.D. number

Remittance Address

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Payment Amount - **\$35,000.00**

Description of Work: example: "payment for Design-Build Team to perform preliminary design work to prepare a bid for contract"

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**TC SECTION 3
SCOPE OF WORK FOR DESIGN-BUILD
TERMS AND CONDITIONS**

ADD: After section TC 3.04

TC 3.05 DESIGN-BUILD - DESIGN AND CONSTRUCTION SCOPE OF SERVICE

This project includes, but is not limited to the following items of work, which the Design-Build Team shall perform and provide. This section sets forth provisions that are design and construction related; however, this section also impacts construction activities and other work.

Specific design and construction criteria are discussed separately following this section.

3.05.01 General Requirements

The Design-Build Team shall complete all design and construction work in two phases - Final Design Phase and Construction Phase which includes Review of Shop Drawings, Revisions, Redesign Under Construction, As-Built Plans and provisions for expert court testimony.

The Design-Build Team shall comply with all Federal, State and local laws, ordinances and regulations applicable to the activities and obligations associated with this project.

3.05.02 Design Personnel Identified in Proposal

The designer and design subcontractors shall utilize the key personnel identified in their Statement of Qualifications to manage the project and supervise engineers and technicians in completing the design in a timely manner to permit construction activities. **Changes in key staff identified in the technical proposal must be approved in writing by Baltimore City, and replacement personnel must have equal or better qualifications than the key personnel identified in the proposal.** The format for replacement staff resumes must be in the same format as required for the technical proposal including requirements thereof. Baltimore City shall be the sole judge as to whether replacement staff members are acceptable. Requests for changes must be made in writing no later than thirty (30) calendar days prior to the due date for submittal of Proposals. The Proposer should carefully consider the make-up of its team, prior to submittal of the SOQ, to reduce the likelihood of occurrence of any such changes during the Proposal period and thereafter throughout the term of the Contract.

3.05.03 Qualified

The Design-Build Team shall have experienced personnel qualified in the development of plans, specifications and estimates for the following: Highway Design; Hydrologic/Hydraulic Engineering, including storm drainage, stormwater management and erosion & sediment control; Structural Engineering; Geotechnical/Pavement Engineering; Arboriculture and Landscape Architecture including roadside planting; Environmental Regulation and Permitting; Traffic

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Engineering including signals, signing, marking, lighting, and traffic control; Utility Engineering including electric conduit, water and sanitary sewer; and Bridge Architecture. The Design-Build Team shall be knowledgeable in coordinating utility designs, utility connections and working with other agencies and the public.

3.05.04 Design Constraints

The Design-Build Team shall construct the project within available right of way and approved temporary construction easements. This includes the final Project, as well as any and all work required to maintain drainage and traffic during construction (including detour roads) and any and all work required to control erosion and sediment laden water. The Design-Build Team may have to use features not shown on the Concept Plans to keep work in the right-of-way, including but not limited to mechanically stabilized embankment slopes, mechanically stabilized retaining walls, block retaining walls, concrete retaining walls, drainage pipes, etc.

3.05.05 Design Exceptions

Any elements of design that fall below the design standards listed in TC-3.09 through 3.21 and AASHTO will require a design exception or design waiver. An SHA ADA design waiver will be required for any elements of design that do not meet the requirements of MSHA's Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways.

The Design-Build Team shall submit the design exception or waiver request to Baltimore City's Project Manager, and receive written approval before proceeding with the design. Requests for design exceptions or waivers that affect construction underway or complete shall not be a basis for approval of the exception.

The request will explain and justify the use of the proposed design and include the following information (at a minimum):

- A description of existing conditions, including existing design values and design speeds.
- A description of AASHTO or other design standards that would normally be applied.
- A description of the actual design values proposed.
- A description of R/W impacts, environmental considerations or other factors that justify the exception.
- A 3-year accident history within the area an exception is being sought.

Baltimore City reserves the right to deny design exceptions or waivers that, in its judgment, are unsafe, otherwise contrary to normal practice, and/or inconsistent with the project or community goals.

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3.05.06 Quality of Design and Construction

3.05.06.1 Design Quality Control Plan

The Design-Build Team shall submit a Design Quality Control Plan (DQCP) for review and approval by Baltimore City, before notice-to-proceed will be given to begin work. The DQCP must be a complete and clear plan to achieve a high quality design, including all related elements and lower tier subcontractors/Design-Build team members. The DQCP shall present both the overall organization plan for design quality control and detailed plan elements to meet the CPM requirements for this project. The DQCP must include an organization structure and reporting requirements that demonstrate that quality control personnel have sufficient independence to allow them to be primarily concerned with quality, as opposed to the schedule and budget. As a minimum, the DQCP shall include calculations, plans, specifications, design coordination, construction coordination for material activity and document control, as well as as-built plans.

The Design-Build Team must adhere to the approved DQCP throughout the duration of the project.

The DQCP must be available for review and discussion at the first partnering meeting.

3.05.06.2 Responsibility of Design-Build Team

The Design-Build Team shall be fully responsible for performing a complete, coordinated, economical, timely, fully functional quality design, including survey and geotechnical elements, all in compliance with the RFP. The Design-Build Team shall follow the DQCP and receive written authorization from Baltimore City for modification to the plan. The Design-Build Team shall request from Baltimore City, in writing, all exceptions to the plan, and Baltimore City will respond in a timely fashion to each request in writing.

The Design-Build Team shall include a complete check of all design and other calculations, plans and specifications in this plan. This check shall include both the overall concept and various element coordination check and the detail check of the calculations for each plan and specification. The design and the check shall be performed by experienced design professionals actively licensed in the State of Maryland that have not participated in any of the design up to the checking process. These individuals may be employed either by the Designer or by an independent design firm other than the Design-Build Team.

All plans and specifications required for construction of a work element shall be checked prior to their transmittal to Baltimore City.

The requirements included in Baltimore City Department of Transportation's Plan Checklist for each discipline and each milestone submission shall be met. The checklists

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shall be filled out and included as part of each milestone submission.

Baltimore City may require that the Design-Build Team provide checked calculations to Baltimore City for specific elements of the design prior to approving the design. Baltimore City will endeavor to provide the Design-Build Team with written requests for such submittals at least 7 days prior to the date the submittal are due. Baltimore City may request that checked calculations be submitted on demand. In such instances, the Design-Build Team shall provide the checked calculations immediately.

The checked calculations shall be submitted to Baltimore City with the other Record Documents submitted at the appropriate milestone reviews.

3.05.07 Calculation Certification

The Design-Build Team shall provide the following certifications concerning the calculations:

3.05.07.1 Designer

Within 30 days of the Notice of Award the corporate officer responsible for quality for the Design-Build Team and the Designer shall certify that the calculations, plans, specifications and other technical documents for which they are responsible shall be prepared in conformance with the DQCP.

3.05.07.2 Checker

Within 30 days of the Notice of Award, the corporate officer responsible for quality for the Design-Build Team and all organization(s) that will check the calculations shall certify, in writing, that the design check shall be performed in conformance with the DQCP.

3.05.07.3 Transmittals

On the transmittal for each submittal of calculations, plans, specification, shop drawings, as-builts and other technical documents, the Design-Build Team, Designer (as appropriate) and the checker shall certify that the documents were prepared and checked in conformance with the DQCP.

3.05.07.4 Conclusion of Work

At the conclusion of the Work and with the transmittal of the Record Documents to Baltimore City, the corporate officer responsible for quality for the Design-Build Team, the Designer, and all organizations that have checked the documents shall sign, seal, and certify in writing, that all calculations, plans, specifications and technical documents, for

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which they were responsible, were prepared in conformance with the DQCP.

3.05.07.5 Professional Seals

All calculations, plans, specifications and other technical documents transmitted to Baltimore City shall be signed and sealed by both of the Professional Engineers licensed in the State of Maryland who are responsible for the design and checking of that document. Landscape plans shall be prepared, signed, and sealed by a Landscape Architect actively licensed in the State of Maryland.

3.05.07.6 Design Quality Assurance

Baltimore City may periodically audit the Design-Build Team's, the Designer's, and the checker's work to ensure that it is being done in conformance with the Contract requirements. Baltimore City will endeavor to perform these audits so as not to interfere with the progress in the work. The Design-Build Team shall fully cooperate with and assist Baltimore City in conducting such audits. The Design-Build Team shall maintain all records and any other elements of the work in a current and readily available manner so that, should Baltimore City audit the work, everything shall be readily available.

Any quality assurance reviews or audits conducted by Baltimore City shall in no way remove from the Design-Build Team the responsibility for designing and constructing all elements of the Work in conformance with its Design Quality Control Plan and all requirements of the Contract. Baltimore City shall at all times have the authority to require the Design-Build Team to re-perform any work that Baltimore City determines is not in conformance with any of the provisions of the Contract or with any drawings, specifications, other documents prepared by the Design-Build Team. Any re-work shall not serve as the basis for claims for additional compensation or time by the Design-Build Team.

3.05.08 Highway Engineering

The Design-Build Team shall prepare roadway, typical section, drainage, geometry, profile, ADA compliant pedestrian ramps/sidewalk, maintenance of traffic, erosion sediments control and special detail plans as part of the highway construction plans using the latest MDSHA CADD Standards.

3.05.09 Structural Engineering

The Design-Build Team shall develop all structural calculations, details, reports and plans for all the bridges, culverts (including those meeting MDSHA criteria for classification of a Small Structure), retaining walls, and any other incidental structure specifically designed for this project. All plans developed shall meet the latest MDSHA CADD Standards.

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3.05.10 Noise Abatement

N/A

3.05.11 Geotechnical Engineering

The Design-Builder shall conduct supplemental subsurface explorations, analyses, design and construction for all geotechnical components of the Project in accordance with all applicable criteria and standards cited herein and in accordance with this Geotechnical Performance Specification.

3.05.12 Pavement Engineering

The Design-Builder shall use the pavement sections provided by Baltimore City for the full-depth roadway reconstruction.

3.05.13 Traffic Engineering

The Design-Build Team shall prepare signing, signal, roadway lighting, pedestrian lighting and final pavement marking plans as part of the highway construction plans.

Baltimore City will review and approve all signing, signal, lighting, and pavement marking plans for this project. All catalog cuts and working drawings pertaining to traffic items shall be reviewed and approved by the Design-Build Team.

The Design-Build Team shall maintain all existing traffic control devices operations throughout the project limits. All traffic control device modifications to existing and/or temporary signals shall be reviewed and approved by Baltimore City DOT, Traffic Engineering Division.

3.05.14 Landscape Planting

The Design-Build Team shall prepare landscape plans with a scale appropriate for the project, but not less than 1"=20'. Plans shall include schedules of all materials proposed for use.

The Design-Build Team shall prepare the necessary documents to obtain final tree removal and landscape planting and Critical Area mitigation planting approval from the Baltimore City Environmental Planning Department. Should the Design-Build Team's submittal not be approved by the Baltimore City departments, the Design-Build Team is responsible for modifying the submittals at no additional cost.

3.05.15 Utility Engineering and Coordination

The Design-Build Team shall be responsible for coordination of all activities during design and construction with regard to utilities and permits. See Section 3.15-Utility Design and Relocation Criteria.

The Design-Build Team shall be responsible for designing, furnishing and installing all

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relocations, replacements, upgrades and/or installations of existing or proposed conduit ductbanks, electric manholes and appurtenances owned by the City within the roadway rehabilitation limits.

The Design-Build Team shall be responsible for designing, furnishing and installing all relocations, replacements, upgrades, abandonments and/or new installations of existing or proposed water mains, water service connections, fire hydrants and appurtenances owned by the City within the roadway rehabilitation limits.

Baltimore City will review and approve all conduit and water plans for this project. All catalog cuts and working drawings pertaining to utility items shall be reviewed and approved by the Design-Build Team.

3.05.16 Stormwater Management (SWM) Design and Approvals

The Design-Build Team shall design SWM in accordance with the criteria established in the Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification.

The Design-Build Team shall ensure that copies of the most current approved plans are available to all personnel involved in the construction and inspection of the project. The Design-Build Team shall be responsible for coordinating all reviews and approval submissions with the appropriate review entities.

Once the City review process is complete, the Design-Build Team shall obtain final approval from the Baltimore City Department of Public Works (DPW).

3.05.16.1 DPW Review and Approval

A SWM concept design was developed to demonstrate to that all of the SWM needs of the project can be met within the project corridor. It is anticipated that DPW will approve the methodology in the concept SWM report and provide a Letter of Intent to issue approvals. The Design-Build Team is responsible for finalizing the SWM design. The final design shall be acceptable to both the Baltimore City DOT and DPW. DPW will issue final SWM Approvals.

A Pre-Permitting meeting must be held once Notice to Award has been issued. This meeting will be scheduled by Baltimore City upon request by the Design-Build Team and will include the Design-Build Water Resource engineer, Design-Build Construction manager, Design-Build Project Design manager, Design-Build E&S manager, and the Baltimore City Storm Drain Division and Highway Design Division managers. The purpose of the meeting is to preview and discuss the SWM concept and the Design-Build Teams erosion and sediment control approach, submission schedules proposed by the Design-Build Team, permitting timeframes, submission requirements and Baltimore City's quality expectations.

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The Design-Build team's Professional Engineer licensed in the State of Maryland must review and certify by signature that the Erosion and Sediment Control plans have met the requirements of Baltimore City.

The SWM submission to Baltimore City shall be submitted directly to the Department of Public Works:

Mr. Warren Ware
Baltimore City Department of Public Works
Bureau of Water and Wastewater
Surface Water Management Division
3001 Druid Park Drive
Baltimore, MD 21215

Review time for submissions to Baltimore City shall not be the basis of a claim or time extensions against Baltimore City.

Deviations from the Concept SWM Report by the Design-Build Team are the sole responsibility of the Design-Build Team. Baltimore City will not pay for any additional design, review coordination, construction or other costs incurred due to deviations from the Concept SWM Report.

SWM locations have been suggested by Baltimore City in the Concept SWM Report and on the Plans. If the Design-Build Team chooses other locations for SWM facilities, they must be reviewed and approved by Baltimore City. Any proposed location shall not result in a net increase in tree, wetland and/or waterway impacts.

The Concept SWM report proposes certain locations of SWM facilities. The Letter of Intent will be issued based upon the locations. Other types of facilities may be used, but they shall meet all requirements of the most recent version of the City of Baltimore Stormwater Management Ordinance, the 2000 Maryland Stormwater Design Manual, and subsequent revisions and shall be in accordance with the Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification. Once approval is gained from Baltimore City, the Design-Build Team shall acquire all other approvals and necessary permits.

3.05.16.2 Stormwater Management (SWM) As-Built Certifications

The Design-Build Team shall provide an SWM As-Built (AB) Inspector to inspect the various stages of construction for each SWM facility and provide documentation to Baltimore City that certifies that the SWM facilities have been constructed as specified in the Contract Documents including certification that the constructed SWM facilities provide the functionality as designed. The AB Inspector shall be a licensed Professional Engineer or Land Surveyor in the State of Maryland with experience in SWM design and construction.

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The As-Built Certification Package shall be prepared according to the special provision, 300 – Stormwater Management Facility As-Built Certification, included in this package. The As-Built Certification signature block, checklists and tabulations are also available upon request.

The Contractor shall submit the completed As-Built Certification Package to:

Mr. Warren Ware
Baltimore City Department of Public Works
Bureau of Water and Wastewater
Surface Water Management Division
3001 Druid Park Drive
Baltimore, MD 21215

3.05.17 Surface Storm Drainage Design and Approvals

The Design-Build Team shall design all surface drainage conveyances (including but not limited to inlets, closed storm drainage systems, cross culverts, and pipes under entrances and driveways) in accordance with the Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification. Approval for the drainage design and report shall be obtained from Baltimore City prior to construction. Review time for submissions to Baltimore City shall not be the basis of a claim or time extensions against Baltimore City.

If Waterway Construction (COMAR 26.17.04) review and approval is required, submittals for MDE approval shall be delivered to Baltimore City for review and approval prior to submittal to MDE. Review time for submissions to Baltimore City or MDE shall not be the basis of a claim or time extensions against Baltimore City.

3.05.18 Erosion and Sediment Control (ESC) Design and Approvals

Baltimore City will not provide any ESC design. The Design-Build team will be responsible for 100% of design and for obtaining approvals for the erosion and sediment control plans from DPW.

The Design-Build Team shall design ESC in accordance with the criteria established in the Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification.

The Design-Build Team shall be responsible for producing a completed set of ESC plans for the roadway construction activity. These plans shall be submitted to DPW for review and approval. DPW will not approve an ESC submittal until all permanent elements to be constructed as part of that ESC submittal have been approved. A signed Title Sheet will not be provided to the Design-Build Team until all proposed elements and comments have been addressed to the satisfaction of Baltimore City. The Design-Build Team shall be responsible for addressing any comments that Baltimore City supplies.

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A Pre-Permitting meeting shall be scheduled as discussed under SWM Design and Approvals section above. Submittals for ESC approval shall be delivered to Baltimore City according to the review process for SWM approval described above under SWM Design and Approvals. Review time for submissions to Baltimore City shall not be the basis of a claim or time extensions against Baltimore City.

3.05.19 Engineering Studies

The Design-Build Team shall be responsible for engineering studies as required to determine solutions to any unforeseen situations that may be discovered during this project, and submission of these studies to Baltimore City for approval.

3.05.20 Coordination with Baltimore City

3.05.20.1 Design Submission Requirements

3.05.20.1.1 Review Timeframes

The Design-Build Team **must notify Baltimore City 14 days prior to the date** of all intended submissions. If the Design-Build Team elects to break the project into smaller separate design packages or to employ a "rolling" process, Baltimore City will review the plan submittals and return comments **within 21 calendar days** of receipt of the plans, beginning on the day after receipt of the plans. If the Design-Build Team elects to submit plans using the normal milestone review process, Baltimore City will review the plan submittals and return comments **within 45 calendar days** of receipt of the plans, beginning on the day after receipt of the plans. Multiple submissions sent concurrently or overlapping submissions may also result in a **45 calendar day** review and comment period depending on the material being submitted. Review time for submissions to Baltimore City shall not be the basis of a claim or time extensions against Baltimore City. The Design-Build Team shall also provide 1 set of plans for Baltimore City review and 10 sets of plans for third party reviews. The Design-Build team shall deliver plans directly to third parties.

The intent of this section is to provide some flexibility for the Design-Build Team in the schedule for design and construction such that the construction work may begin on one portion of the project before all of the design has been reviewed and approved for the entire project.

Any adjustments made necessary by changes during the completion of the design and approval process shall be made at the Design-Build Team's expense. Use of this process will not alter the need to formally submit each element of the design for approval using the review process described below.

The Design-Build Team may follow Baltimore City's normal milestone review

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process in completing the design. Plans and specifications would be submitted for review and approval of Baltimore City at the milestones listed below. The intent would be for Baltimore City to review the plans as design progresses, so that major changes can be avoided late in the process.

Baltimore City may conduct formal review meetings at these milestones and provide comments for the Design-Build Team to address. In either case, the Design-Build Team shall be required to address all issues identified, to the satisfaction of Baltimore City, before Baltimore City will grant the milestone approval.

The Design-Build Team may, at their own risk, prepare the plans for any segment to the Final Plans and Specifications stage (100 percent). Any changes required to plans or field adjustments as a result of Baltimore City comments shall not be the basis of a claim or time extensions against Baltimore City.

The traffic control plans for a particular phase of work must be approved by Baltimore City DOT, Traffic Division before Final Plans and Specifications approval will be given and before construction can begin for that phase of work.

For the protection of both the Design-Build Team and Baltimore City, all submittals prepared by the Design-Build Team shall be dated and initialed by the Design-Build Team as a file copy submission.

Plan reviews that result in “conditional approval” means the comments are minor in nature and should not have an adverse effect on construction activities. If “conditional approval” is granted, the Design-Build Team shall provide to Baltimore City their point-by-point responses outlining how the Design-Build Team will address the comments. If the comments are identified to be addressed as part of an “As-Built Drawing”, the Design-Build Team shall follow the process outlined in Section 3.05.27.2.2. If the Design-Build Team elects to address all comments prior to proceeding towards construction, then the Design-Build Team shall follow the process for plan “approved” as noted below.

Once the plans are “approved”, the Design-Build Team shall submit the title sheet that is signed and sealed by the Design-Build Team’s Engineer to Baltimore City. The title sheet shall be returned to the Design-Build Team with signatures from the appropriate officials of Baltimore City. The Design-Build Team shall then submit one set of reproducible to Baltimore City, including the signed title sheet. The Design-Build Team is responsible for any external distributions associated with the Design-Build Teams personnel, subcontractors, sub consultants, suppliers etc.

The Design-Build Team shall not proceed with the final construction of a particular portion of the project until:

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- a. All Final Plans and Specifications comments have been addressed to the satisfaction of Baltimore City for that portion.
- b. All required permits for that portion of work have been received.
- c. Final Plans and Specifications approval is received in writing from Baltimore City for that portion.
- d. A title sheet is signed and sealed by the Design-Build Team's Engineer and appropriate officials of Baltimore City.

Final contract plans submission shall also be submitted in electronic format (both pdf copy of plan sheets and Microstation files). The submission will be considered the record plan set for seals and signature. Electronic files shall be for documentation purposes only. All revisions to approved plans and as-built revisions shall be made on both the hard copy originals and in the electronic files.

3.05.20.2 Normal Milestone Review Process

If the normal milestone review process is chosen, the following submissions shall be made:

3.05.20.2.1 Semi-Final Review

One set of reproducible plans shall be submitted to Baltimore City when the design is approximately 60 percent complete (including drainage layout, utility locations, TCP concept plans, SWM, etc.). The Design-Build Team shall also produce 10 sets of plans and specifications if third party reviews are included. The Design-Build team shall deliver plans directly to third parties.

3.05.20.2.2 Final Plans and Specifications

The Design-Build Team will be required to submit Final Plans and Specifications when the portions of the design are 100 percent complete. One set of reproducible plans shall be submitted to Baltimore City. The Design-Build Team shall also produce 10 sets of plans and specifications if third party reviews are included. The Design-Build team shall deliver plans directly to third parties.

This review will verify that all comments from semi-final review have been addressed and may include additional comments on the plans, and/or specifications due to the Design-Build Team's subsequent design submittals.

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3.05.20.3 Structural Review Process

All structure plans for structures, including bridges, culverts (including those meeting MDSHA criteria for small structure), and retaining walls shall follow the process outlined in TC-3.11.

3.05.21 Additional Services

The Design-Build Team shall be responsible for all necessary field surveys required for the project, which shall conform to Baltimore City Survey Control System.

3.05.22 Environmental Permits

The Design-Build Team shall procure all other approvals, permits and licenses; pay all charges, fees and taxes and give notices necessary or appropriate for the prosecution of the Work. This includes approvals for on-or off-site staging, stockpiling areas, disposal sites and borrow pits.

The Design-Build Team cannot alter the concept activities in such a manner that increases or creates new wetland, buffer, waterway, floodplain impacts compared to those impacts which were authorized by the original permit, without obtaining all required permits or modifications from the appropriate regulatory agencies. If the Design-Build team determines that additional or other waters, wetlands, or buffers than are permitted will be impacted temporarily or permanently (including potential impacts from supplemental geotechnical investigations), the Design-Build team shall obtain modifications to the permits from MDE, USACE, and other regulatory agencies. The Design-Build Team shall be responsible for tracking any changes to the approved Landscape/Critical Area/Forest Conservation plan which will affect trees removed or saved and obtain approvals for any plan revisions or additional tree removal. The Design-Build Team shall address any comments or issues the regulatory agencies and/or Baltimore City may have, including those pertaining to avoidance and minimization measures and navigability associated with bridge passage. The Design-Build Team shall also be responsible for designing, implementing, and monitoring any additional mitigation which may be required due to any changes in permitted wetlands, buffers, or floodplain impacts proposed by the Design-Builder. It is not the responsibility of, nor guaranteed by, Baltimore City that approval or authorization will be granted by the regulatory agencies.

A. As part of this RFP, Baltimore City is providing the following permits and approvals based on the proposed activities:

- 1) Joint Federal / State MDSPGP-4 (from MDE and USACE)
- 2) Approval from U. S. Coast Guard
- 3) Approved Critical Area Plan including Landscape Mitigation from City

B. The Design-Builder shall obtain the following permits and/or approvals:

- 1) Erosion and Sediment Control Approval (from DPW)

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- 2) Stormwater Management Permit (from DPW)
- 3) NPDES Construction Activity Permit (MDE)
- 4) Tree removal permit from the City.
- 5) All other approvals, permits and licenses, pay all charges, fees and taxes and give notices necessary or appropriate for the implementation of the Project beyond those obtained by Baltimore City. This includes but is not limited to approvals for on or off-site staging, stockpiling areas, disposal sites and borrows pits; and

3.05.23 Construction Phase Services

Construction Phase services consist of partnering during design and construction, checking shop drawings, redesign under construction, revisions, as-built plans, and provisions for expert court testimony.

The Design-Build Team shall provide all services and perform tasks described in compliance with the requirement policies of Administration as stipulated throughout this resume and Volume II.

3.05.24 Construction Personnel Identified in Proposal

The Design-Build Team, all key staff and construction-related key personnel, and all other Major Participants identified in the proposal shall be utilized in the same manner and to the same extent set forth in said Statement and for the duration of the project. **Changes regarding the Design-Build Team shall not be allowed. Changes regarding key staff, construction-related key personnel and all other Major Participants require prior written approval by Baltimore City.** Requests for such changes must be submitted to Baltimore City in writing and replacement personnel must have equal or better qualifications than the key personnel identified in the technical proposal. The format for replacement staff must be the same format as required for the Statement of Qualifications including the requirements thereof. The Design-Build Team acknowledges that any such changes are for the convenience of the Design-Build Team alone and shall not increase the Design-Build Team's Price or change the project schedule. Baltimore City will approve such requests only if it determines that such change will not detrimentally affect the long term quality, durability, maintainability, timeliness of the Work.

3.05.25 Conformance with Contract and Proposal

All construction, construction-related work, and all other work must conform to the Contract, to the Technical Proposal submitted by the Design-Build Team and to the construction plans prepared by the Design-Build Team.

3.05.26 Check Shop Drawings

The Design-Build Team shall check all shop drawings prior to manufacture and/or placement of

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such items. The Design-Build Team shall check all such shop drawings and stamp their approval prior to sending approved shop drawings to Baltimore City for a secondary review.

All shop drawings relating to the structures shall be reviewed in accordance with SHA OBD PPM No. OP-82-34 (G), Checking of Working Drawings, Form Plans and/or Erection Plans. The primary review shall be undertaken by the Design-Build Team. A secondary review shall be undertaken by Baltimore City. Once reviewed and approved by the City, the structural shop drawings shall be stamped as approved or approved as noted and returned to the Design-Build teams with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by Baltimore City .

The Design-Build Team shall correct any errors or omissions found by Baltimore City during QA/QC of such approved shop drawings at no additional cost to Baltimore City.

The Design-Build Team shall challenge all the work of the detailer, approving that, which is correct, or most appropriate and red lining and commenting on incorrect or less appropriate details or design. The importance of this approach is emphasized since inferior detailed design could negate the benefits of quality general design. Each shop drawing shall bear the official stamp of the Design-Build Engineer, attesting to their review and approval by the Design-Build Engineer. This work is to be done under the supervision of and shall be the responsibility of a Maryland Registered Professional Engineer.

3.05.27 Conformance with Approved Plans and Specifications

3.05.27.1 Construction Plans and Project Specifications

All work shall be done in conformance with the details and dimensions shown on the approved Final Plans and Specifications, and shall meet the requirements in the specifications/special provisions approved as a part of the Final Plans and Specifications submission and portions thereof.

3.05.27.2 Plan Revisions after Approval of Final Plans and Specifications

All plan revisions made after Final Plans and Specifications approval shall have approval of Baltimore City prior to implementation.

3.05.27.2.1 Revisions

Redesigns after Final Plans and Specifications approval shall be superimposed on the original project plans in red. Old design details, dimensions and notes shall not be erased, but X'd out in red. The date that the revision was made shall be indicated in the title block of each revised plan sheet. Revisions require prior approval of the agencies that is affected by the change and finally Baltimore City.

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Any revisions to the structural drawings must be submitted in writing to Baltimore City and approved prior to proceeding with any change to the approved structural drawings. All changes must be documented as Red Line Revisions in accordance with SHA OBD PPM No. P-75-6(4), Revisions to Advertised Plans. The Design-Build team is responsible for preparation of all Red Line Revisions. All Red Line Revisions shall be reviewed and approved by Baltimore City prior to implementing any changes to the contract documents.

3.05.27.2.2 As-Built Drawings

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the approved set of drawings in green. Old details, dimensions and notes shall not be erased, but X'd out in green. Each revision must be identified with a Hexagon with the letter A in the center. The date that the revision was made shall be indicated in the title block of each revised plan sheet. The As-Built Plans shall reflect any field revision made during construction.

The Design-Build Team shall submit one comprehensive set of As-Built plans at the completion of the project that are signed and sealed by the Design-Build Engineer. The comprehensive set of As-builts will include an index sheet and a key plan which graphically represents and annotates each phase of the plan submittal if there are multiple submittals. The comprehensive set of as-builts will be assembled and numbered consecutively, beginning with sheet one of the first submittal and ending with the last sheet of the final submittal. The index and key plan will allow for more easily understood and navigable drawings within the overall project limits in the future.

The Stormwater Management Facility As-Built Certification will be a separate submittal as described in 3.05.16.2.

3.05.27.2.3 Computer Files

The Design-Build Team shall also submit Black and White images, at 200 DPI-TIF and PDF files, of the As-Built Plans on CD ROM. The As-Built plans shall be scanned starting with the Title Sheet. The file names will be the Construction Contract Number, followed by a dot (.), followed by a sequential number beginning with 1001. The sequential number must correspond with the plan sheet numbering. This number is followed by another (.) and then the TIF and PDF extension. Example: TRxxxxx.1001.tif. All scanned TIF and PDF images will be scanned in such a way that they do not appear upside down upon opening. The cover of the CD ROM shall be labeled with the Baltimore City contract number, date, and project description.

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3.05.27.2.4 Traffic Control Plans

Any deviations from the approved traffic control plans, details or concepts must have prior approval of Baltimore City.

3.05.27.2.5 Permits

The Design-Build Team shall obtain approvals from the appropriate regulatory agencies for any changes in design and/or construction activities that affect any permit conditions.

3.05.28 Coordination with Other Contractors

The Design-Build Team shall coordinate all design and construction, including that of any subcontractors, with other designers, contractors, the utility companies, and governmental agencies concerning site access, establishment and use of temporary facilities, work schedules, and other elements of the specified work, which require interfacing with others.

It shall be noted that Baltimore City's Contract #TR08310, Rehabilitation of Central Avenue and Storm Drain from Eastern Avenue to Madison Street is currently under construction. The target completion date for this project is August 28, 2017. It is very important that the Design-Build Team coordinate the construction activities and maintenance of traffic schedules with the contractor of Contract #TR08310.

3.05.29 Community Relations

The Design-Build Team will establish a program of public contact for conducting effective relationship with the community and businesses that are in proximity to construction areas. This program shall meet the requirements outlined in TC 3.20, submitted to Baltimore City within 45 days of Notice to Proceed and included as part of the Lump Sum Price for this Contract. As part of this program, the Design-Build Team shall establish and maintain continuing liaison with persons occupying property or doing business in the immediate area of the work site for the purpose of minimizing inconveniences resulting from construction. The plan will detail how the Design-Build Team intends to keep the property owners and businesses informed of the work schedule and include a program for notifying them at a minimum of every 30 days of what will occur within the next 30 days. The Design-Build Team's Technical Proposal shall also name a Public Relations Officer who is responsible for this work and who Baltimore City and citizens can contact for project information and answers to project related questions. See TC Section 3.20, Public Outreach Performance Specification, for all the requirements.

3.05.29.1 Toll Free Telephone Number

The Design-Build Team shall establish a toll free telephone number. This telephone number shall be used for the public to contact the Design-Build Team in the case of an emergency. The Design-Build Team shall maintain a log of all calls made to the number,

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including date, time, name of caller, reason for call, caller's address and phone number. These logs shall be accessible to Baltimore City for review and submitted every two months once the phone line is made available to the public. The Design-Build Team shall respond in person or by telephone within one hour of the time of the call and shall arrange for resolution of any issues as soon as possible. The Design-Build Team shall post the toll free telephone number prominently within the project limits and Baltimore City project field office. The telephone number shall be shown on all flyers distributed on the project.

3.05.29.2 Public Relations Materials

All public relations materials, advertisement, flyers, and meeting handouts and graphics shall be approved by Baltimore City prior to public release.

TC 3.06 BALTIMORE CITY SERVICES

Baltimore City will provide the following services:

3.06.01 General Baltimore City Services

- Provide engineering standards, design criteria, existing R/W plats and prints of other design projects for use as examples or guides.
- Provide erosion and sediment control standard sheets, traffic design standard details, Maintenance of Traffic (MOT) standard plates, etc.
- Schedule and coordinate all milestone meetings for this project.
- Provide accident statistics and other traffic data Average Daily Traffic (ADT), Design Hourly Volume (DHV), percentage of trucks, etc.
- Provide review of all redesign and revisions.
- Provide overall management and liaison services related to project phases.
- Coordinate times and places of all of the Design-Build Team's community and public meetings.
- Review and approve design concepts, plans, contract drawings, documents and estimates.
- Provide existing Right-of-Way plats and/or Right-of-Entry agreements.
- Acquire Right-of-Way for roadway construction as determined by Baltimore City's design concept plans.

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3.06.02 Traffic Services

Baltimore City DOT, Traffic Engineering Division will provide the following:

- A review of signing, signal, pavement marking and lighting plans.
- Design charts for ground mounted sign supports and foundations.
- Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team.
- Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.
- Review the functional operation and requirements for the traffic signals, as recommended by the Design-Builder.
- Once notified by the Design-Build Team when each service drop is needed, Baltimore City may arrange the final electrical service request letters when directed by the utility company.

3.06.03 Structural Services

Baltimore City DOT's Transportation Engineering and Construction Division, Bridge Engineering Section, will provide the following:

- A review and comment on all plans, reports, specifications,, shop drawings, SI&A database forms, load ratings, etc. as related to the individual structures included on this project.
- A response to all Requests for Information on the structures during the design and/or construction.
- Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.

3.06.04 Construction Inspection

Baltimore City will follow its normal construction inspection policies and procedures. However, measurement of quantities will serve to verify that the plan and specification requirements are met and for other purposes at the discretion of Baltimore City. The Design-Build contract does not alter the authorities of Baltimore City's Construction Project Engineer or construction inspection personnel in their administration of the construction contract.

3.06.05 Conduct Pre-Construction Conference

Baltimore City will conduct the conference and take minutes. Representation at the conference

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shall include:

3.06.05.1 Preconstruction Conference Attendees

- A responsible officer of the Design-Build Team;
- The Project Manager;
- The Baltimore City Construction Project Engineer;
- Baltimore City Community Liason;
- A responsible officer of any major subcontractors.
- SHA Construction Management Representative
- The FHWA Area Engineer

3.06.05.2 Pre-Construction Conference Topics

The Design-Build Team should be prepared to discuss the following issues at the conference (at a minimum):

- Designation of responsible personnel;
- Design Quality Control Plan;
- Correspondence/communication;
- Distribution of contract documents;
- Approval of subcontractors;
- Progress schedule (design and construction);
- Critical work sequencing;
- Permits and licenses;
- Submission schedule;
- Submittal of Shop Drawings, project data and samples;
- Itemized schedule listing dates by which other submissions will be forwarded to Baltimore City;

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- Major equipment, deliveries and priorities;
- Site utilization plans;
- Office and storage area;
- Construction constraints;
- Coordination of all interface activities;
- Training;
- Availability of utilities/need for temporary services;
- Procedures for maintaining Record Documents;
- Material submittals and approvals;
- Processing of field decisions and change orders;
- Close-out procedures;
- Review of miscellaneous procedures;
- Safety;
- Utility relocations, and
- Utility connections to all existing and proposed TCD's.

3.06.06 Conduct Progress Meetings

Baltimore City will conduct progress meetings on a regular basis, as scheduled at the project initiation meeting and pre-construction conference. The Design-Build Team shall prepare all meeting minutes and distribute them to attendees and team members for review and comment weekly. Additional progress meetings may be necessary at the discretion of Baltimore City to maintain coordination of design and construction activities. Representatives at the meetings shall be qualified and authorized to act on behalf of the entity each represents.

3.06.06.1 Progress Meeting Attendees

- The Design-Build Manager, Design-Build Project Manager and associates as needed,
- Baltimore City's Project Engineers, Construction, Design and associates as needed,

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- Subcontractors as appropriate to the agenda,
- Utility companies, and other concerned parties as appropriate.
- Stakeholders as needed.

3.06.06.2 Progress Meeting Topics

The meetings will serve as a forum to establish and maintain close coordination of work activities, resolve problem issues and expedite construction operations. Schedules, change orders, work activities, DQCP reviews, and other issues will also be addressed.

3.06.07 Permits

As part of this RFP, Baltimore City is providing the permits and approvals based on the proposed activities. See Section 3.05.22, Environmental Permits, for a list of the permits that have been obtained by Baltimore City. The Design-Builder shall obtain all other permits required for this project and be responsible for ensuring all the permits are updated based on the final project design.

TC 3.07 DELIVERABLES

Deliverables will be produced in both the design and construction phases. They include construction documents, reports, an engineer's office, public relations materials, design exceptions and property owner information.

3.07.01 Plans

At a minimum, the following separate plan sheets shall be produced for this project.

- Title Sheet
- Index of Drawings
- Typical Sections
- Paving Details
- Geometry and Coordinates
- Roadway Plans
- Roadway Profiles

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- Traffic Control Plans
- Traffic Signal Plans
- Structure Plans
- Storm Drain Plans, Profiles and Structure Schedules
- Drainage Details, including ditch type/linings, outfall protection, and non-standard structures
- Erosion and Sediment Control Plans and Details
- Signing and Pavement Marking Plans
- Stormwater Management Plans and Details
- Cross Sections
- Landscape/Reforestation/SWM Planting Plans
- Lighting Plans
- Conduit Plans and Profiles
- Water Plans and Profiles

The plans shall be 24" X 36" and prepared in accordance with Baltimore City Department of Transportation's Streetscape/Reconstruction Plan Review Checklist.

3.07.01.1 General Requirements

The Design-Build Team shall deliver upon request and at no additional cost hard copies of maps, plans and drawings as well as electronic copies of all computer files. This includes Microstation files used to develop the design and drafting of this project. These files must be logically indexed and labeled to enable Baltimore City personnel to use at any time.

3.07.01.2 Refinements to Contract Documents

The Design-Build Team shall develop refinements to the Contract Documents within the parameters of the proposed cost that better achieve the project goals. This includes Semi Final and Final Design plans, Final SWM Report, Drainage Calculations and Contract Documents based on refinements and revisions to Baltimore City-furnished Contract Documents. The Design-Build Team may modify the files provided by Baltimore City, or

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start from new, blank files. In some cases, the Design-Build Team will have to start from new, blank files and redraft everything required for the permit.

3.07.01.3 Contract Plans and Specifications

The Design-Build Team shall provide contract plans and any required specifications, in accordance with Baltimore City Department of Transportation's Streetscape/Reconstruction Plan Review Checklist and this RFP. The Design-Build Team will develop specifications for construction that identify the details of the proposed work. The intent is that the work will be done in accordance with the Standard Specifications, project specific Special Provisions, the "standard" Special Provisions, and the Special Provisions Inserts which are normally included in a Baltimore City advertised RFP. All of these "standard" Special Provisions Inserts and Special Provisions are included in this RFP even though the work items to which they apply might not be included in this project. The intent is that if the item is included in the construction, then these "standard" Special Provisions and Special Provisions Inserts will apply.

The specifications to be prepared by the Design-Build Team and submitted to Baltimore City for review and approval will, in addition to all of the specifications mentioned above, include any specifications developed by the Design-Build Team that supplement or modify what is provided in the RFP.

Throughout the design phase, the Design-Build Team shall prepare and update 50 scale reproducible maps of the design to be used for meetings, briefings, etc. Where needed for added clarification, 20 scale reproducible maps shall be provided for use by Baltimore City. The scale of the roadway plans should be 20 scale unless more detail is needed.

The Design-Build Team shall provide Baltimore City with sufficient data to answer property owners' and other requests for information concerning the project's effects, status, etc.

3.07.01.4 Drafting

The Design-Build Team shall utilize Baltimore City supplied Microstation files, including data collector survey and photogrammetry in their design and drafting. The Design-Build Team shall utilize the Microstation drafting software packages Version V8 or later, and/or Inroads/Geopak.

3.07.01.5 Stormwater Management (SWM) and Surface Drainage Plans

The following items shall be included in the design plan documents:

- Storm Drain Plans
- Pipe profiles and structure schedules for all storm drain systems.

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- Profiles shall be at a scale of 1 in. = 50 ft. horizontal and 1 in. = 5 ft. vertical. The 10-year hydraulic gradient and existing and proposed ground, proposed pipe, existing and proposed utilities, proposed outlet protection, and existing structures shall be shown on all storm drain profiles.
- Details for all non-standard drainage structures.
- SWM Systems including details, profiles, grading and layout plans, planting plans and BMP ID numbers.
- A BMP As-Built Certification sheet shall be developed for each SWM facility (see 3.05.16.3). Examples of the checklists and tabulations are included in this package and checklists for other types of facilities may be available from Baltimore City DPW, upon request. The Design-Build Team may expand the checklist as necessary.
- Hazardous material spill containment plans as necessary.
- Underdrain connections, locations (including linear filter cleanouts), and outlets.
- Cross culvert locations, headwater pool areas, and channel changes required to adjust streams to culverts.
- Spring box and outlet locations and configurations.

3.07.01.6 Erosion and Sediment Control (ESC) Plans

The Design-Build Team shall develop ESC Plans that include the following in addition to the highway plan requirements.

- Plans for both initial and final phases of the construction are required. Plans for interim phases may also be required by Baltimore City to ensure adequate controls throughout project duration. These interim phase plans shall be coordinated with traffic control stages. The plans require one foot contouring for all phases at the same scale as the roadway plans.
- The initial phase plan shall detail the implementation of erosion and sediment control measures necessary to complete the clearing and grubbing and the initial stages of the Traffic Control Plan (TCP).
- The final phase shall detail the control measures required to move to final grade and accommodate interim traffic control phases.
- Plans shall provide a detailed description of the Limit of Disturbance (LOD).

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- Maintenance of stream flow and maintenance of storm drain flow plans as required. This plan will be coordinated with the MDE Non-Tidal Wetland and Waterways Division to ensure compliance with ESC measures in areas subject to waterway construction permits. The Design-Build Team shall be responsible for all revisions due to MDE review and comment.
- The plans shall be sealed and signed by a Maryland Registered Professional Engineer.

3.07.01.7 Traffic Control Plans

The Design-Build Team shall prepare detailed Traffic Control Plans (TCPs) as required for various stages of construction showing traffic patterns, signs, barricades, etc. These plans will be developed using the roadway plan scale, with details in larger scale if necessary, and shall layout in detail each phase of construction as coordinated with the erosion and sediment control, drainage, storm water management, structural, conduit, utility relocations and landscape plans. Final TCPs shall be submitted for final review, and may include cross-sections, temporary signals and/or signal phasing modification plans and interim drainage. All existing roadway lighting systems, and traffic signals are to be kept fully operational throughout the construction period. In the event some or all of the existing lighting must be taken out of service, consideration shall be given to temporary lighting systems and maximizing usage of new lighting systems. All lane closures shall be as outlined elsewhere in this RFP, and shall be approved by and coordinated with the Baltimore City DOT, Traffic Engineering Division.

3.07.01.8 Structure Plans

All structure plans developed by the Design-Build Team shall conform to the following requirements:

All views shall be in accordance with Maryland State Highway Administration, Office of Structures PPM P-75-7(4).

All lettering shall be in accordance with Maryland State Highway Administration, Office of Structures PPM P-76-9(G), except that all lettering shall be by CADD in accordance with current Maryland State Highway Administration CADD Standards.

3.07.01.9 Utility Map

The Design-Build Team shall develop a utility map graphically showing all existing utilities within proposed Right-of-Way. This map shall be at the scale of the roadway plans. Existing utilities are to be clearly indicated and labeled. Connections between valve boxes, manholes, poles, etc., are to be shown and labeled with the type of existing

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service, e.g. 8 in. Sanitary, 4 in. Gas, etc. This map is to be kept current with proposed utility relocations shown and made available for review and use by Baltimore City and Utility Company staff. Existing utilities are to be shown and clearly labeled on plans, profile and cross-sections.

3.07.01.10 Landscape and Replanting Plans

The Design-Build Team shall prepare landscape plans to include any re-planting per Critical Area, Forest Conservation Act, and City tree removal and replacement permit requirements with a scale appropriate for the project, but not less than 1"=20'. Plans shall include schedules of all materials proposed for use, and shall be submitted to Baltimore City, SHA Landscape Architecture Division and Landscape Operations Division, City Recreation and Parks Forestry Division, and City Department of Planning for review and approval. In addition to the requirements of specific approvals and plans, Landscape and Replanting plans should comply with the City of Baltimore Critical Area Management Program Manual and Native Species Plant List, and Baltimore City Landscape Manual and include the following information:

- Vicinity map of site location for planting areas
- Density and quantity of plantings area provided for mitigation
- Limit of Disturbance
- Plans should include environmental/surface features, extending at least 100' beyond Property Line or Right-of-Way of adjacent parcels. Ownership and parcel numbers should be identified for each adjacent parcel
- A schedule of materials, indication plant quantities for each type and size of plant material, proper nomenclature for plant species, root of materials; B&B or Container Grown (CG), and proposed spacing
- Defined limits of mowing and limits of mulching where applicable
- Critical Root Zones for individual significant trees, as identified by the City
- Tree preservation details for any trees impacted but not removed as identified by the City including but not limited to fencing, fertilizing, root aeration, signage, and root pruning/sequencing of construction indicating any additional requirements for tree preservation not identified in the specifications.

3.07.02 Cross Sections

The Design-Build Team shall prepare cross-sections cut at even 25 foot stations, at driveways, and at critical stations for clarity along the baseline of construction at a scale of 1 in. = 10 ft.

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horizontal and vertical. Cross sections shall be provided for the mainline and side roads. Cross-sections shall show: existing ground, proposed grade, roadway slope, curb/gutter, sidewalk, existing and proposed right-of-way and easements, proposed and existing traffic control device and sign structure foundations, grading limits, pavement section and all existing and proposed storm drains, storm water management facilities, and all utilities. Cross-sections shall have all existing and proposed (including relocated) utilities and storm drains drawn to scale at the correct offset and elevation, and have type, size, and invert elevation (if known) labeled. Cross-sections shall be placed on sheets measuring 24 in. x 36 in. with grid lines spaced at .2 in. horizontal and .2 in. vertical. Each section shall be identified by the baseline name, station and a datum elevation. Elevations shall be shown in the Baltimore City Survey Control System.

Existing and proposed utilities, proposed drainage conveyances including pipes, drainage structures, cross culverts and ditches shall be drawn on to the cross-sections. The cross-sections will be used by Baltimore City to verify adequate cover at pipes and clearance at utilities.

Interim and final cross sections containing drainage design components and annotations shall be submitted for use in Baltimore City's review of drainage design.

3.07.03 Reports

The Design-Build Team shall perform engineering computations and/or analysis and maintain all backup data. This data must be available to Baltimore City at all times; and clear, legible copies shall be furnished to Baltimore City upon request. Stormwater management reports, drainage reports, geotechnical report and field inspections reports, computations, and maps shall be submitted to Baltimore City for review and/or approval and placement in permanent files. These computations shall be for the total project and in accordance with Baltimore City procedures. Design Exceptions shall be documented in report form and submitted to Baltimore City.

3.07.03.1 Stormwater Management (SWM) Report

Upon completion of the project, the Design-Build Team shall submit two (2) copies of the approved, final SWM Report to Baltimore City. During the review and approval process, the report can be submitted in phases.

3.07.03.1.1 SWM Report Format

- The report and accompanying mapping shall be compiled in the same format as the Concept Stormwater Management Report.
- The report shall be written in a clear, well organized, and concise manner with all pages numbered and dated.
- The report shall be placed in an 8½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all

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pages and pages to be added, replaced or removed shall be designated. Revisions shall be 3-hole punched for easy placement in the reports.

- The final approved report, including all mapping and exhibits, shall be converted to PDF formatted file(s). The electronic file(s) shall be delivered to Baltimore City for their records.

3.07.03.1.2 SWM Report Contents

The SWM report shall contain the following:

- A thorough discussion explaining the extent of improvements at each outfall and the proposed quantitative and qualitative control methods of SWM, including reasons why other methods were not selected.
- An explanation of hydrologic/hydraulic analysis methodologies used. Final supporting computations, maps, schematics, cross-sections, details and computer outputs shall be included for each outfall location.
- Outfall stability analysis, including photographs of each outfall and receiving channel.
- Computations for riprap sizing and outlet protection.
- Maps and schematics clearly showing the location of subareas, structures, existing land use, time of concentration paths, soil types and SWM facilities. Maps shall be included in pockets within the report.
- Computer printout sheets in 8½ inch x 11 inch format. These sheets shall be clearly labeled for cross-reference to the supporting data and points of analysis.
- SWM Waiver Applications that differ from those submitted with the Concept SWM Report. These shall be submitted to Baltimore City Department of Transportation for signature.

3.07.03.2 Surface Drainage Report

The Surface Drainage Report shall include all drainage design computations performed according to Baltimore City's Highway Drainage Manual, drainage area mapping and schematics necessary to complete the design of the stormwater conveyances for the project.

All drainage computations shall be performed using the appropriate design charts within Baltimore City's Highway Drainage Manual and shall include clear references for all tables and charts used.

Culvert Analysis reports, when necessary for Waterway Construction Permit review and

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approval, shall be included as an attachment to the Surface Drainage Report and shall follow the format described below. The content shall be dictated by the MDE comment letter, approval or subsequent requirements issued by MDE in their review process.

3.07.03.2.1 Surface Drainage Report Format

- All the pages within the report shall be numbered and dated.
- The report shall be placed in an 8½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all revised pages. Pages which are added or removed shall be indicated as such. Revisions shall be 3-hole punched for easy placement in the reports.
- The final approved report, including all maps and exhibits, shall be converted to PDF format file(s). The electronic file(s) shall be delivered to Baltimore City for their records.

3.07.03.2.2 Surface Drainage Report Contents

The report shall include, but not be limited to the following:

- Storm sewer design computations including schematics, inlet drainage area maps, spacing, capacity, spread, hydraulic gradients, and structural design for non-standard drainage structures.
- Culvert analysis including 2, 10, 25 and 100 year frequency storms and design storms.
- Ditch computations and drainage area maps for ditch capacity, freeboard and lining stability.
- Evaluation of outfall stability, and outfall protection design.
- Any deviations from the guidelines and Administration approvals for the deviations.
- Culvert service life verification.
- Inspection documentation and evaluation of existing drainage structures, storm drains and culverts not being replaced.
- Analysis of the Harford Run Drain has previously been completed and is not required provided the Design-Build Teams rehabilitation scheme is within the parameters indicated in the Structural Design Performance Specification.

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3.07.03.3 Erosion and Sediment Control (ESC) Report

The ESC Report shall contain all computations for the ESC design and can be either a separate report or can be included in the SWM report. The ESC Report shall conform to SWM Report formatting described above (3.07.03.1.1).

The ESC Report shall contain the following:

- Drainage area maps to control devices for each phase.
- Computations for sizing control devices.
- Plans and procedures for converting sediment control devices into stormwater management facilities.
- Identification of and placement of controls in sensitive areas.

3.07.03.4 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda prior to releasing constructed elements for subsequent work. The Final Geotechnical Reports shall include the following, at a minimum:

- A) The corresponding Geotechnical Planning Report;
- B) The corresponding Interim Design Memorandum;
- C) Locations and results of borings, rock coring, geophysical testing and other in-situ testing;
- D) A detailed description of geological and subsurface conditions for each Project element (including a description of site stratigraphy);
- E) Field investigation procedures;
- F) A description of groundwater conditions;
- G) Results of laboratory tests;
- H) Values assigned to all applicable soil parameters for design;
- I) All pertinent data and complete discussions of all geotechnical analyses and design;
- J) All relevant design calculations and computer program results checked and initialed by a Professional Engineer licensed in the State of Maryland;
- K) Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;
- L) Groundwater problems encountered, means of dewatering and/or other solutions;

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- M) Designs for support of excavation;
- N) Results of instrumentation and monitoring and post-construction monitoring summaries;
- O) Potential settlement problems; and
- P) Potential stability problems and analysis results;

For each of the following Project elements, the Design-Builder shall submit the following items with the Final Geotechnical Reports.

Q) Foundations

- 1) Individual pile and pile group design calculations including axial and lateral capacity for the pile type, size, and length to achieve the required capacities (including any effects of liquefaction and downdrag); estimated pile and pile group settlement;
- 2) Shallow foundations calculations including allowable bearing capacity, estimated differential and total settlements, and rotations; and
- 3) Calculations of embankment settlement (magnitude and time rate) and downdrag forces on the piles, depths to zero or negligible settlement, and the proposed means to mitigate the downdrag.

R) Retaining Walls

- 1) Wall design calculations including the results of the global and internal stability analyses; analyses of total, differential, and secondary settlements; and, calculations for analyses of sliding, overturning, and bearing pressure for live and seismic loadings;

S) Embankments

- 1) The results of the slope stability analyses, including external loading from live and seismic loading, the recommended side-slopes of all embankments;
- 2) The results of settlement analyses, including predictions of the magnitude and duration of primary, secondary, and post-construction settlements;
- 3) The results of the liquefaction analyses and the proposed methods of mitigation for any location deemed necessary to protect the

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integrity of bridges and adjacent walls;

- 4) The proposed method(s) of protecting and abandoning utilities.

T) Cut Slopes

- 1) The results of the slope stability analyses, including external loading from live and seismic loading, and the recommended side-slopes of all cuts;

U) Subgrades for Pavements

- 1) The results of all subgrade improvement testing including Falling Weight Deflectometer (FWD) test results.

V) Instrumentation

- 1) All items included in TC 3.14.05.01 “Geotechnical Instrumentation”.

W) Stormwater Management

- 1) Results of Bioretention Soil Mix (BSM) testing.
- 2) Results of Field Percolation Tests, Infiltration Tests, SPT tests and test pit including depth to bedrock, soil description, textures, locations of infiltration test pits and soil borings. Include recommendations for SWM facility type, embankment settlement rate and infiltration rates.
- 3) Filter Diaphragm design recommendations.
- 4) Cut-off trench and clay core recommendations.

3.07.03.5 Tree Impact Minimization and Avoidance Report

A report shall be prepared that shows trees to be saved and removed and describes measures that the Design-Build Team proposes to use to avoid or reduce impacts to these trees. This report will be reviewed and approved in conjunction with the grading plans.

3.07.04 Engineers Office

Harbor Point Development Group will provide an office for use by Baltimore City personnel during the construction. The Design-Build Team shall supply furniture and equipment conforming to the requirements of Section 103 of the Standard Specifications.

One phone in the conference room of the Engineer’s Office shall have conference call and

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speakerphone capabilities.

The Design-Build Team shall provide Baltimore City with one (1) digital camera, and two (2) cellular phones, and is described in special provisions in this RFP

The Design-Build Team shall provide the CPM schedule, as is described in the special provision in this RFP.

The Design-Build Team shall provide the Protection Vehicle, as is described in the special provision in this RFP.

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TC 3.08 ROADWAY PERFORMANCE SPECIFICATION

3.08.01 General

Design and construct roadways in accordance with the requirements of this specification, including performance requirements, standards and references, design and construction criteria, and required submittals.

This section is also intended to allow the flexibility to make Project changes that produce benefit of savings to Baltimore City and Design-Builder without adversely affecting the essential functions and characteristics of the Project in terms of safety, traffic operations, desired appearance, durability, ease of maintenance, environmental protection, drainage, and other permitted constraints

3.08.02 Guidelines and References

3.08.02.01 Guidelines

Roadway design and construction shall be in accordance with this specification and requirements of the following Guidelines unless otherwise stipulated in this specification. Guidelines and References specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another, the Guideline assigned the highest priority shall govern. It is the Design-Builder’s responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction. Unless noted below, the most recent version as of the date of issuance of this RFP for each Guideline shall apply.

**Table 1
Guidelines for Roadway**

Priority	Author or Agency	Title
1	SHA	Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways
2	AASHTO	A Policy on Geometric Design of Highways and Streets, 2011
3	AASHTO	Roadside Design Guide, 2002
4	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) – 2011 Edition
5	FHWA	Manual on Uniform Traffic Control Devices, 2009
6	AASHTO	Guide for the Development of Bicycle Facilities, 2012
7	SHA	Highway Design Policy and Procedure Manual
8	ADA	ADA Guidelines Americans with Disabilities Act
9	SHA	Standard Specifications for Construction Materials

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Table 1
Guidelines for Roadway

Priority	Author or Agency	Title
10	SHA	Guidelines for Traffic Barrier Placement and End Treatment Design, dated 2003
11	Baltimore City	Book of Standards
12	SHA	Book of Standards Highway and Incidental Structures

3.08.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Roadway. These publications have no established order of precedence.

Table 2
References for Roadway

Author or Agency	Title
SHA	Book of Standards Highway and Incidental Structures
Baltimore City	Book of Standards

3.08.03 Performance Requirements

Design and construct all roadways to meet the following performance requirements:

- A. Meet or exceed all Maryland Department of Transportation State Highway Administration, Baltimore City, AASHTO and other roadway design and safety guidelines as referenced above, outlined in these specifications, and in accordance with sound engineering principles.
- B. Accommodate traffic volumes and levels of service as outlined in Traffic Performance Specification.
- C. All Roadway components shall be constructed within the defined right of way and easements.

3.08.04 Design and Construction Criteria

The Design-Builder shall design and construct all roadway geometrics including horizontal alignment, vertical alignment, cross slopes, lane widths, turning radii for intersections, sidewalk widths, medians, pedestrian ramps, driveway entrances, and alley entrances in accordance with the requirements of this section and the guidelines for roadway design.

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The Concept Plans show a conceptual design for the Project. These Concept Plans and supporting electronic files are included to illustrate the general scope of the improvements and may contain some elements that require modification to meet the requirements of this Performance Specification. The Design-Builder shall verify all information prior to use to ensure compliance with the requirements of this Performance Specification.

3.09.04.01 Design Criteria

Central Avenue	
Design Speed	35 mph
Posted Speed	30 mph
Functional Classification	Minor Urban Arterial
Terrain	Flat
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	N/A
Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

Intersecting Roadways	
Design Speed	Varies (see below)
Posted Speed	Varies (see below)
Functional Classification	Varies (see below)
Terrain	Flat
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	N/A
Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

Design speeds for intersecting roadways shall be, at a minimum:

ROADWAY	DESIGN SPEED	POSTED SPEED	FUNCTIONAL CLASSIFICATION
Lancaster Street	30 mph	N/A	Urban Collector
Alicenna Street	30 mph	25 mph	Urban Minor Arterial
Fleet Street	30 mph	25 mph	Urban Principal Arterial
Eastern Avenue	30 mph	25 mph	Urban Principal Arterial
Bank Street	30 mph	25 mph	Urban Local Street
Fawn Street	30 mph	N/A	Urban Local Street
Gough Street	30 mph	25 mph	Urban Local Street
Pratt Street	30 mph	25 mph	Minor Urban Arterial
Gransby Street	30 mph	25 mph	Urban Local Street

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Lombard Street	30 mph	30 mph	Minor Urban Arterial
Watson Street	30 mph	N/A	Urban Local Street

Driveway Criteria	
Design Speed	N/A
Functional Classification	N/A
Posted Speed	N/A
Terrain	Flat
Maximum Superelevation	N/A
Maximum Grade	7%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

B. The presence of roadway lighting shall not reduce the requirements for vertical sight distance on sag curves.

3.08.05 Typical Section

The Concept Plans include typical sections for Central Avenue. These specify the general number of lanes, lane widths, medians, curb and gutter, sidewalks, offsets from roadway to sidewalk, and other cross section elements. Any proposed modifications to these cross sections shall be consistent with requirements outlined in these Performance Specifications and Project commitments. Modifications to typical sections shall be subject to approval by Baltimore City and may require approval by additionally affected agencies.

3.08.06 Cross Street Improvements

The Plans include improvements to roadways crossings with Central Avenue. The general extent and limits of these improvements shown in the Concept Plans are conceptual and should be considered as the minimum required. The limits of the cross street improvements shall be determined based on the required horizontal and vertical changes. The reconstruction of the pavement and sidewalk shall be extended to the nearest existing joints.

Cross streets shall be constructed to the full cross street typical sections that are consistent with their existing conditions.

3.08.07 Design Vehicle

The design vehicle for turning movements shall accommodate a WB-50 vehicle for the Central Avenue intersections at Aliceanna Street and Fleet Street, and accommodate a Single Unit Truck for all the other intersections within the project limits..

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3.08.08 Curb

Modified Type A Combination Curb & Gutter, 12” Gutter Pan, 6” Rise shall be used along parking lanes.

Modified Type A Combination Curb & Gutter, 12” Gutter Pan, 8” Rise shall be used for the proposed medians.

The height of the curb shall be tapered to match the existing curb heights at the limits of the construction.

Asphalt curb is not allowed.

3.08.09 Sidewalks and Bike Lanes

Sidewalk and pedestrian ramps shall meet the requirements of MSHA’s Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways and ADA Guidelines Americans with Disabilities Act. Should the requirements in these two documents conflict with each other on certain design elements, MSHA’s Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways shall govern. All legs of all intersections shall be upgraded to ADA compliance.

Existing building entrances shall be maintained. While designing and constructing an ADA-compliant sidewalk, the Design-Builder shall strive to maintain the existing tie-in elevations where the sidewalk meets the building face, building entrances and basement access. If the proposed tie-in elevations vary from the existing, the Design-Builder shall ensure that the existing building foundation will not be exposed and existing building features including, but not limited to basement access and windows, etc will not be compromised. Positive drainage in the sidewalks shall be maintained at all times.

The pedestrian ramps shown in the Concept plans are conceptual, and their compliance with ADA requirements is not guaranteed. The Design-Builder is responsible for making all necessary revisions on the ramp locations and configurations based on the proposed roadway profile and ADA requirements.

All the existing utility manholes, handboxes and other utility structures within the areas of the proposed sidewalks, pedestrian ramps and driveway entrances shall be investigated by the Design-Builder to ensure the frame and cover of these facilities can be adjusted to meet the proposed grade. If it is determined that these facilities cannot be adjusted or should be relocated to meet ADA requirements, the Design-Builder shall coordinate with the utility owners for the modification, replacement or relocation of these facilities in order to construct ADA-compliant sidewalks, pedestrian ramps and driveway entrances.

The bike lane markings shall be compliant with State Highway Administration Policy on Marked Bicycle Lanes, issued in June 2011 and revised in November 2011.

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3.08.10 Construction Stakeout

Refer to SP – Section 107 – Construction Stakeout for Design-Build Projects.

3.08.11 Right-Of-Way and Easement Lines

The Design-Builder shall define right-of-way and easement lines of the Project for adjacent property owners, promptly upon request. The Design-Builder shall reset any disturbed or destroyed property corner(s) adjacent to the project upon request from the owner. The Design-Builder shall provide fencing for any properties which has an existing fence disturbed by construction. The Design-Builder shall reset the existing fence or provide black vinyl coated chain link fence with privacy slats. The fence shall be reset or replaced on the same day it is taken down. Once construction is complete, the existing fence which has been removed shall be reset or replaced by the Design-Builder. Any existing fence damaged shall be replaced by the Design-Builder in-kind with the new fence of the same material and aesthetics.

SPECIAL PROVISIONS**SCOPE OF WORK FOR DESIGN-BUILD****TC 3.09 PAVEMENT PERFORMANCE SPECIFICATION****3.09.01 GENERAL**

Pavement sections are provided herein. The Design-Builder shall construct all pavement sections in accordance with the criteria established in this performance specification.

3.09.02 STANDARDS AND REFERENCES**3.09.02.01 STANDARDS**

Construction of all pavements shall be in accordance with this performance specification and the relevant requirements of the following standards and references. Standards and references specifically cited in the body of this performance specification establish requirements that shall have precedence over all others. Should the requirements in any other standard conflict with those in another, the standard listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification. It is the Design-Builder's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any construction.

Unless noted below, the most recent version for each standard as of the issue date for this RFP shall apply.

Table 1: Standards for Pavement		
Priority	Author or Agency	Title
1	SHA	Pavement Design Guide
2	SHA	Book of Standards
3	ASTM	D 6433 – Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
4	ASTM	D 4694-Standard Test Method for Deflections with a Falling-Weight Type Impulse Load
5	ASTM	E-274 Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire
6	ASTM	E 501-Specification for Standard Rib Tire for Pavement Skid-Resistance Tests
7	AASHTO	M320 – Performance-Graded Asphalt Binder
8	AASHTO	Superpave Volumetric Mix Design
9	AASHTO	R25 – Superpave volumetric Design for Hot Mix Asphalt
10	AASHTO	M 288 – Geotextile Specification for Highway Applications
11	ASTM	E 950 – Test method for Measuring the Longitudinal Profile of Traveled Surfaces within an Accelerometer Established Inertial Profiling Reference
12	SHA	Standard Specifications for Construction and Materials

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3.09.02.02 REFERENCES

Use the reference listed in Table 2 as a supplementary guideline for the construction of the pavement.

Table 2: References for Roadway	
FHWA	FHWA-RD-03-031 June 2003 – Distress Identification Manual for the Long-Term Pavement Performance Program
SHA	Book of Standards

3.09.03 REQUIREMENTS

3.09.03.01 RECONSTRUCTED PAVEMENT SECTIONS

The Design-Builder shall refer to the Plans for the required pavement section for traffic lanes.

Geotextile meeting the requirements for AASHTO M-288, Class 2 for separation fabric, shall be placed on the top of pavement subgrade. A 2-foot overlap is required between adjacent geotextile layers.

3.09.03.02 REHABILITATED PAVEMENT SECTION

The Design-Builder shall use the following pavement sections for areas denoted as pavement rehabilitation:

- 2” Mill and Overlay
- 2” Hot Mix Asphalt Superpave 12.5 mm, PG 76-22, Level 2

3.09.03.03 WEDGE AND LEVEL

The Design-Builder shall use the following pavement sections for wedge and level:

- 2” Hot Mix Asphalt Superpave 12.5 mm, PG 76-22, Level 2
- Hot Mix Asphalt Superpave 9.5 mm for Wedge and/or Leveling Course, PG 76-22, Level 4

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3.09.03.04 PAVEMENT AND SUBGRADE MATERIALS

All materials used on the Project shall meet or exceed the requirements established in this performance specification.

3.09.03.04.1 Acceptable Subgrade Improvement Strategies

Subgrade shall be prepared, test rolled, and approved in accordance with MSHA Standard Specifications and Construction Materials.

Acceptable subgrade improvement strategies include both mechanical and chemical subgrade improvements. Additional supporting documentation shall be provided with any subgrade improvement technique proposed.

Geosynthetic Stabilized Subgrade may be used to improve the subgrade.

3.09.03.04.2 Existing Roads for Construction Traffic or Maintenance of Traffic

The Design-Builder shall evaluate the condition of any roadway or shoulder to be used to support maintenance of traffic during construction. At a minimum, pavement cores of the existing roadway shall be obtained by the Design-Builder and the structural capacity validated through an appropriate analysis by the Design-Builder's pavement engineer. This shall be done in all cases in which the use of any existing roadway, shoulder, or parking lane is used for maintenance of traffic purposes that is expected to have different traffic patterns than those that existed prior to the notice to proceed for this Project. The Design-Builder's pavement engineer shall determine if the roadway has adequate structural capacity to support maintenance of traffic and what, if any, construction is required to provide a pavement structure capable of supporting the traffic volumes for a 2 year time period. Existing roadways used for maintenance of traffic, and new pavement constructed for maintenance of traffic that will ultimately be used as permanent shoulders, parking lanes, or roadways, shall be restored to a suitable condition and meet the ultimate design requirements at the completion of the work. The design-Builder shall be responsible for maintaining roadways used for maintenance of traffic.

3.09.04 PAVEMENT CONSTRUCTION

Construction of all pavement materials shall be completed to the line, grade and cross slope specified in the release for construction plans developed by the design-builder and in accordance

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with MSHA Standard Specifications for Construction and Materials unless modified in this performance specification or in the specifications developed by the Design-Builder.

3.09.04.01 REMOVAL OF PAVEMENT MARKINGS

The Design-Builder shall eradicate all existing pavement markings that conflict with the Design-Builder's MOT markings by means of water blasting, sand blasting, covering with black tape, spot grinding, etc. For areas where existing pavement markings have been eradicated, the Design-Builder shall overlay the entire pavement surface and reinstall permanent pavement markings. The depth of grinding/thickness of overlay shall be the depth to remove the entire thickness of the existing surface layer of the pavement. The Design-Builder shall not install temporary pavement markings on final roadway surfaces.

3.09.04.02 REPAIR OF DAMAGED PAVEMENT

The Design-Builder shall perform pavement repairs of all distressed areas related to the operations of the Project. Distressed areas shall be defined as any medium and high severity distress in existing pavement and any low, medium or high severity level for new construction or reconstruction pavement section. All distress and severity levels shall be identified in D 6433 Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Any damage to the pavement in the Project or adjacent pavements caused by operations of the Design-Builder shall be repaired to the satisfaction of the City at the Design-Builder's expense. The depth and materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the MSHA Standard Specifications for Construction and Materials.

In addition, the Design-Builder shall perform patching and other necessary repairs to maintain traffic during all construction operations at no additional expense to the City.

3.09.04.03 DOWEL BAR ALIGNMENT

After the placement of the PCC pavement is complete and cured, the alignment and placement of the dowel bars will be checked by the Contractor's independent testing and quality control agency using a non-destructive test method. A random representative sample of joints will be tested to determine conformance with the following:

- a) Vertical Skew. The vertical skew shall be no greater than ½ inch tolerance over a 12 inch length of dowel bar.

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- b) Horizontal Skew. The horizontal skew shall be no greater than ½ inch tolerance over a 12 inch length of dowel bar.
- c) Depth of Dowel Bar. The dowel bar shall be located within the middle third of the slab thickness.
- d) Joint. The joint saw cut shall be in the middle third of the dowel bar length.

When a dowel bar is tested and does not conform to the criteria listed above, it is then misaligned. After testing is complete, the percentage of those dowel bars misaligned shall be determined. Dowel bar alignment shall be considered not in conformance when the percentage of misaligned dowel bars meet or exceed 25% of the total number of dowel bars placed for each unit placement. The Design-Builder shall take corrective measures to bring the dowel bar alignment within conformance with the percentage of misaligned dowel bars meet or exceed 25%.

3.09.04.04 PERFORMANCE CRITERIA

The parameters that will be used to evaluate performance of all constructed pavement for this Project are as follows:

- A) Structural capacity;
- B) Ride quality;
- C) Skid resistance;
- D) Visual appearance; and
- E) Conformance with line, grade and cross slope.

These parameters will be evaluated by the Design-Builder in coordination with the City, during construction and at Final Acceptance. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities to minimize disruption to the traffic at no additional cost to the City.

3.09.04.04.01 Structural Capacity

The structural capacity (thickness and strength) of 100% of all pavement sections shall be evaluated during the construction phase through the Design-Builder's Quality Plan. The parameters that will be evaluated include thickness, strength, bond between layers, and quality of materials. The thickness, strength, quality, and proper placement of materials shall be evaluated to ensure compliance with the Design-Builder's Construction Quality Plans. Final Acceptance will require meeting or exceeding proper construction requirements. The Design-Builder shall provide documented field evidence and/or data

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that confirms the design thickness for each pavement layer was achieved after final construction. If the structural capacity is determined to be deficient by the Design-Builder or the City, the Design-Builder shall take corrective action at no expense to the City.

3.09.04.04.02 Conformance with line, grade and cross slope

The Design-Builder shall construct a pavement surface that matches the line, grade and cross slope shown on the Design-Builder's Release for Construction Plans within the tolerances specified in SP 504- Hot Mix Asphalt Pavement.

3.09.05 SUBMITTALS

3.09.05.01 FINAL PAVEMENT REPORT

The Design-Builder shall prepare a Final Pavement Report that incorporates all aspects of the pavement construction performed on the Project for each Design Unit. The Final Pavement Report shall be submitted as part of the As-Built Plan stage. The Final Pavement Report shall include, but is not limited to the following items:

- A) Subgrade test rolling records and field verification notes for all subgrade areas;
- B) The subgrade improvement technique and quantity/details used by the Design-Builder to improve the subgrade, if required;
- C) Test results from any HMA pavement layer that were used to justify the required design strength was achieved.
- D) Test results from any PCC pavement layer that were used to justify the required design strength was achieved;
- E) The location of any pavement or material conditions encountered during the placement of any pavement layer that were unacceptable in terms of pavement quality as defined in the Contract Document and as defined by the Design-Builder in their quality plan; and
 - 1) The improvement made and quantity/details used by the Design-Builder to address the unacceptable material or pavement condition;
- F) Test results from all pavement performance criteria that were used and any corrective actions needed by the Design-Builder to justify the required pavement performance was achieved.

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TC 3.10 **SIDEWALK CAVITY TREATMENT PERFORMANCE SPECIFICATION**

3.10.01 **General**

The Design-Builder is hereby alerted to the presence of cavities underneath the existing sidewalk. A field investigation was conducted by Baltimore City and a list of the properties where these cavities were identified is provided as follows:

600 S EDEN ST

1300 GOUGH ST

415 CENTRAL AVE

401 CENTRAL AVE

319 CENTRAL AVE

317 CENTRAL AVE

315 CENTRAL AVE

313 CENTRAL AVE

311 CENTRAL AVE

137 CENTRAL AVE

135 CENTRAL AVE

133 CENTRAL AVE

117 CENTRAL AVE

Dimensions of these cavities were field measured by Baltimore City and sketches are provided as supplemental information as part of the Contract documents. However, Baltimore City does not guarantee the completeness of the above list and accuracy of the field measurements. The Design-Builder shall conduct its own investigation to verify the dimensions of these known cavities and identify cavities that are not included in the above list, if any.

These cavities, when encountered, shall be treated in accordance with the conceptual construction details provided in the Concept Plans. However, it is the Design-Builder's responsibility to verify the constructability of these details and modify or redesign as needed based on field conditions. Any modifications to the details provided or redesign shall be reviewed and approved by Baltimore City prior to construction. However, Baltimore City approval of the construction method and details does not relieve the Design-Builder's responsibility for the design and construction of the cavity treatment.

3.10.02 **Guidelines and References**

Cavity treatment design and construction shall be in accordance with this specification and requirements of the following Guidelines unless otherwise stipulated in this specification.

1. International Building Code IBC2003 including the modifications made by Baltimore City.
2. American Concrete Institute ACI-318 (2005), "Building Code Requirements for Reinforced Concrete"

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3. American Concrete Institute ACI-130/ ASCE 5/ TMS 402 (2002) "Building Code Requirements For Masonry Structures".
4. American Society of Civil Engineers ASCE 7 (2002), "Minimum Design Loads For Building and Other Structures".
5. AASHTO "Standards Specifications For Highway Bridges (2002)".

3.10.03 Design and Construction Criteria

3.10.03.01 General

- 1) Coordinate all activities, including those of subcontractors, with the property owner's activities.
- 2) Design-Builder shall take precaution and protect all building facades during cavity repair work.

3.10.03.02 Concrete

- 1) The concrete shall be Mix. 6.
- 2) Detail and construct reinforced concrete in accordance with American Institute ACI, "Specification for Structural Concrete".
- 3) Detail reinforcing steel in accordance with American Concrete Institute ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures", and ACI SP-66, "ACI Detailing Manual".
- 4) Provide reinforcement conforming to ASTM A 615, Grade 60, Deformed Bars.
- 5) Unless noted otherwise on the drawings, the concrete cover for reinforcement shall be as follows:
 - A. Cast against earth - 3"
 - B. Exposed to earth or weather after removal of forms - 2"
- 6) Submit reinforcing steel details (shop details) and receive approval before proceeding with fabrication.
- 7) All formwork shall be in accordance with the ACI "formwork for concrete" special publication No 4 and with ACI-347 "Standard Recommended Practice for Concrete Formwork".
- 8) All footings shall be below grade, such that the top of the footing is flush with the existing floor slab.

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9) Design bearing pressure for the footings shall be 1000 psf.

3.10.03.03 Concrete Masonry

1) Construct masonry in accordance with American Concrete Institute ACI-530/ ASCE 5/ TMS 402, 2002 "Building Code Requirements For Masonry Structures".

2) Provide hollow lightweight load-bearing concrete masonry units meeting the requirements of ASTM C 90.

3) Provide mortar conforming to the requirements of ASTM C-270, Type M or S. Cement used for mortar shall be Portland cement.

4) Provide grout conforming to the requirements of ASTM C 476 coarse grout, with a minimum compressive strength of 2,500 psi at 28 days.

5) Provide concrete masonry units with a minimum compressive strength (f'm) of 1,500 psi.

6) Provide reinforcing bars conforming to ASTM A 615, grade 60.

7) Reinforced masonry shall be constructed such that: all cells line up, clean out holes provided above footings in block cells, all mortar protruding into block cells is broken with a reinforcing rod and loose mortar removed, all cell are filled with 2,500 psi grout.

3.10.03.04 Controlled Low Strength Material, Type B for Backfill

1) The backfill shall be placed in lifts with a maximum height of 4'-0". Design-Builder shall prevent the backfill material from leaking or leaking or flowing out of the cavity by sealing all cracks or other pathways as required. Existing walls must be adequately supported to ensure stability of new masonry walls. There shall be a minimum of eight (8) hours between completion of one backfill placement and the start of the next after approval by the engineer.

2) Do not backfill against masonry walls until they have attained required strength and damp/waterproofing has been installed and approved by Baltimore City.

3.10.03.05 Existing Structures

The Design-Builder shall protect all existing structure. Damage to existing structures due to the activities of this project shall be repaired at the Design-Builder's expense and at no additional cost to Baltimore City. The repairs shall be completed to the satisfaction of Baltimore City.

1) Prior to starting any work on this project, the Design-Builder shall engage in a pre-construction survey as per specifications included in the RFP.

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- 2) All dimensions affected by the geometrics and/or location of the existing structure shall be checked in the field by the Design-Builder, before any construction begins, and before any material is ordered or fabricated. It shall be the responsibility of the Design-Builder to supply with Baltimore City with all field dimensions required to check detail drawings.
- 3) Design-Builder shall provide temporary protection to all utility meters, ducts, conduits and switchgears during cavity work and shall maintain service.

3.10.03.06 Existing Utilities

- 1) Necessary precautions shall be taken by the Design-Builder to protect the existing utilities. Any damage caused to the existing utilities due to the activities of this project shall be repaired immediately at the Design-Builder's expense and no additional cost to Baltimore City or the property owners. The repairs shall be completed to the satisfaction of Baltimore City.
- 2) It is the responsibility of the Design-Builder to confirm whether the existing utilities are live or abandoned.
- 3) The Design-Builder shall note that the live or abandoned utilities within these cavities may contain asbestos cover. It is the responsibility of the Design-Builder to adopt safety measures while working in or around asbestos containing materials.

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TC 3.11 STRUCTURAL DESIGN PERFORMANCE SPECIFICATION

3.11.01 General

Design and construct all structures in accordance with the requirements of this specification and the structure description as shown in the Special Provisions, including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required submittals. The minimum design life for all permanent new and rehabilitated structures shall be 75 years.

The requirements of this specification apply to the design and construction of all temporary and permanent structures, including but not limited to bridges, retaining walls, and culverts. This specification also applies to the rehabilitation and repair of existing structures to remain. A summary of the anticipated structures to be constructed in this Contract includes the new Harbor Point Connector Bridge (to connect Central Avenue at Lancaster Street to the proposed Harbor Point development site), structural repairs and strengthening of existing Bridge No. 8018 on Lancaster Street over Harford Run, the replacement of existing Bridge Nos. BC 8019 on Aliceanna Street over Harford Run and BC 8020 on Fleet Street over Harford Run, structural repairs and strengthening of existing Bridge Nos. BC 1555 on Central Avenue over Harford Run (located between Lancaster Street and Aliceanna Streets), and BC 1255 on Central Avenue over Harford Run (located between Aliceanna and Fleet Streets), and structural repairs to the existing small structure on Central Avenue over Harford Run (located between Fleet Street and Eastern Avenue).

As an Alternative Technical Concept to the structural replacement, repair, and strengthening work to the structures specified above (except the new Harbor Point Connector Bridge), the Design-Builder may propose to construct a structural lining system within the maximum typical section limits as identified between Fleet Street and Lancaster Street.

This section is also intended to allow the flexibility to make Project changes that produce benefit of savings to Baltimore City and the Design-Builder without adversely affecting the essential functions and characteristics of the Project in terms of service life, safety, traffic operations, desired appearance, durability, ease of maintenance, environmental protection, drainage, and other permitted constraints.

3.11.02 Guidelines and References

3.11.02.01 Guidelines

Structural design and construction shall be in accordance with this performance specification and the relevant requirements of the following Guidelines listed in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this performance specification establish requirements that shall have precedence over

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all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It shall be the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed Guideline, including interim revisions, as of the initial publication date of this RFP unless modified by addendum or change order.

TABLE 1**GUIDELINES FOR STRUCTURES IN URBAN ENVIRONMENTS**

Priority	Author or Agency	Title
1	SHA	Office of Structures, Policy and Procedure Manual (PPM)
2	SHA	Office of Structures, Structural Standards Manual, Volumes I and II (www.marylandroads.com)
3	SHA	Special Provisions and Special Provision Inserts to the Standard Specifications
4	SHA	Standard Specifications for Construction and Materials
5	AASHTO	AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications
6	AASHTO	AASHTO Standard Specifications for Highway Bridges, 17 th Edition
7	ACI	Building Code Requirements for Structural Concrete, ACI 318
8	AASHTO/AWS	D1.5M/D1.5: Bridge Welding Code
9	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
10	AASHTO	Guide Specification for Horizontally Curved Steel Girder Highway Bridges
11	AASHTO	Guide Specifications for Highway Bridge Fabrication With HPS70W Steel
12	Baltimore City	Book of Standards
13	SHA	Book of Standards for Highway and Incidental Structures
14	SHA	Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways

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TABLE 1

GUIDELINES FOR STRUCTURES IN URBAN ENVIRONMENTS

Priority	Author or Agency	Title
15	AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
16	AASHTO	Roadside Design Guide, 2002
17	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) – 2006 Edition
18	FHWA	Manual on Uniform Traffic Control Devices, 2003
19	AASHTO	Guide for the Development of Bicycle Facilities, 1999
20	SHA	Highway Design Policy and Procedure Manual
21	ADA	ADA Guidelines Americans with Disabilities Act
22	SHA	Guidelines for Traffic Barrier Placement and End Treatment Design, dated 2003
23	FHWA	FHWA Memorandum, Bridge Rails, Dated August 1986 and updated May 1997

3.11.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the structures noted herein. These publications have no established order of precedence.

TABLE 2

REFERENCES FOR STRUCTURES

Author or Agency	Title
FHWA	Design and Construction of Driven Pile Foundations, Volumes 1 and 2
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
FHWA	Publication No. FHWA-SA-98-074, Driven 1.0 User's Manual
FHWA	Publication No. FHWA-SA-91-048, Laterally Loaded Pile Program

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FHWA	Publication No. FHWA-SA-96-038, Geotechnical Engineering Circular No. 2: Earth Retaining Structures
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunnicliff 1986
ASTM	Standards in Building Codes
SHA	Standard Specifications for Subsurface Explorations
OSHA	Occupational Safety & Health Administration (OSHA) Standards – 29CFR, Including Parts 1910 and 1926
FEMA	Code of Federal Regulations Title 44, Part 9 and 10
PCI	Precast Prestressed Concrete Bridge Design Manual, Volumes One and Two
BCDOT	2011 Biennial Inspection Report for Bridge Nos. BC 8019 and BC 8020

3.11.03 Performance Requirements

Design and construct all structures to meet the following performance requirements:

- A. Meet or exceed all Maryland Department of Transportation State Highway Administration, Baltimore City, AASHTO and other structural design and safety guidelines as referenced above, outlined in these specifications, and in accordance with sound engineering principles.
- B. Accommodate traffic volumes and levels of service at all times as outlined in the Traffic Performance Specification.
- C. All structure components shall be constructed within the defined right of way and easements.

3.11.04 Design and Construction Criteria

The Design-Builder shall design and construct all roadway geometrics supported by the project bridges including horizontal alignment, vertical alignment, cross slopes, lane widths, sidewalk widths, medians, pedestrian ramps, driveway entrances, and alley entrances in accordance with the requirements of the previously specified guidelines and the guidelines for roadway design specified under TC 3.08 Roadway Performance Specification.

Design calculations shall be performed in Customary U.S. units. Only Customary U.S. units shall appear on the plans and calculations.

3.11.04.01 Design Methodology

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The following references are for AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, latest edition.

A. Concrete.

All reinforced concrete members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength and extreme event limit states.

B. Prestressed Concrete.

The use of prestressed concrete beam substructures will not be permitted for this project. Any prestressed concrete superstructure component shall be designed in conformance with applicable provisions of the AASHTO LRFD Specifications.

C. Structural Steel.

All structural steel members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength and extreme event limit states. The use of structural steel for the replacement of existing Bridge Nos. BC 8019 on Aliceanna Street over Harford Run and BC 8020 on Fleet Street over Harford Run will not be permitted for this project.

D. Composite Members.

Composite members shall be designed to include effects resulting from differential creep and shrinkage of the concrete deck.

E. Load Ratings.

All new or replaced vehicular superstructures shall be rated using the load factor and resistance factor rating (LRF) method of analysis using the latest edition of the AASHTO "Manual for Bridge Evaluation. The rating factors shall be shown in a table on the General Plan and Elevation in the General Notes.

The ratings shall be performed in accordance with SHA's PPM D-97-47(4) including the list of 14 vehicles. The HL-93 inventory rating factor for all new structures shall be greater than 1.0. The ratings for the existing culverts (Bridge Nos. BC 1555 on Central Avenue over Harford Run and BC 1255 on Central Avenue over Harford Run) and Bridge No. BC 8018 to remain shall be performed using the Load Factor Rating method after strengthening.

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3.11.04.02 Loads and Forces

All loads and forces applied to structures shall be in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications except as modified below.

A. Dead Loads (DL)

- 1) Unit weights of materials shall conform to AASHTO specifications which includes the weight of embedded reinforcement.
- 2) All bridges shall be designed to accommodate a loading of 25 psf for a future 2 inch wearing surface and a loading of 15 psf for forms which remain in place.
- 3) Weight of any lightweight concrete materials shall be less than or equal to 120 pcf.

B. Highway Loads (LL)

- 1) Live loading, designated HL-93, shall be in accordance with AASHTO and applies to the Harbor Point Connector Bridge and the replacement of existing Bridge Nos. BC 8019 on Aliceanna Street over Harford Run and BC 8020 on Fleet Street over Harford Run.
- 2) Retaining walls including wing walls and headwalls shall be designed to accommodate the horizontal surcharge caused by live load per AASHTO criteria.

C. Thermal Forces

- 1) Moderate Temperature Climate Changes shall be used per AASHTO criteria.
- 2) Normal Temperature shall be 60 degrees Fahrenheit.

D. Seismic Forces

- 1) Structures are located within seismic zone 1.
- 2) No detailed seismic analysis need be performed.

E. Miscellaneous Lateral Forces

Wind loads, longitudinal traction forces, stream flow forces, etc. shall be in accordance with AASHTO LRFD Specifications.

F. Construction Loads

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Where the Design-Builder, during construction, anticipates passing truck traffic in excess of the design load over structures designed and constructed under this Project, the structure shall be designed for the higher truck load. The Inventory and Operating Rating Factors shall be greater than 1.0 for the higher truck load. The Design-Builder shall receive written concurrence from the City before developing a design using a live load in excess of that specified above.

3.11.04.03 Materials

A. Foundations

1) Piling

- a. Steel H piles shall conform to conform to A 36, Grade 36 or A 709, Grade 50 Steel.
- b. Steel pipe piles and steel mini/pin piles shall conform to A252, Grade 3 steel ($F_y = 45,000$ psi.).
- c. Concrete for steel pipe piles shall conform to Mix No. 3 with a slump range of 4-6 inches in accordance with Section 902.10 of SHA's Standard Specifications for Construction and Materials.
- d. Reinforcement for steel pipe piles shall conform to Section 908.01 of SHA's Standard Specifications for Construction and Materials.

- 2) Drilled shafts or other deep foundation types that generate soil spoil material shall not be permitted for use on this project.

B. Structural Steel

- 1) Structural Steel shall conform to A 709, Grade 50 and 909.01. All structural steel shall be fully painted as indicated in the special provisions. Weathering steel shall not be permitted for use on this project.
- 2) Fracture critical member structures are prohibited.
- 3) All bridges utilizing steel beams or girders shall be designed without the use of cover plates.
- 4) The use of longitudinal and transverse stiffeners is prohibited except for required bearing stiffeners.
- 5) Minimum sizes for steel members and welds shall conform to SHA's Policy and Procedure Memorandum D-87-34(4).
- 6) Electro-slag welding is prohibited in conformance with SHA's Policy and Procedure Memorandum D-77-11(4).

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- 7) All bolts shall conform to A 325.
- 8) All bolted connections shall be designed as Class A slip critical connections.
- 9) Steel sheet piling shall conform to A328.
- 10) Steel for use in bridge railings shall be in accordance with Section 461 of SHA's Standard Specifications for Construction and Materials.

D. Concrete

- 1) Mix No. 6 (4500 psi) normal weight concrete shall be used at all structures (except where noted in this section) and at the following locations:

Bridge Deck Slabs

Parapets on Bridges and Retaining Walls

Entire portion of Abutment Backwalls

Copings for MSE retaining walls

Top Slab of Culverts with a minimum depth of fill 18 inches or less

- 2) Mix No. 6 (4500 psi) lightweight concrete is permitted for use at Bridge No. BC 8020 – Fleet Street over Harford Run at the following locations:

Bridge Deck Slabs

Prestressed Concrete Elements

Abutment Backwalls

Closure Walls

- 3) Mix No. 3 (3500 psi) normal weight concrete shall be used at the following locations:

Footings and substructure units except Abutment Backwalls

Retaining Walls

Top Slab of Culverts with a minimum depth of fill greater than 18 inches.

- 4) Subfoundation concrete shall be normal weight Mix No. 4 (3500 psi) concrete.
- 5) Precast prestressed concrete for slab beams and girders shall have a minimum design 28 day compressive strength of 7,000 psi. Compressive strength of concrete at the time of initial prestress shall be a minimum of 80 percent of the 28 day compressive strength. The maximum allowable tensile strength shall be $3 \times [f'_c]^{1/2}$.

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6) The use of prestressed concrete substructures is prohibited.

E. Reinforcement Steel

- 1) All reinforcement steel bars shall conform to 908.01.
- 2) All Welded Wire Fabric (WWF) reinforcing shall conform to 908.05.
- 3) All Epoxy coated reinforcement steel bars and WWF shall conform to 917.02 and shall be used at the following locations:

Deck Slabs

Barriers and Parapets

Bearing Seat Pads

All Concrete Superstructure/Roadway Elements

Abutment Back Walls

Abutment Bearing Seat Areas

Parapet Portion of Wing Walls including Retaining Walls and Head walls

Portions of Retaining Walls, including copings, located within 10 ft of the outside edge of shoulder measured vertically and/or horizontally.

Top mat of the top slab, including truss bars and any reinforcement extending into the top of the top slab, for box culverts with less than 18” of cover.

Approach Slabs and associated Sleeper Slabs

4) Unless noted otherwise minimum clear cover to reinforcement steel shall be as follows:

LOCATION	CLEAR COVER
Top of Bridge Deck Slabs	2-1/2 in.
Bottom of Bridge Deck Slabs	1 in.
Box Culvert Slabs Built to Grade	2-1/2 in.
Box Culvert Slab Not Built to Grade	2 in.
Toewall – Top, Bottom and Sides	3 in.
Culvert Bottom Slab - Bottom	3 in.
Footings – Bottom and Sides	3 in.
All Other Locations – Main Reinforcement	2 in.
All Other Locations – Stirrups	2 in.
Precast Concrete Elements	1 ½ in.

- 5) Welding of reinforcement steel is prohibited.
- 6) Mechanical rebar couplers may be used.
- 7) Substructure units shall be designed so that the largest reinforcement steel bar utilized will be No. 11 bars.

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F. Prestressing Steel

- 1) All prestressing strands shall conform to Section 908.11 of SHA’s Standard Specifications for Construction and Materials.
- 2) Prestressing steel strand parameters:

PROPERTY	LIMIT
Modulus of Elasticity	28,500 ksi
Guaranteed Ultimate Tensile Strength (GUTS)	270 ksi
Maximum Anchor Set	0.375”
Maximum Jacking Stress (80% GUTS)	216 ksi
Maximum Anchoring Stress (70% GUTS)	189 ksi
Friction Coefficient	0.25
Wobble Coefficient	0.0020 K/ft

3.11.04.04 Foundations

The Design-Build Team shall prepare a Foundation Plan and Report for each new or replacement structure in conformance with SHA’s Policy and Procedure Memorandum D-79-17(4) and the following requirements.

3.11.04.04.01 Foundation Boring Requirements

Foundation borings for some of the structures were obtained for the preliminary engineering of this project and are included elsewhere in the Contract Documents. The City does not guarantee the accuracy of the borings provided or the sufficiency of the data for the foundation design. Samples from the borings are available for review. The City has evaluated the borings and recommendations and/or restrictions have been established for each structure as indicated in the Special Provisions.

The Design-Build Team shall determine the sufficiency of the borings provided for the final foundation design and obtain their own geotechnical data to supplement the data provided by the City. The Design-Build Team shall obtain supplemental borings in accordance with SHA’s Standards for Subsurface Exploration. Any supplemental borings shall extend at least 10 ft below the proposed pile tip elevations. The location of supplemental borings shall be selected by the Design-Build Team in conformance with SHA’s Policy and Procedure Memorandum D-79-17(4). For bridges, at least two borings are required for each substructure unit. The Design-Build Team’s geotechnical engineer may request in writing that the City reduce the number of required borings to one boring per substructure element provided the soil conditions at a

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particular structure appear to be consistent. Supplemental foundation borings, rock cores, laboratory testing, etc. shall be in conformance with appropriate City, SHA, AASHTO, and ASTM policies and specifications.

3.11.04.05 Foundation Design Requirements

Structures foundations shall be designed in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications and as required below.

A. Spread Footings.

Spread footings for bridge structure elements shall not be permitted.

B. Driven Piles

Steel H-piles or steel pipe piles are acceptable pile types for use on this project. No other driven pile type, including concrete piles, will be considered. Bottom of footings for the bridge abutments or wing walls may be in approach embankments provided they sit on pile-supported foundations with the pile tip elevation set in competent in-situ soil or sound rock. Pile tips shall be applied to driven piles where warranted.

Only one type of pile shall be used on each individual substructure unit. However, different substructure units of the same structure may have different foundation types.

Any driven pile that reaches refusal with less than 20 ft of pile length embedment in original competent in-situ soils will be unacceptable and shall be extracted and holes shall be augured a minimum of 10 ft into competent rock or 5 ft into sound rock. The piles shall be embedded into the augured hole and the void area around the piles shall be filled with Mix No. 4 concrete.

Piles installed for the replacement of Bridge No. BC 8020 on Fleet Street over Harford Run shall consider the future Red Line Tunnel to be constructed by the Maryland Transit Administration (MTA) and the design and construction of the pilings shall conform to the following:

- 1) Maximum pile tip depth shall be EL -40.0
- 2) Piles installed for Abutment B must provide a minimum of 40 feet clear to the station excavation box (including zones of soil improvement)
- 3) As built pile location shall be noted and indicated on the final plans. Individual pile locations and pile tips shall be denoted clearly on the plans

The proposed pile spacing for design shall conform to the following:

- 1) Spacing in the front row of a pile group shall not exceed 8 ft.

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- 2) Spacing for all other rows shall not exceed twice the spacing of the front row.
- 3) The Design-Build Team may use battered piles to resist all horizontal loads.
- 4. Pile patterns shall be designed so that no piles are in tension or uplift.

As-built pile foundation data should be documented in the final As-Built plans in conformance with SHA’s Policy and Procedure Memorandum P-93-35(4).

C. Augured or Drilled Piles

Augured or drilled piles, including steel mini/pin piles, reinforced cast in place drilled shafts (caissons), and steel H-piles placed in augured holes with voids filled with concrete, are prohibited for use on this project.

3.11.04.06 Subsurface Condition Requirements

The following chart represents the minimum subsurface requirements that must be present for the various structure and foundation types. This information does not supersede any other foundation design criteria.

Structure/Foundation Type	Spread Footing	Deep Foundation (Piles)
Subsurface Conditions	N > 30 for 10 ft of sampling*	N > 50 blows per 1 in for tests over 10 ft of sampling* or REC > 50

N = Blow counts representing penetration resistance as defined in AASHTO T-206

* - In accordance with SHA’s Standard Specifications for Subsurface Exploration

3.11.04.07 Rock Definition

The definition of competent rock shall be material with a minimum Rock Quality Designation (RQD) of 80% and a minimum Rock Core Recovery (REC) of 80%. The Engineer shall determine, by observations of the exposed in-situ materials and the operation of the excavation equipment, if the competent rock has been encountered for spread footings and the bottom of caisson holes. For mini/pin piles, competent rock will be determined by the engineer based on observations of the operation of the drilling equipment and the cuttings retrieved.

The Engineer shall determine, by observations of the exposed in-situ materials and the operation of the excavation equipment, if the sound rock has been encountered for spread footings and the bottom of caisson holes. For mini/pin piles, sound rock will be determined by the Engineer based on observations of the operation of the drilling equipment and the cuttings retrieved.

3.11.05 Aesthetic Criteria

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Aesthetic requirements for this project are currently under development for the Harbor Point Connector Bridge only; no aesthetic criteria are required for the other remaining structures included under this performance specification.

The aesthetics for the Harbor Point Connector Bridge are of major significance. The required appearance of the bridge and the various finishes for the bridge appurtenances are shown in the aesthetic criteria package included within the RFP. The aesthetic criteria include an aesthetic rendering of the completed bridge, an anticipated palette of materials and finishes for the bridge elements, and details of major bridge aesthetic elements to be incorporated into the structure. These required elements have been reviewed and accepted by the City of Baltimore, the Harbor East Development Group, and the surrounding community. The Design-Builder shall incorporate the elements shown in the aesthetic criteria package into the design of the bridge. The Design-Builder is encouraged to submit an alternative technical concept (ATC) for different aesthetic concepts to the City for review. No guarantee is made, however, regarding approval or timeliness of the review for the Design-Build Team's ATC submittal.

3.11.06 Structure Specific Design Requirements

3.11.06.01 Bridges

3.11.06.01.01 Geometric Design Criteria for Bridges

Bridge geometric requirements are shown on the directive Plans for each structure located elsewhere in the Invitation for Bids. The Design-Build Team shall adhere to the horizontal and vertical clearance dimensions shown for each bridge. The Typical Section dimensions represent a minimum; structures on horizontal roadway curves or other roadway alignment features may require a wider structure. The Design-Build Team shall obtain approval from the City in writing prior to changing any of these dimensions. The Design-Build Team shall be responsible for determination of the final structure size, clearances, geometry, etc. to meet or exceed the design criteria.

- A. The minimum vertical underclearance for all bridges over highways and roads shall be 16'-9" as defined in conformance with latest AASHTO criteria.
- B. Whenever possible, bridges shall be located on tangent alignments. If this is not possible, the layout of bridges on nontangent alignments shall be in conformance with SHA's Policy and Procedures Memoranda D-85-31(G) and P-85-25(G).
- C. Every effort shall be made to provide a roadway profile grade across bridges so that the bridge surface drains without the need for scuppers. The minimum grade allowed on any structure shall be 0.5 percent. Any flow spread shall be limited to the shoulder area during the 10 year storm event.

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- D. Locating the low point (sump) of the vertical profile within the limits of the bridge or end wing walls is prohibited.
- E. The Harbor Point Connector Bridge shall be designed to allow for future deck replacement in conformance with SHA's Policy and Procedures memorandum D-79-19(4).
- F. The maximum superelevation rate allowed on any structure built to grade shall be 6 percent.

3.11.06.01.02 Location of Harbor Point Connector Bridge

Horizontal - The horizontal location of the proposed Harbor Point Connector Bridge shall be as shown on the Directive Plans. No deviation from the horizontal alignment shown on the Directive Plans will be permitted.

Vertical – The profile of the Harbor Point Connector Bridge at Sta. 99+35.99, the centerline bearing of Abutment B as located on the Directive Plans, shall be elevation 18.76 with a grade not to exceed 4.9%. In the event that the location of the centerline of bearing of Abutment B is modified by the Design-Build Team, the elevation and grade requirements at Sta. 99+35.99 shall not change.

The elevation of the profile at Abutment A may be modified by the Design-Build Team. The roadway design criteria used for the streetscape portion of the project shall apply. The profile shall be set to provide sufficient clearance in Span 1 for the trash removal access as shown on the Directive Plans. No portion of the proposed bridge structure shall obstruct the existing outfall of Harford run under Central Avenue and Lancaster Street. The necessary profile change to existing Lancaster Street and Central Avenue shall tie into the existing grades without requiring modifications to loading dock entrances or other existing building access points.

Typical Section – The typical section of the proposed Harbor Point Connector Bridge shall match exactly the typical section of the Central Avenue Streetscape construction. The locations and widths of typical sections elements outside the traveled roadway shall transition from the streetscape typical section to the bridge typical section beyond the limits of the bridge and as shown on the Directive Plans.

3.11.06.01.03 Structural Details for Bridges

Standard Details as developed in SHA's Structural Standards Manual, and/or contained in the plans, shall be utilized for bearings, bridge decks, deck joints, F shape barrier, and any other details whenever possible. Additional or supplemental Standards developed for use in this project are contained elsewhere in the Contract Documents. Any proposed

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deviation from the established standards shall be approved in writing by the City.

A. Abutments

- 1) The use of MSE walls as abutment front walls or wing walls are prohibited for all bridges.
- 2) Integral or semi-integral abutments may be utilized.
- 3) The maximum slope provided in front of abutments shall not be steeper than two horizontal to one vertical (2:1).
- 4) The existing abutments supporting Bridge Nos. BC 8019 on Aliceanna Street and BC 8020 on Fleet Street shall not be used to support the superstructure loads for the replaced bridges. The existing abutments may remain to minimize excavation and to provide means for excavation support and/or the maintenance of stream flow.

B. Superstructure

- 1) Precast, prestressed concrete superstructure members with voids (concrete slabs with circular voids or small prestressed concrete box elements) are prohibited.
- 2) For bridges supported by beams or girders, the maximum beam or girder spacing between center lines of the beams or girders shall be no more than 10 ft.
- 3) All girders within a single bridge structure shall utilize a single type of girder.
- 4) The location and design of field splices shall be in conformance with SHA's Policy and Procedure Memorandum D-83-26(4).
- 5) Simple span steel girder bridges made continuous for live load are prohibited.
- 6) Partial Depth cross frames are prohibited.
- 7) The development of Camber Diagrams shall be in conformance with SHA's Policy and Procedure Memorandum P-74-1(4).
- 8) Prestressed concrete girder superstructures shall be made continuous for live load.

C. Decks

- 1) For bridges supported by stringers, all bridge deck slabs shall match Structural Standard Nos. BR-SS(6.61) through BR-SS(6.65). Alternate designs of bridge decks are prohibited.
- 2) Steel deck forms which remain in place shall be used for all bridges.
- 3) The ratio of deck overhang length to adjacent deck span shall not exceed 36% without City approval.
- 4) Deck pouring sequence shall be as indicated in the contract documents and may not be altered.
- 5) The development of Finished Roadway Elevation Plan Sheets shall be in

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conformance with SHA's Policy and Procedure Memorandum P-75-8(4).

D. Parapets

- 1) The type of parapet required for each structure will be as indicated in the Special Provisions and details shall be in conformance with the appropriate Structural Standards.
- 2) All parapets on the bridges shall have two 3 inch diameter pvc conduits cast into the barrier in conformance with Structural Standards.
- 3) Precast concrete traffic barriers are prohibited.

E. Deck Joints

- 1) The selection of the appropriate roadway joint and fixed bearing location shall be in conformance with SHA's Policy and Procedure Memorandum D-87-38(4). Intermediate joints are prohibited.

F. Bearings

- 1) Fixed and expansion bearings for straight steel stringer bridges shall be in conformance with Structural Standard Nos. BR-SS(9.05) to BR-SS(9.06).
- 2) Plain elastomeric bearings shall not be used on this project and will not be allowed as an alternate. Steel reinforced elastomeric bearings shall conform to AASHTO LRFD requirements.
- 3) Spherical bearings shall be used for curved girders.
- 4) Pot Bearings or disc type bearings are prohibited and will not be allowed for any reason within this contract.

G. Utilities

- 1) Conduit for future utilities shall be placed in back wall with pipe extending 5' beyond the end of the back wall, or to the end of the moment slabs on wingwalls; whichever is greater.
- 2) When utilities are supported on a bridge, the support requirements shall be coordinated with the utility owner and accommodated by the structural framing.
- 3) Utilities shall be supported between slab beams and/or girders on a bridge. No portion of the utility or support system shall extend below the bottom of slab beams or girders. Utilities shall not be mounted to the fascia of a structure or supported from a concrete deck slab.

H. Slope Protection

- 1) Slope protection shall be required at all embankment slopes at abutments.

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- 2) Slope protections shall be developed in accordance with the Standard Details.

I. Strengthening

- 1) The strengthening of existing Bridge Nos. BC 1555 on Central Avenue over Harford Run (located between Lancaster Street and Aliceanna Streets), and BC 1255 on Central Avenue over Harford Run (located between Aliceanna and Fleet Streets) shall be of sufficient capacity to ensure that both structures have a load rating factor (RF) of greater than 1.0 for the inventory condition using the Load Factor Rating Method for all 14 vehicles per SHA's PPM D-97-47(4) as referenced previously under Section 3.11.04.01 E.
- 2) Strengthening of the existing culverts shall not be accomplished using external mild reinforcement applied to the underside of the top slab.

J. Structural Repairs

- 1) The repair of existing Bridge Nos. BC 1555 on Central Avenue over Harford Run (located between Lancaster Street and Aliceanna Streets), BC 1255 on Central Avenue over Harford Run (located between Aliceanna and Fleet Streets), and the existing small structure on Central Avenue over Harford Run (located between Fleet Street and Eastern Avenue) shall address all structural deficiencies denoted as any active delamination, spall, and crack (greater than 1/16" wide).
- 2) Structural defects of the culverts noted above are summarized in the 2011 Biennial Inspection Report included as reference information.
- 3) The Design-Build Team shall provide an in-depth inspection of each culvert and outline the proposed locations of defects to be repaired. All delaminated areas shall be repaired by removing all hollow sounding and loose concrete. Delamination repairs shall be in conformance with the Special Provisions. Areas of spalled concrete shall also be repaired in similar fashion in conformance with the Special Provisions. Cracks larger than 1/16" wide shall be repaired using epoxy crack injection procedures per the Special Provisions.

3.11.06.01.04 Site Specific Requirements

The proposed Harbor Point Connector Bridge is located immediately north of and adjacent to the Harbor Point property. A list of restrictions for operating on and near the property are included in the Directive Plans. The restrictions are based upon a US Environmental Protection Agency (EPA) Consent Decree and associated documents that regulate development activities on Harbor Point. The Design-Build Team shall abide by these restrictions for all work on the Harbor Point Connector Bridge. It is anticipated that some level of oversight by the property owner, Honeywell, and its representatives, will be exercised over the Design-Build Team's work.

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The existing abutments supporting Bridge Nos. 8019 on Aliceanna Street and BC 8020 on Fleet Street are to remain to the limits shown on the Directive Plans. The proposed abutments for the replacement bridges are to be constructed behind the existing abutments to remain also as shown on the Directive Plans. The Design-Build Team is responsible for locating the existing abutments to remain including the front (Harford Run side) and back faces. The location and design of the proposed abutments, including any deep foundation system, shall account for the presence of the existing abutments to remain. In addition, sufficient subsurface investigations of any existing utilities to remain in service during or post construction, including any proposed utilities, shall be acquired as necessary by the Design Build Team to ensure that the construction of the proposed abutments and any deep foundation system does not interfere with the operation and or maintenance of the utility by its respective owner. The location of any proposed abutment and deep foundation system shall be coordinated with each respective utility owner to ensure that sufficient clearances and construction methodologies are acceptable and accounted for in the Design-Build Team's design documents.

3.11.06.01.05 Scour

- A. A scour analysis shall be performed for the Harbor Point Connector Bridge using the latest available SHA ABSCOUR program and the guidance contained in Chapter 11 of the Manual on Hydrologic and Hydraulic Design.
- B. The scour analysis shall be based on the 100-year flood (i.e., design flood). The Harbor Point Connector Bridge shall be designed for the design flood and checked for stability under the 500-year flood as per Chapter 11 of the Manual on Hydrologic and Hydraulic Design.
- C. No scour analysis is required for the other project bridges.

3.11.06.01.06 Hydraulic Opening and Design Freeboard

- A. The 100-year water surface elevation is shown on the Directive Plans for Bridge Nos. BC 8019 on Aliceanna Street and BC 8020 on Fleet Street. The Design-Build Team shall provide a minimum of at least 1 foot of freeboard between the 100-year water surface elevation and the underside of the proposed superstructure.
- B. The existing abutments for Bridge Nos. BC 8019 on Aliceanna Street and BC 8020 on Fleet Street shall remain.
- C. The hydraulic opening for existing Bridge Nos. BC 1555 on Central Avenue over Harford Run (located between Lancaster Street and Aliceanna Streets), and BC 1255

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on Central Avenue over Harford Run (located between Aliceanna and Fleet Streets) shall be maintained after strengthening.

- D. The only exception to Sections 3.11.05.01.05 C. and D. applies if all four (4) structures are structurally lined as part of an Alternative Technical Concept.

3.11.05.01.07 Strengthening Lancaster Street Bridge (Bridge No. 8018)

Harford Run flows under Central Avenue in a buried storm drain and outfalls at the proposed Harbor Point Connector Bridge. Lancaster Street crosses Harford Run on an existing adjacent box beam bridge. Plans of the existing structure are included for the Design-Build Team's reference. The Design-Build Team shall be responsible for verifying the accuracy of the plans and condition of the structure. After the addition of fill on the existing bridge to raise the profile grade of Lancaster Street and Central Avenue, the existing bridge rating factors for all SHA Legal Load Rating Vehicles are anticipated to be less than the 1.0 required. The Design-Build Team shall calculate the bridge rating factors for all SHA Legal Load Rating Vehicles for the Lancaster Street bridge as a result of the proposed grading. If the calculated rating factors are less than 1.0, the design-builder shall design and construct a retrofit, rehabilitation or replacement for the Lancaster Street bridge crossing Harford Run. The completed design and construction shall result in rating factors for all SHA Legal Load Rating Vehicles greater than 1.0 in accordance with the Load Factor Rating Procedure. The Design-Build Team shall follow the requirements of SHA PPM D-97-47 which is included for the Design-Build Team's reference.

3.11.06.02 Retaining Walls

3.11.06.02.01 Geometric Design Criteria for Retaining Walls

The Design-Build Team shall layout retaining walls in accordance with the following geometric design criteria:

- A. Retaining walls on curved horizontal alignments may be constructed on chords, unless otherwise stated, provided the angle of deflection between segments does not exceed 5 degrees.
- B. The horizontal offset of the wall from the baseline shall not change abruptly. All changes in offset shall be accomplished using curves or chorded construction as described above.
- C. The top of retaining walls shall not be stepped or contain sharp breaks in slope to accomplish a change in elevation. The top shall be level or shall vary using a smooth linear or curved transition.

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- D. The completed retaining wall, and all associated structural elements, shall be located entirely within the City's Right-of-Way. Construction easements shall only be used to facilitate construction efforts.
- E. The ground line behind the retaining wall shall be placed a minimum of 9" below the top of the wall, unless a barrier is required on top of the wall.

3.11.06.02.02 Structural Details for Retaining Walls

Standard Details, as developed in SHA's Structural Manual shall be utilized whenever possible. Any proposed deviation from the established standards shall be approved of in writing by the City. The following structural details shall be used where appropriate:

- A. For retaining walls supporting roadways and adjacent to the shoulder, an F-Shape Barrier shall be placed on top of the proposed retaining wall. The height of the proposed barrier shall be either 34" or 42" in accordance with the roadway design requirements.
- B. For retaining walls adjacent to and supporting sidewalks, a 2'-3" vertical face barrier with a one strand rail resulting in a combined barrier height of 3'-6" shall be utilized. For retaining walls adjacent to and supporting hiker/biker facilities, a 2'-3" vertical face barrier with a two strand rail resulting in a combined barrier height of 4'-6" shall be utilized. All railing elements shall meet the horizontal clear spacing requirements outlined in section 13.8 of AASHTO. These spacing requirements may not be exceeded.
- C. For barriers placed on top of MSE walls, a moment slab shall be utilized to resist the horizontal loads applied to the barrier. The moment slab and barrier shall be cast-in-place.
- D. For retaining walls supporting private property or other facilities that are accessible to pedestrians, fencing shall be provided on top of the wall. The minimum height of the fence shall be 3'-0" and detailed in accordance with Standard No. BR-SS(3.11)-96-317 and BR-SS(3.12)-96-318. If an ornamental fence is required per the structures aesthetic specifications, the fencing details shall be developed in accordance with those requirements.
- E. All retaining walls shall contain the appropriate details for drainage. The drainage system for cast-in-place cantilever walls shall be in accordance with Standard No. RW(0.01)-80-100.

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3.11.06.02.03 Design Alternates for Retaining Walls

The design for permanent retaining walls shall follow one of the following alternates, unless otherwise stated in the Special Provisions. Only one alternate shall be used per wall location retaining Wall Plans shall be developed in accordance with SHA's Policy and Procedure Memorandum P-94-38(4).

A. Cast-in-Place Cantilever Retaining Walls.

The Design-Build Team shall design and detail proposed concrete cantilever retaining walls in accordance with Structural Standards No. RW(6.02)-83-133 through RW(6.14)-89-201.

B. Proprietary Retaining Walls.

Proprietary retaining wall systems shall not be used on this project.

C. Top-Down Retaining Walls.

The Design-Build Team shall design and detail proposed top-down retaining walls in accordance with AASHTO and the following:

- 1) All loads shall be resisted by the soldier piles, lagging, or other elements in direct contact with the retained soil.
- 2) Only concrete lagging shall be used for permanent retaining walls. The use of type of timber lagging will not be permitted.
- 3) A concrete facing shall be provided that will not be considered structural in nature. The aesthetic finish for the concrete facing shall be as outlined in the contract documents.
- 4) Portions of permanent steel elements, which are exposed after excavation, shall be coated in accordance with section 465.

3.11.06.02.04 Modifications along Lancaster Street

To accommodate the proposed profile of the Harbor Point Connector Bridge, the profile of existing Lancaster Street and the adjacent brick promenade shall be adjusted. A conceptual grading plan is provided in the concept plans. The proposed grading shall be supported by new retaining walls on the east side of Central Avenue north of the intersection with Lancaster Street, and at any other locations identified by the design-builder. The design-builder is responsible for the design and construction of any retaining walls based on the design-builder's final proposed grading. The aesthetic appearance of the walls shall be submitted to City for approval. In general the walls shall coordinate with the aesthetic details of the proposed Harbor Point Connector Bridge and the adjacent development. MSE walls will not be permitted.

Raising the grade along Lancaster Street will require raising the grade of promenade

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bulkhead at the Harbor parallel to Lancaster Street and the planting area between Lancaster Street and the promenade. The design-builder is responsible for the design and construction of the modifications to the bulkhead and planter. Existing plans for the bulkhead parallel to Lancaster Street are provided for the design-builder's reference. Any modifications to the existing bulkhead shall match the adjacent existing bulkhead in appearance, finish and materials.

3.11.07 Structure Plan Development

The Design-Build Team shall prepare structure plans as part of the Contract using the latest SHA MicroStation CADD Standards and Baltimore City's January 2011 (or latest) Bridge Engineering Plan Review Checklist. Each structure plan sheet shall be prepared on the City of Baltimore's Department of Transportation – Transportation Engineering and Construction Division standard border and title block sheet.

Baltimore City's January 2011 (or latest) Bridge Engineering Plan Review Checklist included on the CD are developed for various types of structures (Steel Girder Bridges, Retaining Walls, etc.) and indicate the minimum amount of information that is required on the Structure Contract Plans. If a checklist is not provided for the type of structure that is proposed by the Design-Build Team, the existing checklists shall be used as a general guide to provide similar information.

The development of views on all Structure Contract Drawings shall be in conformance with SHA's Office of Structure's Policy and Procedure Memorandum P-75-7(4).

3.11.08 Submittals for Structures

All structures included in this Contract shall follow an independent review process. This process will be coordinated with the review and acceptance of the other articles (roadway, drainage, etc.) as appropriate.

The structure submission schedule shall be presented in the Design-Build Team's original project schedule and updated as the project progresses. Submissions for the proposed structures' Type, Size and Location (TS&L) or combined Type, Size and Location/Foundation review shall be made one at a time. This schedule shall be presented in the Design-Build Team's original submission schedule.

The Design-Build Team shall include a minimum of three (3) full size sets, three (3) half-size sets and an electronic .pdf file of the structure plans, and all corresponding roadway plans, typical sections, profiles and cross sections with any plan review submission containing structures in addition to the requirements of TC 3.06.20. These plan sets are for review by the City. The plans for the proposed replacement of Bridge No. 8020 on Fleet Street will also be reviewed by the Maryland Transit Administration to ensure that the Design-Build team has designed the deep foundations in strict accordance with **Section 3.11.04.04.02.B.** of this

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Performance Specification. Official review comments will be conveyed back to the Design-Build Team via correspondence and plans with comments noted (if applicable). The Design-Build Team shall provide a point-by-point written response to all official comments received and receive concurrence from the City in writing prior to proceeding forward with design/plan development activities. Telephone, email, and discussion meeting comments and questions may also be utilized by the Design-Build Team. Official response will not be required for these inquiries; however, proper documentation (telephone memos, notes to file, etc.) is highly recommended. Any incomplete submission will not be reviewed but will be returned to the Design-Build Team.

3.11.08.01 Type, Size & Location Submission

The first submission required for the structures in this Contract shall be the Type, Size and Location (TS&L) Plans. The materials developed for this submission shall represent approximately 30 percent complete construction documents. It is recommended that the roadway alignment and profile be finalized and accepted prior to this submission. It is also recommended that any other pertinent information such as grading plans or drainage features that impact the proposed structures shall also be accepted prior to submitting the structure plans for review. Comments for TS&L submissions will be provided within 21 calendar days of receipt of the submission.

3.11.08.02 Foundation Report

The Foundation Report and Plan submission shall be made in conformance with the Maryland Department of Transportation Policy and Procedure Memorandum D-79-17(4), the Structure Descriptions, and other requirements specified in the Special Provision. The submission of the foundation report can be made concurrently with the TS&L submission; however, it shall be noted that the foundation design may be impacted by comments received on the TS&L Plans. If the TS&L submission is provided separately, the Foundation Reports shall not be submitted until comments on the TS&L have been provided back to Design-Build Team and the Design-Build Team's responses are accepted by the City. Comments will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission if the Foundation Report is submitted independently. If the Foundation Report is submitted concurrently with the TS&L submission, comments will be provided within 40 calendar days of the receipt of the submission.

3.11.08.03 Structural Detail Submissions

Following acceptance of the TS&L Plans and Foundation Report, the Design-Build Team shall submit detailed plans for various structural elements. Structural details for an individual structure may be submitted as a number of sub-plan set packages or as a complete set. The Design-Build Team shall submit a structure submission schedule that outlines the anticipated structural detail submissions. The Design-Build Team shall have adequately

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developed the load contributing elements prior to finalizing the design of any structural details that are impacted by these loads. If load conditions change during the design, previously submitted elements shall be resubmitted for acceptance. Comments for each structural detail submission will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission.

3.11.08.04 Modifications to Structure Plans

Any modifications or revisions to the structural drawings after acceptance has been received shall be submitted in writing to the City and accepted prior to proceeding with any change to the approved structural drawings. If the request for modifications or revisions is accepted, revised structural drawings shall be submitted to the City along with a detailed list documenting all of the changes that have been made.

3.11.08.05 Work Drawing Review Process

All working drawings relating to the structures shall be reviewed in accordance with Maryland Department of Transportation Policy and Procedures Memorandum OP-82-34 (G) and Section 499. The Design-Build Team shall undertake the primary review and shall be stamped by the Design-Build Team as accepted prior to submitting the shop drawings to the City. A secondary review shall be undertaken by the City. Once reviewed and approved by the City, the structural shop drawings shall be stamped as approved and returned to the Design-Build Team with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by the City. Refer to section TC-4.01 for further guidance regarding working drawing submittals.

3.11.08.06 Final Plans and Computations

The Design-Build Team shall submit a complete set of structure plans once all structural details have been accepted. A full set of plans (details, standards etc.) shall be developed for each of the structures. A structure key plan sheet shall be developed to show the location of multiple structures. The complete set shall consist of two (2) full size paper print sets, two (2) half size paper print sets, and one set of .tiff files provided on CD. The General Plan & Elevation sheet for each of the structures shall be sealed by the Design-Build Team structural key staff member thus denoting it as the final construction documents.

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the original project plans in green. Old details, dimensions and notes shall not be erased, but X'd out in green. The date that the revision was made shall be indicated in the title block of each revised plan sheet. The As-Built Plans shall reflect any field revision made during construction. The Design-Build Team shall submit reproducible As-Built plans at the completion of the project that are signed and sealed by the Engineer.

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The Design-Build Team shall submit a complete set of structure computations once all structural details have been accepted for each structure including all designed elements. All computations shall be on 8 ½" x 11" paper with the initials of the designer and checker indicated on each page. The computations shall be submitted in a three ring binder and subdivided into relevant design sections. A coversheet shall be included in each binder and shall be signed and sealed by the Design-Build team structural key staff member, who is a Professional Engineer registered in the State of Maryland with experience in bridge design, responsible for performing or oversight of the pertinent design work. A copy of the design calculations shall also be provided in .pdf format.

The Design-Build Team shall submit completed SI&A and PONTIS information forms for each structure for use by the City in entering the structure date into their structural inventory system.

TC 3.12 TRAFFIC PERFORMANCE SPECIFICATION

3.12.01 General

The Design – Builder shall be responsible for the design and construction of the Project signing, pavement markings, street and pedestrian lighting, traffic signals, signal systemization and ITS. The Design – Builder is responsible for coordinating all Traffic Control Devices, including signing, signal, lighting and ITS with all other disciplines involved with the Project.

Signing consists of guide, supplemental, route marker, regulatory, and warning signs.

The Design-Builder shall prepare Signing and Pavement Marking plans for all phases of construction (including temporary traffic shifts, detours, median cross-overs, etc.), which may extend outside the project limits shown on the conceptual roadway plans. These shall be prepared in accordance with the latest accepted editions of the MUTCD (MUTCD 2009), Maryland MUTCD (MD MUTCD 2011), SHA Standards and Baltimore City details as provided by the Baltimore City Department of Transportation (DOT). The Design – Builder will be responsible for notifying Baltimore City DOT in its bid of all needed work beyond the NEPA cleared “Project Limits” so that Baltimore City can commence clearance of these areas for the Design – Builder for both temporary and permanent work.

The Design-Build Team shall prepare plans for application of the Final Pavement Markings, including bicycle lane and parking lane pavement markings, in accordance with the latest edition of the MUTCD (MUTCD 2009), MD MUTCD 2011, SHA standards and Baltimore City details. The Design-Builder shall be responsible for the design and construction of the Pavement Markings within the project limits along Central Avenue, and intersecting roadways.

Vehicular lighting, including pedestrian lighting shall be provided within the project limits and as required to meet IESNA and AASHTO criteria and Baltimore City’s street lighting policies and procedures. The Design – Builder shall be responsible for the design and construction of all street light poles, foundations and conduit/hand box systems, including coordination with the power company to install the wiring and final service connections to energize the street lighting systems.

The Design – Builder shall reconstruct or build new traffic signals at the intersections as listed in 3.12. 07.01, provide fiber optic and copper interconnects and ITS equipment as stated in this performance specification, including foundations, traffic signal poles, signal heads, conduit system, circuitry, detection devices, CCTV, DMS sign and structures, required signal and ITS cabinets and control equipment, intersection lighting, and signal related signing. The work shall include:

- Coordinating utility connections with the appropriate utility company to obtain power service for all signal and ITS equipment;
- Coordinating the signal cable and ITS cable connections with Baltimore City signal shop to complete the traffic signal installation;

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- Connecting each proposed signalized intersection to Baltimore City’s interconnect system, as required; and
- Connecting each proposed ITS equipment to Baltimore City’s existing fiber optic system, as required.
- Coordinating with the City to maintain and relocate existing traffic signal system equipment/cables and fiber optic cable infrastructure, as required.

If the Design – Builder proposes modifications to the general geometric layout (including changes to lane configurations/utilization, and/or the alignments of intersections, the Design – Builder shall be responsible for performing traffic analyses to determine the impact to traffic operations as a result of the geometric modifications and preparing and submitting traffic analysis report for approval any changes to the functional operation of traffic control devices. Specific details of the additional analysis/submittals required for modifications to the general geometric layout are included within this performance specification.

3.12.02 Standards and References

3.12.02.01 Standards

Traffic analysis, design, and construction shall be in accordance with this performance specification and the relevant requirements of the following Standards or Baltimore City Guidelines/Details, unless otherwise stipulated in this specification. Standards or Baltimore Guideline/Details specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It is the Design – Builder’s responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current adopted version of each listed Guideline as of the publication date of this RFP.

All traffic analysis shall be in accordance with the relevant requirements of the Standards listed by priority in Table 1.

**TABLE 1
STANDARDS FOR TRAFFIC ANALYSIS**

Priority	Author or Agency	Title
1	TRB	Highway Capacity Manual
2	ITE	Traffic Engineering Handbook
3	ITE	Manual of Transportation Engineering Studies
4	SHA	Office of Traffic and Safety Capacity/Queuing Analysis Procedures for Intersections
5	FHWA	Manual on Uniform Traffic Control Devices (MUTCD 2009)
6	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD 2011)

All traffic design and construction for signing, pavement markings, and traffic signals shall be in accordance with the relevant requirements of the Guidelines and standards listed by

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priority in Table 2.

**TABLE 2
GUIDELINES, STANDARDS FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS, TRAFFIC SIGNALS & ITS)**

Priority	Author or Agency	Title
1	COB	Baltimore City Details
2	COB	Bicycle Facility Design Guide
3	SHA	List of Qualified Permanent Pavement Markings
4	SHA	List of Qualified Detectable Warning Surfaces
5	SHA	Standard Specifications for Construction and Materials
6	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD 2011)
7	FHWA	Manual on Uniform Traffic Control Devices (MUTCD 2009)
8	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD 2011)
9	AASHTO	Roadside Design Guide
10	SHA	Book of Standards for Highway and Incidental Structures
11	FHWA	Standard Highway Signs Book
12	SHA	Maryland State Highway Standard Sign Book
13	NFPA	National Electric Code
14	IEEE	National Electric Safety Code
15	SHA	Recommended Procedure for Determining Types of Left Turn Phasing
16	COB	BC Bicycle Marking & Signing Toolkit
17	AASHTO	Highway Safety Design and Operations Guide
18	SHA	Accessibility Guidelines for Pedestrian Facilities along State Highways
19	SHA	Maryland SHA Bicycle and Pedestrian Design Guidelines
20	SHA	Policy on Marked Bicycle Lane
21	ADA	Americans with Disabilities Act Accessibility Guidelines
22	NTCIP	National Transportation Communications for ITS Protocol
23	USDOT	National ITS Architecture
24	FHWA	23 CFR 940.11-ITS Project Implementation
25	IEEE	Guide for Concept of Operations Document
26	IEEE	Guide for Developing System Requirements Specifications
27	IEEE	Independent Verification and Validation
28	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features

* Note: For traffic signal structures the Design – Builder shall utilize the 3rd Edition.

All traffic design and construction for roadway and pedestrian lighting shall be in accordance with the relevant requirements of the Standards listed in Table 3.

**TABLE 3
GUIDELINES, STANDARDS FOR ROADWAY LIGHTING**

Priority	Author or Agency	Title
1	COB	Specifications for Materials, Highways, Bridges, Utilities and Incidental Structures (Green Book)
2	COB	Specifications for Street Lighting and Conduit
3	COB	Street Lighting and Photometric Design Guide
4	SHA	Standard Specification for Construction and Materials
5	NFPA	National Electric Code
6	IEEE	National Electric Safety Code
7	NFPA	2-Standard for Road Tunnels, Bridges and Other Limited Access Highways

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**TABLE 3
GUIDELINES, STANDARDS FOR ROADWAY LIGHTING**

Priority	Author or Agency	Title
8	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD 2011)
9	FHWA	Manual on Uniform Traffic Control Devices (MUTCD 2009)
10	IESNA	RP-8-00, American National Standard for Roadway Lighting
11	AASHTO	Roadway Lighting Design Guide
12	AASHTO	Roadside Design Guide
13	SHA	Book of Standards for Highway and Incidental Structures
14	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4 th Edition
15	SHA	Traffic Engineering Design Division's Traffic Control Devices Manual
16	AASHTO	Highway Safety Design and Operations Guide
17	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways
18	ADA	Americans with Disabilities Act Accessibility Guidelines
19	AASHTO	Guide for the Planning, Design and Operation of Pedestrian Facilities
20	AASHTO	Guide for the Development of Bicycle Facilities
21	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features

3.12.02.02 References

Use the references listed in Table 4 as supplementary materials for traffic analysis. These publications have no established order of precedence.

**TABLE 4
REFERENCES FOR TRAFFIC ANALYSIS**

Author or Agency	Title
COB	Existing (year 2013) Traffic Volumes
COB	Year 20XX Forecast Volumes(to be added)

Use the references listed in Table 5 as supplementary materials for the design of signing, pavement markings, and traffic signals. These publications have no established order of precedence.

**TABLE 5
REFERENCES FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)**

Author or Agency	Title
TRB	Transportation Research Board's Accessible Pedestrian Signals Synthesis and Guide to Best Practices

3.12.03 Coordination with Other Contracts

The Design – Builder shall coordinate the design and construction of all traffic control devices for the Project with those required for Central Avenue Phase I project, Baltimore City TR 08310, and the proposed MTA “REDLINE” project.

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3.12.04 Traffic Operational Analysis – Procedures and Application

3.12.04.01 Approved Analysis Techniques and Software

3.12.04.01.01 Synchro and SimTraffic – Latest Version

For corridors with multiple intersections, or for individual signalized intersections, the Design – Builder shall use Synchro and SimTraffic to analyze traffic operations. The Design – Builder’s timing plans shall consider corridor-wide cycle lengths and appropriate offsets. The Design – Builder shall provide all calculation files on a CD to support the summary of results.

3.12.04.01.02 Operational Assessment of Design Alternative(s)

It shall be the Design – Builder’s responsibility to perform traffic analyses for each MOT phase with existing traffic volume, and the final build condition with year 20xx traffic volume, using the tools and techniques listed above.

It shall be the Design-Builder’s responsible to collect additional traffic turning movement counts along the corridor if needed, other than those provided in the RFP.

Design-Builder shall perform traffic analyses using the tools and techniques listed above, using year 20XX volumes to evaluate traffic operations, identify and recommend changes to optimize traffic operations within the existing travelled roadways, to Baltimore City. The operation and the accompanying operation reports shall consider, at a minimum, the following strategies for optimizing traffic operations: traffic signal phasing, lane usage/assignment, 95th percental queues/storage lengths, traffic signing timing. Report shall be submitted to the Baltimore City prior to the start of traffic design plans for their concurrence.

3.12.05 Signing

3.12.05.01 Signing Functional Operation Requirements

3.12.05.01.01 Temporary Signing Requirements

Temporary signing for this Project shall include the design and installation of temporary traffic control signs, as per Category 1 of SHA’s Book of Standards, Baltimore City details and use of temporary guide signing (including the installation of new guide signs and/or the modification of existing guide signs). Temporary signing shall be shown on the Traffic Control Plans (TCP). For more information on the requirements for temporary signing, refer to section 3.16 of the performance specifications.

3.12.05.01.02 Permanent Signing Requirements

Route marker, regulatory, and warning signs including but not limited to advisory speed signing shall be provided based on MUTCD 2009, MD MUTCD 2011 requirements and SHA’s Traffic Control Devices Design Manual. Proposed signing

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on existing roadways shall not simply seek to replace existing signs impacted by construction, but should also seek to remedy any existing deficiencies. It is the intent of this Project to provide fully-compliant signing within the Project Limits that meets all applicable standards.

E-Z Park machine and associated signing shall be provided. E-Z Park machine shall be installed every 200’.

The Design-Builder may reuse or relocate existing signs within the Project limits, provided that the sign meets all applicable standards (including placement, application, size, color, reflectivity, condition, etc.). Existing signs that have been damaged in any way shall be removed and replaced, if necessary. The Design-Builder shall be prepared to submit photographs of any signs to remain or be relocated within the Project Limits at the request of the Baltimore city to verify that the sign is suitable for reuse.

3.12.05.02 Design and Construction Requirements

All temporary signing shall be shown on the Traffic Control Plans (TCP). The Design – Builder shall design and install temporary signing to provide motorist guidance throughout and within the Project limits.

All proposed signing, including E-Z Park machine and associated parking restriction signing, shall be shown on the Definitive Design Signing plan and reviewed by the City prior to advancing the design. The Design – Builder shall be responsible for the design and construction of all signing. E-Z Park machines will be furnished by the Baltimore City. The design builder shall be responsible for installing E-Z Park machines and foundations

3.12.05.02.01 Definitive Design Signing Plan (in Roll Plan format or Plan Sheet format)

The Design – Builder shall prepare a Definitive Design Signing Plan and present the plan at a review meeting with Baltimore City DOT. The Definitive Design plan shall include proposed sign locations and messages for all guide, supplemental, route markers, regulatory, warning signs, E-Z Park machines and associated parking restriction signs. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The Definitive Design plan shall display signing within the project limit and intersection related signing on all cross-street roadways in the vicinity of the project limit. Additionally, the definitive design plan shall indicate signing for any other roadways that contain signing affected by the Project. The Design – Builder shall also provide the modification or removal of any signage outside the limits of the Project that is no longer appropriate or pertinent as a result of changes associated with this project. The signage shall be removed or modified regardless of whether it falls within or outside the limits of construction along the mainline and cross-street approach roadways.

Existing sign modifications shall conform to the latest applicable standards and may include sign overlays, replacement of the entire sign panel, or complete sign structure

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replacement. The use of full sign overlays is not permitted. The Design – Builder shall be fully responsible for replacing existing sign structures with new structures on new foundations as required to accommodate new and/or modified signs. The Design – Builder shall provide signing for roadways where existing access has been modified. The signing modifications due to the access modifications shall be shown on the definitive design plan. The definitive design plan features shall include, but are not limited to, the existing and proposed roadway alignments, right-of-way, utilities, drainage, baseline of construction (including stationing), and existing topography and pavement markings at the tie-in points of the roadway limits of work. The proposed pavement markings shall also be shown on the definitive design plan.

3.12.05.02.02 Plan Sheet Requirements

Once the roll plan is reviewed by the City, the Design – Builder shall prepare signing plans at a scale equal to the roadway plans. Plans shall show the proposed message, MUTCD 2009 or the MD MUTCD 2011 sign designation (if applicable), size and location of all guide, supplemental, route marker assemblies, regulatory, warning, E-Z Park machines and associated parking restriction signing. These plans shall also show the location, messages and sizes of all existing signs. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The plans shall include the location and type of delineation devices (including pavement markings). All proposed guide, supplemental and non-standard signs shall be detailed on a Sign Fabrication detail sheet. Signing and Marking Quantities sheets shall also be included which summarizes the quantities and materials in table format being used for this Project; with every sign location shall have a separate line.

3.12.05.02.03 Design of Sign Locations

The Design – Builder shall design, fabricate and install all signs shown on the definitive plan, within 25 feet of the location shown on the definitive design plan or as approved otherwise by Baltimore City DOT. To the extent possible, the Design – Builder shall provide minimum 100 foot spacing between ground-mounted signs, except that the parking signs are excluded from this requirement. The Design – Builder shall coordinate the proposed sign locations with all proposed landscaping, utility, hydraulic, lighting, and all other roadside features to assure proper clearances, lighting levels, and adequate sight distance.

The Design-Builder shall coordinate with the parking authority of Baltimore City (PABC) at 443-573-2800 and the department of transportation meter shop at 410-396-7576 to verify the locations of existing parking meters and/or E-Z Park machines, and the locations of the proposed E-Z Park machines and associated signing.

3.12.05.02.04 Sign Design and Construction Requirements

The Design – Builder shall design, fabricate, and install all guide, supplemental, route marker assemblies, regulatory and warning signing required for this Project, including approaches outside Project limits. The Design – Builder shall modify all existing

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signs requiring message modification, including approaches outside Project limits.

The messages, fonts, font sizes, arrows, shields, colors, borders, and type of supports for the non-standard ground mounted signs shall be designed and constructed according to the MUTCD 2009 and the MD MUTCD 2011. The Clearview font shall be utilized for all positive contrast guide signs. Positive contrast guide signs are signs that utilize white text/copy on a dark colored background (i.e. green, blue, black, brown, etc.)

All Advisory, Regulatory and Warning Signs, and route marker assemblies shall be standard size. The sizes of the signs shall adhere to the latest edition of the FHWA Standard Highway Signs Book and the Maryland State Highway Standard Sign Book and. The sizes of any existing signs to remain or be relocated shall also adhere to the latest edition of the Maryland State Highway Standard Sign Book and the FHWA Standard Highway Signs Book.

Fluorescent yellow background sheeting shall be used for all yellow traffic signs. When a sign contains more than one background color, the signs shall have two separate borders corresponding to each background color where the background colors meet. If the background colors utilize the same border color, then only one border is necessary where the background colors meet.

All signs greater than (4' by 8') shall be manufactured using extruded aluminum sign material. All new signs for this Project shall be constructed with non-reflective (black copy and background) or retroflective (all other colors) sheeting background and copy. The retroflective sheeting for sign copy and sign background shall comply with Section 950.03 of SHA's Standard Specification for Construction and Materials.

3.12.05.02.05 Sign Support Design and Construction

Sheet aluminum signs shall be mounted on square perforated tubular steel sign posts. Signs over 32 square feet shall be installed on steel supports, unless otherwise approved by Baltimore City for a particular sign. Additionally, if the signs are installed at a location where steel posts are required, then extruded aluminum sign material shall be used.

No signs or sign structures will be allowed on bridge overpass structures. No signs shall be banded to utility poles or street lighting poles without Baltimore City's approval.

Signs shall be placed outside the clear zone wherever possible.

The Design – Builder will be responsible for locating and marking all underground and overhead utilities prior to any signing work beginning.

3.12.05.02.06 Coordination with other Contracts

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The Design – Builder shall coordinate the design and construction of signing for the Project with those required for Central Avenue Phase I project, and the proposed MTA “Redline” project.

3.12.06 Pavement Markings

3.12.06.01 Design and Construction Requirements

All temporary pavement markings shall be shown on the Traffic Control Plans (TCP). Temporary pavement markings shall be designed and installed to provide motorist guidance throughout and within the Project limits. Temporary pavement marking tape shall be used on all concrete surfaces. Temporary tape or paint is permitted on asphalt surfaces.

All proposed permanent pavement markings shall be shown on definitive plans for signing and reviewed by the City prior to advancing the design.

All proposed permanent pavement markings shall be shown on the same plan sheets as the signs. All single longitudinal lines shall be 5 inches wide, and all double width lines shall be 10 inches wide. The plans are to show color, size, location, and material type for markings within the limits of work. The final marking design shall be indicated on the signing plan. The travel, bicycle and parking lanes shall be dimensioned based on the typical sections for the Project. Dimensions shall be included for each change in the roadway typical and the location of any change in the roadway typical shall be clearly dimensioned and/or noted on the final design plans. The plan shall also clearly define locations where pavement markings change color, width, or material.

The Design-Build Team shall be responsible for the design and construction of all pavement markings. For all final pavement marking lane lines including parallel, acceleration/deceleration lanes for ramps, and intersection auxiliary lanes, the following Pavement Marking Material shall be adhered to:

Durable Markings – Includes thermoplastics, patterned preformed thermoplastics (wet tape), or epoxy. All durable markings shall demonstrate wet retro reflective properties when tested in accordance with ASTM #E 2177-01 (Test Method for Measuring the Coefficient of Retroreflected Luminance (RL) of Pavement Markings in a Standard Condition of Wetness).

Paint – Whenever paint is listed as an application, the 50/50 blend of large and standard glass beads is required.

All longitudinal pavement markings shall be lead free thermoplastic.

All transverse pavement markings (i.e. yield symbols (shark’s teeth), crosswalks, stop lines), as well as all arrows, symbols, and letters shall be heat applied permanent preformed thermoplastic.

Crosswalks shall be provided at all signalized intersections as specified in section 3.12.07

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Traffic Signals.

All permanent pavement markings installed on the Project shall be listed on SHA's List of Qualified Permanent Pavement Markings, unless submitted and approved through SHA's Maryland Product Evaluation List (MPEL) program.

3.12.07 Traffic Signals & ITS Equipment

3.12.07.01 Traffic Signal & ITS Functional Requirements

Traffic signals and ITS equipment shall be reconstructed at the following intersections, with the following functional requirements:

S. Central Avenue at E. Lombard Street

- Traffic signal reconstruction
- Interconnected hardwire system with other signals on S. Central Avenue
- Crosswalks with pedestrian indications (Countdown pedestrian signal heads and APS pushbutton stations) to box the intersection.
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials

S. Central Avenue at E. Pratt Street

- Traffic signal reconstruction
- Interconnected hardwire system with other signals on S. Central Avenue
- Crosswalks with pedestrian indications (Countdown pedestrian signal heads and APS pushbutton stations) to box the intersection.
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials

S. Central Avenue at Gough Street

- Traffic signal reconstruction
- Interconnected hardwire system with other signals on S. Central Avenue
- Crosswalks with pedestrian indications (Countdown pedestrian signal heads and APS pushbutton stations) to box the intersection.
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials

S. Central Avenue at Eastern Avenue

- Traffic signal reconstruction
- Interconnected hardwire system with other signals on S. Central Avenue
- Crosswalks with pedestrian indications (Countdown pedestrian signal heads and APS pushbutton stations) to box the intersection.
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials
- Fiber connection and conduits to adjacent DMS sign

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- A New DMS sign, electrical service, control cabinet, support structure and associated infrastructure shall be installed on westbound Eastern Avenue, east of Caroline Street.
- Perform boring within 50' of the proposed DMS structure and provide structure foundation design for City's review and approval.

S. Central Avenue at Fleet Street

- Traffic signal reconstruction
- Interconnected hardwire system with other signals on S. Central Avenue
- Crosswalks with pedestrian indications (Countdown pedestrian signal heads and APS pushbutton stations) to box the intersection.
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials
- Proposed MTA "Redline" project shall be coordinated so that the proposed signal equipment will not be in conflict with the future geometrics improvements.
- New Surveillance CCTV on the traffic signal pole, controls and communication equipment incorporated into the traffic signal cabinet.
- Fiber connection and conduits to adjacent DMS sign
- A New DMS sign, electrical service, control cabinet, support structure and associated infrastructure shall be installed on westbound Eastern Avenue, east of Caroline Street.
- Perform boring within 50' of the proposed DMS structure and provide structure foundation design for City's review and approval.

S. Central Avenue at Aliceanna Street

- Traffic signal reconstruction
- Interconnected hardwire system with other signals on S. Central Avenue
- Protective/permissive left turn for southbound S. Central Avenue
- Overlap right turn phasing on westbound Aliceanna Street, where only right turning movement is allowed on westbound Aliceanna Street)
- Crosswalks with pedestrian indications (Countdown pedestrian signal heads and APS pushbutton stations) to box the intersection.
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials

S. Central Avenue at Lancaster Street

- New traffic signal construction
- Interconnected hardwire system with other signals on S. Central Avenue
- Typical signing, marking and lighting.
- Typical signal design layout, features and materials
- Provide traffic analysis to determine signal phasing

3.12.07.02 Design and Construction Requirements

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3.12.07.02.01 Definitive Design Traffic Signal & ITS Plan

The Design – Builder shall prepare a Definitive Design in the form of a traffic signal & ITS roll plan or plan sheets presented at the definitive review concurrently with the signing definitive design plan for review and written comment by Baltimore City DOT. The signal definitive design plan shall include all existing signal equipment and interconnect, and display all proposed signal equipment and interconnect within the Project, including but not limited to the proposed vehicular and pedestrian signal heads, overhead street name signs, guide signs for I-83. The plan shall include numbering for all signs and signal heads related to the traffic signal and clearly specify the sign faces and signal faces to be provided. The plan shall also display all existing and proposed crosswalks, existing and proposed utilities, drainage, storm water management elements that might conflict with the proposed signal equipment within the Project. Any temporary Maintenance of Traffic (MOT) Signal Plan(s), along with associated phasing of signal construction, shall also be presented at this time. The DMS definitive design plan shall include a rendering plan for each site similar to the example plans included in this RFP, and should include the existing fiber optic trunk line along Central Avenue and the connection between the splice point and the DMS controller. The plan shall also display all existing and proposed utilities, drainage, storm water management elements that might conflict with the proposed DMS structure.

3.12.07.02.02 Plan Sheet Requirements

The Design – Builder shall prepare Traffic Signal plans to address any temporary traffic signals that are required. The traffic signals shall be designed at each intersection as specified in Section 3.12.07.01 Traffic Signal Functional Requirements. All traffic signal plans shall be prepared in accordance with Baltimore City’s design and CADD symbology, MUTCD 2009 and the MD MUTCD 2011.

Existing traffic signal operation and detection shall be maintained during all phases of the roadway construction and all stages of Maintenance of Traffic, which may require shifting existing signal heads.

Design and construction of all permanent traffic signals shall use mast arms unless otherwise approved by Baltimore City. The use of diagonal single mast arms is not permitted, unless approved by Baltimore City. Design and construction of temporary traffic signals may use strain poles or wood poles (if the estimated duration of signal operation is less than two years) with span wires.

Lighting shall be provided on signal poles on the far-side of the mainline approaches to the intersection wherever feasible, and shall be coordinated with adjacent existing and/or proposed roadway lighting. Electrical cables for intersection lighting shall not pass through the signal cabinet, but shall be wired to the nearest DPW hand box or BGE manhole.

Pedestrian signals and pushbuttons shall be installed at crosswalk locations as specified in section 3.12.07.01 Traffic Signal Functional Requirements. All

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pushbutton locations shall be in compliance with the current ADA and Accessible Pedestrian Signal (APS) standards and standards. The traffic signals shall have countdown pedestrian signal heads and APS pushbutton stations at all locations where signalized cross-walks are provided.

All conduits crossing roadways shall be installed perpendicular to the roadway being crossed, unless there are constructability or utility conflicts. All conduits crossing underneath a roadway shall be 4 inch PVC Schedule 40 concrete-encased conduit. Three (3) inch PVC Schedule 40 concrete-encased conduit may be used between handholes and pedestal poles. Four (4) inch PVC Schedule 40 concrete-encased conduit shall be used for power feeds.

3.12.07.02.03 ITS Communication Plans

The Design – Builder shall prepare ITS communication plans. There is existing fiber and copper communication along Central Avenue and Fleet Street. The communication shall be maintained at all times, and replaced if impacted by the construction. Fiber optic and twisted pair copper and interconnect shall be installed along Central Avenue from Baltimore Street to Lancaster Street, in accordance with Section 3.12.07.01 Traffic Signal Functional Requirements. Interconnect plans shall be drawn at a scale of 1"=50'. The Design–Builder shall obtain all existing interconnect information and all existing interconnected signals shall remain connected under the final design. New CCTV and DMS signs will be connected to the fiber communications network and shown on the communication plans. Interconnect plans shall include controller cabinet locations, conduits, handholes, sampling stations, wiring diagram, types and quantity of cables, construction details, and equipment list in accordance with Baltimore City's design and CADD requirements. All existing traffic signal interconnect shall be maintained throughout construction, which may require relocation or temporary interconnect. Along any run of existing interconnect there shall be no net increase in splice points. The Design – Builder shall utilize at least twelve-pair communication cable for all proposed copper interconnect for traffic signals and utilize fiber optical cable for CCTV and DMS signs, the minimum size for fiber optic taps shall be 12 count (2 -6 count if tactical type fiber), the main arterial fiber shall be a minimum of 48 count fiber, while major transmission trunks between the TMC and any communications hub cabinet shall be 144 count. All impacted or damaged interconnect cables shall be replaced in-kind.

Traffic signal interconnect cables shall not utilize conduit or handholes/manholes/junction boxes that contain electrical cables.

The Design – Builder shall be solely responsible for all Work and costs associated with maintaining communication cable throughout construction for all signals. All interconnect shall be relocated prior to roadway construction in order to assure that interconnect can be maintained throughout construction. The Design – Builder shall be responsible for relocation of any existing interconnect or fiber optic cables impacted by construction. The Design – Builder shall coordinate with the Baltimore City DOT to facilitate the relocation of existing interconnect and fiber optic cables

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and equipment. All proposed splices shall occur in signal or splice cabinets. If a section of interconnect run is not long enough to be relocated, the entire section of cable shall be replaced. The Design – Builder shall be responsible for obtaining all permits required for placing interconnect in existing conduit systems and shall be responsible for all associated costs.

3.12.07.02.04 Utility Requirements

The Design – Builder shall be responsible for locating and marking all underground and overhead utilities prior to any signal installation work. The Design – Builder shall be responsible for all work, materials, and costs (including coordination with the power company) associated with obtaining power and maintaining power throughout construction for all traffic signals and other electrical work required for this Project. The Design – Builder shall be responsible for completing all electrical service application materials necessary for obtaining service from the appropriate power company. All materials shall be submitted to the power company through Baltimore City. The Design – Builder shall install conduit between the power sources and the nearest handhole (bypassing the signal cabinet) for intersection lighting. Lighting and signal cables shall have their dedicated conduits. Baltimore City will be responsible for all on-going electric costs of proposed signal equipment after the signals have been “Accepted for Maintenance” by the City. Metered service shall only be used for traffic signal equipment unless approved by Baltimore City. For each location requested, it is the Design – Builder’s responsibility to complete all paperwork, coordinate with the utility company, and schedule all utility connections so to not adversely affect the project schedule.

3.12.07.02.05 Materials

Traffic signals and ITS equipment shall be designed and constructed in accordance with the following:

- A) Using Video Detection systems for vehicle detection;
- B) The Design-Builder shall assist Baltimore City to submit a Public Interest Finding (PIF) for the proprietary purchase of traffic signal controllers. Using base mounted Model NEMA TS 2 Baltimore Type Cabinet with a field equipment cabinet for the Battery Backup System, wired in accordance with Baltimore City DOT specifications for all permanent traffic signals, the Design – Builder shall be responsible for furnishing and installing the cabinets and a NAZTEC Model 980 TS2 Type 1 controller with the latest software revision and Battery Backup System for each signal. City Signal Shop will provide final connection of all cables within the cabinet;
- C) Wiring required, including but not limited to the interconnect cables, signal cables;
- D) Using Light-Emitting Diode (LED) traffic signal heads and countdown pedestrian signal heads;
- E) Using APS pushbutton stations and all necessary signs.
- F) Using PVC Schedule 40 concrete-encased conduits for underground installations. Unless otherwise approved by the City, three (3) inch

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conduit shall be used between handholes and pedestal poles. Four (4) inch conduit shall be used to box out intersections and leading to mast arm signal poles;

- G) Furnishing and installing required signal related signing; and
- H) All exposed conduit shall be constructed of galvanized rigid steel;
- I) Furnishing and installing DMS signs and related infrastructure;
- J) Furnishing and installing new surveillance CCTV and associated infrastructure.

3.12.07.03 Temporary Traffic Signals

The Design – Builder shall provide temporary traffic signals as required by the traffic control plans, including shifting traffic signal heads to properly align the signal heads with the approaching traffic. The Design – Builder shall perform all studies as necessary determine appropriate signal phasing and timings, for placement of Temporary Traffic signals and present all information to the Baltimore City for review and written comment.

3.12.08 Lighting

3.12.08.01 Design and Construction Requirements

All proposed and existing luminaires within the Project limits shall be working upon completion of the Project. The Design-Builder shall coordinate with the Baltimore City and BGE for de-energizing and energizing of street lighting equipment.

All proposed lighting equipment shall be located such that it can be readily maintained by personnel of the maintaining agency.

Lighting placed on traffic signal poles (joint-use) shall be wired to the nearest DPW hand box or BGE manhole.

The street lighting systems shall be installed to utilize conduits and hand boxes separate from the traffic signal conduits and hand boxes. The Design – Builder shall provide 2-conductor No. 12 AWG, UF/TC electrical cable from the luminaire mounted on the traffic signal pole, down to the adjacent DPW hand box with 3-foot of slack cable for BGE to energize.

All luminaires shall be equipped with a photocell.

All street lights shall be provided with No. 10 AWG THHN/THWN single conductors, wired from the new fixture down to the base of the light pole and out to the nearest hand box with 3-foot of coiled slack.

All street lights shall be placed 20-24 inches minimum from face of curb. In instances where the Design – Builder encounters a situation where the installation of the street lights conflict with any underground utility, spread footer may be utilized per BC Detail 801.04.

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The street lighting systems shall be wired and energized by BGE. The Design - Builder is not required to provide wiring except for lights placed on traffic signal structures and is not required to perform voltage drop calculations unless a situation arises in which BGE requires a meter to energize the street lighting systems.

The underground street lighting conduit and hand box systems shall be constructed of 3-inch DB-120 Concrete Encased conduits unless directed otherwise by Baltimore City. The conduits shall be constructed in accordance with BC Details 824.01-1 and 824.01-2. All exposed conduit shall be constructed of galvanized rigid steel. Street lighting (DPW) Hand boxes shall be constructed in accordance to BC Details 804.01 thru 804.08.

The Design Builder shall utilize the following fixture and poles:

Fixtures:

Vehicular: 142 Watt, GE Evolve ERM LED Cobra Head.

Pedestrian: 71.5 Watt, 4000K LED with 70 CRI Victorian Acorn.

Poles:

Vehicular: 27'-6" long, round tapered aluminum pole per BC Standard 808.02

Base: BC Detail 801.01

Pedestrian: 10'-6" high Homeland, cast aluminum, fluted base/round shaft with a flared bottom, painted black.

Base: BC Detail 801.03

The Design-Builder shall assist Baltimore City to submit a Public Interest Finding (PIF) for the proprietary purchase of lighting fixtures.

The Design - Builder shall coordinate with BGE for disconnecting and reconnecting of any street light impacted by the Design – Builder as part of this Project unless it is being permanently removed. All abandoned cables shall be made safe in accordance with BGE.

3.12.08.01.01 Definitive Design Lighting Roll Plan

A lighting roll plan shall be presented at the definitive review and concurrently with the signing and signal roll plans for review and written comment by Baltimore City prior to the Design – Builder proceeding with the design, installation, or modification of lighting. The lighting roll plans shall include proposed locations for all lights and photometric calculations supporting the light locations.

The Design – Builder shall provide spacing computations showing luminance, illuminance and veiling luminance calculations, as appropriate. The luminance method shall be used on roadways while the illuminance method shall be used for intersections and sidewalks. The calculations shall include uniformity ratios (average-to-min and max-to-min), point-by-point computations, and a summary of the minimum and average maintained lighting levels and the critical veiling luminance ratios. The calculations shall also include vertical light trespass calculations onto adjacent property lines. Light trespass calculations shall be

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performed along the residential property line at a height of 5-feet while facing the offending light fixtures. Refer to Baltimore City, Street Lighting and Conduit, Street Lighting and Photometric Design Guide for illumination design criteria. The Design – Builder shall apply a Light Loss Factor (LLF) following the requirements as indicated by IESNA RP-8-00, Annex A, Calculation and Measurement Parameters. The definitive design lighting roll plans shall indicate locations of light poles and shall also describe types of fixtures, fixture wattages, fixture mounting heights, arm lengths as necessary and types of light poles intended for use on the project. Calculation zones shall be setup in accordance with IESNA RP-8-00, Annex A, Calculation and Measurement Parameters. The applied LLF and lamp lumens shall be provided with the photometric calculations.

The lighting definitive design roll plan shall also include all existing lighting equipment within the Project. The plan shall also display existing and proposed geometry, existing and proposed pavement markings, existing and proposed utilities, right-of-way, drainage, and storm water management elements that might conflict with the proposed lighting equipment within the Project.

The Design – Builder shall design, fabricate, and install all street lighting shown on the definitive design plan within 5 feet of the location shown on the definitive design plan or as otherwise approved by Baltimore City.

3.12.08.01.02 Plan Sheet Requirements

The Design – Builder shall prepare and present lighting plans with a scale appropriate for the Project, generally 1" = 20', or the same scale as roadway plans. Plans shall include existing and proposed geometry, existing and proposed utilities, right-of-way, landscape features, applicable drainage features, applicable structural facilities, and other information required for coordination of utilities. Plans shall show locations of new light poles and hand boxes either by station and offset or dimensioning, and shall include type and mounting height of poles, type and wattage of luminaires, length of luminaire arms, removal and relocation of existing lighting, concrete encased conduits/duct sections, ground rods and other details pertinent to the construction. The plans shall include identifiers for light poles and hand boxes.

3.12.08.01.03 Existing Lighting

All impacted existing street lighting shall be replaced by the Design – Builder. The impacted street lighting shall incorporate the same luminaire and pole as in the existing conditions unless directed otherwise by Baltimore City DOT. The Design – Builder shall design and construct the lighting system consistent with operational and engineering requirements of BGE and Baltimore City DOT.

The Design – Builder shall remove existing light poles that are no longer required due to construction of the Project. All removed street light poles, fixtures, related hardware and DPW hand boxes are the property of Baltimore City and shall be delivered back to the Baltimore City as indicated by the special provisions. The Design – Builder shall notify the owner of the lighting being removed at least two

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weeks in advance of scheduled equipment removal.

The maximum outage time for existing luminaires shall be 24 hours unless otherwise approved by Baltimore City.

3.12.08.01.04 Intersection Lighting

All intersections (both signalized and unsignalized) within the project limits shall have intersection lighting. The Design – Builder shall combine intersection lighting with the traffic signal plans whenever possible. All intersection lighting shall be illuminated to a level that equals the sum of the recommended average light levels for each of the intersecting roadways. Refer to City of Baltimore, Street Lighting and Conduit, Street Lighting and Photometric Design Guide. A photometric analysis at each intersection is required as part of the Definitive Design roll plan.

3.12.08.01.05 Street Lighting

Vehicular Lighting

The Design – Builder is responsible for the photometric analysis, design and construction of the vehicular lighting systems.

Pedestrian Lighting

The Design – Builder is responsible for the photometric analysis, design and construction of the pedestrian lighting systems necessary to provide Illumination of sidewalk areas within the project limits.

3.12.08.01.06 Temporary Lighting

All existing roadways that are to remain open for the traveling public and which have street lighting shall remain illuminated to the City of Baltimore’s average maintained illuminance values for the duration of the Project unless directed otherwise by Baltimore City.

The Design – Builder shall maintain all existing lighting within the Limits of Work shown on the Concept Plans throughout construction. Where temporary lighting is needed to maintain the existing lighting levels in the Project area, the Design – Builder shall install and maintain temporary lighting (cobra heads attached to wood poles). Temporary overhead electrical service is acceptable for non-breakaway poles. The Design – Builder shall remove temporary lighting when no longer needed. The Design – Builder shall be responsible for the power costs of any and all temporary lighting that may be required and it is the Design – Builder’s responsibility to coordinate and schedule all utility connections.

3.12.08.01.07 Electrical Service for Lighting

The Design – Builder shall be responsible for coordinating with Baltimore City and BGE for power service connections from source. The Design – Builder shall be solely responsible for all work, materials, and costs (including coordination and set-up of a force account with BGE) associated with obtaining power and maintaining power throughout construction for all lighting facilities and other electrical work

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required for this Project.

3.12.09 Submittals

The Design – Builder shall submit traffic design plans as follows:

- A) Definitive Design Signing, Traffic Signal, and Lighting Roll Plans shall be submitted concurrently. Traffic operation analysis report shall be submitted along with the traffic signal definitive design plans. The Design-Builder shall be responsible for coordinating a review meeting at Baltimore City DOT to discuss comments on the Definitive Design roll plans. Baltimore City will provide written comments to the Design-Builder on the Definitive Design roll plans within 28 days of submittal or within seven (7) days following the review meeting at Baltimore City DOT, whichever is later. The Design-Builder shall not advance design to the readiness for construction review until approval has been granted by Baltimore City DOT. It may be necessary to resubmit the roll plans in order to obtain this approval.
- B) Readiness for construction review plans shall be submitted along with Baltimore City’s Signal Design Checklist.

3.12.10 Post-Construction Signing Inventory

The Design-Builder shall be responsible for performing a post-construction inventory of all signs within the Project Limits and all other signs installed under this project outside the Project Limits. This post-construction inventory shall include verification that all signs within the Project Limits and all other signs installed under this project meet MUTCD 2009 or MD MUTCD 2011, SHA standards and Baltimore City details (including application, placement, size, color, and reflectivity). For signs that are to be relocated within the project limit, the Design-Builder shall use a retroreflectometer to measure the sign retroreflectivity and submit the results to Baltimore City for review. The measured values are to be compared with the Minimum Maintained Retroreflectivity Levels outlined in Table 2A-3 of MUTCD 2009 or MD MUTCD 2011. Signs with retroreflectivity values below the minimum values are to be replaced at no additional cost to Baltimore City.

3.12.11 Traffic Control Device Verification

The Design – Builder shall schedule meetings with Baltimore City to verify traffic control device work as follows:

- A) At the completion of all cabling and wiring and prior to electrical utility service connection; and
- B) Prior to traffic control device activation.

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TC 3.13 ROADSIDE LANDSCAPE AND REFORESTATION DESIGN PERFORMANCE SPECIFICATIONS

3.13.01 Preservation of Trees

Baltimore City regulates and restricts construction activities that remove existing trees. Baltimore City requires that the project design minimize the amount of trees removed and avoid or minimize impacts to trees retained through sound tree protection measures in accordance with the requirements of the City of Baltimore Code Article 7 Division 5, City of Baltimore Department of Transportation Book of Standards, City of Baltimore Critical Area Management Program Manual and Native Species Plant List, and approved plans.

- a. All trees removed or trimmed within this project shall be in accordance with the Baltimore City Tree Protection Law. All tree removal and tree protection efforts shall be shown on the construction plans. Trees removed within this project shall be conducted in accordance with the Chesapeake Bay Critical Area, and Baltimore City Recreation and Parks Forestry Division. Tree impacts are estimated to total 74.7" DBH based on current Landscape Plans.
- b. On-site tree planting as shown on the conceptual landscape plans and described in this document shall be made part of this contract. Any proposed revisions to the approved Landscape/Critical Area/Forest Conservation Plan shall be coordinated with Baltimore City Planning Department and Forestry Division. Any Baltimore City requirements or conditions associated with the modification of the approved Landscape/Critical Area/Forest Conservation Plan shall be the responsibility of the Design-Build Team as stated elsewhere. If the Design Builder impacts trees in excess of the anticipated 74.7 DBH inches, the Design Builder shall be responsible for locating additional off-site planting areas, and any necessary revisions to the approved Landscape/Critical Area/Forest Conservation plan.
- c. The Design-Build Team must employ the services of an ISA Certified Arborist and a MD Licensed Tree Expert, who shall perform the following activities:
 1. Conduct an on-site inspection to determine the presence and location of any specimen and/or significant trees within the limits of disturbance plus 30 feet beyond the limits of disturbance. Specimen trees are defined as trees with a Diameter at Breast Height (DBH) of 20" or greater or at least 75% of the DBH of the MD State Champion of the species, whichever DBH measurement is smaller. Significant trees are defined with a DBH of 12" or greater for major or canopy trees

3.13.02 Guidelines and References

3.13.02.01 Guidelines

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Design and construct the Landscape & Aesthetics in accordance with the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It is the Design-Builder’s responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed Guideline as of the initial Publication Date of this RFP.

**Table 1
Guidelines for Landscape**

<u>Author or Agency</u>	<u>Title</u>
DNR	Chesapeake Bay Critical Area Regulations, COMAR Title 27
Baltimore City	Zoning
SHA	Standard Specifications for Construction and Materials
Baltimore City	Baltimore City Stormwater Manual
Baltimore City	Baltimore City Critical Area Management Program Manual and Native Plant Species List
MDE	2000 Maryland Stormwater Design Manual, Appendix A, Landscaping Guidance for Stormwater BMPs
ANSI A300 (Part 1)	Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices
ANSI A300 (Part 2)	Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices – Part 2 – Fertilization
ANSI A300 (Part 3)	Tree Care Operations – Tree, Shrub and Other Woody Plant - Standard Practices – Part 3 – Tree Support Systems
ANSI Z60.1	American Standard for Nursery Stock
AASHTO	Roadside Design Guide Chapters 4, 5, 6 and 10
AASHTO	T88 and T194
COMAR	Nutrient Management Law

3.13.02.02 References

Use the references listed in Table 2 as supplemental materials for the design and construction of the Landscape & Aesthetics. These publications have no established order of precedence.

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**Table 2
References for Landscape**

<u>Author or Agency</u>	<u>Title</u>
Baltimore City	Baltimore City Supplement to the State Forest Conservation Manual
Baltimore City	Baltimore City Landscape Manual- Draft
ANSI Z133.1	Safety Requirements for Pruning, Trimming, Repairing, Maintaining, and removing Trees, and for Cutting brush
Hortus Third	A Concise Dictionary of Plants Cultivated in the United States and Canada (L. H. Bailey Hortorium 1976)
AASHTO	A Guide for Transportation Landscape and Environmental Design
DNR	Department of Natural Resources Article 5-103 – Maryland Reforestation Law; and Maryland Forest Conservation Act

3.13.03 General

The Design-Builder shall design and construct Landscape plantings associated with the Project in accordance with this specification.

This Project requires particular attention to the aesthetic and landscape architectural design elements of the highway corridor. The Project corridor traverses through a variety of existing land use types that include: residential, commercial, and open landscape.

3.13.04 Planting Zones and Landscape Requirements

3.13.04.01 Planting Zone Types

The Design-Builder shall prepare a Planting Plan for the Landscape Plantings, based on the approved Landscape/Critical Area/Forest Conservation Plans. These Plans designate Planting Zone Types, location, and approximate square footage. The landscape planting concept shall be developed to incorporate the use of native plants and to revegetate disturbed areas within the Project to the fullest extent possible. Groupings of trees, shrubs, ornamental grasses and groundcovers shall be created whenever possible to create streetscape plantings that have continuity from the Baltimore City Contract #TR 03310, Rehabilitation of Central Avenue and Storm Drain from Eastern Avenue to Madison Street. Plantings shall be designed to provide multi-season aesthetic interest to the fullest extent possible, be hardy and contribute to the City urban canopy goals. The Design-Builder shall be responsible for coordinating the Planting Plan for Landscape and afforestation with all other elements of work to be performed under the Project, including but not limited to final grading, stormwater management best management practices (BMP) locations, highway clear zones and sight distances, storm drain and stormwater management BMP outfalls and cross culvert outfalls, utilities, signing, and lighting. The Design-

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Builder shall install root barrier in planting pits when these cross gas, water or conduit and conforming to the Special Provisions. If the Design-Builder determines a conflict from one or more of these elements, the Design-Builder shall be responsible for modifying the concept plans, while still retaining the intent of the design. Areas used for stormwater management BMPs may be used for Reforestation plantings or Landscape plantings to the greatest extent practical. Stormwater management BMP landscape plans shall be coordinated with other landscape and reforestation plans to ensure a unified planting theme is created for the Project corridor.

The approved plant species, minimum acceptable sizes, and minimum spacing are listed below. Requests for substitution of other species shall be submitted in writing to Planning Department of Baltimore City and shall be from the Baltimore City Draft Landscape Manual.

The Design-Builder shall maintain the installed plantings for a period of two years and conforming to the Special Provisions.

3.13.04.01.01 Street Tree Planting (6726 SF)

The Design-Builder shall prepare Landscape Plans for the areas identified as Street Tree Plantings. This planting zone occurs between the back of curb and ROW or Face of Building/Fence The Design-Builder shall employ this planting association along Central Ave to compliment the street tree plantings on the Baltimore City Contract #TR 03310 as indicated on the Conceptual Landscape Plans and concept planting details. The plantings shall, at a minimum, consist of regularly spaced shade trees, and groupings of low shrubs, ornamental grasses and groundcovers in extended planting beds located at the back of curbs. Street trees shall be a continuous species and cultivar for each block. Trees shall be underplanted with a groundcover and framed with a grouping of low shrubs or ornamental grasses. Groupings of shrubs, grasses and groundcover shall remain consistent for a minimum of two block lengths. Two trees shall be grouped in 40 linear feet by 5 foot wide planters where feasible and offset from the curb to accommodate on street parking, sign, light pole and pay station placement. Planting pits of less than 30 foot length shall contain one tree and groupings of low shrubs, ornamental grasses and groundcovers to compliment the Baltimore City Contract #TR 03310. Tree pits are to be a minimum of 4’x8’ while 5’x10’ is the preferred minimum. Planting pits are to be offset from the back of curb 16” where possible to accommodate on street parking. Preserving existing trees and providing shade for residences may warrant smaller tree pits and may not allow for offsetting the planting pits from the curb.

The Designer-Builder shall incorporate in bio-retention in the street tree planters as directed by the Stormwater management performance specifications. Bio-retention design criteria may warrant a plant palette specific to the periods of inundation and drought. The bio-retention planters shall be incorporate and shall provide a cohesive streetscape design of brick banding with concrete sidewalk and plantings for this Central Avenue project and the Baltimore City Contract #TR 03310.

Planting pits are to be designed to utilize the Stormwater run-off from existing front of house downspouts. Currently, downspouts drain across the sidewalk or through the sidewalk to the curb. Where feasible, the planting pits are to accept drainage from the downspouts below grade

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and shall be connected to the stormdrain inlet downhill. Planting pits shall have a minimum planting soil depth and drainage aggregate for water storage capacity as indicated in the Landscape Concept Plan details.

PLANT MATERIAL: Street Tree Planting

Botanical Name	Common Name	Maximum Spacing	Minimum Size
Shade Tree:			
<i>Platanus x acerifolia</i> 'Bloodgood'	Bloodgood London Plane Tree	30' OC	2.5" Cal. B&B
<i>Quercus coccinea</i>	Scarlet Oak	30' OC	2.5" Cal. B&B
<i>Quercus phellos</i> 'Hightower'	Willow Oak	30' OC	2.5" Cal. B&B
<i>Quercus prinus</i>	Chestnut Oak	30' OC	2.5" Cal. B&B
<i>Tilia cordata</i> 'Greenspire'	Littleleaf Linden	30' OC	2.5" Cal. B&B
<i>Ulmus Americana</i> 'Valley Forge'	Valley Forge Elm	30' OC	2.5" Cal. B&B
Shrubs/Ornamental Grasses/Groundcover:			
<i>Deschampsia caespitosa</i>	Tufted Hair Grass	24" OC	#1 CG
<i>Hypericum densiflorum</i> 'Creel's Gold Star'	Dense Hypericum	18" OC	#2 CG
<i>Itea virginica</i> 'Little Henry'	Little Henry Sweetspire	36" OC	#3 CG
<i>Liriope muscari</i> 'Big Blue'	Big Blue Liriope	12" OC	#1 CG
<i>Muhlenbergia capillaris</i>	Pink Muhly Grass	30" OC	#2 CG
<i>Nassella tenuissima</i>	Feather Grass	24" OC	#1 CG
<i>Panicum virgatum</i> 'Shenandoah'	Shenandoah Switchgrass	36" OC	#2 CG
<i>Rhus aromatica</i> 'Gro-low'	Fragrant Sumac	24" OC	#2 CG, 24" Ht.
<i>Sporobolus heterolepis</i>	Prairie Dropseed	30" OC	#1 CG
<i>Viburnum dentatum</i> 'Blue Muffin'	Arrowwood virburnum	36" OC	#3 CG

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

3.13.04.01.02 Median Planting (1711 SF)

The Design-Builder shall prepare Landscape Plans for the areas identified as Median Plantings. This planting zone occurs in the medians along Central Avenue. The Design-Builder shall employ this planting association along Central Ave to compliment the median plantings on the Baltimore City Contract #TR 03310 and as indicated on the Conceptual Landscape Plans and concept planting details. The plantings shall, at a minimum, consist of regularly spaced ornamental trees and groupings of low shrubs, ornamental grasses and groundcovers in planting beds. Trees in the median shall be a continuous species and cultivar for the median. No more than two different shrubs or ornamental grasses shall be used in the median. Trees shall be underplanted with a low shrub and framed with a groupings of ornamental grasses.

Median pits shall be designed to surface drain toward the center and retain a portion of rainwater

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that falls upon them. Planting pits shall have a minimum depth of planting soil mix and drainage aggregate for water storage capacity as indicated in the concept landscape plan details.

PLANT MATERIAL: Median Planting

Botanical Name	Common Name	Maximum Spacing	Minimum Size
Shade Tree:			
<i>Lagerstroemia indica</i> 'Sioux'	Sioux Crape Myrtle	25' OC	7' Ht B&B
<i>Syringa reticulata</i> 'Ivory Silk'	Ivory Silk Lilac	25' OC	7' Ht B&B
Shrubs/Ornamental Grasses/Groundcover:			
<i>Deschampsia caespitosa</i>	Tufted Hair Grass	24" OC	#1 CG
<i>Hypericum densiflorum</i> 'Creel's Gold Star'	Dense Hypericum	18" OC	#2 CG
<i>Itea virginica</i> 'Little Henry'	Little Henry Sweetspire	36" OC	#3 CG
<i>Muhlenbergia capillaris</i>	Pink Muhly Grass	30" OC	#2 CG
<i>Nassella tenuissima</i>	Feather Grass	24" OC	#1 CG
<i>Panicum virgatum</i> 'Shenandoah'	Shenandoah Switchgrass	36" OC	#2 CG
<i>Rhus aromatica</i> 'Gro-low'	Fragrant Sumac	24" OC	#2 CG, 24"
<i>Sporobolus heterolepis</i>	Prairie Dropseed	30" OC	#1 CG
<i>Viburnum dentatum</i> 'Blue Muffin'	Arrowwood virburnum	36" OC	#3 CG

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

3.13.04.01.03 Planting Areas (666 SF)

The Design-Builder shall prepare Landscape Plans for the areas identified as Planting Areas. This planting zone occurs behind the sidewalk to the face of building/fence or property line, whichever is less. The Design-Builder shall employ this planting association along Central Ave to compliment the street tree plantings zone as indicated on the Conceptual Landscape Plans and concept planting details. The plantings shall, at a minimum, consist of regularly spaced groupings of low shrubs, ornamental grasses and groundcovers in planting beds. No more than three different shrubs or ornamental grasses shall be used in each block and maintain a uniformity and project biodiversity.

Planting areas shall be designed to drain toward the street and retain a portion of rainwater that falls upon them. Planting pits shall have be a minimum depth of 24" of planting soil mix and 6" of drainage aggregate.

PLANT MATERIAL: Planting Areas

Botanical Name	Common Name	Maximum	Minimum
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	Spacing	Size
Shrubs/Ornamental Grasses/Groundcover:		
<i>Deschampsia caespitosa</i>	Tufted Hair Grass	24” OC #1 CG
<i>Hypericum densiflorum</i> ‘Creel’s Gold Star’	Dense Hypericum	18” OC. #2 CG
<i>Itea virginica</i> ‘Little Henry’	Little Henry Sweetspire	36” OC #3 CG
<i>Liriope muscari</i> ‘Big Blue’	Big Blue Liriope	12” OC #1 CG
<i>Muhlenbergia capillaris</i>	Pink Muhly Grass	30” OC #2 CG
<i>Nassella tenuissima</i>	Feather Grass	24” OC #1 CG
<i>Panicum virgatum</i> ‘Shenandoah’	Shenandoah Switchgrass	36” OC #2 CG
<i>Rhus aromatica</i> ‘Gro-low’	Fragrant Sumac	24” OC. #2 CG, 24”
<i>Sporobolus heterolepis</i>	Prairie Dropseed	30” OC #1 CG
<i>Viburnum dentatum</i> ‘Blue Muffin’	Arrowwood virburnum	36” OC #3 CG

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

3.13.05 Site Amenities

3.13.05.01 Benches

The Design-Builder shall match the type, style of 6’ long metal cast, powder coated benches used on Baltimore City Contract #TR 03310 Central Avenue. One Bench shall be located at each bus stop within the project limits. Benches shall be used in accordance with the Bench Special Provision

3.13.05.02 Bike Racks

The Design-Builder shall match the type, style of five loop bike racks used on Baltimore City Contract #TR 03310. One Bench shall be located one every other block on both sides of Central Ave. Bike Racks shall be used in accordance with the Bike Rack Special Provision

3.13.05.03 Clay Brick Unit Pavers

The Design-Builder shall match the type, style of clay brick pavers used on Baltimore City Contract #TR 03310. Clay brick unit pavers shall be placed from the southern project limits approximately at sta. 101+84 and at the north project limits at approximately stat. 131+62 at sidewalk corners, along the back of curb and along the back of tree pits as indicated on the Concept plan details. Patterns shall compliment the Central Ave project and shall match the patterns illustrated in the Concept Plan details. Clay unit brick pavers shall be in accordance with the Clay Brick Unit Paver Special Provision.

3.13.05.04 Litter and Recycling Receptacles

The Design-Builder shall match the type, style of trash receptacle used on Baltimore City Contract #TR 03310. Litter receptacles shall match the type of trash receptacle used on Baltimore City Contract #TR 03310 and be distinguished by cover and frame decals distinguishing the use

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for recycling. Trash and recycling receptacles shall be located two each per block and one each at bus stops. Trash and Recycling receptacles shall be in accordance with the Litter and Recycling Receptacles Special Provision.

3.13.05.05 Newspaper Corral

The Design-Builder shall match the type, style of newspaper corral used on Baltimore City Contract #TR 03310. Newspaper corrals shall be located at two locations at the ends of the project limits. Newspaper corrals shall be in accordance with the Newspaper Corral Special Provision.

3.13.05.06 Salvaged Belgian Block Paving and Granite Curb

The Design-Builder shall utilize from within the project limits salvaged Belgian Block Paving and Granite Curb. Salvaged Belgian Block Paving shall be incorporated within the streetscape design as suggested in Landscape Concept Details between tree pits. Alternate re-use locations may be proposed based upon the ultimate design and salvageable materials available. Salvaged Belgian block is estimated to be 3000 SF.

Salvaged granite curb shall be incorporated with the streetscape design as suggested in the Landscape Concept Details along the back edge of tree pits. Alternate re-use locations may be proposed based upon the ultimate design and salvageable materials available. Salvaged granite curb is estimated be 300 linear feet. Salvaged Belgian Block Paving and Granite Curbs shall be in accordance with the Special Provision.

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TC 3.14 GEOTECHNICAL PERFORMANCE SPECIFICATION

3.14.01 General

The Design-Builder shall conduct supplemental subsurface explorations, analyses, design and construction for all geotechnical components of the Project in accordance with all applicable criteria and standards cited herein and in accordance with this Geotechnical Performance Specification.

Construction of MSE walls is prohibited for the bridge substructure elements.

Construction of shallow foundation for bridges is prohibited. The Design Builder's deep foundation for bridges shall minimize the amount of possibly contaminated soils displaced during construction which will require treatment and removal from the project site.

Use of ground improvement techniques will be accepted.

3.14.02 Guidelines and References

3.14.02.01 Guidelines

Design and construction of all geotechnical elements shall be in accordance with this Geotechnical Performance Specification and the relevant requirements of the following Guidelines and references unless otherwise stipulated in this specification. Guidelines and references specifically cited in the body of this Geotechnical Performance Specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another, the Guideline listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification. Listed under references are reports and resources that the Design-Builder may use to address the geotechnical requirements as the Design-Builder sees fit. It is the Design-Builder's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any design and construction. All Geotechnical Reports and Submissions will be reviewed based upon FHWA Geotechnical Checklist and Guidelines (FHWA-ED-88-053).

Use the most current version of each listed guideline as of the initial publication date of this RFP unless revised by addendum or contract modification.

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TABLE 1
GUIDELINES FOR GEOTECHNICAL

Priority	Author or Agency	Title
1	SHA	Office of Bridge Development, Policy and Procedure Manual
2	AASHTO	LRFD Bridge Design Specifications, 6 th Edition
3	SHA	Standard Specifications for Construction and Materials
4	AASHTO	Manual on Subsurface Investigations
5	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Parts I and II
6	ASTM	Annual Books of Standards
7	MDE	2009 Maryland Stormwater Design Manual Volumes I and II
8	FHWA	Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Design and Construction Guidelines
9	SHA	Structural Standards

3.14.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and exploration of the geotechnical subsurface. These publications have no established order of precedence.

TABLE 2
REFERENCES FOR GEOTECHNICAL

Author or Agency	Title
FHWA	Design and Construction of Driven Pile Foundations, Volumes 1 and 2
FHWA	Geotechnical Engineering Circular No. 2: Earth Retaining Systems
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	Micropile Design and Construction Guidelines
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
Dunncliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunncliff 1986

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FHWA	Subsurface Investigations (Geotechnical Site Characterization) Subsurface Investigations - Geotechnical Site Characterization Reference Manual for NHI 132031
FHWA	Geotechnical Instrumentation
FHWA	Corrosion/Degradation of Soil Reinforcements for Mechanically
FHWA	Stabilized Earth Walls and Reinforced Slopes
FHWA	Geotechnical Engineering Circular No. 2: Earth Retaining Systems
FHWA	Geotechnical Engineering Circular No. 6. Shallow Foundations
FHWA	Geotechnical Checklist and Guidelines

3.14.03 Requirements

3.14.03.01 Geotechnical Subsurface Exploration

3.14.03.01.01 Historic Subsurface Data

Historic subsurface data in the vicinity of the project has been provided for the Design-Builder's use. The historical subsurface information provided is not intended as a substitute for a subsurface investigation by the Design-Builder. The Design-Builder shall conduct additional studies in accordance with the minimum scope specified herein.

3.14.03.01.02 Design-Builder's Subsurface Exploration

The Design-Builder shall form its own interpretation of the existing geotechnical data and satisfy itself as to the nature of the subsurface conditions, the form and nature of the site and nature of the Work that may affect its detailed design, construction methods, and tools. The Design-Builder shall undertake its own assessment of the suitability of the preliminary geotechnical data.

The Design-Builder shall prepare and implement a subsurface exploration and testing program with all field and laboratory testing necessary (Table 3 & 4) to establish the geotechnical conditions and to perform all geotechnical and foundation design and analyses. The program, herein designated as the Design-Builder's subsurface exploration program, shall be developed and implemented to supplement the data provided by the City and to obtain the data as required to meet the requirements of AASHTO and the Design-Builder's design approach and construction methods. The locations, number, depths and types of boreholes, laboratory and field-testing and sampling shall conform to the standards of practice of the City, State, AASHTO and the FHWA. The details of the Design-Builder's field and laboratory testing programs for design shall be submitted to the City as part of the Geotechnical Planning Reports for review and comment

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(See “Geotechnical Planning Reports”, below) at least 30 days prior to the actual field exploration activities. The rationale for development of the exploration programs, data interpretation, and parameter selection, together with descriptions of the methods of analyses, shall be clearly presented.

In addition to the techniques described in the AASHTO Manual on Subsurface Investigations, the Design-Builder’s Geotechnical Engineer may include the Ko blade, Prebored Pressuremeter (ASTM D-4719), Electronic and Piezocone Testing (ASTM D-5578), Mechanical Cone Penetrometer (ASTM D-3441), and Dilatometer Test Probes (ASTM D-6635) in the subsurface investigations to aid in the development of in-situ soil parameters for the design of this Project. Ko testing shall be in accordance with the manufacturers recommended procedures. The raw data obtained from in-situ testing shall be correlated by a professional geotechnical engineer based upon the soil conditions. Parameters obtained from in-situ testing, without correlation with soil index and validation by a qualified engineer will not be allowed for design purposes.

The City will review and provide written comments on the Design-Builder’s subsurface exploration plan prior to its implementation. The Design-Builders shall perform its subsurface exploration program to establish all geotechnical parameters and subsurface conditions, including groundwater conditions, required for design and construction. In areas of erratic subsurface conditions and where stratification indicates possible deep stability or settlement problems, borings shall extend into rock or into a hard or dense soil stratum.

The Design-Builder shall provide the results of the studies to the City as described in “Interim Design Memoranda”, below.

TABLE 3 MINIMUM REQUIREMENTS FOR BORING DEPTH	
Areas of Investigation	Boring Depth
Bridge Foundations	For deep foundations See AASHTO 6 th Edition
Retaining Walls / Wing Walls	AASHTO 6 th Edition

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TABLE 4 MINIMUM REQUIREMENTS FOR SPT BORING LAYOUT*	
Geotechnical Features	Boring Layout
Bridge Foundations	See AASHTO 6 th Edition
Retaining Walls	A minimum of two borings shall be performed for each retaining wall. For retaining walls more than 100 feet in length, the spacing between borings shall be no greater than 100 feet. Additional borings to define conditions at the toe of the wall and in the zone behind the wall to estimate lateral loads and anchorage capacities shall be included at a spacing of no greater than 150 feet.
Wing Walls	A minimum of one (1) boring shall be performed for each wing wall. For retaining walls in excess of 75 feet in length, see Retaining Walls, above.

* Foundation borings must be within 25-feet of the substructure unit to be applicable.

Among the requirements for the subsurface investigation and laboratory testing to be performed for the Project are the following:

- A) Supervision and Inspection – All geophysical investigations shall be planned and performed under the direct supervision of a geophysicist with a minimum of 10 years experience. All boring and in-situ testing inspection shall be performed by field inspectors that have passed the NHI Subsurface Investigation Qualification Course (#132079), and; (a) be a degreed engineer or geologist; or, (b) have a minimum of two (2) years of field experience in the inspection and reporting of field sampling and testing of similar size and content. All field investigations and laboratory testing shall be performed under the direct supervision of a Maryland-registered professional engineer with a minimum of five (5) years experience in the performance and supervision of geotechnical engineering Projects. The City reserves the right to request resumes to verify said qualifications.
- B) Location and Ground Surface Elevation - The Design-Builder shall determine the coordinate location and ground surface elevation, for each boring and other test probes and show the information on the individual boring logs.
- C) Soil classification shall be performed in accordance with the AASHTO Classification system.
- D) Final boring logs shall be prepared and presented using gINT software as supplied by Geotechnical Computer Applications Inc. The City will provide the electronic template for the latest version of gINT; and,
- E) The soils samples obtained by the Design-Builder for the supplemental subsurface investigation are the property of the owner. The Design-

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- Builder shall deliver all samples to the designated location upon completion.
- F) Location of groundwater table and determination of seepage conditions.
 - G) All drilling equipment shall be calibrated and the Design-Builder shall provide the efficiency of all hammers to be used for this project.
 - H) The Design-Builder shall use all information obtained from the testing program to prepare a subsurface profile in order to determine the adequacy of the site investigation program.

3.14.03.01.03 Laboratory Testing

After collecting soil samples, laboratory tests will be performed to quantify material properties, determine corrosion potential, and verify design assumptions. All engineering properties shall be based upon the type of structure being constructed. The type and number of tests required are primarily a function of the variability of the site, the purpose of the study, and the amount of risk and potential consequences of failure. Sufficient laboratory testing shall be performed so that the Design-Builder's Geotechnical Engineer and that the City is satisfied that the test results are representative of in-situ conditions. All standard soil and rock sample laboratory testing shall be performed in accordance with the appropriate AASHTO Test Designation. All laboratory testing shall be performed by laboratories with AMRL certification for each specific test performed. Laboratory testing conducted on undisturbed samples shall be performed no more than 7 days after sample retrieval.

3.14.03.01.04 Geotechnical Planning Reports

The Design-Builder shall prepare Geotechnical Planning Reports for individual Project elements or groups of Project elements based upon the design/construction priority and/or sequence of construction. The Geotechnical Planning Reports shall include a detailed method statement describing the general philosophy and methods of investigation, preliminary design and analysis and selection of the anticipated means of construction for the included Project elements. The method statement shall indicate how material and design details are chosen to match selected construction methods and construction details and the soil, rock, and groundwater environment for the site.

For each Geotechnical Planning Report, the Design-Builder shall include the following technical information, as a minimum:

- A) Description of geology and various ground types to be encountered along the alignment;
- B) A description of the geotechnical information that was collected and analyzed in developing the Design-Builder's Geotechnical Planning

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Report;

- C) Assessment of the engineering properties of all soil types, including the expected average and range of soil strengths and deformation properties and the preliminary design parameters for all soil and rock types;
- D) A narrative describing the interpretation of the pertinent geotechnical data used as a basis for preliminary selection, design, and installation of the proposed foundation elements;
- E) A description of the planned supplemental subsurface investigation (See “Design-Builders Subsurface Exploration”).
- F) The Geotechnical Planning Reports shall define the investigation, engineering and design approach that will be followed in order to develop the most technically, and environmentally acceptable and durable foundations, retaining structures, and geotechnical designs for the elements included in the Geotechnical Planning Report.

The Geotechnical Planning Reports shall be prepared, signed and sealed by a Professional Engineer licensed in the State of Maryland. This Geotechnical Planning Report shall be submitted to the City 30 days prior to mobilization. Prior to mobilization, the Design-Builder and the City shall meet to discuss the contents of the Geotechnical Planning Reports and present the City’s review written comments.

3.14.03.02 Geotechnical Design

3.14.03.02.01 Selection of Design Properties

The following process shall be followed in selecting material properties for design:

- select samples for performance testing,
- conduct laboratory testing,
- review the quality of the laboratory data,
- select material properties for design.

Subsurface soil properties shall be determined using one or more of the following methods:

- in-situ testing during the field exploration program, including consideration of any geophysical testing conducted,
- laboratory testing,
- and back analysis of design parameters based on site performance data.

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The selection of soil shear strength for design shall consider, at a minimum, the following:

- the rate of construction loading relative to the hydraulic conductivity of the soil, i.e., drained or undrained strengths;
- the effect of applied load direction on the measured shear strengths during testing;
- the effect of expected levels of deformation for the geotechnical structure; and
- the effect of the construction sequence.

Laboratory consolidated undrained (CU) and unconsolidated undrained (UU) testing shall be used to estimate the undrained shear strength, S_u , supplemented as needed with values determined from in-situ testing. Where collection of undisturbed samples for laboratory testing is difficult, values obtained from in-situ testing methods may be used after proper and acceptable correlation practices approved by the City. For relatively thick deposits of cohesive soil, profiles of S_u as a function of depth shall be obtained so that the deposit stress history and properties can be ascertained. Strength measurements from hand torvanes, pocket penetrometers, or unconfined compression tests shall not be used to evaluate undrained shear strength for design analyses. Correlations for S_u based on in-situ test measurements shall not be used for final design unless they have been calibrated to the specific soil profile under consideration. Correlations for S_u based on SPT tests will not be allowed.

Long-term effective stress strength parameters, c' and ϕ' , of clays shall be evaluated by slow consolidated drained direct shear box tests, consolidated drained (CD) triaxial tests, or consolidated undrained (CU) triaxial tests with pore pressure measurements. In laboratory tests, the rate of shearing shall be sufficiently slow to ensure substantially complete dissipation of excess pore pressure in the drained tests or, in undrained tests, complete equalization of pore pressure throughout the specimen. The selection of peak, fully softened, or residual strength for design analyses shall be based on a review of the expected or tolerable displacements of the soil mass. The use of a nonzero cohesion intercept (c') for long-term analyses in natural materials will not be allowed.

The drained friction angle of granular deposits shall be evaluated by correlation to the results of SPT testing, CPT testing, or other relevant in-situ tests. Laboratory shear strength tests on undisturbed samples, if feasible to obtain, or reconstituted disturbed samples, may also be used to determine the shear strength of granular soils. If SPT N values are used, unless otherwise specified for the design method or correlation being used, they shall be corrected for the effects of overburden pressure and for hammer efficiency. If SPT correlation is used to estimate the drained friction angle of granular deposits, Table 5 shall be used. Care shall also

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be exercised when using SPT blow counts to estimate soil shear strength if in soils with coarse gravel, cobbles, or boulders. Large gravels, cobbles, or boulders could cause the SPT blow counts to be unrealistically high.

TABLE 5 CORRELATION OF SPT N₁₆₀ VALUES TO DRAINED FRICTION ANGLE OF GRANULAR SOILS	
<4	25
4	27
10	30
30	35
50	38

Consolidation parameters C_c , C_r , C_α shall be determined from the results of one-dimensional consolidation tests. To assess the potential variability in the settlement estimate, the average, upper and lower bound values obtained from testing shall be considered. Where evaluation of elastic settlement is critical to the design of the foundation or selection of the foundation type, in-situ methods such as PMT or DMT for evaluating the modulus of the stratum shall be used.

The coefficient of consolidation, C_v , shall be determined from the results of one-dimensional consolidation tests. The variability in laboratory determination of C_v results shall be considered in the final selection of the value of C_v to be used for design. CPTu tests in which the pore pressure dissipation rate is measured may be used to validate the laboratory testing for the value of C_v .

Direct shear test results on cohesive soils will not be allowed.

The soil properties are vital in the analysis of the stability of structures. The Design-Builder shall validate the properties of each soil stratum with the testing program.

3.14.03.02.02 Design of Bridge Foundations

The criteria set forth herein shall pertain to the geotechnical and foundation design and shall conform to AASHTO LRFD Bridge Design Specifications, 6th Edition.

A deep foundation shall be used to carry the applied loads or displacements safely. Deep foundations shall also be used where scour, erosion, or unacceptable settlement might occur. See the Structures Performance Specification for design scour depths and/or requirements for scour analyses, if applicable. Refer to the Structures Performance Specification for scour analysis requirements.

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3.14.03.02.03 Shallow Foundations

Shallow foundations shall not be used as bridge foundations.

Shallow foundations shall include spread footings for strip footings and mats or raft foundations beneath an entire structure area.

Shallow foundations may be used where there is a suitable bearing stratum near the surface and where there are no highly compressible layers or soils susceptible to collapse or expansion below. Shallow foundations shall not be placed in existing or proposed fills or embankments. Foundation design shall accommodate potentially detrimental substances in soil or groundwater, such as chlorides and sulfates.

Shallow foundations shall be designed to meet the bearing capacity, settlement and stability requirements of AASHTO 6th Edition. Effects of adjacent foundations, variable groundwater conditions and surcharge loads shall be accommodated when evaluating foundation settlements and nominal bearing resistance.

3.14.03.02.03.1 Bearing Capacity

Shallow foundations shall be analyzed for a nominal bearing resistance to confirm that the underlying soil can resist the footing loads without bearing capacity failure. The desired bearing resistance shall be validated by the required site investigation and laboratory testing program. The Design-Builder will be required to confirm the nominal bearing resistance using an in-situ testing program.

Groundwater and its variation shall be documented in the calculation of the bearing value. An approved ground improvement technique may be accepted to improve the bearing value.

3.14.03.02.03.2 Settlement

Analyses shall be conducted to estimate the total and differential soil settlement induced by the foundation loads. Immediate settlements for granular soils and immediate, primary and secondary consolidation settlements for cohesive soils shall be accommodated. Shallow foundations shall be designed to keep estimated settlements within the allowable values specified in the Structures Performance Specification.

3.14.03.02.03.3 External Stability

Shallow foundations shall be analyzed and constructed for external stability, including sliding, overturning and global failure in accordance with AASHTO

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6th Edition. Passive earth pressure in front of the foundation shall not be used in the evaluation of sliding and overturning modes. Shallow foundations shall be designed such that the resultant load falls within the middle third of the foundation.

3.14.03.02.04 Deep Foundations

Deep foundations shall consist of steel pipe driven piles. Pre-cast pre-stressed concrete piles, auger cast in place, rammed aggregate piers, screw piles, or existing foundations will not be considered for use on this Project. When designing deep foundations, design and construction shall include accommodations to minimize the level of construction noise and the radius of influence from construction vibrations.

Piles shall be designed in accordance with the requirements of AASHTO 6th Edition. See the Structures Performance Specification for material requirements and structural design of foundation elements. The minimum length for steel driven piles shall be 12-feet into natural soils.

The effects of corrosion and deterioration from environmental conditions shall be considered in the determination of the pile cross-section required.

The center-to-center spacing of piles shall not be less than 2.5 times the pile diameter or 30 inches, whichever is greater. Piles shall be designed and constructed such that neither tension loads nor load reversals occur under any loading conditions.

Only open-ended steel pipe piles shall be used for the Fleet Street structure. The recommended pipe piles shall achieve the required factored geotechnical resistance from skin resistance only. Piles shall not extend below EL – 40 feet.

3.14.03.02.04.1 Axial Capacity

Deep foundations shall be analyzed for axial compression, using static analysis methods in accordance with AASHTO specifications and FHWA manuals. A resistance factor with the level of construction control shall be applied to the nominal resistance of driven piles in accordance with AASHTO 6th Edition. The nominal resistance shall be verified by field tests including static load tests.

3.14.03.02.04.2 Group Spacing and Performance

The design of deep foundations shall consider soil properties, type of foundation and group effects due to spacing of foundation elements. See AASHTO 6th Edition.

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3.14.03.02.04.3 Settlement

The design of deep foundations shall accommodate the total and differential settlement caused by the structure loads. Settlement of individual deep foundation elements and settlement of pile groups shall be estimated. The foundation shall be designed and constructed to keep the settlement within the allowable values based on structure tolerance to total and differential movements.

3.14.03.02.04.4 Downdrag (Negative Skin Friction)

The design of deep foundations shall accommodate the effect of negative skin friction from existing ongoing ground settlement, construction dewatering, variable groundwater conditions, placement of fill or embankments, or pile installation. Downdrag loads shall be determined by accounting for the load transfer distribution along the deep foundation element as well as the group layout. The magnitude of the downdrag load shall be applied as prescribed in AASHTO 6th Edition. Battered piles may not be used in areas where downdrag may occur.

To reduce downdrag forces, corrugated metal sleeves or bituminous coatings may be utilized after approval by the City. The use of friction-reducing rings welded on steel pipe piles to reduce downdrag will not be allowed. The driving of piles shall commence after the completion of any anticipated settlement and after approval by the City.

3.14.03.02.04.5 Lateral Load Capacity

Deep foundations shall be designed to adequately resist the lateral loads transferred to them from the structure without exceeding the allowable deformation of the structure or overstressing the foundation elements. See AASHTO Specification for allowable lateral deformations. The lateral load resistance of the individual and group of deep foundation elements shall be analyzed and included in the design. The analysis shall accommodate nonlinear soil pressure-displacement relationships, soil/structure interaction, group action, groundwater, and cyclic and static and dynamic load conditions. The deep foundation performance evaluation shall include the determination of vertical and horizontal movements, rotation, axial load, shear, and bending moment for the foundation elements and the bending stresses in the batter piles due to the weight of settling soils. Equivalent points of fixity shall be determined using the equivalent stiffness method accounting for the soil-structure p-y stiffness and the equivalent fixed end method.

Where the lateral resistance of the soil surrounding the piles is inadequate to resist the applied loads, batter piles shall be provided. Batter piles shall not be flatter than one horizontal to four vertical. Where battered piles are proposed,

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the design shall account for the potential of encroachment on property outside the right-of-way and interfering with underground and aboveground structures, facilities, and utilities. The use of battered drilled shafts will not be considered. Deadmen and ground anchors will be allowed for lateral load resistance where such features can be accommodated within the Right-of-Way without encumbering the space for utilities and/or stormwater management facilities.

The lateral deflection shall be based upon structure tolerance to total and differential movements.

3.14.03.03 Design of Retaining Walls and Retaining Wall Foundations in Fill

See the Structures Performance Specification for design criteria of retaining walls. Mechanically Stabilized Earth (MSE) retaining walls shall have a minimum design life of 75 years.

3.14.03.03.01 Vertical Loads

The loads used in the design of permanent Work shall be in accordance with the requirements of the relevant design codes and Standards, except where herein modified or augmented. Estimation of live loads due to pedestrian, or highway traffic shall be in accordance with the requirements of AASHTO 6th Edition.

3.14.03.03.02 Lateral Earth Pressure

Lateral earth pressures shall be estimated in accordance with AASHTO 6th Edition. The design of the retaining structures shall be based on the maximum lateral pressures that will develop behind the structures.

Loads due to soils or backfill shall be derived using the maximum values of the saturated densities. Only where it can be clearly demonstrated that the fill is well drained, and will remain well drained in the future, shall any reduction in the degree of saturation may be allowed. The submerged densities shall be used for soil unless the location is above the standing water table.

Hydrostatic pressure induced by the groundwater table, when present, shall be included in the lateral pressures. Additional hydrostatic pressures and variations in groundwater conditions due to drainage, flooding and rapid drawdown conditions shall be accommodated in the design of retaining structures.

3.14.03.03.03 Shallow Foundations

See Shallow Foundations for Bridges, above. Shallow foundations for retaining walls shall be designed to maintain wall settlements (total and differential), nominal bearing resistance and other stability criteria within the applicable

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tolerances specified in FHWA “Mechanically Stabilized Earth Walls and Reinforced Slopes, Design and Construction Guidelines”.

3.14.03.03 External and Internal Stability

See Shallow Foundations for Bridges, above, and AASHTO 6th Edition for design.

The vertical spacing of primary reinforcement shall be a maximum of 32 inches and the vertical spacing of secondary reinforcement shall be a maximum of 12 inches.

3.14.03.04 Deep Foundations

Deep foundations for retaining walls shall be designed in accordance with “Deep Foundations for Bridges”, above.

3.14.03.04 Interim Design Memoranda

The Design-Builder shall prepare Interim Design Memoranda for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports. The Interim Design Memoranda shall include the following, at a minimum:

- A) Description of the Project elements included in the Memorandum;
- B) Locations of borings, geophysical testing and other in-situ testing;
- C) Field testing procedures;
- D) Final typed boring logs updated with laboratory testing results;
- E) Electronic copy of the gINT data of subsurface investigation data;
- F) Results of any in-situ testing and geophysical testing;
- G) A description of subsurface conditions, including groundwater, and subsurface profiles;
- H) Results of laboratory tests;
- I) Values assigned to soil parameters for design;
- J) Descriptions of pertinent geotechnical analyses and designs;
- K) Conclusions and recommendations for the specific Project elements;
- L) Construction considerations such as blasting and vibration monitoring;

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- M) Level of construction control for deep foundations from AASHTO 6th Edition, and
- N) Instrumentation and monitoring requirements;

3.14.04 Construction

The Design-Builder is responsible for any and all damage (including, but not limited to settlement and vibrations) to property, structures, or utilities, both inside and outside of the Right-of-Way, caused by the Work on the Project, and shall appropriately mitigate for these damages.

3.14.04.01 Temporary Support of Excavation

Temporary support of excavation shall be designed in accordance with all applicable OSHA standards and AASHTO requirements including, but not limited to, the appropriate lateral earth pressures, hydrostatic pressure, surcharges and construction loading. Detailed design of all components shall be completed by the Design-Builder, including but not limited to, temporary decking, sheeting, bracing and tie-backs.

3.14.04.02 Construction of Bridge and Retaining Wall Foundations

Ground consolidation, existing structure settlements, and disturbance to local residents due to the installation of deep foundations shall be maintained within limits acceptable to the City.

3.14.04.02.01 Shallow Foundations

After excavation, the Design-Builder's Geotechnical Engineer and the City shall verify that the exposed subgrade is suitable for the calculated toe-pressures exerted by the proposed abutment or fill-type retaining wall. The City shall require in-situ testing to verify the required bearing values.

3.14.04.02.02 Deep Foundation Testing and Monitoring

Field-testing shall be performed for deep foundations to evaluate foundation resistance and integrity, to verify design assumptions, to determine foundation installation characteristics, to evaluate the pile driving system performance, and to establish foundation depths. The deep foundation testing and monitoring shall include all necessary test piles or shafts, dynamic testing, static load testing, non-destructive integrity testing, and quality control testing.

At least 30 working days prior to driving piles, the Design-Builder shall present the results of wave equation analysis of piles (WEAP) on the hammer-pile-soil systems proposed for the Project. The WEAP analysis shall be performed for all hammers proposed for use and for each Project element with driven pile

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foundations. The City may provide written comments to proposed hammers based upon the results of the WEAP analysis.

A High Strain Dynamic Test with Signal Matching shall be used to determine if each hammer is delivering the energy required by the WEAP analysis. Each hammer used to drive test piles and production piles shall deliver a minimum of 45 percent of the rated hammer energy. Foundation testing and monitoring shall be performed on both test and production deep foundations, and shall be located so that they will address all conditions of foundation type, capacity and soil conditions encountered. All High Strain Dynamic Test equipment, testing, recording and reporting shall be performed in accordance with ASTM D-4945 Standard Test Method for High Strain Dynamic Testing of Piles. Signal Matching (CAPWAP) shall be utilized to determine the as-built pile capacity from the High Strain Dynamic Test data. As a minimum, the first pile driven for each substructure unit shall be a High Strain Dynamic test pile. High Strain testing shall be performed during both initial drive and restrike. Test piles for the Fleet Street structure shall indicate a Signal Matching (CAPWAP) skin resistance value that is greater than or equal to the required nominal resistance. Additional piles may be tested using High Strain Dynamic testing depending upon the Design-Builder's selected level of construction control and the corresponding resistance factor, in accordance with AASHTO 6th Edition.

The Design-Builder shall prepare and submit a detailed description of the proposed deep foundation testing and monitoring programs. The description shall include detailed specifications and plans presenting the foundation type, test type, purpose, number, location, and procedures for each test, and the recording and reporting procedures. The number, location, type, procedures, and extent of testing of the deep foundations shall be subject to review by the City. Testing and monitoring of deep foundations shall be in accordance with the applicable ASTM and AASHTO specifications.

Static load tests performed on piles shall be in accordance with the ASTM D-1143 or AASHTO. The Design-Builder may also submit for review the use of either the Osterberg Load Cell or the Statnamic Testing arrangement. The number and locations of static deep foundation load tests shall be determined by the Design-Builder, but shall be performed at locations representative of the different subsurface conditions, foundation types, foundation capacities, and foundation depths. At least 30 working days prior to driving load-test piles, the Design-Builder shall submit proposed configuration for pile load tests, including the structural calculations for the reaction beam, piles, and connections; calibration results for the loading jack, load cell, and gages before the tests; and other pertinent details.

All foundation field-testing results shall be compared with the factored resistance and required resistance factor. Where field testing results reflect a lower than

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required nominal resistance or factored resistance, the Design-Builder shall prepare a Remedial Action Plan for review by the City.

3.14.04.02.03 Pile Driving Records

The Design-Builder shall create and maintain a hand-written record of pile driving. For the entire length of each pile, the Design-Builder shall record blows and estimated delivered energy (hydraulic hammers) or stroke (diesel hammers) for each foot of penetration. The Design-Builder shall record the start and stop times to the nearest minute and record any stoppages in field pile driving.

Prior to beginning the placement of reinforcing steel around the piles, and/or prior to beginning any backfilling around the piles, the Design-Builder shall present for review and comment the complete driving records including tolerance measurements for all piles in each pile group and the High Strain Dynamic Testing with Signal Matching results.

3.14.04.02.04 The Design-Builder's Pile Inspector and Geotechnical Engineer

The Design-Builder shall assign one inspector for each pile-driving rig in use. At least 30 working days prior to pile driving, the Design-Builder shall submit the required qualifications for each pile driving inspector who has the following minimum qualifications:

- A) At least one year of pile driving inspection experience while working under the supervision of a licensed civil engineer specializing in foundations and geotechnical engineering; or
- B) At least 2 months of pile driving inspection experience and successful completion of FHWA-NHI Driven Pile Foundation Inspection course (#132069)

The Geotechnical Engineer shall either be on-site during the driving of the first pile at each support (monitored with High Strain Dynamic Testing equipment) and until sufficient data is gathered to establish appropriate driving criteria for each support; or be in direct telephone contact with the High Strain Dynamic Testing operator and the inspector observing the pile driving. The Geotechnical Engineer shall be notified immediately if any unusual or otherwise unanticipated pile driving conditions are encountered, including if the piles are driven out of the tolerances specified by City of Baltimore Department of Public Works Specifications for Materials, Highways, Bridges, Utilities, and Incidental Structures dated 2006.

Based upon the installation and testing data, the Design-Builder's Geotechnical Engineer shall validate that the piles were adequately driven. If not adequately driven, the Design-Builder's Responsible Engineer shall recommend an

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appropriate resolution for review by the City.

3.14.04.03 Mechanically Stabilized Earth Retaining Wall Construction

Maryland Size No 57 stone shall be used within the reinforced mass for all preapproved MSE retaining walls without field verification testing with a Certificate of Compliance from the Design-Builders supplier. Maryland Crusher Run (CR-6) may also be used within the reinforced mass for all preapproved MSE retaining walls without field verification testing with a Certificate of Compliance from the Design-Builders supplier and with a quality control compaction plan.

Prior to initiating construction, the Design-Builder shall submit a quality control plan for field verification testing of grain size distribution, Atterberg Limits and the moisture-density relationship for determination of compaction requirements. Field verification testing should be performed at intervals not to exceed 1,000 cubic yards of material placed within the reinforced mass.

Material shall be compacted to 95% of the maximum density as determined by AASHTO T-180. For material with more than 30% retaining on the 19-mm sieve, compaction shall consist of at least four (4) passes by a heavy roller. All material shall be placed at a moisture content not more than 2 percentage points less than or equal to the optimum moisture content. Maximum lift thickness shall not exceed 6-inches.

3.14.05 Submittals

All submittals shall be subject to review and approval by the City.

3.14.05.01 Geotechnical Instrumentation for Construction

The Design-Builder shall prepare and submit instrumentation monitoring plans to either monitor facilities that may be affected by construction activities or to monitor field performance of specific construction elements in accordance with the following criteria and requirements. The Design-Builder's Instrumentation Engineer shall have a minimum of 5 years of experience in planning instrumentation programs, monitoring, analyzing instrumentation data and providing control and threshold values.

- A) The extent of the monitoring program will depend on the size and type of the facilities. The instrumentation program shall be implemented to monitor potential settlement, stability of fill of surrounding structures;
- B) The type and distribution of instrumentation shall demonstrate an understanding of the need, purpose and advantages of using each

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proposed instrument;

- C) The plan shall include consideration of environmental effects such as temperature, rain, sun, wind, corrodibility, and electromagnetic wave interference;
- D) Responsibilities for the instrumentation plan, procurement, installation, recording, maintenance and protection shall be the Design-Builders;
- E) The instrumentation plan will provide construction-related control information and accommodate the collection of long-term performance data;
- F) Test installations may be performed to demonstrate the compliance and acceptability of instrumentation in relation to the Contract requirements;
- G) If instruments fail or are damaged they shall be replaced at no cost to the City and the Design-Builders Geotechnical Engineer may require that all work cease in the area to be monitored by the instruments, with the concurrence of the City;
- H) Monitoring shall be initiated a minimum of 15 days prior to construction of the features being monitored to establish baseline readings; and,
- I) The results of the vibration measurements shall be used to develop attenuation curves for predicting vibrations at varying distances from the source.
- J) Qualifications of instrumentation personnel should be listed.
- K) The Design-Builder shall provide calibration of all data acquisition equipment used to collect the required instrumentation data.

3.14.05.01.01 Monitoring Facilities for Effects of Construction Activities

The Design-Builder shall prepare instrumentation plans, where appropriate, to monitor existing facilities, temporary construction support structures and in-progress construction of permanent facilities for effects of construction activities such as excavation by blasting, pile driving and nearby construction equipment traffic. Monitoring may include vibrations, ground accelerations, tilt or rotation, and vertical and lateral movement during and after construction. The Design-Builder shall prepare a report detailing the proposed program of instrumentation and monitoring, establishing threshold values of monitored parameters, and describing the response plans that will be implemented when threshold parameters

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are exceeded. After the City's review and comment on the instrumentation plan, threshold values and response plan, the Design-Builder shall provide, install and monitor the instrumentation during and after construction and interpret the data. Construction instrumentation monitoring reports shall be submitted to the City prior to opening the instrumented work for subsequent construction. Corrective actions shall be taken where the instrumentation data so warrant.

The instrumentation plan shall provide that potentially affected facilities are protected against damage due to the construction of the Work. Limiting values of movement (horizontal and vertical), vibration and acceleration for each facility within the zone of influence of the Work shall be established by the Design-Builder. To establish these limiting values, the designer shall consider the nature of buildings and facilities within the sphere of influence of the construction activities, including their use, foundation systems, structural design and current condition. Records of facilities, where available, shall be examined during the design stage and, where no record exists, assessments shall be made and clearly stated. These assessments shall be subject to verification at the commencement of the construction phase prior to the adjacent construction activity.

In addition to the instrumentation plan, the Design-Builder shall conduct Preconstruction and Postconstruction surveys for nearby structures and facilities that may be affected by construction activities. The minimum distance for Preconstruction and Postconstruction surveys is 500 feet from existing facilities, temporary construction support structures and construction of permanent facilities to construction activities such as excavation by blasting, pile driving, and nearby construction equipment traffic. Blasting shall not be allowed on this project.

3.14.05.01.02 Instrumentation for Monitoring Field Performance of Construction Elements

The Design-Builder shall prepare instrumentation plans, where appropriate, to monitor field performance of specific construction elements such as settlement, lateral earth movement, rotation of structural elements and changes in groundwater. The instrumentation and monitoring program shall include appropriate types and quantities of monitoring instruments capable of measuring horizontal and vertical movements, tilt/rotation of structural elements, soil pore pressures and vibrations, as applicable.

Instrumentation that may be used in monitoring programs to control and assist design and construction include, but are not limited to:

- A) Piezometers and observation wells;
- B) Inclinerometers;
- C) Survey stations on structures and at ground level locations;

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- D) Tiltmeters;
- E) Deep and shallow settlement points and extensometers;
- F) Strain and load-measuring devices; and
- G) Seismographs;
- H) Optical survey.

The Design-Builder shall not release monitored elements for subsequent construction until completed monitoring reports have been submitted.

3.14.05.02 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda prior to releasing constructed elements for subsequent work. The Final Geotechnical Reports shall include the following, at a minimum:

- A. The corresponding Geotechnical Planning Report;
- B. The corresponding Interim Design Memorandum;
- C. Locations and results of borings, rock coring, geophysical testing and other in-situ testing;
- D. A detailed description of geological and subsurface conditions for each Project element (including a description of site stratigraphy);
- E. Field investigation procedures;
- F. A description of groundwater conditions;
- G. Results of laboratory tests;
- H. Values assigned to all applicable soil parameters for design;
- I. All pertinent data and complete discussions of all geotechnical analyses and design;
- J. All relevant design calculations and computer program results checked and initialed by a Professional Engineer licensed in the State of Maryland;
- K. Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;
- L. Groundwater problems encountered, means of dewatering and/or other solutions;
- M. Designs for support of excavation;
- N. Results of instrumentation and monitoring and post-construction monitoring

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summaries;

- O. Potential settlement problems; and
- P. Potential stability problems and analysis results;

For each of the following Project elements, the Design-Builder shall submit the following items with the Final Geotechnical Reports.

Q. Foundations

- 1) Individual pile and pile group design calculations including axial and lateral resistance for the pile type, size, and length to achieve the required resistances (including any effects of liquefaction and downdrag); estimated pile and pile group settlement; and
- 2) Shallow foundations calculations including allowable bearing capacity, estimated differential and total settlements, and rotations; and
- 3) Calculations of embankment settlement (magnitude and time rate) and downdrag resistance on the piles, depths to zero or negligible settlement, and the proposed means to mitigate the downdrag.

R. Retaining Walls

- 1) Wall design calculations including the results of the global and internal stability analyses; analyses of total, differential, and secondary settlements; and, calculations for analyses of sliding, overturning, and bearing resistance for live and seismic loadings;

V. Instrumentation

- 1) All items included in Section 3.14.05.01 “Geotechnical Instrumentation for Construction” above.

TC SECTION 3.15 UTILITY DESIGN AND RELOCATION CRITERIA

3.15.01 Utility Statement

3.15.01.01 - General

The Design-Build Team's attention is called to the requirements of Section GP-5.05, GP-7.13 and GP-7.17.

3.15.01.02 – Utility Relocations by Others

The DBT is responsible for coordinating with, but is not responsible for the utility relocations by others. BGE Electric Division, City police and fire alarm telecommunication (P&FAT), Comcast, 24/7 and other telecomm companies are responsible for their systems' cable installation in the City Conduit ductbank system. BGE Gas Division, Verizon and Veolia Energy are responsible for their systems' construction.

3.15.01.03 – Utility Relocations/Extension Design and Construction by Others

The DBT is responsible for coordinating with, but is not responsible for the utility relocations/extensions design and construction by others. BGE Electric Division, City P&FAT, Comcast, 24/7 and other telecomm companies are responsible for their cable systems design and cable installation in the City Conduit ductbank system. BGE Gas Division, Verizon and Veolia Energy are responsible for their systems' design and construction.

3.15.01.04 - Utilities Within Project Limits

The Design-Build Team (DBT) is alerted to the presence of overhead and underground utilities including but not limited to City water mains, sanitary sewers, storm drains, street lights, traffic signals, (P&FAT), conduit ductbanks and electrical manholes (EMH), Baltimore Gas and Electric Co. (BGE) gas mains and electric and fiber optic cables buried in City conduit ductbanks and EMH, and aerial on poles, Verizon of Maryland (VZ) in separate buried VZ conduit ductbank and telephone manholes (TMH) and aerial on poles, Comcast, 24/7 and other telecommunications buried in City conduit ductbank and EMH and aerial on poles, Veolia Energy North America (Veolia) hot/chilled water and steam pipelines, and all buried and aerial house utility service connections that are located within the limits of the City of Baltimore (City) right of way and within the limits of the construction project. It is the responsibility of the DBT to avoid, protect, coordinate, and relocate these utilities as necessary to maintain service, safety and project schedule with minimal disruption to the traveling public or utility customers.

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BALTIMORE CITY CONTRACT NO. TR12317

3.15.01.05 - Contact Information:

Mr. RJ Marshall
BGE Electric Distribution
Project Management Department
2900 Lord Baltimore Drive
Baltimore, MD 21244
Phone 410-470-7832

Mr. Thomas Mitchell
BGE Gas Distribution
2900 Lord Baltimore Drive
Baltimore, MD 21244
Phone 410-470-7863

Mr. Eric Barger
BGE Electric Street Lights
7063 North Front Street
Baltimore, MD 21202
Phone 410-470-8404

Mr. Bill Bloemier
Verizon of Maryland
99 Shawan Road, Room 212
Cockeysville, MD 21030
Phone 410-393-6370

Mr. James Moore
Comcast
Construction Supervisor
21 West Aylesbury Road
Timonium, MD 21093
Phone (410) 649-2723

Mr. Opinder Singh
Chief, Water Engineering
City of Baltimore
Department of Public Works
Abel Wolman Municipal Bldg.
200 North Holliday Street
Baltimore, MD 21202
Phone 410-396-1483

Mr. Anthony Johnson
Acting Chief, Conduits
City of Baltimore
Department of Transportation
Engineering and Construction Division
417 East Fayette St., 7th Floor
Baltimore, MD 21202
Phone 410-396-6835

Mr. Wazir Qadri
Chief, Wastewater Engineering
City of Baltimore
Department of Public Works
Abel Wolman Municipal Bldg.
200 North Holliday Street
Baltimore, MD 21202
Phone 410-396-3440

Ms. Pamela Clark
Veolia Energy North America
1400 Ridgely Street
Baltimore, MD 21230
Phone 410-649-2464

Mr. Azzam Ahmad
Chief, Storm Water Engineering
City of Baltimore
Department of Public Works
Abel Wolman Municipal Bldg.
200 North Holliday Street
Baltimore, MD 21202
(410) 396-4700

3.15.01.06 - Utilities Coordinator

The DBT shall designate a Utility Coordinator. The DBT is responsible to coordinate with these utilities on the overall project design, schedule and construction. As it is impossible to determine how a DBT will perform certain operations or how much space will be needed to perform those operations, the relocations will be based on the utility companies' safety and clearance requirements. It may be necessary for the DBT to utilize non-typical methods in some cases to avoid impacting utility facilities. Associated costs will be incidental to the overall contract lump sum.

3.15.01.07 - Preconstruction Utility Conference

The DBT shall conduct and facilitate a utility coordination meeting as soon as possible after notification as the successful proposer and issuance of the Notice to Proceed. Attendees shall include:

- DBT Design-Build Manager and/or Construction Manager
- DBT Utility Coordinator
- The City Design Project Engineer
- The City Construction Project Engineer
- The City Utility Engineer
- A responsible officer of any necessitated subcontractors.
- Utility owners and/or their representatives

At a minimum the following shall be discussed at this meeting:

- Status of utility relocations
- Establishment of a schedule of utility relocations
- Discuss DBT planned design and construction schedule
- How utility relocation schedule will be facilitated within the DBT's planned design and construction schedule
- Plan for how issues and conflicts will be handled as they occur
- Set up monthly utility coordination meetings

The DBT shall prepare all meeting minutes and distribute them to attendees for review and comment.

3.15.01.08 - Utility Coordination

The DBT shall incorporate and make provisions in the design for all existing and proposed utilities including relocations. The DBT shall establish and maintain ongoing

coordination with utility owners after initial contact has been made by City to fulfill the following requirements:

- a. Obtain plans from the utility companies.
- b. Assure adequate protection of their utilities.
- c. Maintain utility service at all times during construction of the project.
- d. Identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts.
- e. Incorporate and accommodate utility relocations in the schedule and sequence of construction.
- f. Conduct alternative studies to avoid utility relocation.
- g. All costs associated with additional utility relocations caused by changes to the design will be incurred by the DBT and not the City. Additional utility relocations will be coordinated with the utility company and City Utility Engineer.
- h. Incorporate utility relocations in the schedule and sequence of construction.
- i. Provide the construction drawings associated with any utility service connections to existing and proposed Traffic Control Devices. The DBT shall be responsible for all conduits, manholes, cabling, meter cans, and disconnect switches as required by the utility to obtain the electrical utility connection. Monthly energy use charges and the final connection fees will be the responsibility of City.

3.15.01.09 - Accommodations for Adjacent and Future Projects

Design and construction for all utilities by this contract shall accommodate future and adjacent projects including the Red Line and future extension of Central Avenue south of Lancaster Street to the new Harbor East development.

3.15.01.10 – Utility Relocations/Extension Design and Construction by DBT

3.15.01.10.01 – City of Baltimore. Department of Public Works (DPW), Water

The DBT will be responsible to design and construct new and replacement water facilities for the City of Baltimore.

The DBT is referred to the Special Provision Category 876 Water Distribution found within this RFP for the construction specifications and standards pertaining to the water work for use on this contract.

The DBT shall incorporate and make provisions in the design for all existing and proposed water utilities including relocations. This includes scheduling meetings with the City and maintaining ongoing coordination during the entirety of this contract. The DBT shall identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts. Alternative studies to avoid water utility relocations should also be conducted.

The DBT shall provide water relocation design and specifications to each of the utility owners for review and approval.

The DBT shall incorporate and accommodate water relocations in the schedule and sequence of construction.

The DBT shall be responsible for the cost of any and all temporary water relocations, including the cost of temporary easements to accommodate its own construction operations and/or methods and all work required to be performed by the DPW Water Engineering Office.

Preliminary 30% water plans are provided in these Contract Documents to provide the DBT with the City's preferred horizontal alignment for new and relocated water mains and connections and preliminary base information to assist the DBT with its Price Proposal and as a basis for their detailed design. The DBT's detailed designs shall include water main plans and profiles and comply with the City DPW Water Engineering Office requirements. It is acknowledged that should field conditions change (i.e. test pit results, utility conflicts), deviations from the Preliminary horizontal alignments will be adjusted accordingly in conformance to respective utility clearances and final City approvals.

3.15.01.10.02 – City of Baltimore. Department of Public Works (DPW), Sanitary Sewer

The DBT shall review all sanitary sewer as-built plans from the DPW Waste Water Engineering Office to ensure that all proposed work under this contract will not impact existing sanitary sewer facilities. The DBT shall ensure clearance distances from all existing and proposed utility lines are in compliance with OSHA, MOSH, Baltimore City Standards and Specifications, and the utility owner. Relocations and or adjustments may be necessary to obtain the clearance that is required.

The DBT shall coordinate any ongoing work or sanitary sewer rehabilitation improvements associated with Baltimore City DPW Contract No. 912. This includes but is not limited to the following improvements in the general vicinity of the project area associated with this contract:

- Manhole rehabilitation at Lombard Street and Central Avenue
- Manhole rehabilitation at Central Avenue
- Pipe lining and non-structural grouting at Bank Street and Central Avenue
- Pipe lining and non-structural grouting at Aliceanna Street and Central Avenue

3.15.01.10.03 – City of Baltimore. Department of Public Works (DPW), Storm Drains

See Section TC-3.17 Drainage, Stormwater Management, and Erosion & Sediment Control Performance Specification.

3.15.01.10.04 – City of Baltimore. Department of Transportation (DOT), Traffic Facilities

See Section TC-3.12 Traffic Performance Specification.

3.15.01.10.05 – City of Baltimore. Department of Transportation (DOT), Street Lights

See Section TC-3.12 Traffic Performance Specification.

3.15.01.10.06 – City of Baltimore. Department of Transportation (DOT), Conduit

The DBT shall coordinate the design and construction of any and all utility service connections to existing and proposed City Conduit system with the utility companies. The DBT shall be responsible for all conduit ductbanks and electrical manholes (EMHs) and appurtenances as required by the City.

The DBT shall review all existing and proposed City Conduit system structures and ensure clearance distances from all existing and proposed utility lines are in compliance with OSHA, MOSH and the utility owner. Relocations and or adjustments may be necessary to obtain the clearance that is required.

Preliminary 30% conduit horizontal alignment plans are provided in these Contract Documents to provide the DBT with the City's preferred alignment, conduit manhole locations, connections and preliminary base information to assist the DBT with its Price Proposal and as a basis for their detailed design. The DBT's detailed designs shall also include conduit profiles, manhole blowdowns and construction and comply with the City DOT Conduit Division's Submission Checklist (a Draft copy is included in TC Section

3.15 A). It is acknowledged that should field conditions change (eg. test hole results, utility conflicts), deviations from the Preliminary horizontal alignments will be adjusted accordingly in conformance to respective utility clearances and final City approvals.

3.15.01.11 – Veolia Energy North America (Veolia) Facilities

The DBT shall review all Veolia hot/chilled water and steam pipeline as-built plans from the utility owner to ensure that all proposed work under this contract will not impact existing Veolia facilities. The DBT shall ensure clearance distances from all existing and proposed utility lines are in compliance with the utility owner. Relocations and or adjustments may be necessary to obtain the clearance that is required.

It is the responsibility of the DBT to avoid, protect, and coordinate the relocation of Veolia utilities as necessary to maintain service 24 hours per day, 7 days per week, while providing safety and maintaining the project schedule without disruption to the utility customer.

The DBT is responsible for maintaining Veolia’s current supply, at a minimum, of water, gas, and electric utilities at all times (24 hours per day, 7 days per week) for 1001 Fleet Street. Should any existing water, gas, or electric utility that serves 1001 Fleet Street need to be replaced/relocated, the DBT must provide temporary utility services and maintain service 24 hours per day, 7 days per week without disruption.

The DBT is responsible for coordinating with, but is not responsible for the utility relocations/extensions design and construction of Veolia facilities. Veolia is responsible for their systems system design and construction.

3.15.01.12 - Permitting

The DBT shall obtain all required utility permits from City and all other necessary Governmental Approvals with regard to utility work to be done by the DBT including service connections. City will require utility relocation plans that have been approved by the utility owner with the permit package. If the DBT has reasonable cause to believe that a utility owner performing construction work on the Site does not have necessary approvals, or is in violation of the approvals, the DBT shall notify City immediately upon discovery.

3.15.01.13 - Existing Utility Services

Not all existing utility service connections are shown on the plans, therefore, the DBT must communicate with the utility companies and use all means necessary to locate existing services and protect as necessary.

Should a service require relocation, the DBT is responsible for the coordination and work required to relocate, reconnect and remove the existing service. The cost of this work will be incidental to the cost of respective D/B Item impacting the service. Utility services must be maintained at all times during construction, unless written permission is obtained from the utility owner and/or City.

3.15.01.14- Existing Utility Locations

The DBT is responsible to follow the MISS UTILITY process prior to any excavation or work associated with this project. Utility locations shown on the plans are for the convenience of the DBT and shall not be considered accurate or complete. The cost for this coordination and time consumption is considered incidental to all work performed.

To file electronically, visit www.missutility.net. This site has instructions for MISS UTILITY requests, including Registration and Processing a Locate Request. When processing online, you shall complete the LOCATE REQUEST FORM. On this form, toward the bottom is Section – EXCAVATION INFORMATION. Under this Section, in the blank space to the right of “Work Being Done For” type – City of Baltimore DOT, TR-12317. This is so MISS UTILITY knows for whom you are working. Similarly, when notifying MISS UTILITY, via 1 (800) 257-7777, you must state, “City of Baltimore DOT, TR-12317.” The Contractor must also notify the City to locate and mark all City owned facilities – Street Lights, Sign Lights, Traffic Signals, Fiber Optic Cables, Communication Cables and Intelligent Transportation System (ITS) devices.

3.15.01.15 - Surface Utility Frames

The DBT shall make all adjustments to surface utility frame and covers located in pavement and concrete, not limited to EMH, TMH, hot/chilled water and steam manholes, water valves, water meters, gas valves and gas meters. The DBT must coordinate with the utility owner on the specifications and schedule. This work is incidental to the respective D/B Item.

3.15.01.16 - Utilities: Guidelines and Technical Requirements

3.15.01.16.01 - General

All utilities within the Project area, designed and/or constructed by the DBT, shall be placed in accordance with applicable Governmental Rules, including City’s utility regulations and policies, the applicable Utility Standards, Maryland Tariff, and other requirements specified in the Contract Documents.

3.15.02 Installation of BGE Gas and Electric Facilities

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BGE Electric Division will furnish and install cable in the City Conduit Ductbank system, provide service connections and energize their electrical system.

BGE Gas Division will furnish and install gas mains, provide connections and activate their system.

3.15.03 Installation of Verizon Facilities

Verizon will furnish and install the separate Verizon Telephone Conduit Ductbank system and cables, provide service connections and activate their system.

3.15.04 Installation of Telecommunication Facilities

Comcast will furnish and install cable in the City Conduit Ductbank system, provide service connections and activate their system.

BGE fiber optic, 24/7 and other telecommunication companies will furnish and install cable in the City Conduit Ductbank system, provide service connections and activate their systems.

3.15.05 Installation of City DOT Conduit Facilities

3.15.05.01 Description

This work will be specified by City DOT Conduit Division and will consist of designing, furnishing and installing all relocations, replacements, upgrades and/or new installations of existing or proposed conduit ductbanks, electrical manholes (EMHs) and appurtenances owned by the City within the project limits, as shown on the Contract Drawings and City Detail Drawings. The Design Build Team (DBT) shall submit to City DOT Conduit Division for review all locations within the project limits within close proximity of any City DOT conduit facility.

3.15.05.02 Coordination with Other Work

The DBT shall coordinate the work on and location of the City DOT conduit facilities to avoid conflicts with work by others, including the DBT roadway and drainage design.

3.15.05.03 Adherence to City Design Requirements

The City DOT conduit facilities design shall be in accordance with the requirements of the City of Baltimore, Department of Public Works Specifications for Materials, Highways, Bridges, Utilities and Incidental Structures, dated 2006, and all amendments to date, Section 26 07 01.04 – Electrical Conduit Systems, Parts 1, 2 and 3, and SHA

Standard Specifications for Construction and Materials, dated 2008, and all amendments to date, except as modified hereafter, and in accordance with City DOT Conduit design policies and procedures.

The City DOT Conduit policies and procedures can be obtained by contacting:

Mr. Anthony Johnson
Acting Chief, Conduits
City of Baltimore
Department of Transportation
Engineering and Construction Division
417 East Fayette St., 7th Floor
Baltimore, MD 21202
Phone 410-396-6835
Anthony.Johnson@baltimorecity.gov

3.15.05.04 Design Submissions

3.15.05.04.01 Semi-Final Design

Per City Conduit Design Submittal Checklist.

3.15.05.04.02 Final Design

Per City Conduit Design Submittal Checklist.

3.15.05.05 Materials

3.15.05.05.01 - General

The City DOT conduit facilities materials for design and construction shall be in accordance with the City of Baltimore, Department of Public Works Specifications for Materials, Highways, Bridges, Utilities and Incidental Structures, dated 2006, and all amendments to date, Section 26 07 01.04 – Electrical Conduit Systems, Parts 1, 2 and 3, and the MD SHA Standard Specifications for Construction and Materials, dated 2008, and all amendments to date, except as modified hereafter.

3.15.05.05.02 – City Conduit Ductbanks

Refer to Special Provisions Section 805 – City Conduit Ductbanks, 805.02 - Materials.

3.15.05.05.02 – City Electrical Manholes (EMHs)

Refer to Special Provisions Section 811 – City Electrical Manholes, 811.02 - Materials.

3.15.05.06 Construction

3.15.05.06.01 - General

The City DOT Conduit Facilities design and construction shall be in accordance with the City of Baltimore, Department of Public Works Specifications for Materials, Highways, Bridges, Utilities and Incidental Structures, dated 2006, and all amendments to date, Section 26 07 01.04 – Electrical Conduit Systems, Parts 1, 2 and 3, and the MD SHA Standard Specifications for Construction and Materials, dated 2008, and all amendments to date, except as modified hereafter.

3.15.05.06.02 – City Conduit Ductbanks

Refer to Special Provisions Section 805 – City Conduit Ductbanks, 805.03 - Construction.

3.15.05.06.03 City Electrical Manholes (EMHs)

Refer to Special Provisions Section 811 – City Electrical Manholes, 811.03 - Construction.

3.15.06 Installation of City DOT Traffic Facilities

See Section TC-3.12 Traffic Performance Specification.

3.15.07 Installation of City DOT Street Light Facilities

See Section TC-3.12 Traffic Performance Specification.

3.15.08 Installation of Veolia Energy North America Facilities

Veolia Energy will abandon and/or furnish and install hot/chilled water and steam lines, provide service connections and activate their system.

3.15.09 Installation of City DPW Water Facilities

3.15.09.01 Description

This work will be specified by the City DPW Water Engineering Office (WEO) and will consist of designing, furnishing and installing all relocations, replacements, upgrades,

abandonments and/or new installations of existing or proposed water mains, water service connections, fire hydrants and appurtenances owned by the City within the roadway rehabilitation limits, as shown on the Contract Drawings and within this Performance Specification. The Design Build Team (DBT) shall submit to the WEO for review all locations within the roadway rehabilitation limits within close proximity of any City DPW water facility.

The DBT shall be responsible for the analysis, relocation, design, abandonment, and construction of the water utility features along the project alignment in accordance with all applicable criteria and standards cited herein, on the Contract Drawings, and in accordance with this Water Performance Specification.

3.15.09.02 Coordination with Other Work

The DBT shall coordinate the work on and location of the City DPW water facilities to avoid conflicts with work by others, including the DBT roadway and drainage design.

3.15.09.03 Adherence to City Design Requirements

Design and construction of all water elements shall be in accordance with all relevant City standards, this Water Performance Specification, and the following guidelines and references, unless otherwise stipulated in this specification. Guidelines and references cited in the body of this specification shall have precedence over all others. Should the requirements in any guideline conflict with those in another, the stricter guideline shall prevail. It is the DBT's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any design and construction.

Use the most current version of each listed standard as of the initial publication date of this RFP unless revised by addendum or contract modification.

3.15.09.03.01 Guidelines for Water

- A. City of Baltimore, Department of Public Works, Specifications for Materials, Highways, Bridges, Utilities, and Incidental Structures
- B. City of Baltimore, Department of Public Works, Book of Standards, Standard Water Details
- C. City of Baltimore, Department of Public Works, Bureau of Highways and Bureau of Water and Waste Water, Manual of Design Procedure and Criteria

The City DPW Water policies and procedures can be obtained by contacting:

Mr. Opinder Singh
Chief, Water Engineering

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City of Baltimore
Department of Public Works
Abel Wolman Municipal Building
200 North Holliday Street
Baltimore, MD 21202
Phone 410-396-1483
Opinder.Singh@baltimorecity.gov

3.15.09.04 Performance Requirements

3.15.09.04.01 General

The DBT shall be responsible for the design and construction of the water lines within the project's proposed roadway rehabilitation including, but not limited to, design, permitting, excavation, abandonment, installation, equipment, Miss Utility coordination and locating, labor materials, permanent restoration of all disturbed areas, service laterals, temporary water service, testing, as-builts, public relations, project management, and maintenance of traffic.

Water may not be shut off to customers for more than 8 hours, with the exception of the water service for 1001 Fleet Street, which must maintain water supply 24 hours per day, 7 days per week (refer to Section 3.15.08 for details). Appropriate notice must be given by the DBT to the City and the property owners for all scheduled water shut offs.

Drawings, plans, and information provided are not as-builts and should not be relied upon as such. It is the DBT's responsibility to field-verify all information provided in this RFP prior to submission of a bid.

All design, reports, drawings, etc. developed by the selected DBT related to the water work shall become the property of the City upon completion of the work program, or termination of the contract. All value engineering suggestions submitted by the DBT that are related to water work shall become the property of the City as well.

3.15.09.04.02 Design-Build Scope

The DBT shall be responsible for the complete a) design, b) approval and permitting, c) construction, and d) project management of the following water improvements [note that all stations listed below correspond to the Central Avenue Construction Baseline from the Contract Drawings and are approximate locations for reference only]:

1. Abandonment of the following portion of the "eastern" Central Avenue 10" water mains:

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- a. Between Bank Street (south of existing fire hydrant)[Station 114+57] and Eastern Avenue (north of existing 10"x6" tee)[Station 111+16].
 - b. Between Fleet Street (south of existing 16"x10" reducer valve)[Station 106+68] and Lancaster Street (north of proposed 12" tie-in)[Station 100+27].
2. The following water services located within the limit of the road work that are off the abovementioned "eastern" Central Avenue 10" water mains shall be reconnected to the new 12" replacement water main (see item 3b below) across Central Avenue:
- a. Water service connection for 443 S. Central Avenue [Station 111+63].
 - b. Any other existing Water House Connection (WHC) that is active.
 - c. If a WHC is galvanized, it shall be replaced with new copper service lines from a new corporation through a new meter setting matching the existing size. If a WHC is copper, it shall be connected with a new copper line and extended to the new main.
 - d. Fire Hydrant /water service connection at SE corner of Central/Aliceanna [Station 103+41].
3. Replacement of the following "western" water mains:
- a. 16" Central Avenue water main between Watson Street [Station 131+00] and Granby Street [Station 126+61].
 - b. 10" Central Avenue water main between Granby Street [Station 126+61] and Fleet Street (north of existing 16"x10" reducer valve)[Station 107+85] with new 12" water main.
 - c. 16" Central Avenue water main at the Fleet Street intersection (south of existing 16"x10" reducer valve on the north side of Fleet Street [Station 107+85] and north of existing 16"x10" reducer valve on the south side of Fleet Street [Station 106+69]).
 - d. 10" Central Avenue water main between Fleet Street (south of existing 16"x10" reducer valve)[Station 106+69] and Lancaster Street (north of proposed 12" tie-in)[Station 100+75]with new 12" water main.
 - e. 6" Lombard Street water main [Station 129+18] within roadway rehabilitation limits.

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- f. 10” Granby Street water main [Station 126+47] within roadway rehabilitation limits.
 - g. 6” Pratt Street water main [Station 123+40] within roadway rehabilitation limits.
 - h. 10” Fawn Street water main [Station 118+12] within roadway rehabilitation limits.
 - i. 3” Mince Alley water main [Station 112+62] with new 4” water main within roadway rehabilitation limits.
 - j. 6” Duker Court water main [Station 109+83] within roadway rehabilitation limits.
 - k. 16” Fleet Street water main [Station 107+54] within roadway rehabilitation limits.
 - l. Includes the replacement of galvanized service connections located within the limit of the proposed roadway rehabilitation work that are off the abovementioned “western” water mains. All of these galvanized service connections shall be replaced and renewed with new copper service lines from a new corporation through a new meter setting matching the existing size.
 - m. All existing copper service lines shall be reconnected from the new main to the existing copper line as required.
 - n. All existing fire hydrants located within the limit of the roadway rehabilitation work that are off the existing “western” water mains shall be evaluated and old fire hydrants shall be replaced with new break-away fire hydrants as per City of Baltimore standards and specifications.
 - o. Water main replacement work shall be shown in both plan and profile.
4. Replacement of the following “eastern” water mains:
- a. 6” Central Avenue water main between Watson Street [Station 131+00] and Gough Street (north of existing 10”x6” reducer valve)[Station 118+97].

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- b. 10" Central Avenue water main between Gough Street (south of existing 10"x6" reducer valve)[Station 118+97] and Bank Street (north of existing fire hydrant)[Station 114+57].
 - c. 10" Central Avenue water main between Eastern Avenue (south of existing 10"x6" tee)[Station 111+16] and Fleet Street (north of ex. 16"x10" reducer valve)[Station 107+93].
 - d. 16" Central Avenue water main at the Fleet Street intersection (south of existing 16"x10" reducer valve on north side of Fleet Street [Station 107+93] and north of existing 16"x10" reducer valve on south side of Fleet Street [Station 106+68]).
 - e. 6" Lombard Street water main [Station 129+06] within roadway rehabilitation limits.
 - f. 4" Pratt Street water main [Station 123+73] within roadway rehabilitation limits.
 - g. 6" Eastern Avenue water main [Station 111+16] within roadway rehabilitation limits.
 - h. 16" Fleet Street water main [Station 107+26] within roadway rehabilitation limits.
 - i. Includes the replacement of galvanized service connections located within the limit of the proposed roadway rehabilitation work that are off the abovementioned "eastern" water mains. All of these galvanized service connections shall be replaced and renewed with new copper service lines from a new corporation through a new meter setting matching the existing size.
 - j. All existing copper service lines shall be reconnected from the new main to the existing copper line as required.
 - k. All existing fire hydrants located within the limit of the roadway rehabilitation work that are off the existing "eastern" water mains shall be evaluated and old fire hydrants shall be replaced with new break-away fire hydrants as per City of Baltimore standards and specifications.
 - l. Water main replacement work shall be shown in both plan and profile.
5. Replacement of the following water mains that cross Central Avenue:

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- a. 10” water main on Pratt Street [Station 124+73].
 - b. 6” water main on Gough Street [Station 118+65].
 - c. 10” water main on Bank Street [Station 115+00].
 - d. 8” water main on Aliceanna Street [Station 103+88].
 - e. The abovementioned water mains that cross Central Avenue shall be replaced up to the valves on the intersection within the limit of the proposed roadway rehabilitation work.
 - f. Water main replacement work shall be shown in both plan and profile.
6. Installation of new water main cross connection pipes at the following locations:
- a. 10” water main between the existing “western” 10” Central Avenue water main at Central/Eastern and the existing “eastern” 10”x6” tee [Station 111+16].
 - b. 16” water main between the existing “western” 10” Central Avenue water main at Central/Fleet [Station 106+69] and the existing “eastern” 16” Central Avenue water main north of existing 16”x10” reducer valve [Station 106+68]. Consider future Red-Line alignment when determining the location for this new main.
 - c. 12” water main between the existing “western” 10” Central Avenue water main at Central/Lancaster [Station 100+75] and the existing “eastern” 10” Central Avenue /Lancaster water main [Station 100+27].
 - d. New water main work shall be shown in both plan and profile.
7. Installation of a new 12” water main connecting the new cross connection 12” water main (see item 6c above) at the intersection of Central/Lancaster [Station 100+27] and terminate at the edge of the roadway rehabilitation limits to the south across the proposed Harbor Point Connector bridge.
8. The DBT shall prepare drawings that show the water main replacement/new work in both plan and profile. City DPW standard water details shall be referenced or modified construction details associated with the water main construction shall be

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shown on the drawings. The DBT shall prepare water shut off diagram(s) and a sequence of construction for all water main work to be performed under this contract.

9. At least 14 calendar days prior to the start of the water work, the DBT shall contact the City's water engineer and project engineer for a pre-construction meeting, separate from the project pre-construction meeting. This pre-construction meeting shall be attended by an office of the DBT who is responsible for the design and construction of the water utilities, the Project Manager, and City Construction Project Engineer, and the City water engineer. Topics of discussion shall include the construction schedule, coordination with the City regarding existing utilities, reporting procedures, and inspection. In addition the DBT shall provide an overall schedule for construction and relocations including proposed lead times necessary to meet the water work schedule for approval by the City.
10. As-Built Drawings shall include all sheets approved by the City in the Construction Plan set. Two submissions are required. The first submission (2 sets of plans) shall be in paper form only. Once approved, the final submission shall include one paper set, one Mylar set, and one CD. The CD shall contain the drawings in AutoCAD dwg format, with northing and easting data embedded, and be clearly labeled. Vertical control shall be based on Baltimore City vertical datum, and horizontal control shall be based on Baltimore City coordinates.

AS-BUILT in bold letters shall be shown above the title block on the lower right hand corner of the plan along with the date that the as-built modifications were completed.

Each set of as-built drawings shall be signed and sealed by a Maryland Licensed Professional Land Surveyor or Maryland Licensed Property Line Surveyor. The cover sheet shall be signed and sealed and contain the following statement: "I hereby certify that the as-built location information of the water facilities are true and correct to the best of my knowledge and belief as surveyed under my direction." The cover sheet shall include the Surveyor's name and number, business name, address, and telephone number.

As-Built contents: the amount of information required on as-builts will entail the drawing author to organize its presentation for plan readability. It may be necessary to put water information on separate sheets and/or provide tables to show coordinate information where congested conditions affect the neatness and legibility of the plans.

Plan View

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- a. Show the location of easements (both new and existing) used by the water facilities, if applicable.
- b. Show originally proposed locations of all water structures, such as fire hydrants, valves, etc., lightened and all new actual locations bolded.
- c. Show all storm drain, mains, structures and appurtenances and show all other utilities which come within ten (10) feet of the water work.
- d. Provide a minimum of three grid ticks with northing and easting indicated.
- e. Northing and easting data (in Baltimore City coordinates) shall be acquired and submitted for City maintained facilities, including:
 - i. The center of each fitting, valve, blow off, hydrant, water meter, double detector check or other non-pipe water facility.
 - ii. Locations of service valves.
 - iii. Any other locations designated by the City.

Profile view

- a. Show elevations to the nearest tenth of a foot for the top of valve box and top of operating nut for all valves.

3.15.09.04.03 Additional Design Criteria

1. It is preferred that the location of the “western” and “eastern” replacement water mains be consistent with respect to the west or east shoulder of Central Avenue. Switching back and forth between the west and the east shoulder is not desirable; in addition, the location of the water mains should be such as to reduce roadway crossings.
2. Aside from the fire hydrant from Part 2d of the Design-Build Scope, provide fire hydrants on the same side of the road as the relocated water main. At a minimum, one (1) fire hydrant shall be located at each roadway intersection and at the end of stubs. Additional hydrants shall be provided to meet the requirements of the guidelines. The final location of all fire hydrants shall be reviewed and approved by the City prior to finalization of design documents.
3. All existing fire hydrants located within the limit of the road work shall be evaluated and old fire hydrants shall be replaced with new break-away fire hydrants as per City of Baltimore standards and specifications.
4. At all tees and crosses, provide three (3) and four (4) shut-off valves respectively, as necessary to isolate the different sections of the water mains, unless otherwise noted.

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5. All Water House Connections (WHCs) within the roadway rehabilitation limits shall be run from the relocated water main to the property line or existing service shut off valve whichever is further from the main. Where an existing service is a meter vault at or near the property line the service will be reconnected to the existing setting or service valve. Reconnection to the private service line shall be included.
6. All existing galvanized WHCs shall be replaced and renewed with new copper service lines from a new corporation through a new meter setting matching the existing size. All existing copper WHCs shall be reconnected from the relocated main to the existing copper line as required.
7. The DBT shall locate all existing water and sewer appurtenances including but not limited to fire hydrants, valves, meters, etc. and be responsible for their safety, continuous service, access for emergency services and routine maintenance. Should any existing water appurtenances be damaged, destroyed, or placed out of service due to the operations of the DBT, the DBT shall immediately notify the City and the damaged, destroyed, or out of service components shall immediately be replaced, repaired, and restored to the satisfaction of the City. The replacement, repair, and restoration of the components shall be at the expense of the DBT.
8. Adjustments to Grade: The DBT shall be responsible for all adjustments to final grade for the water appurtenances within the project limits including by not limited to fire hydrants and water meters inside of the vaults to meet the specifications of the City. The DBT shall provide access to all water appurtenances in accordance to SP Section 875 – Utilities Statement. All water meters that are affected by grade changes as a result of the project shall be relocated and/or reset in accordance with the guidelines. Water meter vaults as well as the meters themselves shall be reset to the correct elevations specified in the guidelines. Of the affected water meter assemblies, those with older “manual” meters in them shall be replaced with a new meter supplied by the City.
9. Drawing sizes shall be limited to the City standard of 24” x 36”.
10. All water plan drawings must contain at least the following information:
 - a. Shutoff diagram.
 - b. North arrow.
 - c. Minimum three coordinate tic marks.
 - d. All existing or proposed valves, reducers, hydrants, and bends must be detailed or shown on the plans to be restrained back to the main.
 - e. Profiles based on test pits and available City data (showing relation to other underground utilities and obstructions).
 - f. Accurate standard plate numbers.

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- g. A sequence of construction with valves numbered on the shutoff diagram.
- h. Standard Water Notes as shown in Item 12 below.
- i. DBT contact person and engineer's name, address, and phone number.
- j. A list of service type and size, meter size and address of each WHC.

11. Utility Clearances for Water Work

a. Horizontal Clearances

- i. When available, a minimum 5 foot horizontal clearance is requested between water facilities including appurtenances and other utilities; 3 foot clearances are required.
- ii. Water mains installed parallel with sanitary sewer mains require a minimum 10-foot clearance unless waived by the State of Maryland.
- iii. Service installations and all water appurtenances are required to have a minimum 5-foot clearance from sanitary sewers and their appurtenances.

b. Vertical Clearances

- i. A vertical clearance of 12 inches is requested between utilities; 6-inch clearances are required. 12-inch clearances are required on water mains larger than 12-inches in diameter and when crossing sanitary sewers.

12. Standard Water Notes

- a. The Contractor must notify "Miss Utility" at 1-800-257-7777 at least five (5) days prior to beginning work.
- b. Notify Water and Wastewater Maintenance Division (410-396-7870) at least two (2) weeks prior to startup of construction on the water service. For Sanitary, Conduit, Storm Water Services, contact the Permit Inspection Section (410-396-4840). The Contractor must receive written notice to proceed from Water and Wastewater Maintenance Division or the Permit Inspection Section prior to performing any work.
- c. For meter installation, Contractor must notify Baltimore City, Bureau of Water and Wastewater (410-396-1663) 72 hours before starting work. Complete meter installation to be inspected by the Water and Wastewater Maintenance Division representative prior to placement of top slab.

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- d. The Contractor shall arrange to pick up Meter at the Department of Public Works Meter Shop on Franklinton Road.
- e. All existing water valves shall be operated by Water and Wasterwater Maintenance Division forces only. Notify Mr. Ron Brooks (410-396-7807) at least seven (7) working days in advance of any necessary valve operations.
- f. All work shall be done in accordance with the City of Baltimore Book of Standards, City of Baltimore Manual of Design Procedure and Criteria.
- g. The Contractor shall observe extreme caution when working near or over existing water facilities.
- h. All services must be flushed prior to setting meters.
- i. Service must be capped and the completed service will be visually inspected for leaks.
- j. All services to be abandoned must be abandoned at the mains and all meters must be returned to Baltimore City.
- k. The DBT must verify through the Utility Billing Section (410-396-5533) the service account and meter numbers for all existing water services to remain or to be abandoned and shown on the proposed plans.
- l. Meters are not permitted to be installed in the roadway or driveways.
- m. Contractor must notify BGE (410-281-3507) at least two (2) days prior to construction.
- n. Ductile Iron pipe shall be Class 54. Copper pipe shall be seamless, type K annealed.
- o. The Contractor shall notify the Bureau of Water and Wastewater, Meter Repair Shop (410-396-0170) at least one (1) week prior to pickup of meters.
- p. Meters designated for a specific location or address shall not be relocated without the written permission of the Bureau of Water and Wastewater.
- q. The proposed water service connection will be installed a minimum of five (5) feet from sanitary sewer house connection.

- r. Standard buttresses for vertical bends and caps shall conform B.C. 837.06 and 837.22.
- s. Contractor shall confirm invert elevations of existing water mains and all utility crossings prior to any new construction. Any deviation noted from test pit information will require red line revised plans approved by the Utility Engineering Section prior to any new construction.

3.15.09.04.04 Design Submissions

3.15.09.04.04.01 Semi-Final Design

As a first order of business involving water mains encountered and owned by the City within the project limits the DBT shall:

- 1. Consult with the City DPW Water Engineering Office and review as-built information and other pertinent data.
- 2. Obtain such additional geotechnical and related information deemed necessary for performance of the work.
- 3. On the basis of the City's design requirements, as determined upon consultation with the City and as stated herein, prepare Semi-Final Design Phase Documents consisting of water plans.
- 4. Furnish the Semi-Final Design Phase Documents to the City for review by the City.

The City will respond within 21 calendar days of the submission receipt by providing written acceptance or rejection of the Semi-Final Design Phase Documents. If the Semi-Final Design Phase Documents are rejected, the City will provide reason for rejection and the DBT shall address the problems and resubmit the Semi-Final Design Phase Documents. Every resubmission of the Semi-Final Design Phase Documents will constitute the beginning of a 21calendar day review period by the City.

3.15.09.04.04.02 Final Design

After written acceptance by the City of the Semi-Final Design Phase Documents, the DBT shall:

- 1. On the basis of the accepted Semi-Final Design Phase Documents, prepare Construction Plans showing the Water Main Construction to be performed and furnished by the DBT in accordance with the City's DPW Water Engineering Office requirements.

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2. On the basis of the Construction Plans prepare an item-by-item breakdown of the lump sum price for the proposed work. The item-by-item breakdown will be used to determine cost responsibilities between the DBT and the City.
3. Furnish Construction Plans and the item-by-item breakdown to the City for review by the City.

The City will respond within 21 calendar days of the submission receipt by providing written acceptance or rejection of the Construction Plans. If the Construction Plans are rejected, the City will provide reason for rejection and the DBT shall address the problems and resubmit the Construction Plans. Every resubmission of the Construction Plans will constitute the beginning of a 21 calendar day review period by the City.

3.15.09.05 Construction

3.15.09.05.01 - General

The City DPW water facilities materials for design and construction shall be in accordance with the City of Baltimore, Department of Public Works Specifications for Materials, Highways, Bridges, Utilities and Incidental Structures, dated 2006, and all amendments to date, except as modified hereafter.

Refer to Special Provisions Section 876 – Water Distribution.

3.15.09.05.02 - Materials

The DBT shall furnish all material. The DBT will procure materials referred to in City Manuals as “to be furnished by the City” from manufacturers or equals approved by the City.

Refer to Special Provisions Section 876 – Water Distribution – Part 2 - Products.

3.15.09.05.03 - Construction

After written acceptance and the issuance of a construction permit by the City, the DBT shall supervise, inspect and direct the Construction, competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to provide the construction in accordance with the requirements of the City, as determined upon consultation with the City and as stated herein.

All construction activities shall be in accordance with the latest edition of the City of Baltimore Details and Specifications.

Refer to Special Provisions Section 876 – Water Distribution – Part 3 - Execution.

3.15.09.05.04 - Insurance

The City shall be listed as an additional named insured on the policy acquired to fulfill the requirements in the Special Provision section for Insurance. Evidence of insurance shall be provided to the City, prior to performing any work related to City facilities, by the same means as specified in the Insurance Special Provision section for providing evidence of insurance to the City.

3.15.09.05.05 - Inspection

The DBT shall notify the City as required prior to starting specific phases of the water main construction. All water main construction shall be in conformity with the approved Construction Plans. An inspector, provided by the City, will inspect all water main construction. The DBT shall pay all costs for such inspection to insure compliance with the standards and details of the City.

3.15.09.05.06 - Testing

The DBT shall be responsible for all testing required by the City as described in the General Provisions and Standard Specifications.

3.15.09.05.07 – Final Inspection

Within seven calendar days of receiving written notice from the DBT that the entire construction of City water facilities or an agreed upon portion thereof is complete, the City will make a final inspection with the DBT. Within 21 calendar days of the final inspection the City will notify the DBT in writing of all particulars in which this inspection reveals that the Construction is incomplete or defective. The DBT shall immediately take such measures as necessary to complete such Construction or remedy such deficiencies.

3.15.09.05.08 – As-Built Plans

The DBT shall provide the City with as-built plans prior to the Acceptance of Work by the City.

Refer to Design-Build Scope Part 10 for as-built submission criteria.

3.15.09.05.09 – Acceptance of Work

After the DBT has completed all corrections required by the Final Inspection to the satisfaction of the City and has delivered all required submittals to the City, the DBT shall inform the City in writing that the Water Work is complete. If the City is satisfied that the work has been completed and the DBT's other obligations have been fulfilled, the City will inform the DBT that the Work is acceptable. Otherwise, the City will indicate in writing to the DBT the reason for refusing acceptance of the work.

3.15.09.05.10 – Measurement and Payment

The payment for all costs accrued in designing, furnishing the materials and performing the work, complete and to the satisfaction of the City, shall be included as part of the Water Lump Sum Line Item that is part of the Design-Build Contract lump sum price.

Refer to Special Provisions Section 876 – Water Distribution – Part 4 - Measurement and Payment.

3.15.09.05.11 – Notification Requirements

1. Notification to Water and Wastewater Maintenance Division of at least 2 weeks prior to start-up of construction.
2. Notification to Water and Wastewater Maintenance Division of at least 3 working days prior to inspection of 4" and larger meter installations.
3. Notification to Water and Wastewater Maintenance Division of at least 7 working days prior to the need for any valve operations.
4. Notification to Water and Wastewater Maintenance Division of at least 5 working days prior to the setting of the thereby inspection of meters smaller than 4" in the yokes.
5. Notification to Office of Permits Inspection Section to arrange an initiation conference.

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TC 3.16 MAINTENANCE OF TRAFFIC (MOT) PERFORMANCE SPECIFICATION

3.16.01 General

The Design-Builder shall develop and implement Maintenance of Traffic (MOT), including Traffic Control Plans (TCP), and a Transportation Management Plan (TMP) in accordance with the requirements of this specification including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required reviews.

This performance specification provides the flexibility to establish a TMP and to adapt Maintenance of Traffic (MOT) operational changes throughout the Project life to produce benefits or savings to the City of Baltimore or the Design-Builder without impairing the essential functions and characteristics of the Project, such as safety, mobility, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

Work zone impacts, including impacts on the environment and surrounding communities, shall be kept to a minimum, and shall be considered when developing and implementing the TMP. To that end, a Transportation Management Plan Report shall be developed by the Design-Builder. The TMP Report will lay out transportation management strategies and how these strategies will be implemented to manage work zone impacts.

3.16.02 Standards and References

The Design-Builder shall design and implement maintenance of traffic set-ups in accordance with the relevant requirements of the standards listed by priority in Table 1 unless otherwise stipulated in this specification. Standards specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any standard below conflict with those in another, the standard listed with the higher priority shall govern. It shall be the Design-Builder’s responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Table1
Standards for Maintenance of Traffic

Priority	Author or Agency	Title
1	COB	Green Book and Standard Details
1	SHA	Standard Highway Signs
2	SHA	Book of Standards for Highway and Incidental Structures for items identified as Standard in Appendix B of Part 3-Design Requirements
3	SHA	Standard Specifications for Construction and Materials

Table1
Standards for Maintenance of Traffic

Priority	Author or Agency	Title
		Section for items identified as Standard in Appendix A of Part 3-Design Requirements
4	FHWA	Developing and Implementing Transportation Management Plans for Work Zones
5	SHA	Work Zone Lane Closure Analysis Guidelines
6	AASHTO	A Policy on Geometric Design of Highways and Streets
7	FHWA	Manual on Uniform Traffic Control Devices (MUTCD 2009)
8	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
9	AASHTO	Roadside Design Guide
10	FHWA	National Cooperative Highway Research Program (NCHRP) Report 553 Crashworthy Work Zone Traffic Control Devices
11	FHWA	National Cooperative Highway Research Program (NCHRP) Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.
12	ATSSA	Quality Standards for Work Zone Traffic Control Devices
13	ADA	Americans with Disabilities Act Accessibility Guidelines

3.16.03 Performance Requirements

3.16.03.01 City of Baltimore responsibilities

City’s responsibilities include the following activities:

- A) Maintaining Quality Assurance (QA) of any MOT analysis, work zone impact management strategies and temporary traffic control plans from the Design-Builder;
- B) Liaising with and monitoring the Design-Builder’s performance for compliance with this Contract’s requirements;
- C) Maintaining documentation for the TMP as developed by the Design-Builder;
- D) Monitoring implementation of the TMP to verify that the Design-Builder’s performance is in compliance with commitments made in the TMP.

3.16.03.02 Design-builder personnel requirements

This project requires the Design-Builder to have a team experienced in Maintenance of Traffic, including work zone design, work zone traffic analysis, and traffic control devices and setups.

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3.16.03.02.1 Traffic Manager:

The Design-Builder shall provide a Traffic Manager (TM) whose on-site responsibility is to supervise and continuously monitor the installation and maintenance of all traffic control devices. The TM shall be equivalent to, meet the requirements of, and perform all duties outlined in Section 104.18 of SHA's Standard Specifications for Construction and Materials. The Design-Builder shall authorize the TM to direct traffic changes to ensure safe and continuous traffic flow and to direct traffic operations after a traffic incident has occurred. A TM shall be available at all times and be on-site within a ½ hour throughout the duration of the Project. The TM shall document all daily maintenance of the traffic control setup, including but not limited to maximum queue lengths/delays, work zone modifications, incidents, and suggested improvements. Minimum qualifications of the TSO include certification from the American Traffic Safety Services Association (ATSSA) as a Traffic Control Supervisor (TCS) and five years experience in work zone traffic control.

The Traffic Manager shall perform the following duties:

- A) Oversee the development and implementation of the TMP;
- B) Oversee the design and implementation of the Traffic Control Plans (TCPs);
- C) Coordinate MOT activities with the Community Outreach Manager and the City;
- D) Implement traffic management strategies;
- E) Provide an MOT report to the City with each change in traffic phasing, including expected queue lengths/delays, summary of expected operations, and MOT durations;
- F) Review and document each lane closure setup;
- G) Be responsible for ensuring that all deficiencies are corrected;
- H) Be continuously available during construction until Final Completion of the Project and elimination of all construction traffic control; and
- I) Supervise the activities of the crews and persons performing MOT

3.16.03.02.2 Flaggers:

The Design-Builder shall provide flaggers who have completed an American Traffic Safety Services Association (ATSSA) flagger training course within the last four years and meet the requirements for Section 104.15 of SHA's Standard Specification for Construction and Materials. The flaggers provided shall maintain their flagger certification throughout the life of the Project.

3.16.03.03 Maintenance of Traffic – General Requirements

All maintenance of traffic design and implementation shall be performed in accordance with the following performance requirements:

- A) Provide for the safe and efficient passage of pedestrians (including those with disabilities), bicycles, and vehicular traffic through and around construction zones, either by maintaining road users on their existing paths or providing suitable detours;

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- B) Minimize negative impacts on residents, commuters, and businesses;
- C) Provide convenient and logical rerouting of traffic, as needed, (by using advance warning systems and directional and informational signing, and striping) to provide “driver friendly” detours and to maximize the safety of the traveling public;
- D) Maintain and provide access at all times to properties for owners, customers, visitors, and emergency vehicles;
- E) Provide a safe travel corridor while minimizing any unnecessary investment in the existing infrastructure that is being replaced;
- F) Develop and coordinate MOT activities with local law enforcement and other emergency service agencies to ensure public safety and emergency response times are not compromised;
- G) Coordinate MOT activities and Traffic Control Plans with other construction projects;
- H) Provide Traffic Control Plans (TCPs) for each major phase of construction (see Section 3.16.06 of this performance specification);
- I) Provide for a Public Outreach campaign to be implemented in cooperation with the City; and
- J) Develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies.

3.16.04 Design and Construction Criteria

3.16.04.01 Traffic Through Construction Zones

The Design-Builder shall perform the following:

- A) Implement Traffic Control Plans for all roadways within the Project limits in a manner that safely and efficiently accommodates traffic at all times.
- B) Design temporary traffic control plans and implement maintenance of traffic setups using prevailing travel speeds (not posted or design speeds) to determine buffer and taper lengths, clear zone distances, attenuator arrangements, and other temporary traffic control elements. If, due to geometric/field constraints, it is not possible to install temporary traffic control devices based on the prevailing speeds, the Design-Builder may submit a request to the City for a variance. The request shall be accompanied by a description of the constraints and recommendations for proposed adjustments.
- C) Provide all material, labor, equipment, and personnel to effectively carry out the MOT and TMP. All equipment and tools shall be in good operating condition and shall be kept in proper adjustment throughout the duration of the project. All materials and supplies shall be of good quality and suitable for the assigned work.
- D) Provide and use all safety equipment including (but not limited to) hard hats, safety vests and clothing required by State and Federal regulations.
- E) Begin maintenance of traffic activities at the start of construction work (including preparatory MOT work), and continue MOT activities until Completion of the

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Project.

- F) Arrange and host a pre-traffic switch meeting with the City and all affected agencies (including emergency services) at least two weeks prior to switching traffic for each phase of construction.
- G) Identify desired full roadway closures (for any period of time) and submit a request in writing to the City for review and concurrence during the design review process.
- H) Correct all traffic control deficiencies immediately upon notification or observance of the deficiency.
- I) Design all active roadways to accommodate drainage such that there are no puddles or icing on the traveled roadway or shoulders.
- J) Ensure appropriate MOT and flagging procedures are employed during all phases of construction, including mobilization activities.

The maintenance of traffic design shall also meet the following criteria. It is understood that the unique nature of some of the work required for this Project may make adherence to these criteria prohibitive. Should this occur, the Design-Builder may submit a written request to the City for a variance, including documentation of the conditions that restrict the ability to adhere to these criteria.

- A) Work shall only be performed on one side of the roadway at a time.
- B) Work areas along Central Avenue shall be planned such that one thru lane is maintained in each direction and one parking lane is provided. Through access shall be maintained at all times along Central Avenue, except as noted under Detour - refer to section 3.16.04.06 for detour criteria.
- C) Sequencing of construction shall be designed such that milestone dates are met, per the Bridge specifications.
- D) A single long-term lane reduction will be permitted along side streets, inclusive of existing turn lanes.
- E) Detour – refer to section 3.16.04.06 for detour criteria

3.16.04.02 Public Information and Outreach

The Design – Builder shall actively assist the City in providing advance information to the public regarding construction phasing, detour routes, and expected travel impacts, and coordinate these activities through frequent meetings with the City’s Community Outreach Manager. The Design – Builder shall also coordinate with the City regarding special events that may affect traffic patterns through and around the project limits and adjust the TMP and TCPs as needed.

3.16.04.03 Public Access

The Design – Builder shall maintain vehicular, pedestrian, and bicycle access to all businesses, residences, local streets and private driveways at all times, including all temporary approaches to, crossings of, and intersections with roads and streets. The

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Design – Builder shall consider any special access needs of property owners and tenants, such as business hours, delivery schedules and circulation patterns.

3.16.04.04 Pedestrian and Bicycle Traffic

The Design – Builder shall maintain all existing pedestrian and bicycle access along existing facilities at all times during construction. Whenever an existing pedestrian access route in the public right of way is blocked by a construction, alteration, or maintenance activity, an alternate accessible pedestrian route must be provided. If the existing pedestrian access route is compliant with the regulations and accessibility, as defined by the Americans with Disabilities Act (ADA), the alternate pedestrian route shall also be ADA-compliant. If the existing pedestrian access route is not ADA-compliant, the alternate pedestrian route shall be no less compliant than the existing route being detoured.

3.16.04.05 Schools and Public Transportation Agencies

The Design-Builder shall coordinate with the local schools, appropriate Board of Education, and public transportation agencies to maintain bus, private vehicle, and pedestrian access to education facilities and public transportation services in the area. Access to bus stops shall also be maintained, as coordinated with MTA and the City. Construction impacts on school bus and public transportation routes shall be coordinated with the local agencies.

3.16.04.06 Detour Routes

The Design – Builder shall design, place, and maintain all traffic detours required during construction. Wherever possible, use routes of a similar roadway caliber (i.e. similar number of travel lanes and similar roadway classification as the road being closed) for detour routes. The Design – Builder is also responsible for obtaining all necessary permits from the respective agencies for temporary roadways, including construction and/or haul routes.

Detour routes shall be required when complete road closures or the restriction of turning movements are necessary. Proposed detour routes shall be included in the MOT Plans and reviewed through the design review process (see Section 3.16.06 of this performance specification). Complete closures of roadways or the restriction of turning movements will not be permitted without the express written approval of the City as part of the design review process prior to the closure/restriction. Specific identification and written documentation of the proposed closure/restriction, including duration, traffic and operational impacts, shall be provided by the Design-Builder to the City during the design review process for each request.

If the Designer-Builder elects to propose a detour, as part of the TMP, the Designer-Builder shall demonstrate the advantages and disadvantages of the detour in terms of

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construction schedule, quality of the final constructed bridge, traffic delays, queues, level of service, v/c ratios, and safety impacts.

Vehicular detours shall be acceptable under the following conditions during MOT. Detours shall be developed by the Designer-Builder for pedestrian and bicycle traffic.

A) Construction of Harbor Point Connector Bridge

- a. A detour shall be acceptable during the construction of the Central Avenue Harbor Point Connector Bridge over the Baltimore Harbor, south of Lancaster Street for:
 - i. Central Avenue from Lancaster Street to Aliceanna Street
 - ii. Lancaster Street
- b. Access to the loading dock driveway on Central Avenue between Aliceanna and Lancaster Streets shall be maintained as required under section 3.16.04.03

B) Replacement of bridges No. BC 8020 and 8019

- a. A detour shall be acceptable during the replacement of bridges No. BC 8020 and 8019 at the intersections of Fleet Street and Aliceanna Street, respectively
- b. Through movements on Fleet Street and Aliceanna Street shall be maintained at all times.
- c. Detours for through movements on Central Avenue may be acceptable during low volume time periods. The time period, duration, direction, route and acceptability of the detour shall be demonstrated in the Maintenance of Traffic Alternatives Analyses MOTAA and at the approval of the City. Refer to Section 3.16.05 for MOTAA requirements.
- d. Detours during to the replacement of bridges No. BC 8020 and 8019 shall be under separate MOT phases of work. The detour for traffic for the first phased bridge replacement shall be removed and traffic restored to normal operating conditions for one week prior to the start of the second phased bridge replacement detour.
- e. If there is not adequate space for a separate left turn lane, a detour may be acceptable for the turning movement from Fleet Street or Aliceanna Street towards the open approach to Central Avenue. The Designer-Builder shall evaluate the impacts of detouring left turning movements from Fleet Street or Aliceanna Street as part of the MOTAA and make a recommendation for acceptance by the City.
- f. Parking may be restricted along both sides of the roadway for the approaches to the intersections of Central Avenue at Fleet Street and Central Avenue at Aliceanna Street during the bridge replacement detours.
- g. Under a detour for Bridge No. 8019 (Aliceanna Street) south side bridge construction:
 - i. eastbound rights on Aliceanna Street shall be detoured to Eden Street.
 - ii. northbound Central Avenue traffic shall be detoured at Lancaster Street to Exeter Street, or Eden Street, as applicable.
 - iii. southbound Central Avenue through movements shall be detoured to

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- Aliceanna Street.
- iv. eastbound lefts on Aliceanna Street may be detoured to Caroline Street to Fleet Street, subject to requirement e, above.
- h. Under a detour for Bridge No. 8019 (Aliceanna Street) north side bridge construction:
- i. westbound lefts on Aliceanna Street may be detoured to Exeter Street, subject to requirement e, above.
 - ii. One through movement, either northbound or southbound, and not both, on Central Avenue may be detoured during low-volume time periods:
 - 1. northbound Central Avenue through movements shall be detoured via Caroline Street.
 - 2. southbound Central Avenue traffic shall be detoured via Caroline Street.
 - iii. westbound rights on Aliceanna Street may be detoured to Exeter Street to Fleet Street if part h.ii.1 (northbound detour) is utilized.
 - iv. eastbound lefts on Aliceanna Street shall be detoured to Caroline Street to Fleet Street, subject to requirement e, above., and / or if part h.ii.1 (northbound detour) is utilized
- i. Under a detour for Bridge No. 8020 (Fleet Street) south side bridge construction:
- i. eastbound lefts on Fleet Street may be detoured via Caroline Street, subject to requirement e, above.
 - ii. One through movement, either northbound or southbound, and not both, on Central Avenue may be detoured during low-volume time periods:
 - 1. northbound Central Avenue traffic shall be detoured via Caroline Street.
 - 2. southbound Central Avenue traffic shall be detoured via Caroline Street
 - iii. eastbound rights on Fleet Street may be detoured to Caroline Street to Aliceanna Street if part i.ii.2 (southbound detour) is utilized
 - iv. westbound lefts on Fleet Street shall be detoured to President Street to Eastern Avenue to Caroline Street to Aliceanna Street, subject to requirement e, above, and / or if part i.ii.2 (southbound detour) is utilized
- j. Under a detour for Bridge No. 8020 (Fleet Street) north side bridge construction:
- i. westbound lefts on Fleet Street may be detoured to President Street to Eastern Avenue to Caroline Street to Aliceanna Street, subject to requirement e, above.
 - ii. One through movement, either northbound or southbound, and not both, on Central Avenue may be detoured during low-volume time periods:
 - 1. northbound Central Avenue traffic shall be detoured via

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Caroline Street

2. southbound Central Avenue traffic shall be detoured via Caroline Street
- iii. eastbound lefts on Fleet Street shall be detoured via Caroline Street subject to requirement e, above, and / or if part j.ii.1 (northbound detour) is utilized.
- iv. westbound rights on Fleet Street shall be detoured to President Street to Eastern Avenue if part j.ii.1 (northbound detour) is utilized

C) Unsignalized Intersections intersecting Central Avenue

- a. Bank Street eastbound and westbound approaches may be detoured
- b. Lancaster Street eastbound and westbound approaches shall be detoured during Harbor Point bridge construction.
- c. Central Avenue through movements shall not be detoured, except as noted above.
- d. The detour at these intersections shall not occur during either of the MOT phases for the Replacement of bridges No. BC 8020 and 8019.

D) Central Avenue Left Turning Movements in a Shared Through/Left Lane

- a. The City does not prefer to allow detours for the subject left turning movements. However, the Designer-Builder may detour left turning movements along Central Avenue at signalized intersections if the MOT phase only provides one lane on Central Avenue for through and left turning movements. Under this condition, the Designer-Builder shall prepare an analysis comparing the following alternatives for the City to select their preferred option:
 - i. Restricting parking along both side of Central Avenue in order to provide an exclusive left turn bay with adequate queue storage for the 50th percentile queue.
 - ii. Detour the left turning movement.
- b. If the City elects to Detour left turning movements, the following criteria shall apply:
 - i. The detour shall not occur during any of the MOT phases for the Replacement of bridges No. BC 8020 and 8019.
 - ii. Turn restrictions shall be permitted at no more than two intersections along Central Avenue between Lombard Street and Aliceanna Street (exclusive of the intersections with Fawn Street and Granby Street) at any given time. Refer to Section 3.16.04.06 of this performance specification for requirements for adequate detour signage for restricted turning movement.
 - iii. Left turns at Fleet and Aliceanna Streets shall follow the detour routes described above.
 - iv. Detour routes shall not include any of the roadways within the Little Italy area.
 - v. Southbound left turns shall be detoured to the next available left turn at

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- a signalized intersection to the south, and then to Caroline Street.
- vi. Northbound left turns shall be detoured to the next available left turn at a signalized intersection to the north, and then to President Street.

3.16.04.07 Motorist Guidance

The Design – Builder shall provide guidance and signage to and along the entire length of every detour route to motorists who are diverted around or traveling through the construction areas. Signing that is not in compliance with the MUTCD 2009, the latest MD MUTCD or Category 1 of SHA’s Book of Standards shall be corrected within 24 hours, unless the sign is a critical regulatory or warning sign, in which case the sign shall be corrected within 6 hours of notice. If the deficiency is caused by an accident, the 6 hours begins when access to the area is available.

For closures of surface streets or changes in roadway configurations, the Design-Builder shall provide guide signs in accordance with the TCP for that particular phase, the MUTCD 2009, the latest MD MUTCD and Category 1 of SHA’s Book of Standards. At least seven (7) calendar days before a road closure or major change in the roadway configuration or travel pattern, the Design-Builder shall utilize portable variable message signs to warn motorists of the pending changes. Messages to be displayed shall be submitted to the City for review and comment. The Design-Builder shall coordinate motorist guidance activities with the Community Outreach Manager.

3.16.04.08 Maintenance of Existing Parking Facilities

The Design – Builder shall make reasonable efforts to minimize the impacts to existing parking facilities, whether that be on-street parking or parking in lots or garages. If it is necessary to restrict on-street parking, the Design-Builder shall indicate the locations of and number of impacted parking spaces on the TCPs and submit a request for the restriction to the City for review and approval. If necessary, the Design-Builder may restrict on-street parking on one side of the roadway. On-street parking shall be maintained on at least one side of the roadway at all times except as noted under 3.16.04.06 Detour Routes. The Design-Builder shall be responsible for coordinating with the Parking Authority for the installation of “No Parking” signs prior to the proposed restriction and/or bagging existing parking meters and signs during the restriction. The Design-Builder shall be responsible for coordinating with garage or lot owners prior to restriction of access to their facilities.

3.16.04.09 Local Roadway Crossings

The City will allow construction traffic to cross roadways that intersect with the Project as long as the crossing is maintained within the Project ROW. Proper flagging procedures and/or temporary traffic signals are required to facilitate construction traffic crossing local roadways. The Design – Builder shall ensure that delays incurred to local roadways as a result of at-grade crossing operations do not exceed the mobility thresholds

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established by SHA’s “Work Zone Lane Closure Analysis Guidelines”.

3.16.04.10 Emergency Response

The Design – Builder shall cooperate with Baltimore City Police, local law enforcement and other emergency service providers in their response to accidents, fires, spills, or other emergencies in any area affected by the Project, including those on the construction site and on traffic lanes open to the public. The Design – Builder shall cooperate in all City investigations of accidents and other incidents along the Project.

The Design – Builder shall work with emergency service providers and address their concerns about emergency access to and in the corridor, which may include installing gates to allow emergency personnel to access the Project area, and preclude the implementation of detours during the construction.

3.16.04.11 Field Verification of Traffic Operations

The Design – Builder shall be responsible for monitoring queues and delays during Maintenance of Traffic operations. If the thresholds established in SHA’s “Work Zone Lane Closure Analysis Guidelines” are exceeded, the Design-Builder shall modify the Maintenance of Traffic plans or incorporate other mitigation strategies to reduce the queues and delays below the threshold levels. All proposed changes shall be submitted to the City for review.

3.16.04.12 MOT Restrictions

Refer to Special Provision – Section 104.01 – Traffic Control Plan, for work restrictions and temporary lane closure and/or shoulder closure requirements.

Failure to restore full traffic capacity within the time specified will result in a deduction in Contract Price assessed on the next Periodic Payment. Refer to Special Provision – Section 104.01 – Traffic Control Plan, for assessed MOT deductions.

The City reserves the right to modify or expand the methods of traffic control or working hours as specified by the Design-Builder. The City reserves the right to modify the lane closure restriction hours based on area special events. Any request from the Design-Builder to modify the Temporary Lane and Shoulder Closure Schedule restrictions requires review and concurrence from the City at least 72 hours prior to implementing the change. The Design-Builder shall submit a copy of the original work restrictions with the request.

3.16.04.13 Advance Notification Requirements

The Design-Builder shall submit to the City a lane closure permit request form for approval of each lane closure. Lane closures will not be allowed without an approved

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written closure request.

Type of Lane Closure	Minimum Advanced Notice	Maximum Advanced Notice
1	30 Days	45 Days
2	10 Days	21 Days
3	7 Days	14 Days

Type 1 – Planned and acceptable closures of an arterial or local street, traffic switches, new road openings, or changed traffic patterns.

Type 2 – A lane closure that would have significant impact on traffic, such as temporarily stopping traffic completely (traffic drags), closing two (2) or more lanes, or flagging operations.

Type 3 – A lane closure that would have minor or no impact on the flow of traffic, such as closing one lane on a two- or three-lane roadway during off-peak hours.

For Type 1 closures, the Design – Builder shall make provisions in the MOT Phase Plan for local traffic to access properties and businesses at all times on the closed arterial or local street.

Type 1 and 2 closures will require extensive media and stakeholder notification effort and coordination among various local and State agencies. The Design – Builder shall assist with all notification and coordination efforts.

All notices exclude weekends and holidays.

The lane/shoulder closure request shall be submitted on a Lane/Shoulder Closure Request Form provided by the City and shall be submitted electronically. The information provided on the form shall include, but not limited to, the following:

- 1) Location: Roadway name;
- 2) Project Number;
- 3) Direction: West/East/North/South;
- 4) Lane Closure Type: 1, 2, 3 or 4;
- 5) Duration: Date and times;
- 6) Limits: Beginning or work zone to end or work zone;
- 7) Nature of work and justification of lane/shoulder closure;
- 8) Number of remaining lanes on roadway;
- 9) Lane(s)/Shoulder(s) to be closed-specifically left, right, middle, left middle, right middle, shoulder, etc.;
- 10) Traffic Control Plan sheet number;
- 11) Appropriate City detail application;
- 12) Point of Contact: Field Inspector;

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- 13) Contact Information;
- 14) Any detours required;
- 15) Notes: Any other pertinent information that may be needed to facilitate in clarifying closures; and
- 16) City Police request and required number of officers.

The Design-Builder shall contact and notify the City thirty (30) minutes prior to initiating all lane closures and after removing all lane closures.

3.16.04.14 NCHRP Report 350 Implementation Schedule

All items for the maintenance of traffic shall be crashworthy in conformance with the City's NCHRP Report 350 Implementation Schedule. When conformance with NCHRP Report 350 is required, the manufacturers' certifications that the devices comply with the specified criteria shall be reviewed by the Design – Builder and approved in writing, and copies of the certifications and approvals shall be provided to the City for consultation and written comment.

All maintenance of traffic products, including temporary pavement markings, used on the Project shall be listed on OMT's Qualified Products List (QPL), unless submitted and approved through SHA's Maryland Product Evaluation List (MPEL) Program.

3.16.04.15 Work Zone Speed Limits

If the Design – Builder requires a work zone speed limit reduction in any area throughout the Project limits, the Design – Builder shall submit a request in writing to the City for review, comment, and approval. For areas with work zone speed limit reductions, the Design – Builder shall provide work zone speed limit signs and any additional signing as necessary.

3.16.05 Development And Review of the Transportation Management Plan

The Transportation Management Plan (TMP) shall include Maintenance of Traffic Alternatives Analyses (MOTAA) Traffic Control Plans (TCP), as well as Transportation Operations (TO) and Public Information and Outreach (PI&O) strategies. The TMP shall:

- I. Evaluate work zone impacts and develop strategies to mitigate those impacts through the use of improved transportation operations and management of the transportation system (refer to Section 3.16.05.01 of this Performance Specification). Impacts and strategies shall be documented in a TMP Report.
- II. Include traffic control plans that accommodate project and site specific considerations (refer to Section 3.16.06 of this Performance Specification).
- III. Include strategies to communicate with the public and concerned stakeholders, before

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and during the project, through the development of a public outreach plan.

3.16.05.01 Transportation Management Plan Report

The Design – Builder is responsible for developing a temporary traffic control system that best meets the performance requirements and construction activities. Therefore, maintenance of traffic conceptual design shall be done concurrently with a work zone impacts assessment and traffic analysis. This effort shall be documented in a Transportation Management Plan (TMP) report.

The Transportation Management Plan report shall be submitted to the City for review and comment at the Definitive Design stage. The report shall include discussion of the following and all supporting documentation:

- I. Work zone impacts assessment for the proposed MOT;
- II. Traffic analyses for each phase of MOT;
- III. Work zone impact management strategies.

3.16.05.02 TMP Report Format

- A) All the pages within the report shall be numbered and dated.
- B) The report shall be placed in an 8 ½ x 11 or 11x17 sheets, 3-hole binder that allows for insertion of revisions and removal of old data.
- C) The Design-Builder shall make revisions to the report as required to keep reports current with design and construction activities. The date of the revision shall be placed on all pages. Pages to be added, replaced or removed shall be designated during the revision process. Revisions shall be 3-hole punched for easy placement in the reports.
- D) The final approved report shall be converted to a searchable indexed Portable Document Format (pdf) file, including all maps, exhibits, and traffic software analysis files. The electronic file shall be delivered to the City for their records.
- E) Sections for inclusion in the TMP include:
 - 1) Introduction (Cover Page, Table of Contents, Professional Engineer Certification, etc.)
 - 2) Executive Summary
 - 3) TMP Roles, Responsibilities and Contact Information
 - 4) Project Description, including goals and constraints
 - 5) Existing Conditions
 - 6) Work Zone Impacts Assessment (Refer to Section 3.16.05.03 of this Performance Specification)
 - 7) Work Zone Traffic Analysis (Refer to Section 3.16.05.04 of this Performance Specification)
 - 8) Work Zone Impact Management Strategies (Refer to Section 3.16.05.06 of this Performance Specification)

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- 9) Access and Mobility Plan (refer to Section 3.16.05.07 of this Performance specification)
- 10) Contingency Plan (Refer to Section 3.16.05.08 of this Performance Specification)
- 11) Incident Management Plan (Refer to Section 3.16.05.09 of this Performance Specification)
- 12) Public Outreach Proposal (Refer to PS 3.21 – Public Outreach Performance Specification)
- 13) Implementation and Monitoring Plan (Refer to Section 3.16.05.10 of this Performance Specification)
- 14) Supporting Documentation (e.g., Traffic Control Plans)

3.16.05.03 Work Zone Impacts Assessment

The Design – Builder shall identify how the project’s construction phasing, temporary traffic control zone design, and work zone impact mitigation efforts will impact the project area, how they will affect each other, and how they might adversely impact specific areas, if any. Issues to be considered and discussed in this section of the TMP include:

- A) Identification of High-level Construction/Traffic Control Approaches**, including proposed construction phasing, traffic control and management, and construction schedule. Discussion may include need for lane closures, total roadway closures, use of detour routes and times related to these needs (off-peak, night-work, weekend work, intermittent closures, etc.). High-level maintenance of traffic plans shall be developed that include, but are not limited to, all major traffic shifts and the use of temporary roadways, temporary traffic signals, and access modifications to businesses or residences. The duration of each phase shall be noted on the plan. The plans may take the format of 8 ½ x 11 or 11x17 sheets. These high-level Maintenance of Traffic plans will be used as a basis for the development of the Traffic Control Plans.
- B) Identification of Safety Issues**, including pre-existing safety issues and safety implications of proposed construction approach(es). Pre-existing safety issues may include crash history, curve and gradient issues, line of sight issues, weather related safety issues, lack of adequate shoulder width or prevailing speeds. Examples of safety issues from proposed construction approach(es) include implication of night work, lane width issues, lane-closure related safety issues, channelization and work area separation issues, construction staging areas, construction traffic access issues, and management/enforcement of speed in advance of and through the work zone.
- C) Identification of Community Impacts and Related Issues**, including accessibility issues and other coordination issues. This involves the identification of work zone impacts on the community businesses and residents likely to be affected by the project. Examples include business

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access relocation, detour related mobility impacts, and pedestrian and bicycle related impacts. Other coordination issues may include utility related issues and construction noise issues.

- D) Identification of Combined Impacts and Coordination Issues**, including identification of nearby and/or concurrent projects and assessment of potential combined impacts of these projects at the corridor/network level.

3.16.05.04 Work Zone Traffic Analysis

Using the 2013 Existing AM and PM peak hour traffic volumes, (refer to PS 3.12.02.02), the Design – Builder shall perform traffic analysis under all Maintenance of Traffic Phases. Work Zone traffic analysis shall be performed in accordance with the methods and tools described in SHA’s “Work Zone Lane Closure Analysis Guidelines”. Mobility impacts shall be limited to the allowable mobility thresholds, except as noted below, as described in the “Work Zone Lane Closure Analysis Guidelines”. The following are supplemental information for application of SHA’s “Work Zone Lane Closure Analysis Guidelines” in Baltimore City:

- A) Existing Traffic Signal Timing and Phasing** – are available by contacting the Baltimore City Traffic Division at 443-984-2159.
- B) Limits of the Study Network:** the limits of the study network shall include Central Avenue from Lancaster Street to Baltimore Street, and all detour routes. See section *3.16.04.06 Detour Routes* for the intersections included within the detour routes.
- C) Traffic Volumes:** 2013 Existing AM and PM peak hour traffic volumes are provided in PS 3.12.02.02. The Designer-Builder will be required to perform intersection turning movement counts for all intersections included in the Limits of the Study Network.
- D) Origin-Destination Date:** may be estimated using sample data sets or other field observations. Data collection, sample size and estimation methodologies must be documented.
- E) Mobility Thresholds:** The City recognizes that specific work activities and time periods may make it infeasible to comply with the threshold levels contained in the Work Zone Lane Closure Analysis Guidelines. These circumstances shall be outlined in the TMP. For these situations, the Design – Builder shall identify and analyze other MOT alternatives to reduce the mobility impacts below thresholds. If the MOT Alternatives Analysis does not produce an option that reduces impacts below thresholds, the Design-Builder shall propose additional impact management strategies (transportation operations and/or public information and outreach strategies) to minimize the impact, subject to review and approval by the City.
- F) Mitigation for Detours:** The Designer-Builder shall mitigate the impact of traffic due to the detours to a “level” equal to or better than the existing condition “levels.” The word “level” as used herein shall mean that the

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following measure of effectiveness. Each shall be equal to or better than existing “levels.”

1. HCM Intersection Level of Service
2. HCM Lane Group Level of Service, v/c ratios and average delay
3. Synchro 95th percentile queue

The area for which this criteria shall apply shall be all intersection impacted by detoured traffic, except those on Central Avenue between Lombard Street and Aliceanna Street. The following guidance is provided in order to limit the range of possible solutions, so as not to put an undue burden on the Designer-Builder to upgrade intersections outside of the Central Avenue corridor. The Designer-Builder's responsibilities shall be:

1. Limited to improvements within the travelled way; widening of the existing roadways is not required, nor is desirable.
2. Lane configuration changes, including changeable lane assignments by time-of-day using changeable signs.
3. Traffic signal phasing
4. Restriction of parking in order to provide additional lanes
5. Other methods, as appropriate.

Elements to be included in the traffic analysis portion of the TMP include:

- G) Traffic and Travel Characteristics at the Project Location** – Include a summary of traffic and travel characteristics in the project area. This may include recurring congestion issues (pre-existing bottlenecks, high-volume areas, etc.) and non-recurring congestion issues (special event traffic issues, weather related delays, potential for incident related traffic congestion, etc), heavy vehicle volumes, directional traffic, and recreational or seasonal traffic issues.
- H) Traffic Analysis Strategies** – Include a brief description on how the expected traffic conditions during construction were determined. Include source and date of traffic data. Any traffic reduction factors or other parameters assumed for the calculations should be documented.
- I) Identify Measures of Effectiveness** – List the measure of effectiveness used for the analysis, such as capacity, volume, queue, travel time, diversion rates, safety, adequacy of detour routes, etc.
- J) Analysis Tool Selection** – List the traffic analysis tools used.
- K) Mobility Implications of Construction Approach(es)** – Discuss construction approaches that have the potential to impact mobility during the project. This may include detours, doing work at night to reduce traffic delays, or traffic capacity and management issues that may exist on a proposed detour route.
- L) Analysis Results** – Compare existing and construction traffic conditions and operations, with and without work zone impact management strategies (where included). Detour route analysis should be included where detours

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will be used. Traffic analysis should also address, in more quantitative manner than the general impacts assessment, the impacts on:

1. Access for residences, businesses, and non-emergency services
2. Access for pedestrians, bicyclists and persons with disabilities
3. Emergency service impacts (fire, ambulance, police, and hospitals)
4. Safety
5. Adequacy of detour routes
6. Intersection traffic control (signal timing, signage, etc.)
7. Heavy vehicle traffic (including over-height, over-weight vehicles)
8. Transit operations (bus stops, school buses, other transit operations)
9. Seasonal impacts (special events, etc.)

3.16.05.05 Approved Analysis Techniques and Software

The Design – Builder may utilize the following software packages for analysis of Maintenance of Traffic Plans to evaluate expected delays, queues, and level of service under maintenance of traffic phases.

- A) Highway Capacity Software (HCS+) (version 5.3 or higher),
- B) Synchro/SimTraffic (version 8.0 or higher), or
- C) Approved Equal

3.16.05.06 Additional Work Zone Impact Management Strategies

In addition to the impact management strategies and MOT requirements included in this Performance Specification, the Design – Build Team shall list any additional work zone impact management strategies that will be included and discuss anticipated traffic and/or safety impacts of the strategy. The Design-Builder is encouraged to provide additional, cost-effective services to enhance overall Maintenance of Traffic. Additional services should adhere to the standards and be a supplement to the services outlined in this Performance Specification. Any such enhancements may be implemented at any time during the Project and are subject to the City’s written acceptance.

3.16.05.07 Access and Mobility Plan

The Design – Builder shall develop an Access and Mobility Plan depicting construction access points and the method of maintaining access to local businesses during construction. The Access and Mobility Plan shall be reviewed through the design review process with participation by the City. Plans shall be presented on paper no smaller than 11” by 17” with appropriate scale.

3.16.05.08 Contingency Plan

The Design – Builder shall develop a contingency plan that specifies actions that will be

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taken to minimize traffic impacts should unexpected events (unforeseen traffic demand, inclement weather, special events, etc.) occur in the work zone. This plan should also address activities under the Contractor's control within the work zone. The contingency plan should include, but not be limited to, the following:

- A) Information that clearly defines trigger points which require lane closure lifting (i.e., inclement weather, length of traffic queue exceed thresholds);
- B) Decision tree with clearly defined lines of communication and authority;
- C) Specific duties of all participants during lane closure operations, such as coordination with Baltimore City Police and other emergency personnel;
- D) Standby equipment and availability of personnel for callout.

3.16.05.09 Incident Management Plan

The Design – Builder shall develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies. The incident management plan shall meet the following requirements:

- A) Immediately following the initiation of actions necessary for the security of people and property, the Design – Builder shall coordinate with the City on the investigation(s) of accidents and/or other incidents.
- B) At a minimum, the Design – Builder shall provide documentation to the City with details on:
 - 1. Cause of disruption (i.e., whether it is construction oriented or not);
 - 2. Actions being taken to alleviate the problem;
 - 3. Responsible parties for the actions; and
 - 4. Anticipated duration of the disruption.
- C) The Design – Builder shall establish and manage an emergency response telephone tree per the requirements of TC 3.20 – Public Outreach Performance Specification. All appropriate emergency response agencies shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations.

3.16.05.10 Implementation and Monitoring Plan

The implementation and monitoring plan shall define processes to ensure that the Transportation Management Plan and associated elements, including the Traffic Control Plans and Incident Management Plan, are developed and implemented efficiently and appropriately, and that they are kept up-to-date with necessary modifications during the project.

3.16.05.11 Review of and Revisions to TMP Report

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The TMP shall be submitted to the City for review at the Definitive Design stage. No construction shall occur until the City's comments have been successfully addressed.

Any major changes to the TMP Report and associated analyses presented during Definitive Design shall be submitted along with the supporting analyses and documentation to the City for review and comment at least 45 days prior to implementing the proposed change. Changes to construction phasing/staging or other impact management strategies that will have a substantial impact on safety or mobility in the project area can be considered major changes. Minor changes (e.g., change to work zone speed limit) shall be submitted to the City at least 7 days prior to implementing the proposed change.

3.16.06 Traffic Control Plans

MOT Phase Plans shall be developed for each major phase of construction that requires diversion of traffic. MOT Phase Plans shall be presented on paper no smaller than 24" by 36" with appropriate scale. The Design – Builder shall prepare and present each MOT Phase Plan for review and approval by the City. The MOT Phase Plans shall be site specific for each separate portion of Work and shall not simply reference typical drawings, taper tables, or illustrations in various City Standards/Details, the MUTCD 2009 or the latest MD MUTCD. The following components shall be included in/with each MOT Phase Plan:

- A) Description of MOT phase with respect to lane or road closures and proposed detour routes;
- B) Traffic Analysis/Traffic Modeling for the MOT phase, and any required revisions to the MOTAA included in the TMP;
- C) Recommended Signal timing plans (Note: Synchro timing chart print-outs are acceptable), if changed;
- D) Temporary roadways and striping plans;
- E) Appropriate channelizing devices and barrier locations with spacing and type of barricades;
- F) All temporary traffic control devices necessary to safely and efficiently construct a particular portion of Work;
- G) Motorist information and guidance;
- H) Temporary signing, signals, and lighting plans, including the need to relocate or cover existing signal heads or signs based on temporary lane configurations;
- I) Specific sign messages with sign sizes, spacing or referenced distances, and MUTCD 2009 or latest MD MUTCD sign designations. The Design–Builder shall provide details for all proposed non-standard signs;
- J) Proposed phased construction of permanent signing;
- K) Proposed phased construction of traffic signals;
- L) Pavement marking changes shall be specific and clearly shown on the MOT Phase Plan with respect to lane widths and pavement marking

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- material, color, location, and widths. Dimensions are necessary to assure proper installation of the pavement markings;
- M) Flagging locations; and
- N) Emergency response information.

3.16.06.01 Review of and Revisions to Traffic Control Plans (TCP)

Major changes (e.g., changes in construction phasing or staging) to the approved Traffic Control Plans shall be submitted along with the supporting analysis and documentation to the City for review and comment at least 14 days prior to implementing the proposed change. Minor changes (e.g., slight changes in traffic shift location or taper lengths) shall be submitted to the City for review and comment at least three (3) days prior to implementing the proposed change.

SHA understands that certain changes to traffic control setups may need to occur in a timely manner during construction to address urgent safety or mobility problems. These changes should be discussed with the City before implementation; however, revisions to the TCP may be documented after their implementation in these circumstances. In these situations, TCP revisions should be documented either through plan revisions or approved Field Design Changes (FDC) within 10 days of their implementation. All TCP changes shall be reflected in revisions to the TMP Report when necessary and these revisions shall be made within 21 days of their implementation.

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Provide drainage systems, stormwater management, and erosion and sediment control required to serve the Project defined in these Contract Documents. This can necessitate the assessment and improvement of existing drainage and stormwater management as well as the construction of new facilities. Ensure that new or rehabilitated facilities cause no adverse impacts upstream and downstream of the project site.

3.17.02 GUIDELINES AND REFERENCES**3.17.02.01 Guidelines**

Design and construct the drainage systems, stormwater management, and erosion and sediment control measures according to the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated. The Guidelines cited in this specification establish requirements that have precedence over all others. If the requirements in any guideline conflict with those in another; the guideline listed with the higher priority governs. Obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed guideline as of the publication date of this RFP.

TABLE 1 GUIDELINES FOR DRAINAGE		
Priority	Author Or Agency	Title
1	City of Baltimore	City of Baltimore Department of Public Works "Manual of Design Procedure and Criteria" Chapter 4: Design of Storm Water Systems
2	MDE	Regulation COMAR 26.17.01, "Erosion and Sediment Control"
5	MDE	2010 Maryland Standards and Specifications for Soil Erosion and Sediment Control"
6	MDE	National Pollutant Discharge Elimination System General Permit for Construction Activity
7	MDE	Regulations COMAR 26.17.02, "Stormwater Management"
9	MDE	"2000 Maryland Stormwater Design Manual", Volumes I and II.
10	City of Baltimore	City of Baltimore Department Stormwater Management Ordinance
11	City of Baltimore	City of Baltimore Department Stormwater Management Manual 2003 and pending updates

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TABLE 1 GUIDELINES FOR DRAINAGE		
Priority	Author Or Agency	Title
12	MDE	Regulations COMAR 26.17.04 "Construction on Nontidal Water and Floodplains."
13	MDE	"Guidelines for Construction on Nontidal Waters and Floodplains."
14	MDE	Regulation COMAR 26.08.02.10, "Water Quality Certification"
15	NRCS	Pond Code MD-378
16	MSHA	MSHA Highway Drainage Manual

3.17.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the drainage system, stormwater management, and erosion and sediment control measures. These publications have no established order of precedence.

TABLE 2 REFERENCES FOR DRAINAGE	
Author or Agency	Title
City of Baltimore	DPW-Approved SWM Concept Report
City of Baltimore	Standard Details for Construction
MSHA	Standard Specifications for Construction and Materials (most current edition)

3.17.03 REQUIREMENTS

3.17.03.01 Surface Drainage Design

Design all surface drainage conveyances including but not limited to open channels, inlets, closed storm drainage systems, cross culverts and entrance driveway pipes. Submit the drainage design, in report form as indicated herein, to the City for review and concurrence prior to construction.

Waterway Construction (COMAR 26.17.04) review and approval is required for temporary and permanent tidal and non-tidal waterway impacts. Deliver submittals for MDE approval to the City for review and coordination with MDE. The City will review and comment on the Design-Builder's plans. Once satisfied that the plans will meet the requirements of the MDE/USACOE Letter of Authorization, the City will coordinate with regulatory agencies to obtain formal approval of the Design-Builder's Waterway Construction plans and calculations.

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3.17.03.01.01 Surface Drainage Design - General Requirements

Perform drainage design shall be performed according to the following criteria and regulations:

- A. Design and construct the drainage system including the repair, rehabilitation and/or replacement of existing unstable or deteriorating pipes, drainage structures and connections to the Harford Run Drain. The Design-Build Team shall be responsible for the inspection of all drainage systems as described herein, including Closed Circuit Television (CCTV) if necessary. Repair, rehabilitation or replacement of the existing drainage system shall include all roadway drainage elements within the project limits. It shall also include existing inlet structures immediately at the termination of curb returns along the streets intersecting Central Avenue. The Design-Build Team shall present the findings of the storm drain system investigation to the Engineer along with recommendations for rehabilitation or rehabilitation, who shall make the final determination of pipes and structures which must be replaced or rehabilitated. The design shall also include the replacement of adversely sloped and level (zero gradient) pipes to remove adverse slopes and provide positive drainage. Ultimate determination of minimal pipe slopes shall be made by DPW.
- B. Clean all existing and new pipes and drainage structures in order to be free of debris and sediment at conclusion of project. All removed material shall be disposed of in accordance with all applicable regulations as well as the requirements of the Contract documents.
- C. Inspect all existing pipes and drainage structures to be used in the Final Design and assess for structural integrity and hydraulic capacity. Compile inspection reports and submit for concurrence. Include photographs and a written report describing the structural integrity of the drainage structure. Repair or replace all existing pipes and drainage structures failing to meet structural integrity or hydraulic requirements.
- D. Remove all existing pipes and drainage structures which will not be used in the Final Design or abandon by filling with Flowable Backfill.
- E. Provide positive drainage flow in all open and closed systems. Ultimate determination of minimal pipe slopes shall be made by DPW. Complete designs and obtain City approval prior to construction of all temporary and permanent pipe systems.
- F. Construct work so as to not trap water along any section or phase of construction. If during design or construction an area of the Project is identified as not having positive drainage in pre-construction conditions, provide adequate measures to ensure positive drainage after construction.

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- G. Provide adequate connections to maintain all existing drainage systems. Ensure that adequate drainage is provided during interim paving operations (e.g., constructing asphalt berms to divert flow from base course paving to storm drains in closed sections or other precautions as necessary).
- H. No adverse impacts to upstream or downstream properties, infrastructure, or environmental resources are allowed.
- I. The Design-Builder shall have the responsibility of identifying and maintaining flow at all times through all building downspouts discharging within the project limits. In addition, downspouts shall either be extended under sidewalk and discharge to the flowline of the curb and gutter or be extended to planting pits as described in the Roadside Landscape and Reforestation Design Performance Specifications.

3.17.03.01.02 Surface Drainage Design - Specific Criteria

This section contains criteria that are in addition to that contained under Drainage Design General Requirements. Where conflicts arise between these Specific Criteria and those contained in the General Requirements, these Specific Criteria have precedence.

3.17.03.01.02.02 Roadway Drainage Design

- A. The maximum allowable flow spread in a closed section for a 10-year storm event is 6-feet where limited parking is proposed at the curb lane and one-third of the roadway width (12-feet maximum) where unlimited parking is proposed at the curb lane.
- B. The maximum allowable flow across entrances is 1 cfs for the 2-year storm event. Maximum flow from the end of curb and gutter is 0.5 cfs for the 2-year storm event.
- C. Where practicable, use the roadway inlets and drainage structures in accordance with City standards. Submit for approval non-standard structures prior to construction. Within the travel or turning lanes, COG or COS inlets are preferred. If it is necessary to use grated inlets within the travel or turning lanes, place concrete aprons around the inlets unless specifically waived. Where grate inlets are used, bicycle friendly grates or curved vane grates are required unless specifically exempted. Ensure that inlets in or immediately adjacent to (within 1-foot from outside of sidewalk stripping to edge of inlet grate) crosswalks are compliant with the American with Disabilities Act (ADA).
- D. No breaks in curb, such as curb cuts, are allowed for drainage purposes.
- E. Design ditches to ensure positive drainage flow. Standing water is not

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acceptable, except for stormwater management. Design side ditch capacity to convey the 10-year storm with 9-inches of freeboard between the calculated normal flow depth and the edge of pavement.

- F. Design ditch linings using HEC-15 "Design of Roadside Channels with Flexible Linings ". Where practicable, the use of Soil Stabilization Matting (SSM) rather than riprap is preferred. Type A matting is temporary matting and is used in ditches where shear stress is less than 1.75 psf or for slope stabilization. Type B matting, permanent matting designed to reinforce the turf stems, is used in ditches where shear stresses are between 1.75 and 3.0 psf. Type C matting is a soil infilled permanent matting used to reinforce the turf root system and is used in conjunction with type B matting where shear stresses are between 1.75 and 7.0 psf.

- G. Design pipe outfalls using HEC-14 "Hydraulic Design of Energy Dissipaters for Culverts & Channels" Calculate outlet velocity and at a minimum, provide outfall protection for the same design storm as the culvert. Where conditions indicate that greater outfall velocity may occur at a lesser storm event, provide protection for that event
 - i. Riprap outfalls may be used when the outlet Froude number (Fr) is less than or equal to 2.5. Consider stability of the surface at the termination of the apron.
 - ii. Design riprap aprons using Charts in Appendix B to the Culverts section of the MSHA Highway Drainage Manual Design Guidelines
 - 1. No. 405.8 "Design of Outlet Protection Minimum Tailwater Condition" is for use where:
 - o Tailwater is less than ½ the culvert height and the culvert outlets onto flat areas with no defined channel.
 - o Tailwater is less than ½ the culvert height and the receiving stream is wide enough to accept divergence of the flow.
 - 2. No 405.9 "Design of Outlet Protection Maximum Tailwater Condition" is for use where:
 - o Tailwater is greater than ½ the culvert height.
 - o Culvert discharges into a confined channel
 - iii. Riprap lined preformed scour holes may also be used when the outlet Fr is less than or equal to 2.5.
 - iv. The design of outlet protection for the Harford Run Drain at its Lancaster Street outlet is not required.

- H. Concrete lined ditches and concrete slope or channel protection are not allowed unless prior approval is received from the City.

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- I. Refer to Geotechnical Performance Specifications for slope design and construction requirements, and the Environmental Performance Specification for permitted wetland impacts and wetland avoidance.
- J. Obtain written approval prior to construction for conversion of existing drainage structures into junction boxes within the roadway. Inspection report data shall be provided for the City's review and written comment.
- K. A 100 year service life is required for all added, rehabilitated or replaced storm drain pipe. The Design-Builder shall have the responsibility of submitting pipe manufacturer's service life certifications.
- L. Size all added or replaced storm drain so that the 10 year hydraulic grade line remains below the top of all added, replaced, and existing structures.

3.17.03.02 Floodplain and Waterway/Wetland Coordination

The Design-Build Team is responsible for coordinating analysis of applicable drainage crossings with MDE, USACOE FEMA and the City. Restrictions on construction in the 100-year floodplain can be found in Structural Design Performance Specification.

Prior to construction, the City may be required to notify property owners adjacent to floodplains and jurisdictional tidal and non-tidal waterways and wetlands of the upcoming construction project. Incorporate the time requirements of this notice into the design and construction schedule, and make available the necessary construction plans for property owner review, in accordance with MDE Water Management Administration requirements.

3.17.03.03 Stormwater Management (SWM)

The DPW-approved Concept SWM Report addresses management for the maximum project limits; however, if a revised roadway improvement scope is implemented, it is the Design-Builder's responsibility to provide management acceptable to the City.

3.17.03.03.01 BMP Selection

The City desires to integrate the projects landscape and stormwater management elements by implementing the proposed planting pits as bioretention inlets. The Concept SWM Report proposes locations where the tree pits are conceptually proposed to be designed as biofiltration facilities. A detail of the Tree Pit Biofiltration Modification that the City has approved is included for the Design-Builder's information at the end of this specification.

Final determination of the feasibility of implementing the tree pits at the conceptual

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location shall be the responsibility of the Design-Build and shall take into consideration existing and proposed utility impacts, impacts to ADA elements and any other site elements that may prohibit their construction.

In the event that the tree pits and other greening devices cannot be implemented to the extent necessary to fully meet the projects stormwater management requirements, the Design-Builder may use the City's fee-in-lieu option, after demonstrating to DOT/DPW that no other viable Environmental Site Design alternatives exist. The fee-in-lieu amount shall be paid to the City of Baltimore Department of Public Works and shall be calculated by multiplying the net Impervious Area Requiring Treatment in acres (subtracting the area treated by the tree pits) by \$80,000.

3.17.03.03.02 SWM Specific Engineering Criteria

- A. The Tree Pit Biofiltration facilities shall be designed as micro-bioretenion facilities in accordance with the most recent version of the 2000 Maryland Stormwater Design Manual, Chapter 5.
- B. Storm drain inlets shall be located immediately downstream of the tree pits in order to accept runoff in excess of the facilities treated Environmental Site Design (ESD) volume (ESD_v).
- C. Coordinate details for all the new stormwater management facilities throughout the Project and ensure that they are worked into the concepts for the corridor landscaping.
- D. Obtain a BMP number for each SWM facility constructed on the Project.
- E. The minimum required service life for the structural elements (including pipes) of the facilities is 50 years. Whenever any of the structural elements are under a roadway, or extend more than 10 feet below the surface, the minimum required service life is 100 years. The Design-Builder shall have the responsibility of submitting manufacturer's certificates of service life.

3.17.03.04 Erosion and Sediment Control (ESC)

Design, obtain approval from the City Department of Public Works, and implement an E & S Plan and Sequence of Construction. Obtain all approvals prior to commencing earth disturbing activities.

3.17.03.04.01 Severe Weather Event

Maintain erosion and sediment controls at all times. A severe weather event for erosion and sediment control purposes is defined as at least 3.0 inches of rainfall in a

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24 hour period. Maintain, repair, or replace any damaged devices within 48 hours of a severe weather event. A severe weather event shall be determined by rainfall data obtained from the nearest official National Weather Service gauge station to the project.

A lump sum payment of \$ [REDACTED] will be paid for each Severe Weather Event that occurs between the start of grading operations and removal of all erosion and sediment controls for which the Contractor is eligible. The payment will be full compensation for the maintenance, repair and/or replacement of any and all erosion and sediment control devices damaged by the severe weather event and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

3.17.03.04.02 ESC Specific Design Criteria

Coordinate Erosion and Sediment Control Plans with the Design-Builder's proposed Maintenance of Traffic scheme.

Clearly delineate the Limit of Disturbance (LOD) on the ESC Plans.

Evaluate slopes steeper than 2:1 for slope stability and prepare to promote vegetative growth according to Geotechnical Performance Specification and Planting and Landscape Architectural Performance Specification.

Ensure daily stabilization for land disturbance within any drainage areas adjacent to wetlands and streams in the design and implementation of the ESC plans.

Potential strategies to limit the potential for erosion may include, but are not limited to, the following:

- Use clear water diversions to the maximum extent feasible to limit the amount of area required to be controlled;
- Place utility trench excavation on high side of trench;
- Cover stockpiles with tarps or other approved means;
- Stage the construction to limit clearing, grubbing and area of disturbance to what is necessary to carry on a grading operation to minimize the area and duration of soil exposure;
- Provide top of fill berms with pipe slope drains to convey discharge down steep slopes,
- Bench long cut or fill slopes to limit the risk of rilling on steep slopes and to lessen the slope of longitudinal ditches; and

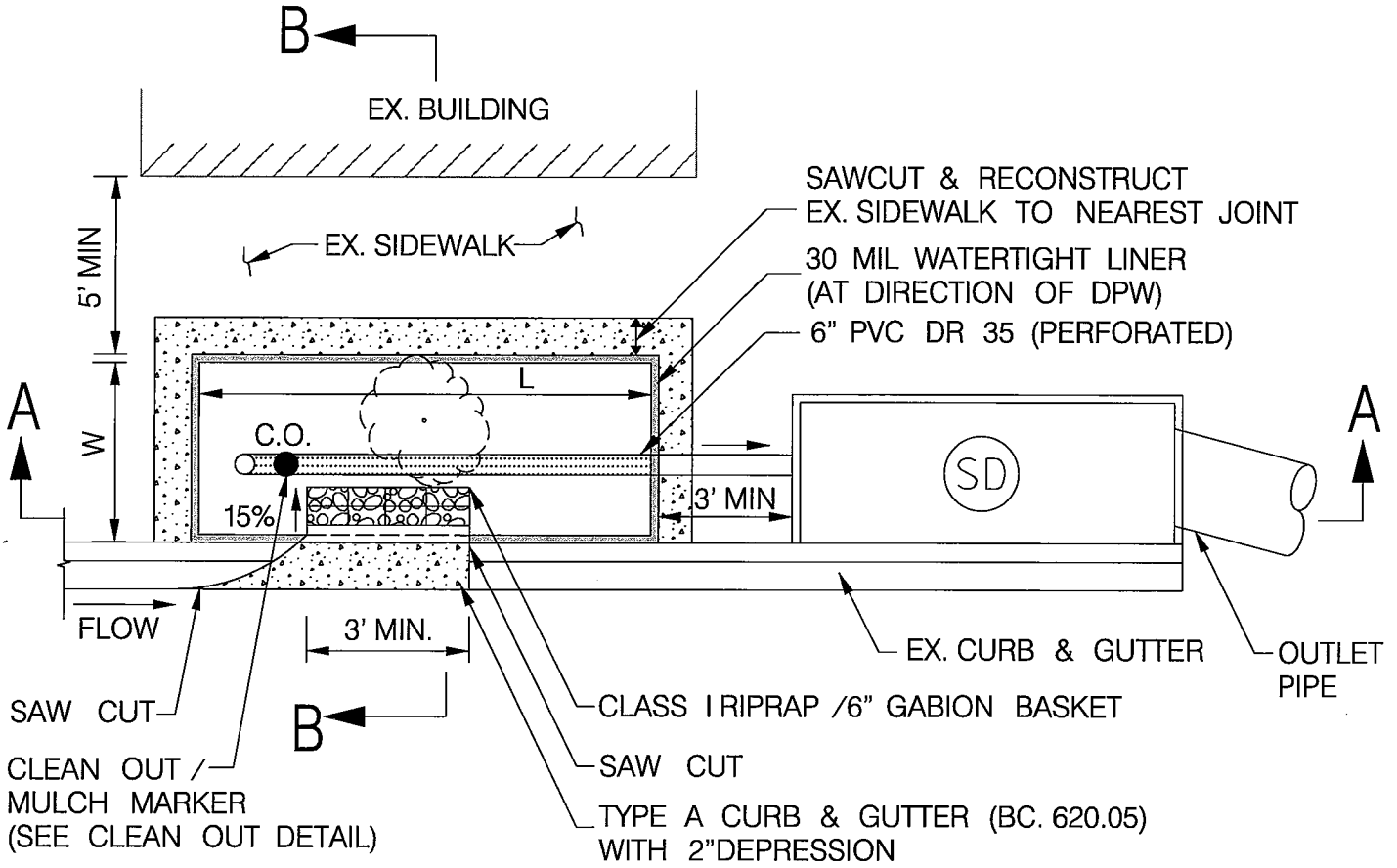
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- Other innovative techniques presented by the Design-Builder with prior written concurrence from the City prior to construction.

Make every attempt to retain sediment generated by construction operations within the site. Some examples of these may include, but are not limited to, the following:

- Stone check dams, compost socks, linings, strip sod, or other erosion inhibitors in influent ditches to sediment traps;
- Ensure effective drawdown and dewatering of sediment traps and basins prior to forecast rain events by pumping to filter bag(s) and mulch berm(s) or other approved devices to ensure that dewatered storage component of sediment trap is available for the future storm event(s);
- Minimize the potential for re-suspension of particulates; and
- Other innovative techniques presented by the Design-Builder with concurrence from the City prior to construction.




PLAN
NTS

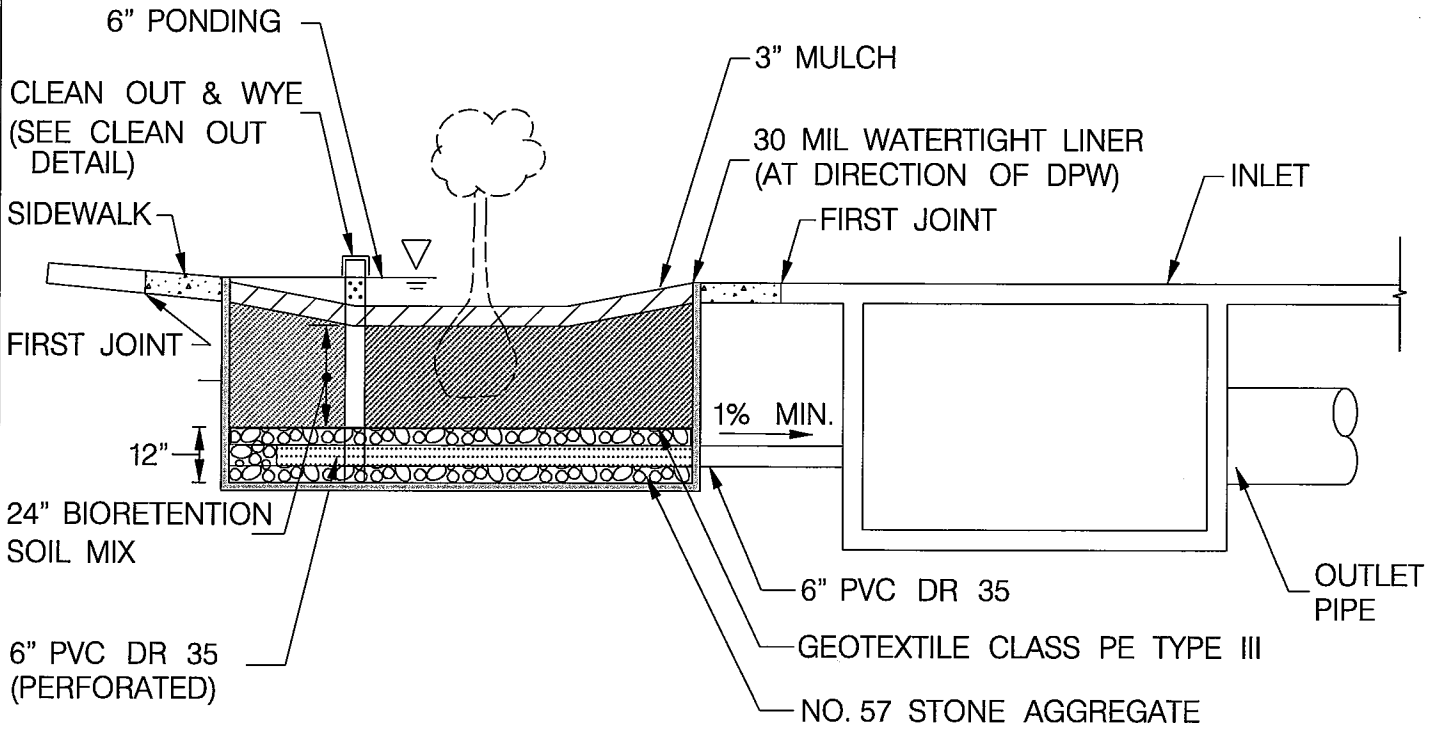
SIZES FOR BIO-FILTRATION (FEET)	
W	L
6	8
6	16

NOTES:

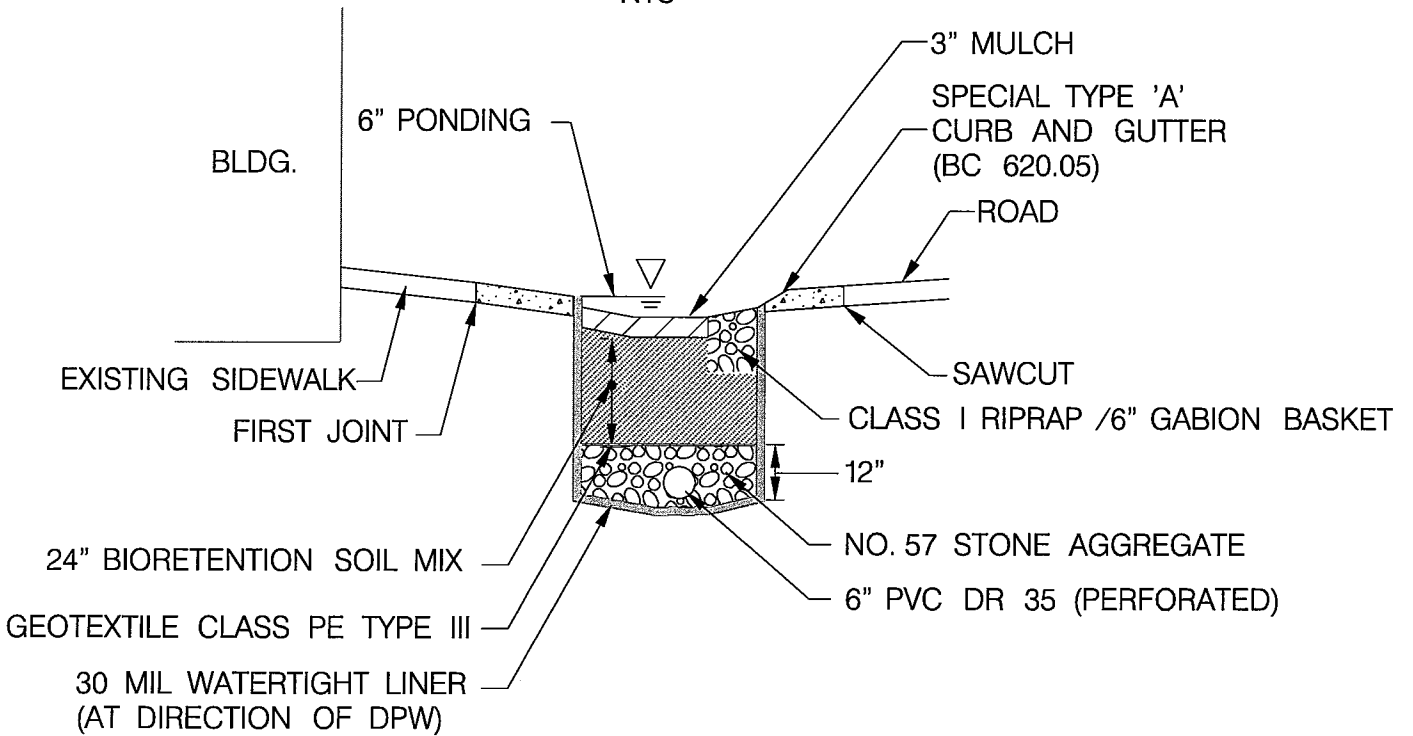
1. BIORETENTION AREA SHALL CONFORM TO THE SECTION 33 44 19.12 OF THE SPECIFICATIONS AND HAVE A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 5%.
2. ENGINEER SHALL PROVIDE 1"=10' SCALE GRADING PLAN SHOWING ALL CRITICAL ELEVATIONS INCLUDING: ELEVATION OF THE INFLOW, TOP OF THE PONDING AREA, BOTTOM OF THE PONDING AREA, ELEVATION OF THE BOTTOM OF CURB AT THE DOWNSTREAM INLET, AND ELEVATION OF THE OUTFLOW PIPE OF THE INLET.
3. ENGINEER SHALL PROVIDE A CROSS SECTION AND LONGITUDINAL SECTION OF BIORETENTION FACILITY SPECIFYING MULCH THICKNESS, PLANTING SOIL THICKNESS, GRAVEL AND UNDERDRAIN.
4. THE MINIMUM HORIZONTAL DISTANCE WITH EXISTING UTILITIES SHALL BE 3' AND THE MINIMUM VERTICAL DISTANCE SHALL BE 1', UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. A LANDSCAPE PLAN SHALL BE PROVIDED INCLUDING PLANTING LISTS (COMMON AND LATIN NAME), PLANT SPECIES, PLANT QUANTITY AND PLANT SPACING SHALL BE IN ACCORDANCE WITH SECTION 32 93 00 OF THE SPECIFICATIONS.
6. SIZING OF THE BIORETENTION FACILITY SHALL CONFORM TO THE MOST RECENT VERSION OF MARYLAND STORMWATER DESIGN MANUAL.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION	ISSUED	REVISED	REVISED
		TREE PIT BIO-FILTRATION MODIFICATION 6'X8' & 6'X16' TREE PIT <small>352</small> 351	STANDARD NO.		
			SCALE: NONE	SHEET 1 OF 5	

DRAFT - NOT FOR CONSTRUCTION



SECTION A-A
NTS



SECTION B-B
NTS



APPROVED :

**CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION**

**TREE PIT BIO-FILTRATION MODIFICATION
6'X8' & 6'X16' TREE PIT**

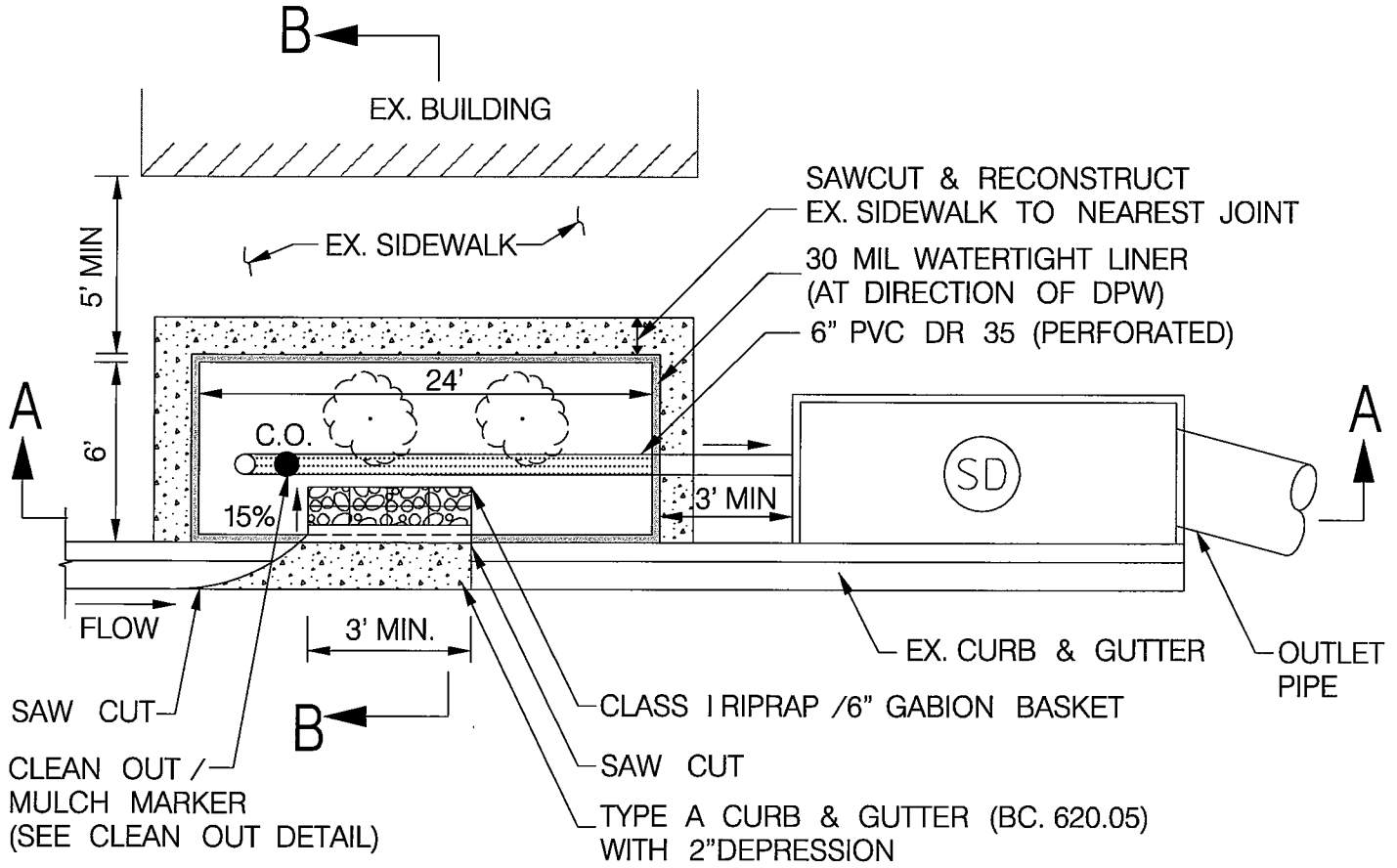
353
352

ISSUED	REVISED	REVISED

STANDARD NO.

SCALE: NONE


SHEET 2 OF 5

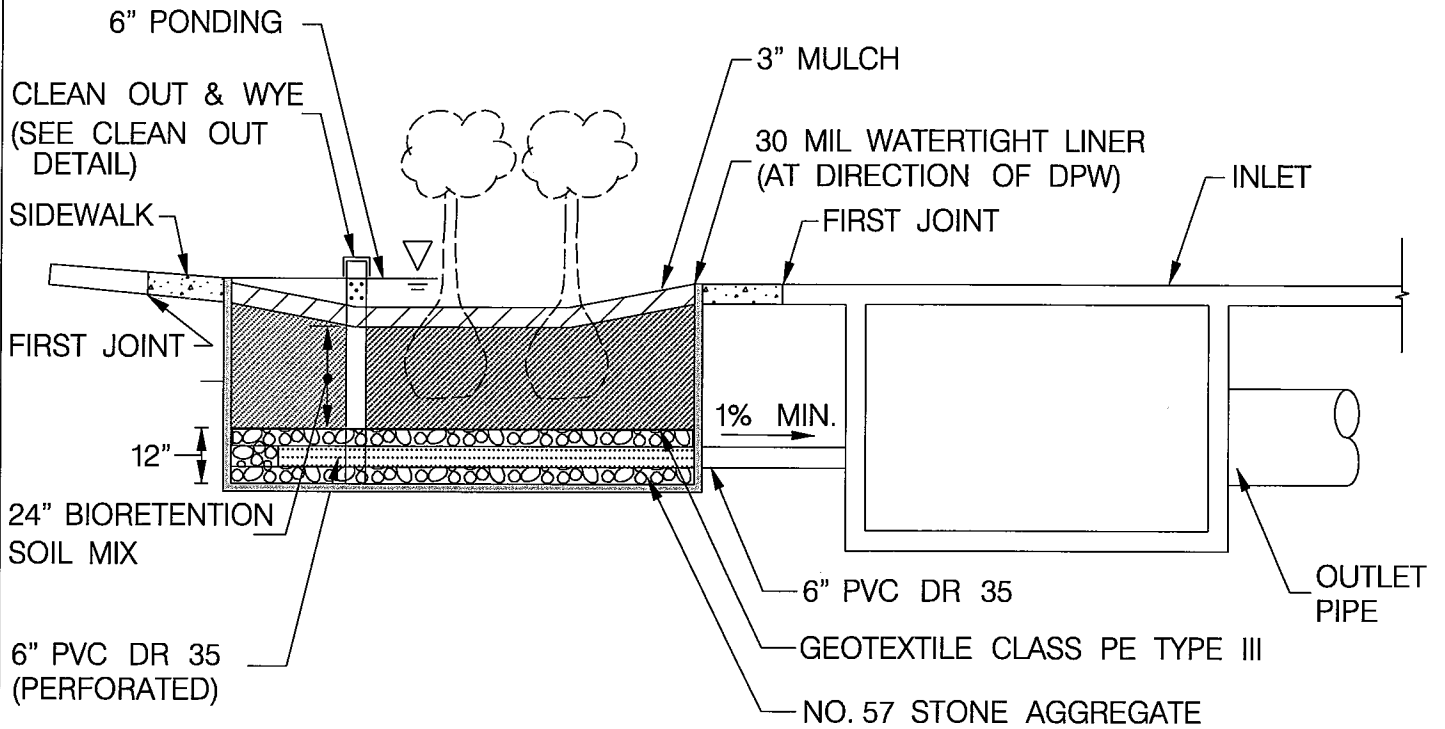


PLAN
NTS

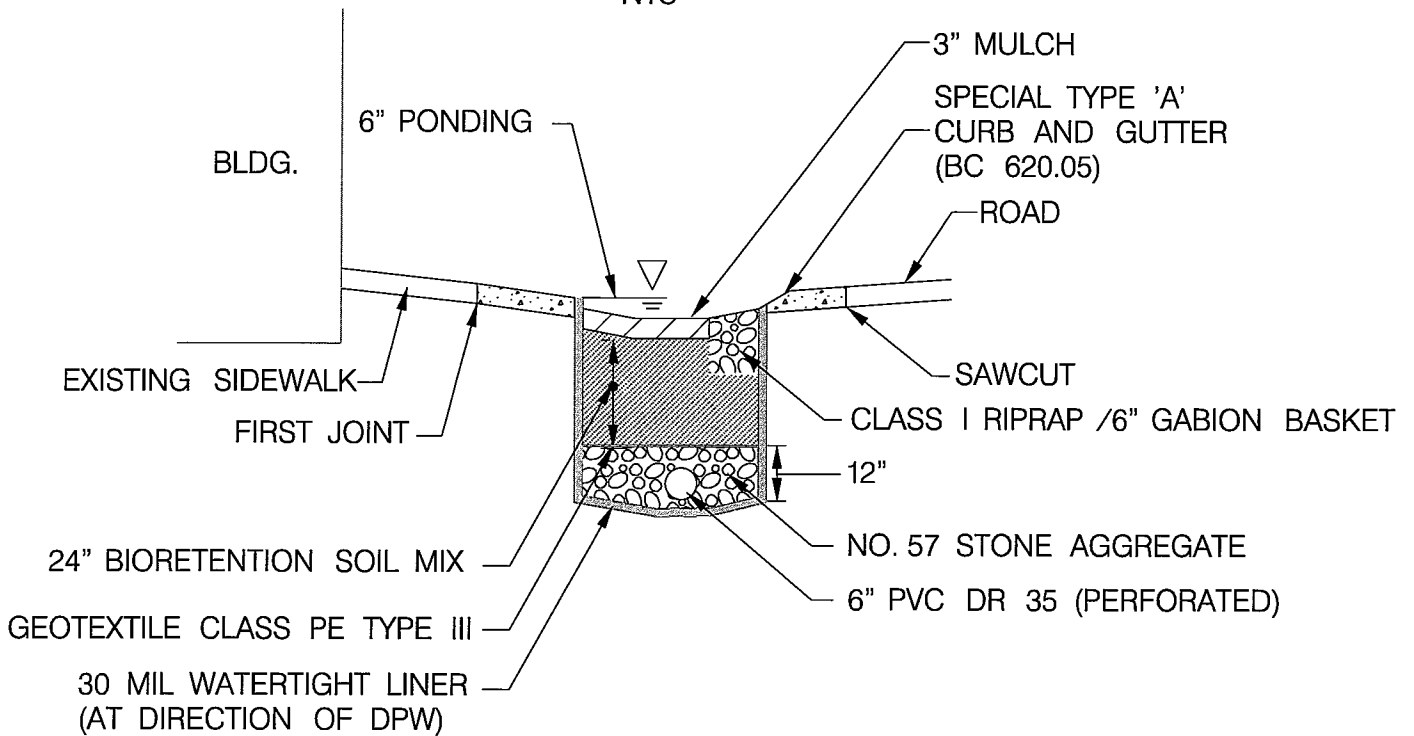
NOTES:

1. BIORETENTION AREA SHALL CONFORM TO THE SECTION 33 44 19.12 OF THE SPECIFICATIONS AND HAVE A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 5%.
2. ENGINEER SHALL PROVIDE 1"=10' SCALE GRADING PLAN SHOWING ALL CRITICAL ELEVATIONS INCLUDING: ELEVATION OF THE INFLOW, TOP OF THE PONDING AREA, BOTTOM OF THE PONDING AREA, ELEVATION OF THE BOTTOM OF CURB AT THE DOWNSTREAM INLET, AND ELEVATION OF THE OUTFLOW PIPE OF THE INLET.
3. ENGINEER SHALL PROVIDE A CROSS SECTION AND LONGITUDINAL SECTION OF BIORETENTION FACILITY SPECIFYING MULCH THICKNESS, PLANTING SOIL THICKNESS, GRAVEL AND UNDERDRAIN.
4. THE MINIMUM HORIZONTAL DISTANCE WITH EXISTING UTILITIES SHALL BE 3' AND THE MINIMUM VERTICAL DISTANCE SHALL BE 1', UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. A LANDSCAPE PLAN SHALL BE PROVIDED INCLUDING PLANTING LISTS (COMMON AND LATIN NAME), PLANT SPECIES, PLANT QUANTITY AND PLANT SPACING SHALL BE IN ACCORDANCE WITH SECTION 32 93 00 OF THE SPECIFICATIONS.
6. SIZING OF THE BIORETENTION FACILITY SHALL CONFORM TO THE MOST RECENT VERSION OF MARYLAND STORMWATER DESIGN MANUAL.

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION	ISSUED	REVISED	REVISED
		TREE PIT BIO-FILTRATION MODIFICATION 6'x24' TREE PIT 354 353	STANDARD NO.		
			SCALE: NONE	SHEET 3 OF 5	



SECTION A-A
NTS



SECTION B-B
NTS



APPROVED :

**CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION**

ISSUED

REVISED

REVISED

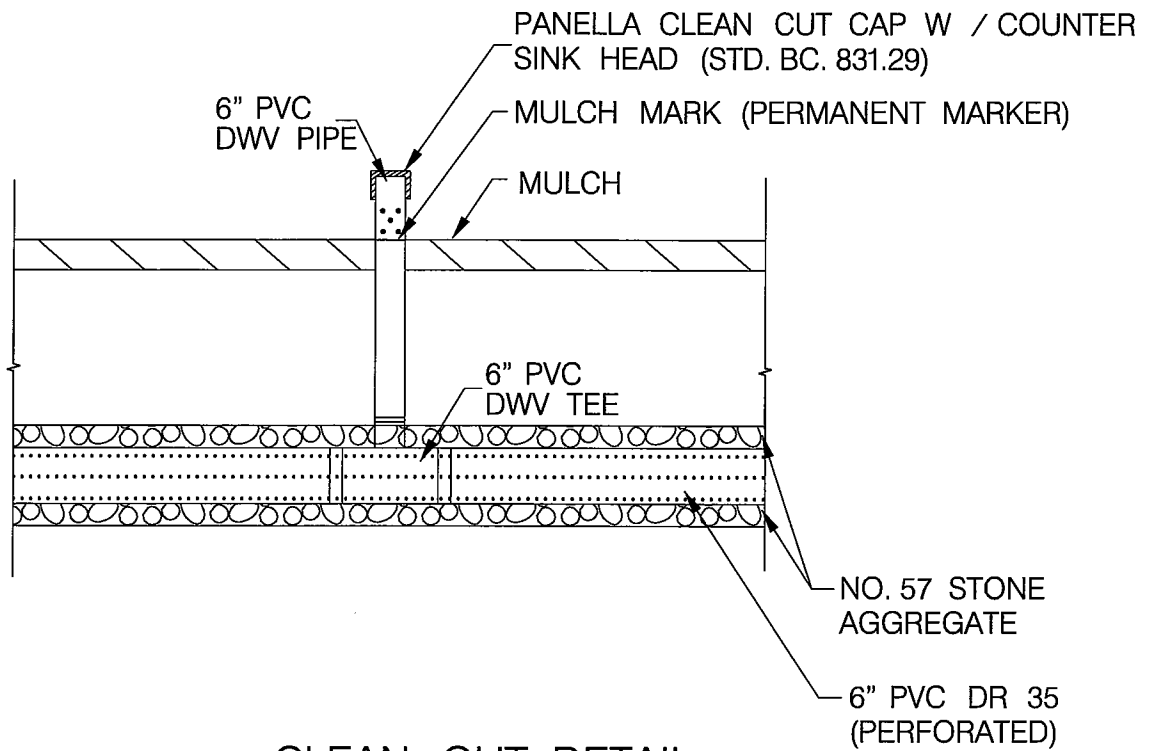
**TREE PIT BIO-FILTRATION MODIFICATION
6'X24' TREE PIT**

STANDARD NO.

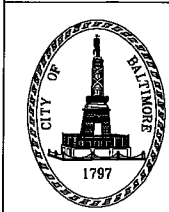
355
354

SCALE: NONE

SHEET 4 OF 5



CLEAN OUT DETAIL
NTS



APPROVED :

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION

TREE PIT BIO-FILTRATION MODIFICATION
CLEAN OUT DETAIL

356
355

ISSUED	REVISED	REVISED
STANDARD NO.		
SCALE: NONE	SHEET 5 OF 5	

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

TC 3.18 ENVIRONMENTAL PERFORMANCE SPECIFICATION

3.18.01 General

The Design-Builder shall conduct its design and construction activities in accordance with these specifications such that no action or inaction on the part of the Design-Builder shall result in non-compliance with the requirements of the necessary permits and approvals required by the Project.

3.18.01.01 General Environmental Philosophy

The Baltimore City (City) Central Avenue Project, Phases 1 and 2, passes through an area of diverse community. Protection of any existing resources is of paramount importance. The philosophy followed by the City during the development of the Concept Plans was to incorporate environmental stewardship measures and avoid and minimize impacts to the any natural areas, trees, waterways, Chesapeake Bay Critical Area, community, cultural resources (Section 106 Resources), and Parkland (Section 4(f)) to the greatest extent feasible and practical. The Design-Builder shall continue this environmentally sensitive approach and philosophy during the preparation of final design plans and through Project implementation. The City has implemented innovative approaches to reward the Design-Builder for high quality environmental performance, as stated in various sections of this Performance Specification. These innovative approaches include incentives for reductions to wetland/waterway impacts.

3.18.02 Guidelines and References

The Design-Builder shall design and implement Environmental requirements in accordance with the relevant requirements of the Guidelines listed by priority in Table 1 unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Appropriate professional standards and regulations shall be utilized for design and construction implementation of all commitments, considerations, permit conditions and approval requirements.

Guidelines shall include, but are not limited to the following:

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

**TABLE 1
GUIDELINES FOR ENVIRONMENTAL**

Priority	Author or Agency	Title
1		Section 106 of the National Historical Preservation Act (16 USC § 470f)
2		Section 4(f) of the US Department of Transportation Act (23 USC § 138)
3		Code of Federal Regulations (CFR)
4		Code of Maryland Regulations (COMAR)
5	MDE/USACE	NPDES General Discharge Permit - Notice of Intent (NOI) Joint Federal / State MDSPGP-4 Permit Application and Authorization Chesapeake Bay Critical Area Regulations and Local Ordinance Maryland Forest Conservation Act and Local Ordinance Baltimore City Tree Protection Ordinance
6		Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (1983 and successors)
7		Standards and Guidelines for Archeological Investigations in Maryland (Shaffer and Cole 1994)
8		Standards and Guidelines for Architectural and Historical Investigations in Maryland (Maryland Historical Trust, 2000)
9		Recommended Approach for Consultation on Recovery of Significant Information from Archeological Sites, ACFIP 1999 (64 FR 27085-27087)
10		Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68)
11	SHA	Standard Specifications for Construction and Materials
12	SHA	Book of Standards for Highways and Incidental Structures National Environmental Policy Act (NEPA) Resource and Recovery Conservation Act (RCRA) Previous investigations: Phase I and Phase II Environmental Site Assessments

183.18.04 Design-Builder's Responsibilities

The Design-Builder shall be responsible for compliance with the NEPA commitments and permit conditions throughout the design and construction of the Project.

3.18.05 Permits and Approvals

The Administration will be relying on the Design-Builder to achieve and maintain commitments and permits through a strong partnering with the City. The Design-Builder is encouraged to consider environmental stewardship measures that exceed those in the standards and permits, while considering reasonable cost and practicality.

A. As part of this RFP, the City is providing the following permits and approvals based on the proposed activities:

- 1) National Environmental Policy Act Categorical Exclusion (NEPA CE)
- 2) Joint Federal / State MDSPGP-4 (from MDE and USACE)

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

- 3) Approval from U. S. Coast Guard
- 4) Approved Critical Area Plan including Landscape Mitigation from City

B. The Design-Builder shall obtain the following permits and/or approvals:

- 1) Tree removal and replanting plan from City Recreation and Parks Forestry Division
- 2) Erosion and Sediment Control Approval (from Baltimore City DPW)
- 3) Stormwater Management Permit (from Baltimore City DPW)
- 4) NPDES Discharge permit for groundwater dewatering (from MDE)
- 5) All other approvals, permits and licenses, pay all charges, fees and taxes and give notices necessary or appropriate for the implementation of the Project beyond those obtained by the City. This includes but is not limited to approvals for on or off-site staging, stockpiling areas, disposal sites and borrows pits; and

3.18.06 NEPA Reevaluation

The Design-Builder shall follow the commitments defined in the approved CE (both inside and outside of the RFP limits of disturbance), and shall evaluate modifications and/or proposed changes in design or construction activities for NEPA clearance including evaluations of the natural, social, and cultural environments. In addition, the environmental summary/reevaluation process shall be required by the following activities:

- 1) Change in scope or design
- 2) Change in limits of disturbance
- 3) Change in surrounding environment
- 4) New information becomes available
- 5) Change that occurs outside of the planning area evaluated in the CE, such as staging areas, and alignment shifts, and
- 6) Changes in applicable laws and regulations

The Design-Builder shall provide the environmental summary/reevaluation text to the City prior to construction. The Design-Builder is also responsible for preparing letters to regulatory agencies that may be necessary to obtain FHWA approvals of the environmental summary/reevaluation text. The City will coordinate approvals with FHWA. Delays due to environmental summary/reevaluation approval for design changes requested by the Design-Builder will not result in additional costs to the City, nor will the Contract be extended. All

SPECIAL PROVISIONS

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commitments in the CE shall be adhered to unless modifications are accepted and approved by the City and the regulatory agencies.

3.18.06 Permit Modifications and Approvals

The Design-Builder shall obtain approvals from the City for any changes in design and/or construction activities that affect any permit conditions and would require a modification approval from the regulatory agencies.

All conditions in the permits shall be adhered to unless modifications are accepted and approved by the City and the regulatory agencies.

Delays due to permit modification approval for permits listed in TC Section-3.18.05A, requested by the Design-Builder, will not result in additional costs to the City nor will the Contract be extended.

The Design-Builder shall not alter the design in such a manner that increases or creates new impacts to forest, trees, cultural resources, parkland, wetland, wetland buffer, waterway, or floodplain compared to those impacts which were authorized by the permits, illustrated in the Concept Plans and defined in the Joint Permit Application tables and approved Critical Area Landscaping plans. If the Design-Builder determines that changes to impacts are to be considered through design and/or construction, the Design-Builder shall be responsible for obtaining the permits, approvals or modifications from the regulatory agencies. Request for modification to the permits listed shall be accompanied by documentation provided by the Design-Builder to demonstrate that there is no practical alternative. Additional mitigation required with approval of modifications shall be the responsibility of the Design-Builder.

3.18.07 Natural Resources

3.18.07.01 Surface Water

For details on Erosion and Sediment Control and Stormwater Management, see the Drainage, Stormwater Management, and Erosion & Sediment Control Performance Specification.

The Design-Builder shall not discharge or allow the release of any sediment laden construction water unless properly treated. The Design-Builder shall obtain City approval of all dewatering operations prior to pumping and discharge. Water to be pumped and discharged shall be in conformance with the NPDES discharge permit requirements issued by MDE and COMAR Standards. When permissible, efforts should be made to minimize the mixing of uncontaminated and contaminated groundwater.

To minimize potential for untreated discharge, the Design-Builder shall designate, design and construct, utilize, maintain and upon conclusion of operations, properly close concrete wash-out pits for all concrete production, transport and placement operations.

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

The location of concrete wash-out pits shall be approved by the City prior to use. The pits shall be managed such that no concrete waste or wash water is discharged into waters of the US. This may include the implementation of drying beds with proper sediment controls and treatment of excess wash water on-site or proper off-site disposal.

If construction discharges exceed water quality standards identified in COMAR, the Design-Builder shall immediately notify the City and resolve any Project related deficiencies within 24 hours.

The City will request spot-check downloads at any time to verify compliance.

3.18.07.02 Aquatic Biota

The Design-Builder shall:

- A. Conduct all work so as to avoid/minimize fish mortality from both construction related water quality impairment and in-stream activities. The Design-Builder shall notify the City 48 hours prior to the commencement of any stream dewatering or other in-stream activities.
- B. Comply with all water quality standards stated in the COMAR for the protection of aquatic biota.
- C. Conduct all in-stream work for the culvert replacement and bridge pier construction in compliance with the Maryland mandated stream closure period for the **Use I stream (March 1 through June 15, inclusive in any year)**. Any riprap placed shall be constructed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to temporarily impound water.

3.18.07.03 Wetlands and Waters of the US

Direct impacts to waterways are anticipated to occur under the Project. The Table in the Joint Permit Application presents the total impacts permitted for the Central Avenue 3 Project. All wetlands and waterways were identified, delineated and surveyed within the Project. Surveyed boundaries of waterways and wetlands are depicted on the Concept Plans.

3.18.07.04 Occupying Wetlands/Waterways and Best Management Practices for Work in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains

See Contract Provisions CP – Occupying Waters.

3.18.07.05 Avoidance and Minimization

The City-proposed avoidance and minimization techniques during the planning and

SPECIAL PROVISIONS

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preliminary engineering phase consisted of alignment shifts where practicable.

The Design-Builder shall focus its efforts to continue to minimize impacts to waterways, floodplains, in all areas of the Project, especially sensitive areas. Engineering designs shall continue to emphasize avoidance and minimization of impacts as the feasibility and effectiveness of using.

3.18.07.06 Reforestation

Reforestation work shall include the performance of all required and applicable, Chesapeake Bay Critical Area, and City Tree permitting requirements associated with the Project.

3.18.07.06.01 Tree Avoidance and Minimization

Direct impacts to trees are anticipated to occur under the Project. Surveyed trees are depicted on the Concept Plans. Prior to performing any Work, the Design-Builder shall be responsible for performing all tree preservation measures in accordance with Section 120-Tree Preservation of the Standard Specifications for Construction and Materials.

All street trees were identified, evaluated and are depicted on the Landscape Plates. The Design-Builder shall avoid as many trees as possible without affecting resources with equal or greater regulatory protection. As the design advances, it may be found that trees are located near the outer edge of the required LOD/ROW or just outside the LOD/ROW. If this condition exists, the Design-Builder shall coordinate with the City to mark and provide a buffer for any such tree to avoid its removal during clearing and grubbing activities.

Before tree removal is approved by the City, every reasonable effort shall be made by the Design-Builder to minimize the cutting or clearing of trees. Only the minimum number of trees may be cut, and sound design practices shall be utilized.

3.18.07.06.02 Tree Mitigation

Land disturbed by construction activities shall be re-vegetated as soon as practical after construction is completed in accordance with the Drainage, Stormwater Management, and Erosion & Sediment Control and Planting & Landscape Architectural Performance Specifications.

Mitigation shall be the responsibility of the Design-Builder for additional impacts proposed beyond those originally approved by the City for the Project, and may include a site search, agency reviews and approvals, design, and obtaining right of way and construction. If available and compensation agreed, the City may allow the Design-Builder to use excess mitigation at the approved mitigation sites.

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3.18.07.06.03 Rare, Threatened and Endangered Species (RTE)

No federally listed rare, threatened, or endangered (RTE) species are anticipated to be directly impacted by construction of the Project.

3.18.07.07 Cultural Resources

Except where otherwise noted below, the City will be responsible for conducting all cultural resources activities. These activities will include all historic and archaeological testing and data recovery, coordination with the City staff and consultation with all federal, state and local historic preservation agencies and public parties, including affected landowners. The project is governed by a Memorandum of Agreement (MOA) between the City, the Federal Highway Administration (FHWA), and the Maryland Historical Trust (MHT).

- A. Unauthorized Project Impacts are prohibited;
- B. Material changes to the highway alignment that result in impact beyond those identified in the Concept Plans will not be allowed without the prior written consent of the City;
- C. Proposed changes shall be supported by the necessary investigations, documentation, and submittals needed for these approvals by applicable resource management agencies; and
- D. Time and cost implications resulting from design changes shall be solely borne by the Design-Builder.

3.18.07.07.01 Work Area Access During Design-Build Activities

The Design-Builder shall provide the City access to the work site to conduct cultural resources investigations as needed. The Design-Builder shall be responsible for coordinating an access plan that supports the timely completion of the required investigations. The City will make every effort to develop plans that avoid or minimize restriction of construction activities.

It is not anticipated that archeological resources are present within the area identified in the Concept Plans based on the negative results of prior studies; however, should such resources be encountered during Design-Build activities, the following procedures will be followed:

3.18.07.07.02 Unanticipated Discoveries of Archeological Resources During Design-Build Activities

In the event that previously unidentified archeological resources are discovered during ground disturbing activities, The Design-Builder shall immediately notify the

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

City's Project Engineer, and shall immediately halt construction work involving subsurface disturbance in the area of the archeological resource, and in the surrounding area where further subsurface remains can be expected to occur. The City's Project Engineer shall contact the Baltimore City Historic Preservation Office as 417 East Fayette St., 8th floor, Baltimore, MD 21202, (410) 396-4866, who shall notify the MD SHPO of the discovery.

The City and the MD SHPO, or an archeologist approved by them, shall immediately inspect the work site and determine the area and nature of the archeological resource. Following this inspection, construction may resume in the area outside the archeological resource as defined by the Administration and the MD SHPO.

Within no more than three working days of the original notification of discovery, the City, in conjunction with the MD SHPO, shall determine the National Register eligibility of the resource. If the resource is determined eligible for the National Register, the City shall prepare a plan for its avoidance, protection, recovery, or destruction without recovery. Such a plan shall be approved by the MD SHPO prior to implementation.

Work in the affected area shall not proceed until either:

- The development and implementation of appropriate data recovery or other recommended mitigation measures, or
- The determination is made that the located remains are not eligible for inclusion on the National Register.

3.18.07.08 Tracking of Sediment

The Design-Builder shall implement means to reduce tracking of sediment such as:

- A. Elongated and widened stone-stabilized construction entrances/exits;
- B. Use of wash racks;
- C. Use of street cleaning equipment;
- D. Increased maintenance of entrances; and
- E. On-site concrete wash-out pits in proximity to all major pour sites.

3.18.08 Submittals

The Design-Builder shall provide the following:

- A. Surveyed as-built 24x36 plans of post construction conditions in the same format as the Concept Plans and the revised impact tables that were included in the Joint State/Federal

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

Nontidal Wetlands and Waterways Permit application.

- B. Tree Impact Plans, including surveyed remaining and planted trees and any variations from approved tree impacts in a table. Final as-built and revised re-planting and landscape plans shall be provided for review and approval.

SPECIAL PROVISIONS**SCOPE OF WORK FOR DESIGN-BUILD****TC 3.19 CONTAMINATED AND HAZARDOUS MATERIALS PERFORMANCE SPECIFICATION****3.19.01 GENERAL**

The Design-Builder is responsible for the preparation/implementation of a site-specific plan for working with potentially hazardous materials. The plan shall address the risks associated with working with potentially contaminated material, including both soil and groundwater. These risks include both human exposure to contaminants and impacts to the environment. Site-specific information from the previous Phase I and Phase II Environmental Site Assessments identifies existing and potential recognized environmental concerns that may be encountered during construction activities. The Design-Builder shall develop a site-specific health and safety plan (HASP) to protect the health and safety of the contractors and subcontractors. Additionally, the Design-Builder is responsible for compliance with applicable local, state, and federal laws and regulations regarding management, handling and disposal of hazardous materials.

All work shall adhere to all current local, state and federal regulations and shall meet recognized American Society for Testing and Materials (ASTM) standards, including but not limited to:

Author or Agency	Title
OSHA	29 CFR, Parts 1910 Hazardous Waste Operations and Emergency Response and 1926 Safety and Health Regulations for Construction
MOSH	COMAR 09.12.31 and COMAR 09.12.33 Title 5, Subsection 4 and Subsection 6 (§5-401 and 601)
EPA	Resource Recovery and Conservation Act, 40 CFR Parts 260 and 261
NFPA	328 Recommended Practice for the Control of Flammable and Combustible Liquids and Gases in Manholes, Sewers and Similar Underground Structures
MDE	COMAR 26.10 Oil Pollution and Tank Management
ASTM	D106 Recommended Practices for Sampling Atmospheres and Analysis of Gases and Vapors
ASTM	D4547-09 Standard Guide for Sampling Waste and Soils for Volatile Organic Compounds (VOCs)
ASTM	D5283-92(2009) Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation
ASTM	D5831-09 Standard Test Method for Screening Fuels in Soils
ASTM	D6009-12 Standard Guide for Sampling Waste Piles
ASTM	D6418-09 Standard Practice for Using the Disposable En Core Sampler for Sampling and Storing Soil for Volatile Organic Analysis

SPECIAL PROVISIONS**SCOPE OF WORK FOR DESIGN-BUILD****3.19.02 HEALTH AND SAFETY**

The Design-Builder is responsible to develop and implement a site-specific HASP identifying and describing health and safety hazards associated with site work. This plan should include all operations and tasks performed and evaluate the risks to personnel to eliminate or effectively reduce hazards. The HASP shall identify a Site Health and Safety Officer (HSO). The HASP shall be reviewed and approved by the Design-Builder Engineer prior to the commencement of work. Construction shall not begin prior to receipt of written acceptance of the HASP. Revisions to the HASP may be required throughout the duration of the project; however, all revisions must be reviewed and accepted by the City of Baltimore prior to implementation. The HASP shall be prepared by a Certified Industrial Hygienist (CIH), certified by The American Board of Industrial Hygiene (ABIH) and comply with all applicable construction and general industry standards.

3.19.02.01 Personnel

The Design-Builder is responsible to develop a chain of command for personnel working on-site. The chain of command shall include protocols for reporting all emergencies and notifications to the Project HSO. The Design-Builder's health and safety professional is responsible for instructing all contractors and sub-contractors working on-site during emergencies and for notification of the City of Baltimore.

3.19.02.02 Personal Protection Equipment

The Design-Builder shall provide appropriate personal protective equipment (PPE) for hazards on-site. The minimum level of PPE required in daily field operations shall be specified in the work plan as Level D PPE and includes hard hat, reflective safety vest, safety glasses, steel-toed boots, long pants and work gloves. Hearing protection shall be required whenever noise levels or exposures exceed Permissible Noise Exposures. PPE shall be used in accordance with and meet requirements outlined in OSHA 29 CFR 1910 and 29 CFR 1926. Levels of PPE shall be task-specific and specified in the HASP. Should hazards change, the Design-Builder shall provide the next highest level of PPE to all personnel as necessary.

Nitrile gloves shall be used by all personnel handling potentially contaminated soil and/or groundwater or equipment exposed to contamination. Face shields shall be used by all personnel whose task may present a splash hazard. Eye-protection shall be OSHA/ANSI approved.

The Design-Builder shall provide appropriate PPE for personnel working in atmospheres that present potential respiratory hazards, including confined space entry personnel, equipment operators, monitoring personnel and authorized site visitors. Respiratory protection may be required in work atmospheres where contaminants such as dust, fumes, and toxic gases are present. The Design-Builder is responsible to ensure that personnel have been instructed on proper fit, use and maintenance procedures for equipment. Personnel shall demonstrate the ability to recognize and evaluate necessary warning signs of working environments requiring respiratory protection to the site HSO. The Design-Builder shall monitor ambient air to determine if respiratory protection is required. Facial hair may compromise the fit of a respirator

SPECIAL PROVISIONS**SCOPE OF WORK FOR DESIGN-BUILD**

and may need to be shaved prior to performing tasks requiring a respirator. The Design-Builder is responsible for ensuring personnel are wearing clothing appropriate for the job task and that long hair is secured under a hard hat to prevent entanglement. Clothing which becomes saturated with contaminants while working shall be removed and replaced immediately.

Personnel and equipment decontamination stations shall be provided by the Design-Builder. Appropriate decontamination procedures shall be implemented by the Design-Builder, as necessary. Receptacles for disposable protective clothing such as coveralls, gloves, or wastes generated by decontamination shall be provided by the Design-Builder. If site hazards are determined to involve “hazardous waste”, contaminated clothing requiring hazardous waste disposal shall be hauled to an approved disposal facility by a U.S. DOT licensed hazardous waste hauler.

3.19.02.03 Work Zone Monitoring

The Design-Builder shall provide air monitoring equipment for work areas in which there is a potential risk of exposure to airborne contaminants. Such equipment shall include, but not be limited to, a combustible gas indicator, a photo-ionization detector (PID), a dust meter and oxygen meter. Air monitoring equipment shall operate at the interval specified in the HASP and as necessary in all other areas determined by: the Site HSO, the City of Baltimore Inspector, or Design-Build Engineer. If action levels established in the HASP are exceeded, appropriate response activities shall be implemented by the Site HSO.

Personnel operating air monitoring equipment shall be trained in accordance with OSHA 29 CFR 1910 which includes the proper use, calibration, data interpretation, and hazard alarm mechanisms and shall be able to demonstrate proficiency of operation and interpretation of instrument readings. Additionally, the operator shall have completed a 40-hour course satisfying OSHA 29 CFR Part 1910.120 (e)(3)(i) initial training needs for individuals involved in hazardous substance removal and waste management of hazardous waste operations and annual refresher training, if applicable. Calibration records and recorded instrument readings shall be documented daily and provided to the City of Baltimore Inspector according to the schedule specified in the HASP.

3.19.02.04 Confined Space Entry

The Design-Builder shall address confined space entry in the HASP. Confined spaces shall be monitored to determine whether an oxygen-deficient, combustible, or contaminant-saturated atmosphere exists by direct reading instrumentation, specified in Section 3.19.02.03. Confined spaces may include but, are not limited to, excavations, tanks, manholes and pipes. Work entry permits shall only be issued by a designated Entry Supervisor to all personnel prior to conducting work activities in confined spaces. Only personnel trained in confined space entry and whose name appears on the work entry permit may enter the confined space. Work entry permits shall include the following information:

- Name of permit space to be entered, authorized entrant(s), eligible attendants and individuals authorized to be entry supervisors;
- Purpose of entry;
- Location and description of work;

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SCOPE OF WORK FOR DESIGN-BUILD

- Pre-entry test results and tester's signature;
- Entry time and date;
- Hazards posed by work and environment including potential atmosphere hazards and tidal influences on groundwater level;
- Hazards expected;
- Fire safety precautions;
- Personal safety including PPE and engineering controls such as lighting, retrieval devices, floatation devices and monitoring equipment;
- Entry and emergency procedures (including name and telephone numbers of rescue and emergency services);
- Communication procedures and equipment, including PPE and alarm/notification systems;
- Time period for which the permit is valid.

All applicable procedures described in Title 29 CFR Part 1910.146 shall be incorporated into the HASP.

3.19.02.05 Trench Excavations

The Design-Builder shall monitor the atmosphere in accordance with Section 3.19.02.03. Sheeting, bracing and shoring shall be provided with these Specifications. All applicable procedures described in Title 29 CFR Part 1926, Subpart P shall be incorporated into the HASP

3.19.02.06 Lockout/Tagout Procedures

The Design-Builder shall implement Lockout/Tagout Procedures to ensure that equipment and pipelines are isolated from all potentially hazardous energy while performing any servicing or maintenance. The HSO shall have sole authority to lock out or to implement tag out procedures and shall maintain a Lockout/Tagout log. The log shall contain the following information:

- Lock number;
- Location of pipeline to be locked out;
- Checkout time and date;
- Return time and date;
- Signature of authorized personnel.

Lockout/Tagout Procedures shall be used as necessary, and specifically if abandoned petroleum product pipelines are encountered during construction activities. Furthermore, if any petroleum pipelines or tanks are encountered, the Design-Builder shall notify the City of Baltimore immediately in order to notify the Maryland Department of the Environment (MDE). Additionally, the Design-Builder shall implement protocols in the HASP addressing the discovery of petroleum product pipelines and/or tanks, including but not limited to, work stoppage, spill containment and the management of potentially contaminated soils and/or groundwater.

All applicable procedures described in Title 29 CFR Part 1910.0147 shall be incorporated into

SPECIAL PROVISIONS

SCOPE OF WORK FOR DESIGN-BUILD

the HASP.

3.19.02.07 Hot Work Permit Procedures

The Design-Builder shall include procedures to prevent ignition/explosion hazards of petroleum/air vapor mixtures in the HASP. Hot work shall not be permitted unless air monitoring equipment determines that the atmosphere is safe for following procedures:

- Burning equipment;
- Welding equipment;
- Brazing equipment;
- Explosives;
- Open fires;
- Portable grinders;
- Operation of internal combustion engines;
- Concrete buster;
- Soldering irons and guns;
- Explosive-activated tools;
- Abrasive blasting heavy equipment operation;
- Any other flame-or-spark inducing equipment or procedure.

All applicable procedures described in Title 29 CFR Part 1910 and Part 1026 shall be incorporated into the HASP.

3.19.02.08 Flammable Materials Handling

The Design-Builder shall provide appropriate PPE, including but not limited to, chemical/flame resistant clothing, gloves, and steel-toed boots to personnel required to handle flammable liquids. Respiratory protection shall be provided to personnel working in hazardous atmospheres. At a minimum, fire extinguishers, specific to the types of chemical hazards present, shall be provided for each work crew involved with flammable materials handling. Firefighting equipment shall be selected to minimize the potential for the generation of static electricity upon discharge. The use of non-sparking tools is required unless the atmosphere is continuously monitored and remains free of vapors.

The Design-Builder is responsible to for the prompt and safe removal and disposal of any leaked or spilled product during transport. Hazardous waste shall be hauled to an approved disposal facility by a U.S. DOT licensed hazardous waste hauler or MDE approved hazardous materials hauler. The Design-Builder shall provide bonding facilities for protection against sparks during handling where Class 1 liquids are involved.

Smoking shall not be permitted within 200 feet of the active work zone during flammable liquid transfer, loading or unloading due to potentially flammable atmospheres. Smoking shall not be permitted within 200 of any dust monitors to avoid interference with monitoring results.

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The Design-Builder shall include emergency procedures within the HASP and shall include situations where outside help is needed, such as the Police, Fire Department, Ambulance, Poison Control or Emergency Medical Services. The HASP shall include detailed site-specific emergency procedures. Emergencies shall include discovery or release of free-product of free-product in the work zone, worker injury, or worker exposure above the permissible exposure limits (PELs) specified in the HASP. Emergency procedures shall be conducted to minimize exposure risks to personnel and the public. An on-site daily safety meeting shall be conducted by the Site Health and Safety Officer before work commences. Personnel operating monitoring equipment shall immediately report all emergencies in accordance with the chain of command outlined in the HASP.

The HASP shall include the following provisions:

- Emergency communications systems;
- Hospital name, address, and map with directions from site;
- Rescue personnel and equipment on-site;
- Rescue training of site personnel;
- Locations of on-site telephone(s);
- Locations of first aid kit(s);
- Location of spill-kits on-site.

The Design-Builder is responsible for including provisions addressing emergencies in which personnel has potentially been exposed to a chemical hazard above the PEL specified in the HASP and shall include immediate medical screening for possible exposure to on-site hazardous materials. Subsequent monitoring, as a result of this exposure, shall be dictated by the industrial hygienist or attending physician.

Personnel reassigned to work shall perform job-tasks where the risk of exposure is eliminated or significantly reduced. Reassigned personnel shall receive a follow-up medical screening if they have not received a medical exam within the previous six months. The extent of the exam shall be limited to substances the worker may have been exposed to in his/her job assignment(s) since the previous exam.

Worker Training and Right-to-Know Compliance: In accordance with 29 CFR 1910.1200 the Design-Builder shall develop a hazard communication program. Workers shall be informed of what types of hazards are present or may be potentially present in the work environment. Material Safety Data Sheets (MSDS) for hazardous materials known to exist on the work site shall be included in the HASP.

The Design-Builder shall implement a hazard communication training program shall include:

- An explanation of the OSHA Hazard Commencement Rule;
- Discussion of potential hazards posed by chemicals;
- Protective measures, including work practices, engineering controls, and equipment to be implemented to reduce the risk of exposure ;

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- An explanation of where to find and how to use the MSDS and other means to obtain hazardous substance information;
- An explanation of employee rights.

3.19.03 HAZARDOUS MATERIALS MANAGEMENT**3.19.03.01 Contaminated Soil**

The Design-Builder is responsible for the management of contaminated soils that could be potentially encountered in the project area during excavation activities. The Design-Builder shall prepare and implement a project-specific Soil Management Plan that includes procedures for the identification, containment, documentation and disposal of non-hazardous and hazardous soils. The Design-Builder shall monitor all excavated soils and ambient air in work zones in accordance with Section 3.19.02.03 during all earthwork operations, including excavation of storm drains and utility construction. Monitoring results shall be documented and shall include time, location, depth, and other pertinent information necessary to be able to adequately document and interpret the air monitoring readings. Additionally, if simultaneous earthwork activities are being performed in areas greater than 500-ft. apart, additional monitoring equipment shall be provided by the Design-Builder.

3.19.03.02 Excavation

The Design-Builder shall screen soils with a PID to monitor for volatile organic compounds (VOCs), indicating the presence of possible petroleum impacted soils. The Design-Builder shall document screening data for all excavated soil and notify the City of Baltimore and/or MDE as necessary to ensure handling, manifesting, and disposal. Prior to excavation, the Design-Builder and City of Baltimore shall determine the signature authority for waste manifestation for soil disposal. Excavated soil may require analytical testing to fully characterize soil prior to disposal. Soils must be disposed of only at approved facilities based on PID and analytical results for soil. For the disposal of any contingent hazardous waste soils, the Design-Builder shall obtain on behalf of the City of Baltimore, a temporary generator identification number from the MDE.

3.19.03.03 Storage

The Design-Builder shall stockpile contaminated soil in a designated staging area on-site until soil material can be transported off-site for disposal. All non-hazardous soil shall be placed on, and completely covered by, strong plastic sheeting (or equivalent) and in accordance with COMAR 26.10 for petroleum impacted soil stockpiling provisions -Petroleum impacted soils shall remain covered and shall be removed from the site within 50 days.

All hazardous soil encountered shall be stored in lined containers that can be equipped with water-tight covers. Hazardous soils storage shall not exceed the limits specified by the issuance of a temporary hazardous waste generator identification number.

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3.19.03.04 Disposal

The Design-Builder is responsible for the disposal of soils as outline below:

- Waste disposal characterization samples from each soil waste stream in accordance with requirements of selected disposal facility. The number of samples and analytical parameters will be based on the permit requirements of the selected disposal facility. Previous site assessments sample results, when applicable, can be made available but data may, or may not be sufficient for waste disposal requirements of the selected disposal facility. Additional testing may be required for soil characterization by the selected disposal facility.
- The Design-Builder is responsible for record keeping of sample collection, lab reports, chain of custodies and other documentation associated with tested on-site soil.
- The Design-Builder shall obtain any and all necessary permits that pertain to storage and disposal of contaminated soil excavated or displaced during on-site construction activities. For more information on permits and requirements, the MDE Waste Management Administration shall be contacted at 410.631.3443.
- The Design-Builder is responsible for managing hauling/disposal manifests and MDE tracking numbers in accordance with requirements specified in obtained permits.
- The hauler shall transport the contaminated soil to a treatment or disposal facility licensed by state and federal regulatory authorities for acceptance of designated wastes. All waste materials shall be transported in accordance with all applicable regulations.
- The Design-Builder shall provide all necessary waste characterization analytical results, manifests, and certificates of containment disposal, and disposal volumes to the City of Baltimore.

3.19.03.05 Groundwater Dewatering

The Design-Builder is responsible for the containment and treatment/disposal of petroleum contaminated groundwater produced during dewatering activities at the project site in accordance with MDE regulations. The Design-Builder shall prepare a Dewatering Management Plan that describes procedures for characterization, containment, documentation, and treatment/disposal of potentially contaminated groundwater. If the Design-Builder identifies contamination during dewatering operations, requiring additional sampling/monitoring to characterize the groundwater and treatment/disposal, the City of Baltimore shall be notified. Compensation will be made for treatment/disposal and required permits for contaminated groundwater with concentrations exceeding the MDE Non-Residential Clean-up Standards.

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3.19.03.06 Dewatering Plan

The Design-Builder shall develop an overall dewatering plan with design details to minimize contaminated groundwater flow into storm drains, trenches and structural excavations. The dewatering plan and design details shall include, but are not limited to, sheeting and shoring, concrete tremie seals or clay foundation seals, pervious foundation depths with maximum pumping rates for various groundwater inflow rates. Trench excavations must be backfilled daily to within two-feet of that day's utility installation. Trenches shall not remain open during non-working hours.

The Design-Builder shall only pump from open excavations. The Design-Builder shall plug pipes and divert others sources of water so that only groundwater and precipitation are collecting in the project area. The Design-Builder shall provide water-tight plugs to be installed at the end of each work day for all utility installations including storm drains, conduit, and water lines within the project area.

The Design-Builder shall manage groundwater that is pumped during dewatering activities. The Design-Builder is responsible for either on-site or off-site groundwater treatment and/or disposal. Groundwater treatment systems may be set up on-site to treat water for the presence of suspended solids, free product, and/or dissolved hydrocarbons. Containers, including frac tanks, may be used by the Design-Builder for storing groundwater pumped from the project site during dewatering activities. To minimize the volume of groundwater that requires treatment and disposal, the Design-Builder shall minimize the mixing of uncontaminated and contaminated groundwater. Groundwater that is elected to receive treatment/disposal off-site must be transported to an approved and licensed facility permitted to accept the specific waste material. Additional sampling and analytical testing may be required to comply with specific permits for on-site treatment and/or to characterize wastes for disposal facilities.

The Design-Builder shall obtain any and all necessary permits that pertain to treatment, storage and disposal of groundwater produced during dewatering activities. The Design-Builder is responsible for reporting, containing and cleaning up spills associated with the dewatering activities in accordance with requirements specified in obtained permits. For more information, the MDE Waste Management Administration shall be contacted at 410.631.3443.

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TC 3.20 PUBLIC OUTREACH PERFORMANCE SPECIFICATION

3.20.01 General

This Performance Specification outlines the requirements for Public Outreach (PO) and defines the roles and responsibilities for this effort.

The PO program includes Baltimore City and Design-Builder activities, including the following:

- A. Public Outreach;
- B. Community involvement and meetings;
- C. Communications with the public;
- D. Public notices;
- E. Media relations; and
- F. Maintenance of Traffic (MOT) plan.

The residents, businesses, elected officials, communities, motorists, and other interest groups within the project area have been kept informed and their engagement in the construction process is critical to the successful completion of the Project. In support of Baltimore City, the Design-Builder shall commit to significant assistance of the City with regard to community participation and interaction activities during the development of the design and throughout the construction of the Project.

3.20.02 Guidelines and References

The Work shall be in accordance with Federal DOT Environmental Justice (EJ) Standards; Baltimore City Department of Transportation's Community Meeting Guidelines; and this Public Outreach Performance Specification.

3.20.03 Requirements

The community involvement and participation element is intended to carry forward the dialogue with residents, landowners, community groups, local officials, and other similar groups. This effort shall include activities such as, but not limited to, the Design-Builder supporting Baltimore City in meetings with individual land owners, local officials, and community groups and public meetings to keep the public involved in design and construction activities.

Public Outreach is intended to keep the public informed of major activities and decisions through design and construction. This element will involve the preparation and distribution of Project information to the assigned City representative for further dissemination to the public and media.

The Design-Builder shall make a good faith effort to address any concerns the public may have, and take under consideration any suggestions or wishes they express if those suggestions are reasonable in regard to cost, time, and construction effort. Documentation shall be in the form of meeting minutes and correspondence, including e-mails. The Design-builder shall direct

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requests it receives to Baltimore City and shall assist in preparing responses. All design or construction modifications are subject to written acceptance by Baltimore City.

3.20.03.01 Baltimore City's Public Outreach Responsibilities

Baltimore City and the Design-Builder have shared responsibility for the PO Program. Baltimore City will be the lead on Public Outreach activities, with active support provided by the Design-Builder, to include project research, adequate support staff, graphic design, materials, and printing.

The Design-Builder shall have primary responsibility for performing the activities specified in this Public Outreach Specification as well as in the Contract Documents.

Baltimore City's responsibilities include the following activities:

- A. Maintain Questions & Answers/Frequently Asked Questions of any approved communication efforts by the Design-Builder; and
- B. Liaising with and monitoring the Design-Builder's performance for compliance with the Design-Builder's public outreach requirements.

3.20.03.02 Design-Builder Responsibilities and Requirements

3.20.03.02.01 Design-Builder's Response to Inquiries and Comments

- A. Questions or comments from residents, businesses, or other member of the public shall be referred to Baltimore City within 4 hours. The Design-Builder shall take necessary steps to facilitate such contact.
- B. If Design-Builder receives a complaint regarding its conduct of work on the Project, the Design-Builder shall notify Baltimore City within 4 hours. The Design-Builder shall provide necessary information, staff support, and representation to assist in resolving the issue.
- C. On occasions specified by Baltimore City, the Design-Builder shall commit its Project Manager to serve as a spokesperson for the Project for technical and safety issues with certain audiences.

3.20.03.02.02 Public Notifications

- A. The Design-Builder shall facilitate Baltimore City's notification of the public and community in general and specifically affected businesses and residents along the Project. As directed by Baltimore City, this may include personal contact to affected parties of construction progress and upcoming events.
- B. The Design-Builder shall provide the specific notifications listed in Table 1.
- C. Utility shut-off/diversion announcements shall be coordinated in advance with Baltimore City and the utility company. The Design-Builder shall prepare a written notice to the affected parties.

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**TABLE 1
NOTIFICATIONS**

Notice	Requirement
Lane Closure	Written notices posted at least 7 days in advance of planned closures at start and end of Project. Notice provided to Refer to Maintenance of Traffic Performance Specifications.
Critical Utility Shut-off/Diversion	Written notice at least 72 hours in advance of, but not more than 96 hours before, shut-off and/or diversions. Copy of notice to Baltimore City and Utility Company.
Business/Commercial Utility Shutdown	Written notification of Utility shutdown or diversion for businesses and commercial property at least 72 hours in advance of shut-down. Notice shall be coordinated in advance with Baltimore City and Utility Company.
Residential Utility Shutdown	Written notification of Utility shutdown or diversion for residential property 72 hours in advance of shut-down. Notice shall be coordinated in advance with Baltimore City and Utility Company.
Weekly Construction Updates	Construction updates shall be provided weekly and shall identify all planned traffic shifts, lane closures and utility shut-downs and activities.
Road and Driveway Closures	Written notice and personal contact at least 72-hours in advance of closure. Copy of notice to Baltimore City. Refer to Maintenance of Traffic Performance Specifications

3.20.03.02.03 Public Contact Records

The Design-Builder shall maintain a consistent system for documenting all contact with business owners, residents, media and property owners. Unless otherwise directed, the Design-Builder should not act as spokesman for the Project. The Design-Builder shall provide Baltimore City an electronic copy of all public contact records. File should be received by the 1st of each month and should include all contacts made prior to the 25th of the previous month.

3.20.03.02.04 Construction Schedule/Maintenance of Traffic and Access

Information regarding Project design and construction shall be readily available in a form that can be quickly disseminated to the public. Information provided to the public shall be consistent with information contained in the Baseline Progress Schedule, schedule updates, and the applicable Maintenance of Traffic Plan.

3.20.03.02.05 Signage

The Design-Builder shall furnish, install and maintain 1 project sign at each of the job limits for this project. Each sign shall be installed prior to the start of any construction operations and shall not be removed until construction operations are completed.

The sign shall be 48” x 72” made of ¾” exterior type, high density overlaid plywood and shall be mounted to adequately permit public viewing. The sign shall be bonded along the edges of the plywood with a 1” x 4” wood strip fastened

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flat to the edge of the sign at the middle of the width of the strip. The wording, coloring and size of the letters will be provided by the Engineer. Refer to the sign detail provided at the end of the section. It shall be the responsibility of the Design-Builder to maintain the sign in good condition throughout the life of the Contract.

3.20.03.02.06 Telephone Trees

The Design-Builder shall establish and manage an emergency response telephone tree. All appropriate emergency response agencies shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations.

3.20.03.02.07 Public Forums

At the specific request of Baltimore City, the Design-Builder shall participate in City organized public forums to give the public the opportunity to discuss the Project.

The Design-Builder should also work with Baltimore City to provide all graphics and printed materials for these forums.

3.20.03.02.08 Construction Progress Photographs

The Design-Builder shall provide to Baltimore City high-resolution construction progress photographs in electronic format at least monthly or at any time that a new significant activity commences. Monthly submission should include at a minimum of 10 (ten) new progress photos. In addition, the Design-Builder will facilitate requests and make arrangements for Baltimore City to take additional photos on an as-requested basis. Distinct from progress documentation photos, the purpose of photos identified in this section is to facilitate public information via the Project Web site, newsletters and other such materials.

3.20.03.03 Other Design-Builder Activities

The Design-Builder is encouraged to provide additional, cost-effective services to enhance the overall Public Outreach Community Relations Program. Additional services should adhere to the standards indicated in the Public Outreach Plan and be a supplement to the services outlined in this Performance Specification. Any such enhancements may be implemented at any time during the Project and subject to Baltimore City's written acceptance.

These activities may include part of the federal Transportation Management Plan guidelines to draft a Public Information & Outreach plan for the project, which shall include:

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Standard language for constituent response (i.e. correspondence, phone inquiries, memos, etc.) in accordance with Baltimore City's guidelines.

Creation/printing of overall project brochure and supporting materials

Creation/printing of community updates for distribution

Development of community contacts list

Educating the publics on work zone safety

3.20.03.04 Media Relations

An ongoing media relations effort will be handled by Baltimore City. The Design-Builder shall assist in providing timely information to Baltimore City regarding construction activities for use in media events.

NEITHER THE DESIGN-BUILDER NOR ANY SUBCONTRACTOR NOR THEIR EMPLOYEES SHALL INTERFACE WITH THE MEDIA WITHOUT THE EXPRESSED CONSENT OF BALTIMORE CITY, EXCEPT AS SPECIFICALLY DIRECTED BY BALTIMORE CITY. IN EMERGENCY SITUATIONS, THE DESIGN-BUILDER SHALL IMMEDIATELY NOTIFY BALTIMORE CITY OF ANY SITUATIONS THAT MAY INVOLVE THE MEDIA.

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

THIS SIGN IS TO BE USED ON ALL FEDERAL / STATE FUNDED
CONSTRUCTION CONTRACTS

PROGRESS AHEAD



**CENTRAL AVENUE STREETSCAPE
AND HARBOR POINT CONNECTOR
BRIDGE**

COMPLETION DATE:

MONTH, YEAR

Questions? Call 410-###-#### or go to www.baltimorecity.gov

City of Baltimore Department of Transportation

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F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317
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TERMS AND CONDITIONS

**TC SECTION 4
CONTROL OF WORK FOR DESIGN-BUILD**

TC-4.01 WORKING DRAWINGS.

(a) General.

DELETE: Paragraph 3 in its entirety.

INSERT: The following:

The Design-Build Team shall prepare working drawings as described in the Standard Specifications, with the exception that the drawings shall not be submitted to Baltimore City, but shall be submitted to the Design-Build Team's engineer for review and approval. Following approval by the Design-Build Team's engineer, two copies of the approved drawings shall be forwarded to Baltimore City. Baltimore City shall review the drawings to determine that they meet minimum job performance specifications only. Acceptance of the drawings shall not relieve the Contractor of any responsibility in connection therewith and Baltimore City assumes no responsibility for the accuracy of the drawings. A two-week period will be permitted for Baltimore City review of the working drawings. The approved working drawings shall be stamped and signed by the Design-Build Team's engineer and forwarded to:

Mr. Michael Wilmore
Baltimore City Department of Transportation
417 E. Fayette Street, 7th Floor
Baltimore, Maryland 21202

(b) Working Drawings for Falsework Systems.

In the first paragraph, substitute Design-Build Team's Engineer for Engineer.

In the third paragraph, substitute Design-Build Team's Engineer for Engineer.

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F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317

TC-4.02 FAILURE TO ADEQUATELY MAINTAIN PROJECT.

98 **ADD**: To the existing paragraph.

Additionally, a deduction of \$2,000 will be made from the Contractor's next progress estimate for each day or portion thereof that Maintenance of Traffic deficiencies exist, and will continue until the deficiencies are satisfactorily corrected and accepted by the Engineer. Any portion of a day will be assessed a full day deduction.

The above noted deduction will be assessed on the next progress estimate if the Contractor does not take action to correct the deficiencies and properly assume the responsibilities of maintaining the project (as determined by the Engineer) within four hours of receiving a notice to comply with the required maintenance provisions. The amount of monies deducted will be a permanent deduction and are not recoverable.

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TERMS AND CONDITIONS

TC SECTION 5

LEGAL RELATIONS AND PROGRESS FOR DESIGN-BUILD

TC-5.01 INSURANCE.

100 **DELETE**: All paragraphs under TC-5.01 in their entireties.

INSERT: The following.

.01 Commercial General Liability

The Contractor shall maintain in full force and effect third party legal liability insurance necessary to cover claims arising from the Contractor's operations under this agreement which cause damage to the person or property of third parties. The insurance shall be under a standard commercial general liability (CGL) form endorsed as necessary to comply with the above requirements; or other liability insurance form deemed acceptable by Baltimore City. The City of Baltimore shall be listed as an additional named insured on the policy. The limit of liability shall be no less than \$1,000,000 per occurrence/\$3,000,000 general aggregate. The insurance shall be kept in full force and effect until all work has been satisfactorily completed and accepted. The policies shall be endorsed to provide 30 days notice of cancellation or non-renewal to:

Mayor and City Council
City Hall Room 204
Baltimore, MD 21202

Evidence of insurance shall be provided to Baltimore City prior to the award of the Contract by means of a Certificate of Insurance with copies of all endorsements attached or, in the event insurance is provided by a policy form other than a CGL form, by certified copy of the complete policy with all endorsements.

Any policy exclusions shall be shown on the face of the Certificate of Insurance.

The Certificate of Insurance shall be accompanied by a document (a copy of State License or letter from insurer) which indicates that the agent signing the certificate is an authorized agent of the insurer.

When specified in the Contract Documents, the Contractor shall carry the type and amounts of insurance in addition to any other forms of insurance or bonds required under the terms of the Contract and these Specifications.

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The cost of the insurance will not be measured but the cost will be incidental to the Contract lump sum price.

Contractor and Railroad Public Liability and Property Damage Insurance shall be provided as specified in TC-6.03.

.02 Indemnification

The Design-Build Team shall indemnify, defend and hold Baltimore City and its officers, directors, employees, agents and consultants from and against all claims, actions, torts, costs, losses, and damages for bodily injury (including sickness, disease or death) and/or tangible property damage (other than to the Work itself) arising out of or resulting from the performance of the Work by the Design-Build Team, any subcontractor, subconsultant, engineer, supplier, any individual or entity directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Damages covered by the preceding sentence include, but are not limited to, all fees and charges of engineers, attorneys and all other professionals and all mediation, arbitration, court or other dispute resolution costs.

The indemnity obligation set forth in the preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Design-Build Team or any subcontractor, subconsultant, engineer, supplier, or other individual or entity under Workers' Compensation acts, disability benefit acts, or other employee benefit acts.

.03 Additional Insurance Requirements

.03.1 Professional Liability Insurance

Professional Liability Insurance Policy, which covers the Indemnification Clause of this contract (paragraph .02 above), as it relates to errors, omissions, negligent acts or negligent performance in the work performance under this contract by the Designer, its subcontractors, employees and agents. The limitation of the Courts and Judicial Proceedings Article states Annotated Code of Maryland Section 5-108(b) shall apply. The limit of liability shall be no less than Five Million Dollars (\$5,000,000).

.03.2 Workers' Compensation Insurance

Workers' compensation, as required by the laws of the State of Maryland, including Employer's Liability Coverage and coverage for the benefits set forth under the U.S. Longshoremen and Harbor Workers' Compensation Act, the Jones Act, and other federal laws where applicable.

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.03.3 Comprehensive Automobile Liability Insurance

Comprehensive Business Automobile Liability covering use of any motor vehicle to be used in conjunction with this contract, including hired automobiles and non-owned automobiles. Loading and unloading of any motor vehicle must be covered by endorsement to the automobile liability policy or policies.

.03.4 Administrative & General Provisions

a. Each policy, with the exception of Workers' Compensation and Professional Liability Insurance, shall name the City of Baltimore.

b. Defense of Claims

Each insurance policy shall include a provision requiring the carrier to investigate and defend all named insured against any and all claims for death, bodily injury or property damage, even if groundless.

c. Compliance

The Design-Build Team shall be in compliance with this Section provided it procures either one policy or insurance covering all work under the contract or separate insurance policies for all segments constituting the entire project. In either case, a certificate of insurance must be filed for each policy with Baltimore City indicating that all required insurance has been obtained.

The Design-Build Team is responsible for assuring that insurance policies required by this Contract comply with all the requirements. The Design-Build Team is also responsible to determine that all subconsultants, subcontractors, suppliers, and all other individuals or entities performing Work for the Project carry all applicable insurance coverages set forth in this section, including, in all cases, Workers' Compensation, Automobile, and Commercial General Liability Insurance. The Design-Build Team shall indemnify and hold harmless Baltimore City from any claims arising from the failure to fulfill said responsibilities.

d. Reporting Provisions

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to Baltimore City, its officers, agents and employees.

e. Separate Application

The insurance provided by the Design-Build Team shall apply separately to

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each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

.03.5 Notice of Cancellation or Modification

All policies of insurance provided in this Section shall be endorsed to provide that the insurance company shall notify Baltimore City, the Design-Build Team, and each named insured at least forty-five (45) days prior to the effective date of any cancellation or modification of such policies.

TC-5.03 SUBCONTRACTING AND SUBCONTRACTORS

102 **INSERT:** The following before the paragraph titled ‘**Subcontractors Prompt Payment.**’

Percentage of Own Workforce Required. The Design-Build Team must perform at least fifty percent of the value of the on-site construction work with its own workforce, not including the percent goal required in the contract proposal to be performed by DBE's. The Designer must perform at least fifty percent (50%) of the value of the design work with its own workforce, not including the work required by DBE's.

102 **Subcontractors Prompt Payment**

DELETE: All paragraphs under this section in their entireties.

INSERT: The following.

In accordance with 49 CFR 26.29.

The Contractor shall promptly pay a subcontractor any undisputed amount including retainage to which the Subcontractor is entitled for work under the Contract within 10 days of receiving a progress, semi-final or final payment in conformance with the latest edition of the State Finance and Procurement Article 15-226 of the Annotated Code of Maryland. The Administration has established the following time frame for subcontractor payment: When a progress, semi-final, or final payment is processed and payment is received by the Contractor, payment shall be made to all subcontractors within 10 days.

Each month, the Public Works Inspector will review the current pay items with the Contractor and all Involved subcontractors to ensure that all work satisfactorily completed in conformance with the Contract Documents is included in the monthly progress payment. For payment purposes, the same quantity totals used to compute the payment to the Contractor will be the basis for payment to the subcontractor.

If the Contractor withholds payment from a subcontractor beyond 10 days, the Contractor shall:

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- (a) Notify the subcontractor in writing and state the reason why payment is being withheld; and
- (b) Provide a copy of the notice to the Public Works Inspector and the Program Compliance Officer.

If the subcontractor does not receive payment within the required 10 days, the subcontractor shall give written notice of nonpayment to the Public Works Inspector and the Program Compliance Officer. The notice shall:

- (a) State the name of the Contractor, the Contract No., and the amount in dispute.
- (b) Provide an itemized summary on which the amount is based; and
- (c) If known, provide an explanation for any dispute concerning payment by the Contractor.

The Public Works Inspector will then notify the Program Compliance Officer, Construction (PCO) of the dispute. The PCO will verbally contact the Contractor within 48 hours to ascertain whether the amount withheld is an undisputed amount.

If the PCO determines that a part or all of the amount withheld is an undisputed amount, the PCO will instruct the Contractor to pay the subcontractor the undisputed amount within three days. The instructions will be confirmed in writing.

The PCO will verbally communicate to the subcontractor the results of the discussion with the Contractor and confirm the results in writing.

If the Contractor fails to pay the subcontractor the undisputed amount within the specified three days, the subcontractor may report the nonpayment in writing to the PCO.

Upon receipt of notification of nonpayment from the subcontractor, the PCO will schedule a meeting to verify and discuss the nonpayment issue. This meeting will be held at the Baltimore City Department of Transportation Office no later than 10 days after receiving notice from the subcontractor.

Invited to this meeting will be the Contractor, the subcontractor, the PCO, and the Public Works Inspector. The purpose of this meeting will be to establish why payment was not made to the subcontractor in the required time period. If it is determined that the Contractor is delinquent in payment to the subcontractor, further progress payments to the Contractor may be withheld until the subcontractor is paid.

If payment is not made to the subcontractor within seven days after the PCO determines that the Contractor is delinquent in paying the subcontractor and the next progress payment becomes due, the progress payment will not be processed and a second meeting will be held at the Baltimore City Department of Transportation to address the

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dispute. The second meeting will be held not later than five days after the close of the seven day period. If the results of this second meeting reveal that payment to the subcontractor continues to be delinquent, the PCO may order a suspension of work based upon the failure of the Contractor to carry out the provisions of the Contract or he may allow work to continue and withhold future progress payments as stated above.

In addition, the Department may require the Contractor to pay a penalty to the subcontractor, in an amount not exceeding \$100 per day, from the date the payment was required.

A penalty will not be imposed for any period that the PCO determines the subcontractor was not diligent in reporting nonpayment in conformance with the Contract Documents.

The Contractor shall notify the PCO when payment has been made to the subcontractor. The PCO will verify the payment with the subcontractor to ensure payment was received.

A Contractor or subcontractor may appeal the decision of the Program Compliance Officer to the Chief Contract Administration who will render a final decision on this issue.

A decision of the Administration under these Terms and Conditions is not subject to judicial review or the provisions of COMAR 21.10.04.

Any administrative costs incurred by the Administration will be deducted from the Contractor's retainage at the conclusion of the project.

Nothing in this provision will prevent the subcontractor from pursuing a claim with the surety under the Contractor's payment bond at any time.

106 **ADD:** The following sections at the end of section 'TC-5.05 DETERMINATION AND EXTENSION OF CONTRACT TIME.'

TC-5.06 OWNERSHIP OF DOCUMENTS

All plans, specifications, inspection records, or other documents ("Documents") generated by the Design-Build Team and all consultants, subcontractors, suppliers, manufacturers performing Work on the Project are the property of Baltimore City. Upon request by Baltimore City, the Design-Build Team or any other person or entity performing Work will produce and deliver such Documents as requested, both in hard copy and electronic format.

SPECIAL PROVISIONS

LEGAL RELATIONS AND PROGRESS FOR DESIGN-BUILD

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TC-5.07 ACCESS TO AND RETENTION OF RECORDS

The Design-Build Team and its employees and Subcontractors shall make all project records available for inspection by the Project Manager and all other persons authorized by Baltimore City, and shall permit such representatives to interview employees during working hours. Project records include daily time reports, records of force account work, quality control or assurance documentation, inspectors reports, employment records, payrolls, equal opportunity records, construction conference records, partnering records, and any other documents in any way related to the Project substantiating payment. These records shall be retained at least three years after final acceptance of the project.



Maryland Department of Transportation
State Highway Administration

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SPECIAL PROVISIONS INSERT

TC 6.10 — RECYCLED OR REHANDLED
MATERIAL

TERMS AND CONDITIONS

**TC SECTION 6
RESTRICTIONS AND PERMITS**

112 **DELETE:** TC 6.10 – RECYCLED OR REHANDLED MATERIAL in its entirety.

INSERT: The following.

TC 6.10 – RECYCLED OR REHANDLED MATERIAL.

Refer to 900.03 in the Contract Documents.

03-03-10

SPECIAL PROVISIONS

TC 6.14 — RESTRICTIONS FOR PLACING AND USING EQUIPMENT ON STRUCTURES, OR STORING MATERIALS ON/OR AGAINST STRUCTURES 1 of 1

TERMS AND CONDITIONS

**TC SECTION 6
RESTRICTIONS AND PERMITS**

115 **DELETE:** TC-6.14 STORING MATERIALS AND EQUIPMENT ON/AGAINST STRUCTURES RESTRICTIONS in its entirety.

INSERT: The following.

TC-6.14 RESTRICTIONS FOR PLACING AND USING EQUIPMENT ON STRUCTURES, OR STORING MATERIALS ON/OR AGAINST STRUCTURES

Materials, and waste shall not be stored on or against any structure or structure element and equipment shall not be placed or used on any structure during the construction phase or finished or final configuration unless the written permission is obtained from the Administration's District Office and the Office of Structures for each type of material or equipment to be stored.

Loads, vehicle or other weight (materials etc.) that exceeds the bridge posted weight limit, if posted, or exceeds Maryland's legal vehicle loads on bridges, (with no posted bridge weight limits), are prohibited on the structure at any time, except as modified by the following. If the Contractor's intended operations will impose loads on the structure that exceed the weights listed above, the Contractor shall submit to the Engineer the type of material, its weight, the area that will be affected by the load, and its location on the structure. No stock pile of material regardless of unit weight shall be more than 4 ft high. If equipment is to be used, submit the maximum gross weight, axle spacing, load per axle, and proposed location on the structure. The maximum gross weight must include the vehicle weights in the most critical load position, i.e. front axle on crane with boom extended and element hanging. A special Hauling Permit is a requirement anytime equipment is moved over a structure that is over legal weight limit.

If any load requires evaluation, then a professional engineer registered in the State of Maryland and experienced in bridge design shall perform a load analysis to ensure that the load on the structure will not create an overstress condition on any bridge element. This analysis also includes effects of legal loads crossing the structure, if applicable. Analyses shall be submitted for review and loading cannot be imposed until written approval is received. Such submission does not guarantee acceptance by the Office of Structures, which reserves the sole right to accept or reject the proposed loading.

For structures under construction or rehabilitation, the Contractor shall also submit information pertaining to the phase of construction, such as which members have been modified or separated from the remainder of the structure, or have been newly constructed.

Any materials or equipment that would have a detrimental affect to the structure such as aluminum products placed against concrete surfaces shall be adequately protected to prohibit them from coming in contact with each other. Any discoloration or damage to the structure as a result of material or equipment being stored on/against the structure shall be removed or repaired.

TERMS AND CONDITIONS

**TC SECTION 7
PAYMENT FOR DESIGN-BUILD**

TC-7.01 MEASUREMENT OF QUANTITIES

DELETE: This section in its entirety.

INSERT: The following:

Unless specifically noted herein, payment for all work within the Scope of Work shall be included in the Lump Sum Price shown on the Proposal Form. The Design-Build Team shall disregard all references in the Standard Specifications and Special Provisions in this RFP to actual quantities, Contract items, Contract unit prices, and any measurement or payment method other than inclusion in the Lump Sum Price.

Payments to the Design-Build Team shall be full compensation for furnishing all materials and for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof.

TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIALS

DELETE: The opening statement:

INSERT: The following statement:

When the Contractor requests payment allowance for stored materials, those materials must be identified as an Item within the Progress Payment Breakdown described in TC-7.11.

TC-7.05 PROGRESS PAYMENTS

(a) **Current Estimate.**

127 **DELETE:** (2) **Variable Retainage** in its entirety.

INSERT: The following:

(3) **Variable Retainage.** The Contract value of work satisfactorily performed during the preceding calendar month will be paid to the Contractor, less 10%. When such 10% Retainage amounts to 5% of the total contract value, plus authorized extras and additions, no further Retainage will be deducted from the monthly payments due the Contractor. Pursuant to the City of Baltimore Guidelines for the Performance Evaluation of Design Consultants and Construction Contractors, a Contractor achieving two consecutive "A" evaluations can request that the retainage for the Contract be reduced from 5% to 1.5% at the 50% payment earned (excluding stored material) milestone. The request shall be accompanied by a document from the Surety indicating approval of said reduction. A

SPECIAL PROVISIONS

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Contractor shall remain eligible for this reduction in retainage by maintaining an “A” rating. If a subsequent evaluation is less than an “A” rating, 10% monthly retainage shall re-commence until retainage again amounts to 5% of the Contract value. Retainage will not be released until final payment (unless partially released in a semi-final payment). When the amount earned during any month or period, less the appropriate retained percentage shall be less than Five Hundred Dollars (\$500.00). The appropriate retained percentage shall be deducted from each and every estimate made under the entire Contract and shall be retained until final completion of all work covered by the Contract, notwithstanding any provision to the contrary that may appear in the Contract documents. Upon completion of the contract, retainage due will be paid to the Contractor to the extent which the Contract is entitled.

(b) Semi-Final Estimate Payments.

129 **DELETE:** Delete the entirety of subsections (1), (2), and (3).

INSERT: The following:

- (1) Upon completion of the project and the acceptance by the Administration for maintenance, the Administration, at the Contractor’s request and with the consent of surety, will initiate a Memorandum of Action by the Director, Office of Construction, State Highway Administration, authorizing semi-final payment. Such a semi-final estimate payment will be based upon: (a) quantities the Administration has computed and set up as proposed final quantities, and (b) a reasonably accurate estimate for those quantities for which the Administration has not yet completed computations. The quantities that the Administration sets forth as proposed final quantities shall be so designated. To arrive at the amount of the semi-final estimate, the following will be deducted from the apparent estimated value of the Contract: (a) total of all amounts previously paid to the Contractor as current estimates, (b) the retainage for landscaping items of work, (c) sums deemed chargeable against the Contractor including penalties and liquidated damages, and (d) as an additional retainage, a sum not less than 1 percent of the total value of the Contract, excluding landscaping items of work.
- (2) In cases where there has been substantial completion of the project and there are remaining only inconsequential or minor work items such as painting, seeding, mulching, or planting to be completed and such items cannot be completed for an extended period of time because of seasonal or weather conditions, a semi-final inspection will be made. If the work completed is found to be satisfactory, then there is deemed to be a partial acceptance on the entire project except for the uncompleted work items. Upon the above referred to partial acceptance, the Administration, within 30 days from such partial acceptance, upon request of the Contractor and with consent of surety, shall pay to the Contractor, what is hereby known as a partial semi-final estimate payment. Such a semi-final estimate will be based upon: (a) quantities the Administration has computed and set up as proposed final quantities, and (b) a reasonably accurate estimate for those quantities for which the Administration has not yet completed computations. The quantities that the Administration sets forth as proposed final quantities shall be so designated. To arrive at the amount of the semi-final payment, the following will be deducted from the apparent estimated value of the Contract: (a) total of all amounts previously paid to the Contractor as current estimates, (b) the

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retainage for landscaping items of work, (c) sums deemed chargeable against the Contractor including penalties and liquidated damages, and (d) as an additional retainage, a sum not less than 1 percent of the total value of the Contract, excluding landscaping items of work.

- (3) If all retained funds have not been paid to an escrow agent, as provided for in (a)(4), the Administration shall, upon payment of the semi-final estimate, place the remaining retainage in a interest-bearing escrow account, as designated and on such terms and conditions as specified by the procurement officer. At the time of the final payment, any retainage due, and any interest accrued on the retainage due from the time of payment of the semi-final estimate, shall be paid to the Contractor.

130 **ADD:** The following at the end of Section TC-7.05:

(c) Application for Progress Payment.

In order to receive payment, the Design-Build Team shall submit a written Application for Progress payment to Baltimore City on a monthly basis. Receipts, invoices, and other vouchers, including invoices from subcontractors shall be included. Invoices shall be based on the proportionate quantities of the various classes of work satisfactorily designed, checked, and completed or incorporated in the work in accordance with the Schedule of Work and the value thereof determined from the Contract Progress Payment Breakdown as described in TC-7.11. If the Application for Progress Payment is inconsistent with the Payment Breakdown, the Projected Schedule of Payments, or the actual progress of work, the Application must include a written explanation for such inconsistencies and Baltimore City reserves the right to withhold the applicable payment in whole or in part.

(d) Payment of Invoices.

All invoice payments shall be subject to correction in subsequent invoices and payments and upon final acceptance and payment. No payment shall be made when, in the judgment of Baltimore City, the work is not proceeding in accordance with the provisions of the Contract or when the total value of the work done since the last estimate amounts to less than \$500.00. Portions of the progress payment may be withheld in accordance with the Contract provisions.

(e) Payment for Mobilization.

The total of payments for Mobilization will not exceed 10% of the Contract Price (less price adjustments and incentives).

(f) Payment for Changes.

Differing site conditions, changes, and extra work meeting the requirements of this Contract will be paid using the following methods as appropriate:

- a. Unit prices agreed upon in the order authorizing the work.

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- b. An agreed upon lump sum amount.
- c. On a Force Account basis, if agreement cannot be reached and if directed by Baltimore City. Refer to TC-7.03

TC-7.10 COST BREAKDOWN AND SCHEDULE OF PAYMENTS

.01 Submittal of Cost Breakdown

Concurrent with the submission of the Price Proposals, each Design-Build Team shall submit to Baltimore City an itemized Cost Breakdown and supporting documentation to be used to evaluate bids and as a basis of payment. This breakdown shall present a realistic and documentable presentation of the costs for the major elements of work that comprise the lump sum price for the work. The breakdown shall be submitted electronically to Latisha Griffin of Baltimore City Department of Transportation at laetitia.griffin@baltimorecity.gov. At a minimum, the following Lump Sum Items shall be included:

Clearing & Grubbing
Mobilization (refer to TC-705,e.)
Design Engineering
As-Built Drawings
Engineer's Office
Maintenance of Traffic
Construction Stakeout
Earthwork - Excavation & Embankment
Drainage
Erosion & Sediment Control
Structures
Paving Items – hot mix asphalt, concrete pavement, and graded aggregate base
Concrete
Landscaping
Lighting & Electrical
Pavement Markings
Permanent Signing
Signals
Utility costs for each utility – engineering and construction

Baltimore City may require additional items to be identified and included prior to approval.

Note that to enable Baltimore City to make effective progress payments, the successful Design-Build Team will be required to submit for approval the more detailed Progress Payment Breakdown described in TC-7.11. All progress payments will be based on an approved Progress Payment Breakdown. The Progress Payment Breakdown may be submitted in place of the Cost Breakdown described above.

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All costs associated with the preparation, submission, or revision of any Cost Breakdown will not be considered as an item for payment, but shall be included in the Design-Build Team's Lump Sum price.

The successful Design-Build Team will be required to submit an Initial Critical Path Method Project Schedule Design-Build Activities Chart within twenty (20) working days after notification of Award. This is in addition to the requirements outlined in Section 112- Critical Path Method Project Schedule Design-Build.

.02 Review and Approval

Within 14 working days after Execution of the Contract, Baltimore City shall approve the Cost Breakdown or return it to the Design-Build Team with deficiencies noted. Baltimore City will not approve a Contract Cost Breakdown that is unbalanced. The Design-Build Team shall then submit the Cost Breakdown until an acceptable Cost Breakdown is approved. The Design-Build Team is responsible for incorporating time for submission and approval of the Cost Breakdown in its Schedule of Work.

.03 Projected Schedule of Payments

Within 7 working days after approval of the Cost Breakdown, the Design-Build Team shall provide Baltimore City with a Projected Schedule of Payments for the Project. This schedule will provide Baltimore City with an estimate of monthly cash flow requirements by forecasting the Design-Build Team's monthly Applications for Progress Payments for the duration of the Project. The Projected Schedule of Payments must be in accordance with the Contract, the approved Cost Breakdown.

.04 Justification of Cost Breakdown or Projected Schedule of Payments

Baltimore City may require the Design-Build Team to provide explanations and supporting documentation if the Cost Breakdown or Projected Schedule of Payments indicate unbalancing or do not reasonably reflect the actual cost of performing the work or the value of work received by Baltimore City.

TC-7.11 CONSTRUCTION PROGRESS PAYMENT BREAKDOWN

.01 Submittal of Progress Payment Breakdown

The successful Design-Build Team shall submit to Baltimore City an itemized Progress Payment Breakdown and supporting documentation to be used as a basis for payment. This breakdown shall be a realistic and documentable presentation of the costs for the major elements that comprise the Contract Lump Sum price for the work. The breakdown shall be sent to Michael Wilmore of Baltimore City Department of Transportation. No progress payment will be made until such time that this breakdown has been accepted by Baltimore City. The Design-Build Team shall submit additional updates to the Payment Breakdown as the design and construction progresses and as directed by Baltimore City. Baltimore City

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PAYMENT FOR DESIGN-BUILD

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reserves the right to request additional detail from the Design-Build Team in order to process progress payments. The breakdown shall be in MS Excel format and include at a minimum, the following items.

Section 1000

- LS for Design Costs
- LS for Mobilization (refer to TC-7.05, e.)
- LS for As-Builts
- LS for Clearing & Grubbing
- LS for Engineer's Office
- LS for Maintenance of Traffic
- LF of Temporary Barrier
- LF of Temporary Striping
- SF of Temporary Signs
- EA of Drums
- EA of Arrow Panels
- EA of VMS

Section 2000

- CY of Excavation

Section 3000

- LF of RCCP
- LF of CMP
- LF of HDPE Pipe
- EA of Drainage Structures
- LF of Underdrain Pipe (if applicable)
- LS for Erosion & Sediment Control
- LS for Stormwater Management

Section 4000

- CY of Structure Excavation
- LF of Piling
- LF of Caissons
- CY of Substructure Concrete
- CY of Superstructure Concrete
- LS for Reinforcing Steel
- LS for Fabricated Structural Steel
- LS for Cleaning & Painting New Structural Steel
- LS for Pre-stressed Concrete Beams & Panels
- LS for Retaining Walls

Section 5000

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SY of Graded Aggregate Base
Tons of HMA Surface
Tons of HMA Base
SY of Grinding Existing Pavement
SY of Portland Cement Concrete
LF of Pavement Markings

Section 6000

LF of Curb & Gutter
SF of Sidewalk
SF of Detectable Surfaces
LF of Chain Link Fencing

Section 7000

SY of Topsoil
SY of Permanent Seeding
SY of Temporary Seeding
SY of Soil Stabilization Matting (if applicable)
LS for Tree, Shrub, Perennial Establishment
LS for Care & Replacement, Warranty of Plantings
EA of Benches
EA of Litter Receptacles
EA of Bike Racks
SF of Clay Brick Unit Pavers

Section 8000

CY of Concrete for Foundations
LS for Sign Structures
SF of Permanent Signing
EA of Lighting Structures
EA of Signal Structures
LF of Wire, Conduit for Lighting and Signals
LF of Conduit Ductbanks
EA of Electrical Manholes and Handboxes
LF of Ductile Iron Water Pipe

The breakdown shall also contain the Design-Build Team unit prices for Hot Mix Asphalt, HMA for Pavement Patching, each type of concrete mix to be used on the project, and each type of pavement marking. These prices will be used to determine a reduction in payment if necessary due to materials not meeting required specifications such as PCC compressive strength, AC content, asphalt density, pavement marking thickness, and reflectivity. Additionally, the breakdown shall include the hourly rate, including overhead, for each Design Key Staff member. This price will be used by Baltimore City to set a baseline cost associated with any

SPECIAL PROVISIONS

PAYMENT FOR DESIGN-BUILD

work determined to be out of scope and agreed to by Baltimore City prior to the work being performed.

The Design-Build Team shall use the Progress Payment Breakdown format in preparing and documenting its Applications for Payment. Baltimore City will use the Cost Breakdown to assist in evaluating requests for payment. All costs associated with preparation, submission, or revision of the Progress Payment Breakdown will not be considered as an item for payment, but shall be included in the Design-Build Team's Lump Sum price.

**SPECIAL PROVISIONS
PRE AND POST CONSTRUCTION SURVEYS**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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**CATEGORY 100
PRELIMINARY**

PRE AND POST CONSTRUCTION SURVEY

DESCRIPTION. The Contractor and the Baltimore City Inspector shall be present to photograph the building walls and foundation (inside and outside) prior to construction. Existing structures are not to be undermined or damaged by construction activities, including vibrations.

Existing structures include all residences, buildings, structures, and retaining walls located within and adjacent to the limits of construction.

Prior to the commencing of any work, the Contractor together with the Baltimore City Inspector, shall make a detailed inspection of the buildings located at the following locations:

Central Avenue, from Lancaster Street to Watson Street

CONSTRUCTION. Inspections will record the condition of all walls, floors, ceilings, and other structural elements as well as its contents and equipment that may be in place and pavements and sidewalks that may become subject to possible damage claims. The record shall consist of a written report including measurements and sketches, videotapes and photographs as required to fully delineate the extent of the deficiencies or lack of deficiencies.

- 1) Photographs shall be eight inches by ten inches (8"x10") in size and shall be in color and should include views both inside and outside of existing buildings.
- 2) A Notarized Statement certifying the date(s) this preconstruction survey was made shall be furnished by the Contractor to the Engineer. This certification shall include a statement that the preconstruction survey was made in the presence of and to the satisfaction of the respective owners or owner's representatives.
- 3) The written report and photographs for each existing structure shall be furnished to the Engineer.

Before any inspections are performed the Contractor shall notify the owners of the buildings or structures involved requesting their permission to enter upon said properties for the purpose of making these inspections for the protection of the owner.

In the event that access for the purpose of determining the conditions of the buildings and/or structures is refused by any owner, the Contractor shall notify Baltimore City in writing and may thereupon be relieved of the responsibility for making the survey with respect to the property to which access is denied.

SPECIAL PROVISIONS
PRE AND POST CONSTRUCTION SURVEYS

F.A.P. NO. PENDING
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The Contractor should, where possible, have the owner or a representative of the owner present during these inspections and should secure the signature of said owner/representative on the completed documents and submit a copy to said owner/representative.

A copy of all data relative to existing conditions of each respective property as found by the preconstruction survey shall be forwarded to each property owner. Two (2) identical copies shall be submitted to Baltimore City.

Upon completion of the work on this project and prior to final acceptance of the work, the Contractor and the Baltimore City Inspector shall re-examine each property to determine any changes from the original conditions established by the preconstruction survey.

MEASUREMENT AND PAYMENT. Pre and Post Construction Survey will be measured and paid for at the Contract unit price Lump Sum, which shall be full compensation for notification of property owners, inspection, photographer, color photographs, preparation and submission of written reports, notarization, all copies provided to the property owners, and all labor, equipment and incidentals necessary to complete the preconstruction survey.

CATEGORY 100
PRELIMINARY
TEMPORARY STREET LIGHTING

DESCRIPTION. This work shall consist of furnishing and installing temporary lighting within the project limit. The Contractor shall be required to provide the temporary lighting and remove it after construction is complete. In order to provide adequate illumination levels for pedestrian safety, special consideration shall be given to the pedestrian facilities at crossings and adjacent to the roadway and work zone. The temporary lighting system shall be in operation until the proposed lights are installed and/or the existing lights are rewired, and as applicable, are connected to the power source and operational. The contractor shall prepare temporary lighting concept plan to meet the requirements in the following paragraph.

The Contractor must maintain existing lighting. In the event that existing lighting cannot be maintained or the existing system requires rewiring, the Contractor shall design and install a temporary lighting system to provide adequate lighting levels for both the roadway and pedestrian facilities. This work shall consist of submitting plans, furnishing, installing and removing a temporary lighting system. The Contractor shall design the system and submit plans to Mr. Suresh Bhatt for his approval at 417 East Fayette Street, 7th Floor, Baltimore Maryland 21202, (410) 396-6946.

MATERIALS. As required for the Contractor's designed system and approved by the City of Baltimore. Temporary wood poles with 250 watt HPS fixtures may be used.

CONSTRUCTION

- A. Temporary lighting shall be installed, maintained and removed by the Contractor. A separate power source will be required to be provided by the Contractor.
- B. Temporary lighting shall correspond to existing lighting and provide a minimum initial lighting level of two (2) foot candles with a uniformity ratio not exceeding six to one (6:1) on the roadway and pedestrian facilities.
- C. The Contractor shall submit to the Engineer a layout proposal of temporary lighting and wiring proposed a minimum of four (4) weeks in advance of any interruptions of existing lighting. Temporary lighting shall not be installed until such layout is approved by the Engineer.
- D. Temporary lighting shall be installed prior to the removal of the existing streetlights and shall not be removed until the permanent lighting is installed and operational.
- E. If temporary lighting is required then the temporary lights shall not be removed until the permanent street lights are operational, tested and accepted by the City. The Contractor shall then remove all temporary lighting poles, wires and related appurtenances.

MEASUREMENT AND PAYMENT. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
TEMPORARY STREET LIGHTING

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Temporary lighting will not be measured but will be paid as Lump sum. The payment will be full compensation for designing and obtaining approval if required, furnishing all materials, temporary power sources, installation, labor, equipment, tools, operation and removal of the temporary lighting system and all incidentals necessary to complete the work. All wiring within the pole, fuse kits, temporary connection to the overhead system and tying into the buried conduit, if approved by BGE and the City of Baltimore, shall be considered incidental to this item. The payment will also include all fees associated with temporary connections performed by BGE and/or the City to power the temporary system, if applicable. All materials will remain the property of the Contractor upon removal. This work also includes the restoration of the area including backfilling, seeding and mulching as necessary.

CATEGORY 100
PRELIMINARY

SECTION 103 — ENGINEERS OFFICE

103.03 CONSTRUCTION.

103.03.05 Requirements for all Offices.

144 **ADD:** the following after (v).

(w) One paper shredder capable of shredding at least 10 sheets (20 lb bond) at a time. Throat width of at least 12 in. Speed of at least 20 feet per minute. Auto reverse or auto stop for paper jams. Power of at least 115 v.

146 **DELETE:** 103.03.09 **Recyclable Materials (Paper, Bottles, Cans, Etc.)** in its entirety.

INSERT: The following.

103.03.09 Recycling. Recycling of recyclable paper (bond, newsprint, cardboard, mixed paper, packaging material and packaging), bottles (glass and plastic), and aluminum cans will be required at the Engineer's Office and the Contractor's facilities for the project.

Furnish approved containers, and remove the material from the site on an approved schedule or as directed. All material shall be taken to an authorized recycling facility. Maintain a log for the duration of the project documenting the type of materials recycled. The log shall include the types of material, date, time, location of facility, and signature line. Furnish a copy of the log at the completion of the project and upon request.

The Contractor shall be considered the owner of any profit and be responsible for all incurred costs.

SPECIAL PROVISIONS
103 — ENGINEERS OFFICE

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CATEGORY 100
PRELIMINARY

SECTION 103 – ENGINEERS OFFICE

144 **DELETE:** 103.03.06 Microcomputer System for all Offices in its entirety.

INSERT: The following.

103.03.06 Computer System. Furnish 1 desktop computers and laptop computers.

General Requirements.

- (a) IBM compatible with an Intel or AMD processor.
- (b) Minimum hard drive storage of 500 GB (gigabyte).
- (c) One CD-RW drive (re-writable CD-ROM).
- (d) Operating System. Minimum Microsoft® Windows 7. The computer system will not be acceptable unless all Microsoft Windows Critical Updates are installed.
- (e) Printer. When an Engineers Office is specified, furnish a color all-in-one laser printer/scanner/copier/fax with at least 64 MB of RAM and meeting the following minimum requirements:
 - (1) Input paper capacity of 150 sheets.
 - (2) Automatic document feed of 35 page capacity.
 - (3) Printer resolution up to 600 X 2400 dpi, and a print speed (color) of at least 15 ppm.
 - (4) Scanner resolution must be capable of 1200 x 2400 dpi optical. Built in Copier resolution must be capable of up to 600 X 600 dpi. Copier speed of at least 15 ppm.
 - (5) Fax speed of at least 2 sec / page.
- (f) Software. Supply all manuals and software on original disks for retention in the Engineers Office or Administration facility for the duration of the Contract.
 - (1) Microsoft® Office 2007 Professional for Windows™ or later.
 - (2) Install and configure antivirus/antispyware software to perform an automatic update when the microcomputer system connects to the internet. (Antivirus/AntiSpyware software approved for Administration web email: *Norton, McAfee, Sophos, or ETrust.) *Norton Internet Security includes Antivirus and a Personal Firewall.

SPECIAL PROVISIONS
103 — ENGINEERS OFFICE

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- (g) Internet Access. Provide unlimited internet service approved by the Engineer. Where available, provide internet high-speed service (DSL or cable). With DSL or cable internet service, provide an external router device. Provide firewall software to protect the computer from security intrusions.
- (h) Accessories.
 - (1) When an Engineers office is specified, provide a standard computer workstation with minimum desk space of 60 X 30 in. and a padded swivel type chair with armrests.
 - (2) 8-1/2 X 11 in. xerographic paper as needed.
 - (3) Toner and ink as needed.
 - (4) Maintenance agreement to provide for possible down time.
 - (5) Physical security system to deter theft of the computer and components.
 - (6) Three 4-GB USB flash drive storage devices.
 - (7) Blank recordable CD-RW media as needed.

Desktop Specific Requirements.

- (a) Minimum processor speed of 3.0 GHz.
- (b) Minimum of 4 GB RAM.
- (c) Enhanced 101 key keyboard with wrist rest.
- (d) Super video graphics accelerator (SVGA).
- (e) Mouse and mouse pad.
- (f) Flat-panel LCD monitor (19 in. minimum) meeting Energy Star requirements.
- (g) Uninterruptible power supply (UPS).

Laptop Specific Requirements.

- (a) Must meet military standard of durability MIL-STD 810G
- (b) Minimum processor speed of 2.4 GHz.
- (c) Minimum 2 GB SDRAM.

SPECIAL PROVISIONS
103 — ENGINEERS OFFICE

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- (d) Minimum 15" 1024x768 (XGA), daylight-readable, 500nits (cd/m2) LCD display.
- (e) Power Supply. Two lithium ion battery packs with overcharge protection, an AC adaptor, and a vehicle DC power adaptor that operates the laptop and simultaneously charges the laptop's internal battery.
- (f) Carrying Case.
- (g) Printer. When an Engineers Office is not specified, furnish a portable B&W printer with DC power adapter and having a minimum resolution of 1200 dpi, at least 8 MB of RAM, and a print speed of at least 15 ppm. (Note: A color printer may be substituted if a digital camera is specified. Refer to SP-Section 113).
- (h) Internet Service. If an Engineers office is not specified, furnish the laptop with an internal wireless broadband card and broadband internet service.

Have the computer system completely set up and ready for use on or before the day the Engineers office is to be occupied. When an Engineers office is not specified, have the computer system furnished complete and ready for use at least five days prior to beginning any work on the project.

If for any reason the system fails to operate, is stolen, or is otherwise unavailable for use, it shall be replaced or repaired within 48 hours.

When the computer system is no longer required, the Construction Management software system including original user/operator guide manuals, program disks, and all data files (including those stored on USB flash drives, CD-R's, etc.) will be removed by the Engineer and delivered to the District Engineer and become the property of the Administration. The remaining computer systems shall remain the property of the Contractor.

103.04 MEASUREMENT AND PAYMENT.

147 **ADD:** The following as a fourth paragraph.

Computer. The computer system will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, the cost of the computer system will be incidental to the payment for Mobilization. In absence of either item, payment will be incidental to the other items specified in the Contract Documents.

SPECIAL PROVISIONS
103.04 — ENGINEERS OFFICE

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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1 of 1

CATEGORY 100
PRELIMINARY

SECTION 103 — ENGINEERS OFFICE

103.04 MEASUREMENT AND PAYMENT

Supplement the following:

The Contract Lump Sum price will also include for the Engineer's Office to remain for two (2) months, fully operational, after the Final Inspection.

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.01 TRAFFIC CONTROL PLAN (TCP)

104.01.01 DESCRIPTION.

- 149 **DELETE:** The fourth paragraph sentence “Refer to contract Documents for Work Restrictions.” in its entirety.

INSERT: The following.

Work Restrictions. The Engineer reserves the right to modify or expand the methods of traffic control or working hours as specified in the Contract Documents. Any request from the Contractor to modify the work restrictions shall require written approval from the Engineer at least 72 hours prior to implementing the change. The Contractor shall submit a copy of the original work restrictions with the written request.

Work is not permitted on Sundays.

Work is not permitted on the holidays, or work day preceding and following holidays indicated below with an “X”:

- New Year's Day, January 1
- Martin Luther King's Birthday, the third Monday in January
- President's Day, the third Monday in February
- Good Friday
- Easter Weekend
- Memorial Day, the last Monday in May
- Independence Day, July 4
- Labor Day, the first Monday in September
- Columbus Day, the second Monday in October
- Veteran's Day, November 11
- Thanksgiving Day, the fourth Thursday in November
- Christmas Day, December 25

Work is not permitted during the following special events. The Contractor shall coordinate with the Engineer for the applicable dates each year:

- Marathon
- Grand Pix
- Baltimore Sailabration

TEMPORARY LANE CLOSURE SCHEDULE			
ROADWAY	# LANE(S) CAN BE CLOSED	DAY OF THE WEEK	CLOSURE PERIOD (TIME OF DAY)
S. Central Avenue – between Baltimore Street and Lancaster Street	Minimum one lane shall be maintained on each direction.	All Days	All Times

149 **ADD:** The following after the last paragraph, “Any monetary savings...and the Administration.”

When closing or opening a lane on freeways, expressways, and roadways with posted speed ≥ 55 mph, a work vehicle shall be closely followed by a protection vehicle (PV) during installation and removal of temporary traffic control devices. The PV shall consist of a work vehicle with approved flashing lights, either a truck-mounted attenuator (TMA) with support structure designed for attaching the system to the work vehicle or a trailer truck-mounted attenuator (TTMA) designed for attaching the system to the work vehicle by a pintle hook and an arrow panel (arrow mode for multilane roadways and caution mode on two-lane, two-way roadways).

The work vehicle size and method of attachment shall be as specified in the TMA/TTMA manufacturer’s specification as tested under NCHRP and/or MASH Test Level 3.

When a temporary lane or shoulder closure is in effect, work shall begin within one hour after the lane is closed. Any delay greater than one hour with no work in progress shall require the Contractor to remove the lane/shoulder closure at no additional cost to the Administration. The Contractor's Traffic Manager shall attend Pre-Construction and Pre-Paving Meetings and shall discuss traffic and the Traffic Control Plan including procedures to be implemented for lane closures.

SPECIAL PROVISIONS
 104.01 — TRAFFIC CONTROL PLAN

DRAFT - NOT FOR CONSTRUCTION
 P.A.P. NO. PENDING
 SHA CONTRACT NO. PENDING
 BALTIMORE CITY CONTRACT NO. TR12317

All closures shall be in conformance with the approved TCP and under the direction of the Contractor's Traffic Manager and the Engineer.

Workers and equipment, including temporary traffic control devices needed for setting up a lane closure or restriction, are prohibited in the lane/shoulder to be closed or restricted before the time permitted in the Contract work restrictions, unless otherwise noted below or as approved by the Engineer.

Temporary traffic control devices to be used for lane/shoulder closure may be placed on the shoulder of the roadway by workers no earlier than 30 minutes prior to actual time lane/shoulder closure or restriction is permitted. When temporary traffic control devices are being installed, all work vehicles involved in the installation shall display flashing lights that provide a 360-degree visibility of the vehicles. These lights shall remain on until the full installation of TTC devices is complete. Temporary traffic signs may be displayed to traffic at this time.

Workers shall not enter a lane open to traffic. Workers may be present on shoulders to prepare for lane closure setup no earlier than 30 minutes prior to actual time lane/shoulder closure or restriction is permitted. During preparation for the lane closure, all work vehicles present at the site and involved in the installation of the lane closure or restriction shall display flashing lights that provide 360-degree visibility of the vehicles. These lights shall remain on until the full implementation of the road closure or restriction is complete.

All temporary lane or shoulder closures shall be restored at the end of the closure period and no travel lane shall be reduced to less than 11 ft on expressways, freeways and 10 ft on other roadways. Prior to opening the closed lane or shoulder, the Contractor shall clear the lane or shoulder of all material, equipment, and debris.

Failure to restore full traffic capacity within the time specified will result in a deduction being assessed on the next progress estimate in conformance with the following.

This is in addition to the requirements specified in TC-4.02.

ASSESSED DEDUCTIONS FOR OTHER ROADS	
ELAPSED TIME, (MINUTES)	DEDUCTION
<i>For 1 Lane Closures</i>	
1 – 10	\$ 150.00
Over 10	\$75.00 per minute (In addition to the original 10 minute deduction)
<i>For 2 or more Lane Closures</i>	
1 – 10	\$ 300.00
Over 10	\$150.00 per minute (In addition to the original 10 minute deduction)

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.02 MAINTENANCE OF TRAFFIC (MOT)

104.02.01 DESCRIPTION.

150 **ADD:** The following:

1. The item of work shall consist of the proper maintenance of vehicular and pedestrian traffic within and adjacent to the Project site and includes the providing of flaggers and security personnel, public convenience and safety considerations, steel plates, traffic cones and all other traffic control devices as required by the Contract Documents or as directed by the Engineer. The Contractor shall furnish, install, reset, maintain and subsequently remove, all necessary fences, barriers, barricades, etc. within and adjacent to the Project limits as required to protect pedestrian and vehicular traffic and to separate the Contractor's construction operations from the pedestrian and vehicular areas, all as directed by the Engineer.
2. All work shall be done in accordance with the latest edition and any revisions or addenda thereto, of the Federal Highway Administration's publication manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).
3. Access by emergency vehicles including ambulances and police and fire vehicles to abutting commercial and residential properties, alleys, intersecting streets and commercial and residential properties and driveways shall be maintained at all times. When access is to be temporary curtailed, the Contractor shall be responsible for giving adequate notice to all affected parties including adjacent businesses, commercial properties and residential property owners.
4. Coordination of the Contractor's maintenance of traffic plans must be developed with other contractors and utility companies working in the same general location to maintain continuity of vehicular and pedestrian traffic and minimize congestion. The Contractor shall work closely with all adjacent business, commercial properties and residential property owners to ensure vehicular and pedestrian access is not denied to any facility at any time.
5. The Contractor shall furnish flaggers equipped with traffic paddles and communication devices during of this Contract and as directed by the Engineer.
6. The Contractor shall furnish, install, and maintain two (2) Information Signs at each location on this project. Each sign shall be portable type and shall be four feet (4') high and six feet (6') wide and shall be installed prior to start of any Construction Operations at each location, as directed by the Engineer.

SPECIAL PROVISIONS

104.02 — MAINTENANCE OF TRAFFIC

104.02.03 CONSTRUCTION.

150 **ADD:** The following:

GENERAL TRAFFIC REGULATIONS

1. The Contractor must contact Mr. Robert Ferguson of the Department of Transportation at 443-984-2173 two (2) weeks before construction begins and one week prior to any changes to the Maintenance of Traffic (M.O.T.) plan.
2. The Contractor must contact Mr. Robert Ferguson of the Traffic Engineering Section at 443-984-2173, one (1) week prior to installing any permanent pavement markings.
3. It shall be required under this Contract that all excavated openings shall be bridged, decked and safely maintained to provide sufficient use of the roadway for vehicles during all hours in a manner satisfactory to the Engineer. The decking shall consist of steel plates backed with temporary asphalt and shall have sufficient strength to safely support all street traffic.
4. All excavations and trenches shall be plated at the end of each workaday and "STEEL PLATES AHEAD" warning signs displayed in advance. All Steel Plates that are installed per BC-576.17 must be clearly marked so that ownership is easily discernable.
5. Excavations that are too large to cover with steel plates shall be filled with crusher run aggregate protected with plastic drums with flashing warning lights.
6. It is the responsibility of the Contractor to supply, install and maintain all traffic control equipment for the duration this contract.
7. All traffic control must be in accordance with the current edition and revisions of the Federal Highway M.U.T.C.D., and the Maryland S.H.A. Work Zone Traffic Control Standards.
8. No work, lane closures or disruptions of traffic other than those shown on the TCP are permitted between the hours of 7:00am – 9:00am and 3:00pm – 6:00pm weekdays.
9. The Traffic Control Sketches in the Detail Drawing Section are additional information for the Traffic Control Plans for this project.
10. The Contractor shall provide signage in accordance with MUTCD for each particular construction activity or changes in Maintenance of Traffic setup. Maintenance of traffic operations for this project shall comply with the following standard details contained in the Contact Documents.
11. All material, equipment, stockpiles, etc. that cannot fit within the work area must be removed from the construction areas and stored at an off-street location during non-working hours.

SPECIAL PROVISIONS

104.02 — MAINTENANCE OF TRAFFIC

12. During the duration of this contract, the Contractor shall minimize all adverse conditions caused by pollution, noise, etc. that would effect the citizens and business owners in the neighborhood.
13. Any areas modified or altered by the Contractor in order to access the Project site or for any reason, shall be returned to their original condition as directed by the Engineer at the Contractor's expense.
14. The Contractor shall exercise all precautions to protect existing buildings, fire hydrants, trees, fences, benches, light poles and other property in and along the site of the work to be performed under this contract. No such property may be cut, marked, moved or removed unless so permitted by the Engineer. Any such property that is damaged or destroyed shall be restored by the Contractor at this expense.
15. All Traffic Control Devices used in this project shall remain the property of the Contractor and shall be removed from the project site after the Project is completed.
16. No work shall be conducted on Holidays.
17. The Contractor is responsible for the installation of any TEMPORARY "NO STOPPING" prohibition signing that may be necessary to complete this project.

VEHICULAR TRAFFIC REGULATIONS

1. When the Contractor is allowed to close traffic lanes for construction work, traffic cones and other suitable Traffic Control Devices shall be installed to prohibit all traffic from entering the closed area except for the Contractor's construction vehicles. Where traffic must travel adjacent to a lane under construction, the contractor shall place Traffic Control Drums at the edge of the traffic lane in the vicinity of the construction area.
2. The Contractor shall maintain an ingress and egress to all driveways within the work zone.
3. The contractor shall contact The Parking Authority of Baltimore City at 443-573-2800 and the Department of Transportation Meter Shop at 410-396-7575 72 hours in advance for the parking meter heads/E-Z Park Machines to be removed or bagged. The Meter Shop shall remove all parking meter heads. It is the responsibility of the contractor to remove and dispose of the existing meter post/E-Z Park Machine Bases. Pay-to-park spaces are not to be maintained throughout construction, but parking shall be permitted during non-working times.
4. The existing number of Residential Permit Parking (RPP) spaces shall be maintained during all phases of construction as shown on the TCP and as per the Engineer. Parking in RPP spaces shall be permitted during all periods of the day.
5. The Contractor is required to coordinate with all property owners to maintain appropriate access during business hours.

PEDESTRIAN TRAFFIC REGULATIONS

1. The Contractor shall maintain a minimum four-foot (4') wide pedestrian footway or implement an appropriate pedestrian detour while actively working in the sidewalk.
2. The Contractor shall separate the construction area with a pedestrian footway with drums and orange construction fencing, or with other means deemed appropriate by the engineer.

TRAFFIC SAFETY OFFICER

The Contractor shall provide a competent Traffic Safety Officer. The Traffic Safety Officer shall be thoroughly experienced in and qualified for Maintenance of Traffic Safety Control Work. Prior to commencing work requiring Traffic Control management, the Contractor shall certify in writing that the proposed Traffic Safety Officer, and/or any designed substitute, has been certified by the American Traffic Service Association (ATSSA), Fredericksburg, VA (800) 272-8772. The Contractor shall submit a copy of the certificate verifying experience in the operation of Work Zone Traffic Control.

In lieu of this requirement, training provided by another agency or the City may be approved. Training provided by another agency or firm will be approved if the following minimum requirements are met:

1. Successful completion of a comparable Work Zone Traffic Control course including evidence of passing a written examination of the material presented in the course.
2. A minimum of one (1) year of documented field experience in Work Zone Traffic Controls.

The Traffic Safety Officer shall be responsible for the Contractor's maintenance of Traffic Operations. The Officer, or his/her approved substitute in case of forced absence, is expected to perform his/her duties on a regular basis and make sure that all traffic maintenance operations are running smoothly at all times by conducting regular inspections along the entire length of the project. Duties shall include the following:

1. Understand the requirements of the MUTCD, 2001 edition and subsequent revisions, and the contract provisions;
2. Be responsible for assuring compliance of the Contractor's maintenance and protection of traffic relative to the requirements of the contract provisions;
3. Be responsible for assuring that all deficiencies are corrected;
4. Be responsible for assuring that all Traffic Control Devices are placed in their proper location and that damaged Traffic Control devices are promptly replaced;
5. Be responsible for coordinating maintenance of Traffic Operations with the Engineer;

SPECIAL PROVISIONS

104.02 — MAINTENANCE OF TRAFFIC

6. Be responsible for developing Traffic Control shop drawings; and hold Contractor's safety meetings.

Flaggers shall be provided, if required, by the Contractor's operations. Flaggers shall conform to Section 6F of the MUTCD.

104.02.04 MEASUREMENT AND PAYMENT.

- 155 **ADD:** the following at the end of the first paragraph:

The Contract lump sum price for "Maintenance of Traffic" will be full compensation for the development and obtaining approval of the "Maintenance of Traffic Sequence/Plan", all work necessary to maintain traffic, including relocating, turning, completely covering or removing, maintaining in like new condition and cleaning all existing and temporary traffic signs, Traffic Safety Officer, and any other Traffic Control Devices not included elsewhere in these Specifications but are necessary for the fulfillment of the Contract requirements and implementation of the approved Traffic Control Plan, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

- (e) Maintenance of Existing Roadway, Measurement and payment for this work will conform to the pertinent pay items included in The Contract Documents.
- (f) Flagging will be considered to be incidental to the Contract lump sum price for Maintenance of Traffic.
- (g) Obtaining permits and bagging of parking meters will be considered to be incidental to the Contract lump sum bid price for Maintenance of Traffic.
- (h) The acquisition of all traffic permits will be considered to be incidental to the Contract lump sum bid price for Maintenance of Traffic.

SPECIAL PROVISIONS INSERT
104.07 — MAINTENANCE OF TRAFFIC

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.07 ARROW PANEL (AP).

104.07.01 DESCRIPTION.

159 **DELETE:** The second and third paragraphs “Furnish APs that are.....units unless otherwise specified” and “APs shall have bothdimmer device is operational.

104.07.03 CONSTRUCTION.

160 **ADD:** The following after the first paragraph.

Furnish APs that are self-contained, vehicle-mounted or portable, and approved. Use self-contained trailer units unless otherwise specified.

Provide APs that have both manual and automatic dimmer devices capable of reducing the light intensity by 50 percent. Periodically clean the photocells in order to prevent malfunctioning of the brightness control. Dimmer devices are mandatory during night operation. The devices shall include a fail-safe system that ensures maximum brightness during daytime operations and a reduction in brightness of up to 50 percent during periods of darkness, regardless of which dimmer device is operational.

The AP’s shall provide full illumination within at least a 24-degree cone perpendicular to the panel face.

Power Supply. The AP shall operate from a solar powered electrical system and consist of battery power and solar array panels, and be capable of providing power supply to the AP for 21 consecutive days without auxiliary charge.

ADD: The following after the Arrow Panel Lamp Options table.

Arrow Board Type	Minimum Size	Minimum Legibility Distance	Minimum Number of Elements
A	48x24 in.	½ mile	12
B	60x30 in.	¾ mile	13
C	96x48 in.	1 mile	15
D	None*	½ mile	12

* Length of arrow equals 48 in. width of arrowhead equals 24 in.



*Maryland Department of Transportation
State Highway Administration*

SPECIAL PROVISIONS INSERT
104 — MAINTENANCE OF TRAFFIC

F.A. P. NO.
S.H.A. NO.
BALTIMORE CITY NO. TR10301
2 of 2

DELETE: (b) “Aim the AP at approaching.....that the display is level”.

INSERT: (b) “Aim the AP at approaching traffic in conformance with the minimum legibility distances specified above. Ensure that the display is level”.

SPECIAL PROVISIONS

104.11 — TEMPORARY PAVEMENT MARKINGS

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

166 **DELETE:** Section 104.11 TEMPORARY PAVEMENT MARKINGS. in its entirety.

INSERT: The following.

104.11 TEMPORARY PAVEMENT MARKINGS.

104.11.01 DESCRIPTION. Furnish, install, and remove temporary pavement markings as specified in the Contract Documents or as directed by the Engineer. These markings shall include lines, letters, numbers, arrows, and symbols.

104.11.02 MATERIALS.

Removable Preformed Pavement Marking Material
Nontoxic Lead Free Waterborne Pavement Markings
Black Out Tape

Refer to the
Contract Documents
QPL

104.11.03 CONSTRUCTION.

104.11.03.01 Quality Assurance/Quality Control. Quality control testing shall be completed by the Contractor's Administration certified technicians. The Engineer will complete the quality assurance checks in conformance with MSMT 729 by performing the Nighttime Visibility Evaluations.

104.11.03.02 Warranty Period. The Contractor shall maintain and be responsible for any defects in the pavement markings for a period of 180 days from the date of application. The Contractor shall replace the pavement markings as necessary within this period as directed by the Engineer at no additional cost to the Administration. Refer to GP-5.11.

104.11.03.02 Application and Removal. The pavement markings shall be applied in conformance with the manufacturer's recommendations and the Contract Documents. Markings shall be applied in the same direction as the flow of traffic. The markings shall be located as specified in the Contract Documents or as directed by the Engineer.

Pavement markings may be applied to either new or existing paved surfaces. When applied to newly paved surfaces, the markings shall be placed before traffic is allowed on the pavement. Nontoxic lead free waterborne pavement markings shall be used for all temporary pavement markings except for the final surface. However, the Contractor may use removable preformed pavement markings at no additional cost to the Administration.

When at the "end of season", the temperatures are too low to allow the placement of removable tape on the final surface, a written exception request may be submitted to the Engineer to allow the use of nontoxic lead free waterborne paint in lieu of removable tape until the following striping season.

When it is appropriate to shift lanes, all nonapplicable pavement markings within the travel way and adjacent to the travel way as directed by the Engineer shall be completely removed. **Surface Condition.** Prior to application of pavement markings, the pavement surface shall be clean, dry, and free of all contaminants, including curing compound, dirt, and loose particles.

SPECIAL PROVISIONS

104.11 — TEMPORARY PAVEMENT MARKINGS

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

Residual pavement markings shall be removed. Loose or poorly constructed markings shall also be removed.

Pavement Marking Removal. All removable preformed pavement markings shall be completely removed prior to application of the permanent markings. On stage construction or final surfaces of portland cement concrete pavements, any objectionable adhesive residue shall be removed by water blasting or other methods as may be approved by the Engineer. Open flame is prohibited to remove adhesive residue, or any pavement markings. The Contractor shall remove all nonapplicable pavement markings so that there is no damage to the existing or final surface.

Retroreflectance. The initial retroreflectance readings for temporary pavement markings shall be a minimum of 250 and 150 millicandellas/lux/square meter for white and yellow, respectively. The Engineer will monitor the pavement markings in conformance with MSMT 729 during the Contractor's 180 day period of responsibility.

104.11.04 MEASUREMENT AND PAYMENT. Payment for Removable Preformed Pavement Markings, Removal of Removable Preformed Pavement Markings, Nontoxic Lead Free Waterborne Pavement Marking Paint, and the Removal of Existing Pavement Markings will be measured and paid for using one or more of the items listed below and as specified in the Contract Documents.

The payment will be full compensation for furnishing, placing, complete removal of lines, letters, numbers, arrows, symbols, and the removal of all residue. In addition, payment will cover maintenance and replacement during the 180 day period, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal and replacement of temporary pavement markings required beyond the 180 day period will be measured and paid for at the Contract unit price for the pertinent temporary pavement marking item.

Temporary markings replaced during the 180 day period as a result of plowing (as determined by the Engineer) will be paid for at the Contract unit price for the pertinent temporary marking item.

- (a) Nontoxic Lead Free Waterborne Pavement Marking Paint-in width specified-per linear foot.
- (b) Removable Preformed Pavement Line Markings-in width specified-per linear foot.
- (c) Removable Preformed Letters, Symbols, Arrows, and Numbers per each.
- (d) Removal of Removable Preformed Pavement Markings-any width-per linear foot.
- (e) Removal of Removable Preformed Letters, Symbols, Arrows and Numbers per each.
- (f) Removal of Existing Pavement Line Markings-any width per linear foot.
- (g) Removal of Existing Letters, Symbols, Arrows, and Numbers per each.
- (h) Black Out Tape Lines-in width specified-per linear foot.
- (i) Removal of Black Out Tape Lines-any width-per linear foot.

SPECIAL PROVISIONS INSERT
104.12 — MAINTENANCE OF TRAFFIC

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.12 DRUMS FOR MAINTENANCE OF TRAFFIC.

104.12.02 MATERIALS.

169 **ADD:** The following to the end of the first paragraph.

Drums may include recycled plastic content. The drum base may contain up to 100 percent recycled content.

104.12.03 CONSTRUCTION.

ADD: The following to the end of the third paragraph.

Damaged drums shall be recycled to the extent possible. The disposition of the damaged drums shall be provided prior to payment for any replacement drums.

104.12.04 MEASUREMENT AND PAYMENT.

ADD: The following to the end of the second paragraph.

A disposition as specified in 104.12.03 is required prior to payment.



SPECIAL PROVISIONS INSERT

104.14 — CONES FOR MAINTENANCE OF TRAFFIC

1 of 1

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.14 CONES FOR MAINTENANCE OF TRAFFIC.

104.14.02 MATERIALS.

171 **DELETE:** First paragraph on this page “Cones shall be...an upright position”.

INSERT: The following.

All cones shall meet MdMUTCD and be new or like new condition. All cones shall be orange in color. Cones shall be at least 28 in. high, 10 in. diameter at the inside of the base, and reflectorized with two white retroreflective stripes. The top stripe shall be 6 in. wide and located 3 to 4 inches from the top of the cone. The second stripe shall be 4 in. wide and located 2 inches below the top band.

Tall-Weighted Cones. When specified, tall-weighted cones shall be at least 42 in. high and 7 in. diameter at the inside of the base. Tall-weighted cones shall be manufactured of low density polyethylene (LDPE) and have four high performance wide angle white and orange retroreflective stripes. The stripes shall be horizontal, circumferential and 6 in. wide. Alternate stripe colors with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 1/2 in.

104.14.03 CONSTRUCTION.

ADD: The following after the first paragraph “The Contractor’s name...away from traffic”.

Equip all cones with approved weights or anchor collars, (15 lb maximum) as needed to maintain an upright position. Anchor collars shall fit to the base of the cone. For tall-weighted cones use anchor collars weighing 10 to 30 lb.

CATEGORY 100
PRELIMINARY

TEMPORARY ORANGE CONSTRUCTION FENCE

SECTION 104.20 – TEMPORARY ORANGE CONSTRUCTION FENCE

104.20.04 MEASUREMENT AND PAYMENT

DELETE: The third paragraph.

INSERT: The following:

This item will be paid as a single one time payment for the actual length of installed fence. The resetting, normal daily maintenance and final removal of the Temporary Orange Construction Fence as many times as necessary to complete the planned construction activities/stages will not be measured but will be incidental to the original furnish and install per linear foot bid price. The replacement of damaged fence (ie. vandalism, contractor's operations, theft, etc.) with new or like new material also will not be reimbursed but is to be included in the original linear foot bid price.

SPECIAL PROVISIONS
104.21 — CELLULAR TELEPHONES

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.21 CELLULAR TELEPHONES.

104.21.01 DESCRIPTION. Furnish and maintain new or like new cellular telephones for use by the appropriate Baltimore City Department of Transportation personnel. Each telephone shall be furnished with a hands-free device and be delivered to the Engineer at time of Notice to Proceed, fully activated and operational. They shall remain operational until returned to the Contractor at final acceptance of the entire project in conformance with GP-5.13.

104.21.02 MATERIALS.

Cellular Telephones

As approved by the Engineer

104.21.03 CONSTRUCTION. Not applicable.

104.21.04 MEASUREMENT AND PAYMENT. The number of cellular telephones required for this Contract is 2. The cellular telephones will not be measured but will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, payment for the cellular telephones will be incidental to the payment for Mobilization. In the absence of either item, payment will be incidental to the other items specified in the Contract Documents. The payment will be full compensation for furnishing the telephones and hands-free devices, activation fees, battery replacement, monthly service fees, extended coverage charges, air time (peak and nonpeak time per minute), roaming rates, long distance fees in conformance with the schedules provided, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. If any of the telephones become defective, are stolen, or for any other reasons do not function as intended, they shall be replaced in-kind at no additional cost to the Administration. Nonfunctioning or stolen telephones shall be replaced within eight hours after the Contractor is notified by the Engineer.

Ownership of the telephones will remain with the Contractor. Baltimore City Department of Transportation assumes no responsibility or liability for the condition of the telephones when they are returned.

SPECIAL PROVISIONS
104.31 — ACCESSIBLE PEDESTRIAN
MAINTENANCE OF TRAFFIC

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.31 ACCESSIBLE PEDESTRIAN MAINTENANCE OF TRAFFIC.

104.31.01 DESCRIPTION. Provide and maintain an accessible pedestrian route, to the “maximum extent feasible”, throughout the project’s limits. When an existing pedestrian access route within the public right of way is blocked by construction, alteration, or maintenance activity, an alternate accessible pedestrian route shall be provided.

The phrase to the “maximum extent feasible” applies in areas where the nature of an existing facility or site conditions makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alternate accessible pedestrian route shall provide the maximum physical accessibility that is feasible, or a design waiver must be approved by SHA’s Office of Highway Development.

104.31.02 MATERIALS. Not applicable

104.31.03 CONSTRUCTION. The following considerations shall be taken into account when addressing accessible pedestrian maintenance of traffic:

- (a) All pedestrians, including persons with disabilities, shall be provided with a reasonably safe, convenient and accessible path that replicates as much as practicable the existing pedestrian facilities.
- (b) The width of the existing pedestrian facility should be maintained if practical. When it is not possible to maintain a minimum width of 60 in. throughout the entire length of the pedestrian route, a minimum width of 36 in. shall be provided with 60 x 60 in. passing zones at least every 200 ft, to allow individuals in wheelchairs to pass.
- (c) Traffic control devices and other construction materials and features shall not intrude into the usable width of the sidewalk, temporary pathway or other pedestrian facility.
- (d) Signs and other devices mounted lower than 7 ft above the temporary pedestrian pathway shall not project more than 4 in. into accessible pedestrian route.
- (e) A smooth, continuous hard surface shall be provided throughout the entire length and width of the pedestrian route throughout construction. There shall be no curbs or vertical elevation changes greater than 1/4 in. in grade or terrain that could cause tripping or be a barrier to wheelchair use. Vertical elevation differences between 1/4 in. and 1/2 in. shall be beveled at a maximum 2:1 slope. The slip resistance coefficient is .80 minimum using test method C 1028 (dry method).

SPECIAL PROVISIONS

**104.31 — ACCESSIBLE PEDESTRIAN
MAINTENANCE OF TRAFFIC**

F.A.P. NO. PENDING
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- (f) When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians using a white cane can follow it. Edging should protrude at least 6 in. above the surface of the sidewalk or pathway with the bottom of the edging a maximum of 2.5 in. above the surface
- (g) Temporary ramps shall be provided when an alternate pedestrian route crosses a curb and no permanent ramps are in place. The width of the ramp shall be a minimum of 36 in. and the slope of the ramp shall not exceed 10:1. Temporary detectable warning mats must be installed at street crossings and signalized entrances. The slip resistance coefficient is .80 minimum using test method C 1028 (dry method).
- (h) When possible, an accessible pedestrian route shall be provided on the same side of the street as the disrupted route. When it is not feasible to provide a same-side accessible pedestrian route an accessible pedestrian detour route shall be provided.
- (i) Information regarding closed pedestrian routes, alternate crossings, and sign and signal information shall be communicated to pedestrians with visual disabilities by providing devices such as audible information devices, accessible pedestrian signals or barriers and channelizing devices that are detectable to the pedestrians traveling with the aid of a white cane or who have low vision.
- (j) It is desirable that pedestrians cross to the opposite side of the roadway at intersections rather than mid-block. Appropriate signing shall be placed at the intersections.
- (k) Access to transit stops shall be provided and maintained at all times.

104.31.04 MEASUREMENT AND PAYMENT. Unless otherwise specified, Accessible Pedestrian Maintenance of Traffic will not be measured but the cost will be incidental to the Lump Sum item for Maintenance of Traffic.

SPECIAL PROVISIONS
107 – CONSTRUCTION STAKEOUT

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 100
PRELIMINARY

SECTION 107 – CONSTRUCTION STAKEOUT

184 **DELETE:** SECTION 107 – CONSTRUCTION STAKEOUT in the Standard Specifications in its entirety.

INSERT: The following.

SECTION 107 – CONSTRUCTION STAKEOUT FOR DESIGN-BUILD PROJECTS

107.01 DESCRIPTION. This work shall consist of furnishing, placing and maintaining construction layout stakes as specified in the Contract Documents or as directed by the Engineer.

The Design-Builder shall, as part of the construction stakeout operation, before any clearing operation commences, demarcate any wetlands and the limit of clearing throughout the entire project as shown in the Contract Documents and labeled as Limit of Clearing or Wetlands to the satisfaction of the Engineer.

Where limits of clearing are not shown in the Contract Documents, the limit of clearing will be the top of cut, toe of slope or limit of ditch excavation.

107.02 MATERIALS. The material for flagging the clearing limits shall be a 3 in. international orange vinyl material with “CLEARING LIMIT” printed on it with 2 in. letters. The material for flagging wetlands shall be the Administration’s standard -1/2 in. pink and white striped vinyl flagging with “SHA WETLAND” printed on it with blue letters.

107.03 CONSTRUCTION.

107.03.01 Line and Grade.

The Design-Build Engineer will provide the Design-Builder with the following:

(a) Control Points.

- (1)** Control Points for horizontal and vertical control shall be as shown on the Preliminary Plans.

SPECIAL PROVISIONS
107 – CONSTRUCTION STAKEOUT

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(b) Structure Stakeout.

- (1) A staked out center line or working line, whichever applies, with stations not over 100 ft apart and extending at least 100 ft beyond ends of the structure.
- (2) When the structure is on a curve, the Design-Build Engineer will furnish a staked out center line or working line, whichever applies, consisting of stations not over 100 ft apart and including the P.C., P.T., and at least one point on the tangents beyond each end of the curve.
- (3) At least two bench marks, one on each end of the structure, will be established by the Design-Build Engineer.

The Design-Builder will provide the following:

(a) Roadway Stakeout.

- (1) A staked center line of the roadway with the maximum spacing of stations (stakes, nails, crosses, etc.) of 100 ft.
- (2) Establish appropriately spaced bench marks and the necessary references including all points of curvature (P.C.), and points of tangency (P.T.) for the preservation and control of the center line.

Horizontal Referencing:

- The Design-Builder will establish references to all Base Line of Construction Controls. This will include all Points of Curvature (P.C.s) and Points of Tangency (P.T.s).
- Reference points shall be positioned in pairs with the closest point placed Twenty (20) feet outside the limit of construction. Should these points fall beyond the Right of Way Line, approval from the property owner or tenant must be obtained prior to setting. Right angle and radial ties to Baselines are preferred but not required.
- Reference points, typically, shall be Number #5 (five) 5/8" Rebar two (2) feet long. In areas unsuitable for Rebars, markers of a stable, permanent nature shall be used (crosses in concrete, PK nails, Railroad spikes, etc.)
NOTE: Wooden hubs are not to be used for any referencing purpose.
- References, when positioned, shall be hand referenced to local points of permanency (trees, structure corners, utility poles, etc.) measured to a 100th of a foot.

SPECIAL PROVISIONS
107 – CONSTRUCTION STAKEOUT

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Vertical Referencing:

- The Design-Builder will place and establish permanent Bench Marks on structures along the project Baseline. These marks are to be placed in a suitable surface at time of pour and finish. In non-structure areas, permanent points in stable positions (Square cuts in existing concrete, Boat spikes in Power poles / large trees etc.) are acceptable.
- Benches shall be referenced to the Base Line of Construction by Station plus and offset distance.
- Spacing of Vertical Control shall be a minimum of Five (5) per mile.
- Elevations on all Benches shall be established by differential leveling and return Loop check.

107.03.02 Equipment and Personnel. The Design-Builder shall engage a Registered Professional Land Surveyor, licensed in the State of Maryland, to determine all lines and elevations for various parts of the Work. The surveyor shall have 3 to 5 years experience as a party chief or higher and have demonstrated experience working with the Maryland Plane Coordinate system – NAD 83/91 and NAVD 88, or similar. The surveyor shall use competent personnel and state of the art equipment for all engineering work required to set and maintain the elevations and dimensions as specified in the Contract Documents.

107.03.03 Control Markers. The Design-Builder shall be responsible for preserving the centerline and benchmarks set by the Design-Build Engineer. When the centerline and benchmarks are disturbed or destroyed, they shall be replaced by the Design-Builder at no additional cost to the Administration.

107.03.04 Control Stakes. For roadways as specified in 107.03.01, the Design-Builder shall furnish, set and preserve stakes at each station along each side of the project on the right-of-way or easement line, whichever is furthest from the center line of construction. Where only part of an ultimate dual highway is to be constructed, the stakes on the side of the future improvement shall be set 10 ft beyond the construction limits. On each of these stakes shall be marked its offset distance from the center line and its top elevation or the cut or fill to the profile grade line. Additional stakes as needed for horizontal and vertical controls necessary for the correct layout of the work shall be set by the Design-Builder.

107.03.05 Layout. For structures, as specified in 107.03.01, the Design-Builder shall proceed with the layout work. However, before any actual construction begins, the Design-Build shall rerun and check the Design-Build Engineer's lines and grades and then establish all center line or working line intersections with the center line or center of bearing of all piers, bents and abutments. From these field layouts, the Design-Builder shall check the proposed span lengths by electronic distance measurement or chaining. When chaining is used, the measurements shall be compensated for temperature, sag and horizontal alignment. The Design-Builder shall also check the location of the structure to affirm its correct location with relation to existing structures, roads, and existing

SPECIAL PROVISIONS
107 – CONSTRUCTION STAKEOUT

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conditions that are to remain in their original positions. If any discrepancies are found, the Design-Builder shall notify the Design Build Engineer at once in writing, otherwise, it will be assumed that all planned dimensions, grades and field measurements are correct. All lines established on the ground shall be preserved or referenced, marked and kept available at all times.

The Design-Builder shall establish the field elevations for all bridge seats and assume responsibility for finishing to proper grade. If any steel beams or girders are incorporated in the project, the Design-Builder shall run elevations over the tops of the beams or girders after they are in place, before any forms are attached to them, to determine the deflection of each member. This information shall then be applied to the deflection diagram to determine the corrected elevation of bottom slab forms and screed supports. After the Design-Builder has assembled this information, it will be checked by the Engineer before final adjustments are made and the placing of any concrete in the forms.

107.03.06 Utilities. The Design-Builder shall furnish to the utility companies or agencies working within the limits of the project, promptly upon request, reference to control points, alignment and grade data, so that they may properly locate and coordinate their work and improvements in relation to the project.

Intersection Utility Stakeout. The Design-Builder shall notify the appropriate agencies listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Design-Builder's anticipated beginning of any underground work.

- (a) Request a MISS UTILITY stakeout and possess a valid MISS UTILITY clearance ticket number for any underground work.
- (b) Contact all utilities within the limits of the project who are not a member of MISS UTILITY and obtain a stakeout of their respective facilities.
- (c) Request the Office of Traffic & Safety's Signal Operations to stakeout Administration maintained traffic signal facilities.
- (d) Request the District Engineer to stakeout their lighting facilities.

The Design-Builder shall stakeout the proposed construction as indicated in the Contract Documents and allow the Design-Build Engineer to verify location of the proposed facilities.

107.03.07 Right-of-Way and Easement Lines. The Design-Builder shall define only right-of-way and easement lines of the project for adjacent property owners, promptly upon request.

107.03.08 Subgrade, Subbase and Base Controls. The Design-Builder shall furnish for subgrade, subbase and base courses, a string line and grade with fixed controls having a maximum longitudinal and transverse spacing of 25 ft.

SPECIAL PROVISIONS
107 – CONSTRUCTION STAKEOUT

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The Design-Builder shall place along each form line for cement concrete pavement line and grade with fixed controls not to exceed 25 ft.

107.03.09 Flagging. The flagging shall be placed continuously through wetland areas.

In areas where trees are not to be disturbed, the Design-Builder shall individually flag those trees in a line along the clearing limits that are not to be moved or destroyed. If the clearing or wetland flagging has been destroyed and the Engineer determines that its use is still required, the Design-Builder shall reflag the areas.

If the Design-Builder does not replace destroyed flagging within 48 hours after notification by the Engineer that replacement flagging is needed, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Design-Builder and deducted from any monies due under the Contract.

At the completion of construction, the Design-Builder shall remove all flagging.

107.04 MEASUREMENT AND PAYMENT. Payment for all work for Construction Stakeout for Design-Build Projects shall be included in the Lump Sum Price shown on the Schedule of Prices for the all-inclusive Project Lump sum. The payment will be full compensation for furnishing, placing and maintaining construction layout stakes, flagging of clearing limits and wetlands, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**SPECIAL PROVISIONS
108 – MOBILIZATION**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 100
PRELIMINARY**

SECTION 108 — MOBILIZATION

DELETE: Section 108 - MOBILIZATION in its entirety.

INSERT: the following.

108.01 DESCRIPTION.

This item of work shall consist of the performance of preparatory construction operations for the establishment of the contractor's facilities necessary to begin work on the project. This work shall include the movement of personnel and equipment to and from the project site, initial expenses and operations and all other work which must be performed prior to the beginning of the work and as further required by this item.

As the work proceeds, the Contractor shall keep a current record set of as-built drawings. When the work is completed, the Contractor shall transfer the as-built notations to one complete set of Plans, recording all changes made to the original Plans. These Plans shall be delivered to the Engineer for the Engineer's approval and acceptance.

In order to work in the public right-of-way, the Contractor must obtain permits from the Department of Public Works. Applications for permits may be obtained at:

Department of Public Works
Permit Division
Abel Wolman Municipal Building
200 North Holliday Street,
Room 7
Baltimore, Maryland 21202
(Phone: 410-396-6875)

The Contractor shall be responsible for applying for any permits that may be required sufficiently in advance of the scheduled construction operations in order that the progress of the work is not delayed. The obtaining of the required permits in a timely fashion shall be the Contractor's responsibility.

Materials and equipment that cannot be stored within the Project limits shall be removed and stored at an off-site location as approved by the Engineer.

The Contractor shall protect all existing buildings, utilities, fire hydrants and other property in and adjacent to the Project site. No property may be cut, marked or defaced.

**SPECIAL PROVISIONS
108 – MOBILIZATION**

F.A.P. NO. PENDING
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108.02 MATERIALS.

Not Applicable.

108.03 CONSTRUCTION.

Not Applicable.

108.04 MEASUREMENT AND PAYMENT.

The item, "Mobilization", will not be measured for payment.

The item, "Mobilization", will be paid for at the lump sum price bid in the Proposal which price shall be full compensation for all equipment, labor, permits, materials, tools and all incidentals necessary to complete this item of work.

When the contractor has established the necessary facilities as specified above, fifty percent (50%) of the total bid price for this item will be payable on the first monthly estimate. The remaining fifty percent (50%) of the price bid to be prorated in equal monthly payments for the duration of this Contract. The duration of the Contract for payment purposes of this item to be the days for completion specified in the proposal.

Payment of the Lump Sum price shall not be made more than once regardless of how many times the Contractor may have had – for any reason – suspended or closed the work on the project and/or moved equipment, materials, etc. away from the project site and then back again.

SPECIAL PROVISIONS
113 — DIGITAL CAMERA

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 100
PRELIMINARY
SECTION 113 — DIGITAL CAMERA

113.01 DESCRIPTION. Furnish and maintain new or like new digital cameras for use by Administration personnel. Furnish one color inkjet printer. The digital cameras and printer shall be delivered to the Engineer at the time of the Notice to Proceed. They shall remain operational and not be returned to the Contractor until final acceptance of the entire project, in conformance with GP-5.13.

113.02 MATERIALS.

(a) **Digital Camera.** Each digital camera shall meet the following requirements and be furnished with the specified accessories:

- (1) Windows XP PRO XP2 compatible operating system.
- (2) Photo Suite, Photo Deluxe, Picture Works, Photo Shop, or similar Photo Managing Software.
- (3) 4.0 megapixel image resolution (minimum).
- (4) 3X optical zoom (minimum).
- (5) Two (2) sets of rechargeable batteries.
- (6) SmartMedia Card or memory stick (2 GB minimum).
- (7) Pop-up or built-in flash modes.
- (8) All items required for quick downloading.
- (9) Auto-quick focus.
- (10) Lens Cover, Shoulder Strap, and Carrying Case.
- (11) AC adapter and Battery Charger.

(b) **Color Inkjet Printer.** The printer shall conform to the following minimum requirements:

- (1) Resolution of 2400 x 1200 DPI (dots per inch).
- (2) Print speed of 17 PPM (pages per minute) for black and white and 13 PPM for color.

SPECIAL PROVISIONS
113 — DIGITAL CAMERA

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(3) Memory 8 MB.

(4) Duty cycle of 5000 pages/month.

Office-jets and Bubble-jets will not be accepted.

113.03 CONSTRUCTION. Not applicable.

113.04 MEASUREMENT AND PAYMENT. The number of digital cameras required for this project is 1. The digital cameras and printer will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, payment will be incidental to the payment for Mobilization. In the absence of either item, payment will be incidental to the other items specified in the Contract Documents. If a digital camera or printer becomes defective, is stolen, or for any other reason does not function as intended, it shall be replaced with an approved camera or printer at no additional cost to the Administration. A nonfunctioning or stolen camera or printer shall be replaced within 5 days after the Engineer notifies the Contractor.

Ownership of the cameras and printer will remain with the Contractor. The Administration assumes neither responsibility nor liability for the condition of the camera when returned.

SPECIAL PROVISIONS

114 — TRUCK STAGING AREAS AND IDLING REQUIREMENTS

1 of 2

**CATEGORY 100
PRELIMINARY**

SECTION 114 — TRUCK STAGING AREAS AND IDLING REQUIREMENTS

114.01 DESCRIPTION. Locate truck staging areas and avoid unnecessary idling of construction equipment in order to reduce engine emissions and to provide air quality benefits to those who live or work in or adjacent to the construction site.

114.02 MATERIALS. Not applicable.

114.03 CONSTRUCTION. Establish truck staging areas for all vehicles waiting to load or unload materials at the job site. Locate and submit for review staging areas where emissions will have the least impact on sensitive areas and the public.

The Administration will review the selection of staging areas, whether within or outside the existing highway right-of-way, to avoid locations near sensitive areas or populations to the extent possible.

Sensitive areas include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. All sources of emissions shall be located as far away as possible from fresh air intakes, air conditioners, and windows. The Engineer will approve staging areas before implementation.

Idling of all mobile construction equipment, including delivery trucks, shall be limited to five minutes except under any of the following circumstances:

- (a) When forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control.
- (b) When necessary to operate defrosting, heating, or cooling equipment to ensure the safety or health of the driver or passenger.
- (c) When necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source.
- (d) To attain the recommended operating temperature.
- (e) When the outdoor temperature is below 32 F.
- (f) When undergoing maintenance that requires operation for more than five consecutive minutes.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idle the main engine of a motor vehicle operating on diesel fuel.

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SPECIAL PROVISIONS

114 — TRUCK STAGING AREAS AND IDLING REQUIREMENTS

2 of 2

114.04 MEASUREMENT AND PAYMENT. All methods and procedures required to comply with these requirements will not be measured for payment but will be incidental to the pertinent contract items.

**SPECIAL PROVISIONS
100 – TEMPORARY CHAIN LINK FENCE**

**CATEGORY 100
PRELIMINARY**

TEMPORARY CHAIN LINK FENCE

DESCRIPTION. This work shall consist of furnishing, erecting, moving and removing new or like new temporary chain link fencing and metal gates of the size and type shown on top of the temporary concrete barriers, and in sidewalk and roadway areas at the locations as shown on the plans and where directed by the Engineer.

Submit in accordance with Section “Catalog Cuts and Working Drawings” shop drawings indicating layout of temporary fencing, location and size of gates, existing pavement and roads, access to fire hydrants and hose connections, and other site specific conditions. Prepare drawing after site observation and verification of existing conditions.

MATERIALS. Materials shall conform to the requirements specified in the following subsections of Section 900-Materials:

Concrete Mix No. 2	902.10
Precast Concrete Blocks	903.05
Fence Fabric	914.01
Tie Wires, Line Post Clips, Tension Wires and Tension Wire Clips	914.02
Posts, Braces, Fittings and Hardware	914.03
Gates	914.04
Barbed Wire	914.05

Type. Install the height (6’) and type of fence specified. Fence may be new or previously used salvaged chain link fencing determined to be in good condition by the Engineer. Prefabricated panels placed onto concrete or other suitable bases may be utilized. When the type of fence is not specified, one of the following types may be used:

- (a) Galvanized steel and malleable iron components.
- (b) Galvanized steel fabric utilizing galvanized steel posts or aluminum line posts.
- (c) Aluminum coated steel fabric utilizing galvanized steel line posts.
- (d) Aluminum coated steel fabric utilizing aluminum line posts.
- (e) Bonded vinyl coated fabric utilizing galvanized steel or galvanized bonded vinyl coated steel line posts and fittings.
- (f) Bonded vinyl coated fabric utilizing aluminum line posts.

Gates. Provide personnel and vehicle gates of the quantity and size indicated on the Drawings or required for functional access to site as specified by the Engineer.

CONSTRUCTION.

General Requirements. Fence lines specified in the Contract Documents are only a guide. The exact location of the fence will be determined in the field by the Engineer. Install all posts

SPECIAL PROVISIONS

100 – TEMPORARY CHAIN LINK FENCE

plumb. Maintain, as uniform as practicable, the spacing specified, with a tolerance of minus 2 ft. Use post lengths that accommodate the fabricated width of the fence fabric without stretching or compressing the fabric and that provide the required spacing below the bottom of the fabric.

Installation of temporary fencing shall not deter or hinder access to existing and new hose connections and fire hydrants.

- (a) Maintain 3 feet diameter clear space around fire hydrants.
- (b) Where fire hydrant or hose connection is blocked by fencing, provide access gate.
- (c) Provide gates for personnel, delivery of materials, and access by emergency vehicles.

Remove the fence when the Engineer determines that the fence is no longer required. The removed fence is the property of the Contractor.

Reset Construction Fence. Reset the construction fence between all phases/stages of construction as shown on the plans and as directed by the Engineer.

Damaged Construction Fence. Repair or replace damaged construction fence within four hours after notification.

MEASUREMENT AND PAYMENT. This work will be measured as the maximum number of linear feet of Temporary Chain Link Fence installed as measured along the top of fencing, including gates, center to center of end posts. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to satisfactorily install the fencing and gates and to subsequently remove them, and shall include all necessary excavation and disposal, fill, concrete, anchoring, posts, hardware, fencing, gates, gate posts, locks, bracing, drilling or forming holes in concrete barriers as necessary, repair of material damaged by the Contractor's operations and all other materials. The resetting as many times as necessary to complete the planned construction activities/stages, normal daily maintenance and final removal of the Temporary Chain Link will not be measured but will be incidental to the original furnish and install per linear foot bid price. The replacement of damaged fence (ie. vandalism, contractor's operations, theft, etc.) with new or like new material also will not be reimbursed but is to be included in the original linear foot bid price. Upon completion of construction, all materials installed under this item shall become the property of the Contractor and shall be removed by the Contractor from the site of work. After placement, payment will be made for ninety (90) percent of the quantity of chain link fencing and gates furnished and erected in accordance with contract requirements. The remaining ten (10) will be paid upon removal.

SPECIAL PROVISIONS
203 — BORROW EXCAVATION

CATEGORY 200
GRADING

SECTION 203 — BORROW EXCAVATION

203.01.02 Notice to Contractor —Borrow Pits.

225 **ADD:** After the first paragraph.

This project is located in Baltimore City. The following conditions applicable to the county or city shall be complied with and documented.

DISTRICT 1

Dorchester (DO) County

Site plan approved by Soil Conservation District.
Grading permit from County Highway Department (except City of Cambridge).
Planning and Zoning approval for use.
Critical Areas approval (if applicable).
Inspection by County.

Somerset (SO) County

Site plan approved by Soil Conservation District.
Grading Permit from the County.
Land Use permit.
Critical Areas approval by Planning and Zoning (if applicable).
Inspection by SHA.

Wicomico (WI) County

Site plan approved by Soil Conservation District.
Certificate of compliance with Planning and Zoning if located in Critical Area.
Inspection by SHA.

Worcester (WO) County

Site plan approved by Soil Conservation District.
Critical areas approved by Planning and Zoning (if applicable).
Inspection by SHA.

DISTRICT 2

Caroline (CO), Cecil (CE), Queen Anne's (QA) and
Talbot (TA) Counties

Site plan approved by Soil Conservation District.
Planning and Zoning approval.
Critical Areas approval (if applicable).
Inspection by SHA.

Kent (KE) County

Site plan approved by Soil Conservation District.
Grading permit.
Planning and Zoning approval.
Critical Areas approval (if applicable).
Inspection by SHA.

SPECIAL PROVISIONS
203 — BORROW EXCAVATION

DISTRICT 3

Montgomery (MO) County

Sediment control permit and plan approval by County
Department of Environmental Protection, Division of
Water Resources Management, Storm Water Management Section/Sediment
Control.

Approval by Maryland National Capital Park and Planning Commission (if
applicable).

Inspection by County.

Prince Georges (PG) County

Site Plan approved by Soil Conservation District.
County Grading Permit.

Tree conservation plan approval by Maryland National Capital Park and
Planning Commission (if applicable).

Critical Areas approval (if applicable).

Payment of all pertinent county fees and/or securing of county required bonding.
Inspection by SHA with oversight by County.

DISTRICT 4

Baltimore (BA) County

Site Plan approved by the Department of Environmental Protection and the Soil
Conservation District.

County Grading Permit.

Critical Areas approval by the Department of Environmental Protection and
Resource Management (if applicable).

Inspection by County.

Harford (HA) County

Site Plan approved by Soil Conservation District.

County Grading Permit.

Critical Areas approval (if applicable).

Inspection by County.

DISTRICT 5

Anne Arundel (AA) County

Site Plan approved by Soil Conservation District.

Planning and zoning approval - special exception required.

Grading plan issued by the County Department of Inspections and Permits.

Critical Areas approval (if applicable).

Inspection by County and SHA.

Calvert (CA) County

Site Plan approved by Soil Conservation District.

Grading plan issued by the County after a mining permit or exemption is issued.

Critical Areas approval (if applicable).

Inspection by SHA.

SPECIAL PROVISIONS
203 — BORROW EXCAVATION

Charles (CH) County
Site Plan approved by Soil Conservation District.
Special exception granted by the County.
Critical Areas approval (if applicable).
Inspection by SHA.

St. Marys (SM) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Critical Areas approval (if applicable).
Inspection by SHA.

DISTRICT 6

Allegany (AL) County
Site plan approved by Soil Conservation District.
Informational copy of plans to County Planning and Zoning Commission.
Inspection by SHA.

Garrett (GA) and Washington (WA) Counties
Site plan approval by Soil Conservation District.
Inspection by SHA.

DISTRICT 7

Carroll (CL) County
Site plan approved by County Planning Commission.
Sediment control plan approval by Soil Conservation District.
County Grading Permit.
Inspection by County.

Frederick (FR) County
Site plan approved by Soil Conservation District.
County Grading Permit.
Inspection by SHA.

Howard (HO) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Inspection by County.

BALTIMORE CITY (BC)

Site plan approved Baltimore City Department of Public Works (BCDPW).
Inspection by BCDPW.

STATE AND FEDERAL PROPERTY

Borrow pits located on state and federal property are subject to Maryland Department of the Environment approval.
Inspection by SHA.

**SPECIAL PROVISIONS
SPECIAL EXCAVATION-RAILWAY AREA**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 200
GRADING**

SPECIAL EXCAVATION - RAILWAY AREA

DESCRIPTION. All existing railroad and streetcar tracks encountered within the contract limits of work shall not be disturbed except for those areas within the limits of utility work, sidewalk reconstruction and full depth pavement reconstruction as shown on the plans.

In general, the existing track sections to be removed are anticipated to be approximately 2.0+/- feet in depth, however, some sections may be deeper. In some areas, track sections may already be partially removed and /or covered by existing surface courses.

Special Excavation - Railway Areas shall include all excavation and disposal of material, regardless of the type of material encountered within the limits as detailed on the Plans, including the removal of existing pavement, base courses, rails, ties, ballast, concrete base and granite blocks.

MATERIALS. The backfill material shall be Graded Aggregate Base.

CONSTRUCTION. Special care shall be exercised to avoid disturbing existing utilities during the removal of railway and streetcar tracks.

Excavated materials removed during the grading operations shall be disposed of promptly as unsuitable material in accordance with the requirements of Section 201.03.09, unless otherwise permitted by the Engineer and as noted below:

All rails and ties encountered shall be removed during grading operations and shall become the sole property of the Contractor. Existing rails shall be cut off at the limit of removal at no additional cost. The Contractor is required to dispose of ties in accordance with all local, state, and federal laws and regulations.

Granite paving blocks removed in excavation on this project shall be salvaged by the Contractor and remain the property of Baltimore City.

MEASUREMENT AND PAYMENT. Special Excavation – Railway Area will be paid for at the contract unit price per cubic yard for the material actually removed from within the limits specified. The payment shall constitute full compensation for all excavation, hauling and for disposing of excess and unsuitable materials, rails, ties, ballast and for all labor, materials, equipment and incidentals necessary to complete the item.

Quantities for payment of Special Excavation – Railway Area will be computed by average end areas from cross sections of the original ground combined with cross sections of the completed work.

SPECIAL PROVISIONS
SPECIAL EXCAVATION-RAILWAY AREA

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

Cutting the ties shall be incidental to this item. The backfill material to the bottom of the sub-base, shall be incidental to this item.

SPECIAL PROVISIONS
203 – Borrow Excavation

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 200
GRADING

VARIABLE DEPTH GRADED AGGREGATE BASE FOR BACKFILL

DESCRIPTION. Furnish and place graded aggregate base as backfill for excavation of unsuitable material below subgrade and special excavation for railway area.

MATERIALS.

Graded Aggregate Base	901.01
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CONSTRUCTION.

Grade Preparation - Cut the area where the graded aggregate base is to be placed to the depth shown or as directed. Bring the area to the specified line, grade, and cross section. Provide a grade that is smooth as practical and free of debris. Minimize construction traffic on the grade. Remove ruts by reshaping, but do not overwork the grade. Have the grade approved prior to placement of the graded aggregate base. Maintain adequate surface drainage as specified in 208.03.03.

Aggregate Placement - Place the graded aggregate base as specified in Section 501.

MEASUREMENT AND PAYMENT. Variable Depth Graded Aggregate Base for Backfill will be measured and paid for at the Contract unit price per cubic yard. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
205 — TEST PIT EXCAVATION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 200
GRADING

SECTION 205 — TEST PIT EXCAVATION

205.01 DESCRIPTION

Delete section 205.01 in its entirety and replace with the following:

The Contractor shall obtain the services of an approved underground utility locating service to provide test holes by air-vacuum or other minimally invasive method to determine the location of underground structures and utilities. The utility locating service shall provide all necessary personnel, equipment, supplies, management and supervision needed for the test holes. The utility locating service shall also provide coordination services with the Engineer, the City and Miss Utility.

205.03 CONSTRUCTION

Delete section 205.03 in its entirety and replace with the following:

The work shall include the final positioning of the test hole site, excavation, measurement and documentation of the horizontal and vertical position of the target utility or structure. Test hole documentation will contain a general description of the target utility with condition, material and general orientation noted as well as data on paving material and thickness and a generalized description of the material encountered in the test hole.

Test hole reports will be prepared for each excavation or attempt. The report will include all field observations noted above as well as elevation data and horizontal positioning information.

205.04 MEASUREMENT AND PAYMENT

Delete section 205.04 in its entirety and replace with the following:

Test Hole Excavation Non-Destructive Method will be measured and paid for at the Contract unit price per each for the completed test hole. The payment will be full compensation for all excavation, tamped backfill, and all material, labor, equipment, tools, and incidentals necessary to complete the work. Any pavement to be replaced will be measured and paid for as specified in Section 106.

**SPECIAL PROVISIONS
PAVEMENT SAW CUTTING**

F.A.P. NO. STP-3057(6)N
SHA CONTRACT NO. BC410005
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 200
GRADING**

**FULL-DEPTH PAVEMENT SAWCUTTING
CONCRETE SAWCUTTING, 2 INCH DEPTH**

DESCRIPTION.

“Full-Depth Pavement Sawcutting” shall consist of sawcutting required for removal of the existing curb & gutter on Madison Street and sawcutting at the limits of work at each phase of construction.

“Concrete Sawcutting, 2 Inch Depth” shall consist of sawcutting at the limits of sidewalk reconstruction as shown on the Construction Drawings or as directed by the Engineer.

MATERIALS. Not Applicable

CONSTRUCTION. Sawcutting (any depth) shall consist of that work required to mechanically sawcut into the existing roadway pavement, curb, apron, sidewalk or where required as directed by the Engineer. The equipment used shall consist of a concrete cutting machine comprising a suitable motor-driven diamond blade circular cutter with control devices and mounted on a sturdy frame. The equipment shall be capable of cutting a groove in a straight line to a sufficient depth to that an even neat joint will be cut to allow removal of material without damage to adjacent paving. A continuous water supply shall be supplied to the cutting element either by a water tank on the equipment or other means.

MEASUREMENT AND PAYMENT. The items “Full-Depth Pavement Sawcutting” and “Concrete Sawcutting, 2 Inch Depth” will be measured and paid for on the basis of the Contract unit price bid per linear foot, which price and payment shall be full compensation for all labor, materials, equipment, and incidentals necessary to complete the work in a manner satisfactory to the Engineer.

SPECIAL PROVISIONS

3" PVC PIPE FOR ROOF DRAIN OUTFALL

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 300
DRAINAGE**

3-Inch PVC PIPE FOR ROOF DRAIN OUTFALL

DESCRIPTION. This item shall consist of the installation of 3-Inch PVC pipe roof drain outfalls and appurtenances.

MATERIALS. PVC pipe and fittings shall be Schedule 40 meeting the requirements of ASTM D 1785 and ASTM D 2467. Pipe shall be NSF approved.

The grates and frames required in the "Special Roof Drain at Sidewalk Detail" as shown in the Construction Drawings shall be Neenah R-4441-1, or approved equal.

CONSTRUCTION. General construction method for pipe excavation and installation shall be in accordance with Section 303, Pipe Culverts.

PVC pipe and fittings shall be prepared and solvent cement joints made in accordance with ASTM D2855 and the manufacturer's installation instructions for the conditions encountered. Test fit dry each joint before applying solvent cement. If the dry fit of any fitting or coupling is loose, the pipe and fitting shall be rejected due to improper size. Do not build up a loose fitting joint with multiple layers of solvent cement to overcome the loose fit. Do not apply solvent cement when the air temperature is below 40°F, unless approved by the Engineer.

Give all solvent cement joints the following minimum set times before moving or handling:

<u>Set Times</u>	<u>Temperature</u>
30 Min.	60° to 100° F
1 Hour	40° to 59° F

Prior to testing, joints shall be allowed to cure a minimum of 24 hours or as approved to cure a minimum of 24 hours or as approved by the Engineer. Pipe shall be tested for leakage by the Contractor. No leakage will be allowed.

Follow the pipe manufacturer's installation instruction for field cutting and beveling P.V.C. pipe and minimum radius of curvature of the various sizes of pipe for installing curved sections of pipe. Solvent cement joint pipe shall be placed in the trench in accordance with manufacturer's recommendations or as directed by the Engineer. After placing pipe and fittings in the trench, allow a minimum of 30 minutes prior to backfilling or placing concrete encasement.

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

SPECIAL PROVISIONS

3" PVC PIPE FOR ROOF DRAIN OUTFALL

The existing roof drain shall be connected to roof drain outfall pipe or as otherwise shown in the Construction Drawings. Connection shall be coordinated with the property owners. Sections of the property owners' roof drain that are damaged by the Contractor shall be replaced at the Contractor's expense.

MEASUREMENT AND PAYMENT. 3-Inch PVC Pipe for Roof Drain Outfall shall be paid for at the contract unit price per linear foot. The payment will be full compensation for all pipe, fittings, adapters, elbows, tees, reducers, and appurtenances, as well as excavation, removal of existing roof drain pipe, connection to existing roof drain, custom fabrication, thickened cement concrete sidewalk, and all labor, materials, testing equipment and incidentals necessary to complete the work.

The grates and frames required in "Special Roof Drain at Sidewalk Detail" shown on the Plans shall be considered incidental to 3-Inch PVC Outlet Pipe for Drains.

SPECIAL PROVISIONS

300 — STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

**CATEGORY 300
DRAINAGE**

STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

DESCRIPTION. This work shall consist of inspecting stormwater management (SWM) facilities during various stages of construction and providing documentation to the Administration to certify that the SWM facilities have been constructed as specified in the Contract Documents, including certification that the constructed SWM facilities meet the functionality as designed.

As-Built (AB) Inspector. The AB Inspector shall be a licensed Professional Engineer or Land Surveyor in the State of Maryland with experience in stormwater management design and construction.

Inspections of planting installations, survival and final turf establishment shall be performed by a Landscape Architect, licensed in the State of Maryland, or an Administration approved Environmental Specialist/Analyst. The inspector shall have experience in stormwater management planting design and construction.

As-Built Certification Package. The as-built certification package, to be provided by the Contractor, shall consist of photographs, completed as-built checklists for each SWM facility, completed as-built certification forms for each SWM facility, material testing reports for any soil, a copy of green-line revision plans for SWM facilities that include as-built survey information, a copy of completed planting checklists, and turf inspection data for SWM facilities and drainage conveyances areas (such as ditches and swales). The as-built survey information shall be superimposed on the final design (including addendums or redlines) contours and a separate plan shall be prepared depicting the as-built information alone.

Information about the person(s) that will perform the plant and turf inspections shall be part of the as-built certification package and shall include, but not be limited to name of the person(s), employer name, brief description of related work history, contact information, and anticipated dates for plant and turf establishment inspections.

The Contractor shall provide to the Administration two hard-copies and one digital copy in PDF format of the as-built certification package.

Plant and Turf Establishment Certification Package. The plant and turf establishment certification package, to be provided by the Contractor, shall consist of field photos, completed turf inspection checklists, completed planting checklists and the contract planting plans and details with green-line revisions. If survivability percentages are not achieved, notation shall be

SPECIAL PROVISIONS

300 — STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

made on the plans and a report designating the plants or areas that are dead or do not meet turf coverage expectations. A description of efforts taken to bring the plantings or turf up to the required survivability shall be included in the report. A schedule for implementing the remediation efforts and documentation of completion of the remediation efforts shall also be included.

The plant and turf establishment certification process must be completed and approved prior to the Administration accepting the establishment phase for maintenance (see Section 710.03.06).

MATERIALS. Not applicable.

CONSTRUCTION.

Stages for As-Built Inspections. The AB Inspector shall perform minimum inspections for SWM facilities as follows:

(a) Stormwater Ponds and Wetlands.

- (1) Upon completion of excavation to sub-foundation and when required, installation of structural supports or reinforcement for structures, including, but not limited to:
 - (i) Core trenches for structural embankments.
 - (ii) Inlet and outlet structures, anti-seep collars or diaphragms, and watertight connections on pipes.
 - (iii) Trenches for enclosed storm drainage facilities.
- (2) During placement of structural fill, concrete, and installation of piping and catchbasins.
- (3) During backfill of foundations and trenches.
- (4) During embankment construction.
- (5) Upon completion of final grading and establishment of permanent stabilization.

(b) Infiltration Trenches.

- (1) During excavation to subgrade.
- (2) During placement and backfill of underdrain systems and observation wells.
- (3) During placement of geotextiles and all filter media.

SPECIAL PROVISIONS

300 — STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

During construction of appurtenant conveyance systems such as diversion structures, pre-filters and filters, inlets, outlets, and flow distribution structures.

(4) Upon completion of final grading and establishment of permanent stabilization.

(c) Infiltration Basins. Refer to stages specified for pond construction and add:

(1) During placement and backfill of underdrain systems.

(d) Filtering Systems. Filtering systems include bioretention, sand filters, organic filters, bio-filters, and dry swales.

(1) During excavation to subgrade.

(2) During placement and backfill of underdrain systems.

(3) During placement of geotextiles and all filter media.

(4) During construction of appurtenant conveyance systems such as flow diversion structures, pre-filters and filters, inlets, outlets, orifices, and flow distribution structures.

(5) Upon completion of final grading and establishment of permanent stabilization.

(e) Open Channel Systems. Open channel systems include wet swales and grass channels.

(1) During excavation to subgrade.

(2) During installation of diaphragms, check dams, or weirs.

(3) Upon completion of final grading and establishment of permanent stabilization.

(f) Non-Structural Practices. Upon completion of final grading and after the establishment of permanent stabilization.

The checklist for each SWM facility shall be completed by the AB Inspector in its entirety at the appropriate stages of construction as specified in the Contract Documents. The as-built certification shall be signed and dated by the AB Inspector upon completion of all SWM facility checklists.

Stages for Plant and Turf Establishment Inspections. At the plant establishment phase (710.03.06) inspection, the plant and turf establishment inspection shall also be conducted and documented by the Contractor's plant inspection representative. Turf establishment inspection shall be conducted according to the Administration's Turf Coverage Specifications (705.03.07). Plants shall be inspected for species, size, quantity,

SPECIAL PROVISIONS

300 — STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

health and location. Plants that measure smaller than the installed size are considered to be dead. Dead plants shall be replaced according to the design specifications. Plant and turf establishment inspections shall be conducted from June 15 to November 15.

The following planting and turf shall be inspected and documented:

(a) Ponds and Wetlands

- (1) During and after wetland area planting.
- (2) SWM embankment (including roadway embankment if applicable) and clear zone 15 feet beyond toe of embankment cleared of woody vegetation and established with turf or native meadow.
- (3) During second growing (plant establishment phase inspection) season to verify a vegetation survival rate at submerged benches and wetlands of 50 percent.

(b) Infiltration Trenches

Turf establishment in conveyances, filter strips and other features draining to the trench that are within the Administration right-of-way and within the project site shall meet Turf Coverage Specifications (705.03.07). Off-site areas shall be visually observed and the location of off-site eroded or bare areas included in the report and photographed.

(c) Infiltration Basins

- (1) Woody plant clear zones listed for Ponds above.
- (2) Plant, turf or native meadow establishment inspected at basin bottom and side slopes.
- (3) Turf establishment in conveyances, filter strips and other features draining to the trench that are within the Administration right-of-way and within the project site shall meet Turf Coverage Specifications (705.03.07). Off-site areas shall be visually observed and the location of off-site eroded or bare areas included in the report and photographed.

(d) Filtering Systems

- (1) Turf establishment on weir, bottom and sides of facility, and all conveyances draining to the facility shall meet Turf Coverage Specifications (705.03.07).
- (2) At Bioretention Facilities, to verify a plant survival rate of at least 90 percent. The mulch bed shall be inspected and replenished to constructed depth and condition.

SPECIAL PROVISIONS

300 — STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

(e) Open Channel Systems.

- (1) For Dry Swales, turf establishment on weir, bottom, side slopes and conveyances draining to the facility meets Turf Coverage Specifications (705.03.07).
- (2) For Wet Swales, turf establishment on weirs, sides and all conveyances draining to the facility shall meet Turf Coverage Specifications (705.03.07). Planting at the bottom of the facility shall meet 50 percent survival rate.

As-Built Survey, Computations and Green-Line Drawings. Upon completion of the final grade and stabilization at each SWM facility, the Contractor shall survey each SWM facility, including contours, inflow and outflow ditches, limits of riprap, emergency spillway(s), outfall structure(s) (including elevations and dimensions at top, all orifices, weirs and openings), and all other pertinent features in and around the facility.

Elevation variances greater than ± 3 in. for earthwork and ± 1.2 in. (0.1 ft.) for emergency and principal spillways, pipe inverts, orifice and weir elevations shall be corrected by the Contractor to meet the acceptable tolerance limits. Constructed dimension for the required freeboard shall be equal to or greater than designed. If meeting the required tolerances is not possible, the Contractor shall provide computations for the volumes, discharges, stage-storages and detention times that demonstrate that the SWM facility meets the designed parameters. The Contractor shall resurvey any corrected areas.

The Administration will provide to the Contractor a copy of the final approved design Stormwater Management Report and copies of the plan CADD files that shall be used in producing the green-line revision plans. The AB Inspector shall follow SHA CADD standards in producing the green-line documents.

Submission to and Approval by the Administration. The Contractor shall submit the completed as-built certification package to:

Maryland State Highway Administration
Highway Hydraulics Division Chief
707 North Calvert Street, Mailstop C-201
Baltimore, MD 21202

MEASUREMENT AND PAYMENT. Stormwater Management Facility As-Built Certification will not be measured but will be paid for at the Contract lump sum price. The payment will be full compensation for the completion and submission of the as-built certification package, plant and turf establishment certification package, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Re-inspection of corrections to stormwater management facilities and re-certification of any

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300 — STORMWATER MANAGEMENT FACILITY AS-BUILT CERTIFICATION

deficiencies to be corrected by the Contractor shall be at no additional cost to the Administration.

Engineering and analysis for Contractor-modified SWM facilities shall be at no additional cost to the Administration.

Deficiencies to the as-built certification package shall be corrected by the Contractor at no additional cost to the Administration.

Additional construction, planting and stabilization necessary to meet the certification standards shall be completed at no additional cost to the Administration.

Payment Schedule. Payment will conform to the following:

No greater than thirty-five percent (35%) of the total payment will be paid upon completion and submission of the As-Built Certification Package.

No greater than thirty-five percent (35%) of the total payment will be paid upon approval from the Administration for the As-Built Certification Package.

Final payment will be paid upon approval from the Administration for the Plant and Turf Inspection Certification Package.



Maryland Department of Transportation
State Highway Administration

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SPECIAL PROVISIONS INSERT
305— MISCELLANEOUS STRUCTURES

CATEGORY 300
DRAINAGE

SECTION 305 – MISCELLANEOUS STRUCTURES

305.03.06 Precast Drainage Structures.

247 **DELETE:** The third paragraph “Do not ship.....untested precast unit” in its entirety.

INSERT: The following.

Do not ship any precast unit without complete documentation showing that all materials meet specifications per 305.02 or the Contract Documents; or without complete identification markings per Sections 440, 905 and 915.



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SPECIAL PROVISIONS INSERT
314 — FLOWABLE BACKFILL

CATEGORY 300
DRAINAGE

SECTION 314 – FLOWABLE BACKFILL

314.02 MATERIALS.

276 **DELETE:** 314.02 Materials in its entirety.

INSERT: The following.

314.02 MATERIALS.

Controlled Low Strength Material

902.16



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SPECIAL PROVISIONS INSERT
316 – STORMWATER FILTRATION FACILITIES

CATEGORY 300
DRAINAGE

SECTION 316 – STORMWATER
FILTRATION FACILITIES

316.01 DESCRIPTION. Construct stormwater filtration facilities including bioretention, micro-bioretention, organic filters, surface sand filters, submerged gravel wetlands, landscape infiltration, rain gardens, infiltration berms, wet swales, dry swales, and bio-swales.

Stormwater Filtration Facilities use vegetation, specific soil mixtures, and aggregate layers to filter stormwater and are highly susceptible to contamination by sediment. Therefore installation of vegetation immediately following the construction of each facility is essential.

316.02 MATERIALS.

No. 57 Aggregate	901.01
No. 7 Aggregate	901.01
No. 2 Aggregate	M-43, No. 2
Topsoil	920.01.01 or .02
Bioretention Soil Mix (BSM)	920.01.05
Coarse Sand	920.01.05(a)(1)
Shredded Hardwood Bark (SHB) Mulch	920.04.03
Soil Stabilization Matting	920.05
Turfgrass	920.06
Turfgrass Sod	920.06
Plant Materials	920.07
Water	920.09.01
Geotextile, Class PE, Type III	921.09

Subdrain Pipe, Fittings and Geotextile Sock. 6 in. diameter thermoplastic pipe. Polyvinyl chloride Profile Wall Drain Pipe (PPWP) meeting F 949 or Corrugated Polyethylene Drainage Pipe (CPP-S) meeting M 252, Type S and Type SP. Perforated pipe shall have slotted perforations with an opening area of 1 in²/ft to 1.5 in²/ft. Pipe used for observation wells requires an appropriate geotextile sock as recommended and supplied by the pipe manufacturer.

316.03 CONSTRUCTION. Construct stormwater filtration facilities only after all contributing drainage areas are permanently stabilized and vegetation including turfgrass and turfgrass sod are established according to Sections 705 and 708. Do not construct stormwater filtration facilities in areas previously used as erosion and sediment control facilities. Do not stockpile materials nor store equipment in these areas.

Use methods of excavation that minimize the compaction of the underlying soil. Use excavators and backhoes operating on the adjacent ground. If the bottom width of the excavated



SPECIAL PROVISIONS INSERT
300 – STORMWATER FILTRATION FACILITIES

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area is greater than 15 ft, wide-track or marsh-track equipment, or light equipment with turf-type tires may be used to excavate, grade, and place fill materials. Do not use equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires.

Rototill the excavation pit bottom to a minimum depth of 6 in. to alleviate compaction from excavation activities. Remove any standing water from the excavation pit prior to rototilling. Only rototill soil that is friable. Do not rototill soil while in a muddy or frozen condition.

Geotextile. Place tightly against the vertical sides of the excavation pit, pull tight to eliminate wrinkles and folds, and pin securely. Eliminate any voids between the geotextile and the soil and avoid wrinkling and folding the geotextile. Maintain a minimum 6 in. overlap at the geotextile joint ends or breaks and pin joints and overlaps securely. Do not place geotextile on the bottom of the excavation pit.

Aggregate. Use aggregate that is clean and free of soil and fines. Prevent soil, fines, and other debris from intermixing with the aggregate. If aggregate become contaminated with soil or fines, remove and replace it with uncontaminated aggregate.

Subdrain. Cap the ends of all pipes not terminating in a cleanout, vent, or drainage structure unless otherwise specified.

Cleanouts. Install solid-wall pipe vertically and connect to horizontal subdrain with the appropriate manufactured connections. Provide a screw cap on the exposed ends.

Vents. Install solid wall pipe vertically and connect to the horizontal subdrain with the appropriate manufactured connections. Provide a ventilated screw cap on the exposed ends. Ventilation holes or slots shall be no larger than 1/4 in. in diameter or width. The sum total area of the openings shall be no less than 1 in². Ensure that the ventilation openings are above the maximum specified water surface elevation.

Observation Wells. Place vertically using perforated and solid-wall pipe. Place an appropriate geotextile sock over the perforated pipe portion and secure on both ends. Provide a screw cap on the exposed end extending 2 in. above the surface. If a concrete collar is specified, trim the top of the well flush with the surface.

Coarse Sand. Place coarse sand in horizontal layers not to exceed 12 in. in thickness. After each lift, apply water by spraying or sprinkling to saturate the entire area of coarse sand until water flows from the subdrain. Use an appropriate sediment control device to capture any discharged sediment-laden water. Prevent soil, fines and other debris from intermixing with the coarse sand. Remove and replace any contaminated coarse sand.

Bioretention Soil Mixture (BSM). Place BSM in horizontal layers not to exceed 12 in. in thickness. After each lift, apply water by spraying or sprinkling to saturate the entire area of BSM until water flows from the subdrain.



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300 – STORMWATER FILTRATION FACILITIES

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Use an appropriate sediment control device to capture any discharged. Prevent soil, fines, and other debris from intermixing with the BSM. Remove and replace any contaminated BSM.

Plant Materials. Install plant materials immediately after final grading according to Sections 710 and 711.

Shredded Hardwood Bark (SHB) Mulch. Place immediately after BSM placement according to 710.03.13.

Soil Stabilization Matting. Place according to Section 709.

Topsoil. Place according to Section 701.

Turfgrass. Install and maintain according to Section 705. Mow by hand cutting only.

Turfgrass Sod. Install and maintain according to Section 708. Prevent damage to check dams, observations wells, vents and other features.

Check Dams. Construct check dams using No. 7 aggregate.

Final Acceptance. Complete and submit a Stormwater Management (SWM) Facility As-Built Certification Package for each stormwater filtration facility. Approval of the SWM As-Built Certification Package will be included in the Punch List requirements for the project.

316.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all applicable excavation, sheeting, shoring, dewatering, hauling, storing, rehandling of material, removal and disposal of excess and unsuitable material, rototilling, grading and slope adjustments, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Excavation. Excavation will be measured and paid for at the Contract unit price per cubic yard for the pertinent Class of Excavation.

Aggregate. Aggregate, including aggregate for check dams, will be measured and paid for at the Contract unit price for one or more of the following.

- (a) No. 2 Aggregate for Stormwater Management Facilities per cubic yard.
- (b) No. 7 Aggregate for Stormwater Management Facilities per cubic yard.
- (c) No. 57 Aggregate for Stormwater Management Facilities per cubic yard.

Removal of contaminated aggregate and replacement with uncontaminated aggregate will be at no additional cost to the Administration.



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300 – STORMWATER FILTRATION FACILITIES

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Geotextile. Geotextile, Class PE, Type III will not be measured but the cost will be incidental to the Excavation.

Subdrain, Cleanouts, Vents, and Observation Wells. Slotted-perforated and solid-wall pipe will be measured and paid for at the Contract unit price per linear foot for 6 Inch Subdrain Pipe. Fittings, caps, geotextile sock, and other incidentals will not be measured, but the cost will be incidental to the Subdrain Pipe.

Coarse Sand. Coarse Sand will be measured and paid for at the Contract unit price per cubic yard for Coarse Sand for Stormwater Management Facilities.

Removal of contaminated coarse sand and replacement with uncontaminated coarse sand will be at no additional cost to the Administration.

Bioretention Soil Mixture (BSM). BSM will be measured and paid for at the Contract unit price per cubic yard for Bioretention Soil Mixture.

Removal of contaminated BSM and replacement with uncontaminated BSM will be at no additional cost to the Administration.

Water. Water used for saturation of course sand and BSM will not be measured but the cost will be incidental to the pertinent item.

Shredded Hardwood Bark (SHB) Mulch. SHB Mulch will be measured and paid for at the Contract unit price per square yard for Shredded Hardwood Bark Mulching, 3 in. Depth.

Discharge from Subdrain. Capture and treatment of any sediment laden water discharged from the subdrain will not be measured but will be incidental to the pertinent Erosion and Sediment Control items specified in the Contract Documents.

Plant Materials. Refer to 710.04 and 711.04.

Soil Stabilization Matting. Refer to 709.04.

Turfgrass. Refer to 705.04.

Turfgrass Sod. Refer to 708.04.

Topsoil. Refer to 701.04.

**SPECIAL PROVISIONS
REINFORCED CONCRETE BLOCK WALL
WITH GROUT FILL**

F.A.P. NO. PENDING
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**CATEGORY 400
STRUCTURES**

12-INCH REINFORCED CONCRETE BLOCK WALL WITH GROUT FILL

DESCRIPTION. This work shall consist of placing reinforced concrete block wall where the cavities indicated on the plans are to be blocked and filled. The work to be performed under this item includes furnishing mortar and accessories for masonry work, furnishing and installing concrete block masonry, furnishing and installing reinforcing steel, grout fill in the masonry unit cells and 2 ply waterproofing membrane, as indicated on the Plans.

MATERIALS.

A. Mortar Materials

1. Cement shall conform to ASTM C 150, Type I.
2. Hydrated Lime shall conform to ASTM C 207, Type 'S'.
3. Sand (Fine Aggregate) shall be clean, sharp, masonry sand conforming to ASTM C 144.
4. Water: Potable and free from amounts of minerals and organic substances that would effect the color and strength of the mortar or may be deleterious to the mortar or any metal in the wall.
5. Admixtures: Do not use anti-freeze compounds, accelerator or other admixtures.

B. Mortar Mixes

Mortar shall be composed of one part Portland Cement, one part hydrated lime and not less than 2½ to not more than 4 parts masonry sand. Mortar shall conform to the requirements of ASTM C 270, Type M with an average compressive strength of 2500 psi at 28 days.

C. Grout

Grout shall conform to the requirements of ASTM C476. Mix shall be composed of 1 part Portland Cement, 2 1/4 to 3 parts sand, 1 to 2 parts gravel. Gravel shall be pea-gravel. Slump shall be 8" with minimum strength of 2,500 psi.

D. Accessories

1. Continuous Wall Reinforcement

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REINFORCED CONCRETE BLOCK WALL
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Prefabricated continuous reinforcing tie system fabricated of wire conforming to ASTM A82. Flush welded cross-ties, 9 gauge wire, hot-dip galvanized after fabrication in accordance with ASTM A153, Class B2, 1.50 ounces for the side and cross-rods.

Wall reinforcement in the size to fit the wall in which it is used.

2. Bar Reinforcing Steel - conform to ASTM A615, Grade 60.
3. Vertical Bar Positioner - prefabricated from 9 gauge wire in a size to fit the wall in which it is used.

E. Concrete Masonry Units

1. Use the product of one manufacturer. Block with face size 7-5/8 inches by 15-5/8 inches and thickness as shown on the Contract Documents.
2. The blocks shall have a uniform medium texture, free from defects, and of uniform dimensions so that courses and joints will line up.
3. Concrete blocks shall be cured in an autoclave with high-pressure steam at 125 to 150 pounds pressure and at temperature of 350 degrees F. Moisture content in units at time of delivery to the site shall not exceed 30 percent of the maximum absorption of the units.
4. Units shall be free from iron or other substances that will stain the surface.
5. Use normal weight, hollow, load bearing, concrete masonry units conforming to ASTM C90, Grade N, Type I.

CONSTRUCTION.

Mixing of Water:

1. Mix mortar for at least five minutes in a clean mechanical mixer to a uniform consistency. Mix cement and sand dry and add putty. Do not mix mortar in quantities exceeding that which can be used immediately.
2. Mix mortar with the minimum amount of water consistent with good workability on the board to provide maximum tensile bond strength within capacity of the mortar.
3. Do not use mortar older than two hours after initial mixing, or mortar which is partially set or frozen.

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4. Use method of measuring materials and mortar that will control and accurately maintain the specified proportions during the entire progress of the work. "Shovel measure" will not be accepted. Measure sand in a damp loose condition.

Preparation:

1. Clean dirt, debris, oil, grease, and other foreign substances which would affect bond of mortar, from surfaces to receive concrete block masonry.
2. Ascertain the location of openings for pipes, conduits and ducts.

Erection:

1. Plumb all walls and partitions. Use level courses with uniform joint thickness.
2. Place wall reinforcement continuously as shown on the Contract Documents.
3. Place vertical bar reinforcing in the cells of the masonry units where shown on the Contract Documents. The concrete fill shall be carefully placed and tamped to insure a dense mass without voids or air pockets.
4. The vertical bars shall be held in place with a bar positioner near the top and bottom of each wall being constructed. The vertical spacing of the bar positioners shall not exceed 10 feet.
5. Keep masonry clean by stiff brushing as the work progresses.
6. Do not wet concrete block units before placing in the wall. Lay units to a line with full mortar coverage on vertical and horizontal face shells and in running bond. Use concave joints. Use a power-drive carborundum disc blade for cutting of units. Remove all mortar smears and drippings on exposed faces of concrete masonry.
7. Carefully cut the faces of units for all utility penetrations. Where possible, use full-size units. Do not use portions of a unit shorter than 4 inches.
8. Provide and set all concrete block work of the sizes as shown on the Contract Documents.
9. Build walls true and plumb to line.

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MEASUREMENT AND PAYMENT. This item will be measured and paid for at the Contract unit price per of square foot of wall as seen in elevation actually placed and accepted, where indicated on the Contract Documents. Payment will be full compensation for furnishing and installing the masonry units, reinforcing, bar positioners, anchors, grout fill, curing and cleaning, 2 ply waterproof membrane, and all labor, tools, materials, equipment, and incidentals necessary to complete this work.



**CATEGORY 400
STRUCTURES**

**SECTION 405 — REMOVAL OF EXISTING
STRUCTURE**

284 **DELETE:** 405.01 DESCRIPTION in its entirety.

INSERT: The following.

405.01 DESCRIPTION. Remove and dispose of or recycle, reclaim, reuse, wholly or in part, designated structures.

The Contractor is advised that prints of plans of the existing pertinent structure(s) may be included in the Contract Documents. No responsibility for their accuracy or completeness is assumed by the Administration. Dimensions, details, etc. as shown thereon may not be as built.

405.03 CONSTRUCTION.

DELETE: The first paragraph, “Before removal operations...method for approval.” in its entirety.

INSERT: The following.

Protect from any damage all portions of the existing structure scheduled to remain in the rehabilitated structure, and the remaining portions of the existing structure used to maintain traffic, and are scheduled to be removed at a later stage, including the beams, abutments, piers, or any other structure members.

Prior to the start of removal operations, submit a list of the proposed equipment and removal methods for approval. Approval does not relieve the Contractor of responsibility for preserving those portions of the structure designated to remain and be incorporated into the rehabilitated structure, or used to maintain traffic.

Immediately halt removal operations if any of these existing elements that are to remain permanently or temporarily are damaged by the Contractor’s operation. Submit the material and work methods proposed to be used to repair or replace the damaged elements to the Office of Structures for approval. Perform the approved method of repair or replacement of the damaged elements to the full satisfaction of the Engineer and the Office of Structures at no additional cost to the Administration. Any delays due to the required repair or replacement shall not be a cause for any claim.

During construction only approved equipment and material (for maximum weight, size, and location) required for a particular operation will be allowed on the existing or newly



constructed portion of new bridge. Refer to TC-6.14 and 420.03.15 for additional requirements.

When a structure contains existing protective shields (sheeting or planking) that have been previously placed to contain debris from a deteriorating deck, the Contractor shall remove and dispose of the debris and shields at no additional cost to the Administration.

286 **ADD:** The following after 405.03.03.

405.03.04 Reporting Requirements. Recycle, reuse, reclaim as much of the removed structure material (structural steel, rebar, concrete, asphalt, bearings, fencing, etc.) as practical. Report the disposition of all removed structure components to the Project Engineer. Indicate the item description, amount (by weight, linear feet, cubic yard, or each), disposition (recycled, reused, reclaimed, disposed of, stockpiled for future recycling or use), place where material was taken (company name, phone number and address), and date. Report all like items using the same unit of measurement.

405.04 MEASUREMENT AND PAYMENT.

DELETE: the first paragraph, “The removal ofdata for review.” in its entirety.

INSERT: The following.

The removal of existing bridges and structures or portions thereof will be measured and paid for as specified. The payment will be full compensation for all excavation, backfill, saw cuts, professional engineer services, removal of existing shields and debris, temporary protective shields, temporary sheeting and shoring, hauling, recycling, reuse, reclamation, storage or disposal, reporting and for all material, labor, equipment, tools, and incidentals necessary to complete the work. On deck replacement projects, payment also includes outlining the locations of the flange and floor beams, obtaining all deck elevations specified to determine rebound, computations necessary to place the new deck at the required elevation, and submitting all data for review.



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420 — PORTLAND CEMENT CONCRETE STRUCTURES

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**CATEGORY 400
STRUCTURES**

**SECTION 420 — PORTLAND CEMENT
CONCRETE STRUCTURES**

420.04 MEASUREMENT AND PAYMENT.

334 **DELETE:** 420.04.06 in its entirety.

INSERT: The following.

420.04.06 Floodlighting for placement of concrete (including superstructure concrete and concrete overlays) will not be measured but the cost will be incidental to the pertinent Concrete item. The payment will also be full compensation for fuel, backup generator, setup, relocation, and removal.



**CATEGORY 400
STRUCTURES**

SECTION 430 — METAL STRUCTURES

430.03 CONSTRUCTION.

363 **DELETE:** 430.03.19 Welding in its entirety.

INSERT: The following.

430.03.19 Welding. Welding of structures and welding qualifications shall meet the Contract Documents and AASHTO/AWS Bridge Welding Code D1.5 unless otherwise specified. The provisions contained herein apply to both shop and field welding.

Ensure that all welders, welding machine operators, and tackers employed to work on steel structures on Administration projects are qualified as follows:

- (a) **American Welding Society (AWS) Qualifications.** Welders shall take tests approved by the Structure Committee for Economic Fabrication (SCEF) in accordance with AASHTO/AWS Bridge Welding Code D1.5; as administered by an AWS Accredited Test Facility (ATF).
- (b) **Fabricator Qualifications.** Fabricators approved in accordance with 430.03.20 may issue in-house welder qualifications for shop and field welding.
- (c) **Steel Stud Shear Developer Qualifications.** Steel Stud Shear Developer welders will be inspected and approved in accordance with AASHTO/AWS Bridge Welding Code D1.5 at the time of installation.

All field welders shall possess a current AWS welder's qualification card or a fabrication facility qualification card approved by the Office of Materials Technology. This card shall be available for inspection at all times.

Unless otherwise specified, welding members carrying primary stress shall be by the submerged arc process (SAW). For material thickness 2 in. and greater, the narrow gap electro slag welding process (ESW) may be substituted. Members carrying primary stress are specified in 909.01.

After fabrication, no welding will be permitted on tension flanges except for steel stud shear developers, as specified.

Welding transversely across tension flanges of beams or girders will be cause for rejection, unless otherwise specified.



**CATEGORY 400
STRUCTURES**

**SECTION 440 — PRESTRESSED CONCRETE
BEAMS AND SLAB PANELS**

440.02 MATERIALS.

410 **DELETE:** 440.02.01 Portland Cement Concrete in its entirety.

INSERT: The following.

440.02.01 Portland Cement Concrete. Ensure that the composition, proportioning, and mixing of concrete produces a homogeneous concrete mixture of a quality that meets the specified material and design requirements.

The required cylinder strength of the concrete at transfer of the tensioning load and the minimum required cylinder strength of the concrete at 28 days will be specified. Include an air entraining admixture in the concrete mix.

Type G high range water reducing admixtures may only be used if the Engineer determines that the producer can design and show by trial mix that the concrete meets the specified strength requirements and the following:

- (a) Slump is not to exceed the admixture manufacturer's recommendation or a maximum of 8 in.
- (b) Air content of $5\frac{1}{2} \pm 1\frac{1}{2}$ percent.
- (c) Cement factor of at least 700 lb/yd³.
- (d) Maximum WCM ratio of 0.45.

Testing. The Engineer will take six test cylinders from each member or members cast and cured with the beam as a unit for the purpose of checking the quality of the concrete being produced; for determining the time when the forms may be removed, and for determining the time when prestressing forces may be applied to a member.

The manufacturer shall provide metal or plastic molds for all test cylinders. The manufacturer's quality control technician shall make at least three cylinder specimens to be cured under laboratory conditions as specified in R 39 to determine the 28-day compressive strengths. The technician shall make and test the cylinders at the manufacturing site according to T 22 and in the presence of the Engineer. A test is defined as the average strength of three companion cylinders.



**CATEGORY 400
STRUCTURES**

450 **DELETE:** SECTION 465 — FUSION BONDED POWDER COATINGS FOR METAL in its entirety.

INSERT: The following.

**SECTION 465 — MISCELLANEOUS
COATINGS FOR METAL (STEEL)**

465.01 DESCRIPTION. Furnish and apply various coatings to metal surfaces as specified. Refer to Sections 435 and 436 for cleaning and painting new and existing bridge structural steel, respectively.

465.02 MATERIALS.

Paint System C	912.05
Fusion Bonded Epoxy Powder Coating for Steel	917.02
Fusion Bonded Polyester Powder	917.03
Hot Dip Galvanized Zinc Galvanizing Repair	A 123, A 153, and 465.03.05(c) A 780 and 465.03.05(c)

Use paint and powder coating material selected from the Administration’s approved vendors list.

465.03 CONSTRUCTION. Perform cleaning and coating in an approved, environmentally controlled plant. The Administration shall have access to each part of the process and reserves the right to witness or perform any Quality Control testing on a random basis.

Use polyester powder coating when coatings other than paint are specified for steel, or as directed.

The powder coating applicator shall have demonstrated the ability to properly apply and cure the materials of the system and shall be on the Administration’s Approved List of Applicators prior to application of any coatings. Galvanizers shall be on the Administration’s Approved List of Galvanizers.

465.03.01 Nongalvanized Carbon Steel. Prepare steel metal surfaces as specified in 436.03.10(h). Clean all items to be coated of any oil or grease; and abrasive blast to Near White in accordance with SSPC SP-10. Remove weld spatter, slivers, hackles, or other defects. Protect



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465— MISCELLANEOUS COATINGS FOR METAL 2 of 4

cleaned surfaces from high humidity, rainfall, and surface moisture; and do not allow to flash-rust. Ensure that the blast profile is 2 to 3 mils as per D 4417, Method C.

- (a) **Epoxy Powder Coating System.** The system consists of a single coat of epoxy powder coating. Ensure that the thickness of the cured coating is 7 ± 2 mils when measured as specified in SSPC PA2.
- (b) **Polyester Powder System.** The system consists of Coat I of System C and a TGIC (Triglycidyl Isocyanurate) polyester powder finish coat. Apply the polyester powder in accordance with the manufacturer's recommendation and in an operation that immediately applies the powder after the organic zinc rich primer has fully cured. Ensure that the dry film thickness of the organic zinc rich paint is 3 to 5 mils and the thickness of the cured polyester coating is 5 to 9 mils as specified in SSPC PA2.

465.03.02 Hot Dip Galvanized Carbon Steel. Metals that have reactive steel chemistry require the galvanizer to reflect the steps to be taken to ensure proper adhesion in their quality control plan as per B 571.

Ensure that the finished galvanized product is free of excessive zinc areas, weld spatter, slivers, ash, and dross or other detriments. Paint or powder coat hot dip galvanized steel as specified. Use an anti-out-gassing type powder coating material for galvanized items. Galvanized items shall not have been galvanized more than one month prior to coating and shall not have been water or chromate quenched.

Clean and smooth surfaces to be coated by sweep blasting as per D 6386. Store items to be coated in an environment free of moisture and dust for a period of 12 hours maximum, when coating application does not immediately follow the sweep blast surface preparation.

- (a) **Paint System.** Ensure that all paint within the paint system is from the same manufacturer and that intermediate and finish coats conform to Coats II and III of System C, respectively. Apply all coatings using methods and under conditions recommended by the paint manufacturer. Measure the thickness of the coating as specified in SSPC PA2.
- (b) **Polyester Powder Coating System.** Place prepared surfaces in a preheated oven and heat for the necessary amount of time. Out-gas galvanized metal surfaces by preheating the surfaces to a temperature 50 F greater than the cure temperature; but not exceeding a surface temperature of 390 F.

Follow the powder coating manufacturer's instructions in regards to the metal surface temperature, applying the coating material, and maintaining the cure parameters.

Apply the powder electrostatically and cure at a temperature not to exceed 50 F less than the out-gas temperature immediately after out-gassing, then cool the preheated piece to 50 F less than the out-gas temperature. Galvanized surfaces for items with different



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465— MISCELLANEOUS COATINGS FOR METAL 3 of 4

thicknesses shall be allowed to cool to at least 50 F below the out-gas temperature prior to the application of the powder. The thickness of the polyester coating shall be 5 to 9 mils when measured in accordance with SSPC PA2.

465.03.03 Adhesion. Adhesion of the paint or powder coating system to either bare or galvanized metal shall be at least 4 A when tested in accordance with D 3359, Method A.

465.03.04 Testing. MSMT 615. The paint and powder coat finished surfaces shall be holiday and pinhole free when tested with a low voltage holiday detector (minimum 67 1/2 volts) in conformance with D 5162. There shall be no more than one deficiency per 5 square feet. Repair all holidays detected with additional coating.

Visually inspect all items for blisters, sags, and other deficiencies and repair in conformance with 465.03.05, if required. Damaged or deficient areas shall not exceed 1/2 of 1 percent of the surface area of the item. Items requiring repairs exceeding 1 in. in the narrowest dimension shall be rejected.

465.03.05 Touch Up System. 436.03.24. Provide a compatible touch up system to repair defects, areas damaged during erection, and all visible open areas. Prepare areas to be repaired and apply touch up systems in accordance with the coating manufacturer’s recommendations.

- (a) Select the epoxy powder touch up material to be used from the Administration’s Approved List.
- (b) Polyester powder touch up system shall be a two component aliphatic polyurethane meeting 912.04.02. The coating thickness of the touch up material for powder coating may be applied in multiple coats and shall be the same thickness as the powder coating. Use Coat I of System C to repair damage to the coating that penetrates to the metal surface; followed by the polyurethane.
- (c) Make any necessary repairs to the galvanizing in accordance with A 780, using the hot stick or metalizing method. Use Coat I of System C for repairing the galvanizing if it is to be powder coated.

465.03.06 Color. The color of all coatings and touch up systems shall match Federal Standard 595 and the following as specified:

COLOR	COLOR NO.
Brown	20040
Black	27038
Green	24108

465.03.07 Certification. Paint shall meet 912.01.03, epoxy powder coating shall meet 917.02.02, and polyester powder coating shall meet 917.03.04.



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465— MISCELLANEOUS COATINGS FOR METAL

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The acceptance of hot dip galvanized zinc will be based on inspection and shall meet A 123, A 153, and the Contract Documents.

465.04 MEASUREMENT AND PAYMENT. Coatings for metal will not be measured but the cost will be incidental to the pertinent items specified.

**SPECIAL PROVISIONS
FIBER REINFORCED POLYMER
COMPOSITE SYSTEM**

F.A.P. NO.
S.H.A. CONTRACT NO.
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**CATEGORY 400
STRUCTURES**

FIBER REINFORCED POLYMER COMPOSITE SYSTEM

DESCRIPTION. This work shall consist of furnishing all materials, labor, equipment and services necessary to supply, install and finish structural strengthening of existing cast-in-place box culverts using an externally bonded fiber reinforced polymer (FRP) system at the locations shown on the Concept Plans and in accordance with these Special Provisions and as may be directed by the Engineer.

MATERIALS. The materials supplied for the FRP system shall be in accordance with the Performance Specifications, Plans, and the following requirements:

International Code Council (ICC) AC125, Acceptance Criteria for Concrete and Reinforced and Unreinforced Masonry Strengthening Using Externally Bonded Fiber Reinforced Polymer (FRP) Composite Systems.

ICC AC178, Interim Criteria for Inspection and Verification of Concrete and Reinforced and Unreinforced Masonry Strengthening Using Externally Bonded Fiber Reinforced (FRP) Composite Systems.

ASTM D7565, Standard Test Method for Determining Tensile Properties of Fiber Reinforced Polymer Matrix Composites Used for Strengthening of Civil Structures.

ASTM D3039, Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials.

ASTM D7522, Standard Test Method for Pull-Off Strength for FRP Bonded to Concrete Substrate.

ASTM D4541, Standard Test Method for Pull-off Strength of Coating Using Portable Adhesive-Testers.

Fire Protection: ASTM E84 (regarding flame spread and smoke development requirement) and ASTM E119 (regarding hourly fire-rated requirement).

ACI 440.2R-08, Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures.

ICRI Technical Guideline No. 310.2-1997 (formerly No. 03732), Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

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COMPOSITE SYSTEM

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The contractor shall provide a compatible primer, filler and other materials as recommended by the manufacturer as needed for the proper installation of the complete surface bonded FRP composite system.

Quality Control and Quality Assurance (QA/QC). The contractor shall submit the proposed FRP system manufacturer's QA/QC manual indicating product standards, physical and chemical characteristics, technical specifications, limitations, installation instructions, maintenance instructions and general recommendations regarding each individual material. Only epoxy resins will be accepted for construction of FRP systems referenced in this specification. Other resins, such as polyesters/vinyl esters, are not allowed as substitutes. The manufacturer shall clearly define the epoxy resin working time. Any batch that exceeds the batch life shall not be used.

The contractor shall submit a list of completed surface bonded FRP composite strengthening projects completed with the manufacturer's FRP system in the past 3 years. The list should include, at a minimum, 5 projects using the proposed FRP system, the dates of work, description and amount of work performed. The FRP composite system shall be installed by certified applicator with written consent from manufacturer that the contractor has been trained. The certified applicator shall prove a minimum of 5 years experience in performing retrofits using FRP systems and submit a list of no fewer than 5 successful installations of the system as proposed.

The contractor shall identify a manufacturer approved testing laboratory that can perform the required ASTM D7565 and/or ASTM D3039 tests as per this Special Provision, if required.

CONSTRUCTION. Construction of the machine spiral wound PVC liner pipe system shall be in conformance with the manufacturer's requirements and the references identified herein.

Submittals. The following submittals shall be made to the Engineer for review and acceptance prior to the start of work:

1. Working drawings detailing the type, locations, dimensions, numbers of layers, and orientation of all FRP materials and coatings to be installed. The working drawings shall be prepared by and stamped by a registered professional engineer licensed in the State of Maryland
2. Calculations conforming to the requirements set forth in ACI 440.2R-08, Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures and shall be based on the design modulus and associated area of the cured laminate for the FRP system to be installed. FRP laminate design values must be lower than the calculated mean determined from the test results of the ASTM D7565 and/or ASTM D3039 field test specimens. The calculations shall demonstrate the ability of the FRP system to meet the minimum design value shown on the Plans. The calculations shall be performed by and stamped by a registered professional engineer licensed in the State of Maryland.

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3. Manufacturer's product data sheets indicating physical, mechanical and chemical characteristics of all materials used in the FRP system. Data sheets shall also include properties of the cured FRP laminates as determined by laboratory testing in accordance with ASTM D7565 and/or ASTM D3039 (ultimate and design tensile modulus, stress and strain).
4. Manufacturer's Material Safety Data Sheets (MSDS) for all materials to be used.
5. Certification by the manufacturer that the supplied products comply with local regulations controlling the use of volatile organic compounds (VOC's). Products that require the use of respirators do not comply with local regulations controlling use of VOC's and shall not be used on this project.

Product Handling. Deliver epoxy materials in factory-sealed containers with the manufacturer's labels intact and legible with verification of date of manufacture and shelf life. Store materials in a protected area at a temperature between 40°F and 100°F. Products shall be stored according to the manufacturer's requirements and shall avoid contact with soil and moisture. Products shall be stored to avoid UV exposure.

Surface Preparation. Surfaces shall be prepared for bonding by means of abrasive blasting or grinding to remove existing laitance and expose aggregate (minimum ICRI CSP-2 concrete surface profile). All contact surfaces shall then be cleaned by hand or compressed air. Prior to the application of the saturated composite fabric, prime surfaces and fill any uneven surfaces with the manufacturer's thickened epoxy. Round off sharp and chamfered corners (to be wrapped around) to a minimum radius of 0.75" by means of grinding or forming with the system's thickened epoxy. Variations in the radius along the edge shall not exceed 0.5" for each 12" of length.

Installation. Installation of the proposed FRP system shall be in conformance with the manufacturer's requirements and the following:

1. Verify ambient and concrete temperatures. No work shall proceed if the temperature of the concrete surface is less than 40°F or greater than 100°F or as specified on the epoxy component labels. The ambient temperature and temperature of the components shall be between 40°F and 100°F, unless provisions have been made to ensure components' temperature is maintained within this range or the range specified by the manufacturer.
2. Prepare the epoxy matrix by combining components at a weight (or volume) ratio specified by the manufacturer. The components of epoxy resin shall be mixed with a mechanical mixer until uniformly mixed, typically 5 minutes at 400-600 rpm.
3. Components that have exceeded their shelf life shall not be used.

SPECIAL PROVISIONS
FIBER REINFORCED POLYMER
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4. Saturation of the fabric shall be performed and monitored according to the manufacturer's specified fiber-epoxy resin ratio. Fabric shall be completely saturated prior to application to contact surface in order to ensure complete impregnation. Saturation shall be supervised and checked by the certified installer. Both the epoxy resin and fabric shall be measured accurately, combined, and applied uniformly at the rates shown on the approved working drawings and per manufacturer's recommendations.
5. All cutting of fabrics, mixing of epoxy and combination thereof shall take place in a protected area away from critical structure functions and any electrical equipment.
6. Prepare surfaces as required, including corner preparation.
7. Remove dust and debris by hand or with compressed air.
8. Clean up and protect area adjacent to element where FRP system is being applied.
9. Using a roller or trowel, apply one prime coat of epoxy resin to the substrate (2 mil min.). Allow primer to become tacky to the touch.
10. Fill any uneven surfaces or recesses with thickened epoxy.
11. Apply saturated fabric to substrate surface by hand lay-up, using methods that produce a uniform, constant tensile force that is distributed across the entire width of the fabric, and ensure proper orientation of the fabric. Under certain application conditions, the system may be placed entirely by hand methods assuring a uniform, even final appearance. Gaps between composite bands may not exceed 0.5" width in the fabric's transverse joint unless otherwise noted on the approved working drawings. A lap length of at least 6" is required at all necessary overlaps in the primary fiber direction of the fabric.
12. Apply subsequent layers, continuously or spliced, until designed number of layers is achieved, per approved working drawings and calculations.
13. Using a roller or hand pressure, release or roll out entrapped air, and ensure that each individual layer is firmly embedded and adhered to the preceding layer or substrate.
14. Detail all fabric edges, including termination points and edges, with thickened epoxy.
15. Finish: All edges and seams must be feathered. Finish as specified between 24 and 72 hours after final application of epoxy. If finish is provided beyond 72 hours of the application of the epoxy, the surface must be roughened by hand sanding or brush blasting, prior to finishing.
16. System may incorporate structural fasteners but limitations and detailing must be verified with FRP system manufacturer.

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Small voids and/or bubbles greater than 3” in diameter shall be injected or back filled with epoxy. Voids and delaminations greater than 6” in diameter (or an area greater than 5” x 5”) shall be repaired by the contractor using a repair method recommended by the manufacturer and approved by the Engineer.

MEASUREMENT AND PAYMENT. Fiber Reinforced Polymer Composite System will not be measured but will be paid for at the Contract Lump Sum price for the item as specified installed and accepted. The payment will be full compensation for preparing the necessary submittals including material data sheets, calculations and working drawings, surface preparation of the areas to be strengthened, applying the FRP system in accordance with these Special Provisions and the manufacturer’s requirements, and all materials, labor, equipment, tools, and incidentals necessary to complete the work as specified. Payment for the work required to repair small voids, bubbles, and/or delamination will be incidental to this item.

SPECIAL PROVISIONS
REINFORCED MACHINE SPIRAL
WOUND PVC LINER PIPE

F.A.P. NO.
S.H.A. CONTRACT NO.
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 400
STRUCTURES

REINFORCED MACHINE SPIRAL WOUND PVC LINER PIPE

DESCRIPTION. Reinforced Machine Spiral Wound PVC Liner Pipe shall consist of furnishing all materials, equipment and labor to install a continuous, grouted-in-place, machine spiral wound polyvinyl chloride liner pipe system inside of the existing Central Avenue storm drain to the limits and locations as specified on the Plans and in accordance with these Special Provisions and as may be directed by the Engineer. Wherever in this specification the words “machine spiral wound” appears, it shall also mean, “manually spiral wound or panels”.

MATERIALS. The materials specified for the system shall meet the following requirements:

Polyvinyl Chloride (PVC) Profile Strip	ASTM D 1784 with a cell classification of 12343, 12344, 13454, or higher
Steel Reinforcing for Profile Strip	ASTM A 653
Reinforcement Steel	908.01

Grout. High strength annulus structural grout shall have a minimum compressive strength of 5,000 psi when tested in accordance with ASTM C 109 and shall consist of Portland cement, water and some portion of the following: fly ash, lime, admixtures, bentonite clay, and/or sand. The grout mix design shall be as designed and proposed by the manufacturer of the PVC profile strip. Reference the section on Construction for submittal requirements. Flow characteristics of the proposed grout and maximum drying shrinkage shall be compatible with the field conditions under which the grout will be installed.

The Contractor shall engage the services of an approved independent testing laboratory to make and test grout cubes at no additional cost to the City. A copy of all laboratory results shall be furnished to the Engineer. The grout shall be tested by making one set of 2 inch cubes from each truck when the grout is being pumped into the annular space. A set of cubes shall consist of two (2) cubes to be tested at seven (7) days, and two (2) cubes to be tested at 28 days. The test cubes shall be made and tested in conformance with ASTM C 109, with the exception that the grout shall be restrained from expansion by a top plate.

The PVC profile strip geometry shall be compatible with the system selected for installation and suitable for installation into the existing Central Avenue storm drain configurations as shown on the Plans. It shall meet the requirements for Type “B” in accordance with ASTM F 1697-09 or ASTM F 1735-09. The PVC profile type designation to be used for lining of the Central Avenue storm drain shall be selected by the Contractor based on the analysis of the installation conditions. The in-service conditions of the storm drain lining after the grout has been placed and fully cured is not dependent on the PVC profile strip for strength. The profile dimensions, area, moment of inertia, and stiffness factor shall be specified for each of the liner pipe profile types shown in the Plans.

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The PVC profile strip shall be shipped on appropriately sized reels for ease of handling and product protection. The product shall be inspected for defects at the time of manufacture and again in the field prior to installation. Defects to the PVC profile strip include, but are not limited to, gouges, abrasion, flattening, cuts, punctures, and ultra-violet (UV) degradation. Defective product shall not be installed and shall be removed from the project site. Handling and storage of the PVC profile strip reels shall be in accordance with the manufacturer's instructions.

All other products required to complete the machine spiral wound PVC lining process shall be handled and stored in accordance with the manufacturer's instructions. Each product shall be accompanied by its relevant specification and MSDS information.

The PVC profile strip shall be distinctly marked on its inside surface at appropriate intervals with a code number identifying the manufacturer, plant, date of manufacture, and profile designation.

All other products required to complete the machine spiral wound PVC lining process shall be distinctly marked with product type and manufacturer.

Contractor Qualifications. The Contractor's personnel involved in installing the machine spiral wound PVC pipe liner shall be certified by the pipe liner manufacturer that they have successfully completed the appropriate training in handling, jointing, insertion, trimming, and finishing the pipe liner system as shown in the Plans.

The work shall be performed by a Contractor who has a proven record of performance for similar installations. The Contractor shall submit resumes for superintendents, foremen, and other applicable lead personnel for field installation crews demonstrating competency and experience to perform the work scope as defined in this Special Provision and as shown in the Plans.

The PVC profile strip manufacturer shall present a letter of qualification certifying the fitness of their product(s) for use in the machine spiral wound PVC lining system as designed and in conformance to the requirements of this Special Provision and the Plans. This certification shall also provide the history of successful application of the product and shall verify that the product has previously been supplied to and successfully installed by the Contractor.

Products used in the machine spiral wound PVC liner pipe system shall be provided by RibLoc Group Limited, Danby of North America, Inc. or Sekisui SPR Americas, LLC, or approved equal.

Quality Assurance. Materials supplied as part of the machine spiral wound PVC pipe liner system shall meet the following requirements:

1. A653/A653M-09a Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

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2. C109-08 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
3. ASTM C940-98A Standard Test Method for Expansion and bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.
4. ASTM C1090 - 01(2005)e1 Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout.
5. D256-06ae1 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
6. D638-08 Standard Test Method for Tensile Properties of Plastics.
7. D648-07 Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
8. D1784-08 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compound.
9. F1697-09 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Strip for Machine Spiral-Wound Liner Pipe Rehabilitation of Existing Sewers and Conduit. (Amendment in process to include non-circular applications).
10. F1741-08 Standard Practice for the Installation of Machine Spiral Wound Poly(Vinyl Chloride) (PVC) Liner Pipe for Rehabilitation of Existing Sewers and Conduits (Amendment in process to include non-circular applications).
11. F1735-09 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Strip for PVC Liners for Rehabilitation of Existing Man-Entry Sewers and Conduits.
12. F1698-02(2008) Standard Practice for Installation of Poly (Vinyl Chloride) (PVC) Profile Strip Liner and Cementitious Grout for Rehabilitation of Existing Man-Entry Sewers and Conduits.

CONSTRUCTION. Construction of the machine spiral wound PVC liner pipe system shall be in conformance with ASTM F 1741-08 or ASTM F 1698-02(2008) except as may be modified herein. In situ fabrication of the machine spiral wound PVC liner pipe system shall be completed using traveling installation equipment.

Submittals. The following submittals shall be made to the Engineer for review and acceptance prior to the start of work:

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1. Cleaning method(s) of existing Central Avenue storm drain. Methods of containing, collecting and disposing of the wash water shall also be included in the event that cleaning agents are used or potential harmful material is encountered in the wash water.
2. Data collected from the pre-installation inventory inspection, including a video survey of existing Central Avenue storm drain.
3. Work plan for spiral winding process including details of all materials and equipment to be used during the winding process. This work shall also include the Contractor's proposed bypass pumping plan for diverting base flow if different from that as shown on the Plans.
4. Work plan for installation of the machine spiral wound PVC liner pipe system shall contain but not be limited to the following information:
 - a. The PVC profile strip to be used for each of the liner types specified in the Plans. Information shall include, but not be limited to the profile dimensions, area, moment of inertia, and stiffness factor. Design calculations supporting the selection of the PVC profile strip shall be included. Calculations shall be certified by a Professional Engineer registered in the State of Maryland.
 - b. Location of the insertion and termination points and limits of each production run, by Type, for the machine spiral wound PVC liner pipe system.
 - c. Spacing and details of bulkheads, details of the bracing system (including design calculations sealed and signed by a Professional Engineer registered in the State of Maryland), and grout injection/vent holes.
 - d. Method of supporting and securing the PVC profile strip so as to maintain the minimum gap between the invert of the PVC profile strip and the invert of the existing storm drain.
 - e. Method of grouting, including use of continuous or staged lifts. If continuous grouting will be performed, provide information on methods to be used to prevent floating of the PVC profile strip.
 - f. Grout mix design showing that the proposed grout mix will satisfy the requirements of this Special Provision and the requirements of the design as indicated on the Plans.
 - g. Method of supporting and securing the reinforcement steel located above the PVC profile strip.
 - h. Method and sequence of operations associated with installing the tap-ins for the existing and proposed lateral storm drains and/or manholes.
 - i. Method of installing the machine spiral wound PVC liner pipe system within the limits shown on the Plans designated as the Junction Transition.
 - j. Method of mobilizing and demobilizing the equipment inside of the existing storm drain.
 - k. Detailed information on the access pits in the event that mobilization and demobilization is not performed via the existing manholes. This information shall include the limits of excavation, removal limits of the existing storm drain, method of installing the liner system

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within the limits of the access pit, grouting in the area of the access pit, and restoring the surface conditions.

The roadway surface above access pits outside the limits of roadway construction shall be repaired in accordance with Baltimore City Detail No. BC-576.20. The flexible surface course and binder course layers shall be revised to 2" thick each. Backfill over culvert shall be Graded Aggregate Base for Backfill.

1. Provisions to protect the work area during high flow events. A plan of action shall also be prepared for those storm events that require removal of the materials and equipment from within the storm drain. Flow rate data (depth, velocity and dissipation times) taken during calendar year 2007 is available for the existing Central Avenue storm drain upon request.
5. Documentation for the steel strip reinforcing confirming that the steel satisfies the requirements of this Special Provision and the requirements of the design as indicated on the Plans.
6. Documentation for the PVC profile strip material confirming that the material satisfies the requirements of this Special Provision and the requirements of the design as indicated on the Plans.
7. Shop drawings for the placement of reinforcing steel bars including a schedule of material, bar marks, bar laps and method of support for reinforcing steel bars at specific locations along the length of the entire storm drain being lined.
8. Catalog data showing manufacturer's clarifications and updates, ASTM references, material composition, specifications, physical properties and chemical resistance of PVC liner.
9. PVC Pipe liner manufacturer's recommended procedures for handling, storing, repairing, and installing the PVC pipe liner.
10. Certified statement from PVC pipe liner manufacturer that the Contractor is an approved installer of their system with certificates of training for each crewmember involved in the lining process from the manufacturer.
11. Television inspection reports, color videos, and CD-ROM's made before and following the lining of the Central Avenue storm drain, and original copies of videotaped inspection furnished to the Engineer.

Safety. The required work shall be completed and performed in accordance with all applicable OSHA standards pertaining to working in permit confined spaces.

Preparation. Unless otherwise specified on the Plans, the Contractor may utilize any of the existing manholes in the project area as access points. Should temporary excavations be needed to access the Central Avenue storm drain, such work shall be coordinated with the Engineer.

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Excavations shall be sloped or shored in accordance with all applicable safety regulations. In the event that shored excavation is required, working drawings and design calculations certified by a professional engineer registered in the State of Maryland shall be submitted for review and approval.

Cleaning and Repair. All debris and obstructions shall be removed from the Central Avenue storm drain and disposed of in accordance with the requirements of the contract, and local codes and ordinances. A high pressure water jet shall be used to clean and prepare the surface of the storm drain. The pressure used to clean the storm drain shall be sufficient to adequately clean the elements, but not too high where as it causes damage to the storm drain. Any damage to the storm drain that is a result of the cleaning process shall be repaired at the sole expense of the Contractor to the complete satisfaction of the Engineer. All loose material, acids, grease and other deleterious substances shall be removed during cleaning, and the prepared surface shall be suitable for bonding with cementitious grout. The existing storm drain shall also be repaired in conformance with the Special Provisions and at the locations and limits as shown on the Plans.

If cleaning agents are used to aid in the cleaning of the existing storm drain, the wash water shall be collected in its entirety and disposed of at an approved facility for handling of this material at no additional cost to the City. Wash water that contains oily residue or other potentially harmful material to the waterway shall also be collected in its entirety and disposed of at an approved facility for handling of this material at no additional cost to the City.

Pre-Installation Inventory Inspection. After cleaning and repairing the existing storm drain, but prior to installing the PVC profile strip material, the Contractor, in the presence of the Engineer, shall perform a pre-installation inventory inspection of the existing Central Avenue storm drain for the entire limits of the proposed work to ensure there are no excessive variations in the storm drain profile and no obstructions that would hinder the machine spiral winding process. The Contractor shall also verify that the proposed PVC profile strip is suitable for the existing Central Avenue storm drain geometry. The longitudinal and radial locations of all drainage side connections to the existing Central Avenue storm drain shall be logged for subsequent reinstatement.

The pre-installation inventory inspection shall clearly log all locations of existing laterals, manholes, obstructions, section changes, etc. that tie into the storm drain. In addition to copies of the logs, a video survey shall be performed of the entire storm drain to receive the PVC liner pipe system. The video inspection shall be furnished in DVD and AVI format.

Removal of Obstructions. Removal of the existing obstructions, which includes but is not limited to existing support systems (e.g., struts and braces) that are located within the storm drain shall not be removed until the liner installation has progressed to the location of the obstruction and all loading with exception of the earth fill above is removed from the storm drain. Removal of the existing obstructions shall only be performed as directed by the Engineer.

Installation. Winding of the PVC profile strip shall conform to the Contractor's accepted submittals. The installation system shall provide precise control of the internal dimensions of the

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newly formed PVC lining to ensure the specified annular grout space is maintained throughout the length of storm rain to be rehabilitated. The PVC profile strip shall be wound using equipment that is self-running (i.e., the winding machine traverses down the existing Central Avenue storm drain forming the spiral wound PVC liner as it goes). The winding process shall be continuous until the machine spiral wound PVC liner is complete for the specific length of the storm drain to be rehabilitated.

The annulus grouting shall conform to the Contractor's approved submittals. After the spiral wound PVC liner has been installed, and before the annulus is grouted, the Contractor shall restore service at all connections. Field conditions will dictate whether service restoration can be done from inside the conduit or whether restoration will require the exterior of the conduit and connecting pipes to be exposed. Grouting shall be done between bulkheads installed at pre-determined distances apart along the storm drain. Prior to grouting, a bracing framework shall be installed which shall be designed by the Contractor to serve the following functions during grouting:

1. Prevent flotation of the machine spiral wound PVC liner.
2. Align the PVC liner within the storm drain so that the required annular space is maintained between the PVC liner and the storm drain.
3. Prevent excessive deflection or buckling of the PVC liner.

Structural grout shall be pumped into the annular space through pre-drilled locations around the circumference of the spiral wound PVC liner. Vent holes shall be provided at suitable locations to permit air to be expelled from the annular space and to monitor grout fill levels. Grouting may be performed in one or more lifts in order to completely fill the annular space. Grout shall be sampled and tested as previously indicated in these Special Provisions.

Completion of Work and Site Restoration. The ends of the machine spiral wound PVC liner shall be securely grouted in position. The PVC liner shall be sealed to the storm drain with material capable of achieving a watertight seal. Any step(s) in the flow line at the ends of the rehabilitated storm drain shall be blended into the existing flow line using appropriate materials. Any holes made in the PVC profile strip during the grouting operation shall be sealed using means and methods as approved by the Engineer. At points where temporary excavation was required for access to the storm drain and/or lateral drainage pipe connections, appropriate encasement shall be provided for the exposed PVC profile strip and/or connecting pipes. Encasement materials may consist of concrete, sand slurry, or other suitable materials as approved by the Engineer.

Final Acceptance. The rehabilitated Central Avenue storm drain may be subject to a final inspection, and no such work shall be scheduled or started without having made prior arrangements with the City to provide for the required inspections. Not less than 24 hours notice shall be provided to the City for scheduling such inspections. This inspection must confirm that the storm drain is properly rehabilitated in accordance with the Contract Documents and is complete without defect

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and groundwater infiltration is not present. If defects are observed, a suitable repair procedure shall be proposed by the Contractor for review and approval by the Engineer all at no cost to the City.

MEASUREMENT AND PAYMENT. Machine Spiral Wound PVC Liner Pipe will be measured and paid for at the Contract unit price per Linear Foot of pertinent Machine Spiral Wound PVC Liner Pipe installed and accepted. The payment for the pertinent Machine Spiral Wound PVC Liner Pipe (which constitutes Types 1 through 7) as specified in the Contract Documents will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work including PVC profile strip, reinforcing steel bars, structural grout, installation equipment including temporary bracing and bulkheads for grouting operations, removal of obstructions, pre-installation inventory inspection, post inspection, all submittals, and repair of grout injection ports. High pressure water jet cleaning of the existing storm drain will be paid for as specified below. Storm drain repair and silt removal will be paid for as specified elsewhere in these Special Provisions.

Structural grout for Machine Spiral Wound PVC Liner Pipe will not be measured and paid for separately but will be incidental to the Contract unit price per foot of pertinent Machine Spiral Wound PVC Liner Pipe installed and accepted. The payment for the pertinent Machine Spiral Wound PVC Liner Pipe per foot as specified in the Contract Documents will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the structural grout work including furnishing and installing the grout material, marking and testing of the test cubes, furnishing and installing the injection and vent ports and preparation and approval of mix design submittals. **The Contractor is hereby notified that the quantities of grout to be furnished and installed as indicated on the Plans are an estimate of the neat quantity only based on the average end area method of computing volume quantities taken from the various cross sections and do not reflect surface irregularities or voids, gaps, cracks, seams or other surface imperfections in the existing storm drain that could affect the actual quantity of grout installed. In addition, the quantity shown on the Plans does not account for material waste resulting from the Contractor's specific method of installation that could affect the actual volume installed. The quantities provided on the Plans are for the Contractor's reference and information only. The City makes no guarantees as to the accuracy of the quantity of grout to be installed as shown on the Plans. The Contractor shall make his own determination of the quantity of grout to be furnished and installed to the limits as indicated on the Plans and prepare his bid accordingly. No additional payment will be made for the structural grout material.**

Site Set Up for Machine Spiral Wound PVC Liner Pipe will not be measured for payment, but will be paid for at the Contract Lump Sum price including, but not limited to, all materials, labor, equipment, tools, and incidentals necessary to set up the equipment within the storm drain for each liner profile type shown on the Plans.

Access Pit for Machine Spiral Wound PVC Liner Pipe will not be measured for payment, but will be paid for at the Contract Lump Sum price. The payment will be full compensation for excavation, support of excavation, partial removal of the existing storm drain to the limits necessary for the

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access pit, forming, curing, form removal, and all materials, labor, equipment, tools, and incidentals necessary to complete the work. Payment for the machine spiral wound PVC liner pipe, structural grout, backfilling, roadway subgrade and pavement, and any required maintenance of traffic will be paid for under other items within the Contract. Payment for roadway patch will be made under the items Variable Depth Graded Aggregate Base for Backfill, 8 Inch Reinforced Portland Cement Concrete Pavement Mix 7, HMA Superpave Base Course 19 mm Pg64 22 Level 2, and HMA Superpave Surface Course 12.5 mm Pg76 22 Level 2.

High pressure water jet cleaning of the existing storm drain will not be measured but will be paid for at the Contract lump sum price for the High Pressure Water Jet Cleaning of Storm Drain item as specified. The entire interior surface of the existing storm drain to be lined shall be cleaned. Payment for this work will include containing, collecting and disposing of the wash water as necessary.

Lateral connections made to the machine spiral wound PVC liner pipe installed in the existing storm drain will be measured and paid for at the Contract unit price per each of Lateral Connections for Machine Spiral Wound PVC Liner Pipe, Various Sizes installed and accepted. The payment for the Lateral Connections for Machine Spiral Wound PVC Liner Pipe, Various Sizes as specified in the Contract Documents will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work as specified on the Plans. Payment for this item per each work will be the same regardless of the size and/or shape of the lateral pipe connections made to the machine spiral wound PVC liner pipe installed in the existing storm drain.

**SPECIAL PROVISIONS
CONSTRUCTION FABRIC**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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**CATEGORY 500
PAVING**

CONSTRUCTION FABRIC

DESCRIPTION. Furnish and install Construction Fabric on the sub-grade in areas of pavement reconstruction as specified or as directed by the Engineer.

MATERIALS. Construction Fabric shall meet the requirements of AASHTO M-288, Class 2.

CONSTRUCTION. The Contractor shall install the Construction Fabric in accordance with the Manufacturer's specifications and as directed by the Engineer. Widths and lengths of fabric shall be overlapped a minimum of two feet (2').

MEASUREMENT AND PAYMENT. Construction Fabric will be measured and paid for at the Contract unit price per square yard for the total square yards installed and accepted. The overlaps will not be measured and shall be considered incidental to this item. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**SPECIAL PROVISIONS
FURNISH FRAME AND COVER**

**CATEGORY 500
PAVING**

**FURNISH FRAME AND COVER
(VARIOUS SIZES)**

DESCRIPTION. The Contractor will be required to furnish and deliver new manhole frames and covers, hand box frames and covers, inlet grates and frames, and the inlet heads from the appropriate vendor to the project site.

MATERIALS. Refer to the Baltimore City Detail Plates for the applicable utility cover details.

MEASUREMENT AND PAYMENT. Furnished Frame and Cover will be measured on the basis of count or number of each size. Furnished Frame and Cover shall be paid for on the basis of the Contract unit price bid per each for Furnish Frame and Cover – Less than 12 In. Diameter Cover, Furnish Frame and Cover – 12 In. to Less than 30 In. Diameter Cover, or Furnish Frame and Cover – 30 In. Diameter and Larger, Including Inlets, whichever is applicable. Payment shall include the removal and disposal of the existing materials and all incidentals necessary to complete the work.

Payment for this item shall also include installation of the new frame and cover. The adjustment of utility structures to final grade within the areas of both full-depth pavement reconstruction and pavement resurfacing will be paid for under the HMA and/or Concrete Paving item.

CATEGORY 500
PAVING

SECTION 504 — HOT MIX ASPHALT PAVEMENT

504.03 CONSTRUCTION

470 **DELETE: 504.03.04 Tack Coat** in its entirety.

INSERT: The following.

504.03.04 Tack Coat. Dry and clean the surface of all loose and foreign materials prior to application of the tack coat. Apply the tack coat uniformly across the surface as directed using an application rate of 0.01 to 0.05 gal/yd².

476 **DELETE: 504.03.12 Thin Lifts and Wedge/Level Courses** in its entirety.

INSERT: The following.

504.03.12 Thin Lifts and Wedge/Level Courses. When the HMA course is determined by the Engineer to be a thin lift in accordance with the “Thin Lift Mix Design Identification Table” in Section 904.04.03, construct a 400 to 500 ft control strip on the first day of paving to determine optimum pavement density.

Using an asphalt density gauge in accordance with the manufacturer’s recommendation, take readings from the control strip in 5 random locations to determine roller patterns and the number of passes needed to obtain optimum density. Optimum density is defined as when the average density does not change by more than 1.0 percent between successive roller passes and the percent density is between 90.0 and 97.0.

Core the five random gauge reading locations to verify the gauge calibration and to determine the percent pavement density. The cores will be tested by the contractor’s QC laboratory and results will be verified by the Office of Materials Technology. The QA cores will be saved by the contractor and made available to the Administration for retesting until the end of the project or as otherwise determined.

On the first day of paving, the target optimum density will be determined using the density gauge readings from the control strip; verified by the core results. The lot average density from the five control strip cores will be used as the target optimum density.

Take a minimum of 10 QC/QA gauge readings daily from random locations per day’s paving per mix or two per 500 tons of paving per mix; whichever yields the higher frequency of locations. A density lot is defined as a day’s paving per mix. A subplot shall not exceed 500 tons. A paving day shall begin with a new lot and sublots.

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For the remainder of the project, any lot average 2.0 percent or more below optimum and below 92 percent shall require a new control strip to be constructed, tested and approved before paving continues.

Take a minimum of 2 QA cores daily when production is in excess of 500 tons per location, or when successive days of less than 500 tons production totals 1000 tons or greater. If the average of the two density gauge readings and the average of the two respective QA core densities are within 3.0 lb per cubic foot, the Administration will accept all the daily density gauge readings. If they do not compare within 3.0 lb per cubic foot, a new control strip will be run and the density gauge recalibrated.

Wedge/Level courses placed at variable thicknesses shall be tested and accepted in accordance with this Thin Lift specification. Incentives are not applicable.

504.04 MEASUREMENT AND PAYMENT.

478 **DELETE: 504.04.01 Price Adjustment for Asphalt Binder** in its entirety.

INSERT: The following.

504.04.01 Price Adjustment for Asphalt Binder. A Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of asphalt binder.

For adjustment purposes, the prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center /Contracts Bids and Proposals) at time of bid opening. Cost differentials between PG 64-22 and a binder specified shall be included in the price bid per ton for Hot Mix Asphalt. A historical database will be maintained by the Administration.

The PA will be made when the index price for the month of placement increases or decreases more than 5 percent of the prevailing base index price. Computations will be as follows:

$$\text{Percent Change} = ((P_p - P_b) / P_b) \times 100$$

$$PA = T \times Q \times ((P_p - (D \times P_b)))$$

Where:

- PA = Price Adjustment for the current month
- T = Design target asphalt content expressed as a decimal
- Q = Quantity of Hot Mix Asphalt placed for the current month
- P_p = Index price for PG 64-22 Asphalt Binder per ton for the month of placement
- D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent
- P_b = Prevailing base index price for PG 64-22 Asphalt Binder per ton

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PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Asphalt Binder. The item amount will be established by the Administration and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

479 **DELETE: 504.04.02 Price Adjustments for Hot Mix Asphalt Mixture and Pavement Density in its entirety.**

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CATEGORY 500
PAVING

SECTION 504 — HOT MIX ASPHALT PAVEMENT

SAWCUTTING AND SEALING OF HOT MIX ASPHALT PAVEMENT

DESCRIPTION.

Sawcut, clean and seal transverse joints in new Hot Mix Asphalt (HMA) overlays. Construct transverse HMA pavement joints over, and in line with, the underlying transverse Portland cement concrete pavement joints.

MATERIALS.

Sealant. Use a sealant meeting the requirements of Section 911.01, Joint Sealer and Crack Filler, and ASTM D6690 Type II; Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements. Deliver the sealant in the manufacturer's original sealed container legibly marked with the following information:

- Manufacturer's name.
- Trade name of sealant.
- Manufacturer's batch or lot number.
- ASTM D6690, Type II.
- Minimum application temperature.
- Maximum (or Safe) heating temperature.

Provide the Engineer with a copy of the manufacturer's recommendations pertaining to heating and application of the sealant prior to commencing work.

Bond Breaker Tape. Use ordinary masking tape or a suitable bond breaker tape designed for use with hot poured sealants. The width of the tape shall be equal to the width of the sawcut (tolerances: -1/8 in., + 0 in.).

CONSTRUCTION.

General. Sawcut, clean, and seal transverse joints as a single operation within seven (7) days after placing the HMA surface course. Sawcut, clean, and seal joints that are damaged by traffic at no additional cost to the City.

If the HMA surface course is to be placed the following paving season, sawcut the HMA base course to provide a 1 inch deep by 1/8 inch wide channel to facilitate and control reflective cracking. Provide a means of properly referencing the sawcut to be made in the HMA surface course. Sawcut the HMA base course within seven (7) days after it is placed and before any evidence of reflective cracking has developed. Do not seal these sawcuts.

Sawcutting of Transverse Joints. Sawcut transverse joints to the appropriate dimensions shown in the contract details. Locate sawcut joints directly over the existing Portland cement concrete pavement joints using a pins-and-stringline method. The details of the method for locating the sawcuts are to be approved by the Engineer. Sawcutting blades shall be of such size and configuration that the desired dimensions of the sawcut can be made with one pass. Either dry or wet cutting will be allowed. No spacers between blades will be allowed.

SPECIAL PROVISIONS
504 — HOT MIX ASPHALT PAVEMENT

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Sawcut joints to the full extent of the underlying Portland cement concrete pavement joints or as shown in the contract documents. Transverse joints that are offset at the longitudinal joint by more than 1 inch measured between the centers of the joint cavities require separate sawcuts terminating at the longitudinal joints.

Joint Preparation. Prepare joints for sealing on the same day that they are to be sealed. Wash wet sawcut joints with a water blast (50 psi minimum) after sawing to remove any sawing slurry, dirt, or deleterious matter adhering to the joint walls or remaining in the joint cavity. Wash slurry from the pavement surface when the wet process is used. Blow or brush dry dust and material from the pavement surface when the dry sawcut process is used.

Use a high pressure air lance or hot air lance to thoroughly clean and dry sawcut joints of dust, dirt, foreign material, sand and any other extraneous materials immediately prior to sealing joints. Do not burn, scorch or ignite the adjoining pavement when using a hot air lance. Install suitable traps or devices on the compressed air equipment to prevent moisture and oil from contaminating the joint crack surfaces. Maintain these devices and see that they are functioning properly. Protect the public from potentially objectionable and/or hazardous airborne debris.

Bond Breaking. Place bond breaker tape in the bottom of the sawcut joint after it is cleaned and dried.

Sealant Melting. Heat and melt the sealant in a melter constructed either as a double boiler filled with a heat-transfer medium between the inner and outer shells, or with internal tubes or coils carrying the sealant through a heated oil bath and into a heated double wall hopper. The melter will be equipped with separate thermometers to indicate the temperature of the heat transfer medium and the sealant material, positive temperature controls and with a mechanical agitator or a recirculating pump to assure a homogeneous blend of the sealant. Maintain the sealant at the pouring temperature $\pm 10^{\circ}$ F indicated on the material packaging. Check the discharge temperature of the sealant with a non-contact infrared thermometer. Discharge the sealant at a temperature between the manufacturer's recommended pouring and safe heating temperatures indicated on the material packaging. Submit an alternate method for measuring the discharge temperature to the Engineer for approval if desired.

Sealing is not permitted if the melter and discharge temperatures do not meet the requirements described above. Equip the discharge hose with a thermostatically controlled heating apparatus or insulate it to maintain the proper sealant pouring temperature. Holster the discharge hose to the melter if it is not thermostatically heat controlled. Circulate the sealant from the discharge hose and the melter to maintain the proper sealant pouring temperature.

Do not use sealant material heated beyond the safe heating temperature.

If the manufacturer's recommendations allow the sealant to be reheated or heated in excess of six hours, recharge the melter with fresh material amounting to at least 20 percent of the volume of the material remaining in the melter.

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Sealing. Sealing is to be done when ambient air temperature is at or above 40° F

Seal the joint by placing the applicator wand in the recess and carefully discharge the sealant. Strike-off the sealant flush with the pavement surface using a squeegee or sealing shoe pressed firmly against the pavement. The level of the sealer will not be greater than 1/8 inch below the pavement surface after the sealant has cooled. If the sealant sinks into the joint more than 1/8 inch below the pavement surface, clean it with high pressure air and fill it to 1/8 inch below the pavement surface. Properly sealed joints shall be watertight and present a neat fine line.

Do not allow traffic on the sealed joint until the sealant has cured so as not to track. Use a low pressure, light spray of water to accelerate cooling of the sealant. Blotting the sealant with fine aggregate is not allowed.

Remove and dispose sealant in excess of the amount depicted in the contract details or that has not bonded to both sides of the reservoir. Clean sealed joints damaged from traffic with high pressure air and reseal them to meet the specified amount at no additional cost to the City.

MEASUREMENT AND PAYMENT.

Sawcutting and Sealing of Hot Mix Asphalt Pavement will be measured and paid for at the Contract unit price per linear foot of the transverse joint. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Sawcuts made in the asphalt base course for the purpose of facilitating and controlling reflective cracking prior to placement of the asphalt surface course shall not be measured but will be considered incidental to the Contract unit price for Sawcutting and Sealing of Hot Mix Asphalt Pavement.

SPECIAL PROVISIONS INSERT
520 — PLAIN AND REINFORCED PORTLAND
CEMENT CONCRETE PAVEMENTS

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 500
PAVING

SECTION 520 — PLAIN AND REINFORCED PORTLAND
CEMENT CONCRETE PAVEMENTS

520.02 MATERIALS.

ADD: The following after the second paragraph.

All dowels used for load transfer devices shall be bar size #10 (1.270" diameter).

520.03 CONSTRUCTION.

506 **ADD:** The following after 520.03.16.

520.03.17 Dowel Bar Placement Checks. After the placement of the PCC pavement is complete and cured, the alignment and placement of the dowel bars will be checked by the Administration using a non-destructive test method. A random representative sample of joints will be tested to determine conformance with the following:

- (a) **Vertical Skew.** The vertical skew shall be no greater than 1/2 in. tolerance over a 12 in. length of dowel bar.
- (b) **Horizontal Skew.** The horizontal skew shall be no greater than 1/2 in. tolerance over a 12 in. length of dowel bar.
- (c) **Depth of Dowel Bar.** The dowel bar shall be located within the middle third of the slab thickness.
- (d) **Joint.** The joint saw cut shall be in the middle third of the dowel bar length.

When a dowel bar is tested and does not conform to all of the above, it is then in non-conformance or misaligned. After testing is complete, the percentage of those dowel bars not meeting the above will be determined. Deficiency will be subject to a reduced payment as specified in 520.04. This is in addition to the reduced pay for slab thickness.

520.04 MEASUREMENT AND PAYMENT.

506 **ADD:** The following after 520.04.01.

520.04.02 Dowel Bar Misalignment Price Adjustment. Payment for the percentage of dowel bars accepted at a reduced price for not conforming to the proper alignment will be adjusted by the factors shown in the following table. Alignment is determined by procedures specified in 520.03.17. This shall be a reduced price for the portland cement concrete pavement item in addition to any reduction due to pavement thickness.

SPECIAL PROVISIONS INSERT
520 — PLAIN AND REINFORCED PORTLAND
CEMENT CONCRETE PAVEMENTS

F.A.P. NO. PENDING
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DOWEL BAR PRICE ADJUSTMENT	
Percent of Misaligned Dowel Bars *	Percent of Payment, Contract Unit Price **
0.0 to 30.0	100
30.1 to 40.0	90
40.1 to 50.0	80
Greater than 50.0	Corrective action or pay reduction as determined by the Engineer

*This is the percentage of all dowel bars tested.

**This price adjustment is to the PCC price and not for the dowel bars. This is in addition to any price adjustment for pavement thickness.

SPECIAL PROVISIONS

500 - LEAD FREE REFLECTIVE THERMO. PM

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 500
PAVING**

**SECTION 500 — LEAD FREE REFLECTIVE THERMOPLASTIC
PAVEMENT MARKINGS**

1.0 DESCRIPTION.

Prepare and apply lead free reflective thermoplastic pavement markings to roadway surfaces as specified in the Contract Documents or as directed by the Engineer.

2.0 MATERIALS.

Lead Free Reflective Thermoplastic Pavement Markings 951.02

3.0 CONSTRUCTION.

3.01 Quality Assurance/Quality Control. Refer to 549.03.01.

3.02 Application Equipment. An oil or air jacketed kettle shall be utilized for uniform melting and heating of the thermoplastic material. The kettle shall provide continuous mixing and agitation of the material. The kettle and the applicator shall be equipped with an automatic thermostatic device to provide positive temperature control.

The equipment shall be constructed so that all mixing and conveying parts, up to and including the application apparatus, maintains the material at the specified temperature. Conveying parts of the applicator between the reservoir and the application apparatus shall be constructed to prevent clogging and accumulation. The applicator shall be capable of containing a minimum of 600 lb of molten thermoplastic material.

The kettle and applicator shall be constructed and arranged to conform to the requirements of the National Board of Fire Underwriters (NBFU), the National Fire Protection Association (NFPA), and State and local authorities.

Temperature gauges shall be calibrated every six months and a copy of the calibration certification shall be submitted to the Engineer.

The applicator shall apply the surface dressing beads to the molten thermoplastic marking by means of a pressurized bead dispenser or other mechanical conveying method not dependent upon gravity for uniform application. The bead dispenser shall be equipped with an automatic cutoff system that will stop the flow of the thermoplastic material whenever there is a disruption in the application of the beads so that all markings placed shall be covered with a uniform layer of surface dressing beads.

Application equipment shall be capable of applying the markings at multiple width settings ranging from 4 to 12 in. as specified in the Contract Documents.

The applicator shall provide a method for cleanly cutting off stripe ends and shall be capable of applying all longitudinal pavement markings.

The equipment shall be mobile and maneuverable to the extent that straight lines can be followed and all standard curves can be made in true arcs.

SPECIAL PROVISIONS

500 - LEAD FREE REFLECTIVE THERMO. PM

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

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All parts of the equipment shall be thoroughly cleaned of foreign material or different colored material prior to the introduction of a new batch of thermoplastic material.

3.03 Cleaning Pavement Surfaces. Refer to 549.03.02.

3.04 Application. The ambient and surface temperatures shall be at least 50 F and rising at the time of application.

Thermoplastic pavement markings shall be sprayed onto the pavement surface. Only the spray method of application shall be permitted. Gore areas, crosswalks, small intersections, roundabouts, and other areas which preclude the application of the markings with truck mounted equipment will be exempt from the spray application requirement.

Thermoplastic pavement markings shall conform to the following:

- (a) **Temperature.** The molten material temperature shall be between 400 and 440 F unless otherwise recommended by the manufacturer, and approved by the Engineer.
- (b) **Primer.** A primer shall be used if thermoplastic is applied to portland cement concrete. Any primer used shall be compatible with the thermoplastic material.
- (c) **Thickness.** The pavement markings shall yield a solid thickness range of 80 to 95 mils above the roadway surface across the middle two-thirds of the line width when tested as specified in MSMT 729. Variation from this range will be used for the price adjustment specified in 553.04.01.
- (d) **Glass Beads.** Glass beads shall be uniformly applied to the surface of the molten thermoplastic at the minimum rate of 7 to 9 lb/100 ft², as specified in MSMT 729.
- (e) **Color.** The color of the dry markings shall match Federal Standard 595 (13538 - yellow or 17886 - white). The Contractor shall supply the specified color chips for the Engineer's use to visually determine that the thermoplastic material matches the specified color.
- (f) **Retroreflectance.** Refer to 549.03.03(h). The millicandellas/lux/square meter values taken anytime within the first 30 days shall conform to the following:

RETROREFLECTANCE

COLOR	RETROREFLECTIVITY	CORRECTIVE ACTION
White	equal to or greater than 250	None
Yellow	equal to or greater than 150	
White	less than 250	Necessary corrective actions, including grinding if necessary, and re-tracing
Yellow	less than 150	

(g) **Width.** Refer to 549.03.03(e).

(h) **Alignment.** Refer to 549.03.03(f).

(i) **Layout Markings.** Refer to 549.03.03(i).

SPECIAL PROVISIONS

500 - LEAD FREE REFLECTIVE THERMO. PM

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SHA CONTRACT NO. PENDING

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3.05 Quality Control Test Strip. Refer to 549.03.04.

3.06 Responsibility. Refer to Section 549.

3.07 Observation Period. Refer to Section 549.

4.0 MEASUREMENT AND PAYMENT.

Refer to 549.04. The reflectometer will become the property of the Contractor at the completion of the project.

4.01 Price Adjustment for Film Thickness. The unit price for Lead Free Reflective Thermoplastic Pavement Markings will be per striped linear foot based on MSMT 729 calculations for thickness, and will be adjusted in conformance with the following:

MIL THICKNESS	PERCENT OF PAYMENT - UNIT PRICE
80 – 95 (a)(b)	100
75 – 79	90
70 – 74	88
65 – 69	82
60 – 64	72
Less than 60	Retrace to achieve a thickness of 80 to 95 mils. Retrace thickness shall be 30 mils min (b).

(a) The Engineer may require the Contractor to remove excess material thickness.

(b) Removal of excess material and retracing pavement markings shall be performed at no additional cost to the Administration.

SPECIAL PROVISIONS

500 - PREFORMED THERMO. PAVEMENT MARKINGS

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

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CATEGORY 500
PAVING

SECTION 500 — PREFORMED THERMOPLASTIC PAVEMENT MARKINGS

1.0 DESCRIPTION. This work shall consist of furnishing and installing heat applied preformed thermoplastic pavement marking symbols, legends, and lines as specified in the Contract Documents or as directed by the Engineer.

2.0 MATERIALS.

Preformed Thermoplastic is a durable pavement marking material. All Preformed Thermoplastic Pavement Marking material shall be selected from the Qualified Products List.

Heat Applied Permanent Preformed Thermoplastic Pavement Marking Material	951.06
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3.0 CONSTRUCTION.

3.01 Quality Assurance/Quality Control. Refer to 549.

3.02 Application. The location, width, and type of marking, shall be as specified in the Contract Documents or as directed by the Engineer.

Applying pavement markings over longitudinal joints is prohibited; they shall preferably be offset 2 in. from them.

Thermoplastic Pavement Marking shall conform to the following:

- (a) **Temperature.** The markings shall be applied when the thermoplastic, ambient, and surface temperature, and relative humidity conform to the manufacturer's recommendations.
- (b) **Color.** The color of the dry markings shall match Federal Standard 595 (13538 - yellow or 17886 - white). The Contractor shall supply the specified color chips for the Engineer's use to visually determine that the thermoplastic material matches the specified color.
- (c) **Primer.** When specified by the manufacturer, a primer shall be used if thermoplastic is applied to Portland cement concrete.
- (d) **Retroreflectance.** The minimum retroreflectance shall be 150 millicandelas/lux/square meter for yellow and 250 millicandelas/lux/square meter for white as determined in conformance with 549.03.

3.05 Packaging. The material shall be handled for shipping, unloading and storage as recommended by the manufacturer. Each shipping package shall be marked with the following information:

SPECIAL PROVISIONS

500 - PREFORMED THERMO. PAVEMENT MARKINGS

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- (a) Manufacturer's name.
- (b) Description of item.
- (c) Date of manufacture.
- (d) Contractor's name.
- (e) Purchase order number.
- (f) Lot number.
- (g) Color.

4.0 MEASUREMENT AND PAYMENT.

The payment will be full compensation for all pavement preparation, furnishing and placing of markings, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Preformed Thermoplastic Pavement Marking Legends (letters and numbers) and Symbols will be measured and paid for at the Contract unit price per square feet.

Preformed Thermoplastic Pavement Marking lines will be measured and paid for at the Contract unit price per linear foot for the color and width specified.

**SPECIAL PROVISIONS
DETECTABLE WARNING SURFACE**

**CATEGORY 600
SHOULDERS**

DETECTABLE WARNING SURFACE

DESCRIPTION. Furnishing and install detectable warning surfaces as specified in the Contract Documents or as directed by the Engineer.

The detectable warning surface shall conform to the most recent accessibility guidelines of the Americans with Disabilities Act (ADA) under Section R304 of the Public Rights-of-Way guidelines.

This work also includes the removal and disposal of the existing sidewalk or other materials necessary for the construction and installation of the detectable warning surfaces.

Detectable warning surfaces are required at street crossings, signalized intersections and wherever sidewalk ramps are installed.

MATERIALS.

Detectable Warning Surfaces

925

A. General: As per Section 925 of the Special Provisions and as follows:

Size: The surface standard size shall be a minimum of 24" wide in the direction of pedestrian travel and extend the full width of the curb ramp landing. The detectable warning surface shall not encroach on the blended transition areas.

B. Use Type III Brick Pavers as per Section 925 of the Special Provisions. Brick pavers shall conform to C67 - Standard Test Methods for freeze and thaw.

C. Bituminous Setting Bed: Bituminous concrete to be used shall conform to 904.02. The fine aggregate to be used shall conform to 904.04. The dried fine aggregate shall be combined with hot asphalt cement and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The approximate proportion of materials shall be 7 percent cement asphalt and 93% fine aggregate. The Contractor shall determine the exact proportions of materials to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

D. Neoprene Modified Asphalt Adhesive: Adhesive shall consist of 2 percent neoprene (Grade WM1) oxidized asphalt with a 155 degree F softening point (80 percent penetration) and 10 percent asbestos free fibers.

E. Sand: The sand shall be zero sand.

F. Tack Coat: Tack coat shall conform to 904.03.

G. Concrete Slab: Concrete slab shall be Concrete-Mix No. 2 (3000 lb. per sq. in.) in accordance with 902.

SPECIAL PROVISIONS
DETECTABLE WARNING SURFACE

H. Expansion Joint Material:

- (a) Preformed Expansion Joint Material - Use the bituminous type which meets the requirements of AASHTO Designation M 213 with the exception of the weathering test. All joint material shall be one-quarter inch (1/4 in.) thick.

CONSTRUCTION

3.1 General

The Contractor shall install the system in conformance with the manufacturer's recommendation. These recommendations shall address the conditions of the concrete surface on which the system will be applied; surface finish, presence of curing compound, length of cure, and other installation practices to ensure the longevity of the detectable warning surfaces.

The detectable warning surface shall be located so that the edge nearest the curb line is 6" – 8" from the face of curb. For skewed applications, detectable warning surfaces shall be placed such that the domes closest to the back of curb are no less than 0.5" and no more than 1" from the back of curb. Truncated dome surfaces shall be fabricated to provide full domes only.

3.2 Installation Procedures:

Storage, and Handling. Store, handling and protect products. Store in a protected and dry area.

Examine Detectable Pavers upon setting and any units damaged will be subject to rejection. The Engineer shall inspect the Detectable Pavers to assure that all items are completely clean and not damaged. All Detectable Pavers shall be free of foreign matter before installation.

Setting Detectable Pavers:

- (a) Examine surfaces to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Detectable Pavers. Do not proceed with installation until any unsatisfactory conditions have been corrected.
- (b) Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- (c) Bituminous material for tack coat shall be provided between the concrete foundation slab and the bituminous setting bed. The tack coat shall completely cover the concrete foundation slab.
- (d) Over the concrete foundation, install the bituminous setting bed by placing $\frac{3}{4}$ in. deep control bars directly on the deck. If grades must be adjusted, set wood chocks under the depth control bars to the proper grade. Set two (2) bars parallel to each other

SPECIAL PROVISIONS
DETECTABLE WARNING SURFACE

approximately eleven (11) feet apart to serve as guides for the striking board. The depth control bars must be set carefully to bring the pavers, when laid, to proper grade.

- (e) Place the bituminous bed between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous material to produce a smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.
- (f) The setting bed shall be hand tamped while hot to a nominal depth $\frac{3}{4}$ in.
- (g) The elevation shall be adjusted so that when the pavers are placed, the top surface of the pavers will be at the required finished grade.
- (h) A coating of 2 percent neoprene modified asphalt adhesive shall be applied by mopping or squeegeeing or troweling over the top surface of the bituminous setting bed so as to provide a bond under the Detectable Pavers. If it is troweled, the trowel shall be serrated with serrations not to exceed 1/16 inch. When the modified asphalt adhesive is dry to the touch, carefully place the pavers by hand in straight courses with hand tight joints and uniform top surface.
- (i) Installation of the Detectable Pavers shall start from the corner or straight edge and proceed forward over the undisturbed leveling course. Detectable Pavers shall be installed in the pattern indicated on the details in this Contract Book. The pavers shall be installed hand-tight with joints not exceeding $\frac{1}{4}$ " , including the joints with the curbs. All cut pavers shall be a minimum of one-quarter ($\frac{1}{4}$) paver in size unless approved by the Engineer. Detectable Pavers shall be cut with an approved cutter to fit accurately, neatly, and without damaged edges, and shall be straight and perpendicular to the surface. Cuts should be made with a blade consisting of the proper bond matrix operated at the proper blade speed as recommended by the manufacturer. All whole and cut block edges shall be free of chips, spalls, or cracks. Edge pavers shall be used wherever possible at edges. String lines shall be used to hold pattern lines true. Sand shall be swept into the joints and pavers compacted again until the joints are filled. The finished surface shall not deviate more than $\frac{3}{8}$ " using a 10' long straightedge.

Weather. Stockpiles of materials shall be covered each day after construction and during each precipitation event so that the maximum moisture content is not exceeded at any time.

Leveling course materials and brick pavers shall not be installed during rain or snowfall conditions or upon frozen substrate.

Cleaning. Detectable Pavers shall be cleaned after installation per the manufacturer's instructions as required or as directed by the Engineer. Do not use muriatic acid.

MEASUREMENT AND PAYMENT Detectable Warning Surface Clay Brick Paver will be measured and paid for at the Contract unit price per square foot, complete and installed. The payment will be full compensation for the furnishing, installation and for all material, labor, equipment, tools and incidentals necessary to complete the work.

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DETECTABLE WARNING SURFACE

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The sidewalk on which the detectable warning surface is complete and installed will be measured and paid for at the Contract price for the pertinent Sidewalk item.

**SPECIAL PROVISIONS
603-SIDEWALKS**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 600
SHOULDERS**

SECTION 603 — SIDEWALKS

603.03.01 CONSTRUCTION.

ADD: After section (g):

(h) After removal of the existing sidewalk, the frames of the existing manholes, valve boxes, and other utility and drainage structures shall be adjusted to the final grade using brick masonry and mortar. Wood blocks or pegs will not be permitted.

For any structures that are broken and need replacement, the Contractor shall furnish and deliver the new manhole frames and covers, new valve boxes, and new hand box frames and covers from the appropriate vendor to the project site.

603.04 MEASUREMENT AND PAYMENT.

ADD: After last paragraph:

Adjustments of existing utility and drainage structures located in the sidewalk area to final grade will not be measured but the cost will be considered incidental to the sidewalk item.

**CATEGORY 600
SHOULDERS**

BENCHES

DESCRIPTION. This work shall consist of the procurement, finish, and installation of benches to be located one per bus stop and all necessary material, labor, incidentals, tools and equipment to complete this work. Benches shall be installed in accordance with the Standard Specifications.

MATERIALS. Benches shall match those used on the phase I Central Avenue Contract and as follows:

Benches. Benches shall be a minimum of 6' long and fabricated of cast metal powder coated gloss black with wood slats and steel cross supports. Benches shall be anchored to pavement with galvanized steel anchor bolts at bus stops. Benches must be furnished with center arm rests. Benches shall be provided by one of the following manufacturers:

- (a) Flat Bay bench, 73 ¼" length, 22" width, 17" height. Aluminum casting, powder coated, Anchor bolt mounting. Wood V.G. fir with #718 Olympic Stain. As manufactured by Urban Accessories, 20004 144th Avenue, N.E., Woodinville, WA 98072, phone: 206-487-0488

When contacting Urban Accessories, the Contractor shall indicate the benches are to be used for the Downtown Partnership of Baltimore Central Avenue Project.

- (b) TimberForm Restoration bench, model 2119-7. 7'-0" length, 27" width, 2'-10" height, 1'-4" seat height. Powder-coated cast iron frame. Surface mounting. Marine teak wood slats. As manufactured by Columbia Cascade, 1975 S.W. Fifth Avenue, Portland, Oregon 97210-5293, phone: 503-223-1157.
- (c) Classic Series bench, standard 6' length, model C-138. 20" width, 17-1/2" seat height, 31-7/8" overall height. Ductile iron castings, electrostatically powder-coated with IGIC polyester powder coating. ½" I.D. anchor bolt holes. Ipe wood slats. As manufactured by Victor Stanley, Inc., P.O. Drawer 330, Dunkirk, MD 20754, phone: 301-855-8300.

Submittals. The Contractor shall supply the following submittals for approval:

- (a) Shop Drawings: Submit complete shop drawings of the bench as specified. Drawings shall include overall dimensions, sizes, materials, accessory details, methods of assembly, hardware data, and milling details of the items specified. Include elevations, details of sections and connections, methods of construction and assembly, type, gage and finish of metals or other materials. Include anchorage and accessory items and integration details of related work.
- (b) Samples: Submit samples of type and finish color of the bench specified.

SPECIAL PROVISIONS
CATEGORY 600 - BENCHES

- (c) **Qualification Data:** Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, locations, date, reference names and phone numbers.

CONSTRUCTION.

Benches. The Contractor shall anchor each bench to the pavement set level and plumb. Refer to the manufacturer's specifications.

Delivery, Storage, and Handling - The Contractor shall be responsible to deliver, store, handle and protect products in accordance with manufacturer's instruction. The Contractor shall store products in a protected and secure area in manufacturer's protective shipping crates or packaging.

The Contractor shall examine the contents of all packages delivered to the site immediately upon delivery and any units damaged during shipping will be rejected. The Contractor shall inspect the shipment to assure that all items are complete.

MEASUREMENT AND PAYMENT. Benches will be measured and paid for at the Contract unit price per each, complete and installed. The payment shall be full compensation for bench, finish, anchoring devices and for all materials, equipment, labor, tools, and incidentals necessary to complete the work.

CATEGORY 600
SHOULDERS

LITTER and RECYCLING RECEPTACLES/

DESCRIPTION. This work shall consist of the procurement, finish, and installation of litter and recycling receptacles located two each per block each side of the street and all necessary material, labor, incidentals, tools and equipment required to complete this work. Litter and Recycling Receptacles shall be installed in accordance with the Standard Specifications.

MATERIALS. When contacting the manufacturer, the Contractor shall indicate the litter and recycling receptacles are to be used for the Downtown Partnership of Baltimore Central Avenue Project.

Litter Receptacles. Litter receptacles shall be all steel powder coated gloss black with black liners. Receptacles shall be surface mounted. Bolts and anchors shall be galvanized as per ASTM 153 and conform to ASTM 709, Grade 36 and shall be provided by the contractor. Litter Receptacles shall be provided by one of the following manufacturers:

- (a) Bethesda Series Ironsites litter container, standard spun steel lid, model S-35. 25" diameter, 32 ¼" height, adjustable glides and center anchor bolt mounting. Electrostatically powder-coated with IGIC polyester powder coating. 24-gallon capacity high density plastic liner. As manufactured by Victor Stanley, Inc., P.O. Drawer 330, Dunkirk, MD 20754, phone: 301-855-0300.
- (b) TimberForm Renaissance litter container, open top style, model 2811-FT-P. 2'-2" diameter, 2'10" height, pedestal mounting. Powder coated steel. Matching powder-coated 23-gallon steel liner and top. Key-locking top. As manufactured by Columbia Cascade, 1975 S.W. Fifth Avenue, Portland, Oregon 97201-5293, phone: 503-223-1157.
- (c) Bowery Trash Receptacle, spun top cover. 28 ½" outer diameter, 39 ½" height, with 4 mounting tabs 5/8" holes (4 pcs.) Standard black powder coat finish. Permanent metal liner with matching finish. As manufactured by Canterbury International, 5632 West Washington Blvd., Los Angeles, CA 90016, phone: 800-935-7111.

Recycling Receptacles. Recycling receptacles shall be all steel powder coated gloss black with recycling plaque for the side decal installed on lid. Receptacles are to have black liners. Receptacles shall be surface mounted. Bolts and anchors shall be galvanized as per ASTM 153 and conform to ASTM 709, Grade 36 and shall be provided by the contractor. Recycling Receptacles shall be provided by one of the following manufacturers:

- (d) Bethesda Series Ironsites litter container, standard spun steel lid, model S-35. 25" diameter, 32 ¼" height, adjustable glides and center anchor bolt mounting. Electrostatically powder-coated with IGIC polyester powder coating. 24-gallon capacity

SPECIAL PROVISIONS
CATEGORY 600 - LITTER RECEPTACLES

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high density plastic liner. As manufactured by Victor Stanley, Inc., P.O. Drawer 330, Dunkirk, MD 20754, phone: 301-855-0300.

- (e) TimberForm Renaissance litter container, open top style, model 2811-FT-P. 2'-2" diameter, 2'10" height, pedestal mounting. Powder coated steel. Matching powder-coated 23-gallon steel liner and top. Key-locking top. As manufactured by Columbia Cascade, 1975 S.W. Fifth Avenue, Portland, Oregon 97201-5293, phone: 503-223-1157.
- (f) Bowery Trash Receptacle, spun top cover. 28 1/2" outer diameter, 39 1/2" height, with 4 mounting tabs 5/8" holes (4 pcs.) Standard black powder coat finish. Permanent metal liner with matching finish. As manufactured by Canterbury International, 5632 West Washington Blvd., Los Angeles, CA 90016, phone: 800-935-7111.

Submittals - The Contractor shall supply the following submittals for approval by the Design-Builder's Engineer:

- (a) **Shop Drawings:** Submit complete shop drawings of the litter and recycling receptacles as specified. Drawings shall include overall dimensions, sizes, materials, and accessory details, methods of assembly, hardware data, and milling details of the items specified. Include elevations, details of sections and connections, methods of construction and assembly, type, gage and finish of metals or other materials. Include anchorage and accessory items and integration details of related work.
- (b) **Samples.** Submit samples of type and finish color of the litter receptacle specified.
- (c) **Qualification Data.** Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, locations, date, reference names and phone numbers.

Delivery, Storage, and Handling. The Contractor shall be responsible to deliver, store, handle and protect products in accordance with manufacturer's instruction. The Contractor shall store products in a protected and secure area in manufacturer's protective shipping crates or packaging.

The Contractor shall examine the contents of all packages delivered to the site immediately upon delivery and any units damaged during shipping will be rejected. The Contractor shall inspect the shipment to assure that all items are complete.

CONSTRUCTION.

Litter and Recycling Receptacles. Litter and recycling receptacles shall be surface mounted using stainless steel, vandal resistant in-ground mounting hardware. The Contractor shall refer to the manufacturer's specifications.

SPECIAL PROVISIONS
CATEGORY 600 - LITTER RECEPTACLES

F.A.P. NO: PENDING
SHA CONTRACT No. PENDING
BALTIMORE CITY CONTRACT No. TR12317

MEASUREMENT AND PAYMENT. Litter and Recycling Receptacles will be measured on a per-each basis, complete and installed. The payment shall be full compensation for litter receptacle, recycling receptacle, finish, anchoring devices, labor and materials, equipment and incidentals necessary to complete the work.

CATEGORY 600
SHOULDERS

NEWSPAPER CORRAL

DESCRIPTION. This work shall consist of furnishing and constructing a steel newspaper corral and shall consist of the procurement, finish, and installation of the steel newspaper corral at two locations within the project limits and all necessary material, labor, incidentals, tools and equipment to complete this work.

MATERIALS.

Newspaper corral shall match in fabrication and style that used on Central Avenue Phase I and as follows:

Newspaper Corral. Newspaper corral shall be 7' 5" length, 1' 8-1/2" width, posts 3' 7-1/2" height, and a top rail set at 2' 9-1/4" height as shown on the detail drawings. Newspaper corral shall be constructed of steel and shall be powder coated gloss black. All sides and edges of steel components shall be ground smooth, free of burs or sharp edges, and shall be powder coated to prevent rusting. Newspaper corral shall be anchored to pavement with stainless steel concrete wedge anchors at the locations shown on the Contract Drawings.

Submittals. Submit product data and test reports for materials other than water and aggregates.

- (a) **Shop Drawings.** Submit complete shop drawings of the newspaper corral. Drawings shall include overall dimensions, sizes, materials, accessory details, methods of assembly, hardware data, and milling details of the items specified. Include elevations, details of sections and connections, methods of construction and assembly, type, gage and finish of metals or other materials. Include anchorage and accessory items and integration details of related work.
- (b) **Samples.** Submit a 6" sample length of the type and finish color of the newspaper corral specified.
- (c) **Qualification Data.** Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, locations, date, reference names and phone numbers.

Quality Assurance.

- (a) **Mockups.** Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

SPECIAL PROVISIONS
CATEGORY 600 - NEWSPAPER CORRAL

F.A.P. No. PENDING
SHA CONTRACT No. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

Delivery, Storage, and Handling. The Contractor shall be responsible to Deliver, store, handle and protect products in accordance with manufacturer's instruction. The Contractor shall store products in a protected and secure area in manufacturer's protective shipping crates or packaging.

The Contractor shall examine the contents of all packages delivered to the site immediately upon delivery and any units damaged during shipping will be rejected. The Contractor shall inspect the shipment to assure that all items are complete.

CONSTRUCTION.

The Contractor shall ensure that the pavement base is suitable for proceeding with installation of the newspaper corral.

The Contractor shall anchor the posts of the newspaper corral to pavement using 3/8" x 3" stainless steel concrete wedge anchors. Posts shall be set level and plumb.

The Contractor shall install all components as shown on the approved shop drawings using vandal resistant stainless steel fasteners. The Contractor shall ensure that after installation all surfaces are clean and free of scratches or abrasions that would deter from the finished appearance or affect the performance of the newspaper corral.

MEASUREMENT AND PAYMENT. Newspaper corral will be measured and paid for at the Contract unit price per each, complete and installed. The payment shall be full compensation for the procurement and installation of newspaper corral, finish, anchoring devices and for all materials, equipment, labor, tools, and incidentals necessary to complete the work.

CATEGORY 600
SHOULDERS

BIKE RACKS

DESCRIPTION. The work shall consist of the procurement, finish, and installation of bike racks to be located one every other block both sides of Central Ave. and all necessary material, labor, incidentals, tools and equipment to complete this work. Bike racks shall be installed in accordance with the Standard Specifications.

MATERIALS. Bike racks shall match in fabrication and style those used on the Central Avenue Phase I project and as follows:

Bike Racks. Bike racks shall be a five “loop” design to accommodate up to seven bikes each, in-ground mounted, steel construction, powder coated gloss black, and shall be provided by one of the following manufacturers:-

- (a) Highland Wave™ heavy duty bike racks, powder-coated Gloss Black, constructed of 2-3/8” O.C. tubular schedule 40 steel pipe, as manufactured by Highland Products Group LLC, 3350 NW Boca Raton Boulevard, Suite B2, Boca Raton, FL 33431, phone: 561-620-7878 or 888-447-2401
- (b) TimberForm Cycloops™ bike racks, model 2170-7-C, powder-coated Gloss Black, constructed of 2-3/8” O.C. schedule 40 tubular steel pipe, as manufactured by Columbia Cascade, 1975 S.W. Fifth Avenue, Portland, Oregon 97210-5293, phone: 503-223-1157.
- (c) Cycle Sentry™ Series bike racks, model BRCS-105, powder-coated Gloss Black constructed of 2-3/8” O.C. tubular steel pipe as manufactured by Secure Site Design™ LLC, and provided by Victor Stanley, Inc., P.O. Drawer 330, Dunkirk, MD 20754, phone: 301-855-8300.

Submittals. The Contractor shall supply the following submittals for approval:

- (a) Shop Drawings: Submit complete shop drawings of the bike rack as specified. Drawings shall include overall dimensions, sizes, materials, accessory details, methods of assembly, hardware data, and milling details of the items specified. Include elevations, details of sections and connections, methods of construction and assembly, type, gage and finish of metals or other materials. Include anchorage and accessory items and integration details of related work.
- (b) Samples: Submit samples of type and finish color of the rack specified.
- (c) Qualification Data: Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, locations, date, reference names and phone numbers.

SPECIAL PROVISIONS
CATEGORY 600 - BIKE RACKS

F.A.P. No. PENDING
SHA CONTRACT No. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

Delivery, Storage, and Handling. The Contractor shall be responsible to deliver, store, handle and protect products in accordance with manufacturer's instruction. The Contractor shall store products in a protected and secure area in manufacturer's protective shipping crates or packaging.

The Contractor shall examine the contents of all packages delivered to the site immediately upon delivery and any units damaged during shipping will be rejected. The Contractor shall inspect the shipment to assure that all items are complete.

CONSTRUCTION.

Bike Racks. The Contractor shall install each bike rack using stainless steel, vandal resistant in-ground anchor hardware and shall be set level and plumb to the manufacturer's specified heights. Refer to the manufacturer's specifications. Bike racks shall be installed on the concrete pavement.

MEASUREMENT AND PAYMENT. Bike Racks will be measured and paid for at the Contract unit price per each, complete and installed. The payment shall be full compensation for bike rack, finish, anchoring devices and for all materials, equipment, labor, tools, and incidentals necessary to complete the work.

CATEGORY 600
SHOULDERS

CLAY BRICK UNIT PAVERS

DESCRIPTION. This work shall consist of furnishing and installing clay brick unit pavers on a bituminous setting bed with sand filled joints, and aluminum and steel edge restraints in the locations and patterns specified on the plan details.

MATERIALS.

- (a) **Graded Aggregate Subbase.** Graded aggregate subbase material shall be in accordance with Standard Specification Section 901.01, Type D 2940.
- (b) **Concrete Slab.** Concrete slab shall be in accordance with Section 902.10.03 Mix No. 3.
- (c) **Bituminous Setting Bed.** Dried fine aggregate shall be combined with hot asphalt cement and the mix shall be heated to approximately 300 degrees F at an asphalt plant. The approximate proportion of materials shall be 7 percent asphalt cement and 93 percent fine aggregate. The Contractor shall determine the exact proportions of materials to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.
- (d) **Neoprene Modified Asphalt Adhesive.** Adhesive shall consist of 2 percent neoprene (Grade WM1) oxidized asphalt with a 155 degree F softening point (80 percent penetration) and 10 percent asbestos free fibers.
- (e) **Tack Coat.** The tack coat shall conform to AASHO Designation T 59.
- (f) **Joint Filler.** Joint filler shall be sand in accordance with Standard Specification 901.01, Type M45 Mortar Sand. The moisture content of the leveling course material and joint filler shall not exceed 12 percent. Stock piles shall be covered each day after construction and during each precipitation event so that this moisture content is not exceeded at any time. The joint filler shall be free of contaminants which would cause efflorescence or staining.
- (g) **Clay Brick Pavers.** Provide solid clay brick unit pavers without frogs or cores in surfaces exposed to view of the completed work. Clay brick pavers shall meet or exceed ASTM C-902, Class SX, Application PX, Type 1, and C-67 for freeze/thaw, for Pedestrian and Light Paving Bricks.
 - 1. **Manufacturers:** Subject to compliance with these specifications, available manufacturers that may supply Clay Brick unit pavers include the following, or approved equal by the Landscape Architect:
 - a. **Pine Hall Brick**, as distributed by Belair Road Supply, 7750 Pulaski Highway, Baltimore, MD 21237, (410) 687-4200

SPECIAL PROVISIONS
CATEGORY 600 – CLAY BRICK UNIT PAVERS

F.A.P. No. PENDING
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BALTIMORE CITY CONTRACT NO. TR12317

1. Thickness: 2-1/4 in.
 2. Face Width: 4 in.
 3. Face Length: 8 in.
 4. Color: 'Pathway Full Range'
 5. Texture: Square edge
- b. **Whitacre Greer**, 1400 S. Mahoning Ave., Alliance Ohio 44601 as distributed by Belair Road Supply, 7750 Pulaski Highway, Baltimore, MD 21237, (410) 687-4200
1. Thickness: 2-1/4 in.
 2. Face Width: 4 in.
 3. Face Length: 8 in.
 4. Color: Blend of:
 - a. 40% #42 Cinnamon
 - b. 35% #43 Tangerine
 - c. 25% #44 Mahogany
 5. Texture: Straight Edge Texture with Lugs
- c. **Watsonstown Brick**, PO Box 68, Route 405 • Watsonstown, Pennsylvania 17777-0068, (800) 538-2040, (570) 538-2555
1. Thickness: 2-1/4 in.
 2. Face Width: 4 in.
 3. Face Lengths: 8 in.
 4. Color: Garden Blend
 5. Texture: Square edge

(e) Expansion Joint Material and Sealant. Preformed Expansion Joint Material shall be the bituminous type which meets the requirements of AASHTO Designation M 213 with the exception of the weathering test. All joint material shall be 1/4 in. thick except at walls, curbs and other adjacent surfaces, where joints shall be 1/2 in. thick.

(f) Joint Sealant. Joint Sealant for expansion joints shall be a two component polyurethane caulk. Sealant color shall match adjacent paver joints.

(g) Steel Edge Restraint. Steel Edge restraints shall be 3/16 in. thickness, by 4 in. height, black or brown powder-coated, and shall include stakes to attach to anchor edging as shown on the Detail Plans.

Submittals. Submit product data and test reports for materials other than water and aggregates.

(a) Samples for Initial Selection, for the following

1. A minimum of three (3) full size units of each type of clay brick unit paver specified showing full range of color selection.

Quality Assurance.

SPECIAL PROVISIONS
CATEGORY 600 – CLAY BRICK UNIT PAVERS

F.A.P. No. PENDING
SHA CONTRACT No. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

- (a) **Source Limitations.** Obtain clay brick unit pavers from a single source with resources to provide quantity of materials and products of consistent quality in appearance and physical properties.
- (b) **Mockups.** Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

CONSTRUCTION.

General. Prior to sidewalk construction the Contractor shall coordinate with the City regarding the placement of parking meter posts and foundations.

The Contractor shall hold a pre-installation meeting prior to placing pavers. The pre-installation meeting will be held to coordinate the placement of the paver patterns. For the pre-installation meeting the Contractor shall construct a 5 ft x 5 ft sample panel of a typical section of walk, which shall include a full 1 ft - 4 in. wide segment of the brick band along two sides of the panel including a 90 degree corner treatment representing the quality of finish work of brick banding and concrete, for the entire project. The sample patterns shall remain until the corresponding pattern is in place and approved by the Design-Builder's Engineer. The Contractor shall not place any pavers on setting bed until receiving written approval from the Design Builder's Engineer.

Concrete substrate shall be clean and free of stones, dirt or other debris prior to beginning work or placement of bituminous for setting bed.

The Contractor shall install preformed joint filler at locations shown. Extend filler from the bottom of concrete to below the finished surface as detailed.

The Contractor shall make splices in the filler in a manner to prevent penetration of concrete between joint faces.

The Contractor shall install aluminum or steel edge restraints where the paving units abut planting pits .

The Contractor shall not use pavers with chips, frogs, cracks, voids, discolorations, and other defects which might be visible or cause staining in the finished work.

The Contractor shall use full pavers without cutting wherever possible. Where necessary, the Contractor shall cut pavers with motor driven saw equipment designed to cut masonry with clean, sharp, un-chipped edges. Cut units as required to provide the pattern shown and to fit adjoining work neatly.

The Contractor shall set pavers in the patterns shown with 1/8 inch uniform joints to accept sand between joints

The Contractor shall maintain surface plane for finished paver floors not exceeding a tolerance of 1/8 inches in ten feet when tested with a ten-foot straightedge.

SPECIAL PROVISIONS
CATEGORY 600 – CLAY BRICK UNIT PAVERS

F.A.P. No. PENDING
SHA CONTRACT No. PENDING
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The Contractor shall use the paver face which matches the color of adjacent pavers to yield the tightest color range possible.

Bituminous Setting Bed. Bituminous setting bed shall have a 3/4” uniform thickness. The Contractor shall adjust the elevation of the setting bed so that when the pavers are placed, the top surface of the pavers will be at the required finished grade and flush with the adjacent concrete.

Control and Expansion Joints. The Contractor shall install control and expansion joints where pavers abut restraining surfaces such as walls, curbs, adjacent concrete paving, etc., and as shown on the Detail Plans.

Curb Joint Sealant. The Contractor shall prepare curb joints adjacent to the brick pavers as specified in Standard Specification 523.03.02. Joints shall be treated to prevent the leveling course from migrating through the joints using Roofing Paper, Joint Sealer, or similar material approved by the Engineer. The curb joint sealant shall be installed prior to installation of paver base and leveling course. Joints shall be filled with Joint Sealer so that excess sealer is pushed out at the top. The excess sealer shall be removed, leaving a clean, smooth surface.

Weather. The Contractor shall cover stockpiles of grout, mortar, and joint materials each day after construction and during each precipitation event so that the maximum moisture content is not exceeded at any time.

Setting bed materials and brick pavers shall not be installed during rain or snowfall or frozen substrate conditions.

Cleaning. The Contractor shall clean brick pavers after installation per the manufacturer’s instructions as required or as directed by the Engineer. The Contractor shall not use muriatic acid.

MEASUREMENT AND PAYMENT. Clay Brick Unit Pavers will be measured and paid for at the Contract unit price per Square Foot of Clay Brick Unit Pavers installed and accepted. The payment for Item Clay Brick Unit Pavers as specified in the Contract Documents will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work including; bituminous setting bed, edge restraints, joint filler, concrete slab, graded aggregate subbase, control and expansion joints, and curb joint sealant.

CATEGORY 600
SHOULDERS

SALVAGED BELGIAN BLOCK PAVING (COBBLES)
AND GRANITE CURBS

DESCRIPTION

This item of construction shall include, but is not limited to, the salvage of existing Belgian block paving and granite curb, cleaning, furnishing of all labor, storing, cleaning, materials, equipment, services for and incidentals to the installation of Belgian Block Paving and Granite Curb. Belgian block paving shall be supported on a sand or mortared setting bed, incorporated with the project sidewalk paving as suggested in the plan detail, and includes the graded aggregate base course. Granite Curb shall be supported on a concrete haunch at each end incorporated with the project street tree pits as indicated in the plan detail. These items shall also consist of the construction of masonry work as required to place pavers adjacent to existing foundations which are to remain.

Work under this section also includes concrete base, sand setting bed, and weed barrier.

This item shall also consist of adjusting manholes and/or utility stacks to final grade, removing and resetting frames and covers, miscellaneous repairs such as replacing portions of concrete or brick, removing debris, minor grade adjustments, and other repairs as directed by the Design-Builder's Engineer. This item covers all structures located behind the curb outside of roadway pavements. Structures located within the proposed roadway pavement shall be adjusted in accordance with other pertinent pay items.

Contractor to confirm quantity of salvageable Belgian block paving to available to be salvaged and reused on the project. Locations for Belgian block reuse include the sidewalk between tree planting beds. Belgian Block Paving may be concentrated in one area or used consistently throughout the project. Use of the Belgian Block Paving shall be developed in concept plan drawing for approval by the Design-Builder's Engineer.

Contractor to confirm quantity of salvageable Granite Curb to available to be salvaged and reused on the project. Locations for Granite Curb reuse include the sidewalk between tree planting beds. Granite Curb may be concentrated in one area or used consistently throughout the project. Use of the Granite Curb shall be developed in concept plan drawings for approval by the Design-Builder's Engineer.

MATERIALS.

Salvaged Belgian Block Paving. Units sizes are approximately 4" x 5" x 10", light grey color varies.

Salvaged Granite Curb. Units sizes are approximately 5' x 6" x 18", dark grey color varies.

SPECIAL PROVISIONS

F.A.P. NO. PENDING

CATEGORY 600 - BELGIAN BLOCK PAVING

S.H.A. NO. PENDING

BALTIMORE CITY CONTRACT NO. NO. TR12317

Mortar for Belgian Block Paving. Mortar shall conform to Section 903.06. Mortar for exterior masonry work shall have an approved waterproofing admixture added (high-bond polymer additives or latex modified Portland cement).

Sand Setting Bed for Belgian Block Paving. The sand shall conform to Section 901.01 with no more than 5% passing the No. 100 sieve; 100% may pass the No. 30 sieve, but if the work requires coarser sand, the coarse sieve size limit may be increased to No. 16.

Graded Aggregate Subbase. Graded aggregate subbase material shall be in accordance with Standard Specification Section 901.01, Type D 2940.

Concrete Slab. Concrete slab shall be Concrete-Mix No. 2 (3000 lb. per sq. in.) in accordance with Section 902.10.

Expansion Joint Material and Sealant.

- (a) Preformed Expansion Joint Material - Use the bituminous type which meets the requirements of AASHTO Designation M 213 with the exception of the weathering test. All joint material shall be one-quarter inch (1/4") thick except at walls and other adjacent surfaces, where joints shall be one-half inch (1/2") thick.
- (b) Sealant - Sealant shall be a two component polyurethane caulk. Sealant color shall match adjacent concrete curbs.
 - 1. Install preformed joint filler at locations shown. Extend filler from the bottom of concrete to below the finished surface as detailed.
 - 2. Make splices in the filler in a manner to prevent penetration of concrete between joint faces.
 - 3. Install in the form a water-soaked wood strip of the required dimensions for, after removal, a proper size slot to receive the sealant compound.

Expansion Joint Material will not be measured for payment but will be incidental to other pertinent items specified in the Contract Documents.

Weed Barrier. Weed Barrier shall be a pre-emergent weed control geotextile which contains trifluralin herbicide. The fabric shall be flexible and permeable. The herbicide shall have a time release mechanism which continues to meter trifluralin into the soil or sand as the exposed trifluralin biologically and chemically degrades. Weed barrier product shall be guaranteed to eliminate weed growth for a minimum of 10 years and shall be registered with the EPA. Weed barrier shall be installed only where Belgian block pavers are set on sand setting bed, and shall be placed between the soil and the sand setting bed as indicated on the Plans.

- (a) Weed barrier shall meet the following:

Property	Typical Value	Test Method
Unit weight (oz/yd ²)	4.0	ASTM D 3776
Tensile strength (lbs)	145	ASTM D 4632
Elongation at break (%):	70 min	ASTM D 4632
Mullen Burst Strength (psi)	175	ASTM D 3786

Puncture Strength (lbs)	50	ASTM D 751 Mod.
Coefficient of permeability (cm./sec.)	3x10G ²	ASTM D 4491

CONSTRUCTION.

Prior to sidewalk construction the Contractor must coordinate with the City regarding the placement of parking meter posts and foundations.

Prior to placing paving and curb a pre-installation meeting shall be held. The pre-installation meeting will be held to coordinate the placement of the paver patterns and locations for granite curb. For the pre-installation meeting the Contractor shall have a minimum 5' x 5' area dry laid of a typical section of walk, as well as smaller areas of all the other paver patterns to be used on the project. The sample patterns shall remain until the corresponding pattern has been approved by the Design-Builder's Engineer.

Submittals. The Contractor shall supply the following submittals for approval by the Design-Builder's Engineer:

- (a) Samples. Submit samples of type and finish color of the Belgian Block Pavers specified.
- (b) Qualification Data. Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, locations, date, reference names and phone numbers.

Storage, and Handling. Handle and protect products in accordance with the Engineer's instruction. Store in protected and dry area in protective packaging.

Do not use pavers with cracks, voids, and other defects, which might cause public safety problems in the finished work.

Use full units without cutting wherever possible. Where necessary, Contractor shall cut pavers with motor driven saw equipment designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide the pattern shown and to fit adjoining work neatly.

Set pavers in the patterns shown with uniform joints.

Setting Belgian Block Paving (Median and sidewalks not adjacent to tree pits):

- (a) Belgian Block Paving Belgian Block paving in the median shall be set on a mortar setting bed with a maximum joint space width between pavers of 1". Surface of mortar joints shall be recessed approximately 1" to give the finish surface a rough texture appearance. Belgian Block Pavers set on sand shall have minimum joint spaces between pavers, and the joints shall be filled to surface level at the top edges of the pavers. All Belgian Block Pavers shall be set in a running bond pattern as shown on the plans. Use full pavers without cutting where possible. If required, hammer cut pavers to provide rough edges similar to full size pavers. Cut pavers as necessary to provide pattern indicated and to fit adjoining work neatly. Cutting with a motor driven masonry saw is not acceptable.

SPECIAL PROVISIONS

CATGORY 600 - BELGIAN BLOCK PAVING

F.A.P. NO. PENDING

S.H.A. NO. PENDING

BALTIMORE CITY CONTRACT NO. NO. TR12317

1. Premolded expansion joints ½” thick shall be provided between the back of the curb and Belgian block paving and between paving surfaces, including the concrete base, as specified on the contract documents. This joint shall be sealed in accordance with Section 603.03.01. Expansion joints shall occur at all intersections of paving material and vertical surfaces.
2. Premolded expansion joints ½” thick shall be provided through the concrete base at intervals not greater than ten (10) feet by twenty (20) feet and shall be located to coincide with the joints in the contiguous concrete curb and gutter.
3. Expansion joints shall extend beyond the top surface of the concrete base and through the mortared Belgian block paving. Align Belgian block paving joints with the expansion joints to minimize cutting of Belgian block pavers.
4. Where required, the graded aggregate subbase material shall be installed and compacted to the depth shown on the plans in accordance with Section 501.

Setting Belgian Block Paving (Sidewalks adjacent to tree pits):

- (a) Belgian Block paving on sidewalks adjacent to tree pits shall be set on a 1” thick sand setting bed with weed barrier between the sand layer and soil mix. Belgian Block Pavers set on sand shall have minimum joint spaces between pavers, and the joints shall be filled to surface level at the top edges of the pavers and fog lightly with water. All Belgian Block Pavers shall be set in a running bond pattern . Use full pavers without cutting where possible. If required, hammer cut pavers to provide rough edges similar to full size pavers. Cut pavers as necessary to provide pattern indicated and to fit adjoining work neatly. Cutting with a motor driven masonry saw is not acceptable.

Setting Granite Curbs:

- (a) Granite curbs shall be utilized at the back of tree pits raised 6” above the adjacent sidewalk surface. Granite Curbs set on sand with a concrete haunch at each end shall have a gap between pieces to allow sidewalk water to drain into the street tree planters. Use full pieces without cutting where possible. If required, hammer cut cut edges to provide rough edges similar to full size units Cut pavers as necessary to fit adjoining work neatly. Cutting with a motor driven masonry saw is not acceptable.

MEASUREMENT AND PAYMENT.

Belgian Block Paving on Mortar Setting Beds will be measured at the Contract unit price bid per square foot, for which measurement shall include the graded aggregate subbase, concrete base, and mortar setting bed, mortar joints and expansion joints..

Belgian Block Paving on Sand Setting Beds will be measured at the Contract unit price bid per square foot., for which measurement shall include the sand setting bed, leveling and compaction, and weed barrier.

SPECIAL PROVISIONS

CATEGORY 600 - BELGIAN BLOCK PAVING

F.A.P. NO. PENDING

S.H.A. NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

Granite Curb on Sand Setting Beds with concrete haunches will be measured at the Contract unit price bid per square foot., for which measurement shall include the sand setting bed, concrete, leveling and compaction

The number of necessary utility adjustments will not be measured, but will be considered incidental to the cost of the pavers.

Coordination with the City by the Contractor regarding installation of parking meter posts will not be measured but will be considered incidental to the cost of the pavers.

Belgian Block Paving on Mortar Setting Beds will be paid for at the Contract unit price bid per square foot, which price and payment shall be full compensation for the furnishing of all labor, materials, equipment, services for and incidentals for the installation of all salvaged Belgian block paving units in the specified patterns with mortared joints as indicated on the Contract Plans. Payment also includes the mortar setting bed, mortar joints, expansion joints, concrete base, and graded aggregate subbase.

Belgian Block Paving on Sand Setting Beds will be paid for at the Contract unit price bid per square foot, which price and payment shall be full compensation for the furnishing of all salvaged Belgian block pavers, sand setting bed, weed barrier, leveling, compaction, labor, materials, equipment, services for, and incidentals for, the installation of all Belgian block paving units in the specified patterns as indicated on the Contract Plans.

Granite curb on Sand Setting Beds with concrete haunches will be paid for at the Contract unit price bid per square foot, which price and payment shall be full compensation for the furnishing of all salvaged granite curb, sand setting bed, concrete, leveling, compaction, labor, materials, equipment, services for, and incidentals for, the installation of all salvaged granite curbs as indicated on the Contract Plan details

CATEGORY 700
LANDSCAPING

ROOT BARRIER

DESCRIPTION. The work shall consist of the procurement and installation of a root barrier system in planting pits along Central Avenue when these cross gas, water or conduit, and all necessary material, labor, incidentals, tools and equipment to complete this work.

MATERIALS. Root barrier shall match in quality and type the following, or approved equal by the Design-Builder's Engineer:

Root Barrier. Root barrier shall be a non-woven, non-biodegradable fabric, provided as 24" wide roll stock in varied lengths. Fabric shall be impregnated with Trifluralin to control the direction of root growth.

Or approved equal by the Design-Builder's Engineer.

Submittals. The Contractor shall supply the following submittals for approval by the Design-Builder's Engineer:

- (a) Samples: Submit for approval, product samples and manufacturer's literature of the root barrier proposed.
- (b) Qualification Data: Submit installer qualifications verifying years of experience; include list of completed projects having similar scope of work identified by name, locations, date, reference names and phone numbers.

Delivery, Storage, and Handling. The Contractor shall be responsible to Deliver, store, handle and protect products in accordance with manufacturer's instruction. The Contractor shall store products in a protected and secure area in manufacturer's protective shipping crates or packaging.

Root barrier shall not be left exposed to surface water or sunlight for more than 12 hours. Root barrier is ready for installation as received. The fabric should be in soil as soon as practical after removal from the sealed shipping container, minimizing exposure to direct sunlight and elevated temperatures. Root barrier should not be installed in water. Store any unused portions of the product tightly resealed in the original container in a dry place.

The Contractor shall examine the contents of all packages delivered to the site immediately upon delivery and any units damaged during shipping will be rejected. The Contractor shall inspect the shipment to assure that all items are complete.

SPECIAL PROVISIONS
CATEGORY 700 – ROOT BARRIER

F.A.P. No. PENDING
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CONSTRUCTION.

Contractor shall wrap all exposed drain lines, gas lines, water lines and pipes, joints, or other critical locations where moisture or air may attract roots within the tree pits with the root barrier. Make sure that the wrapped fabric overlaps itself by 3 inches minimum, including joint overlaps.

Conduits, if exposed within the tree pit, shall be covered with root barrier, or if completely exposed shall be wrapped entirely with root control system, overlapping joints by 3 inches minimum.

Contractor shall assure that when joining two pieces of root barrier together they do not become separated at any point. Seaming can be accomplished by two methods; using construction adhesive and/or overlapping. If the method is by overlapping the fabric, seams shall be overlapped a minimum of 3 inches. Sod pins may also be used for seams, but make sure there are no gaps.

Pins, industrial tape or adhesives, or plastic or metal bands may be used to hold root barrier in place.

Prior to installation of trees, install root barrier vertically on all three sides of the tree planting pits which abut adjacent sidewalk surface. It is not necessary to place barrier at back of curb. Fabric should extend a minimum of 18” beyond the structure area to be protected as roots can grow around edges of fabric. The top edge of the fabric must be even with the soil surface.

Place top edge of root barrier at finish grade (soil surface) of the three interior sides of the planter, securing with pins (provided) or adhesives described herein. Attach root barrier to the edge of adjacent pavement surface using hot or cold adhesive

(a) For hot application use general adhesives hot melt #64x884 or approved equal by the Design-Builder’s Engineer.

(b) For cold applications use Macco, Liquid Nails Heavy-Duty adhesive LN-901 or equal by the Design-Builder’s Engineer.

Do not allow gaps in product during installation or backfilling of tree pits.

Backfill carefully over root barrier with planting soil mix to avoid dislocating the root barrier. Compact firmly.

MEASUREMENT AND PAYMENT.

(a) Root barrier for covering underground utilities: Root barrier placed over existing/ proposed duct banks and conduits which are located within the excavated/exposed tree pit or directly below the tree pit; will be measured and paid for at the Contract unit price per linear foot (LF), complete and installed. The payment shall be full compensation for root barrier, anchoring

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devices, adhesives, and for all materials, equipment, labor, tools, and incidentals necessary to complete the work.

(b) Root barrier for Tree Pit Perimeter: Root barrier placed at the perimeter of the tree pits will be measured and incidental to the cost of tree plantings complete and installed. The payment shall be full compensation for root control system, anchoring devices, adhesives, and for all materials, equipment, labor, tools, and incidentals necessary to complete the work.

CATEGORY 700
LANDSCAPING

SECTION 710 – TREE, SHRUB, AND PERENNIAL INSTALLATION

710.03.22 Establishment Phase.

DELETE Section (a) – Period of Maintenance and REPLACE with the following:

- (a) Period of Maintenance.** The Contractor shall maintain all plantings for a landscaping warranty period of two (2) years. The landscaping warranty will begin at the Semi-Final Inspection and continue for a period of two years until Final Acceptance when the maintenance requirements are turned over to the City. The Contractor is also responsible for grass cutting (cutting back ornamental grasses in early spring), pruning and weeding during the two-year warranty period.

INSERT the following at end of Section (b) – Plant Watering:

Contractor shall provide 24 additional waterings of plants over the Two Year Period of Maintenance, during the months of June, July and August. Watering intervals shall be spaced approximately one (1) week apart or as weather and soil moisture content dictates.

**SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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**CATEGORY 800
TRAFFIC**

CATALOG CUTS AND WORKING DRAWINGS

DESCRIPTION. This work shall consist of the Contractor preparing and transmitting submittals to demonstrate the performance of the work will be in accordance with the Contract Documents. Submittal schedules, catalog cuts, shop drawings, installation methods, manufacturer's certifications, photometric data and working drawings shall be furnished on all Contractor furnished items for highway signing, sign lighting, highway lighting and traffic signals. Stakeouts of the sign locations shall be submitted for all sign structure locations.

MATERIALS. Not Applicable.

CONSTRUCTION

Submittal Requirements. Submittals shall be scheduled and coordinated with the Contractor's construction schedule. A complete submittal schedule and list of required submittals shall be submitted with the first submittal, but no later than three days after the pre-construction conference. The schedule for submission of submittals shall be arranged so that related equipment items are submitted concurrently.

The Engineer may require changes to the submittal schedule to permit concurrent review of related equipment. Shop drawings for closely related items such as a sign and its support structures shall be submitted together.

Submittal Documents. Contractor's drawings shall be neat in appearance, legible and explicit to enable proper review to ensure Contract compliance. They shall be complete and detailed to show fabrication, assembly and installation details, wiring and control diagrams, catalog data, pamphlets, descriptive literature, and performance and test data. They shall be accompanied by calculations or other sufficient information to provide a comprehensive description of the structure, machine or system provided and its intended manner of use. If the Contractor's drawings deviate from the Contract Documents, the Contractor shall so advise the Engineer in writing with the submittal and state the reason therefor.

No portion of the work requiring a Contractor's drawing shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved Contractor's drawings shall be at the Contractor's risk. The City of Baltimore Department of Transportation will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

Shop drawings shall show types, sizes, accessories, layouts including plans, elevations and

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

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sectional views, component, assembly and installation details, and all other information required to illustrate how applicable portions of the Contract requirements will be fabricated and installed.

In case of fixed mechanical and electrical equipment, layout drawings drawn to scale, shall be submitted to show required clearances for operation, maintenance and replacement of parts. Manufacturer's certified performance curves, catalog cuts, pamphlets, descriptive literature, installation and application recommendations, shall be provided and indicate conformance to the Contract Documents. Certifications shall be originals. Certification shall be sent to the Baltimore City Department of Transportation, Construction Inspections Department as required in the Contract Documents.

Manufacturer's catalog, product and equipment data shall be certified and shall include materials type, performance characteristics, voltage, phase, capacity, and similar data along with wiring diagrams when applicable. Indicate catalog, model and serial numbers representing specified equipment. Provide complete component information to verify all specified required items. Installation recommendations and instructions shall provide written Manufacturer's detail step by step preparation and installation of the materials, and products including recommended tolerances and space for maintenance and operation.

Catalog cuts for sign luminaires shall have photometric data attached for each sign to be illuminated. Photometric printouts shall include the sign number, the illumination on a one foot square grid covering the entire sign face, the average illumination, the maximum to minimum uniformity ratio, and a working drawing for the sign face attached.

Catalog cuts for roadway luminaires shall have photometric data attached as specified in the Contract Documents.

The Contractor shall submit working drawings as required for changes, substitutions, contractor design items, and Contractor designed methods of construction. Requirements for working drawings will be listed in appropriate Specification Sections and in Special Provisions. Drawings shall be accompanied by calculations or other information to completely explain the structure, machine or system described and its intended use. Review and approval of such drawings by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract.

Working drawings and calculations as submitted shall be sealed, dated and signed by a Professional Engineer registered in the State of Maryland.

The review and approval of Contractor's drawings by the Baltimore city Department of Transportation shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor shall be responsible for the verification and accuracy of all dimensions and insuring that all Contractor furnished items are compatible, and conform to all design and performance criteria.

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

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All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

Submittal Process. Each Contractor's drawing submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor:

"By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and I have checked and coordinated each item with other applicable approved drawings and Contract requirements."

With the first submittal, submit a Contractor's submittal schedule, listing by Specification Section number, all submittals required and approximate date submittal will be forwarded.

Each submittal having catalog descriptions, shop drawings, working drawings, photometric data, manufacturer's certifications, method of construction and manufacturer's installation recommendations shall be submitted for approval to:

City of Baltimore
Department of Transportation
Construction Management Divisions
417 E. Fayette Street
Baltimore, Maryland 21202

Each submittal shall have a transmittal page that indicates the Contractor and Subcontractor's address and phone numbers. Submittals containing multiple items need the identification only on the exterior of each package. For original submittals, and each subsequent resubmittal that may be required, six (6) copies will be submitted for projects administered by the City of Baltimore. A separate copy shall be forwarded to the Engineer.

All submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto.

1. Drawing title, drawing number, revision number, and date of drawing and revision.
2. Applicable Contract Drawing Numbers and Specification Section and Paragraph Numbers.

The first page of every catalog description, working drawing and material certification shall be stamped in red with the following. All pertinent Contract Document information shall be filled in the spaces provided.

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

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CITY OF BALTIMORE	
SUBMITTAL PACKAGE # _____ DATED _____	
CONTRACT # _____ LOCATION _____	
PROJECT DESC. _____	
ITEM # _____ THIS ITEM CONTAINS _____ PAGES _____	
ITEM DESCRIPTION _____	
<input type="checkbox"/> ACCEPTED	
<input type="checkbox"/> ACCEPTED AS NOTED	
<input type="checkbox"/> REJECTED - REVISE & RESUBMIT	
REVIEWERS NAME _____	DATE _____

The Contractor shall indicate the submittal package by sequential numbering and date of submittal. Catalog, product data or brochure submittals containing various products, sizes and materials shall be underscored or highlighted to indicate the salient features required to meet the specifications. Likewise, items not applicable to the Contract shall be marked "not applicable" or crossed out.

If one or more of the items in a submittal are not approved, resubmittal of only the unapproved items is required, highlighted to show the particular item being resubmitted. Resubmittals shall bear original submittal number and be lettered sequentially.

Three copies of all Contractors' drawings will be returned to the Contractor.

Each submittal shall be in accordance with the Contractor's submission schedule. Allow thirty days for checking and appropriate action by the Engineer.

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

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Contractor's submittals will be returned, marked with one of the following classifications:

ACCEPTED: no corrections, no marks.

ACCEPTED AS NOTED: a few minor corrections. Item shall be installed in accordance with the corrected drawings.

REJECTED - REVISE & RESUBMIT: requires corrections or is otherwise not in accordance with the Contract Documents. No items shall be fabricated. Correct and resubmit drawings as per original submission. Allow thirty days for checking and appropriate action by the Engineer.

MEASUREMENT AND PAYMENT. Catalog cuts, manufacturer's certifications, photometric data and working drawings will not be measured but the cost will be incidental to the pertinent items specified in the Contract Documents.

**SPECIAL PROVISIONS
UTILITY CONNECTIONS**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 800
TRAFFIC**

UTILITY CONNECTIONS AND UTILITY STAKEOUT

DESCRIPTION. This work shall consist of utility connections, and utility stakeout.

MATERIALS.

Disconnect Switches and Utility Connections 950.13.10

CONSTRUCTION. The Contractor shall arrange a meeting with the utility company representatives, Transportation Engineering and Construction Division representatives, and the Engineer to establish a schedule for utility connections before any equipment or material is installed.

The Contractor shall not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of a utility company's facilities. The Contractor shall be responsible for the utility service connections to the utility company's supplied point of service.

The Contractor shall make the necessary arrangements with the utility companies to insure having needed utilities available at the time of turn on. Any utility energization, connection or disconnection delays will not be considered a valid reason for any work time extension claim. Difficulties in securing utility company services are to be reported to the Engineer at the earliest possible time.

Utility Stakeout. The Contractor shall notify the appropriate agencies listed in the Contract Documents, and those listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Contractor's anticipated beginning of any underground work.

The Contractor shall plan the work to minimize interference with any existing traffic control devices.

Existing equipment shall remain in its original condition until the new equipment has been completed, satisfactorily tested and its operation accepted by the Engineer.

SPECIAL PROVISIONS
UTILITY CONNECTIONS

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MEASUREMENT AND PAYMENT.

Utility Connection. Utility Service Equipment connections will not be measured.

All utility company energization, connection or disconnection costs will be the responsibility of the City.

Utility Stakeout. Utility Stakeout will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

**SPECIAL PROVISIONS
DISCONNECT, PULL BACK, AND
RE-ROUTE EXISTING CABLE**

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATAGORY 800
TRAFFIC**

DISCONNECT, PULL BACK, AND RE-ROUTE EXISTING CABLE

DESCRIPTION. Work shall consist of re-using existing electrical, communication, and traffic signal cables, by disconnecting the cable from an existing connection or location, pulling back the cable to a specified point, re-routing the cable through the new conduit system to a new or modified location or new equipment, and re-labeling and connecting the cables.

If any existing cable which is specified to be disconnected, pulled back, and re-routed is of insufficient length for proper termination in the new location, a new cable shall be installed from its new location (traffic signal cabinet) to its point of origin. Permanent underground or above ground splices will not be allowed to facilitate re-routing of any cables.

MATERIALS. Miscellaneous connectors, electrical tape and cable supports.

MEASUREMENT AND PAYMENT. Disconnect, Pull Back, and Re-route Existing Cable will be measured and paid for at the Contract unit price per linear foot of each cable which is relocated. The payment will be full compensation for all miscellaneous material, connectors, electrical tape, cable supports and for all material, labor, equipment, tools, and incidentals to complete the work.

In the event of an existing cable of insufficient length, the new cable will be measured and paid for as per the applicable bid item in Section 810.

SPECIAL PROVISIONS
RELOCATE EXISTING SIGNAL
ON SIGNAL STRUCTURE

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 800
TRAFFIC

RELOCATE EXISTING SIGNAL
ON SIGNAL STRUCTURE

DESCRIPTION. This work shall consist of Relocating Existing Signal Heads Assemblies on Signal Structures.

MATERIALS. Not applicable

CONSTRUCTION.

The Contractor shall be responsible for maintaining the existing signals by relocating equipment during phases of the Maintenance of Traffic. The work shall include relocating Traffic Signal Head Assemblies on Signal Structures.

Relocate Signal Head Assembly shall consist of relocating all signal head indications connected in one assembly, all support hardware to a new location on the same signal structure or span wire; rerouting and resecuring all cables connected to the signal head assembly; and insuring the signal heads are aimed and working correctly.

The Contractor along with the Design Builder's Engineer shall coordinate the equipment locations in accordance to the Contract Documents or at the Direction of the Engineer.

The Contractor shall plan the work to minimize interference with any existing traffic control device.

MEASUREMENT AND PAYMENT. The payment shall be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Relocate Traffic Signal Head Assemblies will be measured and paid for at the contract unit price per each.

CATEGORY 800
TRAFFIC

VIDEO DETECTION EQUIPMENT

DESCRIPTION. This work shall consist of furnishing and installing video detection equipment in accordance with this special provision. Video detection equipment shall detect by processing video images and providing detection input for NEMA TS-1 and NEMA TS-2 traffic signal controllers.

MATERIALS.

Video Image Processor (VIP)

- 1) The VIP shall be modular by design and housed in either a self-contained stand-alone unit or fit directly into NEMA TS1 & TS2 type racks as well as Type 170/179 input files. The VIP shall be interchangeable between a shelf or rack mount installation without replacing or modifying the existing VIP units.
- 2) The system shall control from 1 to 6 VIP boards allowing for 1 to 12 image sensors
- 3) The system shall be designed to operate reliably in the adverse environment of roadside cabinets and shall meet or exceed all NEMA TS1 and TS2, as well as Type 170/179 environmental specifications.
- 4) Ambient operating temperature shall be from -35 to +75 degrees Centigrade at 0 to 95% relative humidity non-condensing.
- 5) The system shall be powered by 12-40 VDC and draw less than 2 amperes.
- 6) The system shall utilize cabinet 24 VDC for rack mount installations or external 24 VDC for stand-alone shelf installations.
- 7) Surge ratings shall be set forth in the NEMA TS1 and TS2 specifications.
- 8) Serial communications shall be through an RS232 serial port. This port can be used for communications to a modem or laptop to upload/download detector configurations, count data and software upgrades. RS485 on the rear edge connector shall facilitate communications to other VIP boards.
- 9) Each VIP board shall have 4 opto-isolated open collector outputs. Twenty (20) additional outputs shall be available via the expansion port. The VIP shall have 20 presence detection zones and 4 data detection zones per camera. Data zones shall collect and store vehicle counts, volume, speed, gap time, headway, occupancy, and classification. Data shall be time-stamped (6713 intervals) and stored onboard (non-volatile memory) in intervals from 1-60 minutes.
- 10) Data alarms are generated for: queue, inverse direction, speed drop, no video, and errors.

SPECIAL PROVISIONS
VIDEO DETECTION EQUIPMENT

DRAFT - NOT FOR CONSTRUCTION

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- 11) Must be able to provide single or double loop emulation.
- 12) Presence hold time must have parameters that range from 10 to 600 seconds.
- 13) Each VIP board shall allow for 20 digital inputs via the I/O Expansion port.
- 14) Each VIP board shall have error detection. An output contact will open if the video signal is bad or the VIP board is not functioning properly. A user defined quality level will automatically put the VIP into a recall state in cases of severe degraded visibility (i.e., fog, blizzard, etc.). Normal detection resumes when visibility improves above the user defined quality level.
- 15) Operator selectable recall shall be available via the VIP front panel. Holding the recall switch on for 5 seconds shall activate this function.
- 16) A video select button on the VIP front panel will switch between camera images of the VIP.
- 17) The VIP board shall have 2 video inputs (RS-170 NTSC or CCIR composite video) and two video outputs (one on the front panel and one on the edge connector). The video inputs shall be through the VIP board's edge connector.
- 18) The VIP board shall have a reset button on the front panel to reset video detectors to "learn" the roadway image. During "relearn", selectable recall can be enabled or disabled for immediate operation. Learning time of video detectors shall be less than 5 minutes.
- 19) External surge suppression, independent of the VIP board shall separate the VIP from the image sensor.
- 20) The VIP board shall have separate light emitting diodes (LEDs) that indicate:
 - i) POWER: Red to verify power supply.
 - ii) I/O COMM: Red to indicate communications to expansion boards.
 - iii) VIDEO 1 & 2: Red to verify the presence of video input 75 Ohm.
 - iv) TX & RX: Red to indicate communications via the serial port.
 - v) OUT1- OUT4: Green if the corresponding detection group is active.
- 21) The VIP board shall also have 2 separate buttons for VIDEO SELECT:
 - i) RECALL: Manually places call on detectors.
 - ii) RESET: Manually reset detectors to "learn" new background.

SPECIAL PROVISIONS
VIDEO DETECTION EQUIPMENT

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING

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- 22) The video detection system shall be capable of being programmed locally with a handheld keypad. Keypad and monitor must be separate units. A PC mouse will not be allowed. The monitor is to have a 9 inch, black and white screen.
- 23) The VIP board shall have a video out female RCA style connector, DB9 female Service port and DB9 I/O Expansion port.
- 24) The VIP Expansion board shall have 8 dip switches that define inputs and outputs used (range: 1-12 or 13-24). The VIP Expansion board shall also have separate LEDs that indicate:
- i) POWER: Red to verify power supply.
 - ii) COMM: Red to indicate communications to VIP board.
 - iii) I/O1- I/O4: Green if the corresponding detection group is active.
- 25) Event Log Database: The VIP module shall have an onboard database capable of time stamping and storing 500 events. The Event Log Database can be viewed or downloaded to a selected spread sheet. Erasure of the Event Log Database shall not alter programmed configurations. As a minimum, the VIP shall log and time stamp the following events:
- i) Firmware upgrade
 - ii) Loss of video signal.
 - iii) Resumption of video signal.
 - iv) Configuration change.
 - v) Bad video quality.
 - vi) Loss of power to VIP module.
 - vii) Resumption of power to VIP module.
 - viii) Speed alarm.
 - ix) Inverse direction.
 - x) Recall activated.
- 26) Each VIP board shall be capable of processing two (2) separate video signals (two (2) separate cameras) per VIP board. The video signal shall be analyzed in real time (30 times per second).
- 27) The system shall be expandable up to 12 cameras that may be connected to different VIP units and programmed independently.
- 28) The system shall be capable of displaying detectors on the video image with associated outputs. Outputs/Inputs status will be indicated on the screen. Parameters will also include the ability to view raw video without any verbiage and/or detectors for surveillance purposes.

SPECIAL PROVISIONS
VIDEO DETECTION EQUIPMENT

29) Each VIP board will detect within the view of the connected camera the presence of vehicles in user defined zones. Detectors available shall be presence, count, queue, delay, extension, or pulse mode of either arrival or departure of vehicles. Delay and extension shall be defined between 0.1 – 99.9 seconds and pulse mode between 0 – 200ms in 33ms increments if NTSC is used. Each VIP board shall also detect and collect traffic data of passing vehicles in user-defined zones within the view of the connected camera.

30) Collected traffic data by direction shall include:

- i) Volume (absolute numbers) per length class and per lane.
- ii) Average speed (km/h or mph) per length class and per lane.
- iii) Average gap time (1/10 sec) per length class and per lane.
- iv) Average headway (m or feet) per lane.
- v) Occupancy (%) per lane
- vi) Concentration (vehicles/km or mile) per lane.
- vii) Average length (m or feet) per lane.
- viii) Confidence level (0-10) per lane.

31) The VIP board shall be programmed without the use of a supervisor computer. A standard CCTV monitor and handheld keypad plugged into the VIP serial port will facilitate detector programming. The handheld keypad shall include the following keys and respective functionalities:

Keys	Functionality
Enter Key	<ul style="list-style-type: none"> ● To enter a menu, a submenu or an item within a submenu.
	<ul style="list-style-type: none"> ● To select a value for a parameter and exit the topic.
Escape Key	<ul style="list-style-type: none"> ● To exit the menu or submenu.
	<ul style="list-style-type: none"> ● To exit the main menu and save the settings in the current configuration
Arrow Keys	<ul style="list-style-type: none"> ● To scroll through a menu.
	<ul style="list-style-type: none"> ● To scroll through the values of a parameter.
	<ul style="list-style-type: none"> ● To select a submenu.
	<ul style="list-style-type: none"> ● To make a presence zone direction sensitive.
F1 Next Key	<ul style="list-style-type: none"> ● To proceed to the next detection zone.

SPECIAL PROVISIONS
VIDEO DETECTION EQUIPMENT

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Keys	Functionality
F2 Prev Key	<ul style="list-style-type: none"> ● To move to the previous detection zone.
F3 Add Key	<ul style="list-style-type: none"> ● To add a detection zone.
F4 Del Key	<ul style="list-style-type: none"> ● To delete a detection zone.
Dir Key	<ul style="list-style-type: none"> ● To make a data zone direction sensitive.
Help Key	<ul style="list-style-type: none"> ● To display help text for an item.
Output Number Key	<ul style="list-style-type: none"> ● To assign an output number to a detection zone.
Operate Key*	<ul style="list-style-type: none"> ● To put the board in operation mode.
Edit Key	<ul style="list-style-type: none"> ● To change settings while starting from default values for all parameters.
Modify Key*	<ul style="list-style-type: none"> ● To change settings while starting from the last saved settings for all parameters.

* The functionality of this key is only for the video system communications modules

- 32) The VIP board shall store up to 8 detector configurations (4 per video input). It shall be possible to switch between detector configurations manually, automatically by time of day or remote input.
- 33) Via the serial port, detector configurations can be uploaded to a laptop and stored on disk.
- 34) Detectors may be linked to 24 outputs and 20 inputs using Boolean Logic features: AND, OR, NOT. It will be possible to generate conditional outputs based upon inputs from a controller.
- 35) It shall be possible to make a detector directional sensitive. Options will include an omni-directional detector or a detector that only senses movement: from right to left, left to right, up to down or down to up as you look at the monitor.
- 36) All detectors and parameters can be changed without interrupting detection. For example: when one detector is modified, all existing detectors continue to operate, including the one that is being modified. When the new position is confirmed, the new detector will enter a learning phase. Once the new detector is in function, it will take over the job of the old one. In this way, the detector is always fully operational with no interruption on any detector, even during modification. Learning phases for new detectors shall not exceed 10 seconds.

SPECIAL PROVISIONS
VIDEO DETECTION EQUIPMENT

DRAFT - NOT FOR CONSTRUCTION

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- 37) Four data detection zones per camera on a two camera VIP board may be used for collection of vehicle count, speed, classification, occupancy, density, headway, and gap time. These detectors will detect and store traffic data at user-defined intervals of 1, 2, 3, 5, 6, 10, 15, 30 & 60 minutes. It shall be possible for each VIP board to store up to 6713 intervals of data in non-volatile memory.
- 38) Six detectors per camera may be used as queue detectors. Using on screen calibration, queue detectors will detect queue delays and display the queue length in feet or meters. A queue may also generate an output alarm from the VIP board.
- 39) Associated software shall be used with a PC to download count data and export to a spreadsheet. The software shall also be used to upload/download detector configurations, traffic data, technical events and update software versions of the VIP board.
- 40) All software upgrades to associated software and VIP board software shall be provided at no cost to the City for the expected life of the VIP board.
- 41) The VIP board shall have an internal clock with daylight saving time system, which can be enabled or disabled.
- 42) The VIP board shall provide overlaid tool tips for each individual menu- and submenu-items.
- 43) The VIP board shall have an optional password implementation. Different user-levels shall be available each having different rights.
- 44) All equipment must be capable of having a minimum of 10 users that can be defined for each user-level.
- 45) The VIP board shall be able to delay or extend a detector zone output in combination with an input from the controller.
- 46) The VIP board shall detect wrong-way drivers and shall provide an alarm/event via communication board and/or output.
- 47) The VIP board shall provide an alarm and/or output when the user selected queue detection threshold of occupancy is exceeded for more than a user selected time threshold.
- 48) The VIP board shall distinguish five classes of detected vehicles based upon user selectable vehicle length thresholds.
- 49) The VIP shall be able to emulate loop emulation with user selectable loop dimensions.
- 50) The VIP shall have a Detection Hold Time function. The timing parameters shall be 10 – 600 seconds.

SPECIAL PROVISIONS
VIDEO DETECTION EQUIPMENT

DRAFT - NOT FOR CONSTRUCTION

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- 51) The VIP board shall provide advanced settings to optimize detection to avoid cross-lane traffic occlusion. Directional detectors shall be able to be programmed for Low, Medium or High depending on the severity of the occlusion.
- 52) The VIP shall be programmable for Wrong Way Suppression Delay. The timing parameters shall be 1 – 30 seconds.
- 53) The VIP board shall utilize advanced shadow rejection algorithms. It shall be possible to place detection zones over lane markings without affecting the shadow rejection accuracy from adjacent vehicle (moving) shadows.
- 54) The VIP board shall utilize an advanced Tree Shadow Suppression algorithm to suppress false detection of moving shadows (non-vehicular, i.e. trees) within a detection zone. It shall be possible to enable or disable this feature.
- 55) The VIP board shall provide integrated image quality diagnostics eliminating the need for users to manually place quality detection zones on the image. Advanced diagnostic information shall display both the quality of the video images (Qim) as well as the quality of detection (Qdet). The Qim and Qdet together will be averaged to provide an overall quality (Q). Each quality diagnostic (Qim, Qdet & Q) will be based on a 1 (poor quality) to 10 (excellent quality) scale.
- 56) The VIP board shall provide the capability to enter a “recall” state if the quality threshold falls inside a user-defined range. The range shall be defined by the Quality Level (1-10) and a timeout range of 1 to 99 minutes. For example, if the quality drops to level 5 for 2 minutes, the VIP shall enter a “recall” mode. Once the quality rises above level 5 for 2 minutes, the VIP resumes normal operation. The VIP shall also provide a contact closure output during this condition.

b) Video System Communications Module

- 1) The Communication board shall be modular by design and housed in either a self-contained stand-alone unit or fit directly into NEMA TS1 & TS2 type racks as well as Type 170/2070 input files.
- 2) The Communication board shall control from 1 to 6 VIP boards allowing for 1 to 12 image sensors.
- 3) The system shall be designed to operate reliably in the adverse environment of roadside cabinets and shall meet or exceed all NEMA TS1 and TS2, as well as Type 170/2070 environmental specifications.
- 4) Ambient operating temperature shall be from –34 to +74 degrees Centigrade at 0 to 95% relative humidity non-condensing.
- 5) The system shall be powered by 12-40 VDC and draw less than 2 amperes.

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- 6) Serial and Ethernet (TCP/IP) communications shall be through respectively an RS232 serial port (F DB9 connector) and Ethernet port (RJ-45 connection). These ports can be used for communications to a laptop or modem to upload/download detector configurations, traffic data, technical events, send software upgrades and do remote setup of detectors. RS485 on the rear edge connector shall facilitate communications to VIP boards.
- 7) Surge ratings shall be set forth in the NEMA TS1 and TS2 specifications.
- 8) The Communication board shall have separate light emitting diodes (LEDs) that indicate:
 - i) POWER: Red LED to verify power supply.
 - ii) LAN: Red LED to indicate data activity over Ethernet communication.
 - iii) VIDEO OUT: Female RCA style connector.
 - iv) RESET: Manual reset to re-initialize communications.
 - v) SERVICE: DB9 female Service port for setup of communication board and also used for serial/dial-up communication.
- 9) The Video System Communication board shall control from 1 to 6 VIP boards allowing for 1 to 12 image sensors.
- 10) The Video System Communication board shall provide a serial or Ethernet interface and communication to provide traffic data and allow remote configuration from the Traffic Operations Center.
- 11) The LAN port shall meet IEEE 802.3 with a RJ-45 connector and meet the following specification: Data rates for Ethernet via LAN port: 10Mbit/s, TCP/IP based protocol.
- 12) The serial communications port shall meet EIA-232-E and meet the following specifications:
 - i) Dial-up data rates for RS232 via Serial port: maximum 57600 bps
 - ii) Direct data rates for RS232 via Serial port: maximum 115200 bps
 - iii) Mode of operation: asynchronous, serial, 8 bit word, 1 stop bit, duplex or half-duplex
 - iv) Parity: none
 - v) Handshake: RTS - CTS, DCD
 - vi) Configuration: DTE
- 13) The communication shall support all functions of the video detection system.
- 14) All data transmissions shall be protected by CRC (cyclic redundancy checking) or an equivalent error detection method.
- 15) The communication board shall be programmed without the use of a supervisor computer. A standard CCTV monitor and keypad plugged into the communication serial port will facilitate board programming.

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- 16) The communication shall support streaming video over Ethernet and serial communication.
- 17) Streaming video frame rate:
 - i) Over Ethernet: 10 frames/second
 - ii) Over serial communication: guarantee of 1 frame every 2 seconds.
- 18) Password protected remote setup (configuration upload/download, setup of detectors and detector parameters, setup of communication board parameters, firmware updates for Communication and VIP module) and monitoring of every connected VIP module shall be possible.
- 19) Dialup shall be possible through PSTN modems.
- 20) The Communication board shall log data and events provided by the VIP module(s) and transmit data and events to the HOST computer.
- 21) RS485 communication to every VIP module shall be established via the Edge connector.
- 22) The Communication board shall be able to store on board pre-post video sequences of alarm triggered upon traffic user defined events. When connected to a HOST computer, the JPEG video sequences shall automatically be downloaded to the HOST computer.
- 23) The Communication board shall be able to accept PAL or NTSC video format.
- 24) A (via Ethernet) connection with a standard Internet browser shall be possible to communicate with the Communication board for remote set-up, monitoring and real-time data of the VIP modules.
- 25) Password protection shall be provided on the Communication board for remote operations.

c) Image Sensor Camera

- 1) The unit shall be a high resolution, 1/3" image format CCD camera, designed for professional video surveillance systems. Incorporating the latest in CCD technology, the video camera shall provide detailed video without lag, image retention, or geometric distortion. System must also be capable of working with either a color or black and camera.
- 2) Temperature range -20 to + 55 degrees C
- 3) Humidity 0% to 95% relative, non-condensing
- 4) Dimensions 47mm X 47mm X 83mm

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- 5) Weight 7.1oz.
- 6) Camera mounting slots 1/4-20, top and bottom
- 7) Connectors BNC for video out
- 8) Lens mount CS Power-in / pressure screw Lens / 6-pin miniature "DIN" style
- 9) Finish Off-white semi-gloss polyurethane
- 10) Construction All metal housing
- 11) Rated input voltage 24 VAC, 60 Hertz
- 12) Voltage range 21 to 30 VAC
- 13) Nominal power 4 Watts
- 14) Imager Interline transfer CCD 1/3" format
- 15) Imager spectral response
 - i) 100% @ 550nm
 - ii) 30% @ 400nm and 800nm
- 16) Sync system EIA RS-170
- 17) Active picture elements 768 H X 494 V
- 18) Horizontal resolution 580 TVL
- 19) Sensitivity (2856 K)
- 20) Illumination (see table below)

Illumination		Usable Picture	Full Video
Scene Illumination	fc	0.01	0.048
	lx	0.12	0.48
Imager Illumination	fc	0.0024	0.01
	lx	0.0024	0.10

* F 1.2 lens @ 89% highlight

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- 21) Signal to noise ratio: 48 dB minimum, 58 dB typical
- 22) AGC: 21 dB, (max)
- 23) Electronic Shutter: 1/60 to 1/600000 sec. (EIA)
- 24) Aperture Correction: Horizontal and vertical symmetrical
- 25) Video out: 1.0 volts peak-to-peak +/- 0.1 volt @ 75 Ohms
- 26) Programmable Controls Video level, shutter, AGC, BLC, Auto Black

d) Image Sensor-Lens

- 1) The camera lens shall be a motorized vari-focal 6.5-65mm with auto iris.
- 2) Image format: 1/3 inch
- 3) Focal length: 10X zoom (6.5-65mm)
- 4) Iris range: f 1.4 – Approx. 360 (With ND Spot Filter)
- 5) Focus range: 9.85mm (in air)
- 6) Back focus distance: 10.05mm (0.4in.) in air
- 7) Weight: 285g.
- 8) Lens mount: CS
- 9) Iris control: 4 pin DC control
- 10) Focus control: Motorized
- 11) Zoom: Motorized

e) Image Sensor-Housing

- 1) The environmental housing shall be an aluminum enclosure designed for outdoor CCD camera installations.
- 2) Temperature range -40 to +50 degrees C
- 3) Dimensions 449mm x 97mm x 112mm
- 4) Weight 1.4kg

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- 5) Housing mounting Three 1/4-20 tapped holes
 - 6) Camera mounting Removable cradle assembly
 - 7) Cable entry Three liquid-tight fittings that will accept cable diameters of:
 - i) One fitting - 2 to 7 mm
 - ii) Two fittings - 3 to 10 mm
 - 8) Finish: Off-white semi-gloss polyurethane
 - 9) Construction: Extruded aluminum housing, Aluminum rear-end cap, Aluminum front cap with glass face plate, and Aluminum cradle. A sunshield shall be included
 - 10) Window: 3 mm thick glass that includes a Thermostatically controlled window Heater/defogger strip
 - 11) Rated input voltage: 115 VAC 60 Hertz
 - 12) Voltage range: 108 VAC to 132 VAC
 - 13) Output voltage: 24 VAC 60 Hertz
 - 14) Nominal power: 30 Watts
 - 15) Enclosure protection: Waterproof and dust-tight in a NEMA-4, IP65, enclosure Type 3
- f) **Surge Protection**
- 1) A video surge suppressor(s) shall be available for installation inside the traffic signal controller cabinet. The suppressor shall provide coaxial cable connection points to a transient suppresser for each image sensor as approved by the Engineer.
 - 2) Peak Surge Current (8 x 20 us) 20KA
 - 3) Technology Hybrid, Solid State
 - 4) Attenuation 0.1db @ 10Mhz
 - 5) Response Time <1 nanosecond
 - 6) Protection Line to Ground
 - 7) Shield to Ground (isolated shield modules)
 - 8) Clamp Voltage 6 volts

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- 9) Connectors BNC
- 10) Impedance 75 Ohms
- 11) Temperature -40 to +85 degrees C
- 12) Humidity 0-95% non-condensing
- 13) Dimensions 4.5" x 1.5" x 1.25"
- 14) UL Listed UL 497B

g) Image Sensor-Mounting Brackets

- 1) Mast arm installations shall be mounted at a sufficient height to prevent occlusion from cross traffic between the stop bar and the mast arm on which the camera is installed. A 74" maximum length of internally reinforced, aluminum tube shall be attached to the mast arm bracket for camera mounting above the mast arm. Camera shall be mounted to the top of the tube with the camera manufacturers recommended bracket. Camera bracket shall provide adjustments for both vertical and horizontal positioning for the camera. Camera attachments shall be designed to securely fasten the camera to prevent the extension tube from falling into the path of vehicles and/or becoming loose. Mounting bracket must fasten to the Mast arm using a 64" or 82" aircraft cable. Miscellaneous hardware shall be stainless steel or galvanized steel. The cameras and associated pole/arm attachment unit shall be designed to withstand a wind load of 90 MPH with a 30-second gust factor.
- 2) Luminaire arm installations shall be installed on the luminaire arm, with the camera/video manufacturers recommended brackets. Camera luminaire brackets shall provide adjustments for both vertical and horizontal positioning of the camera. Camera attachments shall be designed to securely fasten the camera to the luminaire arm. Mounting bracket shall be made of aluminum. Miscellaneous hardware shall be stainless steel or galvanized steel. The cameras and associated pole/arm attachment unit shall be designed to withstand a wind load of 90 MPH with a 30-second gust factor.

h) Image Sensor-Cable (Coaxial & Power)

- 1) Coaxial & Power cable (Siamese) shall be installed in conduits or overhead as indicated in the plans. Coaxial cable shall be suitable for exterior use and in direct sunlight. Power cable will have a minimum of Six (6) conductors.

	ELEMENT 1	ELEMENT 2
CONDUCTORS/PAIR COUNT:	6 CONDUCTORS	1 CONDUCTOR
GAUGE & STRANDING	18AWG7/26 BC	20AWG SOLID

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		BC
PRIMARY INSULATION TYPE:	POLYETHYLENE	FOAM PE
INSULATION THICKNESS:	0.016"	0.056"
COLOR CODE:	WHITE, RED, BLUE, BLACK, BROWN, GREEN	NATURAL
SHEILD:	N/A	95% Bare copper Braid
TAPE:	N/A	N/A
DRAIN WIRE:	N/A	N/A
BRAID:	N/A	N/A
CAPACITANCE:	N/A	N/A
PRINT LEGEND:	N/A	N/A
JACKET TYPE:	N/A	POLYETHYLENE
JACKET COLOR:	N/A	BLACK
JACKET THICKNESS:	N/A	0.035"
NOMIMAL OD:	N/A	0.242"

- 2) A junction box on the camera bracket arm shall provide access to video and power cable terminations. No soldering shall be required in the field. Coaxial cable will terminate with a "barrel" style BNC connector and power shall be terminated via a small terminal strip or via "wire nuts."
- 3) Coaxial cable will be terminated in the surge suppressor before being connected to the VIP boards.
- 4) Power cable will be terminated into a fuse panel provided by the manufacturer and connected to 120 VAC in the controller cabinet.
- 5) Description of cable: Composite, 6 Conductors 2 elements: 18awg 5 conductors 7/26 bare copper, .016" polyethylene, 20awg 1 conductor, solid bare copper, 056" foam polyethylene jacket black, overall .030" PVC jacket black.
- 6) Overall Assembly Of Wire

JACKET THICKNESS:	0.030"
JACKET COLOR:	BLACK
JACKET MATERIAL:	PVC
RIPCORD:	YES
NOMINAL OD:	0.512"
VOLTAGE RATING:	600V
TEMP RATING:	75C
UL TYPE OR STYLE:	N/A
PRINT LEGEND:	TBD

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PACKAGING:	TBA
COPPER WEIGHT:	41.06 LBS/MFT
SHIPPING WEIGHT:	102 LBS/MFT

i) Video Monitor

A portable color LCD monitor for viewing the video output from the video processor unit shall be provided in the controller cabinet irregardless of the programming method utilized by the equipment. Monitor shall have a minimum diagonal measurement of 9". Monitor resolution shall exceed the required camera resolution. Monitor shall be provided with connector and cable for connection to the video processor unit. Monitor shall be provided with 125 VAC power cord. Monitor shall fit on the shelf within the control cabinet without interference to control equipment. Battery life shall be approximately 6 hours.

III. Installation & Training

- a) The product supplier of the video detection system shall supervise the installation and the testing of the video equipment. A factory certified representative from the manufacturer shall be on-site during installation. The factory representative shall install, make fully operational, and test the system as indicated on the intersection drawings and this specification.
- b) Two days training shall be provided to personnel of the contracting agency in the operation, setup, and maintenance of the video detection system. Instruction and materials shall be produced for a maximum of 10 persons and shall be conducted at a location selected by the contracting agency. The contracting agency shall be responsible for travel, room and board expenses for its own personnel.

IV. Warranty

- a) The video detection system shall be warranted against manufacturing defects in materials and workmanship for a period of two years from date of installation. The video detection supplier shall provide all documentation necessary to maintain and operate the VIP system.
- b) Life expectancy of the video cameras and VIP boards shall be a minimum of five (5) years.

CONSTRUCTION. The Contractor shall install the video detection system at the designated intersection(s) and program the controller and cameras if necessary. The Contractor must notify the Engineer or his designated representative at least 2 days before the location is ready for acceptance testing. Acceptance testing must be scheduled and conducted in the presence of the Engineer or designated representative during normal work days (M-F 9:00 AM to 2:00 PM). The Contractor must demonstrate that the camera system is programmed and operating properly in order to pass the

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acceptance test. Upon completion of the acceptance test, a 15-day observation period will commence. Any failures during this period will be repaired within 2 days of the notification; and after repair, another 15 day observation period will begin.

MEASUREMENT AND PAYMENT. Video detection cameras will be paid at the Contract Unit Price per each on a per intersection basis as follows, and will include: video camera, housing, mounting brackets, tube extensions, an appropriate processor card or interface equipment, surge arrestors and fuse panel, connectors, video monitor (1 per intersection), connector cables, programming, aiming and calibration, and control pads to control the cameras and set-up the detection zones (1 set per intersection). Payment will be full compensation for installing video detection cameras and include all material listed in the above specification, labor, tools, equipment, acceptance testing, and 15-day observation periods in order to complete the work.

4-Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- Two 2-position VIP Cards
- Four Camera Assembly Packages
- Four Camera Mounting Assemblies, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 4-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion
- One Power Supply for 10-Pos Rack
- Ten BNC connectors
- One Programming Keypad
- One 9" Monitor
- One CT Zoom Lens Controller
- Software
- Transient protection
- Hardware
- Warranty
- Technical Support
- Aiming
- Programming and Calibration
- Mounting brackets, splices and connectors

3-Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- Two 2-position VIP Cards
- Three Camera Assembly Packages
- Three Camera Mounting Assemblies, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 3-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion

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- One Power Supply for 10-Pos Rack
- Eight BNC connectors
- One Programming Keypad
- One 9" Monitor
- Software
- Transient protection
- Hardware
- Warranty
- Technical Support

2-Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- One 2-position VIP Cards
- Two Camera Assembly Packages
- Two Camera Mounting Assemblies, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 2-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion
- One Power Supply for 10-Pos Rack
- Six BNC connectors
- One Programming Keypad
- One 9" Monitor
- Software
- Transient protection
- Hardware
- Warranty
- Technical Support

1-Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- One 2-position VIP Cards
- One Camera Assembly Package
- One Camera Mounting Assembly, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 2-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion
- One Power Supply for 10-Pos Rack
- Six BNC connectors
- One Programming Keypad
- One 9" Monitor
- Software
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- Hardware
- Warranty
- Technical Support

Relocation of Existing Video Detection Camera will be measured per each at the contract unit price and include all labor material and equipment to remove and relocate an existing video detection camera and mounting hardware to a new location and make fully functional.

Video Detection Camera Cable will be measured in units of linear feet and paid for at the contract unit price per linear foot. This price shall include the Siamese (coaxial and power) cable.

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BATTERY BACKUP SYSTEM
FOR TRAFFIC SIGNALS**

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**CATAGORY 800
TRAFFIC
BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNALS**

DESCRIPTION. This specification establishes the minimum requirements for a complete emergency battery backup system for use with Light Emitting Diode (LED) Traffic Signal Modules. The Battery Backup System (BBS) shall include, but not be limited to the following: Inverter/Charger, batteries, combination power transfer relay and manual bypass switch and all necessary hardware and interconnect wiring. The BBS shall provide reliable emergency power to a traffic signal system (Vehicle and Pedestrian Traffic) in the event of a power failure or interruption.

The BBS shall be capable of providing power for full run-time operation for an “LED-only” intersection (all colors: red, yellow, green and pedestrian heads), an intersection with only yellow and/or pedestrian incandescent bulbs or flashing mode operation for an intersection using Red LED’s.

The BBS shall be designed for outdoor applications, in accordance with the Caltrans Transportation Electrical Equipment Specifications (TEES), dated August 16, 2002, Chapter 1, Section 8 requirements.

MATERIALS.

FCC Class A
IEEE 587/ANSI C62.41

CONSTRUCTION.

BATTERY BACKUP SYSTEM.

The BBS shall be a line interactive system which continuously regulates the AC input. If the input voltage is outside of a default or user selected range, the BBS will buck or boost the AC voltage, regulating the output voltage to the signal equipment. The BBS shall meet the following:

- (a) BBS shall be compatible with NEMA, Caltrans Model 332A Cabinets, Model 170E Controllers, Model 2070 Controllers and cabinet components for full time operation.
- (b) The BBS shall provide a minimum two (2) hours of full run-time operation for an “LED-only” intersection (minimum 700W/1000VA active output capacity, with 80% minimum inverter efficiency).
- (c) When utilizing battery power, the BBS output voltage shall be between 110 VAC and 125 VAC, pure sine wave output, $\leq 3\%$ THD, $60\text{Hz} \pm 0.05\text{Hz}$.

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- (d) The BBS DC system voltage shall be 24 Vdc.
- (e) The BBS shall be equipped with Input and Output AC circuit breakers.
- (f) The manual bypass switch module and power transfer relay shall be rated at 240VAC/30 amps.
- (g) The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized inverter line voltage from batteries shall be 65 milliseconds. The same maximum allowable transfer time shall also apply when switching from inverter line voltage to utility line voltage.
- (h) BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.
- (i) The BBS shall have lightning surge protection compliant with IEEE 587/ANSI C.62.41.
- (j) The BBS shall be equipped with an integral system to prevent the battery from destructive discharge and overcharge.
- (k) The Battery Backup System must be able to shutdown to protect against internal damage in the event of an overload at its output.
- (l) There shall be two, user adjustable transfer point set types. The user will be able to select either "Normal" or "Generator" transfer points. The user will be able to set the low and the high cutoff transfer points which are adjustable between 89 and 135 AC volts. The BBS will automatically apply the 5 volt difference for the return transfer points.
- (m) If the BBS is configured to use these adjustable transfer points (Buck/Boost is disabled), the BBS shall bypass the utility line power whenever the utility line voltage is outside of the set transfer points (± 2 VAC).
 - (1) In cases of low (below the set low cutoff point) or absent utility line power, when the utility line power has been restored at or above $5 \text{ VAC} \pm 2 \text{ VAC}$ of the set low cutoff point for more than 30 seconds (or the user configured line qualify time), the BBS shall transfer from battery backed inverter mode back to utility line mode.
 - (2) In cases of high (above the set high cutoff point) utility line power, when the utility line power has been restored at or below $5 \text{ VAC} \pm 2 \text{ VAC}$ of the set high cutoff point for more than 30 seconds (or the user configured line qualify time), the BBS shall transfer from battery backed inverter mode back to utility line mode.
- (n) The Buck/Boost function of the BBS shall have a range of 80-160Vac. There are not to be any user configurable transfer point settings for the Buck/Boost function.
 - (1) With Buck/Boost selected as the sense type, the output to the signal system will be regulated to voltages between 102-130 Vac.
 - (2) There will be a Buck and Boost event counter and run time meter accessible through the LCD and Ethernet. Buck and Boost events will be recorded

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separately from each other. The counter and run time meter will show the cumulated information since the last reset.

- (o) The BBS will have an adjustable line qualify time. The range will be from 1 to 60 seconds, in 1 second increments. The factory default setting will be 30 seconds.

Battery System. Upon loss of power from the public utility, the BBS shall utilize its battery power.

- (a) Batteries used for BBS shall consist of 2 to 8 batteries to run the loads for the specified time, and a maximum system voltage of 24 VDC to comply with NEC Class 2 Voltage.
- (b) Individual batteries shall be deep cycle, sealed prismatic lead-calcium based AGM/VRLA (Absorbed Glass Mat/ Valve Regulated Lead Acid) rated at 12 volts.
- (c) Batteries shall be certified by the manufacturer to operate over a temperature range of $-25\text{ }^{\circ}\text{C}$ to $+74\text{ }^{\circ}\text{C}$.
- (d) Batteries shall be easily replaced and commercially available off the shelf.
- (e) The batteries shall be provided with appropriate interconnect wiring and corrosion-resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.
- (f) In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC (and de-energized) state, where utility line power is connected to the cabinet.
- (g) The BBS shall be easily replaced by having easily removable AC input and output cables. The DC input connection shall be a one piece Anderson type connector. The external transfer relay control and battery temperature compensation cables shall be a quick release connector. The AC, DC, external transfer relay, and battery temperature compensation cables shall be removable without the use of a screwdriver.

Battery Charging.

- (a) The BBS shall have an integral charger. The charger shall be a 3 step charger (bulk, accept, and float) with an automatic monthly restart.
- (b) The charger shall have the capability of providing the charge current required by the battery. The user shall be able to select either "gel" or "AGM" type batteries. The default setting is for AGM.
- (c) The BBS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of $2.5 - 4.0\text{ mV}/^{\circ}\text{C}$ per cell.
- (d) The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 2 meters (6'6") of wire.

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- (e) Batteries shall not be recharged when battery temperature exceeds $50\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$. Recharge time for the battery, from “protective low-cutoff” to 80% or more of full battery charge capacity, shall not exceed ten (10) hours.

Cabling/Expansion.

- (a) Interconnect wiring shall be via two-piece modular harness consisting of 8 gauge welding style cable, UL listed, super K90.
- (b) Cable assembly shall be equipped with insulated, mating, power pole style connectors. Where two-piece power pole style connectors are used Positive (+) shall be red, and Negative (-) shall be black.
- (c) All power pole connectors shall be assembled to ensure proper polarity and circuit configuration throughout the entire harness.
- (d) Part one of the two-piece harness shall consist of seven inches of appropriate colored cable with $\frac{1}{4}$ inch ring terminals for connecting to the battery terminal and the appropriate colored modular power pole style connector.
- (e) Battery terminals shall be covered and insulated with appropriate colored molded boots.
- (f) Part two of the harness shall consist of mating two-piece power pole style connectors for connecting to the batteries and a single insulated power pole connector for connecting to the BBS unit.
- (g) Cable length shall be a minimum of 12 inches between batteries and 60 inches between BBS unit and first battery.

Mounting.

All references made to EIA rail or EIA 19” (482.6mm) rack shall conform to Electronic Industries Standards EIA-310-B, Racks, Panels, and Associated Equipment, with 10-32 “Universal Spacing” threaded holes.

- (a) Mounting method shall be shelf-mount or rack-mount. Front or rear mounted available rack space is 3U or approximately 6 inches.
- (b) The Power transfer relay and manual bypass switch shall be mounted on the EIA rail or the cabinet shelf.
- (c) All necessary hardware for mounting (shelf angles, rack, etc) shall be included in the bid price of the BBS. Bolts/fasteners and washers shall meet the following requirements:
- (d) All interconnect wiring shall be provided between Power transfer relay and bypass switch and Cabinet Terminal Service Block and shall be no less than 2 meters of UL Style 1015 CSA TEW with the following characteristics:
 - (1) AWG Rating: 10 AWG

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- (2) Stranding: 105 strands of 30 AWG tinned copper
- (3) Rating: 600 V, 105 °C, PVC Insulation
- (e) Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be 3 meters of UL Style 1015 CSA TEW 18 AWG wire, same ratings as above, except 16 strands of 30 AWG tinned copper.

Environmental.

- (a) Operating temperature for the inverter/charger, and power transfer relay and manual bypass switch shall be -40 °C to +74 °C.
- (b) The BBS shall be certified and field proven to meet or exceed NEMA temperature standards. A certificate of compliance shall be made available upon request.

Communications.

- (1) The BBS shall have RS-232 communications for Windows based computers.
- (2) The BBS shall have Ethernet communications as standard.
- (3) The Ethernet communications shall be capable of 100 mbps.
- (4) The Ethernet port shall have a user configurable IP address, subnet mask, and gateway.
- (5) The BBS shall have an embedded web-server for configuration and system status.
 - a. Shall have a Configuration page that allows for configuration of; sense type, transfer points (normal and generator), line qualify time, Time of Day program, self test, and dry relay contacts
 - b. Shall have a Status page that shows the current settings of; sense type, transfer points, line qualify time, Time of Day program, self test, and dry relay contacts
 - c. Shall have a System page to configure; location, IP address, sub-net mask, and gateway address
 - d. Shall have an email page to configure which events trigger an email. It also shall allow input of up to 6 email addresses
 - e. The event log shall be able to be printed from the web browser. The event log shall also be able to be copied and pasted into an excel spreadsheet.

Display and Controls.

The BBS shall have a 4 line by 20 character backlit LCD display. The main screen shall indicate information regarding; transfer points, transfer point type, time of day status, utility input voltage, charger on/off status, battery percent of charge, battery voltage, BBS Mode, a scrolling line of text (which automatically lists any faults, alarms and relay status information), inverter event counter and run time meter. The run time meter shall indicate run time in hours and minutes.

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- (a) The BBS shall have a 4-way navigational keypad so that the user can navigate the menu system by using “↑”, “↓”, “←”, “→”, “Enter”, and “Esc” keys. There shall also be an “Inv” key to turn the inverter on or off.
- (b) The BBS shall have three status LED’s.
 - (1) Green LED “Output” – This is to be on any time the BBS is providing output for either backup, buck, or boost modes.
 - (2) Red LED “Fault” – This is to be on any time there are any faults in the system.
 - (3) Yellow LED “Alarm” – This is to be on anytime there are alarms on the system.
- (c) The BBS shall include a front-panel event counter display to indicate the number of times the BBS was in Backup, Buck, and Boost modes; and a front-panel hour meter to display the total number of hours and/or minutes the unit has operated in those modes since last reset. The run time shall be displayed in HHH:MM format. All meters shall be re-settable. The information displayed shall be cumulative since last reset.
- (d) The BBS shall include a LCD display to indicate battery voltage and standard meter probe input jacks (+) and (-) to read the battery voltage externally.
- (e) There shall be an event log that is 256 lines in length. Data shall be recorded in a FIFO format so that the oldest record is purged as the newest is entered. The event log shall date and time stamp all events. Each event that is recorded will also show the current operating mode of the BBS (Standby, Backup, Buck, and Boost).
- (f) The BBS shall be equipped with a Time Of Day (TOD) program. The user can set the beginning and the end time of the TOD program. The user can also “Enable” and “Disable” the program. Operation is such that if the program is enabled and the BBS goes to Backup mode, the TOD program will energize any dry contact relays that are programmed for TOD. If the BBS is still in Backup mode and the TOD program has expired, any relay that was energized by the TOD program will de-energize when the TOD program expires.
- (g) The BBS Configuration and System menus (on LCD, Ethernet, and RS-232) shall be password protected with a 6 digit alphanumeric password. The password feature can be disabled by the user in the System menu.
- (h) The BBS shall have a “Self Test” feature. The self test feature can be programmed to either automatically run the test on the 1st or the 1st and 15th of each month. The user can program the start time of the test. The self test can also be immediately initiated by either LCD, Ethernet, RS-232, or by momentarily connecting the two self-test contacts on the terminal strip.
- (i) All features shall be accessible from the keyboard on the BBS controller.

Dry Relays. The BBS shall provide the user with 6 programmable dry relay contacts.

- (a) The dry relay contacts shall be rated for 3 amps @ 125 Vac.

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- (b) Each relay can be programmed to trigger by more than one condition simultaneously.
- (c) If any relay is energized, it will show up on the main screen of the LCD, Ethernet web browser, and the RS-232 menu. The programming options are as follows:
 - (1) On Battery
 - (2) Low Battery
 - (3) Timer
 - (4) Time of Day
 - (5) Alarm
 - (6) Fault
 - (7) BBS Failure
 - (8) Off
- (d) The BBS shall have a timer that will energize the dry contact relays (that are configured for "Timer") after the user configured time has elapsed. This timer is started when the BBS is in Backup mode. The user can configure the timer from 0 to 480 minutes, in 1 minute increments. The factory default setting is at 120 minutes.
- (e) The BBS shall have an adjustable low battery relay setting. This setting shall be adjustable so that the user can set the point at which the low battery relay energizes. This setting applies to any dry contact relay that is configured for "Low Battery". This setting is adjustable from 0 to 100% of remaining usable battery capacity in 5% increments. This setting must be in percent. The factory default setting is 40%.

Quality Assurance. Each BBS shall be manufactured by an ISO 9001:2000 certified company in accordance with a manufacturer Quality Assurance (QA) program. QA process and test results documentation shall be kept on file for a minimum period of seven years. Each system shall be visually inspected for any exterior physical damage or assembly anomalies. Any defects shall be cause for rejection.

Warranty. Manufacturers shall provide a five (5) year warranty. During the first three years of the warranty, the manufacturer will send out a replacement unit within two business days of the call notifying them of an issue. The manufacturer will send out either a new unit or a re-manufactured unit that is fully tested and is up to the latest revision. The manufacturer is responsible for all shipping charges to the customer. The last two years of the warranty will be factory-repair warranty for parts and labor on the BBS.

Batteries shall be warranted for full replacement for two (2) years from date of purchase. The warranty shall be included in the total bid price of the BBS.

Training. Operational and Maintenance training for the entire system shall be provided to designated Administration personnel through the means of practical demonstrations, seminars, and other related technical teaching procedures. A minimum of 8 hours of instruction shall be

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provided. The training shall include the following:

- (a) "Hands on" operation of all BBS hardware.
- (b) Explanation of the complete repertoire of system functions.
- (c) Instruction on required preventative maintenance procedures, and servicing procedures.

BBS FIELD EQUIPMENT CABINET.

The Contractor shall furnish and install a field equipment cabinet with each BBS. The Contractor may provide the cabinet, or it may be supplied by the BBS manufacturer with or without the equipment pre-installed in it. The cabinet shall be either a stand-alone design suitable for pad mounting or a side-mount design suitable for direct attachment to the existing traffic control cabinet, as indicated on the Plans or as directed by the Engineer. If of the stand-alone design, the cabinet shall be located as close as possible to the traffic signal controller cabinet.

MATERIALS.

CONSTRUCTION.

Cabinets: General

- (a) Serial numbers, model numbers, the manufacturer's name and production date shall be clearly legible and permanently placed on all cabinets, battery back-up device mainframes and all removable printed circuit boards from the aforementioned equipment.
 - (1) The use of adhesive backed labels is not acceptable.
 - (2) Cabinet and mainframe labels shall be a minimum of 2.5 inches width and 0.75 inches height.
 - (3) Mainframe serial numbers and model numbers shall be readable without disassembly or removal of any part of the cabinet or components located within the cabinet and located on the front face of the mainframe unit.
 - (4) Cabinet serial numbers, model numbers, the manufacturer's name and production date shall be readable without disassembly or removal of any part of the cabinet or components and shall be located on the right upper cabinet interior side.
- (b) All cabinets shall be provided with a vinyl print holder or approved equivalent, mounted on the inside of the cabinet door, suitable for holding a copy of the complete cabinet wiring diagram and other circuit diagrams that might be necessary to troubleshoot the entire cabinet assembly.
- (c) A listing, indicating terminal numbers with a description of their use, shall be attached to the BBS cabinet door and overlaid with a clear, plastic covering. Edges of the plastic overlay shall be sealed with a clear waterproofing compound. Unless

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cable is passing through the cabinet uninterrupted, incoming and outgoing conductors shall have each wire connected to terminal post positions.

Cabinets: Mechanical. The cabinet shall house the batteries, wiring, and related equipment; and, the BBS, which includes converter/inverter/charger unit, power transfer relay, power management unit, manually operated bypass switch and other control panels and wiring harnesses. All cabinets shall meet the following:

- (a) All cabinets shall meet or exceed the requirements of a NEMA 3R rating and shall be UL listed as a unit.
- (b) All cabinet material shall be 5052-H32 tempered aluminum with a minimum one eighth of an inch (1/8 in.) thickness.
- (c) All mounting hardware and cabinet bracing shall also be made from aluminum.
- (d) All external welds shall be made using the Tungsten Inert Gas (TIG) welding method.
- (e) All welds shall be neatly formed and free of cracks, blow holes and other irregularities.
- (f) All inside and outside edges of the cabinet shall be free of burrs.
- (g) All cabinets shall have a rear sloped top surface to prevent the accumulation of water on the top surface of the cabinet.
- (h) Cabinets shall have a three (3) inches width flange inside the cabinet for anchor bolt and/or bottom plate mounting.
- (i) Cabinets shall have four (4) open end slotted anchor bolt openings one (1) inch diameter into the cabinet conduit entrance area in lieu of NEMA TS 2-1992 figure 7.7.3-1.
- (j) Cabinets shall be furnished with four (4) anchor bolts sized as per NEMA TS 2-1992 section 7.8.4.

Cabinet Sizes:

- (a) Stand-alone cabinets shall be a NEMA 3R rated with the approximate dimension of twenty-seven inches in width by thirty-nine inches in height by thirteen inches in depth (27" W x 39" H x 13" D). The top of the cabinet shall have a depth the necessary ventilation opening. Each cabinet shall be provided with an anchor bolt template.
- (b) Side-mount or "Piggyback" cabinets shall have the approximate dimension of twenty inches in width by forty eight inches in height by fourteen inches in depth (20" W x 48" H x 14" D). The top of the cabinet shall have a depth of sixteen (16) inches to provide the necessary ventilation opening. The cabinet shall be attached to the traffic control cabinet in at least two (2) points and be provided with an internal cabinet to cabinet wiring path.

Doors:

Cabinet doors shall provide full access to the cabinet interior and shall provide the following:

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- (a) All main cabinet doors shall be provided with a dust tight gasket. The gasket shall be 0.25 inches minimum thickness closed cell neoprene or silicone and shall be permanently bonded to the metal.
- (b) If neoprene is used the mating surface of the gasket shall be coated with a silicone lubricant to prevent sticking to the metal mating surface.
- (c) A gasket top channel shall be provided to support the top gasket on the main door.
- (d) All access door openings shall have a double flange on all four sides.
- (e) All cabinet doors shall be hinged on the right side as viewed facing the cabinet.
- (f) Hinges shall be stainless steel and continuous.
- (g) All cabinet door hinge pins shall be capped at the top and bottom by weld to render the pin tamper proof.
- (h) Cabinets shall have a three point latching mechanism of the draw roller type.
 - (1) The pushrods shall be turned edgewise at the outward supports.
 - (2) The pushrods shall have a cross section of 0.25 inches by 0.75 inches.
 - (3) The locks and handles shall be on the left of the main cabinet door.
 - (4) The center latch cam shall be designed to allow only the door to open when the handle is moved towards the center of the door.
 - (5) The pushrod end rollers shall have a 0.875 inches minimum diameter.
- (i) All cabinets shall include a door restraint to restrict the door to a maximum one hundred and thirty-five degrees (135°) of swing in addition to stop positions specified in NEMA TS 2-1992 section 7.5.3.
- (j) Cabinets shall be furnished with a dead bolt type version of the lock specified in NEMA TS 2-1992 section 7.5.4.3 and a key hole cover. The dead bolt lock shall be keyed for a "Number 2" key.
- (k) Doors shall have a removable 3/8-inch Allen Wrench Lock in lieu of the door handle.
- (l) Cabinets shall be provided with louvered vents in the front door with a removable air filter.
 - (1) Louvers shall satisfy the NEMA Rod Entry Test for a 3R rated ventilated enclosure.
 - (2) Cabinets shall have a "WASHABLE" filter sized sixteen inches in width by twelve inches in height by one inch in thickness (16" W x 12" H x 1" T). The filter shall not allow air to pass around the frame and shall be rated to capture 90% of 2 micron particles
 - (3) The filter shall cover the vents and be held firmly in place with top and bottom brackets and a spring loaded upper clamp.
- (m) Each cabinet shall be provided with a door open alarm input.
- (n) One 18-inch interior flexible arm goose neck lighting fixture with a 25 watt incandescent lamp shall be wired to a 15-Amp ON/OFF toggle switch mounted to a door activated switch mounted near the top of the door. The lighting arm shall be

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mounted to the door, and when swung open the light shall illuminate the upper portion of the cabinet.

Interior:

The interior of cabinet shall be of sufficient size to provide adequate ventilation of the equipment housed therein. The cabinet shall contain at least two adjustable shelves or equivalent supports, with enough space to hold batteries, wiring and related equipment. Vertical mounting channels for the shelves shall allow for adjustable shelf placement ranging from 5 inches from the bottom to 5 inches from the top of the cabinet. Shelves and vertical mounting channels shall be heavy duty and have sufficient strength to hold the batteries without deforming, bending or breaking. Batteries shall not be installed directly on concrete foundations. Wiring panels and terminal blocks shall be neatly finished and clearly and permanently marked.

Cabinet Foundation:

If used, the cabinet foundation shall be installed in accordance with Baltimore City Department of Transportation (BCDOT)-Standards Details.

Cabinets: Electrical.

If the stand-alone cabinet design is used, wiring from the BBS to the traffic signal controller cabinet shall be accomplished via a conduit passing through the BBS foundation, underground to a spare conduit in the traffic signal controller cabinet.

If the side-mount cabinet design is used, wiring from the BBS to the traffic signal controller cabinet shall be accomplished via an adequately sized and edge-protected opening in the side of the cabinet attached to the traffic control cabinet such that all wiring power and alarm wiring may be passed into the BBS cabinet.

Power:

The AC power interface shall be an independent panel design mounted in close proximity to the existing power panel or mounted within the BBS equipment cabinet with wires/connections passing between the two cabinets. The AC power interface shall provide the following:

- (a) Easy relocation of incoming utility service wiring to the new panel power in terminal strip.
- (b) A properly rated circuit breaker to control utility power state.
- (c) A surge suppressor to protect the BBS.
- (d) The wiring to the Manual Bypass Switch shall be integrated into this panel for incoming AC Power such that all wires are accessible within this panel on identified terminal strips that will allow for the maintenance of the equipment using only standard hand tools.

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- (e) The output AC power from the Manual Bypass Switch shall be terminated on the original incoming utility power service terminals.
- (f) The panel shall be covered with plexi-glass or other approved material to minimize the risk of electrical hazards.

General:

The following shall be implemented/provided in all BBS equipment cabinets:

- (a) Interface to traffic control cabinet (power and status/alarm).
- (b) All conductor wire runs shall be continuous with no splices.
- (c) Wiring for the lamp, fans and other auxiliary equipment shall be connected via terminal blocks.
- (d) All wiring harnesses shall be encased in a continuous sheath. The use of cable ties to arrange wiring harnesses is not acceptable. The use of adhesive backed wire holders is also not acceptable. Conductors shall be neatly arranged and shall not obstruct access to other circuits and terminals in the cabinet.
- (e) All cabinet back and panel harness wiring shall be soldered at its destination point as specified.
- (f) All conductors shall be labeled. Labels shall be either attached to each end of the conductor and indicate the destination of the other end of the conductor, or shall be a continuous, permanent identification of the conductor's function and located every six inches along the conductor.
- (g) All conductors used in the controller cabinet wiring shall conform to the following color code requirements.
 - (1) AC Neutral conductors shall be identified by a continuous white color.
 - (2) AC Ground conductors shall be identified by a continuous green color.
 - (3) AC Positive conductors shall be identified by a continuous black color.
 - (4) All other conductors shall be identified by any color not previously specified.
- (h) All bolts used for electrical connections shall be fabricated from stainless steel.
- (i) All hardware used for electrical connections and terminal facilities shall be fabricated using cadmium plated brass.
- (j) All fuse holders shall be of the encased type.
- (k) All switches shall be encased, environmentally sealed, and rated for one hundred and twenty-five percent of capacity. Switches and thermostats shall break the "hot" side of the line.
- (l) Exhaust air will be vented out of the cabinet between the top of cabinet and the main access door via an exhaust plenum
 - (1) The exhaust area shall be screened with a material having a 0.125 inches maximum hole diameter.
 - (2) Two thermostatically controlled vent fans shall be mounted at the top of the cabinet onto an exhaust plenum.

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- (3) The fan and thermostats shall be rated for one hundred and twenty-five percent (125%) of capacity.
 - i. The fan bearing mechanism shall be of ball bearing design.
 - ii. The fan shall have a minimum rated design life of one hundred thousand hours (100,000 hrs).
- (4) The thermostat shall be adjustable from 80 degrees F to 130 degrees F.
- (5) Degree markings shall be indicated on the thermostat in 10-degree increments.
- (6) The fan shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the Traffic Signal Control Cabinet.
- (7) A two position terminal block shall be provided on the fans panel. Proper over current protection shall be provided for the fan circuit.
- (8) Fan thermostats shall be set so that one fan will operate at normal temperatures and the second fan will operate when temperatures exceed 95 degrees F.

Documentation. The BBS supplier shall provide three sets of operating manuals, service manuals, wiring diagrams, schematics, and maintenance instructions for all components of the BBS, including the cabinet. In addition, the BBS supplier shall provide a fourth set of schematics and wiring diagrams which shall be furnished in the wiring diagram holder in the controller cabinet. This documentation shall include:

- (a) General Characteristics and Description
- (b) Assembly and Installation
- (c) Logic and Schematic Diagrams including Integrated Circuits. Schematics shall include a list of tests points with the following information provided for each point:
 - (1) Nominal operating voltage.
 - (2) Wave form and all pertinent information regarding the waveform at each test point.
 - (3) Theory of Operation
 - (4) Detailed Circuit Operation Description
 - (5) Systems Operation with Block Diagram
 - (6) Connection and I/O diagrams.
- (d) Illustrated parts list with industry standard part numbers where applicable.
- (e) Maintenance Operations
 - (1) Alignment Procedures
 - (2) Preventive Maintenance
 - (3) Trouble Analysis
 - (4) Trouble Shooting Sequence Chart
 - (5) Voltage Measurements
 - (6) Wave Forms

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PROCEDURES. All conduits entering the cabinet shall be sealed and made waterproof, utilizing glad type fittings around all wires or an electrical atmosphere seal-off, (filled after final inspection) and all spare conduits capped using rubber gasket test seal plugs. No air shall be permitted to enter or exit the cabinet through the conduit system.

When installing BBS at an existing traffic signal controller cabinet location, the Contractor shall notify BCDOT a minimum of five days prior to beginning work. The traffic signal shall not be disconnected from utility power unless a representative of BCDOT is present and then only during the time of day and day of week designated by BCDOT.

Upon completion of the installation, the Contractor shall notify BCDOT to arrange demonstration of the BBS. The Contractor shall demonstrate that the BBS is completely operational and shall demonstrate the various features available.

FOUNDATION. The foundation for the BBS shall be poured a minimum of 36 inches deep; the pad shall extend 1.5 inches larger than the outside cabinet dimension on all sides. A 1 inch chamfer will be used to drain water off the pad. Concrete shall meet or exceed Baltimore City Mix #2. Cost of removing pavement, forming and pouring the foundation shall be incidental to the cost for the BBS equipment cabinet (complete)

SAMPLE CABINET The contractor shall provide drawings and a sample cabinet for approval.

- 1) Detailed shop drawings will be submitted for review and comments by the City, changes will be incorporated into the cabinet design.
- 2) A sample cabinet will then be delivered to the City for evaluation and approval.
- 3) Cost of making minor modifications, creating and modifying drawings, freight and delivery costs to and from the vendor to the City shop are incidental to this pay item.
- 4) Sample cabinets will be delivered to:

Contact: Mr. Paul Manik
Phone: (410) 396-9065
Address: 1620 Rappolla Street, Baltimore, MD 21224
Hours: 8AM to 4PM weekdays by appointment only

MEASUREMENT AND PAYMENT. Battery Backup System shall be measured and paid for at the contract unit price per each, which shall include the complete Battery Backup System, NEMA 3R base mounted cabinet or Piggyback cabinet as indicated on the plans or as directed by the Engineer, all batteries and harnesses, installation, electrical work, grounding, training, concrete foundation, forming, excavation and sidewalk removal related directly to the cabinet foundation, conduit and wire seals, sample cabinet and shop drawings, freight and delivery charges and all other incidentals. The payment shall be full compensation for all materials, labor,

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equipment and all other incidentals necessary to complete this work.

**CATEGORY 800
TRAFFIC**

CONCRETE ENCASED PVC TRAFFIC CONDUIT

DESCRIPTION. This specifications cover the furnishing and installation of all the conduits, fittings pull and junction boxes, conduit expansion joints and incidental parts, necessary to provide for future lighting or operation of structures, The type, size and location of conduits, fittings and boxes will be as indicated on the Plans. The following pertains to work within the City of Baltimore only.

MATERIALS. Refer to Section 805.02 - Electrical Conduit and Fittings.

CONSTRUCTION.

General.

1. The size of each conduit shall be such that the sum of the areas of the cross-sections of all conductors, including insulation and protective coverings, shall be not greater than thirty percent (30%) of the inside area of conduit except that no conduit encased in concrete or installed underground shall be less than two inches (2") inside diameter and no conduit small that three quarter inches (3/4") inside diameter shall be used except for fixture hangers.
2. All conduit sizes and conduit layouts shall be approved by the Engineer before installation and the Contractor shall submit data on the lay-out for the exact makeup, overall diameters and cross-sectional areas of the actual conductors he intends to use and the sum of the areas of the conductors in each conduit. All conduits used on a project shall be the product of one manufacturer.
3. Bends shall be of long sweep, free from kinks and of such easy curvature as to permit the drawing in of conductors without injury. The radius of curvature of inner edge of bends shall not be less than ten (10) times the inside diameter of the conduit except as may be otherwise noted on the Plans or in the Special Provisions. Conduits shall not be flattened or distorted. The total angle of all bends between any two (2) boxes, or fittings, shall not exceed two (2) quarter bends.
4. Exposed conduit runs shall be parallel to or at right angles to walls, slabs, girders, etc., and in locations giving greatest accessibility for painting and least accumulation of dirt. All exposed conduit runs shall be attached to steel masonry, concrete or timber by galvanized malleable iron or galvanized steel straps, clamps, or hangers of an approved type, held at not less than two (2) points by galvanized steel bolts or lag screws. The runs shall be supporting members, Conduits mounted o structural steel members shall be securely clamped to prevent rattling and wear.
5. All ends of conduits installed during construction, or for future use shall be closed against the introduction of foreign material by the use of standard pipe or brush caps. All conduits shall be installed so that they will drain and necessary holes for this purpose shall be made as directed.
6. All conduits risers in railing post shall, unless otherwise shown on the Plans, terminate one inch (1") below the top surface of the post. The risers shall be accurately placed so that they may be located for future use.

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PVC TRAFFIC CONDUIT**

7. All conduits installed underground shall have a Mix No. 2 Concrete envelope providing cover as indicated by the dimensions shown on the Detail Plates for Standard Duct Sections.
8. All traffic bearing ductwork shall be encased in Mix No. 2 Concrete. Concrete encasement shall be a minimum of 3" in all directions from the ductwork, as per Detail No. BC-824.01, and extend 3 feet from the curb unless otherwise noted in the plans.
9. Excavation for installation and encasement shall be carefully done, sidewalks trimmed to line and the bottom of trench graded so that the envelope will be uniform and there will be no pockets or low points in the conduit run. All backfill, regardless of class shall be carefully tamped to conform to the requirements of Section 204, unless otherwise specified. Care shall be taken that the concrete envelope, or conduit, are not injured.
10. In areas where a concrete footway currently exists, the Contractor shall remove the existing footway as required and excavate a trench of the width and depth as shown on the Detail Plates, or as directed by the Engineer. After the conduit is installed, the Contractor shall install CR-6 to the existing grade to provide a temporary and or permanent concrete footway.
11. All conduits, boxes, etc., to be encased in concrete must be accurately placed and rigidly held in position so that no variation from line or grade occurs when concrete is placed.
12. Conduits, fittings and boxes shall be stored under cover and above ground.
13. Upon completion of the conduit installation, the system shall be cleared by a pull through mandrel type device inserted in the presence of the Engineer before any conductors are installed. Immediately prior to the installation of conductors in any run, the conduits comprising that run shall again be checked. Any and all obstructions shall be removed to the approval of the Engineer.
14. The Contractor shall install and leave in place NO. 10 iron wire in all conduit runs installed for future use.
15. The Contractor shall furnish work drawings. Work drawings shall be twenty-two inches by thirty-six inches (22"x36") and shall be furnished in duplicate for Engineer's preliminary examination. After work drawings have been accepted by the Engineer, and revisions made the Contractor shall furnish additional copies as may be requested.

Metallic Conduits, Fitting and Boxes.

1. Conduit runs shall be made with as few couplings as standard lengths will permit. Screw couplings shall be used. All cuts shall be made with a hacksaw and reamed clear of fins or burrs with a reamer.
2. Conduit shall have threaded ends coated with red or white lead and of sufficient length so that they will butt squarely and tightly in the coupling. Long running threads will not be permitted. Conduits shall be installed so as to be continuous and watertight between boxes and/or equipment.
3. Where conduits cross expansion joints in the structure, or where otherwise specified, they shall be provided with expansion fittings of an approved type. The electrical continuity of the conduit runs across the expansion fittings shall be assured by approved fittings and bare No. 8 copper wire.
4. Pull boxes shall be used wherever necessary to facilitate the installation of the conductors. Conduits entering into cast iron pull boxes or enclosures shall be threaded into hubs on same.

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CONCRETE ENCASED
PVC TRAFFIC CONDUIT**

Conduits entering into sheet steel boxes or enclosures shall be secured with two (2) lock nuts and the projecting ends shall be equipped with an approved insulating bushing.

5. All surfaces of conduits, boxes, fittings, etc., in contact with concrete encasement shall be painted one (1) coat using RTCB-5 Tar. All surfaces of conduits, boxes, fittings supports, etc. exposed to view as well as the interior surfaces of boxes shall be painted as specified in the Special Provisions. All galvanized surfaces shall be prepared in accordance with Section 917.05 before the application of any paint.

Polyvinyl Chloride (PVC) Conduits and Fittings.

Conduit shall be cut with a saw and all ends shall be accurately tapered or otherwise finished depending on type of coupling specified. Tools recommended for this work by the conduit manufacturer shall be used and finished ends shall be equal to those supplied by the Manufacturer. All ends shall be smoothed of burrs and fins. Standard bends shall be used wherever possible and special bends shall preferably have a radius not less than that of standard bends. All special conduits shall be accurately dimensioned and manufactured. All joints shall be sealed with waterproof joint sealing compound recommended by the conduit manufacturer and approved by the City. All joint thus treated shall be waterproof.

1. An expansion joint shall consist of a break in the conduit run with a space between ends of conduit as indicated on the Plans.
2. A conduit sleeve not less than eighteen inches (18") long unless otherwise indicated shall cover the break. The sleeve shall be rigidly anchored to the structure.
3. All underground ductwork shall have magnetically detectable plastic warning tape installed 12" above the duct for the entire length of the duct. The color of the warning tape shall be red for electric ductwork. Provide tape in rolls, 3 inches minimum width with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification shall be "CAUTION BURIED ELECTRIC LINE BELOW" or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material. Bury tape with printed side up. Three-foot (3') clearances are recommended between lighting conduits and meter vaults.

Inspection and Testing.

1. A braided nylon line, having a minimum tensile strength of four hundred pounds (400 lbs), shall be installed in each duct.
2. Each duct shall be tested in the presence of the Engineer. A test device made from ridged material not more than one-half inch (1/2") smaller than the bore of the duct, and a minimum of two feet (2') long, shall be passed through each duct. The device shall be so constructed as to prevent its use through bends whose radius is less than twenty feet (20'). Any duct through which the device cannot be passed shall be repaired by the Contractor to the satisfaction of the Engineer with no additional compensation from the City.
3. All manholes shall be inspected for proper duct entries, terminators, bell ends, pulling in irons, concrete seal around duct, caps or lugs, pull lines and grout seals between the frame and chimney.
 - a. The duct line sizing device is to be used as a "go" gauge for new PVC duct and will be used on the basis of a receipt signed by the Contractor.

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- b. Use of the device must be observed by the Engineer. Arrangements are to be made at least three (3) days in advance.
- c. Prior to testing, the Contractor shall assure that the bore of all the ducts are clean and clear of fins, burrs or sharp edges and dry.
- d. The Contractor shall supply labor and equipment necessary to gauge the new duct.
- e. If the device meets any resistance within the run of duct, the operation shall stop and the device recovered as its starting point.
- f. Any duct which has resistance to the passing of the device will not be accepted.
- g. Final acceptance of the conduit system will not be made until completion of all the Work in the Contract including completion of cable Work and viability and continuity of cable service acceptance in the specified duct system.

MEASUREMENT AND PAYMENT. This work will be paid for at the contract unit price bid per linear foot for which price and payment shall be full compensation for all trench excavation, conduit, concrete encasement, core drilling into existing manhole walls, waterproof epoxy, rodding, pavement patching, slotting, saw cutting, replacement with matching roadway materials, fittings, pull wires, duct plugs, caps, terminators, junction boxes, warning tape, backfill, seeding, CR-6, and all labor, materials, equipment, and tools necessary to complete the work for each type of conduit. Payment will also include hauling and disposing of all excavated materials and furnishing, transporting and placing of RC-6 or CR-6 stone backfill.

**CATEGORY 800
TRAFFIC**

STANDARD PRECAST COLLECTOR HAND BOX

DESCRIPTION. This section specifies the installation of standard precast collector hand boxes for traffic control devices.

MATERIALS.

- A. Hand boxes; including, Precast Box, and Frame and Cover: as per Details included in the Contract Documents and referenced thereon.
- B. Duct, Encasing Concrete, and Pull-Lines: as per Section titled "Concrete Encased DB-120 Lighting Conduit".
- C. Backfill: Borrow Excavation Type III Material.
- D. Ground Rods – Section 804.

CONSTRUCTION. Each hand box shall be installed complete, with a base and ground rod. When a hand box is to be installed on an existing duct system, the Contractor shall rod the assigned duct to the nearest hand box or manhole. Should the assigned duct prove to be obstructed, another duct is to be rodded until a clear duct is found. The Contractor shall install an approved pull rope in the diverted duct from the nearest manhole or hand box to the new hand box. All ducts are to be plugged immediately after construction with approved plugs. In the event a duct must be diverted each way into the hand box, each leg of the diversion shall be rodded to the nearest manhole or hand box and a pull rope installed in each leg of the run.

- A. Excavate for and place base slab to proper grade; install precast box section, mortaring box to base. Cement mortar seal all "overbreak" openings in base and box that have been formed for duct entrance/exit.
- B. Set frame and cover to finished project grade, utilize cement mortar during setting operations.
- C. Perform backfilling/compacting operations when directed by the Engineer.
- D. Where a new hand box is to be connected to an existing duct bank, the Engineer will, unless shown on the Contract Plans, determine the exact duct to be connected to.

MEASUREMENT AND PAYMENT. Standard Precast Collector Hand Box will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all hand boxes installed complete and accepted by the Engineer. Compensation will be for installed hand box, cover, backfill, concrete base, ground rod and all labor, materials, equipment, tools and incidentals necessary to complete the work. All labor and materials required to divert a duct

**SPECIAL PROVISIONS
STANDARD PRECAST
COLLECTOR HAND BOX**

into the hand box, including rodding as necessary and installing pull rope, duct plugs, all bases, boxes, frames, covers, duct penetration as required, mortaring removal and disposal of material shall be considered incidental to the cost of the hand box. No additional compensation will be made if the duct is diverted each way into the hand box. No payment will be made until the hand box is inspected and accepted as complete.

**SPECIAL PROVISIONS
CONTROLLER AND CABINET
FOUNDATION BASE**

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**CATEGORY 800
TRAFFIC**

CONTROLLER AND CABINET FOUNDATION BASE

DESCRIPTION This work shall consist of furnishing and installing a City of Baltimore cabinet foundation. All equipment shall be compatible with existing equipment.

MATERIALS.

Base Mounted NEMA Controller Cabinet Foundation Base. Base mounted cabinets shall be mounted on concrete foundations conforming to Section 801 and as specified in the Contract Documents. Conduit shall be furnished and installed as specified in Section 805. Conduit shall be as per Sections 902.10, 921.07.01, 921.07.03, and 950.11. Anchor Bolts, and Hardware, shall be as per the contract documents, and as approved by the City of Baltimore.

MEASUREMENT AND PAYMENT

Base Mounted NEMA Controller Cabinet Foundation Base. Concrete foundations for cabinet foundation bases will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all concrete, excavation, corrugated metal pipe or forms, reinforcement steel, anchor bolts, backfill and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**SPECIAL PROVISIONS
FIBER OPTIC CABLE**

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**CATAGORY 800
TRAFFIC**

FIBER OPTIC CABLE

DESCRIPTION This work will consist of installing various size single mode fiber optic communications cables both aerial self-supporting and underground types. This will include installing cable underground and overhead.

The Contractor shall install a pull-string along with the cable inside the innerduct during installation. The pull-string shall be secured or tied off at both ends at each manhole or access point and serve as a pull cord for future installation.

MATERIALS The fiber optic cable shall be loose tube construction and consist of single mode or multi-mode fibers. The individual fibers shall possess the following features:

Type	Step Index
Core Diameter	8.3 μm (nominal)
Cladding Non-circulatory	125 $\mu\text{m} \pm 1.75 \mu\text{m}$
Core to Cladding Offset	$\leq 0.8 \mu\text{m}$
Coating Diameter	250 $\mu\text{m} \pm 15 \mu\text{m}$
Cladding Non-Circularity Defined as: [1-(min. cladding dia. / max. cladding dia.)] x 100	$\leq 1.0\%$
Proof/Tensile Test	3,500 kg/square mm min.
Attenuation @ 1310 nm (SM) @ 1,550 nm	$\leq 0.4 \text{ dB/km}$ $\leq 0.3 \text{ dB/km}$
Attenuation at the Water Peak	$\leq 2.1 \text{ dB/km @ } 1,383 + 3 \text{ nm}$
Chromatic Dispersion Zero Dispersion Wavelength Zero Dispersion Slope	1,301 to 1,321.5 nm $\leq 0.092 \text{ ps}/(\text{nm}^2*\text{km})$
Maximum Dispersion	3.3 ps/(nm*km) for 1,285–1,330 nm < 18 ps/nm*km) for 1,550 nm
Cut-Off Wavelength	< 1,260 nm
Mode Field Diameter (Peterman II)	9.3 $\pm 0.5 \mu\text{m}$ at 1,300 nm 10.5 $\pm 1.0 \mu\text{m}$ at 1,550 nm

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CONSTRUCTION

Because the cable will contain multiple buffer tubes each with multiple fibers; each fiber strand shall be distinguishable from others in the same tube by means of color coding. The colors shall be targeted in accordance with the Munsell color shades and shall meet TIA/EIA-598-A, Optical Fiber Cable Color Coding (ANSI/TIA/EIA-598-A-95).

The color formulation shall be compatible with the fiber coating and the buffer tube filling compound and be heat stable. It shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

Cables having 12, 48 and 96 count fibers shall be provided in aerial / self supporting or suitable for duct banks depending on the application and as directed by the Engineer.

Buffer Tubes. The loose buffer tubes shall provide clearance between the fibers and the inside of the tube to allow for thermal expansion without restraining the fiber. The fibers shall be loose or suspended within the tubes. The fibers shall not adhere to the inside of the buffer tube.

The loose buffer tubes shall be extruded from material having a coefficient of friction sufficiently low to allow the fiber free movement. Buffer tubes shall be made of tough abrasion resistant material to provide mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout entry without jeopardizing the internal fibers.

Buffer tube filling compound shall be homogenous hydrocarbon-based gel (with anti-oxidant additives) USRD to prevent water intrusion and migration. The filling compound shall be non-toxic and derma logically safe to exposed skin. It shall be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional non toxic solvents.

Buffer tubes shall be stranded around a central member by the reverse oscillation stranding process. Each buffer tube shall be distinguishable from other buffer tubes in the cable by means of color coding.

Central Member. The central member will function as an anti-buckling element and shall be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers. A linear overcoat of Low Density Polyethylene shall be applied to the central member of the main trunk fiber cable to achieve the optimum diameter to provide the proper spacing between buffer tubes during stranding.

Filler Rods. Fillers may be included in the cable to lend symmetry to the cable cross-section where needed. Filler rods shall be solid medium or high density polyethylene. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

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FIBER OPTIC CABLE**

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Stranding. Completed buffer tubes shall be stranded around the over-coated central member using stranding methods, lay lengths and positioning such that the cable shall meet mechanical, environmental and performance specifications. A polyester binding shall be applied over the stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

Core and Cable Flooding. The cable core interstices shall be filled with a polyolefin-based compound to prevent water ingress and migration. The flooding compound shall be homogenous, free from dirt and other foreign matter, non-hygroscopic, electrically non-conductive, non-nutritive to fungus and readily removable. The compound shall also be non-toxic, dermally safe and compatible with all other cable components. The compound shall be free from dirt and foreign matter and shall be readily removable with conventional non-toxic solvents. A water blocking tape can be substituted for a filling compound.

Tensile Strength Member. Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass which shall be helically stranded evenly around the cable core.

Outer Jacket. The outer jacket material shall be a Medium Density Polyethylene (MDPE) conforming to ASTM D1248, Type II, Class C, Category 4 or 5, Grade J4. The light absorption coefficient, when measured in accordance with ASTM D3349, shall be a minimum of 400 at a wavelength of 375 nm. The jacket shall be free from holes, splits, and blisters with a total minimum jacket thickness of $1 \text{ mm} \pm 0.1 \text{ mm}$ (40 ± 5 mils). Jacketing material shall be applied directly over the tensile strength members and flooding compound and shall not adhere to the armored strength material. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The outer jacket or sheath shall be marked with the manufacturer's name, the words "Fiber Optic Cable", date of manufacture, and sequential meter (or feet) markers. The markings shall be repeated approximately every meter. The actual length of the cable shall be within 0 ± 1 percent of the length marking. The marking shall be in a contrasting color to the cable jacket. The height of the marking shall be approximately 3 mm (1/8 in.).

The cable shall contain at least one ripcord under the inner sheath for easy sheath removal.

The finished cable shall be capable of withstanding a pulling tension of 2,700 N (12,015 lb-feet) minimum.

Cable Performance. The Contractor shall provide written certification from the manufacturer that the cable meets the following minimum quality control and performance criteria:

The fiber-optic cable shall withstand water penetration when tested with one (1) meter static head or equivalent continuous pressure applied at one end of a one (1) meter length of filled cable for one hour. No water shall leak through the open cable end. Testing shall be done in accordance

**SPECIAL PROVISIONS
FIBER OPTIC CABLE**

with EIA/TIA-455-82B, FOTP-82 - Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable (ANSI/EIA/TIA-455-82B-92).

The cable shall exhibit no flow (drip or leak) at 80 degrees C (176 degrees F). The weight of any compound that drips from the sample shall be less than 0.05 grams (0.002 ounce). Cable shall have been certified in accordance with EIA/TIA-455-81A, FOTP-81 - Compound Flow (Drip) Test for Filled Fiber Optic Cable (ANSI/EIA/TIA-455-81A-91), Method A.

Crush resistance of the finished fiber-optic cables shall be 220 N/cm (25,000 lb-feet/inch) applied uniformly over the length of the cable without showing evidence of cracking or splitting when tested in accordance with TIA/EIA-455-25B, FOTP-25 - Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies (ANSI/TIA/EIA-455-25B-96). The average increase in attenuation for the fibers shall be <0.10 dB at 1,550 nm (single-mode) for a cable subjected to this load. The cable shall not exhibit any measurable increase in attenuation after removal of load. Cable shall have been certified in accordance with TIA/EIA-455-41A, FOTP-41 - Compressive Loading Resistance of Fiber Optic Cables (ANSI/TIA/EIA-455-41A-93).

The cable shall withstand 25 cycles of mechanical flexing at a rate of 30 ± 1 cycles/minute. The average increase in attenuation for the fibers shall be <0.10 dB at 1,550 nm (single-mode) at the completion of the test. Outer cable jacket cracking or splitting observed under 10x magnification shall constitute failure. The test shall have been conducted in accordance with TIA/EIA-455-104A, FOTP-104 - Fiber Optic Cable Cyclic Flexing Test (ANSI/TIA/EIA-455-100A-89, R99).

The cable shall withstand a tensile load of 2,700 N (12,015 lb-feet) without exhibiting an average increase in attenuation of greater than 0.10 dB (single-mode). The test shall be conducted in accordance with TIA/EIA-455-33A, FOTP-33 - Fiber Optic Cable Tensile Loading and Bending Test (ANSI/EIA-455-33A-87).

All optical fibers shall be attenuation tested by the manufacturer. The attenuation of each fiber shall be provided with each cable reel.

All optical fibers shall be proof-tested by the fiber-optic cable manufacturer at a minimum load of 3,500 kg/square mm (2,500 tons/square inch). Documentation of factory results shall be provided to the Engineer prior to shipping.

Packaging & Shipping. The cable and reel shall be wrapped in water resistant covering. Each end of the cable shall be securely fastened to the reel to prevent the cable from coming loose during transport. Two meters of cable length on each end of the cable shall be accessible for testing. Both ends of the cable shall be sealed to prevent the ingress of moisture.

Each cable reel shall have a durable weatherproof label or tag showing the following:

- Manufacturer's name
- The cable type
- The actual length of cable on the reel
- The Contractor's name

**SPECIAL PROVISIONS
FIBER OPTIC CABLE**

- The contract number and
- The reel number.

A shipping record shall be included in an attached weatherproof envelope showing the above information and shall include the date of manufacture, cable characteristics (size, attenuation, bandwidth, etc...), cable information number and any other pertinent information.

The diameter of the reel shall be at least thirty times the diameter of the cable. The fiber-optic cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable.

Contractors Qualifications. At least 30 days prior to the installation of the fiber optic cables, the contractor will provide documentation to the Project Engineer indicating the qualifications and experience of the personnel to be involved in the installation and termination of fiber optic cable.

Fiber Optic Cable Testing & Documentation. The Contractor shall perform a complete bi-directional test of the fiber optic cable plant. The fiber optic cable plant shall consist of the fiber optic cables (new and existing), drop cable, and all splices and connectors. The Contractor shall perform fiber continuity and attenuation testing and fiber backscatter measurements after the complete optical link is installed, and with any other components of the fiber optic system in place.

The Contractor shall perform all Optical Time Domain Reflectometer (OTDR) testing in the presence of the Engineer or his designated representative. The Engineer shall attach his written mark to all test documentation made by the Contractor at the time of the test. Any testing performed by the Contractor and not witnessed by the Engineer shall not be accepted, and thus re-testing will be required.

An OTDR shall be used to measure the backscattered light profile of the designated optical links. The OTDR shall include all necessary hardware to couple it to either a connectorized or non-connectorized fiber. While performing backscatter measurements, the end of the fiber link that is not connected to the OTDR shall be capped to prevent the ingress of infrared radiation.

The OTDR used shall be provided with certification of its most recent calibration which shall be within 12 months from the date of the testing.

A launch cable, or launch box, shall be used to overcome the dead zone of the OTDR inserted between the OTDR and the optical link.

The OTDR testing shall be done at a scale of at least 1 dB per division on the vertical scale. It shall have a dynamic range of at least 30dB at 1310nm and distance measurement accuracy of $\pm 0.01\%$.

The Contractor shall record each optical link measured for attenuation by means of an electronic data file of the OTDR trace. The Contractor shall provide the electronic file and a hard copy printout of each trace as a project deliverable.

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Optical links shall be designated in the test results by indicating the label identifier for each fiber optic cable and the location at which light was launched. The OTDR traces shall be marked noting the physical location of each splice or connector.

The OTDR traces shall indicate the make/model of the OTDR equipment used, calibration date, and operational settings. The notations shall be clear and understandable. The OTDR operator shall hold a current operators certificate for the equipment used. This certificate shall represent not less than 16 hours of training from the equipment manufacture. This certificate shall be presented to the Engineer at the start of testing.

Attenuation and continuity tests shall be measured at the 1310nm and 1550nm wavelengths. OTDR testing shall be done at the following points during construction:

- At cable delivery (reel test);
- Following cable installation and prior to any terminations and splicing (post installation and pre-splice);
- End-to-End, following the installation of all splices, drop cables, connectors and terminations.

At the end-to-end stage, all fibers shall be tested end-to-end with an OTDR and with a power meter and light source. The end-to-end total attenuation shall not exceed the sum of the maximum allowable attenuation for the component cable segments, splices and typical loss for connectors. If the fibers in the cable exceed the allowable loss, the Contractor shall take corrective measures to bring the cable's total attenuation below the allowable limit, including replacement of the cable at the Contractor's expense.

Testing Criteria

- Reel Tests: The fiber must be tested with an OTDR at the 1310 nm and 1550nm wavelengths when the contractor first receives it on the reel. This testing is incidental to the fiber optic cable pay item
- Post Installation/Pre Splice Test: Each fiber in every fiber cable segment that is installed shall be tested with an OTDR at the 1310nm and 1550nm wavelengths before each section is spliced. This testing is incidental to the fiber optic cable pay item
- Post Splice/Connectorization Test: Once the fiber has been spliced and connectorized, every spliced and/or connectorized fiber (including the ones that are not connectorized on both ends) must be tested with an OTDR at 1310nm and 1550nm. The fiber runs that are connectorized on both ends shall also be tested with a power meter and light source at 1310nm and 1550nm. This splicing is incidental to the fiber splicing pay item.

**SPECIAL PROVISIONS
FIBER OPTIC CABLE**

Slack Cable. Sufficient slack cable will be installed in each handhole, manhole, vault or drip loop installed overhead in order to remove the cable to add a splice or inspect a splice. A minimum of 6 feet of coiled slack will be provide either overhead or underground in the closest junction box or structure outside of traffic signal control boxes and communication cabinets to allow for future re-connections due to cabinet knockdowns or damage due to long term exposure to heat. The contractor my also be directed to leave additional slack at locations indicated on the contract plans. Slack is paid at the contract unit price per linear foot for the type of cable being installed.

Identification Tags Fiber cable markers shall be a non-adhesive identification system for fiber optic cable. Produced from heavy duty, precoiled plastic, fiber cable markers can be uncoiled, then snapped into place. The text is protected by a thick layer of clear acrylic which provides UV protection and abrasion resistance. The legends on the cable markers can be customized to suit different applications, a sample will be provided for approval. Identification markers shall be installed in every junction box, hand hole, manhole, vault, splicing cabinet, or traffic signal cabinet.

Substitution. The Contractor is advised that the City reserves the right to modify the fiber optic cable specifications due to changes in technology and requirements of future network configuration and equipment types.

MEASUREMENT AND PAYMENT Furnishing and installing fiber optic cables (12 to 144 count) will be measured and paid per the contract unit price per linear foot and will include all material, labor, equipment testing, researching of existing cable routes, investigating alternate routes and ducts, and as-built documentation to install cable overhead or underground in accordance with the plans and specifications or by the direction of the Engineer. Aerial cable shall include a self supporting version of the fiber cable specified for use in conduit, steel messenger and all associated mounting hardware, over lash on existing communication cable and or installation on new or existing cable rings, for the type aerial cable selected for use depending on existing conditions and the easiest method of installation as directed by the Engineer. All cables and hardware will be submitted for the approval of the Engineer.

**SPECIAL PROVISIONS
6-COUNT SINGLE MODE TACTICAL
FIBER OPTIC CABLE**

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**CATAGORY 800
TRAFFIC**

6-COUNT SINGLE MODE TACTICAL FIBER OPTIC CABLE

DESCRIPTION. This work is for furnishing and installing tactical fiber optic drop cables from the distribution trunk lines to the traffic signal, variable message signs or video camera control cabinets. Specifications and requirements referenced for "Various Count Single Mode Fiber optic Cable" apply and will be followed where applicable. This cable is also intended for use in existing traffic signal conduits where the typical bending radius is not designed for normal fiber cables and shall not be used for long distances that would affect cable performance

MATERIAL. Tactical Fiber Optic Cable will have the following minimum characteristics:

1. Polyurethane jacket,
2. Small Diameter and bend radius,
3. Flexible cable,
4. 900 um TBII Buffered Fibers, and
5. All Dielectric cable.

Specifications:

MLF-PRF-85045F and MIL-PRF-85045F/8A

Temperatures:

Storage	-71 deg. To 185 deg F
Installation	-51 deg. To 160 deg.F
Operation	-51 deg. To 160 deg.F

Fiber count	(6)	
Nominal OD	0.30 inches	
Nominal weight lb./1000	27	
Maximum Tensile loads lb./ft.	393 short term	79 long term
Minimum Bending Radius (in.)	2.8 loaded	1.4 installed

CONSTRUCTION. Tactical Fiber Optic Drop Cables are to be installed between fiber distribution lines and the traffic control, video or Variable Message Sign control cabinets. Sufficient slack cable will be installed in each handhole, manhole, vault or drip loop if installed overhead in order to facilitate the removal of the cable to add a splice or inspect a splice. A minimum of 6 feet of coiled slack will be provide either overhead or underground in the closest junction box or structure outside of traffic signal control boxes and communication cabinets to allow for future re-connections due to cabinet knockdowns or damage due to long term exposure to heat. The contractor my also be directed to leave additional slack at locations indicated on the contract plans. Slack is paid at the contract unit price per linear foot for the type of cable being installed.

**SPECIAL PROVISIONS
6-COUNT SINGLE MODE TACTICAL
FIBER OPTIC CABLE**

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MEASUREMENT & PAYMENT. Furnishing and installing fiber optic and tactical fiber optic drop cable will be measured and paid per the contract unit price per linear foot and will include all material, attachment hardware, labor, equipment testing and documentation to install cable overhead or underground in accordance with the plans and specifications or by the direction of the Engineer.

**SPECIAL PROVISIONS
CCTV POLE MOUNTED ENCLOSURE**

**CATEGORY 800
TRAFFIC**

CCTV POLE MOUNTED ENCLOSURE

DESCRIPTION. This work will consist of furnishing and installing aluminum equipment enclosures with modem, for CCTV camera systems and other Intelligent Traffic System uses.

MATERIAL. The CCTV equipment enclosure shall meet the following specifications.

General

This specification describes an aluminum enclosure to be used for electronic surveillance camera and traffic control equipment. The enclosure shall provide protection from rain, sleet, snow, dripping water and corrosion.

Scope

All enclosures to be supplied under this specification are to be double door, suitable for pole or pedestal mount. Internal reinforcement bars shall be welded to one side for pole mounting. Hinges for both doors shall be mounted on the reinforced side of the enclosure. The enclosures shall have integrated rack mount rails, front and rear, to provide support for standard EIA 19" rack mounted equipment. Bolt-in or "C" mount rack rail assemblies are not acceptable.

Documents and References

An example enclosure is available for inspection.

Contact: Mr. Paul Manik

Phone: (410) 396-9065

Address: 1620 Rappolla Street, Baltimore, MD 21224

Hours: 8AM to 4PM weekdays by appointment only

Technical Requirements

Environmental: Each enclosure must be supplied with the proper sealing materials to maintain a watertight integrity under extreme weather conditions.

Nominal Dimensions: Top cover 22" x 20"

Nominal size: 22" depth, 20" width, 36" height

Door opening: 19 ½" x 35"

External door size: 20 ½" x 36 ½"

Enclosure shall to be fabricated of tempered aluminum type 5052-H32 with a thickness of 0.125".

**SPECIAL PROVISIONS
CCTV POLE MOUNTED ENCLOSURE**

Reinforcement: Two (2) 19 ½” x 3” x ½” x 1/4” thick “U-channel” aluminum bars are required to be welded across inside, side wall of the enclosure, hinge side, 3” on center from top, 4” on center from bottom. Corner braces shall be welded inside door openings, behind rack rails (to prevent enclosure shell from racking), all four corners front and rear. Brace material shall be triangle 2”x 2” x 2” by 1/4” thick aluminum.

The integrated rack rails shall extend 3/4” from the enclosure side walls, be 2 ½” inside the front door and rear door opening, and extend from top to bottom of the enclosure. Rails shall be drilled and tapped for 10-32 machine screws. Tapped holes shall begin 4” from top and extend down 26”. Spacing of tapped holes shall be standard EIA. The rails shall also extend across the top, front and rear. No holes required along top rail.

The enclosure shall have a weather guard welded and sealed to the top of the enclosure front and rear. The guard shall be the entire width of the enclosure to prevent driving rain and debris from coming in contact with the door gasket along the top. The guard shall extend out to cover the entire top edge of the door, but not project farther than the door face.

The enclosure shall be provided with one adjustable shelf, for mounting to the integrated rack rail. The shelf shall be 14” deep front to rear. The shelf shall be fastened utilizing both front and rear rails.

The enclosure shall be provided with one adjustable, slide out shelf/document storage tray assembly. The upper (fixed) portion of the tray shall be designed to support 15 pounds. The tray, both fixed portion and slide out portion, shall be 14” in length front to rear. The slide out portion shall be capable of extending the entire length of the tray. The tray shall be 1” deep and include a hinged top cover. The top cover will extend to form a handle for pull out. The assembly shall be fastened to front and rear rails and utilize two fasteners each at all four rails.

Two removable 12” H x 17” D x 1/8” thick aluminum mounting plates shall be fabricated and mounted across the rack rails in the lower portion of the enclosure 4” from the bottom. The plates shall be mounted with four 10-32 stainless steel machine screws, two front rails, and two rear rails for each plate.

Each enclosure is to be provided with two (2) aluminum pole-mounting brackets complete with stainless steel mounting hardware as per sample. Brackets to be packaged separately.

Holes for fastening mounting brackets to the outside sidewall, hinge side, shall be provided. Holes will be 3” on center from top, 4” on center from bottom.

**SPECIAL PROVISIONS
CCTV POLE MOUNTED ENCLOSURE**

Doors: The door shall be provided with a full length stainless steel continuous hinge with full length stainless steel hinge pin.

1. The hinges shall be secured to the door and enclosure with 1/4" stainless steel carriage bolts and nylok nuts.
2. The doors shall come equipped with a three point latch mechanism.
3. Door handles shall be removable 3/8" hex handle.
4. Door locks shall be a square bolt traffic signal cabinet lock with a #2 key, interchangeable with existing City traffic signal cabinets.
5. Front door (rack rail side) shall contain louvered air vent in lower area of door, with a filter pocket on inside of door. Provide permanent, washable, 15" x 8" x 1" filter.
6. Rear door will have no vent.
7. All door gasket material shall be closed cell neoprene.
8. The door must be provided with a two position restraint. Position one shall be at 90 degrees, position two shall be at full open.
9. No Police entry panel allowed by this specification.

Ventilation: Enclosure shall have provisions for mounting forced air, 110 Vac thermostatically controlled fan system. The enclosure shall have louvered vents in the upper area of the side wall, handle side, for exhaust air. The ventilation system shall include a removable fan mounting plate/plenum. The plate/plenum shall be mounted diagonally from top to side and enclose the louvered vents. Threaded mounting holes shall be provided in the plate/plenum for fan system components. The mounting holes shall be located 4" off center to the rear. A cover plate shall be supplied and fastened to the fan mount opening to prevent dirt and moisture penetration. The fan will be a standard four inch "muffin" type. The thermostat shall be adjustable, "fan on" 80 degrees F to 150 degrees F. The fan shall come equipped with a suitable blade guard. Fan system components shall be provided but packaged separately.

Lock: Each enclosure must be supplied with Corbin #2 deadbolt type lock with two (2) keys.

1. Each lock must be installed so as not to interfere with the door latch or other hardware.
2. An emergency access hole must be provided as per example enclosure. The access hole shall be riveted closed with an aluminum rivet.
3. The door latch shall be tamper resistant heavy duty steel with a three point latching system, with removable hex key handle, as per sample.

**SPECIAL PROVISIONS
CCTV POLE MOUNTED ENCLOSURE**

4. Two (2) matching stainless steel 3/8" hex keys are to be provided with each enclosure.
5. A Neoprene washer or "O" ring must be installed around door latch and door lock to maintain watertight integrity.
6. Aluminum cover must be provided for hex key door handle access. The cover must be attached using a stainless steel carriage bolt. The cover must swing easily and not bind against the door.
7. All door latch and lock hardware shall be fastened to the door using stainless steel carriage bolts and stainless steel nylok nuts.
8. Appropriate stainless steel washers are to be provided.

Exterior Finish: Aluminum.

Power Panel: The cabinet will be provided with a power panel that includes:

1. Surge arrestor, compatible as a direct replacement with the City's existing CCTV cabinet surge arrestors and meeting the following criteria:
 - Peak Current 20,000 amps
 - Life Test 5 percent change
 - Clamp Voltage (L-N) 280V @ 20 KA
 - Response Time Voltage never exceeds 28 volts during surge
 - Continuous Service Current 10 amps maximum 120 VAC 60 Hz
2. Line filter rated at 30 amps/120 volts;
3. 20 AMP GFI convenience outlet;
4. 6 position power strip;
5. 1-15 amp circuit breaker for power strip;
6. 1-20 amp circuit breaker for convenience outlet.

Communication Termination Panel (Fiber & Copper):

The Communications panel shall include:

1. Din Rail Mounted terminal blocks (24) suitable for termination of 19-22 AWG solid wire, terminal blocks shall meet the following specifications:
 - Available in various type & sizes accommodating up to AWG 4
 - Screws designed to prevent loosening

**SPECIAL PROVISIONS
CCTV POLE MOUNTED ENCLOSURE**

- Metal parts made of high-grade corrosion proof copper alloys
 - Insulating housing made from Polymide 6.6 and certified for the inflammability class VO in accordance with UL 94
2. Socket mounted PC surge arrestor compatible as a direct replacement for the City's existing communication panel surge arrestors and meeting the following criteria:
- PC board module shall be double sided and gold plated and designed to mate with a standard PCB1B gold plated female terminal connector.
 - Operating Temperature -40deg.C to +85 deg. C
 - Resettable Fusing
 - Three-Stage Protection
 - Dimensions H x W x L 2.0 in x 1.0 in. x 2.4 in.
 - Weight 2 oz.
 - Peak Surge Current @ 8x20 us - 10KA
 - Life expectancy @ 8x20 us 100 occurrences
 - UL497B Listed

3. Splice Tray/NID

Suitable for 6-count and 12 count single mode fiber.

Rack mounted supporting both patching and splicing in one unit.

Swing out master panel for easy access.

Suitable splice trays matched to the cables entering and leaving the enclosure

Dimensions 1.87" H x 17.0 " W x 9.75"D

Material 16 Gauge Steel

Finish Electro statically applied powder coat (Black)

Modems. The cabinet will be configured for fiber optic or twisted pair copper communication cable.

Cabinet drawings: A minimum of two final detailed shop drawings (D size) per order shall be provided and become the property of the City of Baltimore.

Guarantee/Warranty: All material and workmanship furnished under this specification shall be guaranteed for a period of five (5) years from the date of delivery.

Sample Requirements: A detailed shop drawing must be submitted for approval by the Design Builder's Engineer, prior to releasing any cabinets for production.

**SPECIAL PROVISIONS
CCTV POLE MOUNTED ENCLOSURE**

MEASUREMENT & PAYMENT CCTV Pole Mounted Enclosure will be measured and paid for at the Contract unit price per each and include detailed shop drawings for approval, all material, labor, tools and equipment to install a complete cabinet ready for operation including power panel, communication panel, fiber splice tray, wire & cable, fittings, modem, mini-chassis, power supply, AC adapters, open-slot single blank panel, mounting stand to position modem chassis vertically for cooling air flow, patch cords, grounding and bonding..

**SPECIAL PROVISIONS
CCTV ENCODER & DECODER**

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 800
TRAFFIC**

CCTV ENCODER & DECODER

DESCRIPTION. This work will consist of furnishing and installing MPEG-4 encoders and decoders for CCTV camera systems and other Intelligent Traffic System uses. Field encoders shall be provided suitable for mounting in a standard 19 inch EIA racks and decoders shall be manufactured by the same manufacturer as the encoder but provided in a 12VDC rack mount card to be installed at the TMC..

MATERIAL. The **CCTV Encoder and decoders** shall meet the following specifications and be interoperable with Coretec Model VCX-4400E & VCX-4400D-R.

Inputs and Outputs

Video: 1 NTSC (EIA 170)
1 Volt pk-pk 75 Ohm 60 HZ
Data: 2 RS-2323 /422 (Selectable)

Video Parameters

Compression MPEG-4
Resolution (Scalable) 176h X 120v V720 H X 480v
Frame Rate 1 fps-30 fps (programmable)
Connectors BNC

Data Parameters

Format RS0232 or RS-422
Handshaking Software Selectable
Data Rate up to 115kbps
Connectors RJ-45 (2)

Programming Port

Format RS-232
Handshaking RJ-11

Indicators Parameters

2- line scrolling display

Network Parameters

Data Rate 30 kbps to 6 Mbps
Ethernet RJ-45
Interface 10 /100 Base-T, IEEE 802.3 static
Protocols UDP,IP (v4), IGMP (v2) Multicast

**SPECIAL PROVISIONS
CCTV ENCODER & DECODER**

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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Environmental

Must Meet NEMA standard No. TS-2-2003, section 2
Temperature -55 to + 85 degree C
Humidity 0-95% non- condensing conformal coating is required.

Mechanical

Field Unit Dimensions 19"W X 1.75" H X 12" D (1 RU High)
Weight @ 5 lbs.

Power

Voltage 95-130 VAC. (IEC Detachable Cord)
Current Draw 58 mA @ 120 V

Regulatory Approvals

North America FCC Title 47, Subpart B
Section 15, Class A

MEASUREMENT & PAYMENT CCTV MPEG-4 Encoder and Decoder paid will be measured and paid for at the Contract unit price per each and include all material, labor, tools and equipment to install a complete and operating encoder with all connectors, harnesses, interface, hardware and software. Due to changing technology and the possibility of mismatched equipment the City reserves the right to request a substitution of any encoder or decoder for another model or manufacturer. The City will pay the difference in the price of the unit (if any) plus 5% of the newly established unit price

**SPECIAL PROVISIONS
HIGH DEFINITION CCTV CAMERA**

**CATEGORY 800
TRAFFIC**

HIGH DEFINITION CCTV CAMERA

DESCRIPTION. This work shall consist of furnishing and installing high definition CCTV cameras (HDCCTV) and integrated positioning system, fiber optic modems, and field camera equipment at the locations specified on the design plans. The cameras and equipment shall be installed on existing and proposed traffic signal or lighting structures. Video data shall be transmitted over existing and proposed fiber optic cables. Bidders shall provide documentation that the proposed equipment provides the required features and functions as detailed in this specification.

MATERIALS

General Requirements

All materials furnished, assembled, fabricated or installed under this item shall be new, corrosion resistant, and in strict accordance with the details shown on the plans and in the specifications. The Contractor shall submit catalog cuts and/or shop drawings to the City of Baltimore for review and acceptance prior to the Contractor ordering equipment. The appropriate item number shall be labeled on each of the catalog cuts or shop drawings and conformance with the specifications shall be indicated by highlighting the salient features on the cut sheet or shop drawings that demonstrate conformity. Approval by the Engineer shall not relieve the Contractor from his responsibility with regard to fulfillment of the Contract.

Functional Requirements

The Contractor shall furnish and install in the field the appropriate HDCCTV camera equipment necessary to control the camera and communications equipment, to transmit the video to the Traffic Management Center (TMC) located at **414 North Calvert Street** via the existing or new fiber optic cable. The Contractor shall demonstrate control, adequate signal and video quality at the CCTV cabinet and at the TMC to the satisfaction of the Engineer. The quality of the signals at the TMC, if carried on existing cables is not the responsibility of the Contractor

The HDCCTV field equipment shall include but not be limited to the following items:

- a. Solid state color, HDTV resolution camera with 720p @30 FPS
- b. Integrated motorized 18X optical zoom
- c. Local Control Unit that includes NTCIP support if available.
- d. Integrated pan/tilt/zoom unit (positioning unit)
- e. Power supply
- f. Remote splitter with connectors
- g. Composite Cable
- h. Fiber modem as indicated in the work order
- i. 18 inch wall or pole mounting arm

**SPECIAL PROVISIONS
HIGH DEFINITION CCTV CAMERA**

All HDCCTV field equipment shall meet or exceed system operation temperature range and shall conform to NEMA TS2 paragraph 2.1.5.1.

Product Specifications. The HDCCTV system shall meet or exceed the following design and performance specifications.

1. Camera Module

- a. **Image Sensor:**Ex-View ICX445AKA Progressive Scan.
- b. **Sensor Size:** 6mm Diagonal. 1/3”.
- c. **Sensor Total Pixels:** 1296(H) X 966(V)
- d. **Sensor Effective Resolution** 1280(H) X 720(V)
- e. **Day/Night Control** Type: Removable IR cut filter, selectable auto, Color & Mono Modes
- f. **Sensitivity (F1.6 @ 50% Video)** 1.7 lux @ 1/60 shutter, color .0 lux mono
- g. **Focus Operation** Selectable Auto / Manual modes
- h. **Iris Operation** Selectable Auto / Manual modes
- i. **Shutter Operation** Selectable Auto / Manual modes
- j. **White Balance Operation** Selectable Auto / Manual modes
- k. **WDR Operation** Selectable On /Off Modes.
- l. **Optical Zoom Range** 18X, 4.7mm to 84.6mm
- m. **Lens Aperture** f/1.6 (wide) to f/34 (tele)
- n. **Optical Zoom Speed** two Speeds, from @ 7.0 sec. to 14.0 sec full range
- o. **Horizontal Angle Field or View** 54 deg. To 3.25 deg.
- p. **Minimum Focus Distance** 0.01 m (w); 1.0m (t)

2. Positioning Drive

- a. **Pan/Tilt Drive** Pan Range: 360 deg. continuous rotation, Tilt Range -90 deg. to +90 deg, Accuracy: +/- 0.2 deg, Repeatability: +/- 0.2 deg.
- b. **Pan Speed** Max 120 deg / sec., Preset: 180 deg (start to stop) <2 sec., Manual: 0.1 deg. to 40 deg./sec
- c. **Tilt Speed** Max: 120 deg./ sec, Preset: 180 deg. (start to stop) <2 sec., Manual: 0.1 deg. to 40 deg./sec.

3. Operational

- a. **Absolute Positioning** Set Position: 0.2 deg.precision, Get Position: 0.2 deg Precision.
- b. **Presets** 64 preset positions (each preset includes pan and tilt and 24 character ID label)
- c. **Video Tour** 8 tours. Each consisting of 32 presets with dwell time per preset per tour.
- d. **Sector Zones** Up to 16 Programmable zones in the horizontal plane.
- e. **Compass Direction:** 8 or 16 direction points (i.e.: north, NE, east, SE) Function can be on/off., 3 sec. time out or on permanent.
- f. **Absolute Position** Displayed in 0-359 deg. AZ and +90 deg to -90 deg. EL Function can be on/off., 3 sec. time out or on permanent.

**SPECIAL PROVISIONS
HIGH DEFINITION CCTV CAMERA**

- g. **Title Generation:** Camera ID: 2 lines of 24 characters, Preset ID: 1 line of 24 characters Sector Zone: 1 line or 24 characters per zone Compass/Position: 1 line, includes compass direction and absolute position Minimum of 64, with each preset consisting of a pan, tilt, zoom, and focus coordinate.
4. **I/O Signals**
- Video Compression** H.264 (Main profile/Level 3.1), Motion JPEG
 - Video Streams:** Video Stream 1: H.264, Video Stream 2: H.264 or MJPEG
 - Configurable Properties:** Image resolution: 720p, D1, VGA, CIF settings. Streaming Mode: CBR or VBR settings. Image Settings: GOP (M,N) and quality settings. Frame Rate: 30, 15, 7, 4, 2, 1 FPS settings. Data Rate: Adjustable from 64K to 12MB/sec.
 - Connection Types:** Uni-cast, multi-unicast or multicast.
 - Video Latency:** <250ms.
5. **Power Input**
- The HDCCTV system shall fully comply with and include independent laboratory test results confirming compliance with the following electrical operating conditions.
- Power:** <159Watts Maximum. (with PT heater)
 - Operating Voltage:** Per NEMA-TS2 paragraph 2.1.2 and 2.1.3, 89 to 135Vac +/- 3hz.
 - Power Interruption:** Per NEMA-TS2 paragraph 2.1.4.
 - Transients:** Per NEMA-TS2 paragraph 2.1.6.
6. **Mechanical**
- Connectors:** 18 Pin MS style, weatherproof non-corrosion type or equal.
 - Weight:** Maximum 20lbs.
 - Dimensions:** Housing shall be @ 13.5." outer diameter x 11.4" High and 6" Wide.
 - Construction:** Powder Coated aluminum; all internal and external parts corrosion protected, stainless steel fasteners.
7. **Environmental**
- The HDCCTV system shall fully comply with and include independent laboratory test results confirming compliance with the following environmental operating conditions.
- Temperature:** Per NEMA-TS2 paragraph 2.1.5, -34C to 74C tested across low and high voltage ranges per Nema-TS2 paragraph 2.1.2 and 2.1.3.
 - Vibration:** Per NEMA-TS2 paragraph 2.1.9, 2.2.3, 5-30Hz sweep @ 0.5g applied in each of 3 mutually perpendicular planes.
 - Shock:** Per NEMA-TS2 paragraph 2.1.10, 2.2.4, 10g applied in each of 3 mutually perpendicular planes.
 - Water Spray:** Per IEC 60529+A1, 1999, Para 14.2.6, Solid water stream delivered thru 12.5mm nozzle @ 25 gallons/minute @ 9ft for 3 minutes.
 - External Icing:** Per NEMA-TS2 250-2003, paragraph 5.6.
 - Corrosion Protection:** Per NEMA 250-2003, paragraph 5.10.
 - Humidity:** 0-100% N.C per MIL-E-5400T, paragraph 3.2.24.4.
 - Standards:** IP66, IP67, ASTM-B117 Marine.

**SPECIAL PROVISIONS
HIGH DEFINITION CCTV CAMERA**

8. **Certifications**
 - a. **Safety:** CE.
 - b. **Emissions:** FCC Class A.
9. **Composite Cable** (if necessary)

The composite cable shall be as per camera manufacture recommendations. The outside cable installation shall be UV resistant. Only one connector between the camera cable and composite cable shall be allowed.
10. **Camera Controller:** Integrated Web Browser
11. **Network Protocols:** IPv4, HTTP, DNS, NTP, RTSP, RTP, TCP, UDP, IGMPv2, RTCP, ICMP, DHCP, ARP

CONSTRUCTION. The camera, zoom lens, camera housing, integrated pan/tilt/zoom unit, and composite cable shall be assembled and tested in accordance with the Special Provisions prior to delivery to the job site. These assemblies shall be delivered to the job site as completed units, and installed on the signal or lighting structures as shown on the plans. The combined weight of the camera, lens, housing, and PTZ shall not exceed 30 pounds.

Mounting arms: The camera will be provided with either an 18 inch pole mounted or wall mounted arm and attachment hardware unless otherwise specified in the work order

MEASUREMENT AND PAYMENT. HDCCTV Camera shall be measured and paid for at the Contract unit price per each. The payment will be full compensation for all HDCCTV cameras, mounting hardware, connectors, adapters, 18 inch mounting arm, Ethernet hub, set-up and testing, miscellaneous materials, labor, installation, suppression devices, equipment, tools, wiring, configuration, software, training, documentation, transportation and incidentals necessary to complete the work.

**SPECIAL PROVISIONS
FIBER CONNECTORS**

DRAFT - NOT FOR CONSTRUCTION
F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATAGORY 800
TRAFFIC**

FIBER CONNECTORS

DESCRIPTION. This work includes installation of type SC or similar ST connectors in order to terminate 6 count tactical fiber optic cable, 144, 48 and 12 count fiber optic cables in order to connect to devices and or patch panels for further distribution in splice cabinets CCTV cabinets or where directed by the Engineer in accordance with this special provision and the cable and connector manufacturers recommendations.

MATERIAL

- The No Polish Connector (NPC) 250 μm and 900 μm connections utilizing a one piece, pre-assembled design.
- The SC compatible connector consists of a factory-polished ceramic ferrule, fiber stub and a mechanical splice that is installed with a simple field tool.
- A bell-shaped boot shall be attached to the connector body, minimizing the chance of losing or forgetting to install the boot during the connection.
- The Connector shall be tested for Premises and FTTP applications for indoor and outdoor locations and is available in SM, 62.5 μm , 50 μm and also 50 μm
- The No Polish Connector is RoHS Compliant.
- Meets EIA/TIA 568-8.3 and IEC requirements.
- Alternate SC or ST connectors may be utilized if submitted and approved by the Design Builder's Engineer.

Insertion loss typical @ 1300nm	0.3
Reflection typical (dB)	<-40
Connector durability	<0.2 change after 100 matings
Operating temperature	-40°C to 75°C or
Cable tension (in service) Straight pull	< 0.5 dB increase at 6.9N (1.54 lb.) for 900 μm^*
Side pull	< 0.1 dB increase; 2.2N (0.5 lb.) for 900 μm^*

Material

Connector Ferrule	Zirconia ceramic
Connector housing and body	Engineered resin
Boot	Thermoplastic elastomer
Flame retardancy	UL-94 V-0

Connector identification

Backbone	Black
Housing	Blue
Boot	White

**SPECIAL PROVISIONS
FIBER CONNECTORS**

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F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

MEASUREMENT AND PAYMENT. Fiber connectors will be measured and paid at the contract unit price of each, for every connector type Sc or ST installed made and tested in accordance with these specifications. This price shall be full compensation for installation and testing, and for all materials, labor, tools, equipment, documentation, and incidentals to complete the work.

**CATAGORY 800
TRAFFIC**

FIBER SPLICES

DESCRIPTION. This work includes fusion splicing for fiber optic strands and cables in accordance with this special provision and the cable manufacturers recommendations.

MATERIAL

General Requirements

All optical fibers shall be spliced or terminated by the Contractor as shown in the splicing diagrams on the design plans. Splices shall be allowed only in locations as shown on the design plans or as directed by the Engineer.

The Contractor shall splice and test all the required fiber optic cable. All splicing kits, moisture/water sealants, terminators, and accessories to complete the fiber optic network shall be provided as incidentals. All equipment for splicing and testing shall be provided by the Contractor.

When a splice is made in a manhole, hand hole, or overhead in an aerial splice case, sufficient slack shall be provide so that the splice can be removed to a splice trailer or similar enclosure out of the elements for repair or maintenance.

Nineteen inch (19") splice racks and trays are to be provided for splices in pole or base mounted splice and equipment cabinets and are incidental to the fiber splicing pay item.

Splicing Requirements. All splices shall use the fusion technique. Fusion splicing equipment shall be provided by the Contractor and shall be cleaned, calibrated, and specifically adjusted to the fiber and environmental conditions at the start of each shift. Fusion splicing equipment used shall be approved by the Design Builder's Engineer. Splice enclosures, organizers and incidentals, and cable end preparation tools and procedures shall be approved by the Design Builder's Engineer. The Contractor shall provide specifications for the fusion splicing machine, calibration certificates, and test procedures for review. All splices shall be tested to the satisfaction of the Design Builder's Engineer.

Each spliced fiber shall be packaged in a protective sleeving or housing. Bare fiber shall be completely re-coated with a protective 8 RTV, gel or similar substance, prior to application of the sleeve or housing, so as to protect the fiber from scoring, dirt or micro-bending.

All fibers shall be terminated or spliced inside fiber optic splice enclosures. The enclosure shall be a fully enclosed unit capable of supporting 3 to 6 cables.

**SPECIAL PROVISIONS
FIBER SPLICES**

Splice loss shall not exceed 0.1 dB. for new SMF to new SMF splices, for splices to existing older single or multi-mode fibers the current acceptable standards for arc fusion shall be sufficient but in no case exceed 0.2 dB. All splice losses shall be recorded in tabular form and submitted to the Design Builder's Engineer for approval.

Splices that are made between two cables shall be tested using an Optical Time Domain Reflectometer (OTDR). Bi-directional testing is required. Splices shall be tested at 1310 nm and 1550 nm and printouts of the splice tests shall be provided.

These tests shall be taken in both directions and the average recorded.

Any splice not meeting the Design Builder's Engineer's requirements shall be remade at no cost to the City.

MEASUREMENT AND PAYMENT. Fiber splicing will be measured and paid at the contract unit price of each, for every splice made and tested in accordance with these specifications. This price shall be full compensation for splicing and testing, and for all materials, labor, tools, equipment, documentation, and incidentals to complete the work.

SPECIAL PROVISIONS**800 - HARDENED ETHERNET SWITCH****CATEGORY 800****TRAFFIC****SECTION 800****HARDENED ETHERNET SWITCH**

DESCRIPTION: This work shall consist of furnishing and installing a managed field hardened Ethernet switch in CCTV, traffic signal, or variable message sign controller cabinets. The hardened Ethernet switch shall be interoperable with a Ruggedcom model RS900 industrial managed Ethernet switch. The switch must provide highly reliable, Electronic Industries Association (EIA) Compatible Ethernet data communications via single-mode fiber optic transmission medium and Category 5 or better copper transmission medium.

MATERIAL: Hardened Ethernet switch as approved by the Engineer shall meet the following specifications at a minimum:

General Requirements

- All materials furnished, assembled, fabricated or installed under this specification shall be a new product from the Manufacturer or Reseller, and a Commercial Off-The-Shelf (COTS) product.
- No reconditioned equipment or parts shall be used.
- All equipment and appurtenances shall be identified with name, model number, serial number, technical support and warranty phone numbers, and any other pertinent information required to facilitate equipment maintenance.
- Every conductive contact surface or pin shall be gold plated or made of non-corrosive, non-rusting metal

Optical Ports

The following optical requirements shall be met for all fiber optic link ports

- All optics shall operate at single-mode, 1310 nm or 1550 nm. Each optical port is part of a pair of fibers, one fiber for Transmit, one fiber for Receive.
- Ports shall be type SC connector
- The unit shall have at least two (2) optical 100FX ports (100Mbps)
- Optics shall have the ability to transmit and receive Ethernet data at a minimum distance of 20km

Copper Ports

The following Category 5 requirements shall be met for all 10/100Base TX ports.

- All CAT 5 UTP/STP ports shall be EIA/TIA 568-A Compliant
- All ports shall be type RJ45
- All copper ports shall auto-negotiate for speed (10/100) and duplexity (Auto-MDI/MDIX for Full or Half operation)
- The unit shall have at least six (6) 10/100Base TX ports (100Mbps)

SPECIAL PROVISIONS
800 - HARDENED ETHERNET SWITCH

Switch Properties

- Switching method: Non-blocking Store & Forward
- Switching latency: 8 us (100Mbps)
- Switching bandwidth: 1.8Gbps
- MAC address table size: 4096
- Priority Queues: 4
- Frame buffer memory: 1 Mbit
- Simultaneous VLANs: 255
- VLAN ID Range: 1 to 4094
- IGMP multicast groups: 256
- Port rate limiting: 128kbps, 256, 512, 4, 8Mbps
- Packet forward filtering rate: 14,880 pps for 10Mbps, 148,800 pps for 100 Mbps

Network Management

- HTTP graphical web-based
- SNMP v1, v2c, v3
- Telnet, VT100
- Command Line Interface (CLI)
- TFTP or FTP file transfer access

Security

- Packet filtering and port security: Port enable/disable with source/destination MAC filtering.
- Port mirroring

Indicator LEDs

The unit shall contain the following diagnostic LED's:

- LINK/ACTIVITY
- TX
- RX
- SPEED (for CAT 5 ports only)
- POWER

Power Supply

- The switch shall include an integrated power supply
- Power Consumption: 20W Max
- The following power supply options shall be supported:
 - 24VDC: 9-36 VDC, 0.4A
 - 48VDC: 36-72 VDC, 0.2A
 - HI Voltage AC/DC: 88-300VDC, 85-264VAC, 0.1A

Physical

SPECIAL PROVISIONS**800 - HARDENED ETHERNET SWITCH**

The switch shall be of compact design allowing it to be mounted in a space-constrained field equipment cabinet. Maximum dimensions shall be as follows:

- Height: 18.8cm / 7.4"
- Width: 6.6cm / 2.6"
- Depth: 12.7cm / 5.0"
- Weight: 1.22kg / 2.7lbs
- Ingress Protection: IP40 (1mm objects)
- Enclosure: 20 AWG galvanized steel enclosure
- Mounting: Shelf, DIN rail, or panel mounted

Environmental Compliance

- IEC 61000-6-2 Industrial (Generic standard immunity for industrial environment)
- NEMA TS 2 Traffic Control Equipment
- Operating temperature range: -40 degrees F (-40 degrees C) to +185 degrees F (+85 degrees C) without the use of fans

IEEE Compliance

- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX
- 802.3x-Flow Control
- 802.3ad-Link Aggregation
- 802.1D-MAC Bridges
- 802.1D-Spanning Tree Protocol
- 802.1p-Class of Service
- 802.1Q- port-based VLAN Tagging
- 802.1w-Rapid Spanning Tree Protocol
- 802.1x-Port Based Network Access Control
- 802.1Q-2005 (formerly 802.1s) MSTP

IETF RFC Compliance

- RFC768-UDP
- RFC783-TFTP
- RFC791-IP
- RFC792-ICMP
- RFC793-TCP
- RFC826-ARP
- RFC854-Telnet
- RFC894-IP over Ethernet
- RFC1112-IGMP v1
- RFC1519-CIDR
- RFC1541-DHCP (client)
- RFC2030-SNTP
- RFC2068-HTTP

SPECIAL PROVISIONS**800 - HARDENED ETHERNET SWITCH**

- RFC2236-IGMP v2
- RFC2284-EAP
- RFC2475-Differentiated Services
- RFC2865-RADIUS
- RFC3414-SNMPv3-USM
- RFC3415-SNMPv3-VACM

IETF SNMP MIBS

- RFC1493-BRIDGE-MIB
- RFC1907-SNMPv2-MIB
- RFC2012-TCP-MIB
- RFC2013-UDP-MIB
- RFC2578-SNMPv2-SMI
- RFC2579-SNMPv2-TC
- RFC2819-RMON-MIB
- RFC2863-IF-MIB
- draft-ietf-bridge-rstpmib-03-BRIDGE-MIB
- draft-ietf-bridge-bridgemib-

CONSTRUCTION & INSTALLATION: The switch shall be mountable inside the controller equipment cabinet in a location and method designated by the Design Builder's Engineer.

- The switch may be shelf, DIN rail, or panel (u-channel) mounted.
- All external screws, nuts and locking washers used to mount the switch shall be stainless steel; no self-tapping screws shall be used unless approved by the Design Builder's Engineer.
- All mounting parts shall be made of corrosion resistant material.
- The Contractor shall not use existing GFI outlets in the controller cabinets to plug in Ethernet Field Switch power cord
- The switch must be able to fit inside the controller cabinet in a secure location, accessible by field technicians, and maintaining all applicable bend radii for fiber optic cable.
- Patch cables with appropriate SC or ST connectors will be provided as needed to connect this device to the media adaptor and or local NID

DOCUMENTATION REQUIREMENTS: One copy of the manufacturer's operation manual shall be provided at each installation location. An additional 10 paper copies of the manufacturer's operation manual, plus an electronic copy (in either .doc or .pdf format) shall be delivered to the Engineer prior to the first field Ethernet switch installation.

TESTING: Documentation of all manufacturer's test results in order to meet the specifications contained herein shall be supplied prior to approval. In lieu of or in addition to the above, outside vendor/third party test results shall be accepted.

SPECIAL PROVISIONS

800 - HARDENED ETHERNET SWITCH

WARRANTY: All equipment, materials and other appurtenances shall be warranted by the Manufacturer for five years following the **acceptance of the system.**

MEASUREMENT AND PAYMENT: Hardened Ethernet switch will be paid at the Contract unit price per each and will include all material, labor, equipment, to place and make operable utilizing patch cables and connections provided as part of this specification.

Due to changing technology and the possibility of mismatched equipment the City reserves the right to request a substitution of any hardened Ethernet switch for another model or manufacturer. The City will pay the difference in the price of the unit (if any) plus 5% of the newly established unit price

**SPECIAL PROVISIONS
800 - HARDENED ETHERNET SERIAL
DEVICE SERVER**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 800
TRAFFIC**

**SECTION 800
HARDENED ETHERNET SERIAL DEVICE SERVER**

DESCRIPTION: This work shall consist of furnishing and installing a managed field hardened Ethernet serial device server in CCTV, traffic signal, or variable message sign controller cabinets. The hardened serial device server shall be interoperable with a Ruggedcom model RS910 industrial managed Ethernet serial device server. The server must provide highly reliable, Electronic Industries Association (EIA) Compatible Ethernet data communications via single-mode fiber optic transmission medium and Category 5 or better copper transmission medium, and EIA-232 compatible serial communications.

MATERIAL: Hardened Ethernet Serial Device Server as approved by the Design Builder's Engineer shall meet the following specifications at a minimum:

General Requirements

- All materials furnished, assembled, fabricated or installed under this specification shall be a new product from the Manufacturer or Reseller, and a Commercial Off-The-Shelf (COTS) product.
- No reconditioned equipment or parts shall be used.
- All equipment and appurtenances shall be identified with name, model number, serial number, technical support and warranty phone numbers, and any other pertinent information required to facilitate equipment maintenance.
- Every conductive contact surface or pin shall be gold plated or made of non-corrosive, non-rusting metal

Optical Ethernet Ports

The following optical requirements shall be met for all fiber optic link ports

- All optics shall operate at single-mode, 1310 nm or 1550 nm. Each optical port is part of a pair of fibers, one fiber for Transmit, one fiber for Receive.
- Ports shall be type SC connector
- The unit shall have at least two (3) optical 100FX ports (100Mbps)
- Optics shall have the ability to transmit and receive Ethernet data at a minimum distance of 20km

Copper Serial Ports

The following requirements shall be met for all serial communication ports.

- The unit shall have at least two (2) EIA-232 compliant serial ports that supports serial data transmission over an IP network
- All ports shall be type DB-9F

SPECIAL PROVISIONS
800 - HARDENED ETHERNET SERIAL
DEVICE SERVER

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- Baud rates up to 230kbps
- Raw socket serial encapsulation and TCP mode

Switch Properties

- Switching method: Non-blocking Store & Forward
- Switching latency: 8 us (100Mbps)
- Switching bandwidth: 1.8Gbps
- MAC address table size: 16kbytes
- Priority Queues: 4
- Frame buffer memory: 1 Mbit
- Simultaneous VLANs: 255
- VLAN ID Range: 1 to 4094
- IGMP multicast groups: 256
- Port rate limiting: 128kbps, 256, 512, 4, 8Mbps

Network Management

- HTTP graphical web-based
- SNMP v1, v2c, v3
- Telnet, VT100
- Command Line Interface (CLI)
- TFTP or FTP file transfer access

Security

- Packet filtering and port security: Port enable/disable with source/destination MAC filtering.
- Port mirroring

Indicator LEDs

The unit shall contain the following diagnostic LED's:

- LINK/ACTIVITY
- TX
- RX
- SPEED (for CAT 5 ports only)
- POWER

Power Supply

- The Ethernet device server shall include an integrated power supply
- Power Consumption: 20W Max
- The following power supply options shall be supported:
 - 24VDC: 9-36 VDC, 0.4A
 - 48VDC: 36-72 VDC, 0.2A
 - HI Voltage AC/DC: 88-300VDC, 85-264VAC, 0.1A

**SPECIAL PROVISIONS
800 - HARDENED ETHERNET SERIAL
DEVICE SERVER**

F.A.P. NO. PENDING
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Physical

The Ethernet device server shall be of compact design allowing it to be mounted in a space-constrained field equipment cabinet. Maximum dimensions shall be as follows:

- Height: 18.8cm / 7.4"
- Width: 6.6cm / 2.6"
- Depth: 12.7cm / 5.0"
- Weight: 1.22kg / 2.7lbs
- Ingress Protection: IP40 (1mm objects)
- Enclosure: 20 AWG galvanized steel enclosure
- Mounting: Shelf, DIN rail, or panel mounted

Environmental Compliance

- IEC 61000-6-2 Industrial (Generic standard immunity for industrial environment)
- NEMA TS 2 Traffic Control Equipment
- Operating temperature range: -40 degrees F (-40 degrees C) to +185 degrees F (+85 degrees C) without the use of fans

IEEE Compliance

- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX
- 802.3x-Flow Control
- 802.3ad-Link Aggregation
- 802.1D-MAC Bridges
- 802.1D-Spanning Tree Protocol
- 802.1p-Class of Service
- 802.1Q- port-based VLAN Tagging
- 802.1w-Rapid Spanning Tree Protocol
- 802.1x-Port Based Network Access Control
- 802.1Q-2005 (formerly 802.1s) MSTP

IETF RFC Compliance

- RFC768-UDP
- RFC783-TFTP
- RFC791-IP
- RFC792-ICMP
- RFC793-TCP
- RFC826-ARP
- RFC854-Telnet
- RFC894-IP over Ethernet
- RFC1112-IGMP v1
- RFC1519-CIDR

**SPECIAL PROVISIONS
800 - HARDENED ETHERNET SERIAL
DEVICE SERVER**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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- RFC1541-DHCP (client)
- RFC2030-SNTP
- RFC2068-HTTP
- RFC2236-IGMP v2
- RFC2284-EAP
- RFC2475-Differentiated Services
- RFC2865-RADIUS
- RFC3414-SNMPv3-USM
- RFC3415-SNMPv3-VACM

IETF SNMP MIBS

- RFC1493-BRIDGE-MIB
- RFC1907-SNMPv2-MIB
- RFC2012-TCP-MIB
- RFC2013-UDP-MIB
- RFC2578-SNMPv2-SMI
- RFC2579-SNMPv2-TC
- RFC2819-RMON-MIB
- RFC2863-IF-MIB
- draft-ietf-bridge-rstpmib-03-BRIDGE-MIB
- draft-ietf-bridge-bridgemib-

CONSTRUCTION & INSTALLATION: The Ethernet device server shall be mountable inside the controller equipment cabinet in a location and method designated by the Design Builder's Engineer.

- The Ethernet device server may be shelf, DIN rail, or panel (u-channel) mounted.
- All external screws, nuts and locking washers used to mount the Ethernet device server shall be stainless steel; no self-tapping screws shall be used unless approved by the Design Builder's Engineer.
- All mounting parts shall be made of corrosion resistant material.
- The Ethernet device server must be able to fit inside the controller cabinet in a secure location, accessible by field technicians, and maintaining all applicable bend radii for fiber optic cable.
- Patch cables with appropriate SC or ST connectors will be provided as needed to connect this device to the Ethernet Switch, local NID, LIU or media converter

DOCUMENTATION REQUIREMENTS: One copy of the manufacturer's operation manual shall be provided at each installation location. An additional 10 paper copies of the

**SPECIAL PROVISIONS
800 - HARDENED ETHERNET SERIAL
DEVICE SERVER**

F.A.P. NO. PENDING
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manufacturer's operation manual, plus an electronic copy (in either .doc or .pdf format) shall be delivered to the Engineer prior to the first field Ethernet device server installation.

TESTING: Documentation of all manufacturer's test results in order to meet the specifications contained herein shall be supplied prior to approval. In lieu of or in addition to the above, outside vendor/third party test results shall be accepted.

WARRANTY: All equipment, materials and other appurtenances shall be warranted by the Manufacturer for five years following the **acceptance of the system**.

MEASUREMENT AND PAYMENT: Hardened Ethernet device server will be paid at the Contract unit price per each and will include all material, labor, equipment, to place and make operable utilizing any existing patch cables and connections.

Integration into the City central system, programming, troubleshooting, adjustments, testing and patch cables not readily available in the cabinet at the time of installation are the responsibility of the City or its designated representative. Due to changing technology and the possibility of mismatched equipment the City reserves the right to request a substitution of any hardened Ethernet device server for another model or manufacturer. The City will pay the difference in the price of the unit (if any) plus 5% of the newly established unit price

CATEGORY 800
TRAFFIC

SECTION 800
ETHERNET MEDIA CONVERTER

DESCRIPTION: This work shall consist of furnishing and installing a hardened unmanaged Ethernet media converter in CCTV controller cabinets. The hardened media converter shall be interoperable with a Ruggedcom model RMC40 media converter. The media converter must provide highly reliable, Electronic Industries Association (EIA) Compatible Ethernet data conversion between single-mode fiber optic transmission medium and Category 5 or better copper transmission medium.

MATERIAL: Hardened Ethernet Media Converter as approved by the Design Builder's Engineer shall meet the following specifications at a minimum:

General Requirements

- All materials furnished, assembled, fabricated or installed under this specification shall be a new product from the Manufacturer or Reseller, and a Commercial Off-The-Shelf (COTS) product.
- No reconditioned equipment or parts shall be used.
- All equipment and appurtenances shall be identified with name, model number, serial number, technical support and warranty phone numbers, and any other pertinent information required to facilitate equipment maintenance.
- Every conductive contact surface or pin shall be gold plated or made of non-corrosive, non-rusting metal

Optical Ports

The following optical requirements shall be met for all fiber optic link ports

- All optics shall operate at single-mode, 1310 nm or 1550 nm. Each optical port is part of a pair of fibers, one fiber for Transmit, one fiber for Receive.
- Ports shall be type SC connector
- The unit shall have at least one (1) optical 100FX ports (100Mbps)
- Optics shall have the ability to transmit and receive Ethernet data at a minimum distance of 20km

Copper Ports

The following Category 5 requirements shall be met for all 10/100Base TX ports.

- All CAT 5 UTP/STP ports shall be EIA/TIA 568-A Compliant
- All ports shall be type RJ45
- All copper ports shall auto-negotiate for speed (10/100) and duplexity (Auto-MDI/MDIX for Full or Half operation)

SPECIAL PROVISIONS

800 - THERNET MEDIA CONVERTER

- The unit shall have at least six (6) 10/100Base TX ports (100Mbps)

Switch Properties

- Switching method: Non-blocking Store & Forward
- Switching latency: 10 us (100Mbps)
- MAC address table size: 2048

Indicator LEDs

The unit shall contain the following diagnostic LED's:

- LINK/ACTIVITY
- TX
- RX
- SPEED (for CAT 5 ports only)
- POWER

Power Supply

- The switch shall include an integrated power supply
- Power Consumption: 5W Max
- The following power supply options shall be supported:
 - 24VDC: 9-36 VDC
 - 48VDC: 36-72 VDC
 - HI Voltage AC/DC: 88-300VDC, 85-264VAC

Physical

The media converter shall be of compact design allowing it to be mounted in a space-constrained field equipment cabinet. Maximum dimensions shall be as follows:

- Height: 4.3"
- Width: 2.3"
- Depth: 13.7"
- Weight: 1.5lbs
- Ingress Protection: IP40 (1mm objects)
- Enclosure: 21 AWG galvanized steel enclosure
- Mounting: Shelf, DIN rail, or panel mounted

Environmental Compliance

- IEC 61000-6-2 Industrial (Generic standard immunity for industrial environment)
- NEMA TS 2 Traffic Control Equipment
- Operating temperature range: -40 degrees F (-40 degrees C) to +185 degrees F (+85 degrees C) without the use of fans

IEEE Compliance

- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX
- 802.3x-Flow Control

SPECIAL PROVISIONS
800 - THERNET MEDIA CONVERTER

DRAFT - NOT FOR CONSTRUCTION

P.A.P. NO. PENDING

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CONSTRUCTION & INSTALLATION: The media converter shall be mountable inside the equipment cabinet in a location and method designated by the Design Builder's Engineer.

- The switch may be shelf, DIN rail, or panel (u-channel) mounted.
- All external screws, nuts and locking washers used to mount the switch shall be stainless steel; no self-tapping screws shall be used unless approved by the Design Builder's Engineer.
- All mounting parts shall be made of corrosion resistant material.
- The Contractor shall not use existing GFI outlets in the controller cabinets to plug in Ethernet Field Switch power cord
- The switch must be able to fit inside the controller cabinet in a secure location, accessible by field technicians, and maintaining all applicable bend radii for fiber optic cable.
- Patch cables with appropriate SC or ST connectors will be provided as needed to connect this device to the Ethernet Switch, local NID or LIU

DOCUMENTATION REQUIREMENTS: One copy of the manufacturer's operation manual shall be provided at each installation location. An additional 10 paper copies of the manufacturer's operation manual, plus an electronic copy (in either .doc or .pdf format) shall be delivered to the Engineer prior to the first field Ethernet switch installation.

TESTING: Documentation of all manufacturer's test results in order to meet the specifications contained herein shall be supplied prior to approval. In lieu of or in addition to the above, outside vendor/third party test results shall be accepted.

WARRANTY: All equipment, materials and other appurtenances shall be warranted by the Manufacturer for five years following the **acceptance of the system**.

MEASUREMENT AND PAYMENT: Hardened Ethernet media converter will be paid at the Contract unit price per each and will include all material, labor, equipment, to place and make operable utilizing patch cables and connections provided as part of this specification.

Integration into the City central system, programming, troubleshooting, adjustments, testing and patch cables not readily available in the cabinet at the time of installation are the responsibility of the City or its designated representative. Due to changing technology and the possibility of mismatched equipment the City reserves the right to request a substitution of any hardened Ethernet media converter for another model or manufacturer. The City will pay the difference in the price of the unit (if any) plus 5% of the newly established unit price

**SPECIAL PROVISIONS
ITS HAND BOX**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

**CATEGORY 800
TRAFFIC**

ITS HAND BOX

DESCRIPTION. This work shall consist of furnishing and installing, by the Contractor, ITS hand boxes.

MATERIALS.

1. Pre-cast polymer concrete hand boxes shall consist of a fiberglass reinforced polymer concrete box and cover. Dissimilar materials for the box and cover will not be accepted. The box shall be a nominal 30"x48"x24" with an open bottom.
2. The hand box and cover shall be rated at a design load of 22,500 lbs. and comply with ANSI / SCTE 77.
3. The cover shall provide a water tight seal on the hand box and be secured with two pentagonal bolts. Each cover shall bear the logo "ITS" clearly stamped on the cover. All covers are to be skid resistant, with a minimum coefficient of friction of 0.50 in accordance with ASTM C 1028.
4. Backfill any voids with suitable material from the excavation or by using select backfill compacted to 92% proctor.
5. All boxes shall conform to the requirements of the Underwriters Electric Code and local ordinances.

CONSTRUCTION. Each hand box shall be installed on No. 57 stone compacted. The stone bed shall extend past the limits of the hand box by four inches in each direction. The hand box shall be set to the finished grade. When a hand box is to be installed on an existing duct system, the Contractor shall rod the assigned duct to the nearest hand box or manhole. Should the assigned duct prove to be obstructed, another duct is to be rodded until a clear duct is found. The Contractor shall install an approved pull-rope in the diverted duct from the nearest manhole or hand box to the new hand box. All ducts are to be plugged immediately after construction with approved plugs. In the event a duct must be diverted each way into the hand box, each leg of the diversion shall be rodded to the nearest manhole or hand box and a pull rope installed in each leg of the run. Hand boxes shall be installed flush to drain with finished grade. When hand boxes are installed in sidewalks, the sidewalk shall be removed and reinstalled to the nearest joint.

MEASUREMENT AND PAYMENT. ITS Hand Box will be measurement and paid for at the Contract unit price per each. The payment will be full compensation for all hand boxes installed complete and accepted by the Engineer. Compensation will be for installed hand box, cover, No. 57 stone, backfill, and all labor, materials, equipment, tools, and incidentals necessary to

**SPECIAL PROVISIONS
ITS HAND BOX**

F.A.P. NO. PENDING
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complete the work. All labor to and materials required to divert a duct into the hand box, including rodding as necessary and installing pull-rope and duct-plugs, shall be considered incidental to the cost of the hand box. No additional compensation will be made if the duct is diverted each way into the hand box. No payment will be made until the hand box is inspected and accepted as complete.

**CATEGORY 800
TRAFFIC**

SECTION 800 MODEMS

DESCRIPTION The contractor shall supply a matched pair of fiber modems with each VMS sign and controller compatible with both color and amber signs supplied in this contract, if serial or fiber optic hard wire communication is selected for the sign location. When serial or fiber optic communication is selected the stand alone modem will be installed at the sign controller; the other will be a card rack version of the same modem to be provided to the City for installation at the Traffic Management Center (TMC). In lieu of the matching modem at the TMS the contractor can provide a method to connect the field modem to the TMC's existing equipment as approved by the Engineer. The Contractor is advised that most if not all of the Central Business District (CBD) locations will utilize existing or new twisted pair copper communication cables. The City may elect to have the contractor install fiber optic cable, modems and connections to a new or existing installation.

The communication media selected for each sign will be determined by the Engineer, the contractor will be directed to supply one type of communication system per sign. (paid separately)

1. For Fiber optic cable the Contractor shall supply a modem pair that is interoperable with the Optelecom-nkf mode series 9522A-LD-ST and 9526A card rack and stand alone fiber modems. Fiber optic modems shall include the cost of a furnishing and installing a fiber-optic Network Interface Device (NID) at the field controller similar to a "Leviton" model 502H or approved equal, and all patch cables and connectors to interface to the modem to the sign controller.
2. Acceptance testing of the modems shall be incorporated into the Contractors test procedures for VMS signs

MEASUREMENT AND PAYMENT

Modems will be paid at the Contract unit price per modem pair and will include all material, labor, equipment, field adjustment and troubleshooting on order to provide a reliable communication link between the VMS sign and the Traffic Management Center communications hub. Due to the possibility of a mismatch between the various sign controllers and the NTCIP VMS control system and the type of modems suggested for this item the Contractor can be directed by the Engineer to provide a different modem that utilizes new technology and or is compatible with the existing and or new system hardware. The Contractor will be entitled to the difference in the cost of the modem(s) plus 5 % of the total of the new established price.

**SPECIAL PROVISIONS
SPlice ENCLOSURES AND PATCH PANELS**

**CATAGORY 800
TRAFFIC**

SPlice ENCLOSURES AND PATCH PANELS

DESCRIPTION. This work includes furnishing and installing splice enclosures and splicing cable in accordance with the contract plans and as directed by the Engineer. Splices are only to be made where indicated on contract plans or where approved by the Engineer, dependent upon available lengths of cable and the extent of the cable-run requested to be installed.

1. **Copper Communications Cable.** Conductors are to be hand soldered and insulated by using the appropriate size of heat shrink tubing that is factory coated with a sealing compound. Splices shall be staggered to evenly distribute the splices thru the splice case and not fanned at one end or the other. Shields shall be bonded and carried through the splice case Alternate methods of splicing may be considered for approval by the Engineer on a case by case basis.
2. **Fiber Optic Cable.** Splice enclosures for fiber optic cable shall be for use in manholes, hand holes and aerial applications. Fiber optic cable splices shall only be made utilizing arc fusion splicing.
3. **Network Interface with Internal Patch Panel.** A network interface device shall be submitted for the engineers approval that includes termination facilities for 24 fibers (12 in 12 out) and a patch panel with 12 ports to support connections within the traffic signal cabinet, this device shall be compact and capable of being installed on the side wall of the traffic signal or ITS cabinets

MATERIAL. Splice cases will be suitable for the intended location as specified in the National Electrical Code, as recommended by the cable manufacturer, and be water proof and re-enterable. The contractor shall provide technical data and if necessary a sample of the proposed splice case and splice making material for evaluation and approval by the Project Engineer.

Fiber Optic Cable. The splice cases shall utilize heat shrink seals with a hot-melt adhesive system. The splice case shall have between 3 to 7 entry points, one of which shall be oval in shape; unused openings shall be sealed but available for future use. The same hardware system shall be adaptable for use with aerial splices by adding the appropriate accessories, cable supports and rodent-proof covers and meet the following specifications:

Base and Dome Material:	Impact resistant polymer.
The Done Seal:	Rubber sealing ring.
Cable Termination Seals:	Heat shrinkable polymer
Tensile Strength:	Min. 17 Mpa @ 23 deg.C +/- 3 deg.
Ultimate Elongation:	Min. 350% @ 23 deg.C +/- 3 deg.
UV Resistance:	ASTM G154
Hot-Melt Adhesive Shear Strength:	Min. 200 N (44.96 lb) @60 deg. C +/- 2 deg.

**SPECIAL PROVISIONS
SPlice ENCLOSURES AND PATCH PANELS**

CONSTRUCTION. Sufficient slack shall be provided to remove the completed splice and cables out of the hand hole, manhole, or vault in order to inspect or re-enter the splice case outside of the raceway.

- 1. Copper Communications Cable.** Splice cases will be sized to the cable being spliced, with larger cases being supplied for 25 pair cables.
- 2. Fiber Optic Cable.** Splice cases will be sized and accessories selected to the cable being spliced and the application (underground or aerial), with larger cases being supplied for 144, 48 and 12 count and 6 count tactical cables. All splices placed in manholes shall be capable of supporting 18 buffer tubes and 576 fusion splices. Appropriate cable/slice trays and buffer tube supports will be provided with each splice enclosure.

MEASUREMENT AND PAYMENT. Splice cases and Network interface/ patch panels shall be measured and paid at the contract unit price for each and include an approved splice case, cable trays, entrance caps, heat shrinkable seals, strain relief, heat shrink, insulating material, waterproofing, testing, and all tools, labor, equipment and material to complete the work.

**SPECIAL PROVISIONS
FURNISH AND INSTALL VMS SIGN
STRUCTURES**

**CATEGORY 800
SIGN STRUCTURES**

FURNISH AND INSTALL VMS SIGN STRUCTURES

DESCRIPTION This work shall consist of furnishing and installing VMS sign structures consisting of poles with anchor bases welded to the lower ends, complete with handholes as needed, handhole covers, pole caps, base covers, mast arm flanges and mast arms as needed, simplex fittings as needed, simplex fitting covers and all grommets, high strength bolts and miscellaneous hardware associated with proper installation. The design of the poles and mast arms shall be the responsibility of the manufacturer. It is expected that two parallel arms will be necessary to safely hold the VMS signs, however, round or square tube mast arms and poles should be single arm if possible. Modifications to this specification is permitted providing the resulting structure is equal to or greater than the strengths and tolerances required by this specification. Said manufacturer must be certified to the *American Institute of Steel Construction's Standard for Steel Building Structures*. The design engineer must have a minimum ten (10) years of experience in the design of similar structures. The design engineer must be a full-time employee of the pole manufacturer. Joint use poles shall be provided with a factory installed simplex mounting device and arm for a 4000 watt shoe box fixture per BCDOT standard details

Sign structures are defined as follows:

- Inner Harbor Type (Joint Use) Mast Arm Poles-Bronzed with 400 watt luminaire
- Inner Harbor Type Mast Arm Poles-Bronzed

MATERIALS

Pole Shaft	A-595-50 or A- 572-65
Anchor Base	A 36
Mast – Arm Flange Plates	A 36
Mast – Arm	A-595-50 or A- 572-65
Anchor Bolts	ASTM F1554 GR 55
Hardware	Type 304 SS
Galvanizing	A 153
Foundation	801 and SPECIAL PROVISION
Grounding	804

CONSTRUCTION

1. **Pole Shafts** Square pole shafts shall be fabricated from A sheet steel conforming to A 572-65 and shall have a minimum guaranteed yield strength of 55,000 p.s.i. Square pole shafts are preferred to be uniformly tapered starting at the base and decreasing in diameter at a rate of 0.11 inches per foot of length, however square poles and or arms may be provided without taper.
2. Round pole shafts shall be fabricated from minimum 3 gauge sheet steel conforming to A 595 and shall have minimum guaranteed yield strength of 55,000 p.s.i. Round pole shafts

**SPECIAL PROVISIONS
FURNISH AND INSTALL VMS SIGN
STRUCTURES**

and arms shall be uniformly tapered starting at the base and decreasing in diameter at a rate of not more than .14 inches per foot of length.

3. **Anchor Base.** The base shall be made of steel plate conforming to ASTM A-36 of the proper strength to support the pole and its specified load. The center of the base shall have an opening of such diameter as to provide a slip fit for the shaft. The base shall be double welded, inside at the bottom and outside at the top. All welds shall meet the requirements of the AWS Structural Welding Code.
4. **Handhole(s).** The shaft shall have reinforced opening(s) for handholes complete with cover plate(s) and stainless steel Type 304 fasteners as specified in the Contract Documents.
5. **Ground Wire Connection.** A method to connect a ground wire by means of a ½” bolt shall be provided at the handhole, 3/8” bolt for pedestals.
6. **Pole Cap.** The top of the shaft shall be equipped with removable cast zinc or aluminum pole cape held securely in place by three stainless steel fasteners for round poles, four fasteners for square poles.
7. **Simplex Fittings.** Simplex fittings for joint use poles shall be provided as specified in the B.C. Details. A removable galvanized steel or aluminum cover plate shall be provided for each unused fitting.
8. **Base Cover.** The base cover shall be two-piece cast aluminum or fabricated steel from, which is used to protect the anchor bolts and nuts. The manufacturer shall specify the method of fastening the base cover to minimize removal and theft. The cover shall provide for positive drainage of the base and allow venting of the pole. The finish shall be identical to the pole finish.
9. **Mast Arms.** Manufacturer must submit written certification that materials meet applicable ASTM specifications. The pole and arm shafts shall be manufactured from ASTM A570-50 or A 572-65 grade steel with a minimum yield of 50,000 psi. Cold working to achieve the minimum yield of strength of the material is not acceptable. Minimum thickness of VMS sign structure steel poles and mast arms materials shall be 0.1793 inch. All arms and uprights less than 50’ in length shall be of one piece construction. The pole and arm shaft shall have a continuous taper. All mast arms shall be welded to form one continuous piece. Mast arms shall be connected to the support pole at the height necessary to provide sixteen-feet of clearance between the crown of the road and bottom of the VMS sign. All mast arms shall include sufficient clamp-type hangers to install the largest sign provided and two wire outlet grommets. Mast arms shall have a removable cap(s) at the tip. Due to the loads created by the VMS sign 2 parallel arms will be provided, spaced to fit the type of sign intended for use on the pole and arm(s)
10. **Welding.** Pole Post and Pedestal Shafts, and Mast Arms shall not have more than one

**SPECIAL PROVISIONS
FURNISH AND INSTALL VMS SIGN
STRUCTURES**

longitudinal weld per section which shall be ground or cold rolled smooth to a uniform finish and thickness. Butt welds will not be permitted within a continuous single section. All welds and transverse joints shall fully develop the ultimate strength of the pole. All welds shall meet the requirements of the AWS Structural Welding Code.

11. Coatings

a. Surface Preparation

Prior to being incorporated into an assembled product, steel plates 3/4 inch or more in thickness may require blast cleaning to remove rolled-in mill scale, impurities, and non-metallic foreign materials. After assembly, all weld flux shall be mechanically removed. The iron or steel product is degreased by immersion in an agitated 4.5%-6% concentrated solution elevated to a temperature ranging from 150 to 190 degrees Fahrenheit. It is then pickled by immersion in a heated sulfuric acid solution of 6%-13% concentration, controlling the temperature between 150 and 190 degrees Fahrenheit. It is next rinsed clean from any residual effect of the caustic or acid solutions by immersion in a circulating fresh water bath.

Final preparation is done by immersion in a concentrated zinc ammonium chloride flux solution heated to 130 degrees Fahrenheit. The solution's acidity content is maintained between 4.5-5.0 pH. The assembly is air dried to remove any moisture remaining in the flux coat and/or trapped within the product.

b. Zinc Coating

Following the surface preparation, above, the product is hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A153 (hardware items) by immersion in a molten bath of prime western grade zinc maintained between 810 and 850 degrees Fahrenheit. Maximum aluminum content of the bath is controlled to 0.01%. Flux is skimmed from the bath surface prior to immersion and extraction of the product to assure a debris free zinc coating.

c. Top Coat – Bronze Finish

All galvanized exterior surfaces visually exposed are to be coated with a Urethane or Triglycidyl Isocyanurate (TGIC) Polyester Powder to a minimum film thickness of 2.0 mils. The galvanized exterior should be etched, preheated, then powder coated. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit.

Colors shall conform to the following Federal Standards, or as specified in the contract documents.

Brown - Federal Standard Number 595a-20040

Any finish on the sign structures and mounting hardware damaged during transportation and erection shall be repaired to match the original finish per the manufacturer's recommendations. The finish shall be guaranteed not to flake, peel or otherwise separate from the galvanized surface for 5 years from the date of acceptance.

**SPECIAL PROVISIONS
FURNISH AND INSTALL VMS SIGN
STRUCTURES**

12. **Design Loads For Mast Arm and Multi-Purpose Poles.** The design shall conform to the 2001 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* and approved interim specifications. Design wind pressures are based on a 100 mph wind speed with a 1.14 gust effect factor.

Fatigue Importance Category I is used for fatigue design. Fatigue design loads are the natural wind gust pressure range based on a yearly mean wind velocity of 11.2 mph, and truck-induced gust pressure range based on a truck speed of 65 mph. The natural wind gust pressure range is not applied to areas of the sign arm coinciding with areas of signs. The Contractor shall coordinate the exchange of data between sign manufacturer and the designers and manufacturers of the structures and foundations.

All square tube poles are assumed to be joint use (28 ft) poles, one street lighting luminary fitting per pole, aligned with the sign mast arm. Mast arms and poles will be designed to accommodate the weight and loading of the largest sign placed 3 feet from the tip of the arm.

12. **Marking.** All poles and individual mast arms shall be permanently marked or labeled for identification. The pole height and mast arm length will be clearly listed.
13. **Design Calculations.** The manufacturer shall submit complete structural design calculations of all components including the loads applied to the foundation at the base plate level, i.e. axial load, overturning moment and torsional moments. The professional seal of a registered structural engineer licensed in the State of Maryland shall be on all structural design calculations and shop drawings.
14. **Mounting Brackets./ adjustable tilt** The Contractor shall provide the VMS sign mounting hardware and associated calculations for approval of the Design Builder's Engineer. The Contractor shall coordinate the exchange of data between sign manufacturer and the designers and manufacturers of the structures to insure the sign supports, poles and mounting brackets meet the applicable ASSHTO specifications.
15. **Anchor Bolts** Anchor bolts shall have two (2) nuts and two (2) washers per anchor bolt and shall be included in the unit price per pole. Anchor bolts and nuts shall conform to ASTM A1554 with a minimum yield of 55,000 psi. Anchor bolts and attachment bolts shall be galvanized the full length of the bolt to ASTM A123 requirements. The design of the anchor bolts required shall be the responsibility of the manufacturer.

MEASUREMENT AND PAYMENT

Furnishing and installing of sign structures will be measured and paid for at the Contract unit price per each for the type and size of structure erected in place. The payment will be full compensation for the transportation and installation of all steel poles, weather heads and duct seal, conduit bends, strapping, clips, brackets, sign mounting hardware, mast arms, and for all material, labor, equipment, calculations, shop drawings, tools, and incidentals necessary to complete the work. Concrete

**SPECIAL PROVISIONS
FURNISH AND INSTALL VMS SIGN
STRUCTURES**

foundation including rebar, concrete and anchor bolts are paid separately under item 801. Luminaire and luminaire mounting hardware are by others.

CATEGORY 800
TRAFFIC

WOOD POLES - CLASS II

DESCRIPTION. This work shall consist of furnishing and installing Class II wood poles.

MATERIALS.

General

Wood Poles	ANSI 05.1 Latest Revisions
Poles Conditioning	AWPA (American Wood-Preservers Association) C1-79, latest Revision
Pole Preservatives	AWPA P8 or AWPA P9. Latest Revisions
Pole Branding	AWPA M6, latest revision

Wood Poles shall be Southern Pine, Treatment Group C (steam conditioned) or treatment Group D (kiln-drying).

Poles shall be flat roofed.

All surfacing and trimming shall be done prior to treatment.

Poles may be seasoned by air-seasoning, kiln-drying, steaming, heating in the preservative, or a combination of methods. Boulton drying is not permitted.

Shaving of All poles shall be full-length machine-shaved. The depth of cut shall not be more than necessary to remove inner bark.

There shall be no abrupt changes in the contour of the pole surface between the groundline and the aboveground sections.

The lower 2 ft of poles may be trimmed to remove wood fibers causing butt flare, provided sufficient sapwood remains to obtain the minimum penetration requirements.

The following defects are prohibited:

- (a) Cross Breaks (cracks)
- (b) Decay, except as permitted under "decayed knots"
- (c) Dead streaks

SPECIAL PROVISIONS
WOOD POLES – CLASS II

- (d) Holes, open or plugged, except holes for test purposes, which shall be plugged.
- (e) Hollow butts or tops, except as permitted under hollow pith centers and defective butts.
- (f) Marine borer damage
- (g) Nails, spikes, and other metal not specifically authorized by this specification. All other foreign material is prohibited.
- (h) Ring knots, A ring of knots consisting of four or more knots in a 3 in. section of the pole
- (i) Bark knots, A knot that is undergrown and partially encased with outer bark, in excess of 3 in. diameter.
- (j) Knot cluster. Two or more knots grouped together as a unit with the fibers of the wood deflected around the entire unit
- (k) Decayed Knots -Type II "decayed Knots" where depth of decay exceeds 1/2 in.
- (l) Short Crook - A localized deviation from straightness which, within any section 5 ft or less in length, is more than 1/4 the mean diameter of the crooked section.
- (m) Pole Sweep. A straight line joining the surface of the pole at the top and ground line, shall not be separated from the surface of the pole by more than 1 in. for each ten ft of pole length.
- (n) Indentations, attributed to loading or handling slings, that are 1/4 in. or more deep over 20% or more of the pole circumference, or indentations which result from careless handling more than 1/2 in. deep at any point.
- (o) Spiral grain (twist grain) exceeds one complete twist in any 20 ft.

Pole Preservative Treatment

Poles may be heated in oil-type preservatives at atmospheric pressure to facilitate penetration of preservative.

Poles to be impregnated with the preservative by application of the standard empty cell (Rueping) process shall be performed in accordance with the standard "Poles - Preservative Treatment by Pressure Processes" (AWPA C4, latest revision).

No material other than poles shall be treated with poles.

The minimum net retention of Pentachlorophenol, as determined from 20 boring samples taken from any charge, shall not be less than the following.

Minimum Retention: (lbs. Penta/cu. ft.)	
Zone Assayed	0.5 - 2.0 in.
Retention	.45

Retention of Pentachlorophenol shall be determined by AWPA A5, latest revision.

**SPECIAL PROVISIONS
WOOD POLES – CLASS II**

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CONSTRUCTION. The following marking and code letter information shall be legibly and permanently burn branded with characters not less than 5/8 in. high. The markings shall be placed squarely on the face of the pole at 10 ft above the pole butt end and in the butt end of each pole in the following order.

- (1) Supplier's Brand
- (2) Plant Designation
- (3) Month and Year of Treatment
- (4) Code Letters; "SP" denoting Southern Pine and the Preservative Code, such as "P" for Pentachlorophenol in Petroleum (AWPA M-6).
- (5) Retention and Assay, such as "45-A"
- (6) Class and Length

MEASUREMENT AND PAYMENT. Class II wood poles shall be measured and paid for at the contract unit price each. The payment will be full compensation for the poles, all guy cables and connectors, weatherheads, labor, tools, materials, and incidentals necessary to complete this work.

SPECIAL PROVISIONS
SQUARE PERFORATED TUBULAR SIGN POST

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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CATEGORY 800
TRAFFIC

SECTION 800 - SQUARE PERFORATED TUBULAR STEEL SIGN POST

DESCRIPTION. This work shall consist of furnishing and installing Square Perforated Tubular Steel Posts and Square Perforated Tubular Steel Anchor Bases for mounting traffic.

MATERIALS.

Steel Posts	A570 Grade 50
Galvanizing	A653 Designation G-90
Spray Galvanizing Compound	A780

Square Tubular Steel Posts and Square Tubular Steel Anchor bases shall be formed from 12 gauge steel. All sides of the tubes shall have 7/16 in. die punched circular holes or perforated knock-outs, at one in. centers along their entire length.

The Tubular Steel Posts shall be two in. square tubes 12 ft long.

Square Tubular Steel Anchor Bases shall be comprised of two telescoping tubes. The first shall be 2 1/4 in. square, three ft long, formed from 12 gauge steel and shall snugly fit over the sign post. The second section shall be a 2 1/2 in. square, 18 in. long, formed from 12 gauge steel, and shall snugly fit over the 2 1/4 in. section.

CONSTRUCTION. The Square Tubular Steel Anchor Base assembly shall be constructed by placing the 18 in. base section over the 3 ft base section so that they are flush at the top and the holes are aligned. The entire unit shall be driven into the ground so that one or two rows of holes in the Square Perforated Tubular Steel Base are exposed. The base shall be driven so that it remains plumb and to provide the final sign assembly with the correct orientation.

Finished length of the Tubular Steel Posts shall be determined by adding the total height of the signs to 8 Ft, 2 in. The sign post shall be cut to the correct length, and cold spray galvanizing shall be applied to the cut end. The signs shall be bolted to the top of the post, using tamper proof bolts or drive rivets. The Square Tubular Steel Posts shall be lowered 8 in. into the base, and the post secured to the base using two corner bolts designed for this purpose.

MEASUREMENT AND PAYMENT. Square Tubular Steel Posts will be measured and paid for at the contract unit price per each. The payment will be full compensation for the sign post, corner bolts, and painting as required, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
SQUARE PERFORATED TUBULAR SIGN POST

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Square Tubular Steel Anchor bases will be measured and paid for at the contract unit price per each. The payment will be full compensation for both tubes comprising the base section, all excavation, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
800.01— BAND SIGN TO SUPPORT

DRAFT - NOT FOR CONSTRUCTION
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CATEGORY 800
TRAFFIC

SECTION 800 - BAND SIGN TO SUPPORT

DESCRIPTION. This work shall consist of furnishing required hardware and banding signs to supports.

MATERIALS. 3/4 Inch Stainless Steel Banding

Stainless Steel Banding Clips

CONSTRUCTION. Signs shall be banded to supports as indicated in the Contract Plans or as directed by the Engineer.

METHOD AND PAYMENT. Band Sign to Support will be measured and paid for at the Contract unit price per each sign which is banded to a support and accepted by the Engineer, which price and payment will be full compensation for all hardware, materials, labor, equipment, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
HPS COBRA HEAD LIGHTING FIXTURE,
LAMP, AND BRACKET ARM

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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CATEGORY 800
TRAFFIC

HPS COBRA HEAD LIGHTING FIXTURE, LAMP AND BRACKET ARM

DESCRIPTION. This work involves the furnishing and installing by the Contractor 400-Watt or 250-Watt HPS Cobra Head Lighting Fixture, Lamp and Bracket Arm.

MATERIALS. The Contractor shall submit catalog cuts to the DOT Street Lighting Engineering for approvals and receive approvals prior to the installation of this item.

Fixtures. Fixtures shall be suitable for use with a 400-Watt High Pressure Sodium Vapor lamp. Fixture to have glass reflector, type M-N-III light distribution. Provide with detachable ballast door with quick disconnects and a 400-Watt 120/208/277 volt regulator ballast, connected for 120 volts. Provide with a locking type receptacle for photoelectric control and a 2-inch slip fitter. All to be shipped one complete unit per carton.

Auxiliary Equipment. Fixture auxiliary equipment shall be securely attached to unitized tray with variation-proof fasteners and quick disconnects, which shall allow the equipment to be removed, replaced or upgraded without the use of tools. Ballast shall be pre-wired to the lamp holder receptacle, with one (1) ballast operating one (1) High Pressure Sodium lamp. Each ballast shall be of the separate component type cable of providing reliable lamp starting down to minus twenty degrees Fahrenheit (-20F.), shall have power factor better than ninety percent (90%) and shall be of the regulating type providing plus or minus five percent (15%) lamp power regulation with a plus or minus ten percent (10%) variation from rated input voltage. The photocell receptacle shall be pre-wired to the ballast or ballast terminal block. The ballast shall be utility grade having a 10kv B.I.L. rating or higher. A separate polarized, quick disconnect plug shall disconnect all conductors from power source. Component-to-component wiring within the fixture shall carry no more than eighty percent (80%) of rated current and shall be listed by Underwriter's Laboratories for use at 600 VAC at one-hundred five degrees Celsius (105 C) or better. Field wiring terminals shall accept service leads up to AWG No. 6 and shall be listed by Underwriter's Laboratories for use at 600 VAC or higher. Plug disconnects shall be listed by Underwriter's Laboratories for use 600 VAC. All wiring within the pole shall be No. 12 AWG copper wire, installed complete with minimum 3-inch long "pig-tail" lengths furnished and accessible from pole handhole. The hot wire shall be black and the neutral wire shall be white. All hardware shall be Stainless Steel 316 Grade or better, with all exposed hardware of the vandal proof type.

General. Provide factory-fabricated wiring devices, in type and electrical rating for the service indicated.

NEC Compliance. Comply with the National Electrical Code (NFPA Number 70) as applicable to construction and installation of Electrical Wiring Devices.

UL Labels. Provide Electrical Photo controls that have been tested, listed and labeled by Underwriters Laboratories.

SPECIAL PROVISIONS
HPS COBRA HEAD LIGHTING FIXTURE,
LAMP, AND BRACKET ARM

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N.E.M.A. Compliance. Comply with National Electrical manufacturers Association Standards for general and Specific-Purpose wiring Devices.

Photo Control. Each fixture shall be provided and installed with a photocell. Photo Controls shall operate in a temperature range of minus fifty degrees Centigrade to plus sixty degrees Centigrade (-50C. +60C.). Photo Control shall be factory preset for 'ON' at approximately 2 fc. Provide delay in excess of fifteen (15) seconds to prevent unit from functioning due to sudden brilliant light as from vehicles, lightning, etc. The design of the photo control shall be such that the unit may face any direction without seriously affecting turn-on or reducing the life of the cell.

Bracket Arms. Bracket arms shall be of the type detailed on Detail B.C. 808.04. A single member bracket arm assembly shall be furnished where a six foot (6') or eight foot (8') bracket arm is specified and shall be ovaliptic consisting of tapered tubing made of Aluminum Association Alloy 6063-T6 having an elliptical section at the pole end to two and three-eighths inch (2-3/8") OD at the fixture end. The pole end of the arm shall have a cast aluminum fitted weld to it, which will permit the positioning of the arm on the plats of the pole, held only by gravity, while the arm is secured to the sole by stainless steel cap screws, providing a weather-resistant connection and a smooth wiring raceway. If single mast arms are used, a cover plate with bolts for each pole bottom bracket attachment should be furnished. When a ten foot (10') bracket arm is specified, an "A" Frame bracket arm shall be furnished and shall be constructed of 0.188" thick Aluminum Association Alloy 6063-T6 having a two and three-eighths inch (2-3/8") OD at the fixture end. The pole end of the arm shall have a cast aluminum fitted weld to it, which will permit the positioning of the arm on the plats of the pole, held only by gravity, while the arm is secured to the sole by stainless steel cap screws, providing a weather-resistant connection and a smooth wiring raceway.

Arm Plate Construction. Refer to detail on Detail B.C. 808.14.

Finishes. All hardware (nuts, bolts and washers), except anchor bolts shall be stainless steel. Pole shafts and bracket arms shall have a satin brush finish producing a non-reflecting outer surface. Anchor bases, pole caps and nut covers shall have a wet blast silver gray satin finish. Pole shafts and bracket arm assemblies shall be tire-wrapped with a heavy water resistant paper or other approved method for protection of finish during shipment or installation.

Welding. All welding shall conform to the approved and accepted method of welding for aluminum alloys. Welding shall be done only by welders certified by the Independent Testing Laboratory to the requirements of the latest edition of ASTM Boiler and Pressure Vessel code, Section IX and their credentials shall be made available to the Engineer upon request.

Tests. Aluminum light poles and brackets shall conform to "NEMA TEST REQUIEMENTS FOR METALS". Each aluminum light pole shall be capable of withstanding a five hundred (500) pound transverse load applied eighteen inches (18") from the top of shaft without fracture and with maximum deflection of not more than seven point five percent (7.5%) of shaft length. After removal of the load, the shaft shall have taken a permanent set of not more than one-half

SPECIAL PROVISIONS
HPS COBRA HEAD LIGHTING FIXTURE,
LAMP, AND BRACKET ARM

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inch (1/2"). Each anchor base shall be capable of withstanding the maximum allowable bending movement of the shaft. Each bracket arm, when attached to the shaft, shall withstand a vertical load of one-hundred (100) pounds and a transverse load of fifty (50) pounds, applied at the fixture end of the bracket arm without fracture of apparent deformation after the load is removed.

CONSTRUCTION. Install all associated equipment and incidentals required to properly accomplish this item of work. The electrical power distribution system will be the responsibility of Baltimore Gas and Electric.

Bracket arms shall be perpendicular to the roadway centerline. Exercise extreme care in handling and erecting poles with attached fixtures so as to avoid damage thereto, the Contractor being totally responsible for any and all damages to poles/fixtures.

Pole shafts and bracket arm assemblies shall be wrapped with a heavy water resistant paper or approved method for protection of finish during shipment and installation.

Install lighting fixtures of the types indicated where shown on the plans; in accordance with the Fixture Manufacturer's Written Instructions and with recognized industry practices; to ensure that the fixtures comply with the requirements and serve the intended purposes. Comply with N.E.M.A. Standards and Requirements of the National Electrical code pertaining to installing of lighting fixtures and with applicable portions to N.E.C.A. Standard of Installation.

Performance Test. After the Contractor installs and wires the light poles, BGE will install the fuse kits and energize the pole. The Contractor shall be responsible for maintaining the lights for the entire warranty period of the contract. This will constitute the operational and burn test. The Contractor shall repair or replace any defective part within three days of notification from the City that a streetlight has failed.

Wiring. The Contractor will be responsible for providing 2-1 conductor # 12 AWG Type THWN conductors plus one # 12 ground, 6 feet beyond the pole hand hole for each light fixture, this item is incidental to the lighting fixture

MEASUREMENT AND PAYMENT. This work will be measurement and paid for at the Contract unit price per each. The payment will be full compensation for all mounting hardware, arm plate, bracket arms, fixtures, lamps, ballasts, photocell, internal lamp wiring, external wiring, performance tests, welding and all labor, materials, accessories, equipment, tools and incidentals necessary to complete the work.

SPECIAL PROVISIONS
HOMELAND PEDESTRIAN LIGHTING
POLE, VICTORIAN FIXTURE, LAMP
AND PHOTOCELL

F.A.P. NO. PENDING
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CATEGORY 800
TRAFFIC

**DECORATIVE HOMELAND PEDESTRIAN LIGHTING POLE, 150-WATT HPS
VICTORIAN FIXTURE, LAMP AND PHOTOCELL**

DESCRIPTION. This work shall consist of furnishing and installing by the Contractor, decorative Homeland pedestrian lighting pole, 150-Watt high-pressure sodium Victorian fixture, lamp and photocell.

MATERIALS.

The Contractor shall submit catalog cuts to the DOT Lighting Engineering for approvals and receive approvals prior to the installation of this item.

Light Poles: Decorative Homeland Light Pole.

Internal electrical wiring for lamp and fixture with all necessary internal wiring.

Fixtures: Baltimore Victorian fixture with 150-Watt HPS lamp and photocell.

CONSTRUCTION.

A. Install light poles complete, including poles, fixtures, lamps, photocells, parts, accessories, and all associated equipment and incidentals required to properly accomplish this item of work.

B. Light poles shall be erected plumb, and placed on anchor bolts projecting from roadway and structure pedestal bases. Utilize stainless steel shims to ensure plumbness for poles at sidewalks and or wall-mounted locations. Exercise extreme care in handling and erecting poles with attached fixtures so as to avoid damage thereto, the Contractor being totally responsible for any and all damages to poles/fixtures. Each pole shall be installed with a neoprene gasket between the pole and the base.

C. The Contractor shall be responsible for installing new ballasts and fixtures, verifying the proper working operation of the fixtures (including night-time testing as directed by the Engineer), and all equipment and incidentals necessary to complete this item of work.

All wiring within the pole shall be No. 12 AWG copper wire, installed complete with minimum 3-inch long "pig-tail" lengths furnished and accessible from pole handhole. The hot wire shall be black and the neutral wire shall be white.

SPECIAL PROVISIONS
HOMELAND PEDESTRIAN LIGHTING
POLE, VICTORIAN FIXTURE, LAMP
AND PHOTOCCELL

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Performance Test

After the Contractor installs and wires the light poles, BGE will install the fuse kits and energize the pole. The Contractor shall be responsible for maintaining the lights for the entire warranty period of the contract. This will constitute the operational and burn test. The Contractor shall repair or replace any defective part within three days of notification from the City that a streetlight has failed.

MEASUREMENT AND PAYMENT. Measurement for Decorative Homeland Pedestrian Lighting Pole, 150-Watt HPS Victorian Fixture, Lamp and Photocell will be a per each basis, and the quantity to be measured will be the number of complete assemblies furnished and installed and accepted by the Engineer.

Payment for Decorative Homeland Pedestrian Lighting Pole, 150-Watt HPS Victorian Fixture, Lamp and Photocell will be at the unit price bid in the proposal, for which price and payment shall be full compensation for all poles, fixtures, lamps, internal electrical wiring multivolt ballasts, photocells, base covers, accessories and mounting hardware, bearing pads, performance tests, all internal wiring and all labor, materials, equipment, tools and incidentals necessary to complete the work.

**SPECIAL PROVISIONS
30 FOOT ROUND ALUMINUM
LIGHTING POLE**

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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**CATEGORY 800
TRAFFIC**

30 FOOT ROUND ALUMINUM LIGHTING POLE

DESCRIPTION. This work involves the furnishing and installing by the Contractor, 30-Foot Round Aluminum Pole per the Contract Documents.

MATERIALS.

The Contractor shall submit catalog cuts to the DOT Street Lighting Engineering for approvals and receive approvals prior to the installation of this item.

Base Plate and Bolt Cover – Refer to B.C. Detail 808.15, Sheets 1 and 2.

Light Poles: Aluminum light poles shall be twenty-seven feet, six inches (27'6") long, round tapered aluminum pole per Detail BC 808.02 and including the following:

Shafts – Shafts may be either spun aluminum or cold rolled aluminum at the option of the Contractor and shall conform to the following:

Spun aluminum shafts shall be formed from one-piece of seamless tubing, Aluminum Association Alloy 6063, or equal, and after fabrication it shall have no longitudinal or circumferential welds, except at the lower and joining the shaft to the base. Shafts for thirty foot (30') light poles shall have a wall thickness of 0.1888-Inches. All shafts shall contain a four-inch by eight-inch (4"x8") flush type hand-hole with cover held in place with stainless steel tamper proof screws. After welding, the shaft shall be artificially aged by best treating to a T6 temper. All other shaft dimensions shall be as specified herein and/or as shown on the plans. A suitable adapter or grommet shall be equipped with a removable cast aluminum ornamental cap secured in-place with stainless steel set screws. Pole cap and anchor bolt covers shall be made of Aluminum Association Alloy 43.

Cold-Rolled aluminum shafts shall be fabricated from one-piece of sheet or plate of Aluminum Association Alloy 5052, or equal, and shall have diameters and wall thickness as specified above for spun aluminum shafts. Each shaft will have one (1) longitudinal weld performed by the Metallic-Arc-Consumable-Electrode-Inert-Gas Shielded process. After welding, the shaft shall be longitudinally cold-rolled to the desired shape to develop the mechanical properties listed for H-34 temper. The shaft shall have no circumferential welds, except at the lower end joining the shaft to the base. In all other respects, the cold-rolled aluminum shafts shall be the same as specified above for spun aluminum shafts.

SPECIAL PROVISIONS
30 FOOT ROUND ALUMINUM
LIGHTING POLE

F.A.P. NO. PENDING
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CONSTRUCTION. Install light poles complete, including parts, accessories, and all associated equipment and incidentals required to properly accomplish this item of work. Underground cabling and connections, controls, and the electrical power distribution system will be the responsibility of Baltimore Gas and Electric.

Light poles shall be erected plumb, with bracket arms perpendicular to roadway centerline, and placed on anchor bolts projecting from roadway and structure pedestal bases. Utilize stainless steel shims to ensure plumbness for poles at sidewalks. Exercise extreme care in handling and erecting poles with attached fixtures so as to avoid damage thereto, the Contractor being totally responsible for any and all damages to poles/fixtures. Each pole shall be installed with a neoprene gasket between the pole and the base.

MEASUREMENT AND PAYMENT. 30 Foot Round Aluminum Lighting Pole will be measurement and paid for at the Contract unit price per each. The payment will be full compensation for all poles, mounting hardware, transformer bases, base plate, base cover, handhole, grounding lug, arm plate, internal lamp wiring, welding and all labor, materials, accessories, equipment, tools and incidentals necessary to complete the work.

SPECIAL PROVISIONS
STEEL SUB-BASE
HOMELAND POLE

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 800
TRAFFIC

STEEL SUB-BASE FOR HOMELAND POLE

DESCRIPTION. This work shall consist of the furnishing and installing by the Contractor, steel sub-base where required for proposed Homeland street light poles. Crushed aggregate specified herein shall conform to requirements specified elsewhere in these specifications.

CONSTRUCTION. The depth of excavation for the base shall allow for crushed aggregate to be placed in the bottom of the excavation to a depth of four inches.

The steel sub-base shall be installed so that the flat side faces the roadway and the area around the base shall be filled and compacted with approved material selected from the excavation. Crushed aggregate compacted in place shall be used to replace any unsatisfactory material from excavation.

The top of the base shall coincide with the proposed finished grade.

A 3-inch DB-120 PVC conduit elbow shall be installed in each sub-base.

A 5-foot minimum horizontal clearance will be required between all proposed lighting appurtenances and any existing water line and/or appurtenance.

The Contractor shall use care and caution while working over or around any water line and or appurtenance.

MEASUREMENT AND PAYMENT. Measurement for Steel Sub-Base Homeland Pole will be measured on a per each basis, and the quantity to be measured will be the number of complete assemblies furnished and installed and accepted by the Engineer.

Payment for Steel Sub-Base Homeland Pole will be made at the per each price bid in the Proposal, which price shall be full compensation for all steel sub-base, conduit elbows, ornamental bolt cover, furnishing and placing crushed aggregate in the bottom of the excavation and for replacing unsatisfactory material if required and all labor, materials, equipment, tools and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

CONCRETE ENCASED DB-120 LIGHTING CONDUIT

DESCRIPTION. This specifications cover the furnishing and installation of all the conduits, fittings pull and junction boxes, conduit expansion joints and incidental parts, necessary to provide for future lighting or operation of structures, The type, size and location of conduits, fittings and boxes will be as indicated on the Plans. The following pertains to work within the City of Baltimore only.

MATERIALS. Refer to Section 805.02 - Electrical Conduit and Fittings.
All lighting conduit shall be DB-120.

CONSTRUCTION.

General.

1. The size of each conduit shall be such that the sum of the areas of the cross-sections of all conductors, including insulation and protective coverings, shall be not greater than thirty percent (30%) of the inside area of conduit except that no conduit encased in concrete or installed underground shall be less than two inches (2") inside diameter and no conduit small that three quarter inches (3/4") inside diameter shall be used except for fixture hangers.
2. All conduit sizes and conduit layouts shall be approved by the Engineer before installation and the Contractor shall submit data on the lay-out for the exact makeup, overall diameters and cross-sectional areas of the actual conductors he intends to use and the sum of the areas of the conductors in each conduit. All conduits used on a project shall be the product of one manufacturer.
3. Bends shall be of long sweep, free from kinks and of such easy curvature as to permit the drawing in of conductors without injury. The radius of curvature of inner edge of bends shall not be less than ten (10) times the inside diameter of the conduit except as may be otherwise noted on the Plans or in the Special Provisions. Conduits shall not be flattened or distorted. The total angle of all bends between any two (2) boxes, or fittings, shall not exceed two (2) quarter bends.
4. Exposed conduit runs shall be parallel to or at right angles to walls, slabs, girders, etc., and in locations giving greatest accessibility for painting and least accumulation of dirt. All exposed conduit runs shall be attached to steel masonry, concrete or timber by galvanized malleable iron or galvanized steel straps, clamps, or hangers of an approved type, held at not less than two (2) points by galvanized steel bolts or lag screws. The runs shall be supporting members, Conduits mounted o structural steel members shall be securely clamped to prevent rattling and wear.
5. All ends of conduits installed during construction, or for future use shall be closed against the introduction of foreign material by the use of standard pipe or brush caps. All conduits shall be installed so that they will drain and necessary holes for this purpose shall be made as directed.
6. All conduits risers in railing post shall, unless otherwise shown on the Plans, terminate one inch (1") below the top surface of the post. The risers shall be accurately placed so that they may be located for future use.

SPECIAL PROVISIONS
CONCRETE ENCASED
DB-120 LIGHTING CONDUIT

DRAFT - NOT FOR CONSTRUCTION

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7. All conduits installed underground shall have a Mix No. 1 Concrete envelope providing cover as indicated by the dimensions shown on the Detail Plates for Standard Duct Sections.
8. All traffic bearing ductwork shall be encased in Mix No. 1 Concrete. Concrete encasement shall be a minimum of 3" in all directions from the ductwork, as per Detail No. BC-824.01, and extend 3 feet from the curb unless otherwise noted in the plans.
9. Excavation for installation and encasement shall be carefully done, sidewalks trimmed to line and the bottom of trench graded so that the envelope will be uniform and there will be no pockets or low points in the conduit run. All backfill, regardless of class shall be carefully tamped to conform to the requirements of Section 204, unless otherwise specified. Care shall be taken that the concrete envelope, or conduit, are not injured.
10. In areas where a concrete footway currently exists, the Contractor shall remove the existing footway as required and excavate a trench of the width and depth as shown on the Detail Plates, or as directed by the Engineer. After the conduit is installed, the Contractor shall install CR-6 to the existing grade to provide a temporary and or permanent concrete footway.
11. All conduits, boxes, etc., to be encased in concrete must be accurately placed and rigidly held in position so that no variation from line or grade occurs when concrete is placed.
12. Conduits, fittings and boxes shall be stored under cover and above ground.
13. Upon completion of the conduit installation, the system shall be cleared by a pull through mandrel type device inserted in the presence of the Engineer before any conductors are installed. Immediately prior to the installation of conductors in any run, the conduits comprising that run shall again be checked. Any and all obstructions shall be removed to the approval of the Engineer.
14. The Contractor shall install and leave in place NO. 10 iron wire in all conduit runs installed for future use.
15. The Contractor shall furnish work drawings. Work drawings shall be twenty-two inches by thirty-six inches (22"x36") and shall be furnished in duplicate for Engineer's preliminary examination. After work drawings have been accepted by the Engineer, and revisions made the Contractor shall furnish additional copies as may be requested.

DB-120 Conduits and Fittings.

Conduit shall be cut with a saw and all ends shall be accurately tapered or otherwise finished depending on type of coupling specified. Tools recommended for this work by the conduit manufacturer shall be used and finished ends shall be equal to those supplied by the Manufacturer. All ends shall be smoothed of burrs and fins. Standard bends shall be used wherever possible and special bends shall preferably have a radius not less than that of standard bends. All special conduits shall be accurately dimensioned and manufactured. All joints shall be sealed with waterproof joint sealing compound recommended by the conduit manufacturer and approved by the City. All joints thus treated shall be waterproof.

1. An expansion joint shall consist of a break in the conduit run with a space between ends of conduit as indicated on the Plans.
2. A conduit sleeve not less than eighteen inches (18") long unless otherwise indicated shall cover the break. The sleeve shall be rigidly anchored to the structure.

**SPECIAL PROVISIONS
CONCRETE ENCASED
DB-120 LIGHTING CONDUIT**

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3. All underground ductwork shall have magnetically detectable plastic warning tape installed 12" above the duct for the entire length of the duct. The color of the warning tape shall be red for electric ductwork. Provide tape in rolls, 3 inches minimum width with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification shall be "CAUTION BURIED ELECTRIC LINE BELOW" or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material. Bury tape with printed side up. Three-foot (3') clearances are recommended between lighting conduits and meter vaults.

Inspection and Testing.

1. A braided nylon line, having a minimum tensile strength of four hundred pounds (400 lbs), shall be installed in each duct.
2. Each duct shall be tested in the presence of the Engineer. A test device made from ridged material not more than one-half inch (1/2") smaller than the bore of the duct, and a minimum of two feet (2') long, shall be passed through each duct. The device shall be so constructed as to prevent its use through bends whose radius is less than twenty feet (20'). Any duct through which the device cannot be passed shall be repaired by the Contractor to the satisfaction of the Engineer with no additional compensation from the City.
3. All manholes shall be inspected for proper duct entries, terminators, bell ends, pulling in irons, concrete seal around duct, caps or lugs, pull lines and grout seals between the frame and chimney.
 - a. The duct line sizing device is to be used as a "go" gauge for new PVC duct and will be used on the basis of a receipt signed by the Contractor.
 - b. Use of the device must be observed by the Engineer. Arrangements are to be made at least three (3) days in advance.
 - c. Prior to testing, the Contractor shall assure that the bore of all the ducts are clean and clear of fins, burrs or sharp edges and dry.
 - d. The Contractor shall supply labor and equipment necessary to gauge the new duct.
 - e. If the device meets any resistance within the run of duct, the operation shall stop and the device recovered as its starting point.
 - f. Any duct which has resistance to the passing of the device will not be accepted.
 - g. Final acceptance of the conduit system will not be made until completion of all the Work in the Contract including completion of cable Work and viability and continuity of cable service acceptance in the specified duct system.

MEASUREMENT AND PAYMENT. This work will be paid for at the contract unit price bid per linear foot for which price and payment shall be full compensation for all trench excavation, conduit, concrete encasement, core drilling into existing manhole walls, waterproof epoxy, rodding, pavement patching, slotting, saw cutting, replacement with matching roadway materials, fittings, pull wires, duct plugs, caps, terminators, junction boxes, warning tape, backfill, seeding, CR-6, and all labor, materials, equipment, and tools necessary to complete the work for each type of conduit. Payment will also include hauling and disposing of all excavated materials and furnishing, transporting and placing of RC-6 or CR-6 stone backfill.

**SPECIAL PROVISIONS
REMOVAL OF PARKING
METER POLE AND FOUNDATION**

DRAFT - NOT FOR CONSTRUCTION

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**CATEGORY 800
TRAFFIC**

REMOVAL OF PARKING METER POLE AND FOUNDATION

DESCRIPTION. This work shall consist of removal of Parking Meter Pole and Foundation.

MATERIALS. Not applicable.

CONSTRUCTION. Not applicable.

MEASUREMENT AND PAYMENT Removal of Parking Meter Pole and Foundation will be incidental to Class I Excavation.

9/24/12

SPECIAL PROVISIONS
SECTION 801 – CONCRETE FOUNDATIONS
EZ PARK MACHINE BASE

DRAFT - NOT FOR CONSTRUCTION
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SHA CONTRACT NO. PENDING
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CATEGORY 800
TRAFFIC

SECTION 801 – CONCRETE FOUNDATIONS

EZ PARK MACHINE BASE

801.01 DESCRIPTION

SUPPLEMENT: with the following.

This work also consists of furnishing and placing a concrete foundation base with a City furnished base anchor for an EZ Park Machine at locations specified in the approved signing design plans.

801.02 MATERIALS

SUPPLEMENT: with the following.

Curing Materials	902.07.03
Concrete Mix No. 2	902.10

Less than 1 ft³ of Mix. No. 2 Concrete is needed per base.

801.03 CONSTRUCTION

SUPPLEMENT: with the following.

801.03.06 Removal of Existing EZ Park Machines. Prior to beginning work the contractor shall contact The Parking Authority of Baltimore City (PABC) at 443-573-2800 and the Department of Transportation Meter Shop at 410-396-7575 to verify the locations of existing parking meters or E-Z Park Machine. Please contact the PABC and the Meter Shop 72 hours in advance for the parking meter heads/E-Z Park Machines to be removed or bagged. The Meter Shop shall remove all parking meter heads. It is the responsibility of the contractor to remove and dispose of the existing meter post/E-Z Park Machine Bases.

801.03.07 Installation of EZ Park Concrete Bases. The contractor shall also notify the PABC 72 hours in advance when ready to reinstall the E-Z Park Machines concrete bases. PABC will arrange with the Engineer to have new E-Z Park Machine base anchors delivered to the contractor.

The Contractor shall excavate for the new concrete base, install forms, expansion material and concrete with the City furnished base anchor as specified in the approved signing design plans.

SPECIAL PROVISIONS
SECTION 801 – CONCRETE FOUNDATIONS
EZ PARK MACHINE BASE

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801.04 MEASUREMENT AND PAYMENT

SUPPLEMENT: with the following.

EZ Park Machine Bases will be measured and paid for at the Contract unit price bid per each. The payment will be full compensation for all excavation, disposal, forms, Mix No. 2 Concrete, expansion material, installation of the City furnished base anchor, backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Removal and disposal of the existing meter posts and foundations shall be measured and paid separately under “Remove Existing Parking Meter Pole and Foundation”.

**SPECIAL PROVISIONS
CONCRETE FOUNDATIONS FOR
TRAFFIC STRUCTURES**

DRAFT - NOT FOR CONSTRUCTION
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**CATEGORY 800
TRAFFIC**

CONCRETE FOUNDATIONS FOR TRAFFIC AND LIGHTING STRUCTURES

DESCRIPTION. Construct concrete foundations for Baltimore City type traffic signal poles, pedestal poles, light poles, and base mounted controllers.

MATERIALS.

- A. Concrete: Concrete for foundations shall be Mix No. 3.
- B. Steel Reinforcement: Steel reinforcement shall be ASTM A 65, Grade 60.
- C. Non-Shrink Leveling Grout: Minimum Compressive Strength = 5,000 psi.
- D. Epoxy Grout: Two part epoxy with a Minimum Tensile Strength of 18, 000 psi suitable for fastening steel or stainless steel in concrete.

E. Sizes:

POLE TYPE	FOUNDATION	
	DIAMETER (FT)	HEIGHT (FT)
LIGHT POLE	2'-0"	7'-0" (LEVEL GRADE) 9'-0" (SLOPE)
MAST ARM POLE OR JOINT-USE POLE	3'-0"	9'-6"
PEDESTAL POLE OR PUSH BUTTON POST	1'-6"	3'-0"

CONTROLLER	FOUNDATION	
	LENGTH X WIDTH (FT)	HEIGHT (FT)
BASE MOUNT CONTROLLER	4'-7" X 3'-0"	0'-6" (ABOVE GRADE) 3'-0" (BELOW GRADE)
CONCRETE PAD	4'-7" X 3'-6"	0'-6" (BELOW GRADE)

- F. Anchor bolts shall be fabricated from high strength steel conforming to ASTM A-449 having minimum yield strength of 105,000 P.S.I. The anchor bolts shall be fully galvanized using the hot dip method in accordance with ASTM A-153. The top nine inches of each bolt shall be threaded. There shall be four (4) anchor bolts provided for each pole. Each bolt shall be provided with two (2) hex nuts conforming to ASTM A-194, Grade 2H and (2) flat washers conforming to ASTM F-436. Both nuts and washers shall be hot dip

**SPECIAL PROVISIONS
CONCRETE FOUNDATIONS FOR
TRAFFIC STRUCTURES**

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galvanized. After galvanizing, the nuts shall fit onto the threaded end of the anchor bolts hand tight. Each anchor bolt shall be furnished with plated steel nuts and plated flat washer conforming to ASTM F-436.

G. Ground Rods Section 804.

CONSTRUCTION. The Contractor shall perform all excavation to neat lines for the levels and dimensions specified in the BC details. All excavation work will be inspected and approved by the Engineer before proceeding with construction. Approved material selected from the excavation shall be used for backfill.

Excavation for foundation installation shall be by hand method; or mechanical method, if specified in the Contract Documents. All foundations shall be Test Pit using non-destructive methods to ensure clearance from obstructions and utilities. In fill areas, the fill shall be completed prior to construction of the bases. The base excavation may be augured provided the top six inches (6") of the base is blocked square. Galvanized parts that have been cut or chipped to bare metal shall be repaired as specified in A.S.T.M. specification.

The Contractor shall furnish and install stainless or galvanized steel nuts and washers, if poles are to be installed as an item of work; otherwise, the nuts and washers furnished by the Contractor shall be delivered to the Engineer. It is intended that all concrete for foundations are poured against existing undisturbed earth. However, where the existing ground will not retain its shape during or after excavation, or if the excavation should show any tendency to cave in before placing the foundation, the Contractor shall provide a sleeve or form to retain the earth and receive the concrete. Sleeve material shall be composed of sheet steel formed to the required shape. The sleeve shall be carefully driven to the required depth. As the concrete is placed, the sleeve shall be carefully withdrawn so that the wet concrete will flow into intimate contact with the sides of the excavation. All concrete for foundations shall be placed in a continuous operation. When the sleeve is entirely withdrawn, provide above grade forms and templates to complete the foundation.

Concrete shall not be placed in the foundation by dumping from the top. If there is no groundwater present in the excavation, the method of placing the concrete shall be approved by the Engineer. If there is groundwater in the foundation, the concrete shall be placed by tremie or other method approved by the Engineer. The concrete in a foundation shall be vibrated.

Bases for signal and lighting structures shall be installed to the grade of adjacent footway or as indicated in the Contract Documents. Poured concrete foundations shall be allowed to cure for at least 72 hours prior to installing the poles.

Concrete shall be mixed, placed and tested as specified in the contract documents. Footings including reinforcement and bolt circle data shall be as specified in the Contract Documents or in conformance with approved working drawings. Anchor bolts shall be plumb. Suitable templates for setting anchor bolts shall be supplied by the Contractor and shall be accurately placed and left

**SPECIAL PROVISIONS
CONCRETE FOUNDATIONS FOR
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in place until the concrete has attained its initial set. Two of the bolts shall be on a line parallel to the roadway unless otherwise indicated in the Contract Documents. Tops of foundations shall be screened to a dense smooth finish. Exposed surfaces shall be cured by use of a liquid membrane curing compound. The top 6" of base shall be boxed square. Elbow(s) of the type(s) and size(s) specified shall be placed in each foundation.

MEASUREMENT AND PAYMENT. Measurement of this item will be on a per each basis and quantity to be paid for will be the actual number of signal, pedestal, lighting and/or joint-use pole bases of various sizes actual installed per the Contract plans and the Details and accepted. This work will be paid for at the Contract Unit price bid per each, for the specific Signal, Pedestal, Lighting and/or Joint Use Pole bases indicated in the Proposal, which price and payment shall constitute full compensation for all materials, labor, tools, equipment, hauling, cement concrete, formwork, finishing, anchor bolts, stainless steel nuts and washers, protective sleeves and nuts, galvanizing, compaction, re-compaction, disposal of unsuitable material, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

SECTION 804 – GROUNDING

804.02 MATERIALS.

Add: Ground wire for lighting will be as per BG&E.

804.03 CONSTRUCTION.

Add: Ground rods for traffic signal poles shall be installed in the pole foundation as per B.C. Detail 885.07. Ground rods for lighting poles shall be installed in the adjacent hand box as per B.C. Detail 804.01.

Delete: section 804.04 in its entirety.

Add: the following:

804.04 MEASUREMENT AND PAYMENT. Ground Rods (Traffic Signal) will be measured and paid for at the Contract unit price per each 10 ft length. The payment will be full compensation for lugs and welding, excavation, backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Ground wire will be measured and paid for as specified in 810.04.01.

Ground Rods (Lighting) will be measured and paid for at the Contract unit price per each 10 ft length. The payment will be full compensation for lugs and welding, excavation, backfill, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Ground wire will not be measured, and will be incidental to the Ground Rod (Lighting) item.

SPECIAL PROVISIONS

**805 - ELECTRICAL CONDUIT AND
FITTINGS**

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**CATEGORY 800
TRAFFIC**

SECTION 805 – CITY CONDUIT DUCTBANKS

**D-5 DUCT SECTION: 6-4" CONDUIT CONCRETE ENCASED
D-6 DUCT SECTION: 12-4" AND 1-2" CONDUIT CONCRETE ENCASED
D-7 DUCT SECTION: 2-5" AND 4-3" CONDUIT CONCRETE ENCASED
D-8 DUCT SECTION: 4-5" CONDUIT CONCRETE ENCASED
D-9 DUCT SECTION: 4-5" AND 3-3" CONDUIT CONCRETE ENCASED
D-10 DUCT SECTION: 6-5" AND 3-3" CONDUIT CONCRETE ENCASED
D-11 DUCT SECTION: 6-5", 1-4" AND 5-3" CONDUIT CONCRETE ENCASED
D-12 DUCT SECTION: 8-5" AND 3-3" CONDUIT CONCRETE ENCASED
D-13 DUCT SECTION: 8-5", 1-4" AND 5-3" CONDUIT CONCRETE ENCASED
D-14 DUCT SECTION: 10-5" AND 3-3" CONDUIT CONCRETE ENCASED
D-15 DUCT SECTION: 12-5", 1-4" AND 5-3" CONDUIT CONCRETE ENCASED
D-16 DUCT SECTION: 24-5", 3-4" AND 6-3" CONDUIT CONCRETE ENCASED
D-17 DUCT SECTION: 10-5" AND 6-4" CONDUIT CONCRETE ENCASED**

CONCRETE PROTECTIVE SLAB

**CONDUIT CULVERT CROSSING (ALICEANNA STREET)
CONDUIT CULVERT CROSSING (FLEET STREET)
CONDUIT CULVERT CROSSING (EASTERN AVENUE)
CONDUIT CULVERT CROSSING (BANK STREET)
CONDUIT CULVERT CROSSING GOUGH STREET)
CONDUIT CULVERT CROSSING (PRATT STREET)
CONDUIT CULVERT CROSSING (DUKE ALLEY)
CONDUIT CULVERT CROSSING (LOMBARD STREET)**

805.01 DESCRIPTION.

INSERT: The following.

All work to be performed under this item and payment therefore shall be in accordance with the requirements of Section 805 – Electrical Conduit and Fittings, of the MD SHA Standard Specifications for Construction and Materials, dated 2008, and all amendments to date and these Special Provisions.

805.02 MATERIALS

INSERT: The following.

SPECIAL PROVISIONS

805 - ELECTRICAL CONDUIT AND FITTINGS

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Buried plastic conduits and fittings shall be Polyvinyl Chloride (PVC), Schedule 40, Type DB-120 heavy wall, conforming to, NEMA TC-3 and 13, ASTM D2672, D2466 and F512.

Plastic conduits in casing pipe shall be PVC, Schedule 40, and conform to NEMA TC-2, ASTM D2672 and D2466, with solvent cement joints.

Plastic conduit to be installed with less than 35-foot radius, shall be preformed factory-fabricated segmental sections, with 11.25-degree segmental sections for conduit sections between 12 and 35-foot radius, and preformed radius sweeps for conduit sections with less than 12-foot radius.

Split conduit and fittings shall be PVC, Type 1 or B, and jointing materials shall include joiner strips, reinforcing straps and sealing tape per the conduit manufacturer's printed instructions.

Conduit jointing materials at tie-ins to existing systems shall be impregnated woven glass fabric, primer and sealer as recommended by the conduits and fittings supplier.

All plastic conduits and fittings shall bear the Underwriters Laboratories label and be rated for wire temperatures of 90 degrees Centigrade.

All conduits shall be the product of the same manufacturer and bear the same designation, except as otherwise provided in the Contract Documents.

Flowable Backfill for Casing Pipes	314.02
Crusher Run Aggregate CR-6	901.01
Encasement Concrete MDSHA Mix No. 1 (2,500 psi at 28-days)	902.10
Reinforcing Steel	908.01

Duct Spacers: High-density polyethylene casing spacers and self-supporting vertical and horizontal locking type spacers to provide 2-inch minimum clearance between all conduits.

Conduit Ductbanks shall conform to the Contract Drawings and the following City Detail Drawings:

- BC 802.03-1 and 2 - Conduit Square Bore Adapter,
- BC 802.03-4 – Split Duct,
- BC 803.01-1 to 5 – Conduit Sections in Casing Pipe,
- BC 824.01-1-Standard Duct Sections,
- BC 824.01-2 – Standard Conduit Cross-Sections,
- BC 824.02-1- Plastic Utility Duct PVC (Poly Vinyl Chloride) General Information,
- BC 824.02-2 – Plastic PVC Duct Spacers General Information,
- BC 824.06 - Duct Entrance into Manhole,

SPECIAL PROVISIONS

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BC 824.08 - Reinforcing Slab for Shallow Electric Duct,
BC 824.10 – Duct Transition to Recessed Extension,
BC 830.01-1 to 6 - Duct Identification, and
BC 830.02 – Conduit Transposition.

805.03 CONSTRUCTION

805.03.01 Bends

DELETE: 805.03.01

INSERT: The following.

Unless otherwise specified in the Contract Documents, changes in direction of conduit shall be accomplished by use of manufactured bends. Bends or sweeps shall have a radius of not less than 35 ft.

Any section of conduit that is cracked, bent, punctured, flattened or distorted, shall be rejected and removed from the project site immediately. The Contractor shall use only factory-preformed bends.

The total of all bends between any two manholes shall not exceed 180-degrees. All preformed bends shall be approved by the Engineer before installation. All joints shall be sealed with a waterproof joint-sealing compound recommended by the manufacturer and approved by the Engineer.

805.03.02 Connections:

INSERT: The following at the end of 805.03.02.

All cut lengths shall be reamed clear of fins or burrs. Long running threads will not be permitted. A 30-degree chamfer shall be formed or cut for non-metallic conduit on all spigot ends of conduit prior to installation. All couplings and fittings shall be of the same material and wall thickness as the conduit. All elements of the system to be encased in concrete shall be accurately placed and rigidly held in position so that no variation from line or grade occurs on the individual conduit system when concrete is placed. When two different designations of the conduit are joined, a smooth bore through the transition area shall be assured by using adapters, beveling or other means acceptable to the Engineer. All bends or sweeps specified shall be preformed and no conduit shall be out of round or distorted more than allowed by the manufacturer's specification.

805.03.05 Pull Wire:

DELETE: 805.03.05

SPECIAL PROVISIONS

**805 - ELECTRICAL CONDUIT AND
FITTINGS**

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INSERT: The following.

After installation, all conduit which will be left empty shall have a nylon pull rope installed. The rope shall be made of braided nylon rope with a minimum breaking strength of 400-lb (182 kg).

805.03.08 Buried Conduit (Trenched):

DELETE: 805.03.08

INSERT: The following.

The conduit section shall have a minimum cover of 3 ft., 6 in. under roadways and 4 ft. under sidewalks and shall slope to drain. Where it is not possible to adhere to the minimum cover specified because of an underground obstruction, the Engineer shall give approval before the configuration of the duct section or depth of cover is revised.

805.03.09 Encased Conduit (Trenched):

INSERT: The following.

The dimensions of the concrete encasement and the configuration of the section shall be as specified on the Contract Plans. All conduit sections shall be formed using plastic separators of an approved design, furnished and installed by the Contractor. Each duct shall have 2 in. of separation from the next nearest duct. When casting the envelope, precaution shall be taken to prevent distortion to or floating out of position of any duct.

Chute-deposit concrete as close as possible to the top of the conduit, with the concrete directed down along the formwork wall to the bottom of the conduit section. The placement of the concrete between vertical rows of conduit should be done carefully while at the same time spreading out the concrete to insure the absence of voids and to avoid the dislodging conduits. Under no condition shall concrete be allowed to "drop" a vertical distance of 3-ft. or more without the benefit of a chute or trough to convey same.

Completed encased conduit sections shall be of the sizes shown on the Contract Documents. In no instance shall excess concrete be disposed of indiscriminately atop the design sections, within the trench or trench excavation or on grade.

Trench width shall not be greater than the largest outside dimension of the concrete encasement plus sixteen inches.

INSERT: 805.03.11 Testing, at the end of 805.03

SPECIAL PROVISIONS

**805 - ELECTRICAL CONDUIT AND
FITTINGS**

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Each conduit shall be tested in the presence of the Engineer. The Engineer shall be notified at least two days prior to conducting the test. A test device made from rigid material not more than 1/2 in. smaller than the bore of the conduit, and a minimum of 2 ft. long, shall be passed through each conduit. The device shall be so constructed as to prevent its use through bends whose radius is less than 35 ft. Any conduit through which this device cannot be passed, shall be repaired by the Contractor to the satisfaction of the Engineer, with no additional compensation from the City.

1. The conduit line sizing device is to be used as a 'go' gauge for New PVC Conduit and will be used on the basis of a receipt signed by the Contractor.
2. Use of the device must be observed by the Engineer. Arrangements are to be made at least two (2) days in advance.
3. Prior to testing, the Contractor shall assure that the bores of all conduits are clean and clear of fins, burrs or sharp edges and dry.
4. The Contractor shall supply labor and equipment necessary to gauge the new conduit.
5. If the device meets any resistance within the run of conduit, the operation shall stop and the device recovered at its starting point.
6. Any conduit which has resistance to the passing of this device, will not be accepted.
7. Final acceptance of the Conduit System will not be made until completion of all the work in the Contract.

INSERT: 805.03.12 Minimum Clearance at the end of 805.03

The minimum clearance for electrical conduit from other utilities shall be twelve inches. Should the excavation be adjacent to utilities, the Contractor shall take measures to support and/or brace the affected utility during his operation and it shall be solely his responsibility to perform the excavation without damage to surrounding utilities.

INSERT: 805.03.13 Separation of Conduit at the end of 805.03

Separations will be made only on the written order of the Engineer. Placement of conduit throughout the separation shall be carefully done so that the conduit will slope uniformly. Crimps at joints or other distortion within the line of conduit will not be allowed.

When it is found necessary to form a separation in a conduit section due to an obstruction, which may or may not be indicated on the conduit profile, or the Contract Drawings call out a separation, the following procedures shall be followed:

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1. Between the points of intersection within the limits of the separation, the lower section of the splayed conduit shall be constructed in its entirety prior to filling the area between the conduits and constructing the upper section of the separation.
2. Place and support to a suitable grade, the lower section of the splayed conduit.
3. Place concrete encasement around the lower splayed conduit section with a top, bottom and side thickness of encasement as shown.
4. Backfill the trench with material in conformance with Common Borrow to an elevation equal to the bottom of the concrete encasement for the upper section of the splayed conduit. Use Crusher Run Aggregate CR-6 to fill voids between split conduit.
5. Place and support to grade, the upper section of splayed conduit.
6. Place concrete encasement around the upper splayed conduit section with top, bottom and side thickness of encasement as shown.
7. After the concrete has cured and the unoccupied conduit tested and found acceptable, the backfill operation may be completed.

INSERT: 805.03.14 Trenching and Backfilling at the end of 805.03.

Excavation for installation and encasement shall be carefully done, sidewalls trimmed and the bottoms of trench uniformly graded, so that the envelope will be uniform. All backfill shall be carefully tamped. Trenches for conduit sections shall be excavated, sheeted, shored and pumped as required to install conduit. All disturbed materials in the bottom of the trench shall be compacted before the start of any concrete encasement operations. Refer to Section 809 – Trenching and Backfilling for additional requirements.

Installation of conduit in casing shall be in accordance with BC 803.01-1 to 5 – Conduit Sections in Casing Pipe.

If work on a conduit section must be stopped for any reason or is being constructed for future use, the ends of the conduit shall be sealed at once, with standard caps or plugs.

In areas where existing concrete sidewalk exists, the Contractor shall remove the existing sidewalk to the nearest joint for the conduit installation, and replace with a new 5-inch thick concrete sidewalk.

305.04 MEASUREMENT AND PAYMENT

INSERT: the following at the end of 805.04

SPECIAL PROVISIONS

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The items:

- D-5 Duct Section: 6-4" Conduit Concrete Encased
 - D-6 Duct Section: 12-4" and 1-2" Conduit Concrete Encased
 - D-7 Duct Section: 2-5" and 4-3" Conduit Concrete Encased
 - D-8 Duct Section: 4-5" Conduit Concrete Encased
 - D-9 Duct Section: 4-5" and 3-3" Conduit Concrete Encased
 - D-10 Duct Section: 6-5" and 3-3" Conduit Concrete Encased
 - D-11 Duct Section: 6-5", 1-4" and 5-3" Conduit Concrete Encased
 - D-12 Duct Section: 8-5" and 3-3" Conduit Concrete Encased
 - D-13 Duct Section: 8-5", 1-4" and 5-3" Conduit Concrete Encased
 - D-14 Duct Section: 10-5" and 3-3" Conduit Concrete Encased
 - D-15 Duct Section: 12-5", 1-4" and 5-3" Conduit Concrete Encased
 - D-16 Duct Section: 24-5", 3-4" and 6-3" Conduit Concrete Encased
 - D-17 Duct Section: 10-5" AND 6-4" Conduit Concrete Encased
- Concrete Protective Slab

shall be measured per linear foot and paid for under the Design/Build Contract lump sum bid. The measurement and payment shall be full compensation for the furnishing and placing of all materials, excavation, backfill, ducts, preformed bends, duct encasements, duct installation in casings, attachments, hangers, terminators, separators, caps, plugs, fittings, connections, duct bell end terminators, nylon pull lines, crusher run aggregate for separation, concrete, reinforcing bars, concrete encasement and in casings, removal of portions of existing manholes for recessed extensions, crusher run aggregate (CR-6 stone) used to backfill trenches, core drilling into manholes walls, connections to manholes, including the facing of existing conduit at the face of the wall, and closing of voids around the ducts, supporting and protecting conductors, protecting existing utilities during excavation operations, removal and disposal of all excavated material, forms, pumping, sheeting, shoring, rodding, debris removal, testing, conduit spacers, splits, split-conduit and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will also include hauling and disposing of all excavated materials and furnishing, transporting and placing of CR-6 stone backfill.

Payment will also include furnishing and installing the precast recessed extensions on the existing manholes on the Contract Drawings and detailed in these Specifications.

The items:

- Conduit Culvert Crossing (Alicenna Street)
- Conduit Culvert Crossing (Fleet Street)
- Conduit Culvert Crossing (Eastern Avenue)
- Conduit Culvert Crossing (Bank Street)
- Conduit Culvert Crossing Gough Street)

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Conduit Culvert Crossing (Pratt Street)
Conduit Culvert Crossing (Duke Alley)
Conduit Culvert Crossing (Lombard Street)

shall be measured per each and paid for under the Design/Build Contract lump sum. The measurement and payment shall be full compensation for the furnishing and placing of all materials, excavation, backfill, removing and replacing sidewalks and roadways, single or multiple tunnel casings, spacers, attachments, caps, plugs, fittings, connections, pull lines, crusher run aggregate, concrete, reinforcing bars, concrete encasement, protecting existing utilities during excavation operations, removal and disposal of all excavated material, forms, dewatering, sheeting, shoring, and for all material, labor, equipment, machinery, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
807 - ELECTRICAL SERVICE EQUIPMENT

DRAFT - NOT FOR CONSTRUCTION
F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
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CATEGORY 800
TRAFFIC

SECTION 807 ELECTRICAL SERVICE EQUIPMENT

Section 807

807.02 MATERIALS.

ADD: The following:

The 100 amp fused disconnect switch shall be suitable for service equipment and be NEMA 3R and manufactured of painted steel

807.03 CONSTRUCTION.

DELETE 807.03.06

ADD: The Following:

It shall be the Contractors responsibility to coordinate the installation and or modification of new and existing services. The City shall be responsible for all connection fees required by Baltimore Gas & Electric (BGE)

807.04 MEASUREMENT AND PAYMENT.

DELETE: 807.04.04 AND 807.04.05

ADD: The Following:

Furnish and Install 100 Amp Overhead or Underground Electrical Service will be paid at the contract unit price per each and include all material required to install the underground or overhead electrical service as per the typical details provided in the Contract, including, permits, meter socket, disconnect switches, riser conduits, condulets ,hubs, fittings, sealtight, weather heads, banding and RGS conduits down the pole to hand hole or vault for underground services, drilling installing conduit chase in new and existing poles.

SPECIAL PROVISIONS
810 — ELECTRICAL CABLE,
WIRE, AND CONNECTORS

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATAGORY 800
TRAFFIC

SECTION 810 ELECTRICAL CABLE, WIRE, AND CONNECTORS

810.01 DESCRIPTION

ADD: The following:

This work shall also include splicing and termination of copper cables.

810.02 MATERIAL

ADD: The following:

Twisted pair communications cable will meet IMSA specification 40-2 and be American Wire Gauge 19.

Traffic signal cable shall be IMSA type 19-1, solid conductor.

Power cables shall be IMSA type 20-1, solid conductor

Shield bond connectors

Copper Alloy split bolt connectors.

810.03 CONSTRUCTION

ADD: The following sub-section:

810.03.10 REPLACEMENT OF EXISTING COMMUNICATION CABLE. This contract will require the removal and replacement of sections of the existing twisted pair copper communication cables in kind or as otherwise directed by the Engineer, installed underground or overhead. The Contractor will be utilizing the ducts and conduits already assigned and occupied by the Traffic Divisions copper cable network. Permanent underground or above ground splices will not be allowed.

In the event the Contractor is not able to locate the existing communication cable, continue to follow an existing cable or is not able to locate a duct listed for use in a reasonable amount of time the Contractor shall stop work and request the assistance of the City signal shop, who will dispatch personnel when available to assist in locating the cable or duct.

This work must be coordinated with the Engineer to accommodate special events that require the use of existing copper cables to activate traffic signal patterns. Work schedules must be coordinated and approved by the Engineer for critical cable replacements.

Communication cable will be tested prior to installation on the factory reel and again after installation. All testing will be witnessed by the Engineer or his designated representative using a **time-domain reflectometer** (TDR). The contractor will provide written test procedures indicating the methods and equipment to be used and the expected acceptable results.

SPECIAL PROVISIONS
810 — ELECTRICAL CABLE,
WIRE, AND CONNECTORS

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Any cable not meeting the established acceptable minimum requirements will be removed or repaired by the contractor using methods submitted by the contractor and approved by the Engineer and re-tested.

Grounding of shielded copper interconnect cable shall be accomplished utilizing a shield bond connector, designed to make a stable, low-resistance electrical connection between the shield of a communications cable and a conductor such as a strap, bar, or wire. The connector shall consist of five parts: lower member (base), upper member (top), two securing nuts (lock nuts) and a plastic shoe to aid connector insertion and to protect conductors. The base teeth are to be set at such an angle as to permit easy insertion under the cable shield. Top and base members shall be made of tin-plated tempered brass, slightly curved to exert a continuous spring force on sheath and shield after clamping. Shield bond connectors shall be matched to the size cable to be grounded per the manufacturer's recommendations. Shielded communications cables shall only be grounded at the originating location for each section and will not be grounded on both ends.

810.03.11 Furnish and install split bolt connectors as required for the types of cables and in conformance with the manufacturer's recommendations.

810.04 MEASUREMENT AND PAYMENT

ADD: The following:

810.04.01 The price for communication cable shall include all tools, labor, material and equipment to install, rack, coil, label, ground, test and provide test results in written form to the Design Builder's Engineer for approval. When communication cable is being replaced, the cost to remove the existing communication cable will be incidental to the cost of the new cable.

When electrical cable requires splicing, the cost of split bolt connectors will be incidental to the cost of the cable.

Shield bond connectors will be incidental to the cost of the shielded communication cable.

SPECIAL PROVISIONS

811 — ELECTRICAL HAND HOLES,
MANHOLES, PULL AND JUNCTION BOXES

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 800

TRAFFIC

**TRAFFIC HANDBOX WITH DTT COVER AND
LIGHTING HANDBOX WITH DPW COVER**

**DELETE: SECTION 811— ELECTRICAL HAND HOLES, MANHOLES, PULL AND
JUNCTION BOXES** in its entirety.

INSERT: The following.

SECTION 811—HANDBOX CONDUIT

811.01 DESCRIPTION

This work shall consist of furnishing and installing Hand Boxes for street lighting (DPW Cover) and traffic control devices (DTT Cover). Included also is the removal of boxes in their entirety and the plugging of ducts, the extending of ducts through the void area utilizing split duct and fittings, and replacement of boxes utilizing split sweeps and fittings.

811.02 MATERIALS

INSERT: The following.

Handbox Base: Mix No. 3 Concrete (902.1), as per detail BC 804.01.

Cylindrical Box Section: Mix No. 3 Concrete (902.1), Wire Mesh Reinforced, as per detail BC804.02.

Frame and Cover: Cast Iron and Cast Steel, respectively, as per details BC 804.03 through 804.09. Covers for electric service shall read "DPW CONDUIT". Covers for traffic signals shall read "DTT CONDUIT".

Ground Rod: Solid, steel, 3/4" diameter x 10' length, with rod copper-jacketed, UL Approved and Listed.

Cement Mortar: As per Section 903.

Split Duct and Fittings: As per Section 805 noted herein.

811.03 CONSTRUCTION

INSERT: The following.

SPECIAL PROVISIONS

811 — ELECTRICAL HAND HOLES,
MANHOLES, PULL AND JUNCTION BOXES

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Excavate, install ground rod, and place base slab to proper grade; install cylindrical box section, mortaring box to base. Cement mortar seal all annular openings in base and box that have been formed for duct entrance/exit.

Set handbox frames and covers to sidewalk and planter finished grade, utilize cement mortar during setting operations.

Perform backfilling/compacting operations when directed by the Engineer.

Where a new hand box is to be connected to an existing duct bank, the Engineer will determine the exact duct to be connected to.

Contact Baltimore City Conduit Maintenance Section through the Engineer and request their presence at the site for technical advice regarding proposed work operations.

All existing handbox frames and covers removed from the site are to be transported/deliver to the Leadenhall Street Maintenance Yard, 1400 Leadenhall Street, Baltimore, MD 21201.

Where existing handboxes are to be removed and not replaced, existing duct slated to remain in service shall be extended through the void area as applicable, utilizing split duct and fittings, all encased, in a manner acceptable to the Engineering subsequent to which the void shall be backfilled/compacted. Split duct/sweeps and fittings through handbox void areas and the replacement of handboxes shall, in these instances, be furnished and installed by the Contractor. Where existing duct are slated to be abandoned, their open ends shall be closed-off with a minimum 8" thick concrete or brick masonry bulkhead prior to backfilling void resulting from handbox removal.

Install handbox covers "DPW CONDUIT" or "DTT CONDUIT", as per Contract Plans.

Completed handbox installation shall be as per detail BC 804.01.

811.04 MEASUREMENT AND PAYMENT

INSERT: The following.

Measurement of "Traffic Handbox with DTT Cover" and "Lighting Handbox with DPW Cover" items will be made on a per each basis, for installation complete, and the quantity to be measured will be the number of handboxes of each item installed or adjusted and accepted by the Engineer.

Payment for "Traffic Handbox with DTT Cover" and "Lighting Handbox with DPW Cover" will be made at the contract unit price bid per each, which price and payment shall include all backfill, ground rods, poured concrete bases, boxes, and frames and covers, mortaring, removal and disposal of existing handboxes, modify duct runs, and all labor, materials, equipment, tools and incidentals necessary to complete these items of work. All labor and materials required to divert a duct into the hand box, including rodding as necessary and installing pull rope, duct

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plugs, all bases, boxes, frames, covers, duct penetration as required, operation keys, mortaring removal and disposal of material shall be considered incidental to the cost of the hand box. No additional compensation will be made if the duct is diverted each way into the hand box. No payment will be made until the hand box is inspected and accepted as complete.

SPECIAL PROVISIONS

811 - ELECTRICAL HAND HOLES,
MANHOLES, PULL AND JUNCTION BOXES

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**CATEGORY 800
TRAFFIC**

SECTION 811 – CITY ELECTRICAL MANHOLES

**REMOVE AND REPLACE CITY ELECTRICAL MANHOLE
PROPOSED CITY ELECTRICAL MANHOLE
REPLACE CITY ELECTRICAL MANHOLE ROOF SLAB
ABANDON/REMOVE CITY ELECTRICAL MANHOLE**

811.01 DESCRIPTION.

INSERT: The following.

All work to be performed under this item and payment therefore shall be in accordance with the requirements of Section 811 – Electrical Hand Holes, Manholes, Pull and Junction Boxes, of the MD SHA Standard Specifications for Construction and Materials, dated 2008, and all amendments to date and these Special Provisions.

811.02 MATERIALS

INSERT: The following at the end of 811.02.02,

Cast-In-Place Concrete shall be MDSHA Mix No. 5 (3,500-psi at 28-days)	902.10
Bolts, nuts and washers	909.06

The City Electrical Manholes shall be located as shown on the Contract Drawings and conform to the following City Detail Drawings:

- BC 825.01 – Steel Details for 6 ft. x 12 ft. Line Manhole,
- BC 825.02-1 and 2 - Details for 6 ft. x 12 ft. Poured in Place Line Manhole,
- BC 825.04 – Braced Cofferdam for Poured in Place Manhole,
- BC 825.08.1 and 2 – Excavation and Shoring for Precast Manholes,
- BC 825.10 - Soldier Pile Bracing for Precast Manhole,
- BC 825.11 – Manhole – Conduit Standard Installation,
- BC 826.02-1 and 2 – Precast Line Manhole – 6’x12’x8’ Headroom,
- BC 826.04 – Precast Line Manhole 6’x12’x7’-8’-9’ Bar Schedule,
- BC 826.05 – End and Side Knockout Details – Precast Manhole,
- BC 826.06 – Insert Details for Extension Precast Manholes,
- BC 826.07-1 – Precast Recessed Extension,
- BC 826.07-2 – Precast Recessed Extension Manhole Adjustments,

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BC 826.08 – Accessories for Precast Manholes, and
BC 826.09 – Cast-In-Place Recessed Wall Extensions.

Frames and Covers shall conform to the following City Detail Drawings:

BC 825.12 – Manhole – Conduit Standard Cover, and
BC 825.13 – Manhole – Conduit Standard Frame.

Joint Sealing Compound shall conform to AASHTO D 1190.

Pulling irons for manholes shall be fabricated from 7/8" galvanized, in accordance with A-153 and A-36 steel bar or rod, and BC 825.01 – Steel Details for 6 ft. x 12 ft. Line Manhole.

Terminators shall be molded and shall provide 2 in. clearance between all new duct entrances to new manholes, and shall conform to BC 802.03-3 – Duct Plugs, Bell Ends and Terminators.

Bell Ends shall be molded plastic and may be used as a substitute for terminators with the approval of the Engineer, and shall conform to BC 802.03-3 – Duct Plugs, Bell Ends and Terminators.

811.03 CONSTRUCTION

SHA 811.03.01 Hand Holes and Manholes

INSERT: The following at the end of 811.03.01,

All manholes must meet HS-25 44 (MS 18) bridge loading criteria and be stamped and approved by a Professional Engineer Licensed in the State of Maryland.

Upon acceptance of installed structure, stack construction of mortared masonry in conformance with BC 825.11 (or precast concrete collars) shall begin; 36 in. diameter frame and cover shall be installed flush with finished grade. Precast chimney necks may be ordered with heights of 6 in., 8 in. or 12 in., the number and size to be determined from the profiles in the Contract Drawings and the finished grade.

Upon the Engineer's acceptance of the completed manholes, the area shall be backfilled to the proposed sub-grade with suitable material from the Project or with borrow material as required.

The cable owner shall break into existing conduit sections where manholes are to be constructed on existing lines. Relocation of cable in a manhole to expose an area for a new entrance location shall be performed by the cable owner. The Contractor, under the supervision of the Engineer, shall break into existing manhole walls for the entrance of new conduit systems. The Contractor shall notify the City DOT Conduit Section at least two days in advance of starting any work on the existing systems. Care shall be taken when an opening is made in an existing manhole wall for entry of a new conduit system.

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Excavating and cutting open conduit knock-out panels shall be done neatly. Size shall be adjusted to accommodate entering and existing conduit configurations and/or recessed extensions. Precast concrete recessed wall extensions shall be installed and bolted in place; conduit shall be fastened into opening utilizing bell end fittings or conduit terminators which shall be concreted or non-shrink mortared into place. Bell ends and terminators shall be flush with manhole inside wall face.

Voids in manhole end-wall slots shall be patched using Mix No. 3 concrete. Inside patches shall be smooth and finished even with the precast portion of the manhole wall. Backfilling operations shall begin when directed by the Engineer.

Precast recessed extensions shall be from the same manufacturer as the precast manholes. All precast extensions shall bolt to the manhole wall using preset inserts for that purpose. Extensions shall be installed flush to the manhole wall per manufacturer's instructions. All gaps shall be parged with mortar. Plastic terminators shall be used for all conduit entries into the recess.

On new conduit systems, all manholes shall be constructed before conduit lines are built, in order to assure proper entry of the conduit lines into the manhole. Proper entry of conduit shall be taken to mean the following:

1. A minimum of 12 in. from the edge of the nearest conduit to the ceiling, floors or walls.
2. All conduit shall enter at right angles to wall section.
3. All conduit shall extend a distance of 5 ft. normal to the wall of the manhole before any change in direction is made.

Where the enlargement of existing manholes or construction of new manholes over existing conduit lines is required, support and protection of all cable shall be provided in a manner acceptable to the cable owner. Shop Drawings and scheduling of operations shall be submitted to the Engineer for approval. Protection shall be provided for all excavated areas.

Extreme caution shall be observed at all times during work operations. Energized conductors may be in service during this construction.

The cable owner shall break into existing conduit sections where manholes are to be constructed on existing lines. Relocation of cable in a manhole to expose an area for a new entrance location shall be performed by the cable owner. The Contractor, under the supervision of the Engineer, shall break into existing manhole walls for the entrance of new conduit systems. The Contractor shall notify the Conduit Section at least two days in advance of starting any work on the existing systems. Care shall be taken when an opening is made in an existing manhole wall for entry of a new conduit system.

All manholes shall be inspected for proper conduit entries, terminators, bell ends, pulling irons, concrete seal around conduits, caps or plugs, pull lines and grout seals between the frame and chimney.

Precast Manhole – The Contractor shall perform all excavation necessary to contain the precast manhole and bedding. All loose materials from the excavation shall be removed and the base slab area shall be constructed to a uniform elevation. The Contractor shall backfill the excavated

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areas with suitable material from the project site or with borrow material as required. Setting bed material consisting of 6 inches of AASHTO No. 57 aggregate shall be placed and tamped. The manhole shall be lowered in place, exercising extreme care not to damage the structure. After the floor elevation has been checked by the Engineer, conduit related work operations shall be constructed at the manhole structure.

The Contractor shall provide working drawings and computations for review for the precast line manholes, including recessed extensions. A Professional Engineer licensed in the State of Maryland shall stamp the computations and working drawings. The working drawings shall, at a minimum show all required manhole dimensions, knockout panel sizes and locations and reinforcing steel placement and quantities.

Cast-in-place Manhole – Reinforcement bars in manholes shall be furnished and placed in the concrete as shown on the BC Details, or as directed by the Engineer, care being taken that all parts of steel work are protected by not less than 3 in. of concrete. Only deformed bars shall be used. Bars shall be cleaned of all rust, scale, dirt and grease before being placed in the work.

Where the enlargement of existing manholes or where new manholes are to be constructed on existing conduit lines containing live electrical cables, the Contractor shall excavate and expose the top and sides of the existing conduits. The cable owner will then remove the existing encasement and conduit from around the cables occupying them as required. After the forming of the manhole, the conduit shall be extended into the manhole by the cable owner, using split conduit supplied by the Contractor. All split conduit shall be installed by the cable owner. All materials for this operation will be furnished by the Contractor.

All new or existing conduit entering new manhole walls shall be faced off flush with manhole walls and shall be free of all sharp edges. For PVC entries, the Contractor shall use terminators or bell ends and they shall be flush with the face of the inside manhole wall.

Electrical manholes shall be the size, shape and type shown on the Plans. The exact location of manholes shall be as shown on the Plans. The Contractor shall set stakes on lines indicating such before opening sidewalk or street.

Floors of manholes shall be provided with drain sumps in conformance with Contract Drawings and BC 825.11 – Conduit Manhole Standard Installation. The concrete floor shall be floated to a smooth finish and sloped at a minimum of one-quarter inch per foot (1/4" per foot) towards the drain sump located in the center of the floor.

The Contractor shall construct wall forms for the manhole walls. Once started, the pouring of concrete shall be continuous until walls have been completed.

The roof form for poured-in-place roofs shall be supplied and installed and rigidly supported by the Contractor and shall be placed to adjoin tightly against the top of the walls. The underside of the finished roof shall form a ninety degree angle to the wall and not extend below the top of the wall.

Pulling irons shall be furnished and installed by the Contractor in the floor and roof of all new manholes opposite each conduit entrance in conformance with BC 825.01 – Steel Details for 6ft x 12ft Line Manhole, Note C.

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The Contractor shall provide shop drawings and computations for review for the cast-in place manholes. A Professional Engineer licensed in the State of Maryland shall stamp the computations and working drawings. The working drawings shall, at a minimum show all required manhole dimensions and locations and reinforcing steel placement and quantities.

EMH Conditional Acceptance Inspection - The Contractor shall notify City of Baltimore, Department of Transportation, Conduit Maintenance Section, Jeff Hartman (410) 396-1515 via the City Inspector, 30-calendar days prior to the Substantial Completion of the City Conduit Electrical Manholes (EMHs), that the EMHs are ready for inspection by the City Conduit Maintenance Section crews to document Punch List items, conduit occupancy (cable owner and number of cables) and available conduits. The Contractor shall provide the City Conduit Section crews unobstructed access to the EMHs manhole opening and the interior.

811.04 MEASUREMENT AND PAYMENT

INSERT: the following at the end of 811.04

City Electrical Manholes shall be measured and paid for under the Contract lump sum price bid. All conduit connections are incidental to the price of the manhole. The measurement and payment will be full compensation for all excavation, concrete, bolts, bricks, pipes, backfill with material from the project or from borrow excavation, frames and covers, reestablishment of the surface features (such as, but not limited to, sidewalk, curbing, concrete pavement, bituminous concrete pavement, landscaping, removal and reinstallation of fences and architectural masonry features), and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

1. REMOVE AND REPLACE CITY ELECTRICAL MANHOLE:

The Design/Build Contract lump sum price for Remove and Replace City Electrical Manhole shall be a Cast-In-Place Concrete Line Manhole, and also include all cost for Maryland Professional Engineer stamped shop drawings and computations, 6-inches aggregate drain setting bed, complete demolition and removal of existing City electrical manhole, recessed extensions, chimney stacks, fittings with terminators or bell ends to new and existing underground electrical conduit, providing supports for existing conduit in manhole, protection and maintenance of supported conduit, capping and securing open ends of unoccupied conduit, reinforcing bars, pulling-in-irons, connection to manholes including the facing of existing conduit at the interior face of the wall, sheeting, shoring, temporary cable supports, pumping, forms, hauling, disposal of all surplus excavation materials as directed, joint materials, and reestablishment of the surface features (such as, but not limited to, sidewalk, curbing, concrete pavement, bituminous concrete pavement, landscaping, removal and reinstallation of fences and architectural masonry features) and for all material, labor, equipment, tools and incidentals necessary to complete the work.

2. PROPOSED CITY ELECTRICAL MANHOLE:

SPECIAL PROVISIONS

811 - ELECTRICAL HAND HOLES,
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The Design/Build Contract lump sum price for Proposed City Electrical Manhole shall be a Precast Concrete Line Manhole, and also include all costs for Maryland Professional Engineer stamped shop drawings and computations, 6-inches aggregate drain setting bed, precast recessed extensions, chimney stacks, fittings with terminators or bell ends to new and existing underground electrical conduit, providing supports for existing conduit in manhole, protection and maintenance of supported conduit, capping and securing open ends of unoccupied conduit, reinforcing bars, pulling-in-irons, connection to manholes including the facing of existing conduit at the face of the wall, sheeting, shoring, pumping, forms, hauling and disposal of all surplus excavation materials as directed and joint materials, and reestablishment of the surface features (such as, but not limited to, sidewalk, curbing, concrete pavement, bituminous concrete pavement, landscaping, removal and reinstallation of fences and architectural masonry features) and for all material, labor, equipment, tools and incidentals necessary to complete the work.

3. REPLACE CITY ELECTRICAL MANHOLE ROOF SLAB:

The Design/Build Contract lump sum price for Replace City Electrical Manhole Roof Slab shall be a Cast-In-Place Concrete Manhole Roof Slab, and also include all cost for Maryland Professional Engineer stamped shop drawings and computations, complete demolition and removal of existing City electrical manhole roof slab, chimney stacks, protection and maintenance of support of cables in manhole, reinforcing bars, connection to manholes, sheeting, shoring, dewatering, forms, hauling, disposal of all demolition and surplus excavation materials as directed, joint materials, and reestablishment of the surface features (such as, but not limited to, sidewalk, curbing, concrete pavement, bituminous concrete pavement, landscaping, removal and reinstallation of fences and architectural masonry features) and for all material, labor, equipment, tools and incidentals necessary to complete the work.

4. ABANDON/REMOVE CITY ELECTRICAL MANHOLE:

The Design/Build Contract lump sum price for Abandon/Remove City Electrical Manhole shall include complete excavation, demolition and removal of existing City electrical manhole, chimney stacks, deactivated cables in manhole, reinforcing bars, connection to manholes, providing sheeting, shoring, dewatering, hauling, disposal of all demolition and surplus excavation materials as directed, backfill materials, and reestablishment of the surface features (such as, but not limited to, sidewalk, curbing, concrete pavement, bituminous concrete pavement, landscaping, removal and reinstallation of fences and architectural masonry features) and for all material, labor, equipment, tools and incidentals necessary to complete the work.

**SPECIAL PROVISIONS
811 - ELECTRICAL HAND HOLES,
MANHOLES, PULL AND JUNCTION BOXES**

**CATEGORY 800
TRAFFIC**

COMMUNICATION VAULT

DESCRIPTION

SECTION 811

DELETE: The entire text of Paragraph 811.01.

INSERT: The following:

This work shall consist of furnishing and installing 4 ft. X 4 ft. X 4 ft. communication vault.

CONSTRUCTION

ADD: The following section.

811.03.03 Communication Vaults

- (a) Communication vaults shall be in conformance with the plan details.
- (b) Communication vaults shall not be placed in ditches.
- (c) Communication vaults for communication cables (fiber optic) when constructed shall be spaced at a maximum of 500 feet apart.

MEASUREMENT AND PAYMENT

DELETE: Paragraph 811.04 in its entirety

ADD: the following:

811.04 4 FT. X 4 FT. X 4 FT. Communication Vaults will be measured and paid for at the Contract unit price per each unless otherwise specified in the specifications or on the plans. The payment will be full compensation for all excavation, aggregate drain, concrete, bolts, bricks, grounding rods, pipes, backfill, sealer, frames and covers, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SECTION 813 - SIGNS

813.02 MATERIALS

DELETE: The following.

Provide all hardware not provided by the Administration. Hardware shall be stainless steel. The Administration will supply traffic signal related signs and their mounting hardware for span wire, mast arm, and signal pole mounted applications.

813.04 MEASUREMENT AND PAYMENT

DELETE: The following.

Administration furnished signs and mounting hardware will be measured and paid for at the Contract unit price per square foot for the completed sign installed. The payment will be full compensation for all transportation, drilling holes as specified, installation, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

INSERT: The following.

Traffic Signal Signs will be measured and paid for at the Contract unit price per square foot for the completed sign installed. The payment will be full compensation for mounting hardware, all transportation, drilling holes as specified, installation, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

SECTION 814 - SIGNAL HEADS

DELETE: SECTION 814 – SIGNAL HEADS in its entirety.

INSERT: The following.

814.01 DESCRIPTION. Furnish and install vehicle traffic control signal heads and pedestrian traffic control signal heads, including associated housings, light emitting diode (LED) modules, mounting hardware, back plates and visors. The signal heads shall conform to the latest Institute of Transportation Engineers (ITE) Vehicle Traffic Control Signal Head (VTCSH) Specification. The LED Pedestrian Traffic Signal Countdown Timer Modules shall conform to the most recent, formally-adopted version of the Institute of Transportation Engineers (ITE) specification titled "Pedestrian Traffic Control Signal Indications (PTSCI) - Part 2: Light Emitting Diode (LED) Pedestrian Traffic Signal Modules." The Contractor is required to provide laboratory certification for compliance with the latest ITE specifications. The signal shall employ a lens assembly that presents an appearance that is similar to those found on standard incandescent signals.

Manufacturers of Red and Green 8 inch and 12 inch LED traffic signal modules are required to file a statement with the Maryland Energy Administration, certifying that each signal to be sold or offered for sale in Maryland is in compliance with the State's energy efficiency standard. Information on this requirement can be found at the Maryland Energy Administration's website.

814.02 MATERIALS.

814.02.01 Vehicular Traffic Signal Housing. Traffic signal sections shall be painted before assembly. All housings to be supplied under this specification are to be a one piece corrosion resistant aluminum alloy die-casting. Polycarbonate signal assemblies are not acceptable under terms of this specification.

1. All materials shall be clean, smooth, and free from flaws, cracks, blowholes, and other imperfections.
2. All metallic signal hardware shall be stainless steel material (10-8 Type 304).
3. Vehicular signal sections shall be capable of mating to another vehicular signal section from either the top or bottom of each housing.
4. All hardware furnished shall be installed on the corresponding fitting and threaded component.

814.02.02 Vehicular Traffic Signal LED Modules. Light Emitting Diode (LED) modules shall be used in place of the incandescent lamp, reflector, socket, gasket and lens assembly of the vehicle signal sections. Each Light Emitting Diode (LED) module shall consist of an assembly

that utilizes LEDs as the light source in lieu of an incandescent lamp for use in vehicle signal sections.

1. All vehicle signal LED modules shall be engineered to fit into all ITE compliant conventional vehicle signal housings.
2. LED signal modules shall utilize the same mounting hardware used to secure a standard incandescent lens and gasket assembly, and shall only require a screwdriver or basic installation tools to complete the mounting.
3. Each LED module shall be rated for a minimum useful life of sixty (60) months. All LED modules shall meet all parameters of this specification during this period.
4. Each LED module shall be a single, self-contained sealed unit, not requiring on-site assembly for installation into existing traffic signal housing.
5. Materials used for the lens and signal module shall conform to the appropriate ASTM specifications for the materials.
6. Enclosures containing either the power supply or electronic components of the signal module shall be made of UL94 flame retardant materials. The module lens does not need to conform to this requirement.
7. Each “red ball” and “green ball” LED module shall be in full compliance with all provisions of the July, 1998 Institute of Transportation Engineers (ITE) Interim LED Purchase Specification, Vehicle Traffic Control Signal Heads, Part 2, or latest formally adopted revision thereof.
8. The advertising date of the Contract associated with this specification shall be used to determine the date of the applicable standards.
9. LED modules shall meet all manufacturers’ recommendations for use in an optically programmed vehicle traffic signal.
10. Optically Programmable Module lens and LED lamp shells shall be constructed from UV stabilized polycarbonate.
11. Optically Programmable Module LED signal modules shall fit in a PAR-56 (3-prong) socket and utilize the same mounting hardware used to secure a standard incandescent lens and gasket assembly, and shall only require a screwdriver or basic installation tools to complete the mounting.

814.02.03 Vehicular Traffic Signal Electrical Requirements. The LEDs utilized in the modules shall be AlInGaP technology for red and yellow indications and InGaN for green indications. The LEDs shall be the ultra bright type rated for 100,000 hours of continuous operation from -40° C to +74° C. Each LED shall be capable of being driven continuously at 350 ma minimum and have a minimum power dissipation rating of 1 Watt. Each LED in the light engine shall incorporate an integral metal or metal-ceramic alloy heat sink to cool its semiconductor junction.

814.02.04 Power Consumption. All LED modules except yellow modules shall be U.S. EPA Energy Star compliant at 25° C. Power consumption of these LED modules shall not exceed the maximum allowed by the EPA. The maximum power consumption requirements measured in watts at 120 VAC for each module shall be as follows:

<u>MODULE</u>	<u>MAXIMUM WATTAGE</u> (at 74° C)	<u>NOMINAL WATTAGE</u> (at 25° C)
12 Inch Red Ball	17 W	11 W
12 Inch Yellow Ball	15 W	15 W
12 Inch Green Ball	15 W	15 W
12 Inch Red Arrow	12 W	9 W
12 Inch Yellow Arrow	11 W	11 W
12 Inch Green Arrow	11 W	11 W

814.02.05 Operating Voltage.

1. Each module shall operate from a 60HZ±3HZ AC line over a voltage ranging from 80 volts to 135 volts. Fluctuations of line voltage shall have no visible effect upon the luminous intensity of the indications.
2. The operating voltage of the modules shall be 120 Volts AC. All operating parameters shall be measured at this voltage.
3. LED circuitry shall prevent perceptible flicker to the unaided eye over the 80 to 135 voltage range.
4. The LED module shall have a power factor of 0.90 or greater at a nominal rated voltage at 25° C after 60 minutes of operation.
5. Total harmonic distortion (current voltage) induced into an AC power line by an LED signal shall be less than 20 percent at the rated voltage at 25° C.
6. The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition and low repetition high energy noise transients as stated in Section 2.1.6 and Section 2.1.8 of the NEMA Standard TS-2 dated 1992. The module shall include fusing with a rating of 2 amps or less to protect against sustained over-currents.
7. Each LED module and associated on-board circuitry shall be in compliance with Federal Communications Commission (FCC) noise regulations and must meet FCC Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.
8. All wiring and terminal blocks must meet the requirements of Section 13.02 of the ITE Publication: Equipment and Material Standards, Chapter 2, and Vehicular Traffic Control Signal Heads.
9. Each LED module shall be operationally compatible with controller assemblies and all peripheral equipment including but not limited to, electro-mechanical relays, solid state load switches, flashers, conflict-voltage monitors and malfunction management units currently used in the City of Baltimore, Maryland. Current controller specifications are available for review at the specific request of the contractor or vendor.
10. When a current of 20mA AC or less is applied to the unit, the voltage read across the two leads shall be 15 VAC or less.
11. Each LED module shall feature control circuitry to prevent current flow through the LED module in the off state to avoid any false indication as may be perceived by human eye during daylight and evening hours.
12. Voltage turn off shall be per NEMA TS-2 Standard. There shall be no visible illumination from the module when the applied voltage is less than 35 VAC RMS.

13. Each module shall reach 90% of its full illumination within 75 milliseconds of the application of the nominal operating voltage. The modules shall not have any visible illumination after 75 milliseconds of the removal of the nominal operating voltage.
14. Two secured, color coded, 600 V, anti-capillary 18 AWG minimum jacketed wires conforming to the National Electrical Code, rated for service at +105° C, are to be provided for electrical connections for each LED signal module. The two wire leads shall be separate at the point at which they leave the LED module. Refer to sub-section 4 of **LED Module Assembly** in this specification for specified color coding requirements.

814.02.06 Environmental Requirements.

1. Each LED module shall be rated for use in operating temperatures in the range of -40°C (-40°F) to +74°C (+165°F). Each LED module shall meet all specifications throughout this temperature range.
2. Each LED module shall be protected against dust and moisture intrusion in conformance with NEMA Moisture Resistant Standard 250-1991 for Type 4 enclosures to protect all internal components.

814.02.07 Optically Programmed Signals. Optically Programmed Vehicle Traffic Control Signal Heads shall permit the visibility zone of the indication to be determined optically. Each section of the signal head shall utilize an LED module consisting of an assembly that utilizes LEDs as the light source in lieu of an incandescent lamp. To ensure full interoperability, the dimming option and its resistor must be disconnected before turning on the LED lamp.

814.02.08 Lamp Fixture.

1. Lamp fixtures shall be comprised of a separately accessible housing and integral lamp support, indexed ceramic socket, and self-aligning and quick release lamp retainer. Electrical connection between case and lamp housing shall be accomplished with an interlock assembly that disconnects the lamp holder when opened.
2. The lamp socket shall be a PAR-56 (3-prong) socket manufactured to withstand high temperatures created by the lamp.
3. The lamp shall be secured with a wire ring and spring load clip to permit changing the lamp without the use of tools.
4. Wiring insulation shall be 16 AWG and conform to a conductor rating of 200° C.

814.02.09 Pedestrian Signal General. This specification describes the minimum design and operating requirements for pedestrian signal housing assemblies, painted before assembly. 16 inch by 18 inch signals are covered in this specification. All housings to be supplied under this specification are to be a one piece corrosion resistant aluminum alloy die-casting. Polycarbonate signal assemblies are not acceptable under terms of this specification.

1. All materials shall be clean, smooth, and free from flaws, cracks, blowholes, and other imperfections.
2. All metallic signal hardware shall be stainless steel material (10-8 Type 304).

3. All hardware furnished shall be installed on the corresponding fitting and threaded component.

814.02.10 Pedestrian Signal Modules. This specification describes the minimum acceptable design and operating requirements for LED Pedestrian Traffic Signal Countdown Timer Modules. The specific items covered under this specification include “16 inch by 18 inch Combination LED Pedestrian Signal Modules with Countdown Timer” and “12 inch by 12 inch LED Countdown Module.”

5. The 12 inch by 12 inch LED Countdown Module (hereafter called module or modules) shall be designed as a retrofit replacement for existing signal lamps. The LED modules are to be used in place of the incandescent lamp, reflector, socket and lens assembly of the pedestrian signal sections manufactured in accordance with the ITE PTCSI Standard, March 1985, without modification to the housing. This Unit shall consist of the Countdown Timer Only in a single Sealed Moisture Resistant Enclosure.
6. The 16 inch by 18 inch Combination LED Pedestrian Signal Modules with Countdown Timer (hereafter called module or modules) shall be designed for retrofit and new-build applications in existing and new 16 inch by 18 inch pedestrian signal housings built to ITE PTCSI Standard, March 1985, without modification to the housing. This unit shall consist of the Hand/Man Pedestrian Signal and the Countdown timer in a single Sealed Moisture Resistant Enclosure.
7. LED signal modules shall utilize the same mounting hardware used to secure a standard incandescent lens, gasket and reflector assembly, and shall only require a screwdriver or basic installation tools to complete the mounting.
8. Materials used for the lens and signal module shall conform to the appropriate ASTM specifications for the materials.
9. Enclosures containing either the power supply or electronic components of the signal module shall be made of UL94 flame retardant materials. The module lens does not need to conform to this requirement.

814.02.11 Pedestrian Traffic Signals Electrical

1. The signal shall provide a power factor of 0.90 or greater when operated at nominal operating voltage and 25 ° C, after 60 minutes of operation.
2. The Total Harmonic Distortion induced into an AC power line by the LED signal module shall not exceed 20%, when operated at nominal operating voltage and at an ambient temperature of 25°C.
3. The on-board circuitry shall meet FCC title 47, Sub-Part B, Section 15 regulations concerning the emission of electronic noise.
4. Hand LED modules shall utilize AlInGaP technology exclusively, either AS (Absorbing Substrate) or TS (Transparent Substrate), and shall not exhibit degradation of more than 30% of the initial light intensity following accelerated life testing (operating at 85 Degrees C and 85% humidity for 1000 hours). AlGaAs technology shall not be acceptable. Walking person LED modules shall utilize InGaN technology exclusively.

5. The LED modules shall be connected directly to line voltage, 120 Volts AC nominal, and shall be able to operate over the voltage range of 80 VAC to 135 VAC.
6. The drive circuitry shall include voltage surge protection to withstand high-repetition noise transients and low-repetition high-energy transients as stated in section 2.1.6, NEMA Standard TS-2, 1992.
7. The typical power consumption for the Hand shall be 6W, the typical power consumption for the Person shall be 6W, and the typical power consumption for the countdown shall be 5W.
8. The circuitry shall ensure compatibility and proper triggering and operation of load switches and conflict monitors in signal controllers currently in use by the procuring traffic authority.
9. The pedestrian countdown signal shall not be illuminated by input signals under 35 VAC.
10. The "countdown" portion of the signal shall have a high "off state" input impedance so as not to provide a load indication to conflict monitors and interfere with the monitoring of the pedestrian signals. The input impedance of the countdown circuitry shall maintain a voltage reading above 25 VAC to the conflict monitor for a minimum of 4 units connected on the same channel.
11. The countdown signal drive circuitry shall not be damaged when subjected to defective load switches providing a half wave signal output.
12. The turn-on/turn-off time for the Hand/Person shall be 75ms or less.

814.03 CONSTRUCTION.

814.03.01 Housing

1. All housings to be supplied under this specification are to be a one piece corrosion resistant aluminum alloy die-casting conforming to the latest ITE VTCSH specification alloy and tensile requirements, having smooth, accurate surfaces and edges.
2. Two integrally cast hinge lugs shall be on to the left of each section and one screw lug shall be cast into the right of each section for 8 inch heads, two lugs for 12 inch heads.
3. The top and bottom of the housing shall have an opening to accommodate one (1) standard 1.5 inch pipe bracket.
4. Each signal section shall be rigidly attached, one above the other, by means of stainless steel bolts and attaching washers in such a manner that any section may be rotated about a vertical axis and oriented at any angle with respect to an adjacent section.
5. Each section shall be indexed by means of mating bosses and recesses to provide positive alignment.
6. The bottom opening of the signal housing shall have a Shurlock boss integrally cast into the housing. The dimensions of the Shurlock boss shall be as follows:
 - a. Outside diameter - 2.625 inches
 - b. Inside diameter - 1.969 inches
 - c. Number of teeth - 72
 - d. Angle of teeth - 90°
 - e. Depth of teeth - 1/13 inch

7. The teeth shall be clean and sharp and provide full engagement. The radial angular grooves of the Shurlock boss, when used with Shurlock fittings, shall provide positive positioning of the entire signal to eliminate rotation or misalignment of the signal.
8. The opening at the top of the signal head shall be made with two indentations designed to receive a Shurlock ring which will provide positive positioning of the head when mounted from a mast arm or span wire hanger.

814.03.02 Housing Door

1. The housing door of each signal section shall be a one piece corrosion resistant aluminum alloy die-casting.
2. The door shall be attached to the housing by means of two stainless steel hinge pins. A stainless steel latch screw and wing nut on the right side of the housing shall provide for opening and closing the signal door without the use of any special tools.
3. A gasket groove on the inside of the door shall accommodate a weather proof and mildew proof Ethylene Propylene Diene Monomer (EPDM) gasket. The gasket shall be installed on each door. When the door is closed it shall seal against a raised bead on housing making a positive weatherproof and dust proof seal. The outer face of the door shall have four tapped holes equally spaced about the circumference of the lens opening with four stainless steel screws to accommodate the signal head visors.

814.03.03 Visor

1. The Visor shall be full tunnel, fabricated from 0.050 inch 3105-H25 sheet aluminum alloy and be powder coated as described separately below.
2. 8 inch signal's visor shall have a nominal length of 9 inches.
3. 12 inch signal's visor shall have a nominal length of 11 inches.
4. Axis of visor shall be not less than 3 degrees or more than 3.5 degrees down from horizontal when affixed to the signal head.
5. Visors shall be secured to the signal head door by a minimum of four screws mounted perpendicular to the face of the signal head door.

814.03.04 Terminal Block

1. The terminal block shall be a 5 position, barrier block with 15 quick disconnect terminals and 5 screw clamp terminals.
2. The terminal block shall be mounted vertically in the red section.
3. Screws shall be provided for connecting field wires to each terminal section.
4. A sheet of waterproof insulating paper shall be installed between the housing and the terminal block.
5. One (1) terminal block shall be installed in each signal section.

814.03.05 Hardware

All hardware shall be stainless steel 10-8 Type 304.

814.03.06 Painting

1. All surfaces inside and out of the signal housing, door and visors shall be “powder coated” to the highest industry standards.
2. The color shall be Federal Yellow.
3. The second coat shall be Traffic Signal Yellow Alkyd Urea Exterior Baking Enamel and shall comply with Federal Specification TT-E-489b and shall match Federal Specification TT-c-595.
4. The second coat on the inside of the tunnel and full circle visors shall be an Alkyd Urea Black Synthetic Baking Enamel, with minimum gloss reflectance, and shall meet the performance requirements of MIL-E-5557 Enamel Heat Resisting Glyceryl Phthalate, Type 4, Instrument Black.
5. The Final Coat shall be guaranteed not to crack, peel, or otherwise deteriorate for a period of five (5) years under local conditions. Stainless steel parts shall not be painted.

814.03.07 Mounting Assembly

1. A mounting assembly shall be installed on each signal head.
2. The type of mounting assembly will be according to the Contract Documents and the Engineer.
3. Mounting assemblies for span wire applications will consist of a span wire hanger, balance adjuster and service wire entrance fitting.
 - a. Span wire hanger shall be 6 inch galvanized steel, “U-bolt” type with stainless steel hardware including clevis pin, cotter pin and washers.
 - b. Balance adjuster shall be brass with a 1/2” wide slot at the bottom. The eyebolt shall be stainless steel and be 3/4" wide. Clevis pins shall be stainless steel and be 5/8" diameter.
 - c. Wire entrance fitting shall be aluminum and be provided with grommets and gaskets. The service entrance and grommet shall be of sufficient size to accommodate two cables 3/4" outside diameter. The wire entrance fitting shall be painted to match the signal head.
4. Mounting assemblies for mast arm applications will consist of a mast arm mount signal bracket (1-way, 2-way, or 5-way)
 - a. Mast arm mount signal bracket shall be cast aluminum alloy.
5. Mounting assemblies for side pole applications will consist of an upper and lower arm assembly.
 - a. The upper and lower arm assembly shall be cast aluminum alloy.
6. Mounting assemblies for post top applications will consist of a post top assembly with upper and lower arms.
 - a. The post top assembly shall be cast aluminum alloy.

814.03.08 Guarantee/Warranty

All material and workmanship furnished under this specification will have a manufacturer’s warranty for a period of five (5) years from the date of delivery.

814.03.09 Miscellaneous

1. Manufacturer's name, trademark, model number, serial number, date of manufacture (month and year) and lot number shall be permanently identified on all removable components and hardware. This identification is required, and is in addition to any other identification that may be required in contract special provisions. The serial number and model number shall be etched, stamped, molded, or attached using metallic, polyester, or vinyl self-adhesive labels. The use of adhesive backed paper labels is not acceptable.
2. Rated voltage and rated power in Watts and Volt-Amperes shall also be permanently marked on the back of each LED module.
3. The traffic signal manufacturer shall be ISO 9000 series certified.

814.03.10 LED Module Assembly.

1. LED modules shall fit in standard, incandescent vehicular traffic signal housings, as applicable, without modifications or the need for special tools, and shall be complete with a lens that is tinted for the appropriate color
2. Each LED module shall incorporate printed circuit boards containing required LEDs and circuit components. The LEDs shall be mounted via thermal epoxy and soldered to a metal core printed circuit board for optimum thermal transfer. A single layer of thermal transfer material shall be included between the metal core printed circuit board and the module's heat sink to ensure optimum transfer of heat away from the LED p-n junctions. There shall be air space between the heat sink and the interior sidewalls of the LED module housing to allow for proper dissipation of heat away from the LEDs.
3. Each individual Arrow LED module shall be wired such that the failure of one LED will result in the loss of not more than 5% of the signal module light output.
4. Each LED module shall have prominent and permanent markings for correct indexing and orientation within signal head housing by providing an up arrow, or the word "UP" or "TOP".
5. Each LED module shall feature two (2) 39 inch long 18 AWG minimum anti-capillary wire leads with strain relief and quick connect terminals with spade adapters for connection to the terminal block of the signal head. The two wire leads shall be separate at the point at which they leave the LED module. One of the conductors shall contain white insulation to signify neutral. The color of the other conductor shall be different and shall be used to differentiate between red, yellow, and green LED modules. The following City of Baltimore DOT Wire Lead Color Code Standard for vehicular traffic signal head LED modules shall be followed. The Manufacturer shall supply all modules, including sample modules for evaluation, to the City of Baltimore DOT, wired per the following wire lead color code:

Red:	Red & White
Yellow:	Yellow & White
Green:	Brown & White

6. The assembly and manufacturing process for the LED signal assembly shall be designed to ensure that all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

7. Each LED module shall be watertight when properly installed in traffic signal housing. Each LED module shall utilize the same mounting hardware used to secure the incandescent lens and gasket assembly, and shall only require a screwdriver to complete the mounting.
8. Each LED module maximum weight shall be four (4) lbs. (1.8 kg).
9. Each LED module shall be designed for installation in the doorframe of standard traffic signal housings. Each LED module shall be capable of being sealed in the doorframe with a one-piece EPDM (ethylene, propylene rubber) or equal gasket.
10. Each LED module shall be weatherproof after installation and connection.
11. The power supply for the LED module shall be integral to the unit and shall be conformally coated.
12. The circuit boards and the power supply shall be contained inside the module.
13. Each LED module shall feature a rigid housing for protection in shipping, handling, and installation, and a one-piece gasket installed. Screw-in type products shall be prohibited for LED modules.

814.03.11 Vehicle Signal Lenses

1. The lens of the LED module shall be integral to the unit; the outer lens shall be convex. The outer surface of the lens shall be smooth and made of ultraviolet stabilized polycarbonate material.
2. Each LED module lens shall be capable of withstanding ultraviolet (direct sunlight) exposure for a minimum period of five (5) years without exhibiting any evidence of deterioration.
3. A surface coating, chemical surface treatment or protective covers shall be applied to each outer polymeric lens to provide front surface abrasion resistance for shipping and storing.
4. Each LED module shall incorporate a single circular inner Fresnel lens in the lamp housing to collimate the light emitted by the LED engine. The single inner Fresnel lens shall span the full diameter of the interior of the signal. The outer lens shall focus the collimated light to meet intensity and distribution standards required by this specification. Modules shall radiate equally in both upward and downward directions to ensure full expanded viewing.
5. Each LED ball module shall almost perfectly approximate to the motorist the appearance of an 8-inch standard incandescent signal indication. The surface of the LED ball module shall appear to the motorist to be nearly totally uniform in illumination, and eliminate the visibility of individual LEDs to the observer. The LED ball module shall have a wide viewing angle (Expanded/Extended View) making it suitable for installation on any span wire installations, thus eliminating the on/off effect caused by normal swaying.
6. The external lens surface for all LED modules shall be smooth with no raised surfaces so as to minimize the collection of dirt, debris, and other particulate contaminants, which may impact luminous intensity, and to facilitate periodic cleaning. External lens facets are prohibited.
7. The lens for the red ball and the red arrow shall be tinted red with similar characteristics to enhance on/off contrasts.

8. The lens for the yellow ball and the yellow arrow shall be tinted yellow with similar characteristics to enhance on/off contrasts.
9. The lens for the green ball and the green arrow shall be tinted green with similar characteristics to enhance on/off contrasts.
10. The use of tinting to enhance on/off contrasts shall not affect chromaticity and shall be uniform across the face of the lens.

814.03.12 Optical. The light intensity, chromaticity, and distribution from Red and Green LED traffic signal modules shall meet all photometric values stated in the most recent, formally-adopted version of the specification titled “Vehicle Traffic Control Signal Heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules,” published by ITE. Yellow LED traffic signal modules shall meet the chromaticity requirements of the most recently adopted ITE specification, and the light output shall be the peak instantaneous intensity measured at instant-on and at the highest intensity point.

1. The minimum maintained luminous intensity for red and green 12 inch LED ball signal modules shall meet the values shown in **Table I, Minimum Luminous Intensity for LED Ball Signal Modules (Expanded View)**, over the temperature range given in Section 4.1. The minimum luminous intensity for yellow 12 inch LED ball signal modules shall meet the values shown in **Table I, Minimum Luminous Intensity for LED Ball Signal Modules (Expanded View)**, at 25°C and at instant-on.
2. The minimum luminance for red and green LED arrow modules shall meet the values given in **Table II, Minimum Luminance for LED Arrow Signal Modules**, over the temperature range given in Section 4.1. The minimum luminance for yellow LED arrow modules shall meet the values given in **Table II, Minimum Luminance for LED Arrow Signal Modules**, at 25°C and at instant-on.
3. The intensity of all LED modules covered by this specification shall not vary by more than 10% over the allowable voltage range.
4. In addition, red and green LED modules shall meet the July, 1998 ITE VTCSH Part II standards and measurement criteria for LED modules, or latest formally adopted revision thereof. Test data to verify compliance of all applicable LED modules with this standard shall be provided from the following laboratory chosen by the City of Baltimore DOT:

ETL Testing Laboratories
3933 U.S. Route 11
Cortland, New York 13045-0950

5. In addition, all modules shall meet minimum City of Baltimore DOT specification requirements. Additional laboratory compliance certificates, when applicable if required, must meet all City of Baltimore certification requirements and shall be furnished to the City prior to product acceptance.
6. Red ball, red arrow, yellow ball and yellow arrow LED modules shall utilize AllnGaP technology exclusively, either AS (Absorbing Substrate) or TS (Transparent Substrate), and shall not exhibit degradation of more than 30% of the initial light intensity following accelerated life testing (operating at 85 Degrees C and 85% humidity for 1000 hours). AlGaAs technology shall not be acceptable.

SPECIAL PROVISIONS
814 — SIGNAL HEADS

DRAFT - NOT FOR CONSTRUCTION
 F.A.P. NO. PENDING
 SHA CONTRACT NO. PENDING
 BALTIMORE CITY CONTRACT NO. TR12317

7. Green ball and green arrow LED modules shall utilize Indium Gallium Nitride (InGaN) technology. Green ball and green arrow LED modules shall not be illuminated when the applied voltage is less than or equal to 35 volts A.C. Illumination of green ball and green arrow LED modules shall be in compliance with the July , 1998 ITE VTCSH Part II when the applied voltage is between 80 and 135 Volts A.C.
8. The measured chromaticity coordinates of the LED modules shall conform to the following chromaticity requirements:
 - RED: Y: not greater than 0.308 or less than 0.998 -x
 - YELLOW: Y: not less than 0.411, nor less than 0.995 -x, nor less than 0.452
 - GREEN: Y: not less than 0.506 - 0.519 x, nor less than 0.150 + 1.068 x, or more than 0.730 -x.
 - a. Chromaticity requirements shall pertain to both ball and arrow LED modules.
 - b. Chromaticity requirements shall be satisfied throughout the useful life of the LED modules over the operating temperature range.
9. Red arrow, yellow arrow, and green arrow LED modules shall contain either three (3) rows of LEDs or shall have a uniform/full profile look forming the shape of the arrow, thus appearing the same as a standard incandescent arrow indication.
 - a. Each LED arrow module shall meet the specifications stated in Section 9.01 of the ITE Publication Equipment and Materials Standards, Chapter 2 (Vehicle Traffic Control Signal Heads).
 - b. LEDs shall be spread and arranged evenly across the illuminated portion of the arrow area.

Table I - Minimum Luminous Intensity for LED Ball Signal Modules (Expanded View)

GRID SPECIFICATION FOR 12IN RED BALL SIGNALS (cd)

Shaded area is ITE requirements for light intensity

	-27.5	-22.5	-17.5	-12.5	-7.5	-2.5	+2.5	+7.5	+12.5	+17.5	+22.5	+27.5
22.5U			20			20	20			20		
17.5U	16	20	22	22	22	22	22	22	22	22	20	16
12.5U	16	22	34	44	48	50	50	48	44	34	22	16
7.5U	16	38	89	145	202	226	226	202	145	89	38	16
2.5U			77	141	251	339	339	251	141	77		
2.5D			77	141	251	339	339	251	141	77		
7.5D	16	38	89	145	202	226	226	202	145	89	38	16
12.5D	16	22	34	44	48	50	50	48	44	34	22	16
17.5D	16	20	22	22	22	22	22	22	22	22	20	16
22.5D			20			20	20			20		

Note: Measurements are in Candelas

GRID SPECIFICATION FOR 12IN GREEN / YELLOW BALL SIGNALS (cd)

Shaded area is ITE requirements for light intensity

	27.5	22.5	17.5	12.5	7.5	2.5	-2.5	-7.5	-12.5	-17.5	-22.5	-27.5
22.5U			40			40	40			40		
17.5U	32	41	44	44	44	44	44	44	44	44	41	32
12.5U	32	44	69	89	97	101	101	97	89	69	44	32
7.5U	32	77	178	291	404	452	452	404	291	178	77	32
2.5U			154	283	501	678	678	501	283	154		
2.5D			154	283	501	678	678	501	283	154		
7.5D	32	77	178	291	404	452	452	404	291	178	77	32
12.5D	32	44	69	89	97	101	101	97	89	69	44	32
17.5D	32	41	44	44	44	44	44	44	44	44	41	32
22.5D			40			40	40			40		

Note: Measurements are in Candelas

Table II - Minimum Luminance for LED Arrow Signal Modules

	Minimum Luminance (cd/m ²)
Red Arrow	5,500
Yellow Arrow	11,000
Green Arrow	11,000

814.03.13 Quality Assurance. The modules shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two (2) types of quality assurance: (1) design a quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification, and a documented process of how problems are to be resolved.

1. QA process and test results documentation shall be kept on file for a minimum period of seven (7) years.
2. LED signal module designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.
3. Design Qualification Testing
 - a. Design Qualification testing shall be performed by the manufacturer or an independent testing lab hired by the manufacturer on new LED module design, and when a major design change has been implemented on an existing design.
 - b. A major design change is defined as a design change (electrical or physical) which changes any of the performance characteristic of the module, results in a different circuit configuration of the power supply, or changes the layout of other individual LEDs in the module.
 - c. A quantity of two (2) units for each design shall be submitted for Design Qualification Testing.
 - i. Test units shall be submitted to the City after the manufacturer testing is complete.

- ii. Manufacturers testing data shall be submitted with test units for the City verification of Design Qualification Testing data.
 - d. Burn in
 - i. The sample modules shall be energized for a minimum of 24 hours, at 100 percent on-timed duty cycle, at a temperature of +74°C (+165°F) before performing any design qualification testing.
 - ii. Any failure of the module, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection.
- 4. For Design Qualification Testing, all specifications will be measured including, but not limited to.
 - a. Rated Initial Luminous Intensity. Measured over the operating temperature range.
 - b. Chromaticity (Color). Measured over the operating temperature range.
 - c. Electrical
 - i. All specified parameters shall be measured and used for quality comparison of production quality assurance on production modules. (Rated power, etc.)
 - d. Equipment Compatibility.
 - i. Modules shall be tested by the Manufacturer for compatibility with the controller unit(s), conflict-voltage monitors, malfunction management units and load switches. Each signal module shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 80 to 135 VAC with the input to the load switch in the “off” position.
 - ii. The AC voltage developed across each LED signal module so connected shall not exceed 10 Vrms as the input AC voltage is varied from 80Vrms to 135 Vrms.
 - iii. The LED modules shall be fully compatible with all features provided in the City of Baltimore, DOT’s conflict-voltage monitors and malfunction management units. The Manufacturer must insure that the modules are compatible with the “Dual Indication” feature. This feature, along with the load switch shall together operate as follows:

Under a NO LOAD condition (End of Life) the output of the load switch shall remain “HIGH” and shall remain “HIGH” until the “Dual Indication” feature of the conflict-voltage monitor or malfunction management unit detects this condition and shall place the intersection on “FLASH” after one (1) cycle.
 - iv. Compatibility testing in no way relieves the manufacturer /vendor or contractor from any problems that may occur in the field due to non-compatibility with the aforementioned equipment.
 - v. This specification covers all known non-compatibility problems which may occur. However, in the event the LED modules are found not to be compatible with any existing equipment covered by this specification, due

to further testing conducted by the City, shall in no way relieve the manufacturer/vendor or contractor from compliance.

- vi. Final responsibility on compatibility shall be the manufacturer/vendor or contractor's responsibility and any or all modifications, if needed, shall be at no additional expense to the City of Baltimore.
 - e. Mechanical vibration testing shall be as per MIL-STD-833, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 HZ to 120 HZ. The loosening of the lens, of any internal components, or other physical damage shall be cause for rejection.
 - f. Temperature cycling shall be performed as per MIL-STD-883, Test method 1010. The temperature range shall be per "Environmental Requirements". A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. Module(s) being tested shall be energized and functioning throughout the duration of the test. Failure of a module to function properly or any evidence of cracking of the module lens or housing after temperature cycling shall be cause for rejection.
 - g. Moisture resistance testing shall be performed on all modules mounted in a standard aluminum signal head housing as specified for use in the City per NEMA Standard 250-1991 for Type 4 enclosures. Any evidence of internal moisture after testing shall be cause for rejection.
5. Production Quality Control Testing
- a. The following Production Quality Assurance tests shall be performed on each new module prior to shipment. Failure to meet requirements of any of these tests shall be cause for rejection. Test results shall be retained by the manufacturer for seven (7) years.
 - b. Burn-in period shall consist of each signal module being energized at rated voltage for a 30 minute stabilization period before the measurement is made.
 - c. Each module shall be tested for rated initial intensity after burn-in.
 - i. A single point measurement, with a correlation to the intensity requirements of Section 1.04 of the VTCSH for circular modules, may be used.
 - ii. The ambient temperature for this measurement shall be +25°C (+77°F).
 - iii. Each LED Module failing to meet minimum luminous intensity requirements specified in Section 8.1 of these specifications shall be cause for rejection.
 - d. Each module shall be tested for required power factor after burn-in.
 - e. Each module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing". The current flow shall not exceed the rated value.
 - f. Each module shall be visually inspected for any exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure there are no scratches (abrasions), cracks, chips, discoloration, or other defects. Any such defect shall be cause for rejection.

- g. The manufacturer shall be required to undertake Design Qualification and Production Quality Control testing as specified in sub-sections 4 and 5 of **Quality Assurance** in these specifications and report all results to the City. Procurement and installation of LED modules prior to the receipt and acceptance of test results by the City shall be done at the contractor's risk.
- 6. Conflicts with testing procedures/certification.
 - a. In the event this specification has conflict(s) between City testing procedures/certification and the ITE testing procedure/certification, the City procedures shall apply.

814.03.14 Warranty.

1. Manufacturers shall provide a written warranty issued by their factory located in the NAFTA country of module origin with the following minimum provisions
2. The manufacturer shall provide a written warranty against defects in materials and workmanship for a minimum period of sixty (60) months.
3. The warranty period shall begin on the date the LED module is energized and placed into service at the intersection, or ninety (90) days after delivery of the module to the Department's Traffic Signal Division Warehouse (or any other receiving facility if specified in the Contract Documents), whichever occurs first.
4. Replacement LED modules shall be provided on a one-for-one basis after receipt of the LED modules that no longer conform to this specification and shall be replaced within 45 calendar days after the Manufacturer has receipt of the modules. Replacement modules shall be repaired or replaced at no additional cost to the City, with the exception, the City shall pay for the one-way shipping of the modules to the Manufacturer.
5. All warranty documentation shall be submitted to the City prior to random sample testing.
6. Red and green LED modules shall be warranted to be in compliance with the July, 1998 ITE VTCSH, Part II Specifications, or latest revision thereof, for luminous intensity for a period of sixty (60) months.
7. Yellow LED modules shall be warranted to be in compliance with City of Baltimore DOT specifications for luminous intensity for a period of sixty (60) months.
8. LED signal modules which exhibit luminous intensities less than the minimum values within the first sixty (60) months the module is placed into service at the intersection, or ninety (90) days from the date of delivery, whichever comes first, shall be replaced or repaired, at no additional cost to the City.
9. The City reserves the right to randomly select, and not to exceed, one-quarter percent (1/4 %) of the LED modules, procured and installed by an LED RFP contract; or per City Purchase Order (P.O.), for testing to conformance to this specification. Said testing shall be conducted once per year, during the first sixty (60) months of the warranted life of the modules. The Manufacturer shall conduct said tests and reports for the City, at no additional cost.
10. The City, at anytime during the sixty (60) month warranty period, at its discretion, may have randomly selected modules, Independent Lab tests conducted for conformance to the specification. Independent Lab testing shall be conducted at the City's expense;

- however, in the event of “failure” (non-conformance to the specification), the Manufacturer shall be required to reimburse the City for said testing.
11. Upon request, the LED lamp module manufacturer shall provide written documentation of its ability to satisfy a worst-case, catastrophic warranty claim.
 12. The documentation shall clearly show that the manufacturer and/or its parent corporation possess a minimum of US\$10 million in net worth, within the United States, Canada, and/or England.
 13. A current corporate annual report duly-certified by an independent auditing firm, containing a balance sheet illustrating such net worth, is an example of suitable documentation.
 14. The documentation shall clearly disclose:
 - a. The country in which the factory of module origin is located
 - b. The name of the company or organization that owns the factory of module origin including any and all of its parent companies and/or organizations, and their respective country of corporate citizenship
 15. For firms with business and/or corporate citizenship in the United States of less than seven years, the process by which the end-users/owners of the modules will be able to obtain worst-case, catastrophic warranty service in the event of bankruptcy or cessation-of-operations by the firm supplying the modules within North America, or in the event of bankruptcy or cessation-of-operations by the owner of the factory of origin, shall be clearly disclosed.

814.03.15. Conflicts and Waivers.

1. The technical and warranty requirements of this document shall prevail over any other specification or standards for the installation of Light Emitting Diode (LED) Traffic Signal Modules in Baltimore City, Maryland unless amended by additional requirements and/or testing. This specification supersedes all previous specifications.
2. In the event of conflicts within this specification between technical; certification; and/or testing minimum or compliant standards/requirements, as stated in sub-section **6a** of **Quality Assurance**, or as referenced elsewhere throughout this specification, City requirements shall prevail in all cases.
3. The Department reserves the right to waive in writing any portion or portions of this specification. The following sub-sections **4** and **5** of **Conflicts and Waivers**, of this specification, shall however be excluded from waiver by the City.
4. This technical specification shall be for LED module retro-fit of new “standard” die-cast aluminum traffic signal heads by the manufacturer/suppliers of vehicular traffic signal heads procured by: County, State, Municipal or Private Developer for the installation and operation of vehicular traffic control signals installed within the jurisdictional boundaries of Baltimore City, Maryland which are maintained by City of Baltimore Department of Transportation.
5. This technical specification shall be for LED module installation in new “standard” die-cast aluminum vehicular traffic signal heads and retro-fit of existing “standard” die-cast aluminum vehicular traffic signal heads, for the conversion of all existing vehicular traffic signal heads within the jurisdictional boundaries of the City of Baltimore,

Maryland which are maintained by the City of Baltimore, Maryland, Department of Transportation.

814.03.16 Omissions and Errors.

1. Rectification of errors and inclusion of omissions, which would preclude the proper functions of the above equipment as intended by the City, are the responsibility of the vendor.
2. Such omissions and errors must be brought to the attention of the Superintendent of Signal Electronics Maintenance Facility prior to submission of bid. Failure to inform same or his designate will be deemed sufficient reason for bid rejection.
3. Should such omissions and errors be encountered after installations are under way, responsibility for any additional cost incurred as a result thereof, shall be borne by the contractor/vendor.
4. It is the author's purpose and intent to obtain "State of The Art Equipment", no part of these specifications is intended to exclude potential bidders. All equipment submittals will be tested on their merits as well as compliance to these specifications.

814.03.17 Miscellaneous.

1. Each LED Module shall have the manufacturer's name, trademark, model number, serial number, date of manufacture (month and year) and lot number as identification permanently marked on the back of the module. This identification is required, and is in addition to any other identification that may be required in contract special provisions. The serial number and model number shall be etched, stamped, molded, or attached using metallic, polyester, or vinyl self-adhesive labels. The use of adhesive backed paper labels is not acceptable.
2. Rated voltage and rated power in Watts and Volt-Amperes shall also be permanently marked on the back of each LED module.
3. The LED traffic signal manufacturer shall be ISO 9000 series certified.

814.03.18 Optically Programmed Signals - Optical System.

1. The head shall employ no or hoods to obtain this programmable limitation, however, if required, hoods shall be provided to eliminate extraneous light falling on the lens. The projected indication may be selectively visible or veiled anywhere within 15 degrees of the optical axis.
2. The indication from the lens shall meet the transmittance, chromaticity, and distribution requirements of the most recently adopted ITE specification.
3. Optically programmed signal heads shall have an optical system containing a color filter, lamp fixture, lamp collar, optical limiter/diffuser, and objective lens. All other minor components necessary for the full utilization of the programmable head shall be provided.
4. The optical limiter shall provide an accessible imaging surface at focus on the optical axis for objects 900 to 1200 ft distance and permit an effective veiling mask to be variously applied as determined by the desired visibility zone. The optical limiter shall be composed of heat-resistant glass.
5. The objective lens shall be a high-resolution annular incremental lens hermetically sealed within a flat laminate of weather resistant acrylic or as approved by the Engineer. The

lens shall be symmetrical in outline and may be rotated to any 90-degree orientation about its axis without displacing the primary image.

6. The lens shall be sealed to the housing door by a weather proof and mildew proof Ethylene Propylene Diene Monomer (EPDM) gasket and held in place by four lens clips and screws making a positive weatherproof and dust proof seal

814.03.19 LED Module. LED modules shall fit in optically programmed vehicular traffic signal housings, as applicable, without modifications or the need for special tools. LED traffic signal modules shall have:

1. The regulated power supply for the LED module shall be integral to the unit.
2. The circuit boards and the power supply shall be contained inside the module.
3. Each LED module shall feature a rigid housing for protection in shipping, handling, and installation.

814.03.20 LED Module Assembly

1. Each LED module shall have prominent and permanent markings for correct indexing and orientation within signal head housing by providing an up arrow, or the word “UP” or “TOP”.
2. The assembly and manufacturing process for the LED signal assembly shall be designed to be compliant with MIL-STD-883 Method 2007 to ensure that all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.
3. Each LED module shall be watertight when properly installed in traffic signal housing.
4. Each LED module shall be designed for installation in a PAR-56 (3-prong) socket without the use of any tools.

814.03.21 Pedestrian Signal LED Modules

1. The LED module shall be a single, self-contained device, not requiring on-site assembly for installation into existing traffic signal housings.
2. The assembly of the LED module shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.
3. The LED signal module shall be protected by a textured non-glare UV treated polycarbonate lens.
4. The individual LED light sources shall be interconnected so that a catastrophic failure of a single LED will result in a total loss of not more than 3 LED's or 5% of the signal light output.
5. Three secured, color coded (blue, red, white), 36 inches long, 600V, 16 AWG jacketed wires, rated for service at +105°C, shall be provided for electrical connections.

814.03.22 Pedestrian Signal Chromaticity

1. The measured chromaticity coordinates for the “Lunar White” walking Person and the “Portland Orange” Hand and Digits shall conform to the chromaticity requirements of section 8.04 and figure 1 of the PTCSI standard.

2. The chromaticity measurements shall remain unchanged over the input line voltage range of 80 VAC to 135 VAC.
3. Chromaticity requirements shall be satisfied throughout the useful life of the LED modules over the operating temperature range.

814.03.23 Pedestrian Signal LED Module Drive Circuitry

1. For a minimum period of 60 months, the maintained minimum luminance values for the modules under the ambient operating temperature range of -40°C to $+74^{\circ}\text{C}$ and a 60 ± 3 Hertz ac line power over a voltage range from 80 VAC RMS to 135VAC RMS, when measured normal to the plane of the icon surface, shall not be less than:
 - Walking person: $2,200 \text{ cd/m}^2$;
 - Hand: $1,400 \text{ cd/m}^2$.
2. The luminance of the emitting surface, measured at angles from the normal of the surface, may decrease linearly to a value of 50% of the values listed above at an angle of 15 degrees.
3. The light output requirements in this specification apply to pedestrian signal heads without any visors, hooded or louvered.
4. The luminous intensity of “Hand” and “walking person” LED modules shall not vary by more than 1% over the allowable voltage range.
5. All modules shall meet minimum City of Baltimore DOT specification requirements. Additional laboratory compliance certificates, when applicable if required, must meet all City of Baltimore certification requirements and shall be furnished to the City prior to product acceptance.
6. The LED drive current on both Hand/Person messages shall be regulated to compensate for line voltage fluctuations over the range of 80VAC to 135 VAC.

814.03.24 Pedestrian Signal LED Module Signal Display

1. The LED countdown signal module shall consist of a double overlay message combining the symbols of a Hand and walking Person and two “7 segment” digits forming the time display.
2. The Pedestrian icon LEDs shall be arranged in a manner to form solid icon symbols. The shape of the symbols shall conform to the standard symbols for pedestrian signals.
3. The LED’s shall be distributed evenly in each Pedestrian icon. The distance between each LED shall be evenly spaced.
4. The Hand/Person symbols shall be not less than 10 inch in height and 6.5 inch in width. The Hand symbol shall be made of at least 84 high intensity LEDs, and the Person symbol shall be made of at least 68 high intensity LEDs, in order to assure adequate luminous intensity.
5. The countdown digits shall be 9 inch high, shall be made of at least 144 LED’s, and shall be MUTCD compliant for crosswalks over 100 feet.
6. The countdown digits shall consist of two rows of LEDs in a staggered configuration, producing rounded numeral corners.

814.03.25 Pedestrian Signal Countdown Functionality

1. The countdown module shall be compatible with all types of traffic controllers in existence.
2. The countdown timer module shall have a micro-processor capable of recording it's own time when connected to a traffic controller.
3. When connected, the module shall blank out the display during the initial cycle while it records the countdown time using the Walk & D/Walk signal indications.
4. The countdown timer module shall continuously monitor the traffic controller for any changes to the pedestrian phase time and re-program itself automatically if needed.
5. The countdown module shall register the time for the walk and clearance intervals individually and shall begin counting down at the beginning of the pedestrian change interval.
 - a. After the countdown displays "zero," the display shall remain dark until the beginning of the next countdown.
 - b. The countdown pedestrian signal shall display the number of seconds remaining until the termination of the pedestrian change interval.
 - c. Countdown displays shall not be used during the walk interval, or during the yellow change interval of a concurrent vehicular phase.
6. When the flashing Hand becomes solid, the module shall display "zero" for one second and then blank-out. The display shall remain dark until the beginning of the next countdown.
7. In the event of a pre-emption sequence, the countdown module shall skip the pre-empted clearance time and reach "zero" at the same time as the flashing Hand becomes solid.
8. In the cycle following a pre-emption call, the signal shall display the correct time and not be affected by the reduced previous cycle. The countdown shall remain synchronized with the signal indications and always reach "zero" at the same time as the flashing Hand becomes solid.
9. The countdown timer shall be capable of timing 2 consecutive complete pedestrian cycles outputted by the traffic controller (no steady Hand signal between cycles).
10. The countdown module shall not display an erroneous or conflicting time when subjected to defective load switches.
11. The countdown module shall have an internal conflict monitor preventing any possible conflicts between the Hand/Person signal indications and the time display. It shall be impossible for the display to countdown during a solid Hand indication.
12. The countdown module shall have a user selectable option offering the possibility to countdown the entire duration of the walk and clearance time.
13. The countdown module shall have accessible dip-switches for the following user selectable options:
 - 1- Display "zero" during stand-by.
 - 2- Turn on all LEDs for testing.
 - 3- Countdown walk + clearance time.
 - 4- Disable countdown display.
14. The LED module shall have a removable plug on the rear of the unit allowing easy access to dip switches.

814.03.26 Pedestrian Signal Housings. All countdown pedestrian signal housings to be supplied under this specification are to be a one piece corrosion resistant aluminum alloy die-casting conforming to the latest ITE VTCSH specification alloy and tensile requirements, and single-piece cast aluminum swing down doorframe, having smooth, accurate surfaces and edges.

1. The maximum overall dimension of the signal shall be 18.75" W x 18.75" H x 9"D. (470 x 476 x 229 mm), including the visor and hinges. The distance between the mounting surfaces of the upper and the lower openings shall be 15.75" (400 mm).
2. The case shall be one piece corrosion resistant aluminum alloy die-casting, complete with integrally cast top, bottom, sides and back.
 - a. Four integrally cast hinge lug pairs, two at the top and two at the bottom of each case, shall be provided for operation of the swing down door.
 - b. When properly mated to other pedestrian signal components and mounting hardware, the case shall provide a dustproof and weatherproof enclosure and shall provide for easy access to and replacement of all components.
3. The case shall be mounted via upper and lower openings, suitable for either post top or bracket mounting. The openings shall accommodate standard 1.5" (39 mm) pipe brackets. The bottom opening of the case shall have a serrated boss integrally molded into the case. The dimensions of the boss shall be as follows:
 - a. Outside diameter - 2.625 inches
 - b. Inside diameter - 1.969 inches
 - c. Number of teeth - 72
 - d. Angle of teeth - 90°
 - e. Depth of teeth - 1/13 inch
 - f. The dimension of the serrated boss has 72 teeth.
4. A serrated boss of the same dimensions shall be an option for the top opening of the case. The radial angular grooves of the serrated boss, when used with the serrated fittings, shall provide positive positioning of the entire signal to eliminate rotation or misalignment of the signal.

814.03.27 Pedestrian Signal Housing Doors. All countdown pedestrian signal housing doors to be supplied under this specification are to be a one piece corrosion resistant aluminum alloy die-casting, having smooth, accurate surfaces and edges.

1. The doorframe shall be one piece, complete with two hinge lugs cast at the bottom and two latch slots cast at the top of each door.
 - a. The door shall be attached to the case by means of two Type 304 stainless steel spring pins.
 - b. Two stainless steel hinged bolts with captive stainless steel wing nuts and washers shall be attached to the case with the use of stainless steel spring pins.
 - c. Latching or unlatching of the door shall require no tools.
2. A gasket groove on the inside of the door shall accommodate a weather proof and mildew proof Ethylene Propylene Diene Monomer (EPDM) gasket. When the door is closed it

shall seal against a raised bead on housing making a positive weatherproof and dust proof seal.

218.03.28 Pedestrian Signal Visor. Pedestrian signals shall have tunnel visors, egg crate visors are prohibited.

MEASUREMENT AND PAYMENT. Vehicular Traffic Signal Head Sections furnished and installed will be measured and paid for at the Contract unit price per each section of signal head type and size. The payment will be full compensation for all lenses, and or LED modules, terminal blocks, assembly, mounting hardware, backplates, housing assembly, and incidentals for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Pedestrian Signal Assemblies furnished and installed, and all mounting hardware, visors, terminal blocks, LED pedestrian countdown timer modules, mounting hardware, assembly, and labor necessary to complete the work will be incidental to the Contract unit price of each section of signal head type and size.

SPECIAL PROVISIONS
816 — TRAFFIC CONTROL DEVICE
CABINETS AND EQUIPMENT

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 800
TRAFFIC

DELETE: SECTION 816 – TRAFFIC CONTROL DEVICE CABINETS AND EQUIPMENT in its entirety.

INSERT: The following.

DESCRIPTION.

Traffic Signal Cabinet and Controller: This work shall consist of furnishing and installing a City of Baltimore NAZTEC Model 980 TS2 Type 1 controller with the latest software revision, cabinet and foundation as specified in the Contract Documents. All equipment shall be compatible with existing equipment, and as such this will be a sole source item and no alternates will be accepted. Naztec's contact information is as follows:

Naztec, Inc.	Telephone: 281-240-7233
820 Park Two Drive	FAX: 281-240-7238
Sugar Land, TX 77478	Email: naztec@naztec.com

Lighting Control Cabinet: This work involves the furnishing and installing a complete lighting control cabinet, installed in a base mounted cabinet per the contract drawings, documents, BCDOT Details where applicable, and this special provision

MATERIALS.

Traffic Signal Cabinet and Controller:

GPS Time Reference Receiver and Supporting Equipment. The GPS Time Reference Receiver shall include a Naztec OEM Model 16-HVS that is readily compatible with the City of Baltimore Naztec Series 980 signal Controller and latest software revision. This equipment shall include a GPS Antenna, 16-foot Cat 5 cable, cable connectors, extension cables and controller interface adapters for a complete and operational installation. Installation of the GPS Antenna either shall be on top of the cabinet or mounted on the signal pole, as directed by the Engineer. This item shall be furnished as a turn-key system. *Each cabinet of any type will include a GPS unit.*

Eight-Phase Fully-Actuated Signal Controller. Contractor shall furnish and install an eight-phase Naztec Model 980-BALTMR TS 2 Type 1 signal controller and latest firmware release, all harnesses required for a fully operational controller in a NEMA TS 2 Baltimore base or pole mounted cabinet.

Type C Base Mounted Controller Cabinet. Contractor shall furnish and install a non-vented eight-phase Model NEMA TS 2 Baltimore Type C cabinet (City part number INT-70006-TS2CBM) with all harnesses required for a fully operational cabinet. Cabinet shall be populated

SPECIAL PROVISIONS
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CABINETS AND EQUIPMENT

with four two-channel detector amplifiers, video interface equipment, all output devices, communication terminal blocks, Bus Interface Units (BUIs), power supplies, communication surge arrestors, NEMA TS2 EDI. Eagle Signal or Econolite MMU Model 16LE SmartMonitor, and monitor harness. Each Type C sheet aluminum cabinet shall be a NEMA TS2, size 6 modified and shall be in full compliance with the TS2 specifications and shall include all necessary base-mounting accessories including anchor bolts and adapter bases, if required. **All cabinet material shall be 5052-H32 tempered aluminum.** Each cabinet shall be provided with a Technician Service Panel switches for Flash/Normal, Stop Time/Run/Normal, and Controller Power ON/OFF; Door Open Alarm Input; Local Flash Alarm Input; Ped Call Test switches for Phases 2, 4, 6 and 8, power supply, removable 3/8-inch Allen Wrench Lock in lieu of the door handle, three-point door latching mechanism and one 18-inch interior flexible arm goose neck lighting fixture and 25 watts incandescent lamps. The lamp shall be wired to either a 15-Amp ON/OFF toggle switch mounted to a door activated switch mounted near the top of the door. The lighting arm shall be mounted to the door, and when swung open the light shall illuminate the upper portion of the cabinet. The Contractor shall furnish and install suppression devices for output file, power supply and controller unit. Communication suppressors shall be supplied only for system controllers and shall be interchangeable with the surge arrestors installed in the current City cabinet design. Power Supply suppressors shall be interchangeable with the current City cabinet design Catalog cut sheets of the cabinet are required for approval by the City of Baltimore prior to final fabrication.

Lighting Control Cabinet:

1. Base mounted cabinet and foundation per contract documents and BCDOT Detail 804.10
2. 120/240 Volt 12 circuit panel board, enclosure and cover per NEC
3. 4 channel DZS400BP Astronomic/Programmable Electronic Timer
4. Surface mounted 100 watt heater and thermostat
5. Size "O" 2 pole contactor and enclosure
6. Terminal blocks sized per NEC and wire size required by the project plans
7. GFCI maintenance receptacle
8. 100 Amp NEMA 3R Fused Disconnect

CONSTRUCTION:

Lighting Control Cabinet: A two door BCDOT base mounted lighting cabinet shall be modified with a back panel to enclose a lighting control panel and associated devices per the layout and schematic drawings provided in the project plans. The exact position of each proposed device is approximate and the contractor may adjust component locations as necessary to provide the necessary clearances per the NEC and as common sense would dictate. The time clock is to be programmed to turn on one of the 4 lighting channels depending on the season, thus the clock needs to be astronomic and programmable for 365 days and provide automatic correction for daylight savings time and limited power back-up. A Hand-Off Automatic switch will be provided for the two Victorian light poles that are not on the BGE circuit, the photo cell provided as part of the closest light pole shall be utilized to turn on and off these two Victorian lights as shown on the project plans. A separate circuit breaker will be provided to power a circuit for the irrigation control panel as well as internal circuits for control power, GFCI

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maintenance receptacle and the internal thermostatically controlled space heater. The cabinet foundation will be designed per BCDOT Detail 804.10 and include all conduits shown in the detail and any others required by the project plans or the NEC. Meter enclosures may be purchased from BGE and shall be installed per BGE specifications. The Contractor shall provide catalog cuts for all components, schematic diagrams and elevation details for the Engineers approval.

MEASUREMENT AND PAYMENT.

Traffic Signal Controller and Cabinet:

Type C Pole Mounted Controller Cabinet with Eight-Phase Fully-Actuated Signal Controller. Payment for this item shall be on a “per each” basis. Payment shall be full compensation for all equipment, materials, software, installation, pole-mounted cabinet, input devices specified, output devices specified, communication terminal blocks and communication surge arrestors, BIUs and power supplies, MMU Model 16LE SmartMonitor and harness, shop drawings, catalog cuts, and all equipment, materials, and any other work necessary to complete the work to the satisfaction of the Engineer. The unit bid price for this item shall include flashers, relays, load switches, two detector input isolation cards, BIUs, harnesses, SDLC cables, surge and transient protection devices, cabinet power supply, GPS Unit, programming signal timing plans, adapter cables, cabinet mounting kits and shipping and handling, on-site testing, controller test plan and submittal materials. Further, this item shall also include programming the controller unit with the prescribed phasing and timing information, detector assignment set-up, coordination, time base control functions, and timing information (phasing and timing information to be identical to that of the existing controller), and any fees for permits required for the work under this item.

Lighting Control Cabinet: The 120/240 volt lighting control cabinet will be measured and paid for at the contract unit price per each and include cabinet, foundation, anchor bolts, internal components, back panel, fused disconnect, time clock, switches, circuit breakers, as show on the project plans and approved by the Engineer and all labor, materials, accessories, equipment, tools and incidentals necessary to complete the work and provide a complete and fully operational lighting control panel.

**CATEGORY 800
TRAFFIC**

SECTION 818 – BALTIMORE CITY SIGNAL STRUCTURES

DELETE: SECTION 818 – SIGNAL STRUCTURES in its entirety.

INSERT: The following.

DESCRIPTION. This work shall consist of furnishing and installing signal structures consisting of poles, post and pedestal shafts with anchor bases welded to the lower ends, complete with handholes as needed, handhole covers, pole caps, base covers, mast arm flanges and mast arms as needed, simplex fittings as needed, simplex fitting covers and all grommets, high strength bolts and miscellaneous hardware associated with proper installation.

Signal structures are defined as follows:

- Steel Strain Poles,
- Joint-Use Type Steel Strain Poles,
- Multi-purpose Mast Arm Poles,
- Galvanized Steel Mast Arm Poles,
- Inner Harbor Type Steel Mast Arm,
- Inner Harbor Type (Joint Use) Mast Arm Poles,
- Steel Pedestal Poles.

MATERIALS

Pole Shaft	A 595
Post Shaft	A 53, A 595
Pedestal Shaft	A 53, A 595
Anchor Base	A 36
Mast – Arm Flange Plates	A 36
Mast – Arm	A 595
Bolts	A 325
Hardware	Type 304 SS
Galvanizing	A 153
Foundation	801
Grounding	804

Pole Shafts

Round pole shafts shall be fabricated from minimum 3 gauge sheet steel conforming to A 595 and shall have a minimum guaranteed yield strength of 55,000 p.s.i. Round pole shafts shall be uniformly tapered starting at the base and decreasing in diameter at a rate of not more than 0.14 inches per foot of length.

Square pole shafts shall be fabricated from minimum 7 gauge sheet steel conforming to A 595 and shall have a minimum guaranteed yield strength of 55,000 p.s.i. Square pole shafts shall be uniformly tapered starting at the base and decreasing in diameter at a rate of 0.11 inches per foot of length.

Anchor Base

The base shall be made of steel plate conforming to ASTM A-36 of the proper strength to support the pole and its specified load. The center of the base shall have an opening of such diameter as to provide a slip fit for the shaft. The base shall be double welded, inside at the bottom and outside at the top. All welds shall meet the requirements of the AWS Structural Welding Code.

Handhole(s)

The shaft shall have reinforced opening(s) for handholes complete with cover plate(s) and stainless steel Type 304 fasteners as specified in the Contract Documents.

Ground Wire Connection

A method to connect a ground wire by means of a 1/2" bolt shall be provided at the handhole, 3/8" bolt for pedestals. No ground connection is required for push button posts.

Pole Cap

The top of the shaft shall be equipped with removable cast zinc or aluminum pole cap held securely in place by three stainless steel fasteners for round poles, four fasteners for square poles.

Simplex Fittings

Simplex fittings for joint use poles shall be provided as specified in the B.C. Details and Contract Documents. A removable galvanized steel or aluminum cover plate shall be provided for each unused fitting.

Base Cover

The base cover shall be a two-piece cast aluminum or fabricated steel form, which is used to protect the anchor bolts and nuts. The manufacturer shall specify the method of fastening the base cover to minimize removal and theft. The cover shall provide for positive drainage of the base and allow venting of the pole. The finish shall be identical to the pole finish. Base covers shall be provided for Inner Harbor Type Mast arm Poles only.

Mast Arms

Mast arms shall be round or square, tapered steel with a uniform taper of 0.10 inches per foot. All mast arms shall be welded to form one continuous piece. Mast arms shall be connected to the support pole at the height necessary to provide sixteen-foot clearance under signals and three-foot high overhead signs. All mast arms shall include one clamp-type signal hanger and one wire outlet grommet for every eleven feet, or fraction thereof, of length. Mast arms shall have a removable cap at the tip. Guy rods or truss type arms will not be permitted.

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Mast arms materials and fabrication shall conform to A 595, Grade A, with the exception that the shaft shall be round or square and tapered.

A flange plate is to be welded to the butt end to provide a rigid connection to the upright pole. Flange plate dimensions and bolt patterns shall be uniform for all mast arm lengths. A braided nylon line having a minimal tensile strength of four hundred pounds shall be installed in all mast arms from each signal location to the hand hole.

Welding

Pole Post and Pedestal Shafts, and Mast Arms shall not have more than one longitudinal weld per section which shall be ground or cold rolled smooth to a uniform finish and thickness. Butt welds will not be permitted within a continuous single section. All welds and transverse joints shall fully develop the ultimate strength of the pole. All welds shall meet the requirements of the AWS Structural Welding Code.

Galvanized Finish

Each structure shall be thoroughly cleaned inside and out, then hot dip galvanized to a minimum zinc thickness of 0.003 in. in accordance with A-123.

Bronze Finish

Pre-Treatment – Each structure shall be thoroughly cleaned inside and out, then hot dip galvanized to minimum zinc thickness of 0.003 in. in accordance with A-123. All surfaces shall then be roughened by light sand blasting using a Fine Abrasive.

Prime Coat – Thoroughly clean the surface using solvent as approved by the Engineer. Then apply paint as approved by the Engineer. One (1) Coat of Primer shall be applied, minimum thickness 4 mils. Primer color shall be approximately the same color as the topcoat.

Top Coat – Apply paint to a dry film thickness of 1.5 to 2.0 mils. Color shall match the color of Baltimore Inner Harbor Project 1 or as approved by the Engineer.

Alternate state-of-the-art coating system treatments will be considered.

Protective Coating – A biodegradable protective covering shall be wrapped around bronze finish poles to prevent damage to the finish from occurring during shipment.

Design Loads For Mast Arm and Multi-Purpose Poles

All poles and mast arms shall be designed in accordance with the Contract Documents, AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, for a 90 MPH wind zone. For joint use poles assume two street lighting luminaires per pole, aligned with the longest signal mast arm for either category of pole.

Marking

All poles and individual mast arms shall be permanently marked or labeled for identification. Poles

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designated for mounting single mast arms up to 24 ft. shall be labeled "LIGHT DUTY" on an aluminum plate riveted to the plate shaft. Poles designed for longer arms shall be labeled "HEAVY DUTY." Mast arm length shall be similarly labeled on the side of the mast arm.

Design Calculations

The manufacturer shall submit complete structural design calculations of all components including the loads applied to the foundation at the base plate level (i.e. axial load), overturning moment, and torsional moments. The professional seal of a registered structural engineer shall be on all structural design calculations and shop drawings.

CONSTRUCTION. The signal structure shall be installed on a concrete foundation conforming to the Contract Documents. Any finish on the signal structures and mounting hardware damaged during transportation and erection shall be repaired to match the original finish by and at the Contractor's expense and approved by the Engineer.

MEASUREMENT AND PAYMENT. Furnishing and installing of structures will be measured and paid for at the Contract unit price per each for the type of structure erected in place. The payment will be full compensation for the transportation and installation of all traffic signal poles, weather heads and duct seal, conduit, elbows, strapping, clips, brackets, mounting hardware, mast arms, twin mast arms, strain poles, pedestal poles, push button posts, breakaway base support systems, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
REMOVAL, SALVAGE, DISPOSAL,
PICK-UP AND DELIVERY OF TRAFFIC
SIGNAL AND LIGHTING EQUIPMENT

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CATEGORY 800
TRAFFIC

**REMOVAL, SALVAGE, DISPOSAL, PICK-UP AND DELIVERY OF TRAFFIC
SIGNAL AND LIGHTING EQUIPMENT**

SECTION 823

DELETE: Section 823 in its entirety.

ADD: The following:

DESCRIPTION. This work shall consist of removing, salvage, disposal, pick-up and or delivery of existing and proposed equipment: concrete, steel sub-base, foundation bases, structures, lighting fixtures, hardware, equipment and material which is no longer in use as part of a signal or street lighting system installation or modification.

MATERIALS. Not applicable.

CONSTRUCTION. The Contractor shall remove, salvage, dispose, pick-up and deliver all traffic signal and lighting material and equipment. The Contractor shall tag all salvaged materials with the location and contract number. All salvaged materials shall be delivered in the same condition, as they existed in the field to Department of Transportation facilities between the hours of 9:00 am and 3:00 pm any City workday. The Contractor shall contact each facility 48 hours in advance to arrange pick-up and deliveries. The Contractor shall unload all material and place it in the area(s) designated at each facility listed below.

Traffic Signal Poles, Street Lighting Poles, Handbox frame and cover, Lighting Fixtures, Controller and or Cabinets, Signs, Signal Heads and Hardware:

The Contractor shall contact the Engineer one week prior to material removal to mark poles for salvage, disposal, or relocation. The Contractor shall remove poles that have been marked for salvage, vehicular and pedestrian signal heads, signs, mast arms, lighting poles and fixtures, and other related material and associated hardware and deliver to the appropriate facility listed below.

The Engineer shall determine the condition of all existing street and pedestrian lights and instruct the Contractor to which lights will be relocated. When there is a conflict between the design plans and the Engineer, the Engineer's direction shall supersede the design plans.

The Contractor shall remove traffic signal pole and or cabinet bases to a depth twelve (12) inches below sub-grade, cut off anchor bolts, reinforcing steel, or remaining pole, dispose of all material, backfill voids with graded aggregate, compact the material, and patch the hole to match surrounding conditions and deliver to Department of Transportation facility located at:

3202 Southern Avenue
Baltimore, Maryland 21215

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The Contractor shall remove electronic signal control and detection equipment, cabinets, and related hardware and deliver to the Department of Transportation facility at:

1620 Rappolla Street
Baltimore, Maryland 21224
Phone # 410-396-9065

The Contractor shall remove pole bases to a depth twelve (12) inches below sub-grade, cut off anchor bolts, reinforcing steel, or remaining pole, dispose of all material, backfill voids with graded aggregate, compact the material, and patch the hole to match surrounding conditions.

The delivery of existing lighting poles, fixtures and related hardware will be made to the Department of Transportation facility Gay Street Yard at:

1801 Southern Avenue
Baltimore, Maryland 21206
Phone # 410-396-9012

The Contractor shall remove handboxes, backfill the voids with graded aggregate, compact the material and reconstruct the sidewalk to the nearest tooled/expansion joint, or restore the area to surrounding conditions. The Contractor shall deliver hand boxes to the Department of Transportation facility located at:

1400 Leadenhall Street
Baltimore, Maryland 21230
Phone No. (410)396-1515

The Contractor shall remove and dispose of any other material including span wire, banner arms, plates, covers, cable rings, cable, bands, clips and items not specifically designated by the Engineer for salvage.

MEASUREMENT AND PAYMENT Removal, Salvage, Disposal, Pick-Up and Delivery of Traffic Signal and Lighting Equipment will be measured and paid for at the Contract unit price per lump sum basis. The payment will be full compensation for all materials, labor, equipment, tools, transportation, delivery and unloading of materials, removal of pole bases to a depth twelve (12) inches below sub-grade, cutting off anchor bolts/ reinforcing steel / remaining pole, disposal of all material, backfilling voids with Crusher Run (CR-6), compacting the material, patching the hole to match surrounding conditions, and for any incidentals necessary to complete the work. Any loss in value of salvaged materials due to damage or misplacement by the Contractor will be deducted from the Contractor's payment. A list of all removed and salvaged equipment shall be provided to the engineer. Lump sum payment will also include removal, salvage, disposal, pick-up, transportation and delivery, and unloading of all existing, proposed and temporary materials, structures, and equipment.

SPECIAL PROVISIONS
SECTION 826 - JACK AND BORE

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SECTION 826 - JACK AND BORE

JACK AND BORE – 36” STEEL CASING
PREPARATION OF JACK AND BORE OPERATION

826.01 DESCRIPTION.

This specification includes requirements for boring and jacking a 36-inches outer diameter casing pipe under the existing Central Avenue Storm Drain at 7-locations, with required access shafts for the proposed City Conduit system, providing necessary dewatering and monitoring of movement, to the limits indicated and in accordance with the Contract Documents.

1. Definitions:

- a. Casing pipe is the sleeve through which the proposed conduits will be placed.
- b. Boring and jacking pipe is a method of installing a pipe sleeve by means of cutting, hand mining or boring an opening in soils material while simultaneously forcing the pipe through the opening with hydraulic jacks.

826.02 MATERIALS.

1. Steel Casing Pipe: Steel pipe for Bore-jack casing shall be smooth walled, shall have minimum yield strength of 36,000-psi meeting the requirements for ASTM A36 steel and shall be 36-inches outer diameter with ½-inch wall thickness. Joints shall be fully welded around the circumference of the pipe with a complete penetration weld.
2. Flowable Fill: Grout for filling in the voids inside the casing around the ducts shall be flowable fill per SHA Section 314 – Flowable Backfill.
3. Surface Settlement Markers: Steel Rods consisting of 18-inches x ½-inch diameter ASTM A36 steel.

826.03 CONSTRUCTION.

1. General:

- a. It shall be the Contractor's sole responsibility, prior to bidding, to make his/her own investigation and make his/her own determination of the work site soil conditions. Rock and/or water, if encountered, shall not entitle the Contractor to additional compensation.
- b. When water is encountered, provide and maintain a dewatering system of sufficient capacity to remove water on a 24-hour basis keeping excavations free of water until the backfill operation is completed. Dewatering shall be performed in such a manner that removal of soils particles is held to a minimum. Dewater into a sediment trap and

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comply with requirements specified in other approved methods. Methods of dewatering shall be at the option and responsibility of the Contractor. Maintain close observation to detect settlement or displacement of surface facilities due to dewatering.

- c. Should settlement or displacement be detected, notify the Engineer immediately and take such action as necessary to maintain safe conditions and prevent damage.

2. Delivery, Storage and Handling:

Materials shall be unloaded and handled with equipment of adequate capacity, equipped with slings to protect the materials from damage. Storage of materials on the site shall be in a reasonably level well-drained area. Individual pieces and bundles shall be stored with safe walking space between to allow full view for inspection purposes.

3. Site Conditions:

- a. Bore and Jack operation shall not interfere with, interrupt, or endanger surface and traffic activity thereon, and minimize subsidence of the surface in the vicinity of the tunnels. Support the ground continuously in a manner that will prevent loss of ground and keep the perimeters and face of the tunnel, passages, and shafts stable. The Contractor shall be responsible for all settlement resulting from tunnel operations and shall repair and restore damaged property to its condition prior to being disturbed at no cost to the City.
- b. Comply with applicable ordinances, codes, statutes, rules and regulations of the City, State of Maryland, SHA and applicable regulations of the Federal Government, OSHA 29CFR '1926 and applicable criteria of ANSI A10.16-81 -Safety Requirements for Construction of Tunnel Shafts and Caissons.

4. Preparation:

- a. Install, maintain, and make observation measurements at regular time intervals acceptable to the Engineer, on surface settlement markers placed as specified or as directed by the Engineer. Tie settlement markers to bench marks and indices sufficiently remote as not to be affected by the bore and jack operations. Take readings and permanently record prior to start of dewatering operations and/or shaft excavation. Readings shall be taken on a daily basis during boring and jack operations and once a week for two months after bore and jack operations are completed. Make all elevation measurements to the nearest 0.01 feet. All readings shall be reported to the Engineer within one hour of the reading. Settlement detected shall be corrected by the Contractor at no cost to the City.
- b. Settlement markers shall be located according to a grid, spaced at ten feet or otherwise specified. In the event settlement or heave on any marker exceeds 1-inch, the Contractor shall immediately cease work and take immediate action to restore the surface elevation that existed prior to start of the bore and jack operation.

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- c. Perform preliminary work including constructing bore and jack shafts, backstop, placing guide timbers, and placing boring apparatus.

5. Bore and Jack Equipment:

- a. Bore and Jack equipment shall be U.S. Bureau of Mines approved types.
- b. Power machinery and tools within the tunnel shall be operated by either electricity, compressed air, diesel with approved scrubber or other approved power. Electrical tools and equipment shall be grounded in accordance with the latest requirements of the National Electrical Code.
- c. Provide temporary electric lights to properly and safely illuminate all parts of the tunnel construction area including special illumination at the working face. Lighting circuits shall be thoroughly insulated and separated from power circuits, and lights shall be enclosed in wire cages. Secure electrical permits required for successful completion of this work.

6. Ventilation and Air Quality:

Provide, operate, and maintain for duration of tunnel project a ventilation system to meet safety and MOSHA requirements.

7. Bore and Jack Operation:

- a. Provide removable auger and cutting head arrangement. Provide method to control line and grade.
- b. Jack casing pipe with auger rotating within the pipe to remove spoil. Hand mining is an option provided method is submitted in detail and is acceptable to the Engineer.
- c. Overcut of cutting head shall not exceed the outside diameter of the casing pipe by more than 1 inch. For hand mining, no overcut will be permitted.
- d. Provide positive means for continuous monitoring and controlling grade of casing pipe during boring operation.
- e. Weld steel pipe casing as required herein and when coating is required, repair coating damage each side of weld and recoat complete weld area.

8. Suspension of Operation:

Whenever the boring or tunneling operation is suspended, support the tunnel face by positive means and keep dewatering system operating. Have qualified personnel periodically check conditions that might threaten the stability of the tunnel.

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9. Grouting:

Once the multi-duct conduits has been installed, tested and approved, grout the annular space between the pipe casing and multi-duct conduit with flowable fill.

10. Field Quality Control:

Bore and jack casing pipes shall maintain line and grade indicated on the Drawings to within a tolerance of two inches.

11. Welded Joints:

Joint welds for the casing pipe sleeve shall be made in a neat workmanlike manner by a certified welder and shall be air tight and continuous over the entire circumference of the pipe with a bead equal to the minimum wall thickness, and shall increase the outside diameter by no more than 3/4" total.

826.04 MEASUREMENT AND PAYMENT

1. JACK AND BORE – 36-inch STEEL CASING - The Jack and Bore – 36-inch Casing Pipe shall be measured per linear foot measured horizontally along the centerline of the casing pipe and paid for under the Design/Build Contract lump sum price. The number of linear feet of Jack and Bore – 36-inch Casing Pipe shall be determined by measurement of pipe installed in place, competed and accepted, which measurement shall be from end to end of each completed pipe line. Payment includes excavation, backfill, access shafts, disposal of excess excavated material, bore-jacking operations, concrete invert with anchors, concrete or brick bulkheads, steel reinforcement, filling space between multi-duct conduits and casing pipe with flowable fill, flowable fill, skids, casing spacers and for all material, labor, equipment, tools, and incidentals necessary to complete the work.
2. PREPARATION OF JACK AND BORE OPERATION - Preparation of Jack and Bore Operation will not be measured but will be paid for under the Design/Build Contract lump sum price. Items of work not specifically included in measurement and payment items as described herein will not be measured for payment but will be considered incidental to the Design/Build Contract. This shall include but not be limited to the monitoring of movement, dewatering, and rock removal and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 876
WATER DISTRIBUTION**

DESCRIPTION

A. Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Front End Specification Sections, apply to this Section.
2. Maryland Department of Transportation State Highway Administration Standard Specification for Construction and Materials

B. Summary

1. This Section includes water-distribution piping and related components.
2. Ductile iron pipe will be utilized for all water piping four inch (4") diameter and larger.
3. Copper pipe will be utilized for all water piping three-quarter inches (3/4") through two inches (2").

C. Definitions

1. PVC: Polyvinyl chloride plastic.

D. Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
3. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
4. Field quality-control test reports.

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5. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

E. Quality Assurance

1. Regulatory Requirements:
 - a. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - b. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - c. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
2. Piping materials shall bear label, stamp, or other markings of specified testing agency.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
4. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
5. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
6. NSF Compliance:
 - a. Comply with NSF 14 for plastic potable-water-service piping.
 - b. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

F. Delivery, Storage, and Handling

1. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

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- a. Ensure that valves are dry and internally protected against rust and corrosion.
 - b. Protect valves against damage to threaded ends and flange faces.
 - c. Set valves in best position for handling. Set valves closed to prevent rattling.
2. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 - a. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - b. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
 3. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
 4. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
 5. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
 6. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Project Conditions
1. Interruption of Existing Water-Distribution Service: Do not interrupt service to any users of the Baltimore City (City) water system unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 - a. Notify City no fewer than five days in advance of proposed interruption of service.
 - b. Do not proceed with interruption of water-distribution service without City's written permission.

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H. Coordination

1. Coordinate water main work with the City.

MATERIALS

A. Ductile-Iron Pipe and Fittings

1. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless flanged ends are indicated.
 - a. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - b. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
 - c. Pipe Special Class 54.
2. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - a. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - b. Gaskets: AWWA C111, rubber.
 - c. Pipe Special Class 54
3. Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:
 - a. Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
 - b. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes
 - c. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

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- d. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
- e. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
- f. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

B. Copper Pipe

- 1. Copper pipe shall be seamless, type K annealed, and meet the material, chemical, and mechanical requirements of ASTM B 88.
- 2. Copper Pipe and Fittings: Fittings shall be copper meeting requirements of ASTM B62 and shall meet requirements of AWWA C800. Copper to copper couplings shall be those known as the two (2) part type consisting of a tubing connection, a coupling nut and a friction ring. The copper tub end of the couplings shall be the flare type for three-quarters of an inch to one inch (3/4" to 1") services and for one and one-half inch to two inch (1-1/2" to 2") services; compression type fitting should be used for connecting to type K copper service pipe. The opposite end, and all couplings nuts shall be threaded in accordance with AWWA C800. The iron end of all copper to iron pipe fittings shall be threaded in accordance with American National Pipe Threads. Copper and brass fittings shall be standard seamless threaded reamed and chamfered, and of the proper size required. The brass fittings shall be 85-5-5-5 Red Brass.

C. PVC Pipe

- 1. PVC pipe will not be permitted to be used on this project for water distribution.

D. Piping Specialties

- 1. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- 2. Tubular-Sleeve Pipe Couplings:

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- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - i. Total Piping Solutions, Inc. (Hymax – 2000 series)
 - ii. Mueller Co. (MaxiFit – MFC Coupling)
 - iii. Smith-Blair, Inc. (Quantum – 461 Series Coupling)
 - iv. Cascade Waterworks Manufacturing.
 - v. Dresser, Inc.; Dresser Piping Specialties.
 - vi. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - vii. Hays Fluid Controls; a division of ROMAC Industries Inc.
 - viii. JCM Industries.
 - ix. Viking Johnson.
 - x. Or approved equal.

- b. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.:
 - i. Standard: AWWA C219.
 - ii. Center-Sleeve Material: Manufacturer's standard
 - iii. Gasket Material: Natural or synthetic rubber.
 - iv. Pressure Rating: 200 psig minimum.
 - v. Metal Component Finish: Corrosion-resistant coating or material.

E. Gate Valves

1. AWWA, Cast-Iron Gate Valves:

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - i. American Flow (Series 2500)
 - ii. Kennedy (KEN-SEAL NRS)
 - iii. M & H (4067 NRS)
 - iv. Mueller Co. (A-2360 NRS)
 - v. U.S. Pipe (Metroseal 250 NRS)
 - vi. Clow (F 6100)
 - vii. Or approved equal.

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F. Accessories and Specialties

1. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - i. East Jordan Iron Works, Inc. (8550 Series)
 - ii. Bingham and Taylor (4905 Series)
 - iii. Tyler (6850 Series)
 - iv. Or approved equal.
 - b. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
2. Meter Boxes:
 - a. Portland cement concrete for cast in place meter box lids and bases shall be as specified in the Contract Documents and Standard Details.
 - b. Concrete reinforcement shall be as specified in the Contract Documents and Standard Details.
 - c. Precast meter boxes shall be precast of the size indicated on the Standard Details or as approved by the Water and Waste Water Engineering Division.
 - d. Prefabricated meter boxes shall also comply with the following:
 - i. Prefabricated water meter boxes shall be furnished with a standard Meter Frame and Cover as shown on the Standard Details.
 - ii. The meter setting shall be furnished with a ball angle valve on the outlet and inlet sides of the setting.
 - iii. The ball angle meter valves shall be as shown on the Standard Detail to assure interchangeability of City standard meters.
 - e. PVC, PE and fiberglass meter boxes shall be of the size indicated on the Standard Details or as approved by the Water and Waste Water Engineering Division.

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G. Fire Hydrants

1. Dry-Barrel Fire Hydrants:

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - i. Mueller Co. (Super Centurion 250-A-423)
 - ii. American Darling (B-62-B, modified upper valve plate)
 - iii. Kennedy (Guardian K-81D, modified for two drains)
 - iv. Or approved equal

- b. Description: Freestanding, with one NPS 4-1/2 (DN 115) and two NPS 2-1/2 (DN 65) outlets, 5-1/4-inch main valve, drain valve, and NPS 6 (DN 150) mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
 - i. Standard: AWWA C502.
 - ii. Pressure Rating: 250 psig
 - iii. Pentahead nut
 - iv. Open left
 - v. National Standard hose thread

CONSTRUCTION

A. Earthwork

- 2. Trench excavation and suitable bedding shall be complete to proper grade per Section 809 (Trenching and Backfilling) before pipe is placed. Any adjustment due to improper trench grade or settlement shall be accomplished at Contractor expense. If the pipeline floats or collapses from accumulation of water in trench or from other causes, approved repair and replacement shall be at no cost to the City.

B. Piping Applications

- 1. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

- 3. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

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4. Do not use flanges or unions for underground piping.
5. Flanges may be used, instead of joints indicated, on aboveground piping and piping in vaults.
6. Underground Water Main Piping NPS 6 to NPS 12 (DN 150 to DN 300) shall be the following:
 - a. Ductile-iron, push-on-joint pipe; mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

C. Valve Applications

1. General Application: Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.
2. Where specific valve types are not indicated, the following requirements apply:
 - a. Underground Valves, NPS 3 (DN 80) and Larger: AWWA, cast-iron, nonrising-stem, metal and resilient seated gate valves with valve box.

D. Piping Installation

1. Water-Main Connection: Arrange with City for tap of size and in location indicated in water main.
2. Make connections larger than NPS2 as shown on the contract drawings.
3. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
4. Bury piping with depth of cover over top at least 48 inches.
5. Install underground piping with restrained joints at horizontal and vertical changes in direction.

E. Joint Construction

1. Make pipe joints according to the following:

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- a. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
- b. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
- c. Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.
- d. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

F. Anchorage Installation

1. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 - a. Concrete thrust blocks.
 - b. Locking mechanical joints.
 - c. Set-screw mechanical retainer glands.
2. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 - a. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 - b. Fire-Service-Main Piping: According to NFPA 24.
3. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

G. Valve Installation

1. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
2. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

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H. Meter Box Installation

1. Water meter boxes shall be installed in accordance with the requirements for the specific materials indicated above, in accordance with the Contract Documents, Standard Details, and the following:
 - a. All meter boxes shall be set at the location, and constructed of the materials shown on the plans and Standard Details.
 - b. Special care shall be taken to insure that the services are well bedded on a solid foundation. Any defects resulting from settlement shall be repaired by the contractor at the contractor's expense. All meter boxes shall be bedded on firm undisturbed earth.
 - c. Meter settings and associated piping are to remain undisturbed during the installation of new meter boxes.
2. Meter Box installation will be paid for in accordance with paragraph J "Water Service Connection and Meter Vault Replacement" under Measurement and Payment in this specification section.

I. Water Service Curb Stop Installation

1. Water service curb stops shall be installed in accordance with the requirements for the specific materials indicated above, in accordance with the Contract Documents, Standard Details, and the following:
 - a. All water service curb stops shall be set at the location, and constructed of the materials shown on the plans and Standard Details.
 - b. Special care shall be taken to insure that the services are well bedded on a solid foundation. Any defects resulting from settlement shall be repaired to the City's satisfaction by the contractor at the contractor's expense. All water service curb stops shall be bedded on firm undisturbed earth.
 - c. Water service curb stop settings and associated piping are to remain undisturbed during the installation of new curb stops.

J. Fire Hydrant Installation

1. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
2. AWWA Fire Hydrants: Comply with AWWA M17.

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K. Connections

1. Connect water-distribution piping to relocated/new water main as indicated on the drawings.
2. Reconnect any service lines, branches etc., to the new main that exist but were not shown on the drawings that require reconnection.

L. Abandonment

1. Cap ends of mains as shown. Place required concrete blocking to retain the cap on the water main to remain in service.
2. Where mains are to be abandoned and removed to a fitting or valve cut and plug main at fitting or valve. When shown on the Contract Plans, remove and salvage abandoned valves, valve boxes, and fire hydrants within the limits of abandonment and deliver to City warehouse. Pipe, fittings and other appurtenances that are removed but not required to be salvaged, shall become the property of the Contractor and shall be removed and disposed of offsite.
3. For abandonment of water mains twenty inches (20") and larger diameter, construct a brick bulkhead nine inches (9") thick or install an approved plug or cap at each location where the pipe was cut or valve removed.
4. For abandonment of water mains smaller than twenty inch (20") diameter, install bulkheads using brick masonry, twenty-five hundred (2500) psi concrete, gray iron plugs or caps at the end of abandoned sections.
5. Fill abandoned water utility structures with twenty-five hundred (2500) psi concrete.

M. Field Quality Control

1. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
2. Hydrostatic Tests: Test at not less than 150-psig for two hours.
 - a. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking

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joints with new materials and repeat test until leakage is within allowed limits.

3. Prepare reports of testing activities.
4. Test and disinfect the new main before it is connected to the City's existing water system.

N. Identification

1. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.

O. Cleaning

1. Clean and disinfect water-distribution piping as follows:
 - a. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - b. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - c. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - i. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - ii. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - iii. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - iv. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
2. Prepare reports of purging and disinfecting activities.

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MEASUREMENT AND PAYMENT

A. Water Main – 4” Ductile Iron Pipe

Water Main – 4” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 4” main functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

B. Water Main – 6” Ductile Iron Pipe

Water Main – 6” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 6” main functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

C. Water Main – 8” Ductile Iron Pipe

Water Main – 8” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 8” main functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

D. Water Main – 10” Ductile Iron Pipe

Water Main – 10” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 10” main functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

E. Water Main – 12” Ductile Iron Pipe

Water Main – 12” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 12” main functional. The

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payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

F. Water Main – 16” Ductile Iron Pipe

Water Main – 16” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 16” main functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

G. Water Main – 40” Ductile Iron Pipe

Water Main – 40” Ductile Iron Pipe will be measured and paid for at the Contract Unit prices per linear foot installed and tested. The work shall include all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, connections to existing mains, testing, cleaning, and any other work required to make the 40” main functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

H. Valves

Unit of measure will be each. Payment for Gate Valve and manhole/vault will be made at Contract Unit Price per each, which price and payment will include flanged and mechanical joint ends, flanged and plain end pieces where needed along with sleeve couplings, tapping machine connection, saddle, excavation and backfill beyond trench excavation pay limits, concrete base, riser sections, castings and all labor, materials, tools, equipment and incidentals needed to complete work specified.

I. Fire Hydrants

Fire Hydrants will be measured and paid for at the Contract Unit prices per each installed and tested. The work shall include the connection to the indicated size water main, 6” ductile iron pipe, fittings, valves, the hydrant, restraints, buttresses, testing, cleaning, and any other work required to make the fire hydrants functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

J. Water Service Connection and Meter Vault Replacement

Water Service Connection and Meter Vault Replacement will be measured and paid for at the Contract Unit prices per each installed and tested. The work shall include the connection to the indicated size water main, copper pipe, fittings, valves, meter box, meter box frame cover, meter box foundation, backfill and compaction of the meter box, cleaning,

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and any other work required to make the water service connection and meter vault functional. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

K. Curb Stop Adjustments

Curb Stop Adjustments will be measured and paid for at the Contract Unit prices per each adjusted in the field to meet the final grade. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

L. Remove Water Main

Unit will be measured and paid for at the Contract Unit prices per linear foot of water main removed. The work shall include the removal of all pipe, fittings, valves, restraints, anchors, couplings, sleeves, spacers, and any other work required to fully remove the water main. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work specified.

M. Abandon Valve

Unit of measure will be each. Payment for Abandon Valve will be made at Contract Unit Price per each, which price and payment will include all labor, materials, tools, equipment and incidentals needed to complete work specified.

N. Remove and Dispose of Fire Hydrant

Unit of measure will be each. Payment for Remove and Dispose of Fire Hydrant will be made at Contract Unit Price per each, which price and payment will include all labor, materials, tools, equipment and incidentals needed to complete work specified.



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State Highway Administration

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SPECIAL PROVISIONS INSERT

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**CATEGORY 900
MATERIALS**

655 **ADD:** The following after the last paragraph of 900.02 TECHNICIAN QUALIFICATION REQUIREMENTS.

900.03 RECYCLED MATERIALS.

900.03.01 CERTIFICATION. All recycled or rehandled material furnished or supplied for use may require testing and certification to ensure compliance with all State and local applicable environmental and EPA regulations. The required testing may include, but not be limited to, the EPA Toxicity Characteristic Leaching Procedure (TCLP) or its successor. Provide testing and certification for all recycled materials at no additional cost to the Administration. Evaluation and interpretation of the test data will be made by an OMT Quality Assurance Manager. The above requirements do not preclude the normal materials acceptance process, and the recycled material shall meet all applicable specifications. EPA regulations governing the use of the material, certified test results, and material safety data sheets shall accompany the source of supply letter and sample submitted for approval.

Refer to the Contract Documents for recycled materials not covered by this specification.

900.03.02 RECLAIMED/RECYCLED CONCRETE (RC).

Usage. Use RC for the following with written approval:

- (a) Graded Aggregate Base (GAB).
- (b) Common, Select, or Modified Borrow:
 - (1) At least 2 ft above saturated soil or groundwater conditions,
 - (2) At least 100 ft from surface waters (streams, creeks, or rivers),
 - (3) At least 3 ft from exposed metal surfaces, and,
 - (4) At least 3 ft from geotextile.
- (c) Riprap.

Do not use RC as Capping Borrow nor as aggregate for the following:

- (a) Portland cement concrete.
- (b) Hot mix asphalt.



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- (c) Drainage systems.
- (d) Mechanically stabilized earth (MSE) systems:
 - (1) MSE walls.
 - (2) Reinforced soil slopes (RSS).
 - (3) Reinforced earth slopes (RES).
- (e) In embankment construction as follows:
 - (1) Within 1 ft of the top surface of any area to be vegetated.
 - (2) Within 2 ft of saturated soil or groundwater conditions.
 - (3) Within 100 ft of any surface water course (streams, creeks, or rivers).
 - (4) Within 3 ft of any metal pipe or shoring.
- (f) Under pervious or porous surfaces.

Grading Requirements. The grading requirements for the use of RC are:

- (a) Table 901 A when used as GAB or for any other application within the pavement structure.
- (b) 204.02 when used in embankment construction.
- (c) 916.01 when used as Borrow material.
- (d) 901.02.01 when used as riprap.

RC shall not contain more than 5 percent brick and hot mixed asphalt material by mass except when used as Common Borrow.

pH Requirements. The pH shall be less than 12.0 for all applications. RC usage shall not cause water leaving the site to exceed a pH of 8.5. RC may be blended with natural materials to control the pH. RC used as GAB requires daily testing to monitor the pH, and as directed.

Quality Control. The producer shall submit a Quality Control Plan and obtain approval prior to production. The plan shall include, but not be limited to, the operational techniques and procedures proposed to produce the RC product. Quality control includes the sampling and testing performed to validate the quality of the product during production operations.



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Quality Assurance. OMT Quality Assurance personnel will perform quality assurance inspection, sampling, and testing at the point of processing/reclamation. Additional inspection and compaction control will be performed by the Project Engineer.

900.03.03 RECYCLED ASPHALT PAVEMENT (RAP).

Usage. Use RAP for Common, Select, Capping, or Modified Borrow.

Do not use RAP as aggregate for the following:

- (a) Graded Aggregate Base (GAB).
- (b) Portland cement concrete.
- (c) Drainage systems.
- (d) Embankment construction.
 - (1) Within 1 ft of the top surface of any area to be vegetated.

Refer to MSMT 412 and M 323 for the use of RAP in hot mix asphalt mixes.

Grading Requirements. The grading requirements for the use of RAP are:

- (a) 204.02 when used in embankment construction,
- (b) 916.01 when used as Borrow material,
- (c) 901.02.01 when used as riprap.

Quality Control. Create a captive stockpile for storing the RAP prior to use. Create a new captive stockpile and take new acceptance samples for gradation approval whenever the source of the RAP changes.

Quality Assurance. OMT Quality Assurance personnel will sample and test the RAP stockpiles to ensure that they meet the above gradation requirements. The completed test results will be reviewed by the OMT Soils and Aggregate Division for approval.

Construction of Control Test Strip. The location, equipment, and methods used to construct the control test strip shall be as directed; prior to approval. The equipment and methods used to construct the control test strip shall be the same as those used in subsequent construction. Place and test the control test strip when the RAP is 32°F or higher to establish the maximum density. RAP is temperature sensitive, which may affect the density.



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Construct the control test strip that shall be at least 100 ft long, 12 ft wide and a maximum compacted lift thickness of 6 in. Prepare the subgrade for the control test strip in accordance with 204.03.07. Do not construct the control strip, or perform any subsequent construction, on frozen subgrade.

Compact the RAP for the control test strip with one pass of the roller. Measure the density after one pass with a nuclear density gauge (backscatter method) at the frequency for capping material at five random locations distributed across the length and width of the control test strip, as directed. Record the measurements and mark the locations for future reference.

Compact the RAP for the control test strip with a second pass of the roller. Measure and record the density again at the exact locations previously tested and as described above. Prepare a plot of density versus the number of roller passes. Continue this process until the maximum dry density of the control strip is established.

There should be no drop in average density during construction of the control test strip for each lift. A drop in the average density of greater than 2 pcf during construction of the control test strip is an indication that the material is not properly compacting, and a new test strip shall be constructed.

The Project Engineer may require the Contractor to cut into the control test strip for visual inspection. All material, labor, equipment, tools, and incidentals necessary to provide an approved control test strip shall be at no additional cost to the Administration.

Compaction Control. Use the roller pattern and number of passes determined from the construction of the test strip to compact the RAP for production placement. The density of the RAP compacted for production work shall be at least 97 percent of the maximum density obtained from the control test strip. Recheck the density of the production work if it is less than 97 percent of the maximum density obtained from the control test strip. Construct a new control test strip if the second density does not meet the 97 percent requirement. Construct a new control test strip if the measured density of the compacted RAP for production work exceeds 105 percent.

Establish one rolling pattern to achieve maximum density for each use based on the control test strips. Samples or results produced prior to the construction of any new stockpiles will not be considered.



SPECIAL PROVISIONS INSERT
902-PORTLAND CEMENT CONCRETE

CATEGORY 900
MATERIALS

665 **DELETE:** SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS in its entirety.

INSERT: The following.

SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS

902.01 STORAGE. Storage of materials shall conform to the Contract Documents and as directed by the Engineer.

902.02 CERTIFICATION OF PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT. The manufacturer shall furnish certification as specified in TC-1.03. The certification shall also include:

- (a) The mill shall report its quality control procedures, and submit a new report whenever there is a procedural change.
- (b) The mill's control laboratory shall be inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology on their regularly scheduled visits. The Engineer shall be provided with copies of the reports of these inspections along with an account of the action taken to correct cited deficiencies.
- (c) Records of data accumulated by the quality control procedures shall be produced upon request.
- (d) A certified document shall accompany each shipment stating that the contents conform to all applicable requirements. Additionally, the document shall show the producer's name, mill location, carrier number, date loaded, weight contained in carrier, silo number, consignee, destination, Contract number, and type of cement. The signature and title of the signer shall be shown on the document.
- (e) The mill shall, upon request, supply certified chemical and physical test values that can be associated with any sample representing cement drawn from a particular silo on a given date.
- (f) Acceptance of cement by certification will be terminated if test results differ from mill results by more than the precision limits given in the test method. The acceptance procedure will then revert to storage testing and approval prior to shipment.

902.03 HYDRAULIC CEMENT.

902.03.01 Portland Cement. M 85, with the fineness and the time of setting determined using T 153 and T 131, respectively.



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902.03.02 Ground Iron Blast Furnace Slag. M 302, Grade 100 or 120. The Contractor may request to substitute a maximum of 50 percent of the weight of cement with ground iron blast furnace slag. When ground iron blast furnace slag is used, the minimum cement factor and water/cement ratio will be determined on the basis of the combined weight of the portland cement and ground iron blast furnace slag. When ground iron blast furnace slag is used to control alkali silica reactivity, see Table 902 B for percentage.

902.04 BLENDED HYDRAULIC CEMENT. M 240, Type I (PM) or a Type IP containing 15 to 25 percent pozzolan by weight of cement. Maximum loss on ignition is 3.0 percent. Do not use ground iron blast furnace slag for blending. The requirement for a manufacturer's written statement of the chemical composition is waived.

902.05 MASONRY CE MENT. C 91, except the water retention and staining tests are waived.

902.06 CONCRETE ADMIXTURES. Do not use concrete admixtures that contribute more than 200 ppm of chlorides based on the cement content when tested per MSMT 610. Use only prequalified admixtures.

Do not use pozzolan and Type I (PM) or Type IP cement in the same mix. Since the strength gains are delayed with these materials, a longer period of time may be required for curing and form removal.

902.06.01 Air Entraining Admixtures. M 154.

902.06.02 Che mical Admixtures. M 194, Type A, D, or nonchloride C.

902.06.03 High Range Water Reducing Admixtures. M 194, except that it shall be a liquid, the water content shall be a maximum of 85 percent of that of the control, and the durability factor shall be a minimum of 90. Use Type F for early strength, which shall produce a minimum compressive strength in 12 hours of 180 percent of that of the control. Use Type G when early strength is not specified. The manufacturer shall furnish certification as specified in TC-1.03. The certification shall include curves indicating the fluid ounces of admixture per 100 lb of cement as related to water reduction and strength gain for 12 hours when used with a minimum cement factor of 700 lb.

902.06.04 Pozzolans. The use of pozzolans may be requested to control alkali silica reactivity or for other reasons. When a pozzolan is used, determine the minimum cement factor and water/cement ratio on the basis of the combined weight cement and pozzolan. See Table 902 B for percentage of fly ash, and microsilica.

(a) **Fly Ash.** M 295, pozzolan Class C or F, except that the maximum permissible moisture content shall be 1.0 percent, and when used in concrete Mix Nos. 3 and 6 the maximum loss on ignition 3.0 percent.

(b) **Microsilica.** C 1240, except that the oversize requirement is waived.



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902.06.05 Corrosion Inhibitors. Corrosion inhibitors shall be calcium nitrite based and contain a minimum of 30 percent active ingredients by mass. The gallonage of corrosion inhibitor used in the concrete mixture shall be included as water when determining the water/cementitious materials ratio.

902.07 PORTLAND CEMENT CONCRETE CURING MATERIALS. Use burlap cloth, sheet materials, liquid membrane forming compounds, or cotton mats.

902.07.01 Burlap. M 182, Class 1, 2, or 3.

902.07.02 Sheet Materials. M 171 with the following exceptions:

- (a) **White Opaque Burlap Polyethylene Sheeting.** Tensile strength and elongation requirements are waived. Use sheeting having a finished product weight of not less than 10 oz/yd².
- (b) **White Opaque Polyethylene Backed Nonwoven Fabric.** 902.07.02(a), with the thickness requirement waived. Use material having a finished product weight of not less than 5 oz/yd².
- (c) **White Opaque Polyethylene Film.** Tensile strength and elongation requirements are waived.

902.07.03 Liquid Membrane. M 148. Field control testing of the white pigmented curing compounds is on the basis of weight per gallon. The samples shall not deviate more than ± 0.3 lb/gal from the original source sample.

902.07.04 Cotton Mats. Cotton mats consist of a filling material of cotton bats or bats covered with unsized cloth and tufted or stitched to maintain the shape and stability of the unit under job conditions of handling.

Use coverings of either cotton cloth, burlap or jute having the following properties:

- (a) Cotton cloth covering shall weigh not less than 6.0 oz/yd² and have an average of not less than 32 threads/in. of warp and not less than 28 threads/in. of filling. Use raw cotton, cotton comber waste, cotton card strip waste, or combinations thereof as the raw material used in the manufacture of the cotton cloth.
- (b) Burlap or jute covering for cotton mats shall weigh not less than 6.4 oz/yd² and shall have not less than 8 threads/in. of warp and not less than 8 threads/in. of filling. Use the grade known commercially as "firsts" and they shall be free from avoidable imperfections in manufacture and from defects or blemishes affecting the serviceability.

Use a cotton bat, or bats made of raw cotton, cotton waste, cotton linters, or combinations thereof, as the filling material for the mats. Mats shall weigh not less than 12 oz/yd².



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State Highway Administration

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SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

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902.08 FORM RELEASE COMPOUNDS. Use form release compounds that effectively prevent the bond of the concrete to the forms. Form release compounds shall not cause discoloration of the concrete or adversely affect the quality or rate of hardening at the interface of the forms.

The flash point of the form release compound shall not be less than 100 F when tested per T 73.

902.09 PARAFFIN WAX. Use clear paraffin wax for use as a bond breaker for concrete. The flash point shall not be less than 380 F when tested under D 92.

902.10 PORTLAND CEMENT CONCRETE. Section 915 and as specified herein.

902.10.01 PROPORTIONING. Prior to the start of construction, submit to the AME the source and proportions of materials to be used for each concrete mix. The mixture shall meet 902.10.03.

The concrete, with the exception of water and chemical admixtures, shall be proportioned by weight. Water and chemical admixtures may be proportioned by volume or weight. The mix shall be uniform and workable.

902.10.02 Materials.

Coarse Aggregate	901.01
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Synthetic Fibers	902.15
Water	921.01

902.10.03 Portland Cement Concrete Mixtures.



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The concrete mixes shall conform to the following:

TABLE 902 A

PORTLAND CEMENT CONCRETE MIXTURES									
MIX NO.	28 DAY SPECIFIED COMPRESSIVE STRENGTH	STANDARD DEVIATION	CRITICAL VALUE	MIN CEMENT FACTOR	COARSE AGGREGATE SIZE	MAX WATER/CEMENT RATIO	SLUMP RANGE	TOTAL AIR CONTENT	CONCRETE TEMPERATURE
	psi	psi	psi	lb/yd ³	M 43 / M 195	by wt	in.	%	F
1	2500	375	2430	455	57, 67	0.55	2 – 5	5 – 8	70 ± 20
2	3000	450	3010	530	57, 67	0.50	2 – 5	5 – 8	70 ± 20
3	3500	525	3600	580	57, 67	0.50	2 – 5	5 – 8	70 ± 20
4	3500	525	3600	615	57, 67	0.55	4 – 8	N/A	70 ± 20
5	3500	525	3600	580	7	0.50	2 – 5	5 – 8	70 ± 20
6	4500	675	4770	615	57, 67	0.45	2 – 5	5 – 8	65 ± 15
7	4200	630	4420	580	57	0.50	1½ – 3	5 – 8	70 ± 20
8	4000	600	4180	750	7	0.42	2 – 5	5 – 8	65 ± 15
9	3000 (a)	N/A	N/A	800	57, 67	0.45	4 – 8	5 – 8	70 ± 20
10	4500	675	4770	700	¾" – No. 4	0.45	2 – 5	6 – 9	65 ± 15
11	4200	630	4420	—	57, 67	0.45	2 – 5	5 – 8	65 ± 15
12	4200	630	4420	—	¾" – No. 4	0.45	2 – 5	6 – 9	65 ± 15

Note 1: When concrete is exposed to water exceeding 15,000 ppm sodium chloride content, Type II cement shall be used. In lieu of Type II cement, a Type I cement may be used in combined form with an amount of up to 50 percent replacement with ground iron blast furnace slag, or an amount of up to 25 percent replacement with Class F fly ash. The Contractor shall submit to the Engineer the proposed mix proportions and satisfactory test results per C 1012 showing a sulfate resistance expansion not exceeding 0.10 percent at 180 days

Note 2: The temperature of Mix No. 6 when used for other than superstructure work as defined in TC-1.03 shall be 70 ± 20 F.

Note 3: Type A or D admixture shall be added to bridge, box culvert, and retaining wall concrete.

Note 4: Nonchloride Type C admixtures may be used when approved by the Engineer.

Note 5: Other Slump Requirements:

When a high range water reducing admixture Type F or Type G is specified, the slump shall be 4 to 8 in.

When synthetic fibers are specified, the slump shall be 5 in. maximum.

When concrete is to be placed by the slip form method, the slump shall be 2-1/2 in. maximum.

When the absorption of the coarse aggregate is greater than 10 percent, the slump shall be 3 in. maximum.

Note 6: Mix 9 shall contain a Type F high range water reducing admixture.

Note 7: Mix 10 and 12 shall be proportioned as specified in 211.2 of the ACI's Recommended Practices for Selection Proportions for Structural Lightweight Concrete. The maximum average Density of Cured Concrete shall be 118 lb/ft³. Control testing for Density of Cured Concrete shall be two companion cylinders for each 100 yd³, or fraction thereof, as specified in M 195.

Note 8: Mix 11 and 12 shall also conform to all requirements as specified in Table 902 C.

(a) Acceptance will be based on a minimum compressive strength of 3000 psi in 24 hours. Design approval will be given based on trial batch obtaining a minimum compressive strength of 2500 psi in 12 hours. Testing shall conform to 902.10.08 except that cylinders shall remain in the molds until tests are conducted.

Coarse and fine aggregate having an expansion up to 0.10 percent when tested for alkali silica reactivity (ASR) MSMT 212 may be used without restriction. Aggregates having an expansion greater than 0.10 but less than 0.35 percent are considered reactive and may only be used when one of the options in table 902 B are employed. Those having an expansion of 0.35 percent and greater are prohibited.



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TABLE 902 B

OPTION	ALKALI CONTENT OF CEMENT % max	REPLACE CEMENT WITH		SPECIFICATION
		MATERIAL	% BY WEIGHT	
1	1.50	Class F Fly Ash	15 – 25	M 295
2	1.50	Ground Iron Blast Furnace Slag	25 – 50	M 302 Grade 100 or 120
3	1.50	Microsilica	5 – 7	C 1240
4	—	Blended Cement (a)	100	M 240
5	0.60 (b)	Low Alkali Cement	100	M 85

(a) Pozzolan content of 15 – 25 percent by weight of cement

(b) For mix 9 used for Portland cement concrete pavement repairs; the maximum allowable percentage of alkalis in Portland cement shall be 0.70.

When reactive aggregate is used, designate which option will be used to control the formation of the ASR gel. If an option other than option 5 in Table 902 B above is chosen, conduct tests per MSMT 212 using the reactive aggregate and the proposed cementitious material. The expansion test results shall not be greater than 0.10 percent. When more than one reactive aggregate is used in a concrete mix, each shall be tested individually and the maximum amount of pozzolan required to reduce the expansion of all the aggregates to 0.10 percent or less shall be used. Submit the aggregate source, test results, and the percent and type of replacement cement to the Engineer. The Engineer may withhold source approval pending verification testing.



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TABLE 902 C

MIX PHYSICAL PROPERTIES		
TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Minimum Cementitious Materials Factor, lb/yd ³	—	580
Maximum Content of Portland Cement, lb/yd ³	—	550
Water/Cementitious Materials Ratio by Wt.	—	0.45
Corrosion Inhibitor, gal/yd ³	902.06.05	2.0
Synthetic Fibers, lb/yd ³	902.15	1.5
Permeability of Field Concrete, moving average of three tests, coulombs max	T 277 Modified	2500
Permeability of Field Concrete, individual test, coulombs max	T 277 Modified	3000
Shrinkage at 28 days, microstrains	C 157	400

Note 1: Only Type I or II Portland cement shall be used.

Note 2: Mixes shall contain ground iron blast furnace slag, fly ash or microsilica.

Note 3: The water to cement ratio shall be based upon the total water to cementitious materials ratio. The gallonage of the corrosion inhibitor shall be included in the water/cementitious materials ratio.

Note 4: The permeability test value of field concrete shall be the average of two test specimens representing production concrete. Test specimens shall be molded on the project site in 4 x 8 in. molds conforming to M 205. Test specimens shall be handled under same conditions as compressive strength test specimens in conformance with C 31 for the first seven days. When seven days old, they shall be cured in a 100 F water bath for the remainder of the 28 day curing. The 28 day rapid chloride permeability of the specimens will be determined in conformance with T 277. Test for the geometry of test specimens will be waived.

Note 5: Shrinkage tests will be performed on trial mixes only.

Note 6: High range water reducing admixture may be used except the water reducing requirements will be waived.

Note 7: A sealer conforming to 902.12 shall be used on the finished surface.

902.10.04 Trial Batch. A trial batch shall be prepared to certify that each mix meets 902.10.05 and 902.10.06. Approval will be given when the test results meets the minimum required average strength.

Make arrangements with the AME at least two weeks in advance, to have an authorized representative present during the batching and testing. Each trial batch shall consist of at least 3 yd³ of concrete. Supply all equipment, and labor required to produce the trial batches and conduct the required tests at no additional cost to the Administration.

The AME may waive the requirement for a trial batch when past performance records show that the required average strength requirement has been met.



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902.10.05 Design Required Average Strength.

Specified compressive strength, f_c' , psi	Required average compressive strength, f_{cr}' , psi
$f_c' \leq 5000$	Use the larger value computed from Eq. (A-1) and (A-2) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = f_c' + 2.33s - 500$ (A-2)
Over 5000	Use the larger value computed from Eq. (A-1) and (A-3) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = 0.90f_c' + 2.33s$ (A-3)

where:

f_c' = the 28 day specified compressive strength.
 s = the standard deviation as specified in 902.10.06.

A test is defined as the average strength of two companion cylinders.

902.10.06 Standard Deviation.

- (a) When past performance records are available, a standard deviation will be established from documented performance records of the producer consisting of a minimum of 15 consecutive 28 day compressive strength tests obtained within the last 12 months.

The standard deviation will be established as the product of the calculated standard deviation and multiplier.

NUMBER OF TESTS	MULTIPLIER FOR STANDARD DEVIATION
15	1.16
20	1.08
25	1.03
30 or more	1.00

Interpolate for intermediate number of tests.



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- (b) When past performance records are not available, the required average strength shall meet to the following:

Specified compressive strength, f_c' , psi	Required average compressive strength, f_{cr}' , psi
$f_c' < 3000$	$f_{cr}' = f_c' + 1000$
$3000 \leq f_c' \leq 5000$	$f_{cr}' = f_c' + 1200$
$f_c' > 5000$	$f_{cr}' = 1.10 f_c' + 700$

902.10.07 Standard of Control. The average of all sets of three consecutive strength tests shall equal or exceed the critical value as specified in 902.10.03 which shall be computed using the following formula:

$$\text{Critical Value} = f_c' + (1.14 \times S) - 500$$

Failure to conform to this criteria shall be cause for immediate investigation and remedial action up to and including suspension of production. A design standard deviation equal to 15 percent of the specified strength shall be used for calculation until a minimum of 15 test results are obtained.

The actual average strength and standard deviation shall be computed upon the availability of 28 day strength data comprising a minimum of 15 tests. Should this determination indicate an excessive margin of safety, the concrete mix may be modified to produce lower average strength as approved by the Engineer. If these calculations indicate a coefficient of variation greater than 15, the quality of the concrete and testing will be evaluated.



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902.10.08 Testing. Sampling per T 141. Testing as follows:

TEST	METHOD	MINIMUM TEST FREQUENCY	RESPONSIBILITY
Temperature (e)	T 309	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Slump (a)(e)	T 119	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Air Content (a)(e)	T 152 T 196	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Compression (b)(c)(d)	T 23	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Compression (b)(c)(d) Mix No. 7 Only	T 23	3 per Day	Project Engineer

- (a) A second test will be made when the first slump or air content test fails. Acceptance or rejection will be based on the results of the second test.
- (b) Compressive strength tests are defined as the average of two companion cylinders.
- (c) The Contractor shall be responsible for the making of all early break cylinders and furnishing the molds, stripping, curing/delivery of all cylinders, including 28 day cylinders, to the testing laboratory.
- (d) The Project Engineer will be responsible for making, numbering and signing the 28 day cylinders.
- (e) When constructing plain and reinforced concrete pavements, the testing frequency for slump, air content, and temperature shall be 1 per 100 yd³ or fraction thereof.

902.10.09 Acceptance. Concrete will be acceptable if both of the following requirements are met:

- (a) The average of all sets of three consecutive strength tests equal or exceed the specified design strength.
- (b) No individual strength test (average of two companion cylinders) falls below the specified design strength by more than 500 psi.

902.10.10 Price Adjustment. A price adjustment will be based on the Contract unit price per cubic yard of concrete. If the unit is a lump sum item, the price per cubic yard for the concrete will be determined by dividing the cubic yards into the Contract lump sum price.

- (a) **Test Results More Than 500 psi Below the Specified Design Strength.** Failing strength tests will be considered individually with a price adjustment being applied on the percentage basis as shown below.

(Price per yd³) X (quantity of yd³ represented by the failing concrete strength) X (percent of failure).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times [1 - (3600 / 4500 \text{ psi})] = \$4,000.00$$



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No payment will be allowed when the test results fall below 50 percent of the specified design strength for structural concrete or 40 percent for incidental concrete.

The Engineer will determine when the strength of the concrete represented by the failing tests is sufficient to remain in place or whether it must be removed and replaced with Specification concrete.

- (b) **Test Results 500 psi or Less than the Specified Design Strength.** Strength failures 500 psi or less than the specified design strength will be averaged with the next two consecutive tests. If those two tests include a failure greater than 500 psi, those tests will be evaluated as in 902.10.10(a) and replaced with the next consecutive test. If the resulting average falls below the specified design strength, a price adjustment will be applied as specified in the table below. Any failure will only be included in one grouping.

STRENGTH BELOW THE SPECIFIED (avg of 3 tests) DESIGN LEVEL, psi	ADJUSTMENT FACTOR
MIX NO. 1 THRU MIX NO. 7	
1 – 100	0.005
101 – 200	0.01
201 – 300	0.02
301 – 400	0.04
401 – 500	0.08

Adjustment price equals (price per yd³) X (quantity of yd³ represented by the failing cylinders) X (the adjustment factor).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times 0.01 = \$200.00$$

902.11 MORTAR FOR GROUT. Mortar used for grouting anchor bolts, pipe, handrail posts, and miscellaneous items shall be composed in accordance with one of the following:

- (a) One part Portland cement or blended hydraulic cement and one part mortar sand by dry loose volume.
- (b) Prepared bag mixes consisting of Portland cement or blended hydraulic cement and mortar sand. The prepared mixes shall produce a mortar meeting the strength requirements specified in the Contract Documents.
- (c) Use nonshrink grout when specified. The grout shall have a minimum compressive strength of 5000 psi in seven days when tested as specified per T 106, except that the cube molds shall remain intact with a top firmly attached throughout the curing period. The nonshrink grout shall have a minimum expansion of 0.0 percent after seven days when tested as specified per T 160.



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- (d) Epoxy grout shall consist of sand and epoxy mixed by volume in per the manufacturer's recommendations. The grout shall be capable of developing a minimum compressive strength of 6500 psi in 72 hours when tested per MSMT 501. Sand for epoxy grout as specified in 901.01.
- (e) An epoxy or polyester anchoring system may be used when approved by the Engineer in accordance with the manufacturer's recommendations. Strength values shall be as specified in the Contract Documents.

902.12 LINSEED OIL. Shall consist of a 50-50 mixture (by volume) of boiled linseed oil meeting Federal Specification TT-L-190 and kerosene per D 3699.

902.13 LATEX MODIFIED CONCRETE. Portland cement concrete containing prequalified Laboratory approved styrene butadiene latex emulsion is defined as Latex Modified Concrete (LMC).

Latex emulsion shall have a minimum of 90 percent of the nonvolatiles as styrene butadiene polymers. The latex emulsion as specified in Table 902.13 A. The material shall be stored in suitable containers and be protected from freezing and exposure to temperatures in excess of 85 F.

LMC shall be proportioned using volumetric mixing and designed as follows:

LATEX MODIFIED CONCRETE	
MATERIAL	SPECIFICATION LIMITS
Portland Cement, CWT/yd ³ , min	6.6
Latex Emulsion/Cement Ratio	0.31 – 0.34
Water/Cement Ratio, max	0.22
Entrained Air, %	6.0 ± 3
Slump, in.	5 ± 1

The physical properties of LMC shall conform to Table 902.13 B. The Contractor shall furnish the necessary 3 X 6 in. molds per M 205 to be used for the fabrication of compressive strength cylinders.

Control and Acceptance Sampling.

- (a) Submit a two qt minimum sample, of the styrene butadiene latex emulsion to the AME daily for each lot of material used in a day's production.
- (b) A batch for LMC is defined as the capacity of the equipment being used on the project. Slump and air samples will be taken and tested before the placement of a batch is permitted. The slump shall be measured four to five minutes after discharge from the mixer. The test material shall be deposited off the deck and not be disturbed during this



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waiting period. One additional sample for slump and air will be taken randomly during the placement of each batch. For seven day compressive strength, two tests each per batch are required. A test is defined as consisting of two companion cylinders. The samples for these tests will be taken at random while the placement is in progress.

TABLE 902.13 A

REQUIREMENTS FOR CHEMICAL PROPERTIES OF LATEX EMULSION MATERIALS				
PROPERTY	SPECIFICATIONS		QUALITY ASSURANCE TESTS	
	LIMITS	TOLERANCE	PREQUALIFICATION TESTS	CONTROL AND ACCEPTANCE
Color	White	—	X	X
pH	9.0 – 11.0	—	X	X
Weight, lb/gal	8.40 – 8.47	—	X	X
Solids Content, %	46 – 53	—	X	X
*Butadiene Content, % of polymer	30 – 40	—	—	—
Viscosity @ 10 rpm-cps	Match Original	± 20	X	X
*Surface Tension, dynes/cm max	50	—	—	—
*Mean Particle Size, polymer – Å	1400 – 2500	—	—	—
Coagulum, % max	0.10	—	X	X
*Freeze-Thaw Stability, coagulum, % max	0.10	—	X	X
Infrared Spectra of Latex Film	Match Original	—	X	X
Infrared of Alcohol, Soluble Portion of Latex	Match Original	—	X	X
Shelf Life, min	1 yr	—	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 612 except those denoted by an * shall be conducted as specified in FHWA RD – 78-35.

Note 2: The original or prequalification sample shall be accompanied by the producer's certification on all of the tests and properties noted above and as specified in TC-1.03. The certification shall contain actual test values of the product and the infrared spectrograph.

Note 3: A separate certification is required for each lot of material. The certification shall note the date of manufacture, lot size, and whether or not the material is identical to the formulation of the original sample.



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TABLE 902.13 B

LATEX MODIFIED CONCRETE PHYSICAL PROPERTIES			
TEST PROPERTY	TEST VALUES	QUALITY ASSURANCE TESTS	
		PREQUALIFIED TESTS	CONTROL AND ACCEPTANCE
7 Day Compressive Strength, psi min	3000	X	X
28 Day Compressive Strength, psi min	3500	X	—
42 Day Compressive Strength, psi min	3500	X	—
7 Day Flexural Strength, psi min	550	X	—
28 Day Flexural Strength, psi min	650	X	—
42 Day Shear Bond Strength, psi min	2000	X	—
Durability Factor, 300 cycles, % min	85	X	—
Chloride Permeability, Ppm max	510	X	—
Scaling Resistance, 50 cycles, max	3	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 721.

Note 2: Seven Day Compressive Strength Test will be used for Control & Acceptance of the material. The minimum specified design strength is 3000 psi at seven days. The mix design approval and acceptance will be based on a coefficient of variation of 10 percent with a probability of 1 in 10 tests falling below the specified strength. Only test values 80% or greater than the specified strength will be accepted

902.14 RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE PAVEMENT REPAIRS. Materials shall be a dry, packaged cementitious mortar having less than 5 percent by weight of aggregate retained on the 3/8 in. sieve and meet the following requirements:

Classification.

- Class I — For use at ambient temperatures below 50 F.
- Class II — For use at ambient temperatures of 50 to 90 F.
- Class III — For use at ambient temperatures above 90 F.

Chemical Requirements. C 928 except that no organic compounds such as epoxy resins or polyesters as the principal binder.



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Physical Requirements. Meet the following when tested per MSMT 725:

COMPRESSIVE STRENGTH, psi min				
CLASSIFICATION	< 2 hr	2-6 hr	6 hr	28 days
Type I — Slow	—	—	2000	4500
Type II — Rapid	—	2000	—	4500
Type III — Very Rapid	2500	—	—	4500

TEST RESULTS	
TEST PROPERTY	LIMITS
Bond Strength, 7 days, psi min	2000
Length Change, increase after 28 days in water, based on length at 3 hr, % max	+ 0.15
Length Change, decrease after 28 days, % max	- 0.15
Freeze Thaw, loss after 25 cycles in 10% CaCl ₂ solution, % max	8
Initial Setting Time, minutes min	10

Marking. All packages delivered to the project shall be marked with the following information:

- (a) Date material was packaged.
- (b) Approximate setting time.
- (c) Recommended dosage of water or liquid component.
- (d) Mixing instructions.
- (e) Class or temperature range.

Certification. The manufacturer shall furnish certification as specified in TC-1.03 showing the actual test results for each class and type of material submitted to the Laboratory.

902.15 SYNTHETIC FIBERS. When synthetic fibers are specified in the Contract Documents, the fibers shall be 1/2 to 1-1/2 in. long and conform to C 1116, Type III. The manufacturer shall furnish certification as specified in TC-1.03. The quantity of fibers used and their point of introduction into the mix shall conform to the fiber manufacturer's recommendations.

902.16 CONTROLLED LOW STRENGTH MATERIAL.

902.16.01 Usage. Controlled Low Strength Material (CLSM) shall consist of the types described below:



SPECIAL PROVISIONS INSERT
902-PORTLAND CEMENT CONCRETE

TYPE A – Used where future excavation of the CLSM may be necessary (e.g. utility trenches, pipe trenches, bridge abutments, and around box culverts).

TYPE B – Used where future excavation of the CLSM is not anticipated (e.g. filling abandoned conduits, pipes, tunnels, mines, etc. and replacing unsuitable soils below roadway and structure foundations where extra strength is required).

902.16.02 Materials.

Coarse Aggregate	901.01*
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Fly Ash	902.06.04
Water	921.01

*maximum size of 3/4 in.

Produce CLSM in conformance with the applicable portions of Section 915 and the following:

902.16.03 Proportioning. Submit the sources and proportions of materials, and test data for each CLSM mixture prior to construction. CLSM shall be proportioned, on the basis of field experience and/or laboratory trial mixtures, to produce a flowable and self-compacting mixture meeting the requirements of 902.16.04.

CLSM shall be proportioned by weight; with the exception of water and chemical admixtures. Water and chemical admixtures may be proportioned by volume or weight.

902.16.04 CLSM Mixtures. Proportion CLSM with sufficient amounts of Portland cement, fly ash, or ground granulated blast furnace slag; individually or in combination, to produce a cohesive, non-segregating mixture that conforms to the physical properties in the following table:

CLSM Mix	28 Day Compressive Strength, (psi) ASTM D4832	Flow Consistency, (in.) ASTM D6103
Type A	50 - 200	8 min.
Type B	500 min.	8 min.



SPECIAL PROVISIONS INSERT
905 —PIPE

CATEGORY 900
MATERIALS

SECTION 905 – PIPE

694 **DELETE:** Sections 905.01 and 905.02 in their entirety.

INSERT: The following.

905.01 CERTIFICATION. Furnish certification for pipe as specified in TC-1.03.

MATERIAL	SPECIFICATION	REMARKS
Nonreinforced Concrete Pipe	M 86, Class 3	–
Reinforced Concrete Pipe	M 170, Class 4 and 5	60 in. and smaller diameter, Load bearing option. Larger than 60 in. diameter, Material option.
Reinforced Concrete Elliptical Pipe	M 207, Class 4, Horizontal installation only	60 in. and smaller equivalent diameter, Load bearing option. Larger than 60 in. equivalent diameter, Material option.
Concrete End Sections	M 170	Class 3 pipe reinforcement required
Reinforced Concrete Arch Culvert	M 206	–
Concrete Drain Tile	M 178	–
Non-Asbestos Fiber-Cement Storm Drain Pipe	C 1450	–
Reinforced Concrete Low-Head Pressure Pipe	C 361	–
Corrugated Polyethylene Pipe	M 294	–
Corrugated Polyethylene Drainage Pipe	M 252	Perforated underdrain and underdrain outlet pipe.
Polyvinyl Chloride (PVC) Profile Wall Pipe	M 304	–
Polyvinyl Chloride (PVC) Pipe	M 278	Underdrain outlet pipe
	M 278 (a)	Perforated underdrain
Preformed Rubber Joint for Circular Pipe	M 198, Type A	–
Corrugated Steel Pipe, Pipe Arches and Underdrain	M 36 (b), (c)	End finish shall be annular corrugations
Corrugated Aluminum Alloy Pipe	M 196 (b)	End finish shall be annular corrugations
Structural Plate for Pipe, Pipe Arches and Arches	M 167	–
Copper Pipe	Fed Spec WW – T-799, Type K	–
Polyethylene (PE) Precoated Corrugated Steel Pipe	M 245 and M 246	Minimum thickness 10 mil on each of the surfaces.

- (a) Perforations shall conform to the requirements of F 758.
- (b) Bands with dimples are prohibited.
- (c) All Corrugated Steel Pipe shall be aluminum-coated Type 2 conforming to M 274 unless otherwise specified.

905.02 CERTIFIED REINFORCED CONCRETE PIPE PLANTS. Reinforced concrete pipe (RCP) will be accepted on certification based on TC-1.03 and the requirements outlined below. This includes the sampling, testing, documentation, and certification of the product by the manufacturer in combination with an Administration monitoring program.



SPECIAL PROVISIONS INSERT
905 —PIPE

2 of 5

Annual Inspections. Prior to any plant producing any material for SHA, or an SHA inspected contract, for the first time, or, after a break in production longer than one calendar year, that plant shall be subject to a comprehensive inspection of its production, testing and storage facilities as well as its materials and applicable documentation. Each plant will be subject to another comprehensive inspection at the beginning of each calendar year thereafter. The Administration will determine whether plant equipment and personnel conform to all applicable specifications and that suitable testing facilities are available. Submit a Quality Control Plan (QCP) for review and approval prior to inspection. The producer is responsible for ensuring timely delivery of the QCP. The QCP shall include the following:

- (a) The manner in which the materials will be handled including:
 - (1) Locations of stockpiles.
 - (2) Methods of weighing and batching material into mixers.
 - (3) Sources of materials and certifications that those materials meet these Specifications.
 - (4) Methods to be used to heat or cool materials during periods of extreme temperature.
- (b) The following Quality Control (QC) procedures:
 - (1) The names, qualifications, responsibilities and a unique identification number for each of the QC personnel and the designation of a QC manager.
 - (2) Sampling and testing methods and frequencies.
 - (3) Method used for inspecting reinforcement cages prior to and during production.
 - (4) Method of curing.
 - (5) Method of maintaining accurate QC records.
 - (6) Samples of forms approved by the Administration.
 - (7) Patching procedure.
 - (8) Method of preparation of units for shipping.
 - (9) Method of identification of each unit as tested and approved.

Certification by a Professional Engineer registered in the State of Maryland attesting the plant's facilities conform to all applicable specifications will be accepted in lieu of Administration inspection. However, final determination of conformance will be as determined.



SPECIAL PROVISIONS INSERT
905 —PIPE

3 of 5

905.02.01 Responsibilities of the Concrete Pipe Producer. Perform Quality Control operations at the plant to ensure that the material conforms to specifications. The QC process will be subject to unannounced periodic Quality Assurance (QA) verification and the plant's QC personnel shall fully participate in the verification process. Submit any change in personnel, production, testing facility and policy as a supplement to the QCP in writing within 10 days.

905.02.02 Lot Size. A pipe lot is defined as a maximum 14-day production run of concrete pipe of like size, material, strength designation, and manufacturing process. The 14 days need not be consecutive, as long as they occur within a period of 30 consecutive days and the manufacturing process is not altered in any way between production days. Lot size may include up to 1000 pieces for 12 to 36 in. pipe and 18 to 36 in. equivalent elliptical diameter pipe, or 500 pieces for 42 in. and larger pipe and 42 in. and larger equivalent elliptical diameter pipe.

905.02.03 Acceptance Testing. Perform a three-edge bearing test to produce a 0.01 in. crack for each lot in conformance with M 170, section 5.1.1 except as modified for pipe diameter per Table 905. Pipe that have been tested only to the formation of a 0.01 in. crack and that meet the 0.01 in. or lesser load requirement will be considered acceptable for use.

905.02.03 Quality Control Testing. Perform one three-edge bearing test to ultimate load at least once every twelve months in conformance with M 170, section 5.1.1 for each size and class of pipe shipped to SHA inspected contracts. Also, perform an absorption test on each size and class of pipe manufactured and shipped to Administration projects at least once every twelve months. Specify in the QCP the method selected to test the lots for ultimate load and absorption.

905.02.04 Test Facilities. The producer's facilities, equipment, and quality control personnel shall be capable of conducting the tests specified in T 280 and will be approved as part of the Annual Inspection. Identify all QC personnel in accordance with 905.02 (b) (1) with a unique number used for testing and stamping or stenciling pipe for shipping. Record that number in the QCP and include the individual's printed name and signature. Maintain yearly calibration certificates on all equipment used for testing. The producer may elect to use the services of an independent commercial testing laboratory as approved in lieu of conducting their own tests.

905.02.05 Shipment. Pipe may be shipped to Administration projects only after the required testing for all pipe in the lot have been completed with acceptable results and all pipe to be shipped is at least the age of the test specimens at testing. Visual inspection of the pipe and the accompanying documentation will be made when pipe is received on the project to verify compliance with certification requirements.

Prior to shipping, mark the following information on the inside of each pipe.

- (a) Plant name.
- (b) Plant location.
- (c) Size of pipe.
- (d) Class of pipe.
- (e) Date of manufacture.



SPECIAL PROVISIONS INSERT
905 —PIPE

- (f) Quality control stamp.
- (g) Quality control personnel number.

905.02.06 Certification. Manufacturer’s certification shall accompany each shipment of pipe. Deliver a copy of the certification to the Engineer, the Administration’s laboratory, the Contractor, and maintain a copy at the plant. Certification shall include the following:

- (a) The plant name, address, and location.
- (b) Size and class of the pipe.
- (c) Date of manufacture and shipment.
- (d) Number of pieces.
- (e) Administration Contract number.
- (f) Statement of Specification compliance.
- (g) Signature and number of the quality control personnel that inspected the shipment.

905.02.07 Records. Maintain all testing and inspection documents at the production plant for at least three years from the manufacture date and make available upon request. Collect and maintain conformance certificates and mill test reports for aggregates, cement, fly ash, joint material, reinforcing steel, and other materials intended for use in products used on Administration projects.

905.02.08 Quality Control Forms. Maintain an Administration approved quality control form for all pipe produced for use on Administration projects. Include the following on the forms for each lot:

GENERAL INFORMATION	PIPE DIMENSIONS	REINFORCEMENT	TESTS
Plant Name Lot Identification Production Dates Pipe Class Units Per Lot Technician Signature	Diameter Length Wall Thickness Joint Style	Size Spacing Area: Specification and Test Results Adequacy and Quality of Welds and Splices	Visual Inspection Absorption: Specification and Test Results: Once per year
<u>Material Sources</u> Cement Fine Aggregate Reinforcement			THREE EDGE BEARING 0.01 in. Crack Strength: Specification and Test Results
			Ultimate Strength: Specification and Test Results: Once per year



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905 —PIPE

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905.02.09 Responsibilities of the Administration. The Administration will notify each plant when to present its Quality Control Plan. Thirty days will be provided to make arrangements for delivery after the Administration is notified of the plan's completion. Verification of certification by Quality Assurance Audit will be performed a minimum of once per year, as determined.

The Administration reserves the right to discontinue acceptance of RCP if the verification process indicates that materials, test procedures, or finished pipe do not conform to the specifications, Contract Documents or QCP. If a Quality Assurance Audit reveals any type of non-compliance, the producer will be notified of those findings and provided with a resolution procedure for any deficiencies.



SPECIAL PROVISION INSERT
908 — REINFORCEMENT STEEL

1 of 1

CATEGORY 900
MATERIALS

SECTION 908 — REINFORCEMENT STEEL

703 **DELETE:** 908.07 thru .10 in their entireties.

INSERT: The following.

908.07 FABRICATED STEEL BAR MATS. Steel shall meet A 184.

908.08 WIRE FABRIC FOR PNEUMATICALLY APPLIED MORTAR AND CONCRETE ENCASEMENT. Fabric shall meet A 185 and be galvanized as specified in 906.01.01. Fabricate from size W1.4 wire on 3 in. centers in each direction or from W0.9 wire on 2 in. centers in each direction.

908.09 COLD DRAWN STEEL WIRE. Concrete reinforcement shall meet M 32.

908.10 TIE DEVICES FOR CONCRETE PAVEMENT. Tie device sizes shall be as specified and produce a frictional force of at least 160 lb/ft per foot of spacing when tested per MSMT 512.

908.11 STEEL STRAND. M 203, Grade 270, Low Relaxation Strand.



SPECIAL PROVISIONS INSERT
914 — CHAIN LINK FENCE

1 of 1

CATEGORY 900
MATERIALS

SECTION 914 — CHAIN LINK FENCE

725 **DELETE:** 914.03 POSTS, BRACES, FITTINGS, AND HARDWARE in its entirety.

INSERT: The following.

914.03 POSTS, BRACES, FITTINGS, AND HARDWARE. M 181. When PVC coating is specified, PVC shall be thermally fused and bonded. The PVC thickness shall be 10 to 15 mil except that bolts, nuts, and washers shall be metallic coated steel. Polyester powder coating material for galvanized metal meeting 465.03.02(b) may be used in lieu of PVC.

Round posts shall meet industry standards for Class 1 or 2.



SPECIAL PROVISIONS INSERT

916 — SOIL AND SOIL-AGGREGATE BORROW

1 of 1

**CATEGORY 900
MATERIALS**

740 **DELETE**: SECTION 916 — SOIL AND SOIL-AGGREGATE BORROW in its entirety.

INSERT: The following.

**SECTION 916 — SOIL AND SOIL-AGGREGATE
BORROW**

916.01 BORROW EXCAVATION. A soil or soil aggregate mixture meeting the following:

Maximum dry density and optimum moisture content of the material per T 180, Method C unless the material has more than 35 percent retained on the No. 4 sieve, in which case Method D shall be used. Material with a maximum dry density of less than 100 lb/ft³ is unsatisfactory and shall not be used in embankments. Potentially expansive materials, such as steel slag, are prohibited.

Refer to the Recycled Materials Special Provisions located elsewhere in the Contract Documents.

BORROW REQUIREMENTS						
Class Borrow	Max Dry Density Minimum P.C.F. T 180	LL Maximum T 89	PI Maximum T 90	Gradation Requirements T 88	Reference MSMT Soil Classification	Reference AASHTO Classification
Select Borrow	105	34	7	30% max passing No. 200 sieve	A-2,A-3, A-2-4	A-1-a, A-1-b, A-3, A-2-4
Capping Borrow	105	34	7	30% max passing No. 200 sieve*	A-2,A-3, A-2-4	A-1-a, A-1-b, A-3, A-2-4
Modified Borrow	125	30	9	50% min.retained on No. 4 sieve	Any material except A-5	A-2-4, A-4**
Common Borrow	100	N/A	N/A	N/A	N/A	N/A
* When material has no liquid and plastic limit, and the amount of material that passes the No 4 sieve and retained on the No. 10 sieve is less that 10 percent of the total sample mass, the material shall have at least 15 percent passing the No. 200 sieve. ** When A-4, the material has to be a manufactured product.						

SPECIAL PROVISIONS INSERT
925 — DETECTABLE WARNING SURFACES

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CATEGORY 900
MATERIALS

789 **DELETE:** SECTION 925 — DETECTABLE WARNING SURFACES in its entirety.

INSERT: The following.

SECTION 925 — DETECTABLE WARNING SURFACES

925.01 GENERAL. Detectable warning surfaces shall conform to the current accessibility guidelines of the Americans with Disabilities Act (ADA). The Office of Materials Technology (OMT) maintains a Qualified Products List (QPL). Manufacturers seeking inclusion of their product on the QPL shall submit certified test results showing conformance to the properties in 925.07, as well as installation instructions and the types of adhesives and sealants required.

925.02 COMPOSITION. Warning surfaces shall be either flexible or rigid. If there is a change in the composition of a qualified product, the manufacturer shall notify OMT and submit new test results showing conformance with 925.07.

925.02.01 Pavers. Type III Brick Pavers shall conform to the requirements of C 902, Class SX, Type 1, and Application PX. The pavers shall be 2-1/4 x 4 x 8 in. with square edges and a surface meeting 925.03.

925.03 CONFIGURATION AND DIMENSIONS. The warning surface shall consist of a system of truncated domes having a base diameter of 0.9 in. to 1.4 in., a top diameter 50 to 65 percent of the base diameter, and a height of 0.2 in. The domes shall be arranged in a square grid with center-to-center spacing of 1.66 to 2.35 in.

925.04 COLOR. The color shall be homogeneous across the surface of the material and contrast with adjoining surfaces.

925.05 IDENTIFICATION. The top surface shall have an identifier that uniquely distinguishes the manufacturer. Brick pavers are excluded.

925.06 REQUIREMENTS.

TYPE	DESCRIPTION	PHYSICAL TEST REQUIREMENTS
Type I	Cast in Place	A, B, C, D, E, G
Type IIa	Surface Mount, Rigid	A, B, C, D, E, G
Type IIb	Surface Mount, Flexible	A, B, C, D, F, G
Type III	Brick Pavers	925.02.01
Type IV	Prefilled Pavers	A, B, C, D, G

925.07 PHYSICAL PROPERTIES.

SPECIAL PROVISIONS INSERT
925 — DETECTABLE WARNING SURFACES

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	PROPERTY	TEST METHOD	SPECIFICATION LIMIT
A	Slip Resistance Coefficient	C 1028 (dry method)	0.80 minimum
B	Abrasive Wear, index	C 501	150 minimum
C	Fade (UV) Resistance/Color Retention	D 4587	Fade or Change in color after 2000 hours less than $\Delta E = 5^*$
D	Freeze/Thaw Resistance	C 1026	No disintegration
E	Adhesion/Bond Strength, pull off	C 482/C 882(as appropriate)	No adhesion failure
F	Adhesion/Bond Strength, peel	D 903/D 429 (modified as appropriate)	No adhesion failure
G	Contrast	Contrast percentage formula** using E 1349 to determine cap Y brightness/light reflectance values (LRV)	Current ADA requirement***

* Chromaticity coordinates (L*a*b* system) checked in conformance with D 2244, before and after test.

** Contrast % = $[(B_1 - B_2)/B_1] \times 100$,

where B_1 = (LRV) of the lighter area, and B_2 = (LRV) of the darker area.

*** For the purpose of determining whether a material meets acceptable contrast criteria, use actual cap Y brightness of detectable warning surface, and assume a value of 15 for the cap Y brightness of cured concrete, or a value of 3 for asphalt wearing surfaces to determine percentage difference. Detectable warning surfaces to be installed on other materials are required to undergo additional testing.



SPECIAL PROVISIONS INSERT

950.03— REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES

**CATEGORY 900
MATERIALS**

SECTION 950 — TRAFFIC MATERIALS

792 **DELETE**: 950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES in its entirety.

INSERT: The following.

950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES.

Provide retroreflective sheeting that meets the requirements of the latest version of ASTM D 4956 and is selected from the Administration's QPL. The type of sheeting to be used for different classifications of signs shall be as specified in the QPL and as described below.

Provide fluorescent colors, when yellow, orange or pink sheeting is specified. Color coordinates and values shall be as described in the MDMUTCD and 23 CFR Part 655, Subpart F, Appendix.

Provide non-reflective sheeting, when black sheeting is specified.

All sheeting for legend and backgrounds shall be from the same manufacturer and be a matched component system intended to be used together.

Use ASTM Type IV or VIII construction sheeting with a Class 1 backing for drums for maintenance of traffic. The sheeting must be reboundable as defined in the supplementary requirements of ASTM D 4956, latest version.

Use ASTM Type IV, V or VIII for delineators, and lane separator systems. Use ASTM Type IV, VI or VIII sheeting for cones for maintenance of traffic. The sheeting must be reboundable as defined in the supplementary requirements of ASTM D 4956, latest version.

Use ASTM Type VI sheeting with a Class 5 backing for Roll up signs for Maintenance of Traffic.

Use ASTM Type VIII, IX or XI sheeting for rigid temporary traffic signs.

Use ASTM Type IX or XI sheeting for Guide Signs, Exit Gore Signs, General Information Signs, School Signs, Warning Signs and Red Regulatory Signs.

Use ASTM Type IV, VIII, IX or XI sheeting for all other Regulatory Signs and for Route Markers.



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SPECIAL PROVISIONS INSERT

950.03— REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES

Use ASTM Type I or higher sheeting for No Trespassing Signs, signs directed at Pedestrian Traffic, signs directed at Bicycle Traffic, R7 series Parking signs, R8 series Parking signs and supplemental panels for R7 and R8 series signs.

SPECIAL PROVISIONS
951.01 — NONTOXIC WATERBORNE
PAVEMENT MARKINGS

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CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.01 NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKINGS

All nontoxic lead free waterborne pavement marking materials shall be ready-mixed, pigmented binder, emulsified in water, and capable of anchoring reflective beads that are applied separately.

The pavement marking material shall not contain any hazardous material listed in the Environmental Protection Agency Code of Federal Regulations (CFR) 40, Section 261.24, Table 1.

951.01.01 Waterborne Physical Requirements. The nontoxic lead free waterborne pavement marking material shall conform to the manufacturer's formulations as initially approved for use by the Administration and shall be controlled from batch to batch. All paint shall be evaluated in conformance to the requirements listed below.

Production batch samples will be subject to random tests, such as but not limited to, X-ray spectroscopy, infrared spectroscopy, ultraviolet spectral analysis, and atomic absorption spectroscopy.

The combined total of lead, cadmium, mercury, and hexavalent chromium shall not exceed 100 ppm, when tested by X-ray fluorescence spectroscopy, or other method capable of detection at this level.

For each production batch, the Contractor shall provide the Administration with the manufacturer's certified analysis conforming to TC-1.03 of the Standard Specifications.

- (a) **Viscosity.** The viscosity shall be 85 ± 10 KU when tested in conformance with D 562.
- (b) **Pigment For Yellow Pavement Marking Material.** The colorants used to attain the color of the yellow product shall be one or more of the following, along with titanium dioxide: Pigment Yellow 65, Pigment Yellow 75, and opaque Pigment Yellow 74.
- (c) **Color and Appearance.** Color and appearance shall be evaluated using the following: CIE 1976 $L^*a^*b^*$, illuminant D 65, and standard observer angle 1931 CIE 2 degrees. The geometry shall be 45/0 or 0/45, or d/8, excluding specular gloss. Measurements shall be taken from samples applied to an opacity chart, e.g., Leneta Form 2A, at a wet film thickness of 15 mils \pm 1 mil. The applied sample shall have been allowed to dry for at least 12 hours before measurements are taken. The evaluation shall be as follows:
 - (1) **Production:** The color of the dry paint film of the production sample shall match the $L^*a^*b^*$ values provided, under the specified conditions. For white material the values are: $L^* = 94.80$, $a^* = -2.35$, $b^* = 3.20$. For yellow material the values are: $L^* = 80.70$, $a^* = 19.40$, $b^* = 88.65$. The colors shall match when compared instrumentally.
 - (2) **Control.** The maximum permissible variation from the specified $L^*a^*b^*$ values shall be $2.0 \Delta E_{cmc}$. The measurements shall be taken from a sample applied over the black portion of an opacity chart.

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951.01 — NONTOXIC WATERBORNE
PAVEMENT MARKINGS

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The Administration will approve or disapprove any batch based on a laboratory visual evaluation for blemishes and irregularities in the test specimen (i.e. cracks, flaking, surface depressions, pooling, etc.) that would interfere with the measurement of color and appearance on the opacity chart. The Administration will make the final decision.

- (3) **Reflectance.** The reflectance, without beads, and using CIE XYZ Y_{xy} , shall be a minimum Y of 80 percent for white production batches; and a minimum of 50 percent for yellow production batches with a maximum of 60 percent. The measurement shall be taken from a sample applied over the black portion of an opacity chart.
- (4) **Color Difference over Black and White..** For any production batch the measured color difference between readings taken over the black portion of the opacity chart from those taken over the white portion shall be a maximum value of $1.0 \Delta E_{cmc}$ for white products and $1.3 \Delta E_{cmc}$ for yellow products.
- (5) **Yellowness Index.** The yellowness index of the white material, when determined according to E 313, Using Equation 1 and the coefficients for CIE D 65 illumination, 1931 from Table 1 in that standard, shall not exceed 8.0.
- (d) **Flexibility.** The pigmented binder shall not display cracking or flaking when subjected to the flexibility test of Federal Test Method TT-P 1952D, with the exception that the panels shall be 35 to 31 gauge (0.0078 to 0.0112 in.) tin plate approximately 3 x 6 in. The tin plates shall be lightly buffed with steel wool and thoroughly cleaned with solvent and dried before being used for the test.
- (e) **Weight per Gallon.** The weight per gallon for a production batch, when determined according to D 1475, shall be within ± 0.3 lb/gal of the value obtained by The National Transportation Product Evaluation Program (NTPEP), and reported on a NTPEP deck designated "north". When the Administration waives the NTPEP requirements, another target value will be stipulated.

951.01.03 Glass Bead Physical Requirements. Each lot of glass beads shall be sampled in conformance with the Administration's Frequency Guide and shall be submitted to the Administration's Office of Materials and Technology for testing and approval prior to use.

Glass beads shall be colorless, clean, transparent, and free of milky and excessive air bubbles.

Reflective glass beads shall conform to M 247, except that the gradation shall conform to the following:

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 951.01 — NONTOXIC WATERBORNE
 PAVEMENT MARKINGS

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PERCENT PASSING			
SIEVE SIZE	Standard Beads	Large Beads	Maryland Blend
12 (1.70 mm)	—	100	100
14 (1.40 mm)	—	95 – 100	98 – 100
16 (1.18 mm)	—	80 – 95	88 – 97
18 (1.00 mm)	—	10 – 40	48 – 70
20 (0.85 mm)	100	0 – 5	28 – 50
30 (0.60 mm)	75 – 95	—	—
50 (0.30 mm)	15 – 35	—	5 – 25
80 (0.18 mm)	—	—	0 – 5
100 (0.15 mm)	0 – 5	—	—

Moisture resistance and flotation test are not required.

(a) Refractive Index. The refractive index shall be 1.50 minimum, when tested in conformance with MSMT 211.

(b) Roundness. Glass beads shall be smooth, spherical in shape, free of sharp angular scars, scratches, or pits, and shall contain a minimum of 60 percent silica. Beads shall have a minimum average roundness of 75 percent when tested in conformance with D 1155.

951.01.04 Qualification. Pavement marking material manufacturers desiring to have their material formulations approved under this Special Provision shall have their formulations evaluated on a NTPEP North Test Deck unless waived by the Administration. Only NTPEP evaluated formulations will be considered candidates for selection, unless the requirement is waived.

951.01.05 Field testing. Materials conforming to this specification shall be field evaluated for performance on a NTPEP North Test Deck. Materials performing satisfactorily throughout the test period will be placed on the Administration’s Qualified Products List. All marking materials supplied under the Contract Documents shall be identical in composition to the materials submitted for initial NTPEP testing. The Office of Materials and Technology will determine conformity with these requirements.

951.01.06 Material Acceptance. Only Administration approved and stamped materials conforming to these Specifications shall be used.

Prior to the shipment of any pavement marking material batch, the manufacturer shall provide access for the Administration’s representative to collect samples of the material from each production batch. The samples shall be sent to the Administration laboratory for QA testing. Each sample shall be accompanied by a certified analysis conforming to TC 1.03, showing compliance with the physical and chemical requirements of this Specification, and a statement certifying that any marking material supplied under the Contract Documents is identical in composition to the material submitted for initial NTPEP testing. The Administration will determine conformity with these requirements. Administration authorization shall be required before a batch or a portion of a batch is shipped.

SPECIAL PROVISIONS

**951.01 — NONTOXIC WATERBORNE
PAVEMENT MARKINGS**

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Paints shall be compatible with cleaning solvents used in equipment cleaning.

Nontoxic waterborne pavement markings shall not skin, curdle, settle or be unusable or difficult to apply within 12 months of the date of manufacture. The supplier, at the Administration's request, shall replace containers of marking material exhibiting an unacceptable level of settling, skinning, or curdling, as determined by the Administration. Marking material from a production batch shall not be used beyond 12 months after the date of manufacture.

951.01.07 Certification. The manufacturer shall explicitly certify in writing that any marking material supplied under the Contract Documents conforms to the formulation identified by the same product code or name placed on the NTPEP test deck from which it was approved. The same code or name as used in the published report from that test deck must identify the product. Failure to certify will be considered grounds for product batch rejection.

The manufacturer shall, in accordance with TC-1.03, explicitly certify, in writing, of any paint batch supplied under the Contract Documents that it complies with all applicable specifications. Failure to so certify will be considered grounds for product batch rejection. Certification for yellow nontoxic lead free waterborne pavement markings shall include, for the purpose of showing compliance with this specification, the name or the type of colorant used to achieve the yellow color. The Administration will keep the paint composition and chemical analysis information confidential.

The Certification shall also, contain the following:

- (a) Manufacturer's name.
- (b) Place (address) of manufacture.
- (c) Color of material.
- (d) Date of manufacture (month-day-year).
- (e) Lot or batch identification.
- (f) Size of lot/batch.
- (g) The recommended paint temperature at the spray gun.
- (h) Material Safety Data Sheets for all materials submitted for testing and application.

The Contractor shall furnish a copy of this certification to the Administration's representative before applying the paint batch it represents.

951.01.08 Production Facility.

- (a) The producer shall have a facility, presently in operation, capable of producing the traffic paint in the quantity and quality required by the Administration. This facility will be subject to the Administration's approval.
- (b) The producer shall have a laboratory, subject to the Administration's approval, that is capable of performing the required tests.

SPECIAL PROVISIONS
 951 — PAVEMENT MARKING MATERIALS

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CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.02 LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS. All materials composing the reflective thermoplastic material shall be lead free. Reflective thermoplastic material shall be homogeneously composed of pigment, filler, resins and glass beads and shall conform to the following.

951.02.01 Reflective Thermoplastic Components.

(a) Composition.

COMPONENT	TEST METHOD	COLOR	
		WHITE	YELLOW
Binder, % min	Certified	18.0	18.0
Premixed Reflective Beads, % min	MSMT 614	30.0	30.0
Titanium Dioxide, % min	X-Ray Fluorescence	10.0	N/A
Calcium Carbonate Inert fillers, % max	D 34	42.0	*
Yellow Pigment, %	---	N/A	*

* Amount of yellow pigment, calcium carbonate and filler shall be at the option of the manufacturer, provided all other requirements are in conformance.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm when tested by X-Ray Fluorescence, ICP, or comparable method capable of this level of detection. Diarylide type pigments shall only be used when the manufacturer or pavement marking material application temperature does not exceed 392 F.

(b) Binders. The binder shall be alkyd consisting of maleic modified glycerolester of resin and other plasticisers.

(c) Titanium Dioxide. The titanium dioxide shall be rutile type.

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951.02.02 Reflective Thermoplastic.

(a) Physical Properties.

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Bond Strength, psi min.	MSMT 614	180
Softening Point, F		215 ± 15
Low Temperature Stress Resistance	T 250	No Cracks

(b) Specific Gravity. The specific gravity of the white and yellow pavement marking material shall be 1.7 to 2.2 when tested in conformance with D 153, Method A at 77 F.

(c) Color. After heating for 4 ± 0.5 hours at 425 ± 3 F, the thermoplastic shall be as specified in E 1347 and the following:

(1) Production. The color of the cured thermoplastic material film of the production sample shall match the Federal Standard 595 Color chips specified when compared by instrumental measurement.

(2) Control. Control color matching determinations will be made using a Pacific Scientific Color Machine, and an observation angle of 2°, and the CIE Chromaticity Coordinate Color Matching System under light source Illuminate C, with the following tolerances permitted between the standard chip and the cured thermoplastic film sample:

	WHITE Color No. 17886		YELLOW Color No. 13538	
	X	Y	X	Y
Standard Chip	0.310	0.330	0.480	0.450
Delta Tolerance	± 0.020	± 0.020	± 0.030	± 0.030

(3) Reflectance.

COLOR	TEST METHOD	DAYLIGHT REFLECTANCE at Degree	PERCENT MIN
White	Fed Std 595 No. 17886	45 - 0	80
	Fed Std 595		

SPECIAL PROVISIONS
 951 — PAVEMENT MARKING MATERIALS

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Yellow	No. 13538	45 - 0	50
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(d) Yellowing Index. The yellowing index of the white material shall not exceed 8 prior to QUV and 15 after QUV when tested in accordance with E 313.

951.02.03 Glass Beads Physical Requirements. The glass beads shall conform to M 247 and the following:

GRADATION SIEVE SIZE	PERCENT PASSING
	STANDARD BEADS
0.85 mm (No. 20)	100
0.60 mm (No. 30)	75 - 95
0.30 mm (No. 50)	15 - 35
0.15 mm (No. 100)	0 - 5

Glass beads shall be colorless, clean, transparent, and free of milkiness, excessive air bubbles, and essentially free of sharp angular scarring or scratching. The beads shall be spherical in shape and shall contain a minimum of 60 percent silica. Roundness shall be 75 percent minimum when tested as specified in D 1155, Procedure A.

Glass beads shall have a 1.50 minimum refractive index when tested in conformance with MSMT 211.

Glass beads shall not absorb moisture in storage and shall remain free of clusters or lumps.

951.02.04 Field Testing. Materials conforming to this specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administration’s Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by the Office of Materials and Technology (OMT).

951.02.05 Sampling for Preapproval. Sources supplying thermoplastic material and glass beads shall be submitted by the Contractor to the Engineer for approval in conformance with the Contract Documents.

Each lot of thermoplastic material will be sampled at the source and tested by the Administration over two construction seasons. If 95 percent of the lots tested conform to Specifications, source samples will no longer be required and the manufacturer may ship directly to the project. All shipments shall be accompanied by a manufacturer’s certification in conformance with TC-1.03 and shall include the following:

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- (a) Manufacturer's name.
- (b) Place of manufacture.
- (c) Material color.
- (d) Date of manufacture (month-year).
- (e) Lot identification.
- (f) Size/quantity of lot represented.

Random samples will be taken on the project in conformance with the MSMT Sample Frequency Guide and tested for conformance with these specifications. Nonconformance may result in the suspension from the certification program until conformance is reestablished. To reestablish conformance, the manufacturer shall achieve a 95 percent approval level from samples taken at the manufacturer's facility and tested by the Administration prior to shipment to Administration projects.

Each lot of glass beads shall be sampled in conformance with the MSMT Sample Frequency Guide and shall be submitted to the OMT for testing and approval prior to use.

Sampling will be by batch or lot which is defined as a maximum of 44 000 lbs of material.

951.02.06 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03. The manufacturer shall certify that any reflective thermoplastic materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Reflective thermoplastic materials which fail to conform will be rejected.

The manufacturer shall also provide the following:

- (a) Material Safety Data Sheets for all materials submitted for testing and use.
- (b) A facility, presently in operation, capable of producing the reflective thermoplastic materials in the quantity and quality required by the Administration.
- (c) A laboratory subject to the Administration's approval which is capable of performing the required tests.

SPECIAL PROVISIONS
951.04 — REMOVABLE PAVEMENT
MARKING TAPE

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MATERIALS**

SECTION 951 — PAVEMENT MARKING MATERIALS

951.04 REMOVABLE PAVEMENT MARKING TAPE. Removable pavement marking tape shall remain in place on the pavement surface without being displaced by traffic, or affected by weather conditions. The material shall be capable of being removed without the use of heat, solvents, grinding, or sand blasting and shall not leave an objectionable residue.

The material shall be of good appearance and free from cracks. Edges shall be true, straight and unbroken. Line marking material shall be in rolls having no more than three splices per 150 ft of length. All marking materials shall be packaged in conformance with accepted commercial standards and shall have a minimum shelf life of one year.

Performance Requirements. When applied in conformance with the manufacturer's recommendations, the material shall provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface or underlying markings remain stable. The material shall be weather resistant and, through normal traffic wear, shall show no lifting or shrinkage that will significantly impair the intended usage of the tape throughout its useful life, and shall show no significant tearing while in place, or other signs of poor adhesion. The material shall be capable of easy removal without tearing into small pieces.

951.04.01 White and Yellow. Removable preformed pavement marking materials shall conform to the requirements of the MdmUTCD and the following:

(a) **Composition.** The marking material shall consist of a mixture of polymeric materials, pigment, and glass beads distributed uniformly throughout the surface.

(b) **Color.** The color of the marking materials shall match Federal Test Standard No. 595 for the following color numbers:

White - 37925
Yellow - 38907

(c) **Glass Beads.** Glass beads shall conform to the General Requirements of M 247 and have a minimum refractive index of 1.90 when tested as specified in MSMT 211.

(d) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.

(e) **Certification.** Samples submitted to the Office of Materials Technology (OMT) for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.

(f) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over 180 day period as specified in MSMT 723 for conformance with the following:

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951.04 — REMOVABLE PAVEMENT
MARKING TAPE

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- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2.
- (3) Residue Remaining at Time of Removal (day and night) - minimum rating of 2.
- (4) Durability, Appearance, and Night Visibility - minimum weighted rating of 4.
- (5) Loss or Movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on OMT's Qualified Products List. The material shall conform to all criteria for a minimum period of 120 days to be considered satisfactory.

951.04.02 Black. Removable preformed pavement marking materials shall conform to the requirements of the MdmUTCD and the following:

- (a) **Composition.** The non-reflective blackout tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments, and inorganic fillers distributed throughout its cross-sectional area, with a matte black non-reflective surface. The film shall be pre-coated with a pressure sensitive adhesive. A nonmetallic medium shall be incorporated to facilitate removal.

For patterned materials, a minimum of 20 percent of the total surface area shall be raised and coated with nonskid particles. The channels between the raised areas shall be substantially free of particles.

- (b) **Color.** The color of the blackout material shall match Federal Test Standard No. 595 for the following color numbers:

Black - 37038 (or as approved by the Engineer)

- (c) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.
- (d) **Certification.** Samples submitted to OMT for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.

- (e) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over a 180 day period as specified in MSMT 723 for conformance with the following:

- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2. The manufacturer shall show that the blackout tape can be manually removed after its intended use, intact or in large pieces, at temperatures above 40 F without the use of heat, solvents, grinding, or sand or water

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951.04 — REMOVABLE PAVEMENT
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blasting. The blackout tape shall remove cleanly from existing markings that are adequately adhered to the pavement surface.

- (3) Residue Remaining at Time of Removal (day and night) - minimum rating of 2.
- (4) Durability, Adhesion, Appearance, and Night Visibility - minimum weighted rating of 4. The manufacturer shall demonstrate that the properly applied blackout tape adheres to the roadway and existing stable roadway markings under climatic and traffic conditions normally encountered in the construction work zone.
- (5) Loss or Movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on OMT's Qualified Products List. The material shall conform to all criteria for a minimum period of 180 days to be considered satisfactory.

951.04.03 Packaging. Preformed pavement markings shipping package shall conform to the manufacturer's shipping requirements to prevent damage during delivery and unloading of all shipments. The shipping package shall be marked with the following information placed on each container:

- (a) Description of item.
- (b) Date of manufacture.
- (c) Successful Bidder's Name.
- (d) Purchase Order Number.
- (e) Lot Number.
- (f) Color.
- (g) Installation instructions.

SPECIAL PROVISIONS
951.06 — HEAT APPLIED
THERMOPLASTIC MATERIALS

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SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.06 HEAT APPLIED PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING MATERIAL. The material shall be highly durable retroreflective polymeric materials designed for use as transverse lines, numbers, legends, symbols and arrow markings subjected to high traffic volumes and severe wear conditions such as shear action from crossover or encroachment.

The applied material shall adhere to hot mix asphalt (HMA), open-grade friction courses (OGFC), stone matrix asphalt (SMA), portland cement concrete (PCC), and any existing pavement markings when applied using normal heat from a propane fueled heat gun in conformance with manufacturer's recommendations.

The applied material shall be capable of conforming to pavement contours, breaks and faults, shall not be affected by weather conditions, and shall remain in place on pavement surfaces without being displaced by traffic.

The material shall have a minimum shelf life of one year.

The material shall conform to the requirements of the MdmUTCD and the following:

(a) Composition. The material shall consist of polymeric materials, pigments, binders and glass beads distributed throughout the entire cross-sectional area. The thermoplastic material shall conform to M 249 with the exception of the relevant differences for the material being supplied in the preformed state.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm when tested by X-ray diffraction, ICP, or comparable method capable of this level of detection. Nonleachable lead based pigments will not be permitted. Diarylide type pigments shall only be used when the manufacture or pavement marking material application temperature does not exceed 392 F.

(b) Color. Preformed markings shall consist of film with pigments selected and blended to match Federal Standard 595 color chip Nos. 17886 and 13538 for white and yellow respectively.

(c) Frictional Resistance. The surface of the applied material shall provide a minimum average skid resistance value of 50 BPN when tested in conformance with E 303.

SPECIAL PROVISIONS
951.06 — HEAT APPLIED
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- (d) **Patchability.** The material shall be capable of use for patching worn areas of the same type in conformance with manufacturer's recommendations.
- (e) **Thickness.** The minimum thickness, without adhesive, shall be 120 mils.
- (f) **Adhesion.** The material shall retain a minimum of 65 percent adhesive bond after 100 cycles of freeze-thaw when tested in conformance with C 666, Method B.
- (g) **Beads.**
- (1) **Index of Refraction.** All beads shall meet the general requirements of M 247, Type I, and shall have a minimum index of refraction of 1.50 when tested using the liquid oil immersion method specified in MSMT 211.
- (2) **Acid Resistance.** A maximum of 15 percent of the beads shall show a formation of a distinct opaque white layer on the entire surface after exposure to a 1 percent solution (by weight) of sulfuric acid in conformance with MSMT 211.

Field Testing. Materials conforming to this Specification shall be field tested at AASHTO regional test facilities, such as National Transportation Product Evaluation Program (NTPEP), for performance.

Materials performing satisfactorily throughout the test period, including exhibiting a minimum retained reflectance of 100 mcd/m²/lux at the completion of the testing, will be placed on the Prequalified Materials List maintained by the Office of Materials and Technology.

Certification. Any marking material supplied during the Contract shall be identical in composition to the material submitted for initial testing. Samples submitted for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

BALTIMORE CITY DETAIL PLATES

INCLUDED IN THIS SECTION ARE BALTIMORE CITY DETAIL PLATES THAT MAY APPLY TO THIS PROJECT. BALTIMORE CITY DOES NOT GUARANTEE THE COMPLETENESS OF THE DETAILS. THE DESIGN-BUILDER SHALL BE RESPONSIBLE FOR OBTAINING THE LATEST BALTIMORE CITY DETAIL PLATES THAT APPLY TO THE DESIGN AND CONSTRUCTION OF THIS CONTRACT.

DRAFT - NOT FOR CONSTRUCTION

GUIDELINES FOR TEMPORARY TRAFFIC CONTROL

THESE GUIDELINES ARE FOR PREPARING TEMPORARY TRAFFIC CONTROL PLANS (TTCP) FOR CONSTRUCTION OR UTILITY WORK WITHIN OR ADJACENT TO THE STREETS OF BALTIMORE CITY. FOLLOWING THESE GUIDELINES WILL HELP DEVELOP AN ACCEPTABLE PLAN THAT MINIMIZES INCONVENIENCES TO THE DRIVING PUBLIC WHILE ASSURING SAFE CONDITIONS FOR WORKERS AND OTHER STREET USERS INCLUDING PEDESTRIANS AND BICYCLISTS.

DESIGN AND INSTALLATION OF TEMPORARY TRAFFIC CONTROL IN BALTIMORE CITY WILL BE DONE UTILIZING THE TEMPORARY TRAFFIC CONTROL PORTION OF THE MOST CURRENT MARYLAND STATE HIGHWAY ADMINISTRATION (MDSA) BOOK OF STANDARDS AND THE MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PART 6, TEMPORARY TRAFFIC CONTROL, AS BASIC GUIDELINES. THE GUIDELINES, REQUIREMENTS AND DETAILS PROVIDED HERE SUPPLEMENT THE ABOVE MENTIONED BASIC DOCUMENTS AND INCLUDE OTHER USEFUL INFORMATION THAT WILL FACILITATE DESIGN AND INSTALLATION OF APPROPRIATE TEMPORARY TRAFFIC CONTROLS. USERS OF THIS INFORMATION SHALL ALSO COMPLY WITH TRAFFIC CONTROL RELATED PORTIONS OF THE LATEST BALTIMORE CITY 2006 STANDARD SPECIFICATIONS FOR MATERIALS, HIGHWAYS, BRIDGES, UTILITIES AND INCIDENTAL STRUCTURES.

THE PURPOSE OF USING TEMPORARY TRAFFIC CONTROL DEVICES (TTCD) IS TO ENSURE ROADWAY SAFETY BY PROVIDING ORDERLY AND PREDICTABLE MOVEMENT OF VEHICULAR TRAFFIC AND THE GUIDANCE AND WARNING NECESSARY FOR STREET USERS, PEDESTRIANS AND BICYCLISTS TO NAVIGATE THE WORK ZONE SAFELY. AT THE COMPLETION OF WORK ACTIVITIES, STREET CONDITIONS SHALL BE FULLY RESTORED TO THOSE THAT EXISTED PRIOR TO THE WORK ACTIVITY.

STREET USER AND WORKER SAFETY AND ACCESSIBILITY TO WORK ZONES SHOULD BE INTEGRAL AND HIGH PRIORITY ELEMENTS OF EVERY PROJECT FROM PLANNING THROUGH DESIGN AND CONSTRUCTION. MAINTENANCE AND UTILITY WORK SHOULD BE PLANNED AND CONDUCTED WITH THE SAFETY OF ALL MOTORISTS, BICYCLISTS, PEDESTRIANS (INCLUDING THOSE WITH DISABILITIES), AND WORK ZONE PERSONNEL BEING CONSIDERED AT ALL TIMES. PERSONS INVOLVED IN DEVELOPING TTCP SHOULD BE FAMILIAR WITH PROVISIONS OF THE AMERICAN WITH DISABILITIES ACT.

ANY CONSIDERATIONS FOR CLOSURE OF A STREET OR SIDEWALK MUST BE CAREFULLY REVIEWED AND JUSTIFIED TO BALTIMORE CITY WITH RESPECT TO BOTH THE NECESSITY AS WELL AS THE IMPACT OF THE CLOSURE TO THE PUBLIC.

TEMPORARY TRAFFIC CONTROL ZONES IN BALTIMORE CITY MAY INCLUDE AT GRADE RAILROAD CROSSINGS. IT IS RECOMMENDED THAT EARLY CONTACT AND COORDINATION BE MADE WITH THE RAILROAD COMPANY OR MARYLAND TRANSIT ADMINISTRATION (LIGHT RAIL, METRO SUBWAY).

THESE GUIDELINES, MANUALS AND STANDARDS ADDRESS A WIDE VARIETY OF NECESSARY TRAFFIC CONTROL CONDITIONS, HOWEVER EVERY POSSIBLE SITUATION MAY NOT BE SHOWN. CLOSELY SPACED INTERSECTIONS, AUXILIARY TURN LANES, TURN PROHIBITIONS, SHORT STREET LENGTHS, SHORT BLOCK LENGTHS, TRAFFIC SIGNALS, THE PRESENCE OF HIGH VOLUME COMMERCIAL DRIVEWAYS, PARKING METERS AND VARIABLE STREET WIDTHS ARE URBAN CONDITIONS WHICH REQUIRE CAREFUL ATTENTION TO SITE SPECIFIC CONSTRUCTION SEQUENCE PHASING AND TRAFFIC CONTROL DEVICE APPLICATION.

IF PARKING METERS ARE WITHIN THE WORK ZONE OF A CONTRACT, THE CONTRACTOR SHALL CONTACT BALTIMORE CITY PARKING AUTHORITY TO ARRANGE FOR BAGGING OF PARKING METERS. EXISTING 'PARKING' SIGNS SHALL BE COVERED AND TEMPORARY 'NO PARKING ANYTIME' SIGNS SHALL BE INSTALLED WITHIN THE AFFECTED AREA. PARKING METER POLES SHALL NOT BE USED FOR TEMPORARY SIGNS. AT THE COMPLETION OF CONSTRUCTION, PARKING SIGNAGE AND METERS SHALL BE RESTORED TO THEIR PREVIOUS CONDITION.

AS PART OF TEMPORARY TRAFFIC CONTROL DESIGN INCLUDES A SPECIAL PROVISION CONTAINING ANY WORK RESTRICTIONS, SUCH AS DAYS THE CONTRACTOR MAY NOT WORK, DAYS DETOURS MAY NOT BE IMPLEMENTED, HOURS THAT LANE RESTRICTIONS ARE ALLOWED OR NOT ALLOWED, OR OTHER RESTRAINTS THAT MUST BE CONSIDERED BASED ON TRAFFIC VOLUMES OR OTHER CONSIDERATIONS. THE PREPARER OF THE TRAFFIC CONTROL PLAN SHALL CONTACT THE BALTIMORE CITY TRAFFIC ENGINEERS' OFFICE TO OBTAIN THIS INFORMATION. THE SPECIAL PROVISION SHALL BE PART OF THE PROJECT BOOKLET.


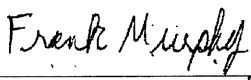
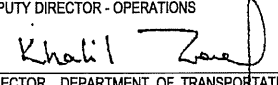
TEMPORARY TRAFFIC SIGNAL MODIFICATION(S) WILL BE COORDINATED THROUGH THE BALTIMORE CITY TRAFFIC ENGINEERS' OFFICE.

THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR ALL ACCIDENTS OR DAMAGE TO PERSONS AND ANY PROPERTY DAMAGE RESULTING FROM HIS OPERATIONS.

NO MATERIALS OR EQUIPMENT SHALL BE STORED ON THE ROADWAY SURFACE OR SIDEWALK DURING NON-WORKING PERIODS. ALL STORED MATERIALS AND EQUIPMENT SHALL BE SET BACK AT LEAST SIX (6) FEET BEHIND THE CURB ALONG A CLOSED SECTION ROADWAY AND AT LEAST TWELVE (12) FEET FROM THE EDGE OF AN OPEN SECTION ROADWAY. HAZARDOUS MATERIAL SHALL NOT BE STORED WITHIN THE PUBLIC RIGHT-OF-WAY.

ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED AS SOON AS PRACTICAL WHEN THEY ARE NO LONGER NEEDED. WHEN WORK IS SUSPENDED FOR SHORT PERIODS OF TIME, TEMPORARY TRAFFIC CONTROL DEVICES THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED OR COVERED.

IN UTILIZING THESE GUIDELINES ANY QUESTIONS ABOUT INTERPRETATIONS OR DETAIL APPLICATIONS SHALL BE REFERRED TO BALTIMORE CITY TRAFFIC ENGINEER OR OTHER RESPONSIBLE PARTY WHO HAS EXPERTISE IN TRAFFIC ENGINEERING AND HAS JURISDICTION ON THE AFFECTED STREETS.

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
GUIDELINES FOR TEMPORARY TRAFFIC CONTROL 772 771			DETAIL NO. BC 104.01-1		
			SCALE : NONE		SHEET 1 OF 7

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL PLAN (TTCP) PREPARATION AND REQUIREMENTS

PERSONS RESPONSIBLE FOR THE DEVELOPMENT AND IMPLEMENTATION OF WORK ZONE TTCP SHALL BE CERTIFIED BY THE MARYLAND STATE HIGHWAY ADMINISTRATION, OFFICE OF TRAFFIC AND SAFETY AS HAVING COMPLETED AND PASSED THE TEMPORARY TRAFFIC CONTROL MANAGERS TRAINING COURSE.

SPECIFIC DRAWING SCALES ARE REQUIRED TO ADEQUATELY SHOW THE LOCATIONS OF ADVANCE CONSTRUCTION SIGNS, THE DIMENSIONS FOR THE PLACEMENT OF CHANNELIZING DEVICES AND PAVEMENT MARKINGS, OR OTHER PHASES OF CONSTRUCTION AS REQUIRED. ACCEPTABLE SCALES ARE 1"=20', 1"=30' AND 1"=40'.

IT IS EXPECTED THAT A LOGICAL, PRACTICAL SEQUENCE WILL BE PRESENTED. THIS SEQUENCE SHOULD BE BASED ON REALISTIC AND UP TO DATE CONSTRUCTION PRACTICES AND METHODS. IMPACTS OF UTILITY RELOCATION, PEDESTRIAN MOVEMENTS, TRAFFIC DELAYS, DETOURS, ROADWAY STABILITY, CAPACITY RESTRICTIONS, MINIMUM LANE WIDTHS AND SAFETY MUST BE CONSIDERED ALONG WITH ANY OTHER SITE SPECIFIC CONDITIONS THAT MAY AFFECT WORK ZONE TRAFFIC CONTROL. EACH PHASE OF CONSTRUCTION, INCLUDING THE FOLLOW UP RESTORATION OPERATIONS, SHALL BE PROVIDED WITH APPROPRIATE WORK ZONE TRAFFIC CONTROLS.

FIELD CHECKS OF THE CONSTRUCTION SITE ARE RECOMMENDED PRIOR TO AND DURING THE PREPARATION OF A TEMPORARY TRAFFIC CONTROL PLAN. SPECIFIC SIGN MESSAGES, SIGN SIZES, TAPER LENGTHS, BARRICADE OR TRAFFIC DRUM SPACING, TYPES OF BARRICADES, TYPICALS FOR BARRIER CONNECTIONS, ETC, MUST BE SITE SPECIFIC AND SHOWN ON THE TTCP DRAWINGS. ALSO, IT MUST BE RECOGNIZED THAT MANY OF THE NECESSARY TRAFFIC CONTROL DEVICES ARE LOCATED IN ADVANCE OF THE CONSTRUCTION LIMITS OF A PROJECT.

EACH PROJECT SHALL HAVE SITE / JOB SPECIFIC SET OF GENERAL NOTES AND A DETAILED SEQUENCE OF CONSTRUCTION FOR EACH PHASE OF THE WORK. THIS INFORMATION SHALL APPEAR AT THE BEGINNING OF THE TEMPORARY TRAFFIC CONTROL DRAWINGS.

ALL EXISTING TRAFFIC CONTROL DEVICES (I.E. SIGNS, MARKING, ETC.) THAT MUST BE REMOVED SHALL BE REPLACED IN THEIR PROPER LOCATION PRIOR TO THE COMPLETION OF THE PROJECT. COST OF THE REPLACEMENT AND / OR REPAIR OF DEVICES DAMAGED AS A RESULT OF THE PROJECT SHALL BE ASSESSED TO THE CONTRACTOR.

WORK WITHIN THE TRAVELED PORTION OF ROADWAYS SHALL GENERALLY BE RESTRICTED TO THE HOURS OF 9:00 AM TO 3:30 PM, MONDAY THROUGH FRIDAY, UNLESS OTHERWISE NOTED IN THE CONTRACT DOCUMENTS. WORK OVERNIGHT OR ON HOLIDAYS AND WEEKENDS SHALL NOT OCCUR UNLESS AN EXCEPTION IS GRANTED IN WRITING BY BALTIMORE CITY.

CONSTRUCTION ACTIVITY, LOADING OR UNLOADING OF EQUIPMENT SHALL NOT BLOCK ANY TRAFFIC LANE OTHER THAN THOSE DELINEATED WITHIN THE WORK ZONE.


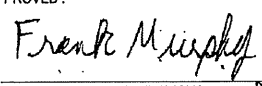
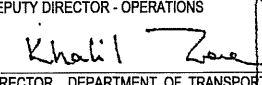
EXCLUSIVE OF EMERGENCY WORK, THE CONTRACTOR SHALL CONTACT OCCUPANTS OF ALL ADJOINING PROPERTIES AND INFORM THEM OF THE SCOPE AND THE TIMING OF CONSTRUCTION. A MINIMUM OF 24 HOURS NOTIFICATION SHALL BE REQUIRED PRIOR TO THE COMMENCEMENT OF ANY ACTIVITY.

ACCESS SHALL BE MAINTAINED TO ALL DRIVEWAYS UNLESS PERMISSION FOR CLOSURE IS GRANTED BY THE PROPERTY OWNER / MANAGER. HOWEVER, ACCESSIBILITY FOR EMERGENCY VEHICLES SHALL BE MAINTAINED AT ALL TIMES.

UNLESS OTHERWISE SPECIFIED ON THE TTCP OR IN THE CONTRACT DOCUMENTS AT LEAST ONE 10-FOOT TRAVEL LANE SHALL BE AVAILABLE FOR TRAFFIC AT ALL TIMES.

TEMPORARY TRAFFIC CONTROL DEVICES (SIGNS, TRAFFIC DRUMS AND CONES, ARROW PANELS, ETC.) SHALL BE PLACED IN ACCORDANCE WITH THE SPACING REQUIREMENTS OF BC 104.01-4. WORK AREA AHEAD (W20-1 MODIFIED) SIGNS MUST BE INSTALLED AT THE END OF EACH WORKDAY WHEN TEMPORARY AGGREGATE RAMPING IS IMPLEMENTED. CHANNELIZING DEVICES SHALL BE PLACED ADJACENT TO EXCAVATIONS AT TEN (10) FOOT INTERVALS. ARROW PANELS (FLASHING MODE ONLY) SHALL BE USED AT THE BEGINNING OF ANY LANE CLOSURE ON A MULTI-LANE ROADWAY. FOR MERGING, SHIFTING, AND SHOULDERS TAPERS, THE MAXIMUM SPACING BETWEEN DEVICES EQUALS THE POSTED SPEED IN FEET.

ALL WARNING SIGNS, UNLESS OTHERWISE SPECIFIED, SHALL BE A MINIMUM OF 48" X 48", BLACK SYMBOL OR LEGEND ON ORANGE BACKGROUND AND DIAMOND SHAPED. ALL WARNING SIGNS NOT APPLICABLE TO THE ACTUAL SITUATION SHALL BE REMOVED OR COVERED DURING NON-APPLICABLE PERIODS. ALL PORTABLE SIGNS SHALL BE MOUNTED A MINIMUM OF ONE (1) FOOT ABOVE THE LEVEL OF THE ROADWAY, WITH HIGHER MOUNTING HEIGHTS DESIRABLE. ALL SPECIAL TRAFFIC SIGNS (NON-STANDARD MUTCD SIGNS) MUST BE DESIGNED. DESIGN DETAILS REQUIRED ARE TYPICAL OF THOSE SHOWN IN THE MUTCD SUPPLEMENT STANDARD HIGHWAY SIGNS. IF ANY TRAFFIC CONTROL SIGNS ARE TO BE PLACED ALONG MDSA ROADWAY WITHIN THE CITY LIMITS, THE CONTRACTOR SHALL NOTIFY THE BALTIMORE CITY TRAFFIC ENGINEER OF SIGNAGE TO BE INSTALLED.

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
TEMPORARY TRAFFIC CONTROL PLAN (TTCP) PREPARATION AND REQUIREMENTS			DETAIL NO. BC 104.01-2		
			SCALE : NONE		SHEET 2 OF 7

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TEMPORARY TRAFFIC CONTROL PLAN (TTCP) PREPARATION AND REQUIREMENTS (CONTINUED)

PAVEMENT MARKING CHANGES MUST BE SPECIFIC WITH RESPECT TO CROSSWALKS, LANE WIDTHS, EDGE LINE WIDTHS, STOP LINE WIDTHS, LANE LINE WIDTHS AND LOCATIONS, COLOR OF LINES, LENGTHS OF SOLID LINES, TAPER LENGTHS, LENGTH OF LINE REMOVALS, PLACEMENT OF ARROWS AND ONLY'S, AND OTHER DIMENSIONS NECESSARY TO ASSURE THE PROPER INSTALLATION OF THE PAVEMENT MARKINGS. IN ADDITION, IF TEMPORARY PAVEMENT MARKINGS ARE TO BE REMOVED RATHER THAN PAVED OVER, THE USE OF REMOVABLE PREFORMED PAVEMENT MARKINGS MUST BE SPECIFIED ON THE DRAWINGS. THE TTCP MUST SPECIFY THAT THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PAVEMENT MARKING REMOVAL AND INSTALLATION.

WHEN PAVEMENT MARKINGS HAVE BEEN OBLITERATED BY THE WORK ACTIVITY, THE CONTRACTOR SHALL INSTALL ANY CRITICAL INTERIM PAVEMENT MARKINGS PRIOR TO THE END OF THE WORKDAY. ON STREET SECTIONS THAT ARE NOT SCHEDULED TO BE OVERLAID, ALL TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVABLE PREFORMED PAVEMENT MARKINGS. ANY CONFLICTING MARKINGS, WHICH NEED TO BE TEMPORARILY REMOVED, ARE TO BE MASKED USING REMOVABLE BLACKOUT TAPE LINES.


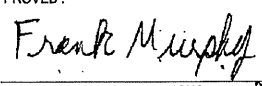
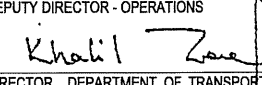
FOR STREET SECTIONS THAT ARE TO BE OVERLAID, TEMPORARY MARKINGS CAN BE EITHER TAPE OR PAINT. EXISTING CONFLICTING MARKINGS SHOULD BE REMOVED WITH A PAVEMENT GRINDER.

DURING APPROVED NIGHTTIME OPERATIONS REFLECTORIZED TRAFFIC DRUMS SHOULD BE USED. HOWEVER, FOR EMERGENCY WORK ACTIVITIES WHERE TRAFFIC DRUMS ARE NOT READILY AVAILABLE, REFLECTORIZED TRAFFIC CONES THAT ARE A MINIMUM OF TWENTY EIGHT (28) INCHES IN HEIGHT AND HAVING SIX (6) INCH AND FOUR (4) INCH REFLECTIVE COLLARS WITHIN THE TOP SIXTEEN (16) INCHES OF THE CONE MAY BE USED. ALL WORK AREAS LEFT UNATTENDED AT NIGHT SHALL BE DELINEATED WITH REFLECTORIZED TRAFFIC DRUMS.

WHEN TEMPORARY CONCRETE BARRIER (TCB) IS USED, REFLECTORIZED SIDE BARRIER MARKERS, 8" X 12" TOP BARRIER WALL MARKERS, AND APPROPRIATE END TREATMENTS/ATTENUATION ARE REQUIRED IN ACCORDANCE WITH THE LATEST STANDARDS.

NO STREET OR SIDEWALK CLOSURES ARE PERMITTED WITHOUT THE APPROVAL OF THE BALTIMORE CITY TRAFFIC ENGINEER

SIDEWALK CLOSURES SHALL BE LIMITED TO OCCUR ONLY DURING THE CONSTRUCTION ACTIVITY. DURING CLOSURE, SIDEWALKS SHALL BE BARRICADED TO PHYSICALLY PREVENT PEDESTRIAN PASSAGE AND APPROPRIATE PEDESTRIAN DETOURS SHALL BE POSTED. DURING ALL OTHER TIMES, PROVISIONS FOR SAFE PEDESTRIAN ACCESS THROUGH THE WORK AREA VIA A TEMPORARY WALKWAY SHALL BE PROVIDED.

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
TEMPORARY TRAFFIC CONTROL PLAN (TTCP) PREPARATION AND REQUIREMENTS			DETAIL NO. BC 104.01-3		
			SCALE : NONE	SHEET 3 OF 7	

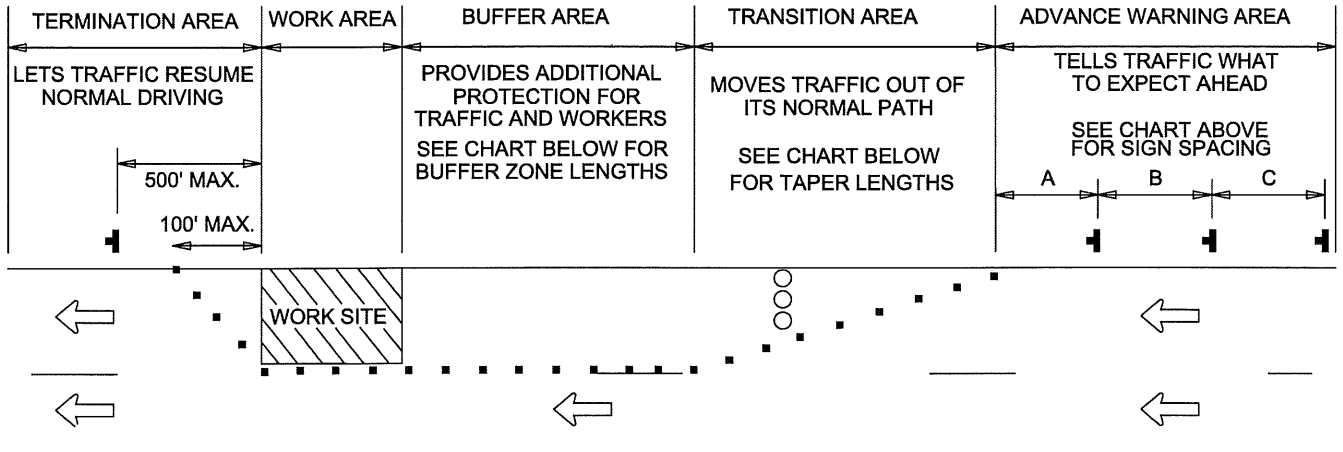
773

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TABLE 1

GUIDELINES FOR SIGN SPACING					
SPEED M.P.H.	MINIMUM DISTANCE FROM TAPER TO FIRST SIGN		ADDITIONAL SIGNS IN SERIES TO BE SPACED AT A MINIMUM		MINIMUM COMBINED ADVANCED WARNING
	A	B	C	D	
25-30	200'	200'	200'		600'
30-35	300'	300'	300'		900'
40-45	500'	500'	500'		1500'
45-65	800'	700'	1100'	2600' (OPTIONAL)	2600'

EXAMPLE: TWO LANES, ONE-WAY ROADWAY



NOTE: THE POSTED SPEED PLUS
10 MPH SHOULD BE USED FOR THE DESIGN
OF SIGN SPACING, TAPER AND BUFFER LENGTHS

TABLE 2

GUIDELINES FOR TAPER LENGTHS						
SPEED M.P.H.	TAPER LENGTH LANE WIDTH IN FT.			NUMBER OF DEVICES FOR TAPER	SPACING OF DEVICES ALONG TAPER IN FEET	
	10	11	12			
20	70	75	80	5	20	
25	105	115	125	6	25	
30	150	165	180	7	30	
35	205	225	245	8	35	
40	270	295	320	9	40	
45	450	495	540	13	45	
50	500	550	600	13	50	
55	550	605	660	13	55	
60	600	660	720	13	60	
65	650	715	780	13	65	

$L = WS^2 / 60$ FOR SPEEDS EQUAL TO OR LESS THAN (<) 40 MPH
WHERE: L = MINIMUM LENGTH OF TAPER (FT.)
S = NUMERICAL VALUE OF PREVAILING TRAVEL SPEED OR SPEED LIMIT (MPH), WHICHEVER IS HIGHER, PRIOR TO WORK STARTING.
W = WIDTH OF OFFSET (FT.)

TABLE 3

GUIDELINES FOR BUFFER ZONE LENGTHS	
SPEED (MPH)	LENGTH (FEET)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335
60	415
65	485

NOTES:

LENGTHS IN TABLE 2 ARE MINIMUM TAPER LENGTHS REQUIRED FOR MERGING TRAVEL LANES (MERGING TAPERS). WHEN SHIFTING TRAVEL LANES (SHIFTING TAPER) AND CONDITIONS DO NOT PERMIT USE OF THE LENGTHS IN TABLE 2, LENGTHS EQUAL TO ONE-HALF THOSE IN TABLE 2 MAY BE USED.

MERGING TAPERS SHALL BE A MINIMUM 1,000 FEET ON EXPRESSWAYS AND FREEWAYS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

WHEN USED, ARROW PANELS SHOULD BE PLACED ON THE SHOULDER AT THE BEGINNING OF THE TAPER. WHERE NO SHOULDER EXISTS, ARROW PANELS SHOULD BE PLACED WITHIN THE TAPER AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.



APPROVED:
Frank Murphy
DEPUTY DIRECTOR - OPERATIONS
Khalil Zaeed
DIRECTOR, DEPARTMENT OF TRANSPORTATION

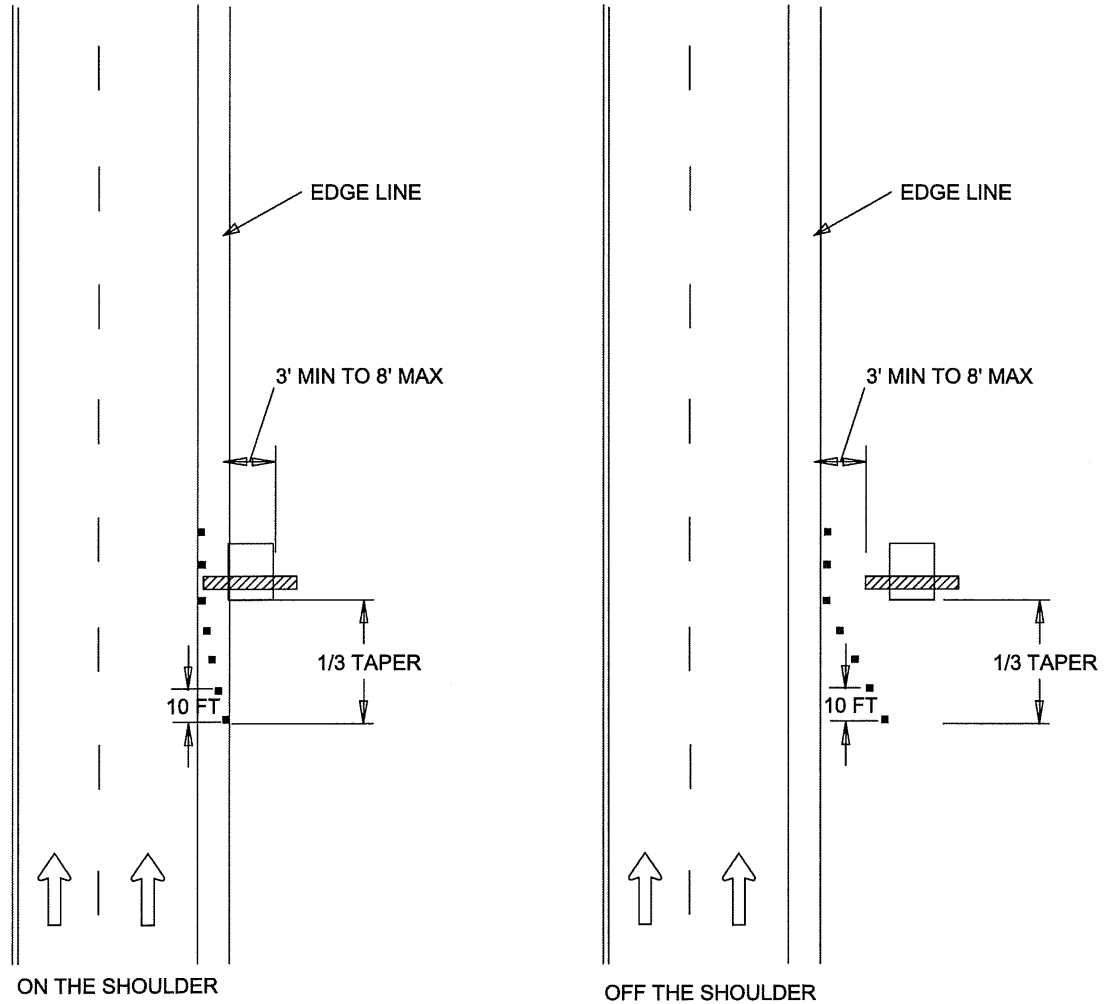
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION
**SIGN SPACING, TAPER AND
BUFFER LENGTHS CRITERIA**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.01-4		
SCALE: NONE	SHEET 4 OF 7	

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NOTES:

1. REFER TO BC 104.01-4 FOR TAPER LENGTHS.
2. PVMS MESSAGES AND PLACEMENT OF THIS DEVICE SHALL BE APPROVED BY THE BALTIMORE CITY TRAFFIC ENGINEER.
3. THE EDGE OF THE SIGN BOARD OF THE PVMS SHALL BE PLACED A MINIMUM OF 3' AND NO MORE THAN 8' FROM EDGE LINE.
4. PMVS SHOULD BE INSTALLED BEHIND TRAFFIC BARRIER WHERE POSSIBLE.



LEGEND

- DIRECTION OF TRAFFIC
- PORTABLE VARIABLE MESSAGE SIGN (PVMS)
- CHANNELIZATION DEVICES



APPROVED:
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DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
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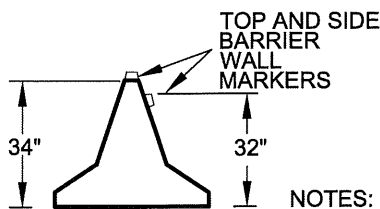
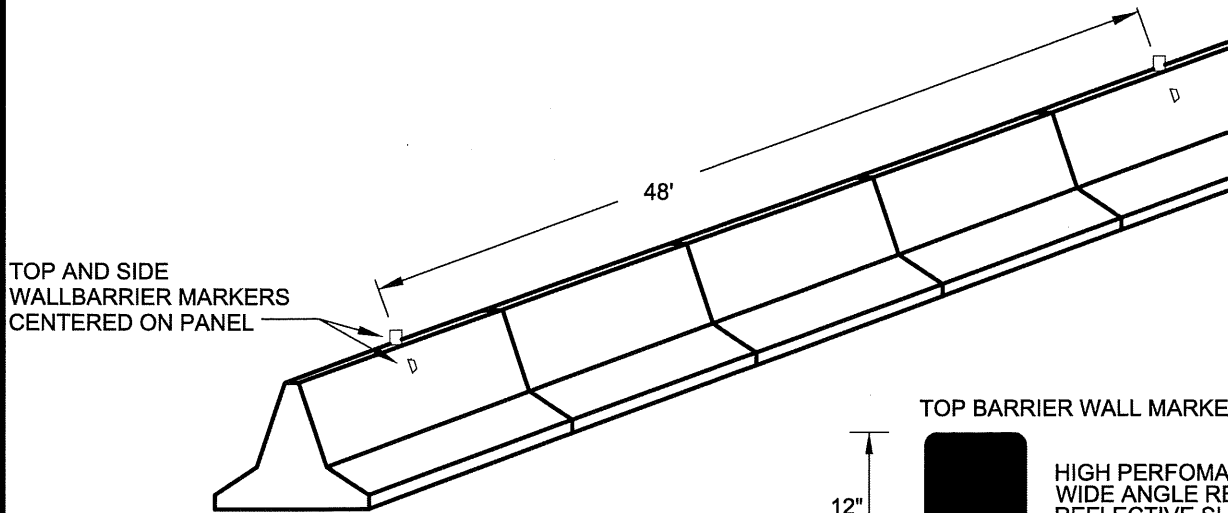
PORTABLE VARIABLE MESSAGE
SIGN PLACEMENT

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775

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.01-5		
SCALE : NONE	SHEET 5 OF 7	

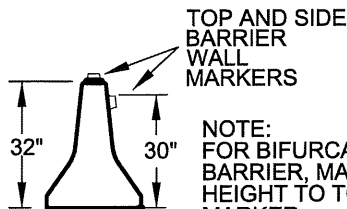
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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



JERSEY SHAPE FRONT VIEW

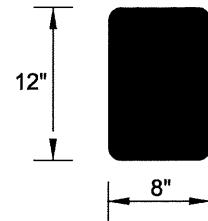
NOTES:
FOR BIFURCATED JERSEY BARRIER, MAINTAIN 32 INCH HEIGHT TO TOP OF SIDE MARKER JERSEY TYPE BARRIER TO BE USED FOR REPLACEMENT PURPOSES ONLY



F SHAPE FRONT VIEW

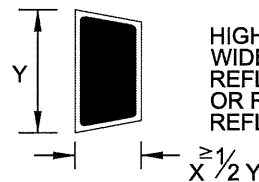
NOTE:
FOR BIFURCATED F-SHAPED BARRIER, MAINTAIN 30 INCH HEIGHT TO TOP OF SIDE MARKER

TOP BARRIER WALL MARKER



HIGH PERFORMANCE WIDE ANGLE RETRO-REFLECTIVE SHEETING FLUORESCENT ORANGE

SIDE BARRIER WALL MARKER



HIGH PERFORMANCE WIDE ANGLE RETRO-REFLECTIVE SHEETING OR RETROREFLECTIVE REFLECTORS

MINIMUM REFLECTIVE AREA, 7.5 SQ. IN.

NOTES:

SIDE BARRIER MARKERS SHALL BE YELLOW IN COLOR WHEN PLACED ON MEDIAN-SIDE BARRIER (SEPARATING OPPOSING TRAFFIC). SHALL BE WHITE IN COLOR WHEN PLACED ON SHOULDER-SIDE BARRIER (OR BARRIER SEPARATING SAME DIRECTION TRAFFIC).

THE SPACINGS BETWEEN MARKERS ON CURVES/TURNS SHALL BE 48 FOOT (RADIAL).

THE BOTTOM OF THE TOP MARKER SHALL BE AT THE SAME ELEVATION AS THE TOP OF THE BARRIER.

NO ATTACHMENT METHOD MAY BLOCK ANY PART OF THE REFLECTIVE AREA OF THE MARKER.

BACKING FOR TOP MARKERS SHALL BE SHEET ALUMINUM, MEETING MATERIAL THICKNESS PER TEMPORARY TRAFFIC SIGNS SPECIFICATIONS OR ANY OTHER MATERIAL APPROVED BY SHA, OFFICE OF TRAFFIC AND SAFETY.



APPROVED:

Frank Murphy

DEPUTY DIRECTOR - OPERATIONS

Khaliq Zane

DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

**BARRIER DELINEATION
BARRIER 4' OR CLOSER TO EDGE
LINE**

ISSUED	REVISED	REVISED
8 / 2010		

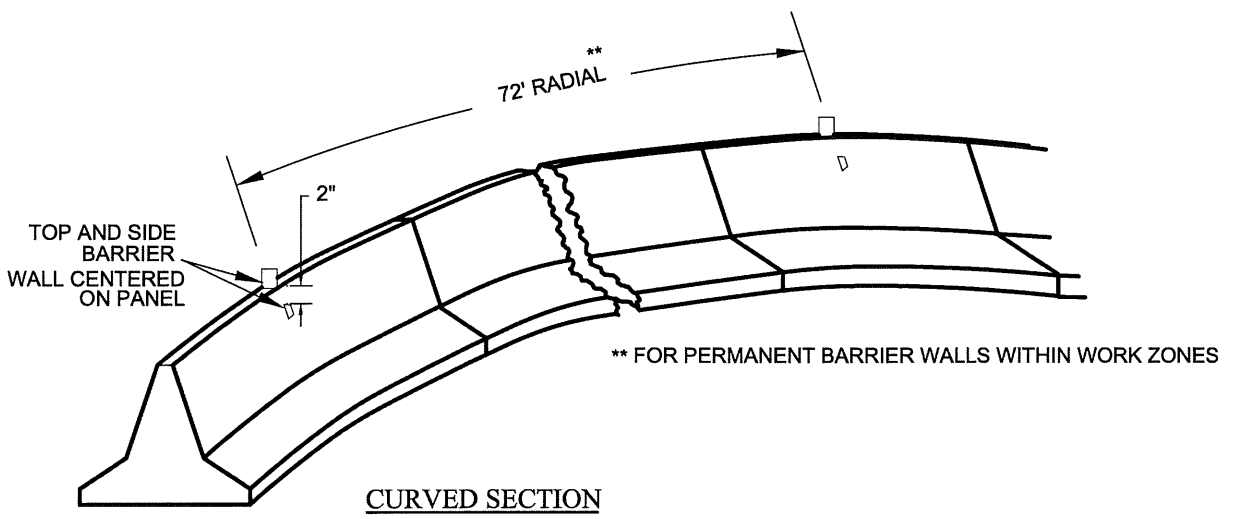
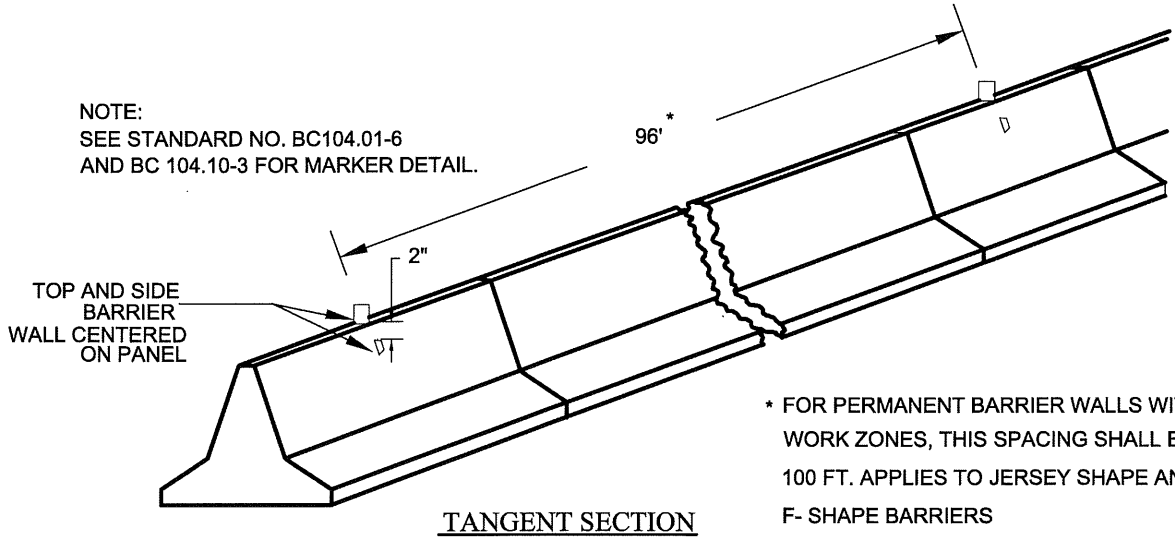
DETAIL NO.
BC 104.01-6


SCALE : NONE SHEET 6 OF 7

777
776

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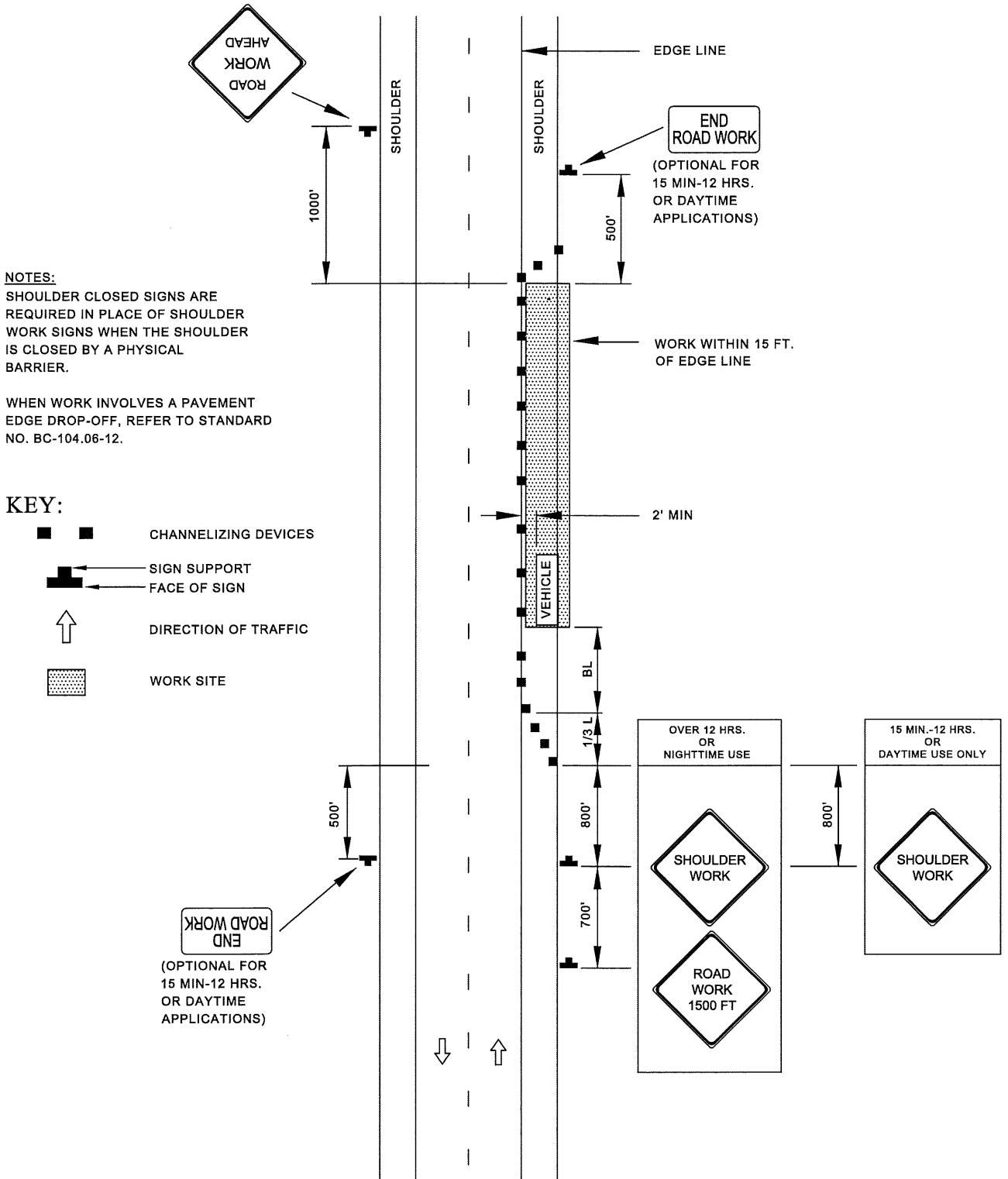
TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION BARRIER DELINEATION BARRIER BETWEEN 4' AND 15' FROM EDGE LINE	ISSUED	REVISED	REVISED
	<i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 104.01-7		
			SCALE : NONE	SHEET 7 OF 7	

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



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 DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

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DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

SHOULDER WORK / 2 LANE, 2 WAY
EQUAL OR LESS THAN 40 MPH

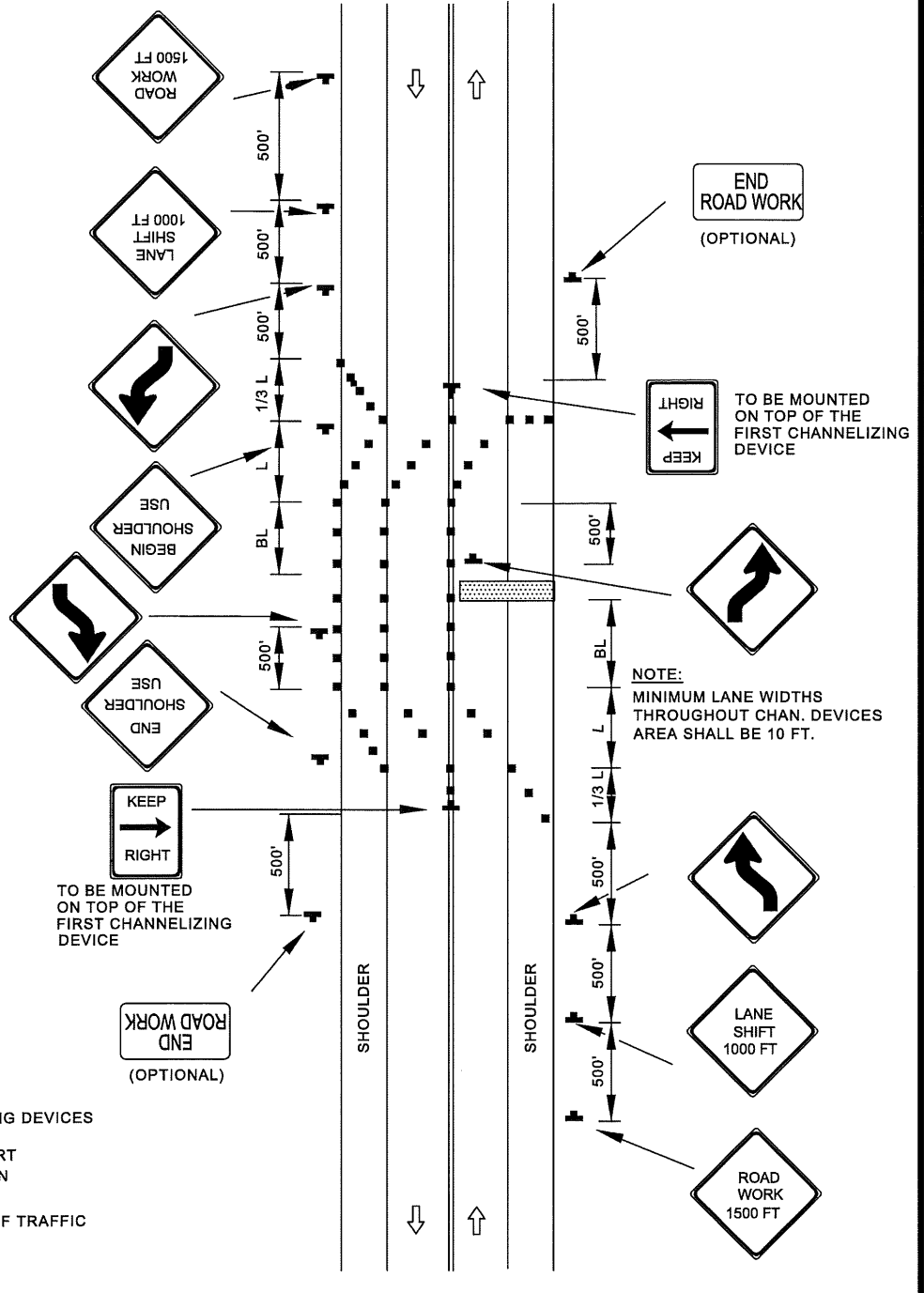
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.02-2		
SCALE : NONE	SHEET 1 OF 1	

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTES:

- THIS TYPICAL SHALL BE USED FOR ANY LANE SHIFT WHERE PREVAILING SPEEDS CANNOT BE MAINTAINED THROUGH THE SHIFT.
- FOR LANE SHIFTS WHICH DO NOT SATISFY ABOVE CONDITIONS:
 - ▶ DELETE "REVERSE CURVE" WARNING SIGNS, AND
 - ▶ REPLACE "LANE SHIFT" SIGNS WITH "ROAD WORK XXX" SIGNS OR OTHER APPROPRIATE SIGNS AS SHOWN IN TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS.



KEY:

- ■ CHANNELIZING DEVICES
- ← SIGN SUPPORT
- ← FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE



APPROVED:
Frank Murphy
DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION
LANE SHIFT RIGHT OR LEFT SIDE / 2 LANE, 2-WAY EQUAL OR LESS THAN 40 MPH / 15 MIN.- 12 HRS. OR DAYTIME ONLY

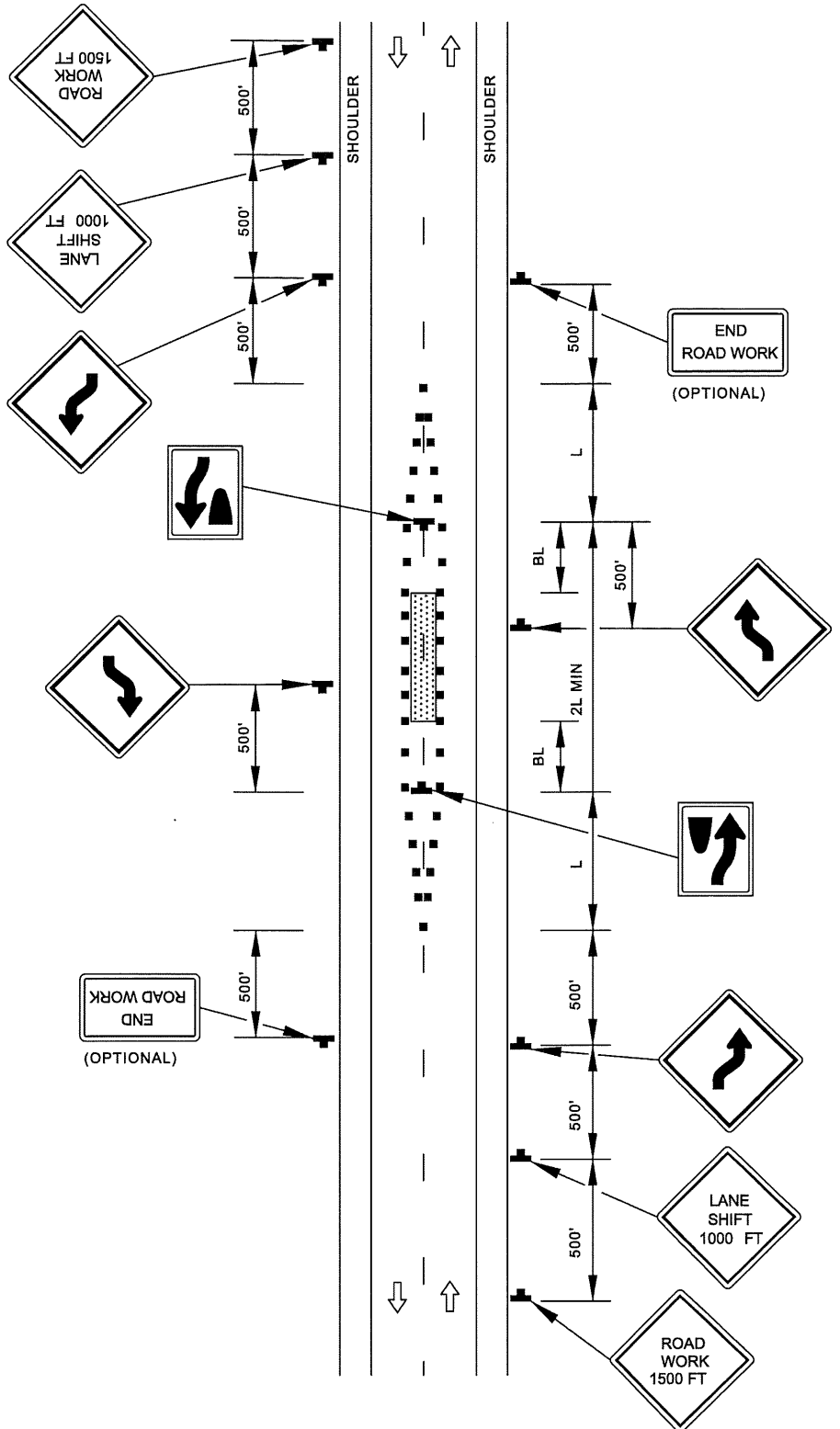
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.02-4		
SCALE : NONE	SHEET 1 OF 1	


TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTE:
 THE LANES ON EITHER SIDE OF THE CENTER WORK SPACE SHALL HAVE A MINIMUM WIDTH OF 10 FT AS MEASURED FROM THE NEAR EDGE OF THE CHANNELIZING DEVICES TO THE EDGE OF PAVEMENT OR THE OUTSIDE EDGE OF PAVED SHOULDER.

KEY:

- ■ CHANNELIZING DEVICES
- ▬ SIGN SUPPORT
- ▬ FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE



	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION WORK IN CENTER OF LOW-VOLUME ROAD 2 LANE 2-WAY EQUAL / LESS THAN 40 MPH / 15 MIN.- 12 HRS. OR DAYTIME ONLY 780	ISSUED	REVISED	REVISED
	APPROVED: <i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 104.02-6		
			SCALE: NONE	SHEET 1 OF 1	

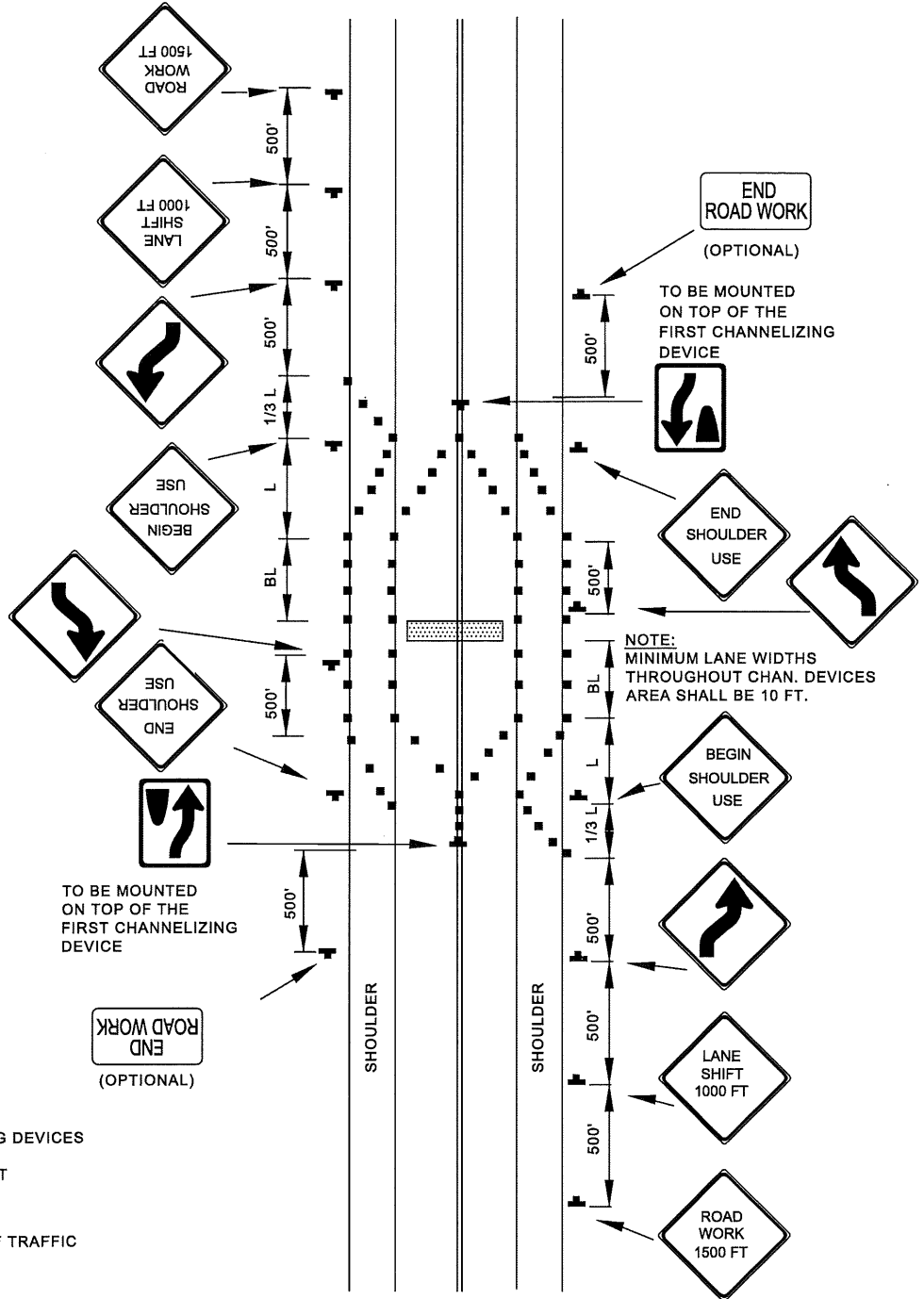
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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTES:



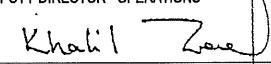
THE "BEGIN AND END SHOULDER USE" SIGNS SHOULD BE OMITTED WHEN THE SHOULDER CANNOT BE DIFFERENTIATED FROM THE NORMAL TRAVEL PATH.

- THIS TYPICAL SHALL BE USED FOR ANY LANE SHIFT WHERE PREVAILING SPEEDS CANNOT BE MAINTAINED THROUGH THE SHIFT.
- FOR LANE SHIFTS WHICH DO NOT SATISFY ABOVE CONDITIONS:
 - ▶ DELETE "REVERSE CURVE" WARNING SIGNS, AND
 - ▶ REPLACE "LANE SHIFT" SIGNS WITH "ROAD WORK XXX" SIGNS OR OTHER APPROPRIATE SIGNS AS SHOWN IN TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS.



KEY:

- ■ CHANNELIZING DEVICES
- ▬ SIGN SUPPORT
- ▬ FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	LANE SHIFT FOR COMPLETE TRAVEL WAY BLOCKAGE / 2 LANE 2-WAY FOL / LESS THAN 40 MPH / 15 MIN. - 12 HRS. OR DAYTIME ONLY	DETAIL NO. BC 104.02-8	SCALE : NONE	SHEET 1 OF 1

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

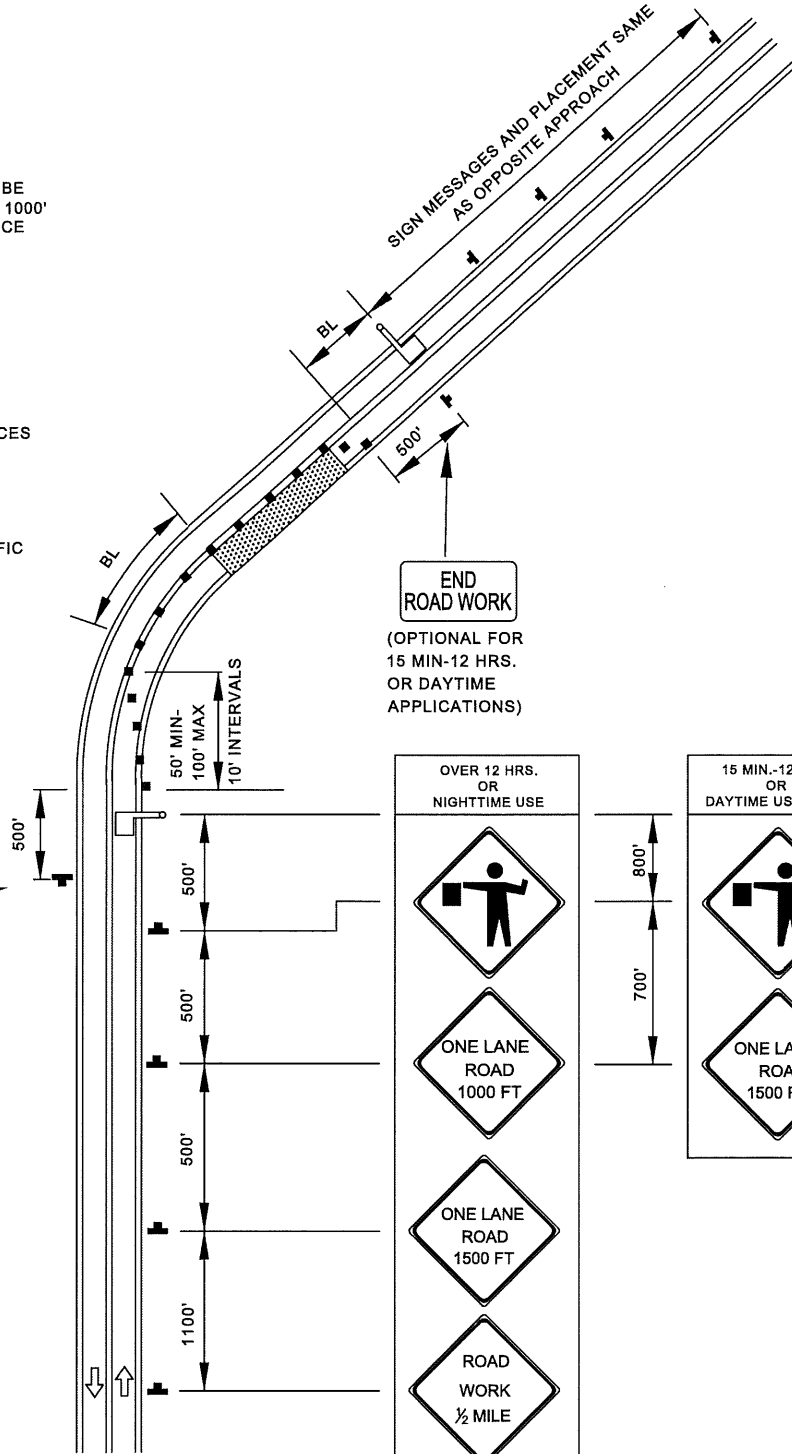
NOTE:
 FLAGGER SHALL NEVER BE STATIONED MORE THAN 1000' AWAY FROM THE ADVANCE FLAGGER SIGN.

KEY:

- ■ CHANNELIZING DEVICES
- ▬ SIGN SUPPORT
- ▬ FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE
- FLAGGER

END ROAD WORK
 (OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

END ROAD WORK
 (OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)



OVER 12 HRS. OR NIGHTTIME USE

15 MIN.-12 HRS. OR DAYTIME USE ONLY



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

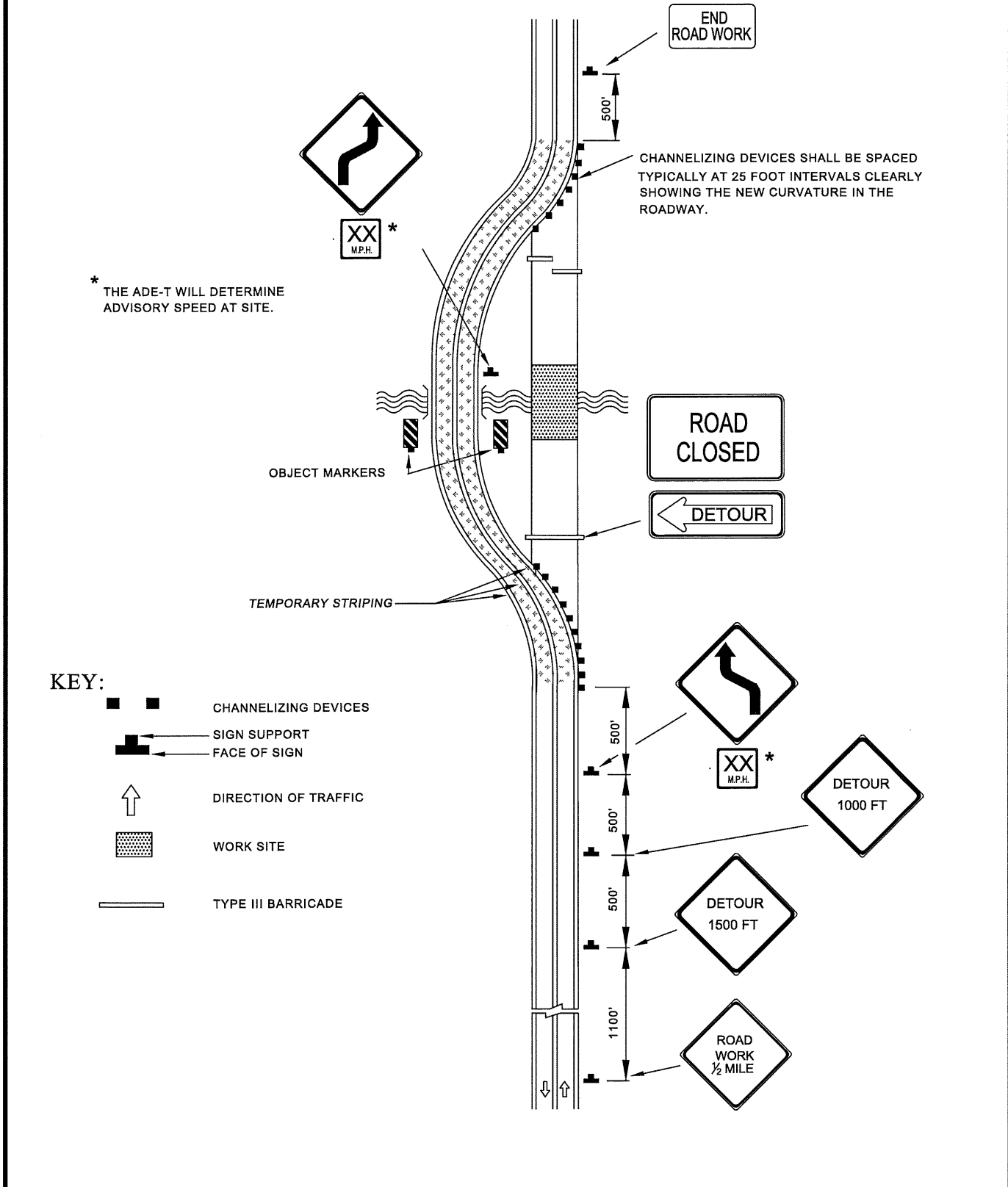
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION


**FLAGGING OPERATION /
 2-LANE, 2-WAY
 EQUAL / LESS THAN 40 MPH**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.02-10		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

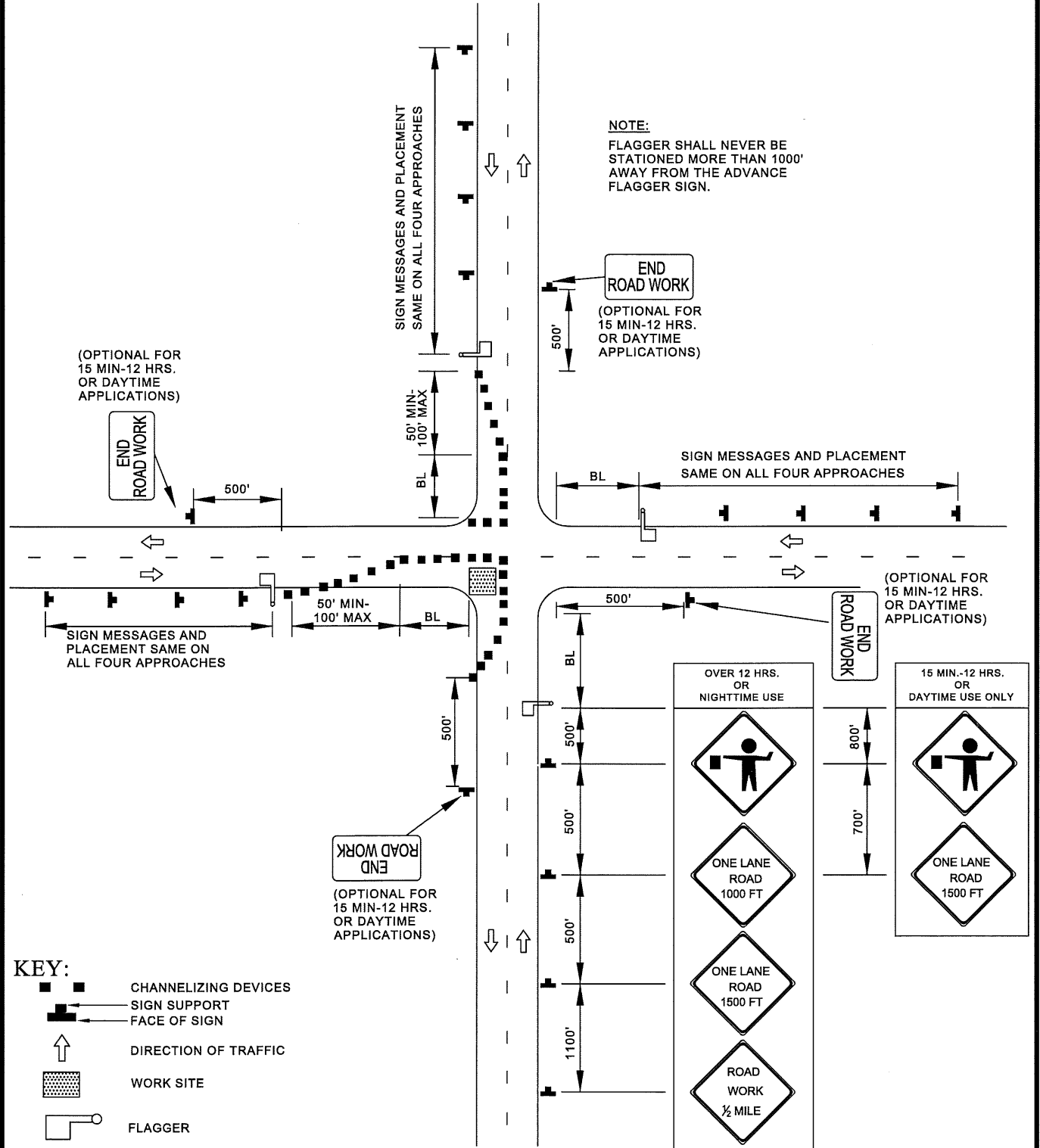
TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION BYPASS DETOUR / 2-LANE, 2-WAY EQUAL / LESS THAN 40 MPH / OVER 12 HRS. OR NIGHTTIME USE	ISSUED	REVISED	REVISED
	<i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
	SCALE: NONE		SHEET 1 OF 1		

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

INTERSECTION FLAGGING OPERATION
 7852-LANE, 2-WAY
 EQUAL / LESS THAN 40 MPH

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.02-14		
SCALE: NONE	SHEET 1 OF 1	

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

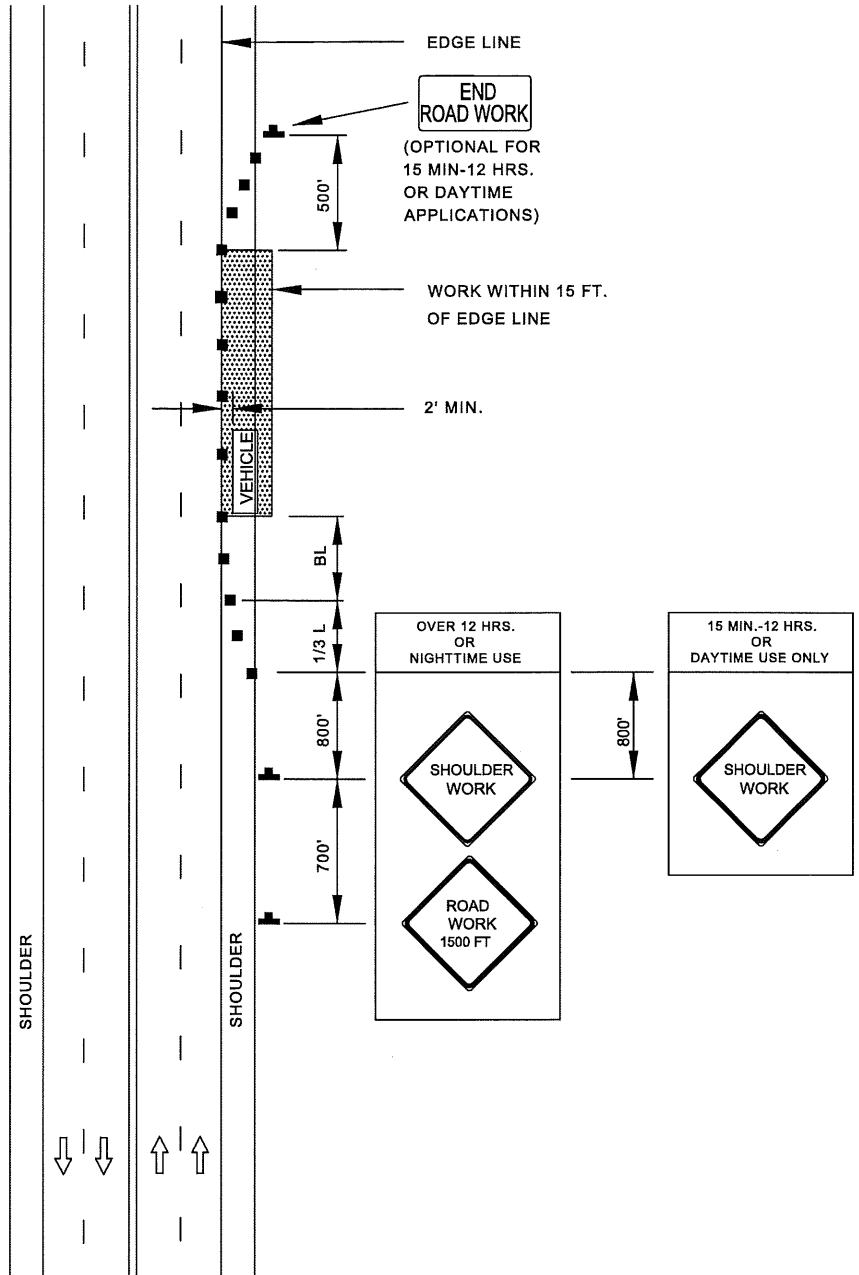
NOTES:


SHOULDER CLOSED SIGNS ARE REQUIRED IN PLACE OF SHOULDER WORK SIGNS WHEN THE SHOULDER IS CLOSED BY A PHYSICAL BARRIER.

WHEN WORK INVOLVES A PAVEMENT EDGE DROP-OFF, REFER TO STANDARD NO. BC 104.06-12.

KEY:

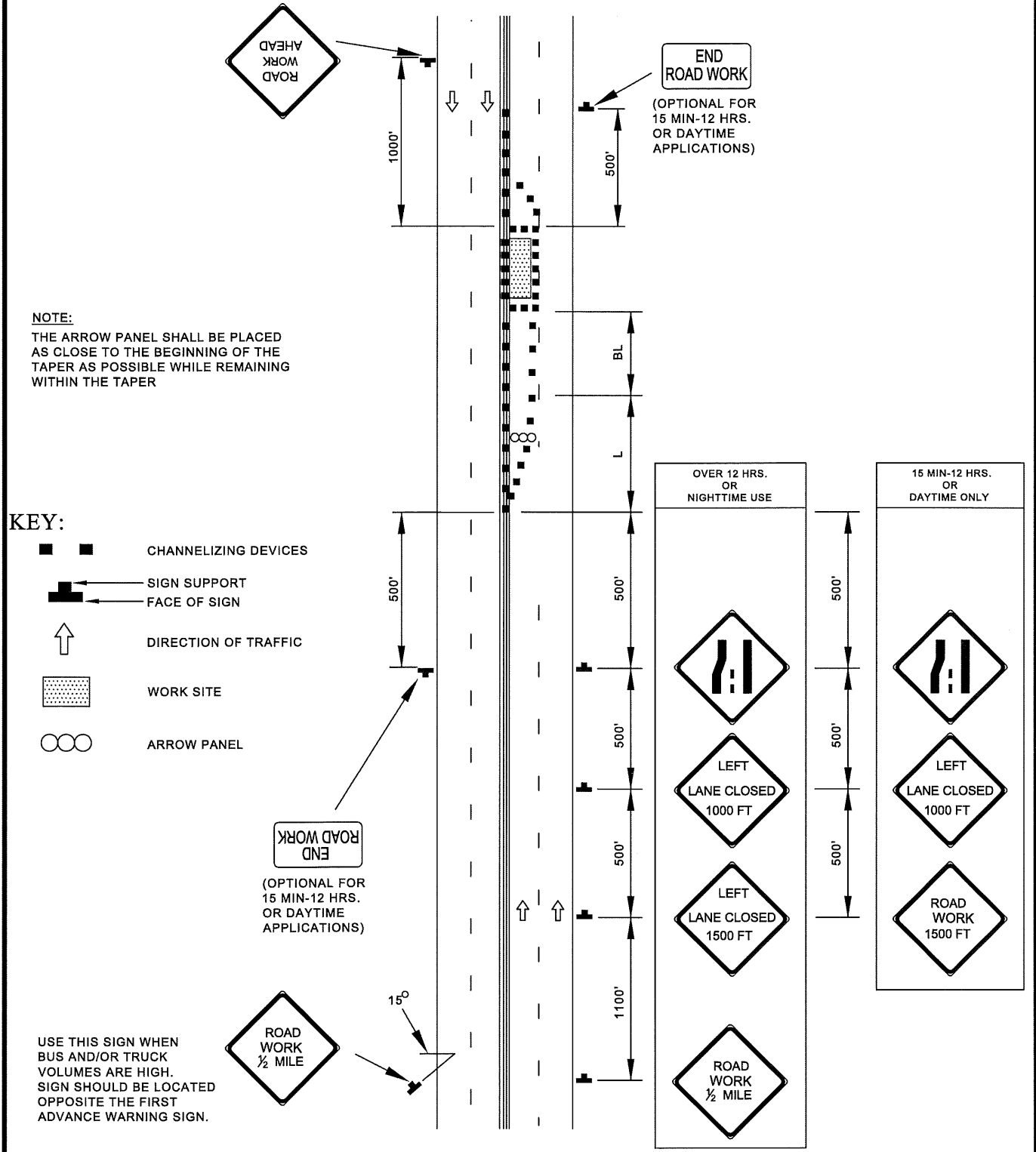
- ■ CHANNELIZING DEVICES
- ▬ SIGN SUPPORT
- ▬ FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE



	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	<i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
SHOULDER WORK / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH			DETAIL NO. BC 104.03-2		
			SCALE: NONE	SHEET 1 OF 1	

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION


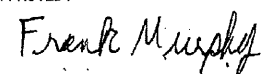
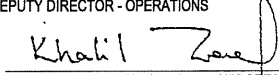


NOTE:
 THE ARROW PANEL SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE WHILE REMAINING WITHIN THE TAPER

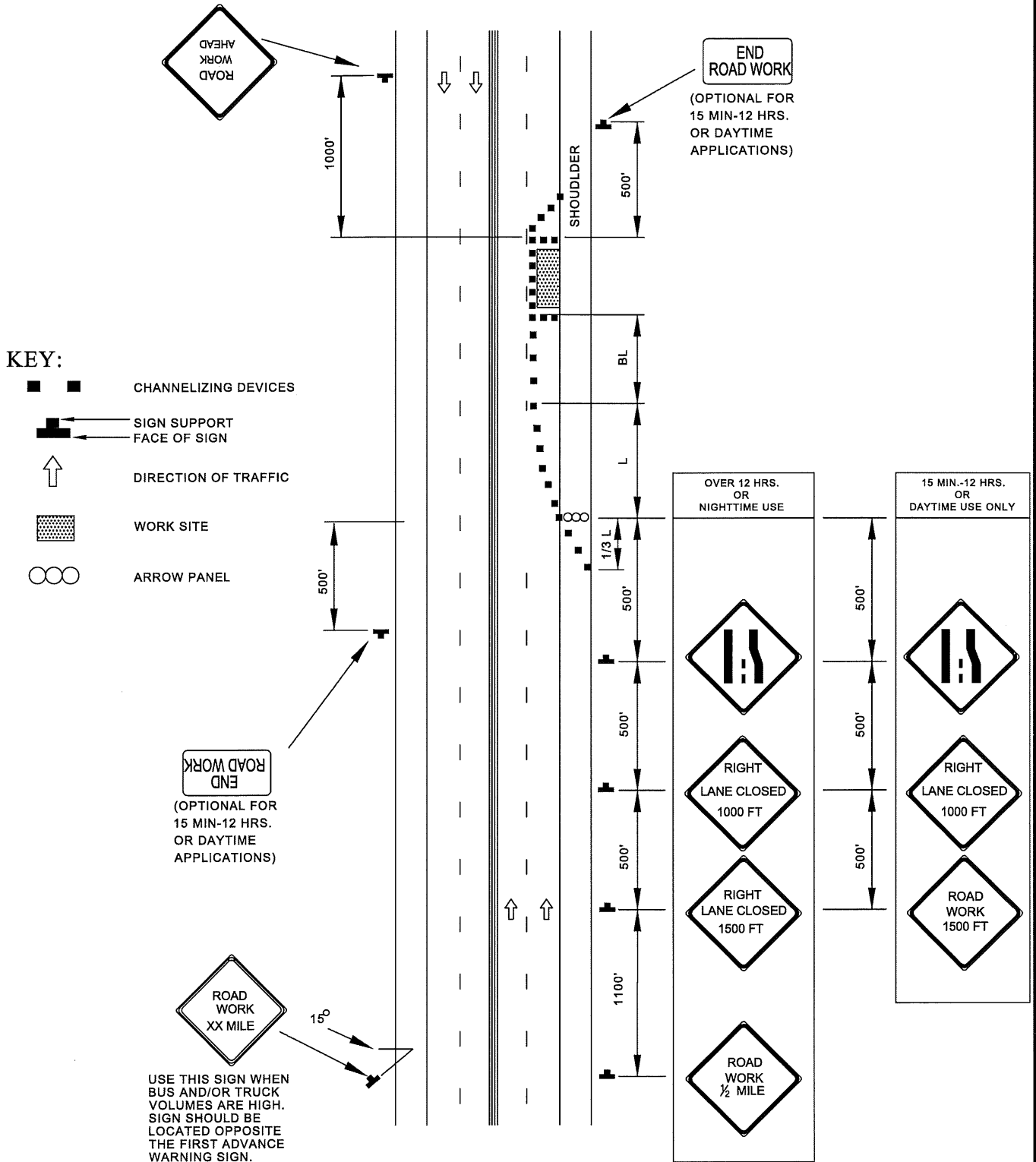
KEY:

- CHANNELIZING DEVICES
- SIGN SUPPORT
FACE OF SIGN
- DIRECTION OF TRAFFIC
- WORK SITE
- ARROW PANEL

USE THIS SIGN WHEN BUS AND/OR TRUCK VOLUMES ARE HIGH. SIGN SHOULD BE LOCATED OPPOSITE THE FIRST ADVANCE WARNING SIGN.

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED 8 / 2010	REVISED 	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	LEFT LANE CLOSURE / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH	DETAIL NO. BC 104.03-4		SCALE: NONE

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

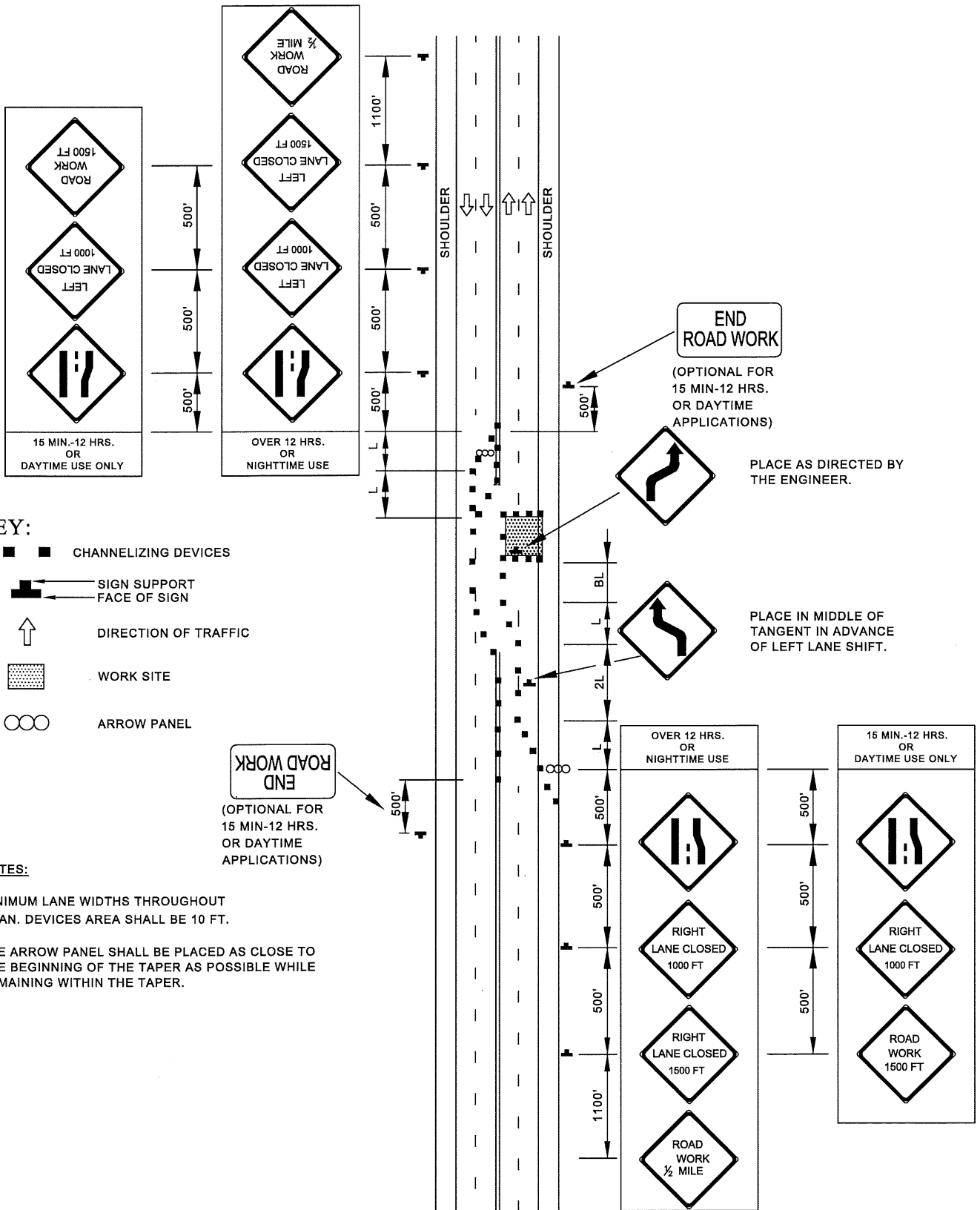
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

RIGHT LANE CLOSURE / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.03-6		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION




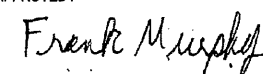
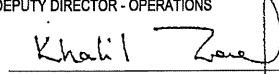
KEY:

- CHANNELIZING DEVICES
- ← SIGN SUPPORT FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE
- ○ ARROW PANEL

NOTES:

MINIMUM LANE WIDTHS THROUGHOUT CHAN. DEVICES AREA SHALL BE 10 FT.

THE ARROW PANEL SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE WHILE REMAINING WITHIN THE TAPER.

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
PARTIAL ROADWAY CLOSURE / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH			DETAIL NO. BC 104.03-8		
			SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTES:

THE ARROW PANEL SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE WHILE REMAINING WITHIN THE TAPER.

* SEE SIGN SPACING CHART BELOW FOR APPROPRIATE DISTANCE.

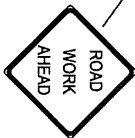
(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

END ROAD WORK

1000'

END ROAD WORK

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)



LEFT TURN STORAGE LANE LENGTH TO BE DETERMINED BY ENGINEER.

END ROAD WORK

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)



END ROAD WORK

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

KEY:

- CHANNELIZING DEVICES
- SIGN SUPPORT
- FACE OF SIGN
- DIRECTION OF TRAFFIC
- WORK SITE
- ARROW PANEL

OVER 12 HRS. OR NIGHTTIME USE	15 MIN.-12 HRS. OR DAYTIME USE ONLY

	APPROVED: DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
INTERSECTION FAR-LEFT LANE CLOSURE / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH			DETAIL NO. BC 104.03-10		
			SCALE: NONE	SHEET 1 OF 1	

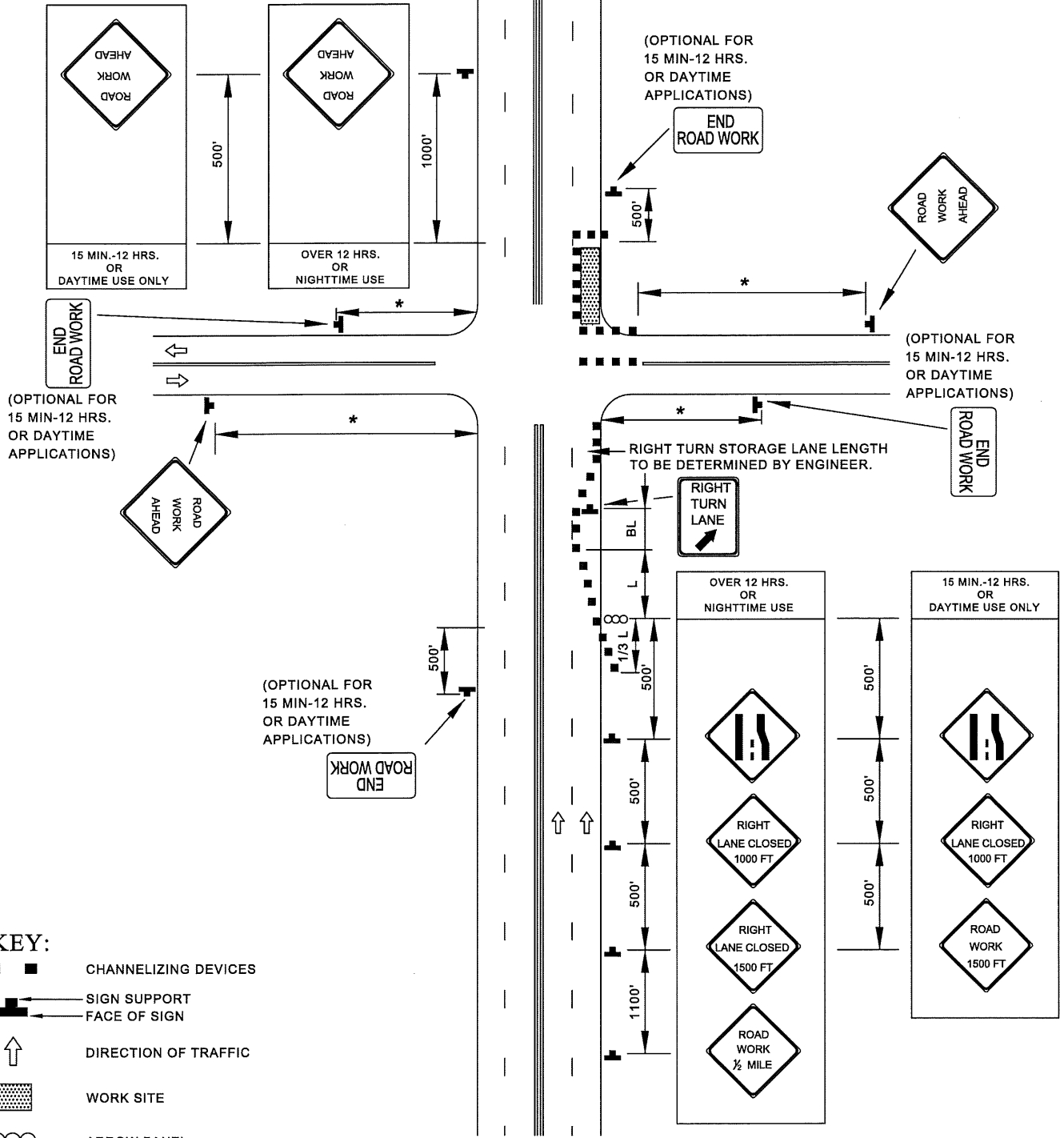
DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTES:

THE ARROW PANEL SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE WHILE REMAINING WITHIN THE TAPER WHEN CURB EXIST.

* SEE SIGN SPACING CHART BELOW FOR APPROPRIATE DISTANCE.



KEY:

- ■ CHANNELIZING DEVICES
- SIGN SUPPORT
- ← FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE
- ARROW PANEL



APPROVED:
Frank Murphy
DEPUTY DIRECTOR - OPERATIONS
Khali Zare
DIRECTOR, DEPARTMENT OF TRANSPORTATION

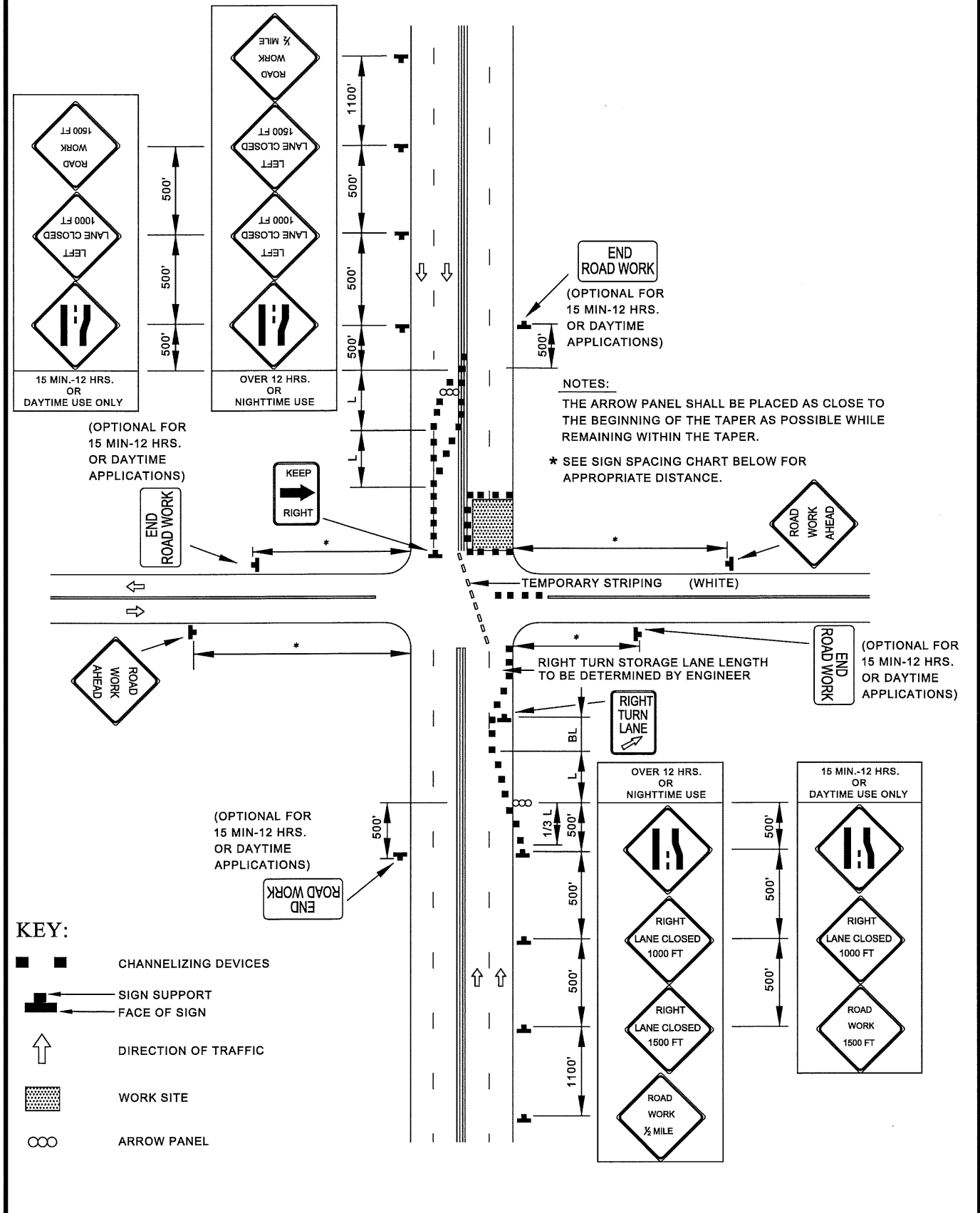
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

INTERSECTION FAR-RIGHT LANE CLOSURE / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.03-12		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

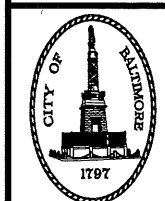


END ROAD WORK
 (OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

NOTES:
 THE ARROW PANEL SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE WHILE REMAINING WITHIN THE TAPER.
 * SEE SIGN SPACING CHART BELOW FOR APPROPRIATE DISTANCE.

END ROAD WORK
 (OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

- KEY:**
- ■ CHANNELIZING DEVICES
 - ▲ SIGN SUPPORT
 - ▲ FACE OF SIGN
 - ↑ DIRECTION OF TRAFFIC
 - ▨ WORK SITE
 - ∞∞∞ ARROW PANEL



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

INTERSECTION FAR-SIDE LANE CLOSURE / MULTILANE UNDIVIDED EQUAL / LESS THAN 40 MPH

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.03-14		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION






NOTES:

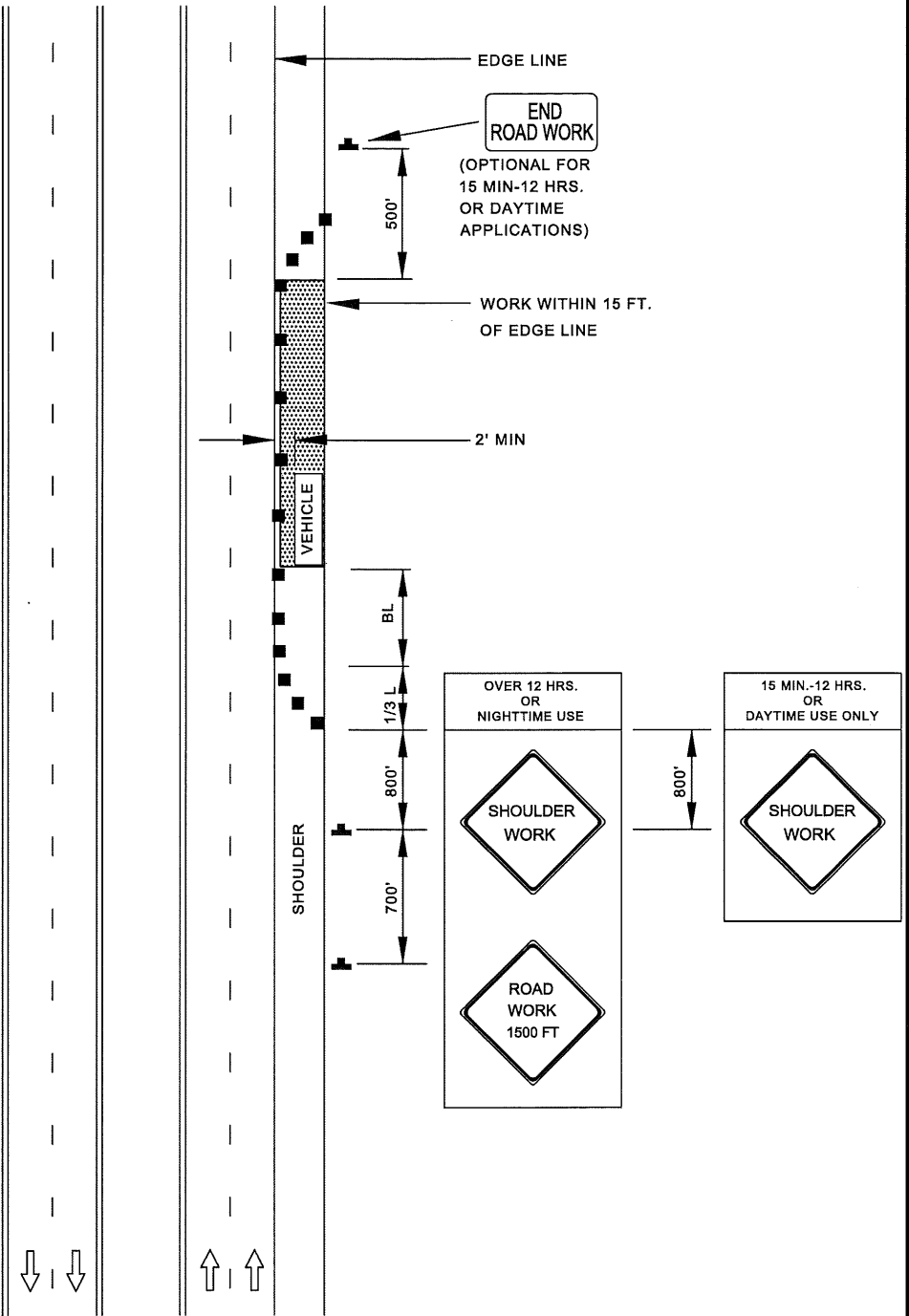
SHOULDER WORK SIGNS SHALL BE MOUNTED ON THE SIDE OF THE ROADWAY WHERE THE SHOULDER IS AFFECTED. USAGE OF SHOULDER WORK SIGNS ON THE OPPOSITE SIDE OF DIVIDED HIGHWAYS IS OPTIONAL.

SHOULDER CLOSED SIGNS ARE REQUIRED IN PLACE OF SHOULDER WORK SIGNS WHEN THE SHOULDER IS CLOSED BY A PHYSICAL BARRIER.

WHEN WORK INVOLVES A PAVEMENT EDGE DROP-OFF, REFER TO STANDARD NO. BC-104.06-12

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

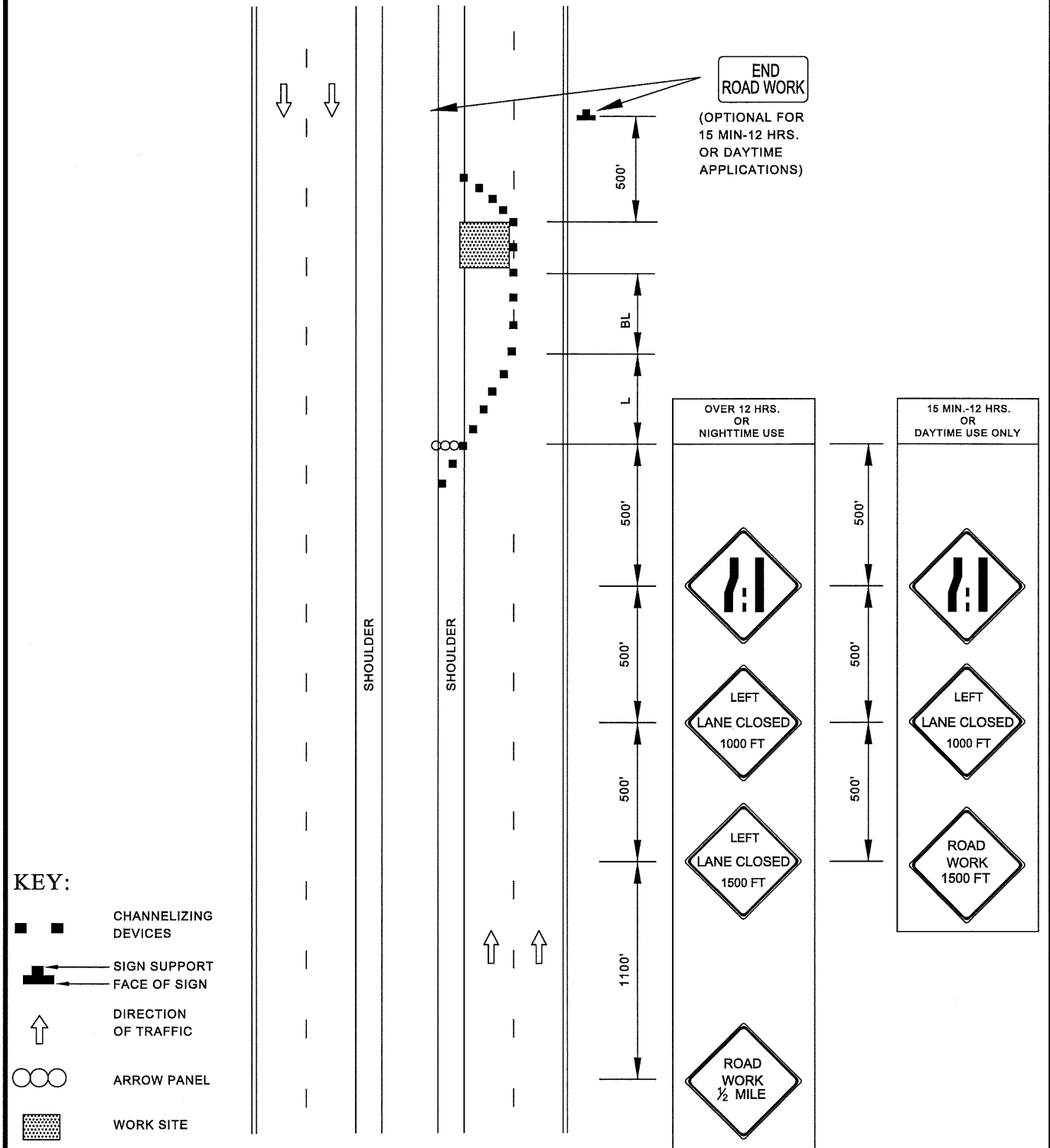
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

SHOULDER WORK / DIVIDED UNCONNECTED EQUAL / LESS THAN 40 MPH






ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.04-2		
SCALE: NONE	SHEET 1 OF 1	



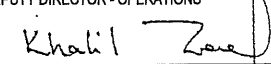
DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



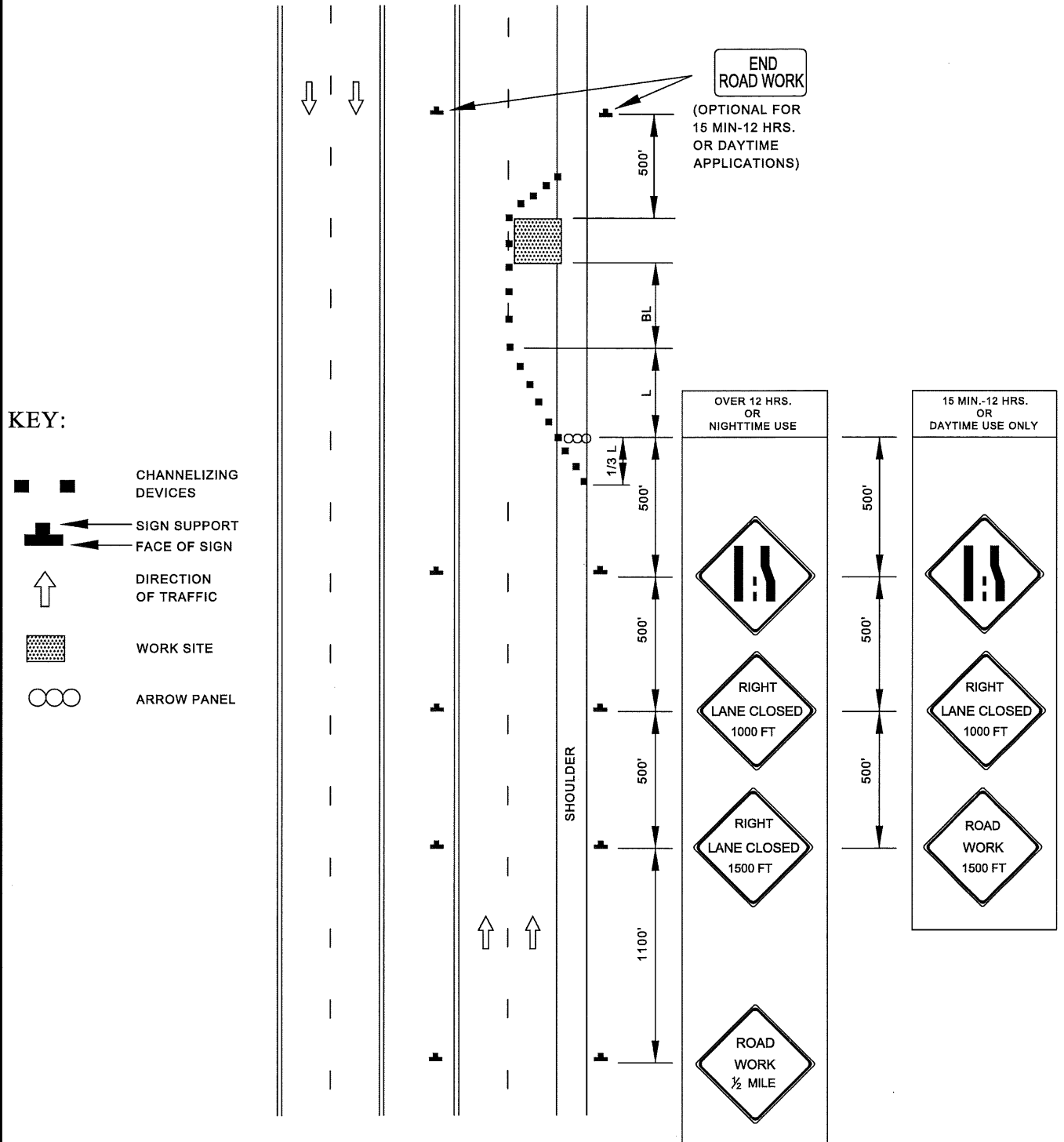
KEY:


-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  DIRECTION OF TRAFFIC
-  ARROW PANEL
-  WORK SITE

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED 8 / 2010	REVISED 	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	LEFT LANE CLOSURE / DIVIDED UNCONNECTED EQUAL / LESS THAN 40 MPH	DETAIL NO. BC 104.04-4		SCALE: NONE

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	APPROVED: <i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
RIGHT LANE CLOSURE / DIVIDED UNCONNECTED EQUAL / LESS THAN 40 MPH			DETAIL NO. BC 104.04-6		
			SCALE: NONE	SHEET 1 OF 1	







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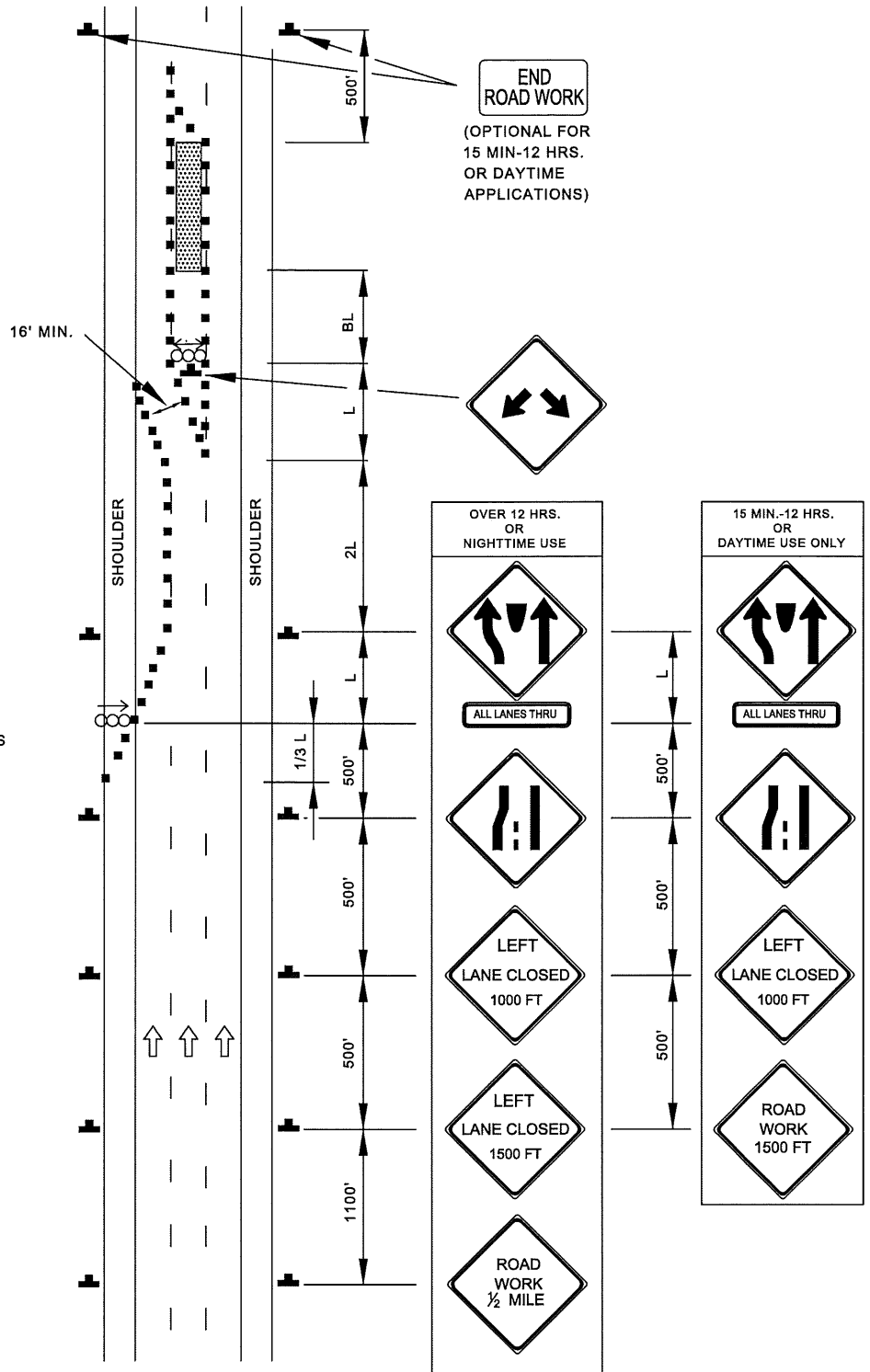
TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTE:

THIS TYPICAL APPLICATION SHOULD GENERALLY BE USED ONLY WHEN WORKERS ARE NOT PRESENT IN THE CENTER LANE. WHEN WORKERS ARE PRESENT IN THE CENTER LANE, EITHER TEMPORARY TRAFFIC BARRIER SHOULD BE USED TO CLOSE THE CENTER LANE OR A TWO LANE CLOSURE SHOULD BE USED.

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  ARROW PANEL (WITH DIRECTIONAL ARROW)



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

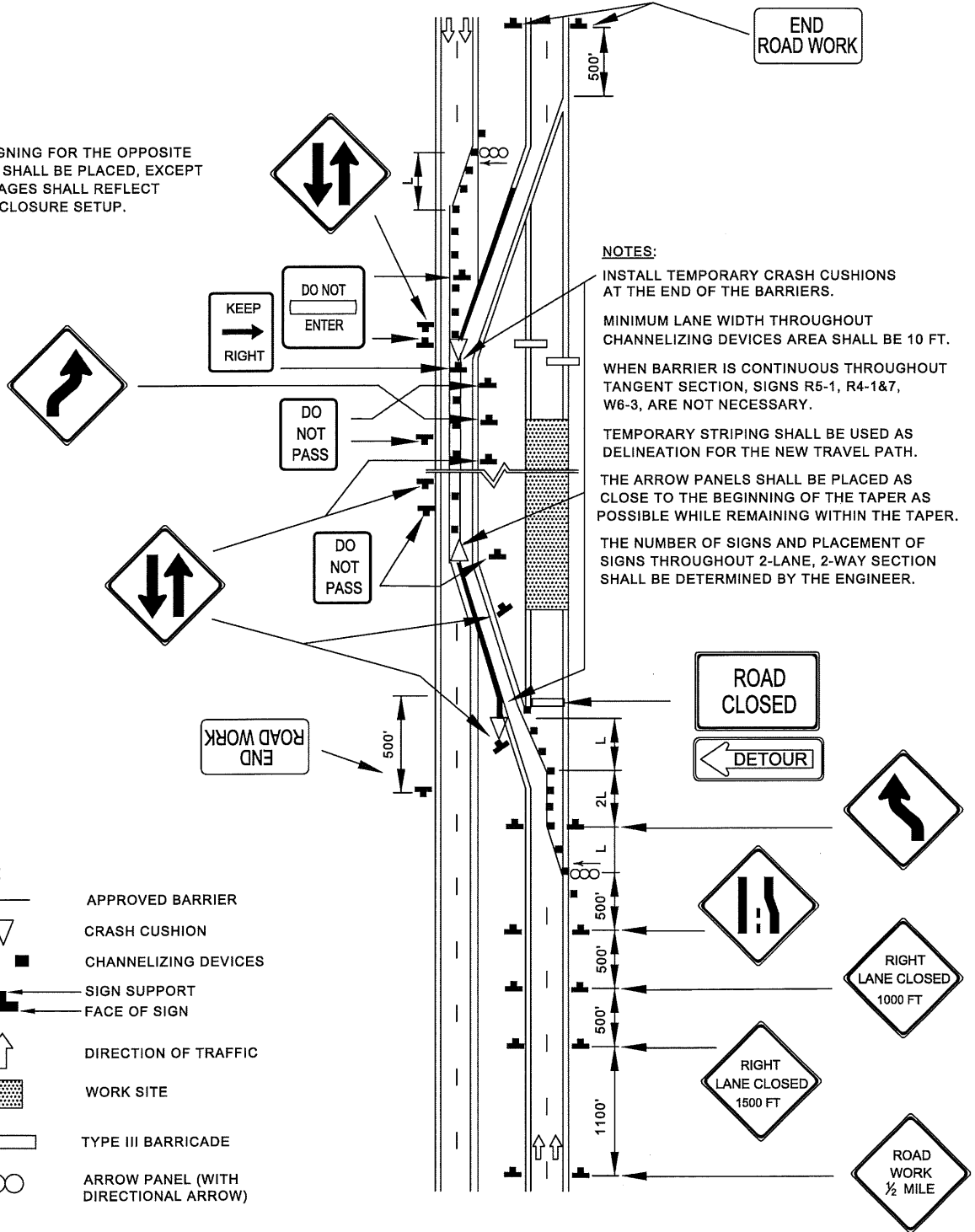
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
CENTER LANE CLOSURE / DIVIDED UNCONNECTED EQUAL / LESS THAN 40 MPH

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.04-8		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

SIMILAR SIGNING FOR THE OPPOSITE APPROACH SHALL BE PLACED, EXCEPT SIGN MESSAGES SHALL REFLECT LEFT LANE CLOSURE SETUP.



KEY:

- APPROVED BARRIER
- CRASH CUSHION
- CHANNELIZING DEVICES
- SIGN SUPPORT
- FACE OF SIGN
- DIRECTION OF TRAFFIC
- WORK SITE
- TYPE III BARRICADE
- ARROW PANEL (WITH DIRECTIONAL ARROW)



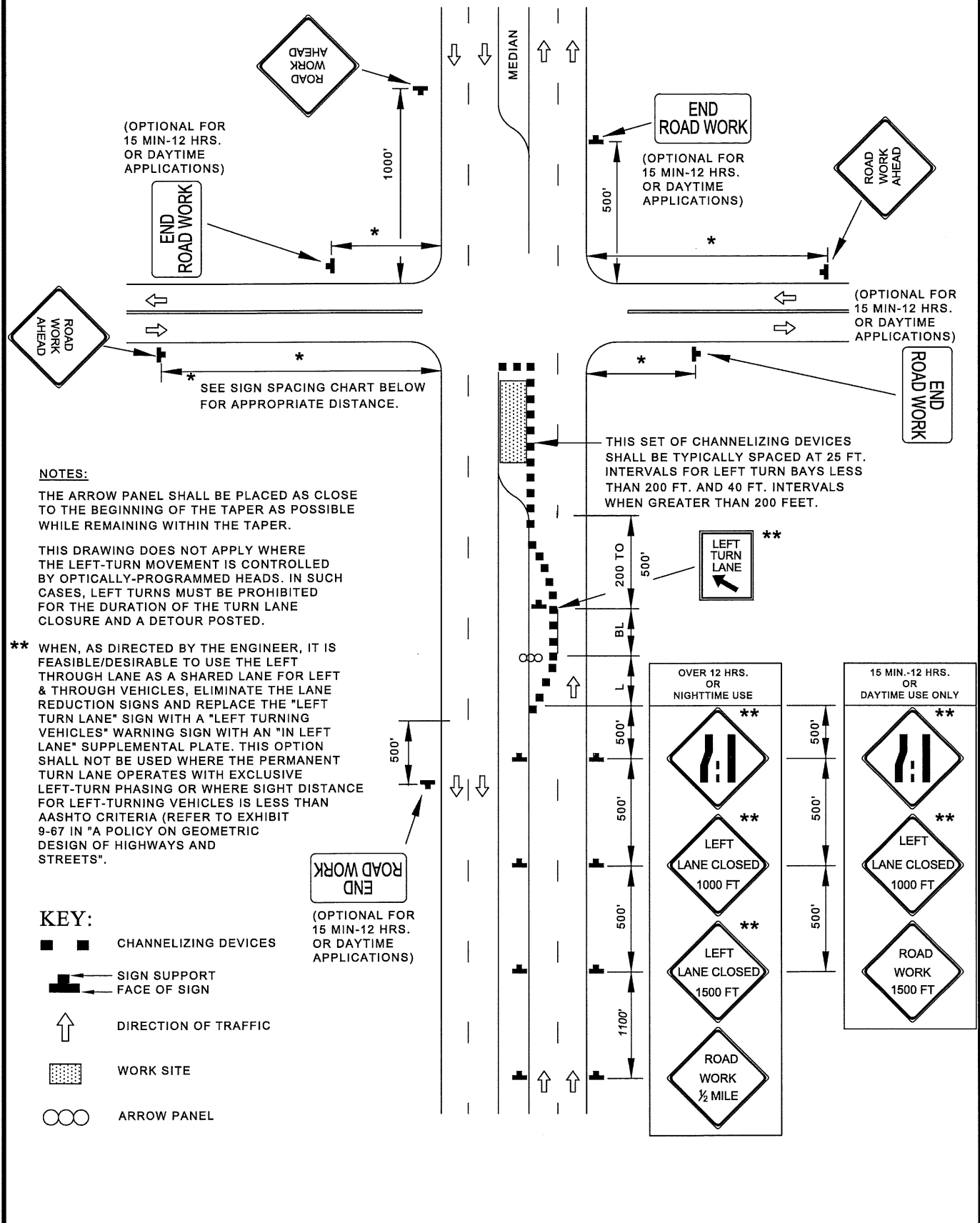
APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
ROADWAY CLOSURE / DIVIDED UNCONNECTED EQUAL / LESS THAN 40 MPH / 12 HRS. OR NIGHTTIME USE

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.04-12		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

NOTES:

THE ARROW PANEL SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE WHILE REMAINING WITHIN THE TAPER.

THIS DRAWING DOES NOT APPLY WHERE THE LEFT-TURN MOVEMENT IS CONTROLLED BY OPTICALLY-PROGRAMMED HEADS. IN SUCH CASES, LEFT TURNS MUST BE PROHIBITED FOR THE DURATION OF THE TURN LANE CLOSURE AND A DETOUR POSTED.

** WHEN, AS DIRECTED BY THE ENGINEER, IT IS FEASIBLE/DESIRABLE TO USE THE LEFT THROUGH LANE AS A SHARED LANE FOR LEFT & THROUGH VEHICLES, ELIMINATE THE LANE REDUCTION SIGNS AND REPLACE THE "LEFT TURN LANE" SIGN WITH A "LEFT TURNING VEHICLES" WARNING SIGN WITH AN "IN LEFT LANE" SUPPLEMENTAL PLATE. THIS OPTION SHALL NOT BE USED WHERE THE PERMANENT TURN LANE OPERATES WITH EXCLUSIVE LEFT-TURN PHASING OR WHERE SIGHT DISTANCE FOR LEFT-TURNING VEHICLES IS LESS THAN AASHTO CRITERIA (REFER TO EXHIBIT 9-67 IN "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS").

KEY:

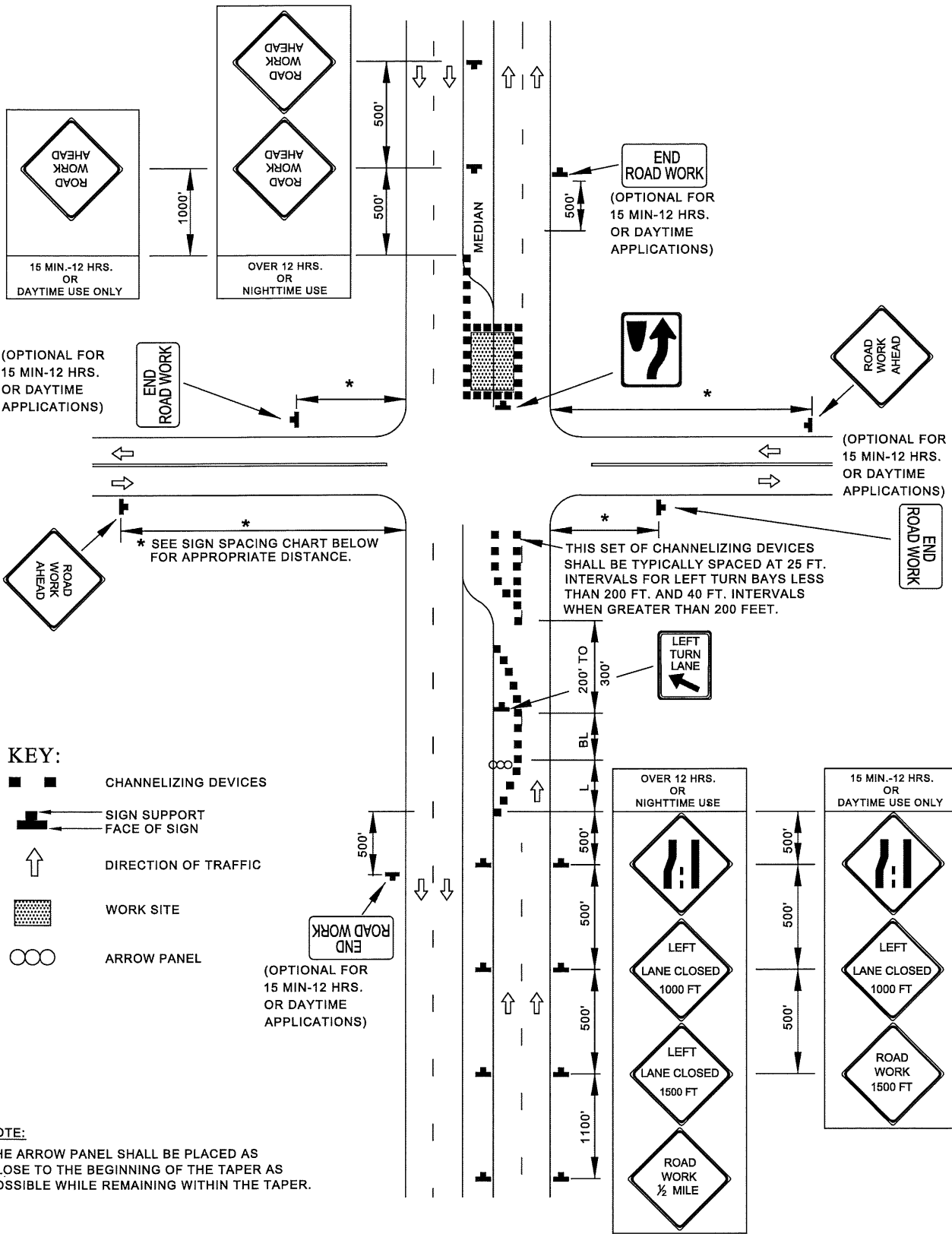
- ■ CHANNELIZING DEVICES
- ▬ SIGN SUPPORT FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE
- ARROW PANEL

(OPTIONAL FOR 15 MIN-12 HRS. OR DAYTIME APPLICATIONS)

OVER 12 HRS. OR NIGHTTIME USE	15 MIN.-12 HRS. OR DAYTIME USE ONLY

	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	APPROVED: <i>Khali Zaeed</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
LEFT TURN BAY CLOSURE / DIVIDED UNCONNECTED EQUAL / LESS THAN 40 MPH			DETAIL NO. BC 104.04-14		
			SCALE: NONE	SHEET 1 OF 1	

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

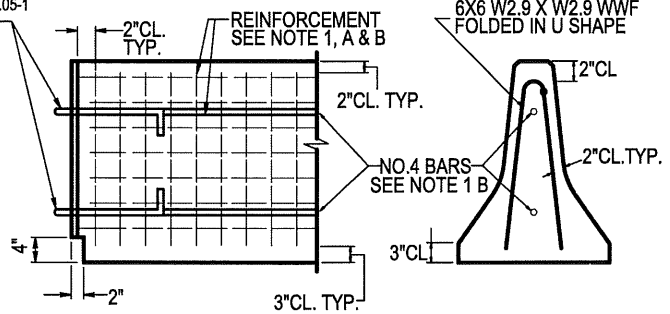
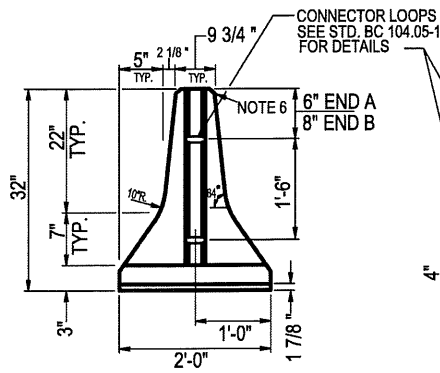
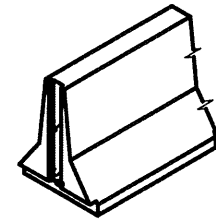
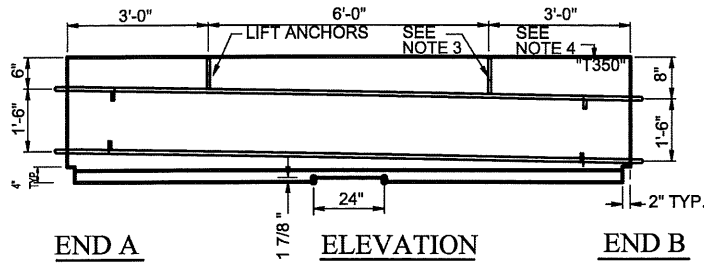
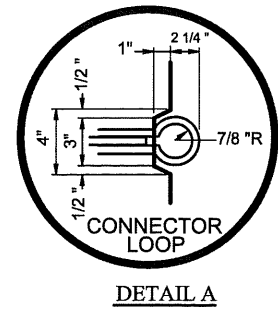
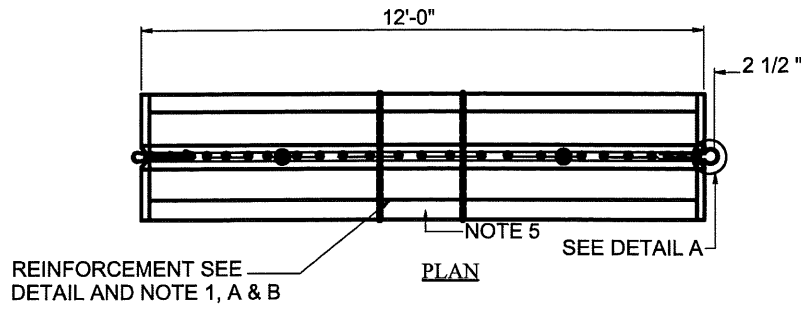


APPROVED:
Frankie Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
**INTERSECTION (LEFT LANE, TURN BAY) CLOSURE / DIVIDED
 799 UNCONNECTED
 EQUAL / LESS THAN 40 MPH**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.04-16		
SCALE: NONE	SHEET 1 OF 1	

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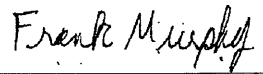
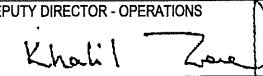


END VIEW

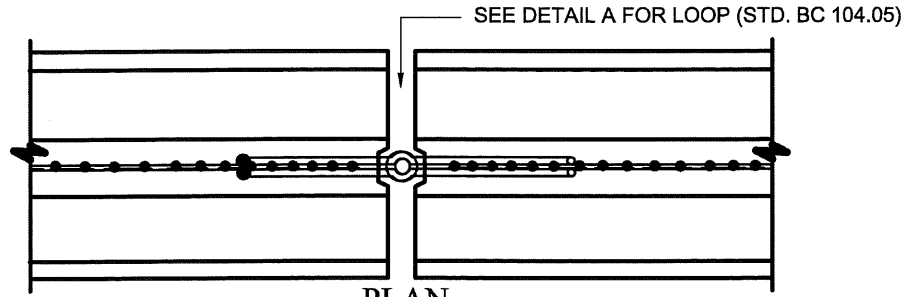
REINFORCEMENT DETAILS

NOTES

1. REINFORCEMENT: A) 6x6 W2.9 X W2.9 WELDED WIRE FABRIC FOLDED IN U SHAPE. B) 2- NO.4 1/2" Ø REINFORCEMENT BARS - GRADE 60 - EACH 11'-4" LONG.
2. CONCRETE SHALL BE MIX NO. 6 (4500 PSI).
3. 2 -SC52 - 2 TON LIFTING ANCHORS.
4. ALL BARRIERS SHALL HAVE "T350" IMPRINTED ON TOP END OF BARRIER.
5. 24" WIDE X 1 7/8" HIGH DRAIN PAN.
6. 3/4" CHAMFER ALONG TOP EDGES.
7. CONNECTOR LOOP -3/4" Ø ROD ASTM 709 GRADE 36 PLAIN SHALL CONFORM TO ASTM A 153.

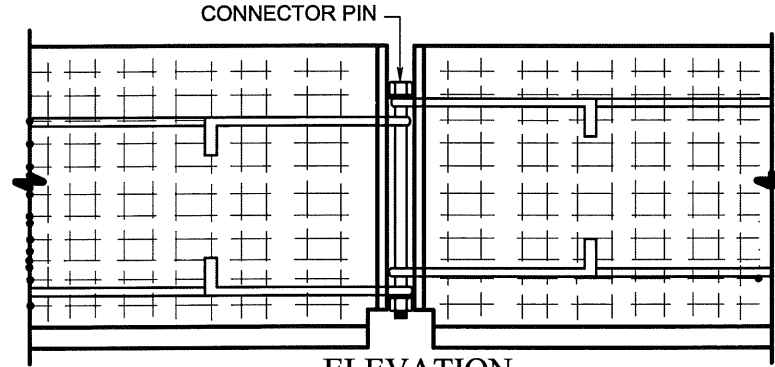
	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION PRECAST TEMPORARY 32" F SHAPE CONCRETE TRAFFIC BARRIER (PIN AND LOOP JOINT)	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 104.05		SCALE : NONE

DRAFT - NOT FOR CONSTRUCTION



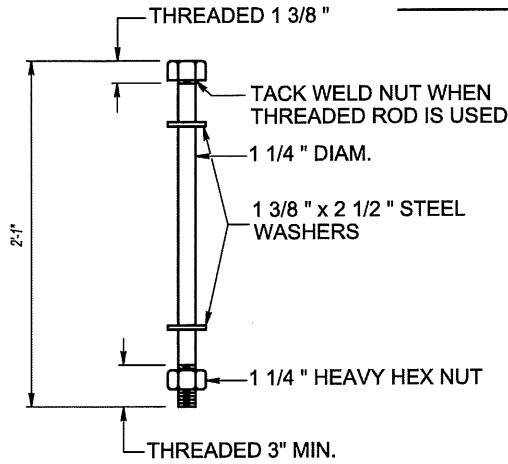
PLAN

(CONNECTOR PIN NOT SHOWN)

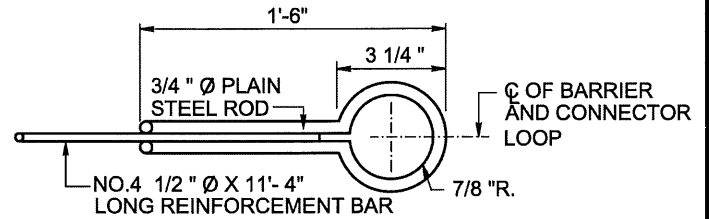


ELEVATION

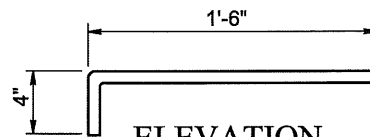
JOINT DETAILS



CONNECTOR PIN



PLAN



ELEVATION

CONNECTOR LOOP

NOTES

- 1) THE CONNECTOR PIN SHALL BE 1 1/4 " ϕ x 25" AND SHALL CONFORM TO ASTM A307, GRADE A. NUTS SHALL CONFORM TO A 563, WASHERS SHALL CONFORM TO ASTM F 436. THE CONNECTOR PIN, NUTS AND WASHERS SHALL BE PLAIN OR GALVANIZED IN ACCORDANCE WITH ASTM A 153.
- 2) CONNECTOR LOOP 3/4 " ϕ PLAIN STEEL ROD SHALL CONFORM TO ASTM A 709 GRADE 36 PLAIN OR GALVANIZED IN ACCORDANCE WITH ASTM A 153 OR STAINLESS STEEL ROD SHALL CONFORM TO ASTM A 276 FOR THE TYPE SPECIFIED.



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
**PRECAST TEMPORARY 32" F SHAPE
 CONCRETE TRAFFIC BARRIER
 (PIN AND LOOP JOINT)**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.05-1		
SCALE : NONE	SHEET 2 OF 2	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION






NOTES:

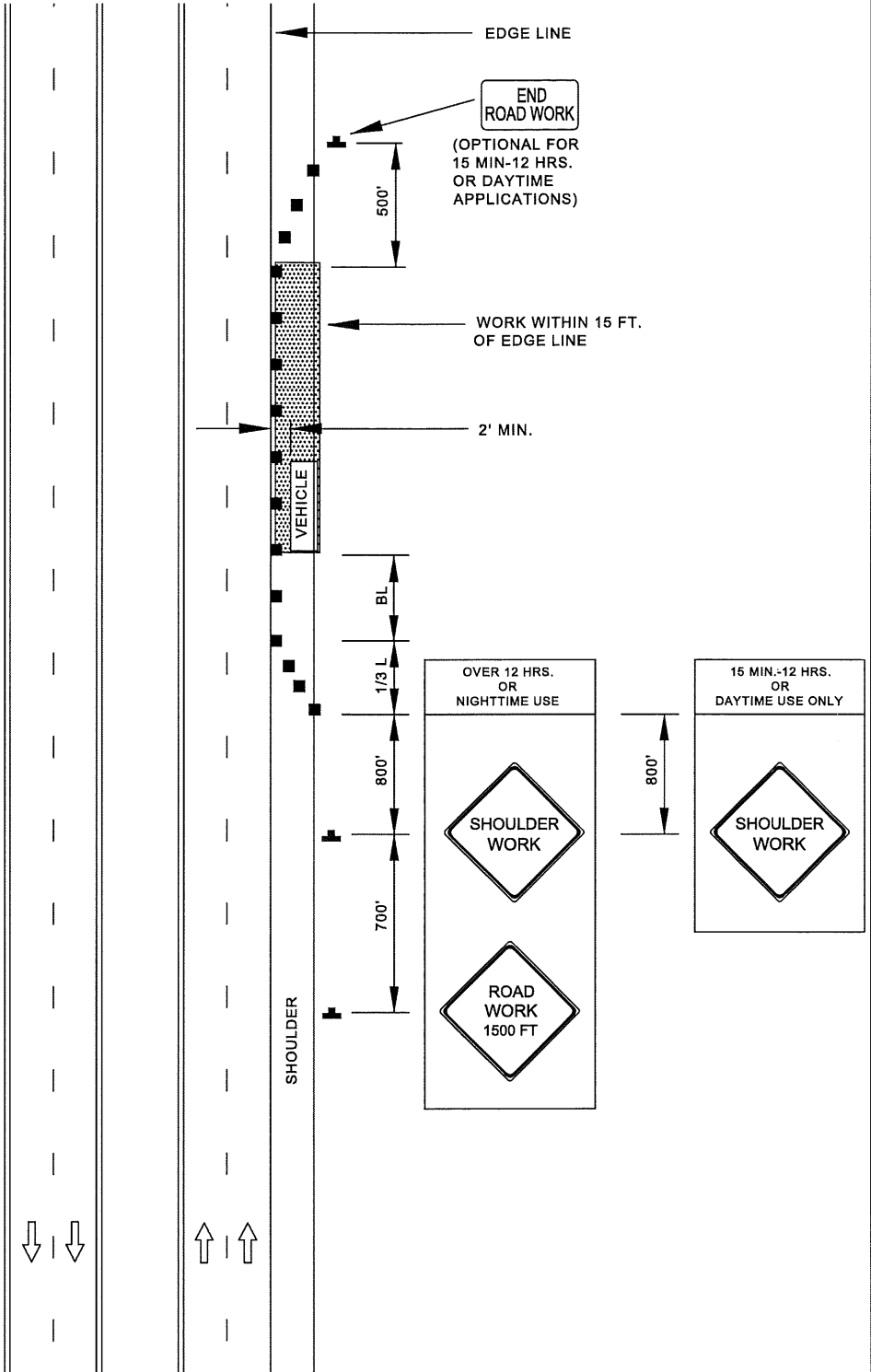
SHOULDER WORK SIGNS SHALL BE MOUNTED ON THE SIDE OF THE ROADWAY WHERE THE SHOULDER IS AFFECTED. USAGE OF SHOULDER WORK SIGNS ON THE OPPOSITE SIDE OF DIVIDED HIGHWAYS IS OPTIONAL.



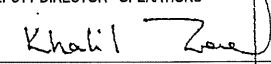
SHOULDER CLOSED SIGNS ARE REQUIRED IN PLACE OF SHOULDER WORK SIGNS WHEN THE SHOULDER IS CLOSED BY A PHYSICAL BARRIER.

WHEN WORK INVOLVES A PAVEMENT EDGE DROP-OFF, REFER TO STANDARD NO. BC-104.06-12.

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE



	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
SHOULDER WORK / EXP-FREWAY / EQUAL / LESS THAN 40 MPH 801			DETAIL NO. BC 104.05-2		
			SCALE: NONE	SHEET 1 OF 1	






DRAFT - NOT FOR CONSTRUCTION

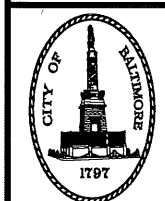
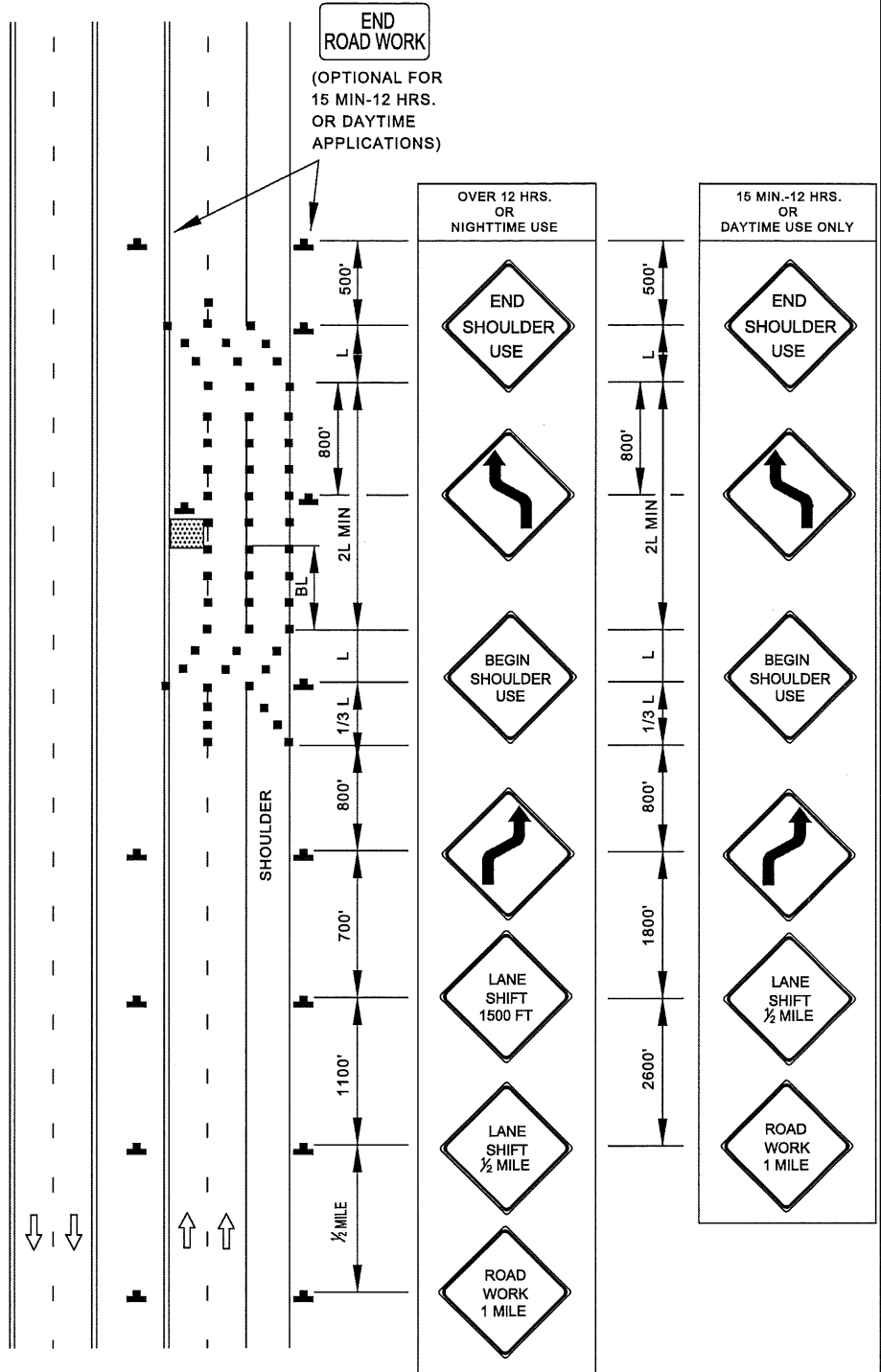
TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTES:

- THIS TYPICAL ALSO APPLIES TO DIVIDED UNCONTROLLED HIGHWAYS
- THE "BEGIN AND END SHOULDER USE" SIGNS SHOULD BE OMITTED WHEN THE SHOULDER CANNOT BE DIFFERENTIATED FROM THE NORMAL TRAVEL PATH.
- THIS TYPICAL SHALL BE USED FOR ANY LANE SHIFT WHERE PREVAILING SPEEDS CANNOT BE MAINTAINED THROUGH THE SHIFT.
- FOR LANE SHIFTS WHICH DO NOT SATISFY ABOVE CONDITIONS:
 - ▶ DELETE "REVERSE CURVE" WARNING SIGNS, AND
 - ▶ REPLACE "LANE SHIFT" SIGNS WITH "ROAD WORK XXX" SIGNS OR OTHER APPROPRIATE SIGNS AS SHOWN IN TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS.

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE



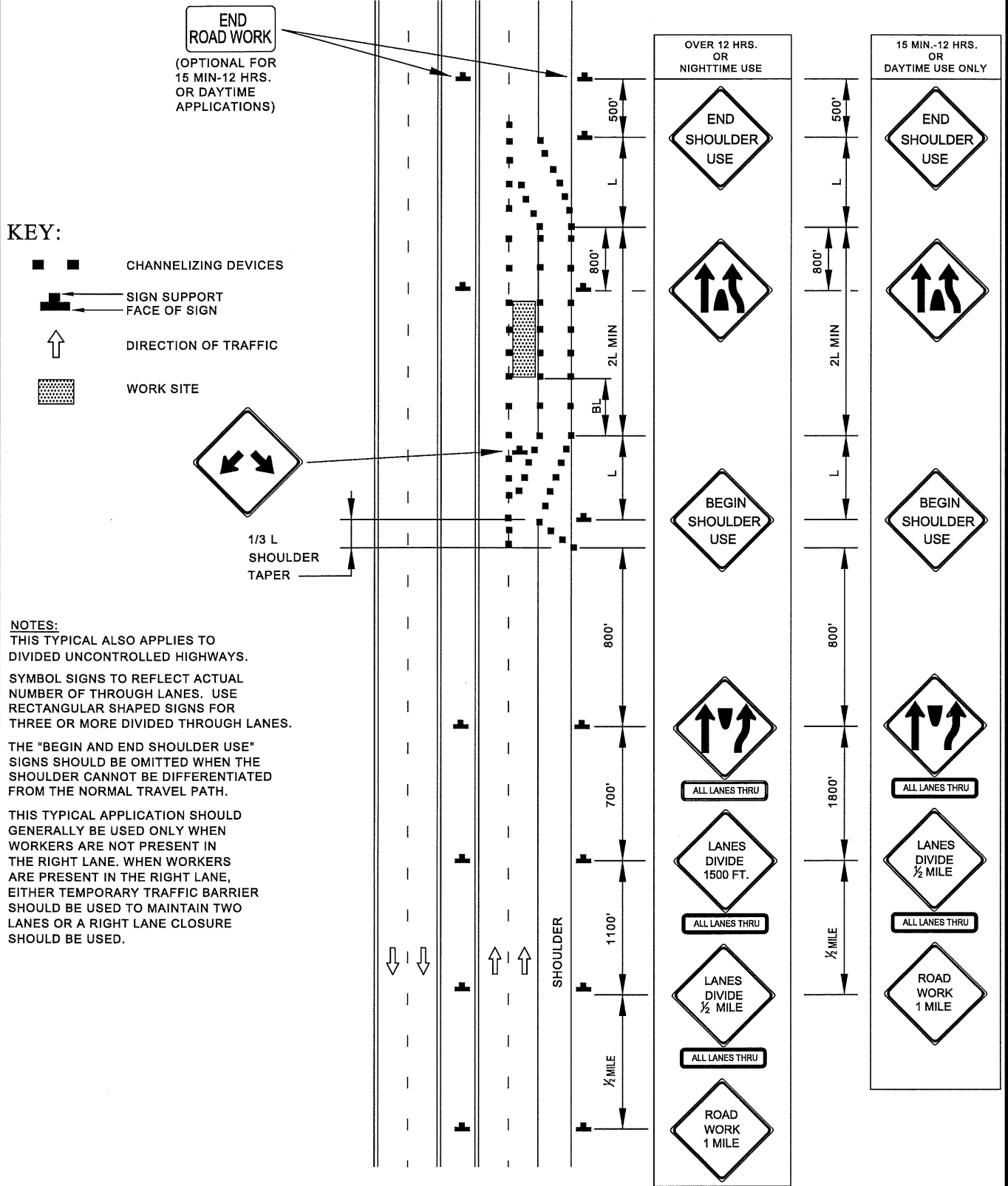
APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
 ROADWAY SHIFT / EXP-FREEWAY /
 GREATER THAN 40 MPH
 802

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.05-3		
SCALE: NONE	SHEET 1 OF 1	

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

LANES DIVIDE / EXP-FREEWAY /
GREATER THAN 40 MPH
 803

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.05-4		
SCALE : NONE	SHEET 1 OF 1	

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

NOTES:
 THIS TYPICAL ALSO APPLIES TO DIVIDED UNCONTROLLED HIGHWAYS,
 SYMBOL SIGNS TO REFLECT ACTUAL NUMBER OF THROUGH LANES.

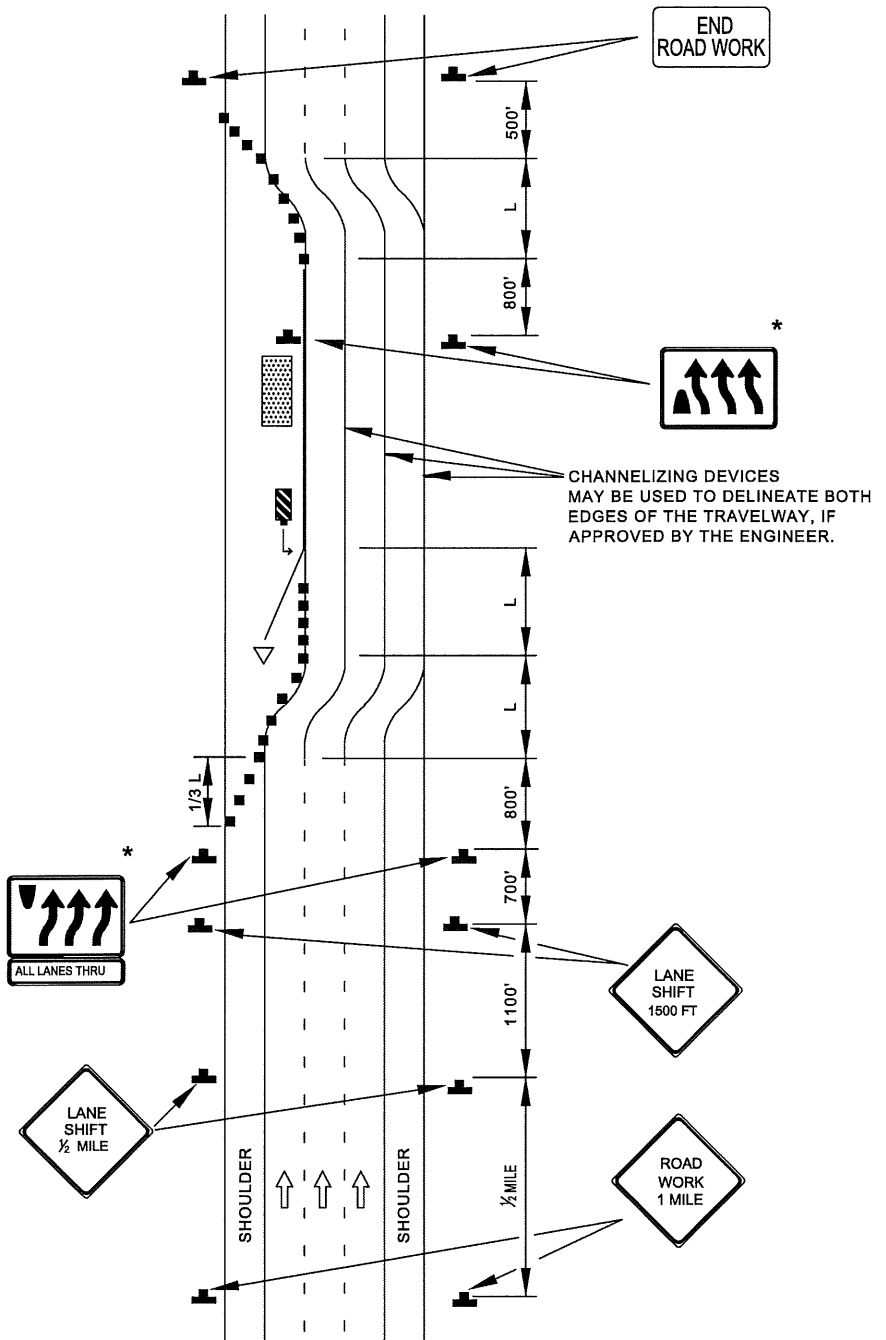
* WHEN LANES WILL NOT BE DIVIDED IN SUBSEQUENT WORK PHASES, USE THE W 1-4(R/L) SIGNS IN LIEU OF SIGNS SHOWN WITH ASTERISK (*).

THIS TYPICAL SHALL BE USED FOR ANY LANE SHIFT WHERE PREVAILING SPEEDS CANNOT BE MAINTAINED THROUGH THE SHIFT.

○ FOR LANE SHIFTS WHICH DO NOT SATISFY ABOVE CONDITIONS:

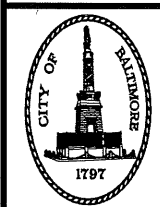
▶ DELETE "REVERSE CURVE" WARNING SIGNS, AND

▶ REPLACE "LANE SHIFT" SIGNS WITH "ROAD WORK XXX" SIGNS OR OTHER APPROPRIATE SIGNS AS SHOWN IN TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS.



KEY:

- APPROVED BARRIER
- CRASH CUSHIONS
- CHANNELIZING DEVICES
- SIGN SUPPORT
- FACE OF SIGN
- DIRECTION OF TRAFFIC
- WORK SITE
- OBJECT MARKER



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION










**LANES SHIFT / EXP-FREEWAY /
 GREATER THAN 40 MPH / OVER
 12 HRS. OR NIGHTTIME USE**

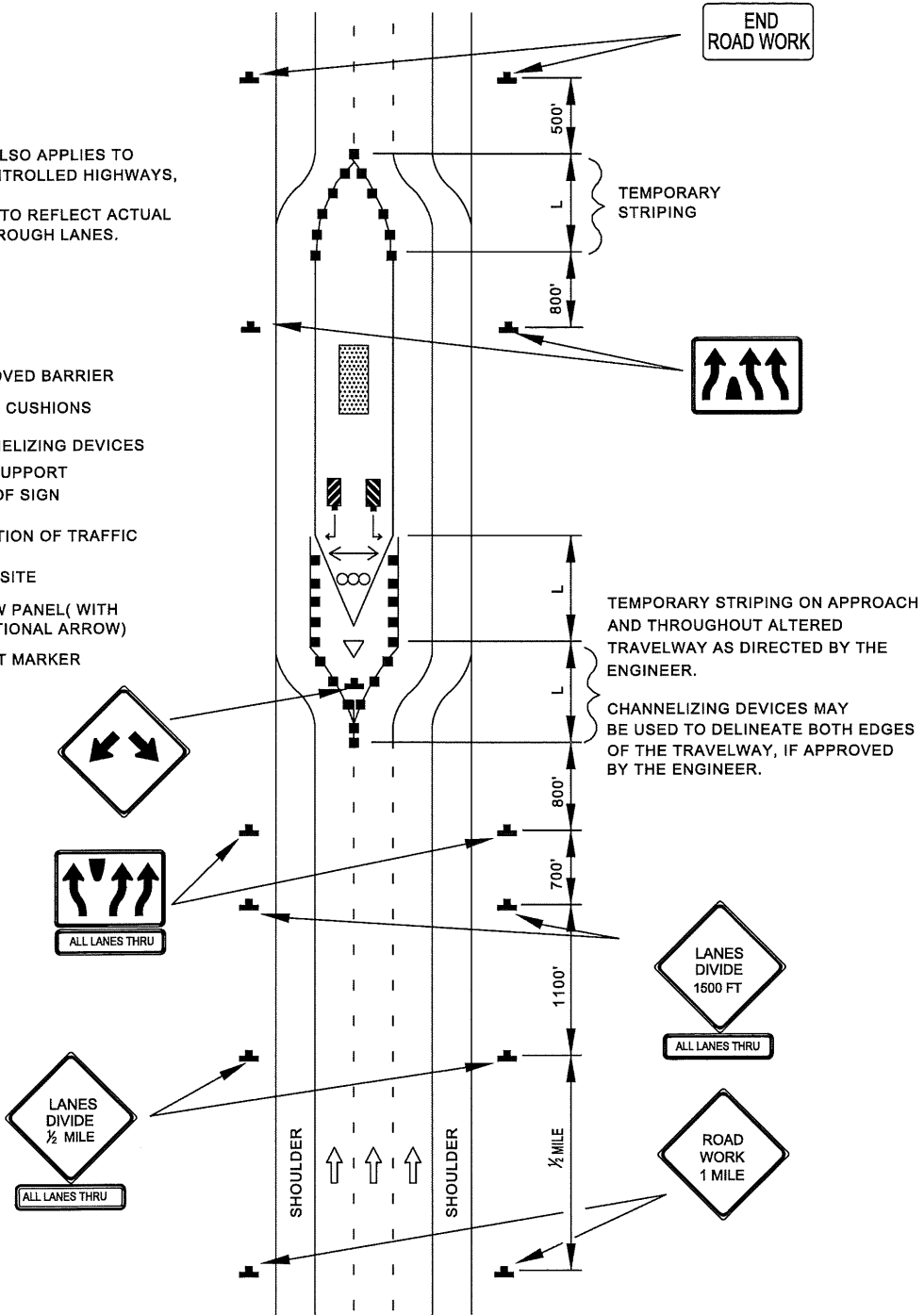
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.05-5		
SCALE: NONE	SHEET 1 OF 1	

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION


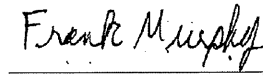
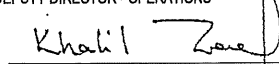
NOTES:
 THIS TYPICAL ALSO APPLIES TO
 DIVIDED UNCONTROLLED HIGHWAYS.
 SYMBOL SIGNS TO REFLECT ACTUAL
 NUMBER OF THROUGH LANES.

KEY:

-  APPROVED BARRIER
-  CRASH CUSHIONS
-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  ARROW PANEL (WITH DIRECTIONAL ARROW)
-  OBJECT MARKER









TEMPORARY STRIPING ON APPROACH AND THROUGHOUT ALTERED TRAVELWAY AS DIRECTED BY THE ENGINEER.
 CHANNELIZING DEVICES MAY BE USED TO DELINEATE BOTH EDGES OF THE TRAVELWAY, IF APPROVED BY THE ENGINEER.

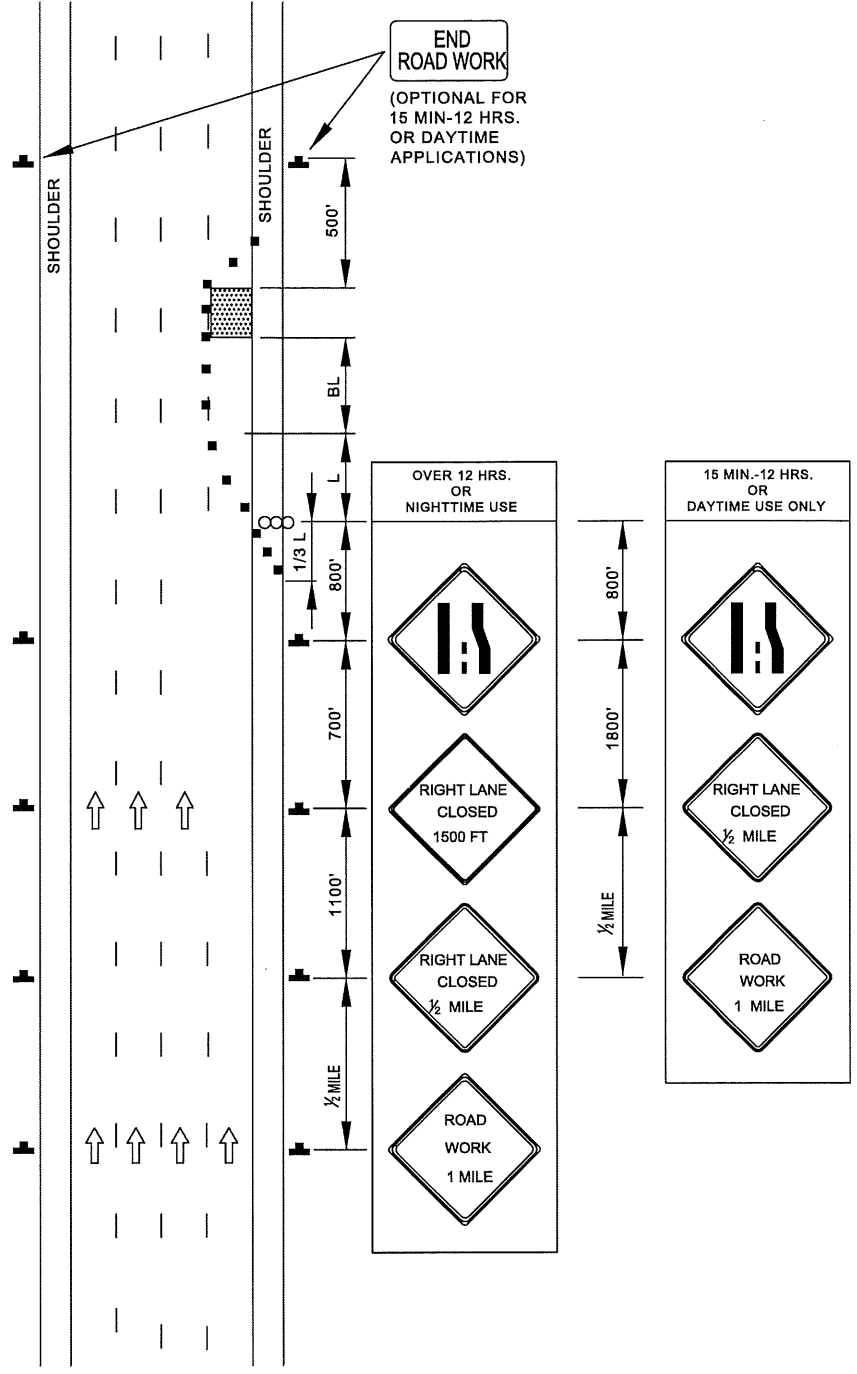
	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
LANES DIVIDE / EXP-FREEWAY / GREATER THAN 40 MPH / OVER 12 HRS. OR NIGHTTIME USE			DETAIL NO. BC 104.05-6		
			SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

KEY:

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  ARROW PANEL



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

RIGHT LANE CLOSURE /
EXP-FREEWAY
GREATER THAN 40 MPH

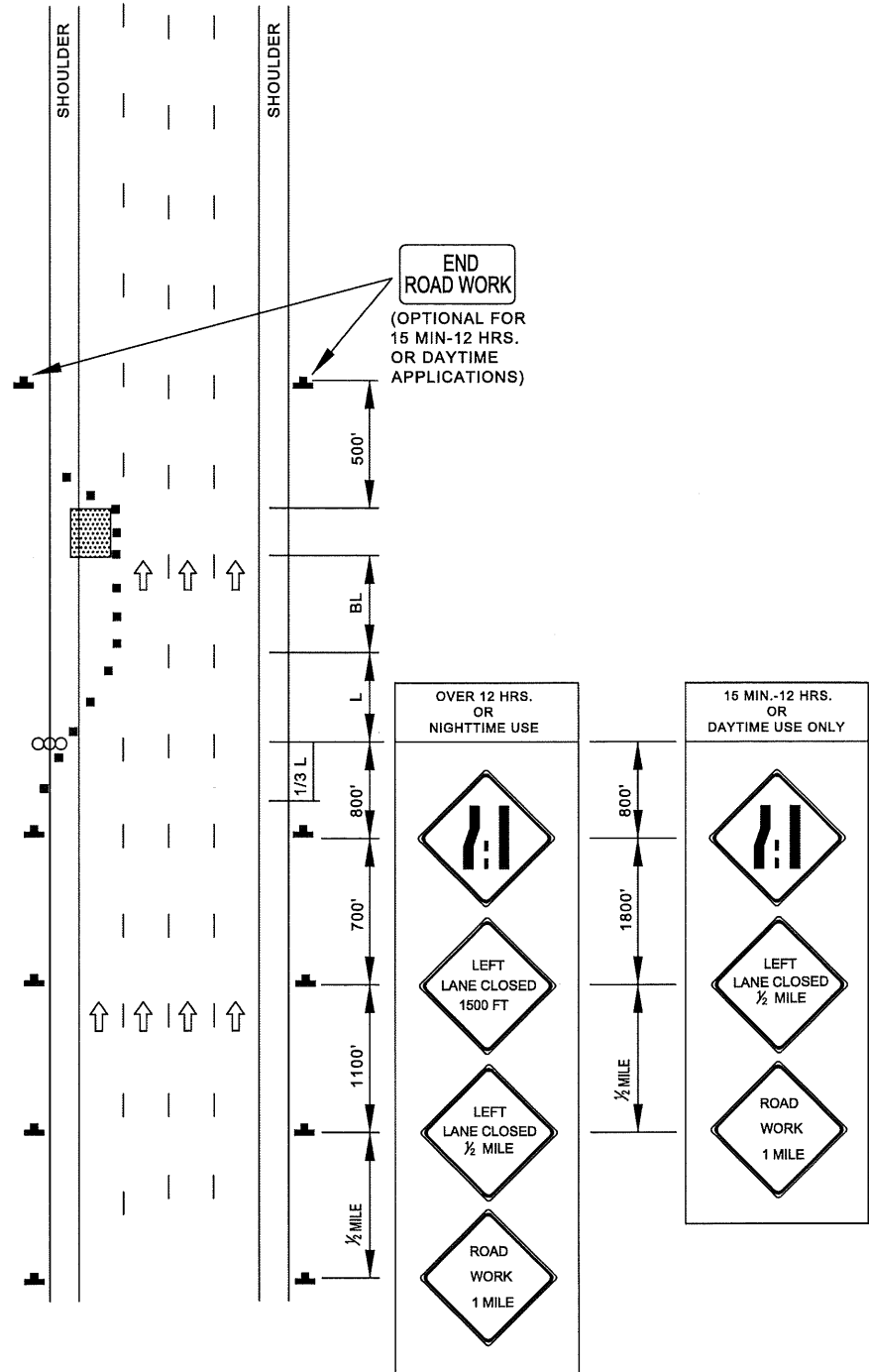
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.05-7		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

KEY:

- CHANNELIZING DEVICES
- SIGN SUPPORT
- FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE
- ○ ○ ARROW PANEL



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

**LEFT LANE CLOSURE /
 EXP-FREWAY
 GREATER THAN 40 MPH**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.05-8		
SCALE : NONE	SHEET 1 OF 1	

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

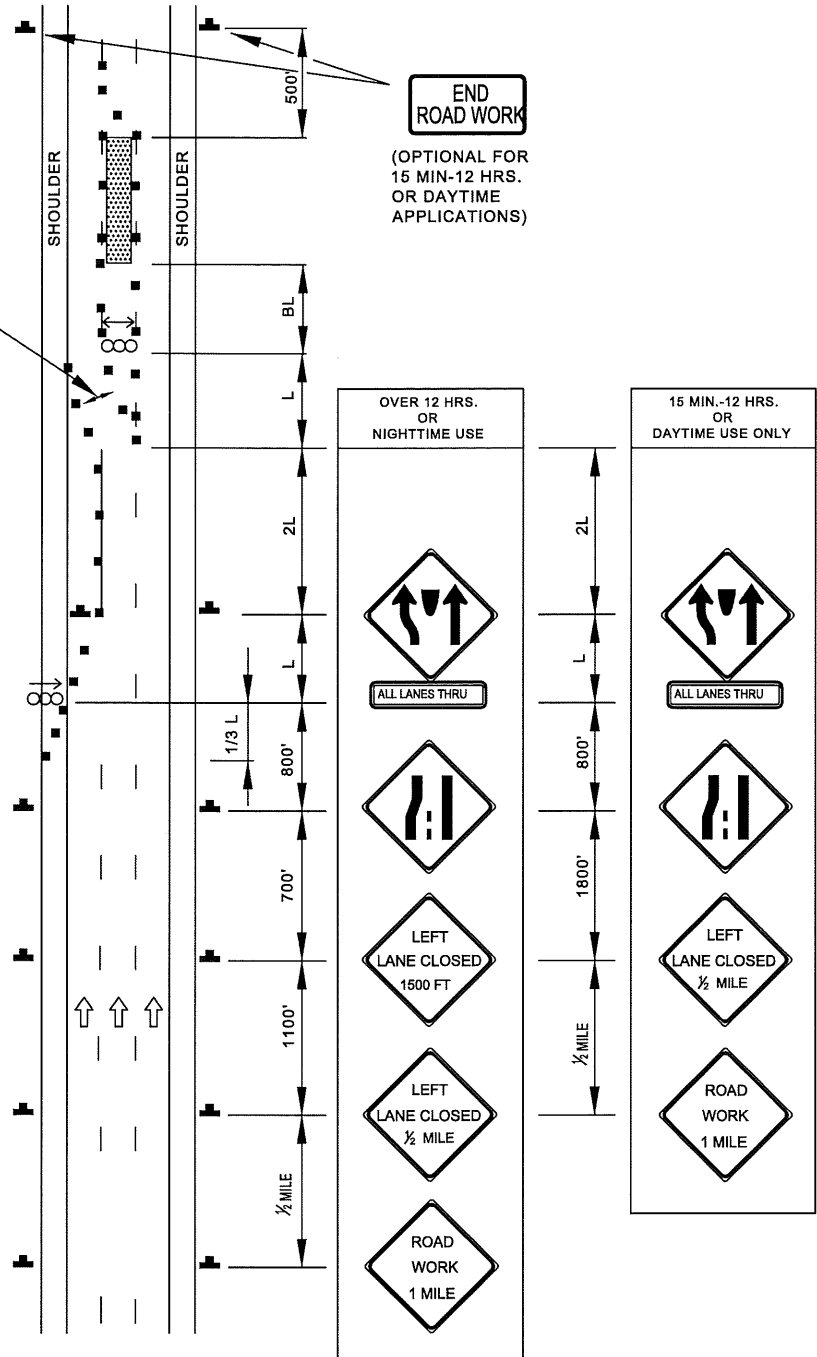
NOTE:


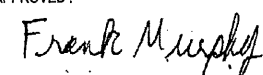
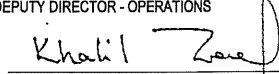
THIS TYPICAL APPLICATION SHOULD GENERALLY BE USED ONLY WHEN WORKERS ARE NOT PRESENT IN THE CENTER LANE. WHEN WORKERS ARE PRESENT IN THE CENTER LANE, EITHER TEMPORARY TRAFFIC BARRIER SHOULD BE USED TO CLOSE THE CENTER LANE OR A TWO-LANE CLOSURE SHOULD BE USED.

KEY:

- ■ CHANNELIZING DEVICES
- ← SIGN SUPPORT
← FACE OF SIGN
- ↑ DIRECTION OF TRAFFIC
- ▨ WORK SITE
- ○ ○ ARROW PANEL (WITH DIRECTIONAL ARROW)

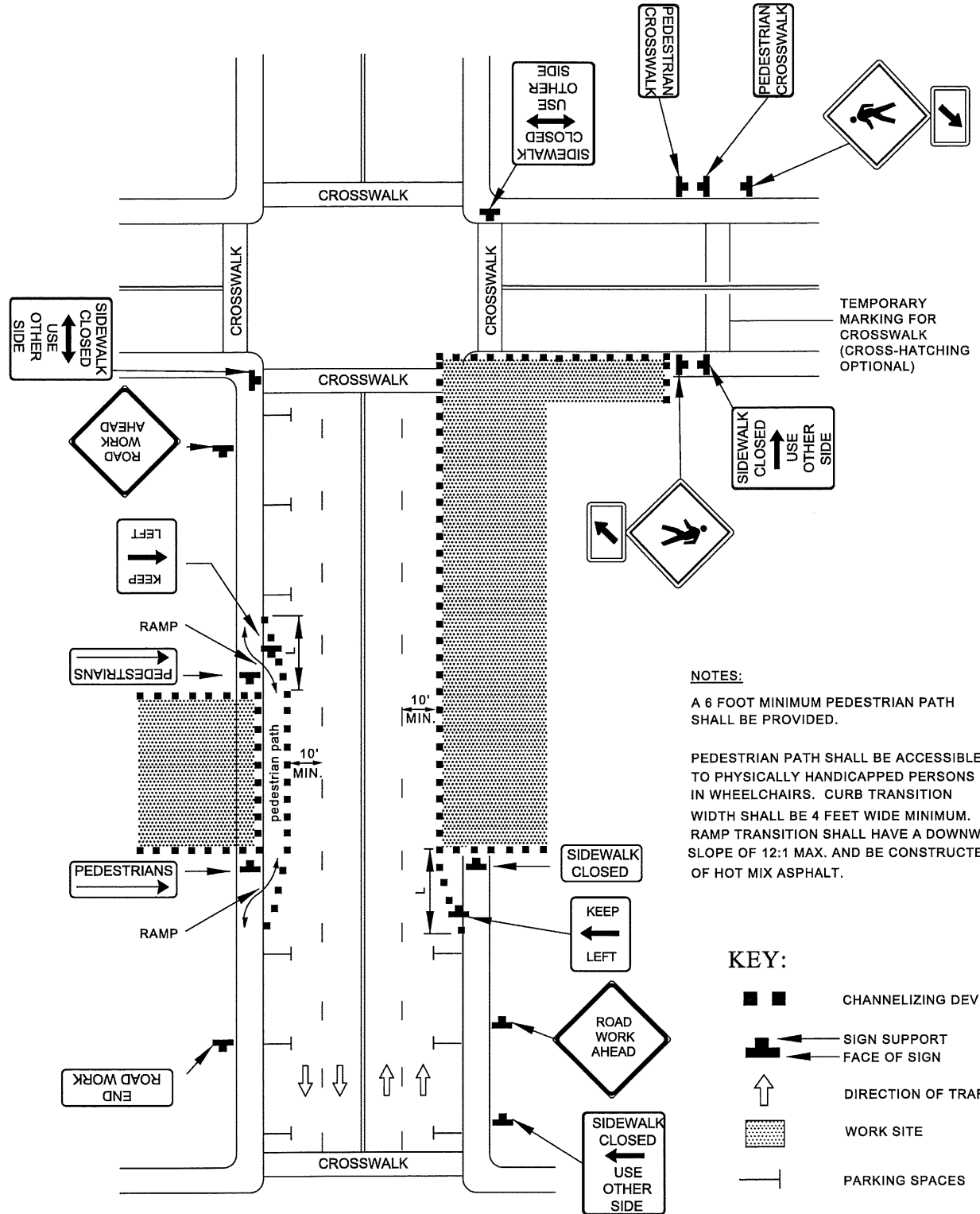
16' MIN.



	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	CENTER LANE CLOSURE / EXP-FREEWAY GREATER THAN 40 MPH	DETAIL NO. BC 104.05-10		SCALE : NONE SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



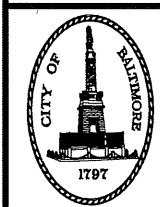
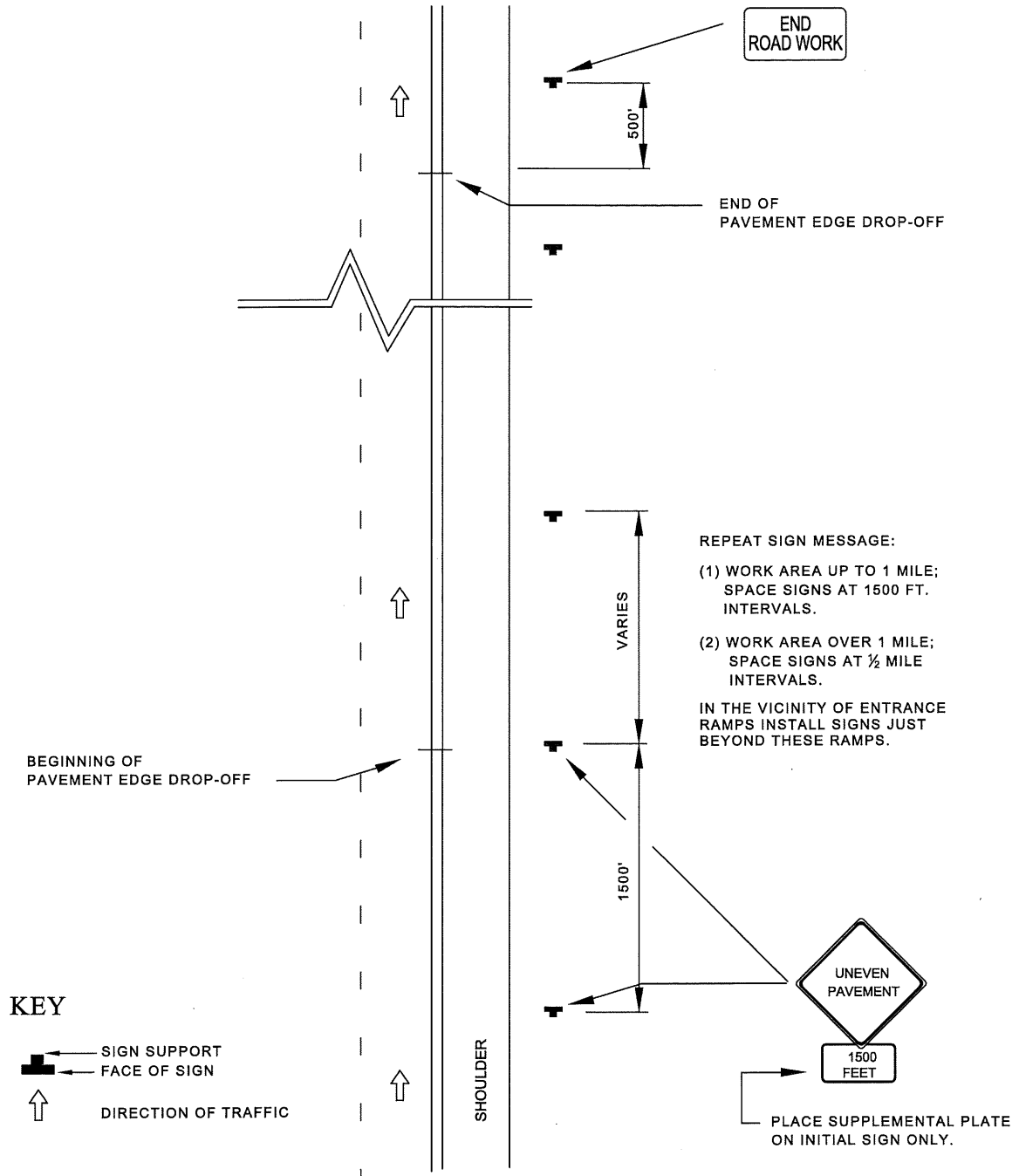
APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
PEDESTRIAN AND CURB LANE CONTROL / MULTILANE UNDIVIDED ALL SPEEDS / OVER 12 HRS. OR 809NIGHTTIME USE

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.06-5		
SCALE: NONE	SHEET 1 OF 1	

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TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zaeed
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

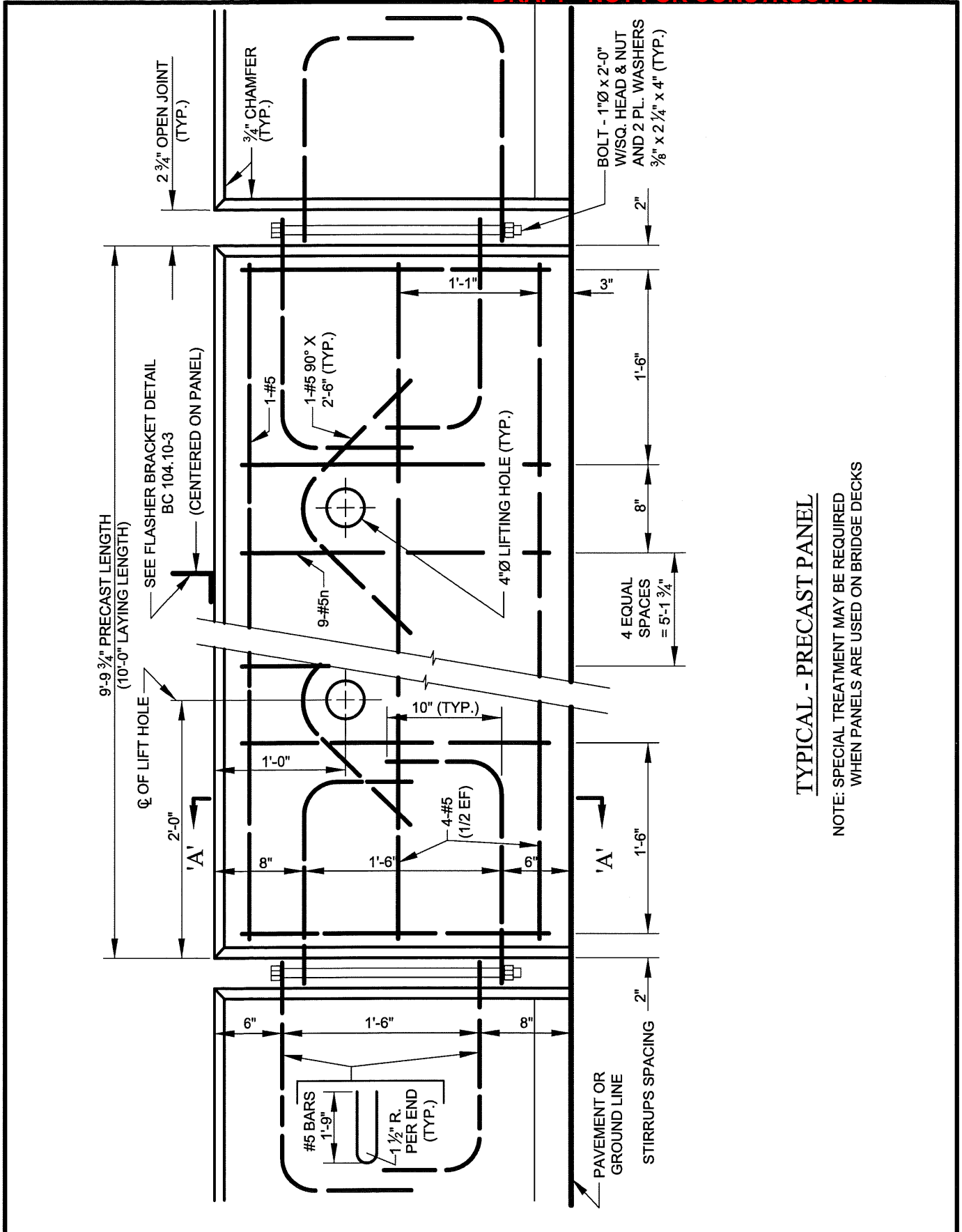
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

PAVEMENT EDGE DROP-OFF 2.5 INCHES OR LESS (BETWEEN TRAFFIC LANES AND SHOULDER)

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.06-12		
SCALE: NONE	SHEET 1 OF 1	


810

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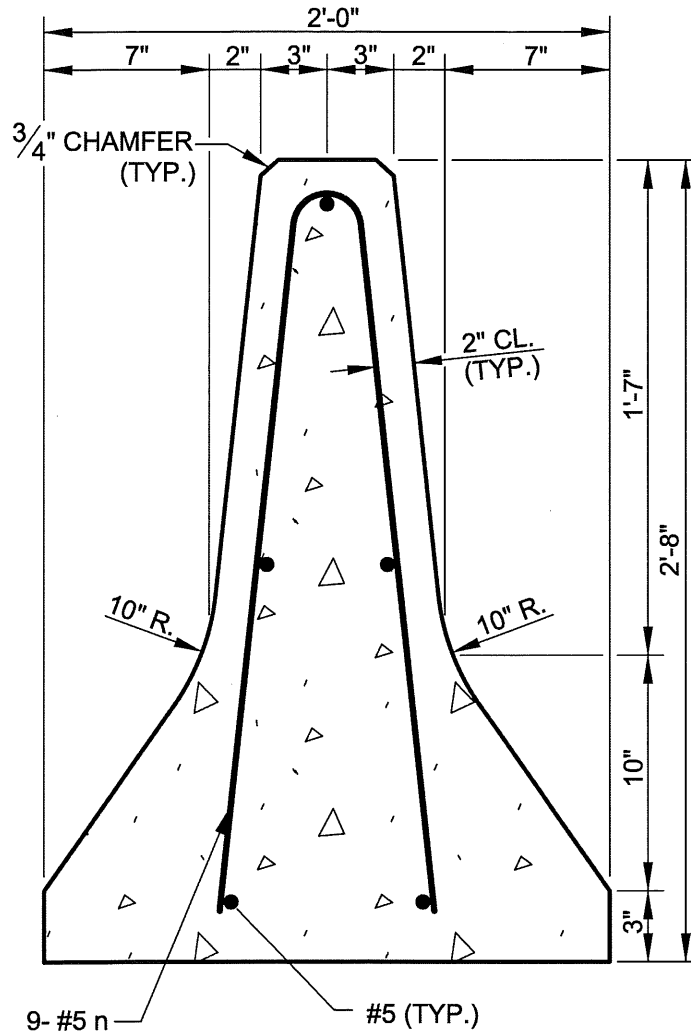


TYPICAL - PRECAST PANEL


NOTE: SPECIAL TREATMENT MAY BE REQUIRED WHEN PANELS ARE USED ON BRIDGE DECKS

	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION PRECAST CONCRETE BARRIER (TYPICAL PANEL) 812 811	ISSUED	REVISED	REVISED
	<i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 104.10-1		
			SCALE: NONE	SHEET 1 OF 3	

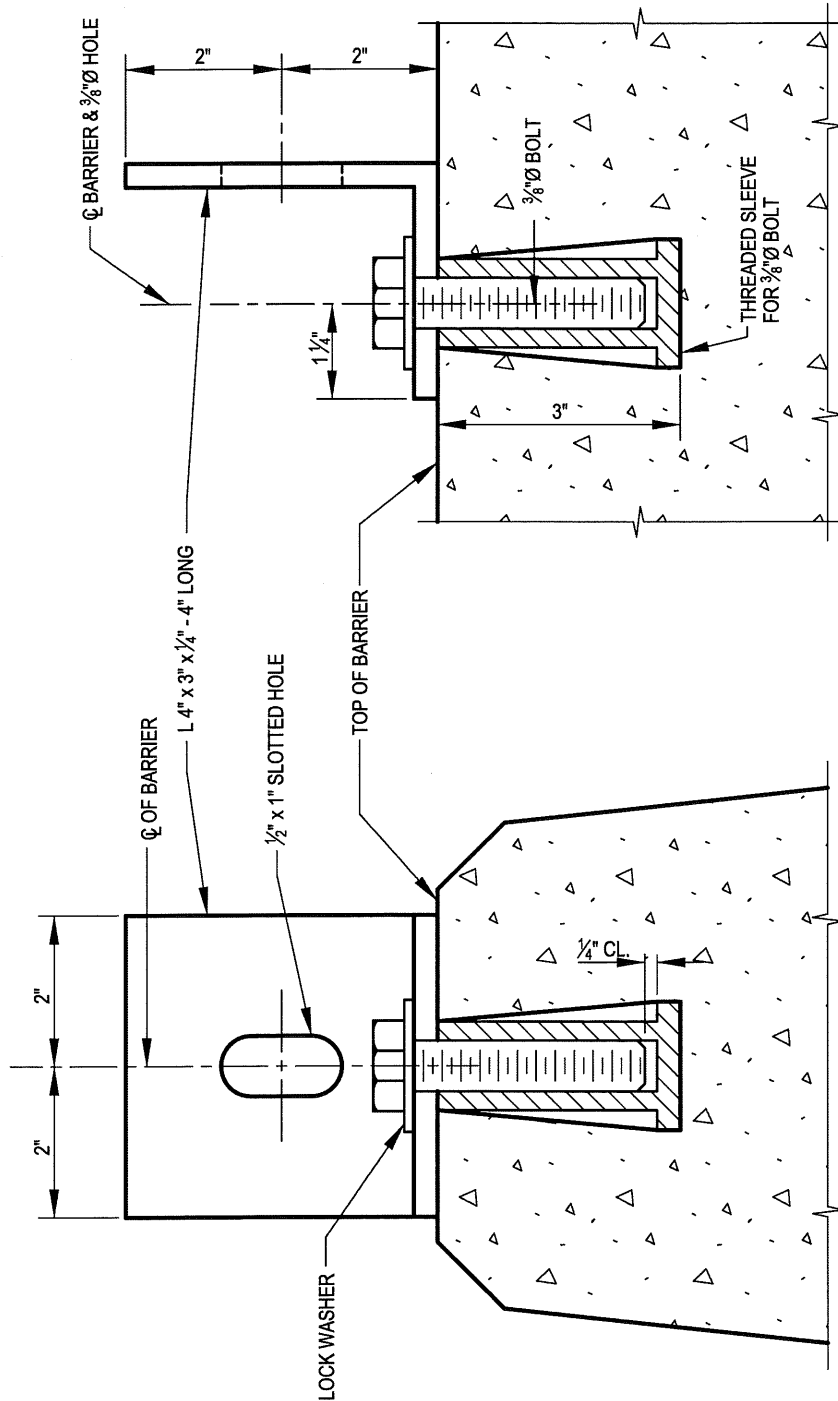
DRAFT - NOT FOR CONSTRUCTION



SECTION A-A
(SEE BC 104.10 - 1 of 3)

	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION PRECAST CONCRETE BARRIER (SECTION A-A) 813 812	ISSUED	REVISED	REVISED
	<i>Khalil Zane</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 104.10-2		
			SCALE: NONE	SHEET 2 OF 3	

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FLASHER BRACKET DETAILS

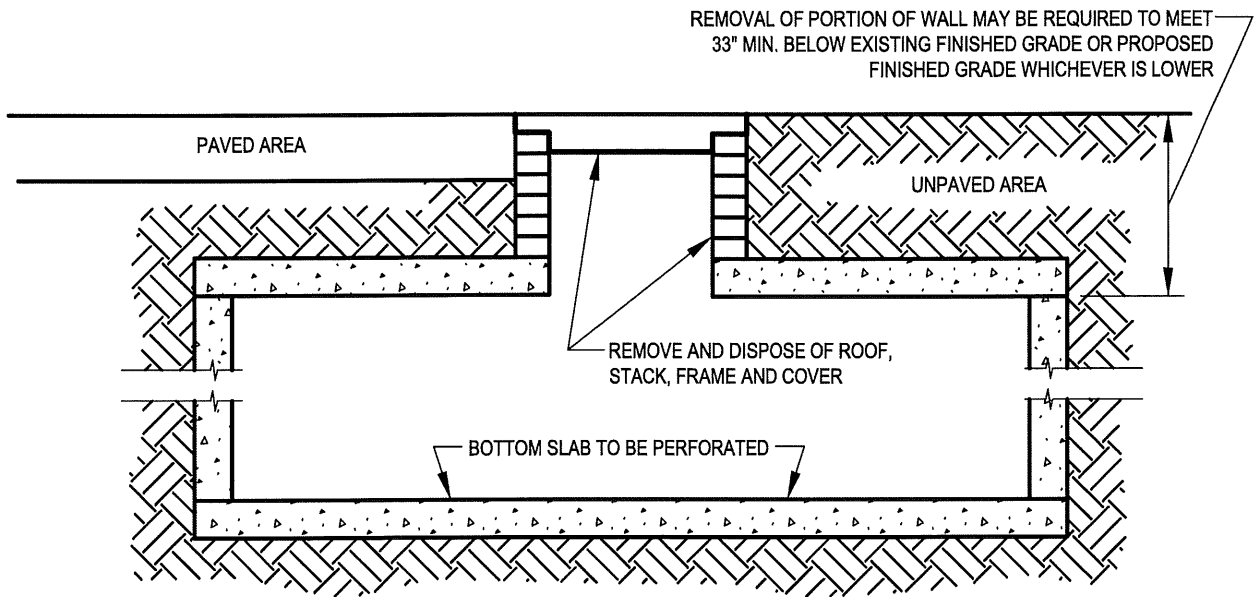


APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION


CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
**PRECAST CONCRETE BARRIER
 FLASHER BRACKET DETAILS**
 813

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 104.10-3		
SCALE: NONE		SHEET 3 OF 3

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NOTE:
 ABANDONED MANHOLES, INLETS, AND/ OR VAULTS
 SHALL BE BACKFILLED AND PAVED IN ACCORDANCE
 WITH STANDARD PLATES NO. BC 576.18, BC 576.19,
 AND BC 576.20

	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED	
	<i>Khalil Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010			
	TREATMENT FOR ABANDONED MANHOLES 814		DETAIL NO. BC 105.01			SCALE: NONE

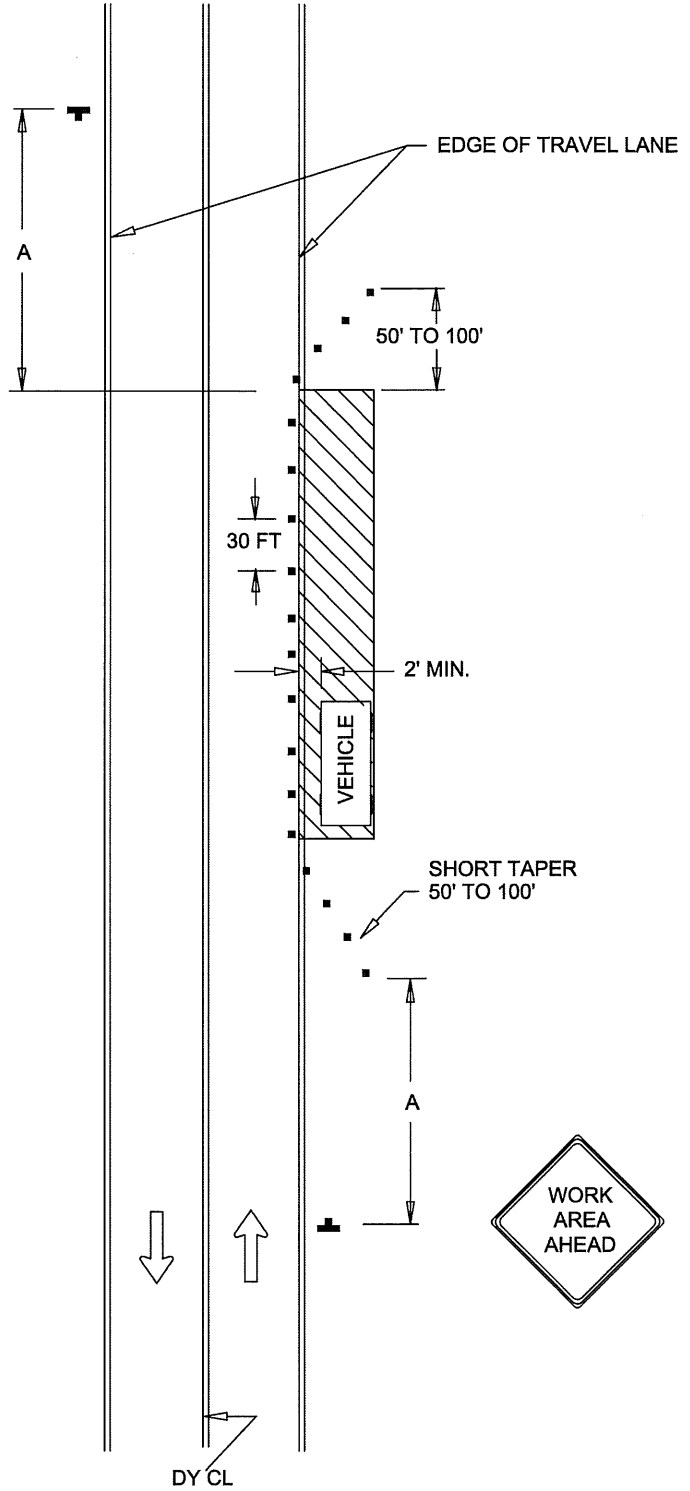
DRAFT - NOT FOR CONSTRUCTION

NOTED

REFER TO BC 104.01-4 FOR SIGN
 SPACING, TAPER AND BUFFER
 LENGTHS

ALL WORK ACTIVITY TO BE OFF THE
 TRAVELED PORTION OF ROADWAY

THE WORK AREA AHEAD SIGN
 SHOULD BE REPLACED WITH
 SHOULDER WORK SIGN FOR
 WORK SITE LOCATIONS ON
 THE SHOULDER



LEGEND

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- CHANNELIZING DEVICES



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zaeed
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

**TRAFFIC CONTROL FOR
 WORK ACTIVITY
 OFF THE ROAD**

816
815

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 111.01		
SCALE: NONE		SHEET 1 OF 1

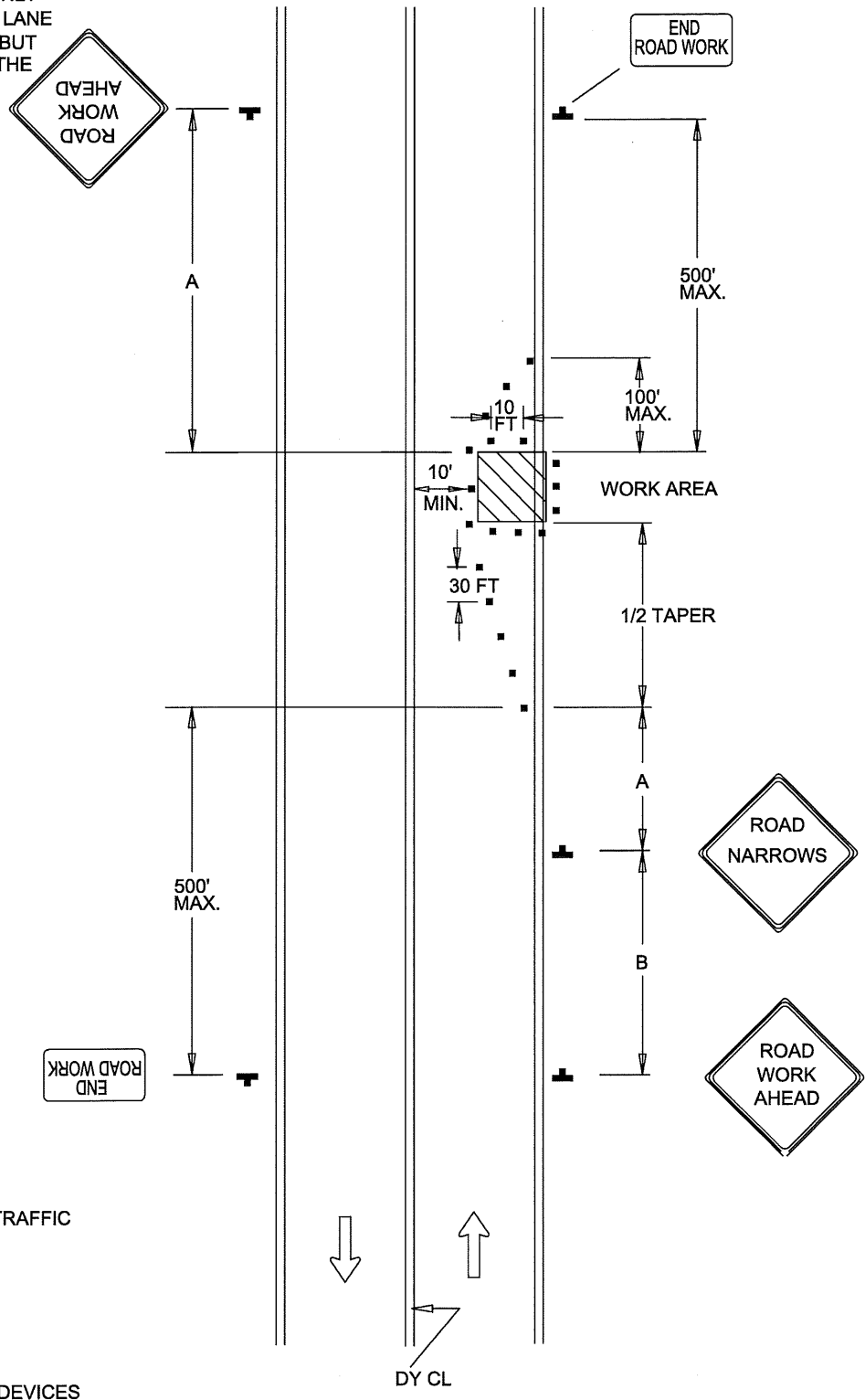
DRAFT - NOT FOR CONSTRUCTION

NOTED

REFER TO BC 104.01-4 FOR SIGN SPACING, TAPER AND BUFFER LENGTHS

THIS FIGURE SHOULD BE USED WHERE PARKING AREAS ADJACENT TO TRAVEL LANES ARE CLOSED.

THIS FIGURE APPLIES ONLY TO SITUATIONS WHERE LANE WIDTHS ARE REDUCED BUT NOT SHIFTED ACROSS THE EXISTING CENTERLINE.



NOTED

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- CHANNELIZING DEVICES



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
**TRAFFIC CONTROL FOR PARTIAL
 817 LANE CLOSURE**
 816

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 112.01		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

NOTES

REFER TO BC 104.01-4 FOR SIGN
 SPACING, TAPER AND BUFFER LENGTHS

ACCESS POINTS WITHIN LANE CLOSURE
 SHALL BE CONTROLLED BY FLAGGER(S)

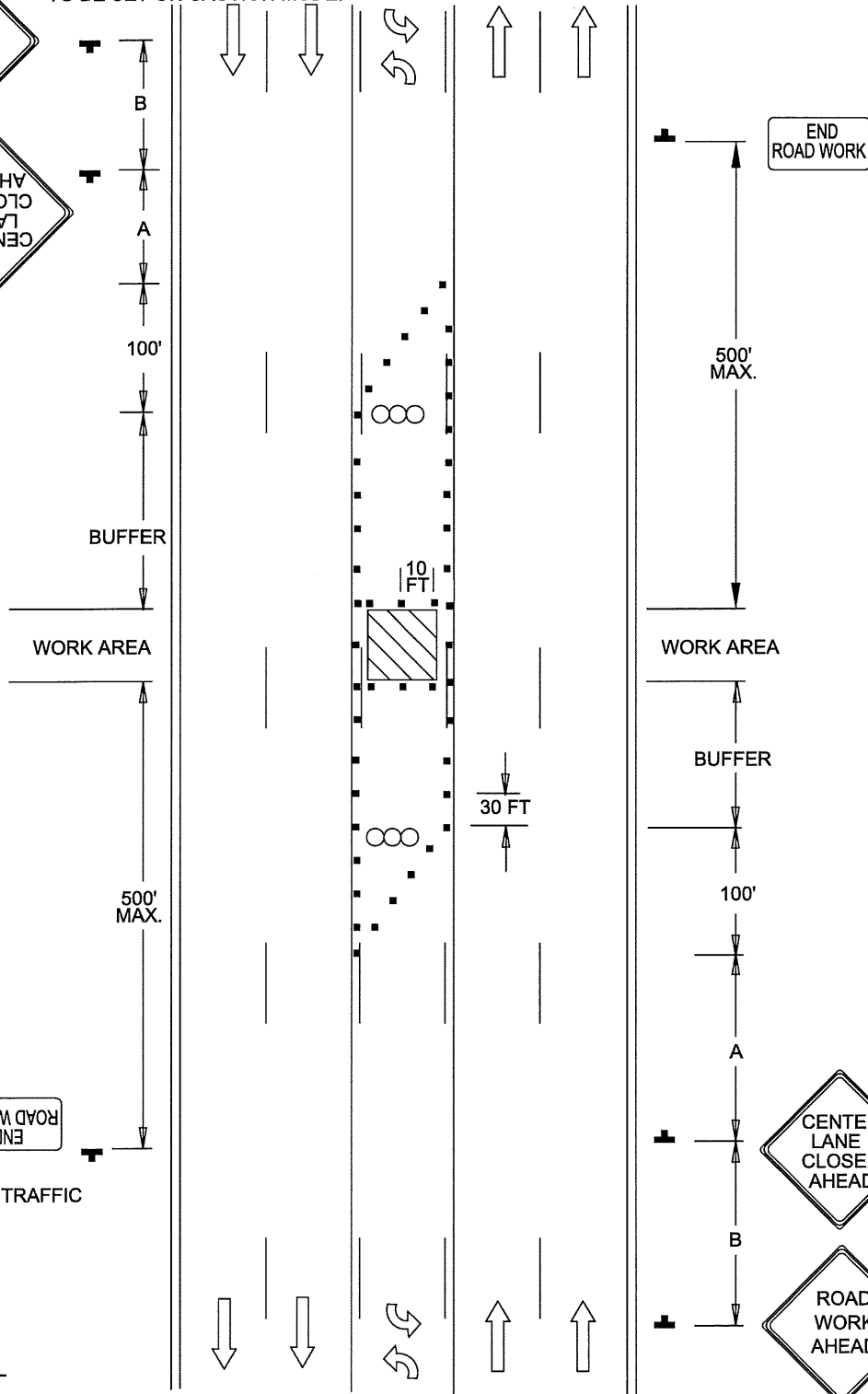
ARROW PANEL DISPLAYS
 TO BE SET ON CAUTION MODE.



LEGEND

LEGEND

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- ARROW PANEL
- CHANNELIZING DEVICES

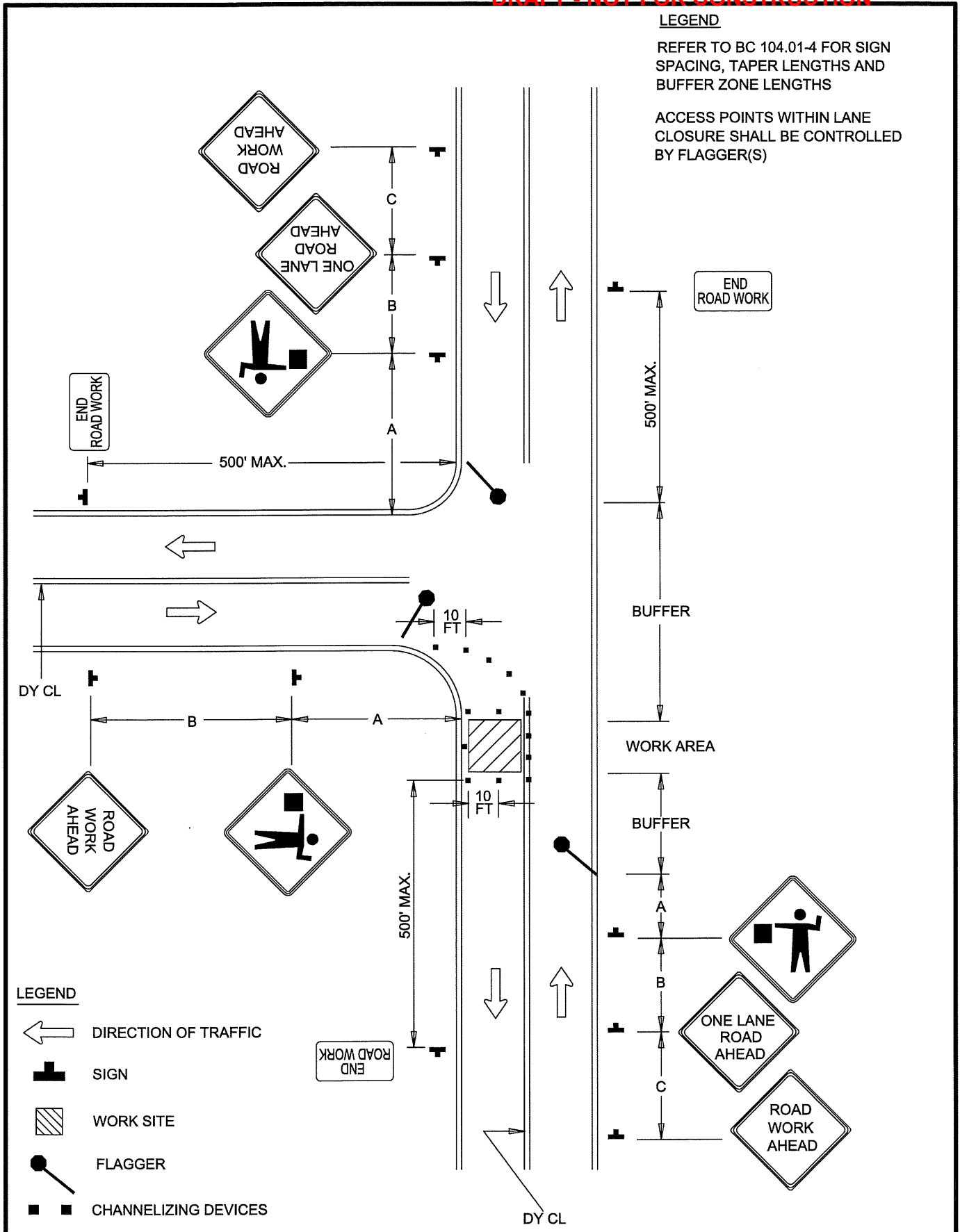


APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khaliil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION
**TRAFFIC CONTROL FOR TWO-WAY
 LEFT TURN LANE CLOSURE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 114.01		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION




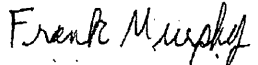
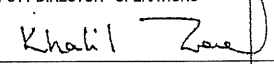
LEGEND

REFER TO BC 104.01-4 FOR SIGN SPACING, TAPER LENGTHS AND BUFFER ZONE LENGTHS

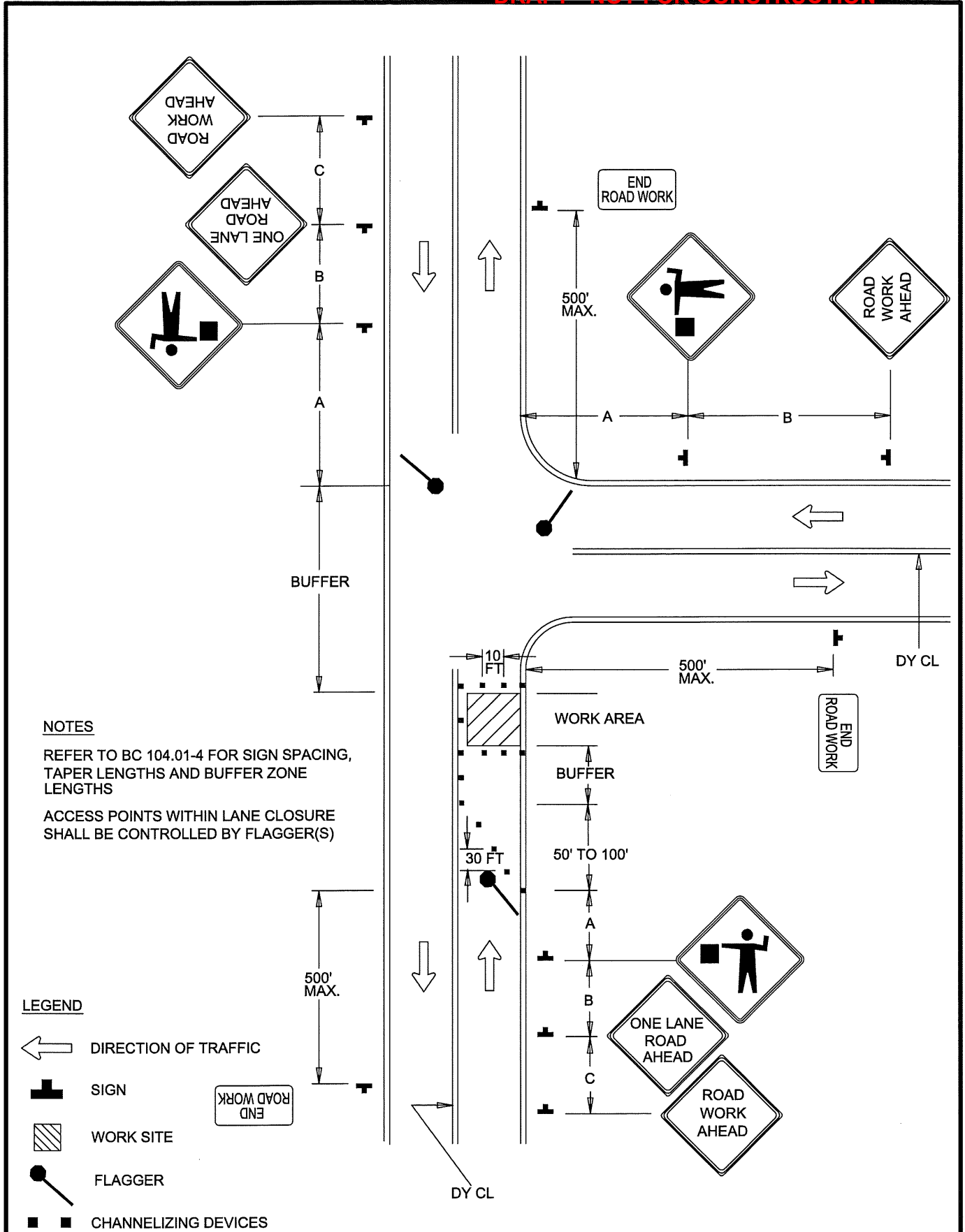
ACCESS POINTS WITHIN LANE CLOSURE SHALL BE CONTROLLED BY FLAGGER(S)

LEGEND

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- FLAGGER
- CHANNELIZING DEVICES

	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION	ISSUED	REVISED	REVISED		
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		FLAGGING CONTROL AT 3-LANE INTERSECTION (1)			DETAIL NO. BC 115.01	
	818		8 / 2010			SCALE : NONE	SHEET 1 OF 1

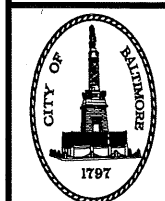
DRAFT - NOT FOR CONSTRUCTION



NOTES
 REFER TO BC 104.01-4 FOR SIGN SPACING,
 TAPER LENGTHS AND BUFFER ZONE
 LENGTHS
 ACCESS POINTS WITHIN LANE CLOSURE
 SHALL BE CONTROLLED BY FLAGGER(S)

LEGEND

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- FLAGGER
- CHANNELIZING DEVICES



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

**FLAGGING CONTROL AT
 3-WAY INTERSECTION (2)**

819

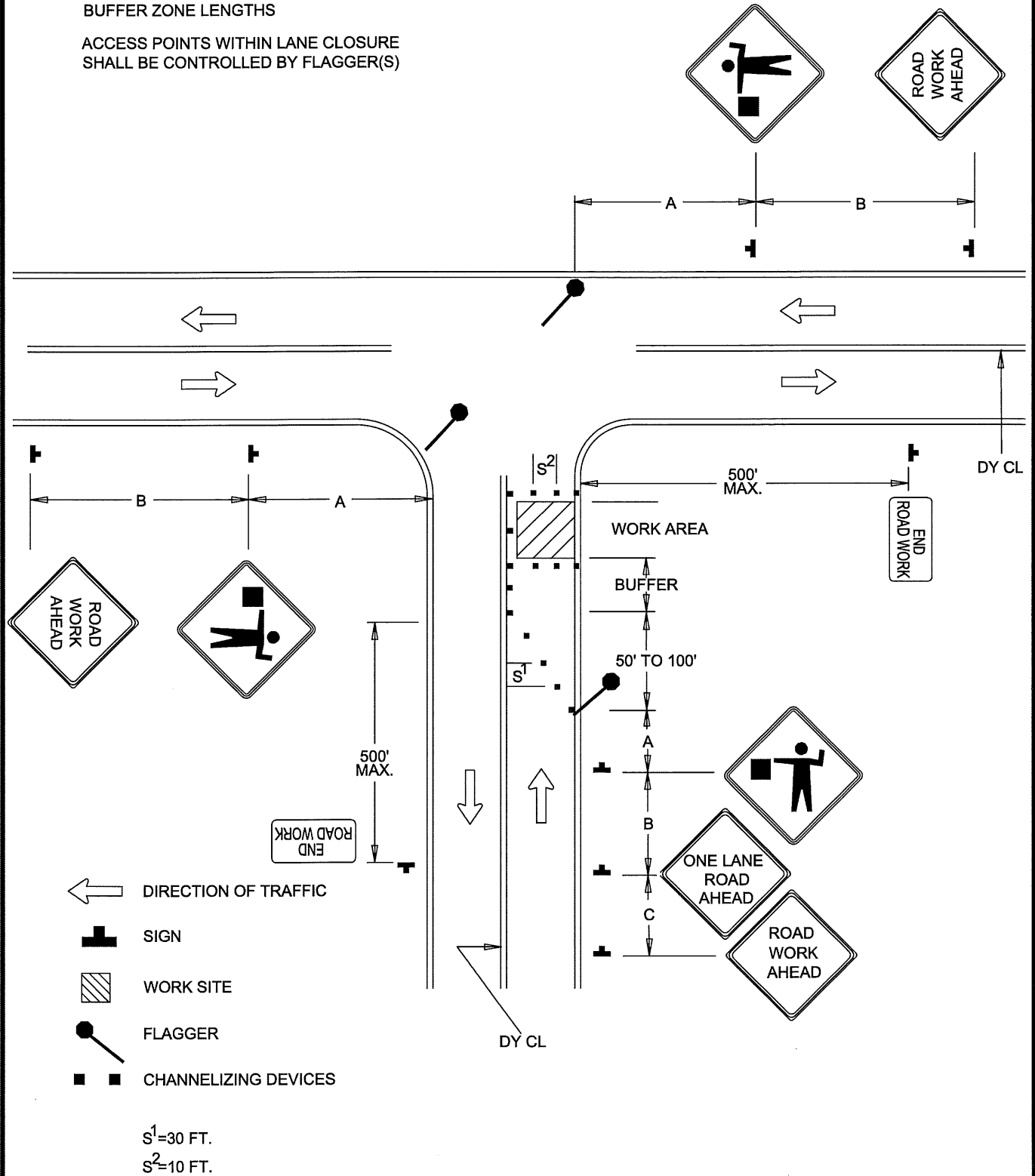
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 115.02		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

NOTES

REFER TO BC 104.01-4 FOR SIGN
 SPACING, TAPER LENGTHS AND
 BUFFER ZONE LENGTHS

ACCESS POINTS WITHIN LANE CLOSURE
 SHALL BE CONTROLLED BY FLAGGER(S)



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

**FLAGGING CONTROL AT
 3-WAY INTERSECTION (3)**

820

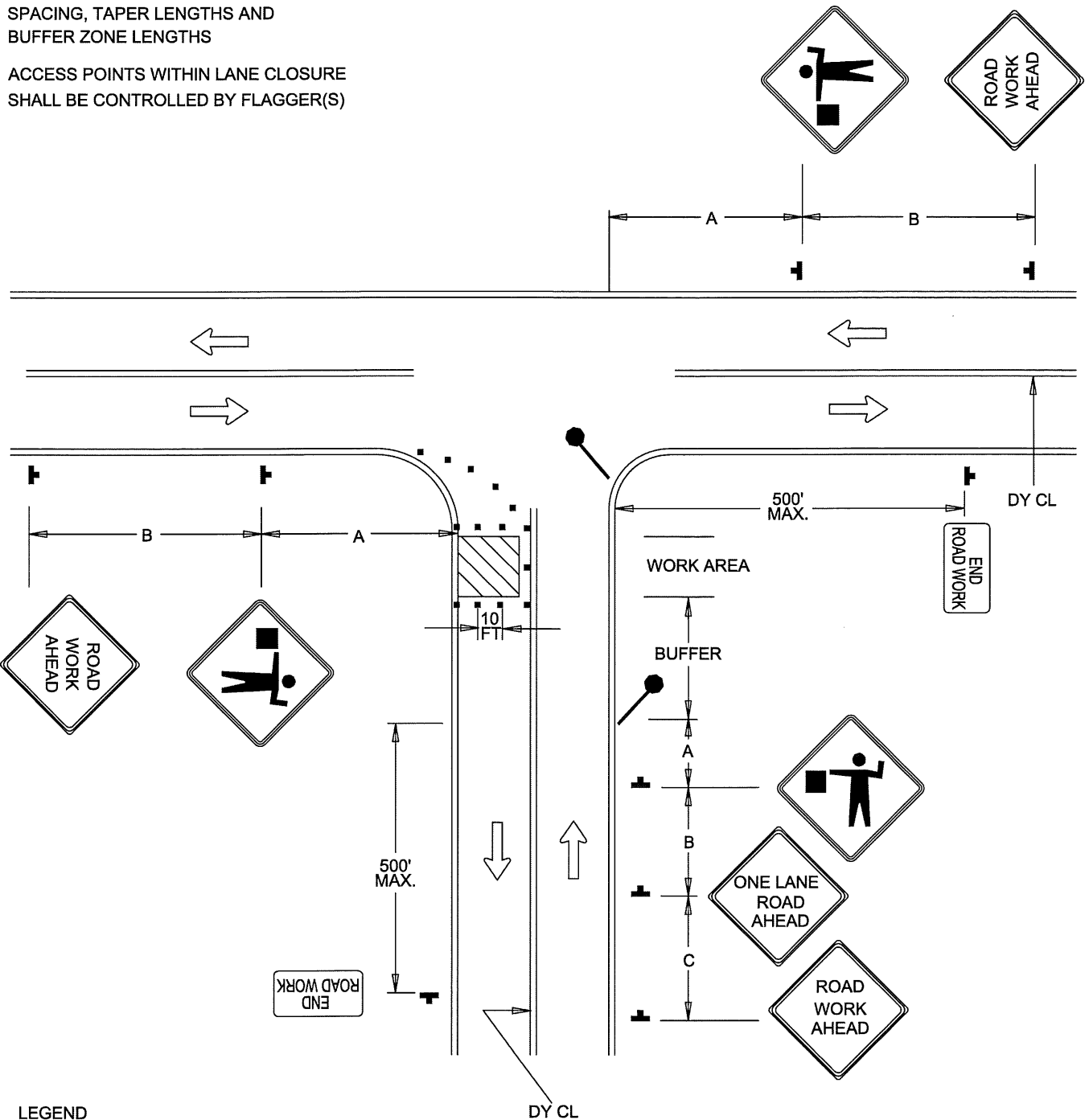
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 115.03		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION

NOTES

REFER TO BC 104.01-4 FOR SIGN
 SPACING, TAPER LENGTHS AND
 BUFFER ZONE LENGTHS

ACCESS POINTS WITHIN LANE CLOSURE
 SHALL BE CONTROLLED BY FLAGGER(S)



LEGEND

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- FLAGGER
- CHANNELIZING DEVICES



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

**FLAGGING CONTROL AT
 3-LEG INTERSECTION (4)**

821

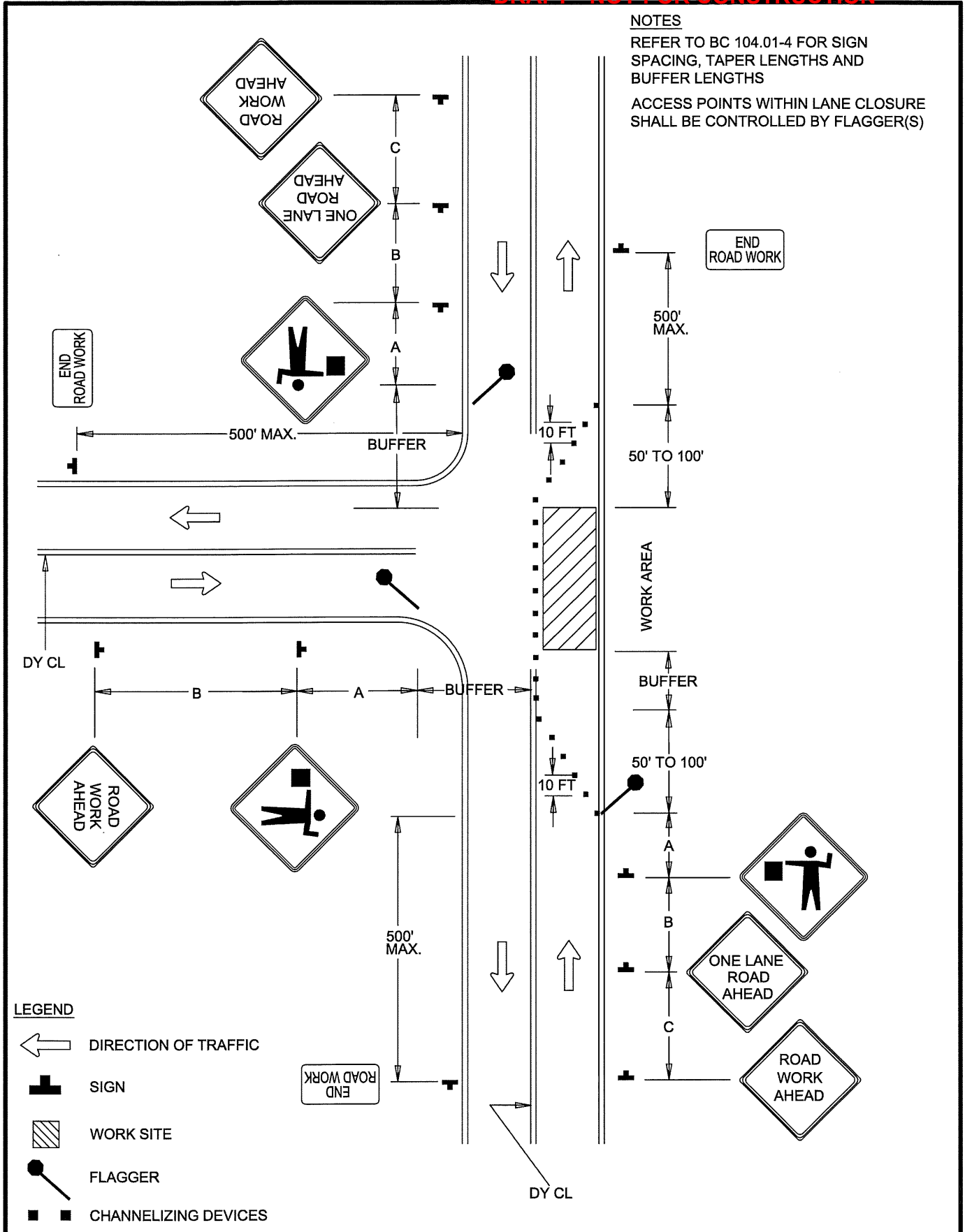
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 115.04		
SCALE : NONE	SHEET 1 OF 1	



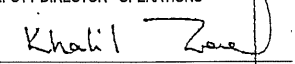
DRAFT - NOT FOR CONSTRUCTION

NOTES

REFER TO BC 104.01-4 FOR SIGN SPACING, TAPER LENGTHS AND BUFFER LENGTHS

ACCESS POINTS WITHIN LANE CLOSURE SHALL BE CONTROLLED BY FLAGGER(S)



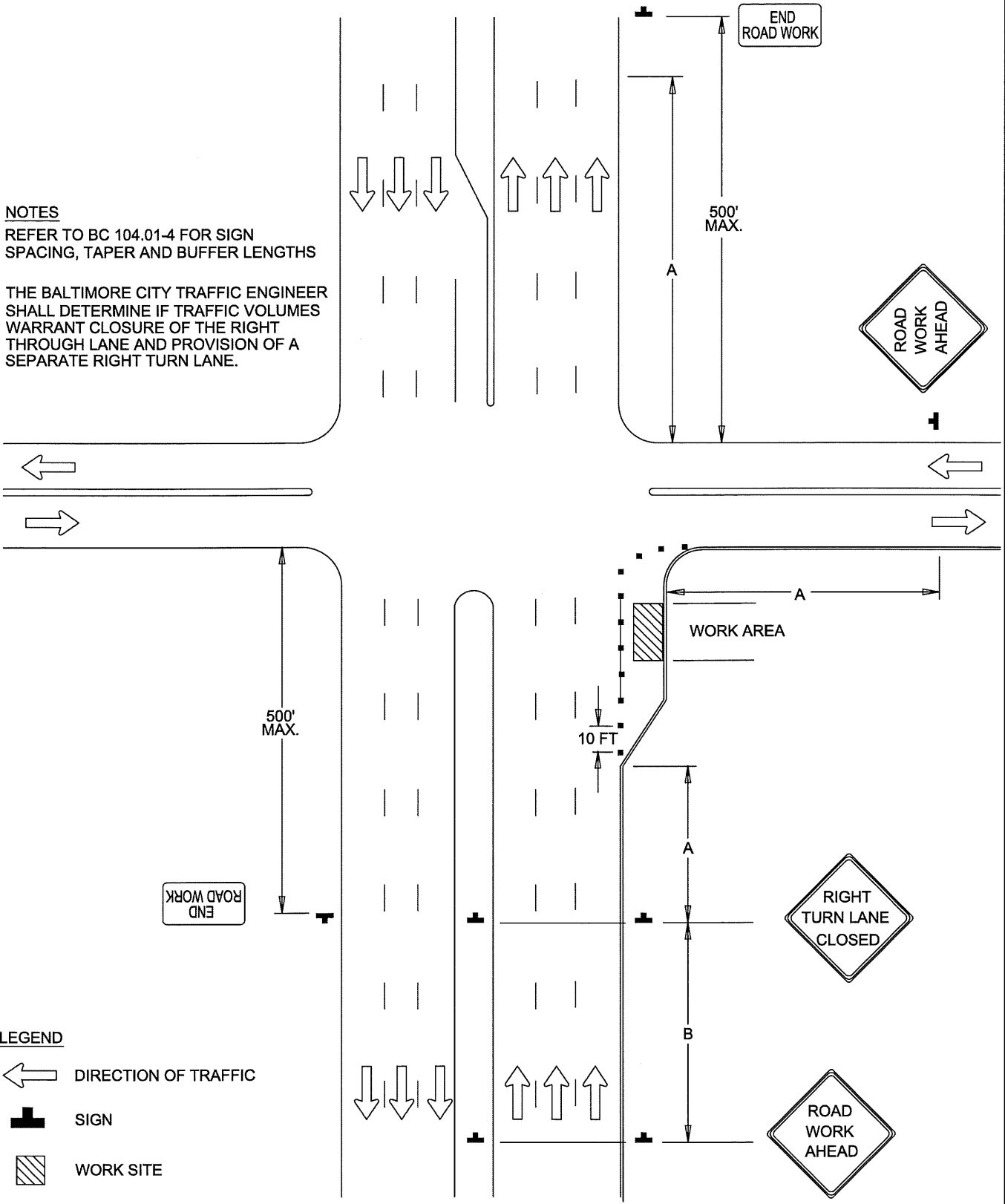
	APPROVED:  DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION FLAGGING CONTROL AT 3-LEG INTERSECTION FAR - SIDE CLOSURE	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 115.05		SCALE: NONE

DRAFT - NOT FOR CONSTRUCTION

NOTES

REFER TO BC 104.01-4 FOR SIGN SPACING, TAPER AND BUFFER LENGTHS

THE BALTIMORE CITY TRAFFIC ENGINEER SHALL DETERMINE IF TRAFFIC VOLUMES WARRANT CLOSURE OF THE RIGHT THROUGH LANE AND PROVISION OF A SEPARATE RIGHT TURN LANE.



LEGEND

- DIRECTION OF TRAFFIC
- SIGN
- WORK SITE
- ARROW PANEL
- CHANNELIZING DEVICES



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

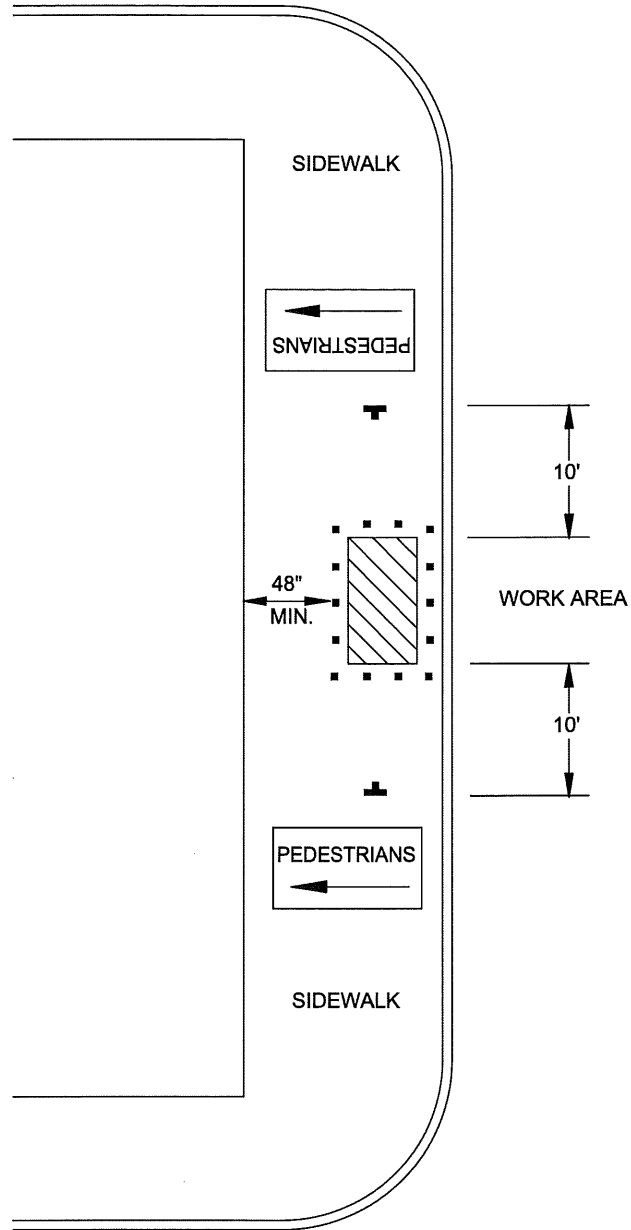
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

TRAFFIC CONTROL FOR RIGHT TURN LANE CLOSURE

823

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 116.01		
SCALE : NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION



LEGEND



SIGN



WORK SITE



CHANNELIZING DEVICES



APPROVED:

Frank Murphy

DEPUTY DIRECTOR - OPERATIONS

Khali Zare

DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION

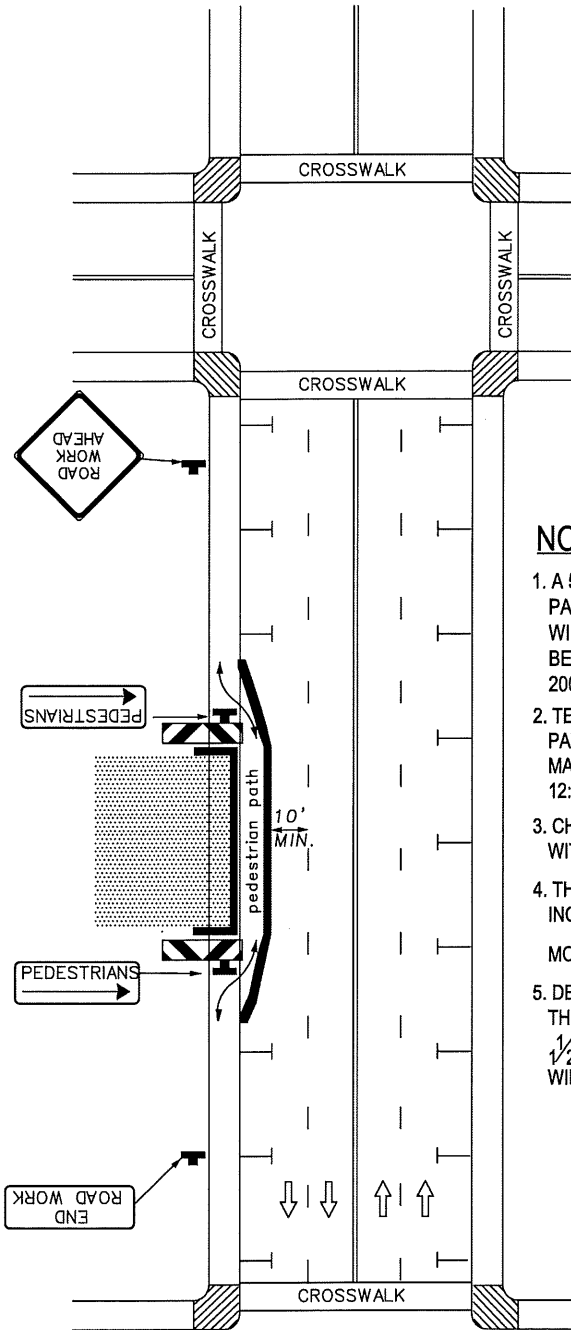
PEDESTRIAN CONTROL FOR
 SIDEWALK BYPASS

824

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 117.01		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION

**TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION FOR SIDEWALK CLOSURE
 ALTERNATE PEDESTRIAN ROUTE USING ROADWAY LANE OR SHOULDER**











IMPORTANT:
 THIS DRAWING SHALL BE USED IN
 COMBINATION WITH THE GENERAL
 NOTES BC 104.01-1 THRU BC 104.01-7

NOTES

1. A 5 FOOT MINIMUM WIDTH PEDESTRIAN PATH / ALTERNATE PEDESTRIAN PATH SHALL BE MAINTAINED WHERE POSSIBLE. WHERE A 5 FOOT MIN WIDTH CANNOT BE ACHIEVED, A MINIMUM WIDTH OF 36 INCHES SHALL BE PROVIDED WITH PASSING ZONES (60 IN X 60 IN) AT LEAST EVERY 200FT.
2. TEMPORARY RAMPS SHALL HAVE A SLOPE OF 12:1 MAX. THE PEDESTRIAN PATH AND RAMP SHALL BE CONSTRUCTED OF HOT MIX ASPHALT OR OTHER MATERIAL THAT CAN PROVIDE SMOOTH, HARD SURFACE & WILL MAINTAIN 12:1 SLOPE.
3. CHANNELIZING DEVICES SHALL BE TEMPORARY CONCRETE BARRIERS WITH THE ADDITION OF CONTINUOUS DETECTABLE EDGING.
4. THE CONTINUOUS DETECTABLE EDGINGS SHALL PROTRUDE AT LEAST 6 INCHES ABOVE THE PATHWAY WITH THE BOTTOM OF THE EDGING NO MORE THAN 1/2 INCHES ABOVE THE PATHWAY.
5. DETECTABLE BARRICADES SHALL EXTEND AT LEAST 36" ABOVE THE PATHWAY WITH THE BOTTOM OF THE BARRICADE NO MORE THAN 1/2 INCHES ABOVE THE PATHWAY, AND SHALL EXTEND THE FULL WIDTH OF THE CLOSURE

KEY:

-  SIGN
-  CHANNELIZING DEVICES WITH DETECTABLE EDGING
-  DETECTABLE BARRICADE
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  PARKING SPACES / SHOULDER AREA
-  TEMPORARY RAMP (WITH DETECTABLE SURFACE WARNING)
-  EXISTING CURB RAMP



APPROVED:
Frank Murphy
 DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

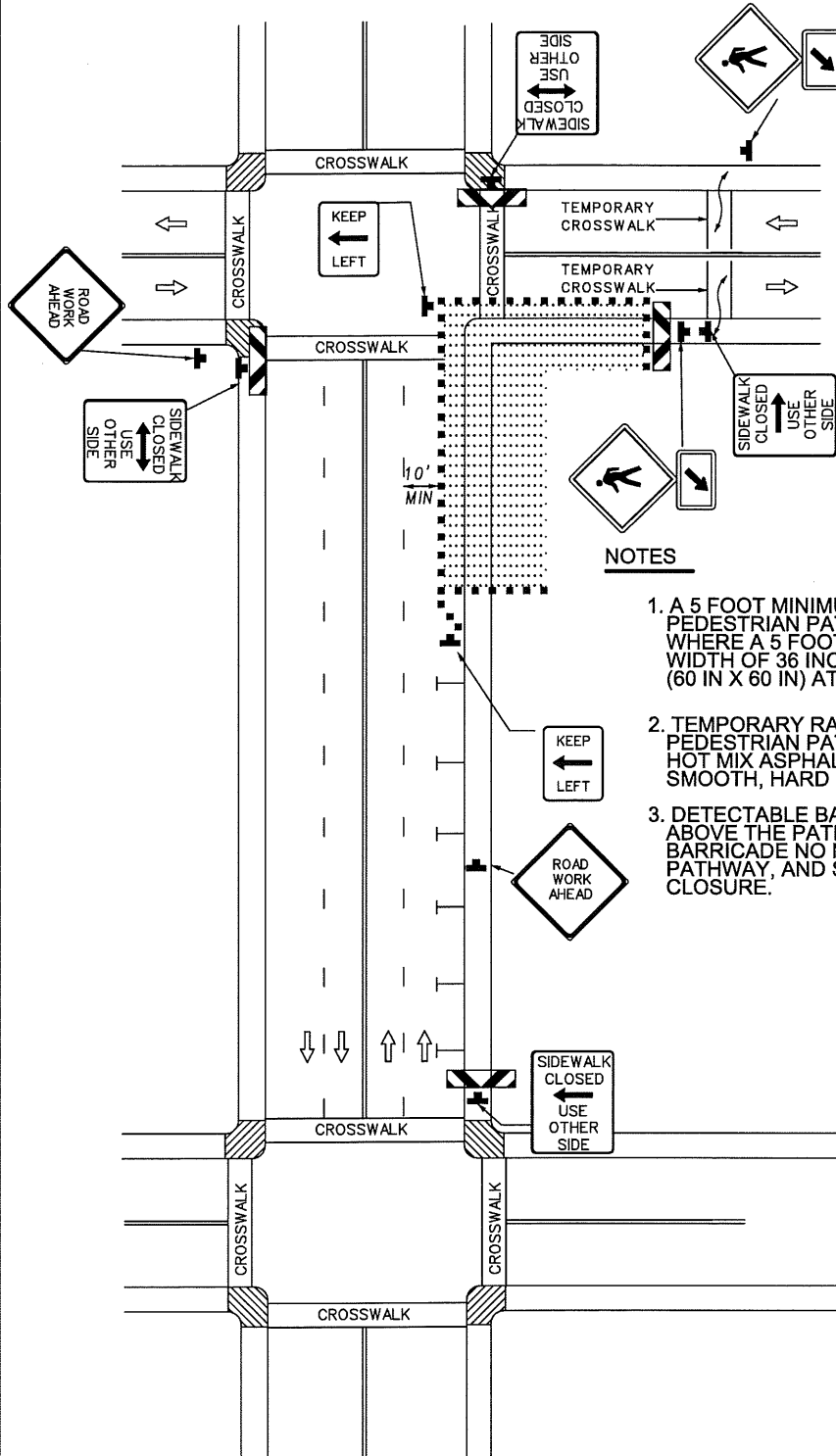
**CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRAFFIC DIVISION**

**PED AND CURB-LANE CONTROL /
 MULTILANE UNDIVIDED SPEEDS
 LESS THAN OR EQUAL TO 40 MPH /
 OVER 2 HRS. OR NIGHTTIME USE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 117.01-1		
SCALE : NONE	SHEET 1 OF 4	

DRAFT - NOT FOR CONSTRUCTION

**TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION
ALTERNATE PEDESTRIAN DETOUR ROUTE AT INTERSECTION**



IMPORTANT:
THIS DRAWING SHALL BE USED IN
COMBINATION WITH THE GENERAL
NOTES BC 104.01-1 THRU 104.01-7

NOTES

1. A 5 FOOT MINIMUM WIDTH PEDESTRIAN PATH / ALTERNATE PEDESTRIAN PATH SHALL BE MAINTAINED WHERE POSSIBLE. WHERE A 5 FOOT MIN WIDTH CANNOT BE ACHIEVED, A MINIMUM WIDTH OF 36 INCHES SHALL BE PROVIDED WITH PASSING ZONES (60 IN X 60 IN) AT LEAST EVERY 200 FT.
2. TEMPORARY RAMPS SHALL HAVE A SLOPE OF 12:1 MAX. THE PEDESTRIAN PATH AND RAMP SHALL BE CONSTRUCTED OF HOT MIX ASPHALT OR OTHER MATERIAL THAT CAN PROVIDE A SMOOTH, HARD SURFACE & WILL MAINTAIN 12:1 SLOPE.
3. DETECTABLE BARRICADES SHALL EXTEND AT LEAST 36" ABOVE THE PATHWAY WITH THE BOTTOM OF THE BARRICADE NO MORE THAN 1 1/2 INCHES ABOVE THE PATHWAY, AND SHALL EXTEND THE FULL WIDTH OF THE CLOSURE.

KEY:

- DIRECTION OF TRAFFIC
- WORK SITE
- TEMPORARY RAMP (WITH DETECTABLE SURFACE WARNING)
- SIGN
- DETECTABLE BARRICADE
- PARKING SPACES / SHOULDER AREA
- EXISTING CURB RAMPS
- CHANNELIZING DEVICES



APPROVED:
Frank Murphy
DEPUTY DIRECTOR - OPERATIONS
Khali Zaeed
DIRECTOR, DEPARTMENT OF TRANSPORTATION

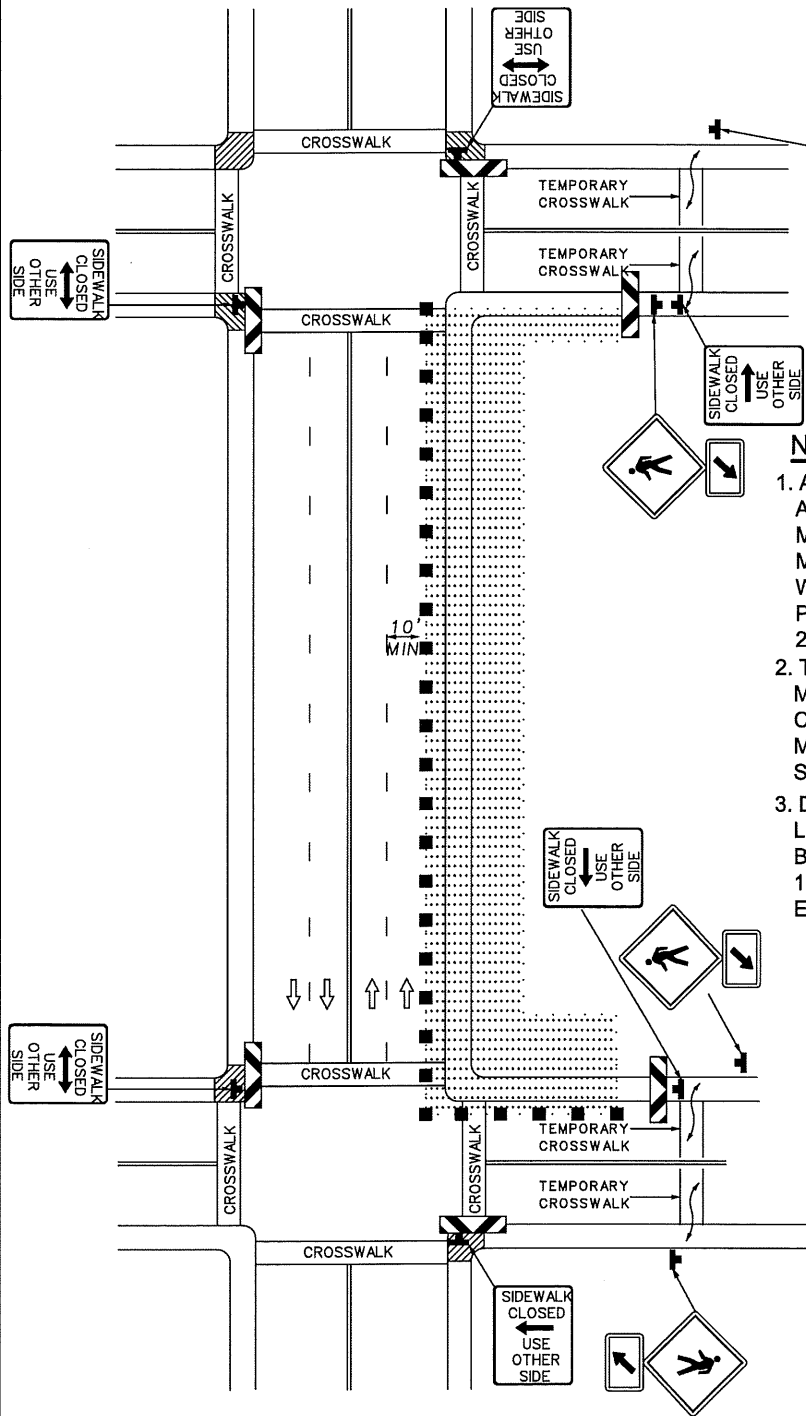
**CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION**

**PED AND CURB-LANE CONTROL /
MULTILANE UNDIVIDED SPEEDS
LESS THAN OR EQUAL TO 40 MPH /
OVER 12 HRS. OR NIGHTTIME USE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 117.01-2		
SCALE: NONE	SHEET 2 OF 4	

DRAFT - NOT FOR CONSTRUCTION

**TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION FOR SIDEWALK CLOSURE
ALTERNATE PEDESTRIAN DETOUR ROUTE FOR FULL BLOCK CLOSURE**










IMPORTANT:
THIS DRAWING SHALL BE USED IN
COMBINATION WITH THE GENERAL
NOTES BC 104.01-1 THRU 104.01-7

NOTES

1. A 5 FOOT MINIMUM WIDTH PEDESTRIAN PATH / ALTERNATE PEDESTRIAN PATH SHALL BE MAINTAINED WHERE POSSIBLE. WHERE A 5 FOOT MINIMUM WIDTH CANNOT BE ACHIEVED, A MINIMUM WIDTH OF 36 INCHES SHALL BE PROVIDED WITH PASSING ZONES (60 IN X 60IN) AT LEAST EVERY 200FT.
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3. DETECTABLE BARRICADES SHALL EXTEND AT LEAST 36" ABOVE THE PATHWAY WITH THE BOTTOM OF THE BARRICADE NO MORE THAN 1 1/2 INCHES ABOVE THE PATHWAY, AND SHALL EXTEND THE FULL WIDTH OF THE CLOSURE.

KEY:

-  SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  TEMPORARY RAMP (WITH DETECTABLE SURFACE WARNING)
-  DETECTABLE BARRICADE
-  EXISTING CURB RAMPS
-  CHANNELIZING DEVICES



APPROVED:
Frank Murphy
DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

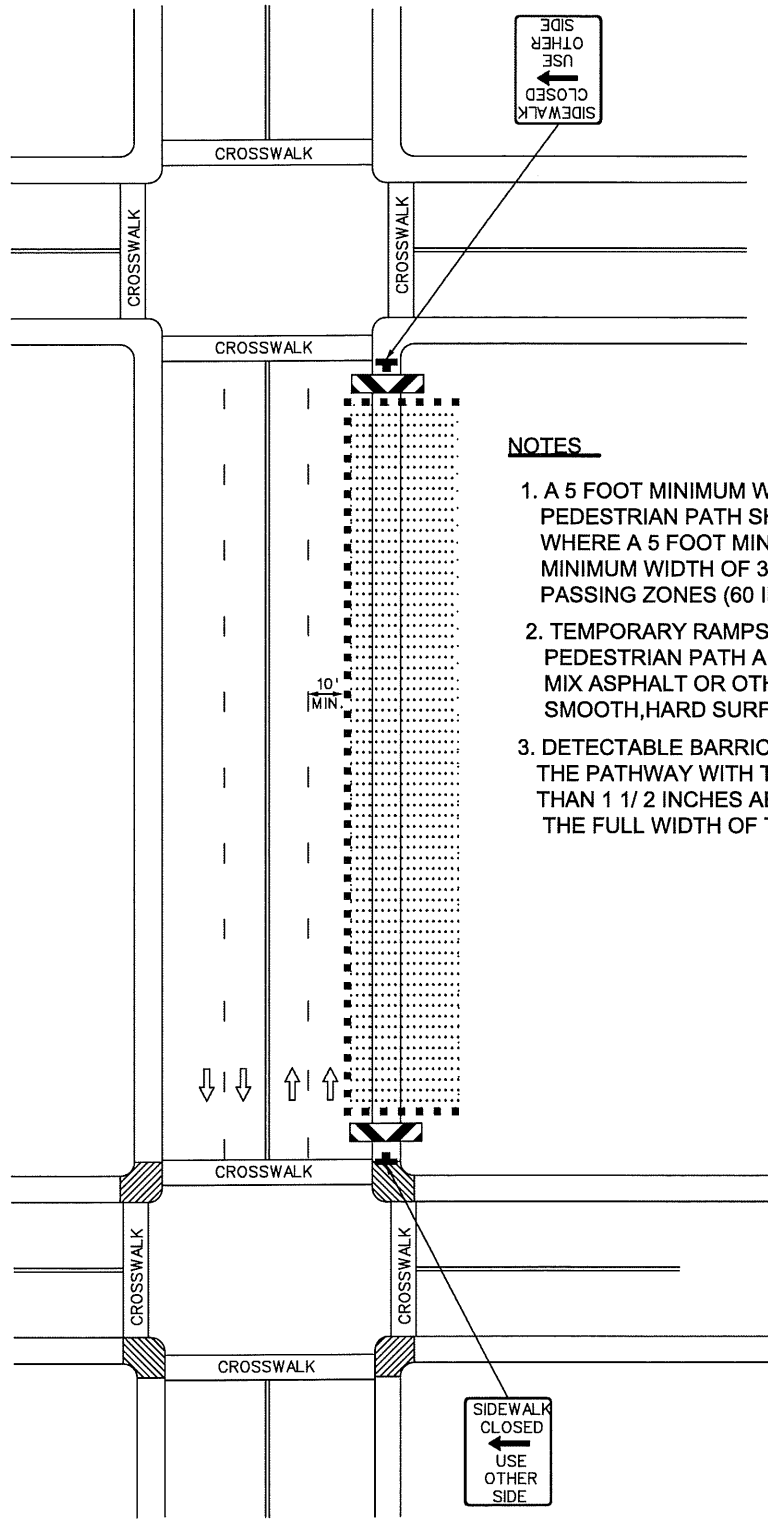
**CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION**

**PED AND CURB-LANE CONTROL /
MULTILANE UNDIVIDED SPEEDS
LESS THAN OR EQUAL TO 40 MPH /
OVER 12 HRS. OR NIGHTTIME USE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC-117.01-3		
SCALE: NONE	SHEET 3 OF 4	

DRAFT - NOT FOR CONSTRUCTION

**TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION
ALTERNATE PEDESTRIAN DETOUR ROUTE USING OPPOSITE SIDEWALK**



IMPORTANT:
THIS DRAWING SHALL BE USED IN COMBINATION WITH THE GENERAL NOTES BC 104.01-1 THRU BC 104.01-7

NOTES

1. A 5 FOOT MINIMUM WIDTH PEDESTRIAN PATH / ALTERNATE PEDESTRIAN PATH SHALL BE MAINTAINED WHERE POSSIBLE. WHERE A 5 FOOT MINIMUM WIDTH CANNOT BE ACHIEVED, A MINIMUM WIDTH OF 36 INCHES SHALL BE PROVIDED WITH PASSING ZONES (60 IN X 60 IN) AT LEAST EVERY 200FT.
2. TEMPORARY RAMPS SHALL HAVE A SLOPE OF 12:1 MAX. THE PEDESTRIAN PATH AND RAMP SHALL BE CONSTRUCTED OF HOT MIX ASPHALT OR OTHER MATERIAL THAT CAN PROVIDE A SMOOTH, HARD SURFACE & WILL MAINTAIN 12:1 SLOPE.
3. DETECTABLE BARRICADES SHALL EXTEND AT LEAST 36" ABOVE THE PATHWAY WITH THE BOTTOM OF THE BARRICADE NO MORE THAN 1 1/2 INCHES ABOVE THE PATHWAY, AND SHALL EXTEND THE FULL WIDTH OF THE CLOSURE.

- KEY:**
- DIRECTION OF TRAFFIC
 - WORK SITE
 - SIGN
 - DETECTABLE BARRICADE
 - EXISTING CURB RAMPS
 - CHANNELIZING DEVICES



APPROVED:
Frank Murphy
DEPUTY DIRECTOR - OPERATIONS
Khalil Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

**CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION**

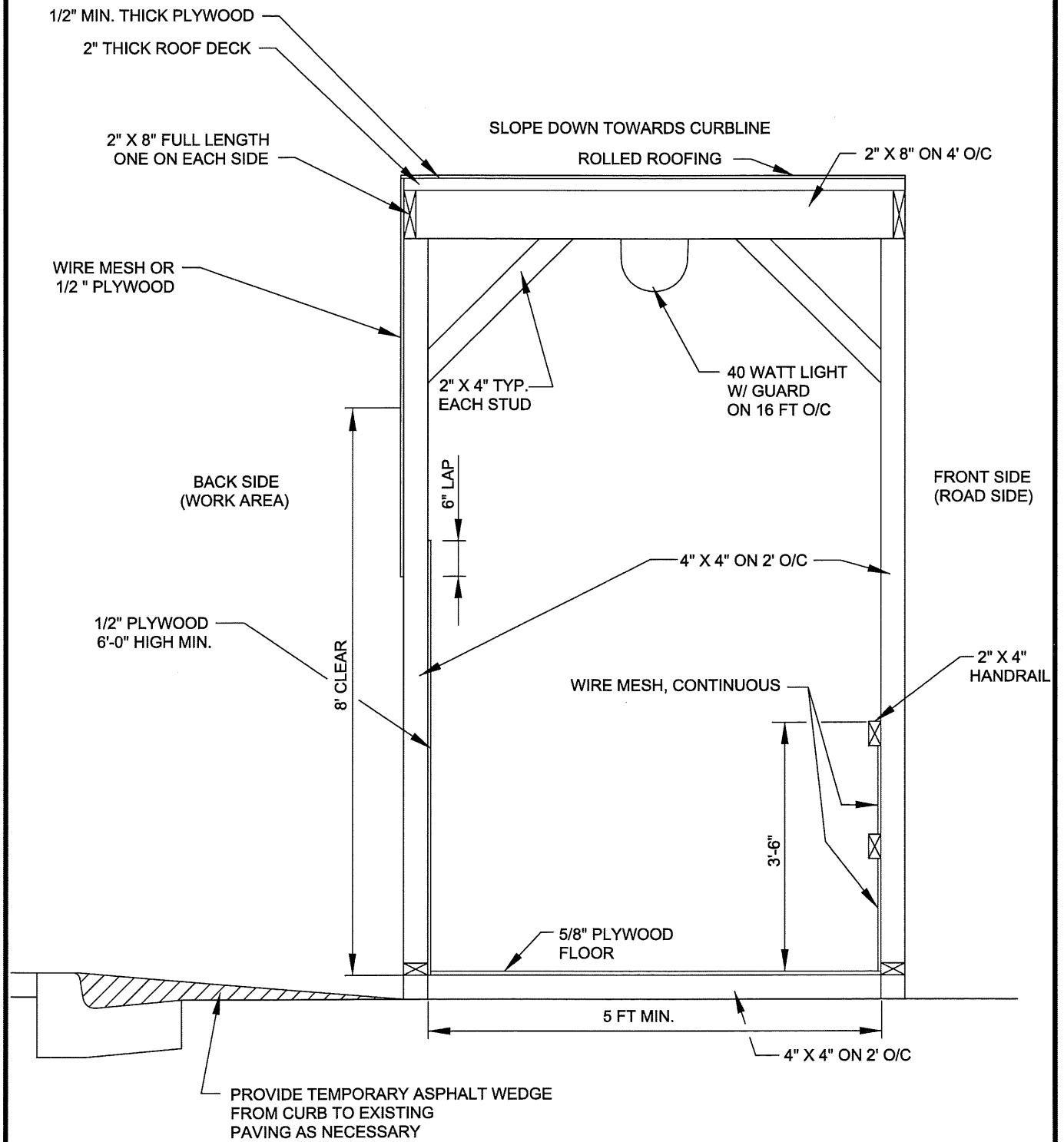
**PED AND CURB-LANE CONTROL /
MULTILANE UNDIVIDED SPEEDS
LESS THAN OR EQUAL TO 40 MPH /
OVER 12 HRS. OR NIGHTTIME USE**


ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC-117.01-4		
SCALE: NONE	SHEET 4 OF 4	

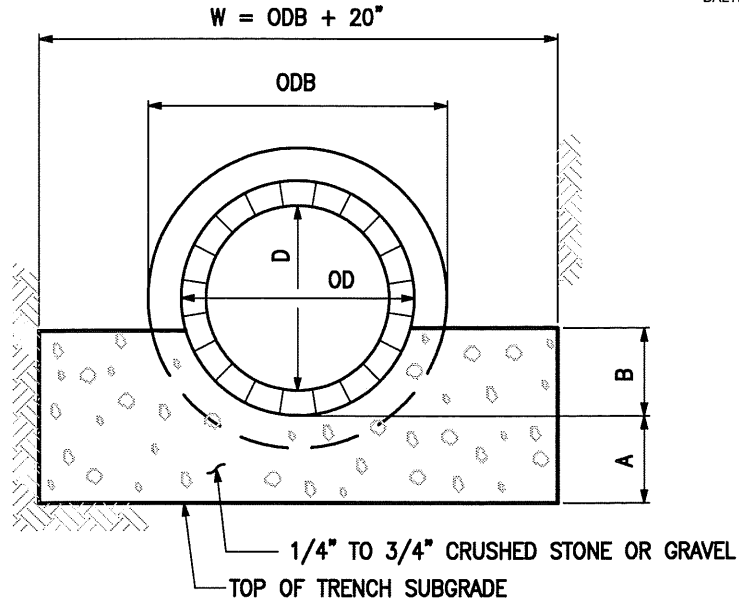
828

DRAFT - NOT FOR CONSTRUCTION

CONTRACTOR MUST PROVIDE SHOP
 DRAWING DETAIL OF COVERED WALKWAY
 FOR REVIEW AND APPROVAL TO THE
 TRAFFIC OPERATIONS SECTION, IF
 ALTERNATE MATERIALS FOR WALKWAY
 ARE PROPOSED



	APPROVED: <i>Frank Murphy</i> DEPUTY DIRECTOR - OPERATIONS	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRAFFIC DIVISION COVERED WALKWAY 830 829	ISSUED	REVISED	REVISED
	<i>Khali Zare</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 117.02		
			SCALE : NONE	SHEET 1 OF 1	



NOTES:

1. STONE (NO. 6 AGGREGATE) MAY BE SUBSTITUTED FOR GRAVEL.
2. WHEN 2 TIER TRENCH SUPPORT IS REQUIRED, ADD 24" TO "W" FOR CALCULATING THE AMOUNT OF PAVING NEEDED FOR TRENCH REPAIR.

REINFORCED CONCRETE PIPE					
DIMENSIONS					
D	OD	ODB	A	B	W
15"	19"	23"	7"	6"	43"
18"	22.5"	27"	7"	6"	47"
21"	25.75"	30.5"	7"	6"	50.5"
24"	29"	34"	7"	6"	54"
27"	32.25"	37.5"	7"	6"	57.5"
30"	36"	41.5"	7"	6"	61.5"
33"	39.5"	45.5"	7"	6"	65.5"
36"	42.75"	49"	8"	6"	69"
42"	50"	57.5"	8"	6"	77.5"
48"	57"	66"	9"	6"	86"
54"	64"	72.5"	9"	7"	92.5"
60"	72"	75.5"	6"	8"	95.5"
66"	79"	81"	6"	8"	101"
72"	86"	88"	6"	9"	108"

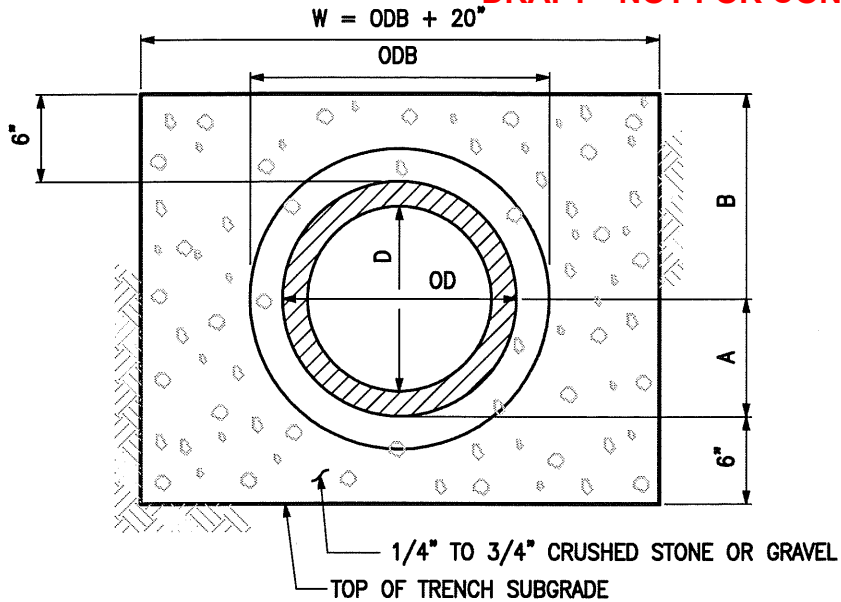


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

GRAVEL CRADLE FOR
 831 RCP STORM DRAINS
 830


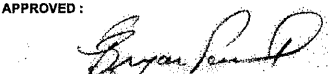
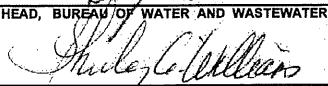
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 302.02		
SCALE: NONE	SHEET 1 OF 1	



NOTES:

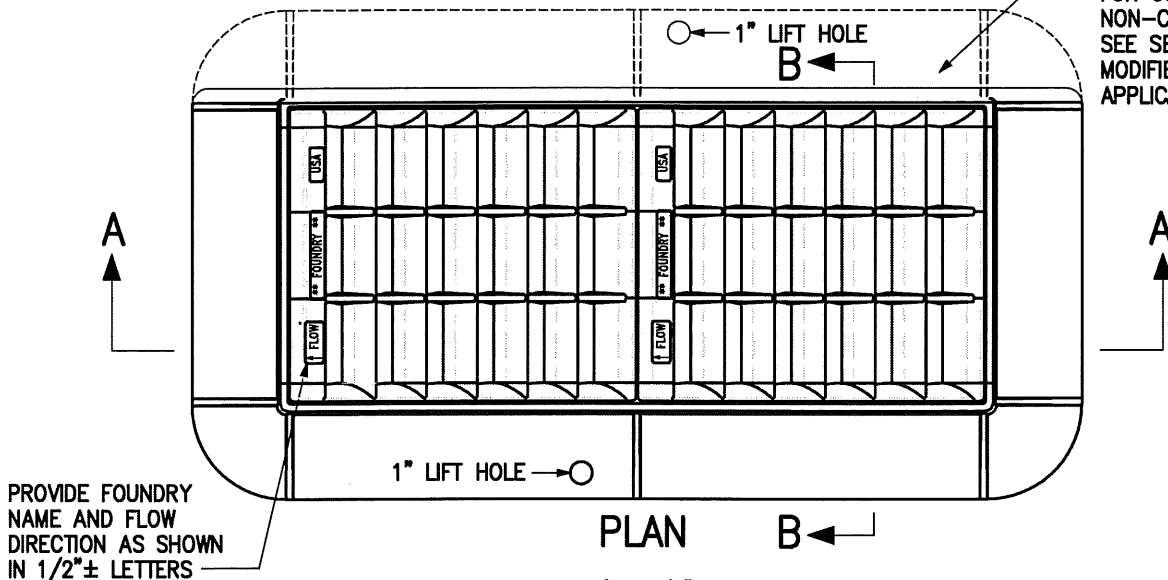
1. STONE (NO. 6 AGGREGATE) MAY BE SUBSTITUTED FOR GRAVEL.
2. WHEN 2 TIER TRENCH SUPPORT IS REQUIRED, ADD 24" TO "W" FOR CALCULATING THE AMOUNT OF PAVING NEEDED FOR TRENCH REPAIR.
3. HAUNCHING AREA (A) AROUND THE PIPE SHALL BE COMPACTED TO A MINIMUM 95% PROCTOR DENSITY. TAMPING SHALL BE DONE IN 4" LAYERS TO THE SPRING LINE. COMPACTION OF THE EMBEDMENT MATERIAL SHOULD BE DONE IN A WAY THAT THE COMPACTION EQUIPMENT WILL NOT DAMAGE THE PIPE OR CAUSE DEFLECTION OF/IN THE PIPE. WHEN HYDRO-HAMMERS ARE USED TO ACHIEVE COMPACTION THEY SHOULD NOT BE USED WITHIN 3' OF THE TOP OF PIPE AND THEN ONLY IF THE EMBEDMENT MATERIAL DENSITY HAS BEEN PREVIOUSLY COMPACTED TO A MINIMUM 85% PROCTOR DENSITY.

PVC PIPE						
DIMENSIONS						
D	OD	ODB	A	B	W	
					MIN	MAX
6"	6.25"	7"	3.13"	9.13"	30"	60"
8"	8.5"	9.5"	4.25"	10.25"	30"	60"
10"	10.5"	12"	5.25"	11.25"	30"	60"
12"	12.5"	14"	6.25"	12.25"	36"	60"
15"	15.25"	16.5"	7.63"	13.63"	42"	60"
18"	18.75"	20"	9.38"	15.38"	42"	66"
21"	22"	23.5"	11"	17"	48"	66"
24"	24.75"	26.5"	12.38"	18.38"	48"	72"
27"	28"	30"	14"	20"	54"	78"

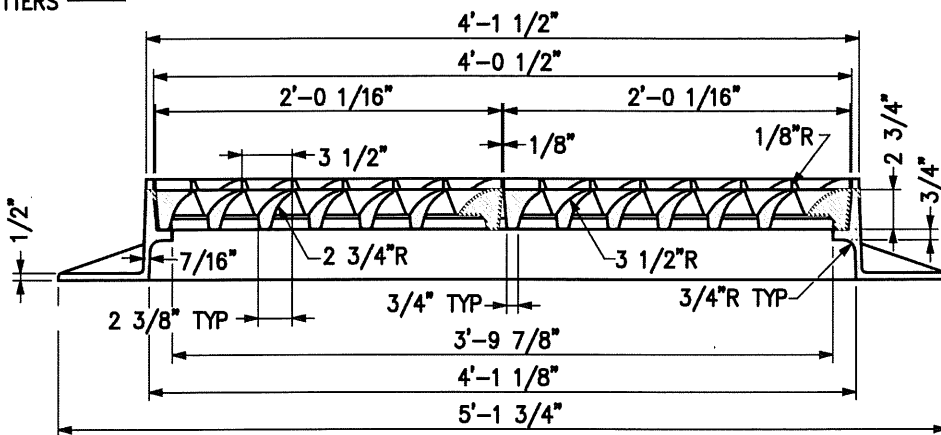
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED	
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008			
	GRAVEL CRADLE FOR 832 PVC STORM DRAINS 831		STANDARD NO. BC 302.03			SCALE: NONE

DRAFT - NOT FOR CONSTRUCTION

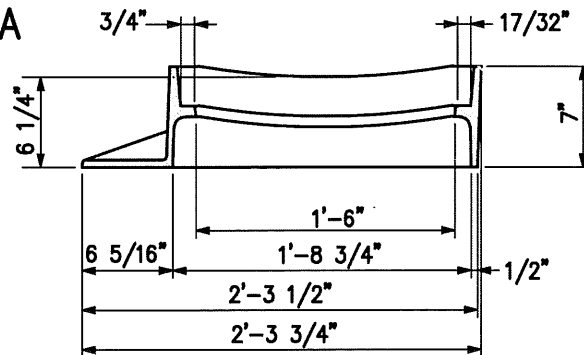
GUSSETED REAR FLANGE FOR USE IN ALLEY OR NON-CURB APPLICATIONS. SEE SECTION B-B MODIFIED FOR CURB APPLICATION



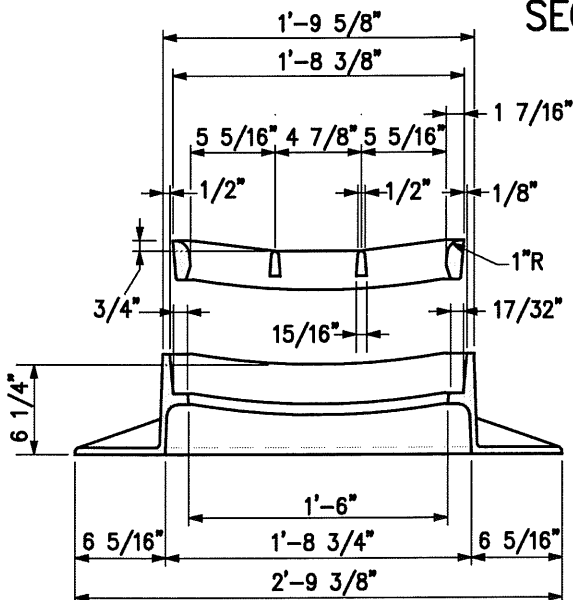
PROVIDE FOUNDRY NAME AND FLOW DIRECTION AS SHOWN IN 1/2"± LETTERS



SECTION A-A



SECTION B-B
MODIFIED



SECTION B-B

NOTES:

1. GRATE(S) SHALL SIT SQUARE UPON FRAME SUPPORTS WITHOUT ROCKING OR SHIFTING UNDER LOAD. GRATE SHALL MEET OR EXCEED AASHTO M306 PROOF LOAD REQUIREMENTS.
2. MATERIAL: GRAY IRON CASTINGS AASHTO DESIGNATION M105-06.
3. WEIGHT: GRATE APPROXIMATELY 129 LBS EACH.



APPROVED:

[Signature]

HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]

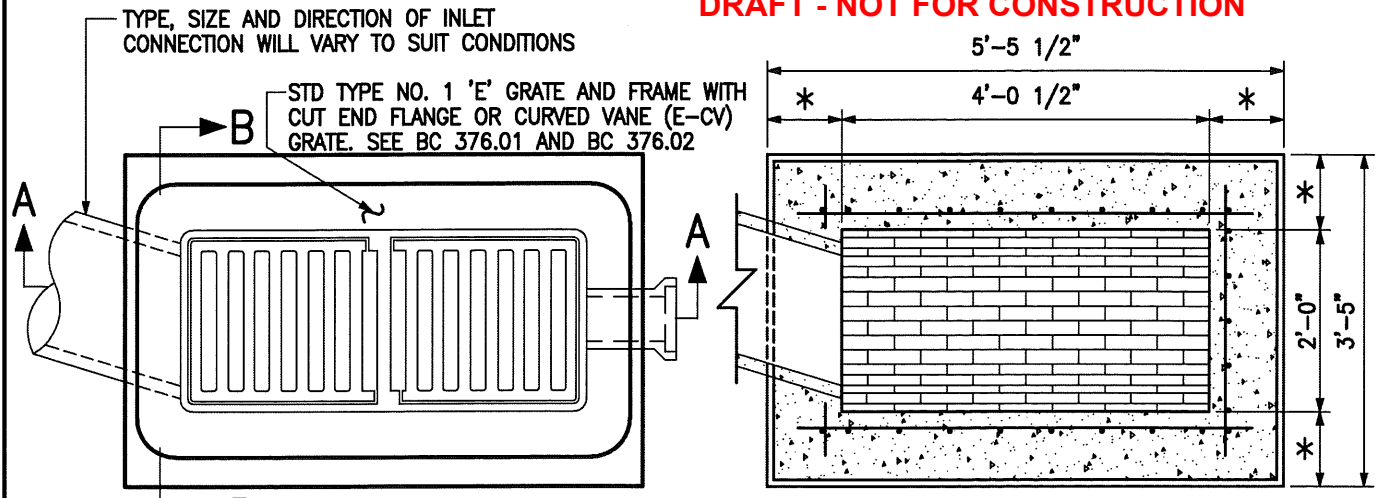
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

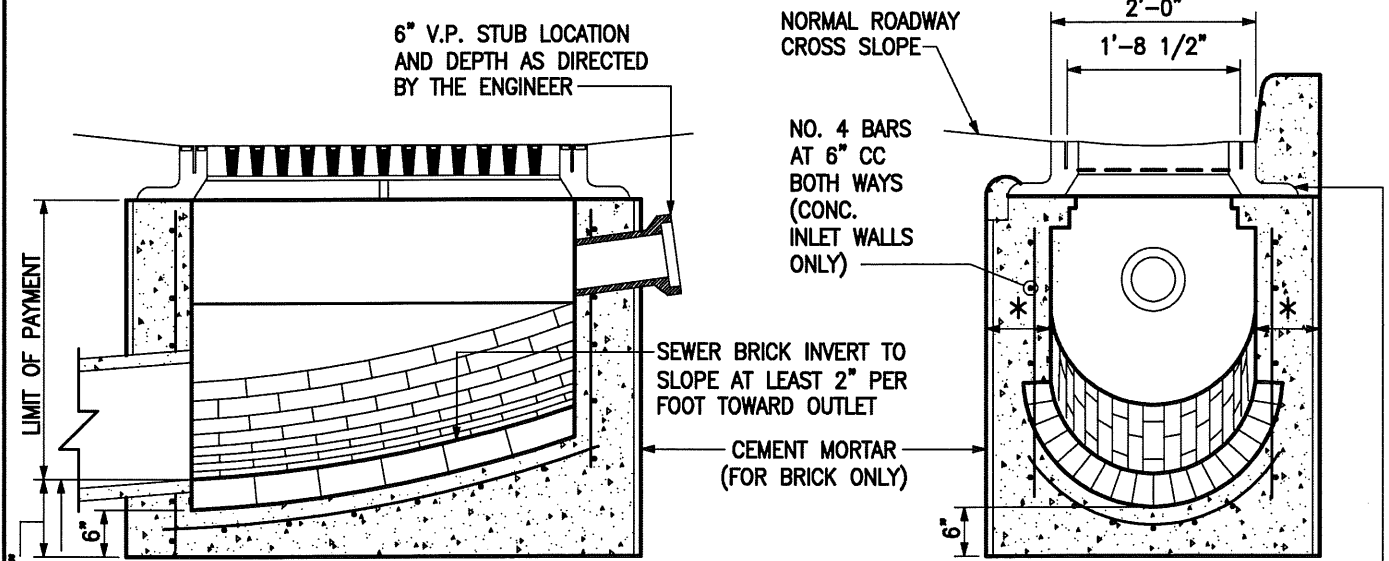
CURVED VANE (E-CV) GRATE(S)
WITH CLASS 35 TYPE 'E' FRAME
NEW CONSTRUCTION

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 376.02		
SCALE: NONE		SHEET 1 OF 1

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PLAN * SEE CHART FOR WALL THICKNESS **PLAN OF INVERT**




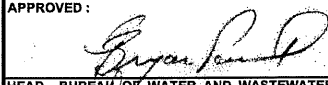

SECTION A-A

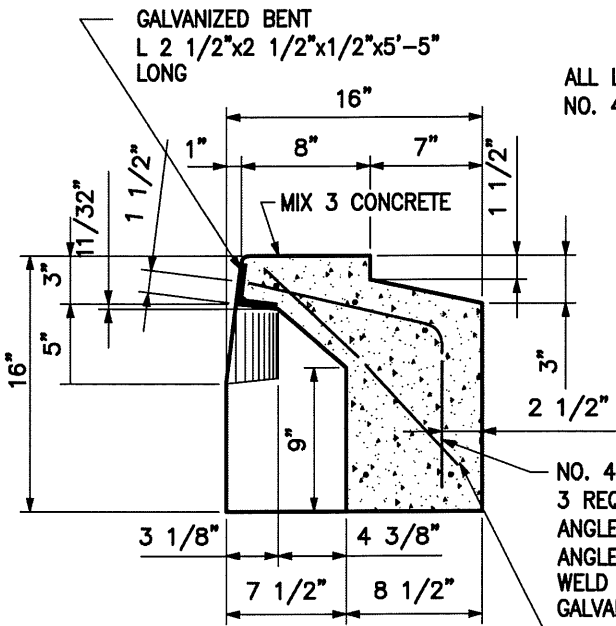
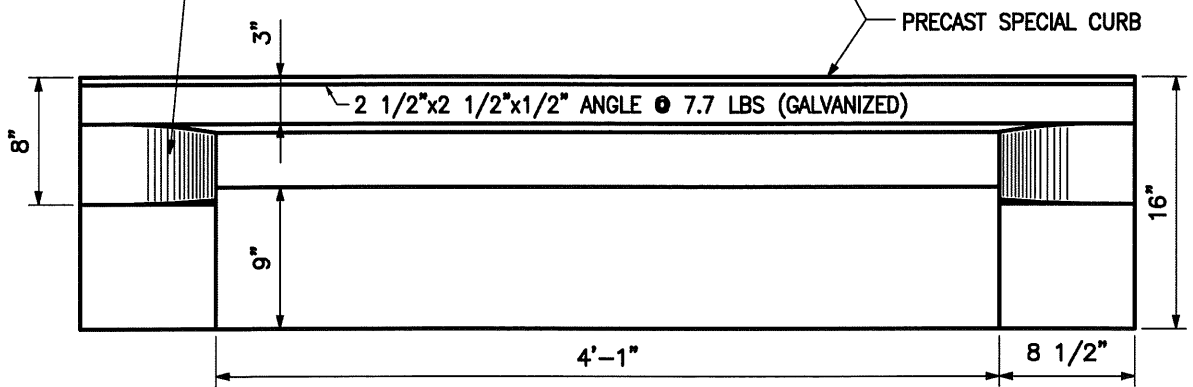
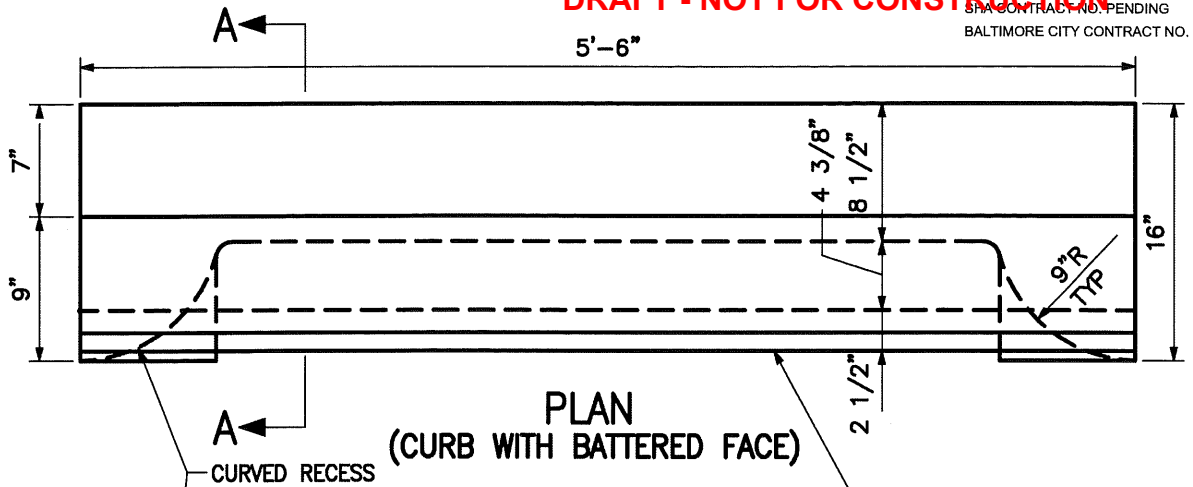
SECTION B-B

	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS AT 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPECIFICATIONS FOR INLETS.
2. TOP 4" OF PRECAST/CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. DEPTH OF INLET CONNECTION IN ALLEYS TO BE 42" FROM INVERT TO ALLEY GRADE. NO DEVIATION FROM THESE DEPTHS WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
		834 833	TYPE 'E' INLET		
		STANDARD NO. BC 376.14			
		SCALE: NONE		SHEET 1 OF 1	

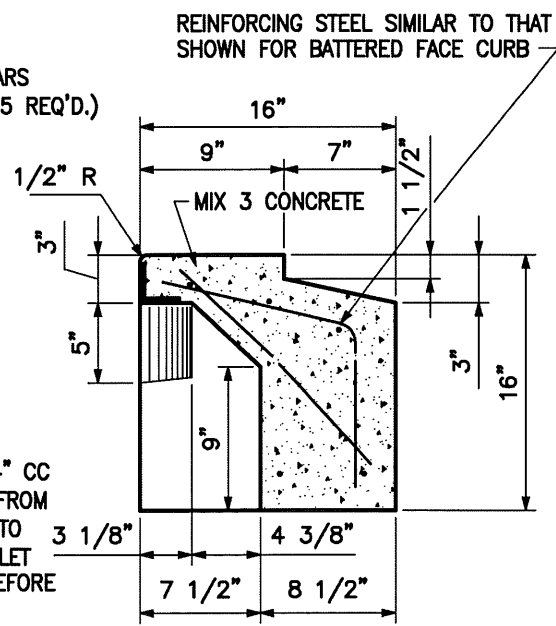


SECTION A-A
(BATTERED FACE)

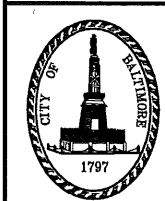
ALL LONGITUDINAL BARS
 NO. 4 5'-2" LONG (5 REQ'D.)

NO. 4 BARS 24" CC
 3 REQ'D. (BEGIN 9" FROM
 ANGLE END) FASTEN TO
 ANGLE WITH 1/4" FILLET
 WELD ALL AROUND BEFORE
 GALVANIZING.

NO. 4 BARS 12" CC
 6 REQ'D.



SECTION A-A
(VERTICAL FACE)



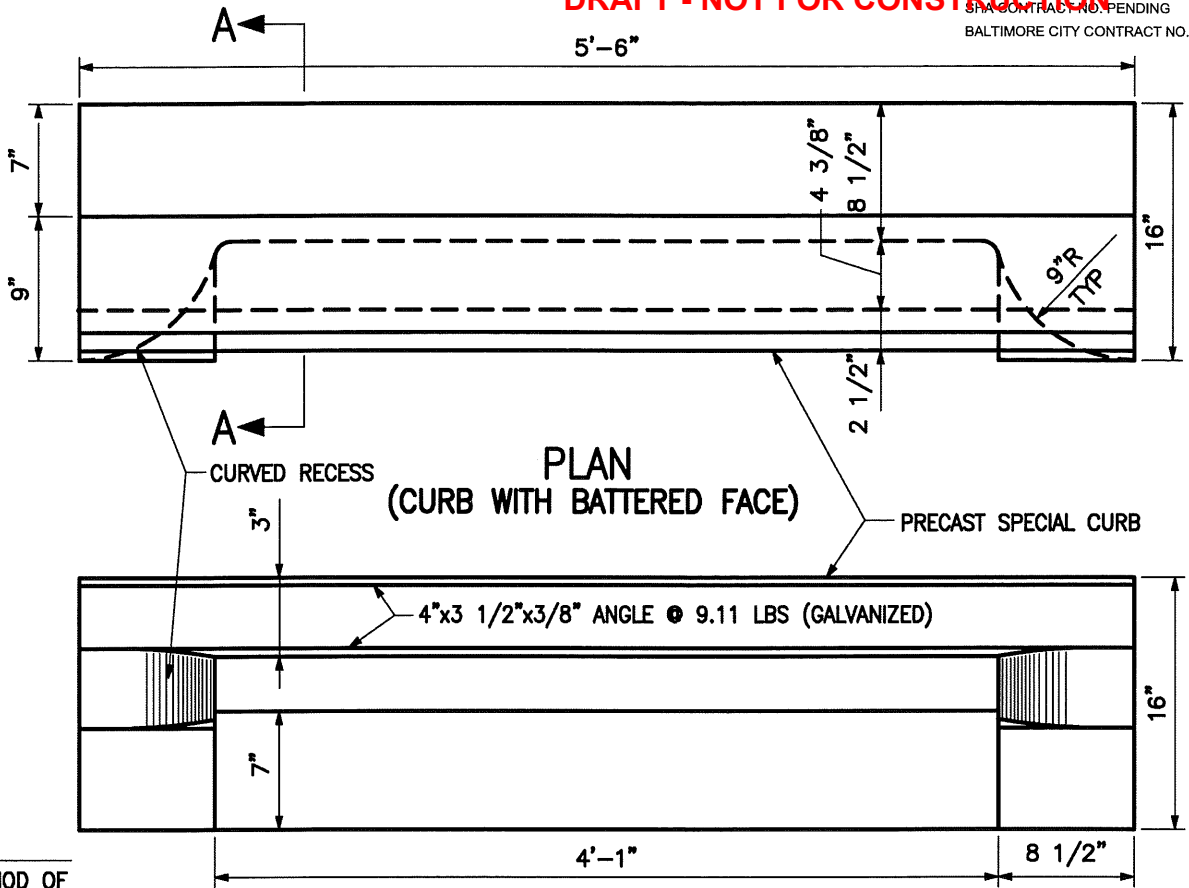
APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

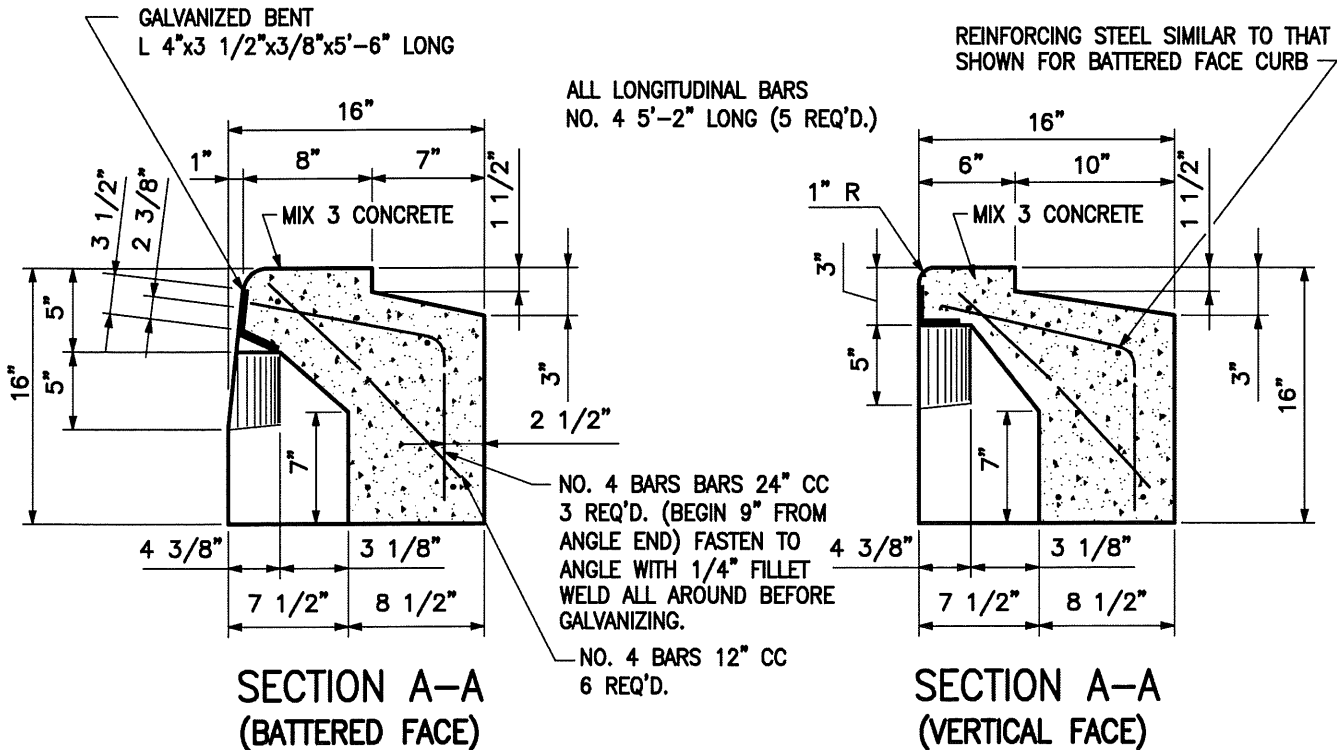
PRECAST SPECIAL CURB
 FOR UNDEPRESSED 'E'
 COMBINATION INLET
 835
 834


ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 376.22
 SCALE: NONE SHEET 1 OF 2



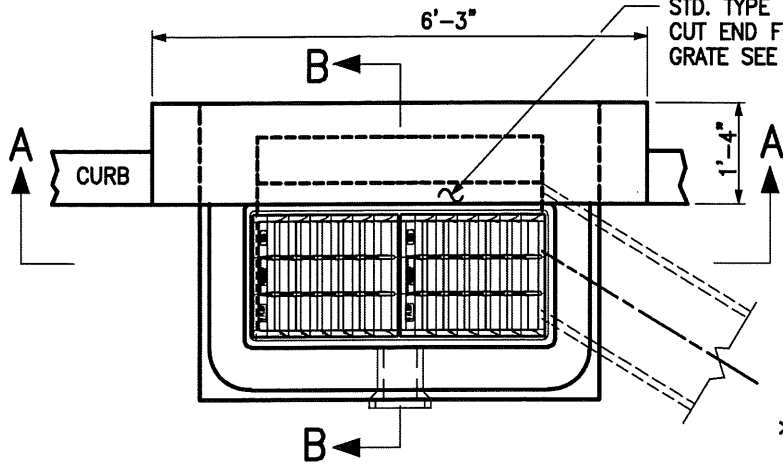
NOTE:
 FOR METHOD OF
 DEPRESSING PAVING AT
 INLETS SEE BC 380.99



	APPROVED: <i>[Signature]</i> HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	APPROVED: <i>[Signature]</i> DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
PRECAST SPECIAL CURB FOR DEPRESSED 'E' COMBINATION INLET 836 835			STANDARD NO. BC 376.22		
			SCALE: NONE	SHEET 2 OF 2	

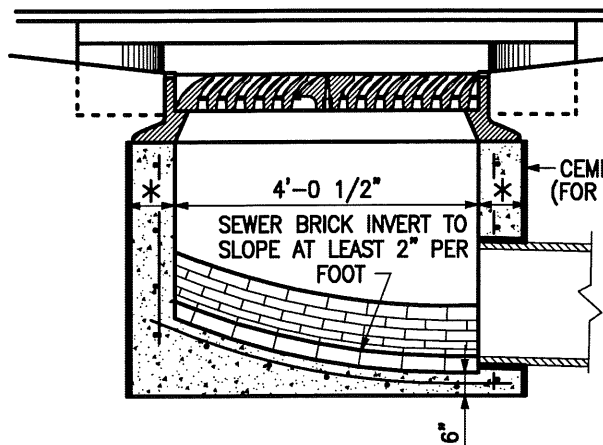
DRAFT - NOT FOR CONSTRUCTION

STD. TYPE NO. 1 'E' GRATE AND FRAME WITH
 CUT END FLANGE OR CURVED VANE (E-CV)
 GRATE SEE BC 376.01 AND BC 376.02.

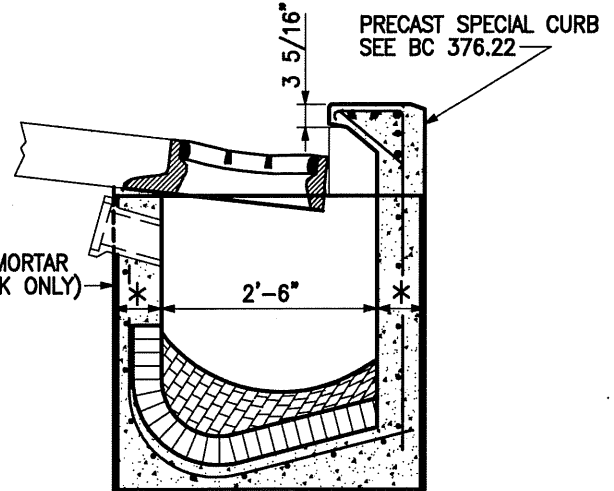


PLAN

* SEE CHART FOR WALL THICKNESS



SECTION A-A




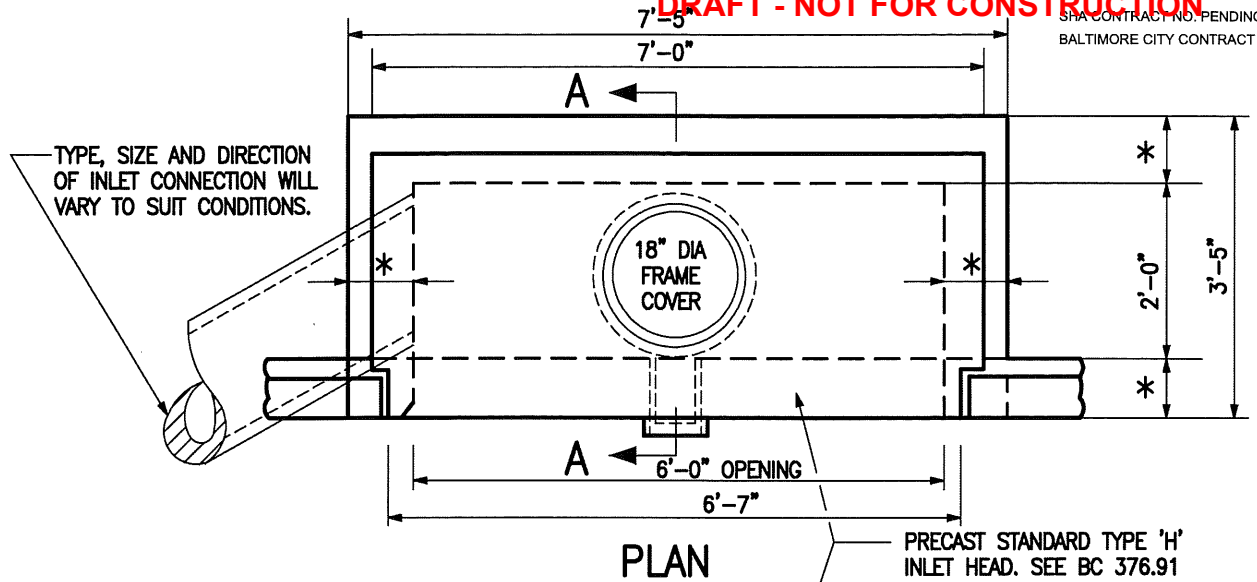
SECTION B-B

	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS AT 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPECIFICATIONS FOR INLETS.
2. TOP 4" OF PRECAST/CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. DEPTH OF INLET CONNECTION IN ALLEYS TO BE 42" FROM INVERT TO ALLEY GRADE. NO DEVIATION FROM THESE DEPTHS WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.

	APPROVED: <i>[Signature]</i> HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	APPROVED: <i>[Signature]</i> DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
TYPE 'E' 837 COMBINATION INLET 836			STANDARD NO. BC 376.24		
			SCALE: NONE		SHEET 1 OF 1

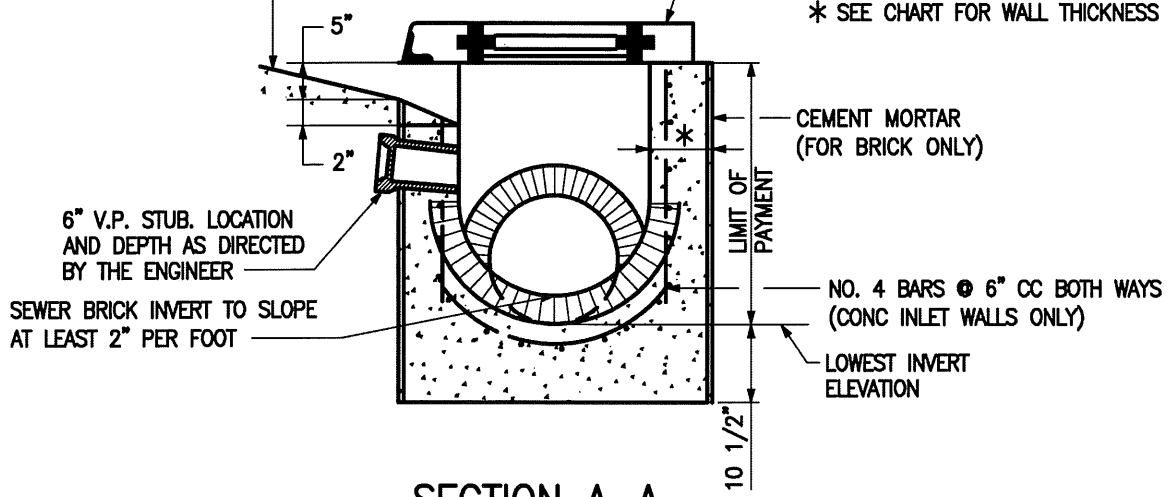


TYPE, SIZE AND DIRECTION OF INLET CONNECTION WILL VARY TO SUIT CONDITIONS.

PRECAST STANDARD TYPE 'H' INLET HEAD. SEE BC 376.91

SLOPE TO CONFORM TO CROWN OF STREET


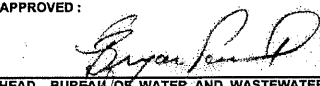

* SEE CHART FOR WALL THICKNESS

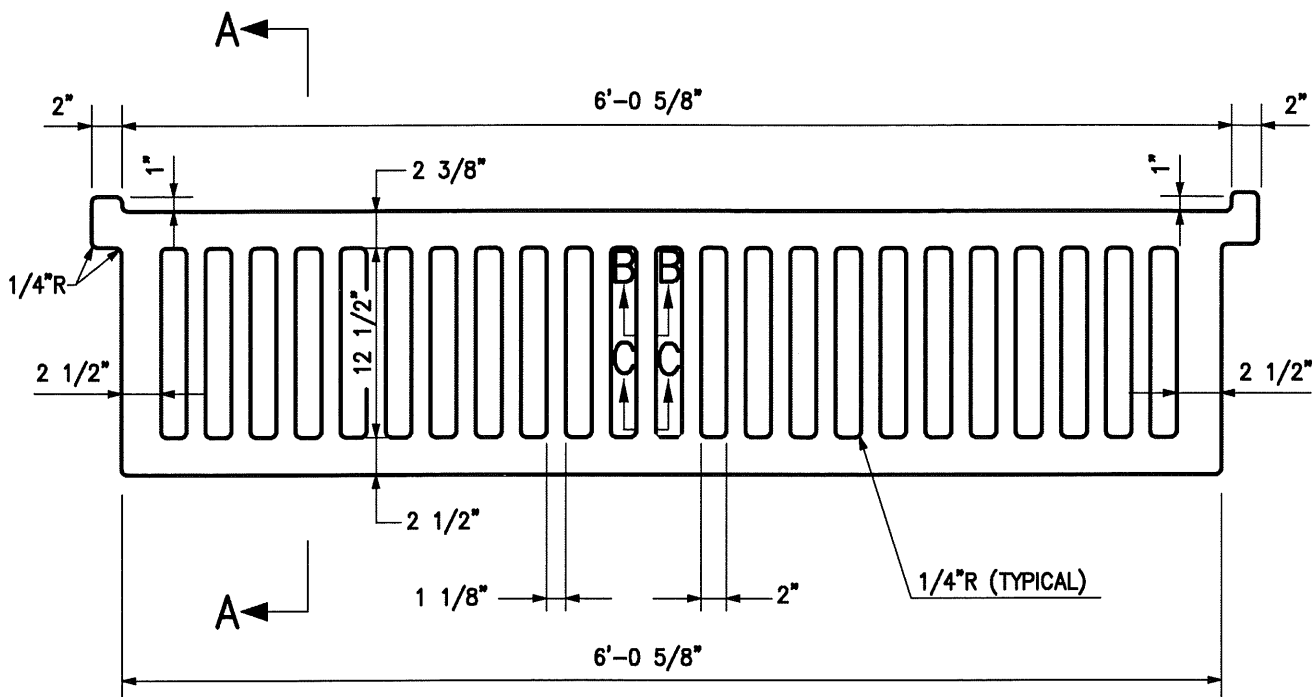


	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

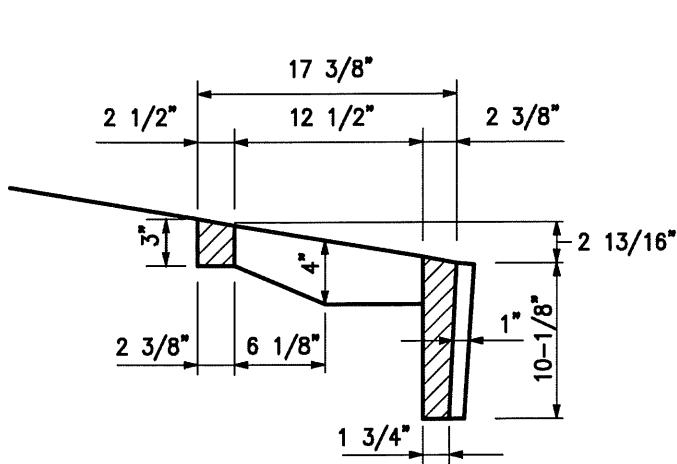
NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK OR MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS @ 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPEC FOR INLETS.
2. TOP 4" OF CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS @ 12" CC BOTH WAYS. 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. NO DEVIATION FROM THIS DEPTH WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.

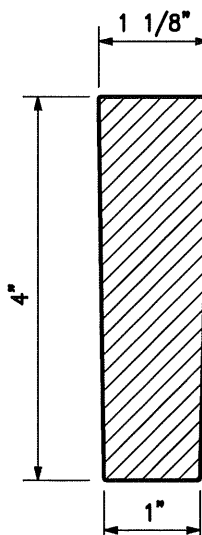
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
838 837 TYPE 'H' INLET			STANDARD NO. BC 376.54		
			SCALE: NONE	SHEET 1 OF 1	



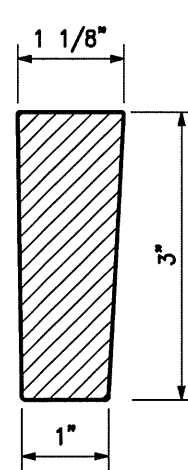
PLAN



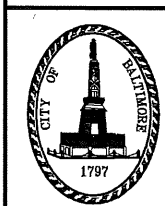
SECTION A-A



SECTION B-B
HALF SIZE



SECTION C-C
HALF SIZE



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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

839
838

TYPE NO. 2
'H' GRATE

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 376.62		
SCALE: NONE	SHEET 1 OF 1	

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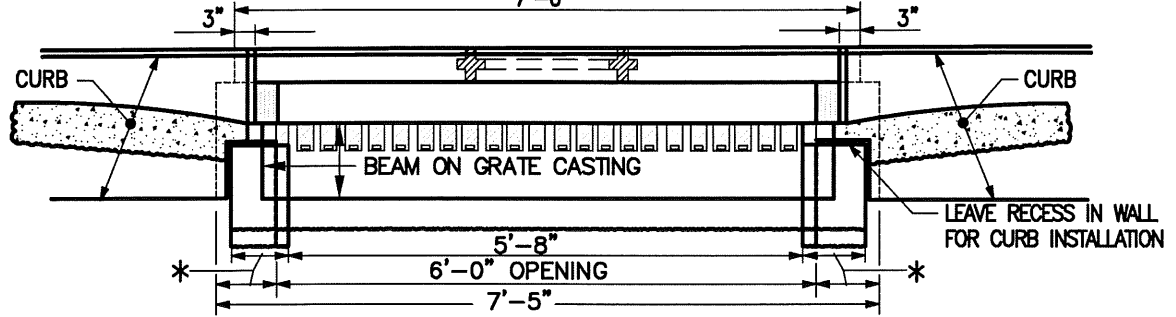
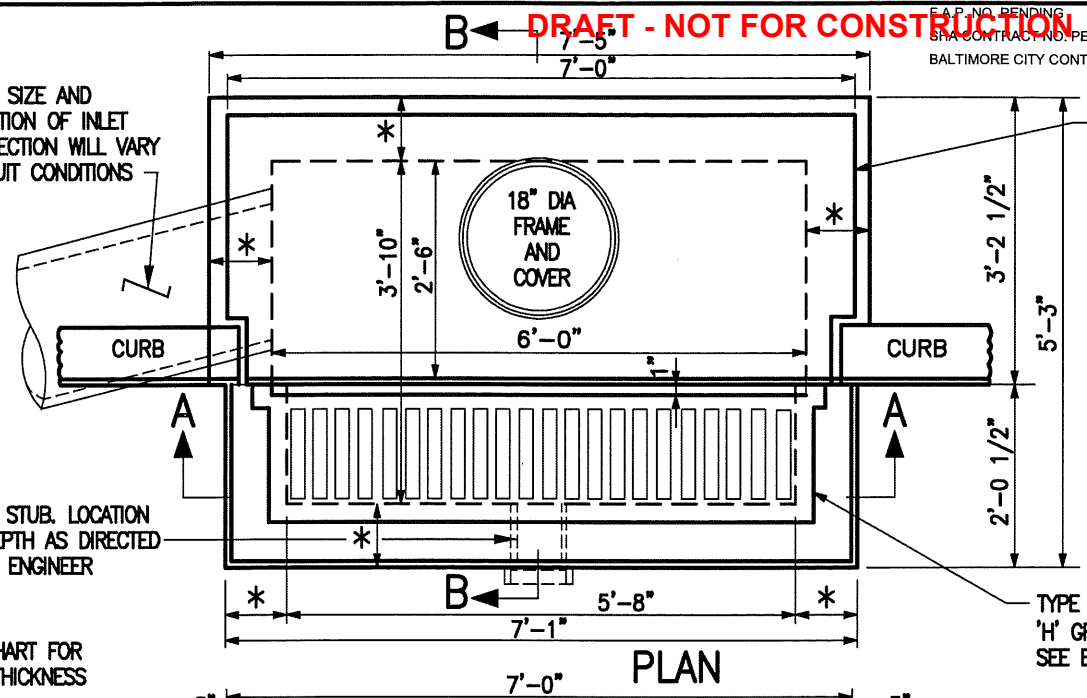
TYPE, SIZE AND DIRECTION OF INLET CONNECTION WILL VARY TO SUIT CONDITIONS

PRECAST TYPE 'H' INLET HEAD SEE BC 376.91

6" V.P. STUB. LOCATION AND DEPTH AS DIRECTED BY THE ENGINEER

* SEE CHART FOR WALL THICKNESS

TYPE NO. 2 'H' GRATE SEE BC 376.62



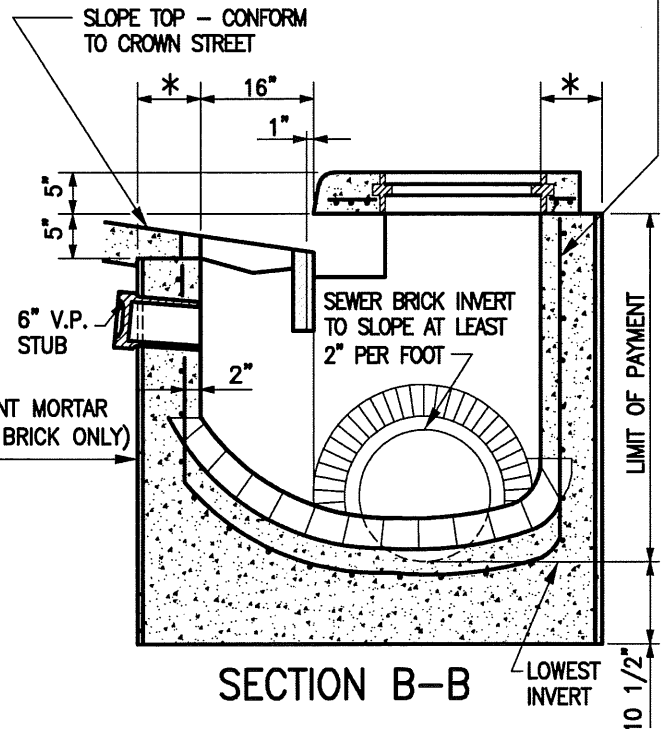
	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

SECTION A-A

NO. 4 BARS @ 6" CC BOTH WAYS (CONC INLET WALLS ONLY)

NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK OR MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS @ 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPEC FOR INLETS.
2. TOP 4" OF CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS @ 12" CC BOTH WAYS. 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. NO DEVIATION FROM THIS DEPTH WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.



SECTION B-B

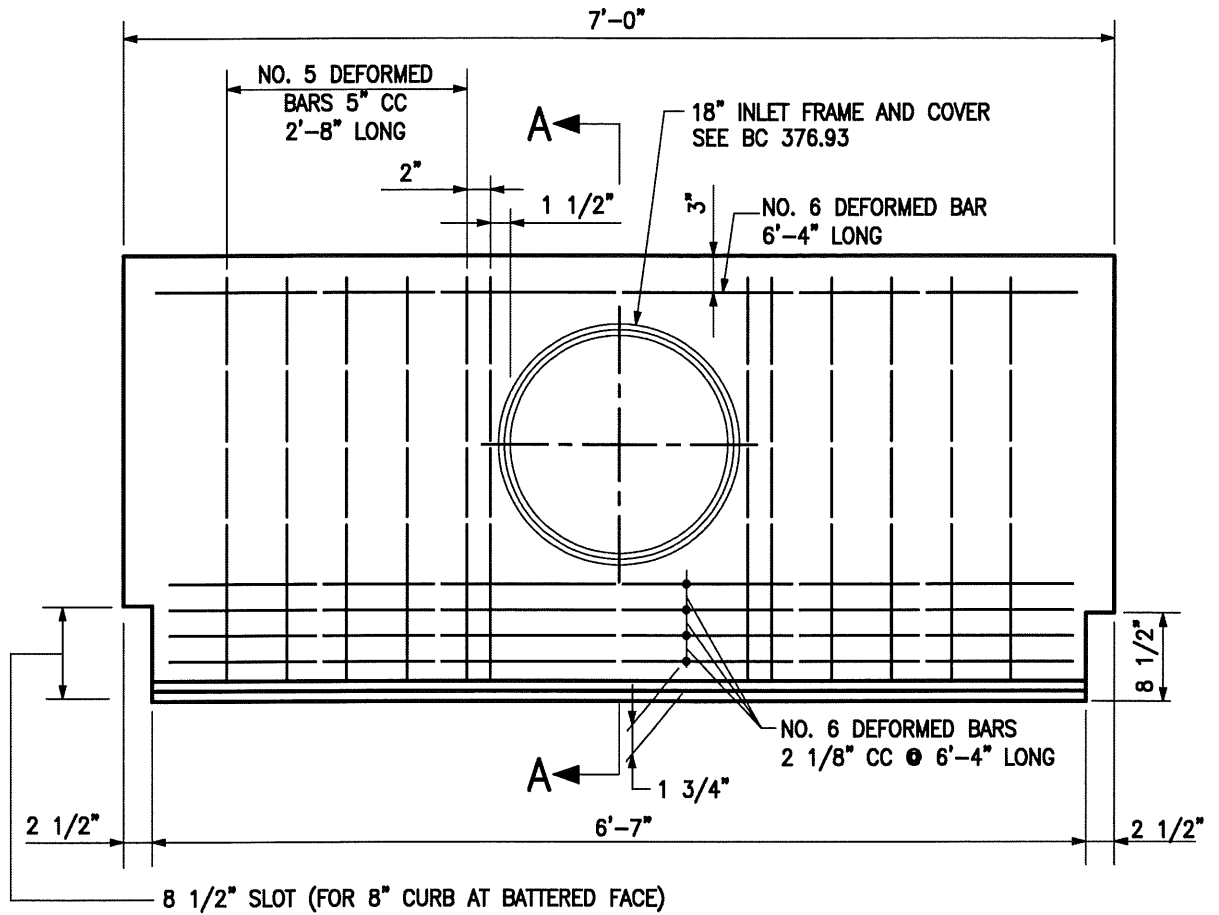


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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

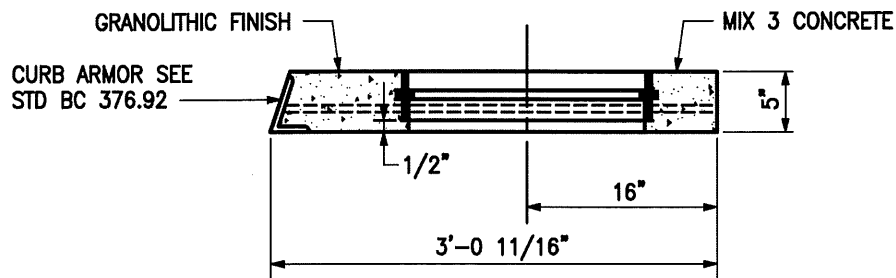
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

TYPE 'H'
 COMBINATION INLET
 840
 839

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 376.64		
SCALE: NONE	SHEET 1 OF 1	



PLAN



SECTION A-A



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HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]

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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

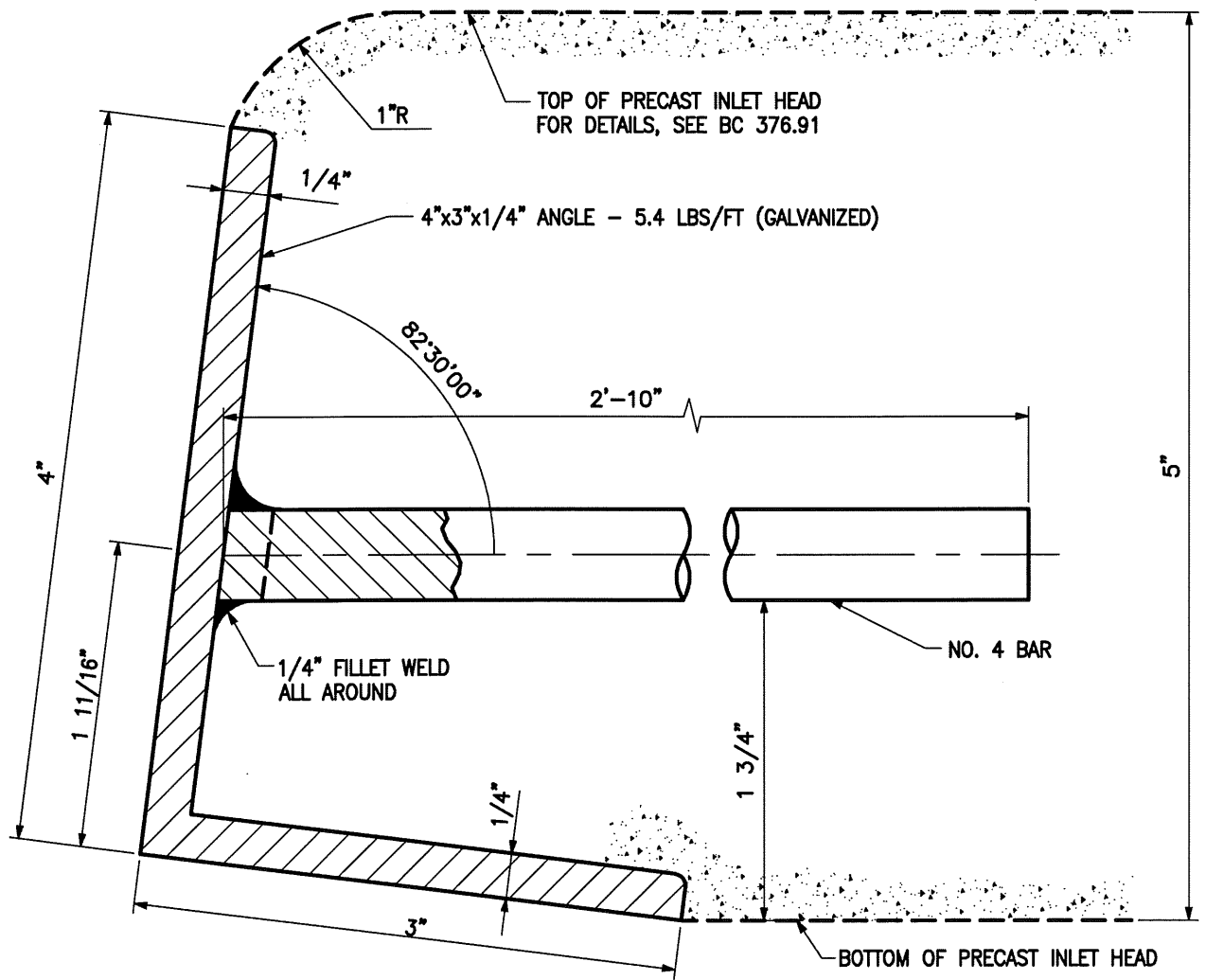
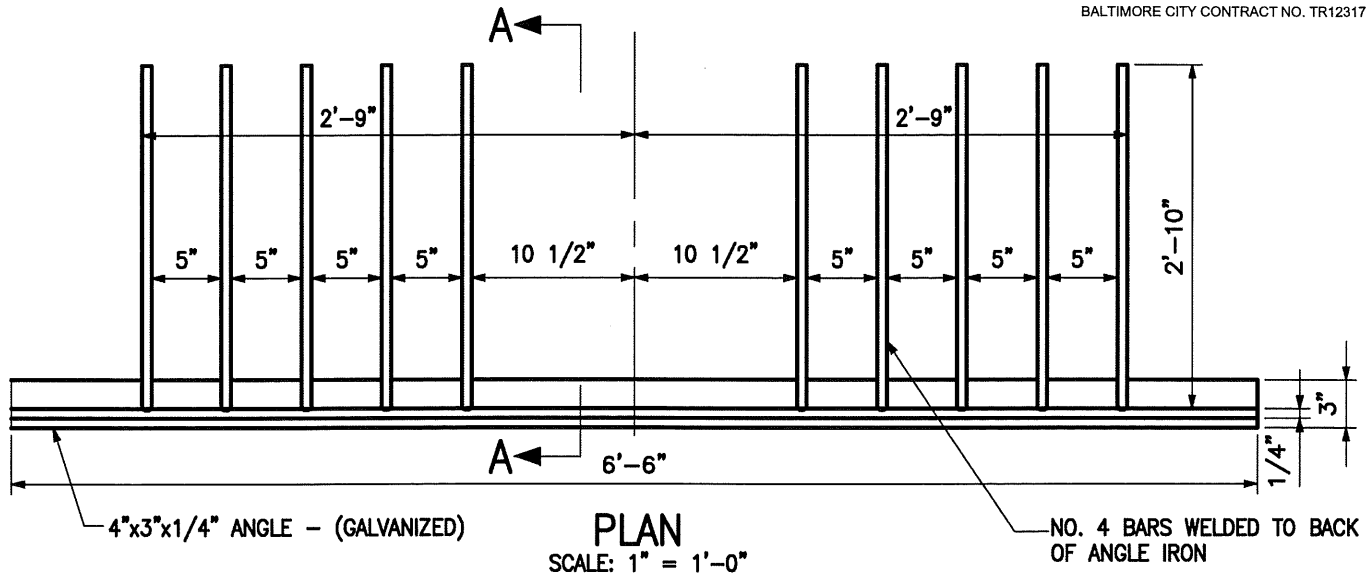
841
 840

PRECAST TYPE
 'H' INLET HEAD


ISSUED	REVISED	REVISED
3 / 2008		

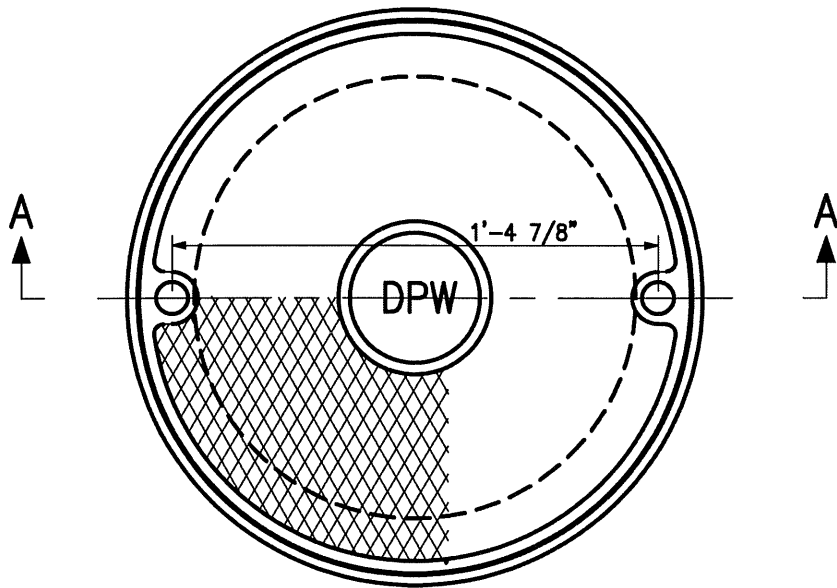
**STANDARD NO.
 BC 376.91**

SCALE: NONE SHEET 1 OF 1

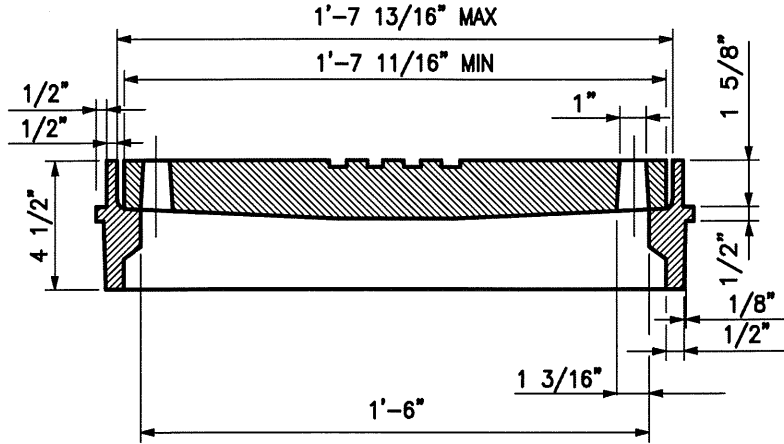


SECTION A-A
 SCALE: FULL SIZE


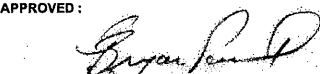
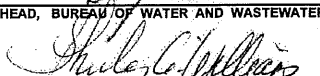
	APPROVED: <i>[Signature]</i> HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	APPROVED: <i>[Signature]</i> DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
	CURB ARMOR FOR TYPE 842 'H' INLET HEAD 841		STANDARD NO. BC 376.92		
			SCALE: NONE	SHEET 1 OF 1	

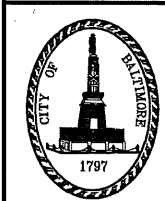
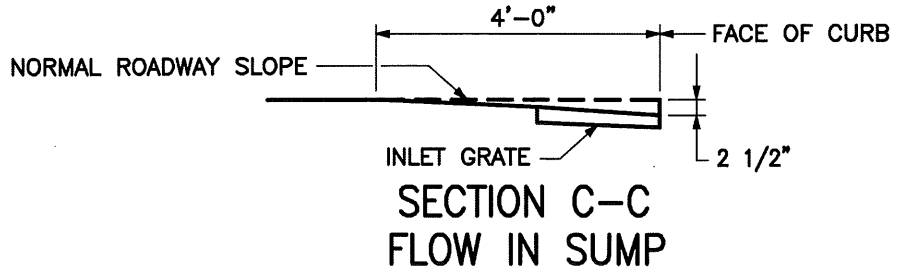
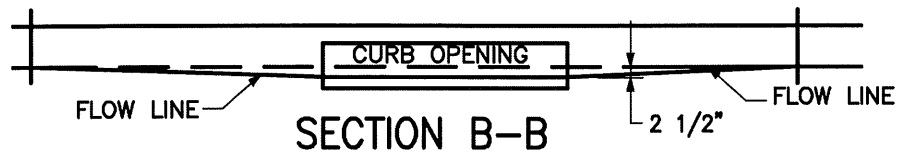
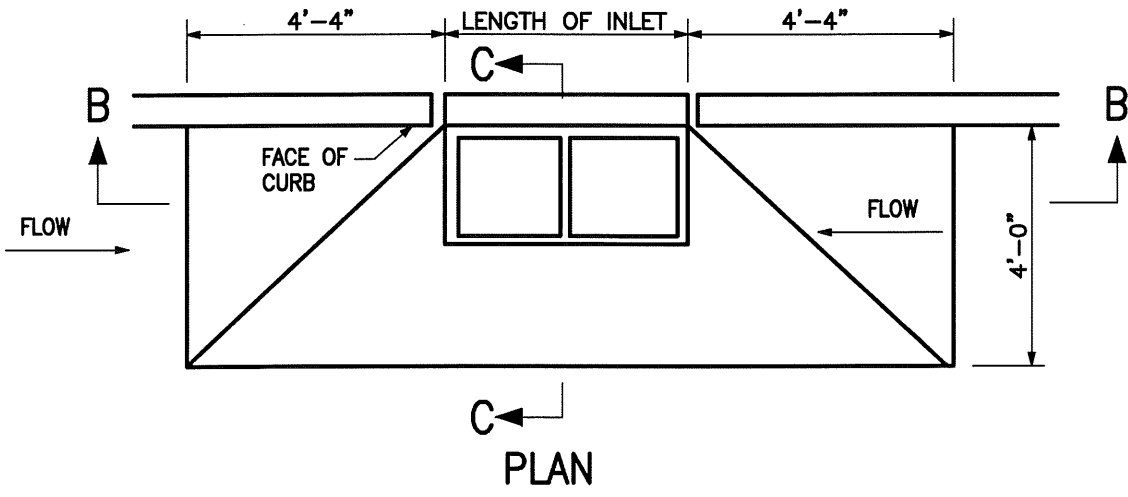
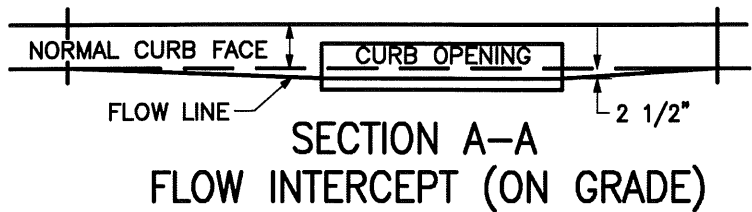
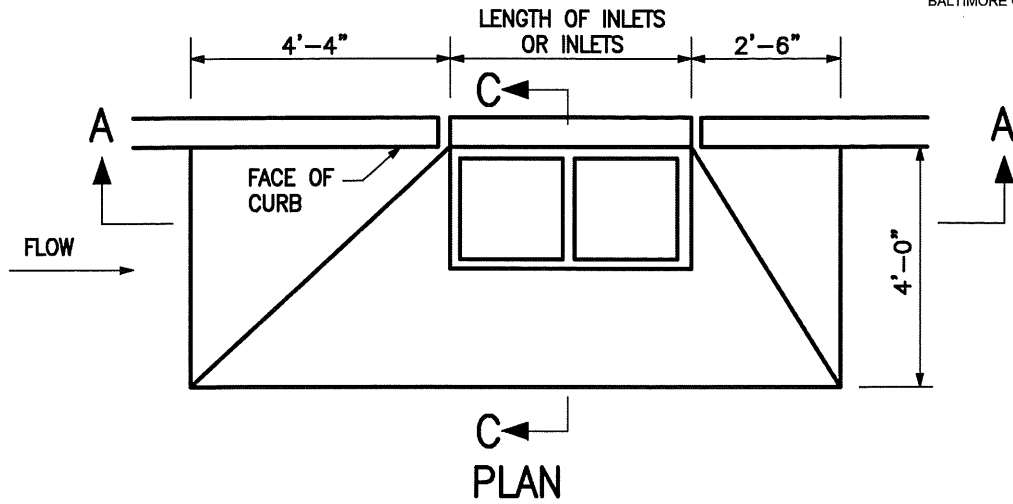


PLAN



SECTION A-A

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS	18 IN. INLET FRAME AND COVER 843 842	STANDARD NO. BC 376.93	SCALE: NONE	SHEET 1 OF 1



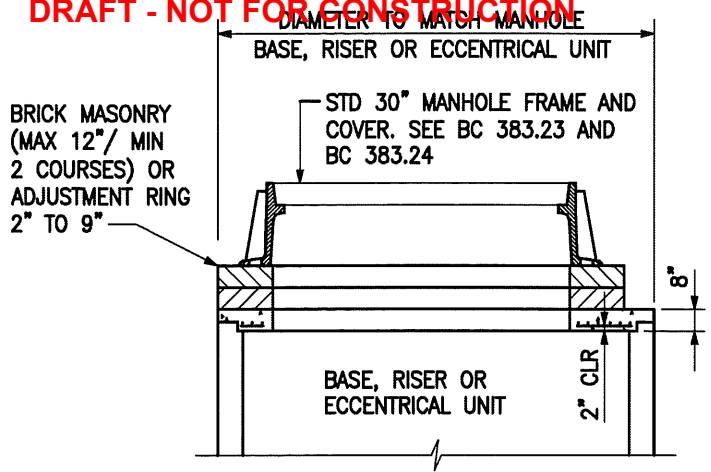
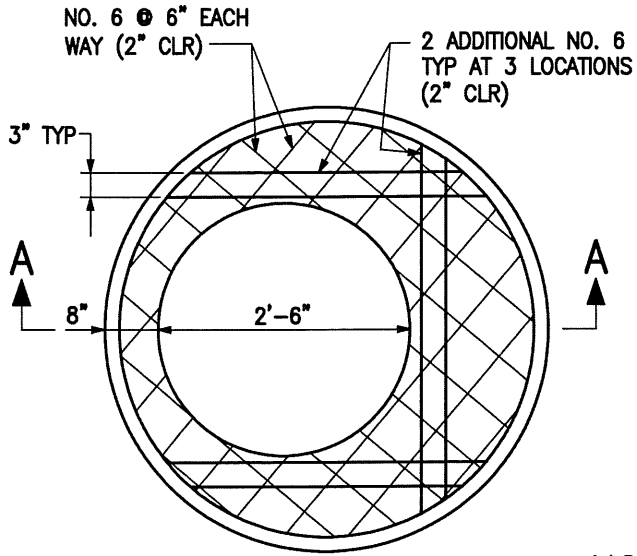
APPROVED: *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

METHOD OF DEPRESSING
844 PAVING AT INLETS
843

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 380.99		
SCALE : NONE	SHEET 1 OF 1	

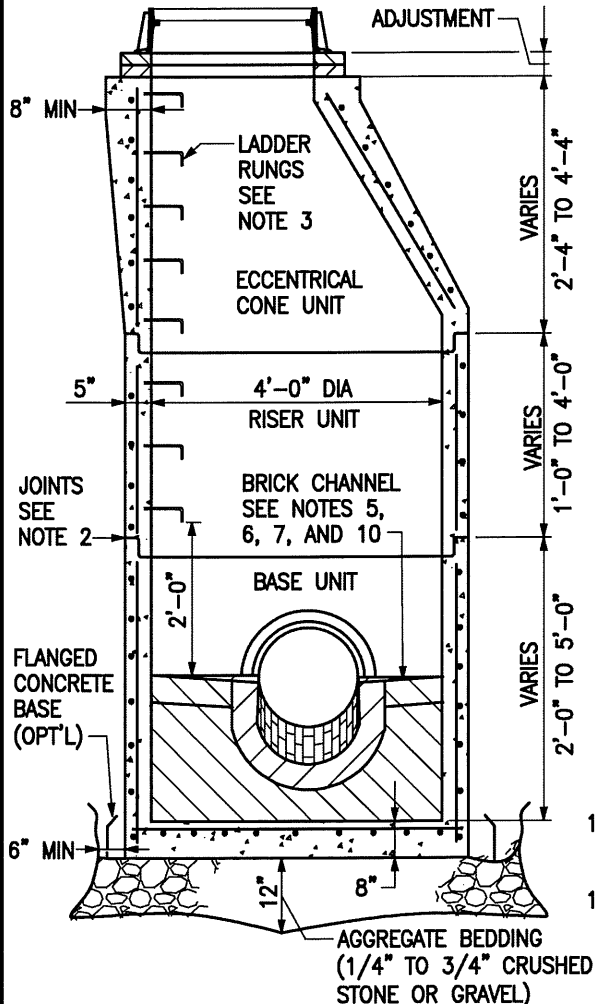
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SECTION A-A

OPTIONAL FLAT SLAB TOP

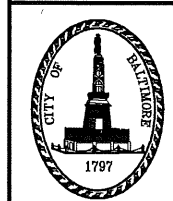
(SHOWN WITHOUT MANHOLE FRAME AND CLOVER - SEE NOTE 9)



SECTION

NOTES:

1. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO "PRECAST REINFORCED CONCRETE MANHOLE SECTION ASTM DESIGNATION C-478, LATEST REVISIONS".
2. MANHOLE SECTIONS MANUFACTURED ACCORDING TO ASTM C-478 AND AASHTO M199. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATER TIGHT USING 'O' RING RUBBER GASKETS AND PROFILE JOINTS MEETING ASTM C-443 AND C-361. FLEXIBLE PLASTIC GASKET TO MEET AASHTO M198 TYPE B.
3. LADDER RUNGS SHALL BE INSTALLED IN STAGGERED ALIGNMENT AT 1'-3" TYPICAL CC. RUNG TYPE SHALL BE IN ACCORDANCE WITH STANDARD BC 383.92 OR 383.93. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
4. LIFT EYES OR LIFT INSERTS SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
5. BENCH AND CHANNEL TO BE CONSTRUCTED OF ONE COURSE OF SEWER BRICK ON EDGE. BENCH TO SLOPE A MINIMUM OF 1" PER FOOT TOWARDS CHANNEL.
6. BENCH HEIGHT ABOVE OUTGOING PIPE INVERT TO BE EQUAL TO ONE HALF DIAMETER OF THE OUTGOING PIPE OR AS DIRECTED BY THE ENGINEER.
7. CHANNEL TO THE SLOPE 1/4 INCH PER FOOT TOWARDS OUTLET OR AS DIRECTED BY THE ENGINEER.
8. USE NON-SHRINK GROUT JOINT FILLER.
9. USE FLAT SLAB TOP WHEN MANHOLE LENGTH IS NOT SUFFICIENT FOR ECCENTRICAL CONE UNIT.
10. VERTICAL MEASUREMENT FOR PAYMENT SHALL BE FROM THE INVERT OF THE OUTGOING PIPE TO THE BOTTOM OF THE MANHOLE FRAME.
11. MATERIAL PROPERTIES: CONCRETE SHALL BE MIX 6, WWF PER ASTM A135, REBAR PER ASTM A615 GRADE 60.



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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

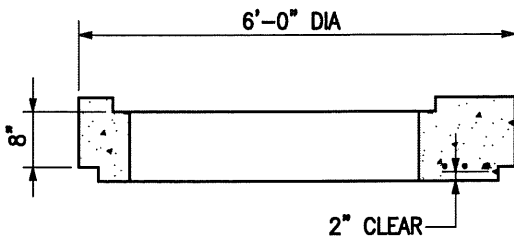
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

845
 844
 48" DIA PRECAST
 STORM MANHOLE FOR
 15" TO 24" PIPES

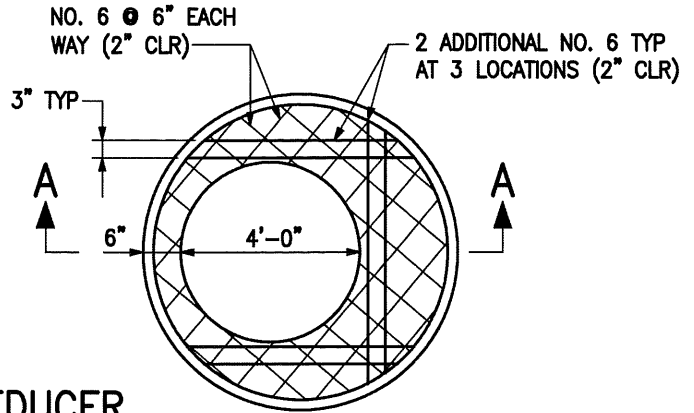
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 383.04
 SCALE: NONE SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION



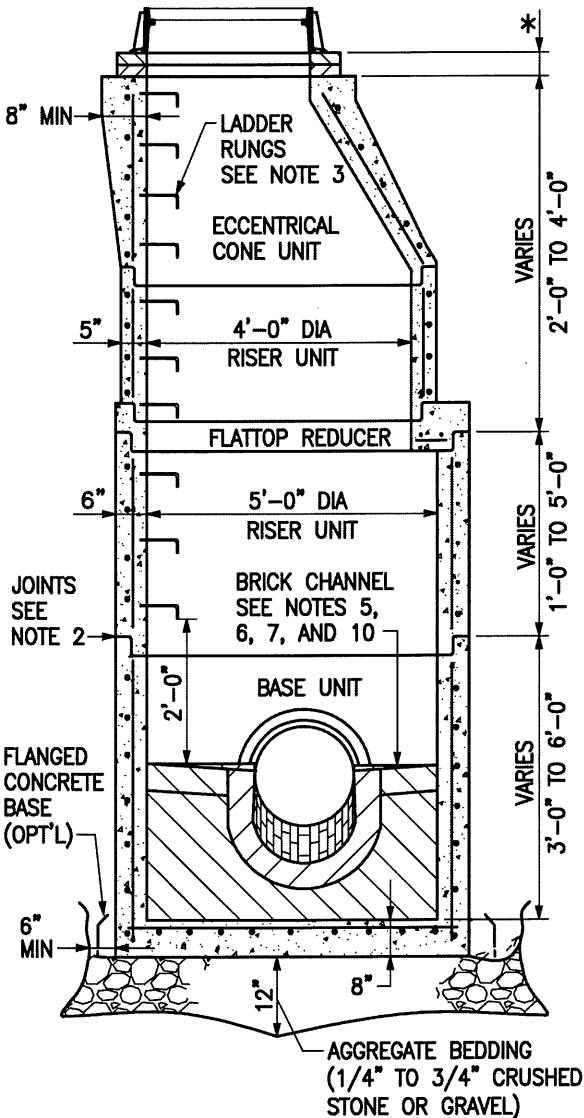
SECTION A-A



PLAN

FLATTOP REDUCER


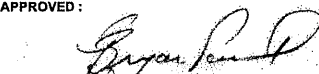
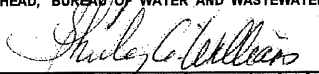
* ADJUSTMENT - SEE SECTION A-A
 ON BC 383.04



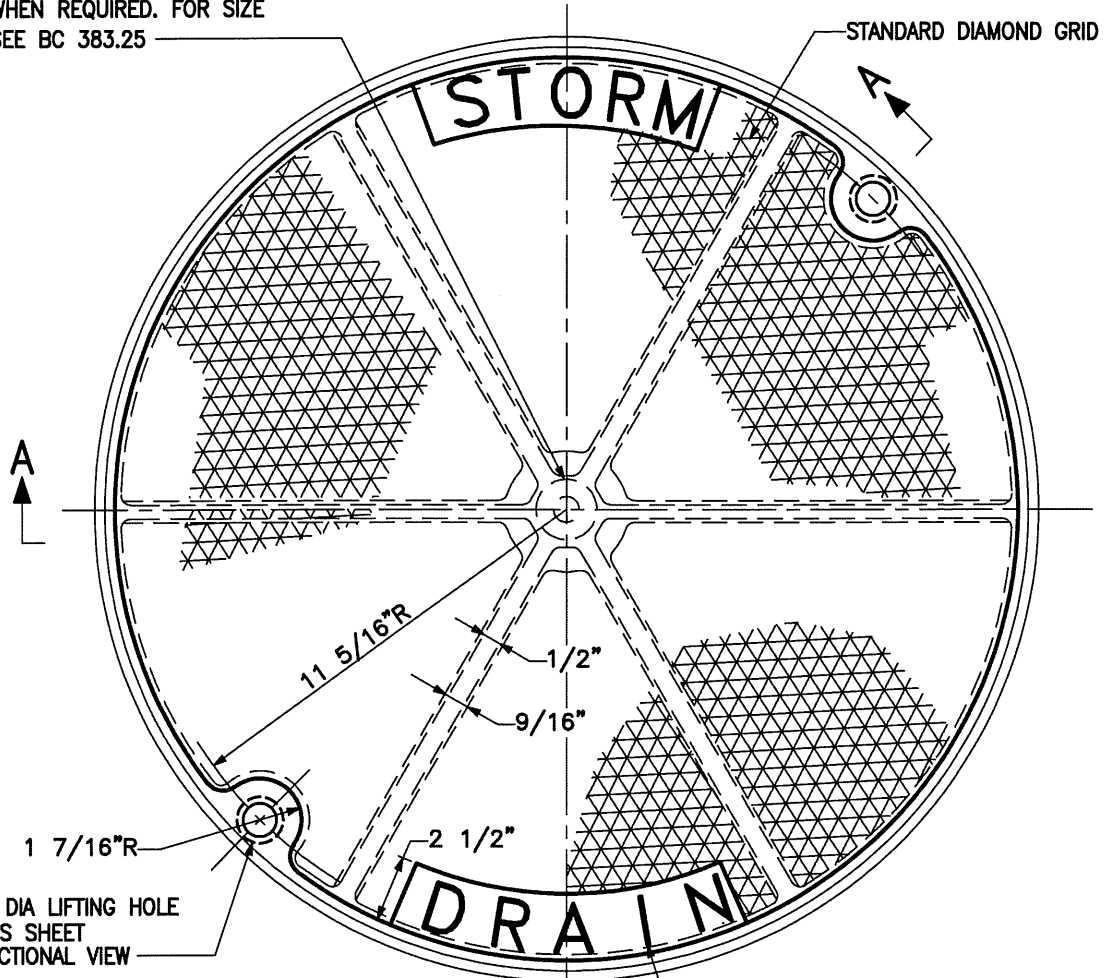
SECTION

NOTES:

1. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO "PRECAST REINFORCED CONCRETE MANHOLE SECTION ASTM DESIGNATION C-478, LATEST REVISIONS".
2. MANHOLE SECTIONS MANUFACTURED ACCORDING TO ASTM C-478 AND AASHTO M199. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATER TIGHT USING 'O' RING RUBBER GASKETS AND PROFILE JOINTS MEETING ASTM C-443 AND C-361. FLEXIBLE PLASTIC GASKET TO MEET AASHTO M198 TYPE B.
3. LADDER RUNGS SHALL BE INSTALLED IN STAGGERED ALIGNMENT AT 1'-3" TYPICAL CC. RUNG TYPE SHALL BE IN ACCORDANCE WITH STANDARD BC 383.92 OR 383.93. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
4. LIFT EYES OR LIFT INSERTS SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
5. BENCH AND CHANNEL TO BE CONSTRUCTED OF ONE COURSE OF SEWER BRICK ON EDGE. BENCH TO SLOPE A MINIMUM OF 1" PER FOOT TOWARDS CHANNEL.
6. BENCH HEIGHT ABOVE OUTGOING PIPE INVERT TO BE EQUAL TO ONE HALF DIAMETER OF THE OUTGOING PIPE OR AS DIRECTED BY THE ENGINEER.
7. CHANNEL TO THE SLOPE 1/4 INCH PER FOOT TOWARDS OUTLET OR AS DIRECTED BY THE ENGINEER.
8. USE NON-SHRINK GROUT JOINT FILLER.
9. USE FLAT SLAB TOP WHEN MANHOLE LENGTH IS NOT SUFFICIENT FOR ECCENTRIC CONE UNIT.
10. VERTICAL MEASUREMENT FOR PAYMENT SHALL BE FROM THE INVERT OF THE OUTGOING PIPE TO THE BOTTOM OF THE MANHOLE FRAME.
11. MATERIAL PROPERTIES: CONCRETE SHALL BE MIX 6, WWF PER ASTM A135, REBAR PER ASTM A615 GRADE 60.
12. FLATTOP REDUCER REINFORCEMENT TO CONSIST OF REBAR SPACING AS SHOWN OR TWO CONTINUOUS CAGES WITH ONE WIRE PER CAGE INSIDE AND OUTSIDE WIRE AREA 0.12 PER ASTM A185.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
60" DIA PRECAST STORM MANHOLE FOR 27" TO 36" PIPES			STANDARD NO. BC 383.05		
846 845			SCALE: NONE	SHEET 1 OF 1	

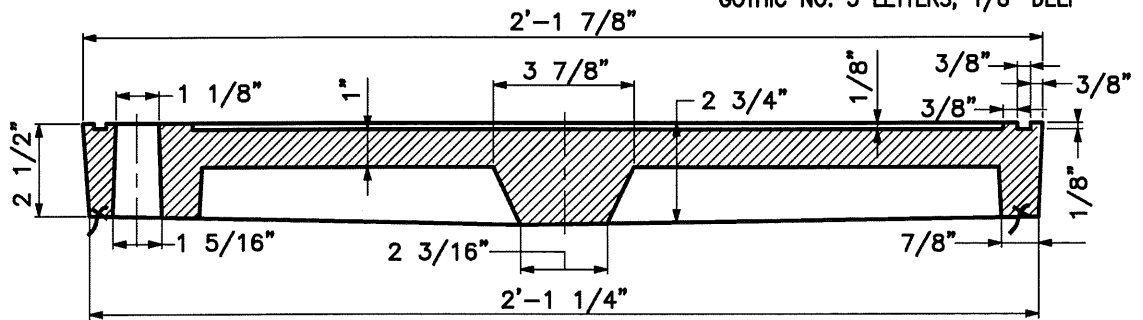
PROVIDE HOLE FOR LOCKING BOLT
WHEN REQUIRED. FOR SIZE
SEE BC 383.25



1 7/16"R
1 1/8" DIA LIFTING HOLE
SEE THIS SHEET
FOR SECTIONAL VIEW

PLAN

1 3/4" STANDARD FLAT FACE
GOTHIC NO. 3 LETTERS, 1/8" DEEP



SECTION A-A

NOTES:

1. FOR STD 24" MANHOLE FRAME SEE BC 383.22
2. MATERIAL SHALL BE CAST GRAY IRON ASTM A-48, CLASS 35B
3. COVER SHALL MEET OR EXCEED AASHTO M 306 PROOF LOAD REQUIREMENTS.

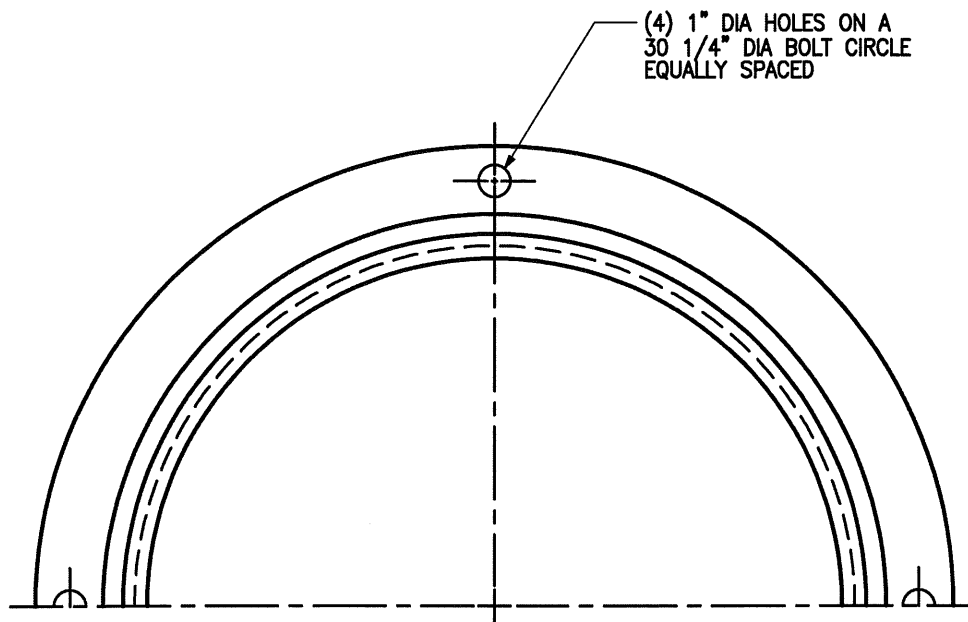


APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

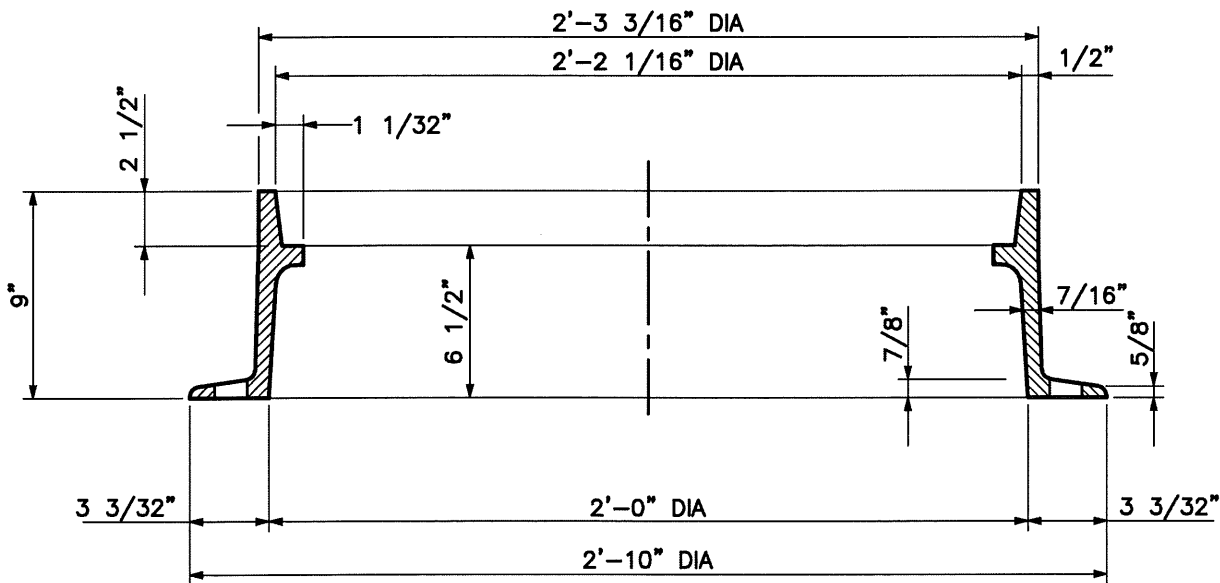
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 24 IN.
MANHOLE COVER
847
846

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.21		
SCALE: NONE	SHEET 1 OF 1	



PARTIAL PLAN



SECTION

NOTES:

1. FOR 24" LOCK TYPE FRAME SEE BC 383.25
2. FOR STD 24" MANHOLE COVER SEE BC 383.21
3. MATERIAL SHALL BE CAST GRAY IRON ASTM A-48, CLASS 35B
4. FRAME SHALL MEET OR EXCEED AASHTO M 306 PROOF LOAD REQUIREMENTS.

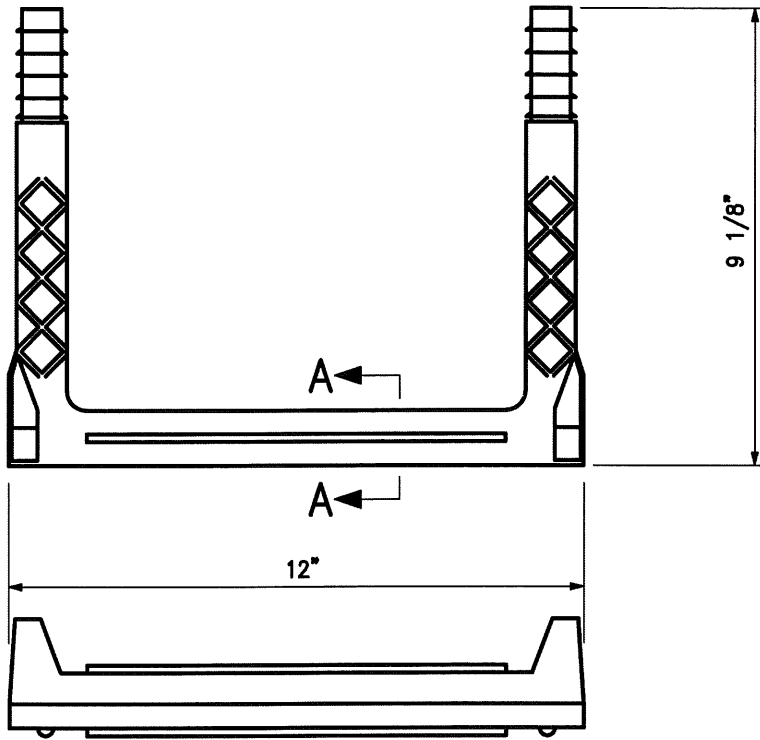


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

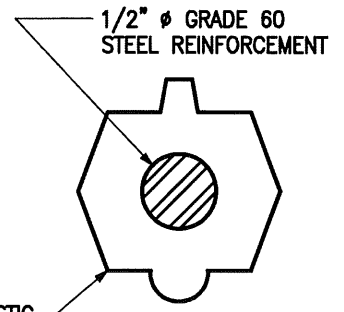
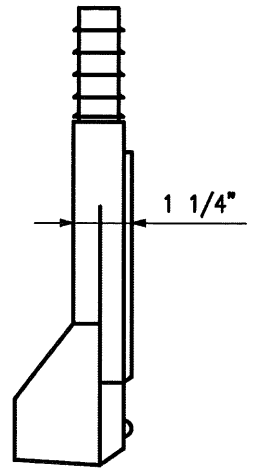
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD 24 IN.
 MANHOLE FRAME
 848
 847

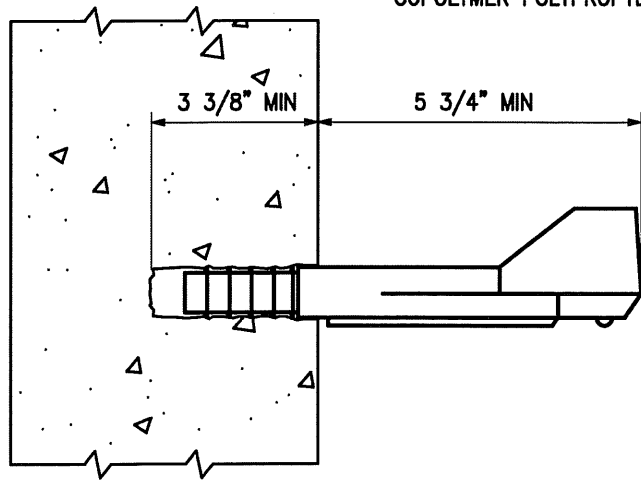
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.22		
SCALE: NONE	SHEET 1 OF 1	



PLAN


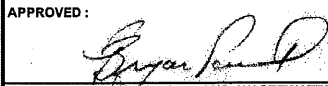
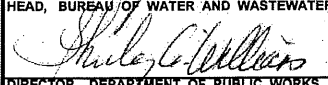


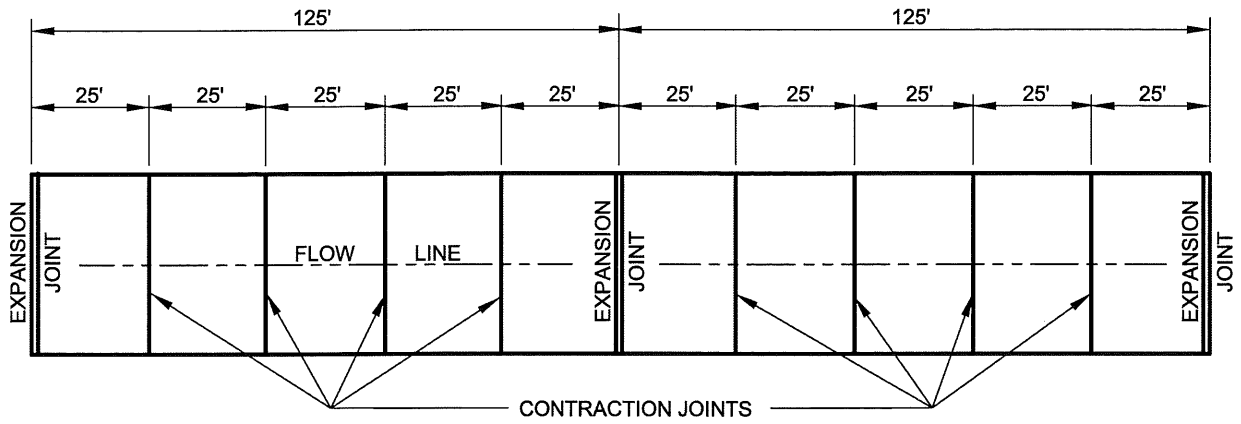
SECTION A-A



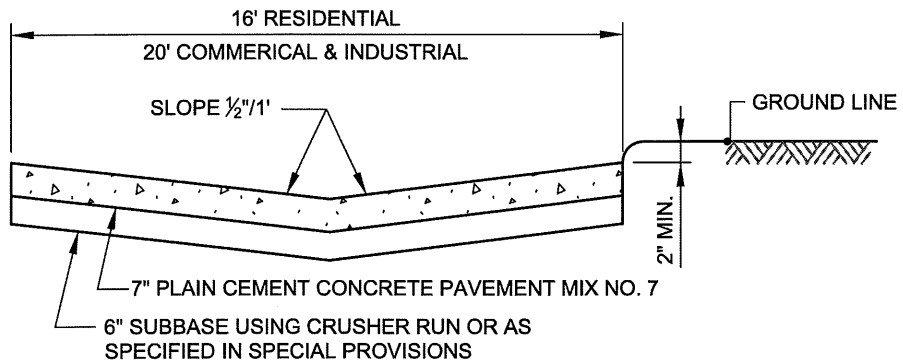
NOTE:

COPOLYMER POLYPROPYLENE SHALL BE CERTIFIED BY THE MANUFACTURER TO CONFORM TO ASTM D4101 AND HAVE A MINIMUM EXPOSED SECTION THICKNESS OF 1/8".

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED	
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008			
	POLYPROPYLENE MANHOLE STEP FOR PRECAST MANHOLES		STANDARD NO. BC 383.93			SCALE: NONE




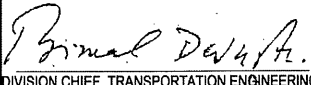
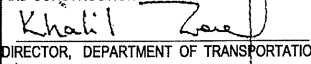
PLAN
 MAXIMUM SPACING SHOWN

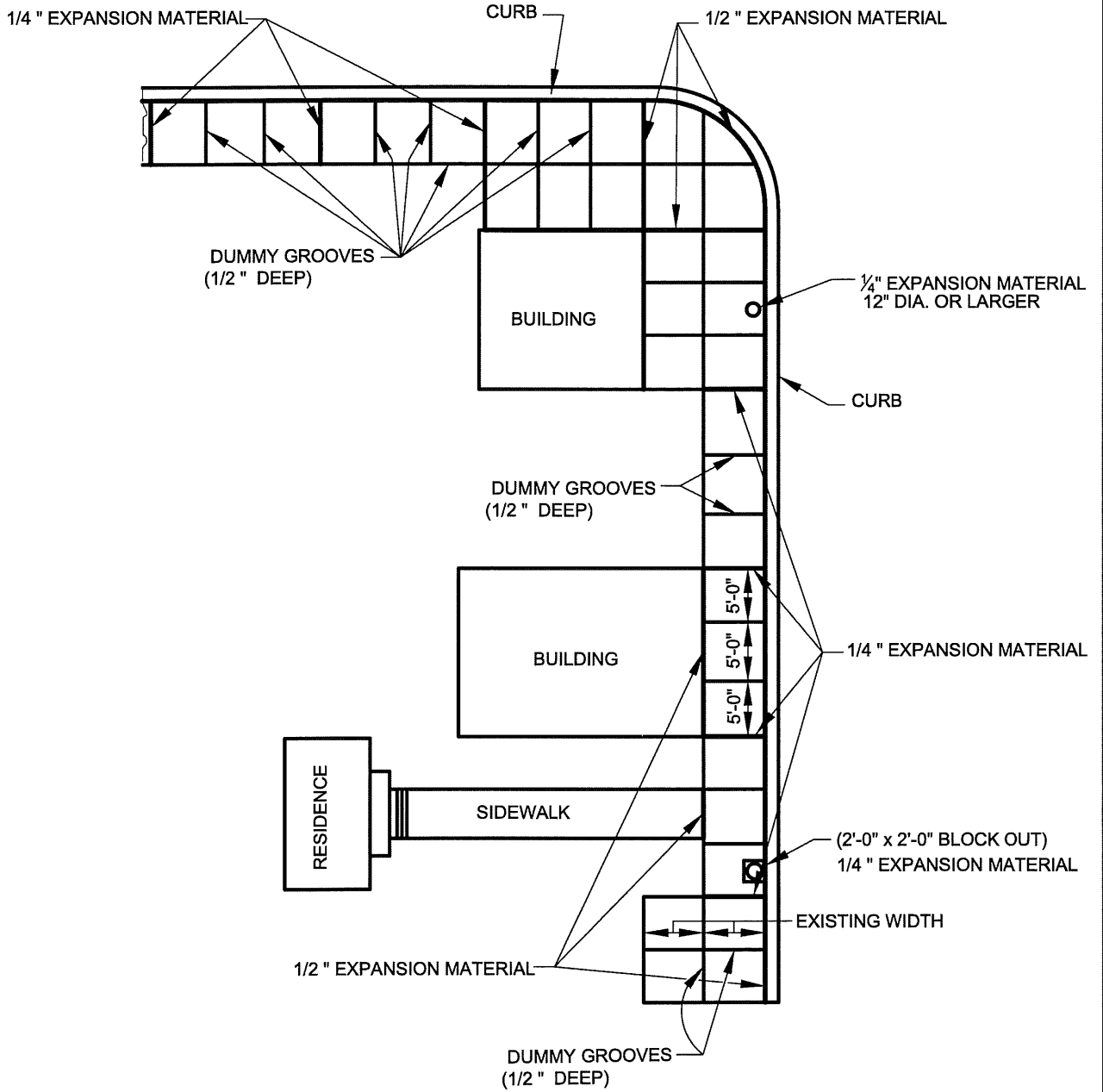


TYPICAL SECTION

GENERAL NOTES

1. WORK TO BE DONE IN ACCORDANCE WITH SECTION 32 13 13.33 OF THE STANDARD SPECIFICATIONS DATED 2006.
2. PLACE AN EXPANSION JOINT AT INTERVALS SHOWN AND AT ALL ANGLES IN ALLEYS.
3. NO LONGITUDINAL CONSTRUCTION JOINTS WILL BE PERMITTED.
4. PLACE 1/2" PERFORMED EXPANSION MATERIAL AT ALL ABUTTING CONCRETE.
5. AN EDGING TOOL WITH A ONE - QUARTER (1/4) INCH RADIUS SHALL BE USED TO FINISH THE CONCRETE NEXT TO EXPANSION AND CONTRACTION JOINTS, UNLESS CONTRACTION JOINT ARE SAWED.
6. EXPANSION AND CONTRACTION JOINTS SHALL BE IN ACCORDANCE WITH STD. PLATE BC 572.21 AND BC 572.92-1, EXCEPT AS FOLLOWS: EXPANSION JOINTS - USE 3/4" DIA. DOWEL BAR CONTRACTION JOINTS - DOWEL BARS NOT REQUIRED.

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED	REVISED	REVISED	
	 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION		CONCRETE ALLEY 850 849	8 / 2010		
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION			STANDARD NO. BC 500.12		
			SCALE : NONE	SHEET 1 OF 1		

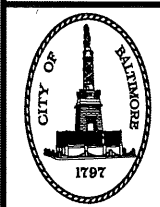
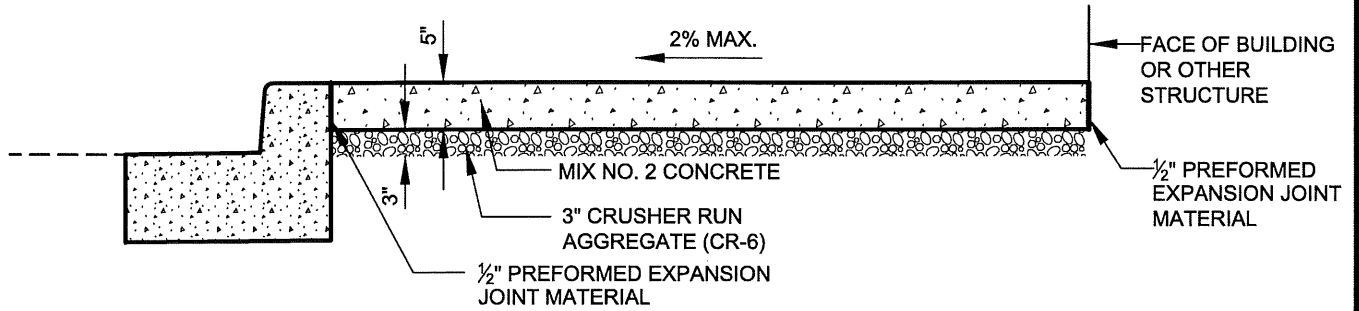


APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND
 CONSTRUCTION
SIDEWALK EXPANSION JOINTS
 851
 850

ISSUED	REVISED	REVISED
8 / 2010		
STANDARD NO. BC 655.01		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION



APPROVED:
Primal DeWalt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND
 CONSTRUCTION

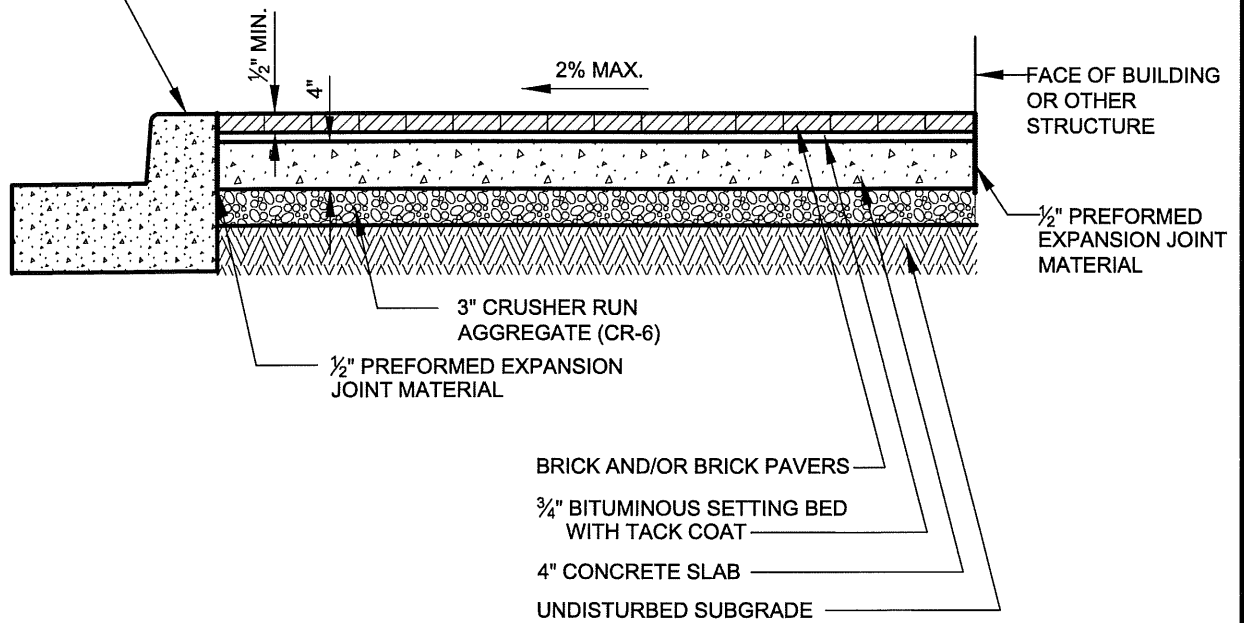
**TYPICAL SECTION
 CONCRETE SIDEWALK**

692
 851


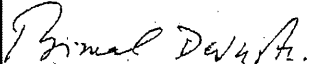

ISSUED	REVISED	REVISED
8 / 2010		
STANDARD NO. BC 655.05		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION

NOTE: TYPE OF CURB OR CURB AND GUTTER SHALL BE AS SPECIFIED ON THE PLANS.

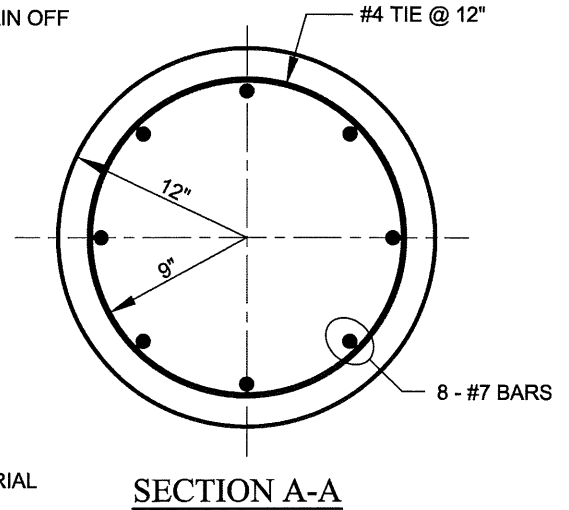
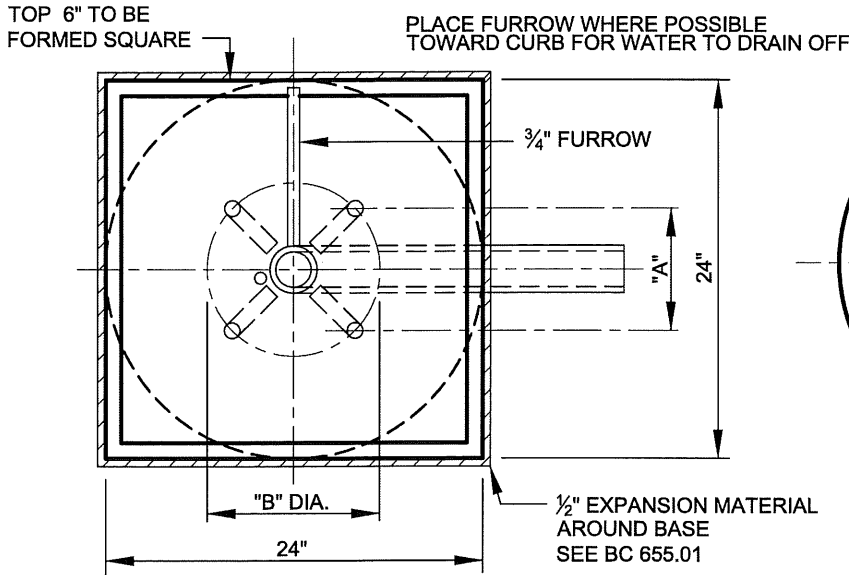


NOTE: BRICK WILL NOT BE INSTALLED FOR DRIVEWAYS.
 ONLY STANDARD CONCRETE SHALL BE USED.

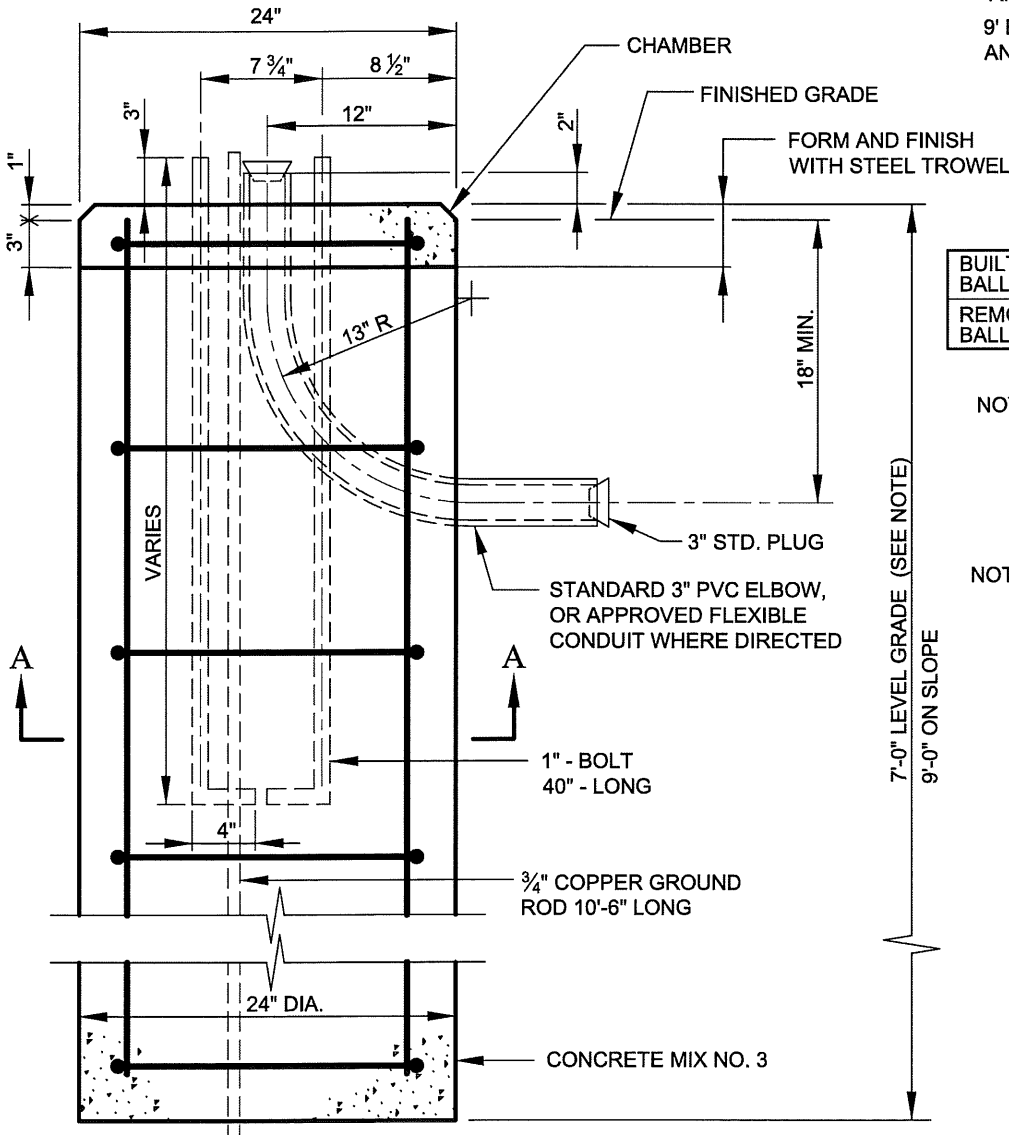
	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	STANDARD NO. BC 655.10	SCALE: NONE	SHEET 1 OF 1		

859
852

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REINFORCING: 7' BASE MUST HAVE 8 - #7 BAR AND 8 - #4 TIES AT 12" C/C
 9' BASE MUST HAVE 8 - #7 BAR AND 10 - #4 TIES AT 12" C/C



	"A" BOLT SPACE	"B" BOLT CIRCLE DIA.
BUILT IN BALLAST	7 3/4"	11"
REMOTE BALLAST	10 5/8"	15"

NOTE: 7' BASE FOR MAST ARMS UP TO 15'
 9' BASE FOR MAST ARMS 15' AND LONGER

NOTE: POLE TO BE 2'-6" BACK FROM FACE OF CURB UNLESS OTHERWISE NOTED



APPROVED:
Primal Dew A.
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION

ROADWAY PEDESTAL BASE FOR LIGHT POLES - AUGURED

853

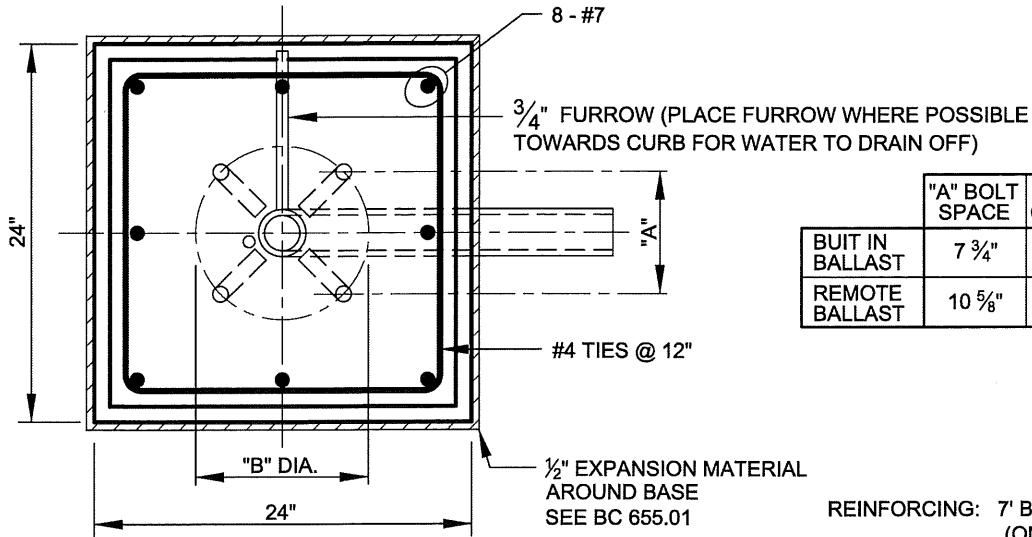
ISSUED	REVISED	REVISED
8 / 2010		

DETAIL NO.
 BC 801.01

SCALE: NONE

SHEET 1 OF 1

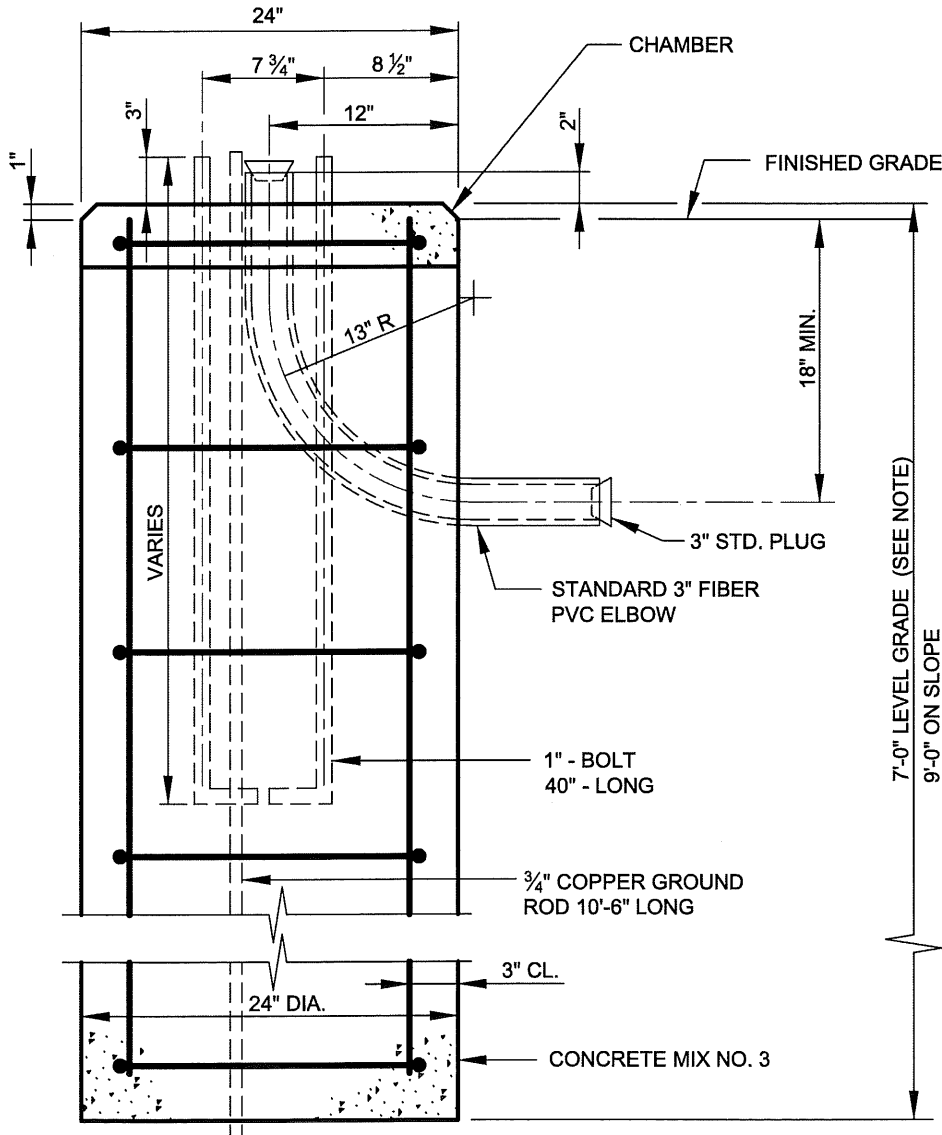
DRAFT - NOT FOR CONSTRUCTION



	"A" BOLT SPACE	"B" BOLT CIRCLE DIA.
BUILT IN BALLAST	7 3/4"	11"
REMOTE BALLAST	10 5/8"	15"

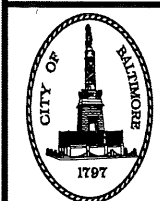
REINFORCING: 7' BASE MUST HAVE 8 - #7 BAR (ONE EACH CORNER) AND 8 - #4 TIES AT 12" C/C

9' BASE MUST HAVE 8 - #7 BAR (ONE EACH CORNER) AND 10 - #4 TIES AT 12" C/C



NOTE: 7' BASE FOR MAST ARMS UP TO 15'
 9' BASE FOR MAST ARMS 15' AND LONGER

NOTE: POLE TO BE 2'-6" BACK FROM FACE OF CURB UNLESS OTHERWISE NOTED

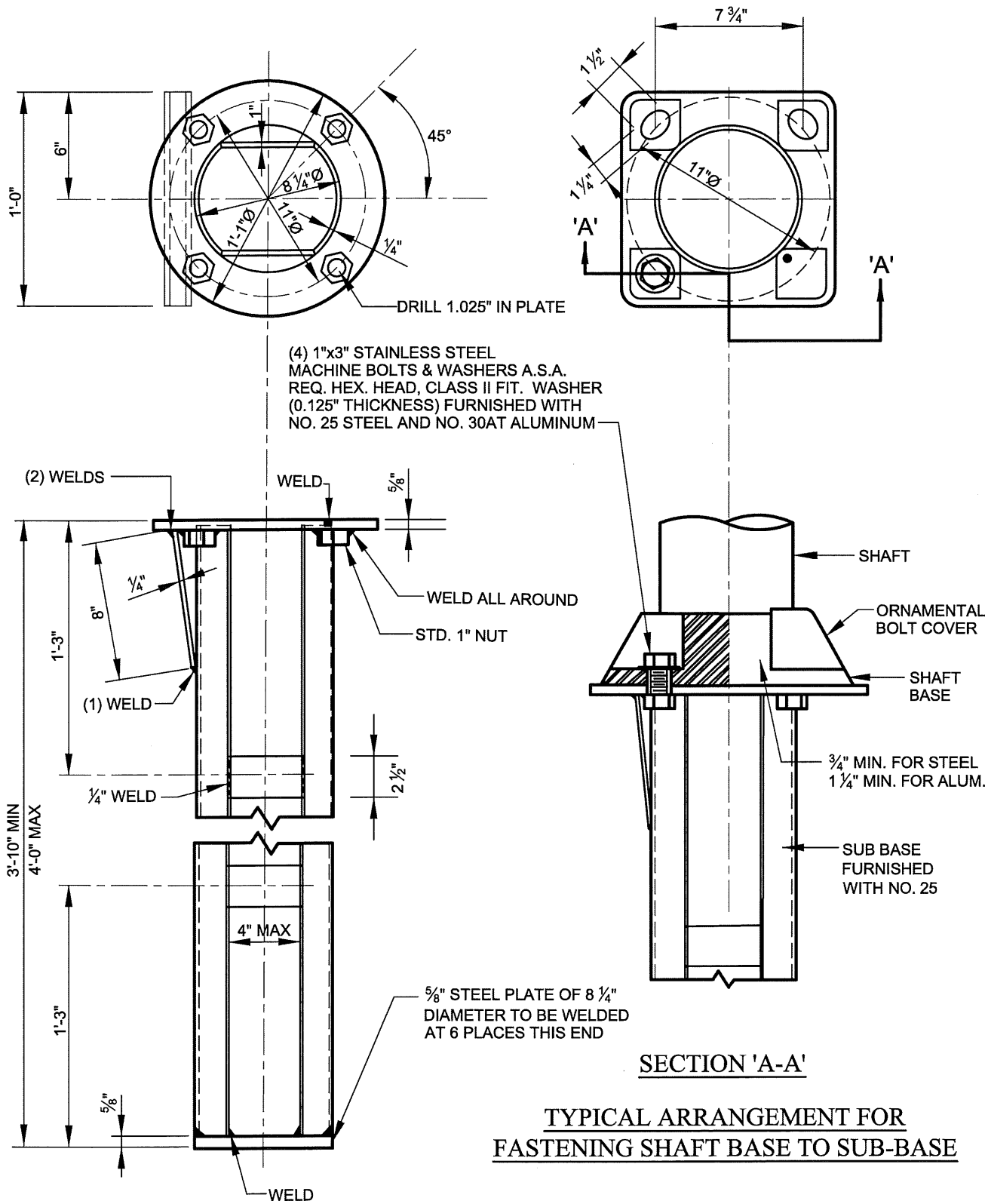


APPROVED:
Primal DeWalt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khalil Zaid
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION
ROADWAY PEDESTAL BASE FOR EIGHT POLES - SQUARE
 854

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 801.02		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION



APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khail Zaid
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

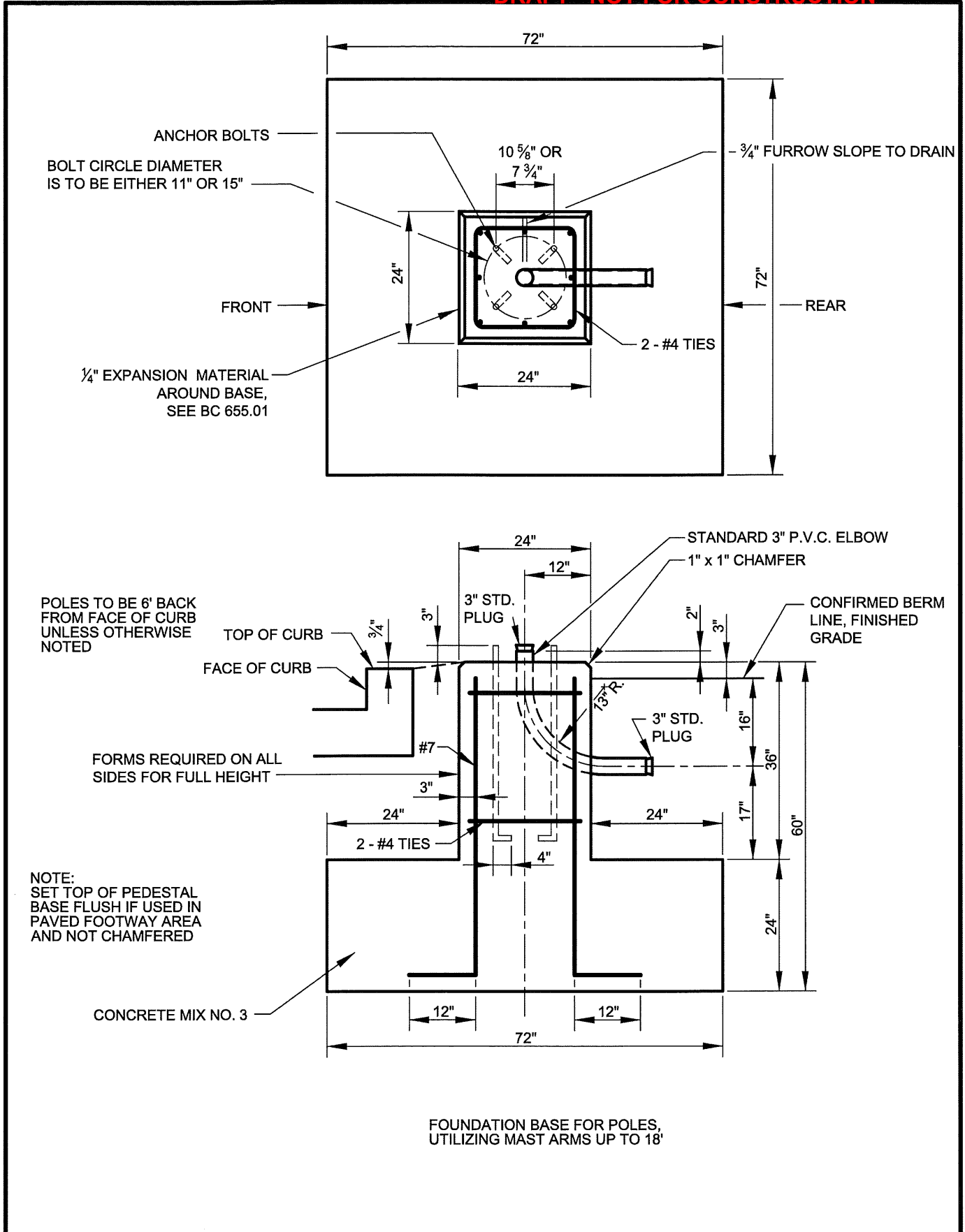
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION


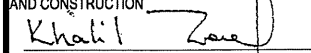
FOUNDATION BASE FOR LIGHT POLES - STEEL SUB-BASE

855

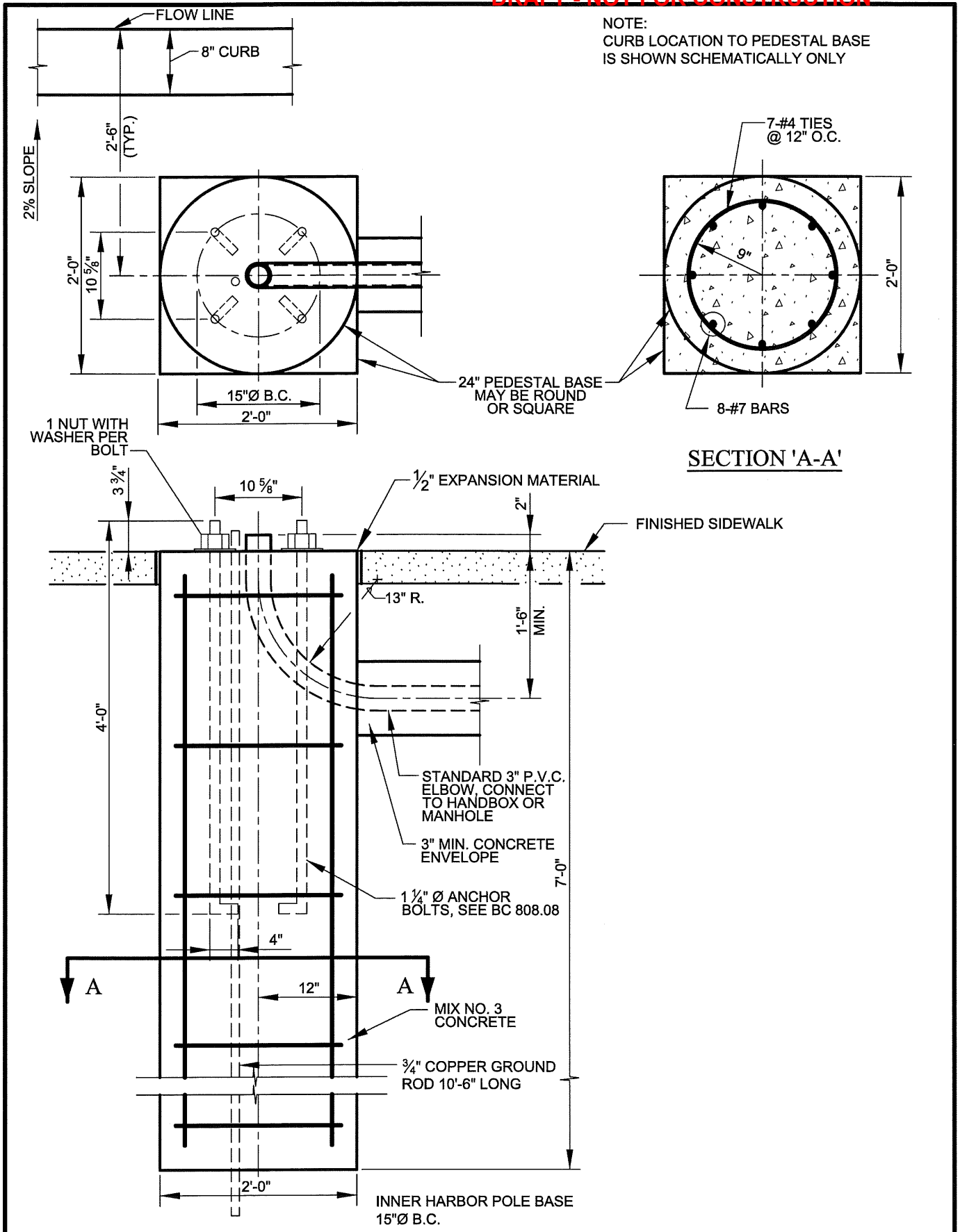
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 801.03		
SCALE : NONE	SHEET 1 OF 1	


DRAFT - NOT FOR CONSTRUCTION



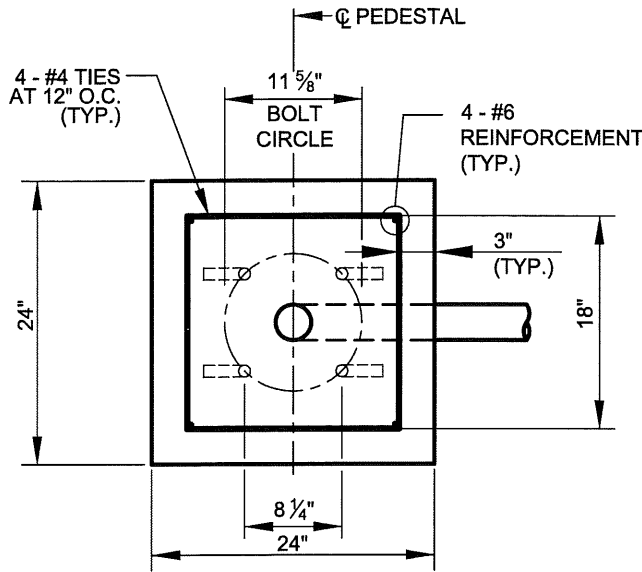
	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION ROADWAY FOUNDATION BASE FOR LIGHT POLES - FREE STANDING TYPE	ISSUED	REVISED	REVISED
	8 / 2010				
857 850			DETAIL NO. BC 801.04		
			SCALE : NONE	SHEET 1 OF 1	

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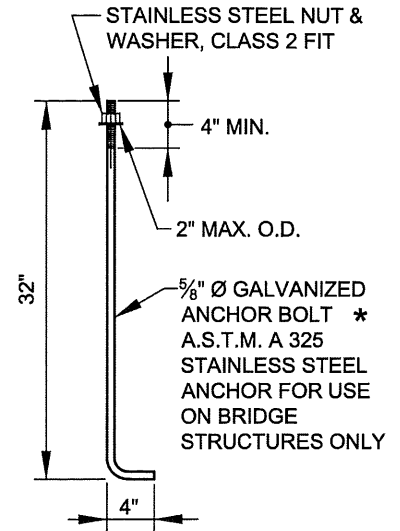


	APPROVED: <i>Primal Dew A.</i> DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION <i>Khail Zae</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	ROADWAY PEDESTAL BASE FOR INNER HARBOR TYPE LIGHT POLES 858 857	DETAIL NO. BC 801.05		SCALE: NONE	SHEET 1 OF 1

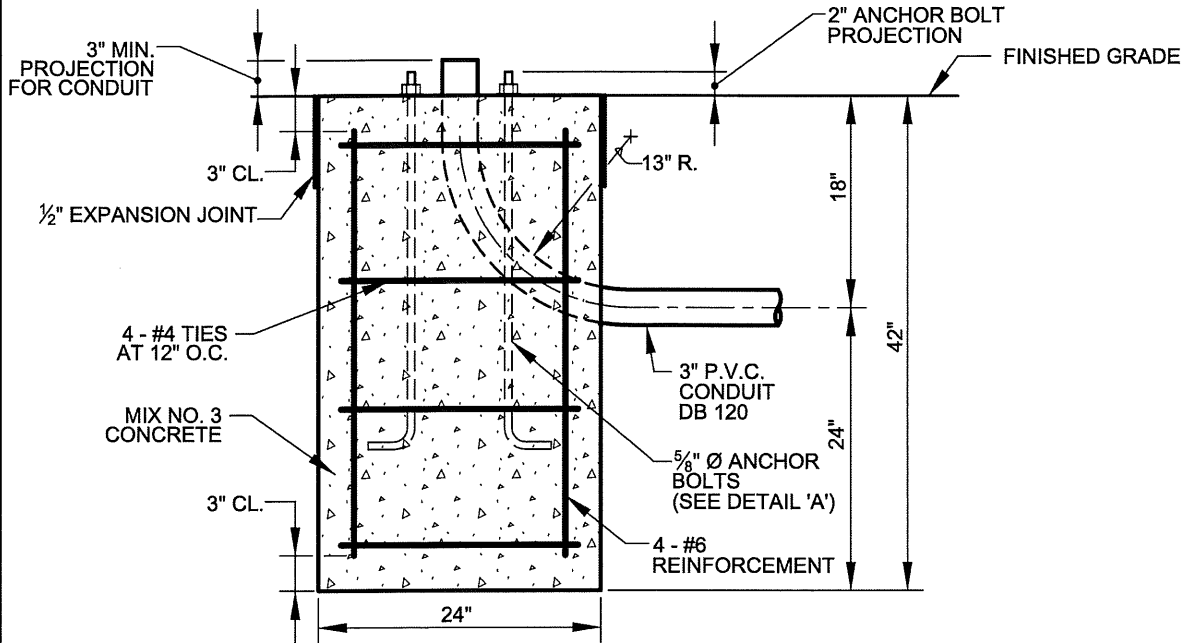
DRAFT - NOT FOR CONSTRUCTION



PLAN

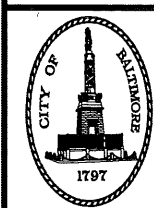


DETAIL 'A'



ELEVATION

* ANCHOR BOLTS TO BE SUPPLIED WITH ONE HEX NUT & ONE WASHER, EACH TO BE STAINLESS STEEL

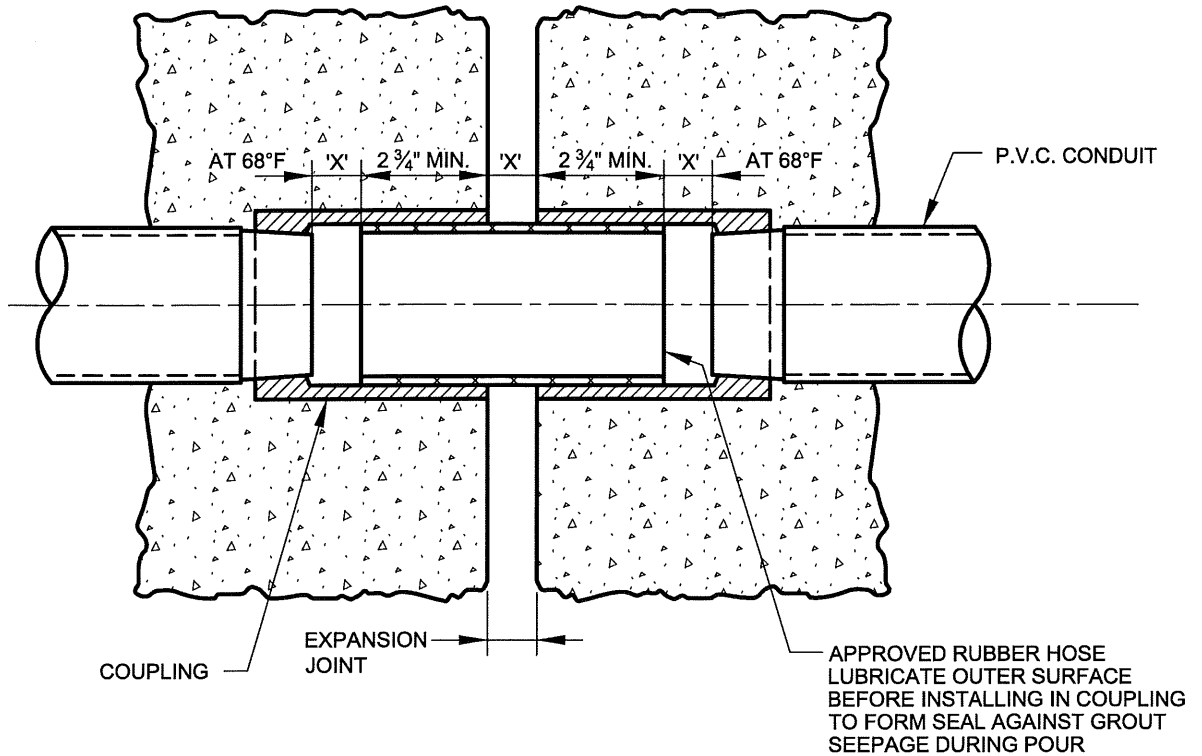


APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

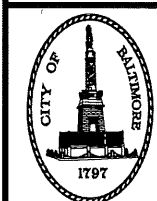
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION
BOLTON HILL, FELS POINT AND OTTERBEIN BASE
 858

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 801.07		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION



NOTE:
 DIMENSION 'X' TO BE DETERMINED
 BY DESIGN REQUIREMENTS



APPROVED:
Russell L. Baker
 CHIEF, CONDUIT DIVISION
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

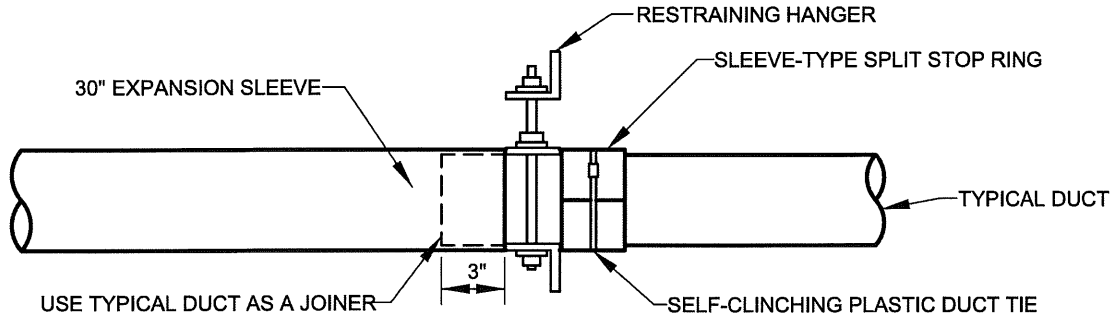
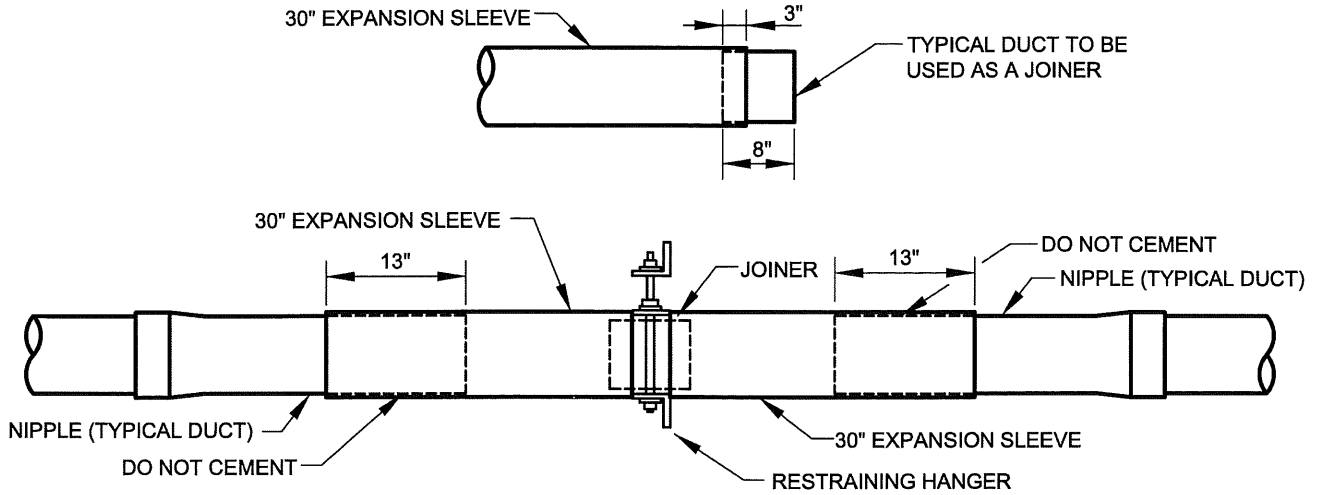
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

**CONDUIT EXPANSION
 COUPLING PARAPET**

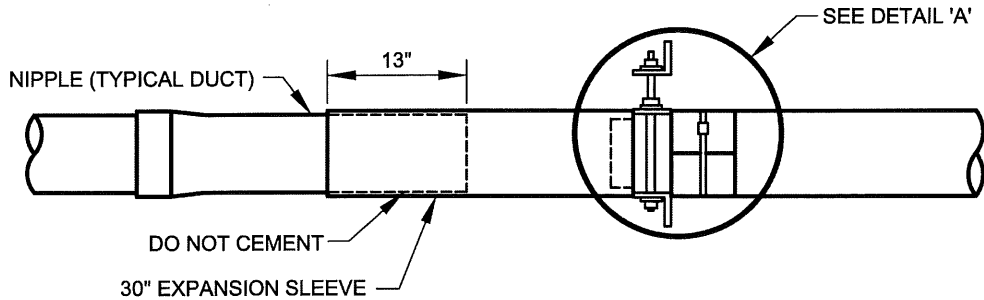
859

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 802.01-1		
SCALE : NONE	SHEET 1 OF 2	


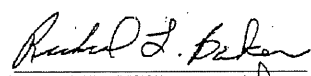
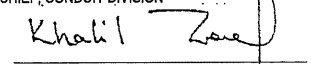
DRAFT - NOT FOR CONSTRUCTION



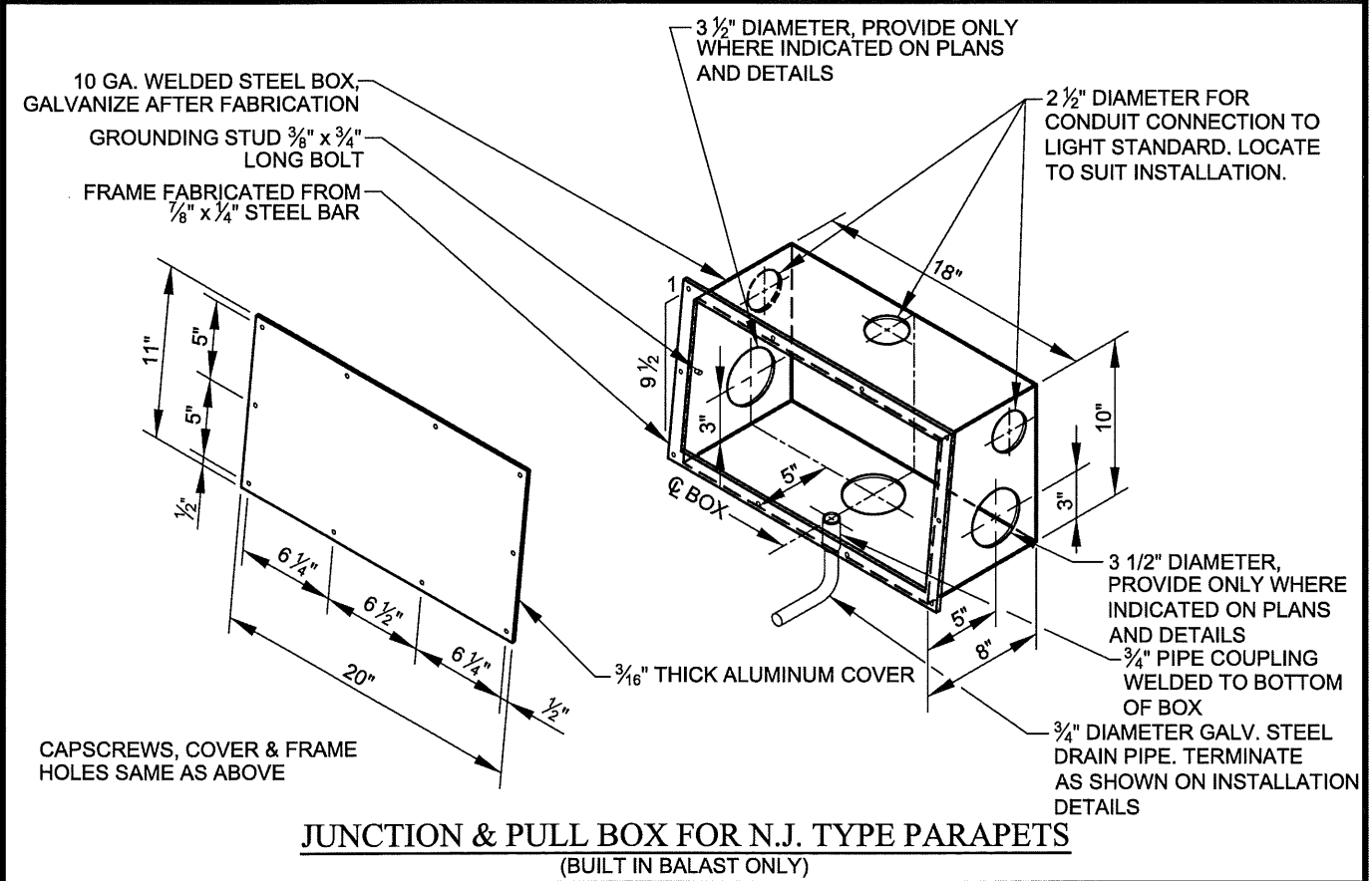
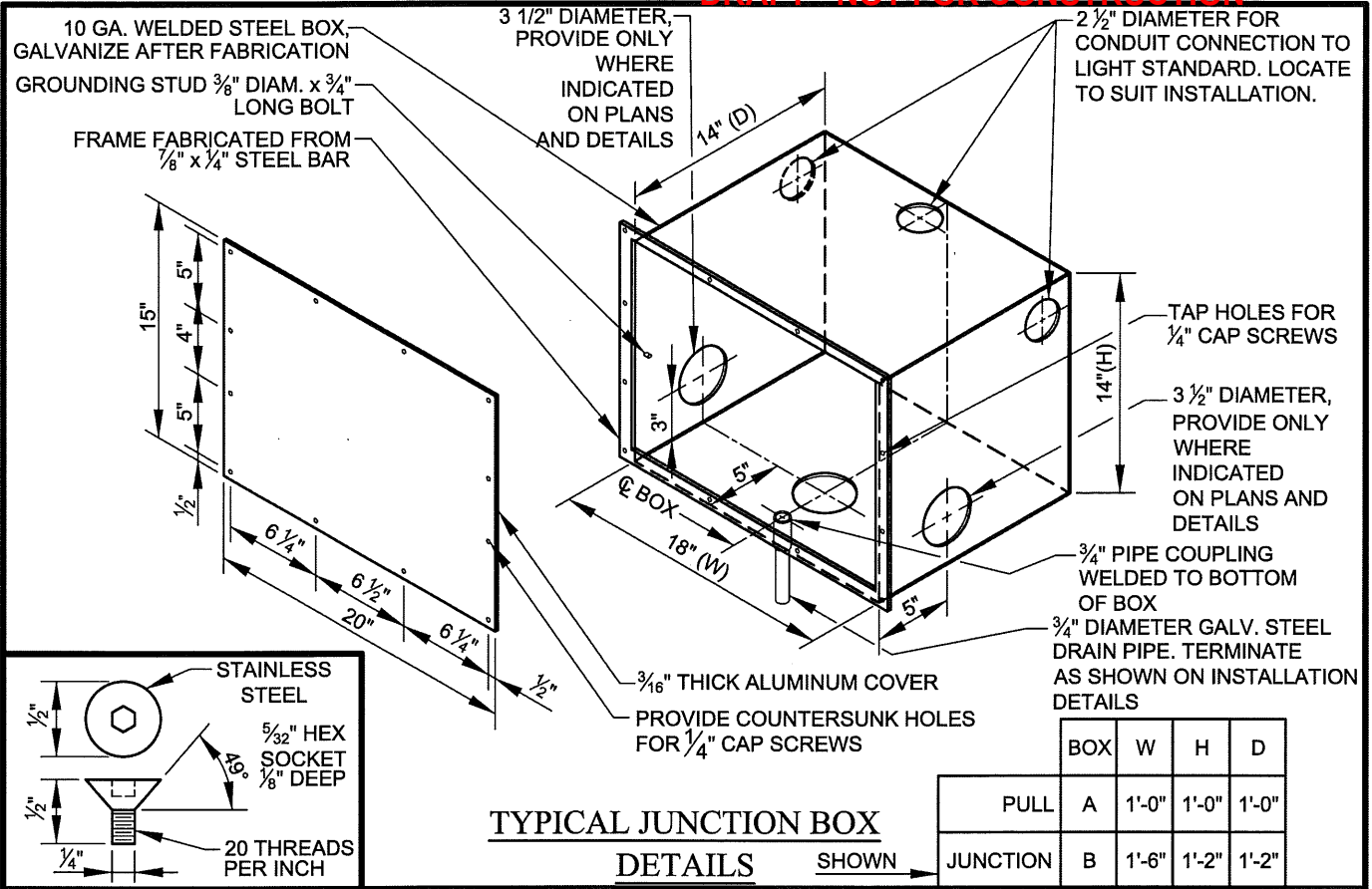
DETAIL 'A'


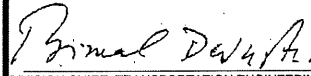
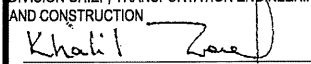


NOTE:
 BEVEL INSIDE EDGES OF SLEEVES, NIPPLE, AND JOINER.
 SCORE ENDS OF ALL THREADS AFTER INSTALLATION.

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED	
	CONDUIT EXPANSION JOINT FOR SUSPENDED ELECTRICAL DUCT	801 860	DETAIL NO. BC 802.01-2	SCALE : NONE	SHEET 2 OF 2	

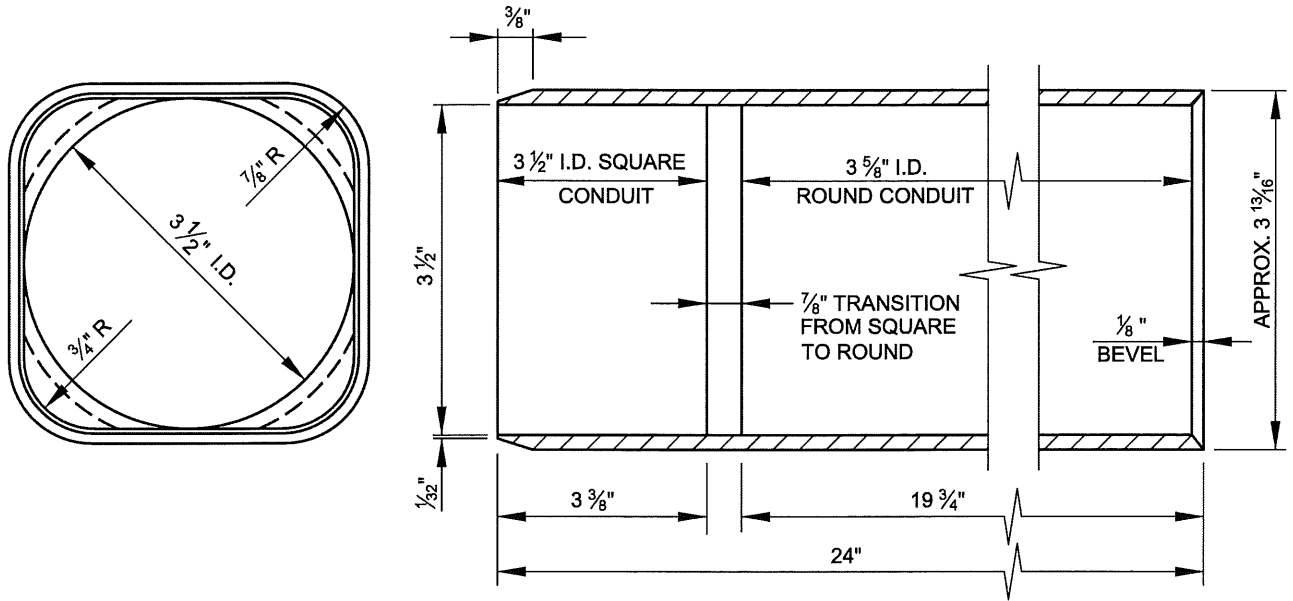
DRAFT - NOT FOR CONSTRUCTION



	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	JUNCTION BOXES 862 & PULL BOXES 861		DETAIL NO. BC 802.02		
			SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

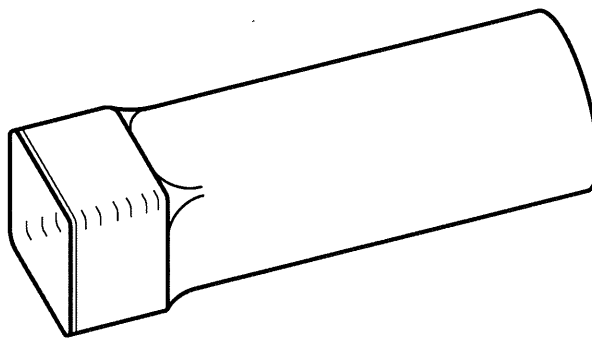
SQUARE ADAPTER 3 1/2" TO 3" AND 4" P.V.C.


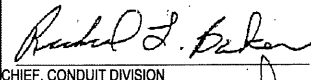
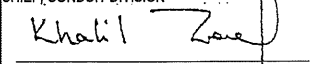


SQUARE BORE ADAPTER

USED TO CONVERT FROM "SQUARE" 3 1/2" TILE DUCT TO 3" AND 4" ROUND P.V.C. PLASTIC DUCT.

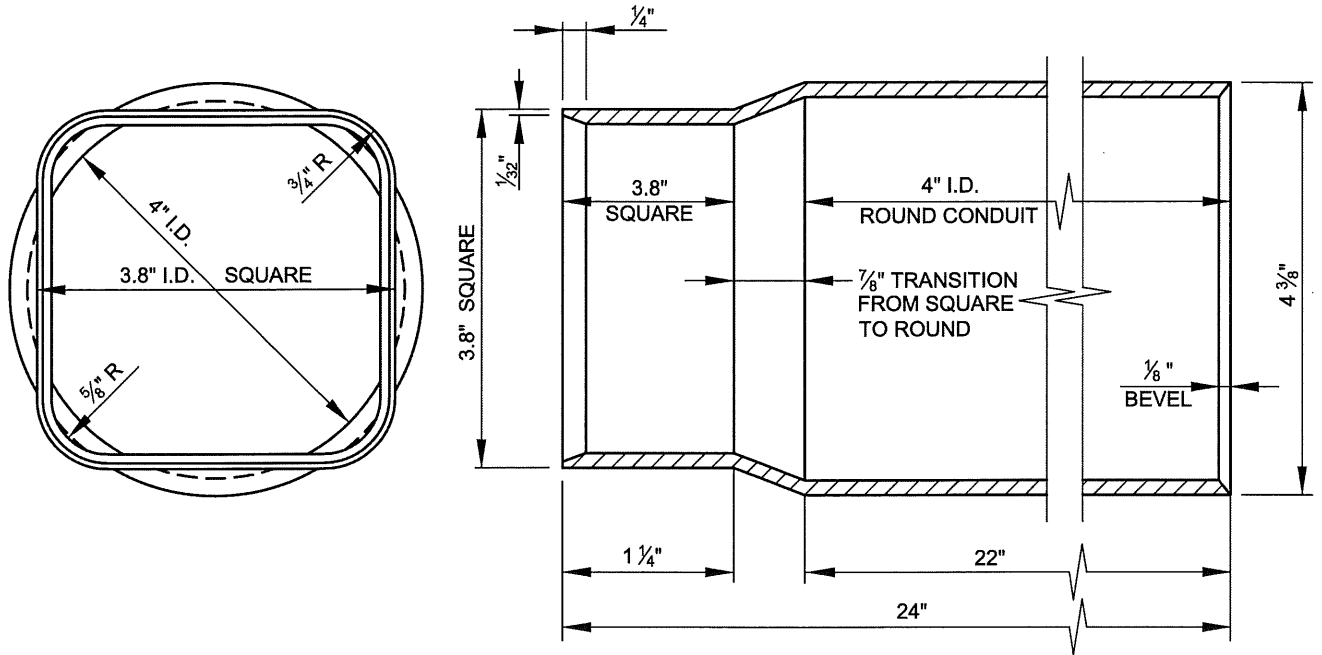
MADE OF P.V.C. PLASTIC IN ACCORDANCE TO THESE SPECIFICATIONS, A.S.T.M. F 512, RATING 90°C



	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	CONDUIT SQUARE BORE ADAPTER 862	DETAIL NO. BC 802.03-1			
	SCALE: NONE	SHEET 1 OF 4			

DRAFT - NOT FOR CONSTRUCTION

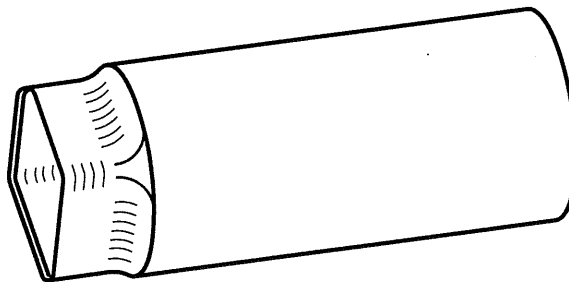
SQUARE BORE ADAPTER 3 3/4" TO 4"


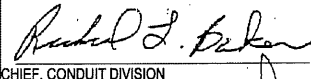
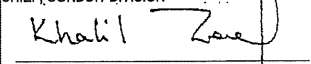


SQUARE BORE ADAPTER

USED TO CONVERT FROM "SQUARE" 3 3/4" ± TILE DUCT TO 4" ROUND P.V.C. PLASTIC DUCT.

MADE OF P.V.C. PLASTIC IN ACCORDANCE TO THESE SPECIFICATIONS, A.S.T.M. F 512, RATING 90°C

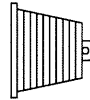


	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	CONDUIT SQUARE BORE ADAPTER 863	DETAIL NO. BC 802.03-2			
	SCALE: NONE	SHEET 2 OF 4			

DRAFT - NOT FOR CONSTRUCTION

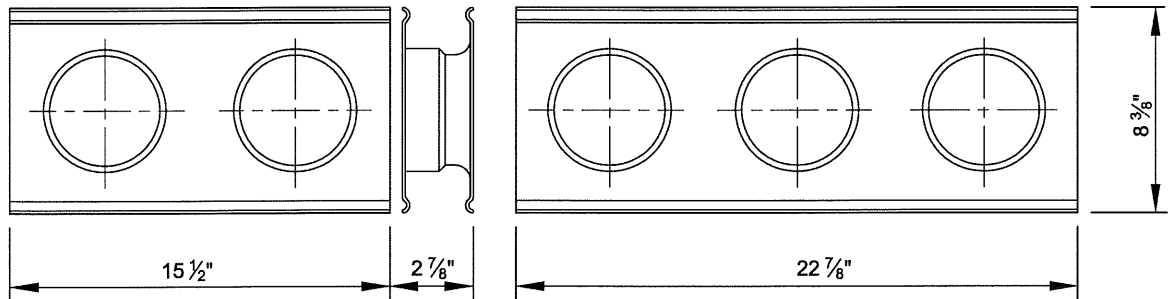
DUCT PLUG

P.V.C.	6"	TAPERED
P.V.C.	5"	TAPERED
P.V.C.	4"	TAPERED
P.V.C.	3"	TAPERED



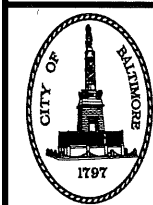
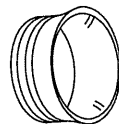
DUCT TERMINATORS

ABS	6"	2-WAY
ABS	6"	3-WAY
ABS	5"	2-WAY
ABS	5"	3-WAY
ABS	4"	2-WAY
ABS	4"	3-WAY



DUCT BELL ENDS

P.V.C.	6"	MOLDED
P.V.C.	5"	MOLDED
P.V.C.	4"	MOLDED
P.V.C.	3"	MOLDED



APPROVED:
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 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

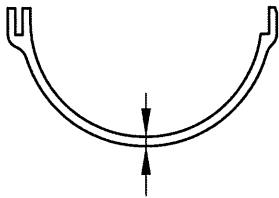
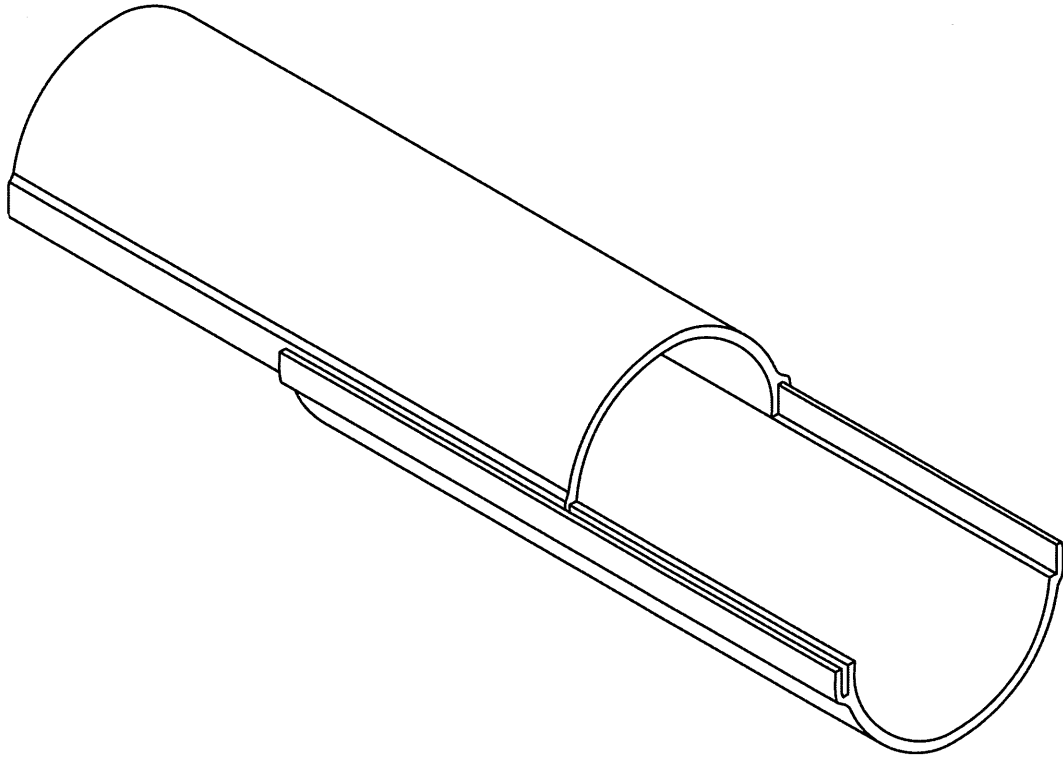
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

DUCT PLUGS, BELL ENDS
 AND TERMINATORS
 864
 864

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 802.03-3		
SCALE: NONE		SHEET 3 OF 4

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**SPLIT DUCT (LOCKING TONGUE & GROOVE)
 10 FT. LENGTHS**


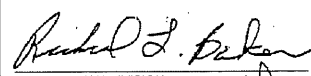
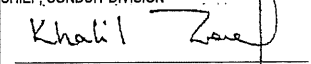


MINIMUM WALL THICKNESSES

- 3" D.B. — 0.118"
- 4" D.B. — 0.154"
- 5" D.B. — 0.191"
- 6" D.B. — 0.227"

SPLIT DUCT IS USED TO COVER
 EXISTING UNDERGROUND CABLES
 OR REPAIRING DAMAGED DUCT
 WITHOUT CUTTING OR RESPLICING
 EXISTING CABLES. MADE OF
 P.V.C. DUCT.

A.S.T.M. F 512
 RATED 90° C

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED	
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	866 865	SPLIT DUCT	DETAIL NO. BC 802.03-4		
				SCALE : NONE	SHEET 4 OF 4	

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5" PVC PLASTIC UTILITY DUCT ON BRIDGE HANGER SUPPORTS

Existing bridge diaphragms used for hanger support.

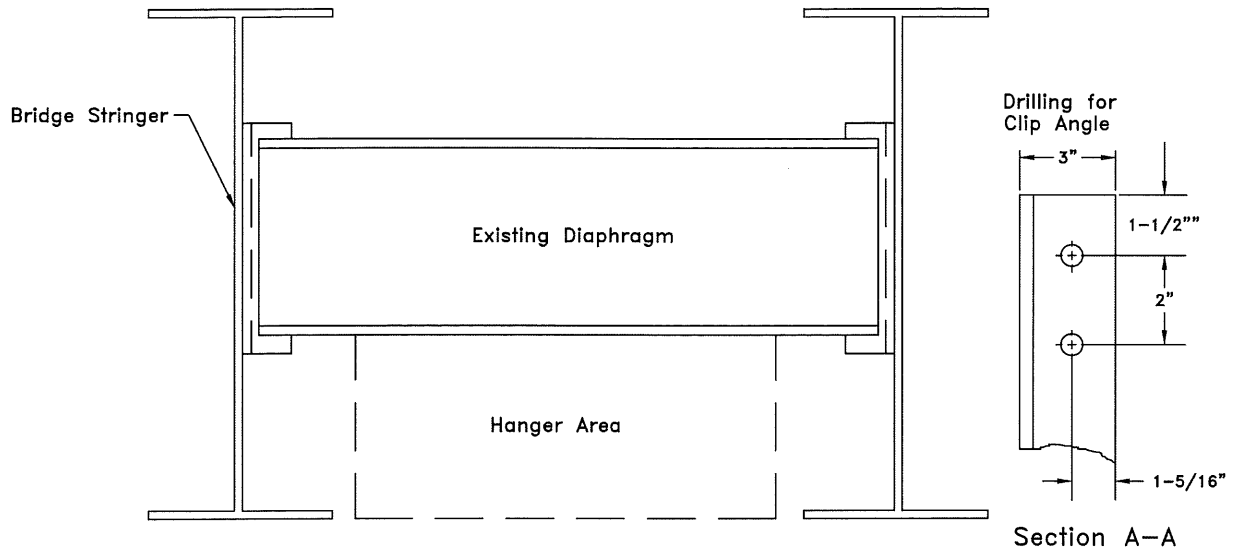


Figure 1

Intermediate support used to supplement existing diaphragms.

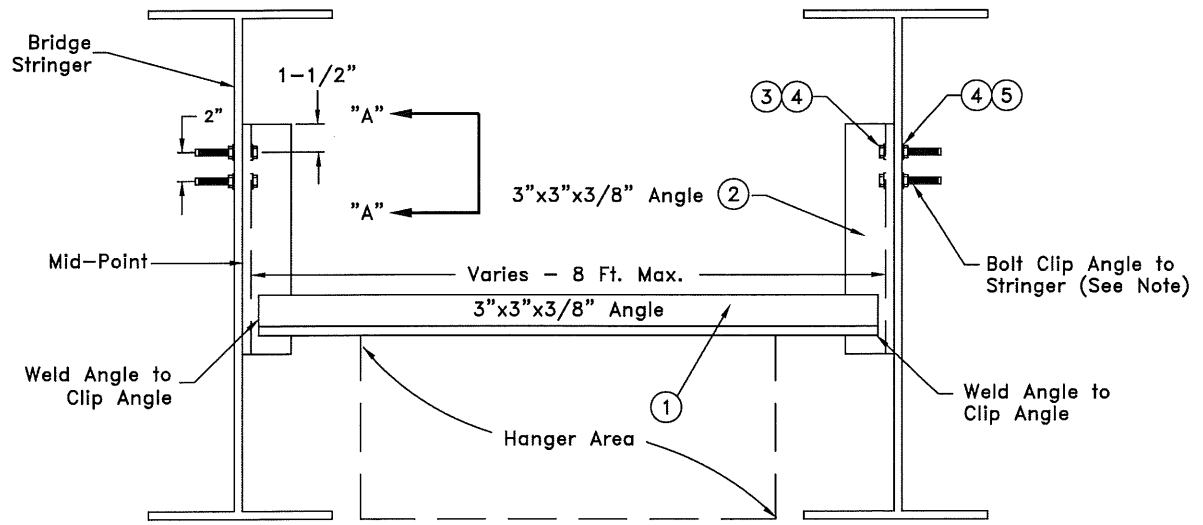


Figure 2

Description	Quantity
1 3" x 3" x 3/8" Steel angle	As Required
2 3" x 3" x 3/8" Steel angle	2
3 1/2" x 4" Galv. sq. hd. bolts	4
4 1/2" Galv. round flat washers	8
5 1/2" Galv. hex. hd. locknuts	4

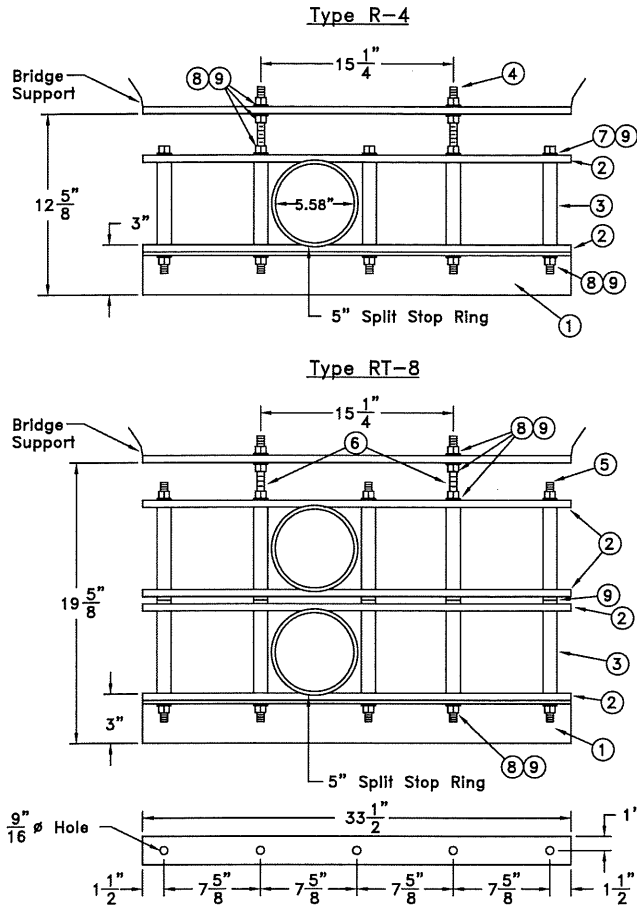
5" PVC duct Schedule 40 shall be used for bridge attachments.

Note: All clip angles must be bolted at or above the mid-point of the stringer, clip angle length shall be determined by the elevation of the duct.

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	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	5" PVC, PLASTIC UTILITY DUCT ON BRIDGE HANGER SUPPORTS	DETAIL NO. BC 802.04-1		
	866	SCALE : NONE		SHEET 1 OF 6	

DRAFT - NOT FOR CONSTRUCTION

5" PVC PLASTIC UTILITY DUCT ON BRIDGE HANGER SUPPORTS



Bill of Material

Item	Description	Quantity Restraining	
		Type R-4	Type RT-8
1	3" x 2" x 1/4" x 33-1/2" Lg. steel angle	1	1
2	1/2" x 2" x 33-1/2" PVC plate	2	4
3	1/2" x 5-3/4" Schedule 40 PVC pipe	5	10
4	1/2" x 13" Galv. all thread hanger rod	2	
5	1/2" x 17" Galv. all thread hanger rod		3
6	1/2" x 20" Galv. all thread hanger rod		2
7	1/2" x 9" Galv. sq. hd. bolt	3	
8	1/2" Galv. hex. hd. locknut	11	14
9	1/2" Galv. round flat washer	14	24

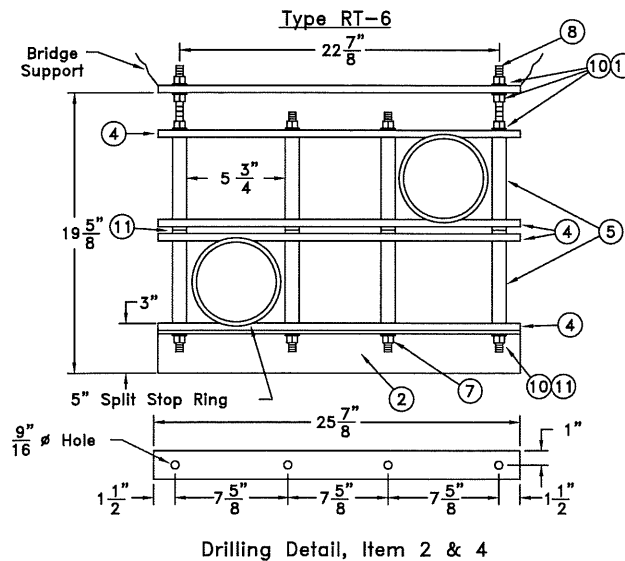
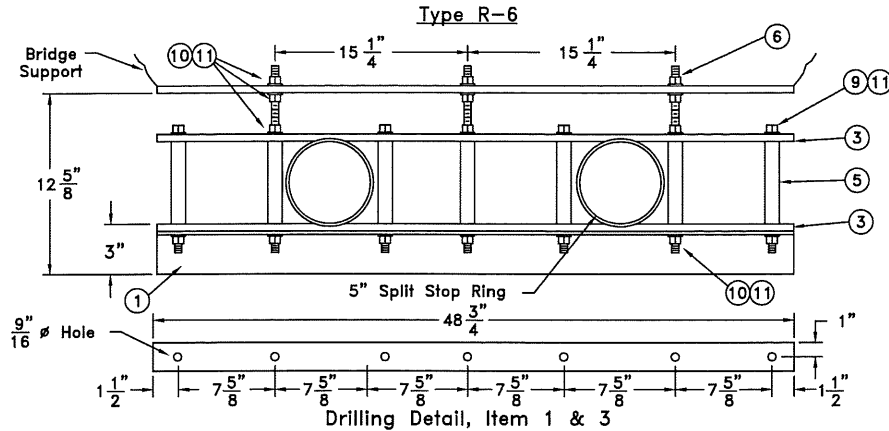
Instructions:

- (A) Score ends of all threads after installation.
- (B) When conduit is not being restrained, bell ends or couplings shall not be located closer than 14" to any hanger.
- (C) Paint all fabricated steel welds with an approved stainless steel paint. Color to be compatible with bridge.

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	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	5" PVC, PLASTIC UTILITY DUCT ON BRIDGE HANGER SUPPORTS	8 / 2010		
			SCALE : NONE	SHEET 2 OF 6	

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5" PVC PLASTIC UTILITY DUCT ON BRIDGE HANGER SUPPORTS



Bill of Material

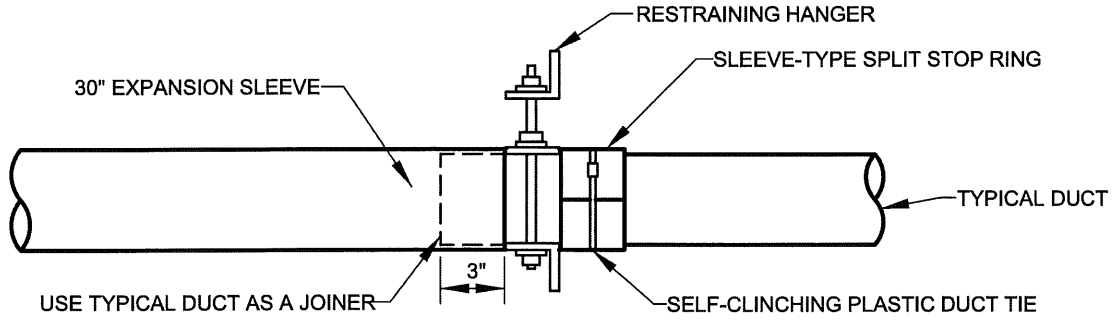
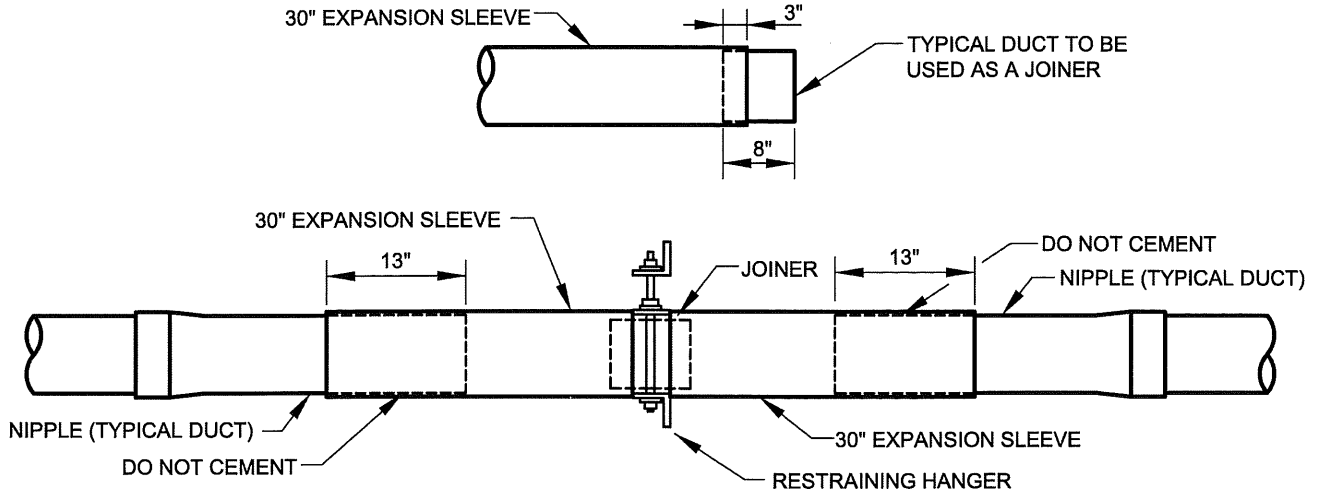
Item	Description	Quantity Restraining	
		Type R-6	Type RT-6
1	3" x 2" x 1/4" x 48-3/4" Lg. steel angle	1	
2	3" x 2" x 1/4" x 25-7/8" Lg. steel angle		1
3	1/2" x 2" x 48-3/4" PVC plate	2	
4	1/2" x 2" x 25-7/8" PVC plate		4
5	1/2" x 5-3/4" Schedule 40 PVC pipe	7	8
6	1/2" x 13" Galv. all thread hanger rod	3	
7	1/2" x 17" Galv. all thread hanger rod		2
8	1/2" x 20" Galv. all thread hanger rod		2
9	1/2" x 9" Galv. sq. hd. bolt	4	
10	1/2" Galv. hex. hd. locknut	16	12
11	1/2" Galv. round flat washer	20	20

Instructions:

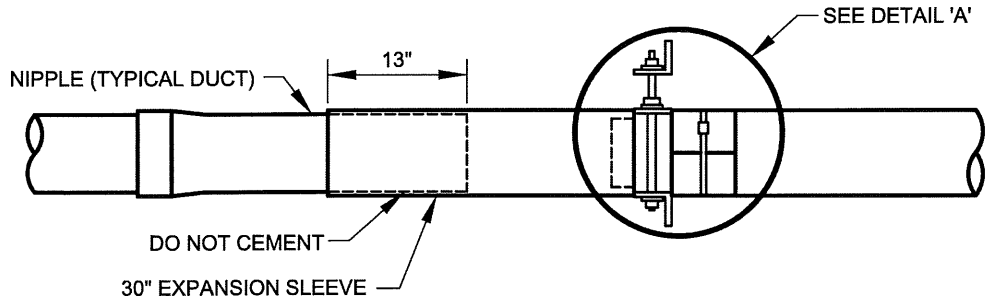
- (A) Score ends of all threads after installation.
- (B) When conduit is not being restrained, bell ends or couplings shall not be located closer than 14" to any hanger.
- (C) Paint all fabricated steel welds with an approved stainless steel paint. Color to be compatible with bridge.

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	5" PVC, PLASTIC UTILITY DUCT ON BRIDGE HANGER SUPPORTS	DETAIL NO. BC 802.04-3		
		SCALE: NONE	SHEET 3 OF 6	

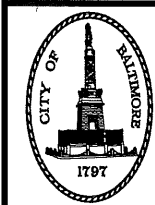
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DETAIL 'A'



NOTE:
 BEVEL INSIDE EDGES OF SLEEVES, NIPPLE, AND JOINER.
 SCORE ENDS OF ALL THREADS AFTER INSTALLATION.



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Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

5" PVC DUCT ON BRIDGES
BACK TO BACK EXPANSION JOINT
INSTALLATION

870
869

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 802.04-4		
SCALE: NONE	SHEET 4 OF 6	

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5" PVC DUCT ON BRIDGES BACK TO BACK EXPANSION JOINT INSTALLATION

Instructions:

To install the expansion joint:

- (A) Cut an 8 inch length of duct to serve as a joiner between the two expansion sleeves.
- (B) Bevel inside edges of sleeves, nipple and joiner.
- (C) Apply cleaner to one end of this joiner and to the inside of an expansion joint sleeve (3 inches wide).
- (D) Immediately apply cement generously to one end of the joiner piece, and insert 3 inches into the end of the expansion joint sleeve. (See Figure 1)
- (E) Insert this 8 inch joiner through the support and repeat steps C and D. Be certain that the shoulders of both expansion joint sleeves set firm.
- (F) Install the duct nipples into the expansion sleeves as shown in Figure 2.
- (G) Score ends of all threads after installation.
- (H) Baltimore City uses 3" and 4" PVC ducts for utilities other than Baltimore Gas and Electric Company.

Notes:

The coefficient of thermal expansion for PVC is .00003 inches per inch per degree fahrenheit.
The length of a 100 foot conduit run will change 3.6 inches during a temperature change of 100° F.

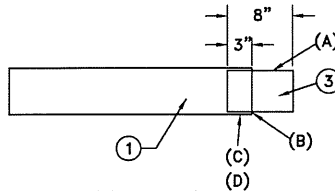


Figure 1

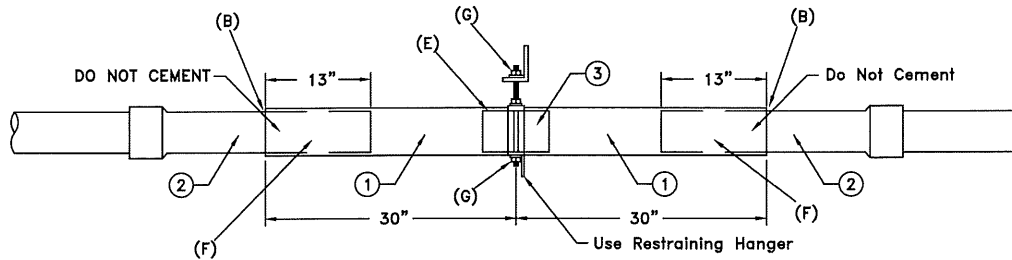

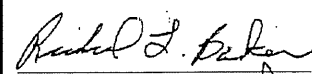
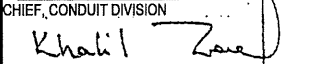


Figure 2

Bill of Material

Item	Description	Quantity
1	30" Expansion sleeve	2
2	5" - I.D. - Duct nipple (Schedule 40)	2
3	5" - I.D. x 8" - Duct joiner (Schedule 40)	1

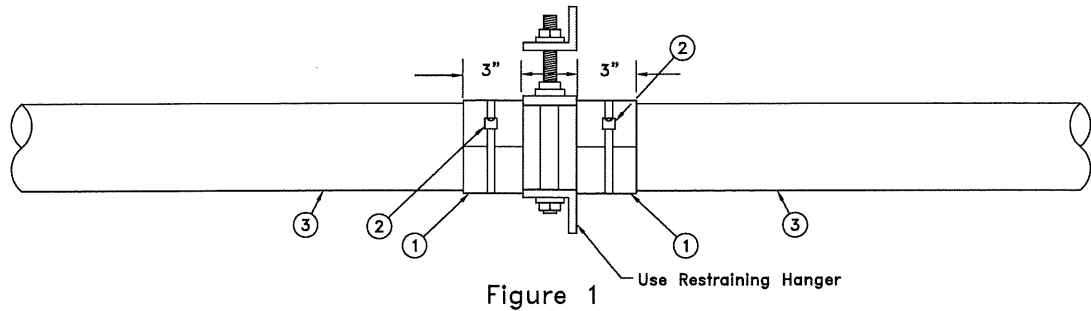
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	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	5" PVC DUCT ON BRIDGES BACK TO BACK EXPANSION JOINT INSTALLATION 871 870	8 / 2010		
			DETAIL NO. BC 802.04-5		
			SCALE: NONE	SHEET 5 OF 6	

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5" PVC PLASTIC UTILITY DUCT ON BRIDGES STOP RING INSTALLATION AND DUCT TERMINATION

Typical Stop Ring Installation

- (A) Apply cement around duct (3-inch wide band) on each side of hanger.
- (B) Immediately slide sleeve-type split stop rings over cemented areas, place firmly against hanger and secure in place with plastic duct ties. (See Figure 1)



Bill of Material

Item	Description	Quantity
1	5" x 3" Schedule 40 PVC, sleeve-type split stop ring	2
2	20" Plastic duct tie (self-clinching)	2
3	5" Schedule 40 PVC duct	As Req'd.

Duct Termination at Bridge Abutment

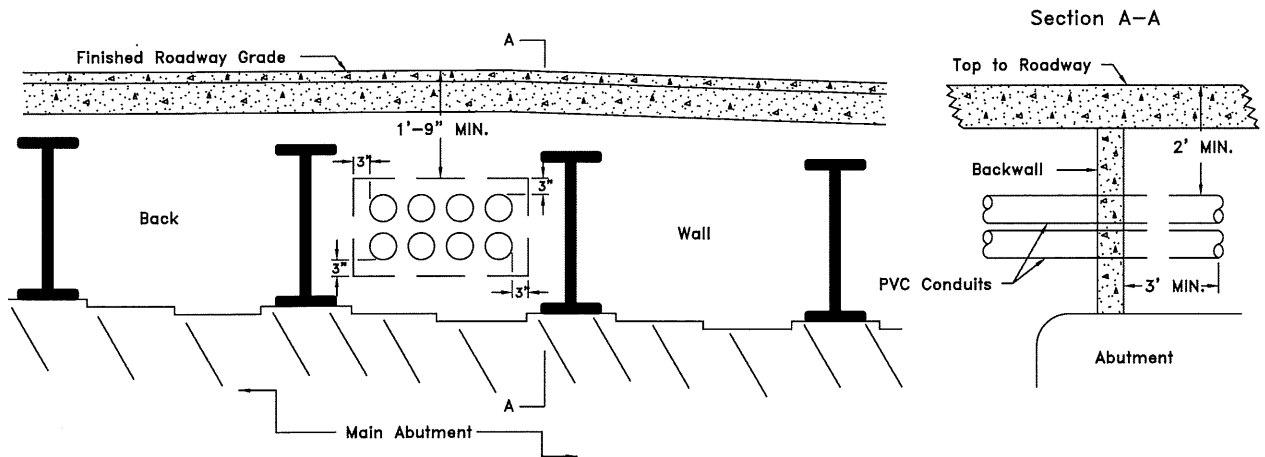

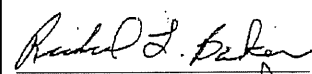
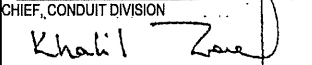
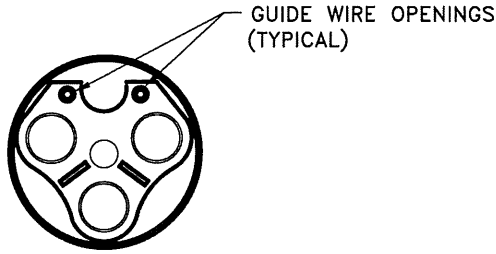


Figure 2

Conduits shall exit from the bridge thru the backwall which is located on top of the main abutment. The opening in the wall to be 6" larger horizontally and vertically than the conduit configuration. The opening around the conduits shall be sealed with a watertight cement grout.

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	5" PVC, PLASTIC UTILITY DUCT ON BRIDGE STOP RING INSTALLATION AND DUCT TERMINATION			DETAIL NO. BC 802.04-6	
			SCALE: NONE	SHEET 6 OF 6	

12" CASING

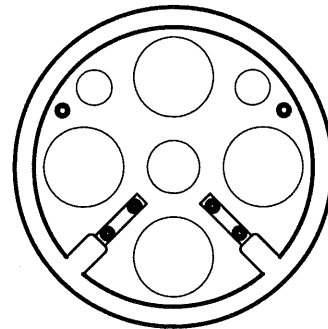


GUIDE WIRE OPENINGS
(TYPICAL)

3-3" PVC TYPE DB CONDUITS
 12" OD STEEL CASING PIPE
 BORE SPACER

STOCK No.
 NON-STOCK
 40-323
 12-485

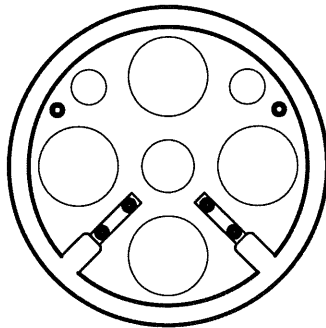
20" CASING



4-5" PVC TYPE DB CONDUITS
 20" OD STEEL CASING PIPE
 BORE SPACER

STOCK No.
 12-748
 40-946
 12-512

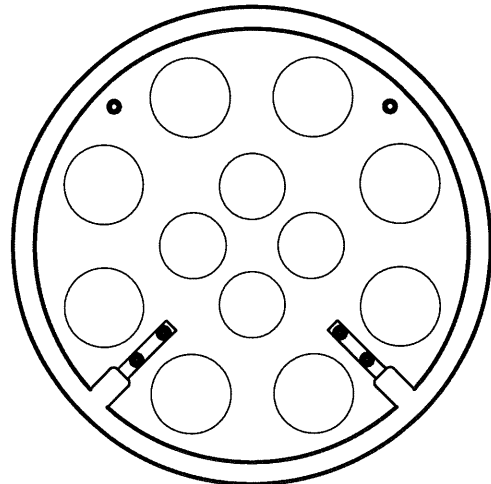
24" CASING



6-5" PVC TYPE DB CONDUITS
 24" OD STEEL CASING PIPE
 BORE SPACER

STOCK No.
 12-748
 40-859
 12-486

30" CASING



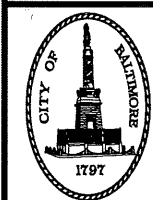
8-5" PVC TYPE DB CONDUITS
 30" OD STEEL CASING PIPE
 BORE SPACER

STOCK No.
 12-748
 40-860
 12-708

NOTE

FOR ALL CONDUITS IN CASING PIPE:
 CONDUITS TO BE SUPPORTED BY SPECIAL BORE SPACERS AND SHALL BE SPACED A MAXIMUM OF 5' ON CENTERS. AFTER INSTALLATION OF CONDUIT, FILL THE CASING PIPE WITH SPECIAL GROUT No. 424-72 FROM LAFARGE (PREVIOUSLY CALLED GENSTAR) OR AN APPROVED EQUAL. MATERIAL SHALL BE PLACED BY A "SQUEEZE-CRETE" CONCRETE PUMP. QUANTITY TO BE MEASURED AND RECORDED.
 GROUT CALCULATION FORMULA: (LINEAR FOOTAGE OF CASING X GROUT FACTOR) + 0.5 = CU. YD. GROUT

CASING PIPES			GROUT FACTOR CU.YDS./LN.FT.
NOMINAL SIZE	No. DUCTS	DUCT SIZE	
12"	3	3"	0.022
20"	4	5"	0.053
24"	6	5"	0.075
30"	8	5"	0.126
24"	4	6"	0.077
30"	6	6"	0.123
36"	8	6"	0.184



APPROVED:

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 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
**CONDUIT SECTIONS
 IN CASING PIPE**
 873
 872

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 803.01-1		
SCALE: NONE	SHEET 1 OF 5	

This Standard covers the installation of ducts in a steel casing pipe.

A. DUCT PLACEMENT

1. After the casing is installed, check to make sure it is clear of obstructions.
2. Only PVC (DB) duct shall be installed in casings. The Material No's are: 3" (12-745), 4" (12-844), 5" (12-748), and 6" (12-A90) Every piece shall be checked for defects.
3. Ducts shall be installed using only Bore or Casing Spacers. The maximum separation between spacers shall be 5 feet.
4. Great care must be used to cement all joints. The pressure created while pumping grout could force grout through a joint if not properly cemented.
5. A wooden cradle should be fabricated to hold the ducts in the proper formation while the spacers are placed over each duct prior to banding. The cradle also keeps the duct formation lined up with the casing entrance.
6. Wrap a strap (preferably non-metallic) around duct formation not more than 6" from the casing spacer. Do not pull strap too tight to deform the duct but just enough to cause the duct to pinch the spacer.
7. Use a push plate (Figure #1) to advance the duct formation into the casing. The plate shall be large enough to bear against the ends of all the ducts.

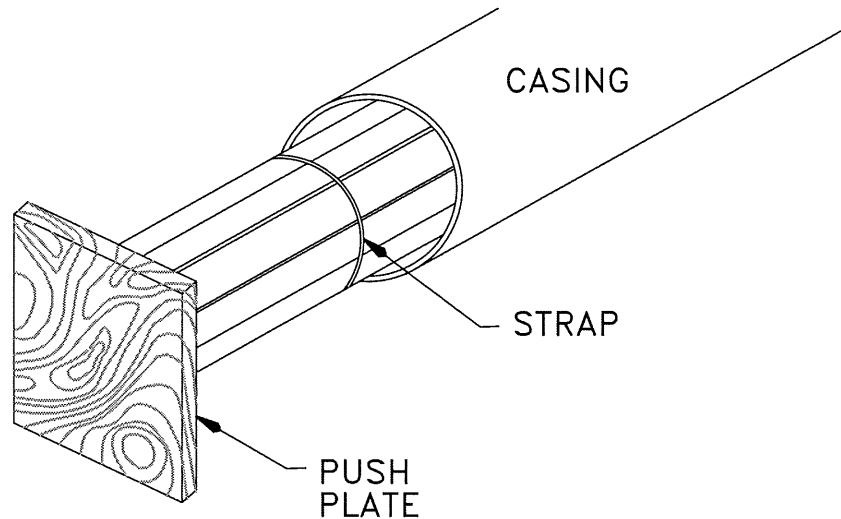
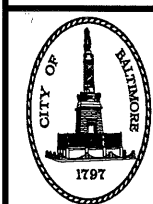


FIGURE 1

8. Ducts should extend a minimum of 2' beyond the casing at both ends. Do not connect to any existing ducts or extend ducts until grouting has been installed and ducts rodded and mandreled.



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Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

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CONDUIT SECTIONS
 IN CASING PIPE

874
 873

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 803.01-2		
SCALE: NONE	SHEET 2 OF 5	

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A. DUCT PLACEMENT (Continued)

9. Return ducts to their proper formation if rotation has occurred during insertion into casing.

Special Instructions For Duct Installation In Casings Over 250 Feet In Length

10. Casing spacers are designed with small openings which permit guide wires to be threaded through them. Wires prevent rotation of the duct bank as it advances through the casing. Feed two 1/4" guy wires (Mat, I #11-936) through the casing and thread them through all the spacers (openings may need to be punched out). Draw the wires taut and tie them off. Assemble duct and push into casing.
11. Rollers are available for 24", 30" and 36" spacers only and are to reduce friction for an easier installation of ducts. (See Figure 2).

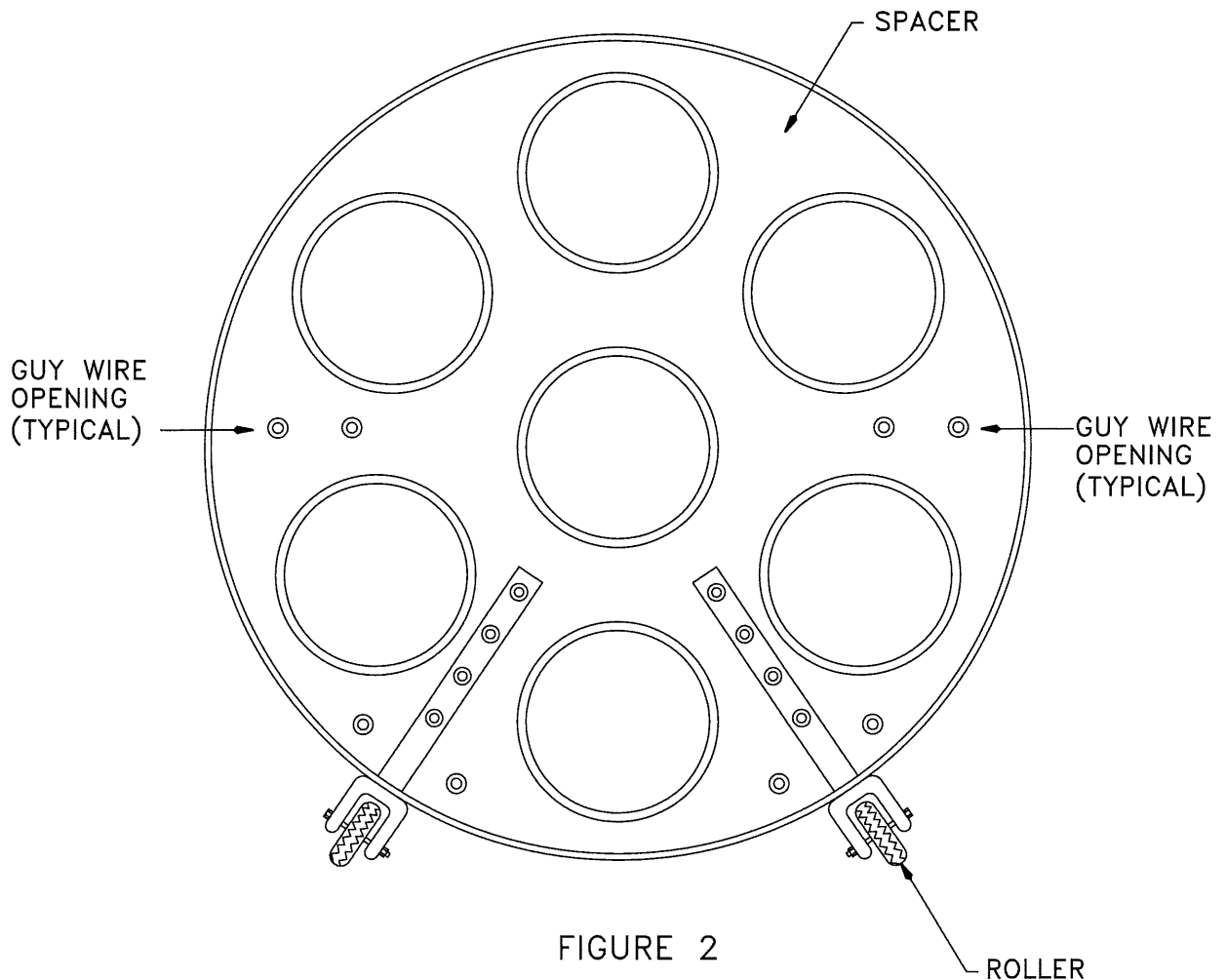

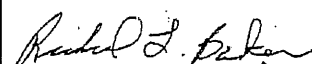
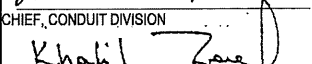


FIGURE 2

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	 DIRECTOR, DEPARTMENT OF TRANSPORTATION	CONDUIT SECTIONS IN CASING PIPE 875 874	8 / 2010		
			DETAIL NO. BC 803.01-3		
			SCALE: NONE	SHEET 3 OF 5	

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B. GROUT PLACEMENT

1. Seal Casing Ends

a) Preferred Method - "Box and Pour"

Ducts extending out of the casing shall be cut flush, couplings attached and duct plugs installed (bell ends with duct plugs installed may also be made flush). Build a box form around the casing end with the form flat against the duct ends (See Figure #3). Install the filler and vent pipe (See Sheet 5 Of 5). Fill the box with concrete until the casing end is sealed.

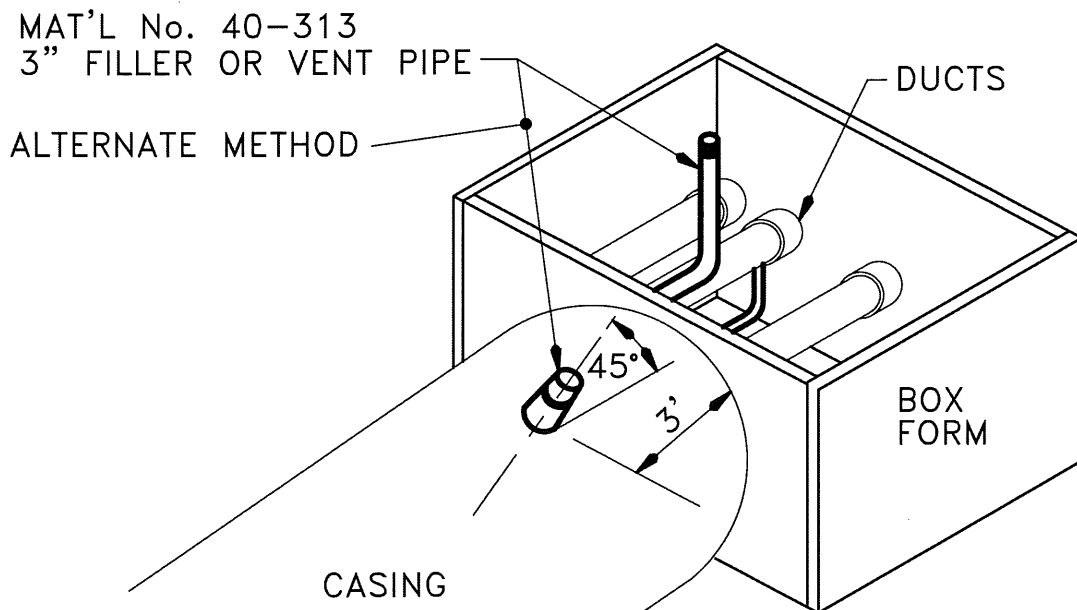

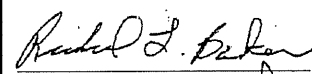
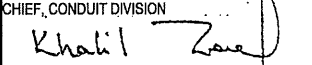


FIGURE 3

b) Alternate Method - "Hand Grout"

Install the filler and vent pipe (See Sheet 5 of 5) into the casing. Use grout and pieces of brick to build a 12" cement bulkhead just inside the casing end. Seal the entire opening.

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	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
	CONDUIT SECTIONS IN CASING PIPE		DETAIL NO. BC 803.01-4		
		SCALE: NONE		SHEET 4 OF 5	

876
875

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B. GROUT PLACEMENT (Continued)

- Install two threaded 3" steel 90 degree 12" radius elbows with caps. Elbows are to pass through the concrete seals and be used as filler and vent pipes (See Figure #4).

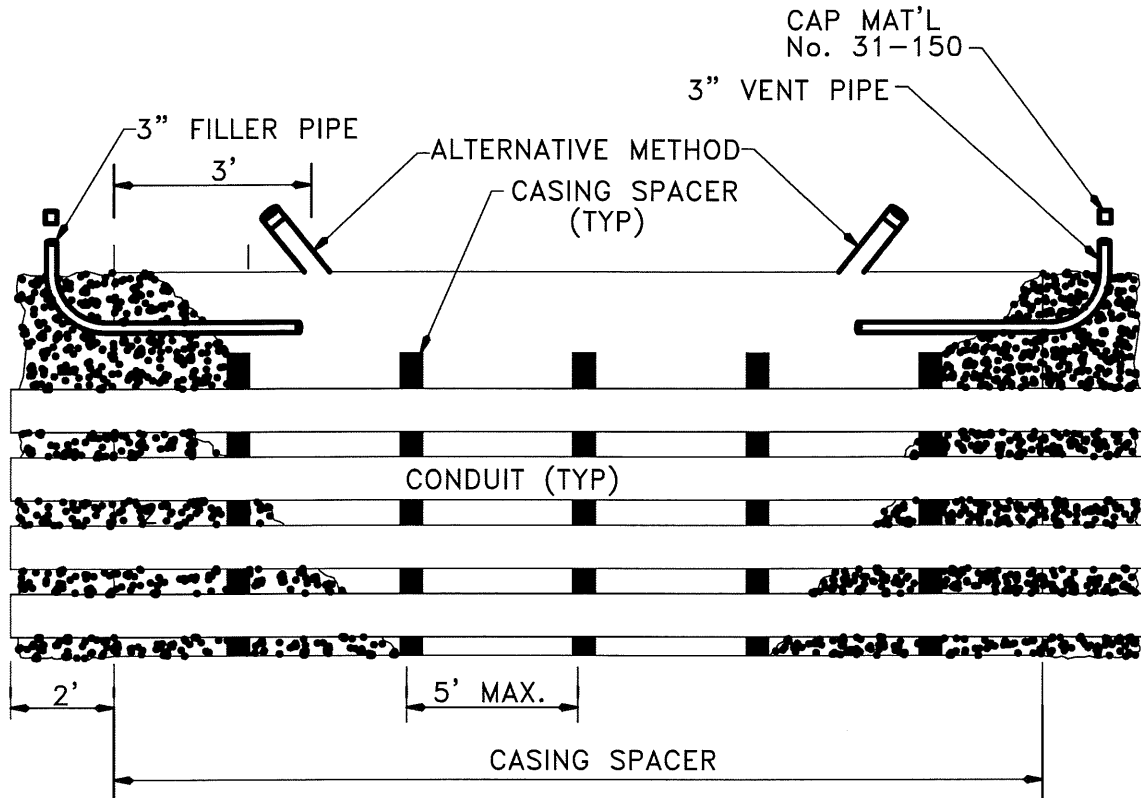

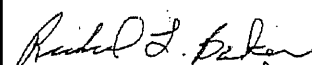
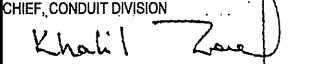
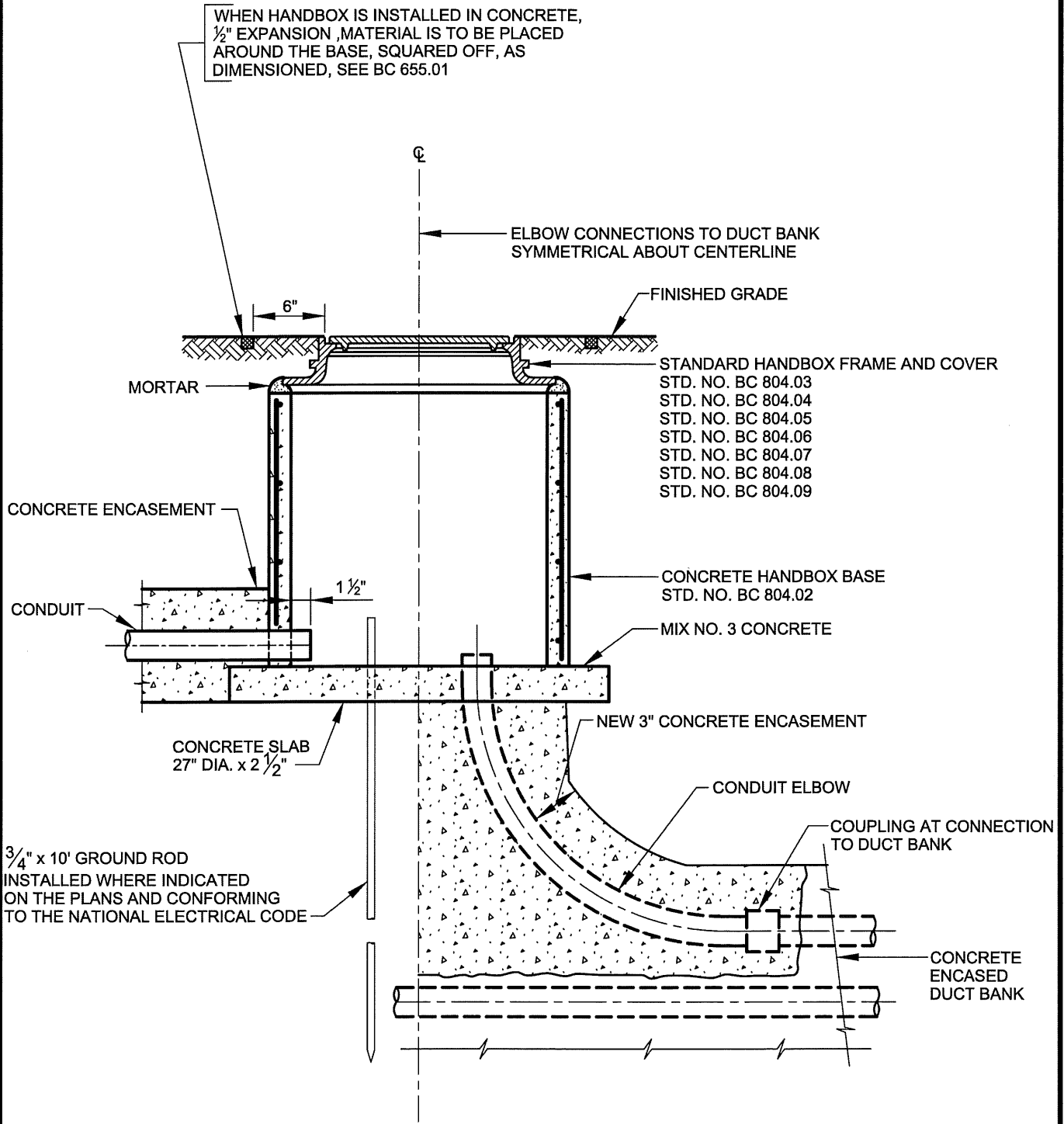


FIGURE 4

- Only "High Density Cable Backfill" shall be pumped into the casing. Grout is available from "LaFARGE," previously called Genstar or an approved equal. (See Baltimore City Std. 803.01-1 to determine amount of grout needed.)
- All trucks containing the required grout filler shall be on the job site before pumping operation is started.
- A "Squeeze-Crete" concrete pump shall be used to pump the grout into the casing. This type pump is available at Concrete Placing Services Inc, 708 Crain Hgwy. The pump shall be operated at a slow, continuous pace exercising care to avoid pressure readings of over 30 PSI. Pumping too fast could jam the material and stop the pumping operation prematurely and excessive pressure could collapse the ducts.
- Grout shall be pumped into the filler pipe until the grout is forced out the vent pipe. (Air and water will probably precede the grout.)
- When casing is filled, cap both the filler and vent pipes. be sure the pumping operation has stopped before the vent cap is put on. Do not give an "extra shot" once pumping of grout has stopped.
- Rod, clean and mandrill casing duct before extending or connecting them to adjacent ducts, The mandrill shall be 1/2" smaller then the ducts I.D.


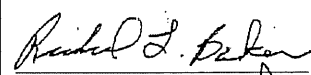
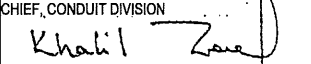
	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	CONDUIT SECTIONS IN CASING PIPE 877		DETAIL NO. BC 803.01-5		
	876		SCALE: NONE		SHEET 5 OF 5

DRAFT - NOT FOR CONSTRUCTION

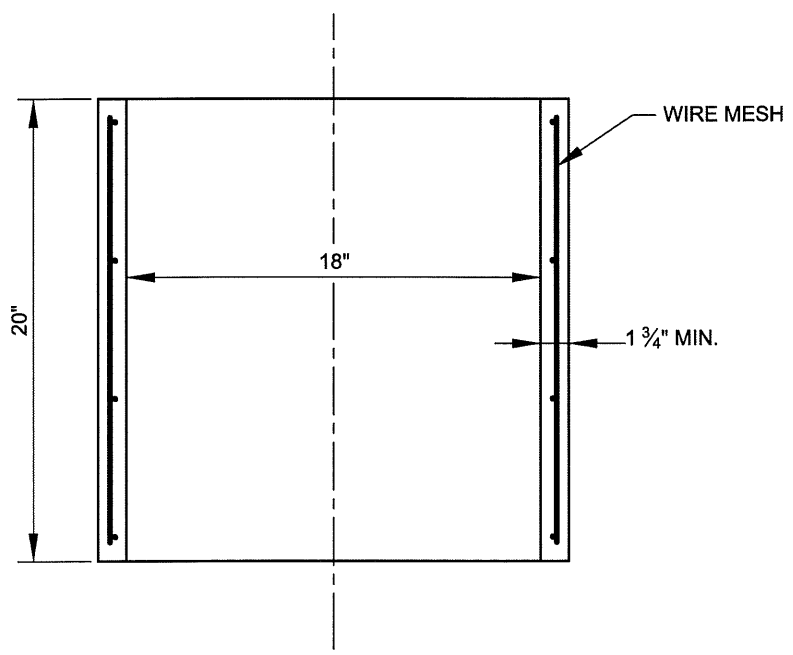
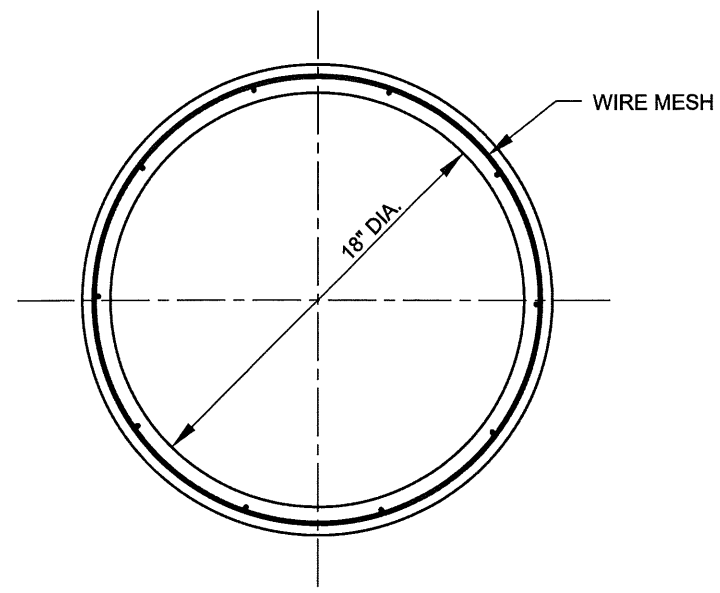


CONNECTION TO
LIGHT STANDARDS

CONNECTION TO
EXISTING DUCT BANK

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	HANDBOX-CONDUIT TYPICAL INSTALLATION 878 877		DETAIL NO. BC 804.01		
			SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION



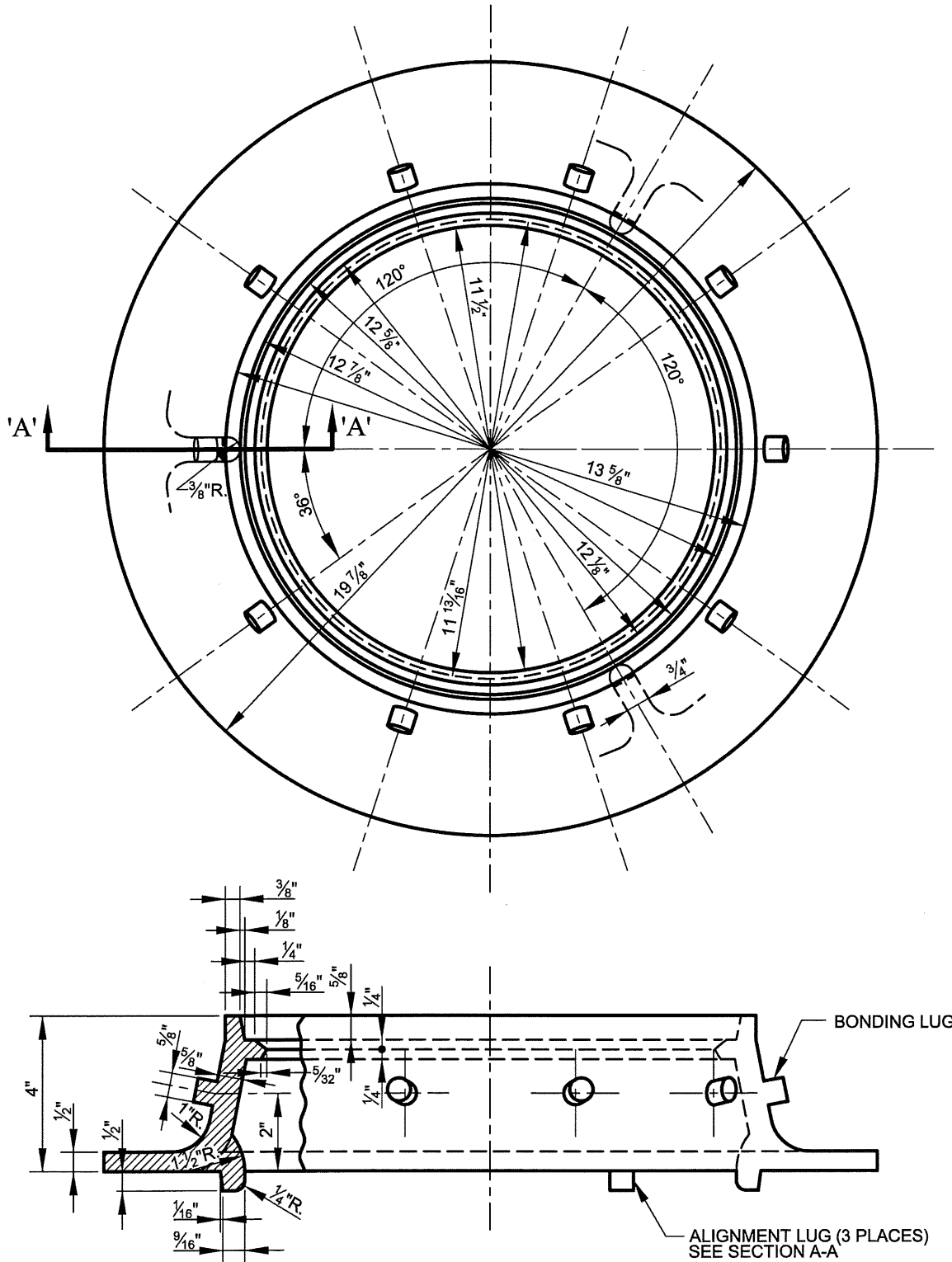
APPROVED:
Richard L. Baker
CHIEF, CONDUIT DIVISION
Khali Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION
**HANDBOX - CONDUIT
STANDARD CONCRETE BASE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.02		
SCALE : NONE	SHEET 1 OF 1	


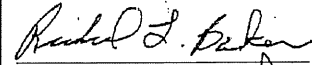
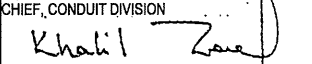
DRAFT - NOT FOR CONSTRUCTION

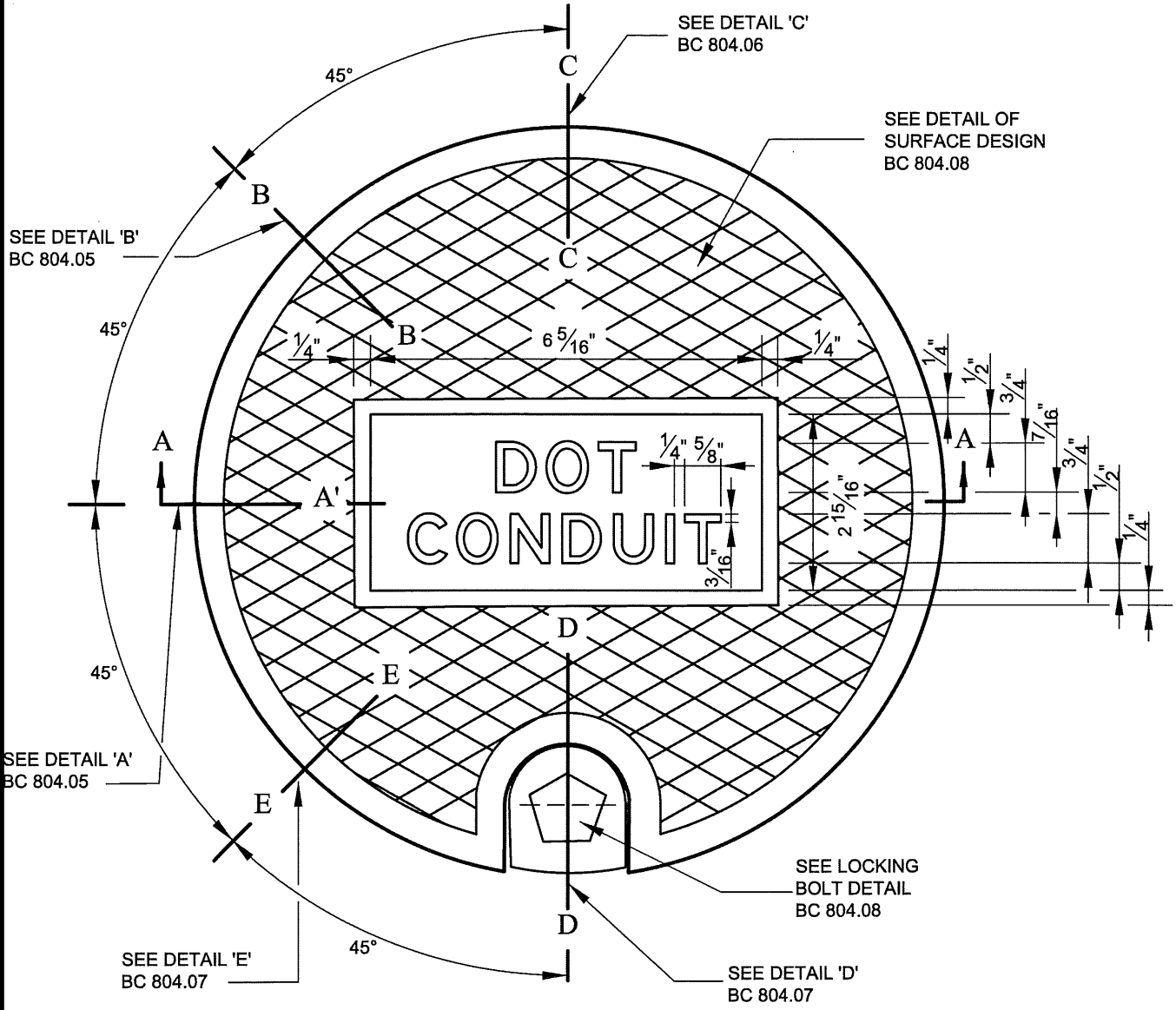
NOTE: MATERIAL SHALL BE CAST
IRON 21,000 PSI
TENSILE STRENGTH



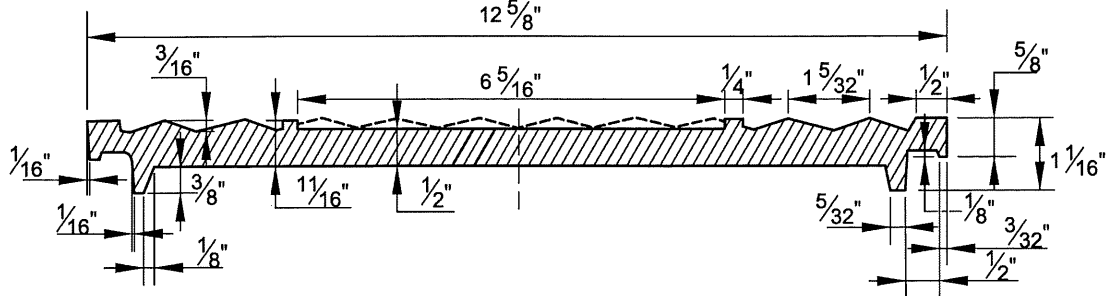
A-A ELEVATION & SECTION

NOTE:
AVERAGE WEIGHT OF FRAME 57.75 LBS.

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	HANDBOX - CONDUIT STANDARD FRAME 879	DETAIL NO. BC 804.03			
	SCALE: NONE	SHEET 1 OF 1			


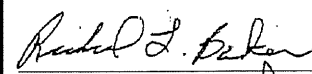
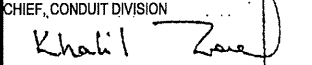


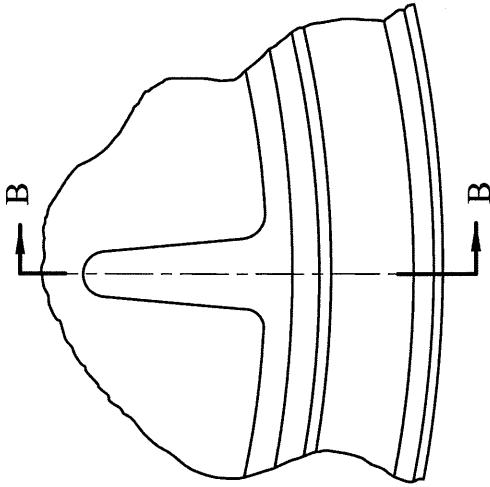
PLAN



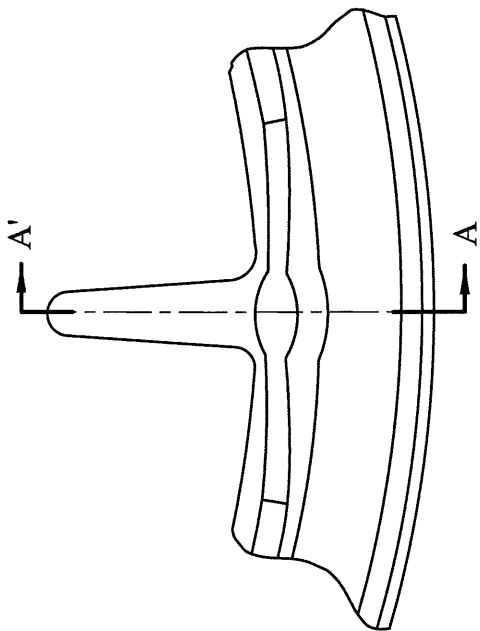
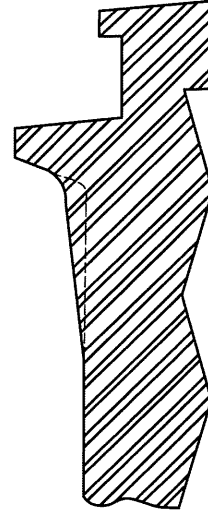
SECTION A-A

NOTE:
 HANDBOX COVER MATERIAL SHALL BE CAST STEEL,
 21,000 PSI TENSILE STRENGTH. WEIGHT = 21 LBS.

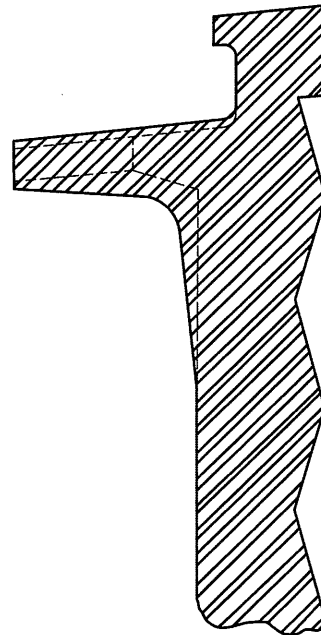
	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	HANDBOX - CONDUIT STANDARD COVER 880	DETAIL NO. BC 804.04		SCALE: NONE	
	880	SHEET 1 OF 1		880	



PLAN-BOTTOM VIEW



PLAN-BOTTOM VIEW



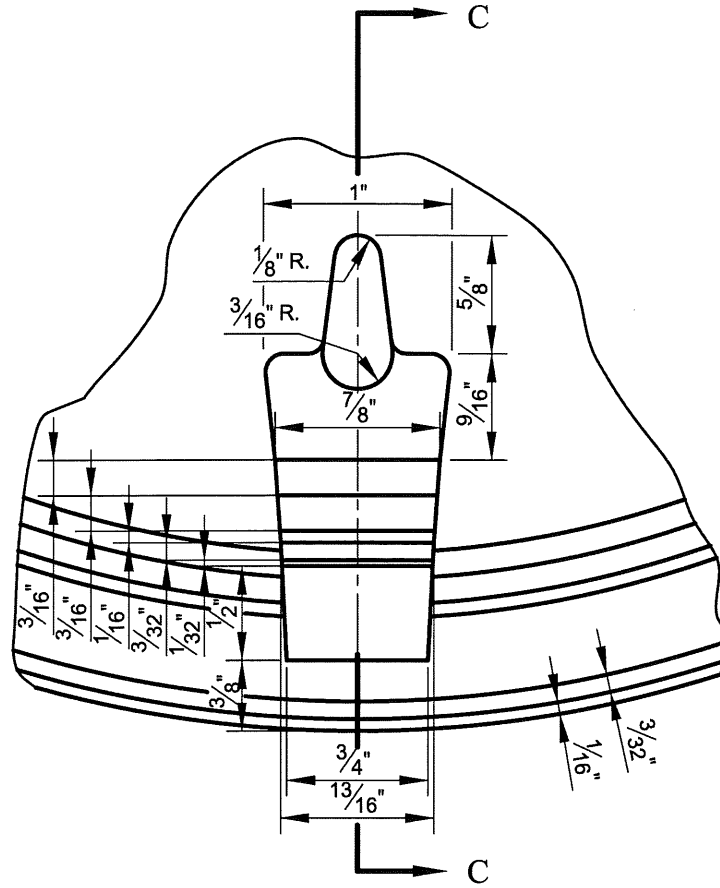
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

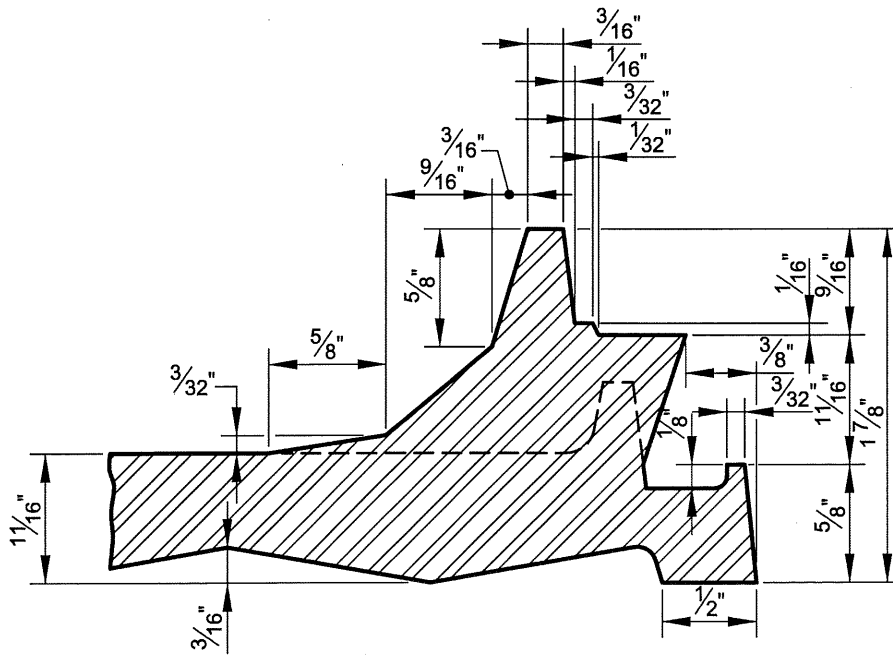
HANDBOX - CONDUIT
 STANDARD COVER
 882
 881
 DETAILS 'A' & 'B'

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.05		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION



PLAN - BOTTOM VIEW



SECTION C-C
 DETAIL 'C'



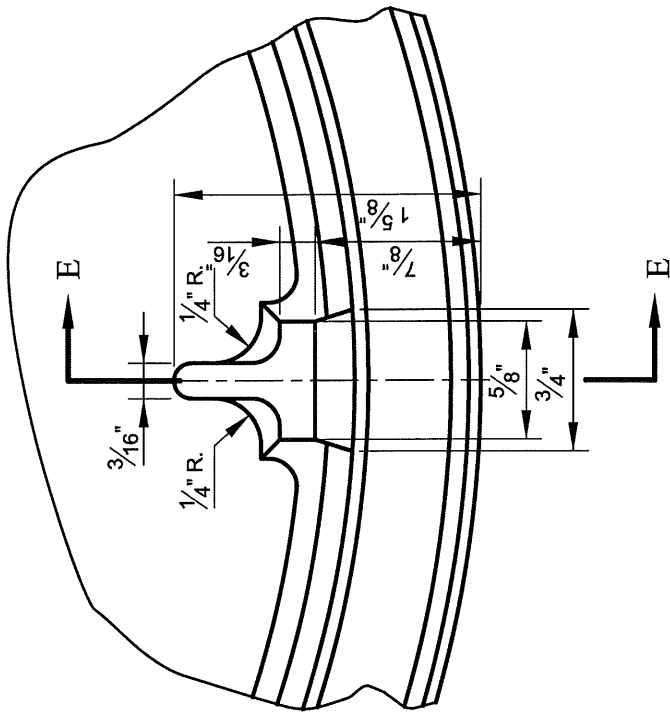
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

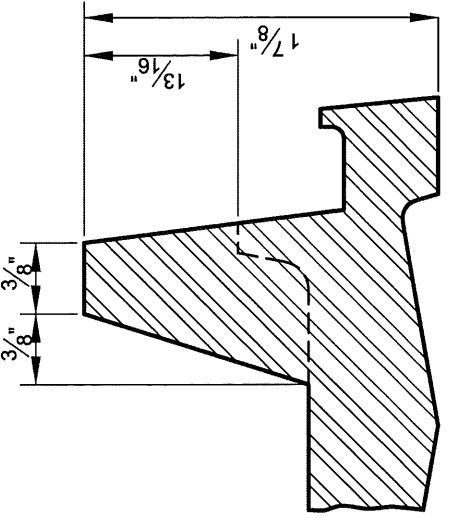
HANDBOX - CONDUIT
 STANDARD COVER DETAIL 'C'

882

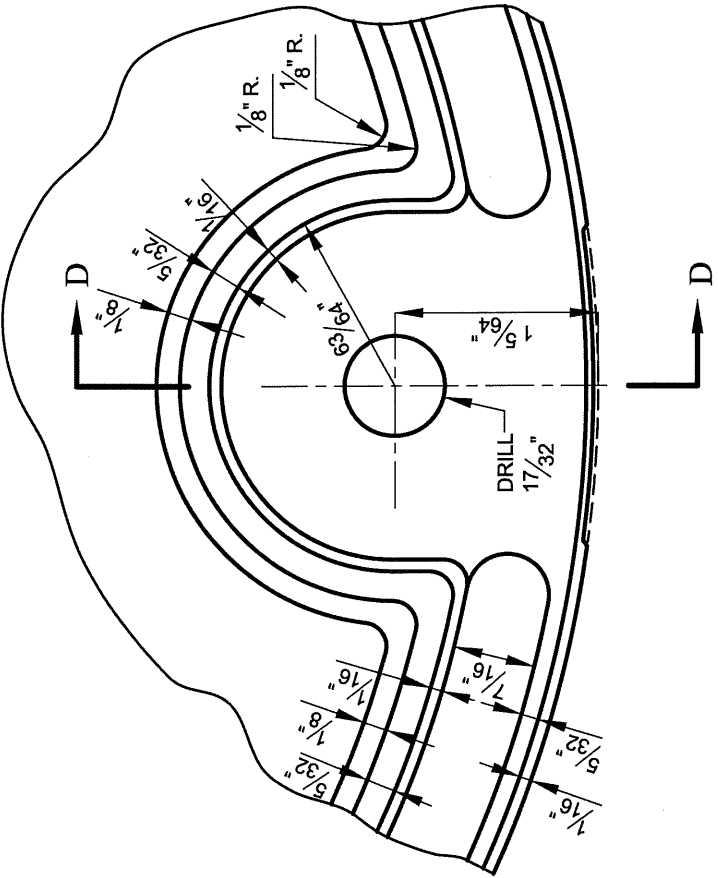
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.06		
SCALE: NONE	SHEET 1 OF 1	



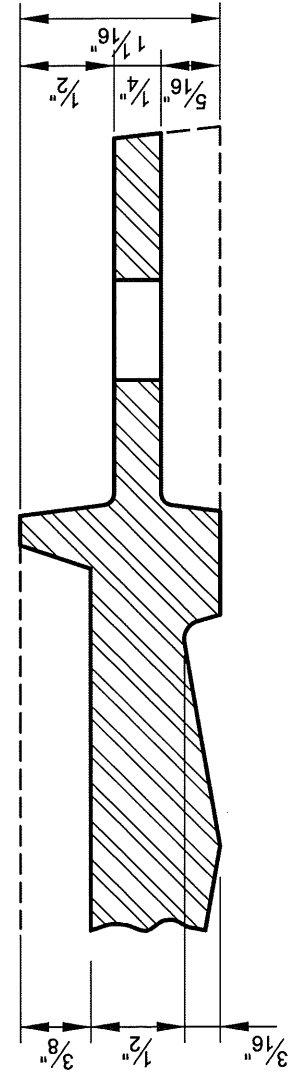
PLAN - BOTTOM VIEW



SECTION E-E
 DETAIL 'E'



PLAN - BOTTOM VIEW



SECTION D-D
 DETAIL 'D'

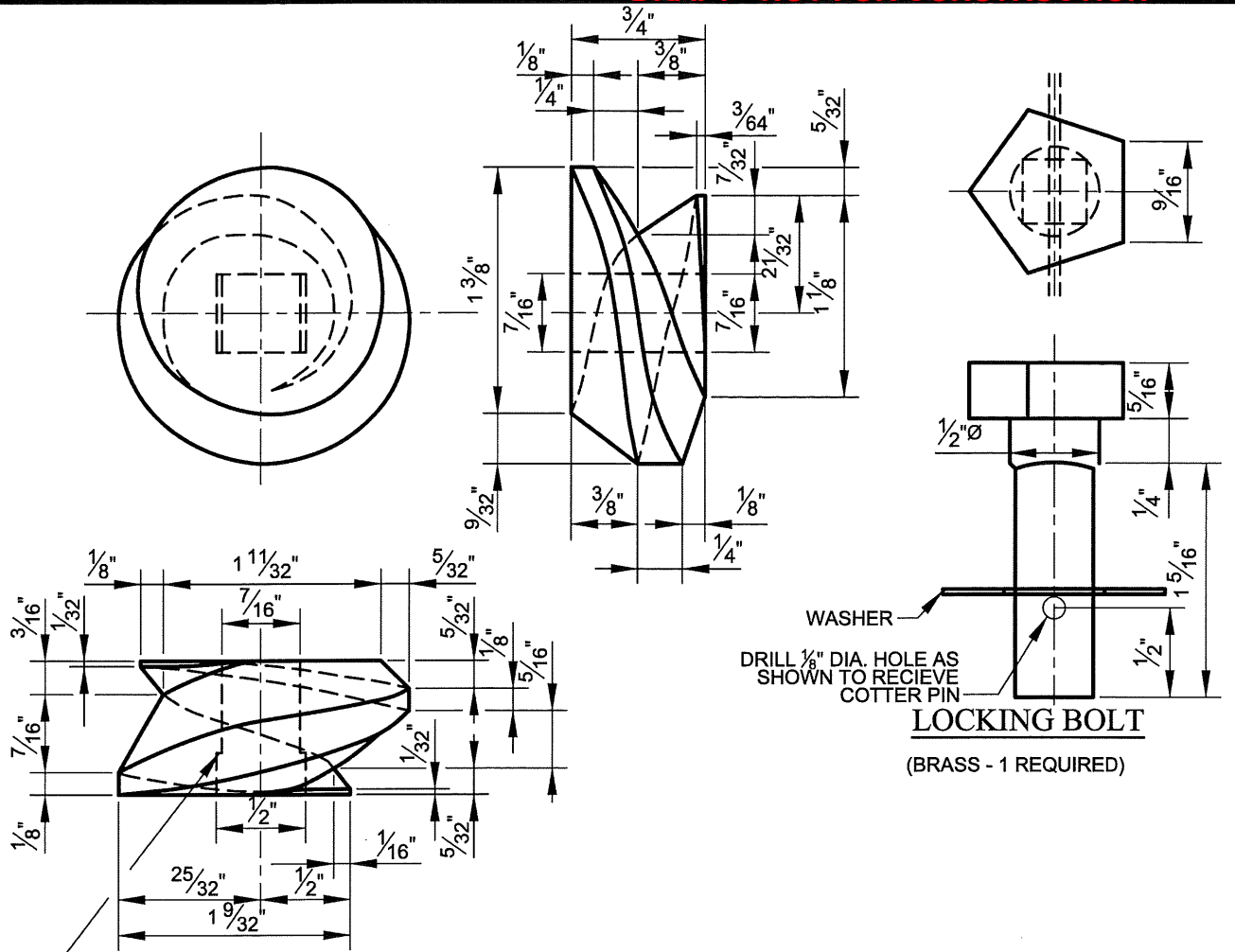


APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

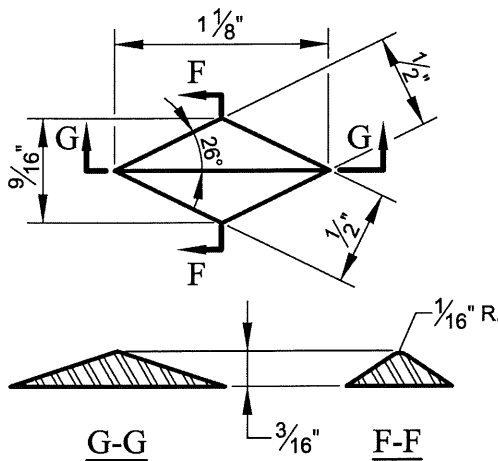
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
 HANDBOOK - CONDUIT
 STANDARD COVER DETAILS 'D' & 'E'

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.07		
SCALE: NONE	SHEET 1 OF 1	

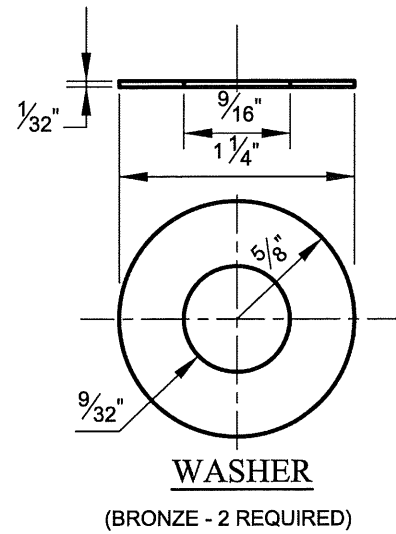
DRAFT - NOT FOR CONSTRUCTION



SQUARE SHOULDER
 1/4 FROM BASE
LOCK WORM
 (CAST IRON - 1 REQUIRED)



SURFACE DESIGN DETAIL

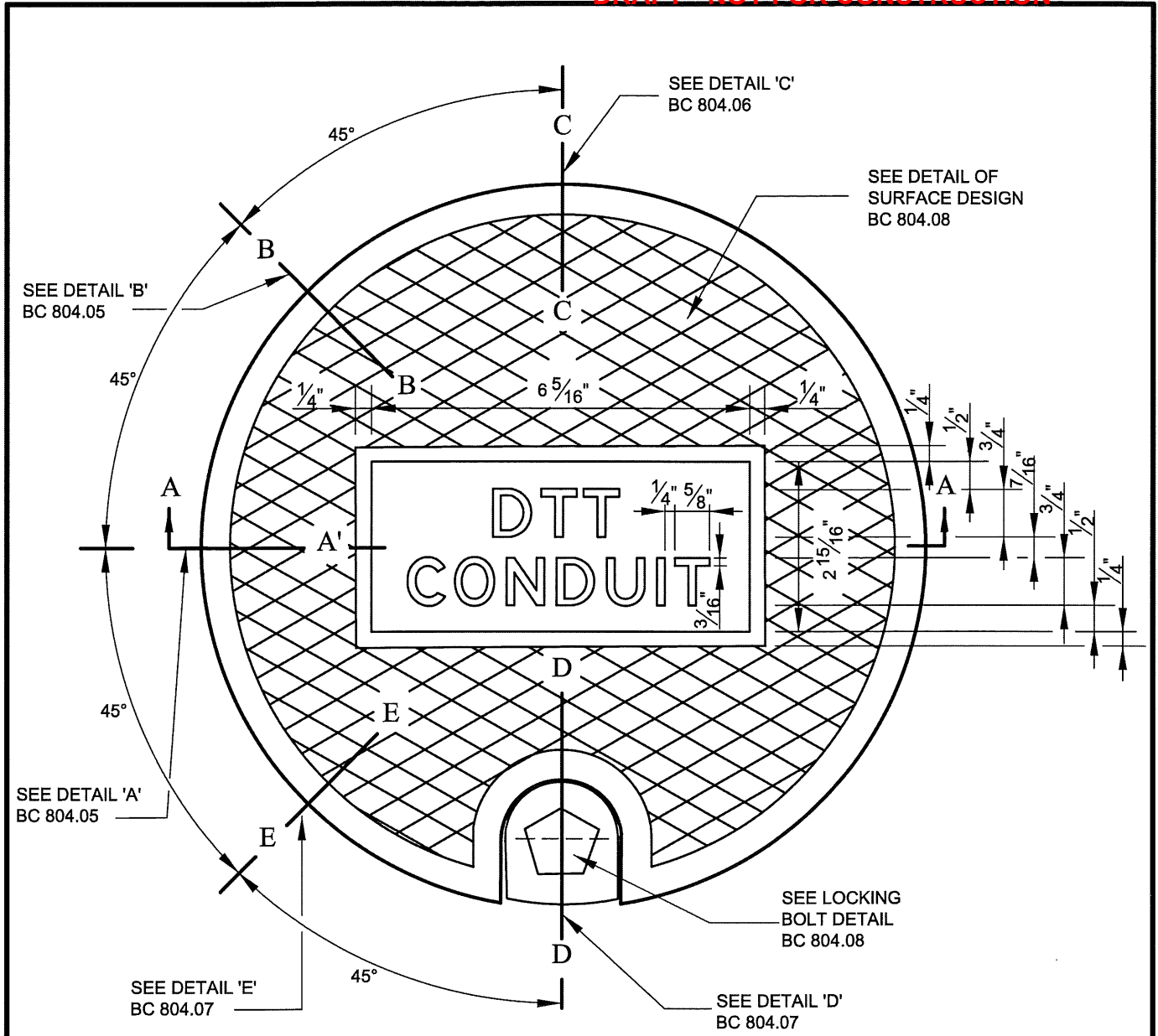


APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

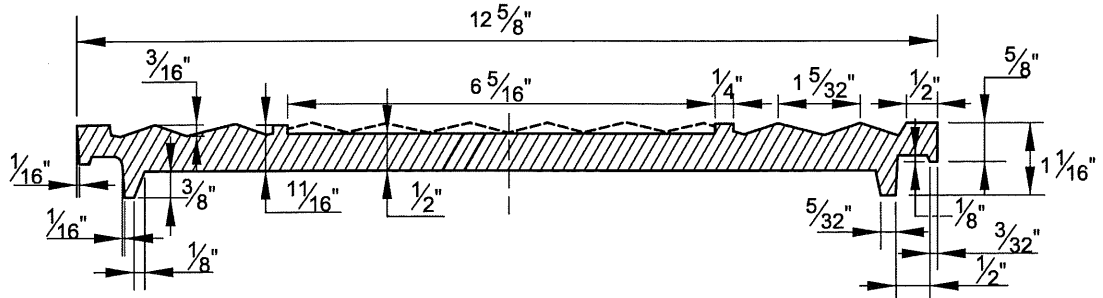
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
**HANDBOOK - CONDUIT STANDARD
 COVER LOCKING BOLT AND
 SURFACE DESIGN DETAILS**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.08		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

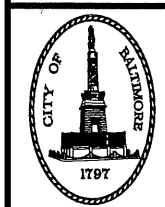


PLAN



SECTION A-A

NOTE:
 HANDBOX COVER MATERIAL SHALL BE CAST STEEL,
 21,000 PSI TENSILE STRENGTH. WEIGHT = 21 LBS.



APPROVED:
Primal DeLuca
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
TRANSPORTATION ENGINEERING AND
CONSTRUCTION

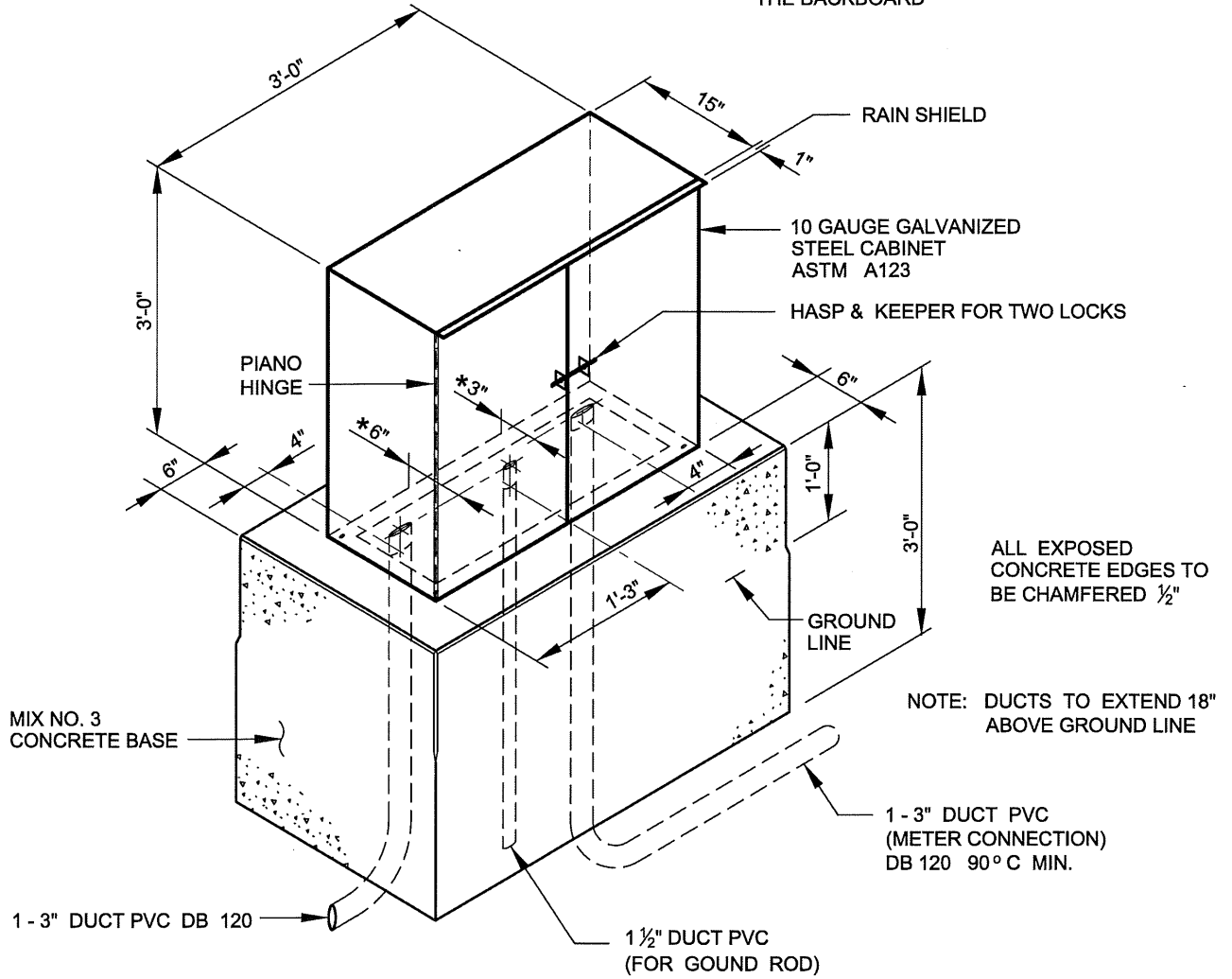
STANDARD HANDBOX
886 COVER - DTT
885

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.09		
SCALE : NONE		SHEET 1 OF 1

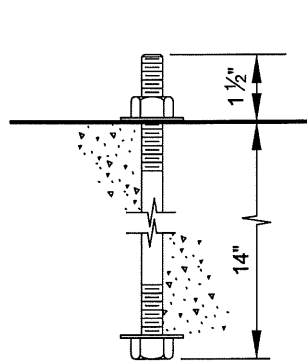
DRAFT - NOT FOR CONSTRUCTION

INSTALL 1/2" EXTERIOR GRADE MARINE PLYWOOD
 BACKBOARD PAINTED GRAY

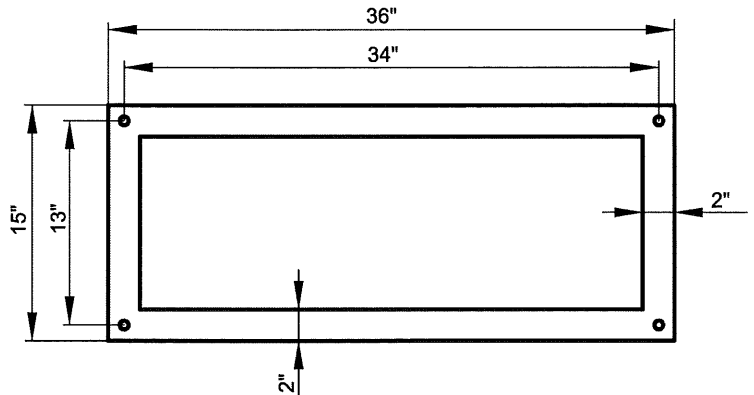
* MEASURING FROM
 THE CABINET, NOT
 THE BACKBOARD



N.E.M.A. 3R FREE STANDING METER CABINET
 NTS



BOLT SIZE 1/2" STAINLESS STEEL
ANCHOR BOLT DETAIL
 NTS



CABINET BASE DETAIL
 NTS



APPROVED:
Primal Dew A.
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khalil Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND
 CONSTRUCTION

**METER CABINET
 FOR ELECTRICAL SERVICE**

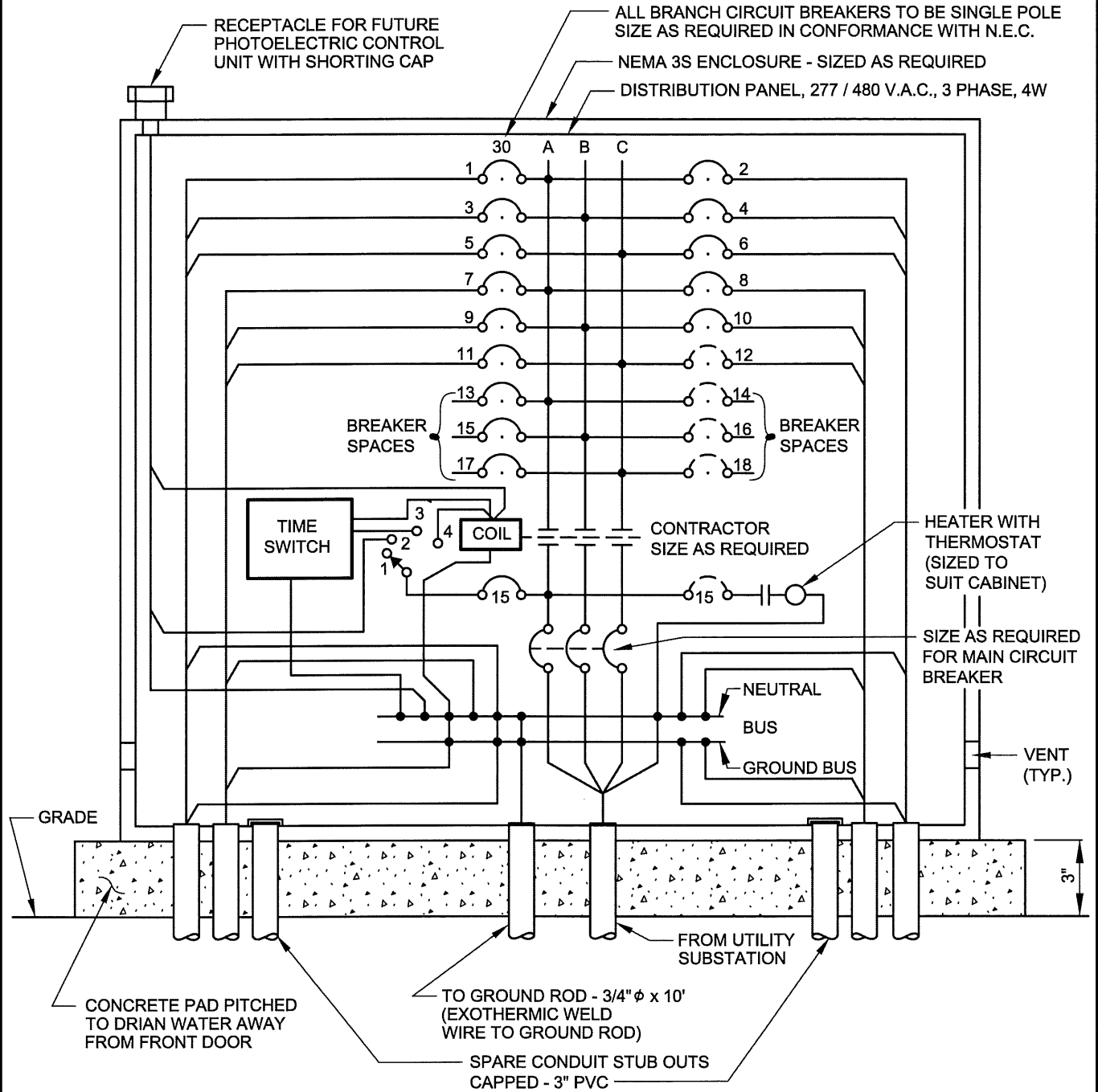
886

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.10		
SCALE : NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION

SELECTOR SWITCH POSITION

- 1 - OFF
- 2 - PHOTOCELL CONTROL
- 3 - TIME SWITCH CONTROL WITH 24 HR MIN. RESERVE POWER SPRING MECHANISM
- 4 - MANUAL CONTROL



NOTES:

- A - SIZE BRANCH CIRCUIT CONDUCTORS FOR 5 PERCENT MAXIMUM VOLTAGE DROP.
- B - MINIMUM WIRE SIZE - #12 THWN FOR CONTROLS
- C - BASE SPARES ON 20% OF ACTIVE CIRCUITS BUT NOT LESS THAN THREE SPARES

CIRCUIT	LOAD	* VOLT DROP
1.		
2.		
3.		
4.		
ETC.		

* MAXIMUM VOLT DROP ON 277 VOLT CIRCUIT IS 13.85 VOLTS (5%)



APPROVED:

Primal DeWalt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION

Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION

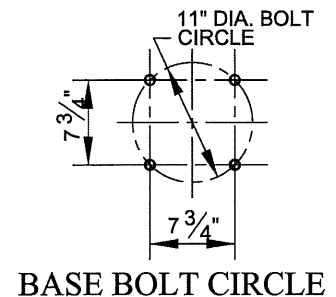
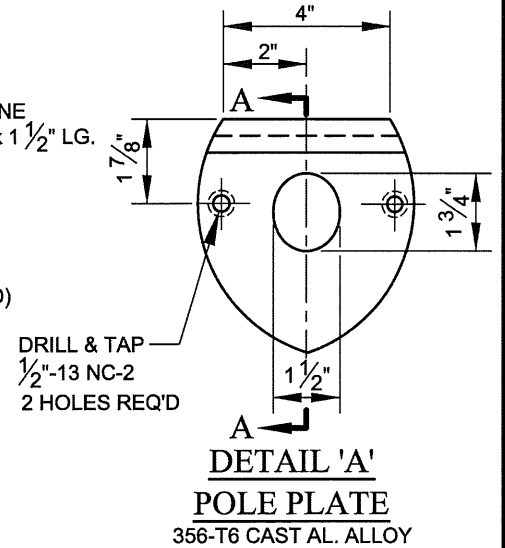
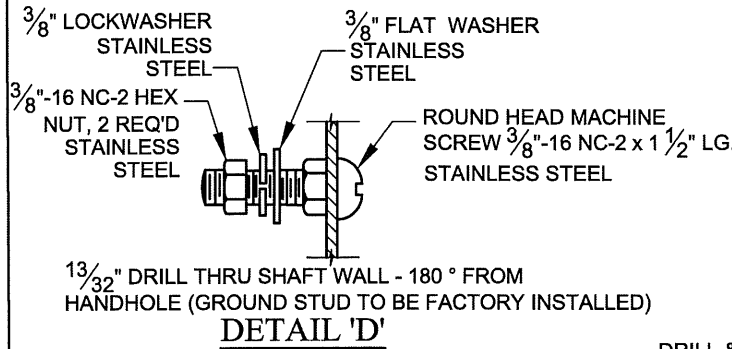
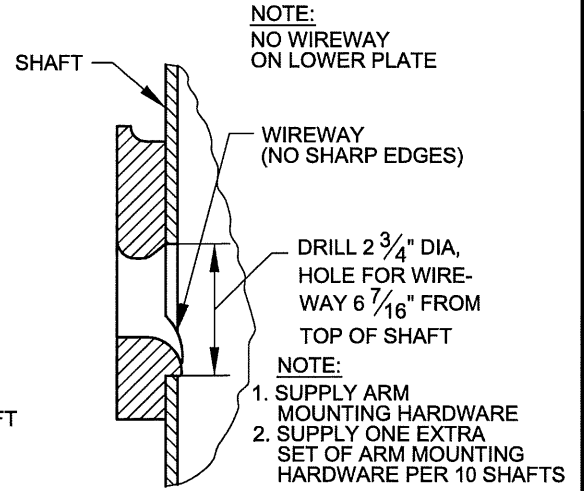
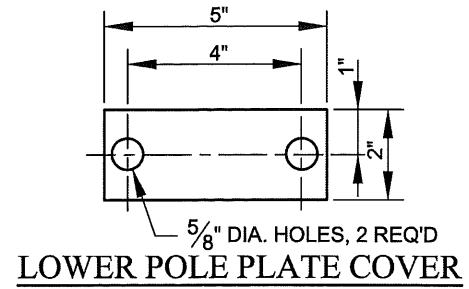
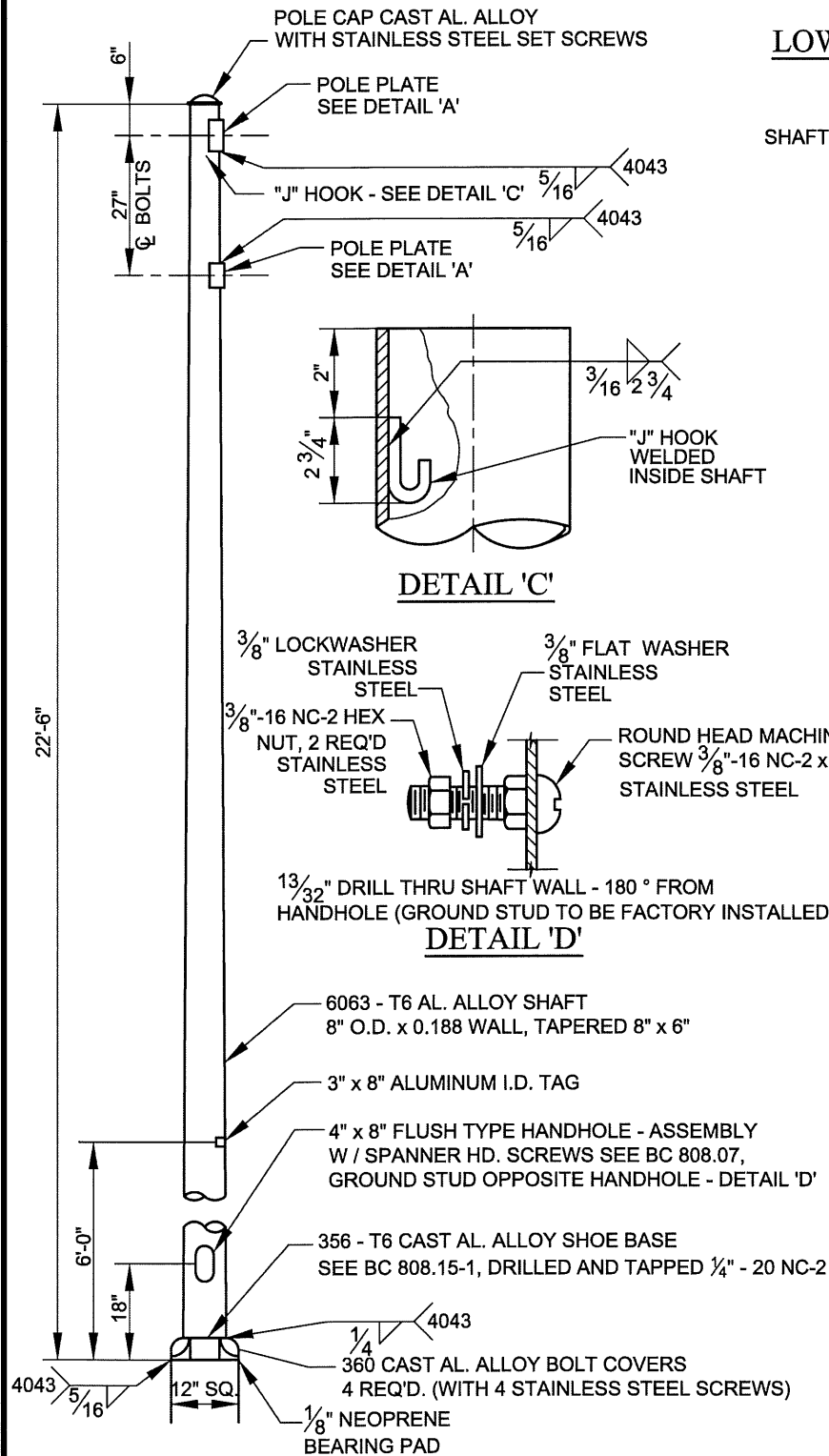
ROADWAY LIGHTING DISTRIBUTION PANEL SCHEMATIC DIAGRAM - 480Y/277 - UNMETERED

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 804.11		
SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

NOTE:
 6063 ASSEMBLY .375 WALL OR LESS
 TO BE HEAT TREATED AFTER WELDING

8" x 6" x 22'-6" 0.188 WALL THICKNESS



APPROVED:
Primal Dewa
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khalil Zaid
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION

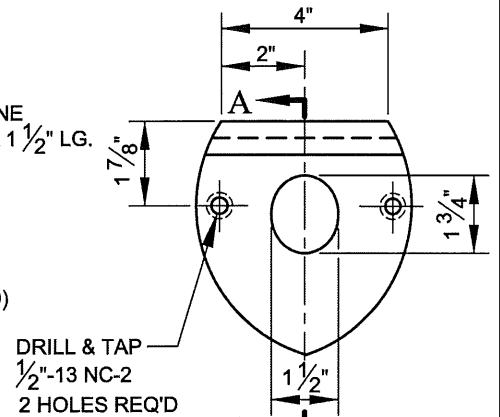
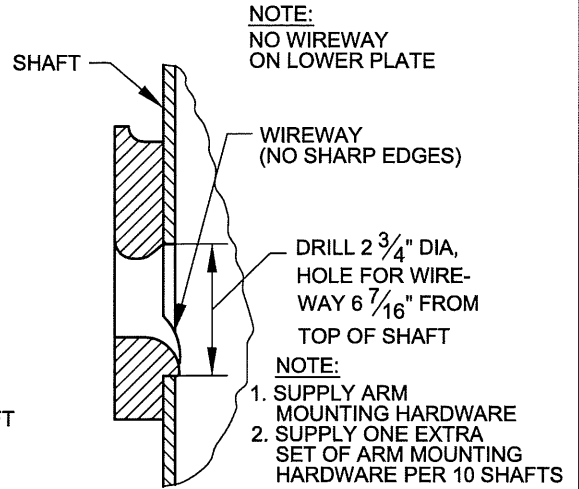
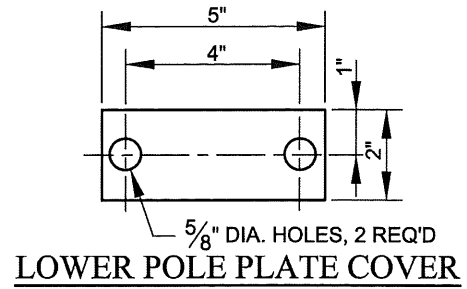
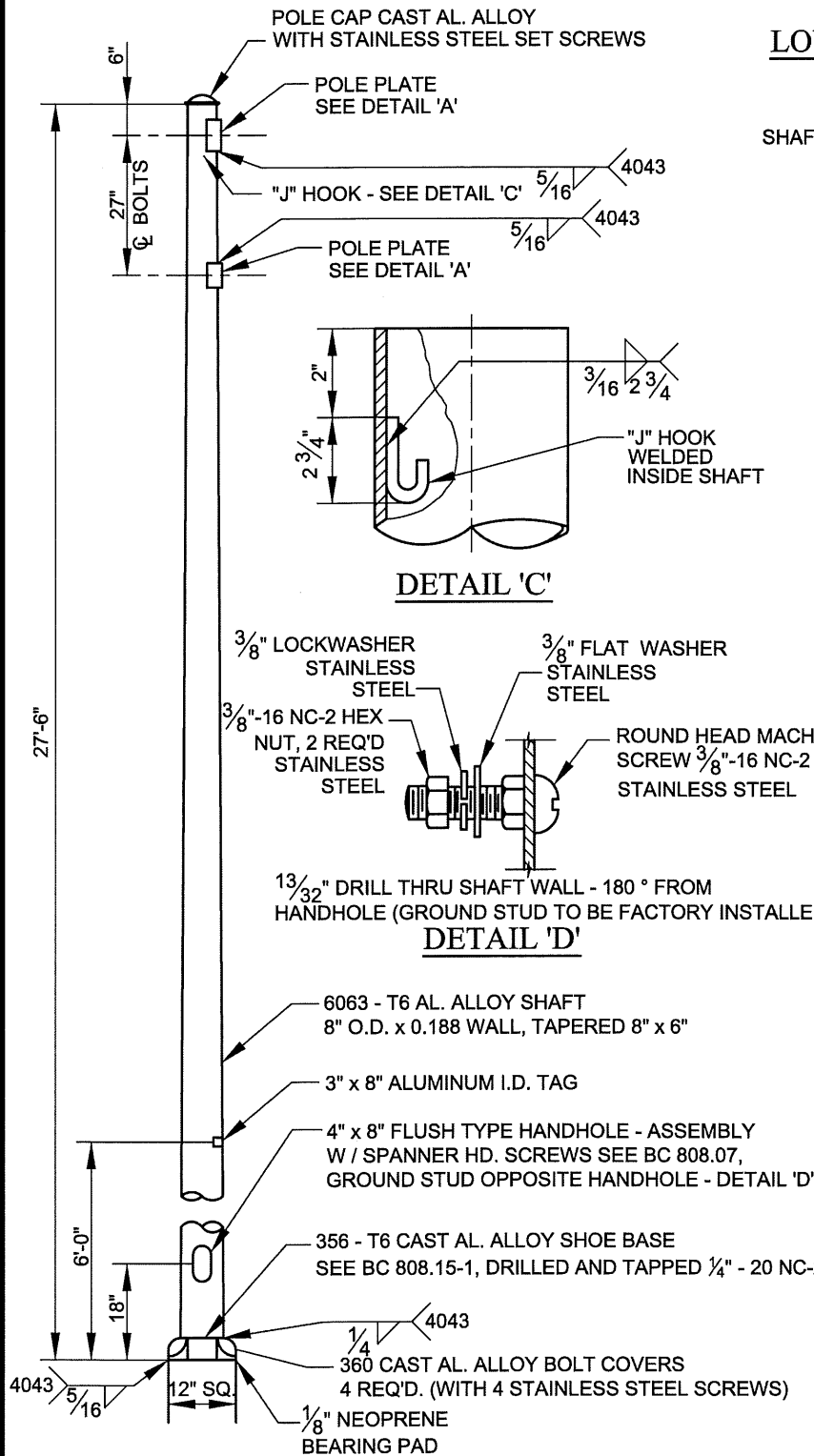
TYPICAL LIGHT STANDARD
 889 25' AW POLE
 888

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.01		
SCALE: NONE	SHEET 1 OF 1	

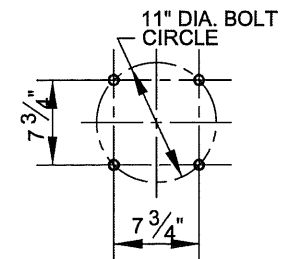
DRAFT - NOT FOR CONSTRUCTION

NOTE:
 6063 ASSEMBLY .375 WALL OR LESS
 TO BE HEAT TREATED AFTER WELDING

8" x 6" x 27'-6" 0.188 WALL THICKNESS



356-T6 CAST AL. ALLOY



APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khalil Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

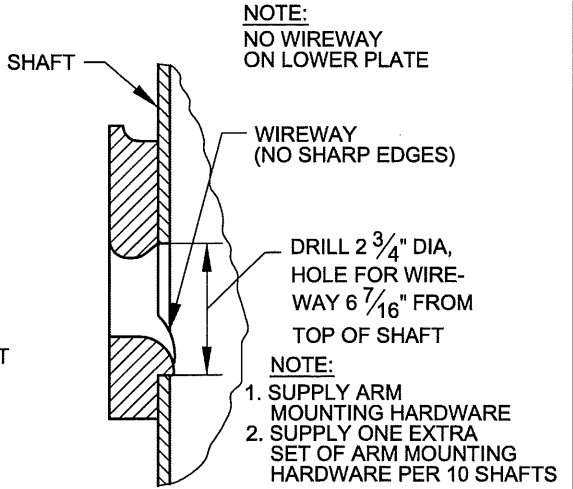
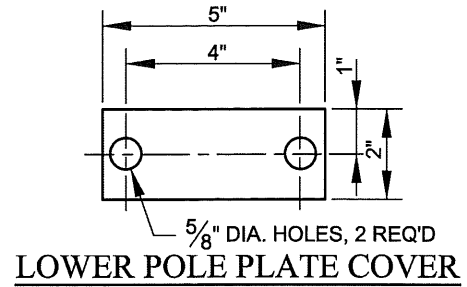
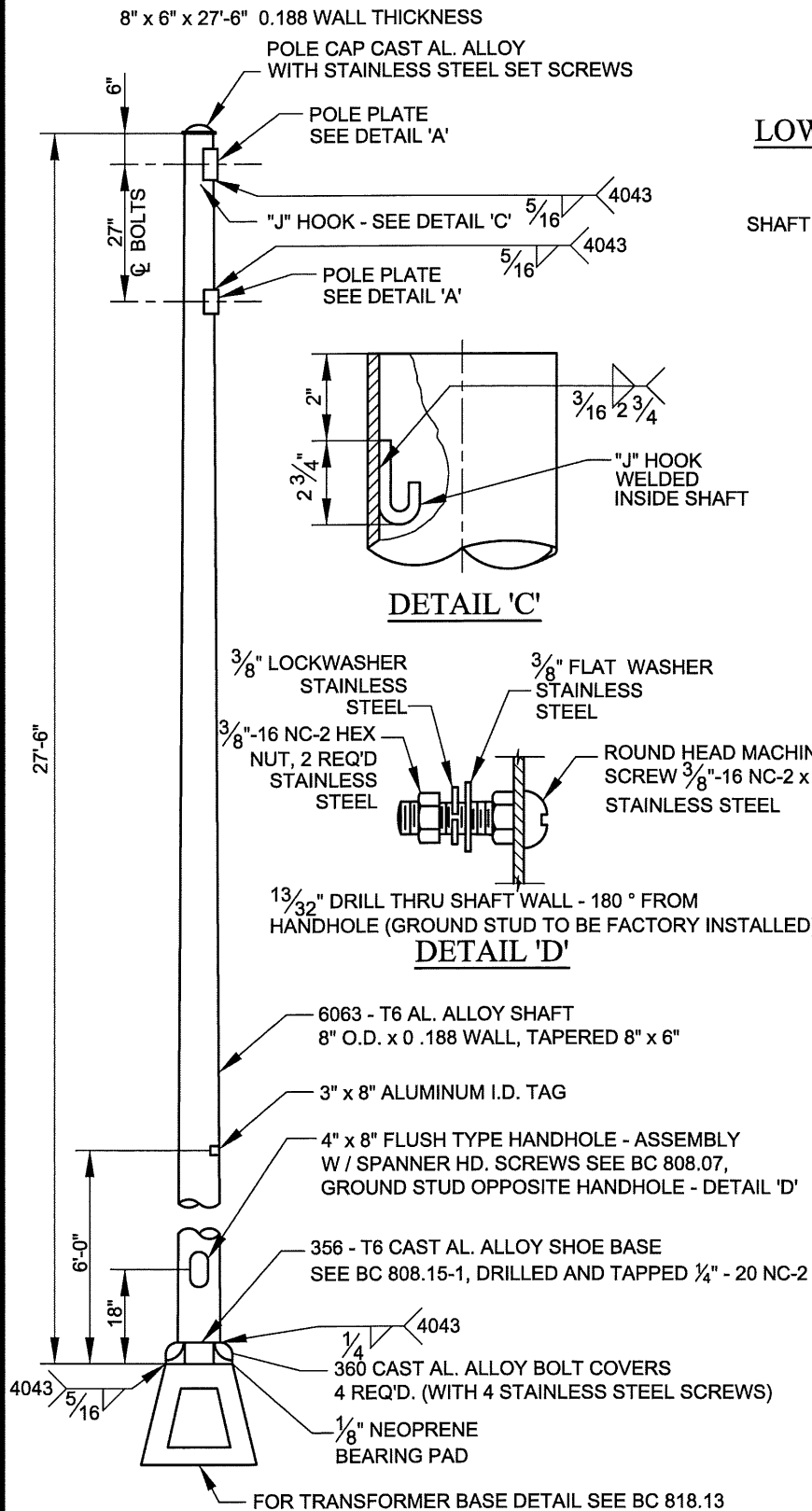
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION

TYPICAL LIGHT STANDARD
 890 30' AW POLE
 889

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.02-1		
SCALE: NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION

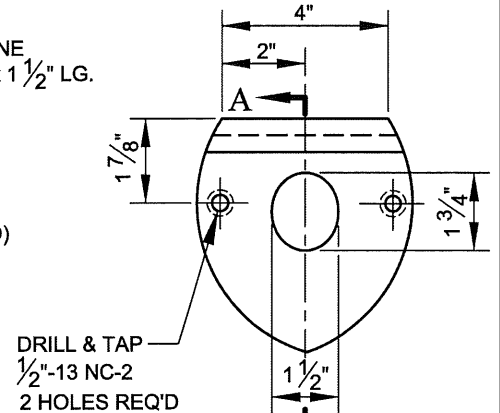
NOTE:
 6063 ASSEMBLY .375 WALL OR LESS
 TO BE HEAT TREATED AFTER WELDING



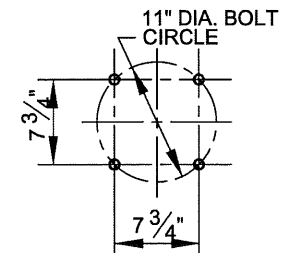
DETAIL 'C'

**A-A CUT DETAIL
 POLE PLATE**

DETAIL 'D'



**DETAIL 'A'
 POLE PLATE
 356-T6 CAST AL. ALLOY**



BASE BOLT CIRCLE



APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khaili Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND
 CONSTRUCTION
**TYPICAL LIGHT STANDARD
 30' AW POLE ON
 TRANSFORMER BASE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.02-2		
SCALE: NONE	SHEET 2 OF 2	


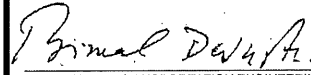
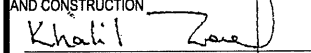
DRAFT - NOT FOR CONSTRUCTION

CHART
No. 25
 STEEL

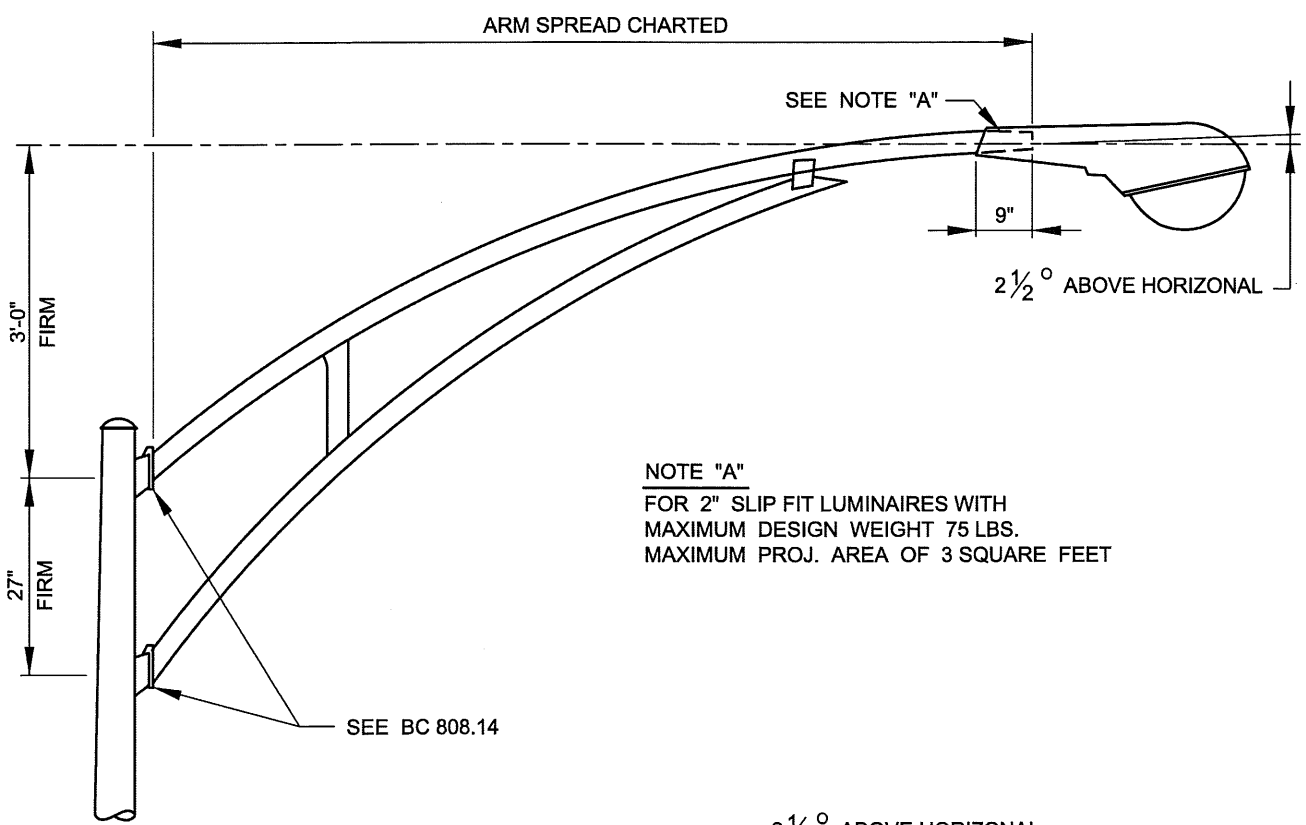
BRACKET - ARM TYPE & SPREAD	SHAFT SIZE AND GAUGE	LUMINAIRE MOUNTING HEIGHT	LUMINAIRE	
			MAX. WT. & PROJECTED AREA	
2' AND 6' SINGLE STRAIGHT PIPE	7.5" x 4.2" x 21'-6" 11 GAUGE	21'-0" NOM	75 LBS.	3.3 SQUARE FEET
4' AND 6' SINGLE UPSWEEP	7.5" x 4.2" x 22'-6" 11 GAUGE	25'-0" NOM		
8 FT. SINGLE UPSWEEP				
10 FT. "A" FRAME				
12 FT. "A" FRAME	7.5" x 4.2" x 22'-6" 7 GAUGE			
15 FT. "A" FRAME				
18 FT. "A" FRAME				
20 FT. "A" FRAME				

CHART
No. 30
 STEEL

BRACKET - ARM TYPE & SPREAD	SHAFT SIZE AND GAUGE	LUMINAIRE MOUNTING HEIGHT	LUMINAIRE	
			MAX. WT. & PROJECTED AREA	
6' SINGLE STRAIGHT PIPE OF ELLIPTICAL SECTION	8.0" x 3.52" x 32'-6" 11 GAUGE	32'-0" NOM	75 LBS.	3.3 SQUARE FEET
6 FT. SINGLE UPSWEEP	8" x 4.2" x 27'-6" 11 GAUGE FOR USE WITH ANCHOR BASE	30'-0" NOM		
8 FT. SINGLE UPSWEEP				
10 FT. "A" FRAME	8" x 4.2" x 27'-6" 7 GAUGE FOR USE WITH ANCHOR BASE			
12 FT. "A" FRAME				
15 FT. "A" FRAME				
18 FT. "A" FRAME				
20 FT. "A" FRAME	8" x 4.4" x 25'-10" 7 GAUGE FOR USE WITH TRANSFORMER BASE			

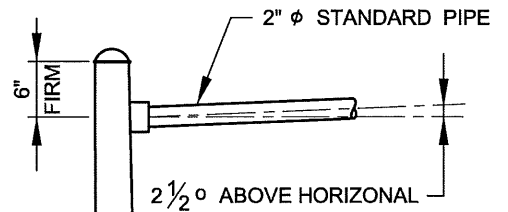
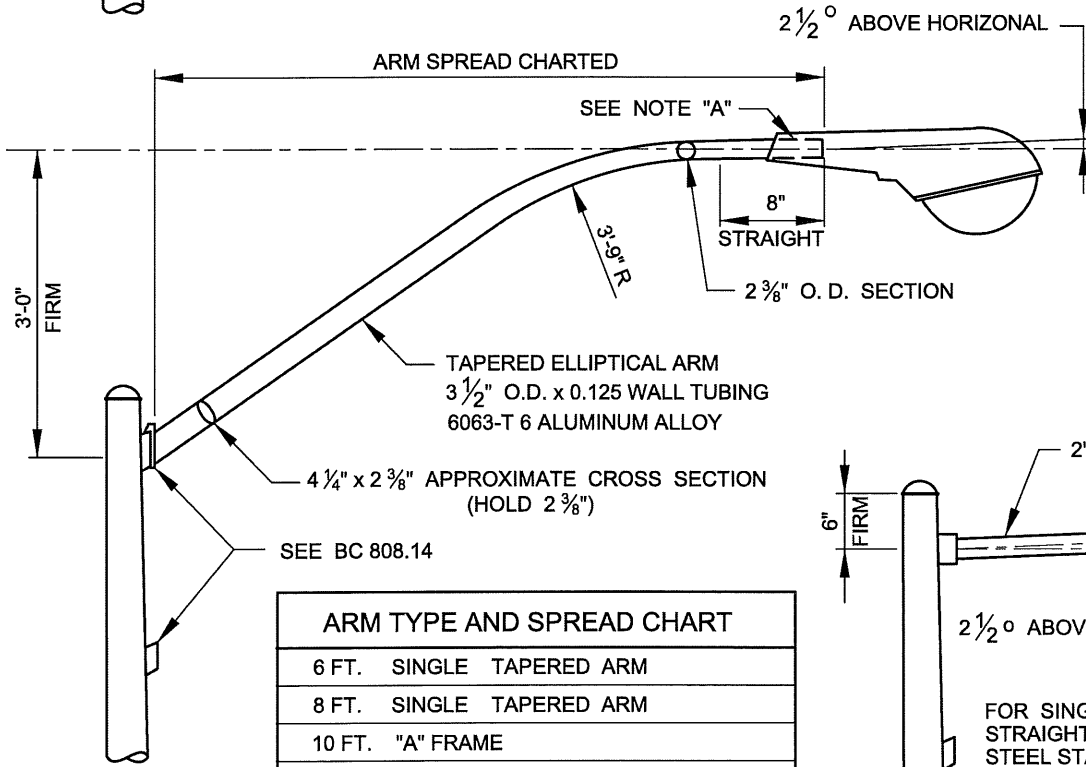
	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED	
	TYPICAL LIGHT STANDARD STEEL POLE DIMENSIONS 891			DETAIL NO. BC 808.03		
				SCALE : NONE	SHEET 1 OF 1	

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NOTE "A"
 FOR 2" SLIP FIT LUMINAIRES WITH
 MAXIMUM DESIGN WEIGHT 75 LBS.
 MAXIMUM PROJ. AREA OF 3 SQUARE FEET

SEE BC 808.14



FOR SINGLE 2'-0" OR 6'-0"
 STRAIGHT PIPE ARMS
 STEEL STANDARDS ONLY

CHARLES CENTER POLES ONLY

ARM TYPE AND SPREAD CHART

6 FT.	SINGLE TAPERED ARM
8 FT.	SINGLE TAPERED ARM
10 FT.	"A" FRAME
12 FT.	"A" FRAME
15 FT.	"A" FRAME
18 FT.	"A" FRAME SPECIAL DESIGN
20 FT.	"A" FRAME SPECIAL DESIGN



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 AND CONSTRUCTION
Khail Zayed
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

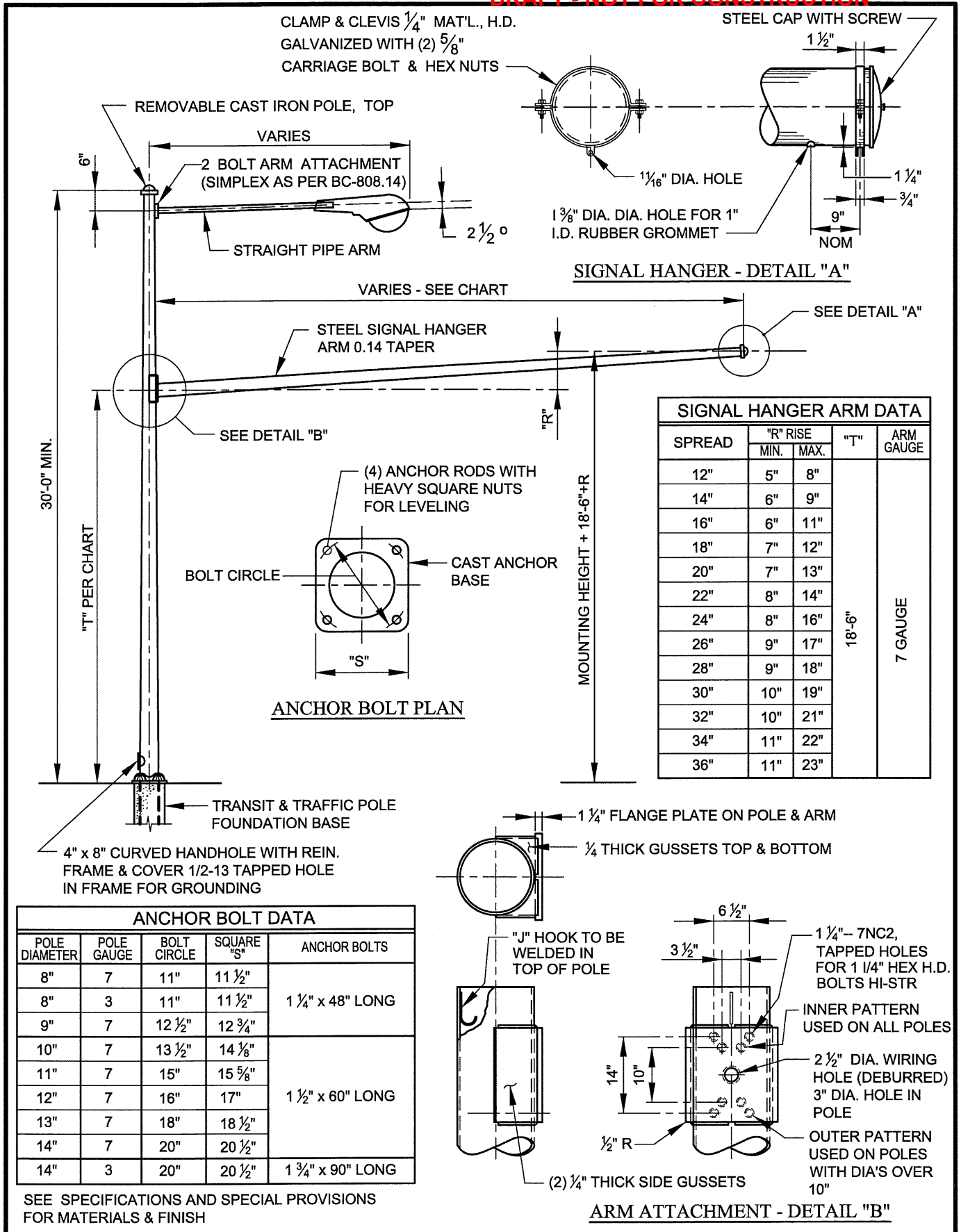
CITY OF BALTIMORE
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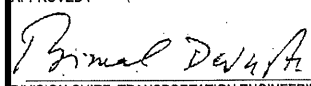
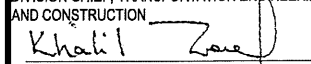
**TYPICAL POLE ARMS
 FOR 25' AND 30' POLES**

892

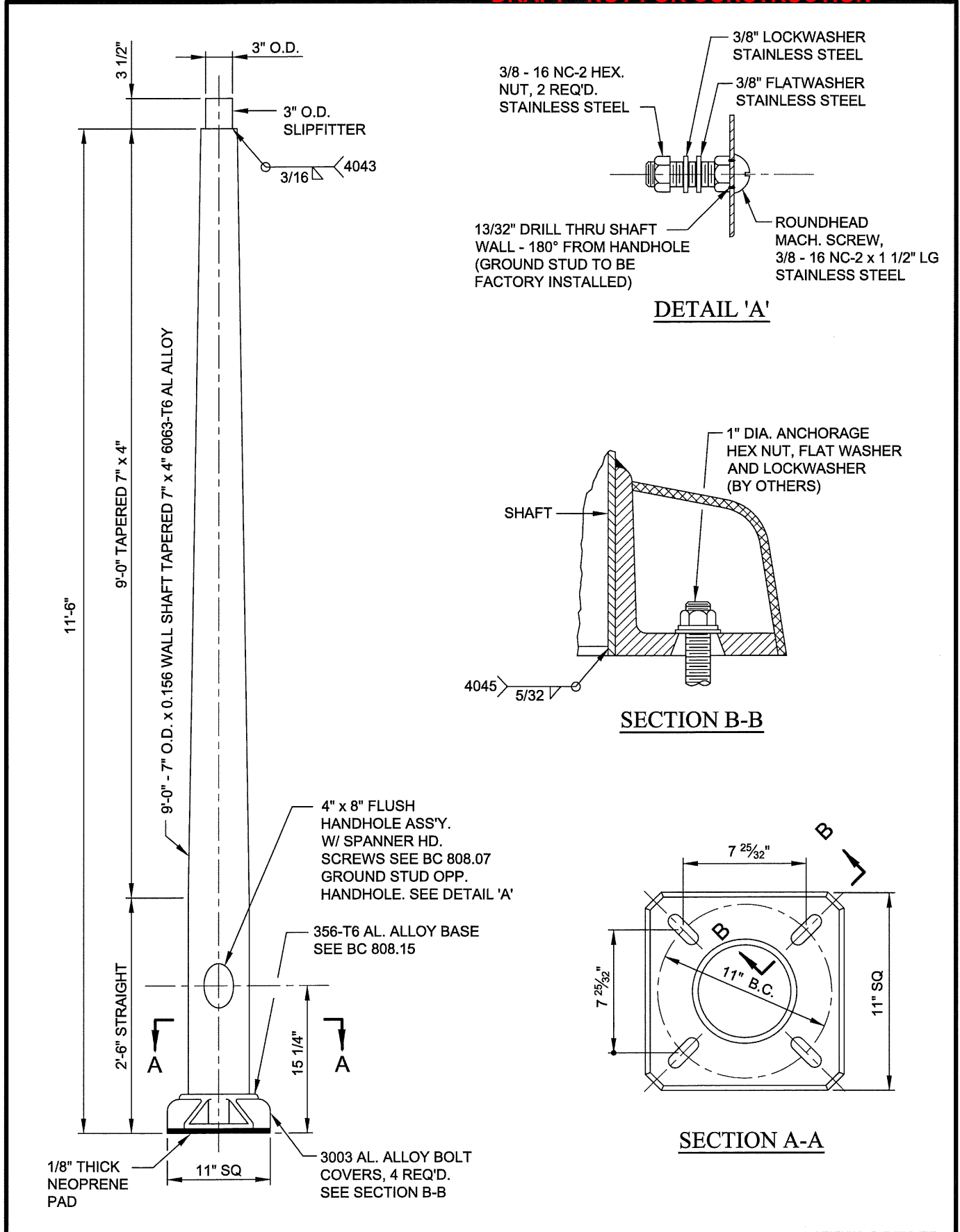
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.04		
SCALE: NONE	SHEET 1 OF 1	


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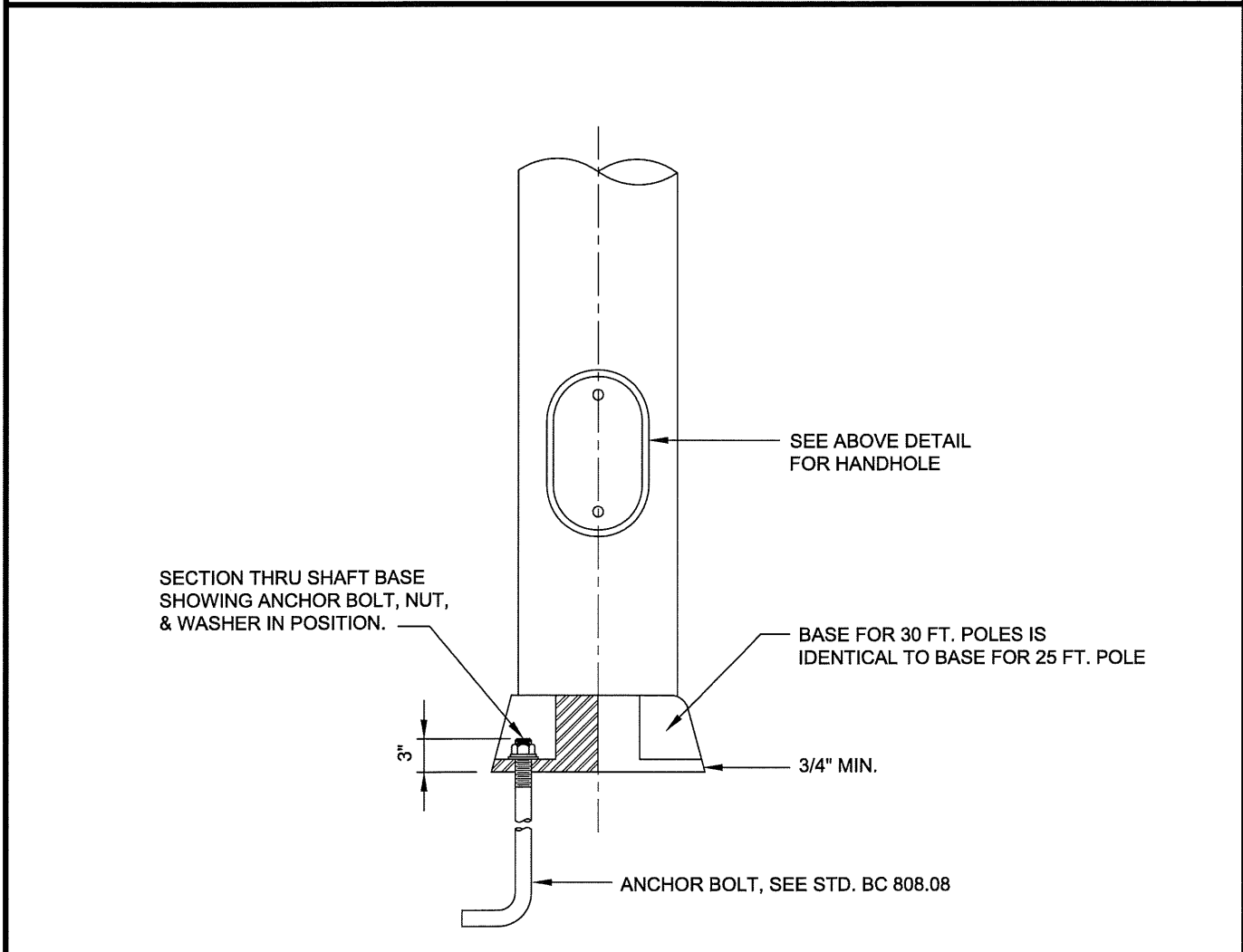
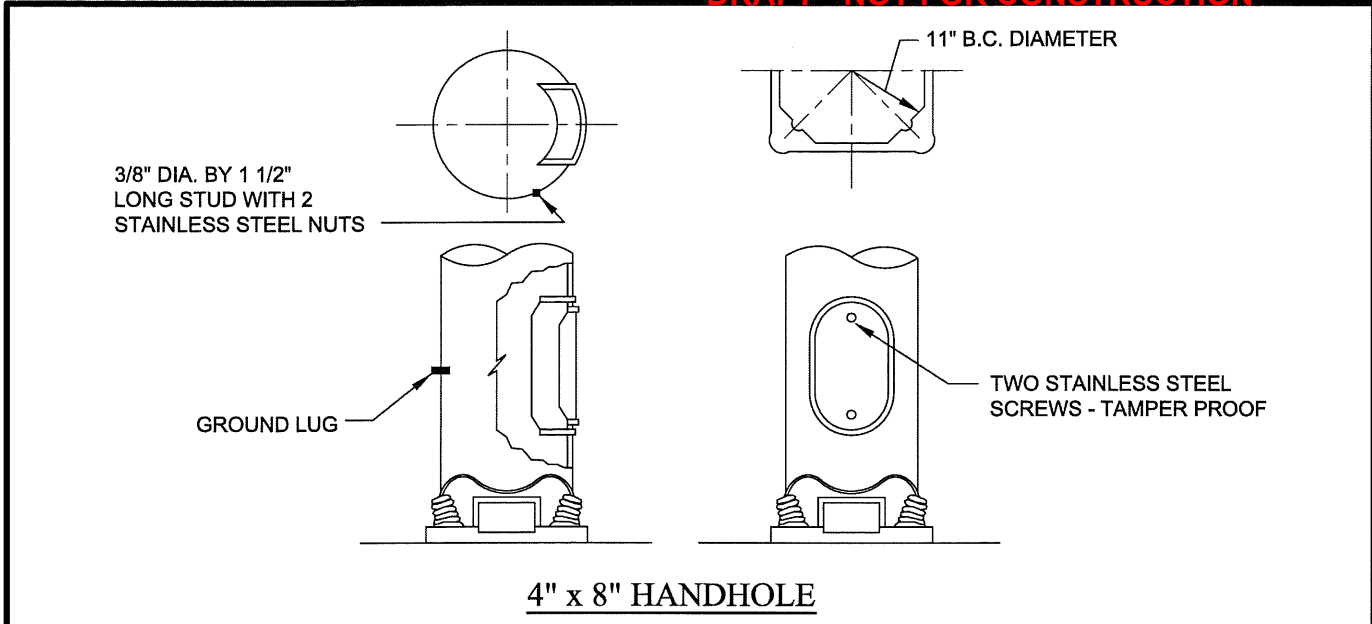
	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	COMBINATION POLE FOR LIGHT STANDARD AND TRAFFIC SIGNALS	DETAIL NO. BC 808.05	SCALE: NONE	SHEET 1 OF 1	

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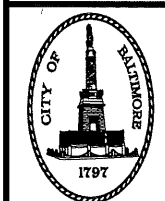


	APPROVED: <i>Primal DeWitt</i> DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION <i>Khaili Zaid</i> DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	11'-6" LIGHTING STANDARD FOR RESIDENTIAL STREETS		DETAIL NO. BC 808.06		
			SCALE: NONE	SHEET 1 OF 1	

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DETAILS OF ANCHOR BOLT IN PLACE



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 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
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 TRANSPORTATION ENGINEERING AND CONSTRUCTION

**LIGHTING STANDARD
 MISCELLANEOUS DETAILS**

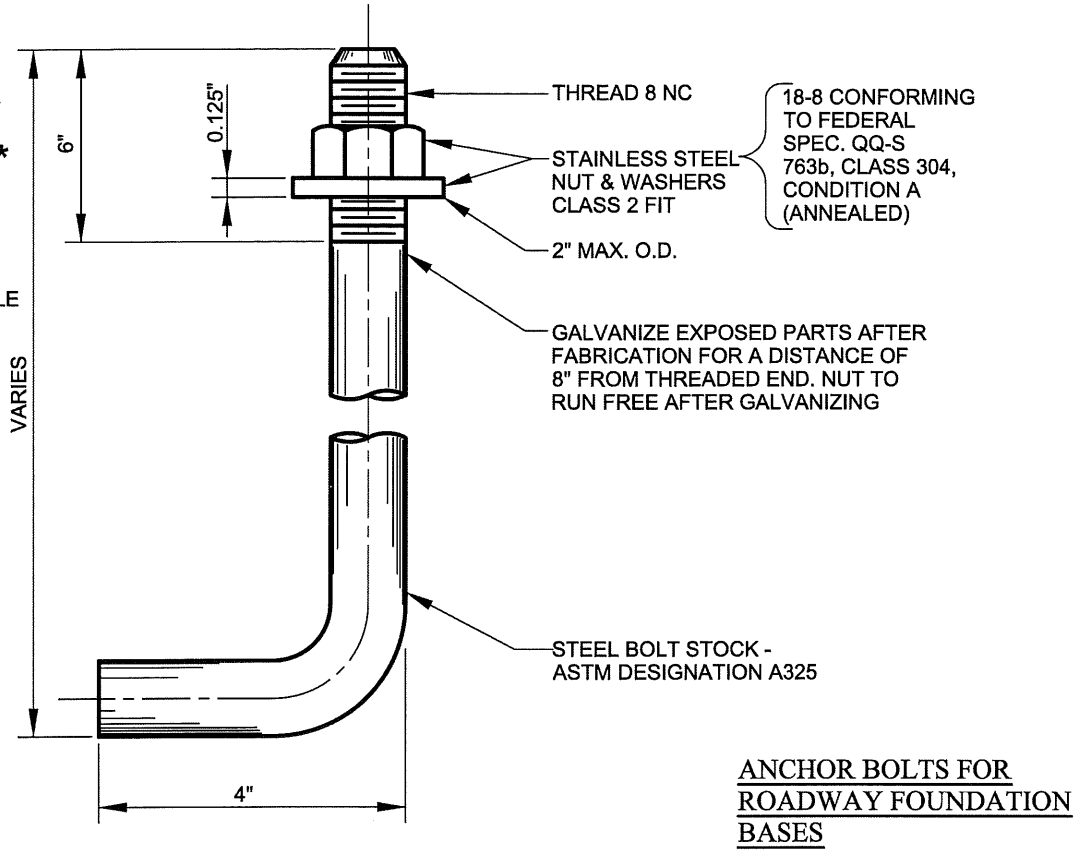
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ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.07		
SCALE: NONE	SHEET 1 OF 1	

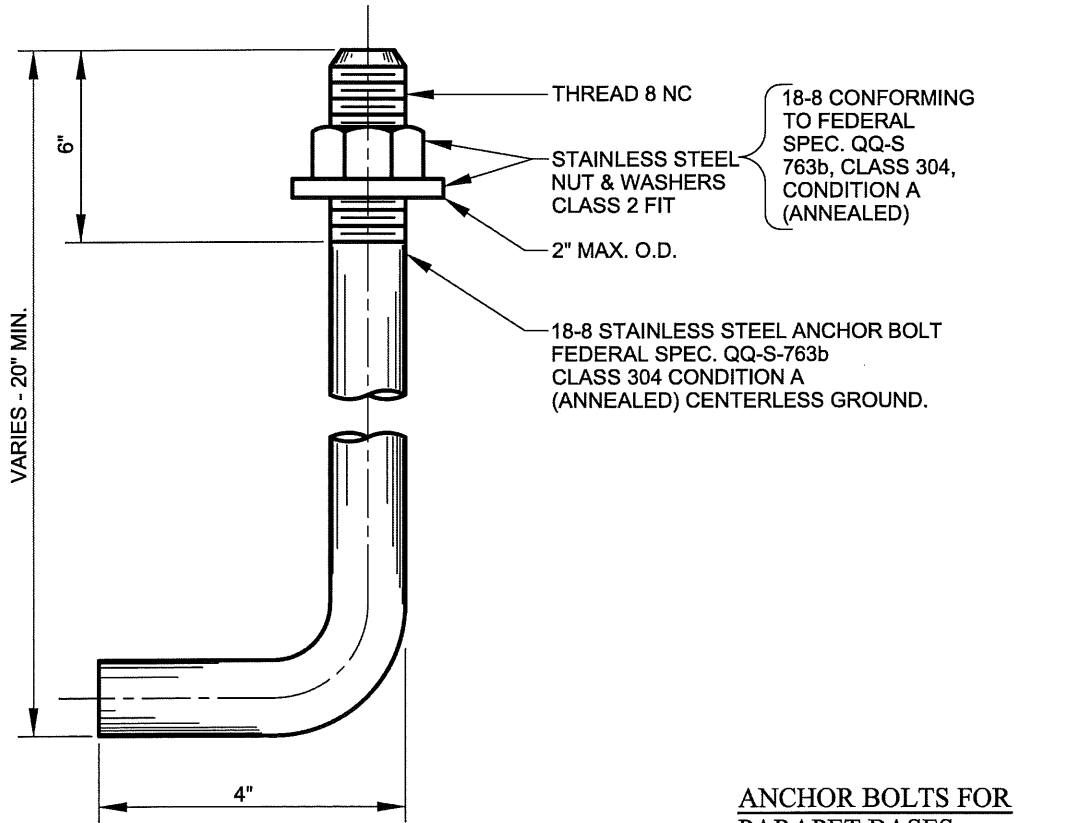
DRAFT - NOT FOR CONSTRUCTION

BOLT DIA.	LENGTH
1"	40" *
1 1/4"	48" **
1 1/2"	60"

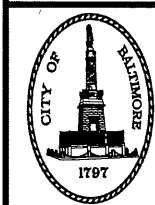
* STANDARD LIGHT POLE
 ** INNER HARBOR TYPE LIGHT POLE



ANCHOR BOLTS FOR ROADWAY FOUNDATION BASES



ANCHOR BOLTS FOR PARAPET BASES



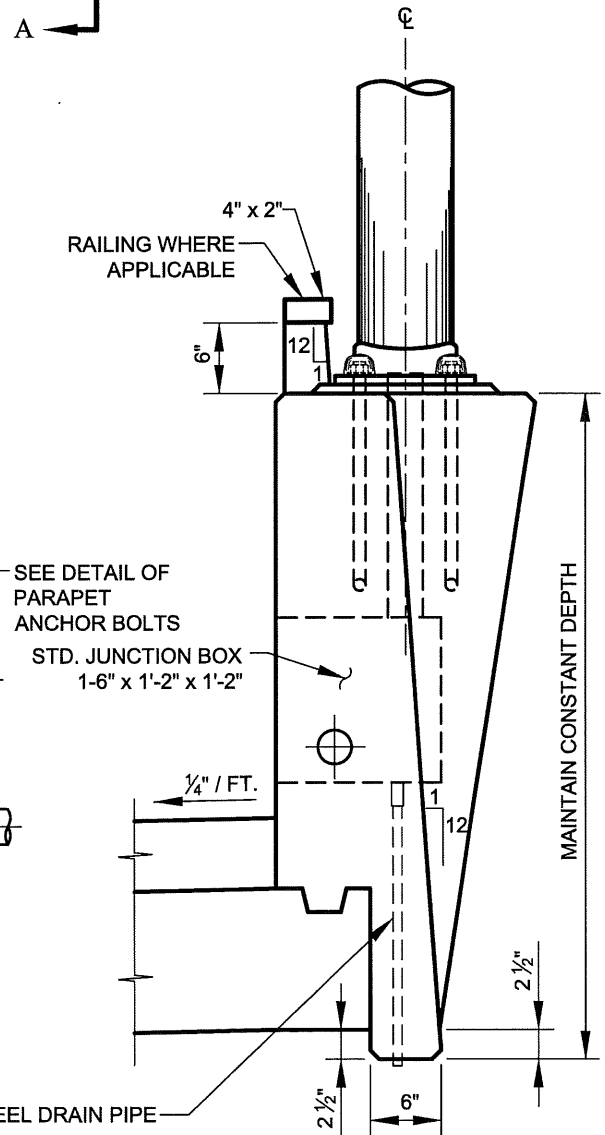
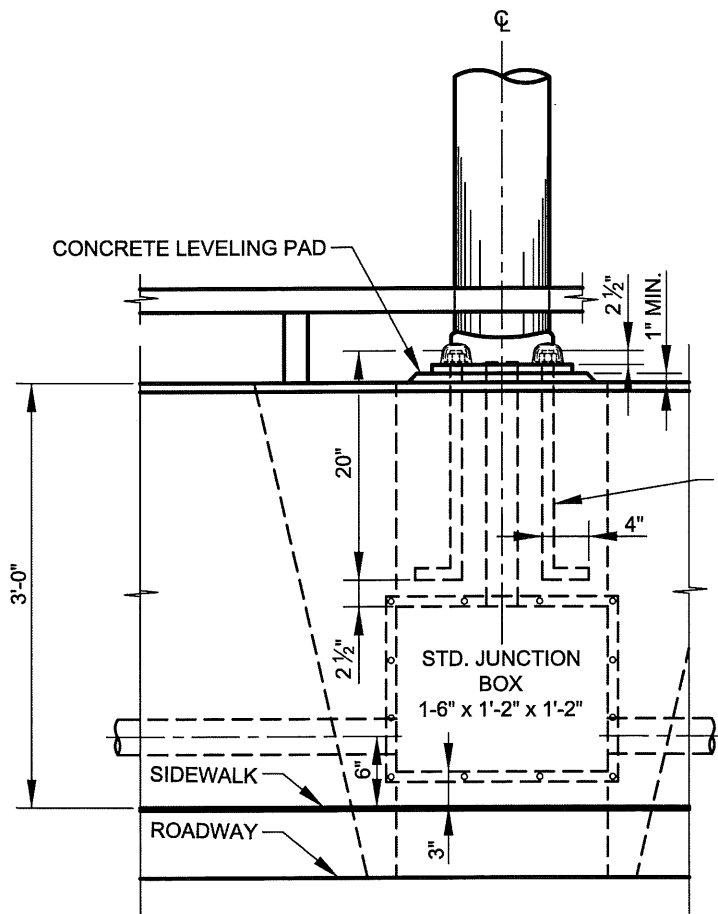
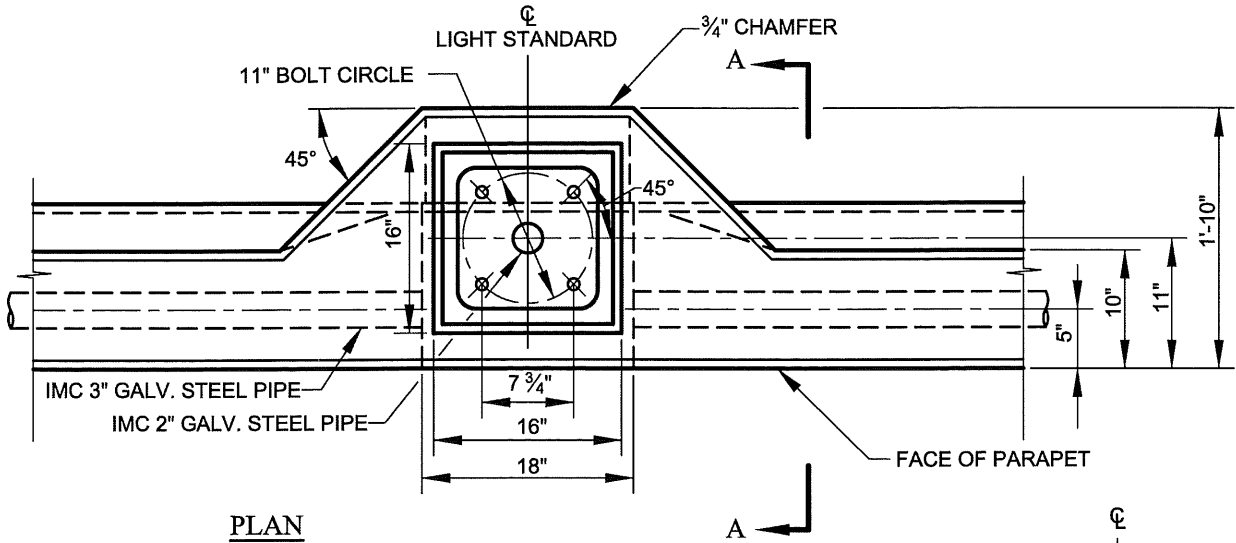
APPROVED:
Primal Dew A.
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

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 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION

STANDARD ANCHOR BOLTS
 897
 896

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.08		
SCALE : NONE		SHEET 1 OF 1

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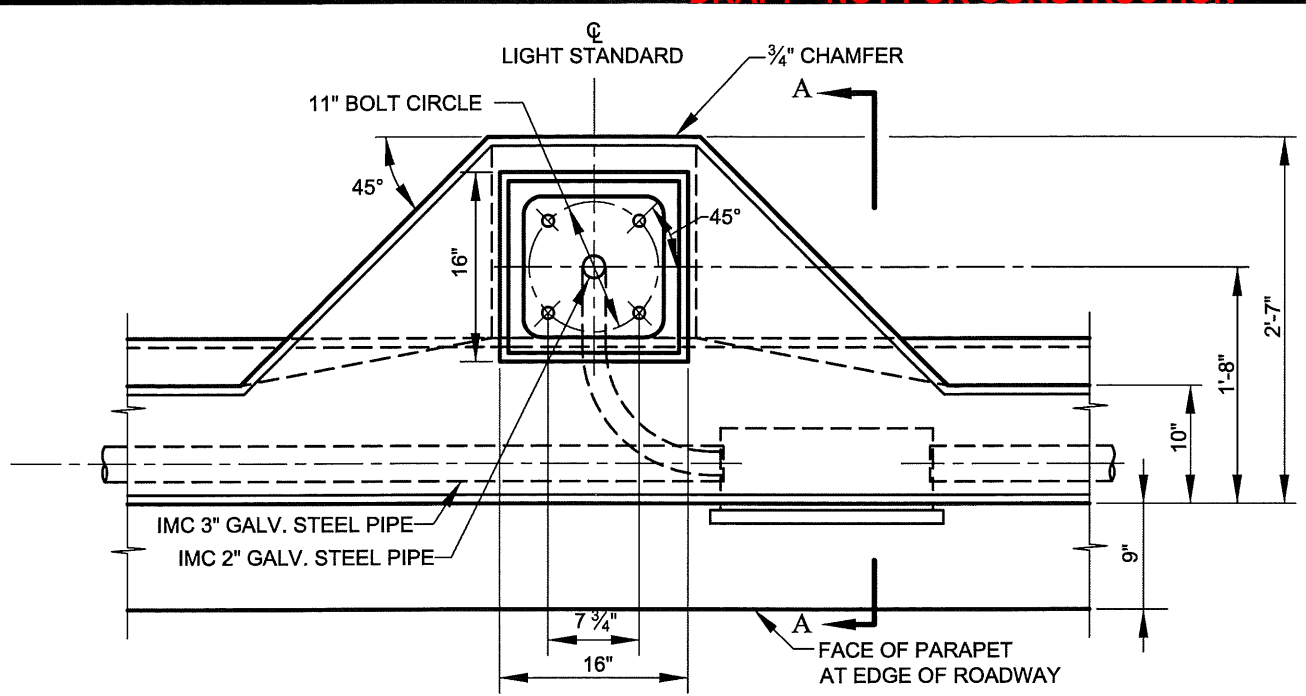


APPROVED:
Primal Dewar
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

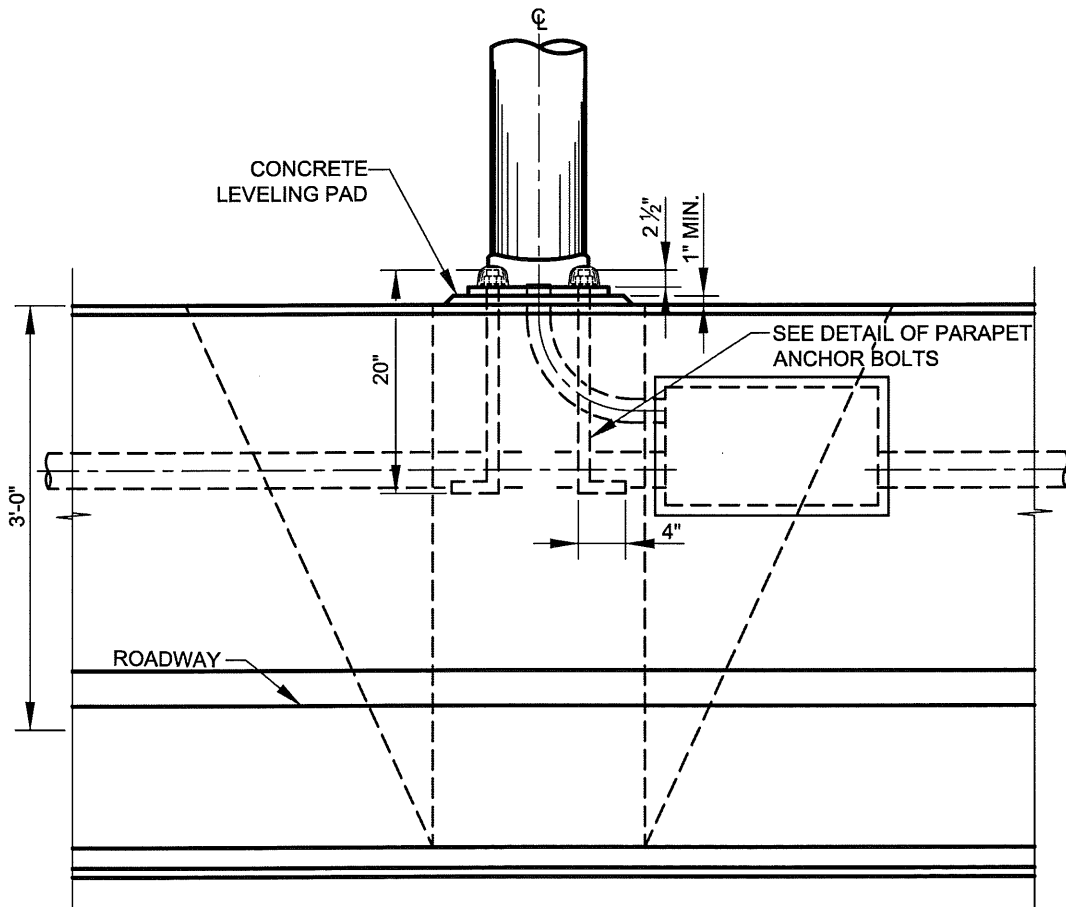
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
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 CONSTRUCTION
**TYPICAL INSTALLATION OF LIGHT
 STANDARD ON BRIDGE PARAPET
 ADJACENT TO SIDEWALK**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.09		
SCALE: NONE	SHEET 1 OF 1	

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PLAN



ELEVATION



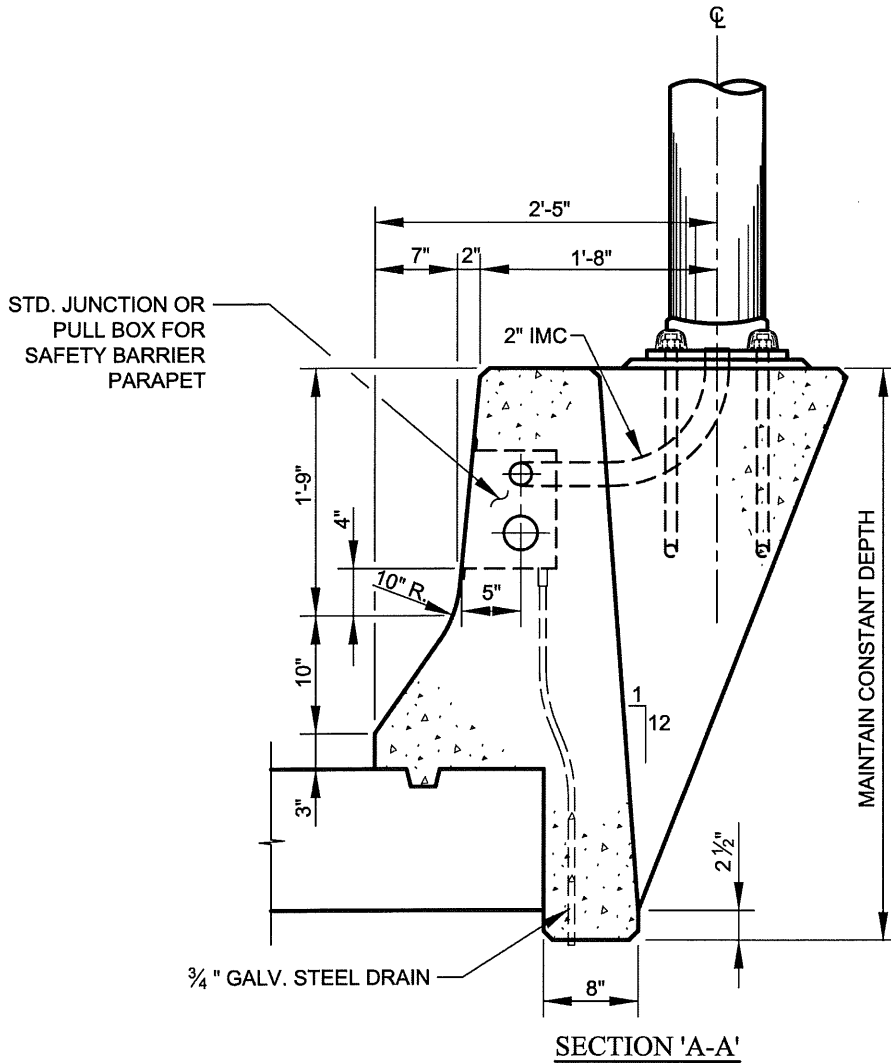
APPROVED:
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 AND CONSTRUCTION
Khalil Zare
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**TYPICAL INSTALLATION OF LIGHT
 STANDARD ON BRIDGE PARAPET
 ADJACENT TO ROADWAY**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.10-1		
SCALE : NONE	SHEET 1 OF 2	

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 AND CONSTRUCTION
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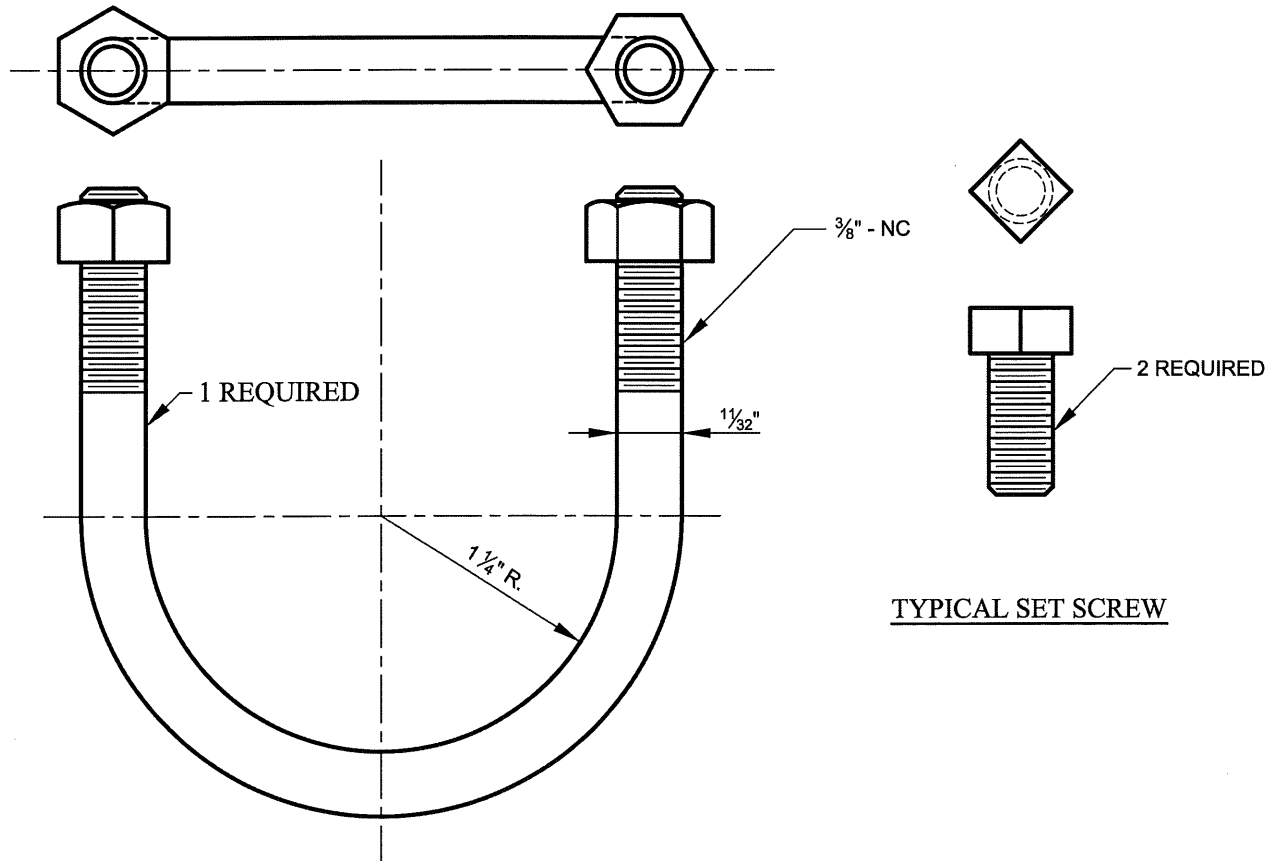
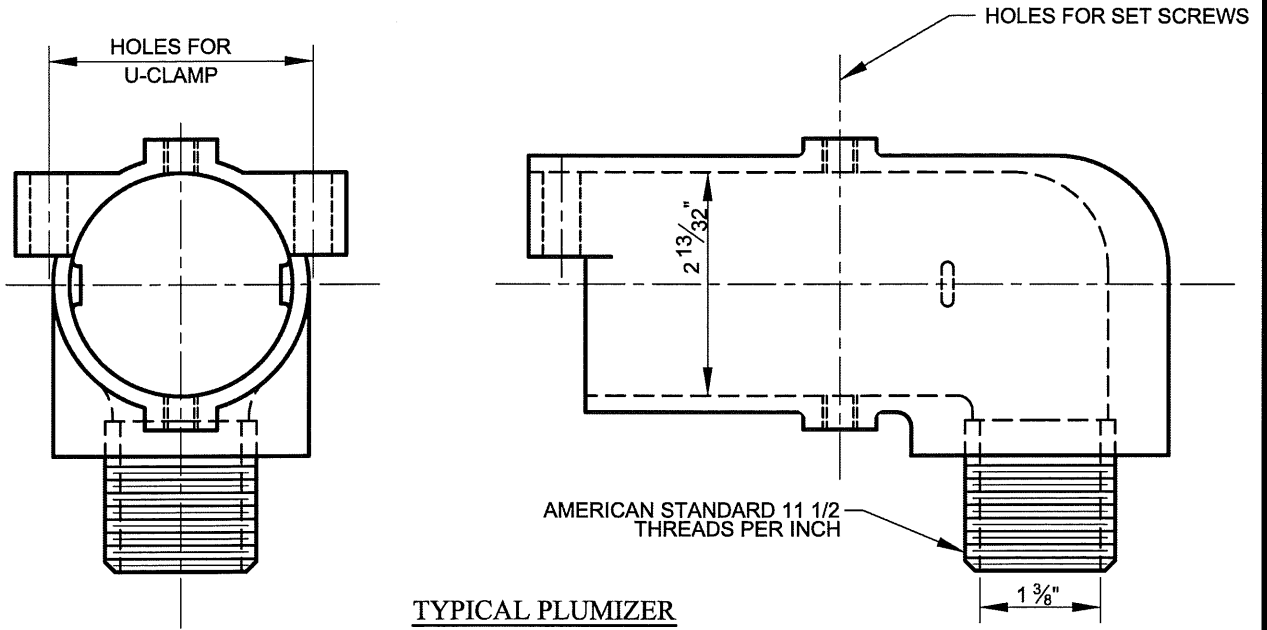
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**TYPICAL INSTALLATION OF LIGHT
 STANDARD ON BRIDGE PARAPET
 ADJACENT TO ROADWAY**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.10-2		
SCALE: NONE		SHEET 2 OF 2

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PLUMIZER FURNISHED WITH NO. 25
 STEEL POLE IF REQUIRED



TYPICAL U-CLAMP

SEE SPECIFICATIONS AND SPECIAL PROVISIONS
 FOR MATERIALS AND FINISH



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 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
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 DIRECTOR, DEPARTMENT OF TRANSPORTATION

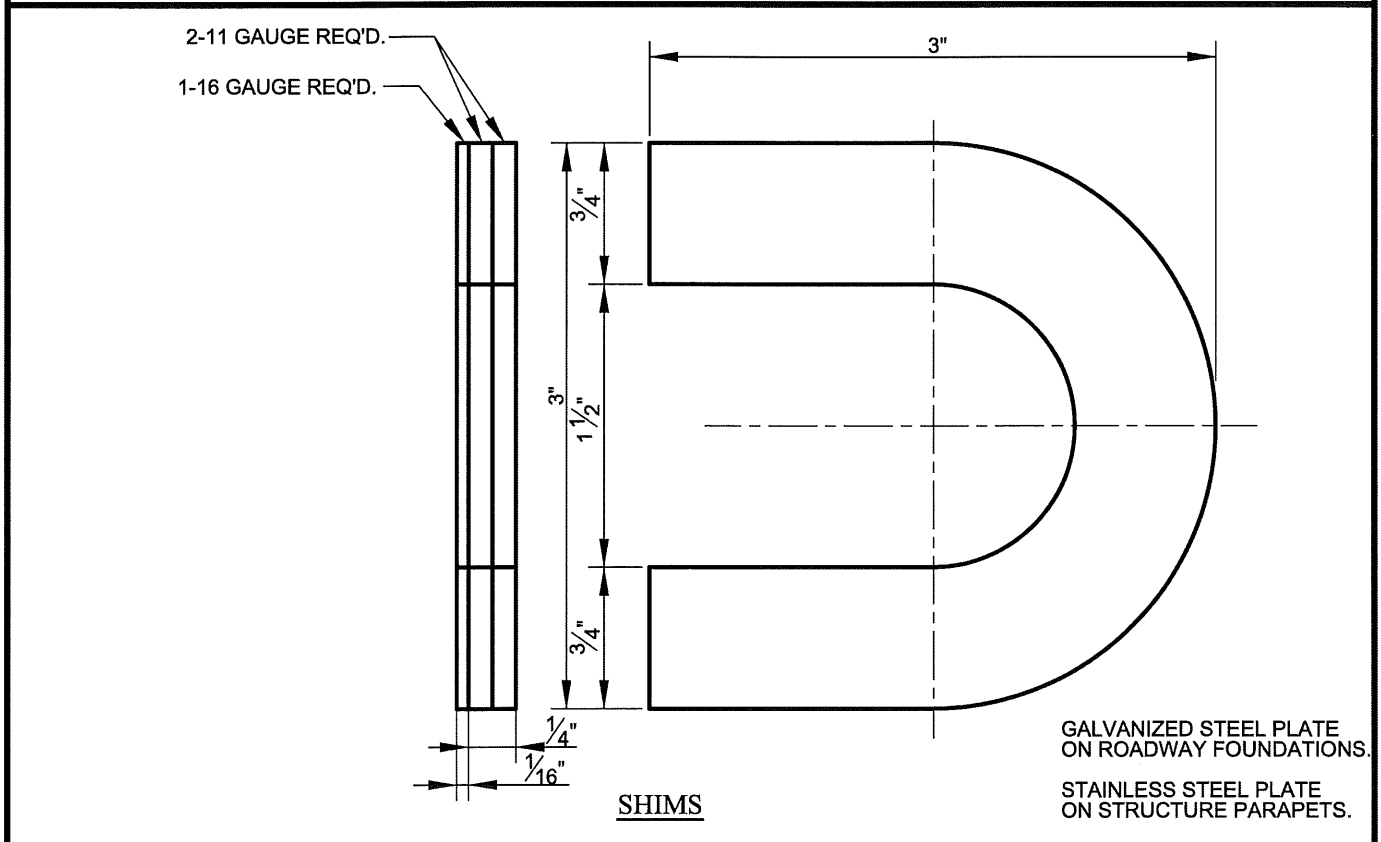
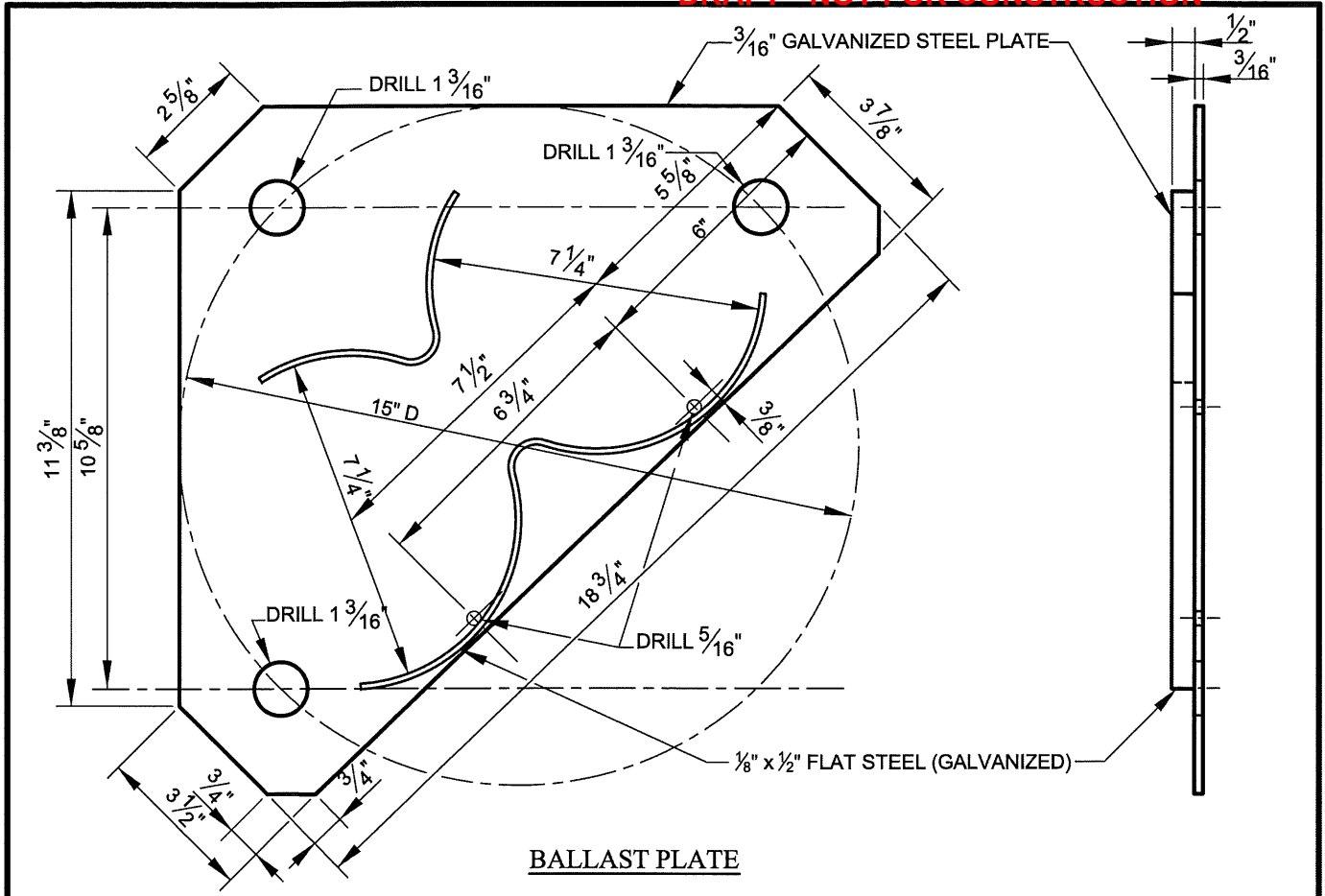
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**LIGHTING ACCESSORIES
 PLUMIZER ATTACHMENT
 AND PARTS**


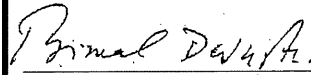
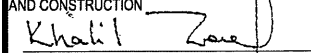
901
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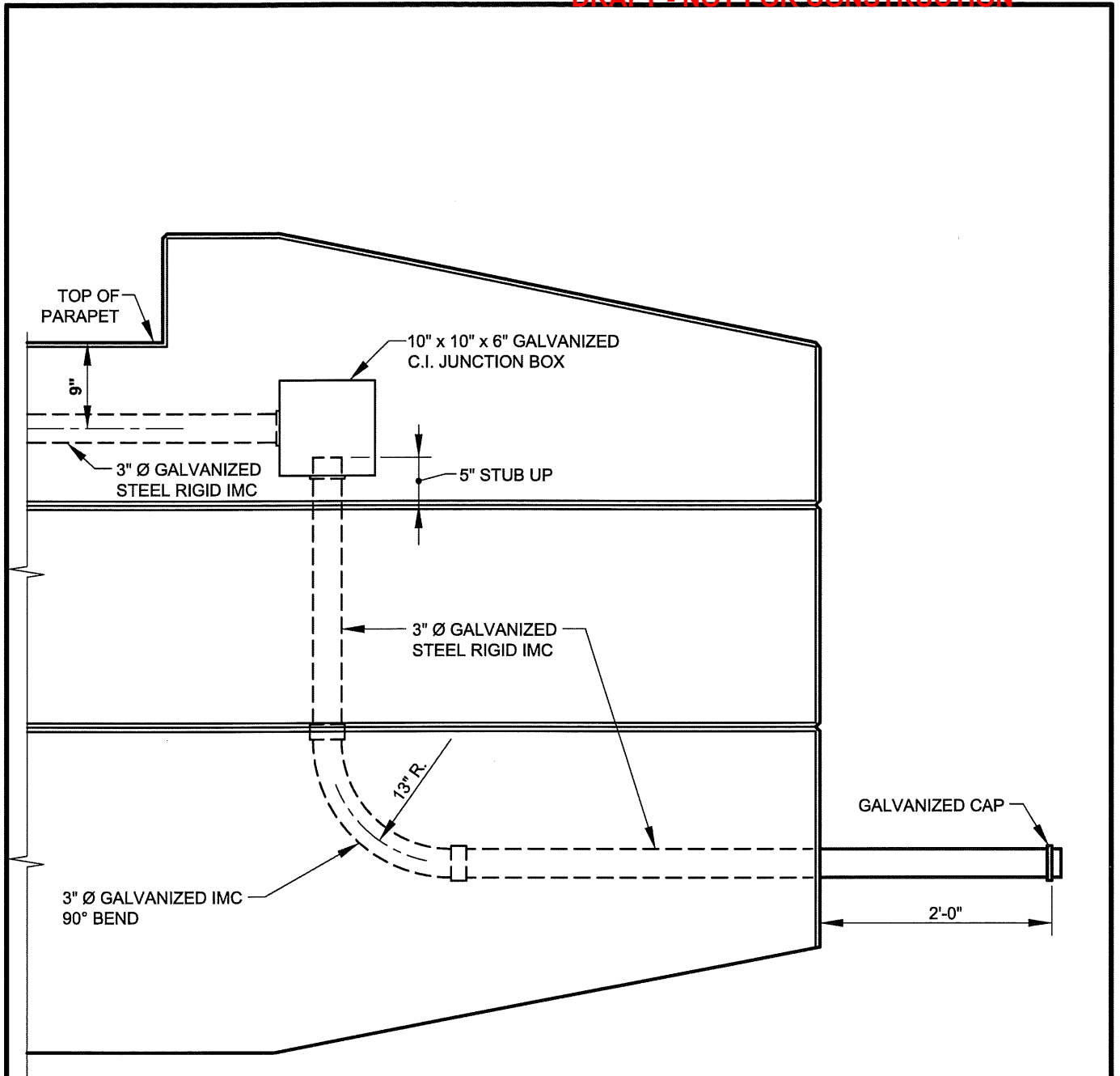
ISSUED	REVISED	REVISED
8 / 2010		
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SCALE: NONE	SHEET 1 OF 1	

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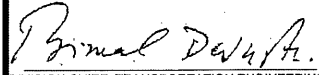
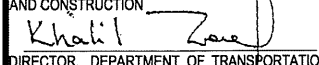


GALVANIZED STEEL PLATE
 ON ROADWAY FOUNDATIONS.
 STAINLESS STEEL PLATE
 ON STRUCTURE PARAPETS.

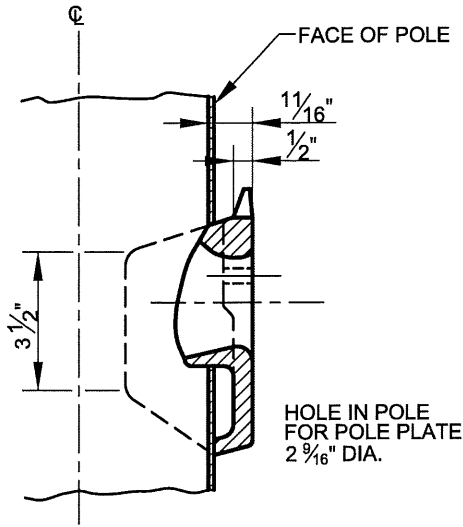
	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	LIGHTING ACCESSORIES BALLAST PLATE AND SHIMS 901	DETAIL NO. BC 808.12			
	SCALE : NONE	SHEET 1 OF 1			



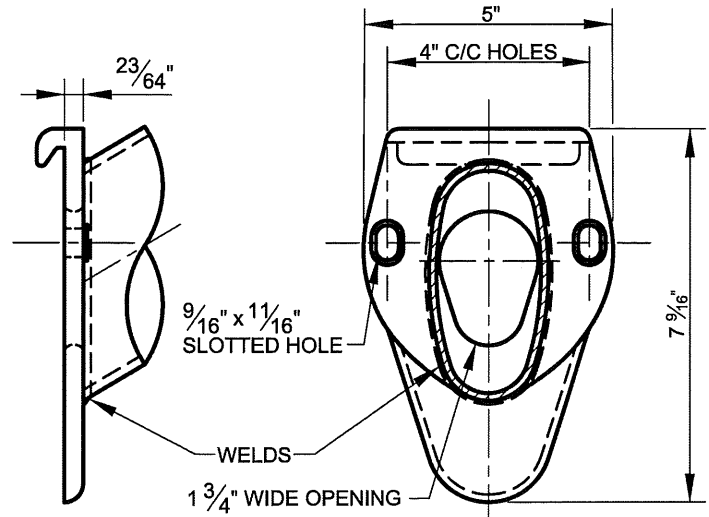
END OF BRIDGE PARAPET DETAILS

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	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		BRIDGE LIGHTING CONDUIT DETAILS 902 902	8 / 2010	
			DETAIL NO. BC 808.13		
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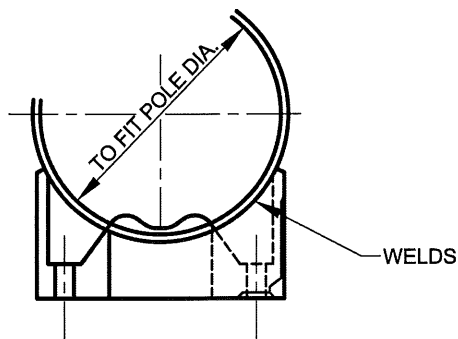


SECTION THRU POLE PLATE

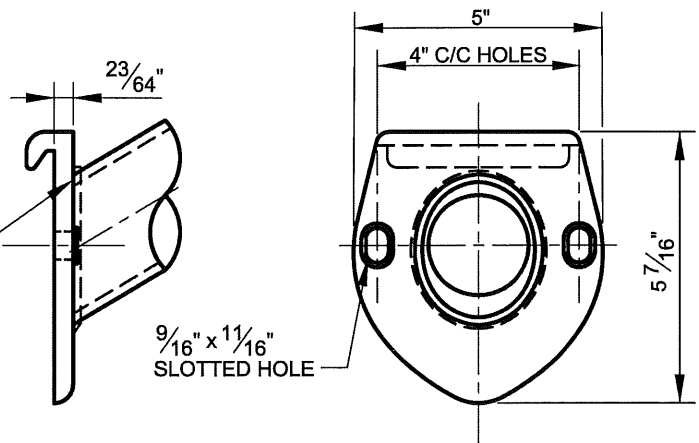


TAPERED ARM CONNECTION

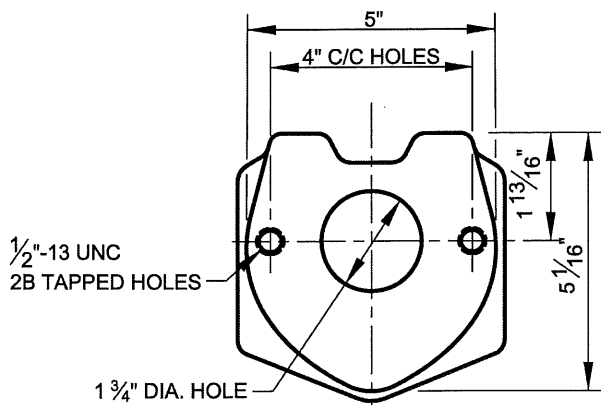
NOTE: TO BE USED ON POLES SHOWN ON
 BC 808.01 THRU BC 808.05 AND BC 808.13



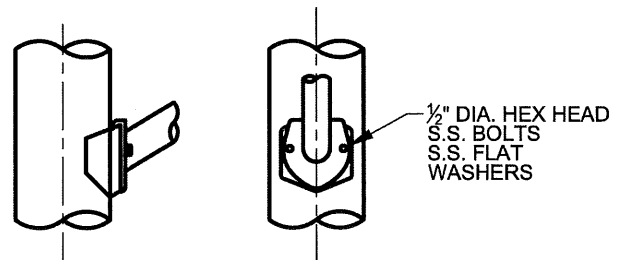
TOP VIEW OF POLE PLATE



PIPE ARM CONNECTION



FRONT VIEW OF POLE PLATE



ASSEMBLED VIEW



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 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khaili Zaid
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

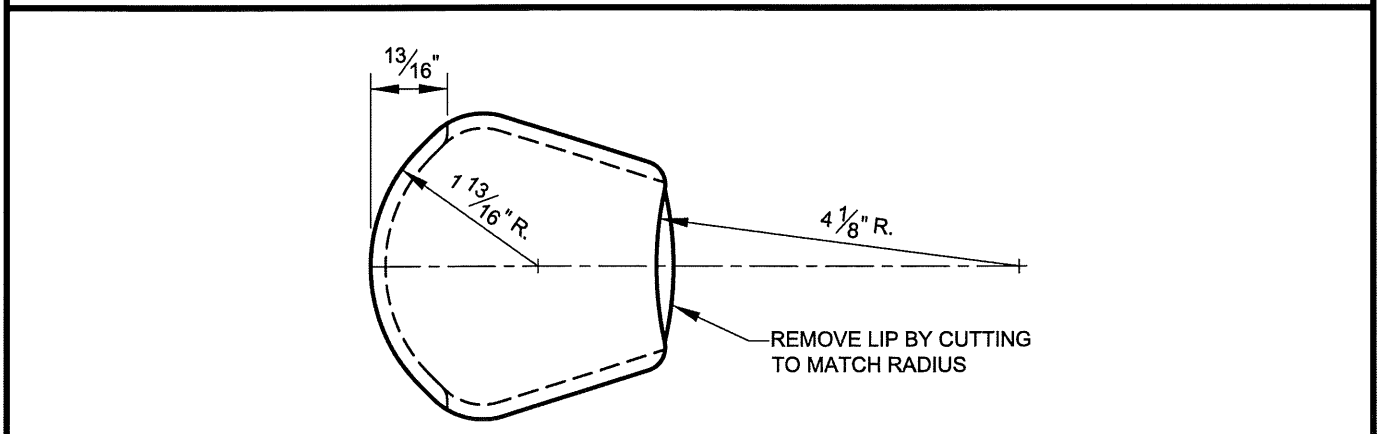
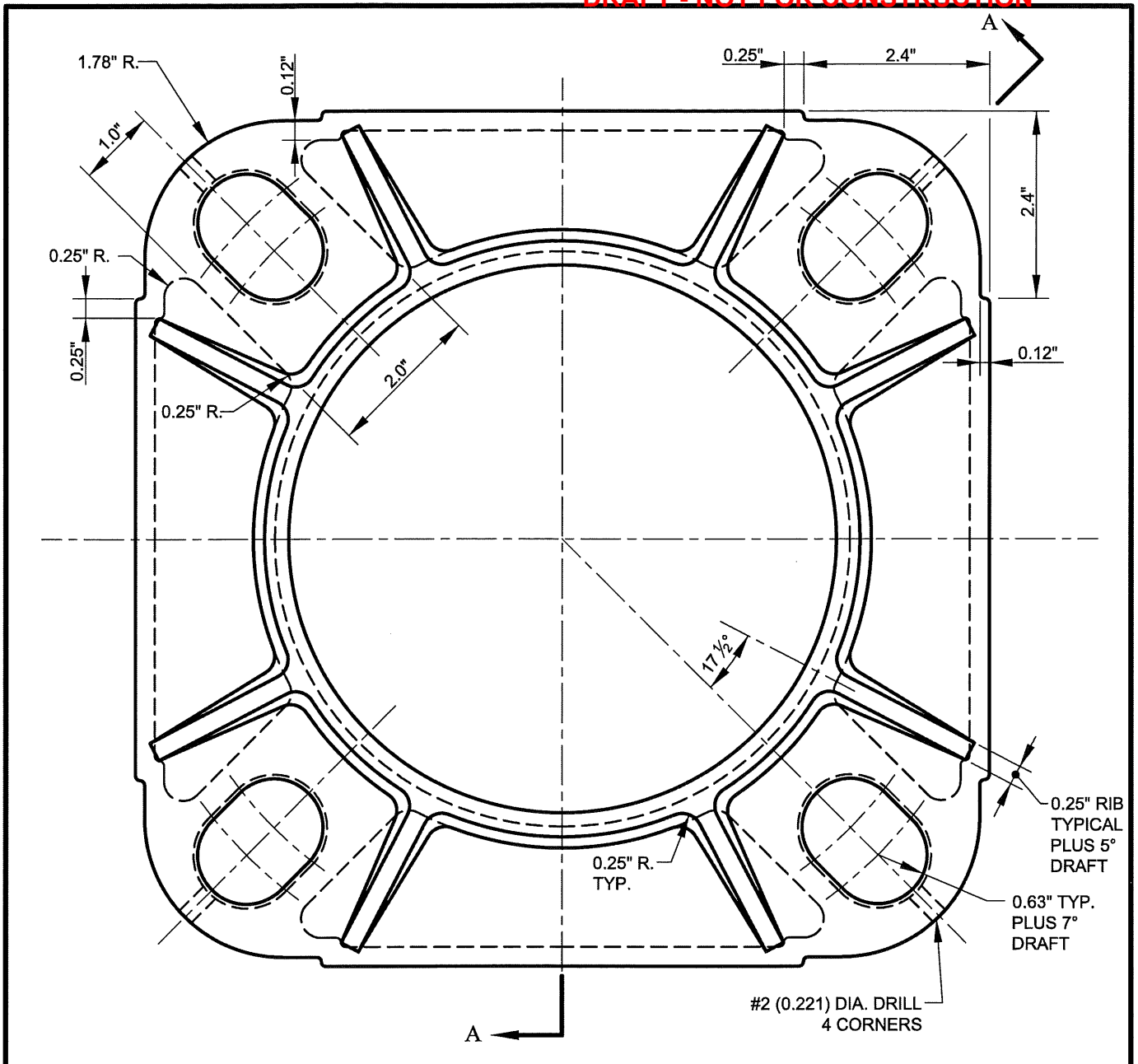
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 CONSTRUCTION

**DETAIL OF ALUMINUM POLE AND
 ARM/PLATE CONSTRUCTION**


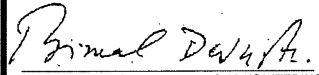
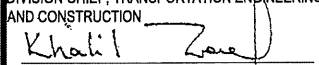
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ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.14		
SCALE: NONE		SHEET 1 OF 1

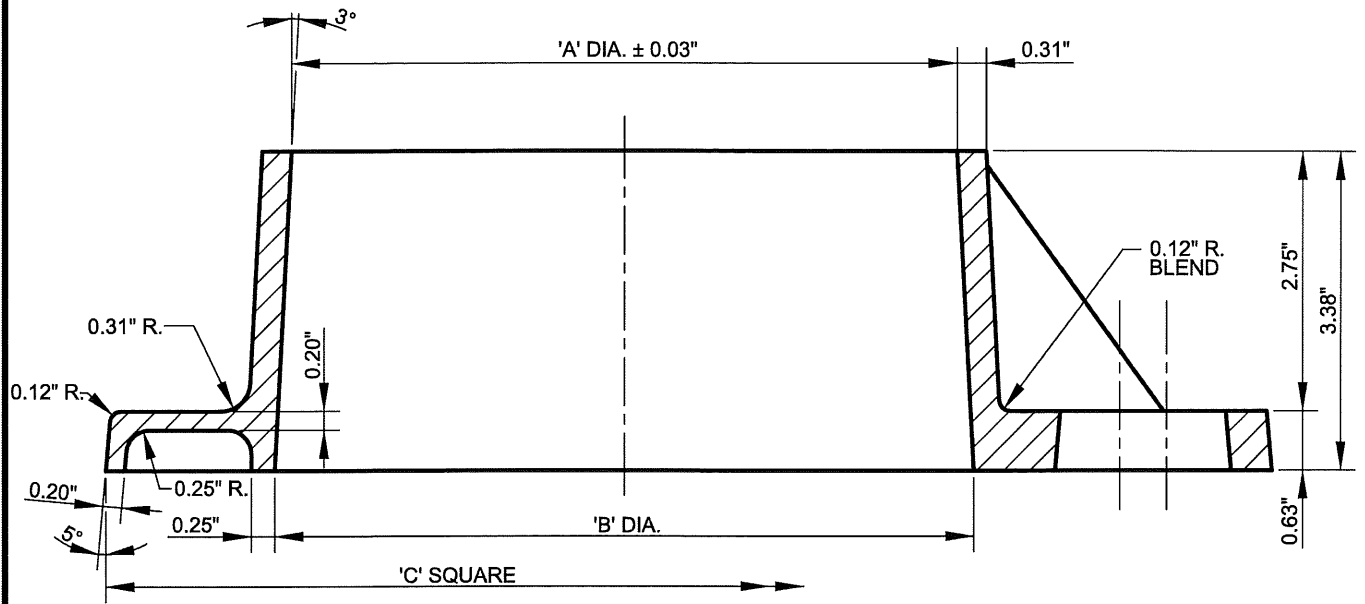
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BOLT COVER DETAIL

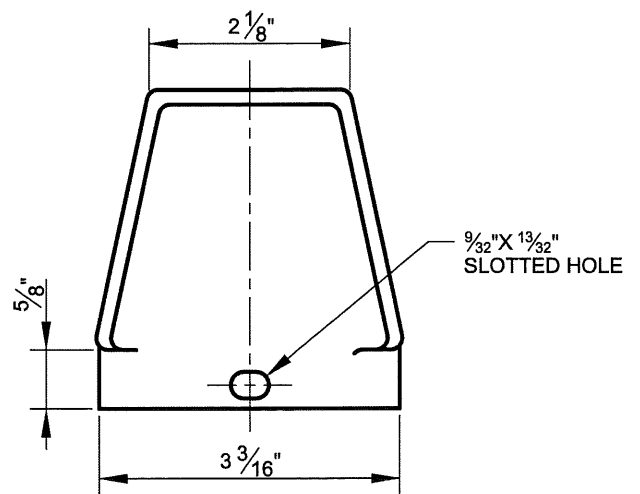
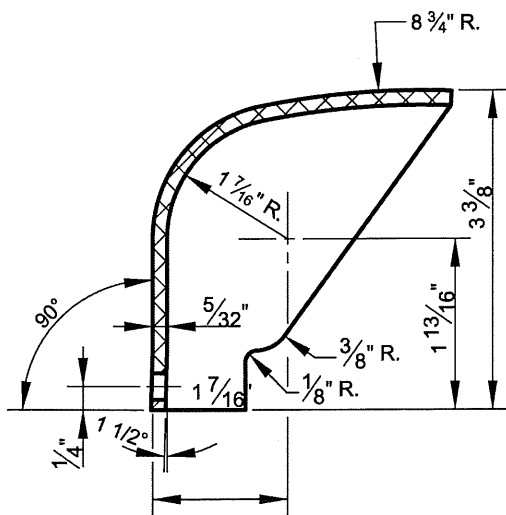
	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	BASE PLATE FOR 11'-6", 25' & 30' POLES 904	DETAIL NO. BC 808.15-1			
	SCALE: NONE	SHEET 1 OF 2			

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SECTION 'A-A'

	'A' DIMENSION	'B' DIMENSION	'C' DIMENSION
11'-6\" POLE	7.05"	7.404"	11" SQUARE
25' POLE	8.05"	8.404"	12" SQUARE
30' POLE	8.05"	8.404"	12" SQUARE



BOLT COVER DETAILS



APPROVED:
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 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khail Zaid
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

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 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND
 CONSTRUCTION**

**BASE PLATE FOR 11'-6\", 25' & 30'
 POLES
 DETAIL OF BOLT COVER**

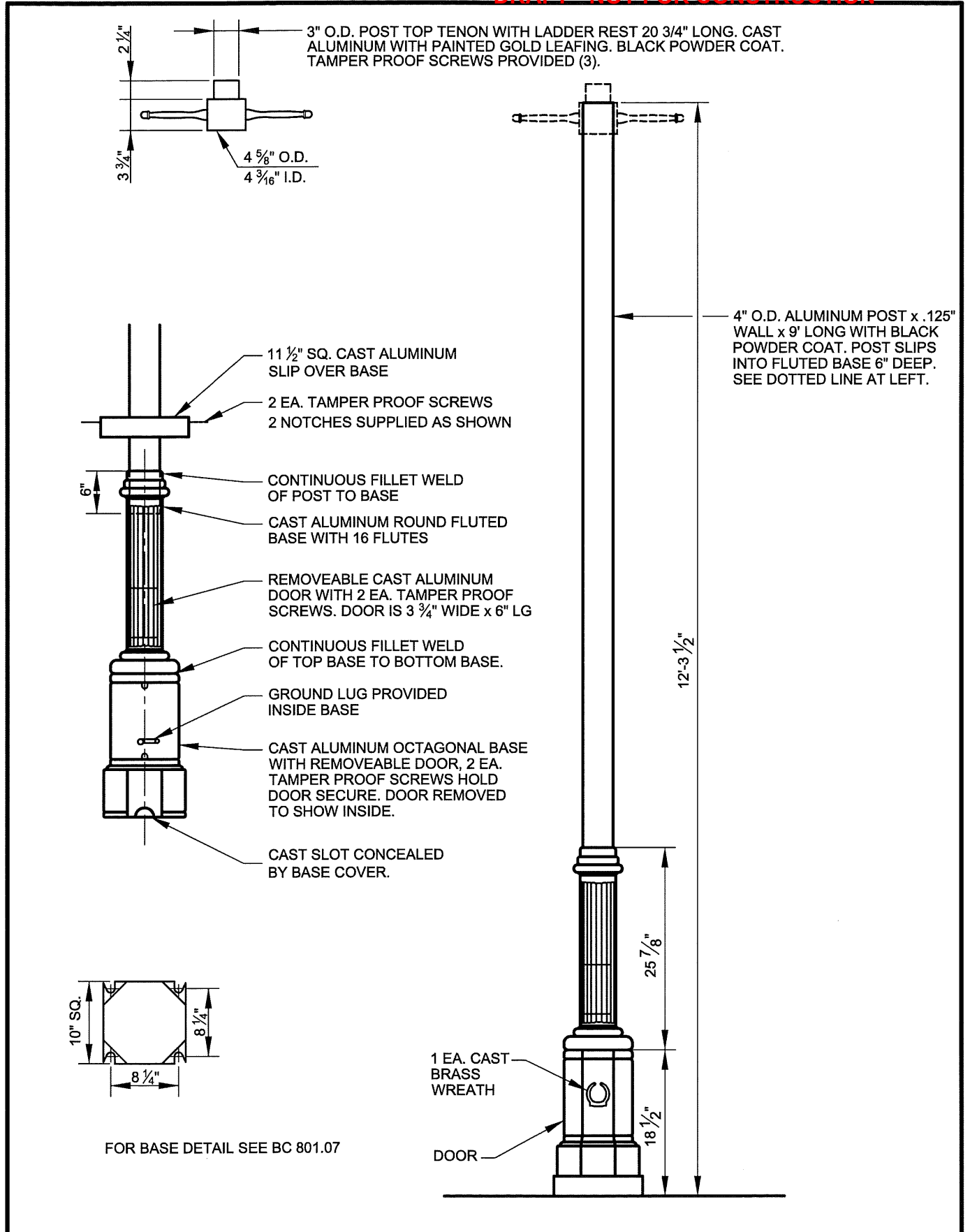
905


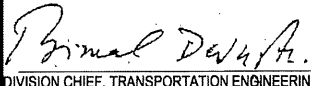
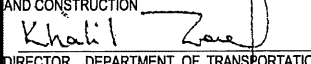
ISSUED	REVISED	REVISED
8 / 2010		

**DETAIL NO.
 BC 808.15-2**

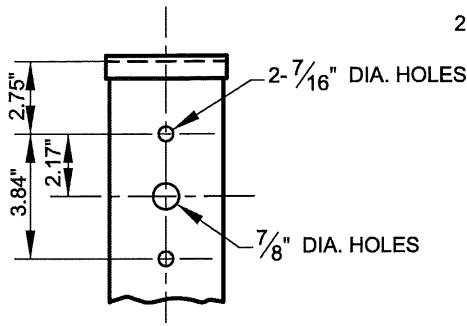
SCALE: NONE SHEET 2 OF 2

DRAFT - NOT FOR CONSTRUCTION

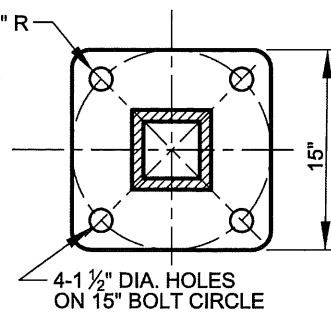


	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	DECORATIVE POLE AND TENON 907 906		DETAIL NO. BC 808.16		
			SCALE: NONE	SHEET 1 OF 1	

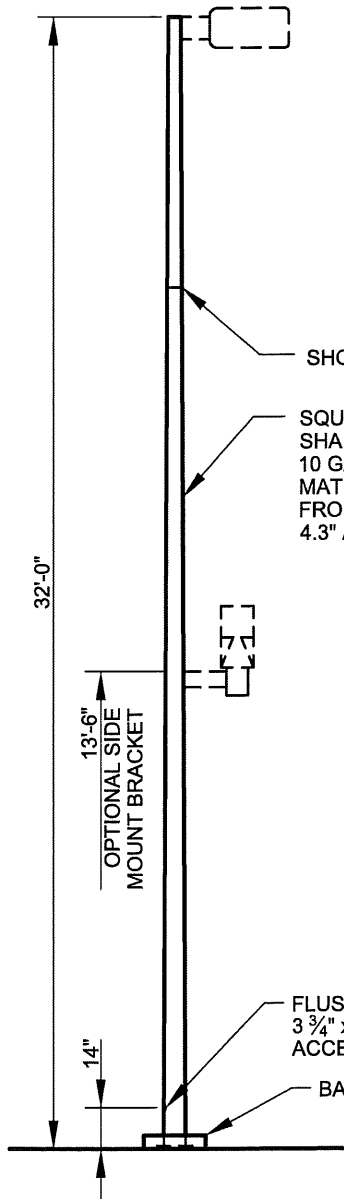
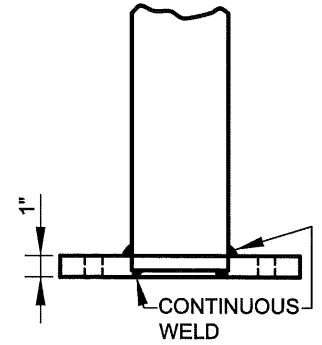
DRAFT - NOT FOR CONSTRUCTION



POLE TOP DETAIL



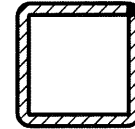
BASE PLATE DETAIL



FULL PENETRATION WELD WITH BACK-UP PLATE AND GRIND FLUSH

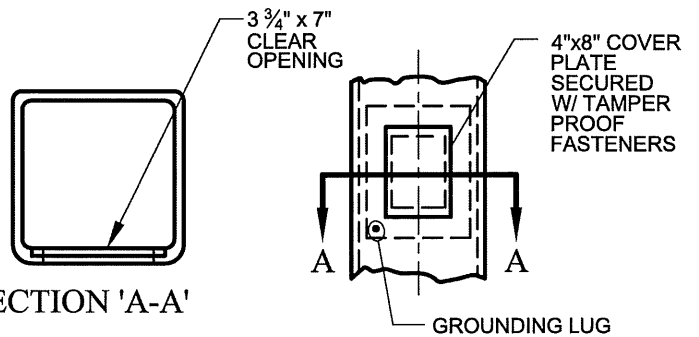
SHOP SPLICE DETAIL

2/3 PENETRATION WELD AND GRIND TO MATCH RADIUS



LONGITUDINAL WELD

NOTE:
 THE POLE SHALL BE FINISHED WITH AN ELECTROSTATICALLY DEPOSITED DRY POLYESTER POWDER COATING IN DURANODIC 312 BRONZE



FLUSH HANDHOLE DETAIL



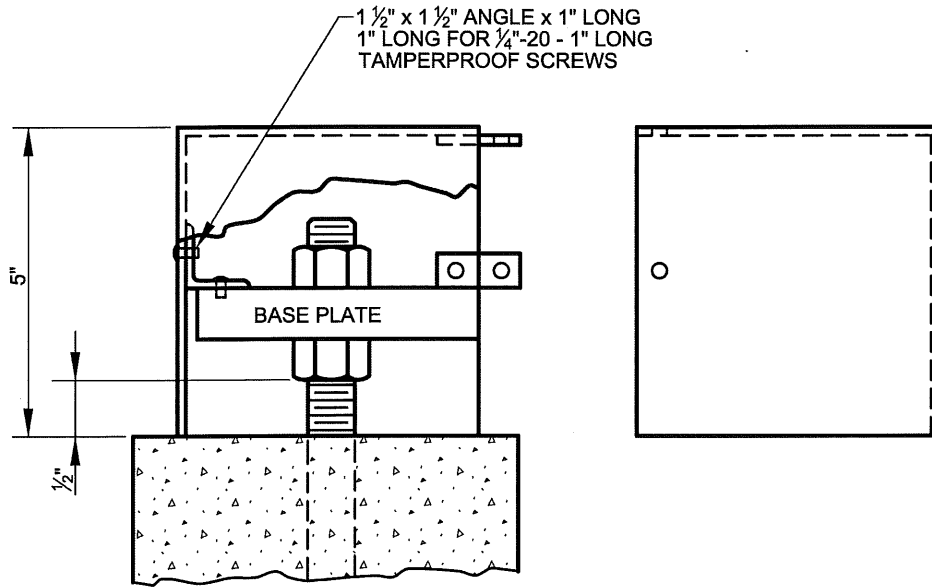
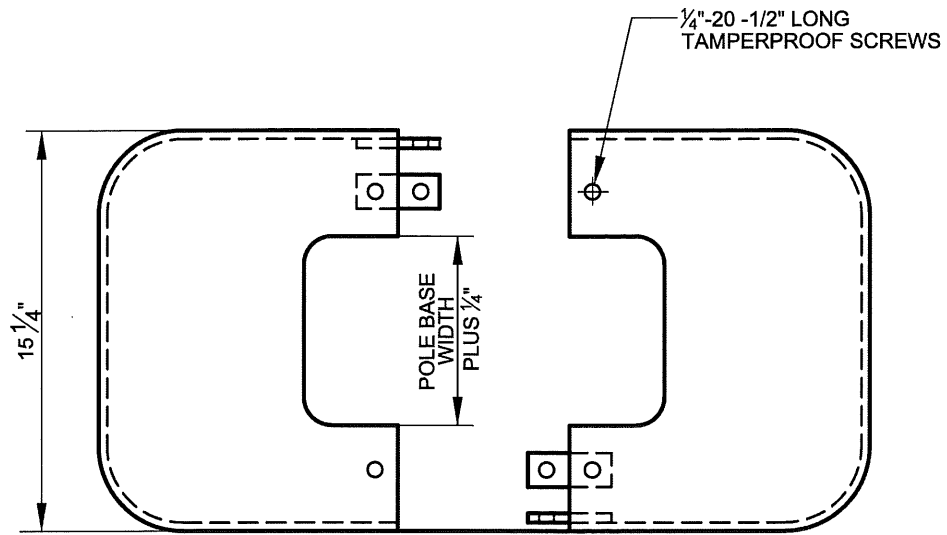
APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khalil Zaid
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

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 DEPARTMENT OF TRANSPORTATION
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32' SQUARE TAPERED POLE
 908
 907

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.17-1		
SCALE: NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION



NOTES: BASE COVERS SHALL BE FABRICATED FROM HEAVY GAUGE STEEL.
 BASE COVERS SHALL BE FINISHED WITH AN ELECTROSTATICALLY DEPOSITED DRY POLYESTER POWDER COATING IN DURANODIC 312 BRONZE.



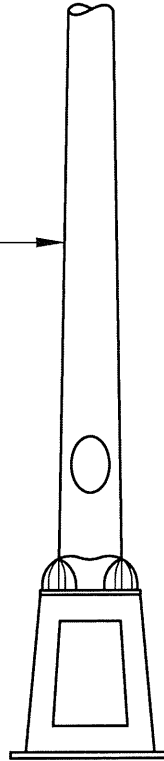
APPROVED:
Primal DeWitt
 DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND CONSTRUCTION
**32' SQUARE TAPERED POLE,
 909 BASE COVER**
 908

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 808.17-2		
SCALE: NONE	SHEET 2 OF 2	

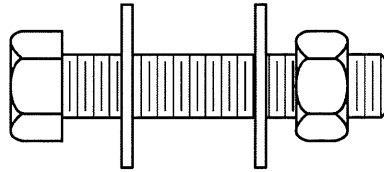
DRAFT - NOT FOR CONSTRUCTION

FOR POLE DETAILS
 SEE BC 808.02-2



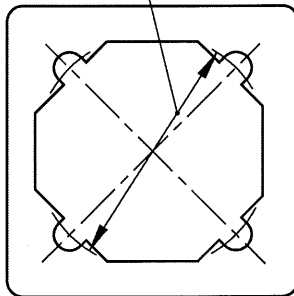
FOR ANCHOR BOLT DETAILS,
 SEE BC 808.08

FOR POLE ATTACHMENT BOLT DETAILS
 SEE BELOW



STAINLESS STEEL BOLT AND NUT
 NC-8 THREAD 1" x 3" WITH TWO
 STAINLESS STEEL WASHERS 1 1/16"

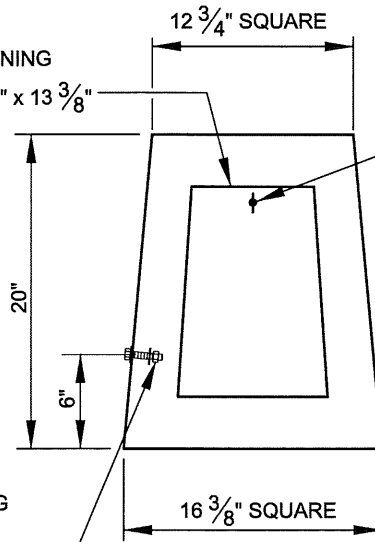
15" BOLT CIRCLE
 DIAMETER



3/8" DIAMETER BY 1 1/2" LONG
 STUD WITH 2 STAINLESS
 STEEL NUTS

PLAN BOTTOM

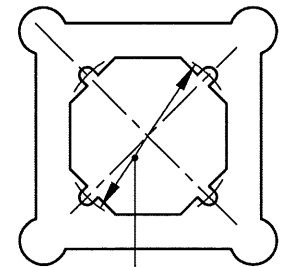
DOOR OPENING
 7 3/4" x 9 1/2" x 13 3/8"



ELEVATION

SEE SPECIFICATIONS AND SPECIAL
 PROVISIONS FOR MATERIALS & FINISH

3/8" - 16 CAP SCREW



11" BOLT CIRCLE
 DIAMETER

PLAN TOP

PERMANENT MOLD ALUMINUM TRANSFORMER BASES



APPROVED:
Primal Dew A.
 DIVISION CHIEF, TRANSPORTATION ENGINEERING
 AND CONSTRUCTION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION ENGINEERING AND
 CONSTRUCTION

TYPICAL
 TRANSFORMER BASES

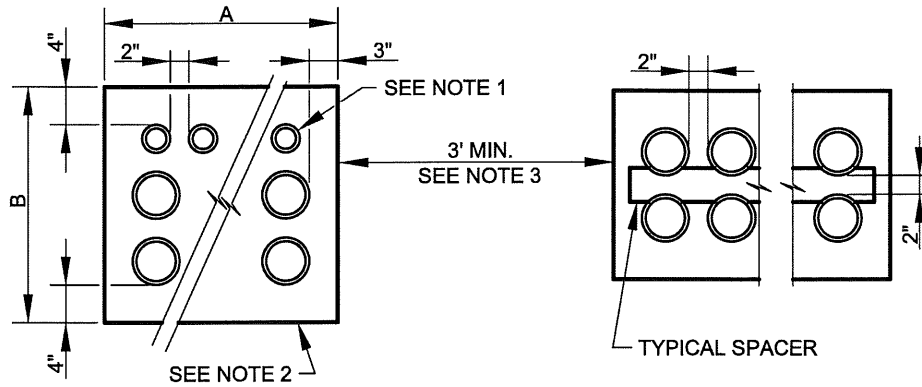
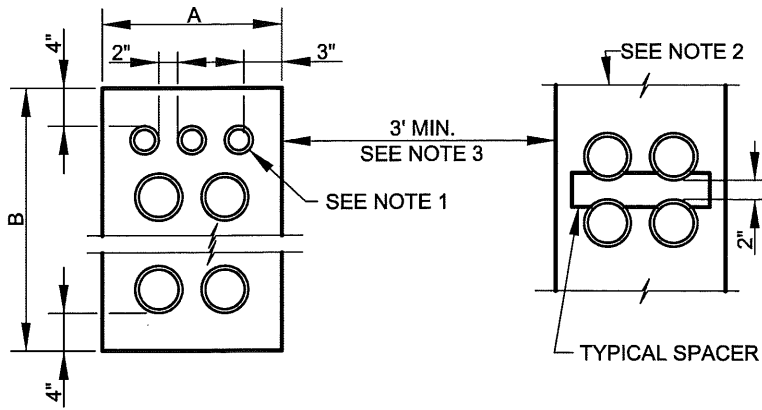
909

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 818.13		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

NOTES

1. 3-3" DUCTS TO BE INCLUDED IN THE DUCT SECTION WHERE INDICATED ON PLANS.
2. ALL CONCRETE SHALL BE MIX NO. 1.
3. THIS DIMENSION SHALL APPLY WHEN CONDUITS ARE INSTALLED IN PARALLEL SYSTEMS.
4. TYPICAL SPACERS SHALL BE PLACED AT EACH JOINT AND EVERY FIVE (5) FEET THEREAFTER.
5. ALL DIMENSIONS ARE BASED ON 1/4" WALL THICKNESS

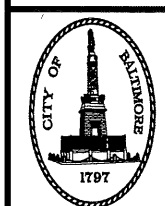


FOR 5" DUCT

CAT. CODE	TYPE	A	B	H	W
82430	X	1'-7"	1'-1 1/2"	1	2
82417	O	1'-7"	1'-9"	2	2
82415	M	1'-7"	2'-4 1/2"	3	2
82413	K	1'-7"	3'-0"	4	2
82410	H	1'-5"	3'-7 1/2"	5	2
82416	N	2'-6"	1'-9"	2	3
82414	L	2'-10"	1'-9"	2	4
82411	I	3'-5 1/2"	1'-9"	2	5
82433	Y	0'-11 1/2"	1'-1 1/2"	1	1

FOR 3" DUCT

CAT. CODE	TYPE	A	B	H	W
82435	Y	0'-9 1/2"	0'-11 1/2"	1	1
82432	X	1'-3"	0'-11 1/2"	1	2
82422	P	1'-8 1/2"	0'-11 1/2"	1	3



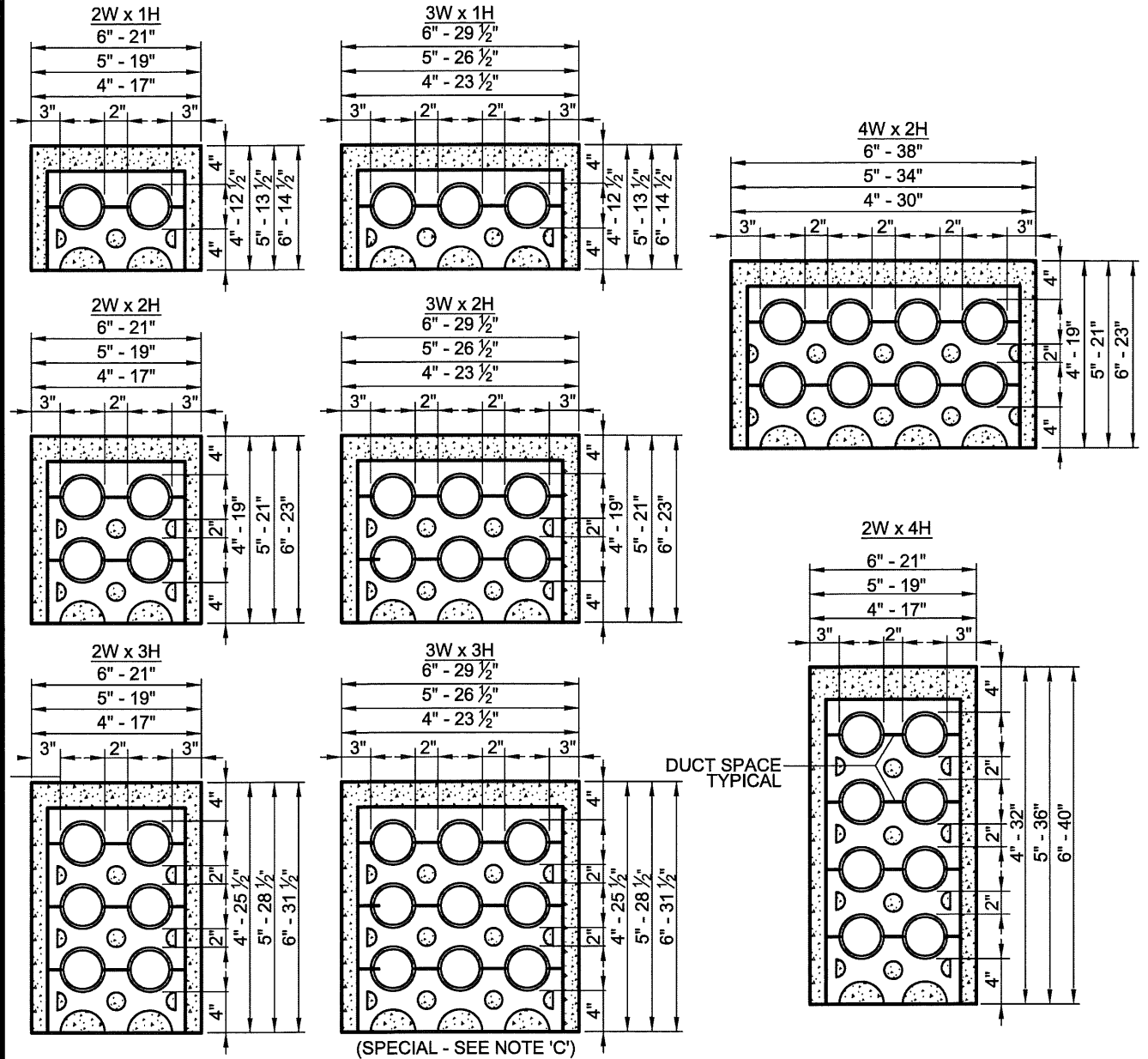
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

STANDARD DUCT
 911 **SECTIONS**
 910

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 824.01-1		
SCALE : NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION




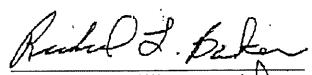
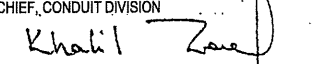
CUBIC YARDS OF CONCRETE PER LINEAR FOOT OF CONDUIT
(SEE NOTE 'A')

DUCT SIZE	NUMBER OF DUCTS	CUBIC YARDS OF CONCRETE
3"	2	.031
4"	2	.038
5"	2	.044
6"	2	.050
3"	3	.043
4"	3	.051
5"	3	.060
6"	3	.068

DUCT SIZE	NUMBER OF DUCTS	CUBIC YARDS OF CONCRETE
3"	4	.048
4"	4	.058
5"	4	.068
6"	4	.078
4"	6	.078
5"	6	.092
6"	6	.106

DUCT SIZE	NUMBER OF DUCTS	CUBIC YARDS OF CONCRETE
4"	8	.098
4"	8	.109 (SPECIAL)
5"	8	.116
5"	8	.131 (SPECIAL)
6"	8	.134
6"	8	.153 (SPECIAL)

- NOTES: A. CONCRETE CALCULATIONS ARE BASED ON STANDARD CONDUIT ENVELOPE INDICATED ABOVE.
 B. THE CONCRETE ENVELOPE WILL BE 3" ON BOTH SIDES, AND SHOULD NOT EXCEED 4". THE TOP AND BOTTOM OF THE ENVELOPE SHOULD NOT EXCEED 4" IN THICKNESS.
 C. INSTALL #4 REINFORCING BARS THROUGH THE INSIDE EDGES OF THE DUCT SPACERS TO PROVIDE TEMPORARY ANCHORING. THIS PREVENTS THE CONDUIT FROM FLOATING OR CHANGING ALIGNMENT WHILE THE CONCRETE ENVELOPE IS BEING POURED.

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	STANDARD CONDUIT 9 CROSS-SECTIONS			DETAIL NO. BC 824.01-2	
			SCALE: NONE	SHEET 2 OF 2	

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Glossary

Duct = a single enclosed raceway for conductors or cable

Conduit = a structure containing one or more ducts

Conduit System = any combination of duct, conduits, manholes, handholes, and vaults joined to form an integrated whole

Terminator (Duct) = a plastic fitting used to terminate one or more ducts in a manhole wall

Duct Coupling = a plastic fitting used to join together two non-belled duct ends

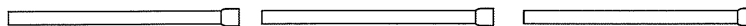
10 Foot and 20 Foot Long PVC Utility Duct Data

Nominal Duct Size	Type	Average		Minimum Wall Thickness
		O.D.	I.D.	
3"	DB-120	3.500	3.170	0.118
4"	DB-120	4.500	4.192	0.154
5"	DB-120	5.563	5.181	0.191
6"	DB-120	6.625	6.171	0.227

General Information


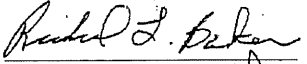
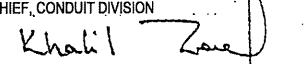
(A) PVC duct lengths used for electric distribution cables are 10 and 20 foot long.

(B) Each 10 or 20 foot section of duct has a belled end and a straight end. The straight end of another duct.



(C) If a bell end is damaged, cracked duct can be glued to the straight end of a non-damaged duct using a duct coupling.



	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	PLASTIC UTILITY DUCT PVC (POLY VINYL CHLORIDE) GENERAL INFORMATION		DETAIL NO. BC 824.02-1		
			SCALE: NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION

General Information

(A) Duct spacers are used to hold PVC ducts in Position and maintain a 2" separation between adjacent ducts while pouring concrete.

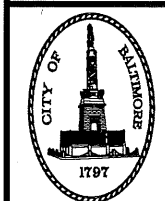
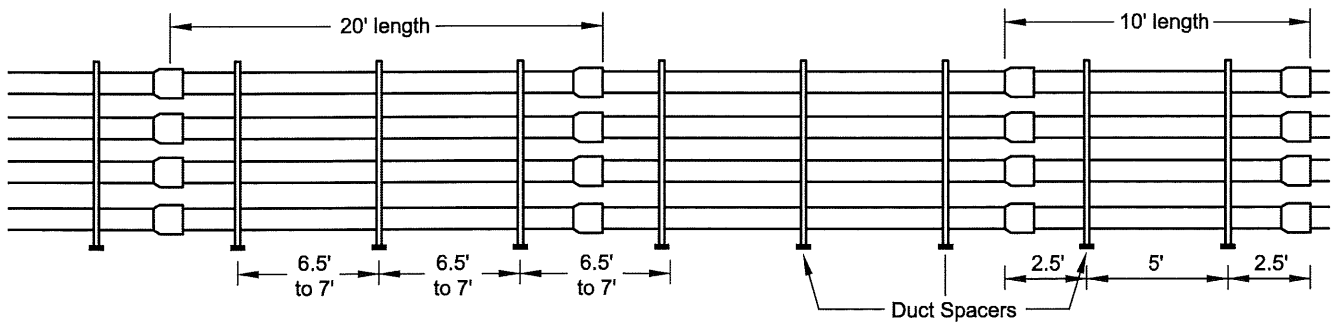
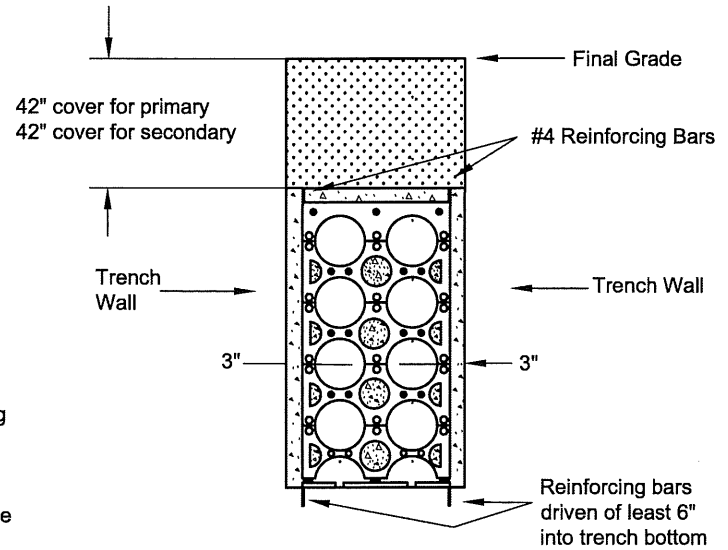
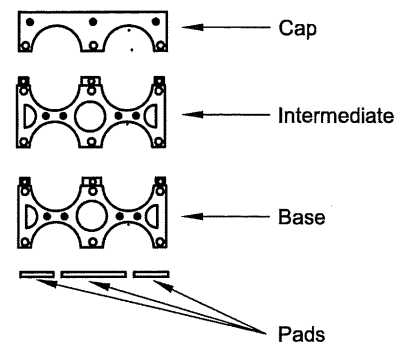
(B) There are 3 basic parts to the duct spacers -- the base, intermediate, and cap. If required, they are also pads/feet that can be used with 5" and 6" spacers for extra support in an unstable trench bottom.

(C) Standard cover for a primary conduit system is 42" and 42" cover for a secondary conduit system. Both of these dimensions are measured from final grade to the top of the concrete envelope of the duct.

(D) Reinforcing bars are used to stabilize the duct and spacers when the concrete is poured. Drive #4 reinforcing bars through the inside edges of the duct spacers and at least 6" into the trench bottom.

(E) The sides of the trench are used as retaining walls when the concrete is poured. The distance from the outer duct diameter to the trench wall should be 3" wide. This in turn gives the required 3" apron around the whole duct bank.

(F) To properly support multiple ducts in a trench, the duct spacers are separated approximately 6-1/2 feet to 7 feet apart. Since PVC duct is manufactured in 10 foot and 20 foot lengths, this means there are two (2) spacers installed within one 10 foot section of duct and three (3) spacers installed within one 20 foot section of duct.

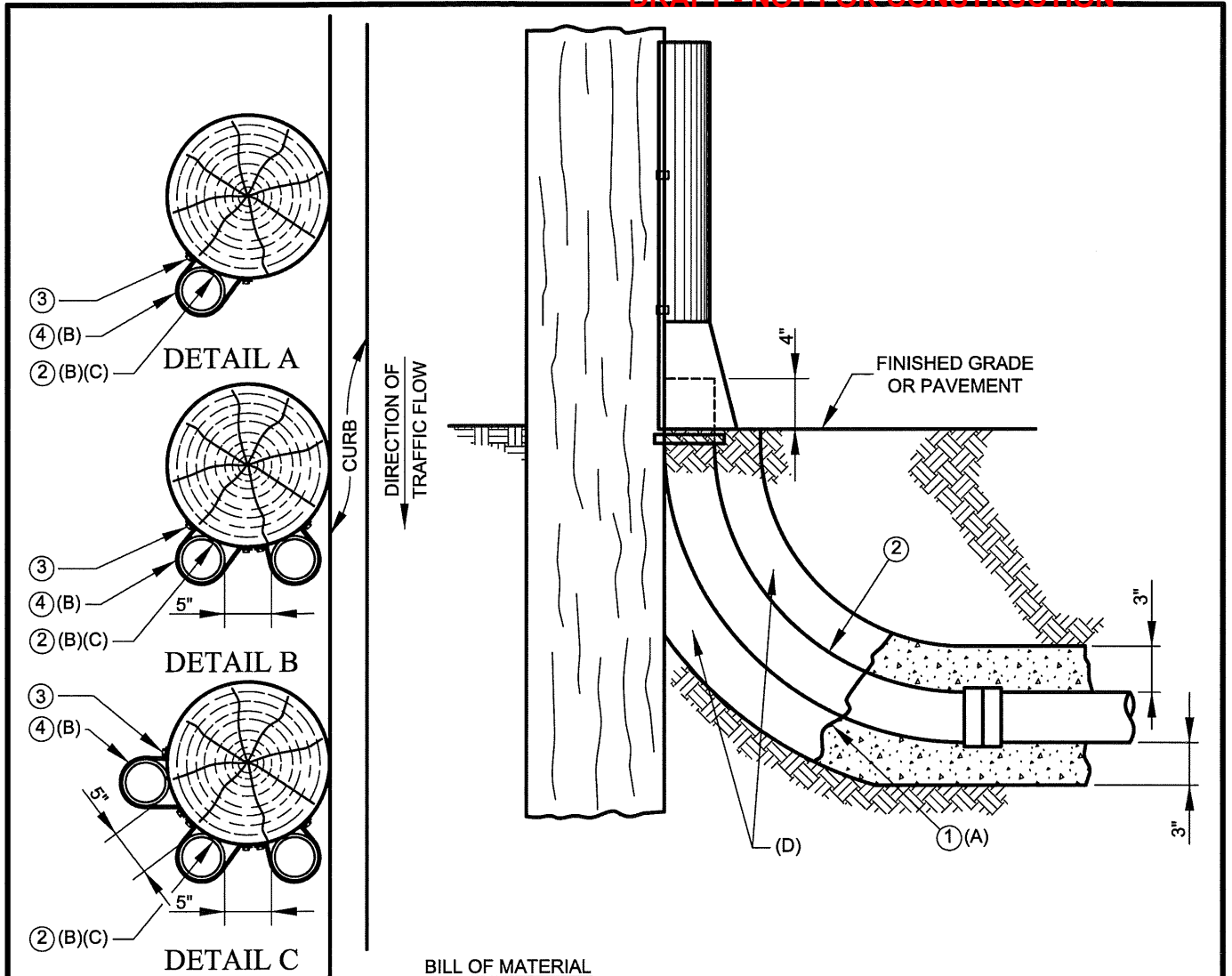


APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khali Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
**PLASTIC PVC DUCT SPACERS
 GENERAL INFORMATION**
 913

ISSUED	REVISED	REVISED
8 / 2010	10-9-86	
DETAIL NO. BC 824.02-2		
SCALE : NONE	SHEET 2 OF 2	

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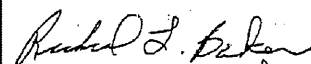
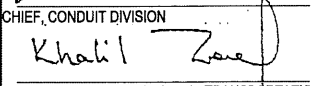


BILL OF MATERIAL

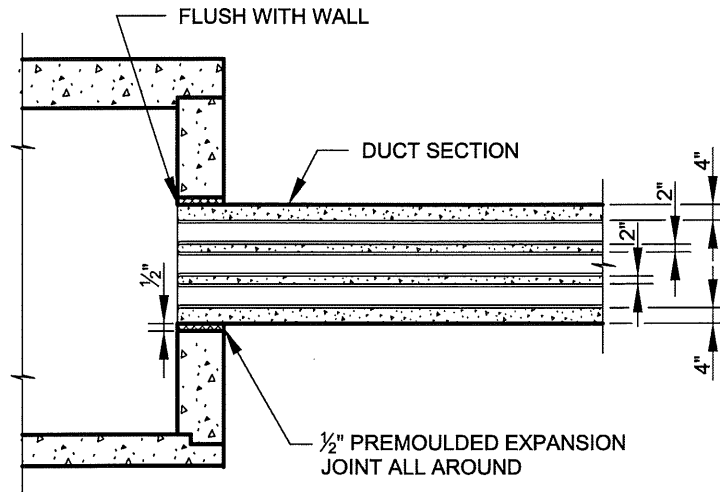
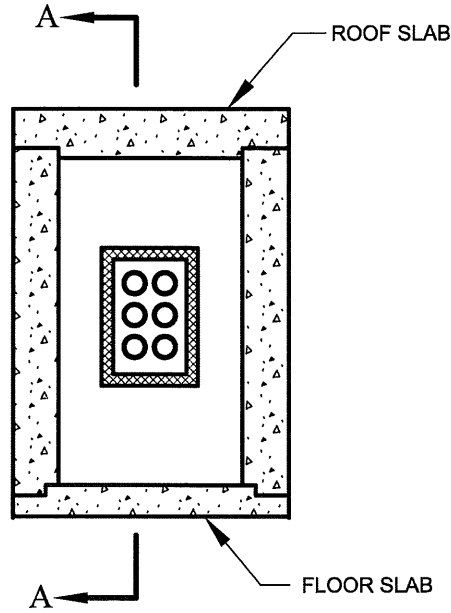
<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>	
1	CONCRETE, MIX NO. 1	CU. YD.	AS REQUIRED	
2	BEND, 36" RADIUS PVC DUCT	$\left\{ \begin{array}{l} 3" \\ 4" \\ 5" \\ 6" \end{array} \right.$	AS REQUIRED	
3	SCREW 2", WASHER ATTACHED		BOX	AS REQUIRED
4	STRAP, PERFORATED GALVANIZED STEEL		ROLL	AS REQUIRED

INSTALLATION INSTRUCTIONS

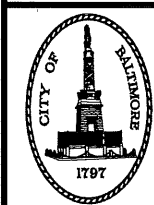
- (A) CONCRETE ENCASUREMENT OF CONDUIT WILL END AFTER INCLUDING JOINT BETWEEN DUCT BEND(S) AND DUCT EXTENDING AWAY FROM POLES.
- (B) FASTEN END OF DUCT BEND(S) TO POLE WITH STRAP. (SEE DETAIL "A" OR "B").
- (C) SECURE DUCT BEND(S) AWAY FROM TRAFFIC FLOW IF POSSIBLE AND INSIDE CURBSIDE TANGENT TO POLE. (SEE DETAIL "A" OR "B").
- (D) FILL IN AROUND BEND(S) WITH CLEAN COMPACTED BACKFILL.
- (E) COORDINATE LOCATION OF CONNECTION(S) WITH CONCERNED OVERHEAD AND UNDERGROUND SUPERVISION.

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION CONDUIT POLE CONNECTION SINGLE, DOUBLE AND TRIPLE 915 914	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			SCALE : NONE	SHEET 1 OF 1	

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SECTION A-A



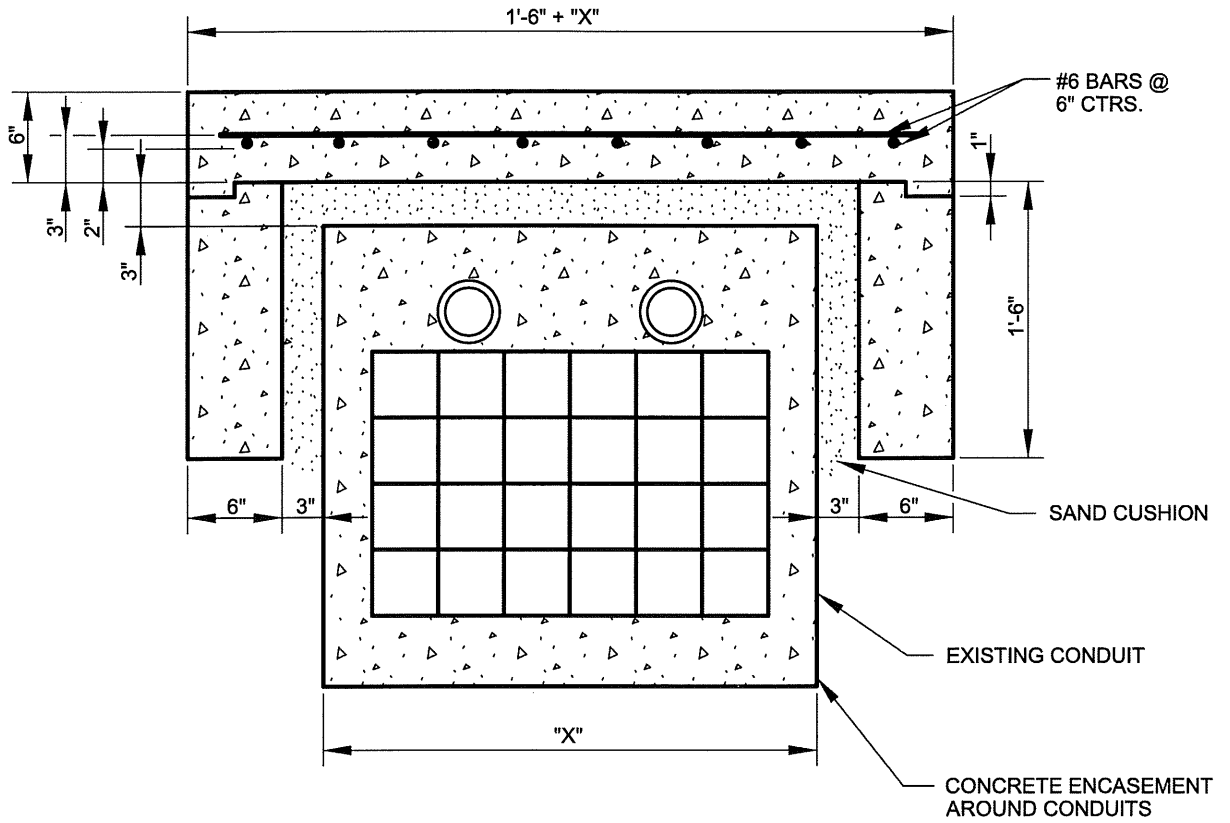
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION


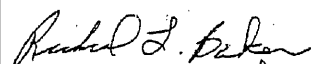
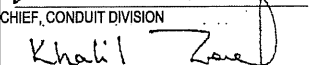
DUCT ENTRANCE
 916 INTO MANHOLE
 915

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC-824.06		
SCALE : NONE		SHEET 1 OF 1

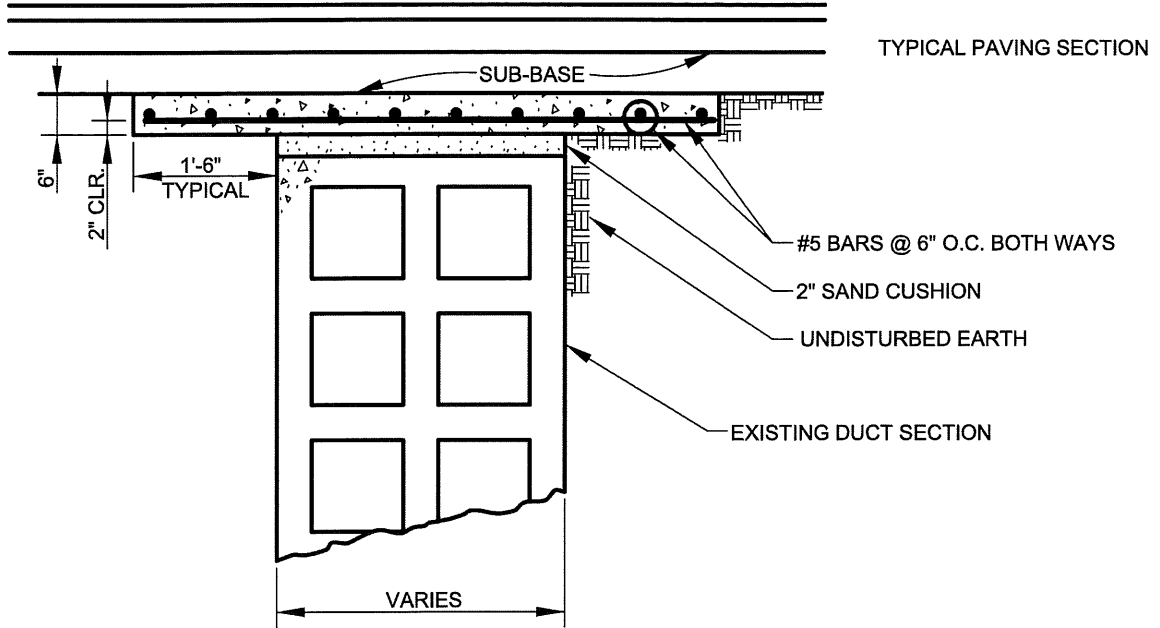
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CONCRETE TO BE MIX NO. 3

	APPROVED:  RICHARD L. BAKER CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED	REVISED	REVISED
	 KHALIL ZARE DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
DUCT REINFORCEMENT AT RAILROAD CROSSING 916			DETAIL NO. BC 824.07		
			SCALE : NONE		SHEET 1 OF 1

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ALL CONCRETE TO BE MIX NO. 3. ALL REINFORCING STEEL TO CONFORM TO A.S.T.M. 615, GRADE 40



APPROVED:

Richard L. Baker
 CHIEF, CONDUIT DIVISION

Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

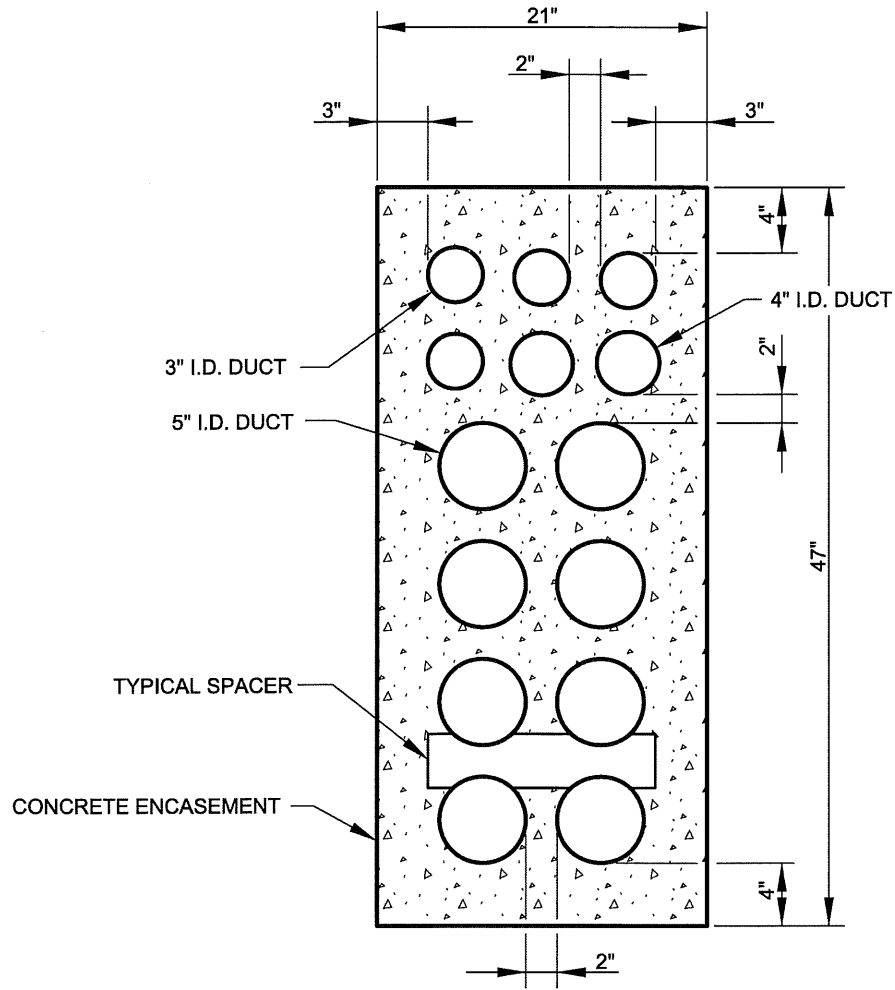
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

**REINFORCING SLAB FOR
 SHALLOW ELECTRIC DUCT**

917

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 824.08		
SCALE: NONE		SHEET 1 OF 1

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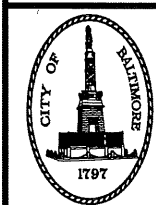


CUBIC YARDS OF CONCRETE PER LINEAR FOOT OF CONDUIT
 (SEE NOTE A)

CONCRETE MIX NO. 1 (1/2" PEA GRAVEL) 2500 PSI, 6" SLUMP

NOTES:

- A. CONCRETE CALCULATIONS ARE BASED ON STANDARD CONDUIT ENVELOPE INDICATED ABOVE.
- B. WHEN CONDITIONS REQUIRE A LARGER THAN STANDARD ENVELOPE, IN NO CASE SHALL THE ENVELOPE EXCEED 6" ON THE SIDES AND 4" ON THE TOP AND BOTTOM.
- C. INSTALL #4 REINFORCING BARS THROUGH THE INSIDE EDGES OF THE DUCT SPACERS TO PROVIDE TEMPORARY ANCHORING. THIS PREVENTS THE CONDUIT FROM FLOATING OR CHANGING ALIGNMENT WHILE THE CONCRETE ENVELOPE IS BEING POURED.
- D. 3" DUCTS ARE NORMALLY ALLOCATED TO COMMUNICATION COMPANIES AND THE LARGEST DIAMETER DUCTS ARE ALLOCATED TO ELECTRIC SUPPLY CABLES.



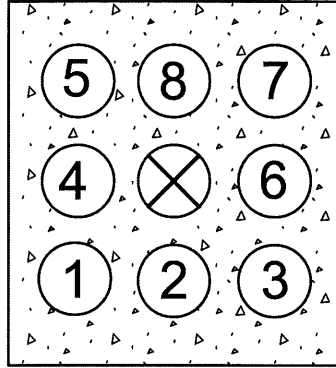
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

DUCT TYPICAL SECTION
 9-5", 4-3" AND 2-4"
 918

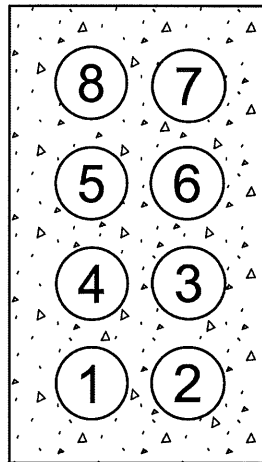
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 824.09		
SCALE: NONE		SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION




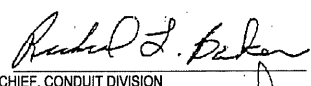
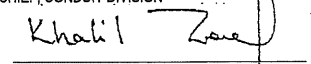
8 - 5"

TRANSITION SECTION



TYPICAL 8 - 5" DUCT SECTION

(2w x 4H)

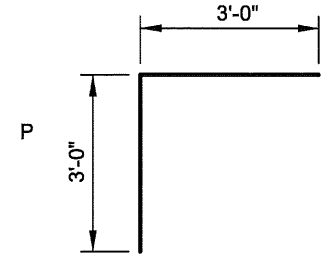
	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	DUCT TRANSITION TO PRECAST RECESSED EXTENSION 919		DETAIL NO. BC 824.10		
			SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

STEEL SCHEDULE

MARK	SIZE	LENGTH	NO. OF PIECES
A	9	13'-0"	8
B	6	5'-9"	4
C	6	5'-2"	4
D	6	4'-10"	6
E	6	7'-0"	14
F	9	7'-0"	6
G	6	2'-9"	4
H	6	2'-2"	4
I	6	1'-10"	6
J	5	4'-8"	8
K	6	13'-0"	12
L	6	5'-6"	8
M	6	7'-0"	12
N	7	7'-0"	12
O	6	2'-6"	8
P	5	6'-0"	120
Q	6	7'-0"	28
Q	6	7'-0"	32
Q	6	7'-0"	36
R *	5	7'-4"	48
R **	5	8'-4"	48
R ***	5	9'-4"	48
S *	6	13'-0"	28
S **	6	13'-0"	32
S ***	6	13'-0"	36
T	5	3'-2"	8

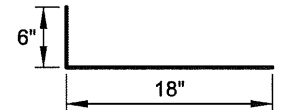
A THRU N



BAR SUPPORTS

(A) 1 1/2 - BC - A

(B) # 3 REINFORCING BARS
 INSTALL AT RANDOM
 LOCATIONS, AS NEEDED.



(C) PULLING IRONS SHALL BE INSTALLED AT THE JUNCTION
 OF THE FLOOR AND WALL AND WALL AND ROOF.
 LOCATION OF PULLING IRONS TO BE CENTERED ON END
 WALLS AND OPPOSITE DUCT BANKS, OR KNOCK - OUTS
 ON SIDE WALLS.



- * 7 FT HEADROOM
- ** 8 FT HEADROOM
- *** 9 FT HEADROOM

NOTES:
 THIS MANHOLE WAS DESIGNED IN ACCORDANCE WITH A.A.S.H.T.O. STANDARD
 SPECIFICATIONS FOR HIGHWAY BRIDGES DATED 1996, INCLUDING ALL INTERIM
 SPECIFICATIONS THROUGH 2002. ALL MATERIALS AND CONSTRUCTION SHALL
 CONFORM TO BALTIMORE CITY STANDARDS.

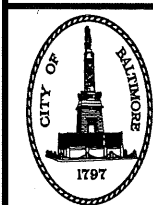
LOADING: HS25 TRUCK LOADING

MATERIALS
CONCRETE:

4,000 PSI COMPRESSIVE STRENGTH AFTER 28 DAYS.
 CONCRETE DESIGN: SERVICE LOAD DESIGN METHOD - $f'_c=1,600$ PSI.

STEEL

60,000 PSI YIELD STRENGTH - GRADE 60
 REINFORCING STEEL DESIGN - $f_s=24,000$ PSI
 REINFORCING STEEL IN THE ROOF SLAB SHALL BE EPOXY COATED



APPROVED:

 CHIEF, CONDUIT DIVISION
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

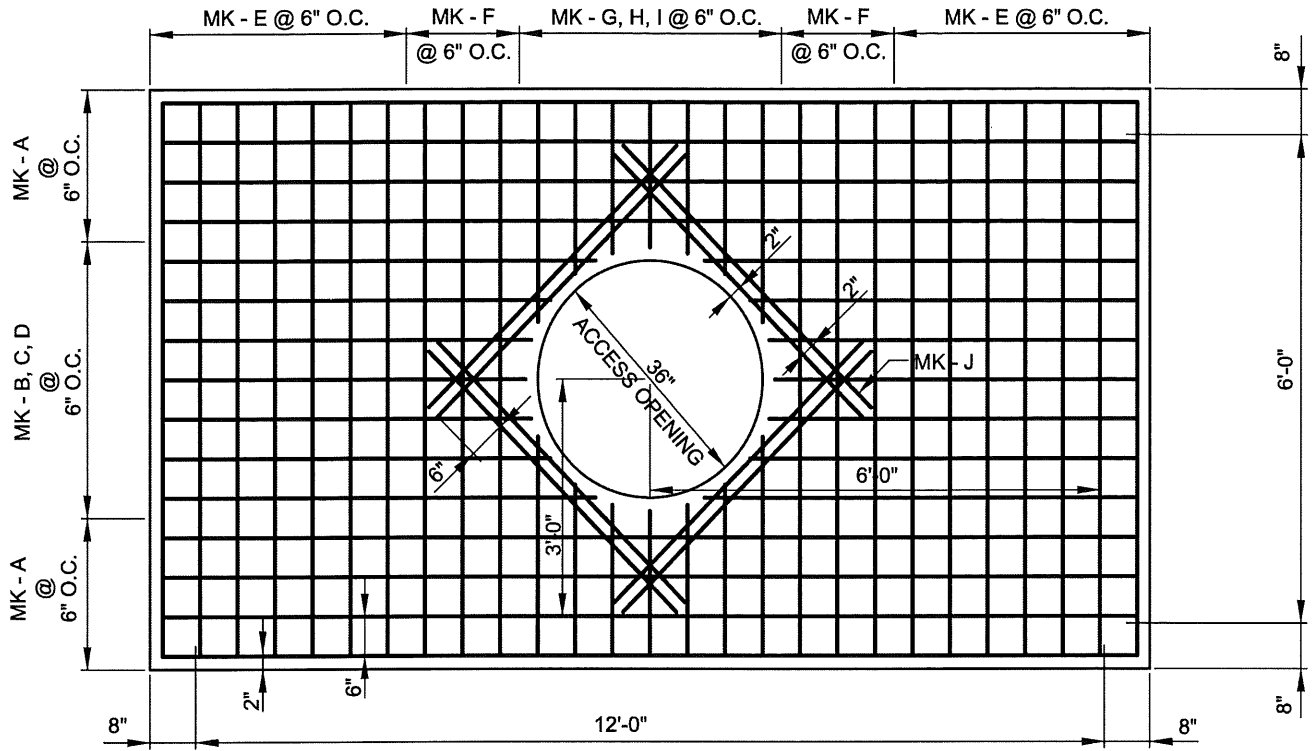
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

STEEL DETAILS FOR
6 FT x 12 FT LINE MANHOLE

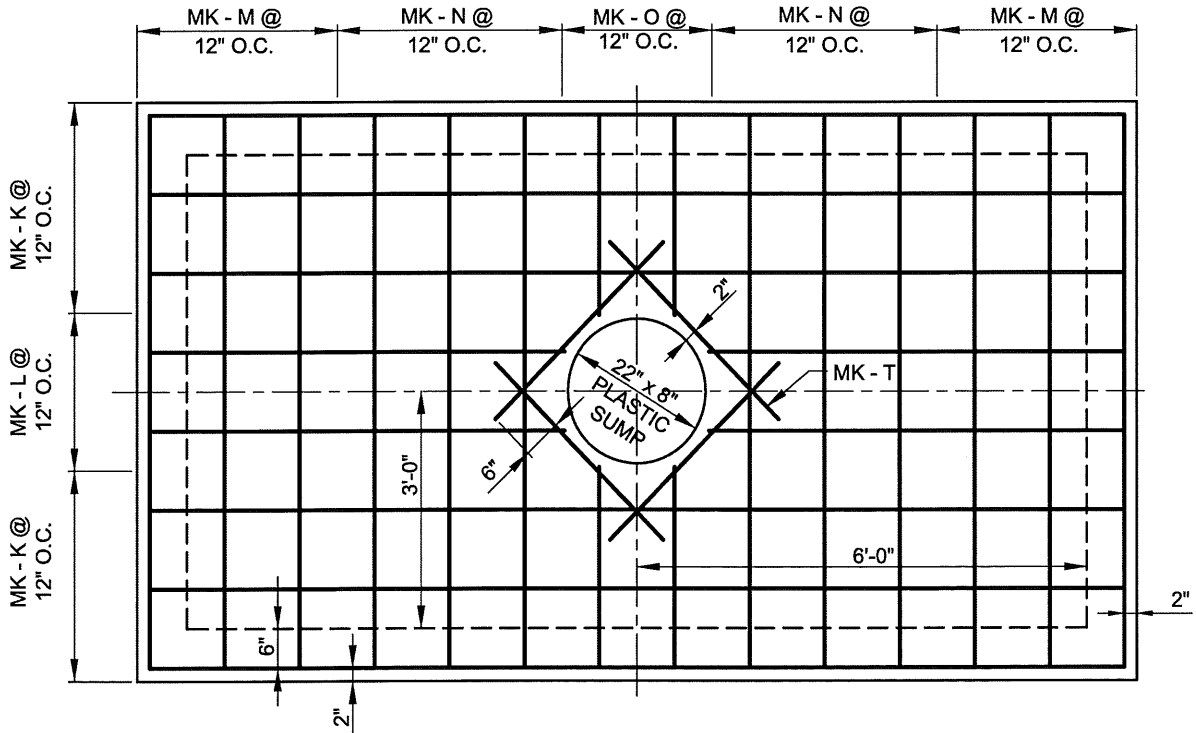
920

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.01		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION



ROOF - MAIN REINFORCING



BASE - MAIN REINFORCING

NOTE:
 ALL STEEL REINFORCING
 IS SYMMETRICAL AROUND
 CENTERLINE



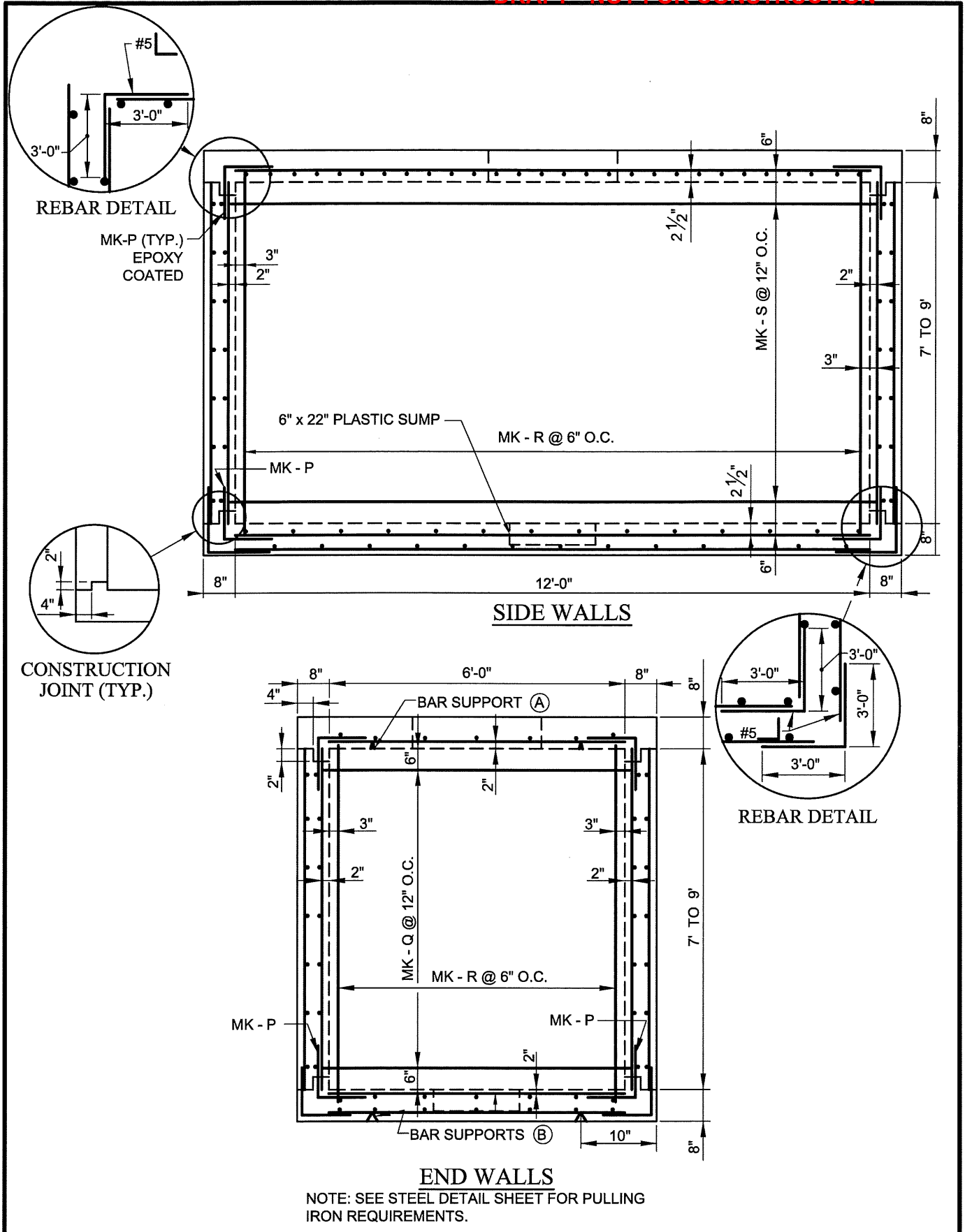
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION


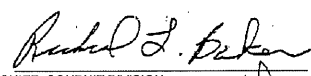
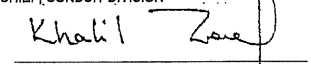
922
 921
**DETAILS FOR 6 FT X 12 FT
 POURED IN PLACE LINE
 MANHOLE**

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.02-1		
SCALE: NONE	SHEET 1 OF 2	

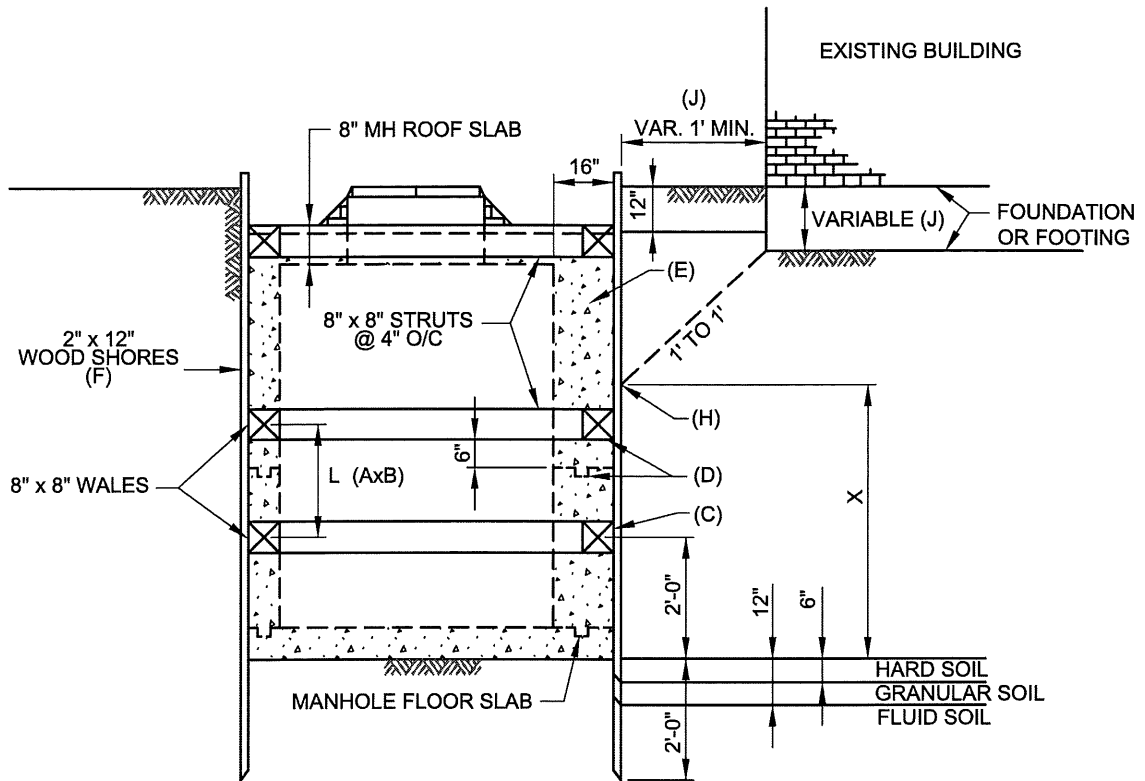
DRAFT - NOT FOR CONSTRUCTION



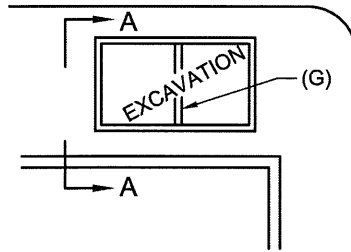
NOTE: SEE STEEL DETAIL SHEET FOR PULLING IRON REQUIREMENTS.

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
DETAILS FOR 6 FT x 12 FT POURED IN PLACE LINE 923 922 MANHOLE			DETAIL NO. BC 825.02-2		
			SCALE: NONE	SHEET 2 OF 2	

DRAFT - NOT FOR CONSTRUCTION




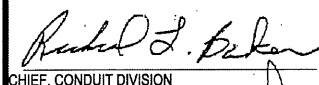
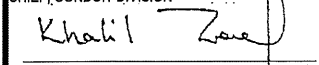
SECTION A-A



PLAN

NOTES:

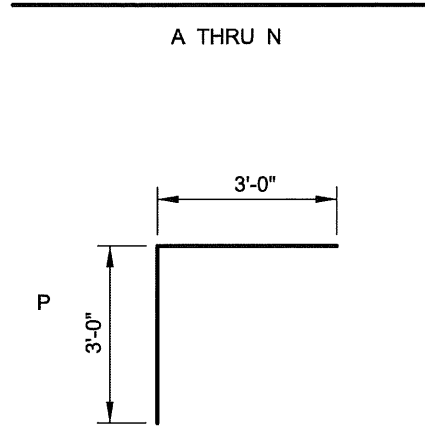
- (A) WHEN "X" IS 5' OR LESS, USE 2 SETS OF WALERS WITH ASSOCIATED STRUTS (BRACES), L IS EQUAL TO OR LESS THAN 2.5'.
- (B) WHEN "X" IS 10' OR LESS, L=2'. THE WALER SPACING MUST BE MAINTAINED WITH ADDITIONAL BRACES TO A POINT AT OR ABOVE THE 1 TO 1 SLOPE LINE THAT INTERSECTS THE EXCAVATION.
- (C) REMOVE THIS SET OF WALERS AND STRUTS AFTER POURING MANHOLE FLOOR SLAB.
- (D) CONSTRUCT WALLS TO THIS ELEVATION BEFORE REMOVING SECOND SET OF WALERS AND STRUTS.
- (E) POURED CONCRETE WALL TO BE 16" WIDE ON BUILDING SIDE ONLY.
- (F) 2" WOOD SHORES TO BE DENSE STRUCTURAL #65 - TREATED (MATERIAL NO. 11-336) LEFT IN PLACE.
- (G) WALERS AND STRUTS LONGER THAN 10' ARE TO BE BRACED AT OR NEAR THE CENTER POINT IN BOTH DIRECTIONS WITH 2" x 6".
- (H) FROM THIS POINT, WOOD SHORES MUST BE KEPT BELOW EXCAVATION, (6" HARD SOIL, 12" GRANULAR SOIL, 24" FLUID SOIL).
- (J) CONSTRUCTION DRAWING SHALL CLEARLY INDICATE EXCAVATION DISTANCE FROM NEAREST ADJACENT BUILDING AND DEPTH OF FOUNDATION OR FOOTING.

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	BRACED COFFER DAM FOR POURED IN PLACE 924 923 MANHOLE		DETAIL NO. BC 825.04		
			SCALE: NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION

STEEL SCHEDULE

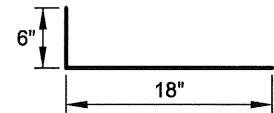
MARK	SIZE	LENGTH	NO. OF PIECES
A *	9	13'-0"	8
B **	6	5'-9"	4
C ***	6	5'-2"	4
D *	6	4'-10"	6
E **	6	7'-0"	14
F ***	9	7'-0"	6
G *	6	2'-9"	4
H **	6	2'-2"	4
I ***	6	1'-10"	6
J	5	4'-8"	8
K	6	13'-0"	12
L	6	5'-6"	8
M	6	7'-0"	12
N	7	7'-0"	12
O	6	2'-6"	8
P	5	6'-0"	120
Q	6	7'-0"	28
Q	6	7'-0"	32
Q	6	7'-0"	36
R *	5	7'-4"	48
R **	5	8'-4"	48
R ***	5	9'-4"	48
S *	6	13'-0"	28
S **	6	13'-0"	32
S ***	6	13'-0"	36
T	5	3'-2"	8



BAR SUPPORTS

(A) 1 1/2 - BC - A

(B) # 3 REINFORCING BARS
 INSTALL AT RANDOM
 LOCATIONS, AS NEEDED.



(C) PULLING IRONS SHALL BE INSTALLED AT THE JUNCTION OF THE FLOOR AND WALL AND WALL AND ROOF. LOCATION OF PULLING IRONS TO BE CENTERED ON END WALLS AND OPPOSITE DUCT BANKS, OR KNOCK - OUTS ON SIDE WALLS.




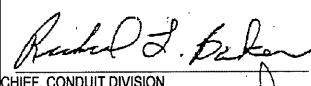
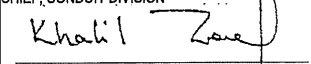
- * 7 FT HEADROOM
- ** 8 FT HEADROOM
- *** 9 FT HEADROOM

NOTES:
 THIS MANHOLE WAS DESIGNED IN ACCORDANCE WITH ACI STANDARD 318-71 AND ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THIS STANDARD.

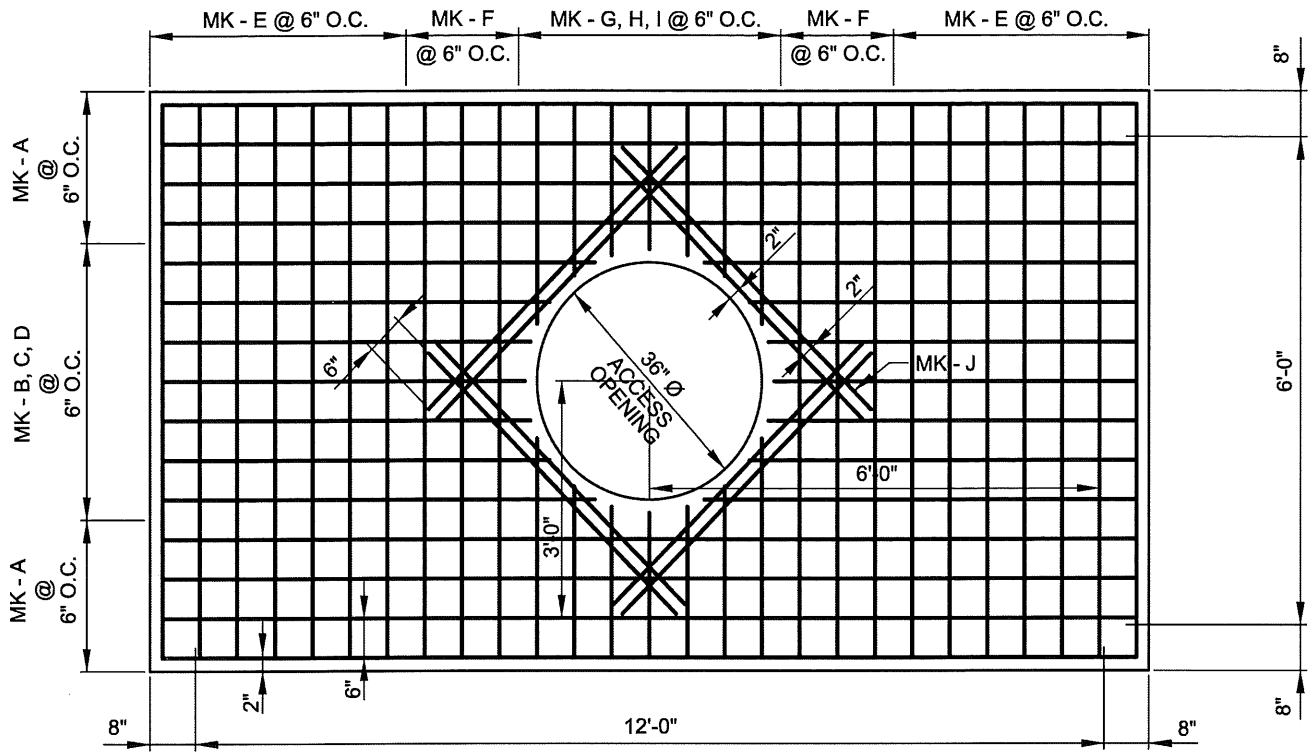
MATERIALS:
 CONCRETE
 4,000 PSI COMPRESSIVE STRENGTH AFTER 28 DAYS
 STEEL
 60,000 PSI YIELD STRENGTH - GRADE 60

LOADING: HS 25 TRUCK LOADING

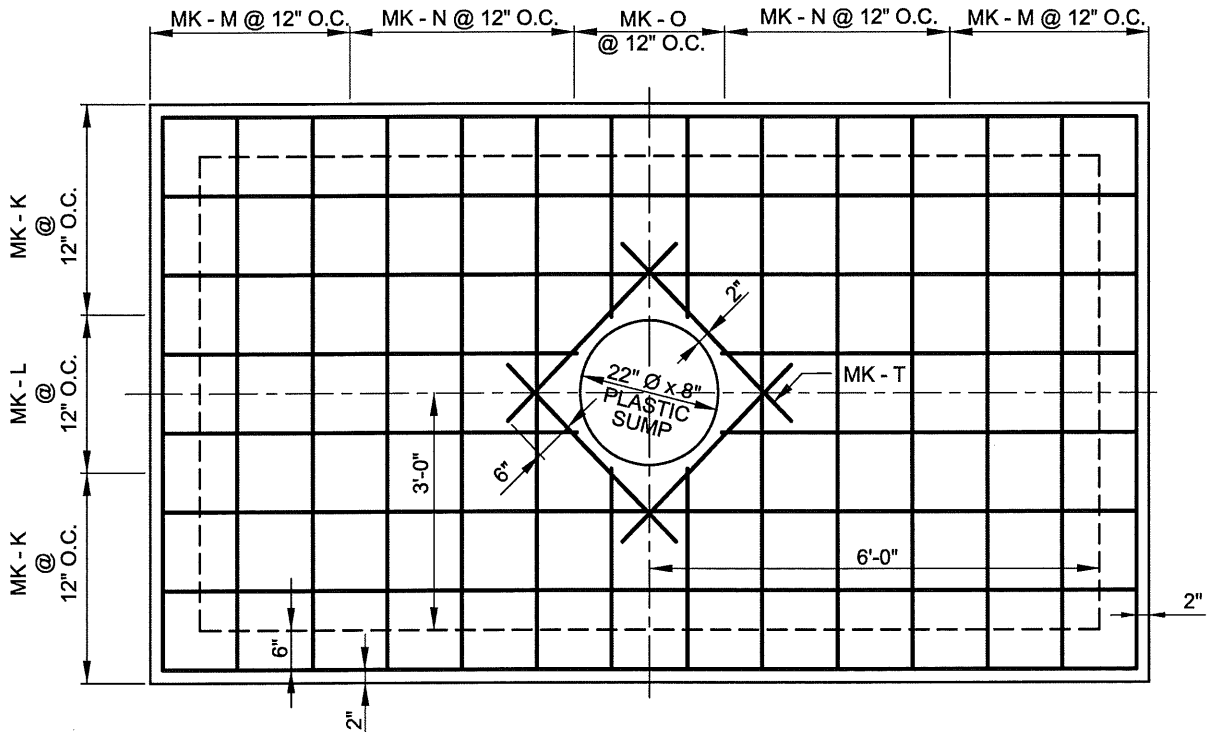
SEE B.C. 825.08 FOR GRATING DETAILS

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	STEEL DETAILS FOR 6 FT x 12 FT TRANSFORMER 925 924 MANHOLE	DETAIL NO. BC 825.05		SCALE : NONE	SHEET 1 OF 1


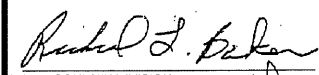
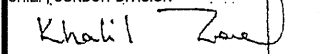
DRAFT - NOT FOR CONSTRUCTION



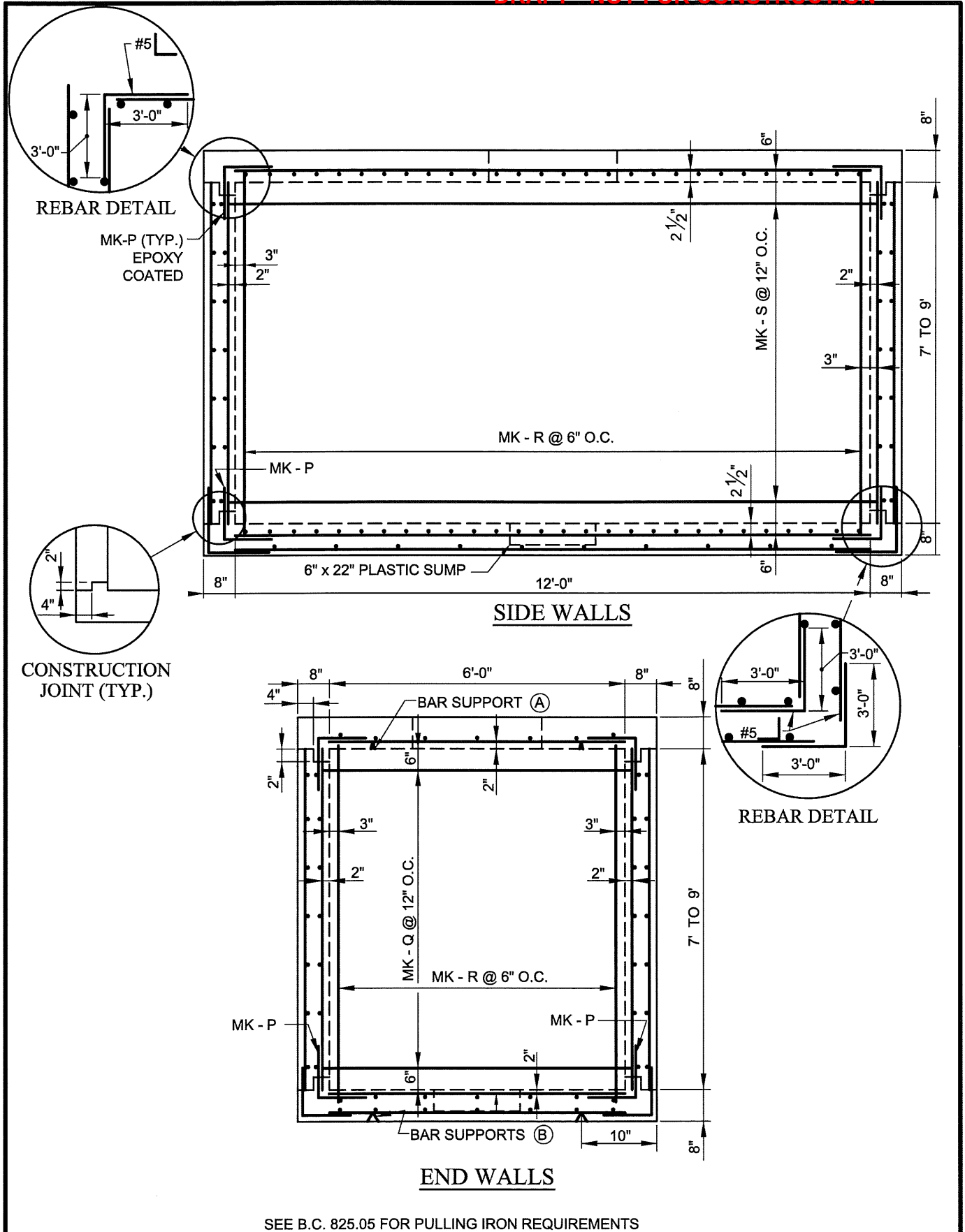
ROOF- MAIN REINFORCING




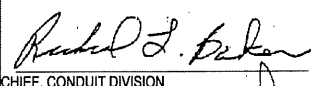
BASE - MAIN REINFORCING

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	DETAILS FOR 6 FT x 12 FT POURED IN PLACE TRANSFORMER MANHOLE	DETAIL NO. BC 825.06-1	SCALE: NONE	SHEET 1 OF 2	

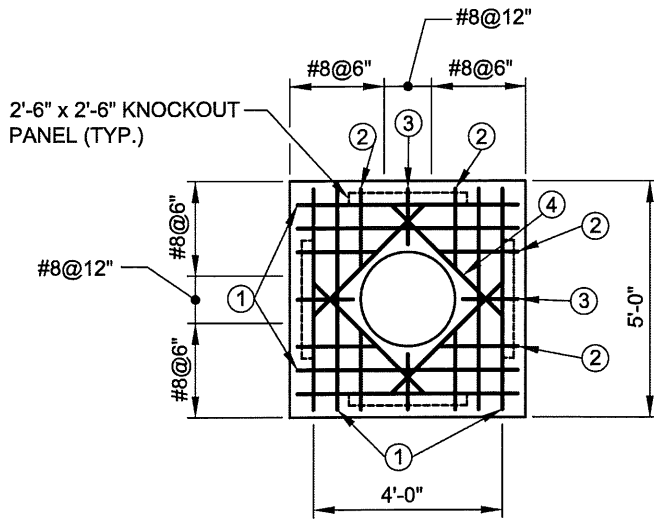
DRAFT - NOT FOR CONSTRUCTION



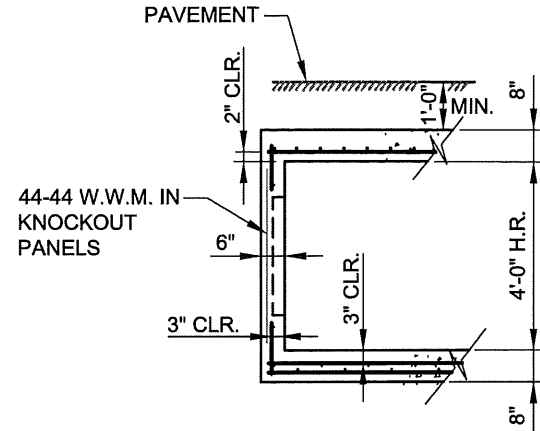
SEE B.C. 825.05 FOR PULLING IRON REQUIREMENTS

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION DETAILS FOR 6 FT x 12 FT POURED IN PLACE TRANSFORMER MANHOLE	ISSUED	REVISED	REVISED
	DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 825.06-2		
			SCALE: NONE	SHEET 2 OF 2	

DRAFT - NOT FOR CONSTRUCTION



TOP SLAB PLAN




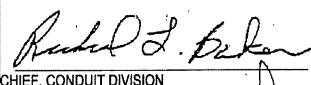
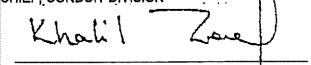
WALL SECTION

NOTE:
 3'-2" x 3'-2" AREA OF
 44-44 W.W.M. CENTERED
 ON KNOCKOUT PANELS

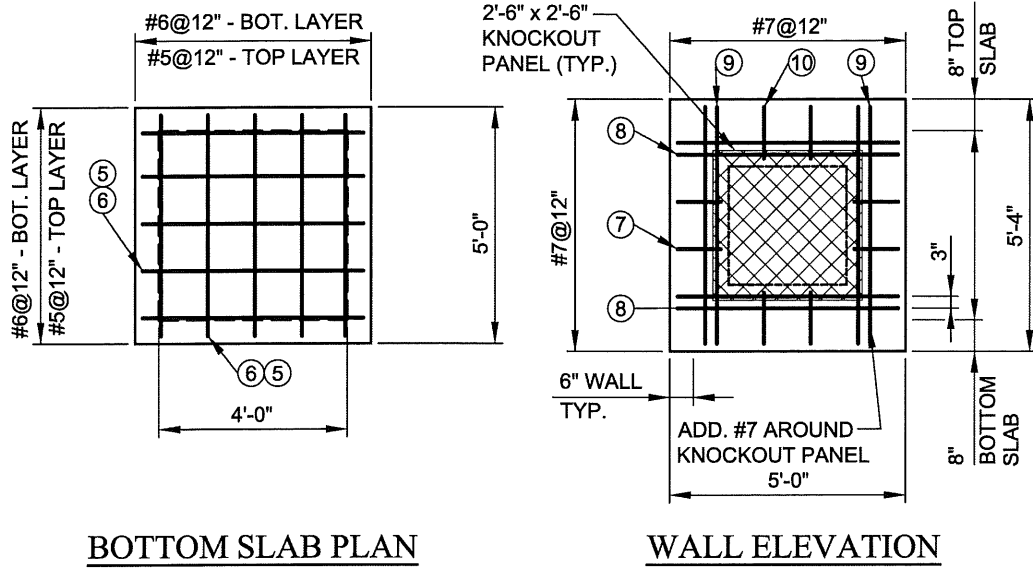
SCHEDULE OF REINFORCING STEEL FOR SHEET NO. 1
 SEE SHEET NO. 2 FOR ADDITIONAL REBAR

BAR NO.	1	2	3	4	TOTAL LENGTH		TOTAL WEIGHT
					#5	#8	
BAR SIZE	#8	#8	#8	#5	#5	#8	
M. H. SIZE	H.R. 4'-8"	1'-8"	1'-2"	3'-4"			
	4' x 4'	4'	8	8	4	4	13'-4" 55'-4" 162#

NOTES:
 CONCRETE: MIX NO. 3
 LOADING: HS25

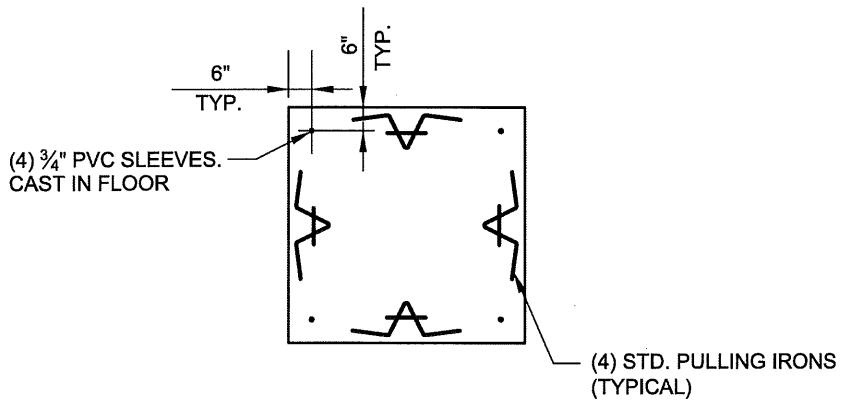
	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED	REVISED	REVISED	
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010			
	4'-0" x 4'-0" x 4'-0" MANHOLE - CONDUIT 927		DETAIL NO. BC 825.07-1			SCALE : NONE

DRAFT - NOT FOR CONSTRUCTION



BOTTOM SLAB PLAN

WALL ELEVATION


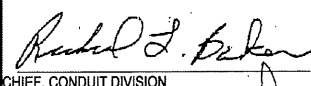
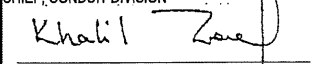


BOTTOM SLAB PLAN

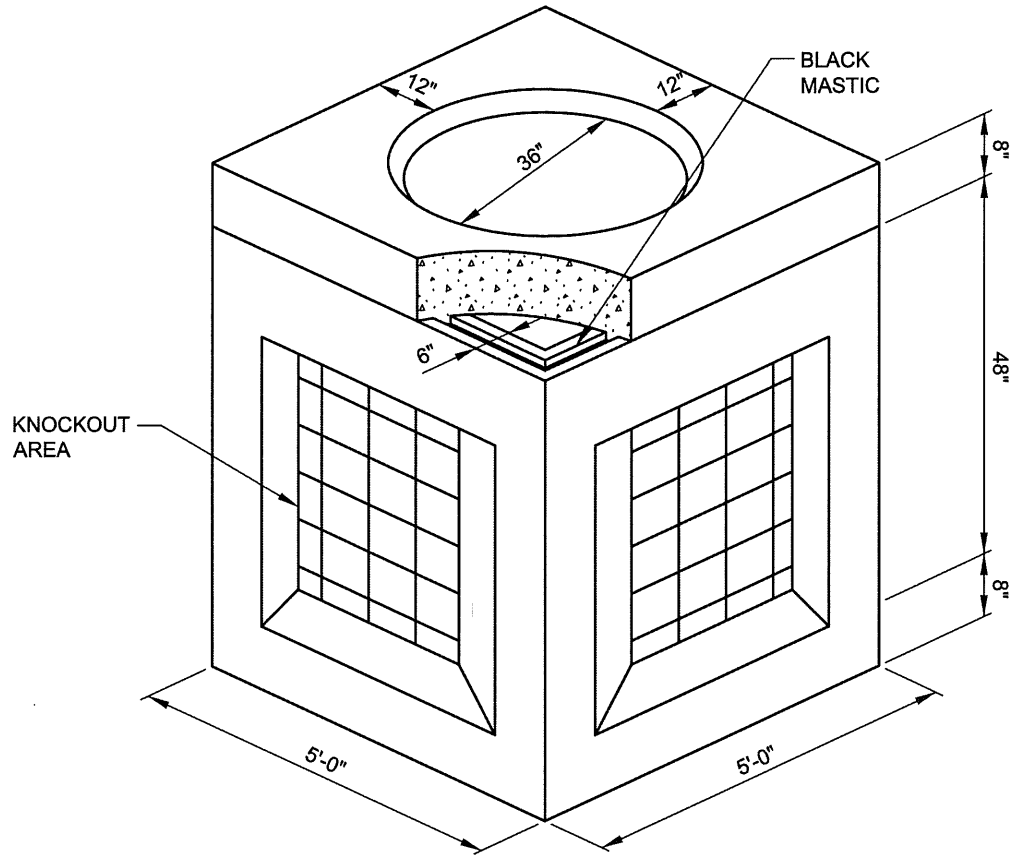
SCHEDULE OF REINFORCING STEEL FOR SHEET NO. 2
 SEE SHEET NO. 1 FOR ADDITIONAL REBAR

BAR NO.		5	6	7	8	9	10	TOTAL LENGTH			TOTAL WEIGHT
BAR SIZE		#6	#5	#7	#7	#7	#7	#5	#6	#7	
M. H. SIZE	H.R.	4'-8"	4'-8"	11"	4'-8"	5'-0"	1'-1"				
4' x 4'	4'	10	10	4	4	4	4	46'-8"	46'-8"	46'-8"	214#

NOTES:
 CONCRETE: MIX NO. 3
 LOADING: HS25


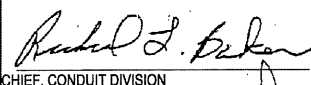
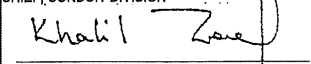
	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION 4'-0" x 4'-0" x 4'-0" MANHOLE - CONDUIT 928	ISSUED 8 / 2010	REVISED	REVISED	
				DETAIL NO. BC 825.07-2		
				SCALE: NONE	SHEET 2 OF 3	

DRAFT - NOT FOR CONSTRUCTION

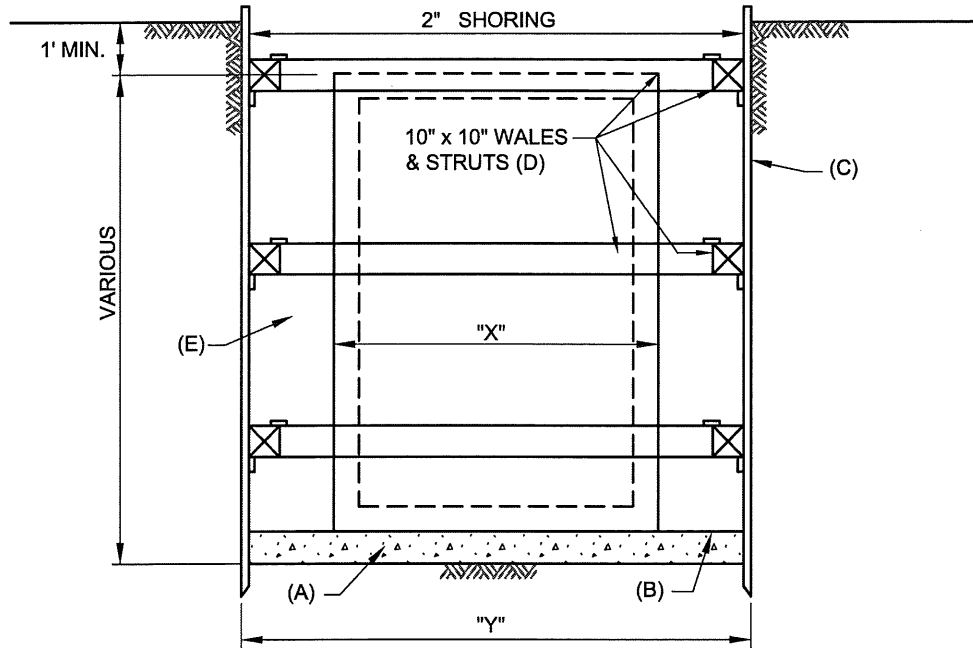


ISOMETRIC VIEW

NOTES:
 CONCRETE: MIX NO. 3
 LOADING: HS25

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	4'-0" x 4'-0" x 4'-0" MANHOLE - CONDUIT 929	DETAIL NO. BC 825.07-3			
	SCALE: NONE	SHEET 3 OF 3			

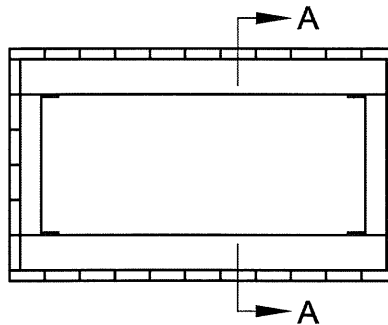
DRAFT - NOT FOR CONSTRUCTION



SECTION A-A

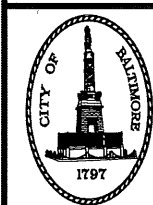
NOTES:

- A. 8" OF STABILIZER MATERIAL (PEA - GRAVEL)
- B. BOTTOM TO BE DRY AND LEVELED TO WITHIN 1" SIDE TO SIDE.
- C. 2" SHORING #1 ROUGH PINE, TO BE CARRIED ON ALL FOUR SIDES.
- D. PRIOR TO BACKFILLING, REMOVE ALL SHORING WHEN CONDITIONS ALLOW AND PERMIT AUTHORITIES APPROVE.
- E. BACKFILL WITH CLEAN DRY WELL COMPACTED MATERIAL. USE BANK RUN SAND AND GRAVEL.



PLAN

STD. M. H. SIZE	EXCAV. SIZE	"V"	"W"	"X"	"Y"	2" SHORING BD. FT. REQ'D	WALERS & STRUTS 10"x10" MIN. SIZE LIN. FT. REQ'D
4' x 4' x 4'	8' x 8'	5.33'	8'	5.33'	8'	384	64'
6' x 8' x 7'	9' x 12'	10'	12'	7'	9'	756	126'
6' x 8' x 8'	10' x 12'	9.33'	12'	7.33'	10'	704	126'
6' x 12' x 7'	10' x 16'	13.33'	16'	7.33'	10'	936	126'
6' x 12' x 8'	10' x 16'	13.33'	16'	7.33'	10'	1040	126'
6' x 12' x 9'	10' x 16'	13.33'	16'	7.33'	10'	1144	126'
SPECIAL							
6' x 17'-6" x 9'	10' x 21.5'	18.83'	21.5'	7.33'	10'	1386	126'



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

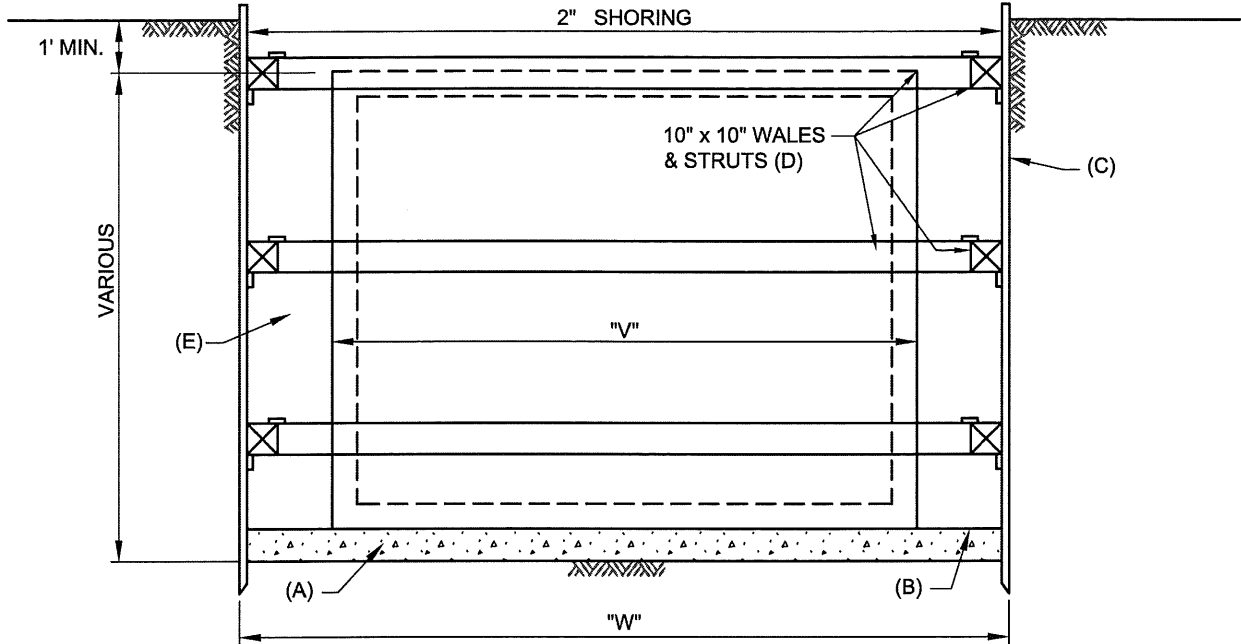
**CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION**

**EXCAVATION & SHORING
 FOR PRECAST MANHOLES**

930

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.08-1		
SCALE: NONE	SHEET 1 OF 2	

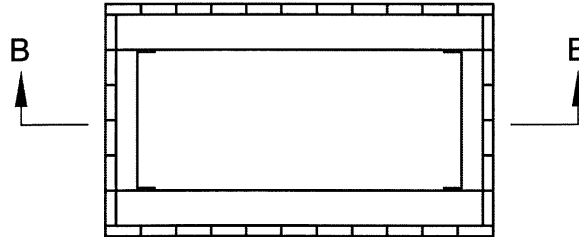
DRAFT - NOT FOR CONSTRUCTION



SECTION B-B


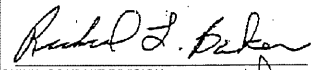
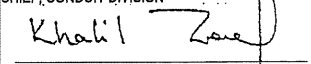
NOTES:

- A. 8" OF STABILIZER MATERIAL (PEA - GRAVEL)
- B. BOTTOM TO BE DRY AND LEVELED TO WITHIN 1" SIDE TO SIDE.
- C. 2" SHORING #1 ROUGH PINE, TO BE CARRIED ON ALL FOUR SIDES.
- D. PRIOR TO BACKFILLING, REMOVE ALL SHORING WHEN CONDITIONS ALLOW AND PERMIT AUTHORITIES APPROVE.
- E. BACKFILL WITH CLEAN DRY WELL COMPACTED MATERIAL. USE BANK RUN SAND AND GRAVEL.

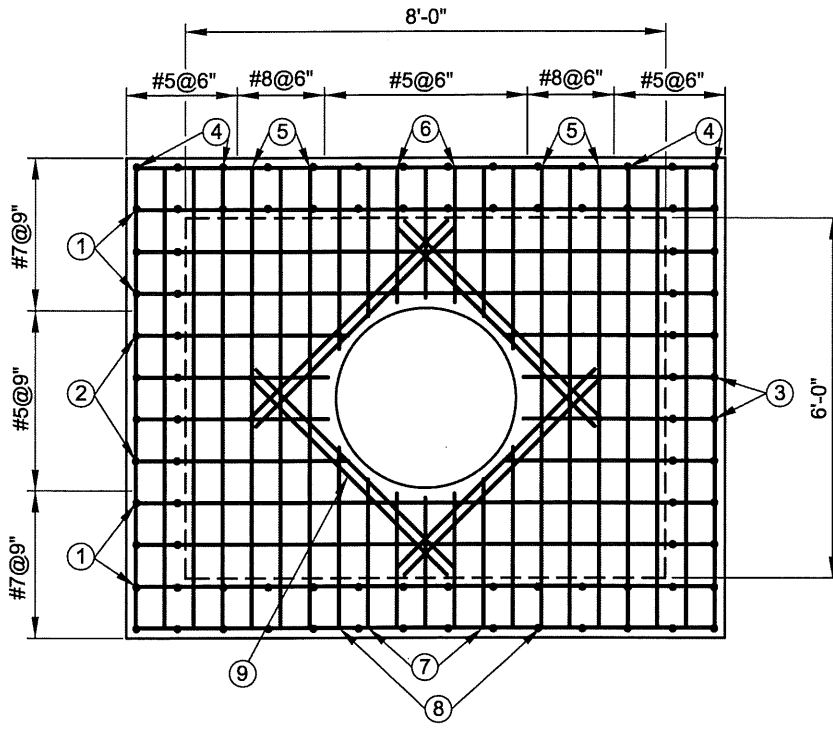


PLAN

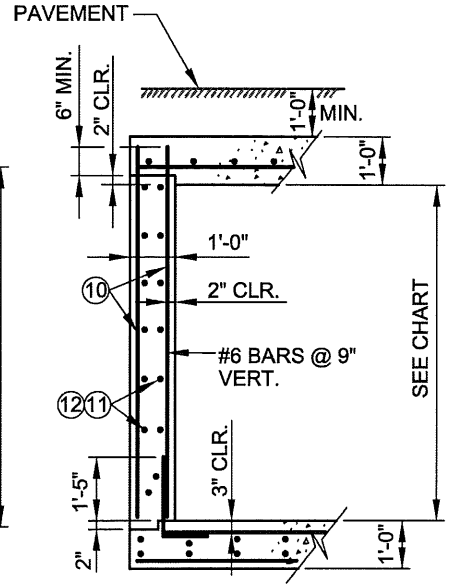
SEE SHEET 1 OF 2 FOR DIMENSIONS

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION EXCAVATION & SHORING FOR PRECAST MANHOLES 931	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
			DETAIL NO. BC 825.08-2		
			SCALE: NONE	SHEET 2 OF 2	

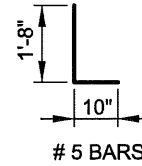
DRAFT - NOT FOR CONSTRUCTION



TOP SLAB PLAN
STANDARD TRUNKLINE MANHOLE



SECTION



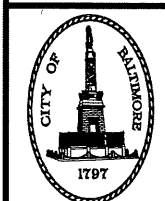
	NO. REQ.	TOTAL LENGTH	TOTAL WGT.
# 5 BARS	26	65'	68 #

SCHEDULE OF REINFORCING STEEL FOR SHEET NO. 1
 SEE SHEET NO. 2 FOR ADDITIONAL REBAR

BAR NO.	1	2	3	4	5	6	7	8	9	
BAR SIZE	#7	#5	#5	#5	#8	#5	#5	#5	#5	
M. H. SIZE	H.R. 9'-8"	3'-6"	3'-2"	7'-8"	7'-8"	2'-2"	2'-5"	3'-0"	4'-8"	
6' x 8'	7'	8	4	4	8	6	6	4	4	8
6' x 8'	8'	8	4	4	8	6	6	4	4	8

BAR NO.	10	11	12	TOTAL LENGTH				TOTAL WEIGHT	
BAR SIZE	#6	#5	#5	#5	#6	#7	#8		
M. H. SIZE	H.R. 8'-7"	7'-8"	9'-8"	#5	#6	#7	#8		
6' x 8'	7'	88	28	28	645'-4"	755'-4"	77'-4"	46'-0"	2089#
6' x 8'	8'	88	36	36	784'-6"	755'-4"	77'-4"	46'-0"	2234#

NOTES:
 CONCRETE: MIX NO. 3
 LOADING: HS25

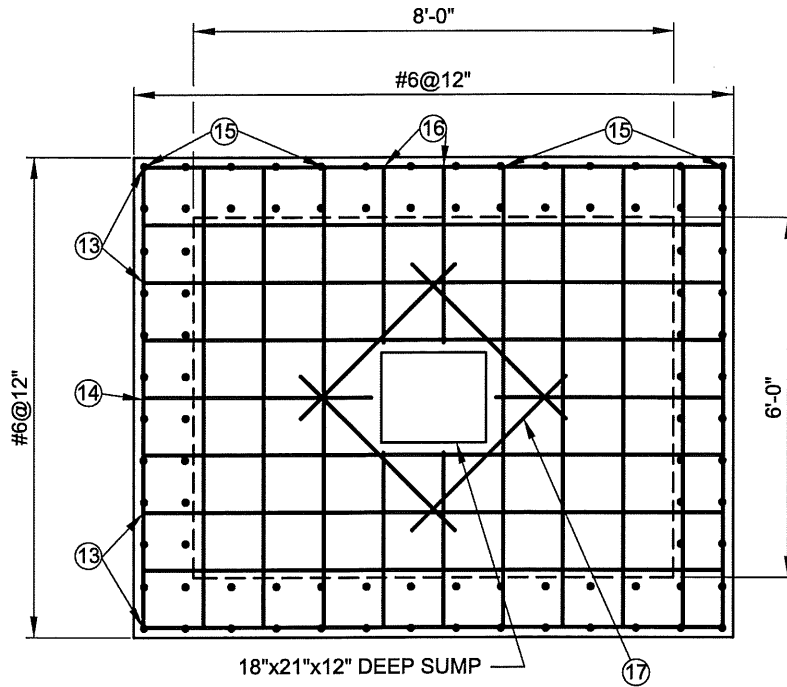


APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
POURED IN PLACE
 93 MANHOLE 6' x 8'
 932

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.09-1		
SCALE: NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION



BOTTOM SLAB PLAN
STANDARD TRUNKLINE MANHOLE

SCHEDULE OF REINFORCING STEEL FOR SHEET NO. 2
 SEE SHEET NO. 1 FOR ADDITIONAL REBAR

BAR NO.		13	14	15	16	17	TOTAL LENGTH		TOTAL WEIGHT
BAR SIZE		#6	#6	#6	#6	#5	#5	#6	
M. H. SIZE	H.R.	9'-8"	3'-9"	7'-8"	2'-11"	3'-8"			
6' x 8'	7'	8	2	9	4	4	14'-8"	165'-6"	264 #
6' x 8'	8'	8	2	9	4	4	14'-8"	165'-6"	264 #

NOTES:
 CONCRETE: MIX NO. 3
 LOADING: HS25



APPROVED:

 RICHARD L. BAKER
 CHIEF, CONDUIT DIVISION

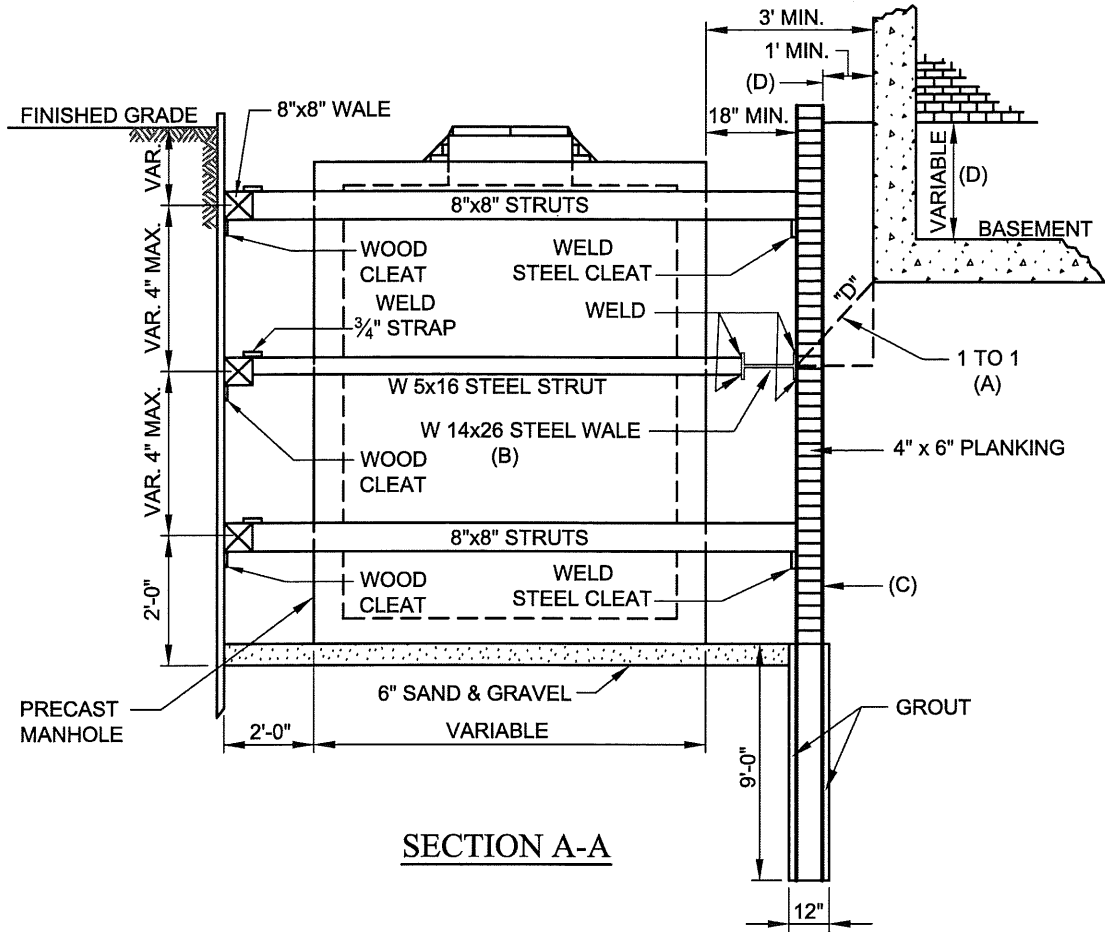
 KHALIL ZARE
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

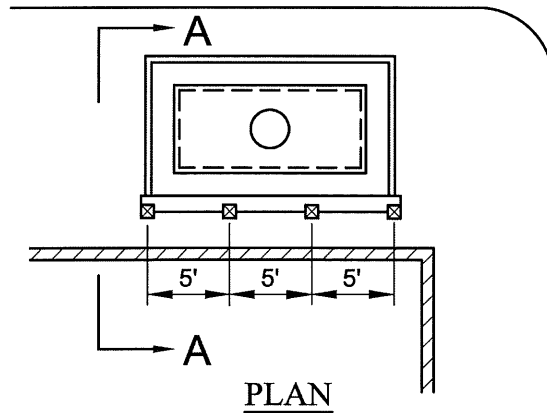
POURED IN PLACE
 934 MANHOLE 6' x 8'
 933

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.09-2		
SCALE: NONE	SHEET 2 OF 2	

DRAFT - NOT FOR CONSTRUCTION




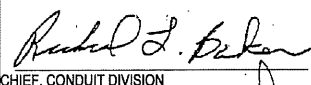
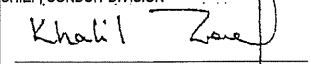
SECTION A-A



PLAN

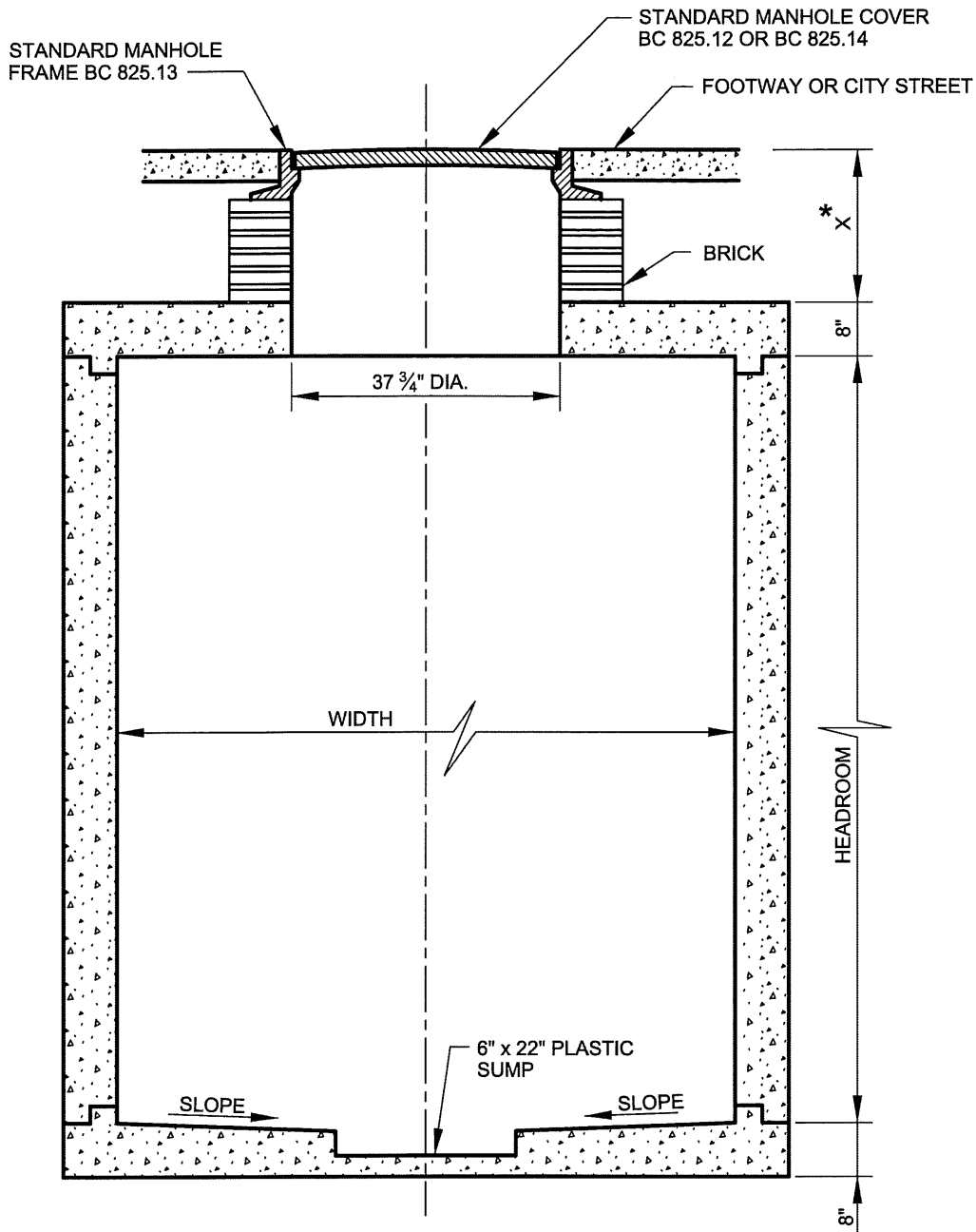
NOTES:

- A. SOLDIER PILE BRACING IS REQUIRED ONLY WHERE UNDERMINING A BUILDING IS A CONSIDERATION. THIS POSSIBILITY EXISTS WHENEVER A 1' TO 1' SLOPE BEGINNING AT THE BUILDING FOUNDATION FLOOR OR FOOTING FALLS ABOVE THE BOTTOM OF THE PROPOSED EXCAVATION AS SHOWN BY LINE "D".
- B. PLACE W 14x26 STEEL WALE AT INTERSECTION OF 1' TO 1' SLOPE WITH EXCAVATION.
- C. W 6X8.5 BEAMS PLACED IN A 12" AUGURED HOLE AND GROUTED.
- D. THE CONSTRUCTION DRAWING PREPARED FOR A SPECIFIC INSTALLATION SHALL CLEARLY INDICATE THE EXCAVATION DISTANCE FROM NEAREST ADJACENT BUILDING AND DEPTH OF THIS BUILDINGS BASEMENT OR FOOTING.
- E. ALL SHORING AND BRACING TO REMAIN IN PLACE.
- F. BACKFILL WITH SPECIAL BANK RUN SAND AND GRAVEL, COMPACT IN LAYERS SPECIFIED BY LOCAL GOVERNMENTAL SUB DIVISION.

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
SOLDIER PILE BRACING FOR PRECAST MANHOLE			DETAIL NO. BC 825.10		
			SCALE : NONE	SHEET 1 OF 1	

934

DRAFT - NOT FOR CONSTRUCTION

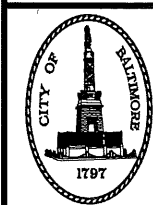


TYPICAL SECTION

NOTE:
 FOR STEEL AND OTHER DETAILS, SEE BC 825.01 AND BC 825.10

* THE "X" DIMENSION SHALL BE 30" WHEN THE MANHOLE HEADROOM IS LESS THAN NINE (9.0') FEET. WHEN THE HEADROOM IS NINE (9.0') FEET OR MORE, THE "X" DIMENSION SHALL BE 24".
 SEE BC 825.01 NOTE "C" FOR PULLING IRON REQUIREMENTS.

CHIMNEY: BRICK
 LOADING: HS25



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

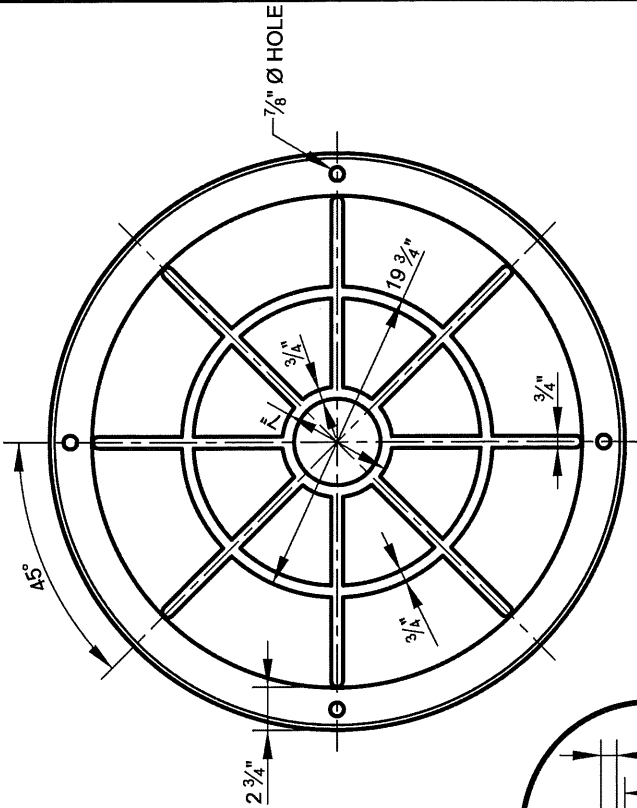
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

**MANHOLE - CONDUIT
 STANDARD INSTALLATION**

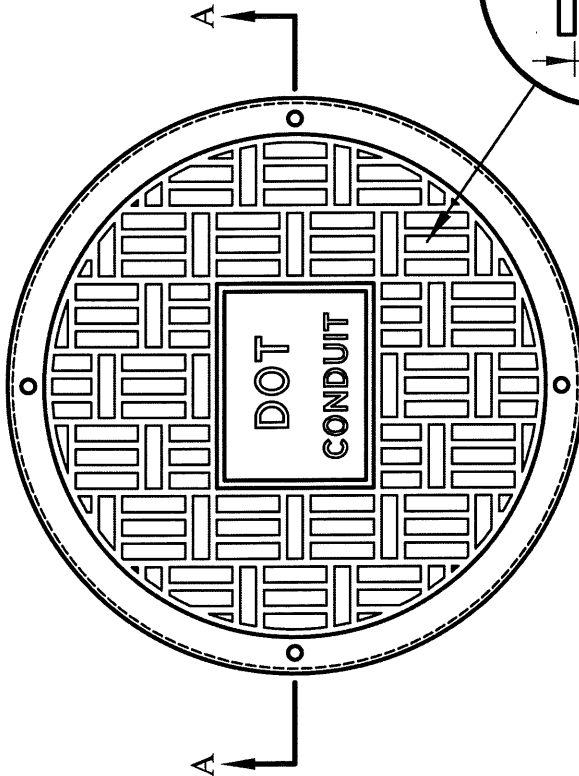
935

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.11		
SCALE : NONE	SHEET 1 OF 1	

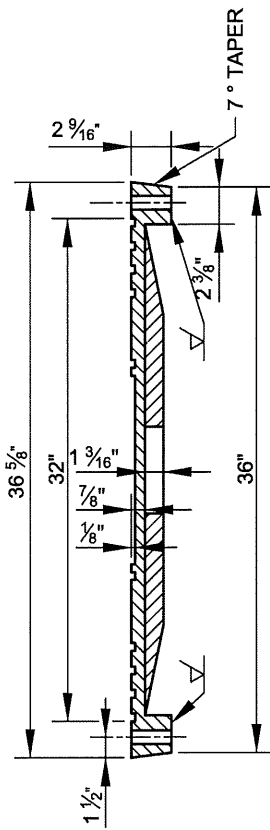
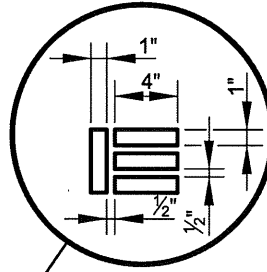
DRAFT - NOT FOR CONSTRUCTION



BOTTOM OF COVER A-1



TOP OF COVER A-1



NOTE:
 FOR TRANSIT AND TRAFFIC MANHOLE
 COVERS CHANGE THE LETTERS DPW TO DTT

NOTE:
 AVERAGE WEIGHT OF MANHOLE
 COVER - APPROX. 323 LBS.

SECTION A-A

GRAY IRON A48-No. 30B



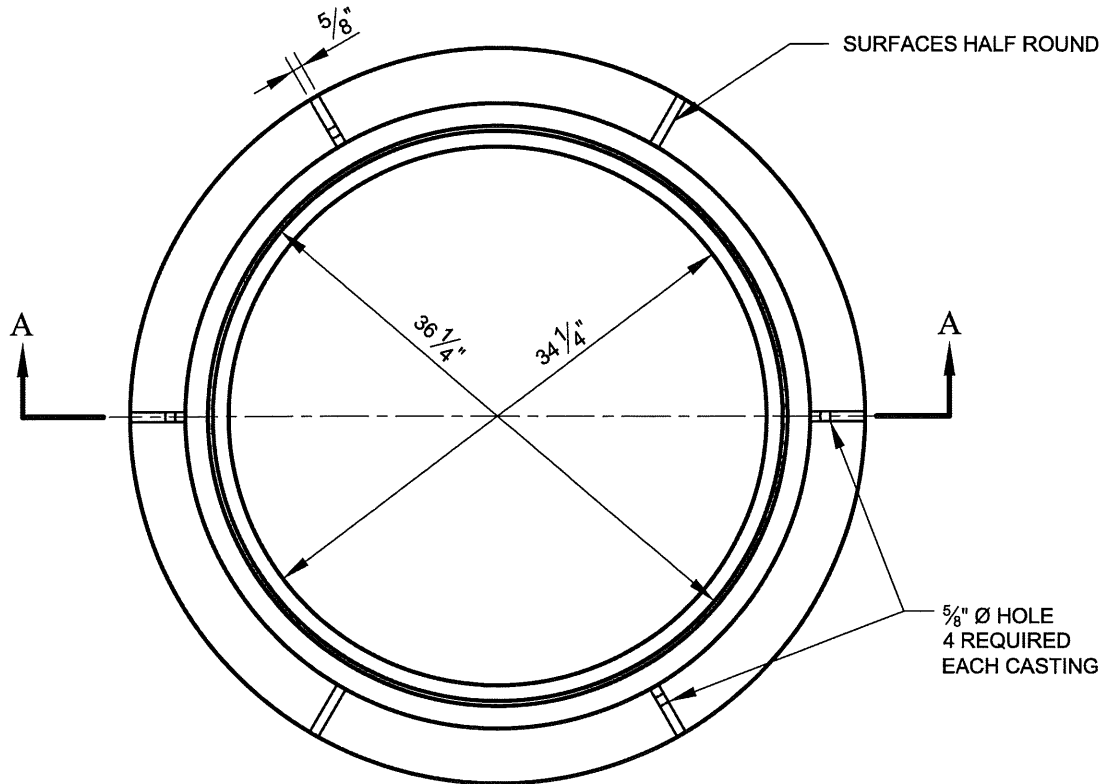
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

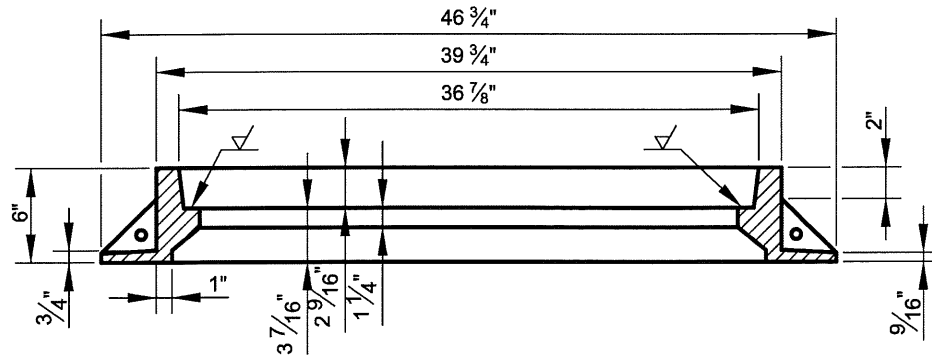
MANHOLE - CONDUIT
936 STANDARD COVER
 936

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.12		
SCALE : NONE	SHEET 1 OF 1	

DRAFT - NOT FOR CONSTRUCTION


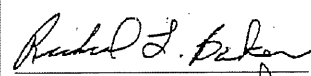
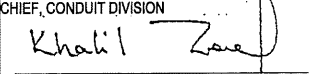


PLAN OF CASTING A-2

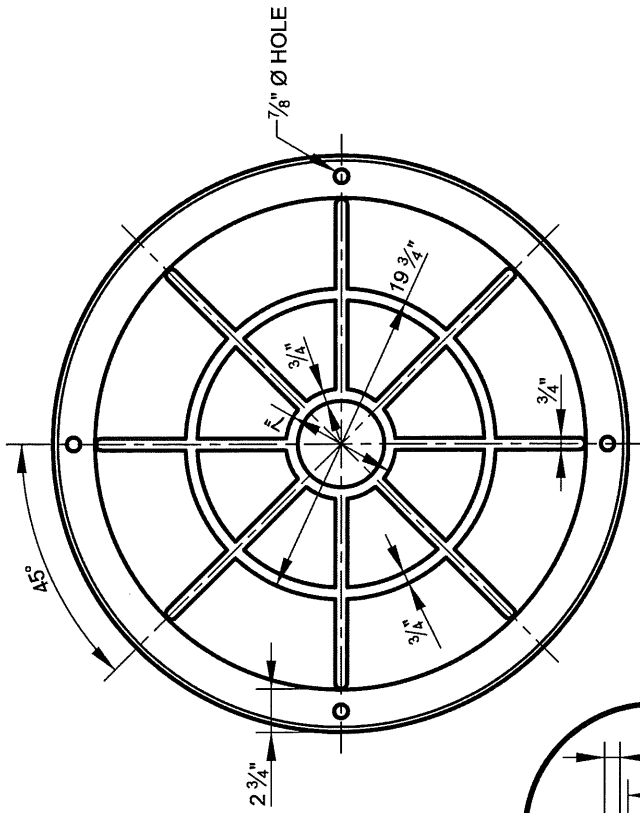


SECTION A-A

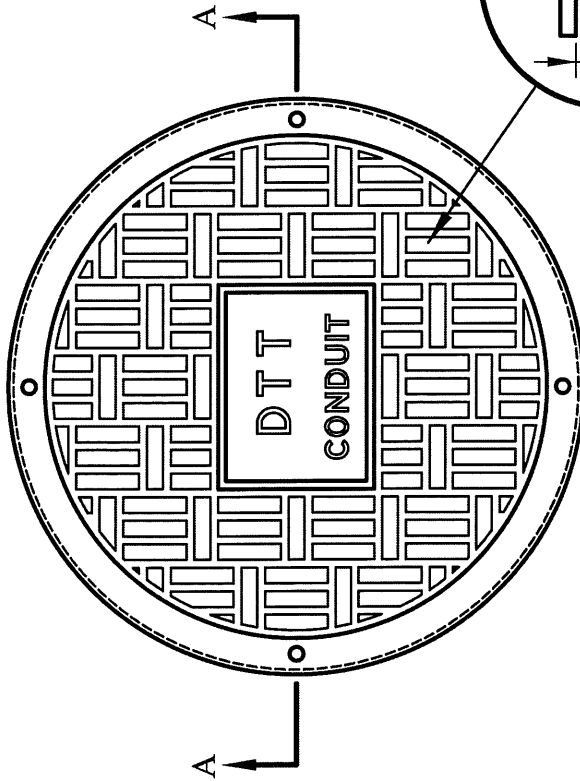
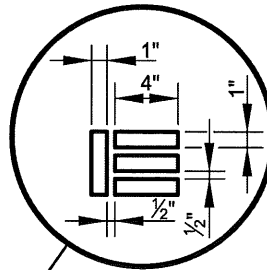
AVERAGE WEIGHT OF CASTING A-2 - 350 LBS.

	APPROVED:  CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED	REVISED	REVISED	
	 DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010			
	MANHOLE - CONDUIT STANDARD FRAME 937 937		DETAIL NO. BC 825.13			SCALE : NONE

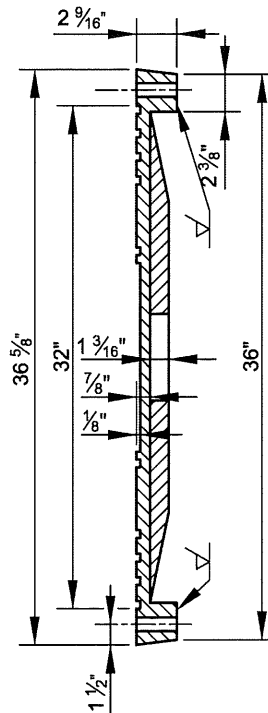
DRAFT - NOT FOR CONSTRUCTION



BOTTOM OF COVER A-1




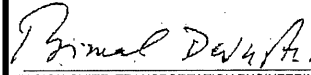
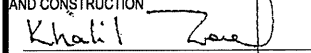
TOP OF COVER A-1



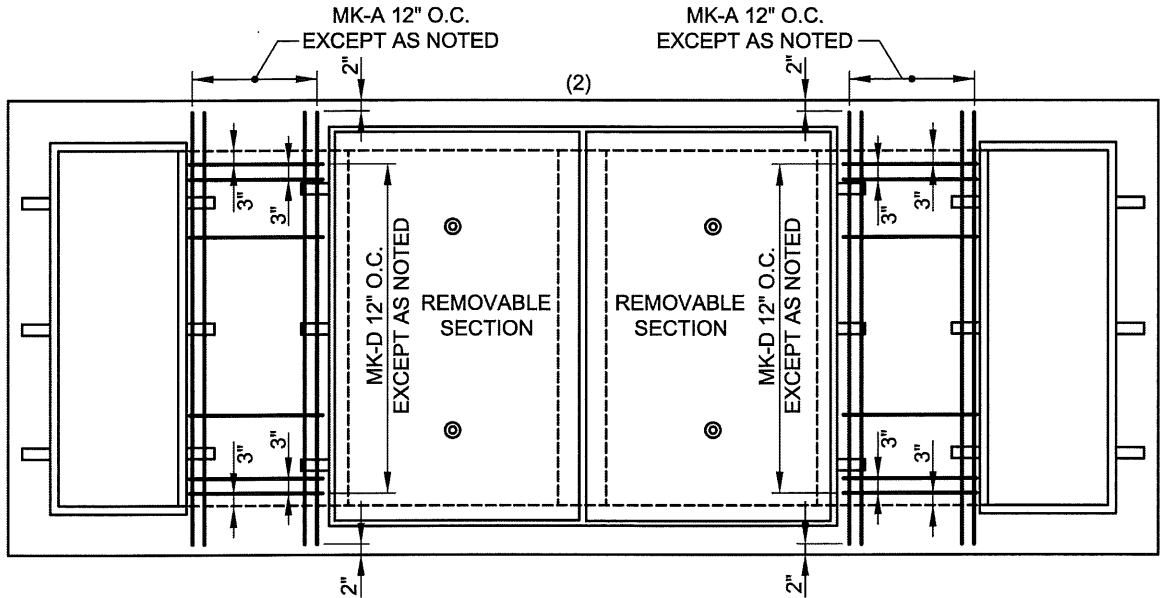
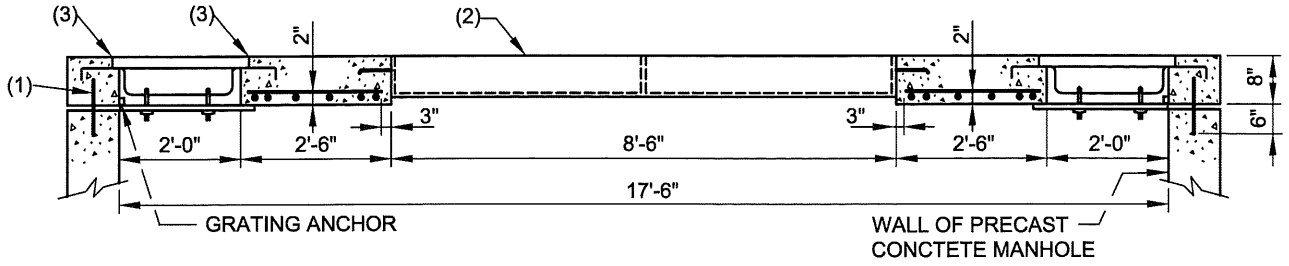
SECTION A-A

STANDARD MANHOLE FRAME
 SEE BC 825.13

NOTE:
 AVERAGE WEIGHT OF MANHOLE
 COVER - APPROX. 323 LBS.

	APPROVED:  DIVISION CHIEF, TRANSPORTATION ENGINEERING AND CONSTRUCTION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION TRANSPORTATION ENGINEERING AND CONSTRUCTION	ISSUED 8 / 2010	REVISED	REVISED
	MANHOLE - CONDUIT STANDARD COVER - DTT 938	DETAIL NO. BC 825.14		SCALE : NONE	SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION



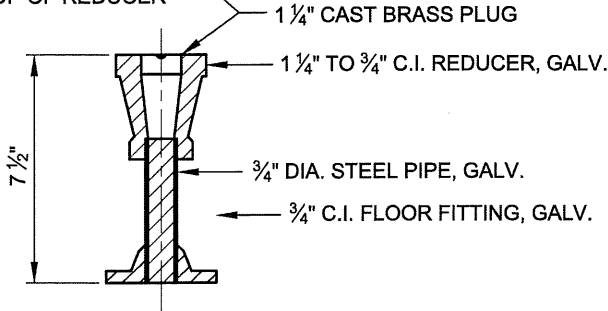
STEEL SCHEDULE

MARK	SIZE	LENGTH	QUANTITY
A	8	7'-0"	12
B	7	4'-1 1/4"	16
C	8	5'-8"	14
D	7	2'-0"	22

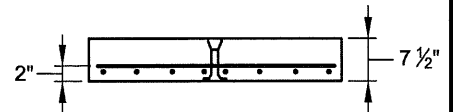
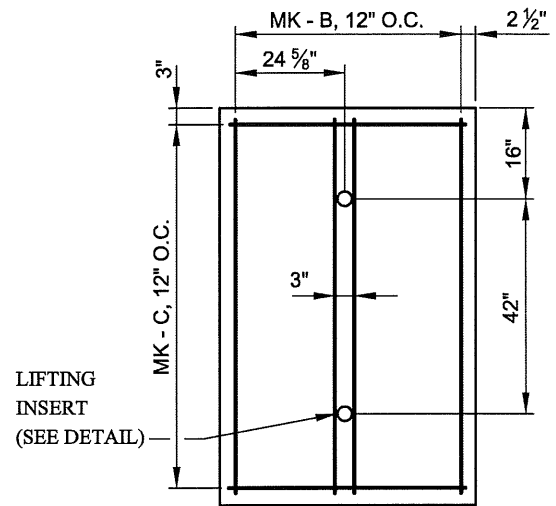
NOTE:

- (1) 12" LONG DOWELS SPACED 12" ON CENTER EXTENDING 6" ABOVE TOP OF WALL.
- (2) POUR REMOVABLE SECTION WITH REMOVABLE FRAMES INSTALLED IN STATIONARY FRAME.
- (3) DO NOT SCORE ROOF, REMOVABLE SECTION OR AROUND FRAMES.

PLUG TO FIT FLUSH W/ TOP OF REDUCER



LIFTING INSERT ASSEMBLY
FOR REMOVABLE SECTIONS



REINFORCED CONCRETE PORTION OF REMOVABLE SECTIONS
3000 LBS

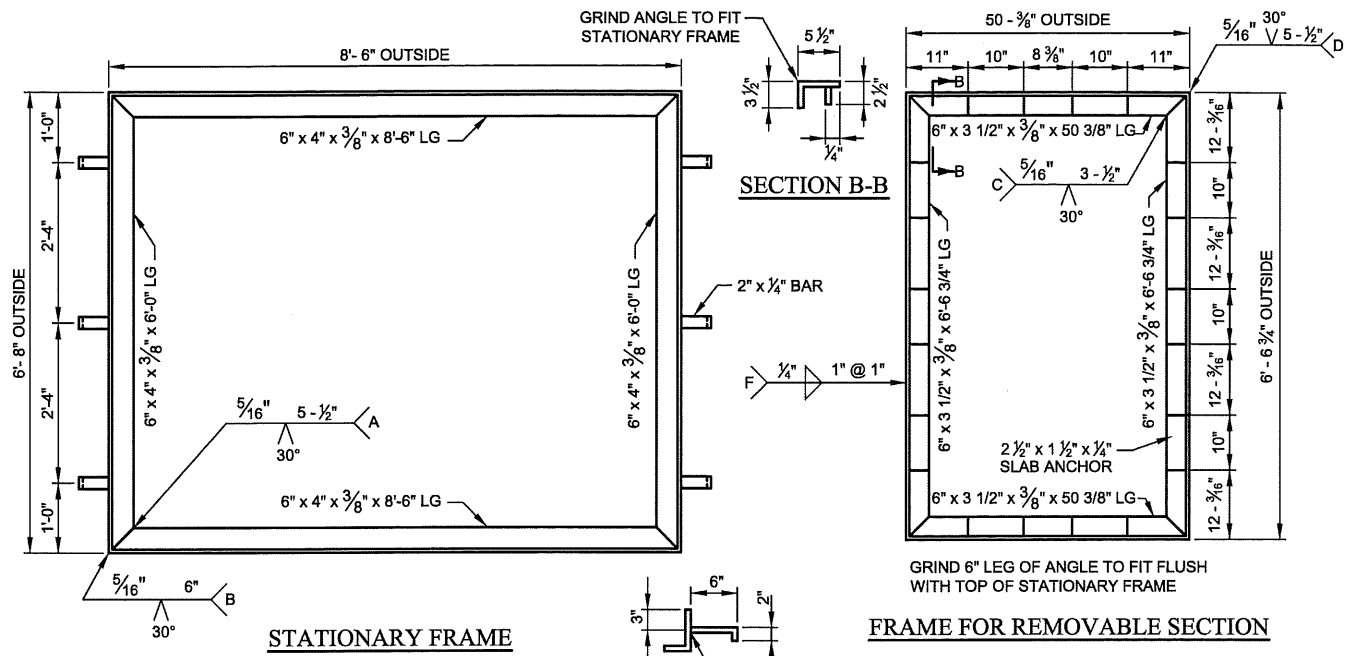


APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

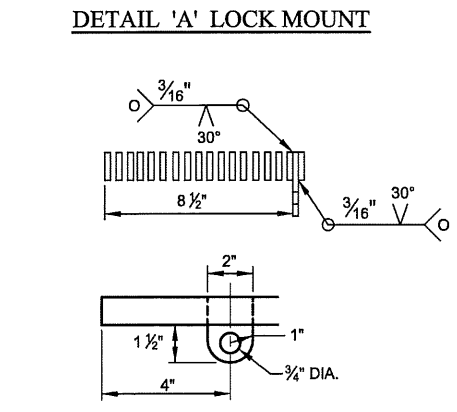
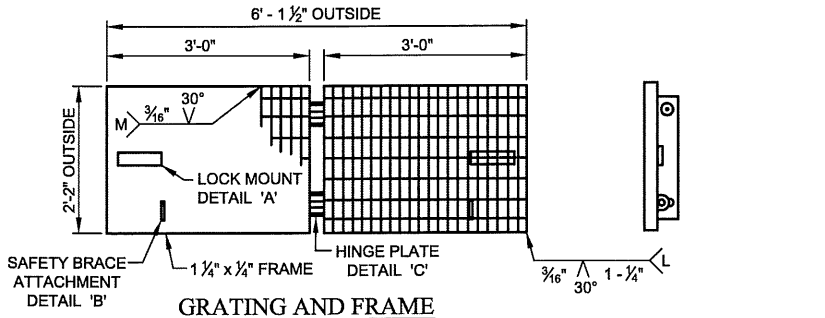
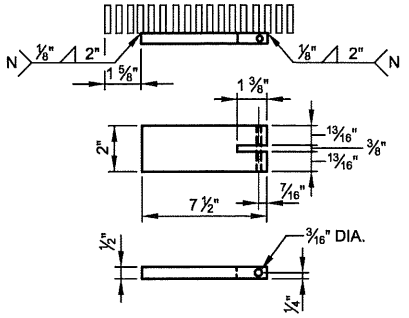
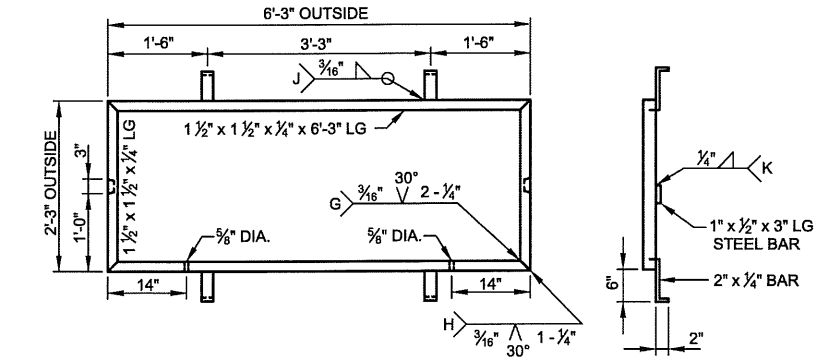
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
6' x 17' - 6" x 9' PRECAST NETWORK TRANSFORMER MANHOLE - DETAILS

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.15-2		
SCALE: NONE	SHEET 2 OF 5	

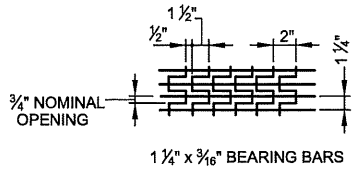
DRAFT - NOT FOR CONSTRUCTION



- A) 5/16" SINGLE - VEE OUTSIDE OF ANGLE 5 1/2" LG
- B) 5/16" SINGLE - VEE OUTSIDE OF ANGLE 6" LG
- C) 5/16" SINGLE - VEE INSIDE OF ANGLE 5 1/2" LG
- D) 5/16" SINGLE - VEE INSIDE OF ANGLE 3 1/2" LG
- E) 1/4" FILLET ALL AROUND
- F) 1/4" FILLET 1" LG, 1" O.C. BOTH SIDES



- G) 3/16" SINGLE - VEE OUTSIDE OF ANGLE 2 1/4" LONG
- H) 3/16" SINGLE - VEE OUTSIDE OF ANGLE 1 1/2" LONG
- J) 3/16" FILLED ALL AROUND
- K) 1/4" FILLET ALL AROUND
- L) 3/16" SINGLE - VEE 1 1/4" LONG
- M) 3/16" SINGLE - VEE, WELD 1 GRATING MEMBER TO FRAME EVERY 6"
- N) 1/8" SINGLE - VEE 2" LONG
- O) 3/16" SINGLE - VEE ALL AROUND



- NOTES:
1. MATERIAL TO BE HOT DIP GALVANIZED AFTER FABRICATION AS PER ASTM SPEC. A - 123.
 2. ANY DEVIATION OF GRATING DESIGN MUST BE APPROVED.



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
**6' x 17' - 6" x 9' PRECAST
 NETWORK TRANSFORMER
 MANHOLE - DETAILS**

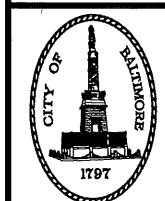
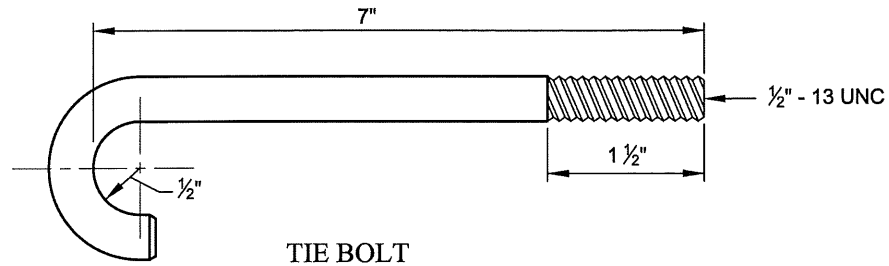
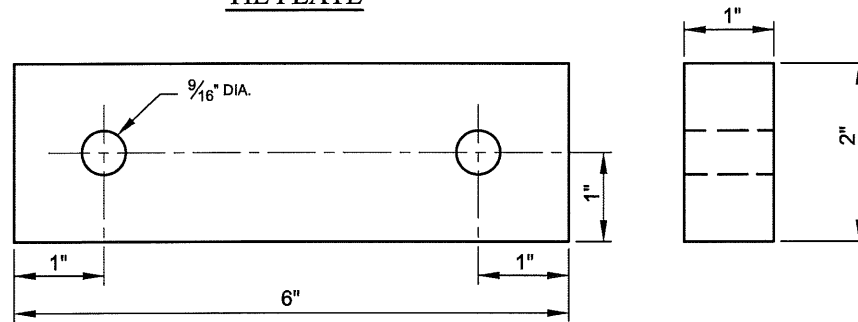
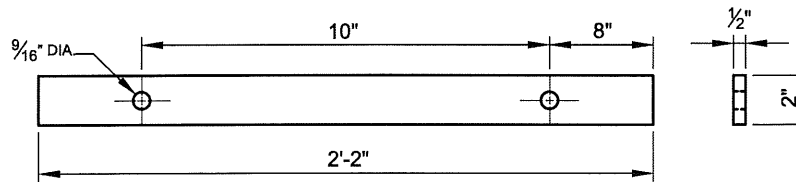
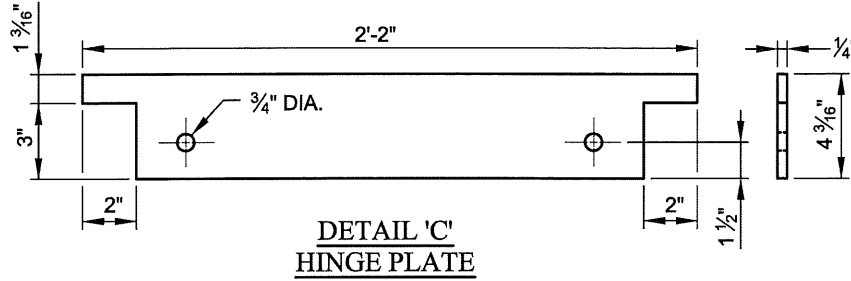
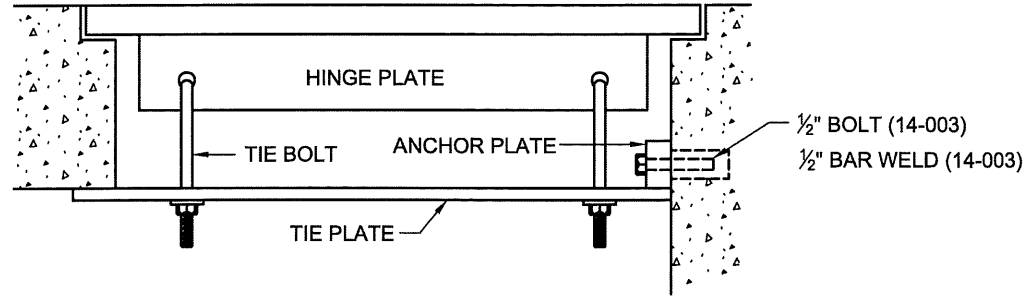
ISSUED	REVISED	REVISED
8 / 2010		
	10-9-86	

DETAIL NO.
BC 825.15-3

SCALE : NONE SHEET 3 OF 5

DRAFT - NOT FOR CONSTRUCTION

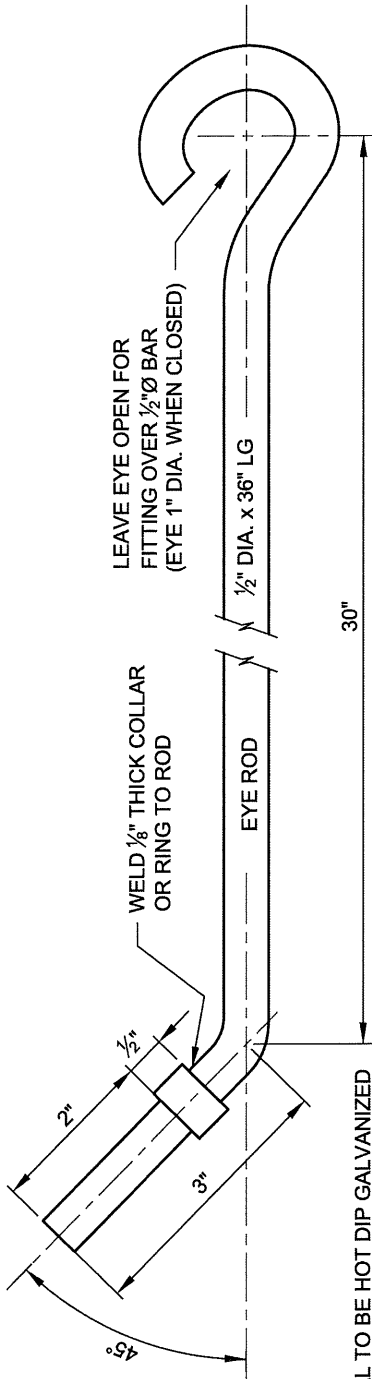
- NOTES: 1. ALL STEEL TO BE HOT GALVANIZED AFTER FABRICATION AS PER ASTM SPEC A 123.
 2. HINGES ARE SUPPLIED AND INSTALLED BY OTHERS.



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

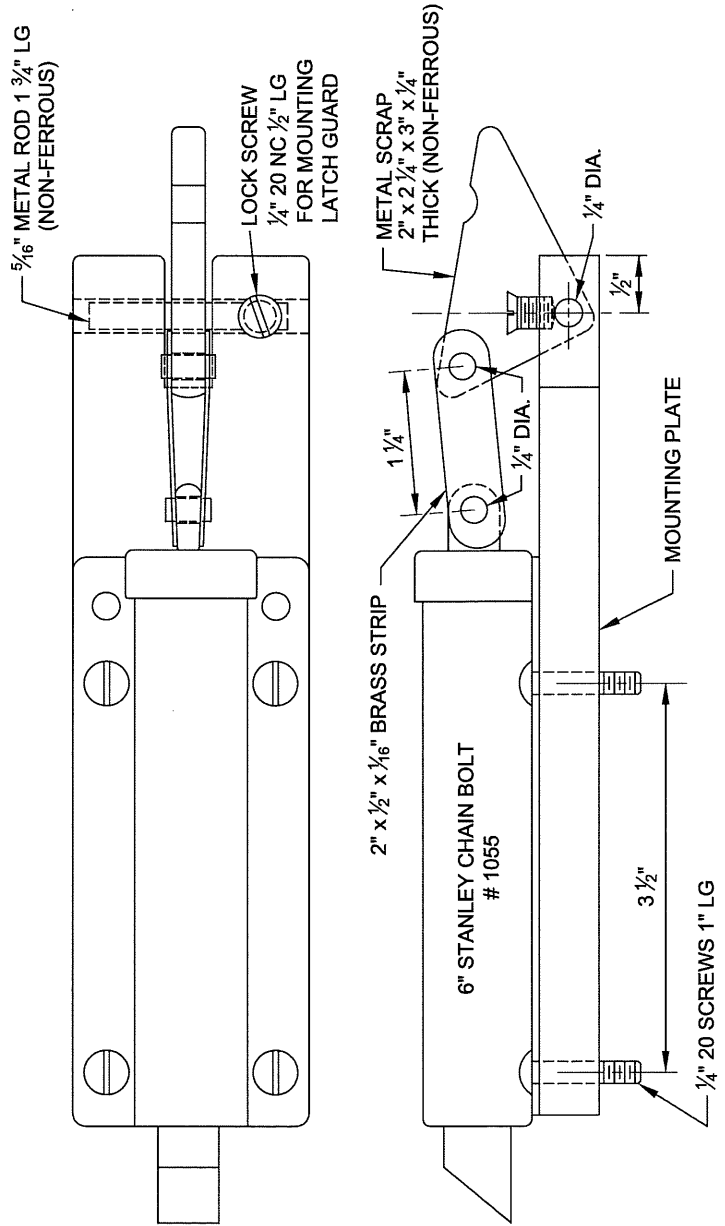
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
 6' x 17'- 6" x 9' PRECAST
 NETWORK TRANSFORMER
 MANHOLE - DETAILS

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.15-4		
SCALE : NONE	SHEET 4 OF 5	



GRATING ENTRANCE SUPPORT ROD

- NOTES:
1. MATERIAL TO BE HOT DIP GALVANIZED AFTER FABRICATION AS PER ASTM SPEC. A 123.
 2. LATCH SUPPLIED AND INSTALLED BY OTHERS.



DETAIL OF LATCH GUARD
 #6 GA. GALV. SHEET METAL

DETAILS OF GRATING ENTRANCE LATCH



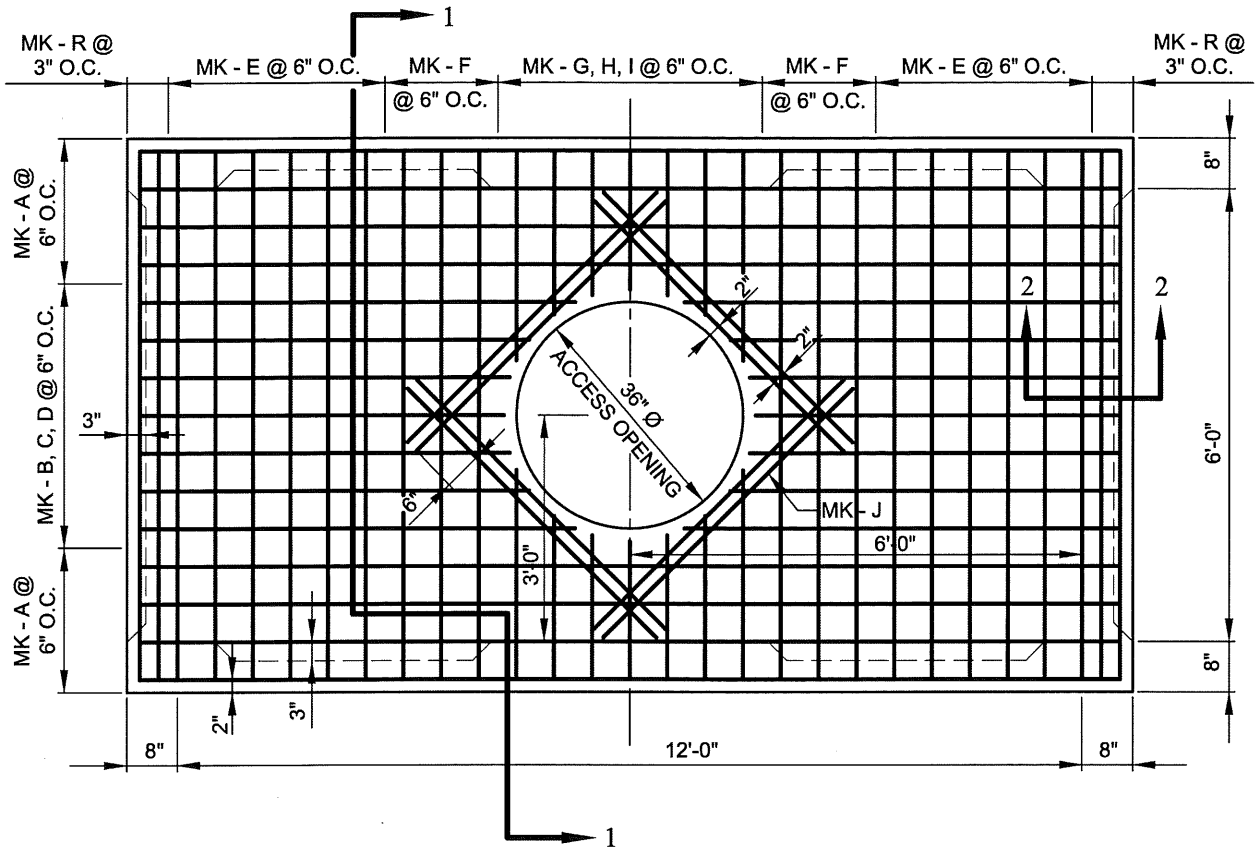
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khali Zae
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
 6' x 17'- 6" x 9' PRECAST
 NETWORK TRANSFORMER
 MANHOLE - DETAILS

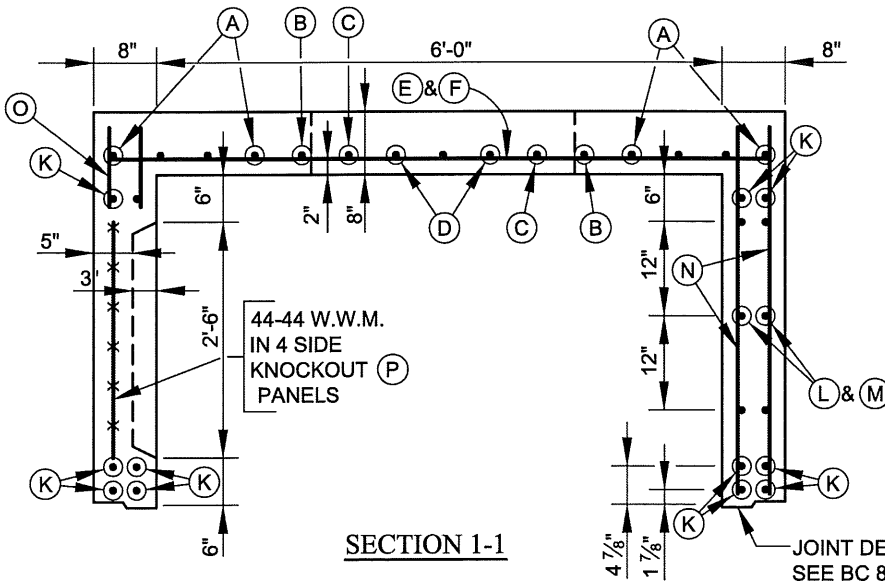
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 825.15-5		
SCALE : NONE	SHEET 5 OF 5	

DRAFT - NOT FOR CONSTRUCTION

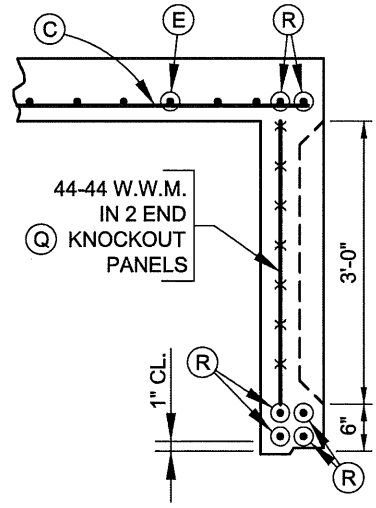
NOTE: ALTERNATE DESIGNS ON HS-20-44 LOADING WITH 1' TO 3' COVER WILL BE ACCEPTABLE



PLAN - TOP HALF



SECTION 1-1



SECTION 2-2

BOTTOM HALF (6' x 12' x 7' MANHOLE) SEE BC 826.01-2
 BAR SCHEDULE (6' x 12' x 7' MANHOLE) SEE BC 826.04
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

GENERAL NOTES

SPECIFICATIONS ----- LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE ----- $f'_c = 5,000$ PSI - MIX AS APPROVED BY ENGR.
 REINFORCING ----- ASTM A615, GRADE 60
 WELDED WIRE MESH --- ASTM A185
 LOADING ----- HS 25 TRUCK LOADING



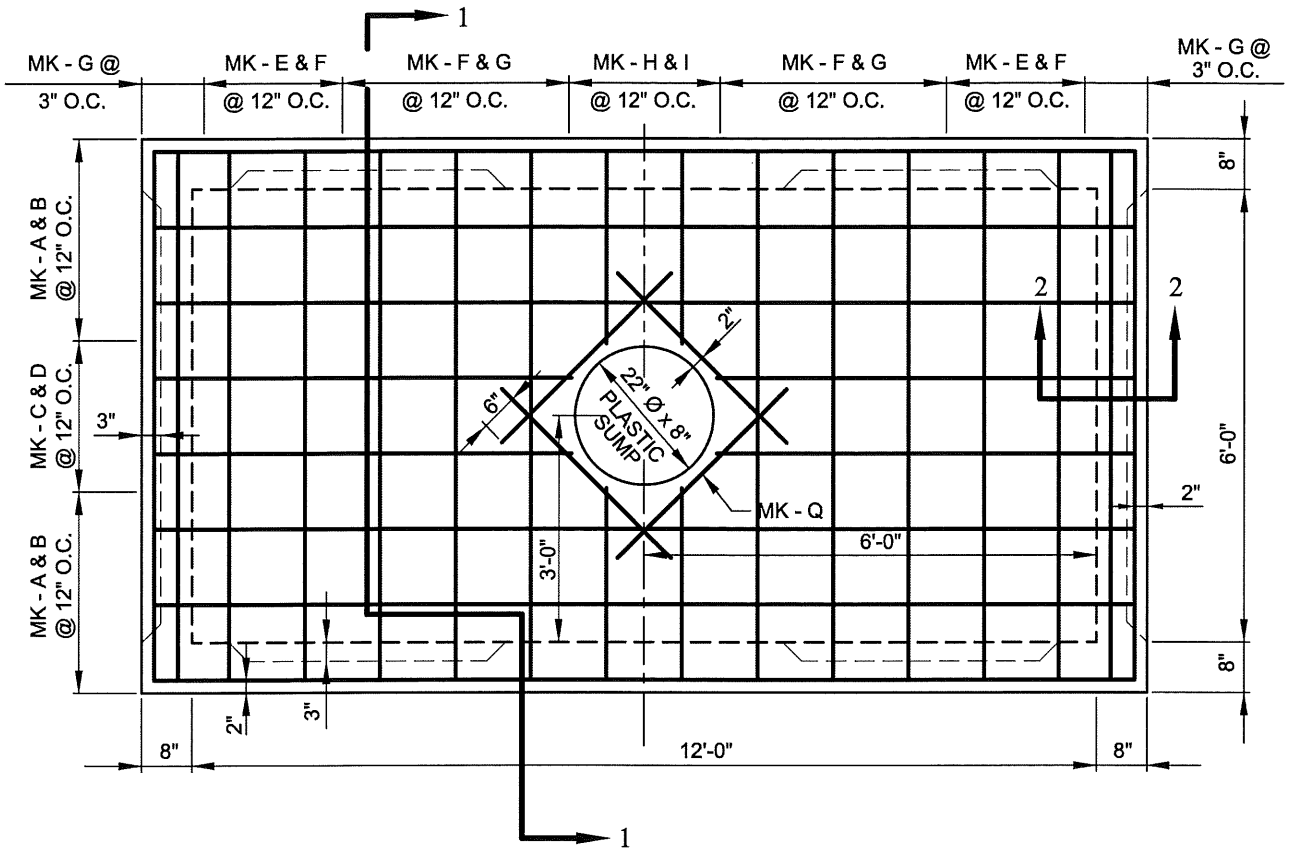
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
**PRECAST LINE MANHOLE
 6' x 12' x 7' HEADROOM
 TOP HALF**

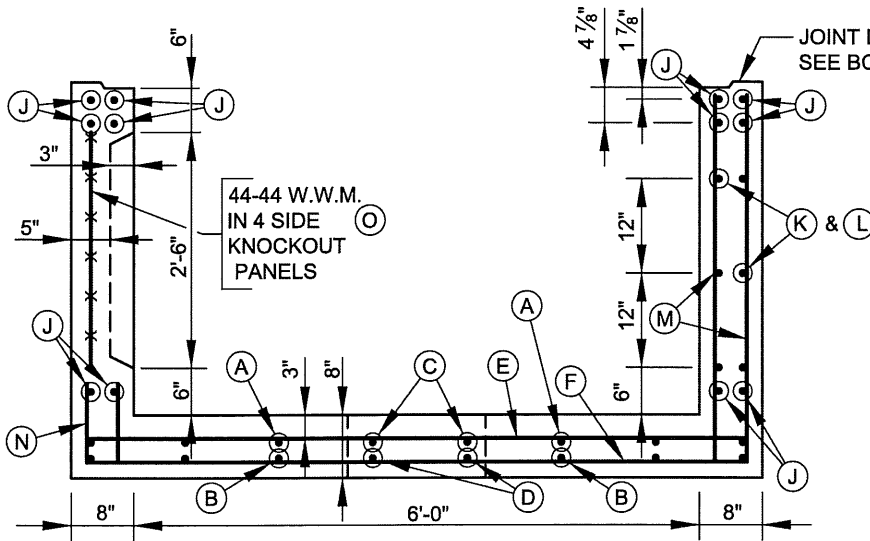
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.01-1		
SCALE: NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION

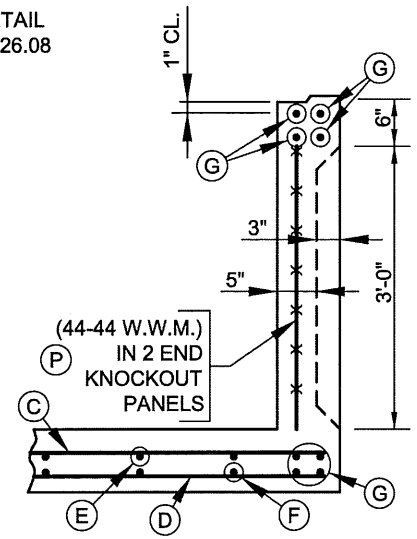
NOTE: ALTERNATE DESIGNS ON HS-20-44 LOADING WITH 1' TO 3' COVER WILL BE ACCEPTABLE



PLAN - BOTTOM HALF



SECTION 1-1



SECTION 2-2

TOP HALF (6' x 12' x 7' MANHOLE) SEE BC 826.01-1
 BAR SCHEDULE (6' x 12' x 7' MANHOLE) SEE BC 826.04
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-7

GENERAL NOTES

SPECIFICATIONS ----- LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE ----- $f'_c = 5,000$ PSI - MIX AS APPROVED BY ENGR.
 REINFORCING ----- ASTM A615, GRADE 60
 WELDED WIRE MESH --- ASTM A185
 LOADING ----- HS 25 TRUCK LOADING



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

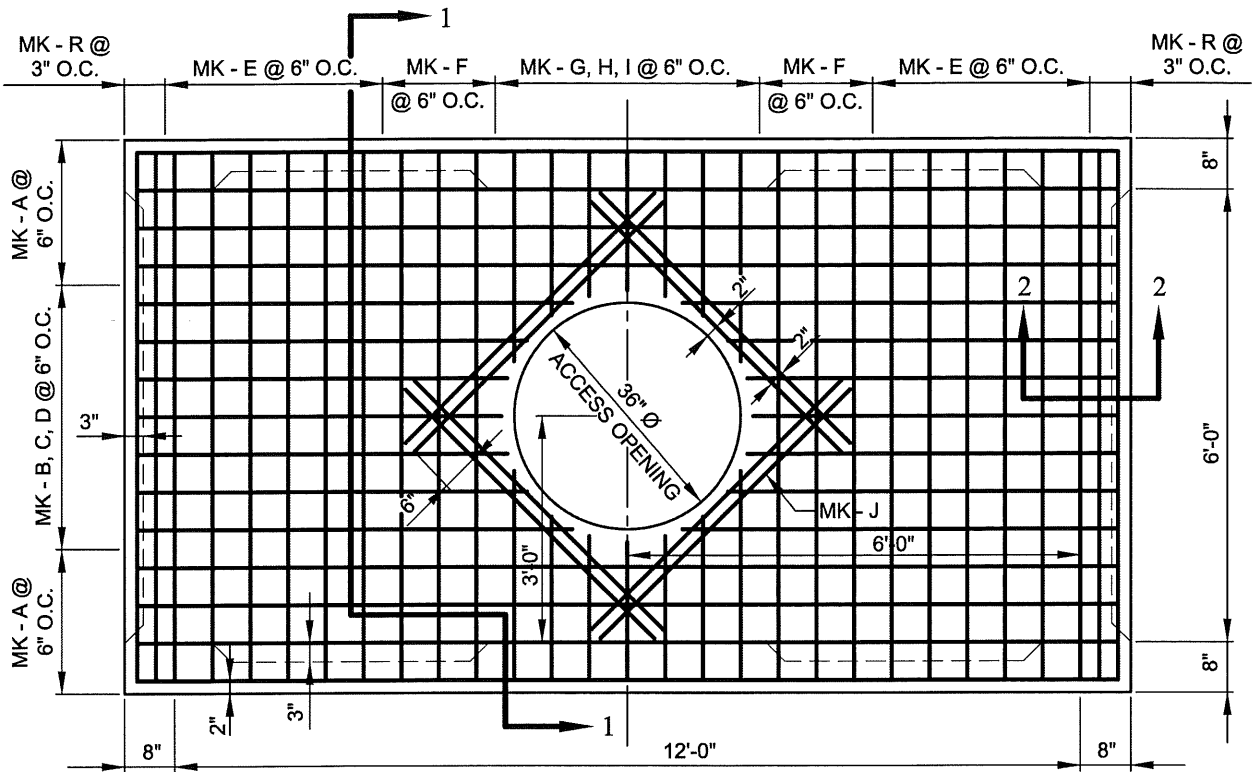
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

PRECAST LINE MANHOLE
6' x 12' x 7' HEADROOM
945
944
BOTTOM HALF

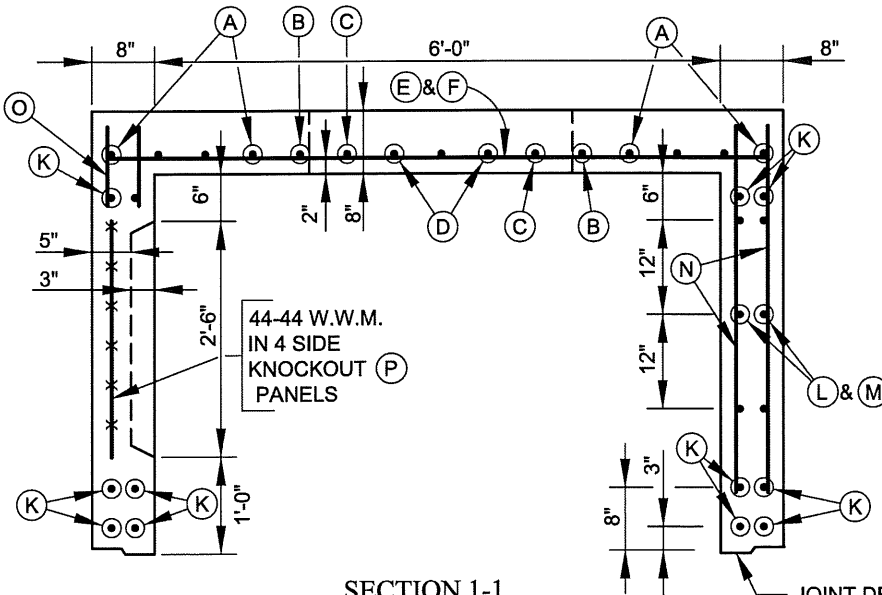
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.01-2		
SCALE: NONE	SHEET 2 OF 2	

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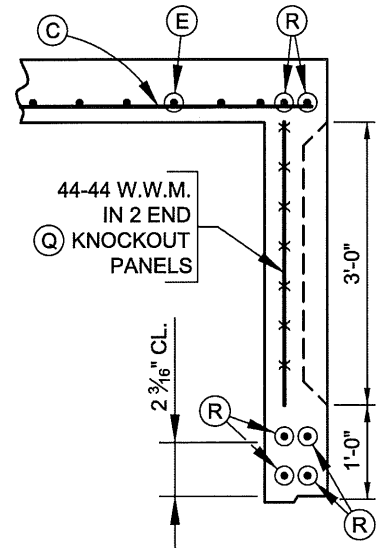
NOTE: ALTERNATE DESIGNS ON HS-20-44 LOADING WITH 1' TO 3' COVER WILL BE ACCEPTABLE



PLAN - TOP HALF



SECTION 1-1



SECTION 2-2

BOTTOM HALF (6' x 12' x 8' MANHOLE) SEE BC 826.02-2
 BAR SCHEDULE (6' x 12' x 8' MANHOLE) SEE BC 826.04
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

GENERAL NOTES

SPECIFICATIONS ----- LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE ----- f'c = 5000 PSI - MIX AS APPROVED BY ENGR.
 REINFORCING ----- ASTM A615, GRADE 60
 WELDED WIRE MESH -- ASTM A185
 LOADING ----- HS 25 TRUCK LOADING



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

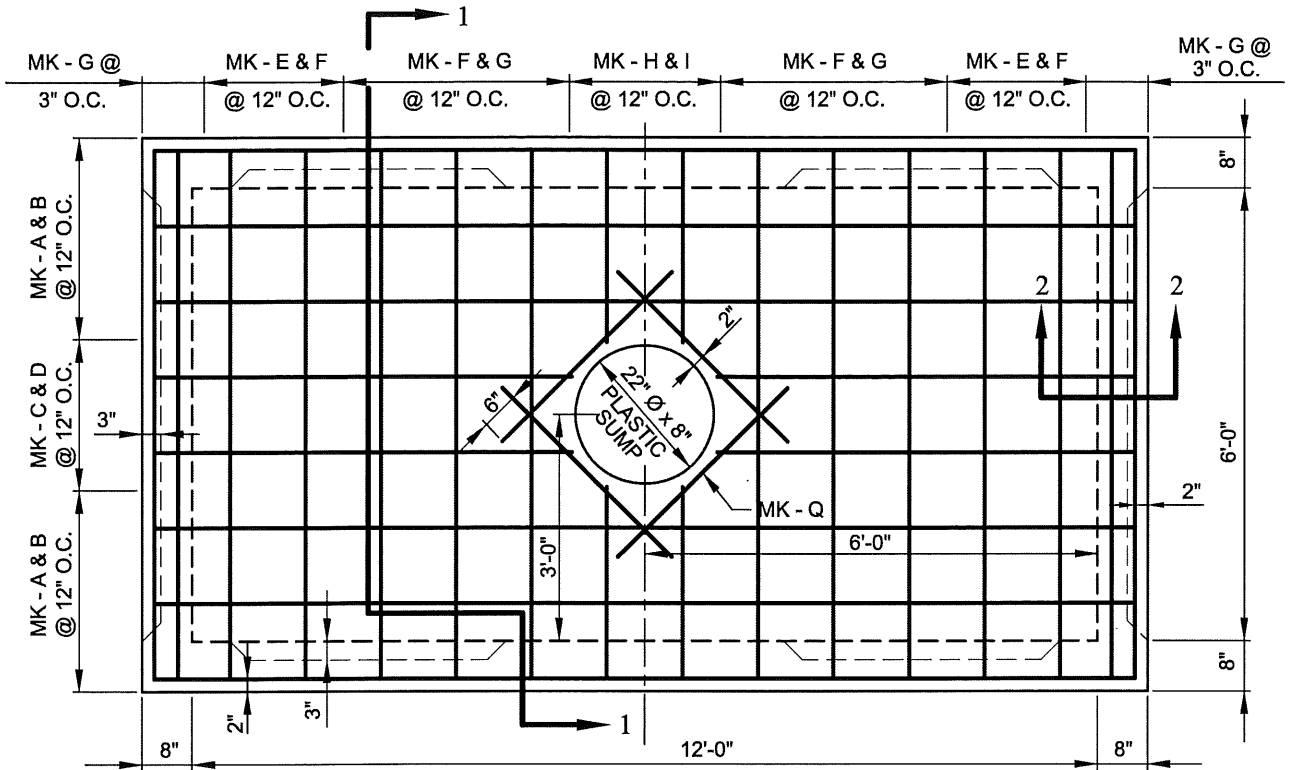
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

PRECAST LINE MANHOLE
 6' X 12' X 8' HEADROOM
 946
 945 TOP HALF

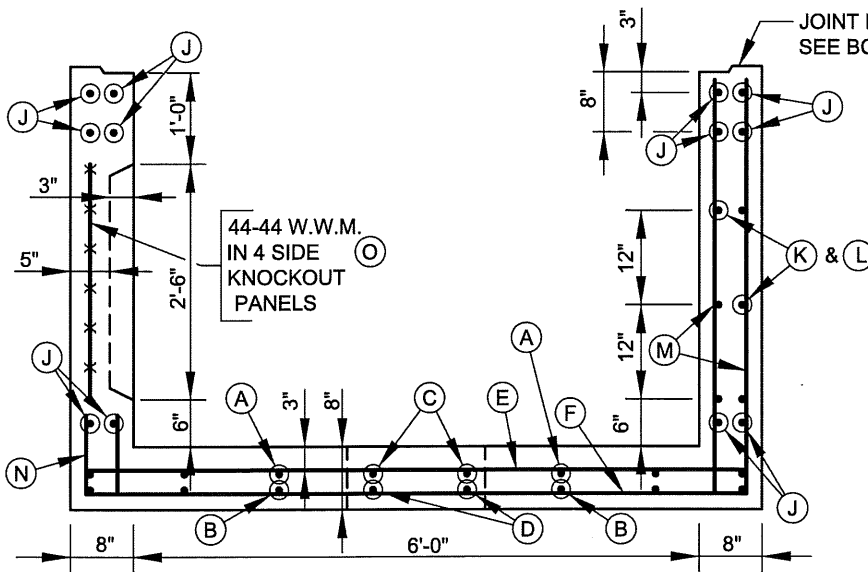
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826-02-1		
SCALE : NONE	SHEET 1 OF 2	

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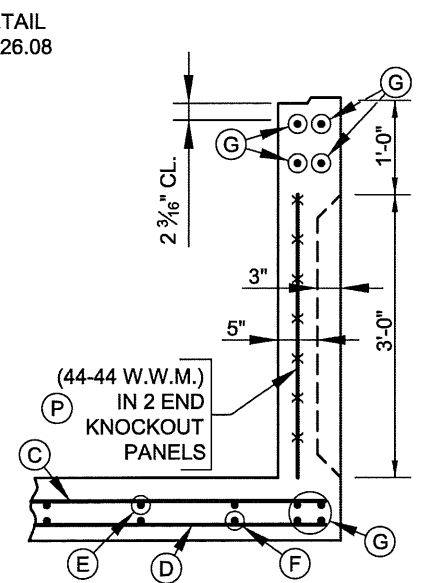
NOTE: ALTERNATE DESIGNS ON HS-20-44 LOADING WITH 1' TO 3' COVER WILL BE ACCEPTABLE



PLAN - BOTTOM HALF



SECTION 1-1



SECTION 2-2

TOP HALF (6' x 12' x 8' MANHOLE) SEE BC 826.02-1
 BAR SCHEDULE (6' x 12' x 8' MANHOLE) SEE BC 826.04
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

GENERAL NOTES

SPECIFICATIONS ----- LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE ----- $f'_c = 5,000$ PSI - MIX AS APPROVED BY ENGR.
 REINFORCING ----- ASTM A615, GRADE 60
 WELDED WIRE MESH --- ASTM A185
 LOADING ----- HS 25 TRUCK LOADING



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 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

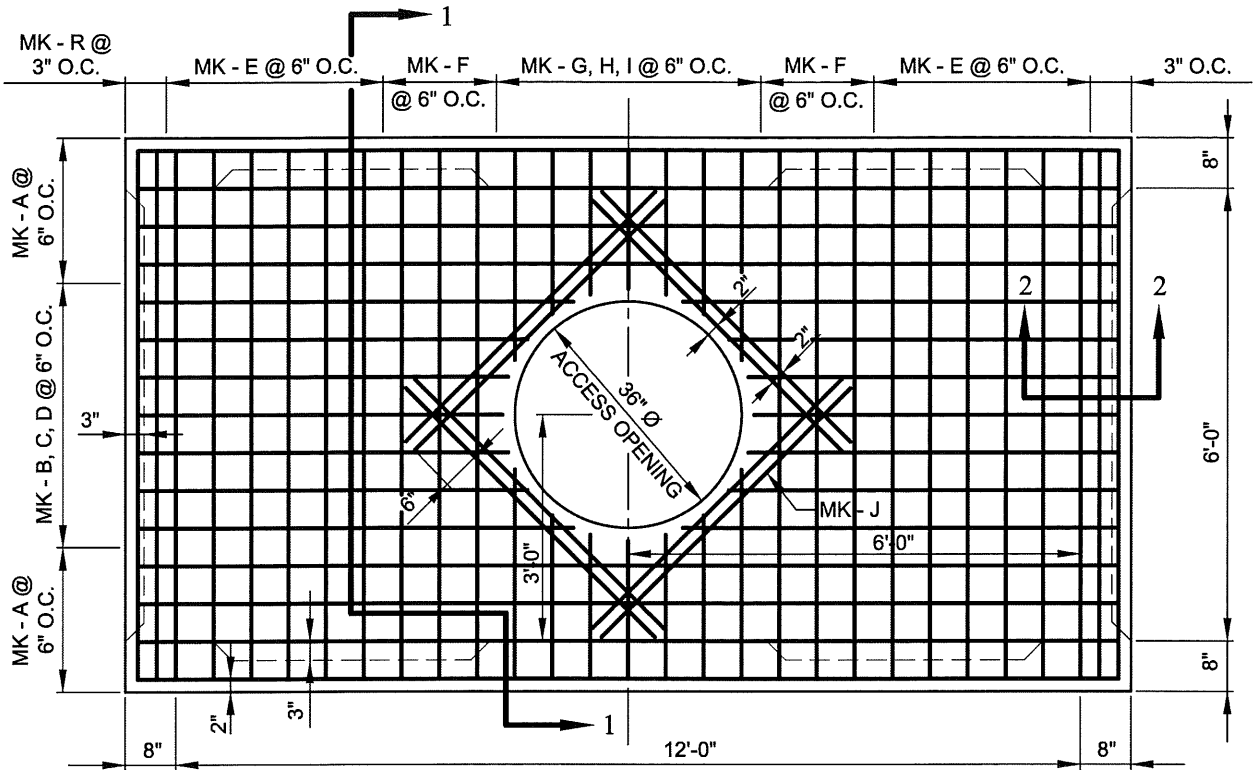
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

PRECAST LINE MANHOLE
 6' x 12' x 8' HEADROOM
 BOTTOM HALF

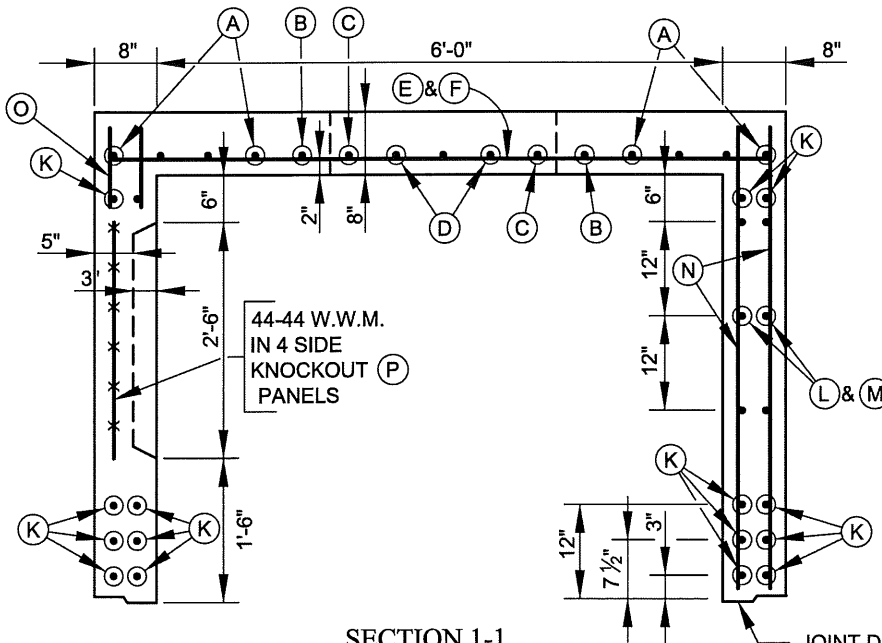
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.02-2		
SCALE: NONE	SHEET 2 OF 2	

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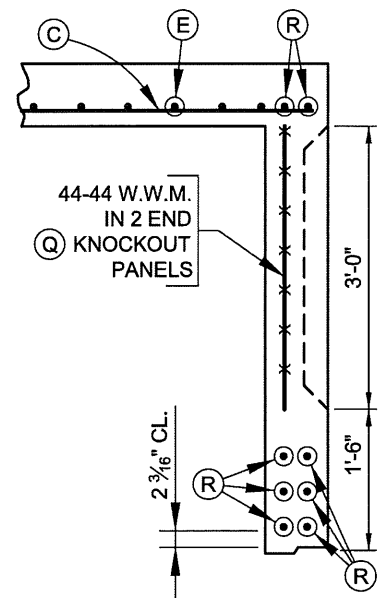
NOTE: ALTERNATE DESIGNS ON HS-20-44 LOADING WITH 1' TO 3' COVER WILL BE ACCEPTABLE



PLAN - TOP HALF



SECTION 1-1



SECTION 2-2

BOTTOM HALF (6' x 12' x 9' MANHOLE) SEE BC 826.03-2
 BAR SCHEDULE (6' x 12' x 9' MANHOLE) SEE BC 826.06
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

JOINT DETAIL
 SEE BC 826.08

GENERAL NOTES

SPECIFICATIONS ----- LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE ----- $f'_c = 5000$ PSI - MIX AS APPROVED BY ENGR.
 REINFORCING ----- ASTM A615, GRADE 60
 WELDED WIRE MESH -- ASTM A185
 LOADING ----- HS 25 TRUCK LOADING



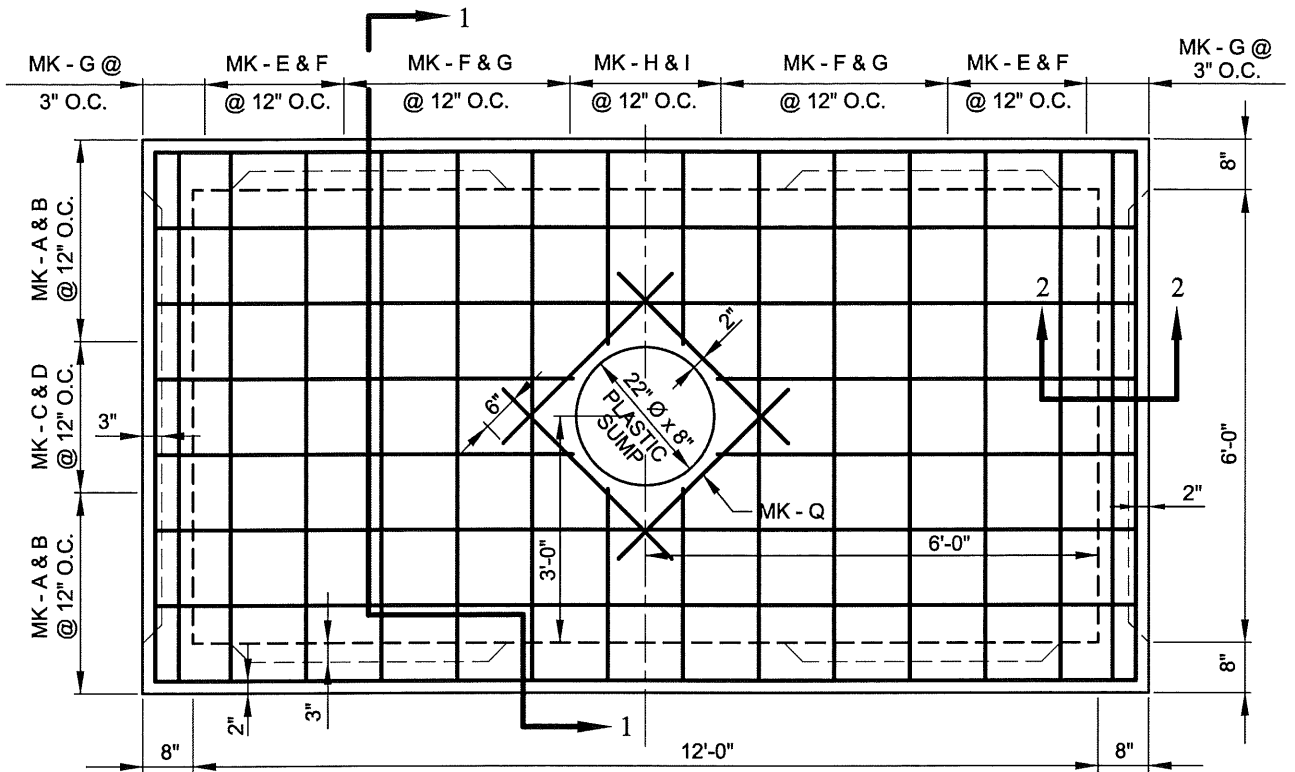
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION
PRECAST LINE MANHOLE
 6' X 12' X 9' HEADROOM
 948
 947 **TOP HALF**

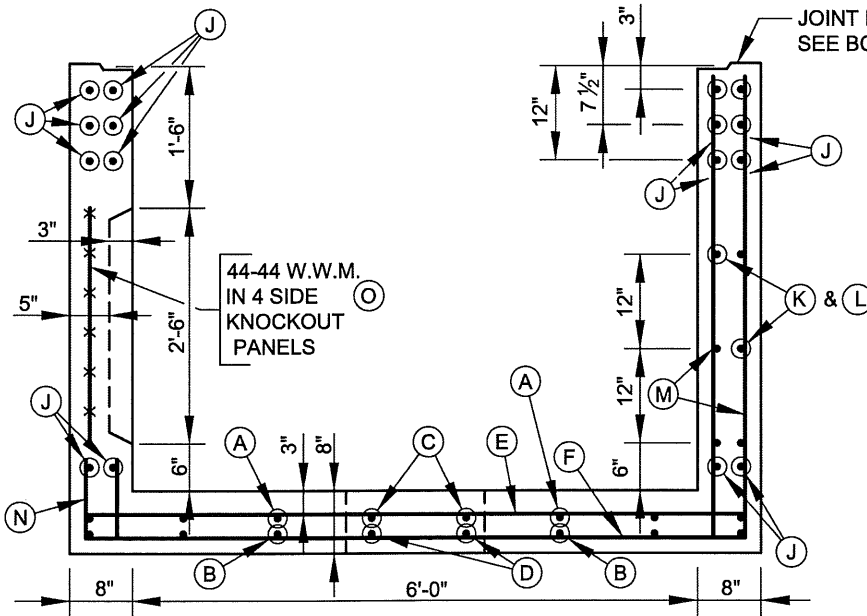
ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.03-1		
SCALE: NONE	SHEET 1 OF 2	

DRAFT - NOT FOR CONSTRUCTION

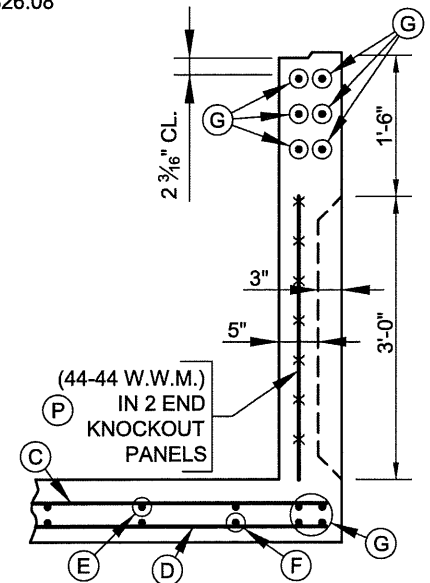
NOTE: ALTERNATE DESIGNS ON HS-20-44 LOADING WITH 1' TO 3' COVER WILL BE ACCEPTABLE



PLAN - BOTTOM HALF



SECTION 1-1



SECTION 2-2

TOP HALF (6' x 12' x 9' MANHOLE) SEE BC 826.03-1
 BAR SCHEDULE (6' x 12' x 9' MANHOLE) SEE BC 826.04
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

GENERAL NOTES

SPECIFICATIONS ----- LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE ----- f'c = 5000 PSI - MIX AS APPROVED BY ENGR.
 REINFORCING ----- ASTM A615, GRADE 60
 WELDED WIRE MESH -- ASTM A185
 LOADING ----- HS 25 TRUCK LOADING



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khalil Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

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PRECAST LINE MANHOLE
 6' x 12' x 9' HEADROOM
 BOTTOM HALF

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.03-2		
SCALE : NONE	SHEET 2 OF 2	

**PRECAST LINE MANHOLE - 6' x 12' x 7'-8' - 9' HR.
BAR SCHEDULE - BOTTOM HALF**

WT. LBS.	MARK	SIZE	NO. REQ'D.	TYPE	A	B	C
117	A	6	6	99	13'-0"		
81	B	5	6	99	13'-0"		
33	C	6	4	99	5'-6"		
23	D	5	4	99	5'-6"		
42	E	6	4	99	7'-0"		
73	F	5	10	99	7'-0"		
⑥	G	7	③	99	7'-0"		
15	H	6	4	99	2'-6"		
10	I	5	4	99	2'-6"		
④	J	7	②	99	13'-0"		
30	K	6	24	99	10"		
60	L	6	12	99	3'-4"		
⑦	M	5	16	99	①		
56	N	5	64	99	10"		
38	O	WWM	4	(44-44)	2'-9" HIGH x 4'-0" WIDE		
69	P	WWM	4	(44-44)	3'-3" HIGH x 6'-3" WIDE		
26	Q	5	8	99	3'-2"		

**PRECAST LINE MANHOLE - 6' x 12' x 7'-8' - 9' HR.
BAR SCHEDULE - TOP HALF**

WT. LBS.	MARK	SIZE	NO. REQ'D.	TYPE	A	B	C
354	A	9	8	99	13'-0"		
35	B	6	4	99	5'-9"		
31	C	6	4	99	5'-2"		
44	D	6	6	99	4'-10"		
126	E	6	12	99	7'-0"		
143	F	9	6	99	7'-0"		
17	G	6	4	99	2'-9"		
13	H	6	4	99	2'-2"		
17	I	6	6	99	1'-10"		
39	J	5	8	99	4'-8"		
④	K	7	②	99	13'-0"		
30	L	6	24	99	10"		
60	M	6	12	99	3'-4"		
⑦	N	5	16	99	①		
56	O	5	64	99	10"		
38	P	WWM	4	(44-44)	2'-9" HIGH x 4'-0" WIDE		
35	Q	WWM	2	(44-44)	3'-3" HIGH x 6'-3" WIDE		
⑤	R	7	②	99	7'-0"		

	7' HR.	8' HR.	9' HR.
⑤	#172	#172	#229
⑥	#200	#200	#257
⑦	#65	#73	#81

	7' HR.	8' HR.	9' HR.
①	3'-10 1/2"	4'-4 1/2"	4'-10 1/2"
②	12	12	16
③	16	16	20
④	#319	#319	#425

MANHOLE SIZE	QUANTITIES	
	CONC. C.Y.	STEEL LBS.
6' x 12' x 7'	11.51	2851
6' x 12' x 8'	12.47	2867
6' x 12' x 9'	13.42	3209



TYPE 99



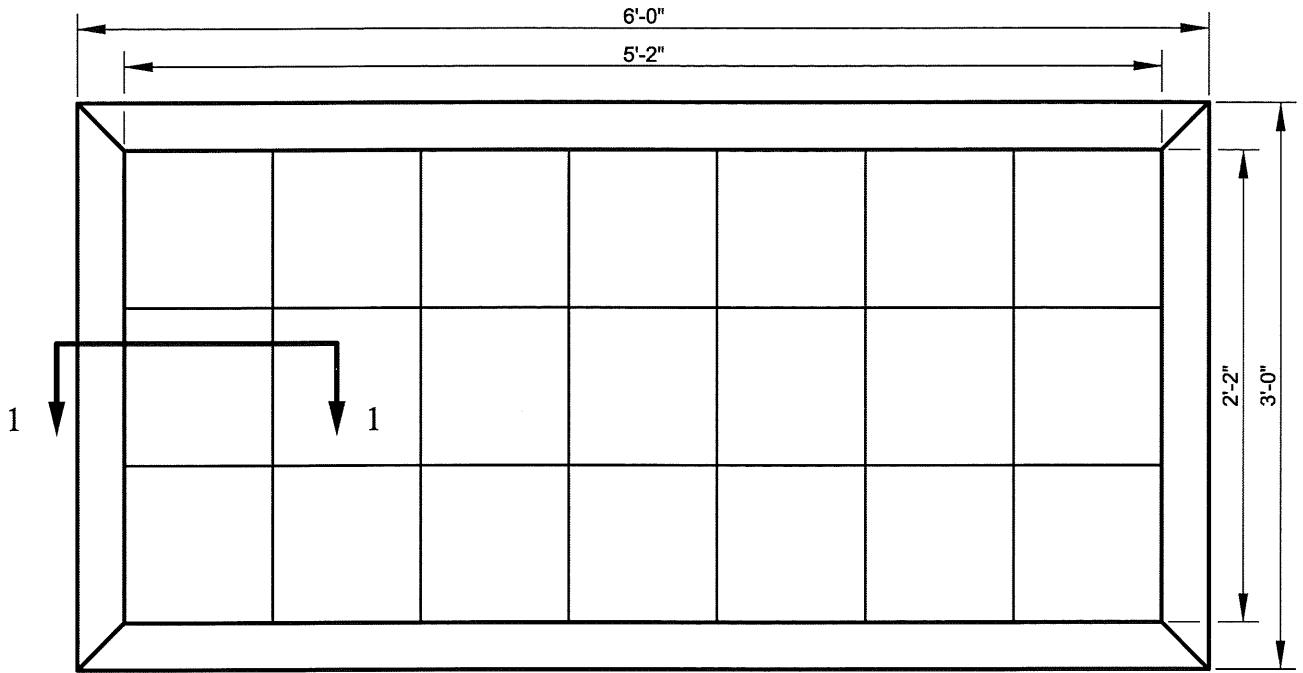
APPROVED:
Richard L. Baker
CHIEF, CONDUIT DIVISION
Khail Zae
DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

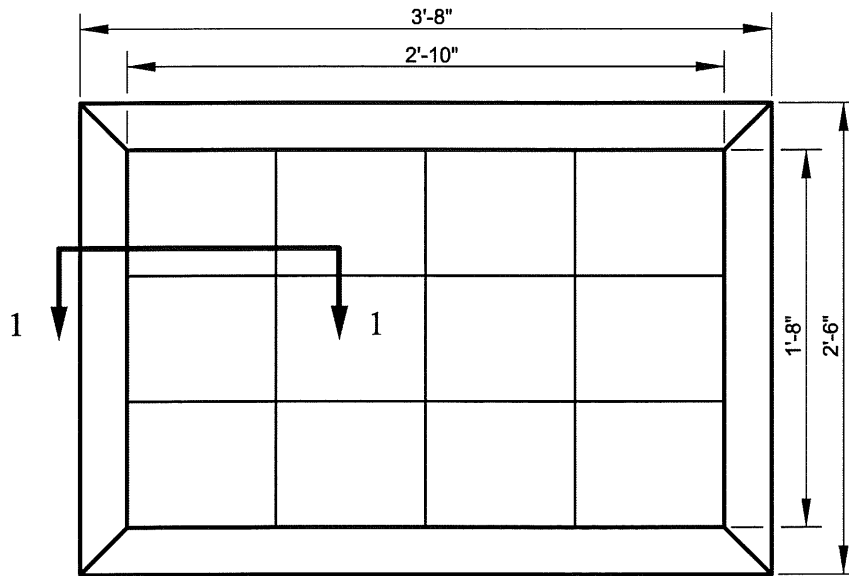
PRECAST LINE MANHOLE
6' x 12' x 7' - 8' - 9' HR
BAR SCHEDULE

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.04		
SCALE: NONE	SHEET 1 OF 1	

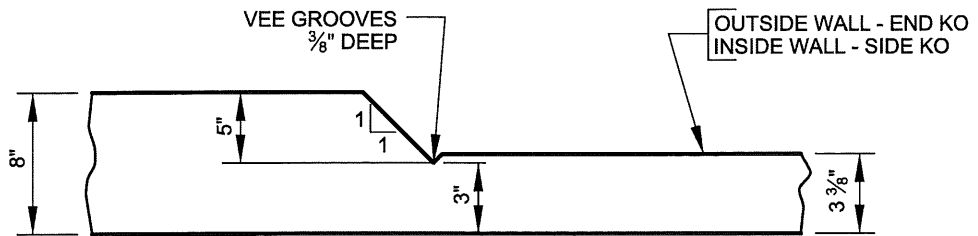
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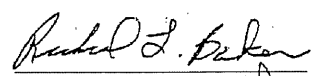
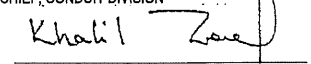
END KNOCKOUT



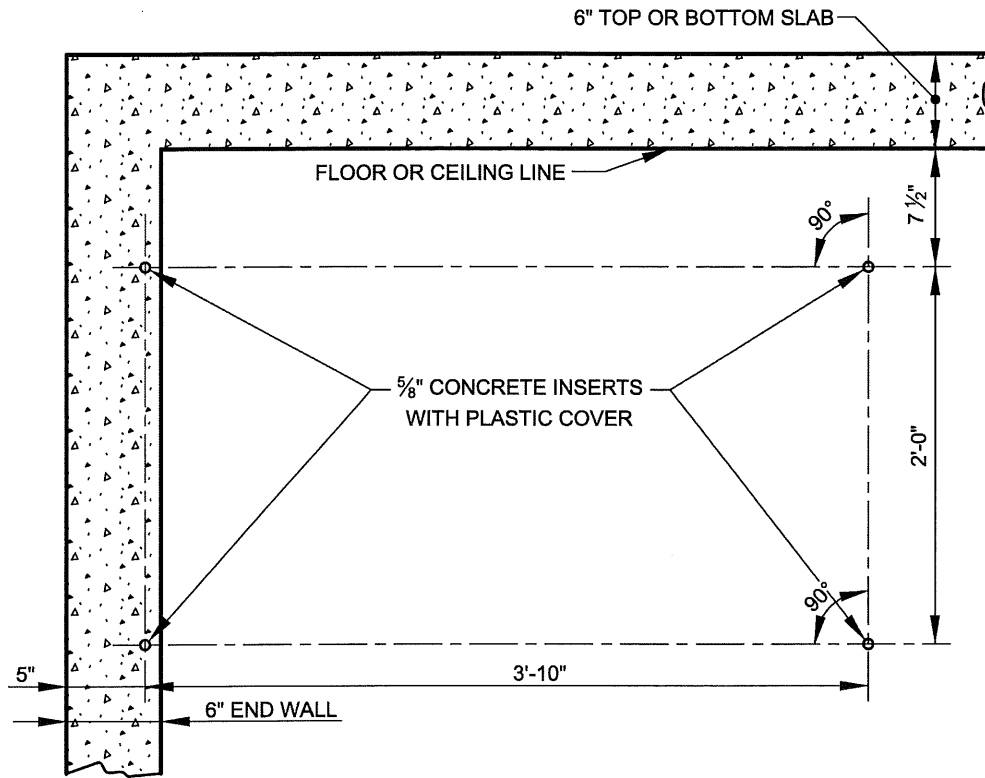
SIDE KNOCKOUT



SECTION 1-1

	APPROVED:  RICHARD L. BAKER CHIEF, CONDUIT DIVISION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED	REVISED	REVISED
	 KHALIL ZARE DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
	END AND SIDE KNOCKOUT DETAILS PRECAST MANHOLE		DETAIL NO. BC 826.05		
			SCALE : NONE	SHEET 1 OF 1	

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NOTES:

CONCRETE INSERTS FOR RECESSED EXTENSIONS
 TYPE AS APPROVED BY ENGINEER
 5/8" - 11 N.C. (3" MIN. LENGTH)

CAST 4 INSERTS IN THE OUTSIDE FACE OF
 WALL AT EACH SIDE KNOCKOUT. SEE DETAIL
 ABOVE FOR LOCATION OF EACH 5/8" INSERT.

32 - 5/8" INSERTS REQUIRED FOR EACH
 PRECAST LINE MANHOLE. INSTALL PLASTIC
 BOLTS OR COVER FOR PROTECTION OF
 INSERTS PRIOR TO USE.



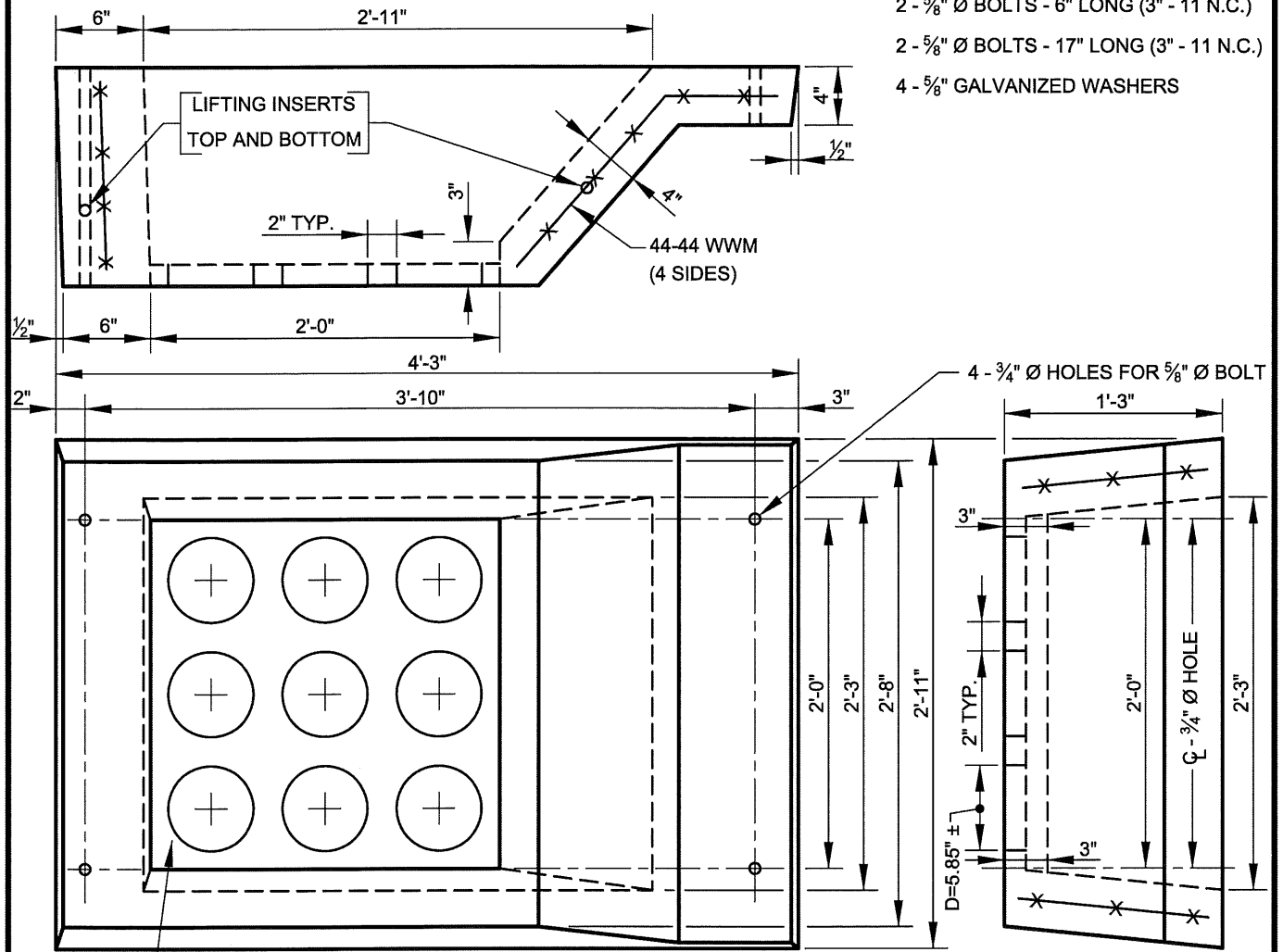
APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

INSERT DETAILS FOR
 RECESSED EXTENSION
 PRECAST MANHOLE

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.06		
SCALE : NONE		SHEET 1 OF 1

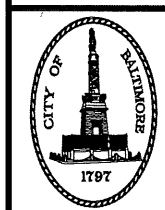
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CAST 9-WAY PLASTIC TERMINATOR FOR 5" I.D. DUCT FLUSH WITH OUTSIDE FACE OF WALL

GENERAL NOTES

- SPECIFICATIONS _____ LATEST DEPARTMENT OF GENERAL SERVICES
- CONCRETE _____ MIX NO. 3
- WELDED WIRE MESH _____ ASTM A185
- COVER _____ 1 1/2" MINIMUM
- PLASTIC TERMINATOR _____ TYPE AS APPROVED BY UTILITY ENGINEER
- LIFTING DEVICES _____ TYPE AS APPROVED BY ENGINEER
- BOLTS _____ BOLTS SHALL BE HOT DIPPED. GALVANIZED STEEL MEETING THE REQUIREMENTS OF ASTM A-307. GALVANIZING TO BE PER ASTM A-123. WASHERS TO BE COMPATIBLE.
- MASTIC COMPOUND _____ PLACE ON MANHOLE WALL PRIOR TO ATTACHING RECESSED EXTENSION. MATERIAL SHALL MEET THE REQUIREMENTS SPECIFIED BY THE ENGINEER.



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

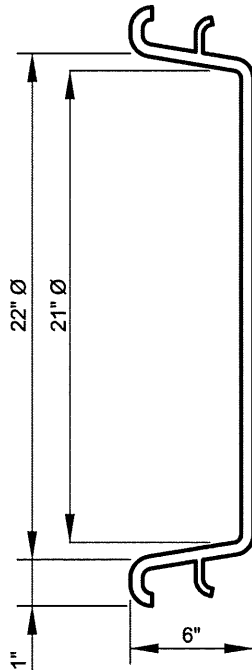
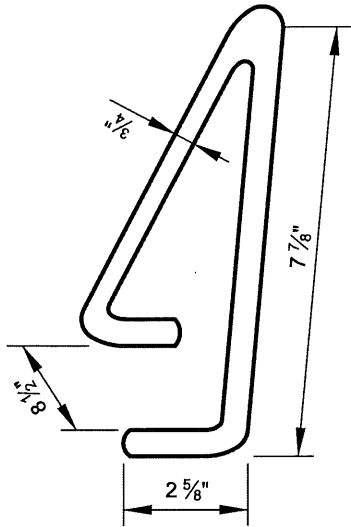
**PRECAST
 RECESSED EXTENSION**

952

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.07-1		
SCALE: NONE	SHEET 1 OF 2	

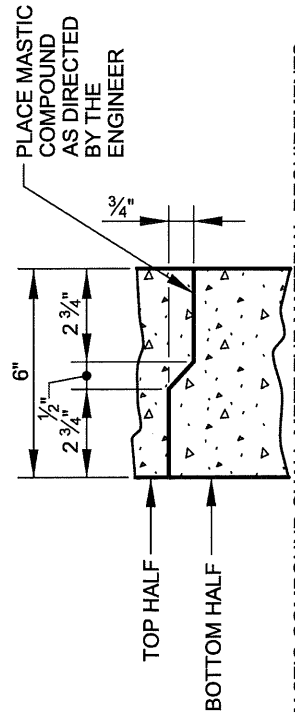
THE FABRICATOR SHALL PROVIDE A MINIMUM OF FOUR LIFTING POINTS FOR EACH SECTION OF PRECAST MANHOLE. LIFTING DEVICES IN ALL STRUCTURES SHALL BE DESIGNED FOR WORKING LOADS WITH A MINIMUM SAFETY FACTOR OF 5 TO 1 BASED ON THE WEIGHT OF THE STRUCTURE AND UTILIZING NO MORE THAN 2 LOAD POINTS. THESE WORKING LOADS SHALL BE COMPENSATED FOR IN THE DESIGN OF THE STRUCTURE AND SHALL BE CONSIDERED INDEPENDENT OF THE IMPOSED DESIGN LOADS.

LIFTING DEVICES



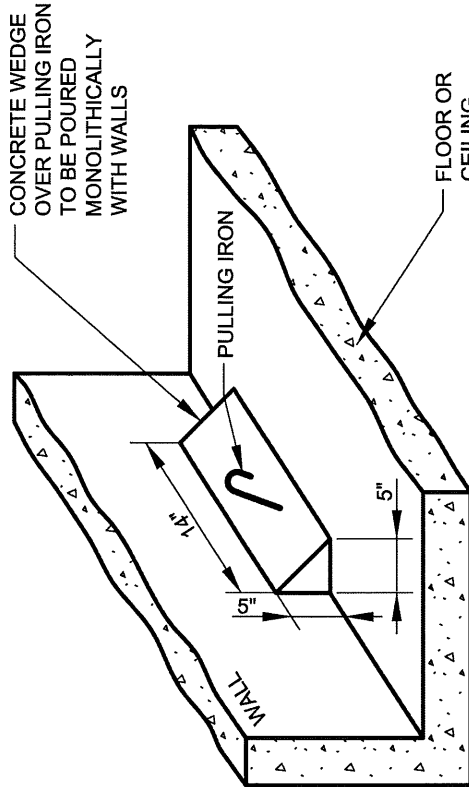
PLASTIC SHALL MEET THE THICKNESS AND MATERIAL REQUIREMENTS SPECIFIED BY THE ENGINEER.

PLASTIC SUMP



PLASTIC COMPOUND SHALL MEET THE MATERIAL REQUIREMENTS SPECIFIED BY THE ENGINEER.

JOINT DETAIL



POSITION EACH PULLING IRON OPPOSITE THE CENTER LINE OF EACH KNOCKOUT IN BOTH THE TOP AND BOTTOM HALF OF MANHOLE AND PROVIDE A CLEAR OPENING OF APPROXIMATELY 3 INCHES IN THE EYE. 12 PULLING IRONS ARE REQUIRED FOR EACH PRECAST LINE MANHOLE. PULLING IRONS SHALL BE HOT DIPPED GALVANIZED STEEL MEETING THE REQUIREMENTS OF ASTM A-36. GALVANIZING SHALL BE CLASS A PER ASTM-153 AND A-386.

PULLING IRON



APPROVED:
Richard L. Baker
 CHIEF, CONDUIT DIVISION
Khail Zare
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

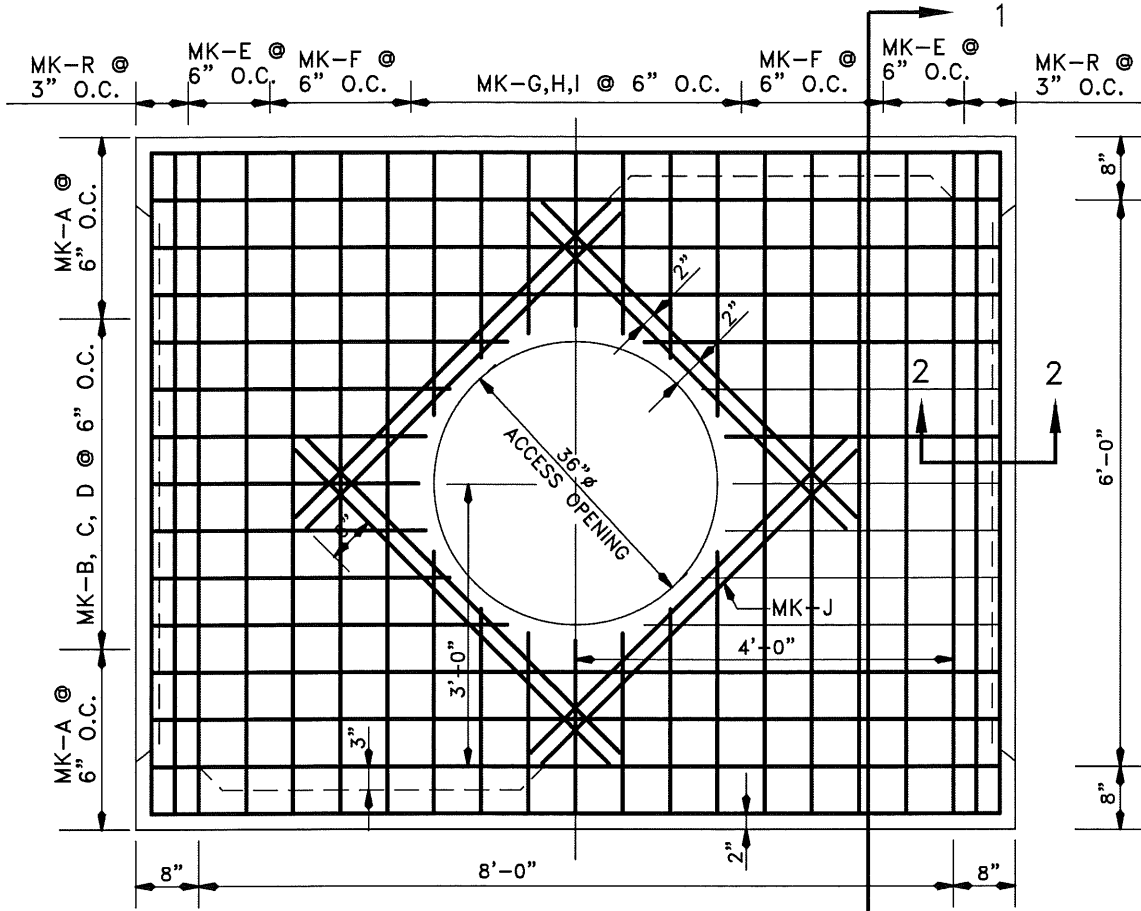
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

ACCESSORIES FOR PRECAST
 MANHOLES

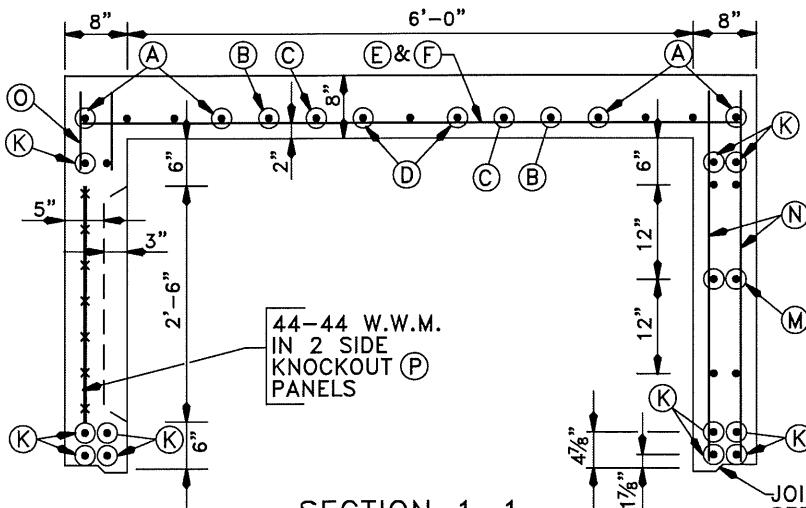
954
 953

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 826.08		
SCALE: NONE	SHEET 1 OF 1	

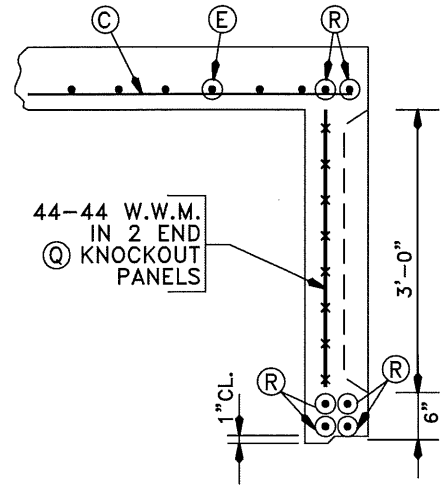
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PLAN - TOP HALF



SECTION 1-1




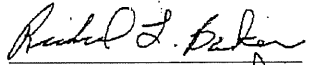
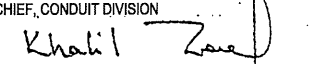
SECTION 2-2

JOINT DETAIL
SEE BC 826.08

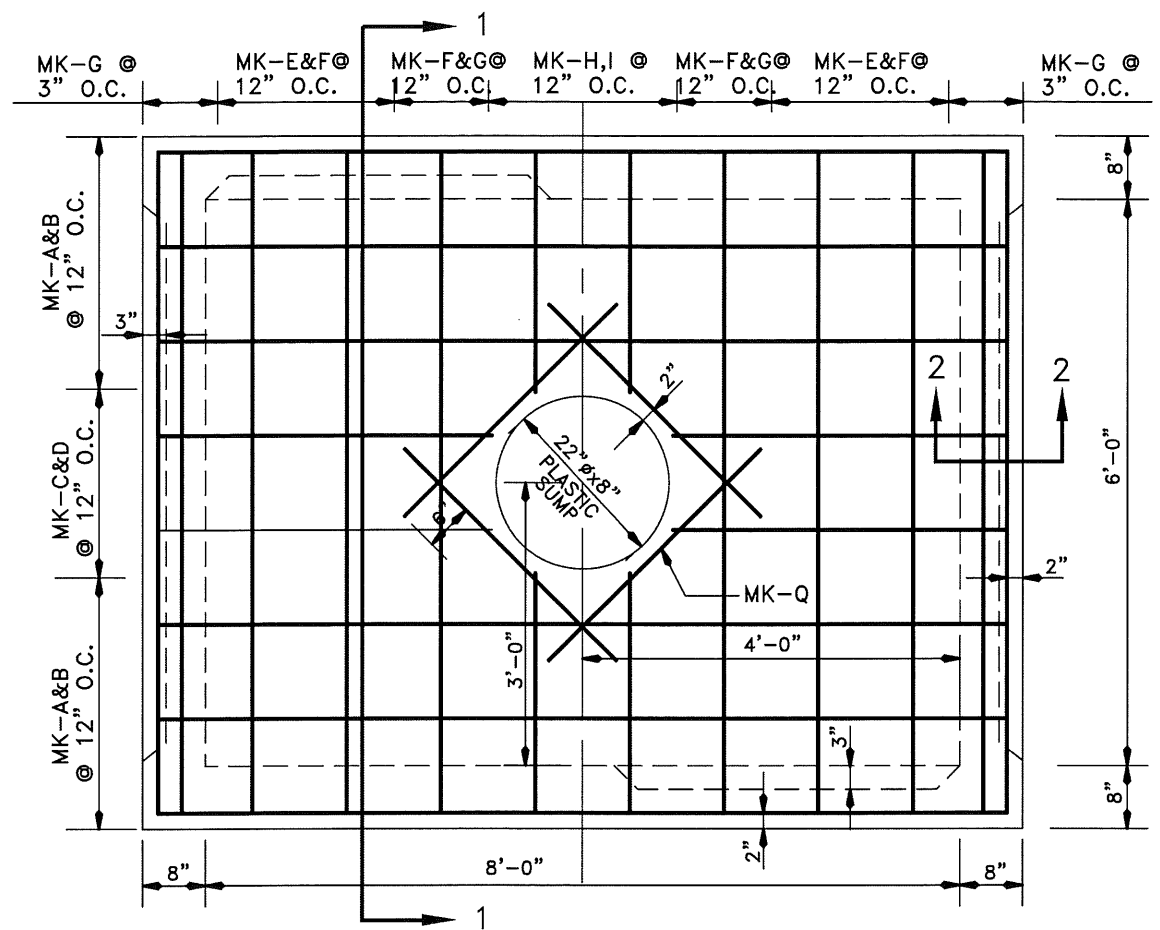
GENERAL NOTES

BOTTOM HALF (6'x8'x7' MANHOLE) SEE BC 827.01-2
 BAR SCHEDULE (6'x8'x7' MANHOLE) SEE BC 827.03
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

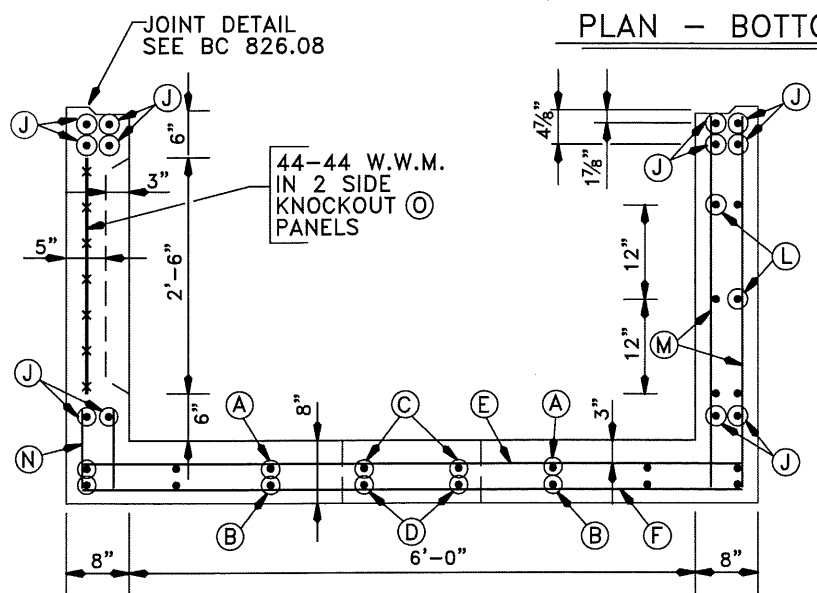
SPECIFICATIONS.....LATEST DEPARTMENT OF
 GENERAL SERVICES
 CONCRETE..... $f'_c = 5,000$ PSI - MIX AS
 APPROVED BY ENGINEER
 REINFORCING.....ASTM A615, GRADE 60
 WELDED WIRE MESH....ASTM A185
 LOADING.....HS 25 TRUCK LOADING

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	PRECAST MANHOLE 6' x 8' x 7' HEADROOM TOP HALF 955 954	DETAIL NO. BC 827.01-1		SCALE: NONE	SHEET 1 OF 2

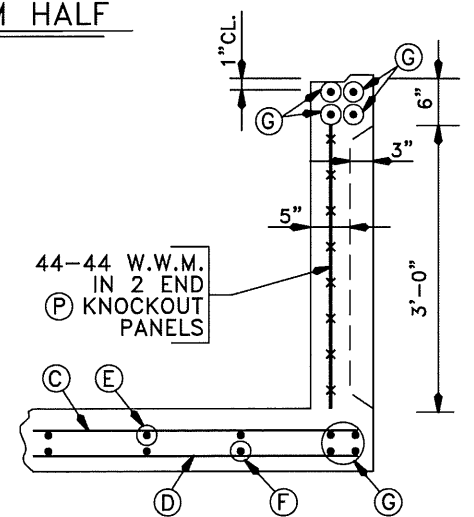
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PLAN - BOTTOM HALF



SECTION 1-1


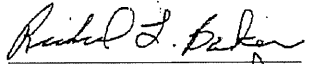
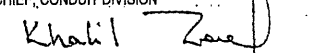


SECTION 2-2

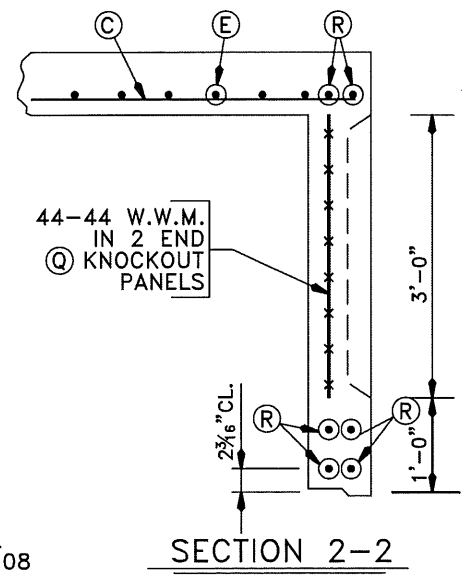
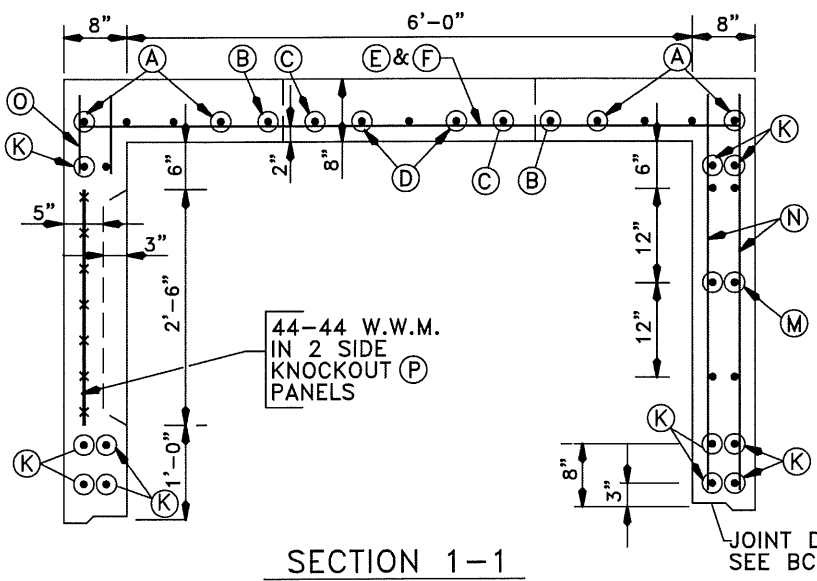
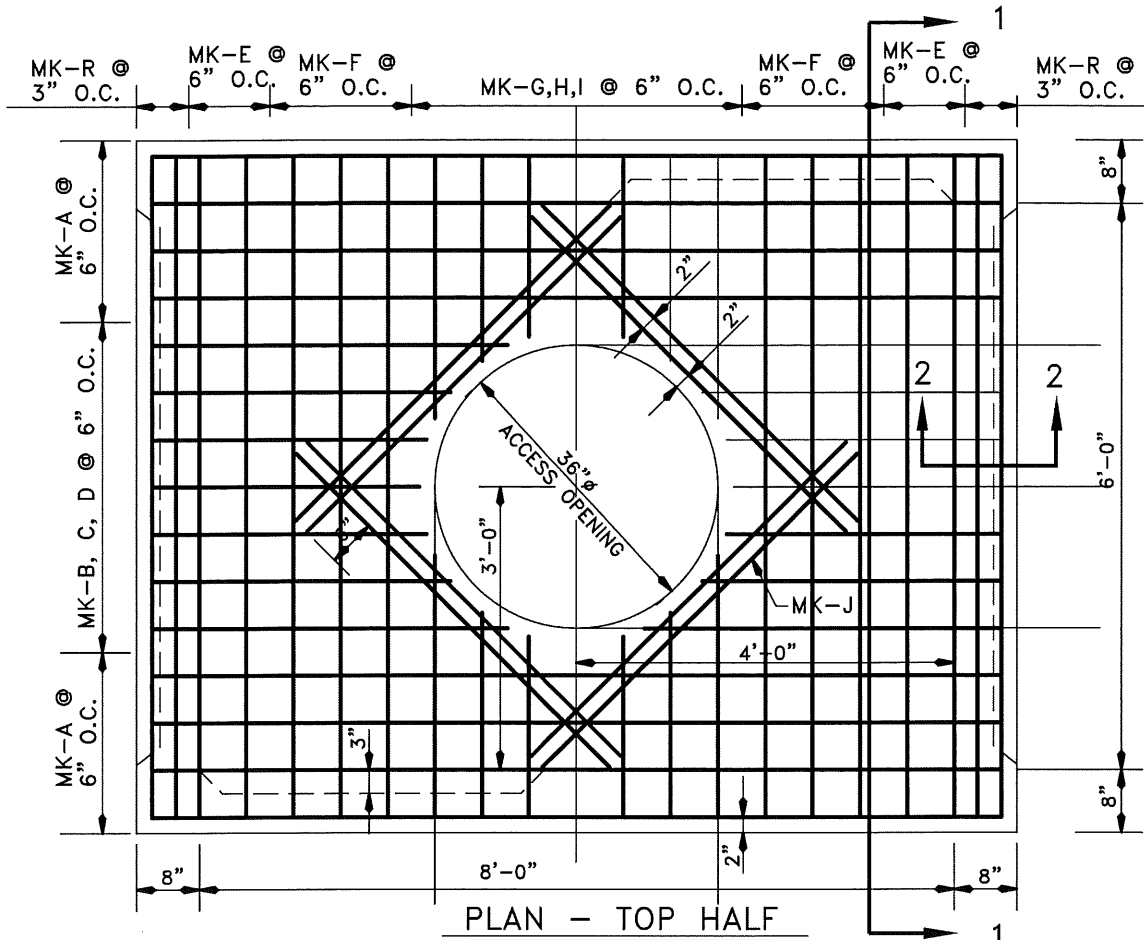
GENERAL NOTES

TOP HALF (6'x8'x7' MANHOLE) SEE BC 827.01-1
 BAR SCHEDULE (6'x8'x7' MANHOLE) SEE BC 827.03
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

SPECIFICATIONS.....LATEST DEPARTMENT OF
 GENERAL SERVICES
 CONCRETE..... $f'_c=5,000$ PSI-MIX AS
 APPROVED BY ENGINEER
 REINFORCING.....ASTM A615, GRADE 60
 WELDED WIRE MESH.....ASTM A185
 LOADING.....HS 25 TRUCK LOADING

	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	PRECAST MANHOLE 6' x 8' x 7' HEADROOM 956 955 BOTTOM HALF		DETAIL NO. BC 827.01-2 SCALE: NONE SHEET 2 OF 2		

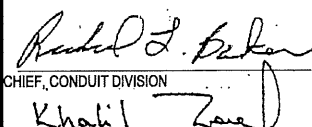
DRAFT - NOT FOR CONSTRUCTION



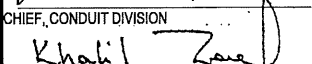
BOTTOM HALF (6'x8'x8' MANHOLE) SEE BC 827.02-2
 BAR SCHEDULE (6'x8'x8' MANHOLE) SEE BC 827.03
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

GENERAL NOTES
 SPECIFICATIONS.....LATEST DEPARTMENT OF GENERAL SERVICES
 CONCRETE.....f'_c = 5,000 PSI - MIX AS APPROVED BY ENGINEER
 REINFORCING.....ASTM A615, GRADE 60
 WELDED WIRE MESH...ASTM A185
 LOADING.....HS 25 TRUCK LOADING


APPROVED:



CHIEF, CONDUIT DIVISION



DIRECTOR, DEPARTMENT OF TRANSPORTATION



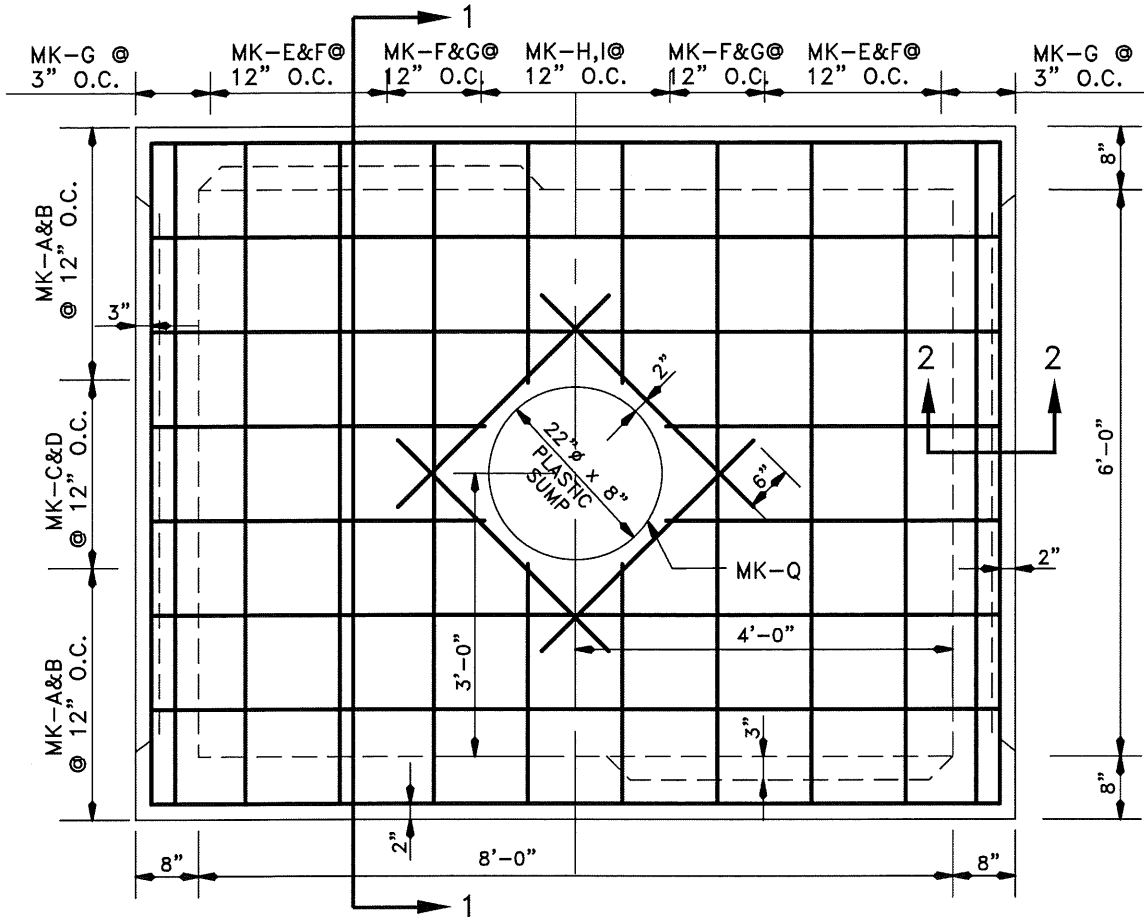
CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION
 CONDUIT DIVISION

PRECAST MANHOLE
6' x 8' x 8' HEADROOM
TOP HALF

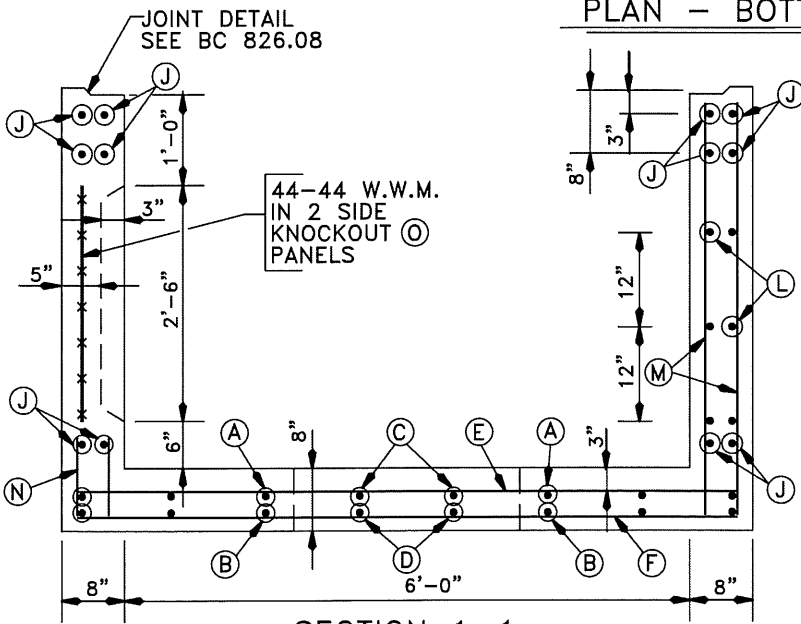
957
956

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 827.02-1		
SCALE: NONE	SHEET 1 OF 2	

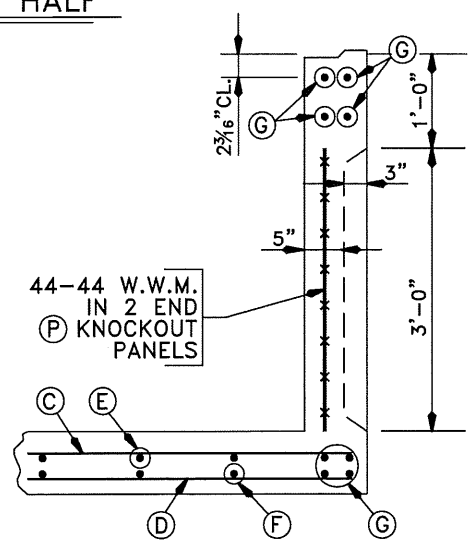
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PLAN - BOTTOM HALF



SECTION 1-1



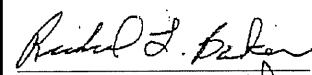
SECTION 2-2

GENERAL NOTES

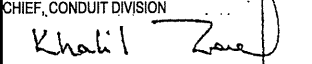
TOP HALF (6'x8'x8' MANHOLE) SEE BC 827.02-1
 BAR SCHEDULE (6'x8'x8' MANHOLE) SEE BC 827.03
 KNOCKOUT DETAILS SEE BC 826.05
 INSERTS FOR RECESSED EXTENSION SEE BC 826.06
 ACCESSORIES FOR PRECAST MANHOLES SEE BC 826.08
 STANDARD ACCESS STACK SEE BC 825.11
 PRECAST RECESSED EXTENSION SEE BC 826.07-1

SPECIFICATIONS.....LATEST DEPARTMENT OF
 GENERAL SERVICES
 CONCRETE..... $f'_c = 5,000$ PSI-MIX AS
 APPROVED BY ENGINEER
 REINFORCING.....ASTM A615, GRADE 60
 WELDED WIRE MESH.....ASTM A185
 LOADING.....HS 25 TRUCK LOADING


APPROVED:



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DIRECTOR, DEPARTMENT OF TRANSPORTATION



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CONDUIT DIVISION

PRECAST MANHOLE
6' x 8' x 8' HEADROOM
958 BOTTOM HALF

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 827.02-2		
SCALE: NONE		SHEET 2 OF 2

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PRECAST LINE MANHOLE - 6'x8'x7'-8' HR BAR SCHEDULE - BOTTOM HALF						
WT. LBS.	MARK SIZE	NO. REQ'D.	TYPE	A	B	C
81	A	6	99	9'-0"		
56	B	6	99	9'-0"		
21	C	4	99	3'-6"		
15	D	4	99	3'-6"		
42	E	4	99	7'-0"		
73	F	6	99	7'-0"		
200	G	7	99	7'-0"		
15	H	6	99	2'-6"		
10	I	5	99	2'-6"		
129	J	7	99	9'-0"		
168	L	6	99	4'-8"		
②	M	5	99	①		
56	N	5	99	10"		
19	O	WWM	(44-44)	2'-9"		
35	P	WWM	(44-44)	3'-3"		
26	Q	5	99	7'-0"		

PRECAST LINE MANHOLE - 6'x8'x7'-8' HR BAR SCHEDULE - TOP HALF						
WT. LBS.	MARK SIZE	NO. REQ'D.	TYPE	A	B	C
245	A	8	99	9'-0"		
23	B	4	99	3'-9"		
19	C	4	99	3'-2"		
26	D	6	99	2'-10"		
42	E	4	99	7'-0"		
143	F	6	99	7'-0"		
17	G	4	99	2'-9"		
13	H	4	99	2'-2"		
17	I	6	99	1'-10"		
39	J	8	99	4'-8"		
129	K	7	99	9'-0"		
168	M	6	99	4'-8"		
②	N	5	99	①		
56	O	5	99	10"		
19	P	WWM	(44-44)	2'-9"		
35	Q	WWM	(44-44)	3'-3"		
172	R	7	99	7'-0"		

7' HR	8' HR
3'-10½"	4'-4½"
#65	#73

① ②

QUANTITIES		
MANHOLE SIZE	CONC. C.Y.	STEEL LBS.
6'x8'x7'	10.27	2117
6'x8'x8'	11.23	2133



APPROVED:
Richard J. Baker
CHIEF, CONDUIT DIVISION
Khali Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

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CONDUIT DIVISION

959
958
PRECAST MANHOLE
6' x 8' x 7' - 8' HR
BAR SCHEDULE

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 827.03		
SCALE: NONE	SHEET 1 OF 1	

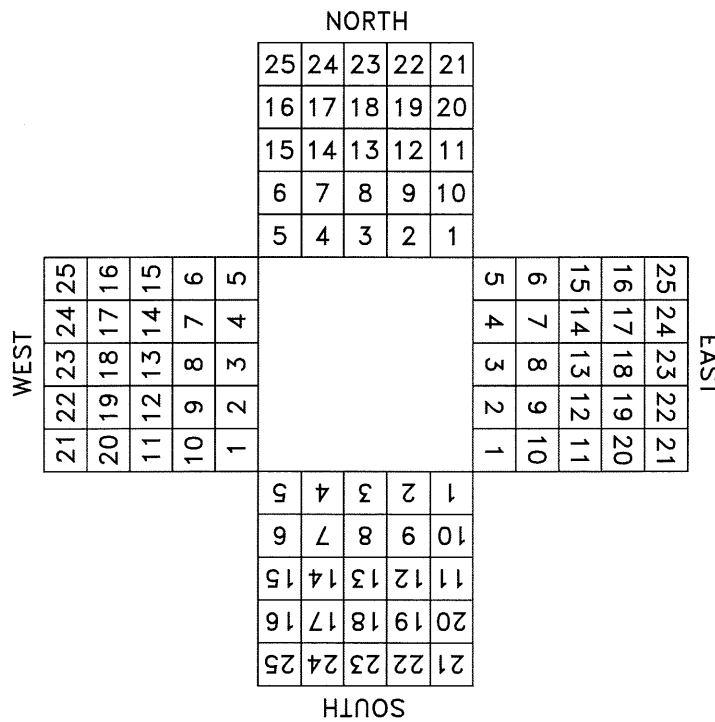
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DUCT IDENTIFICATION

I. GENERAL


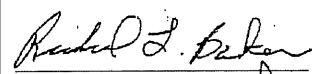
The following method and associated rules have been established to prevent confusion and inconsistencies in the identification of ducts. This method has been reviewed and found acceptable and satisfactory by Baltimore City and Baltimore Gas and Electric Company.

The following diagram illustrates the proper method to use to count ducts when facing in the indicated direction. It is to be noted that the counting is started from the east duct in the bottom row when facing either north or south, and from the south duct in the bottom row, when facing either east or west.



To correctly identify a duct it is necessary to determine the following:

- A. The direction of the line.
- B. Whether it is a trunk or distribution line.
- C. The manhole which each duct group supplies.

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	DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010		
DUCT IDENTIFICATION 960 959			DETAIL NO. BC 830.01-1		
			SCALE : NONE	SHEET 1 OF 6	

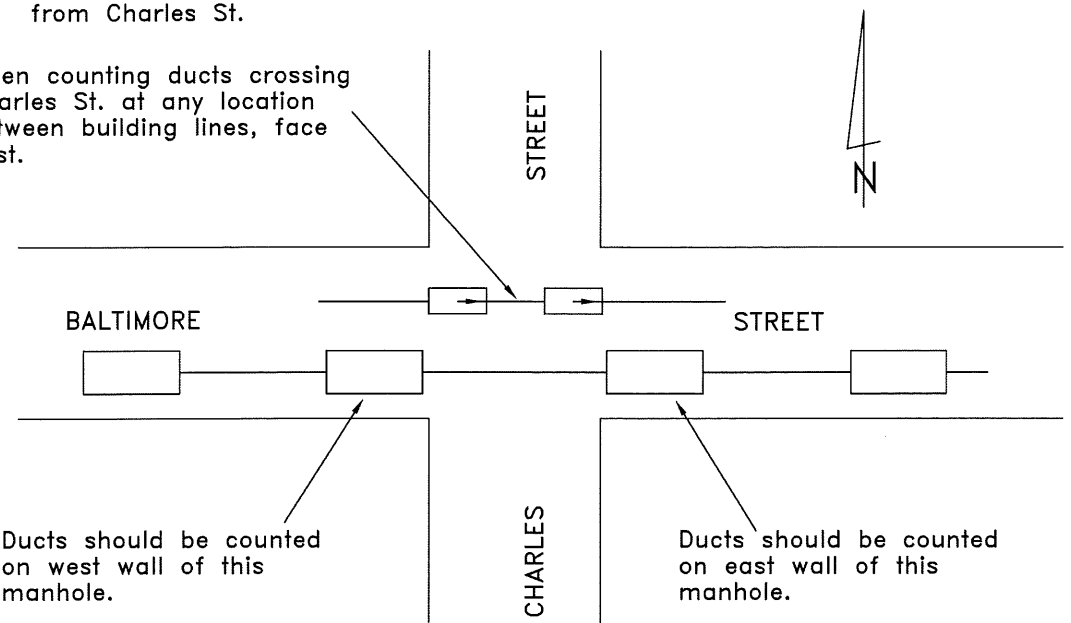
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DUCT IDENTIFICATION

II. FACING DIRECTIONS

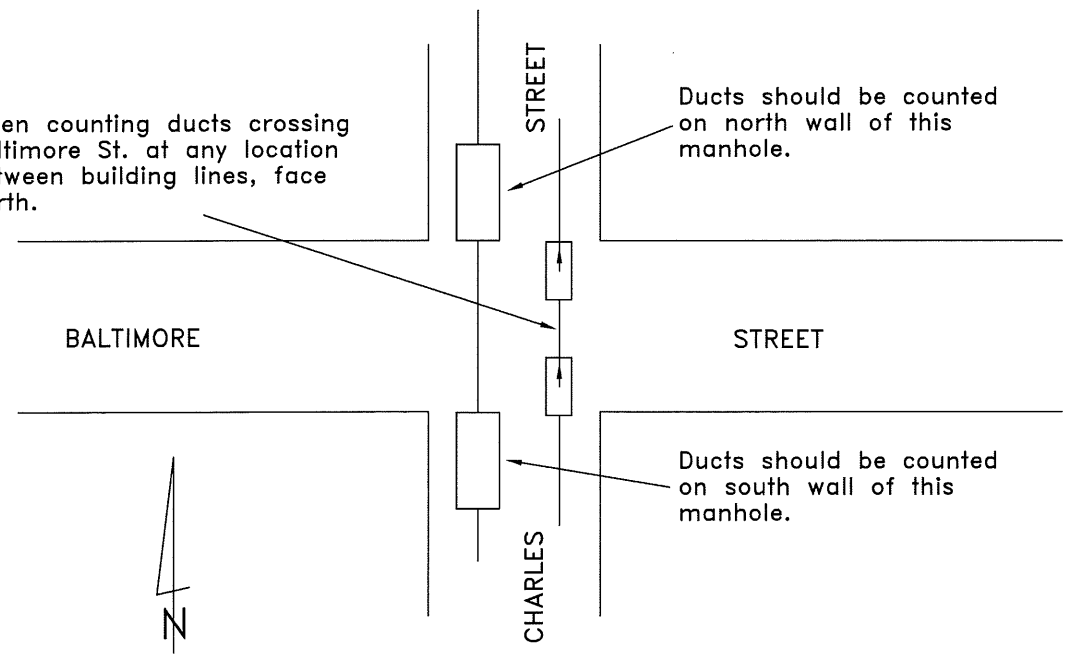
A. When identifying ducts in an East-West line, the count shall be made facing away from Charles St.

When counting ducts crossing Charles St. at any location between building lines, face east.



B. When identifying ducts in a North-South line, the count shall be made facing away from Baltimore St.

When counting ducts crossing Baltimore St. at any location between building lines, face north.



APPROVED:
Richard L. Baker
CHIEF, CONDUIT DIVISION
Khali Zare
DIRECTOR, DEPARTMENT OF TRANSPORTATION

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CONDUIT DIVISION**

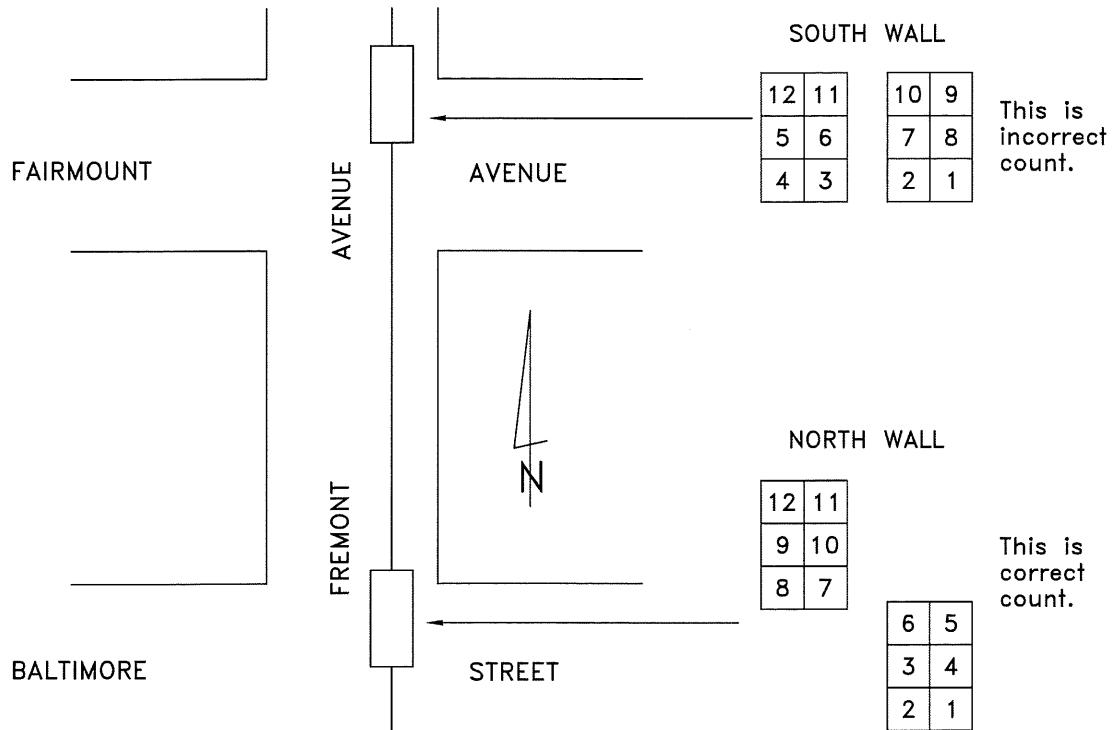
DUCT IDENTIFICATION
961
960

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 830.01-2		
SCALE: NONE	SHEET 2 OF 6	

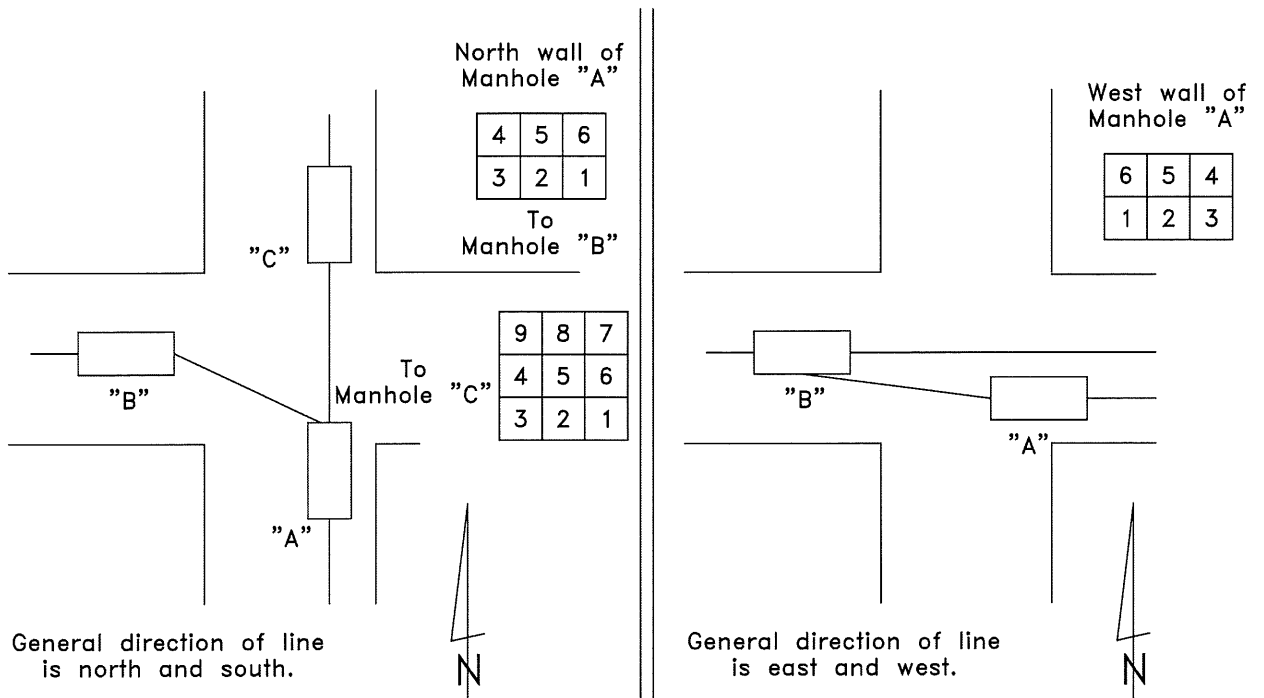
DRAFT - NOT FOR CONSTRUCTION


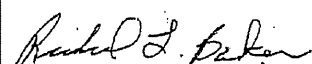
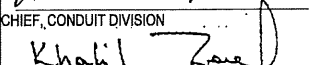
DUCT IDENTIFICATION

The following example illustrates the need for adhering to the above rules to avoid confusion due to changes in duct formation.



- C. When a duct line leaves a manhole on either a north or south wall and enters a connecting manhole on the east or west wall, the general direction of the duct line shall be the deciding factor in determining the duct count.



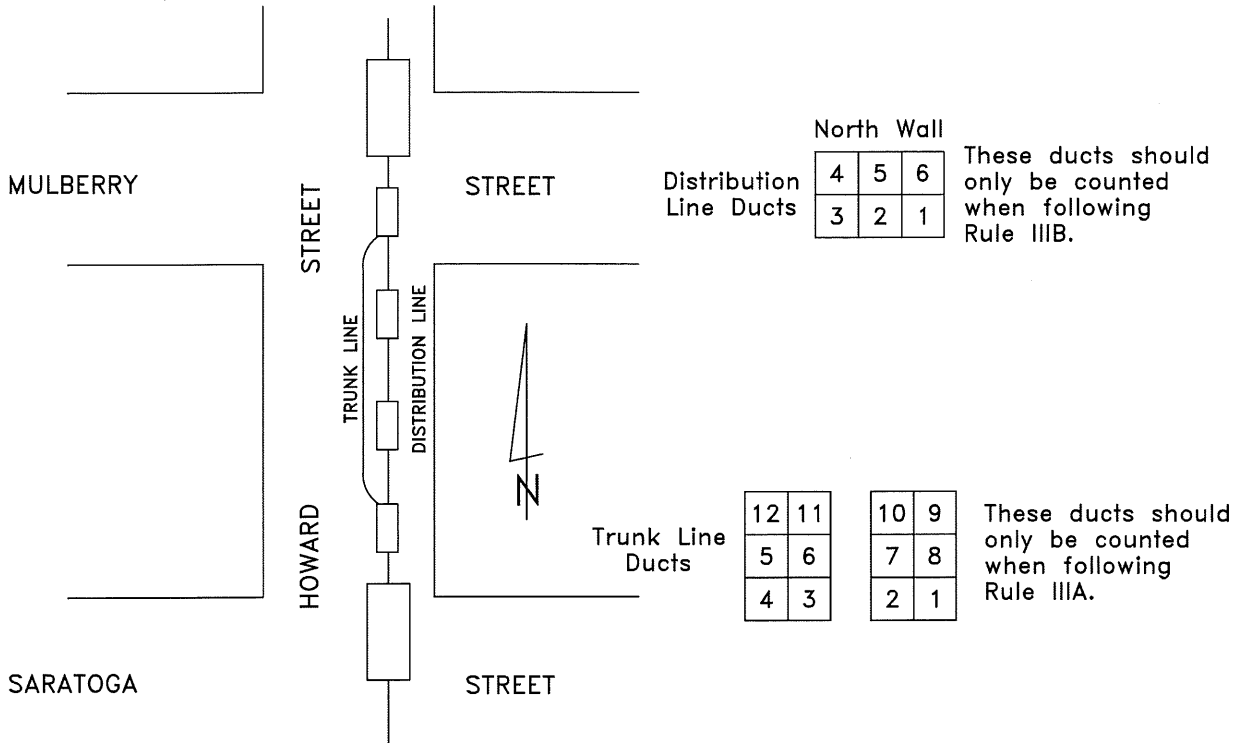
	APPROVED:  CHIEF, CONDUIT DIVISION  DIRECTOR, DEPARTMENT OF TRANSPORTATION	CITY OF BALTIMORE DEPARTMENT OF TRANSPORTATION CONDUIT DIVISION	ISSUED 8 / 2010	REVISED	REVISED
	DUCT IDENTIFICATION 962 961	DETAIL NO. BC 830.01-3		SCALE: NONE	SHEET 3 OF 6

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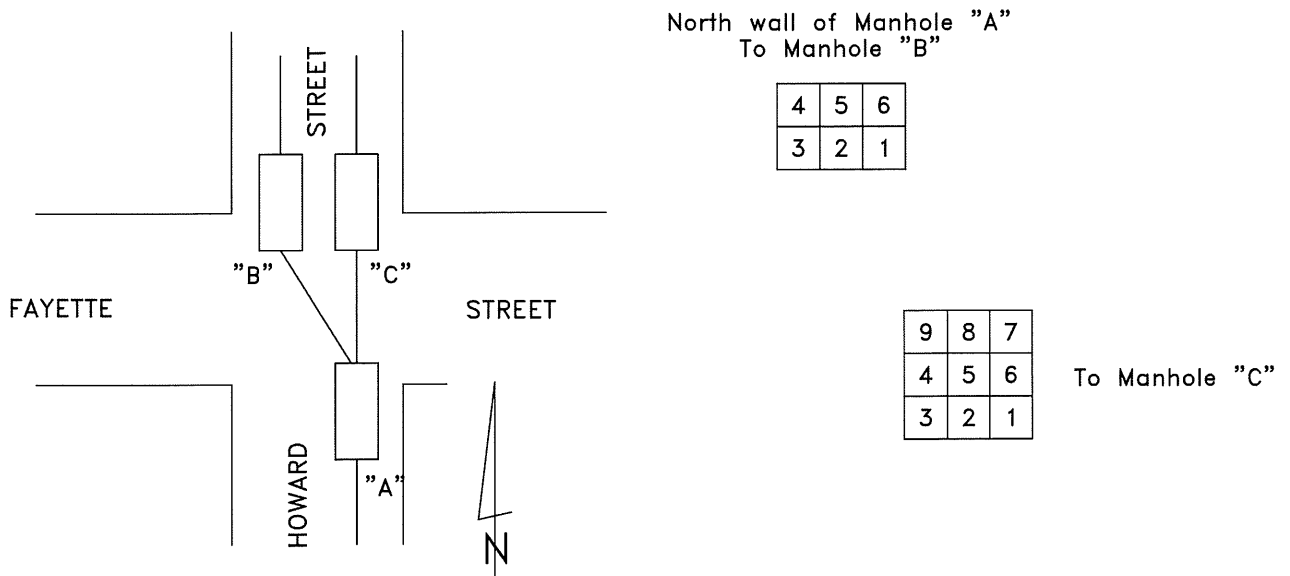
DUCT IDENTIFICATION


III. Grouping

- A. When identifying ducts between trunk line manholes, only the ducts connecting directly with other trunk line manholes shall be counted as trunk line ducts.



- B. When identifying ducts from a trunk line manhole to a distribution line manhole do not count trunk line ducts. See sketch under A above.
- C. If two duct groups leave a manhole on the same wall but connect with different manholes, each group shall be counted separately.



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	CHIEF, CONDUIT DIVISION DIRECTOR, DEPARTMENT OF TRANSPORTATION		8 / 2010	DETAIL NO. BC 830.01- 4	SCALE : NONE
963 962		DUCT IDENTIFICATION			

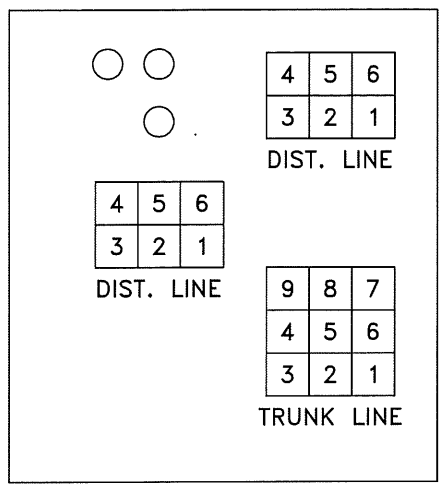
DRAFT - NOT FOR CONSTRUCTION

DUCT IDENTIFICATION

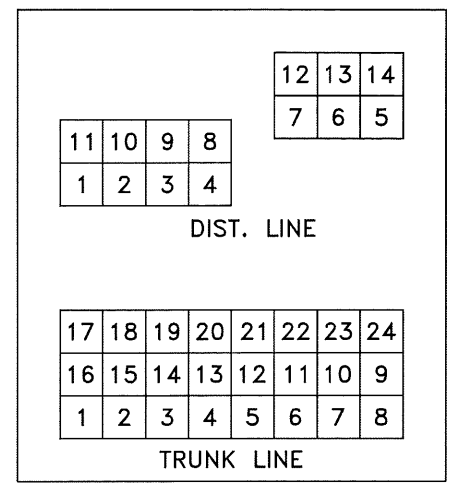
IV. EXAMPLES

The following sketches show various duct arrangements and the proper method to use in identifying ducts in each group.

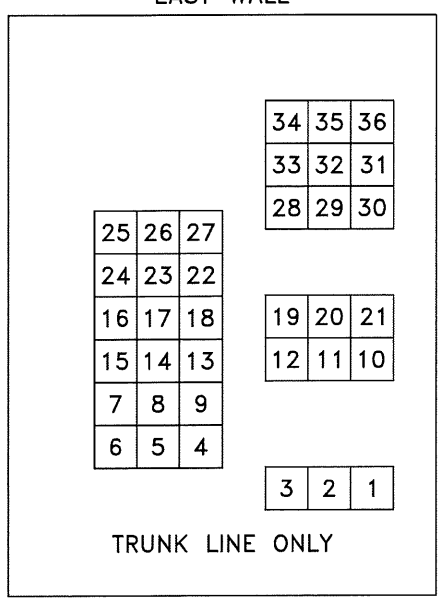
NORTH WALL



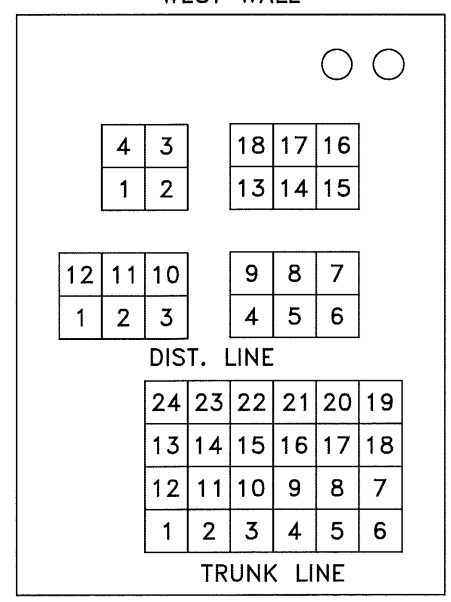
SOUTH WALL



EAST WALL



WEST WALL



When any portion of a row of ducts in separate duct banks overlap, they are considered in the same plane and are counted as being in a straight line. See below.



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CHIEF, CONDUIT DIVISION
Khalil Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

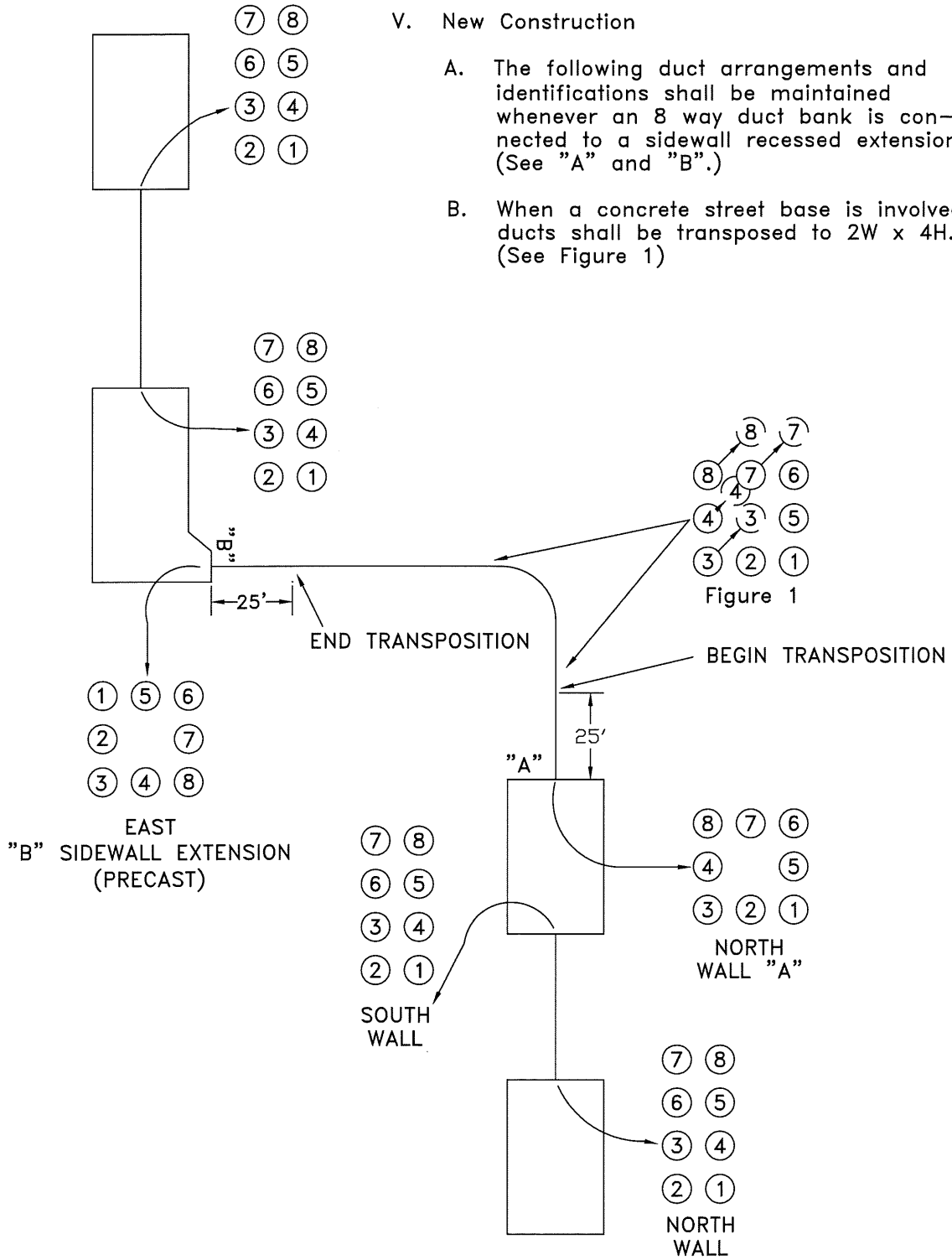
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

DUCT IDENTIFICATION
964
963

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 830.01 - 5		
SCALE : NONE	SHEET 5 OF 6	

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DUCT IDENTIFICATION



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 CHIEF, CONDUIT DIVISION
Khali Zaeed
 DIRECTOR, DEPARTMENT OF TRANSPORTATION

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

DUCT IDENTIFICATION
 965
 964

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 830.01- 6		
SCALE : NONE	SHEET 6 OF 6	

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CONDUIT TRANSPOSITION

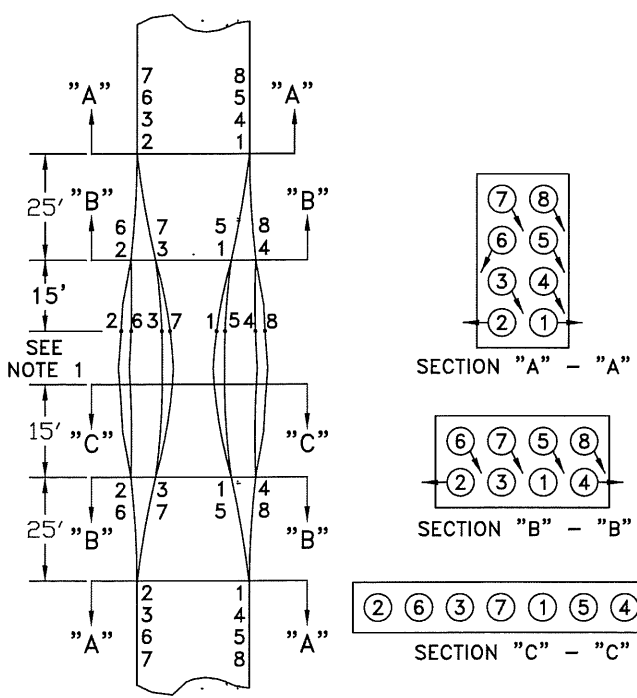
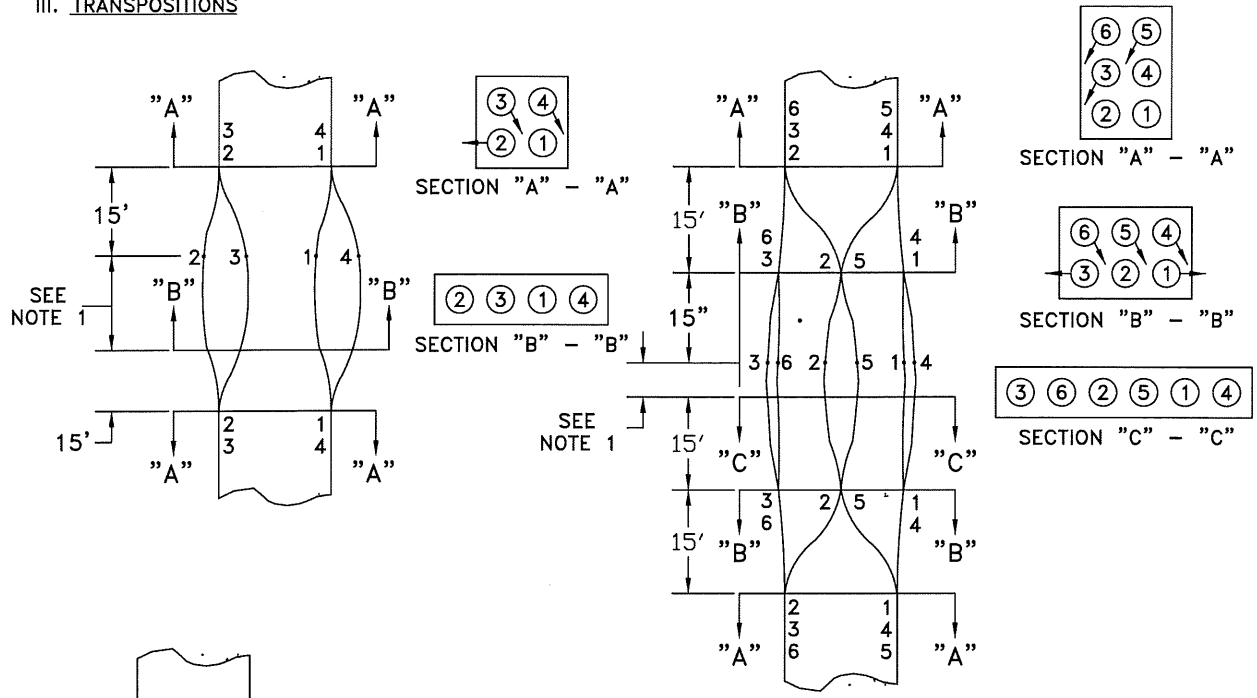
I. SCOPE

This standard details procedures for installing conduit transpositions.

II. GENERAL

Field conditions at times make it necessary to transpose conduits from one formation to another. Transpositions are usually required when it is impossible for conduit to go over, under or split an obstruction. When large amounts of rock, water, running sand, etc. are encountered excavation depth can be reduced by transposing the conduit. When physically possible, conduits shall be returned to their standard configurations before entering manhole.

III. TRANSPOSITIONS



NOTES:

1. Transition area: distance will vary dependent upon circumstance.
2. 2" minimum duct separation, horizontal and vertical shall be maintained.
3. Transpositions shown are one of several options. The relative position of each duct shall be the same on either side of the transition area.

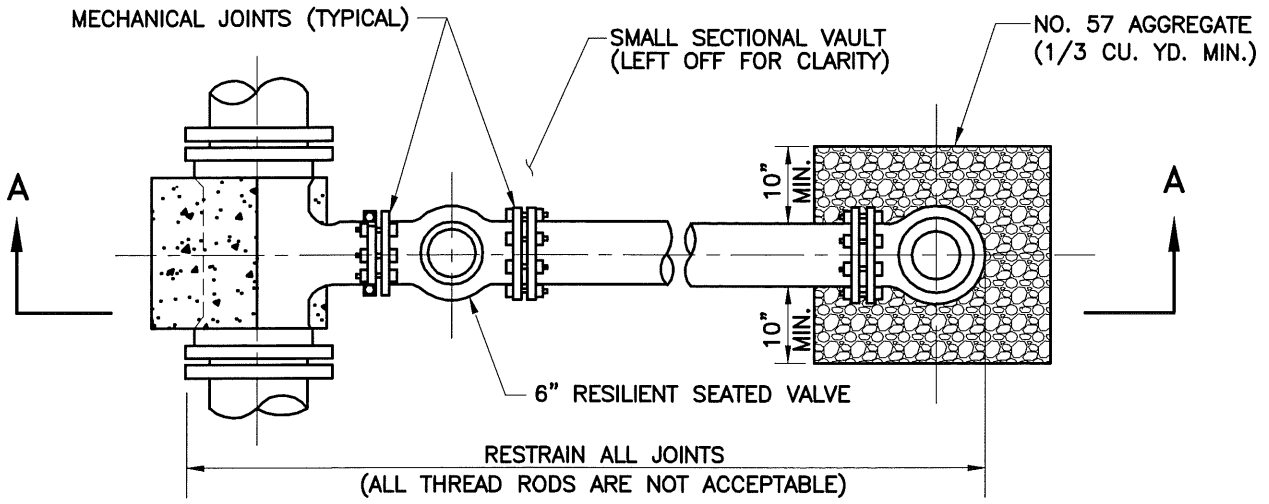


APPROVED:
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CHIEF, CONDUIT DIVISION
Khali Zane
DIRECTOR, DEPARTMENT OF TRANSPORTATION

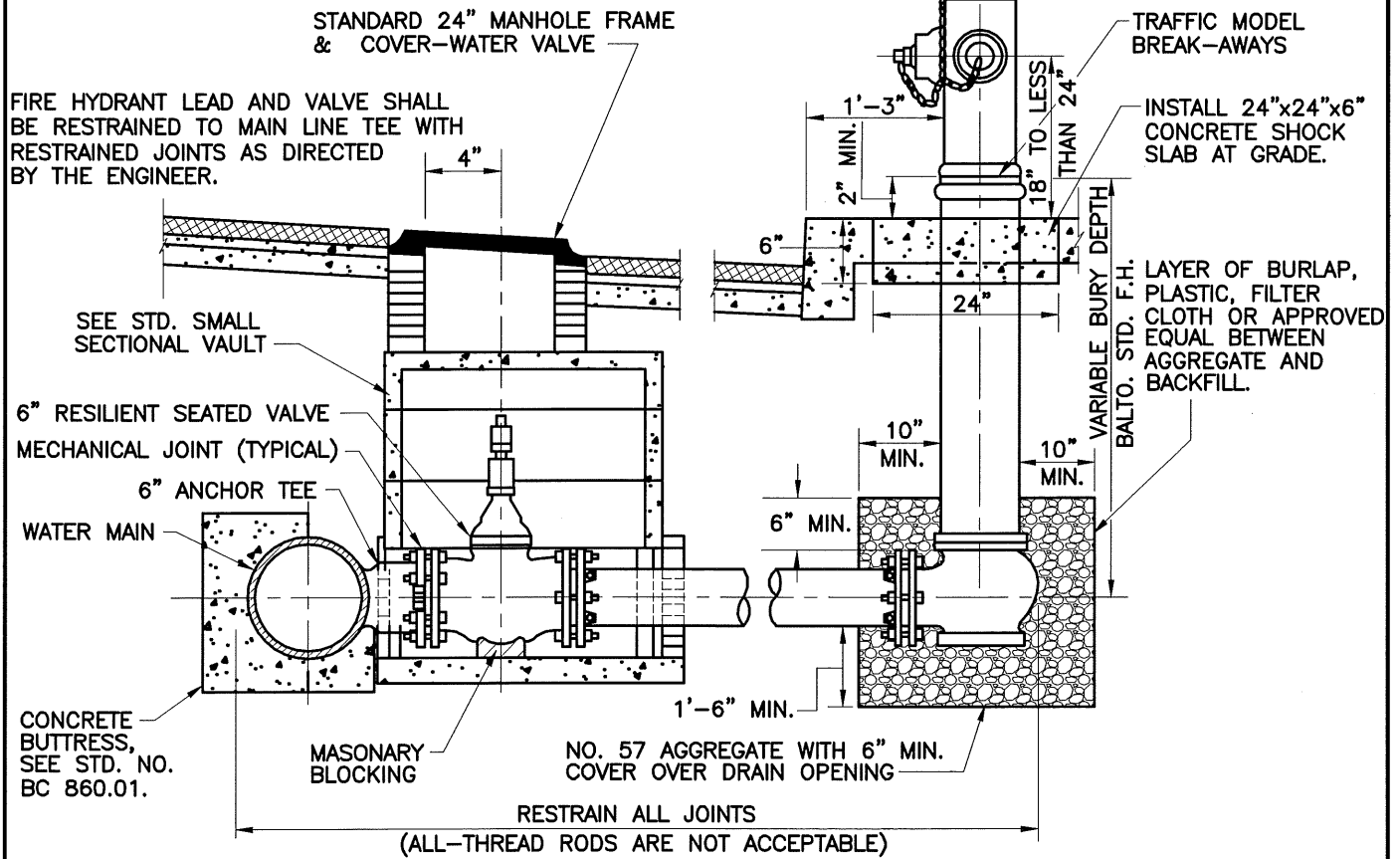
CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
CONDUIT DIVISION

CONDUIT TRANSPOSITION
966
965

ISSUED	REVISED	REVISED
8 / 2010		
DETAIL NO. BC 830.02		
SCALE: NONE	SHEET 1 OF 1	






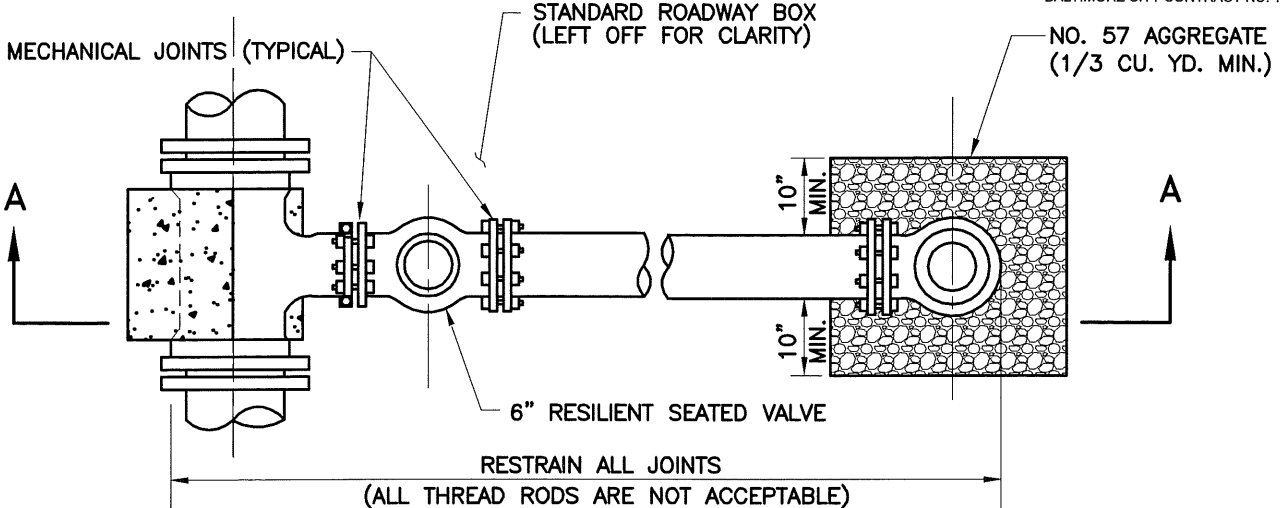
PLAN



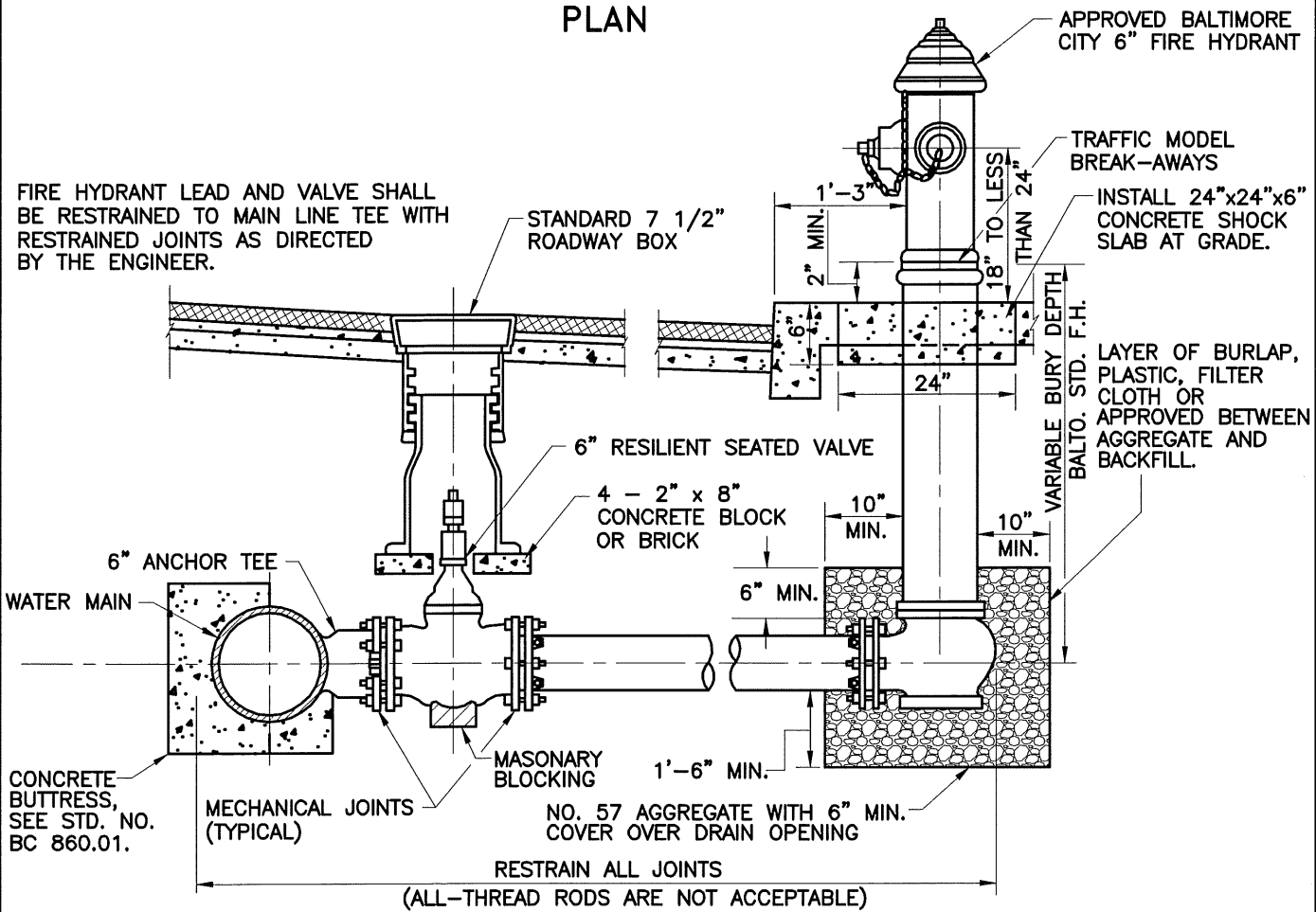
- NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.
2. CONCRETE SHALL BE MIX 3.

SECTION A-A

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
	STANDARD INSTALLATION OF FIRE HYDRANT 967 WITH TEE AND VALVE 966 (SECTIONAL VAULT)		STANDARD NO. BC 833.01		
			SCALE: NONE	SHEET 1 OF 1	


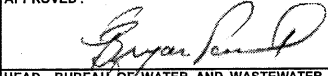



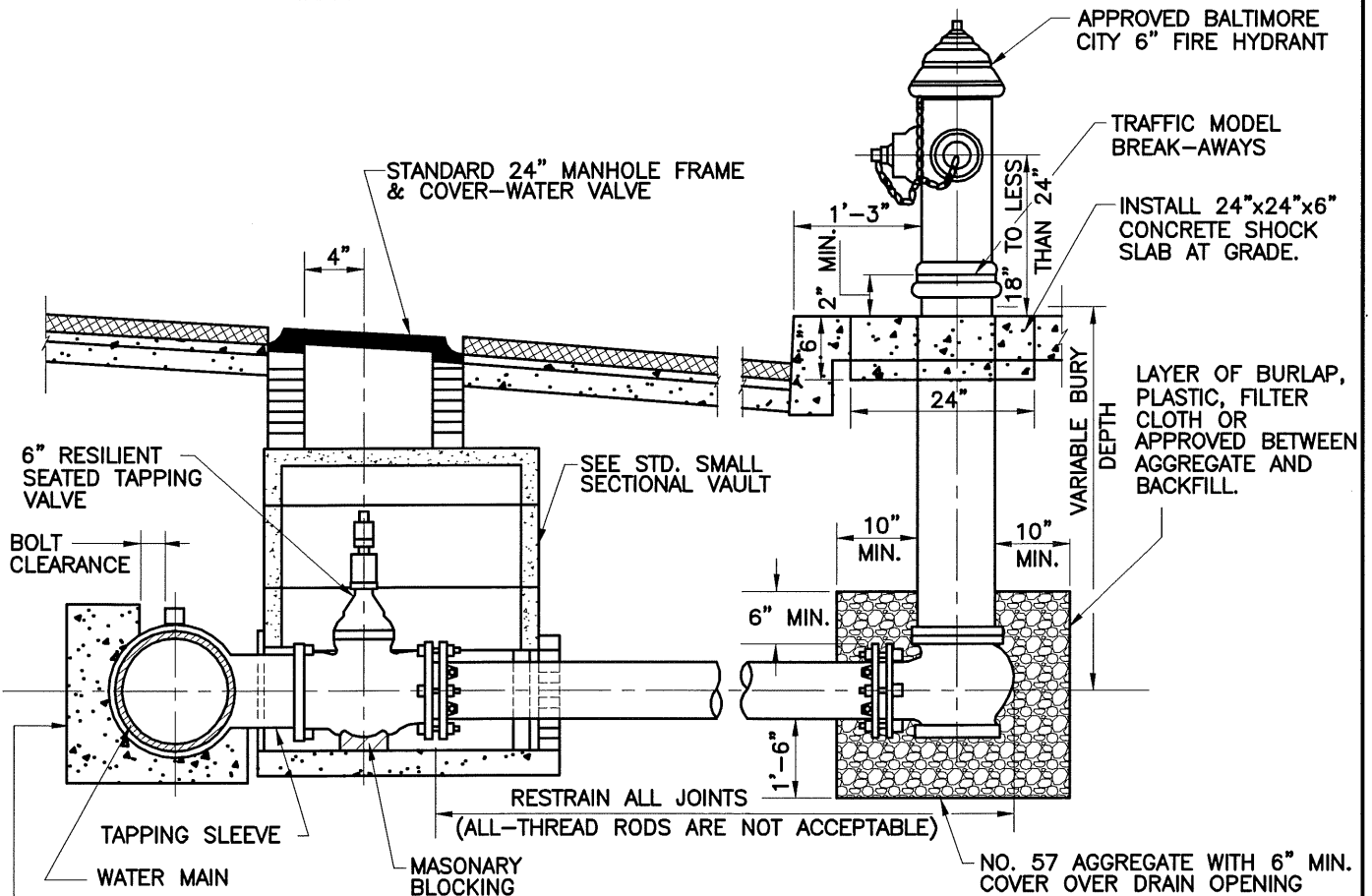
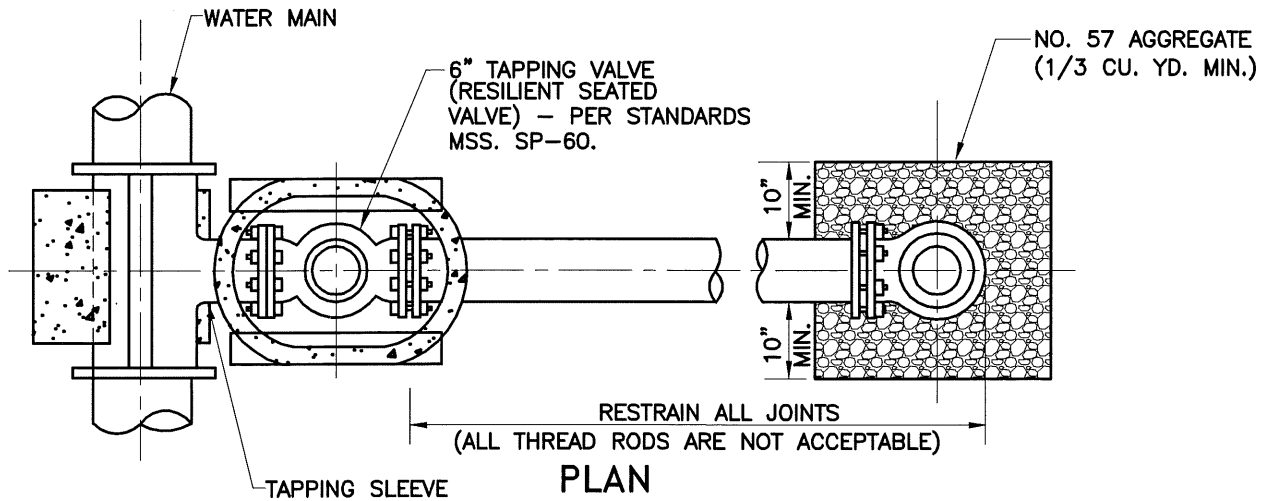
PLAN



- NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.
 2. CONCRETE SHALL BE MIX 3.




SECTION A-A

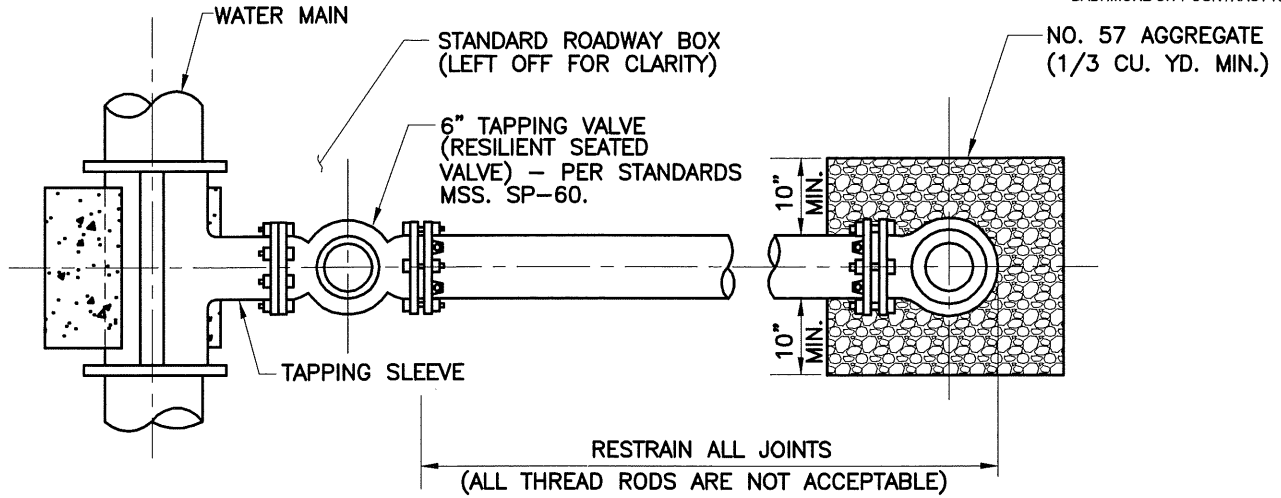
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
	STANDARD INSTALLATION OF FIRE HYDRANT 96 WITH TEE AND VALVE 967 (ROADWAY BOX)		STANDARD NO. BC 833.02		
			SCALE: NONE	SHEET 1 OF 1	



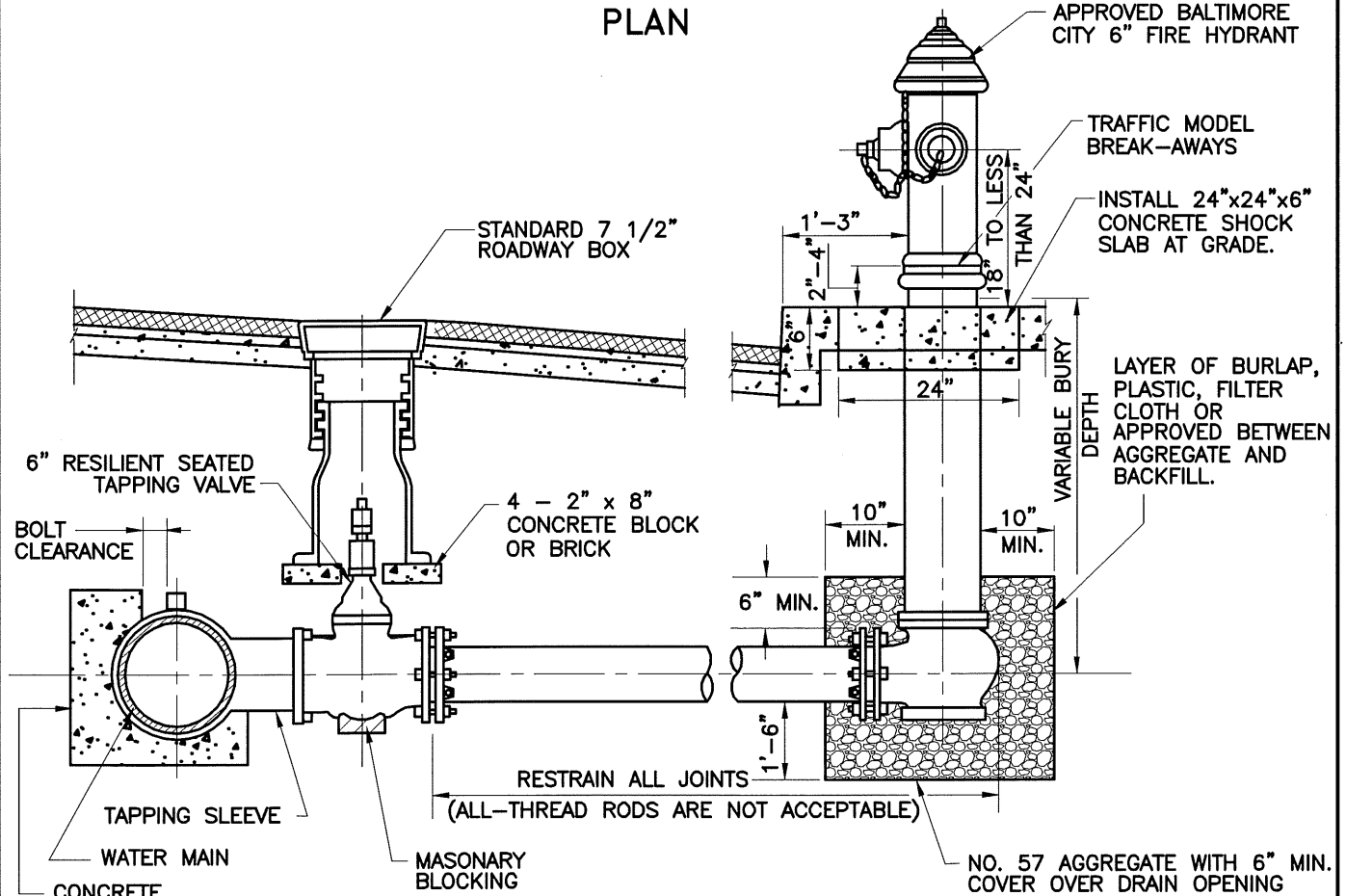
- NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH. ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.
2. CONCRETE SHALL BE MIX 3.

ELEVATION

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD INSTALLATION OF FIRE HYDRANT WITH TAPPING SLEEVE AND VALVE (SECTIONAL VAULT)			STANDARD NO. BC 833.03		
			SCALE: NONE	SHEET 1 OF 1	



PLAN



ELEVATION

- NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.
 2. CONCRETE SHALL BE MIX 3.

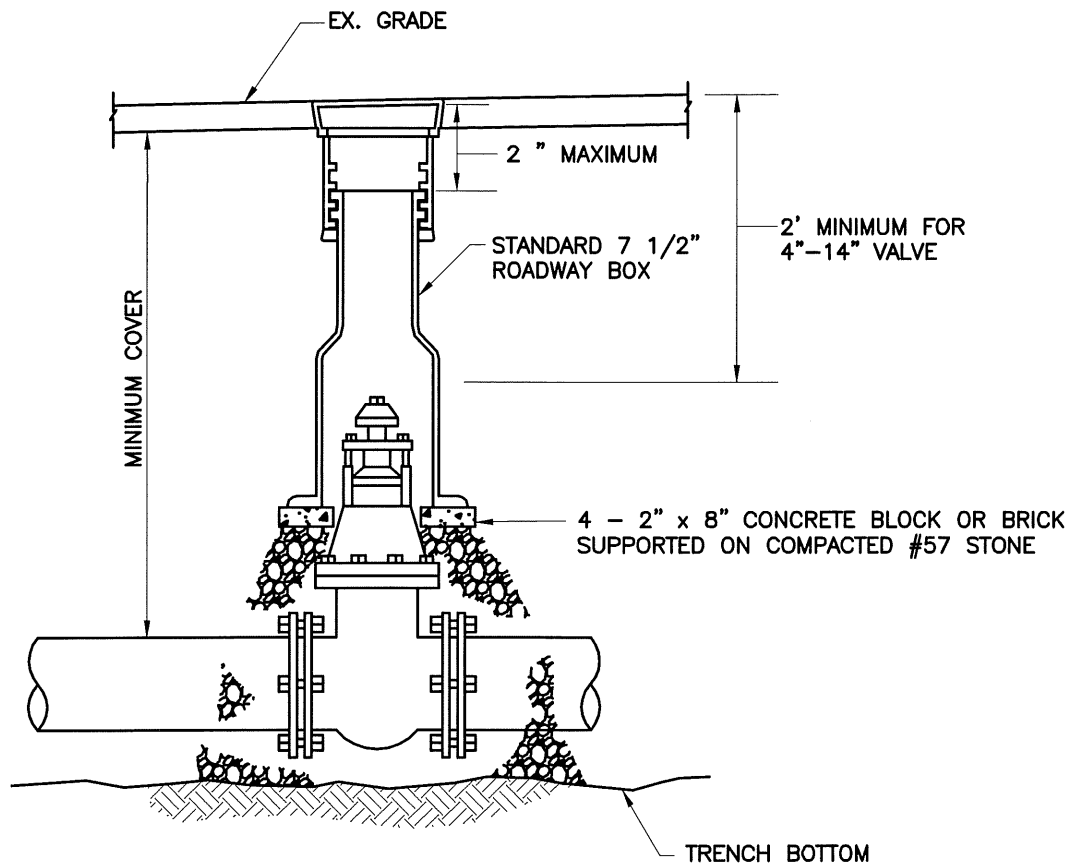


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF FIRE HYDRANT WITH
 TAPPING SLEEVE AND VALVE
 969 (ROADWAY BOX)

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 833.04		
SCALE: NONE	SHEET 1 OF 1	



NOTES:

1. NORMAL SETTING FOR 4"-14" SHOWN
2. DIMENSIONS NOTED MAY VARY DEPENDING ON MANUFACTURER



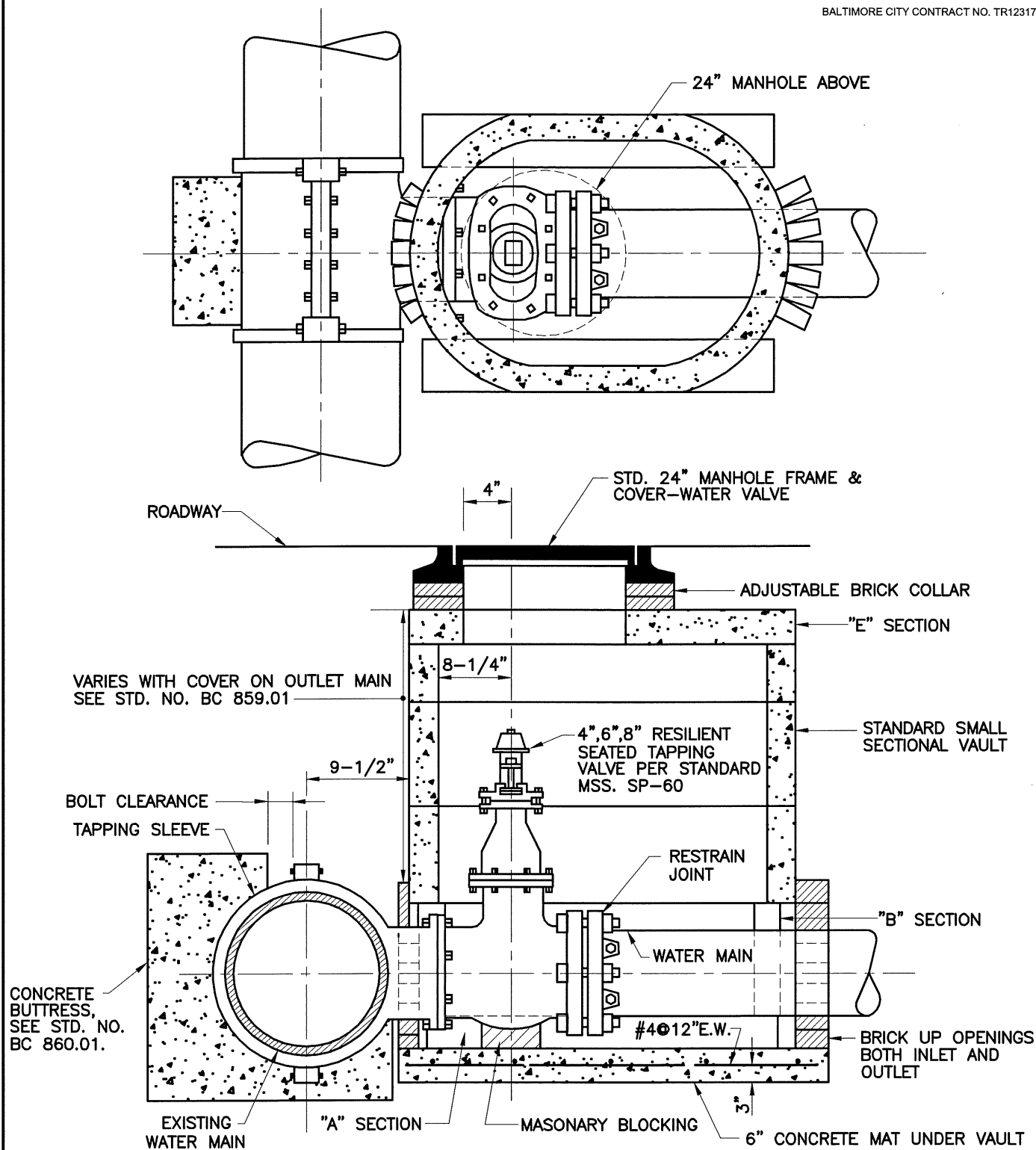
APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF RESILIENT - SEATED
 VALVE WITH ROADWAY BOX
 970 (4" - 14")

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO. BC 834.01	
SCALE: NONE	SHEET 1 OF 1



NOTES:

1. ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER & WASTEWATER APPROVED STANDARDS.
2. FOR DIMENSIONS & REINFORCEMENT OF THE VARIOUS SECTIONS, SEE STD. NO. BC 870.

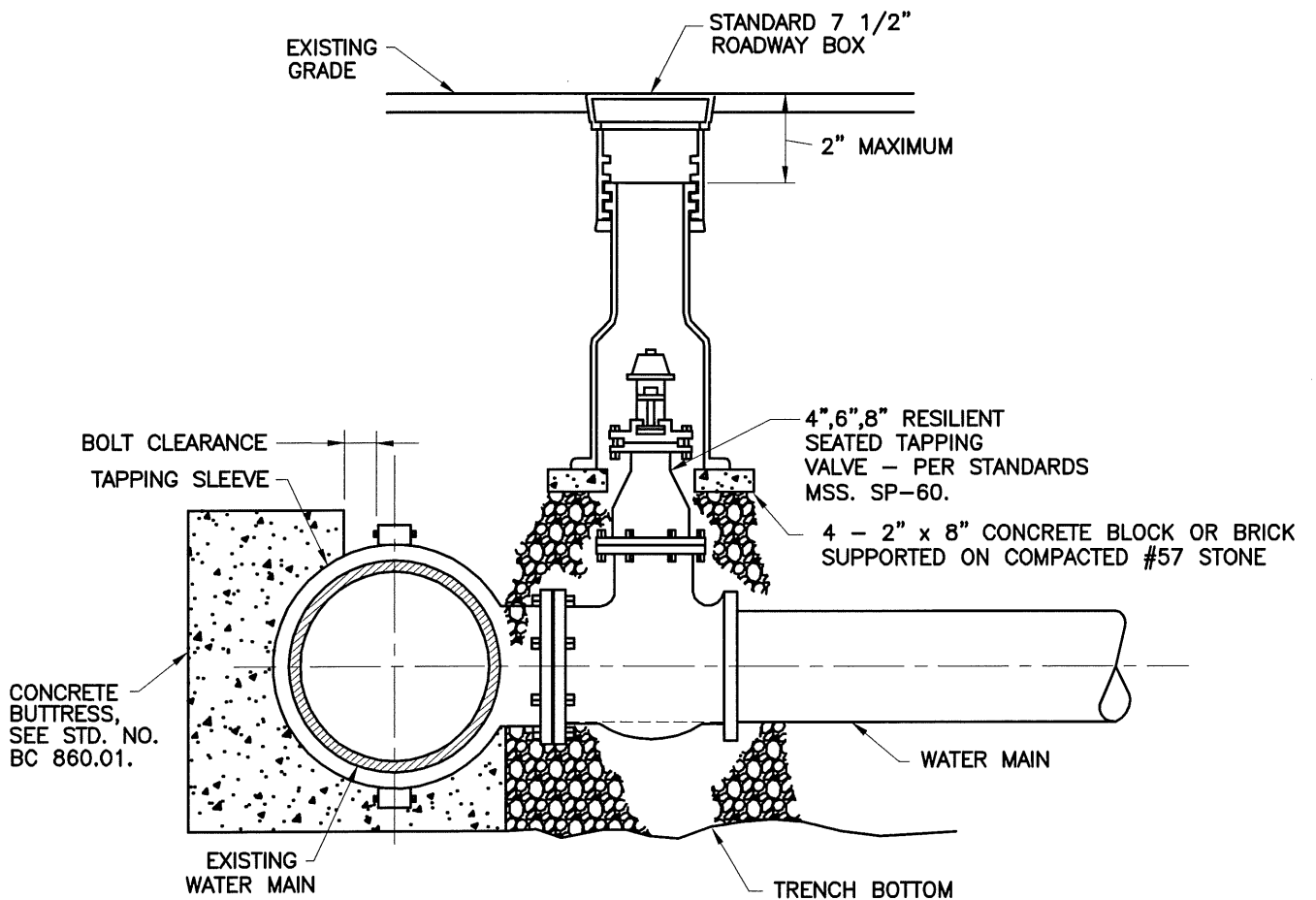
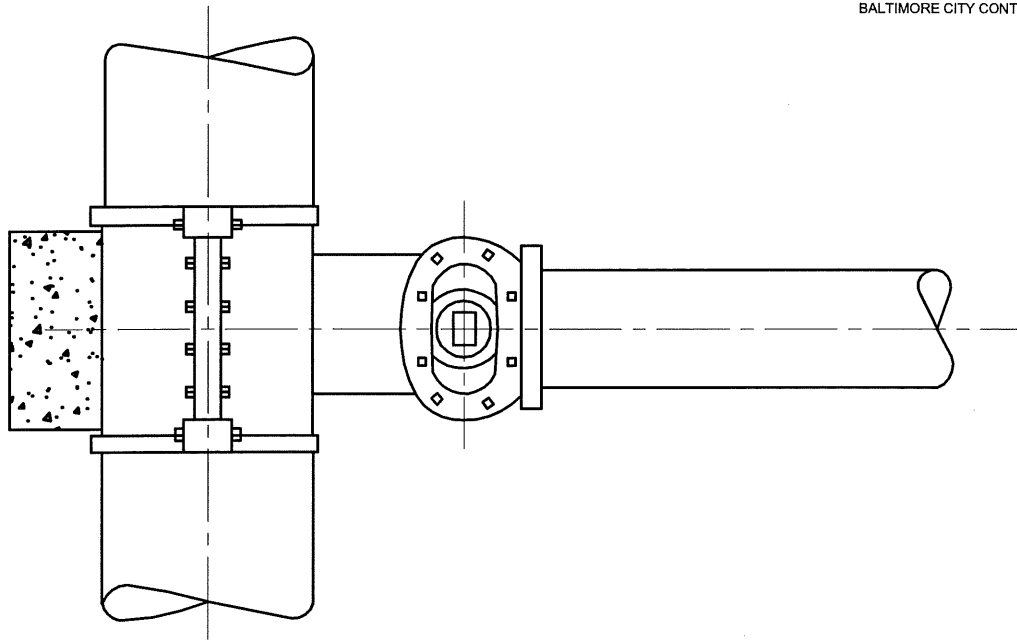


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF TAPPING VALVE WITH
 SMALL SECTIONAL VAULT
 971 (4" - 8")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.02		
SCALE: NONE	SHEET 1 OF 1	



NOTE:
 ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER &
 WASTEWATER APPROVED STANDARDS.



APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

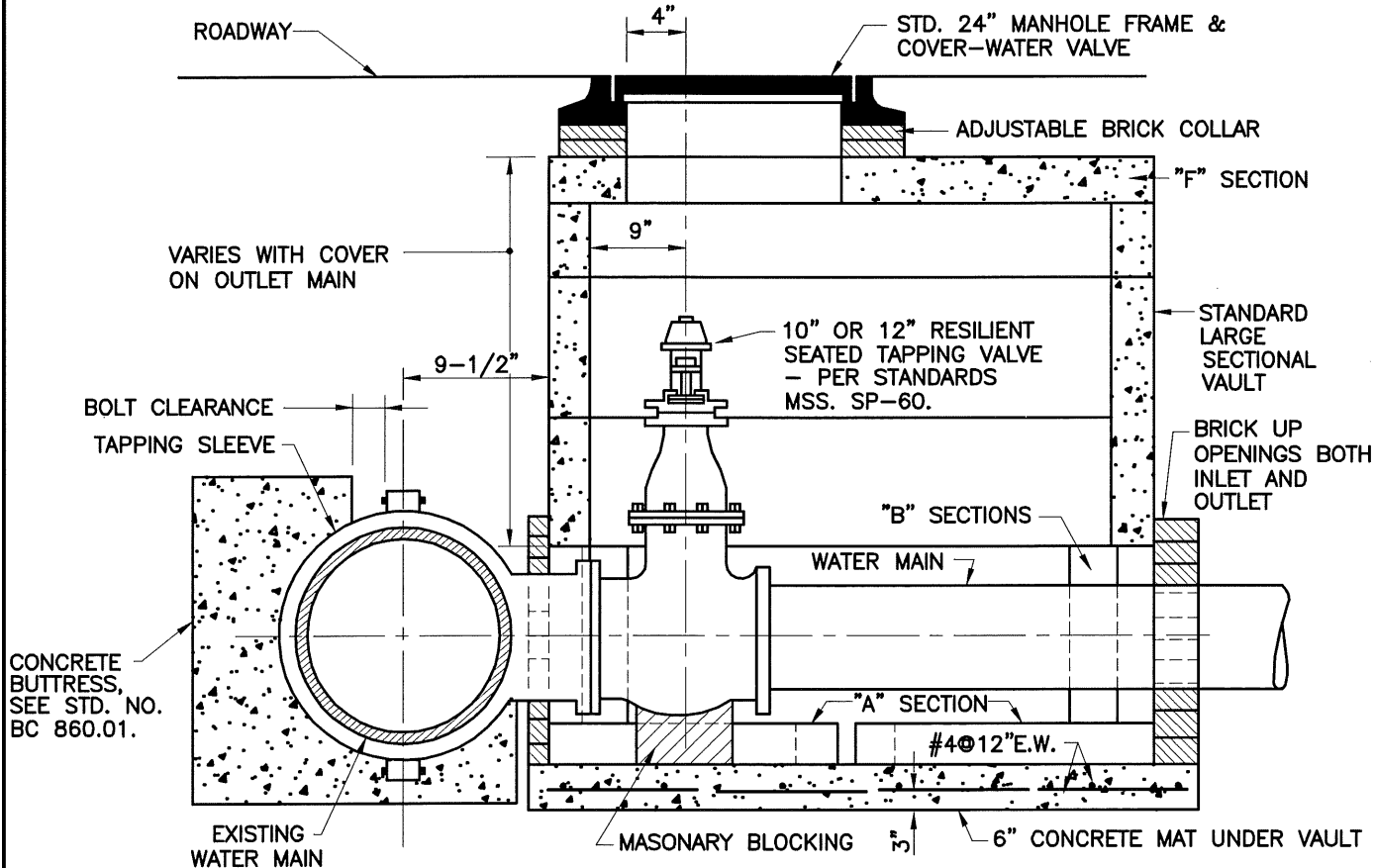
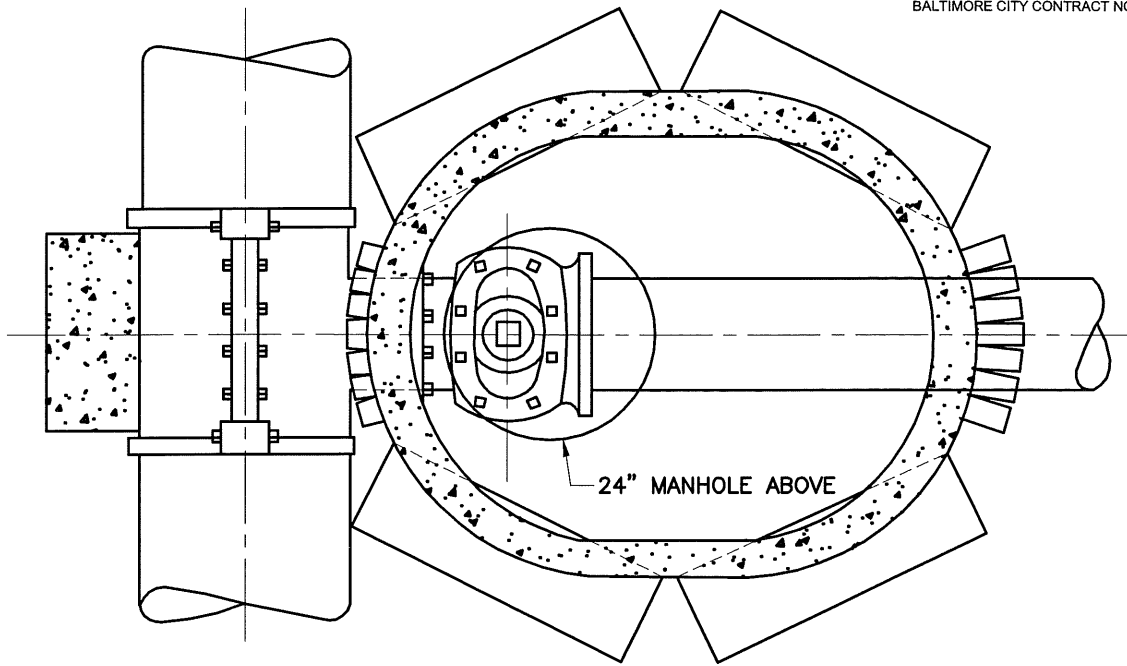
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF TAPPING VALVE
 973 WITH ROADWAY BOX
 972 (4" - 8")



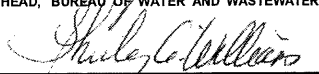
ISSUED	REVISED	REVISED
3 / 2008		

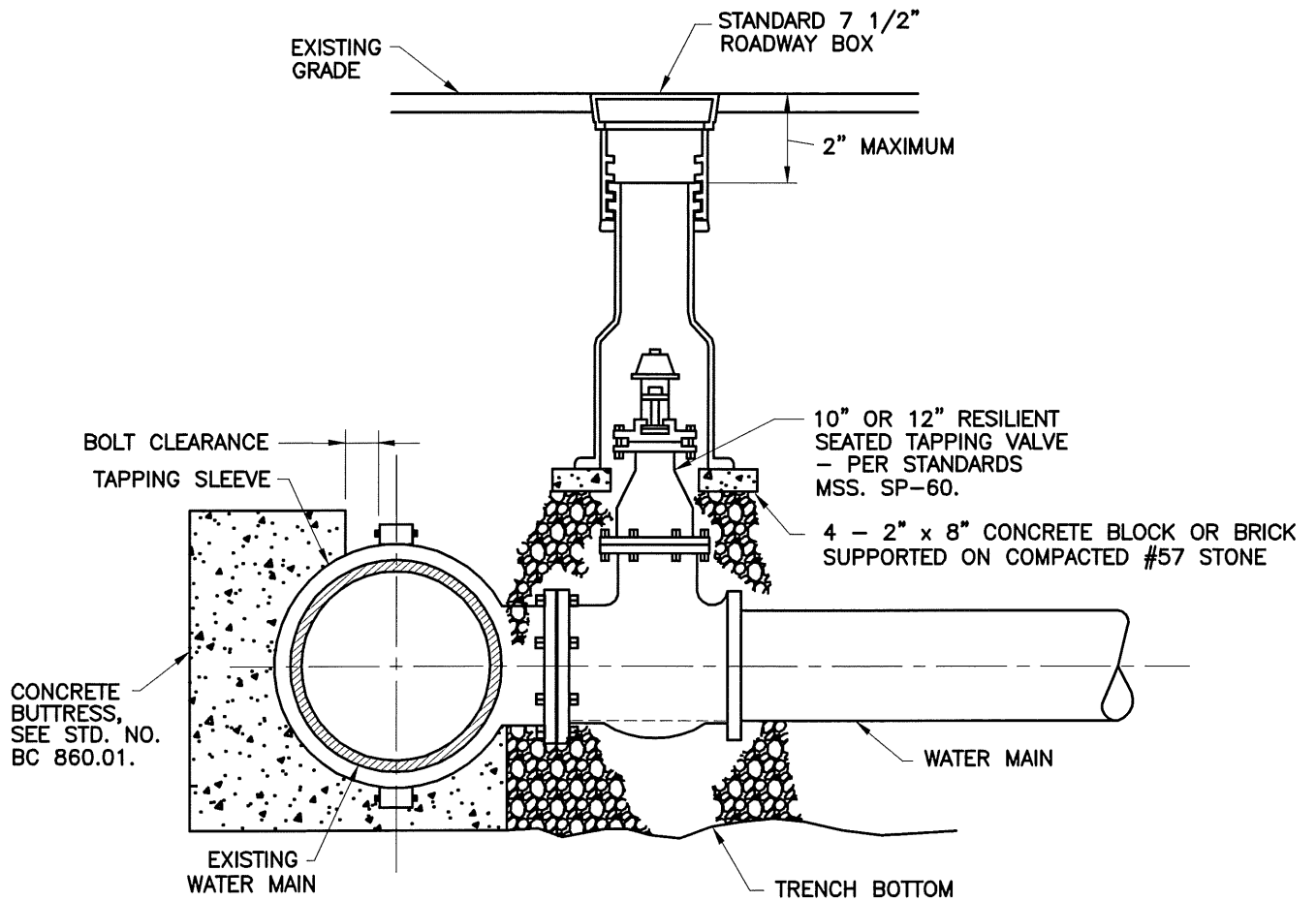
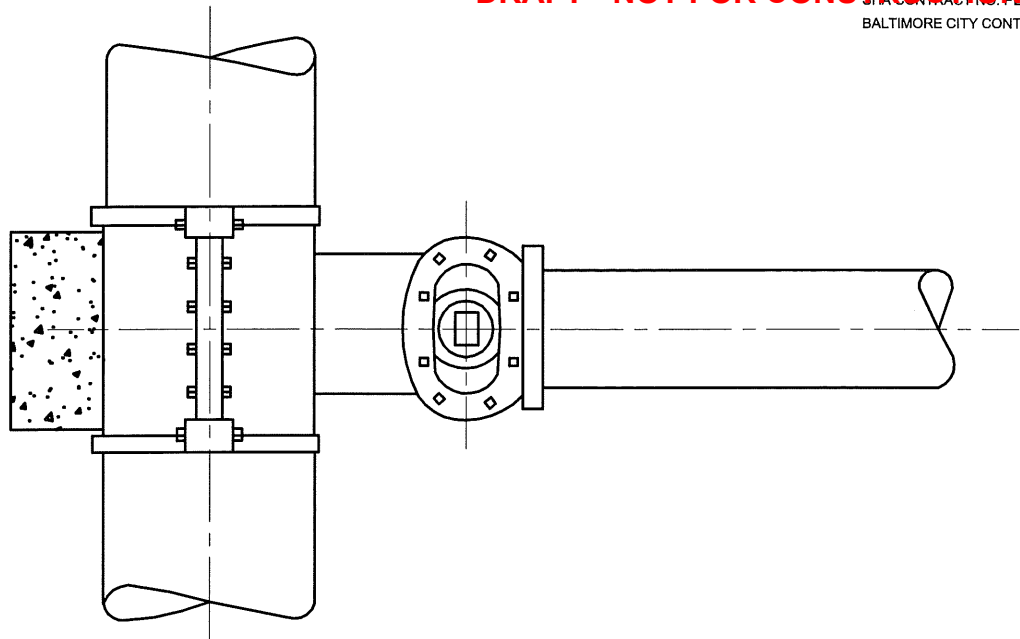
STANDARD NO.
BC 834.03

SCALE: NONE SHEET 1 OF 1



- NOTES:**
1. ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER & WASTEWATER APPROVED STANDARDS.
 2. FOR DIMENSIONS & REINFORCEMENT OF THE VARIOUS SECTIONS, SEE STD. NO. BC 871.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION OF TAPPING VALVE WITH LARGE SECTIONAL VAULT 973 (10" - 12")	3 / 2008	
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 834.04		



NOTE:
 ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER &
 WASTEWATER APPROVED STANDARDS.



APPROVED:
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 HEAD, BUREAU OF WATER AND WASTEWATER
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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

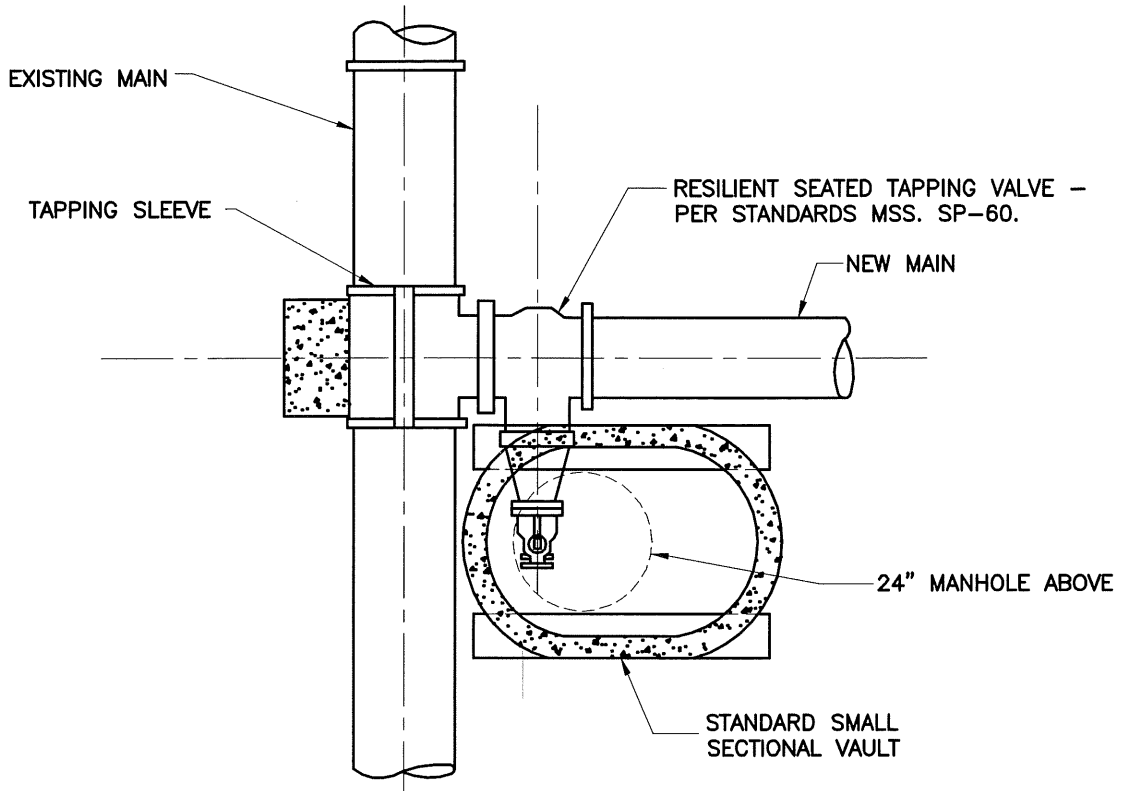
STANDARD INSTALLATION
 OF TAPPING VALVE
 WITH ROADWAY BOX
 974 (10" - 12")

ISSUED	REVISED	REVISED
3 / 2008		

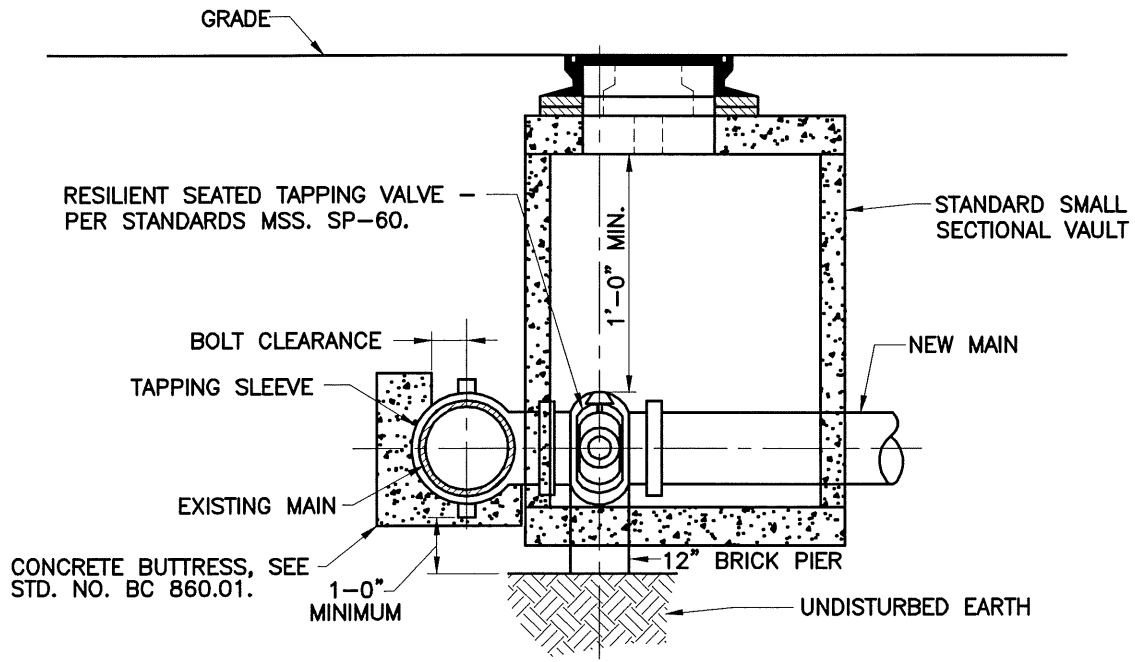
STANDARD NO.
BC 834.05

SCALE: NONE

SHEET 1 OF 1



PLAN



ELEVATION

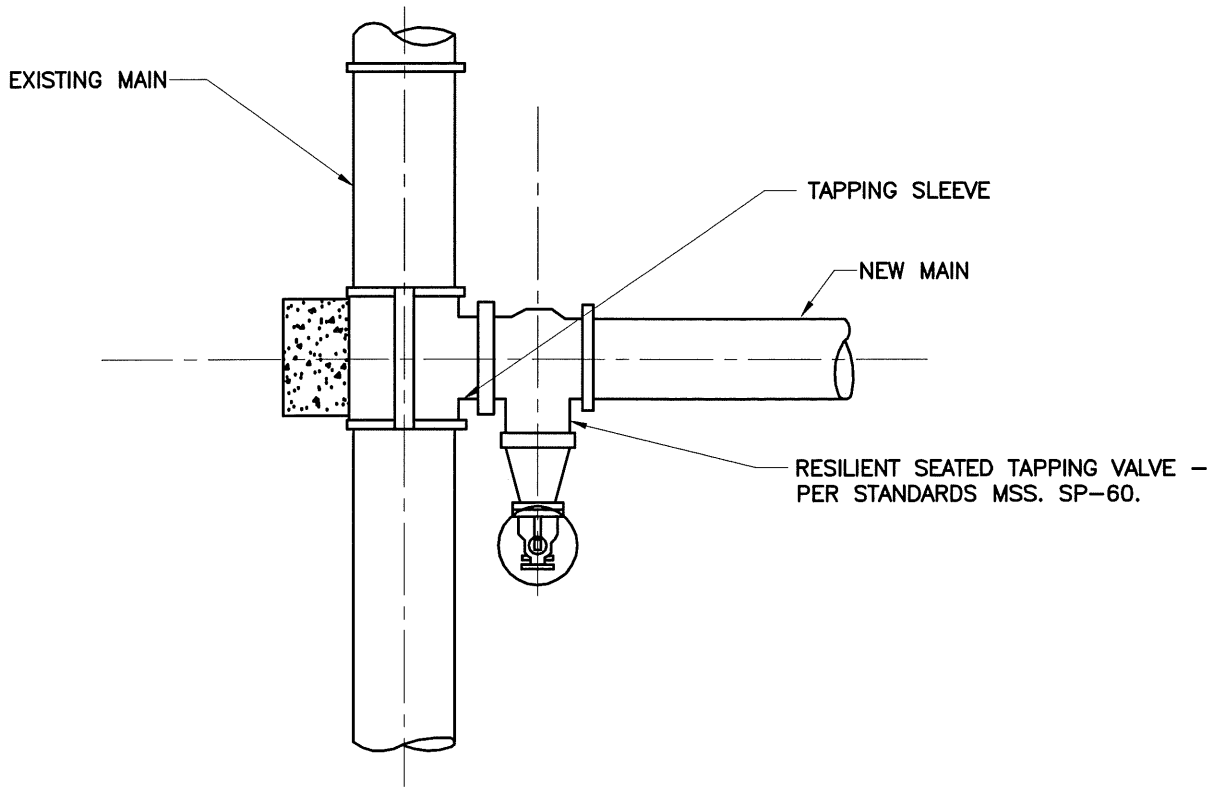


APPROVED:
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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

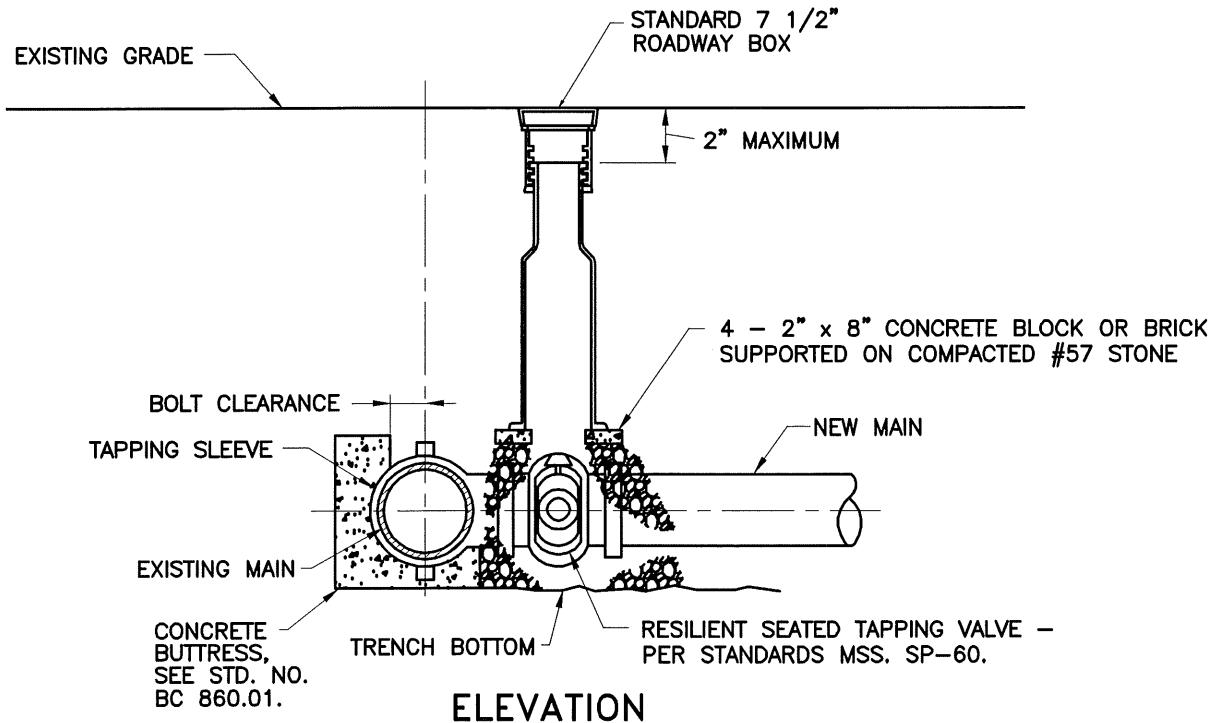
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF TAPPING SLEEVE AND
 HORIZONTAL VALVE WITH
 SECTIONAL VAULT (4" - 24")

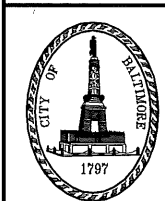
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.06		
SCALE: NONE	SHEET 1 OF 1	



PLAN



ELEVATION

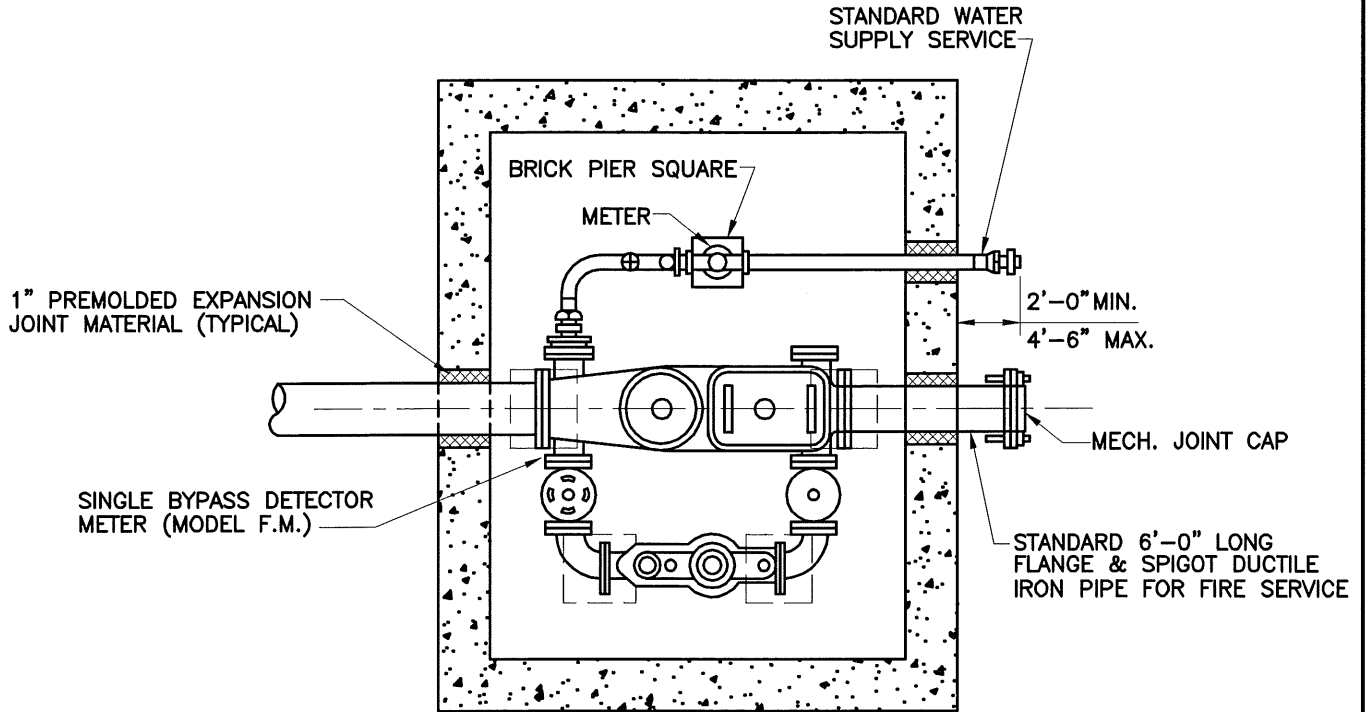


APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

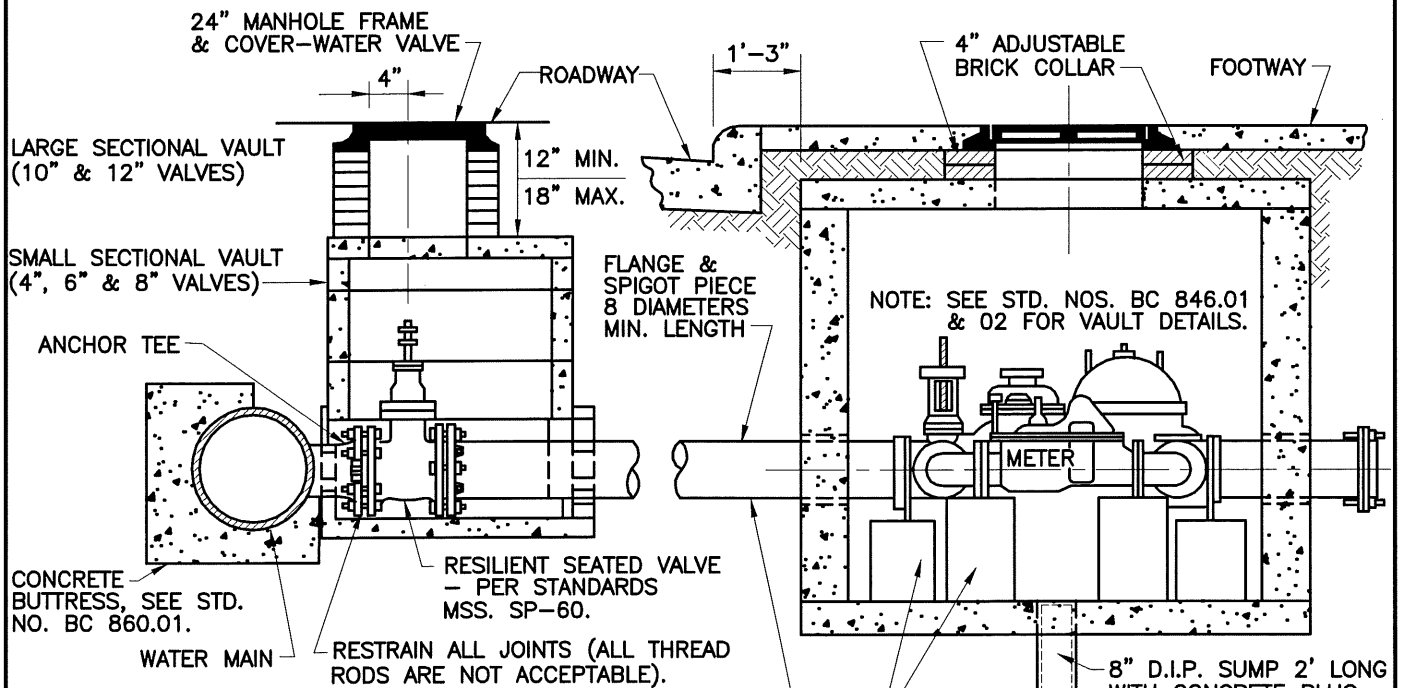
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF TAPPING SLEEVE AND
 HORIZONTAL VALVE WITH
 ROADWAY BOX (4" - 24")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.07		
SCALE: NONE	SHEET 1 OF 1	



PLAN (METER VAULT ONLY)



ELEVATION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER & SET METER LEVEL.



APPROVED:

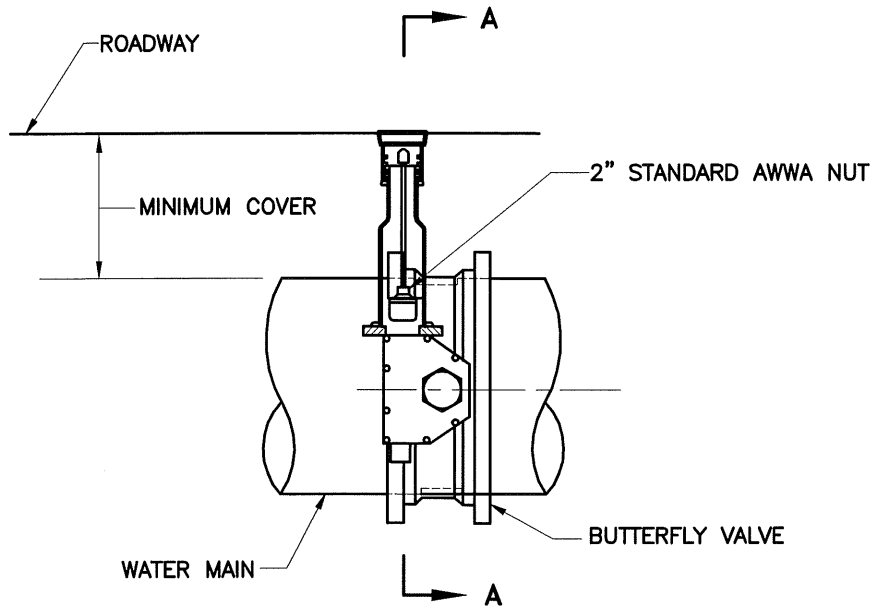
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

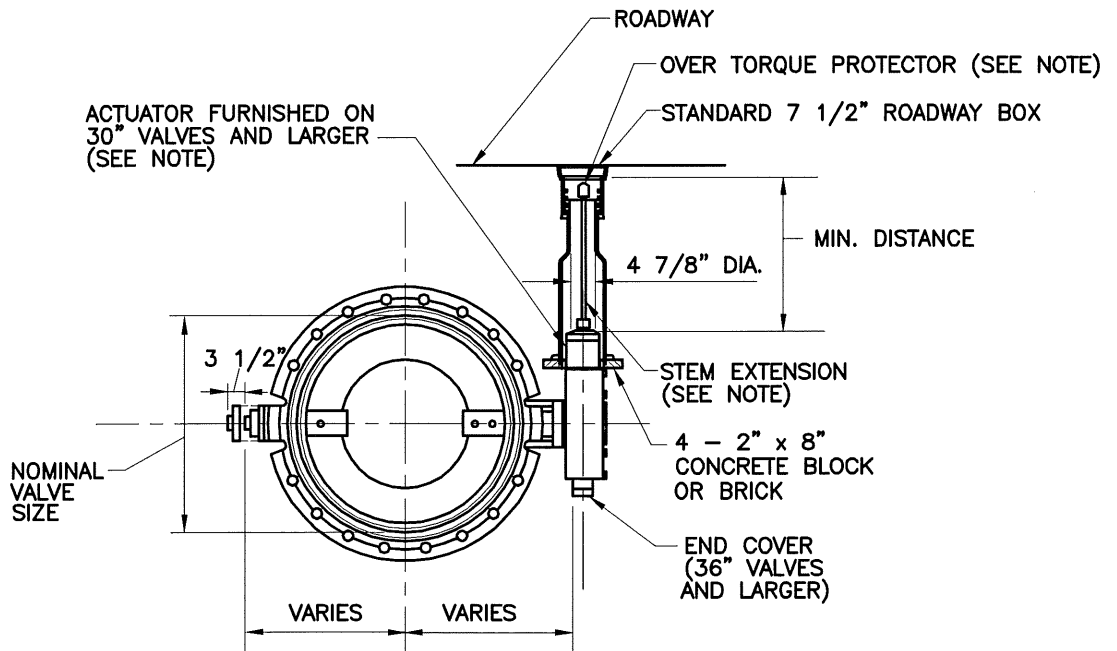
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(OUTSIDE FIRE HYDRANTS) WITH
TEE AND VALVE (SECTIONAL VAULT)

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 850.01		
SCALE: NONE	SHEET 1 OF 1	



ELEVATION



SECTION A-A

NOTE:
 SEE DPW BUTTERFLY VALVE
 SPECIFICATION FOR ALL BUTTERFLY
 VALVES 30"-72"



APPROVED:
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[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 OF BUTTERFLY VALVE
 WITH ROADWAY BOX
 978 (30" - 72")

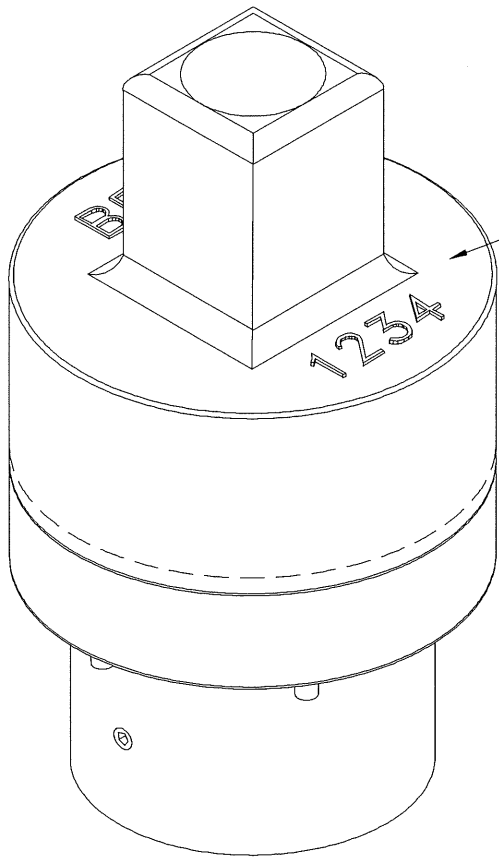
ISSUED	REVISED	REVISED
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3 / 2008

STANDARD NO.
 BC 835.02

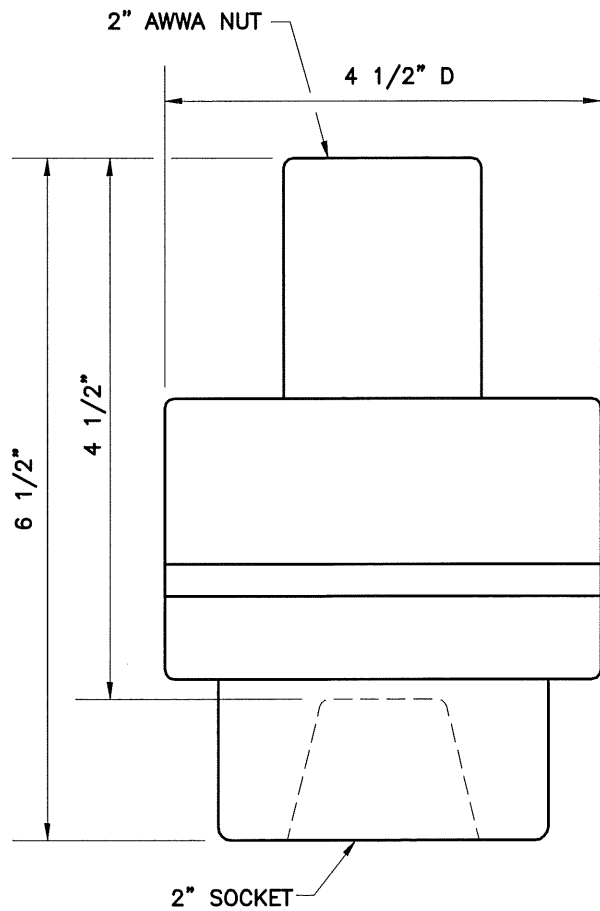
SCALE: NONE

SHEET 1 OF 1



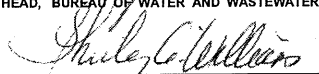


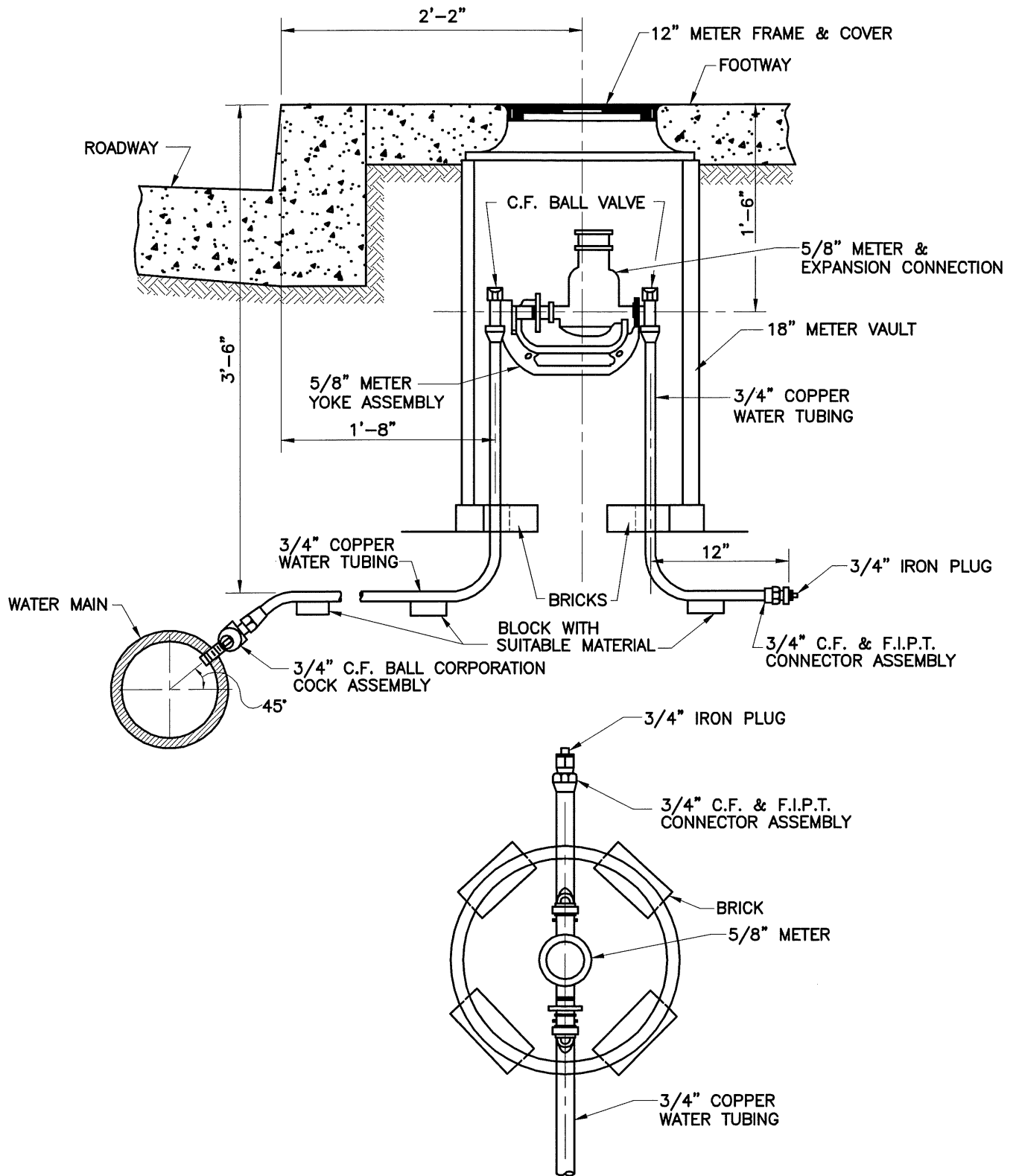
IDENTIFICATION DISK

INCLUDE: VALVE SIZE, VALVE TYPE (I.E., BUTTERFLY VALVE-BFV), & NUMBER OF TURNS TO OPEN WITH ARROW



USE: AUNSPACH CONTROLS, MODEL D86 BW-250 VALVE
 OVER TORQUE PROTECTOR OR APPROVED EQUAL

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
		STANDARD BUTTERFLY VALVE OVER TORQUE PROTECTOR 979	STANDARD NO. BC 835.03		SCALE: NONE SHEET 1 OF 1



NOTE:
 SEE STD NO. BC 853.01 FOR METER VAULT.



APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

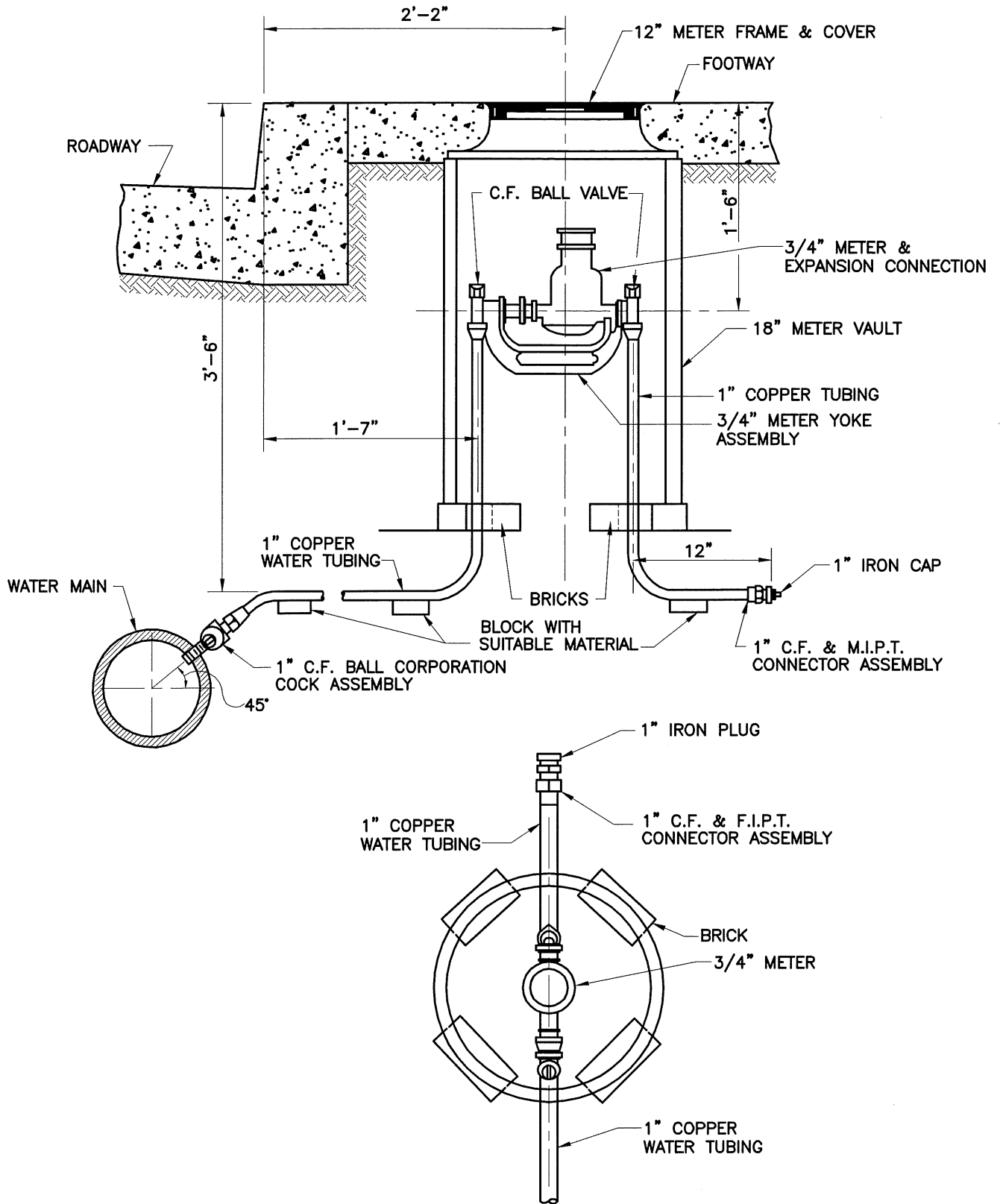
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
 3/4" WATER SUPPLY SERVICE
 981 (5/8" METER)
 980


ISSUED	REVISED	REVISED
3 / 2008		

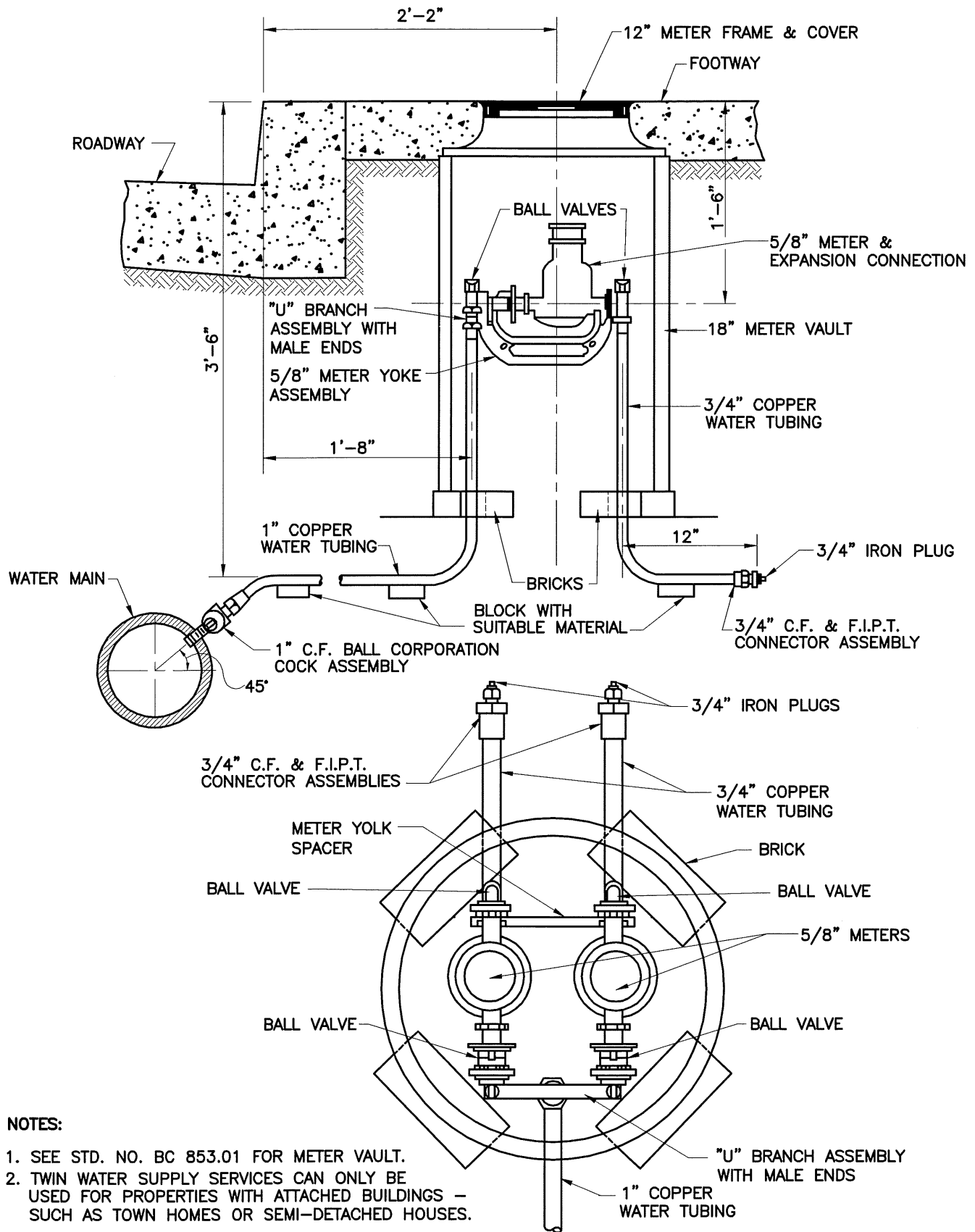
**STANDARD NO.
 BC 836.01**

SCALE: NONE SHEET 1 OF 1





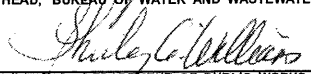
NOTE:
 SEE STD NO. BC 853.01 FOR METER VAULT.

	APPROVED: <i>[Signature]</i> HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	APPROVED: <i>[Signature]</i> DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD INSTALLATION OF 1" WATER SUPPLY SERVICE 982 (3/4" METER) 981			STANDARD NO. BC 837.01		
			SCALE: NONE	SHEET 1 OF 1	

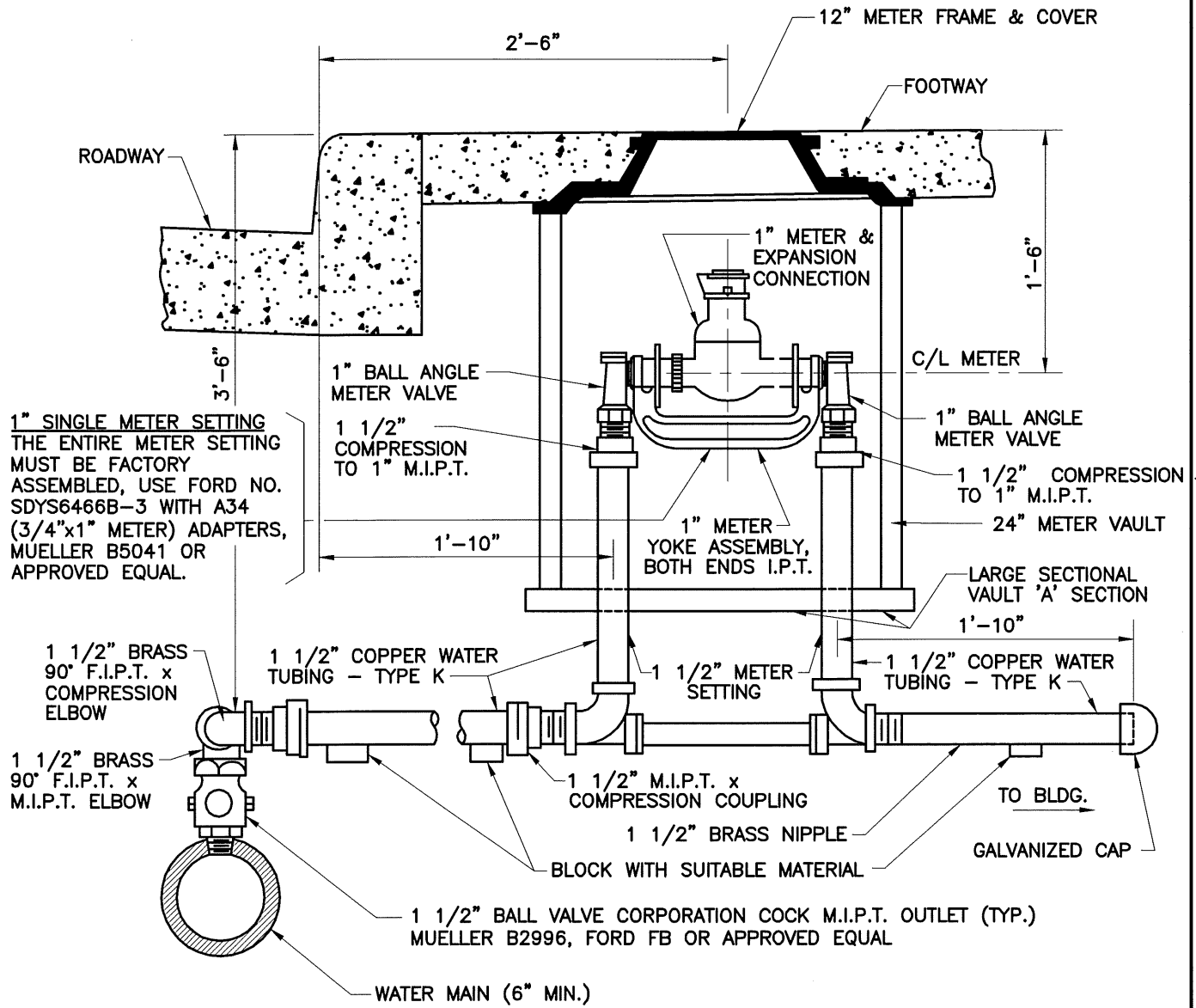


NOTES:



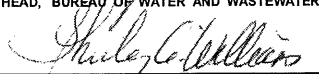
1. SEE STD. NO. BC 853.01 FOR METER VAULT.
2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.

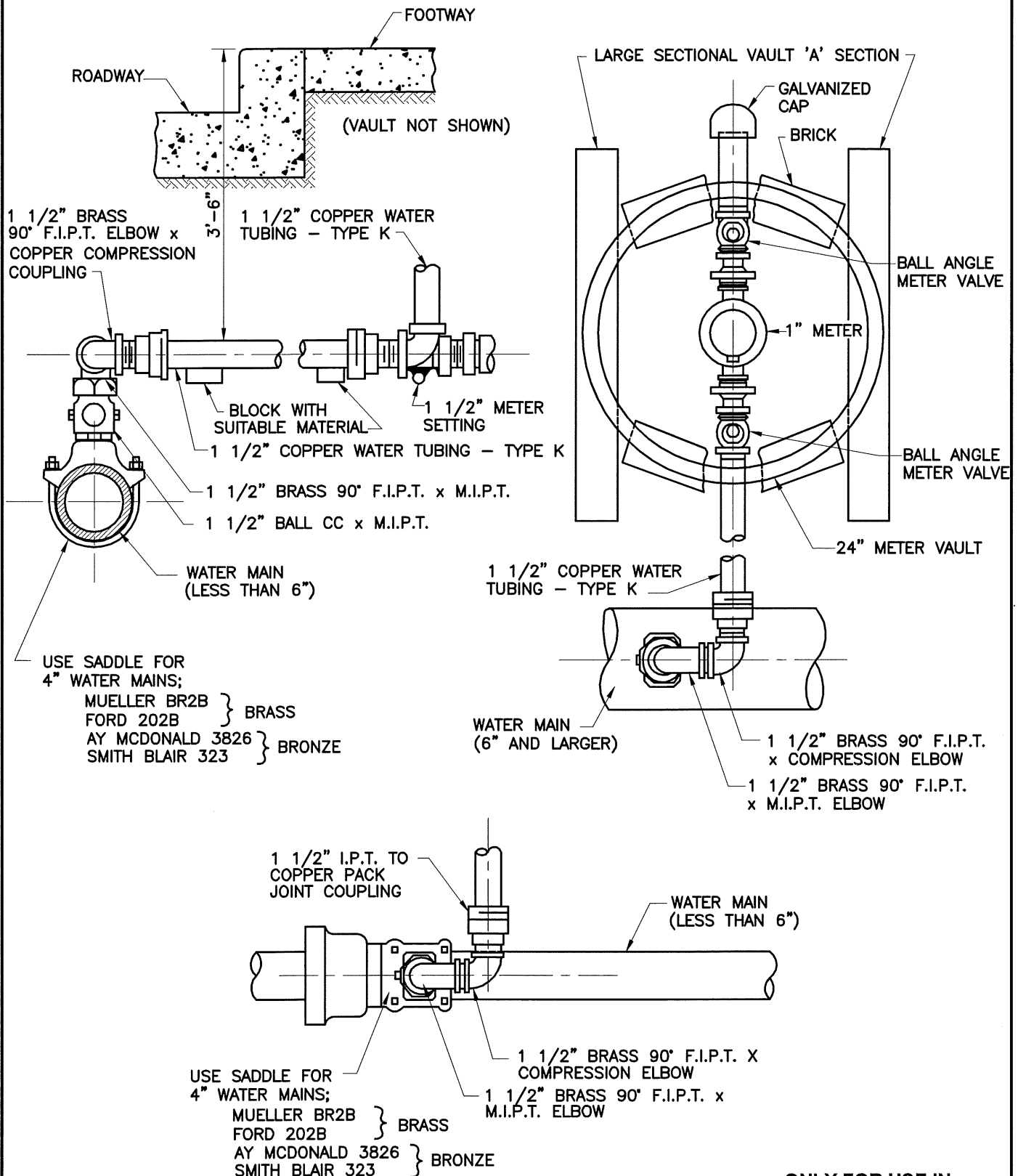
	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION OF TWIN WATER SUPPLY SERVICES (5/8" METERS)	3 / 2008	
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			STANDARD NO. BC 838.01		
			SCALE: NONE	SHEET 1 OF 1	

983
982



NOTE:
 SEE STD. NO. BC 853.01 FOR METER VAULT.



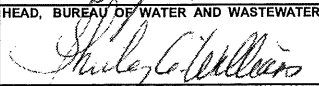
	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION OF 1 1/2" WATER SUPPLY SERVICE 984 (1" METER) FOR 986" MAIN AND LARGER	3 / 2008	
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			STANDARD NO. BC 839.01		
			SCALE: NONE	SHEET 1 OF 1	

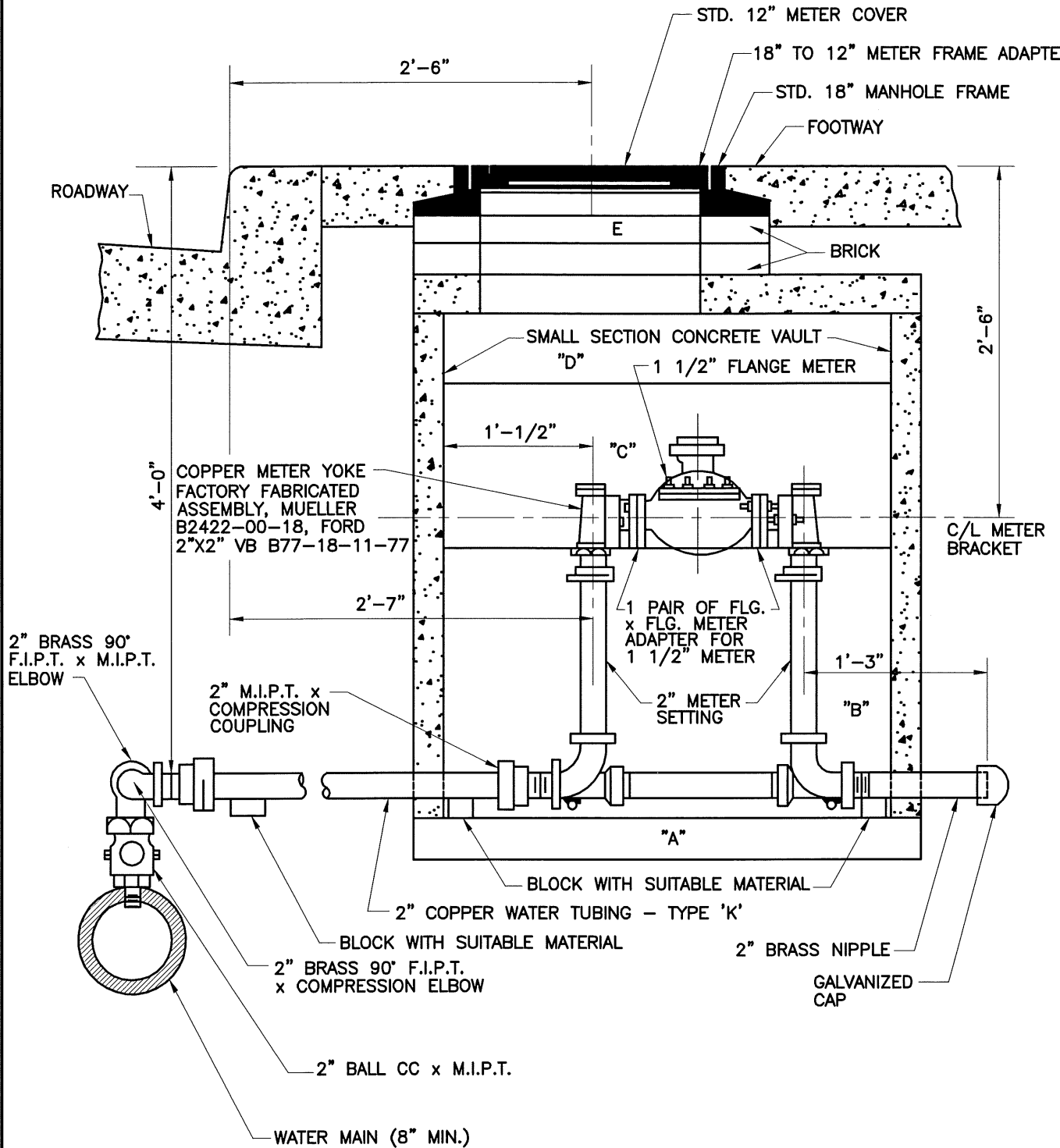




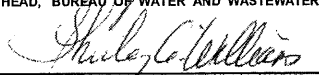
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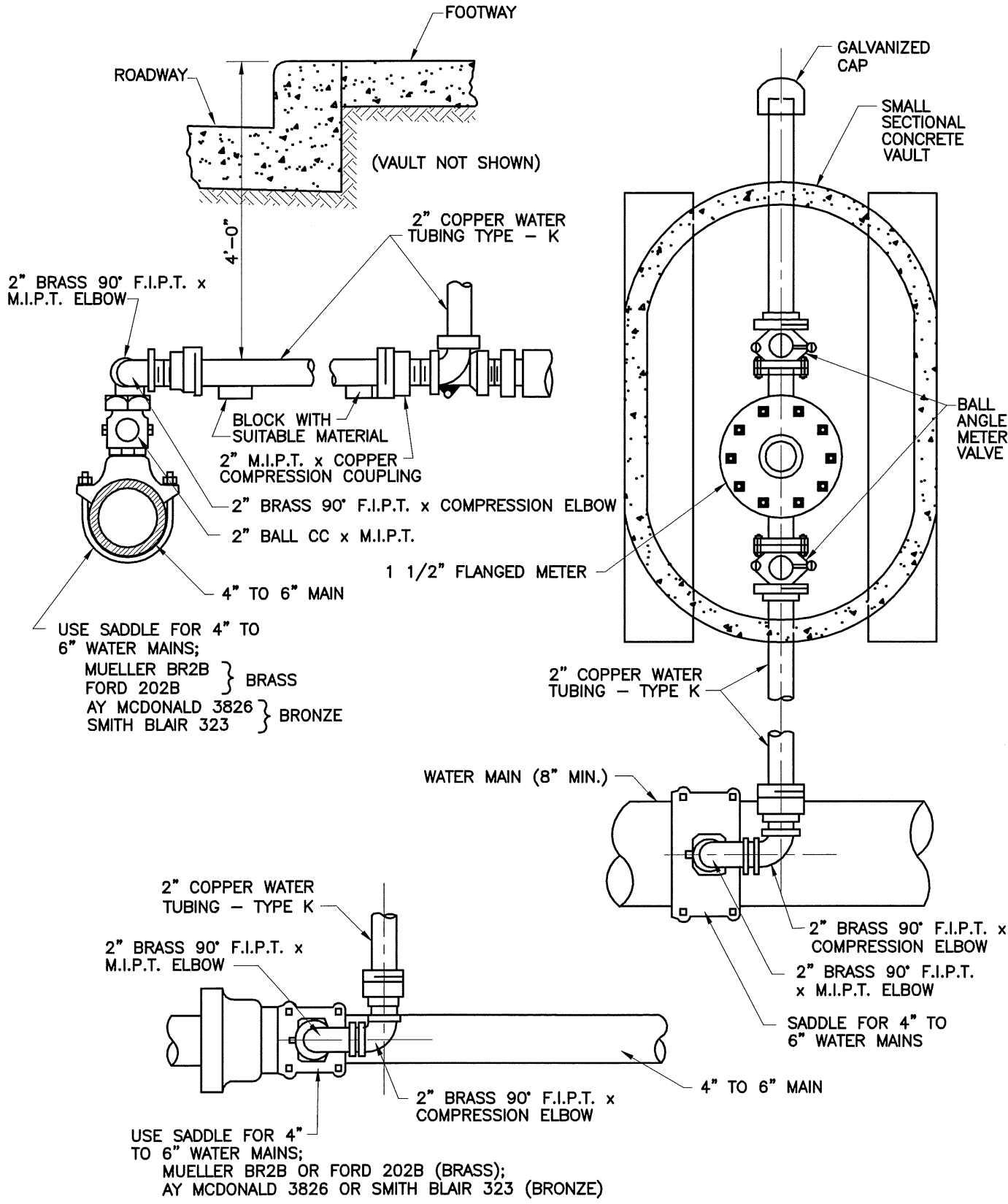
- FOR METER SETTINGS, SEE STD. NO. BC 839.01.
- SEE STD. NO. BC 853.01 FOR METER VAULT.

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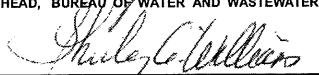
	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION OF 1 1/2" WATER SUPPLY SERVICE 985 (1" METER) FOR MAINS SMALLER THAN 6"	3 / 2008	
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			STANDARD NO. BC 839.02		
			SCALE: NONE	SHEET 1 OF 1	

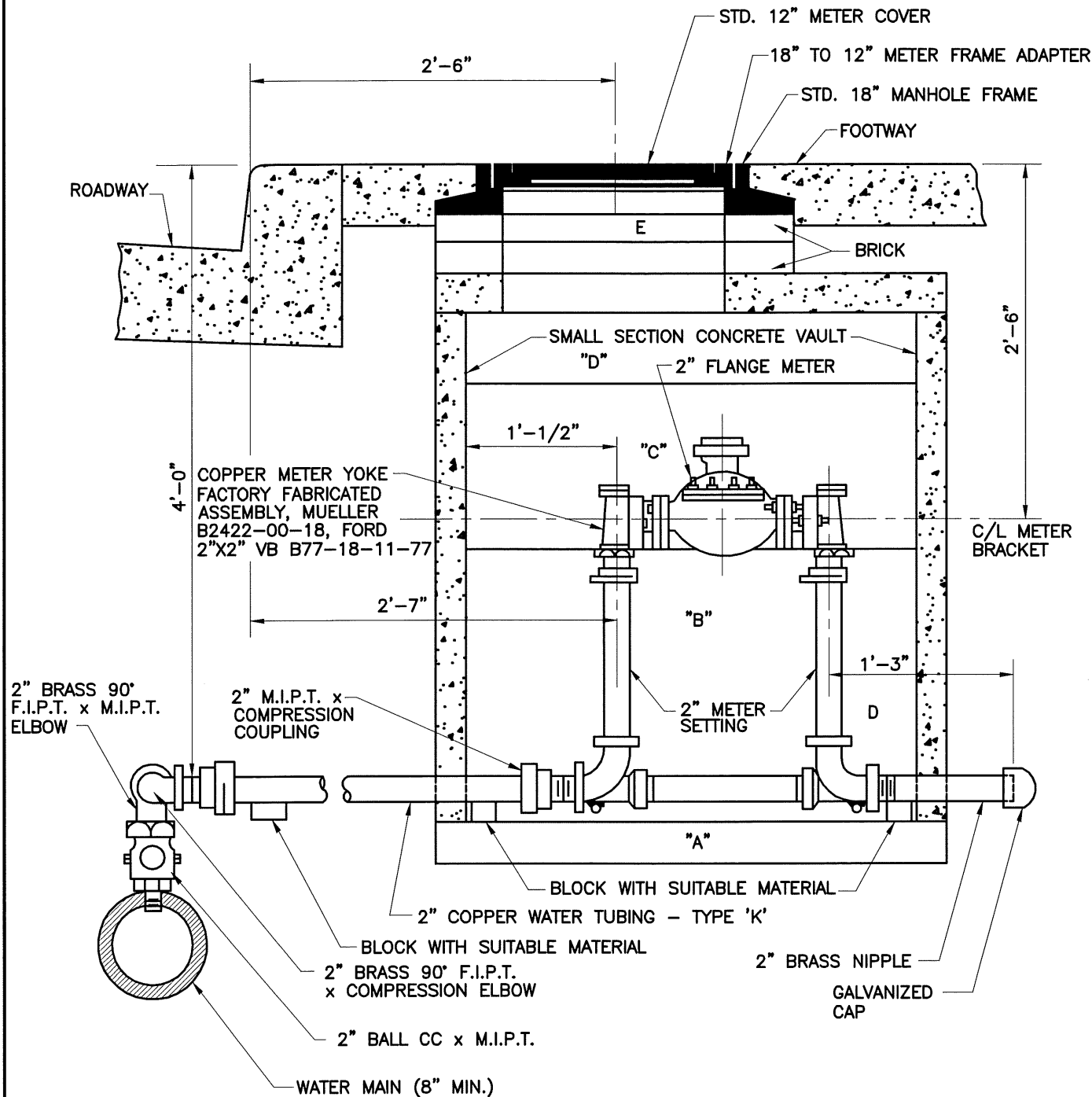


	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
STANDARD INSTALLATION OF 2" WATER SUPPLY SERVICE 986(1 1/2" METER) FOR 985" MAIN AND LARGER			STANDARD NO. BC 840.01		
			SCALE: NONE	SHEET 1 OF 1	



NOTE: FOR METER SETTINGS, SEE STD. NO. BC 840.01.

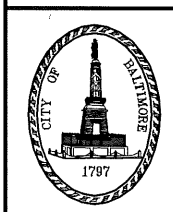
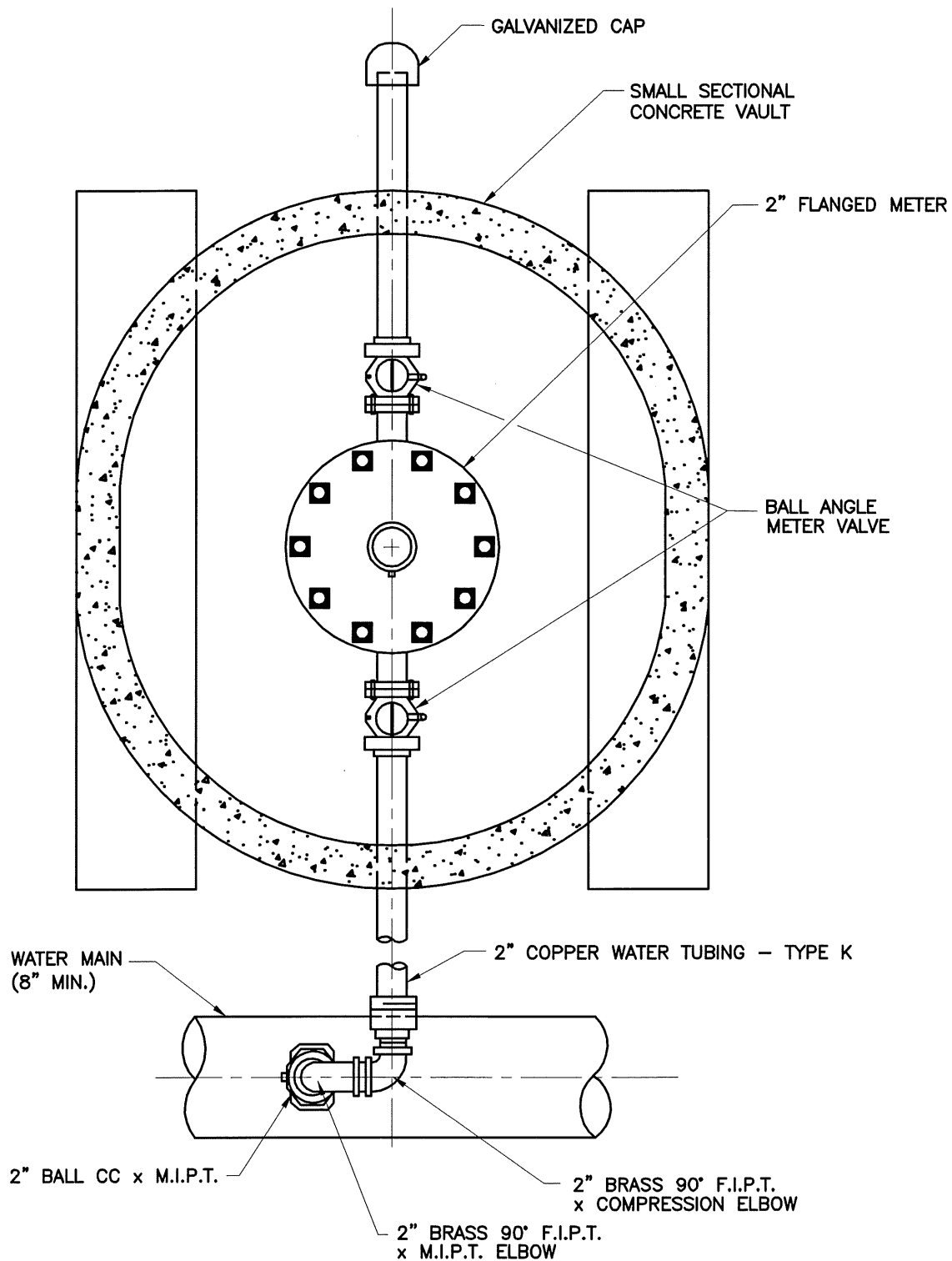
	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION OF 2" WATER SUPPLY SERVICE 987(1 1/2" METER) FOR 986 MAIN AND SMALLER	3 / 2008	
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			STANDARD NO. BC 840.02		
			SCALE: NONE	SHEET 1 OF 1	



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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 STANDARD INSTALLATION OF
 2" WATER SUPPLY SERVICE
 988 (2" METER) FOR
 98" MAIN AND LARGER

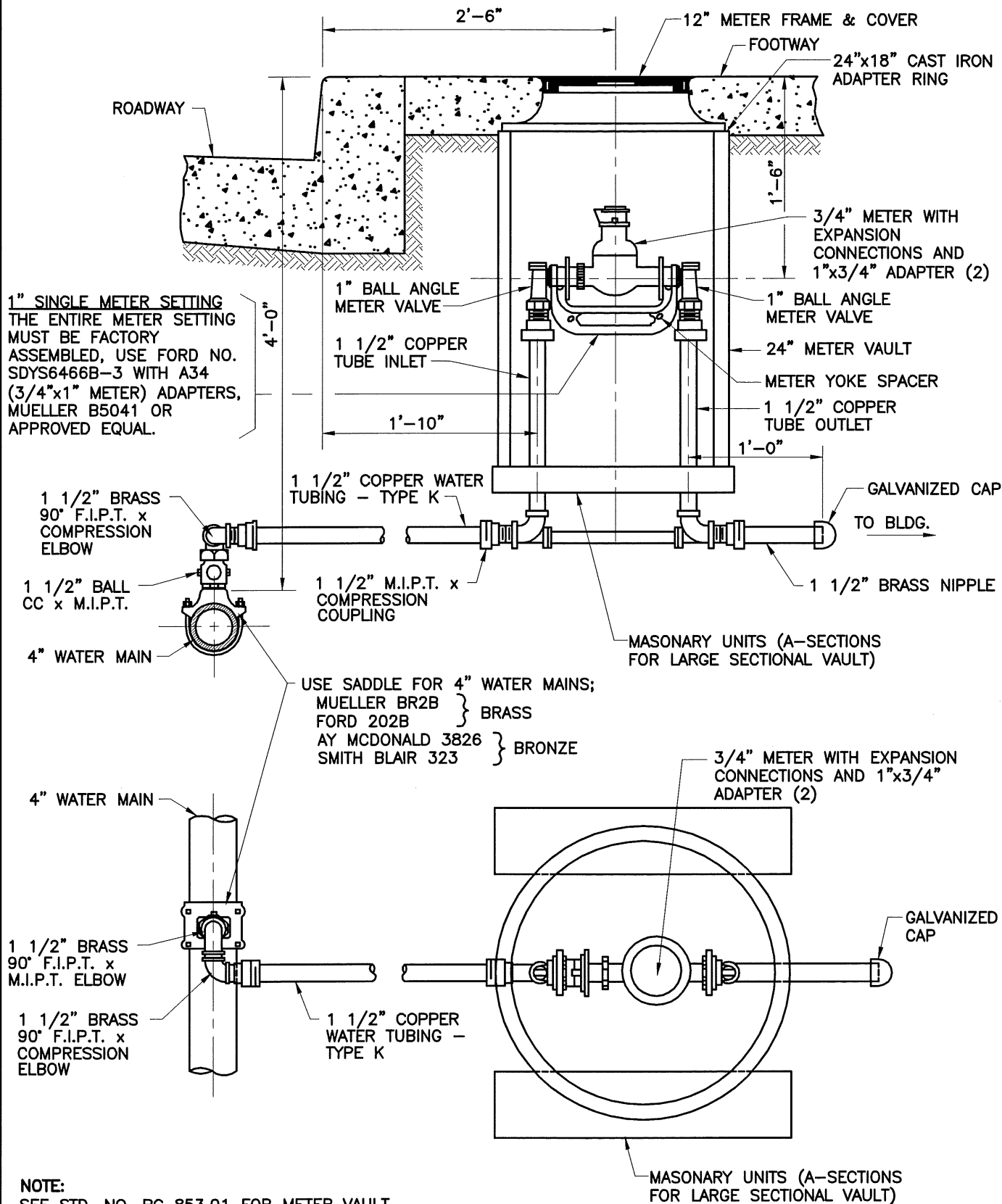
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 840.03		
SCALE: NONE		SHEET 1 OF 2



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 HEAD, BUREAU OF WATER AND WASTEWATER
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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 STANDARD INSTALLATION OF
 2" WATER SUPPLY SERVICE
 989 (2" METER) FOR
 988" MAIN AND LARGER

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 840.03		
SCALE: NONE	SHEET 2 OF 2	

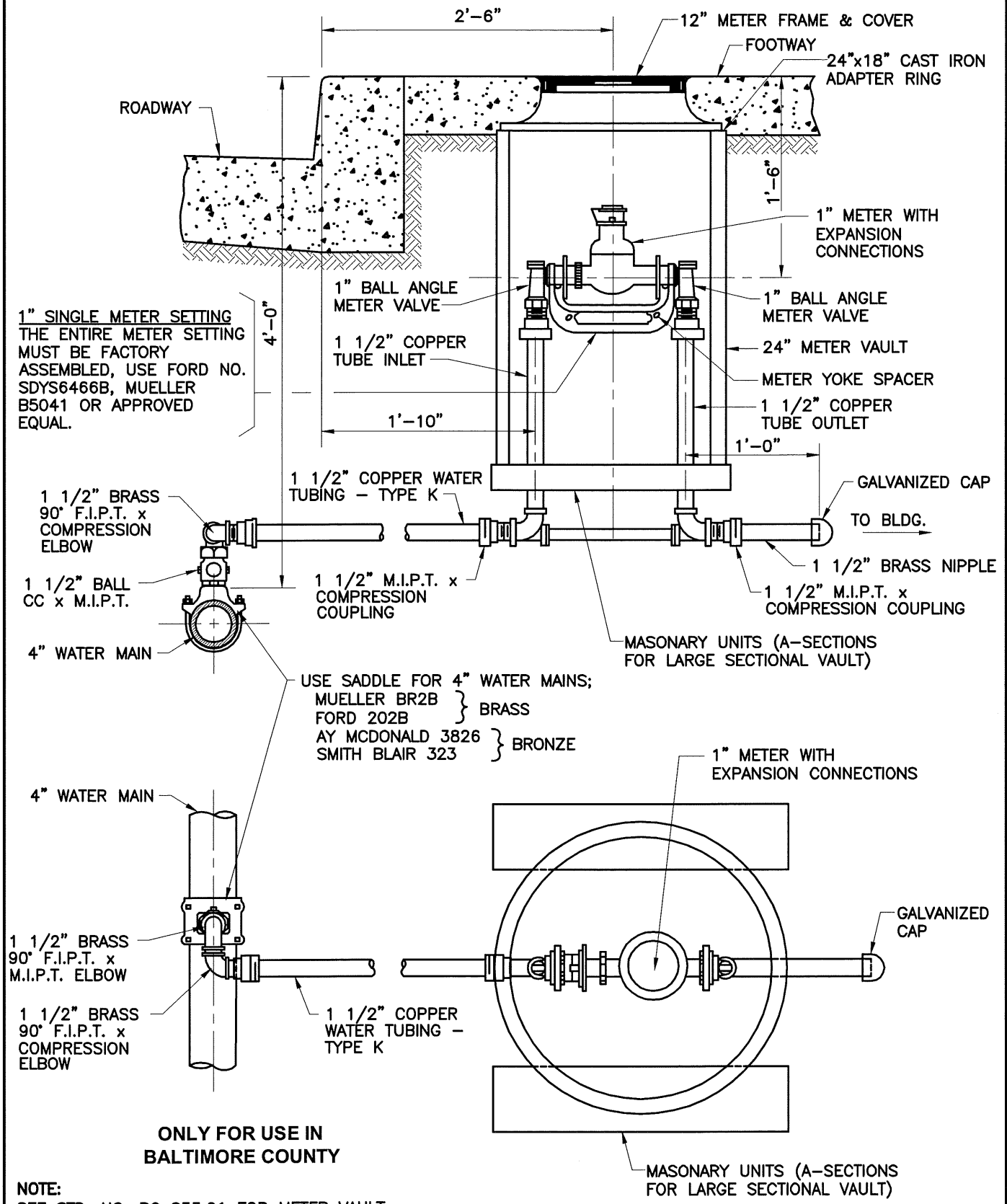


APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 FOR FIRE PROTECTION
 1 1/2" (3/4" METER) FOR 4" MAIN

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 841.01		
SCALE: NONE		SHEET 1 OF 1



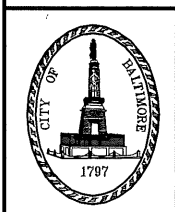
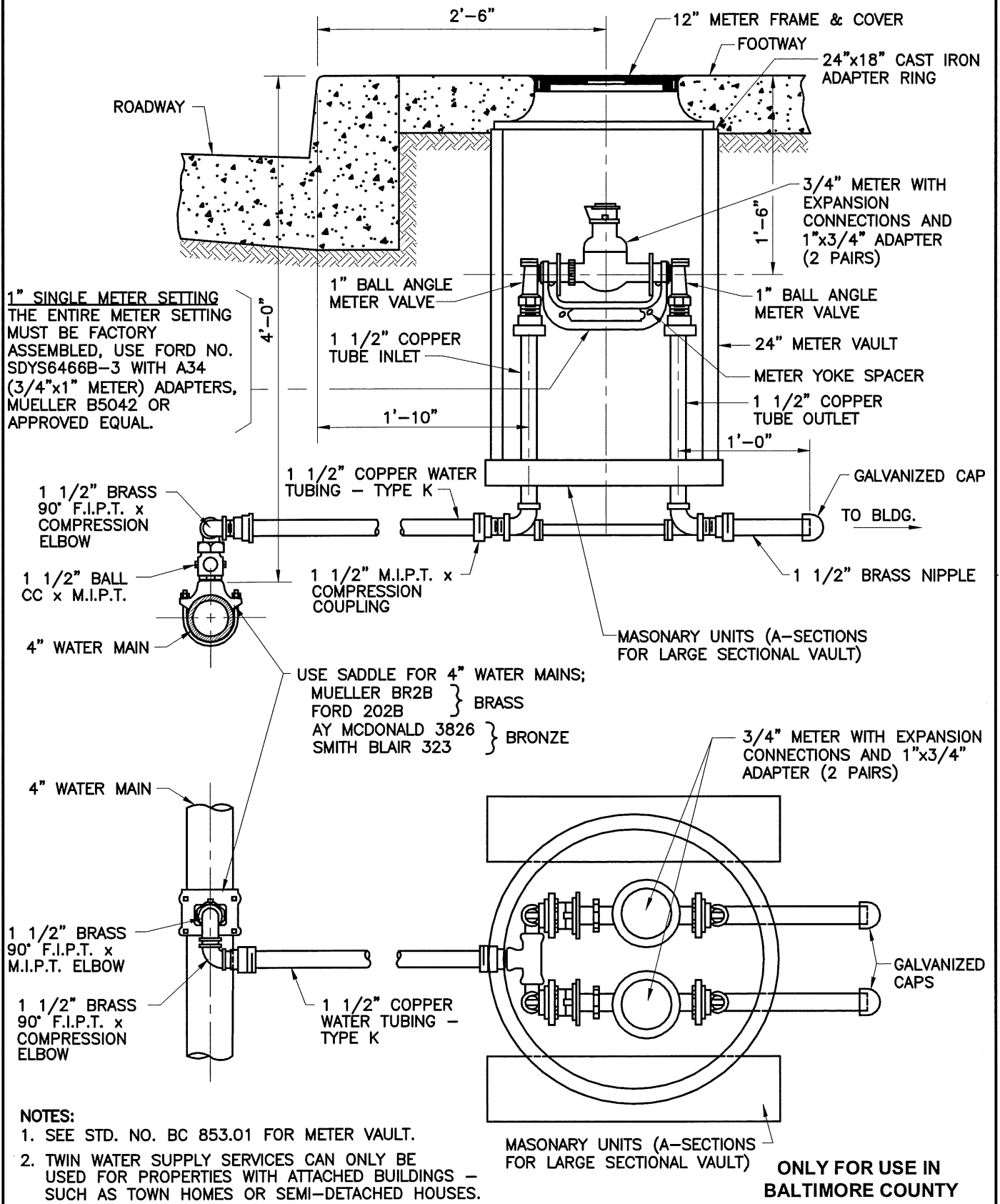
APPROVED: *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
FOR FIRE PROTECTION
1 1/2" (99) WATER SUPPLY SERVICE
METER) FOR 4" MAIN

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 841.02		
SCALE: NONE	SHEET 1 OF 1	



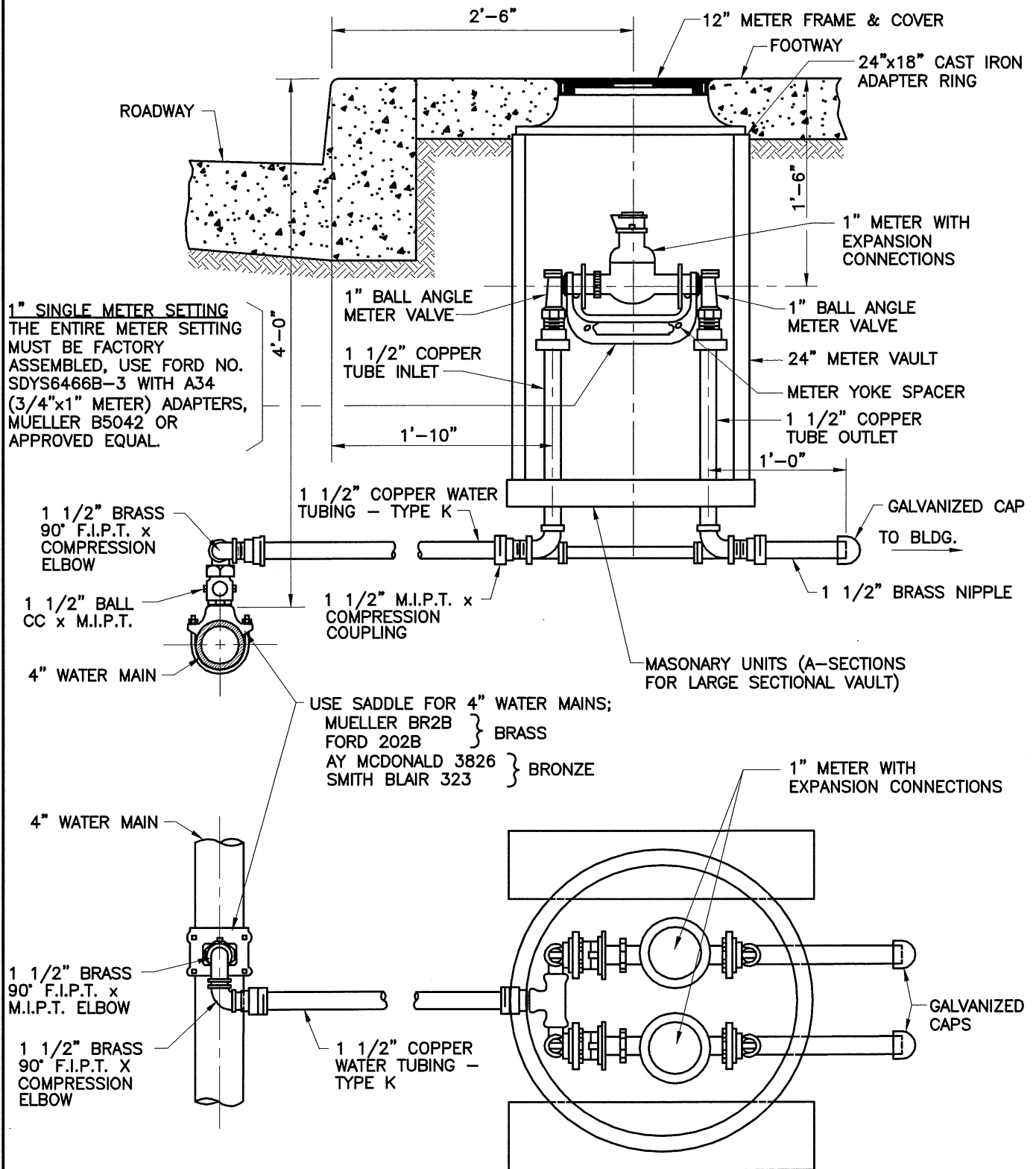
APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 FOR FIRE PROTECTION
 1 1/2" TWIN WATER SUPPLY SERVICES
 (3/4" METERS) FOR 4" MAIN

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 841.03		
SCALE: NONE	SHEET 1 OF 1	



1" SINGLE METER SETTING
THE ENTIRE METER SETTING
MUST BE FACTORY
ASSEMBLED, USE FORD NO.
SDYS6466B-3 WITH A34
(3/4"x1" METER) ADAPTERS,
MUELLER B5042 OR
APPROVED EQUAL.

1 1/2" BRASS
90° F.I.P.T. x
COMPRESSION
ELBOW

1 1/2" BALL
CC x M.I.P.T.

4" WATER MAIN

4" WATER MAIN

1 1/2" BRASS
90° F.I.P.T. x
M.I.P.T. ELBOW

1 1/2" BRASS
90° F.I.P.T. X
COMPRESSION
ELBOW

1 1/2" COPPER WATER
TUBING - TYPE K

1 1/2" M.I.P.T. x
COMPRESSION
COUPLING

USE SADDLE FOR 4" WATER MAINS;
MUELLER BR2B } BRASS
FORD 202B }
AY MCDONALD 3826 } BRONZE
SMITH BLAIR 323 }

1 1/2" COPPER
WATER TUBING -
TYPE K

12" METER FRAME & COVER

FOOTWAY

24"x18" CAST IRON
ADAPTER RING

1" METER WITH
EXPANSION
CONNECTIONS

1" BALL ANGLE
METER VALVE

1" BALL ANGLE
METER VALVE

1 1/2" COPPER
TUBE INLET

24" METER VAULT

METER YOKE SPACER

1 1/2" COPPER
TUBE OUTLET

GALVANIZED CAP
TO BLDG.

1 1/2" BRASS NIPPLE

MASONRY UNITS (A-SECTIONS
FOR LARGE SECTIONAL VAULT)

1" METER WITH
EXPANSION CONNECTIONS

GALVANIZED
CAPS

MASONRY UNITS (A-SECTIONS
FOR LARGE SECTIONAL VAULT)

- NOTES:**
1. SEE STD. NO. BC 853.01 FOR METER VAULT.
 2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.

**ONLY FOR USE IN
BALTIMORE COUNTY**



APPROVED:
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HEAD, BUREAU OF WATER AND WASTEWATER
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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

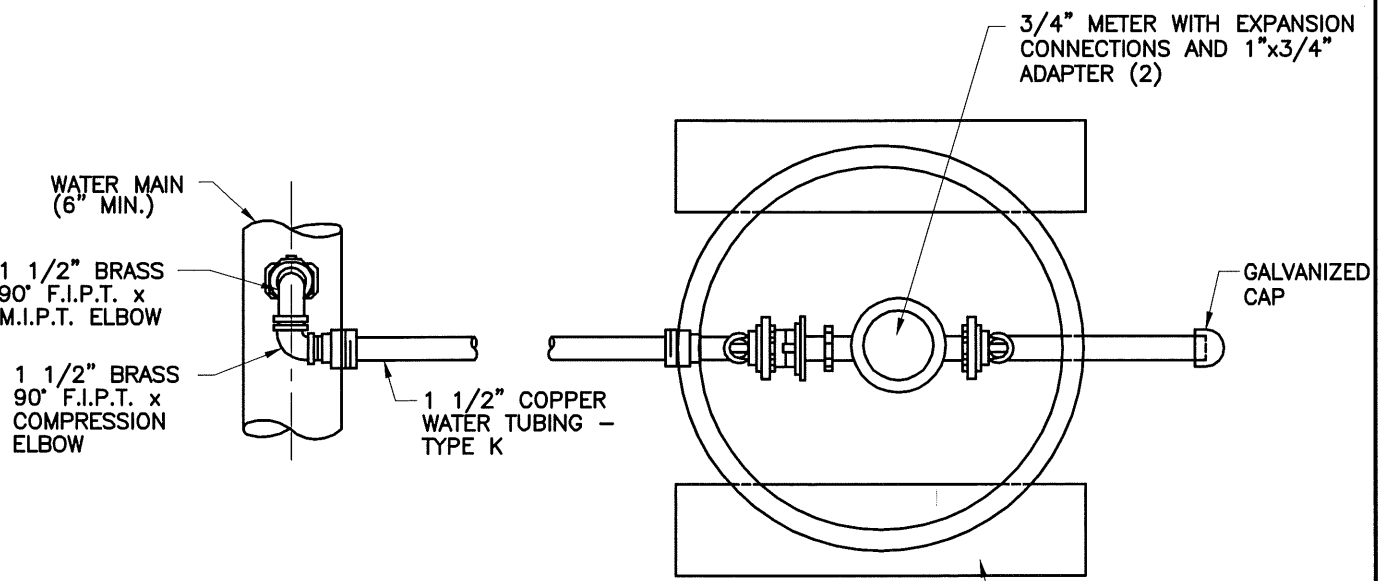
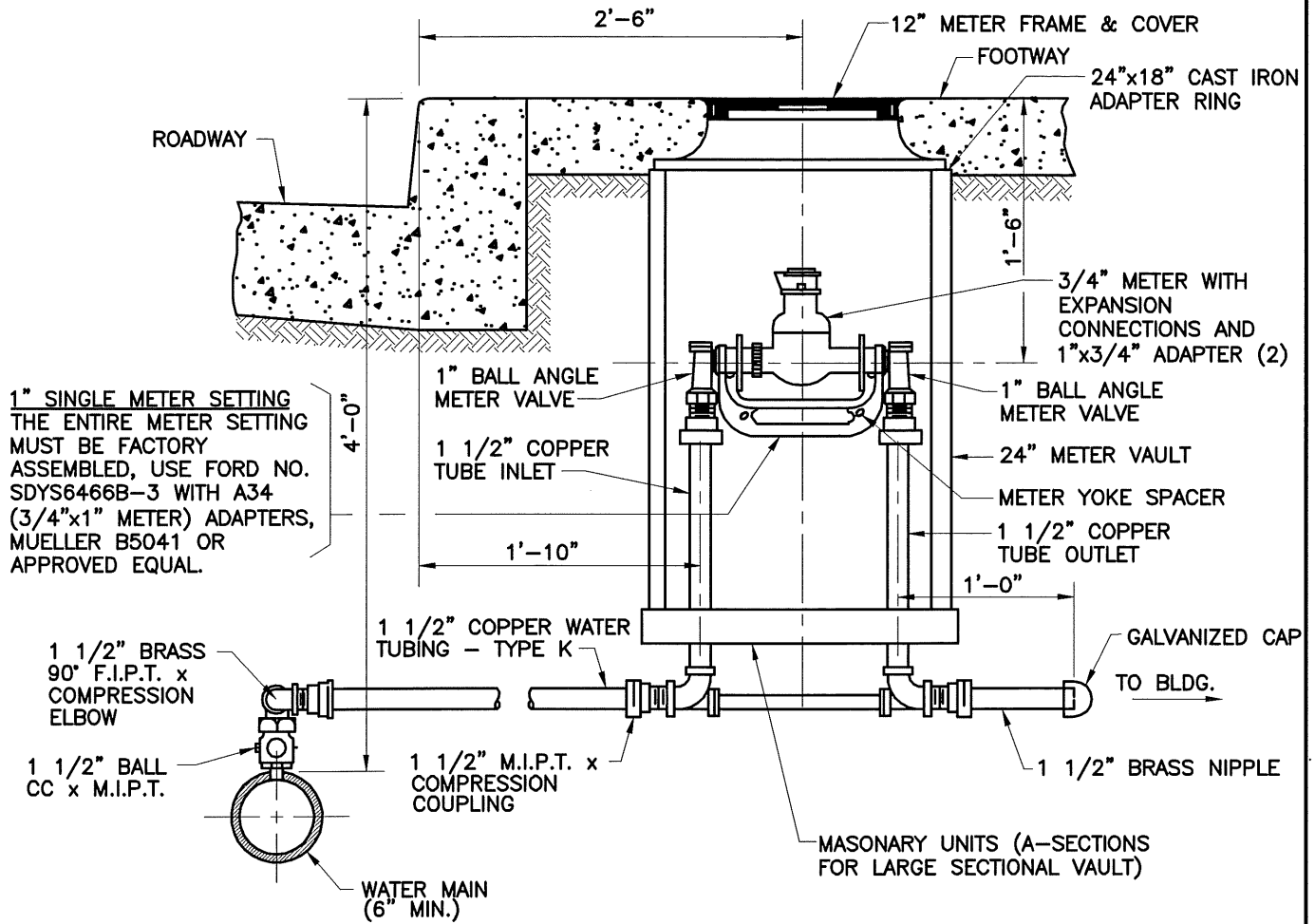
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
FOR FIRE PROTECTION
1 1/2" TWIN WATER SUPPLY SERVICES
(METERS) FOR 4" MAIN

ISSUED	REVISED	REVISED
3 / 2008		


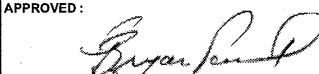
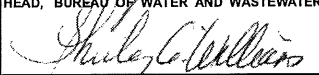
**STANDARD NO.
BC 841.04**

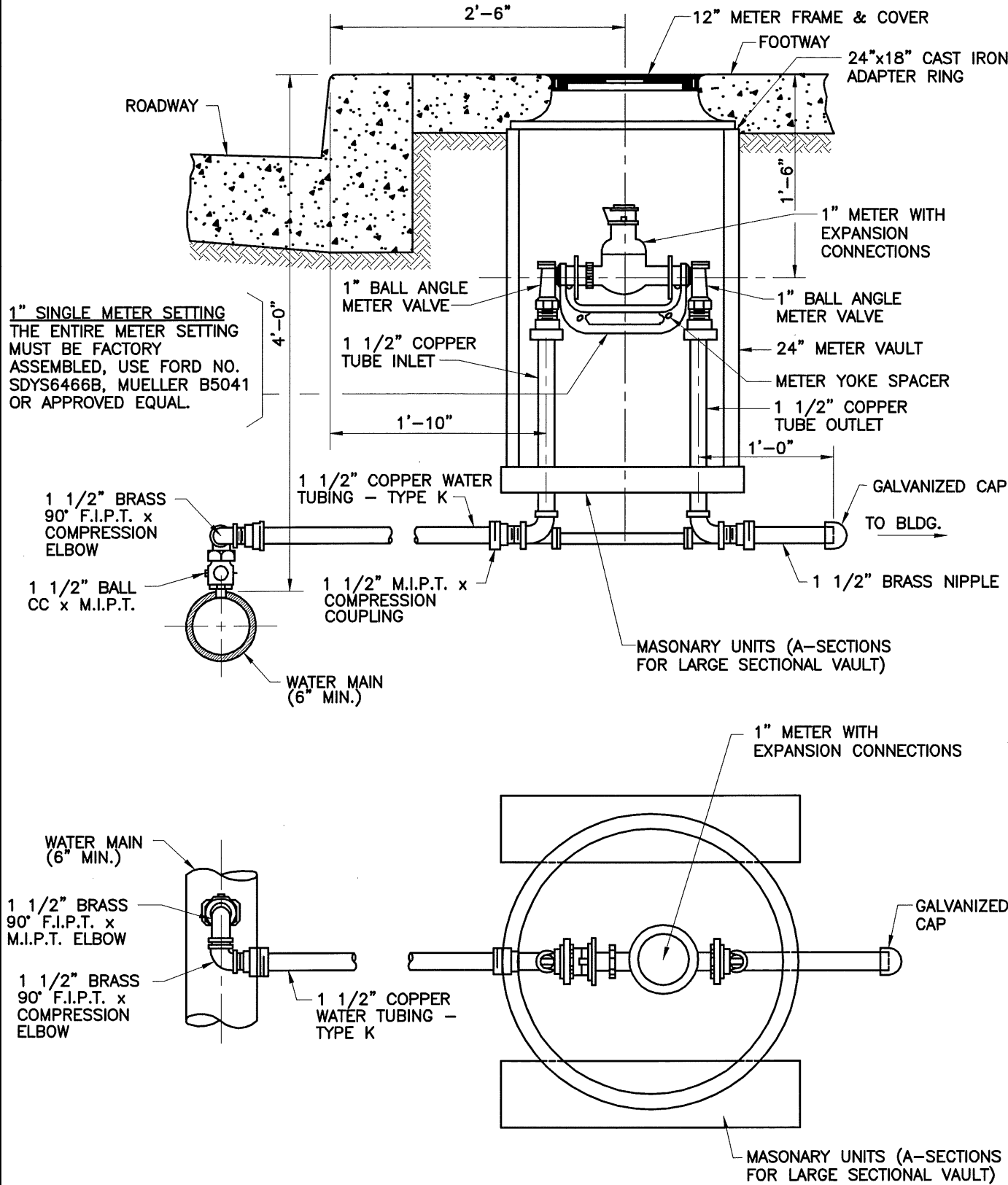
SCALE: NONE SHEET 1 OF 1



NOTE:
SEE STD. NO. BC 853.01 FOR METER VAULT.



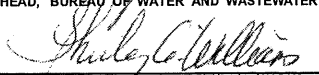
**ONLY FOR USE IN
BALTIMORE COUNTY**

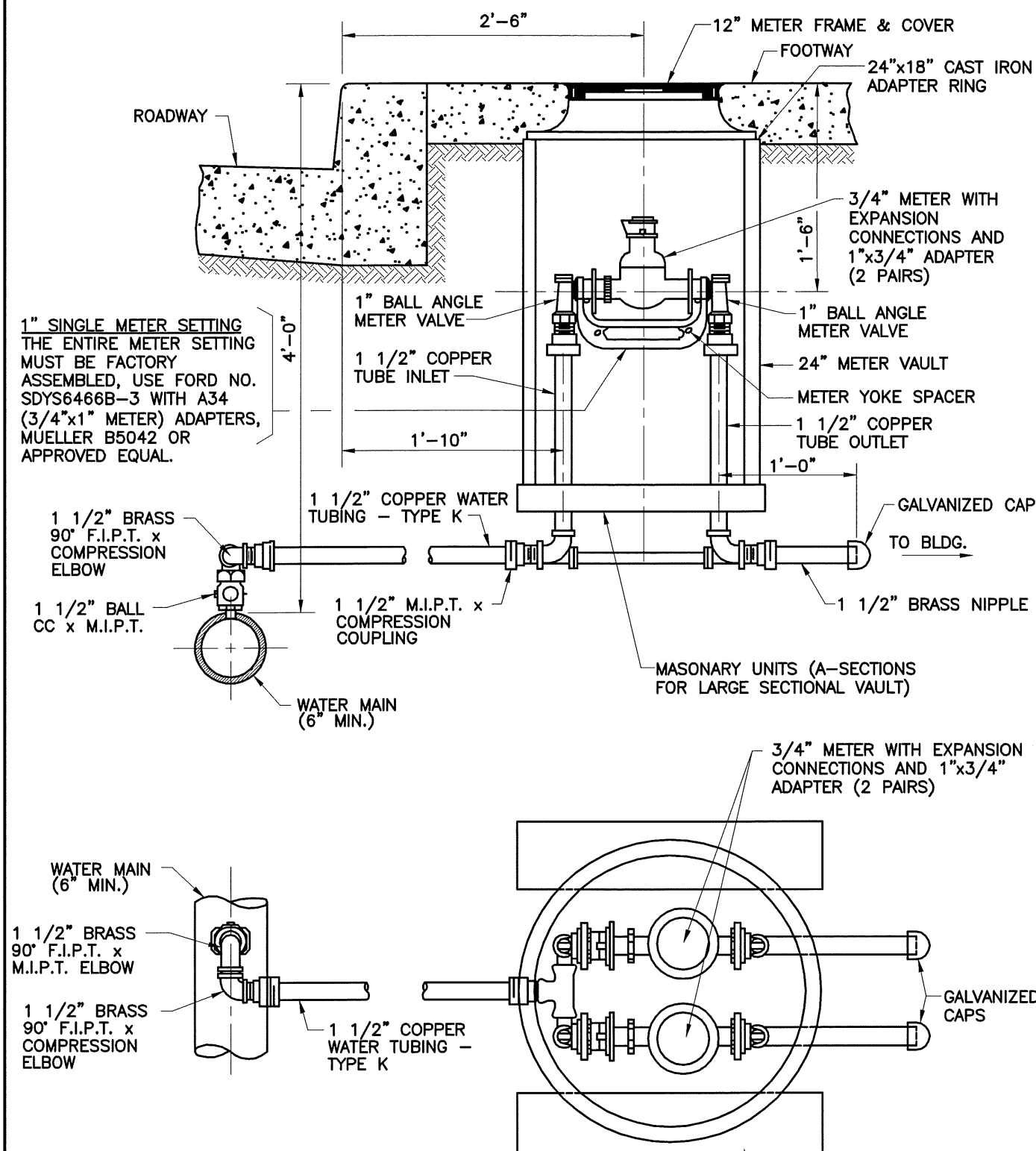
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION FOR FIRE PROTECTION 1 1/2" WATER SUPPLY SERVICE (3/4" METER) FOR 6" MAIN AND LARGER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 841.05		
			SCALE: NONE	SHEET 1 OF 1	






1" SINGLE METER SETTING
THE ENTIRE METER SETTING
MUST BE FACTORY
ASSEMBLED, USE FORD NO.
SDYS6466B, MUELLER B5041
OR APPROVED EQUAL.

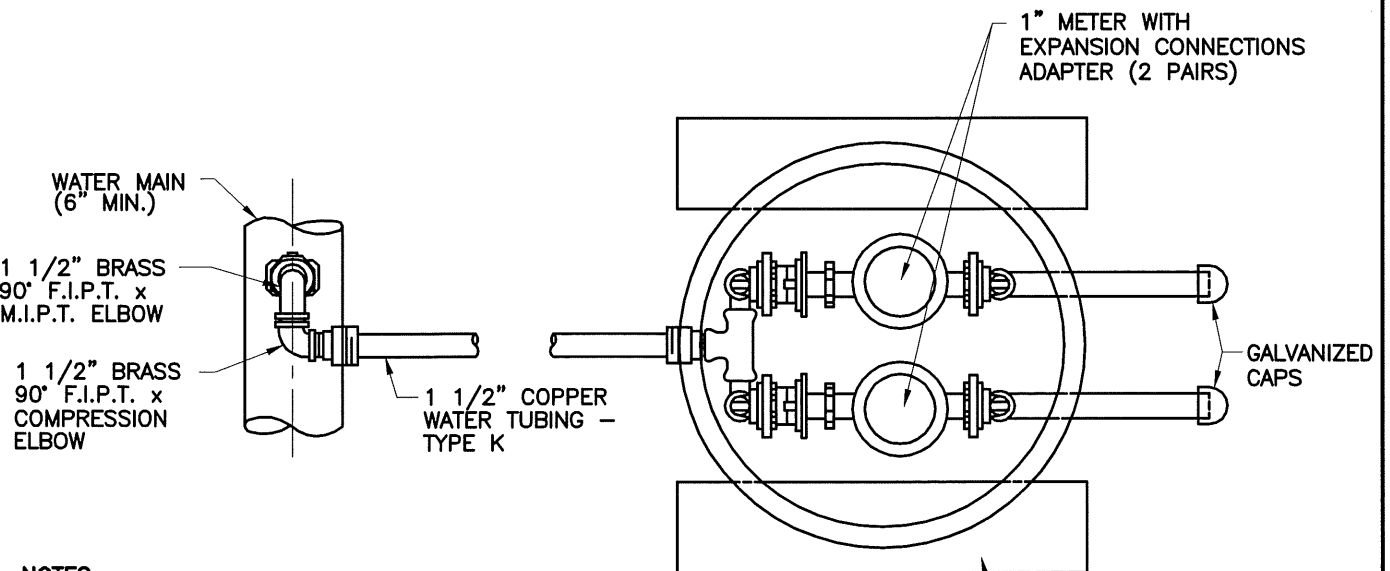
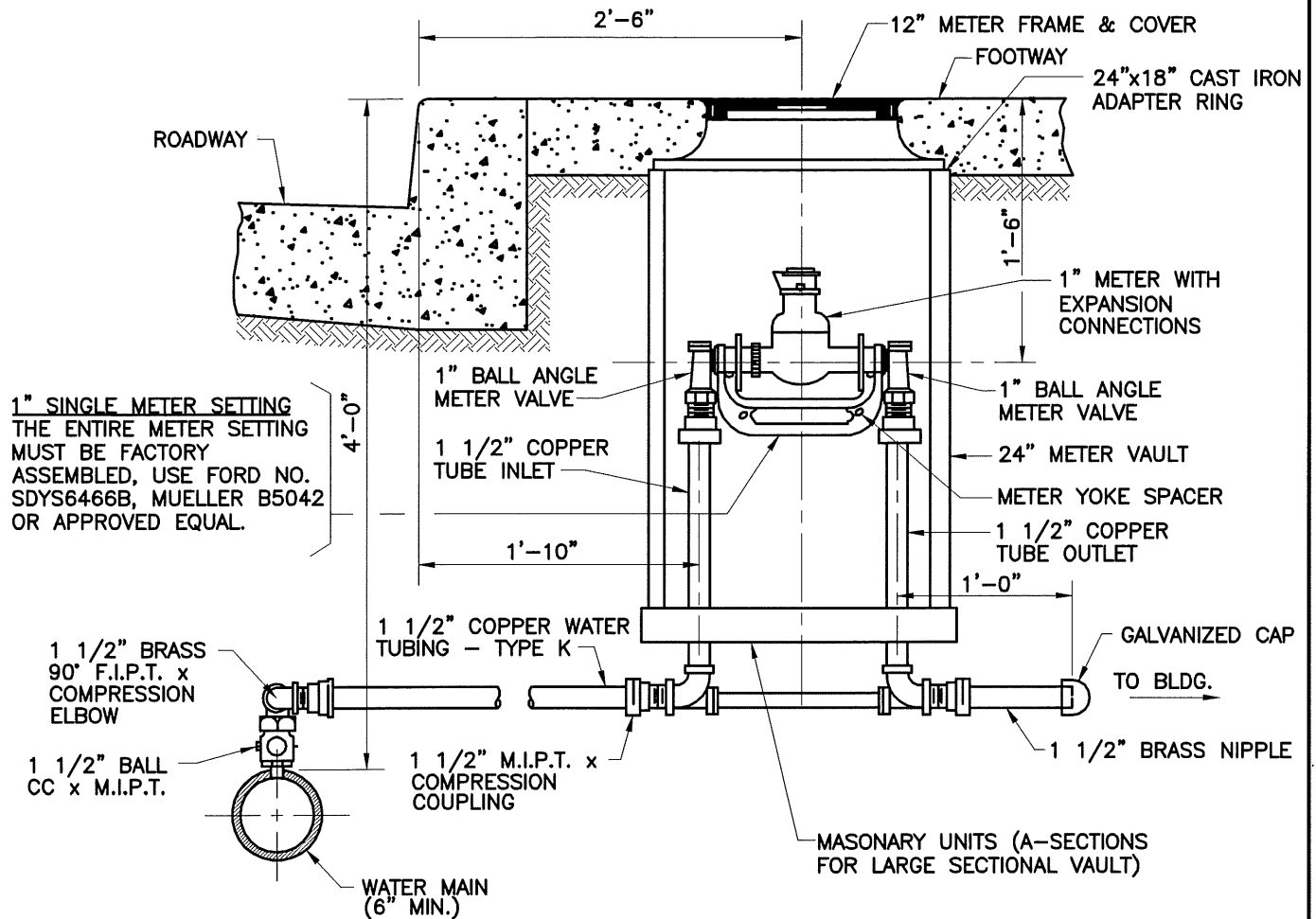
NOTE:
SEE STD. NO. BC 853.01 FOR METER VAULT.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	APPROVED:  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD INSTALLATION FOR FIRE PROTECTION 1" METER FOR 6" MAIN AND LARGER			STANDARD NO. BC 841.06		
			SCALE: NONE	SHEET 1 OF 1	



- NOTES:**
1. SEE STD. NO. BC 853.01 FOR METER VAULT.
 2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION FOR FIRE PROTECTION 1 1/2" TWIN WATER SUPPLY SERVICES (3/4" METERS) FOR 6" MAIN AND LARGER	3 / 2008	
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			STANDARD NO. BC 841.07		
			SCALE: NONE	SHEET 1 OF 1	



NOTES:

1. SEE STD. NO. BC 853.01 FOR METER VAULT.
2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.



APPROVED:

[Signature]

HEAD, BUREAU OF WATER AND WASTEWATER

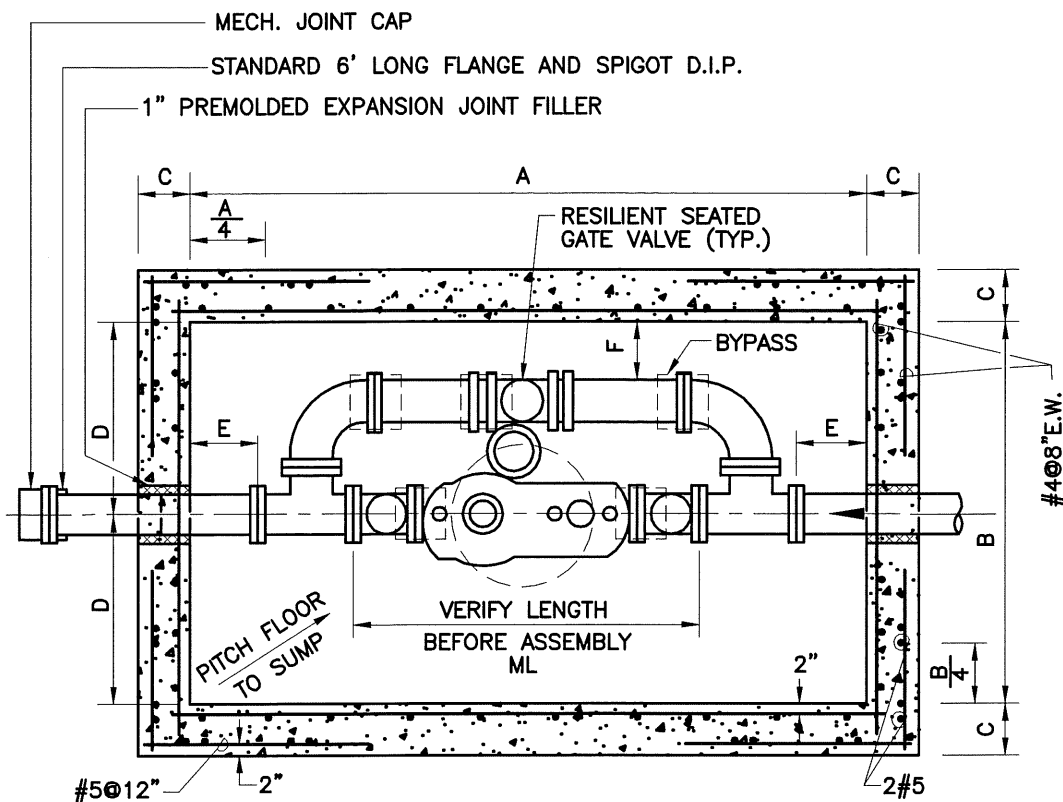
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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

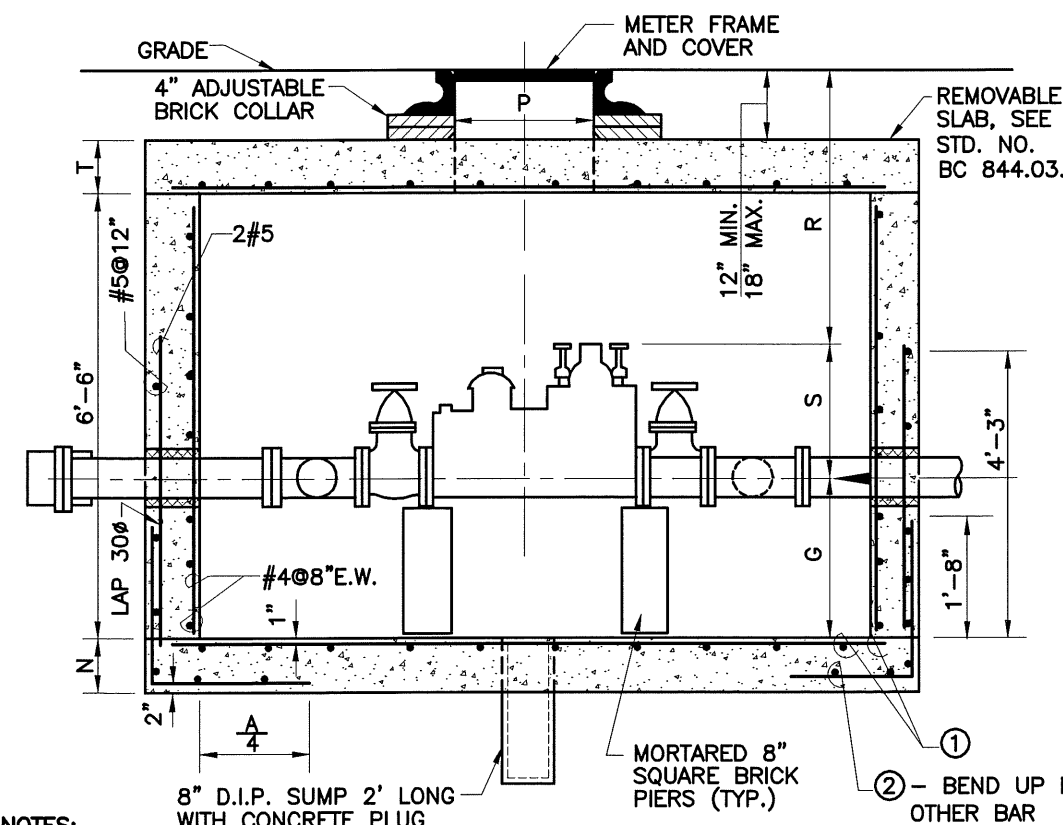
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 FOR FIRE PROTECTION
 1 1/2" GWS WATER SUPPLY SERVICES
 (1" METERS) FOR 6" MAIN AND LARGER

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 841.08		
SCALE: NONE		SHEET 1 OF 1






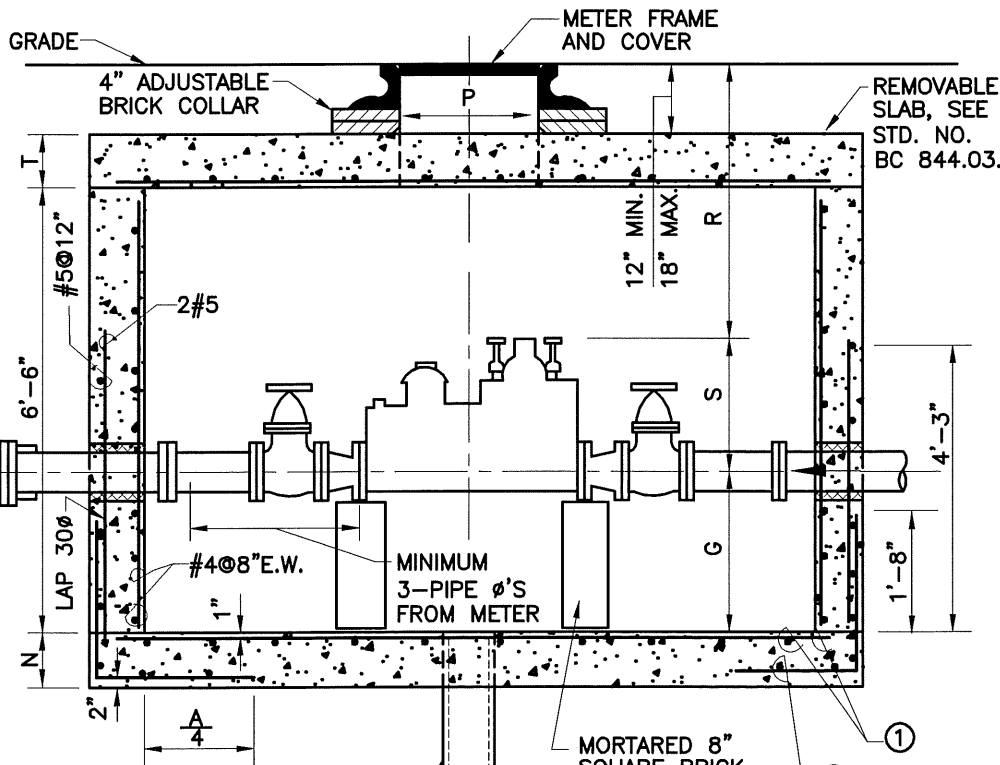
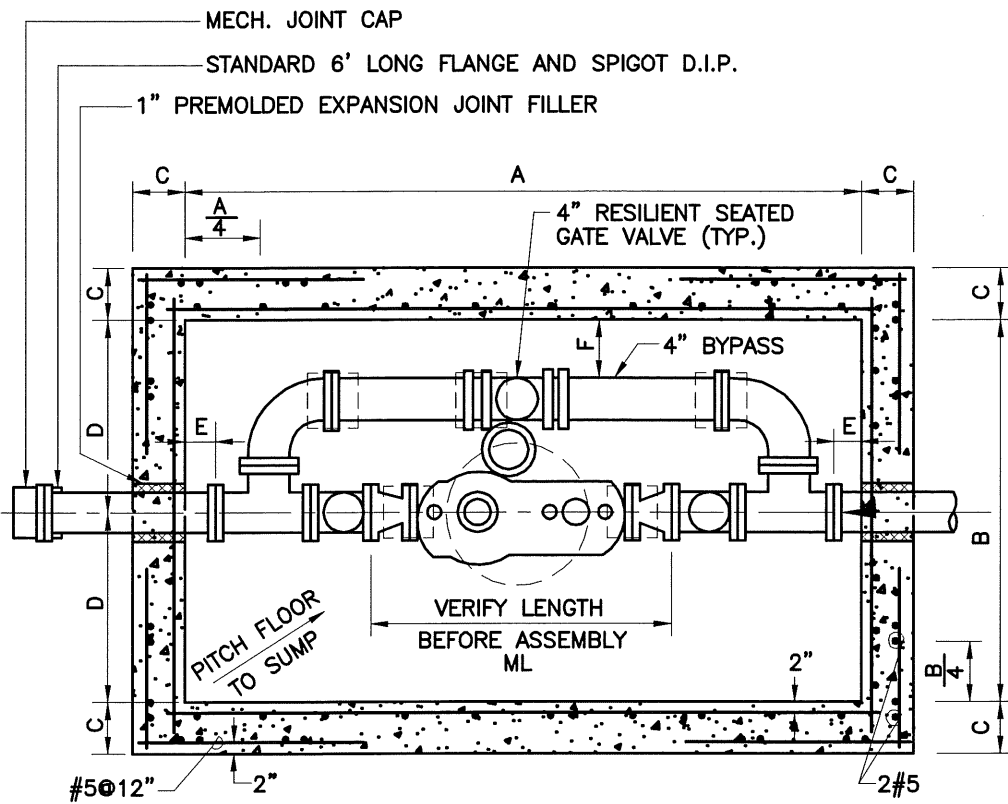
SIZE	4"	6"
A	8'-4"	9'-10"
B	4'-6"	5'-6"
C	9"	9"
D	2'-3"	2'-9"
E	13 1/2"	14 1/2"
F	11"	14 1/2"
G	2'-8"	2'-8"
H	3'-0"	3'-6"
L	4'-11"	5'-8"
N	6"	6"
P	24"	24"
R	4'-3" 4'-9"	3'-10" 4'-4"
S	1'-5"	1'-10"
①	#4@12	#4@12
②	#5@6	#5@6
ML	29"	36 1/2"
BP	4"	6"



NOTES:




1. FOR CURB SETBACK, SEE STD. NO. BC 851.01.
2. CONCRETE SHALL BE MIX 3.

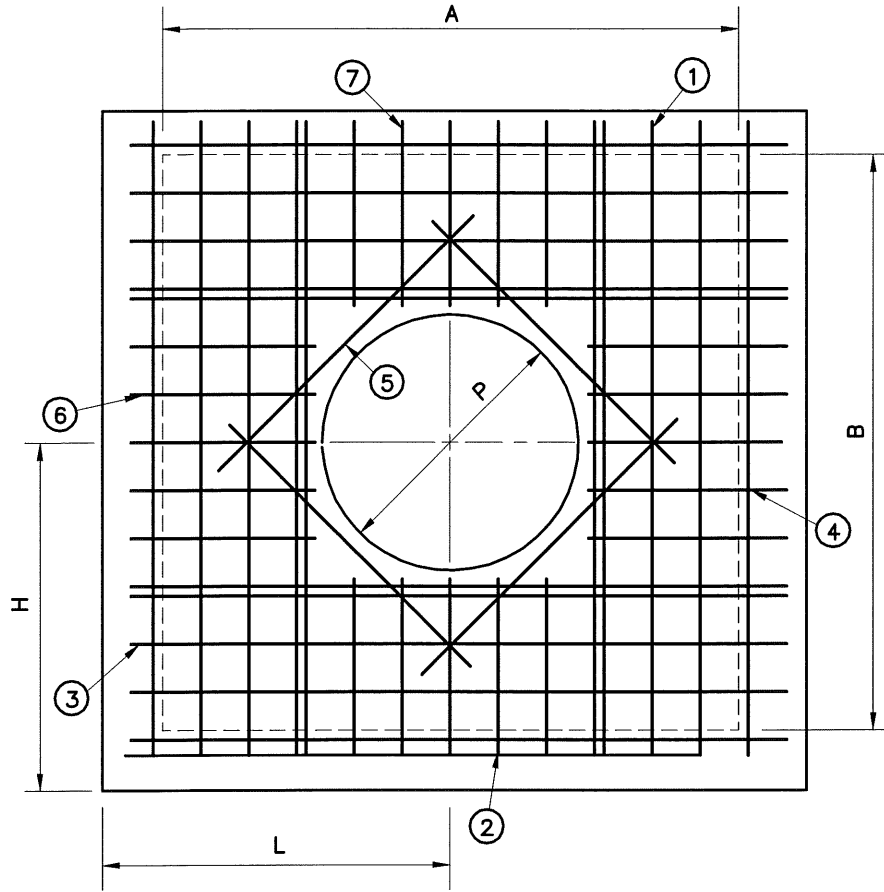
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES 997 (4" & 6" METERS)	ISSUED	REVISED	REVISED
	APPROVED:  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD NO. BC 842.01			SCALE: NONE SHEET 1 OF 1		



NOTES:
1. FOR CURB SETBACK, SEE STD. NO. BC 853.01.
2. CONCRETE SHALL BE MIX 3.

	4" SERV. 3" METER	6" SERV. 4" METER	6" SERV. 3" METER
A	8'-4"	9'-10"	9'-10"
B	4'-6"	5'-6"	5'-6"
C	9"	9"	9"
D	2'-3"	2'-9"	2'-9"
E	9"	9"	11 1/2"
F	11"	15 1/2"	15 1/2"
G	2'-8"	2'-8"	2'-8"
H	3'-0"	3'-6"	3'-6"
L	4'-11"	5'-8"	5'-8"
N	6"	6"	6"
P	24"	24"	24"
R	4'-6" 5'-0"	4'-3" 4'-9"	4'-6" 5'-0"
S	14"	17"	14"
①	#4@12	#4@12	#4@12
②	#5@6	#5@6	#5@6
ML	24"	29"	24"

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (3" & 4" METERS WITH REDUCERS)	ISSUED	REVISED	REVISED
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS 		3 / 2008		
			STANDARD NO. BC 842.02		
			SCALE: NONE	SHEET 1 OF 1	



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"	10"	#6@6"	18@5'-8"	3@1'-8"	10@9'-6"	3@3'-7"	4@3'-3"	3@3'-7"	3@1'-8"	5.18	1.09	1.80
6"	10"	#6@6"	20@6'-8"	3@2'-2"	12@11'-0"	3@4'-4"	4@3'-3"	3@4'-4"	3@2'-2"	6.08	1.47	2.45

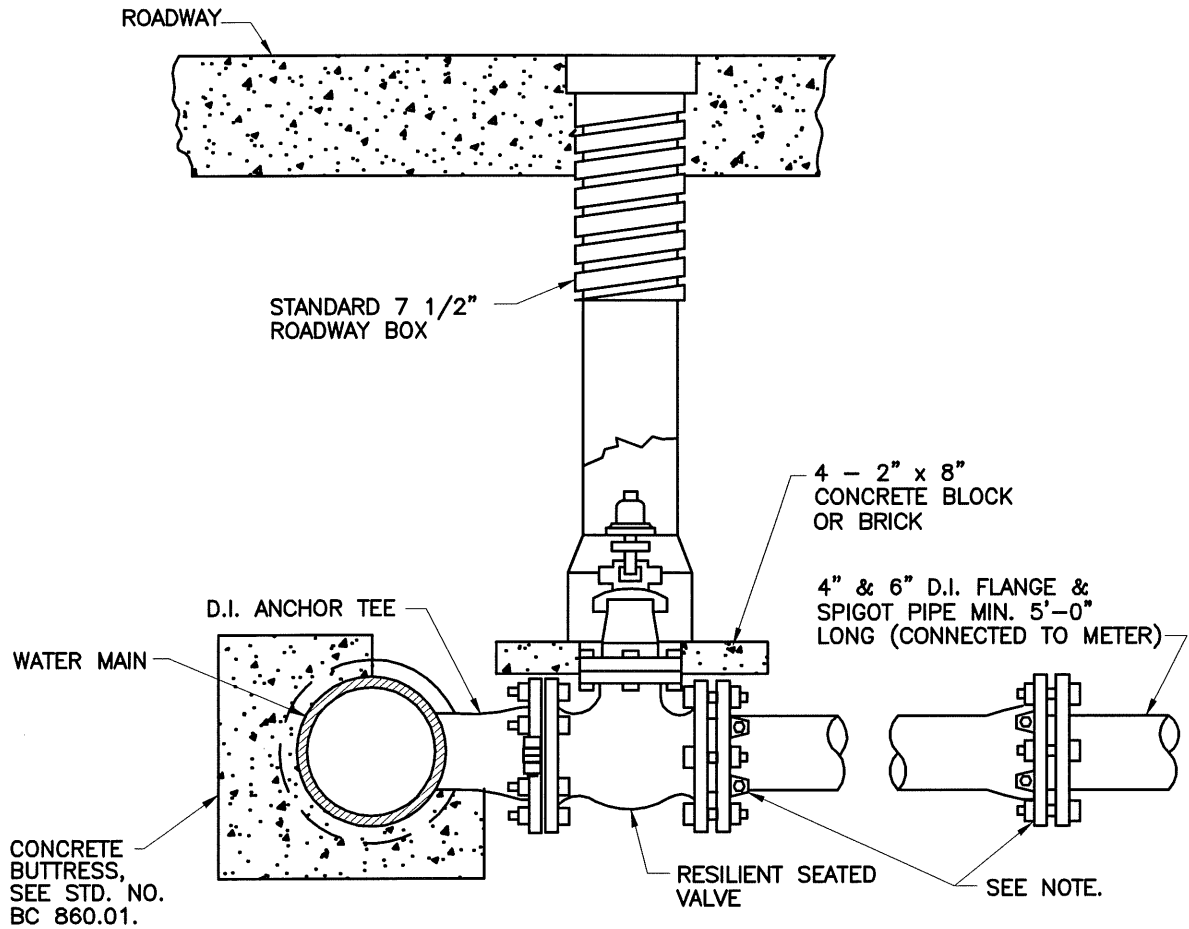


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS



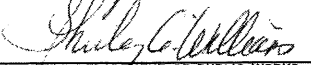
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 STANDARD VAULT
 FOR 4" & 6"
 WATER SUPPLY SERVICES

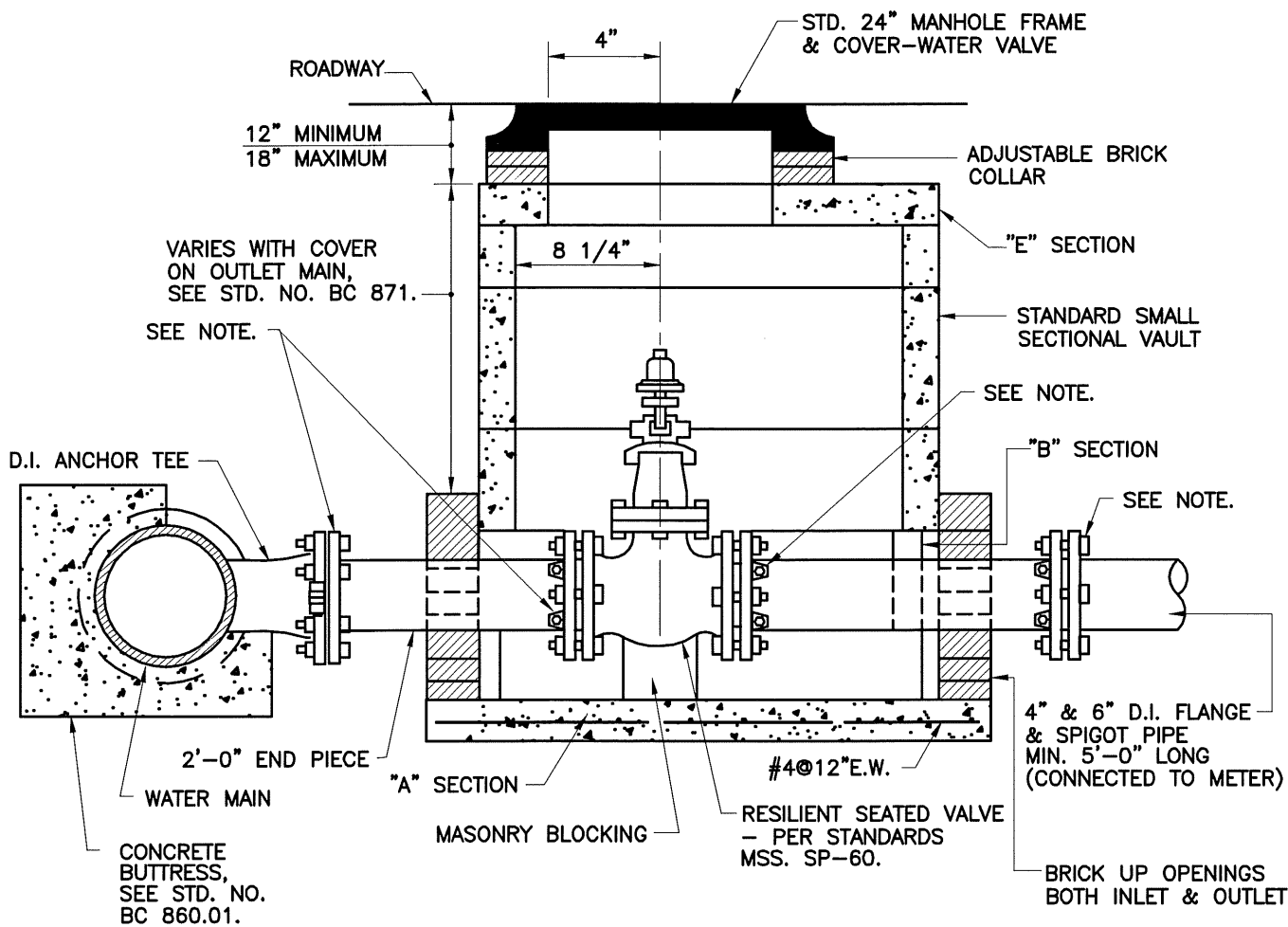
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 842.03		
SCALE: NONE	SHEET 1 OF 1	

1000
999



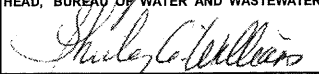


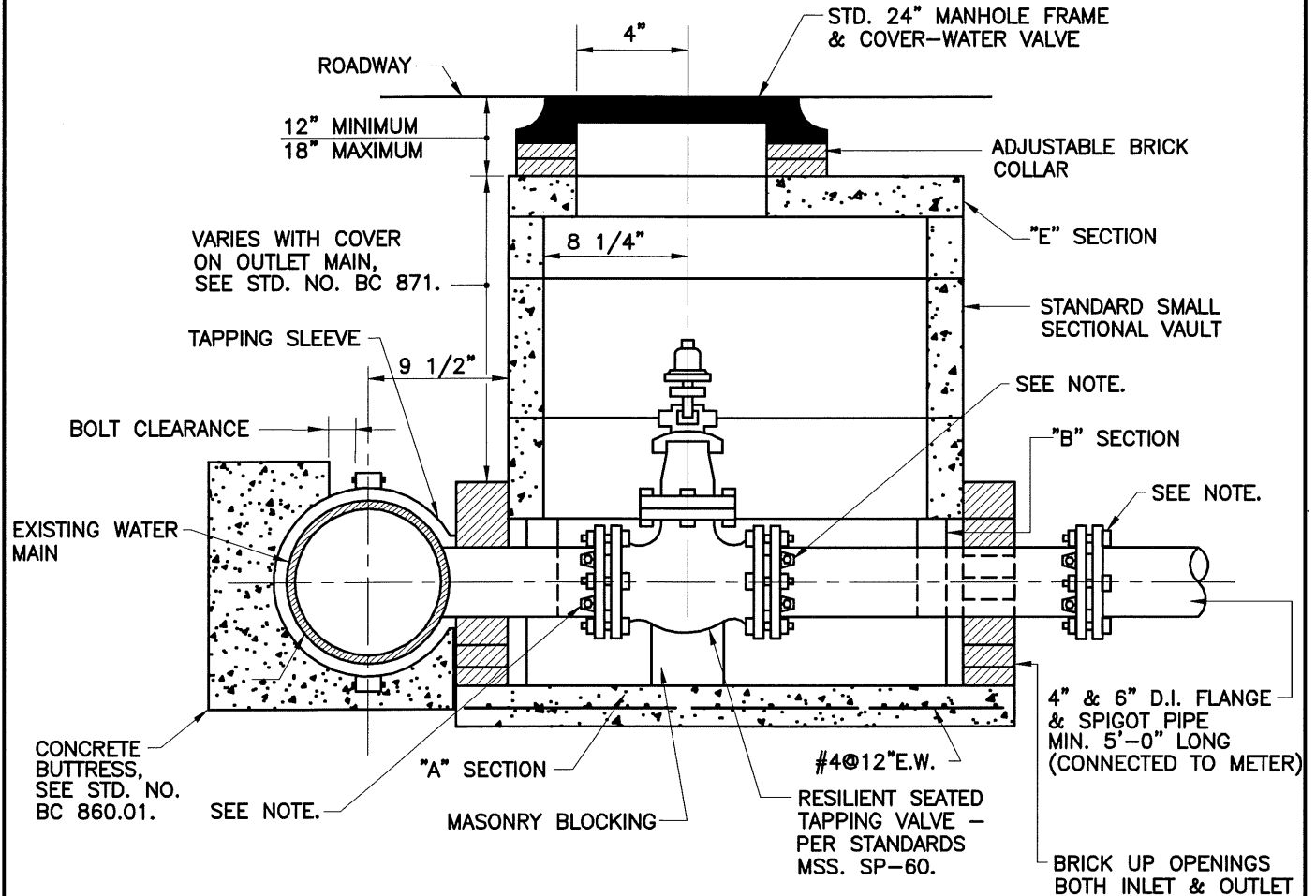
NOTE: ALL JOINTS MUST BE RESTRAINED BACK TO MAIN (ALL-THREAD RODS ARE NOT ACCEPTABLE).

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (30, 14", & 6" METERS) WITH TEE AND VALVE (ROADWAY BOX)	3 / 2008	
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			STANDARD NO. BC 843.01		
			SCALE: NONE	SHEET 1 OF 1	



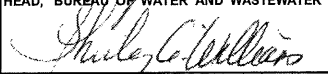


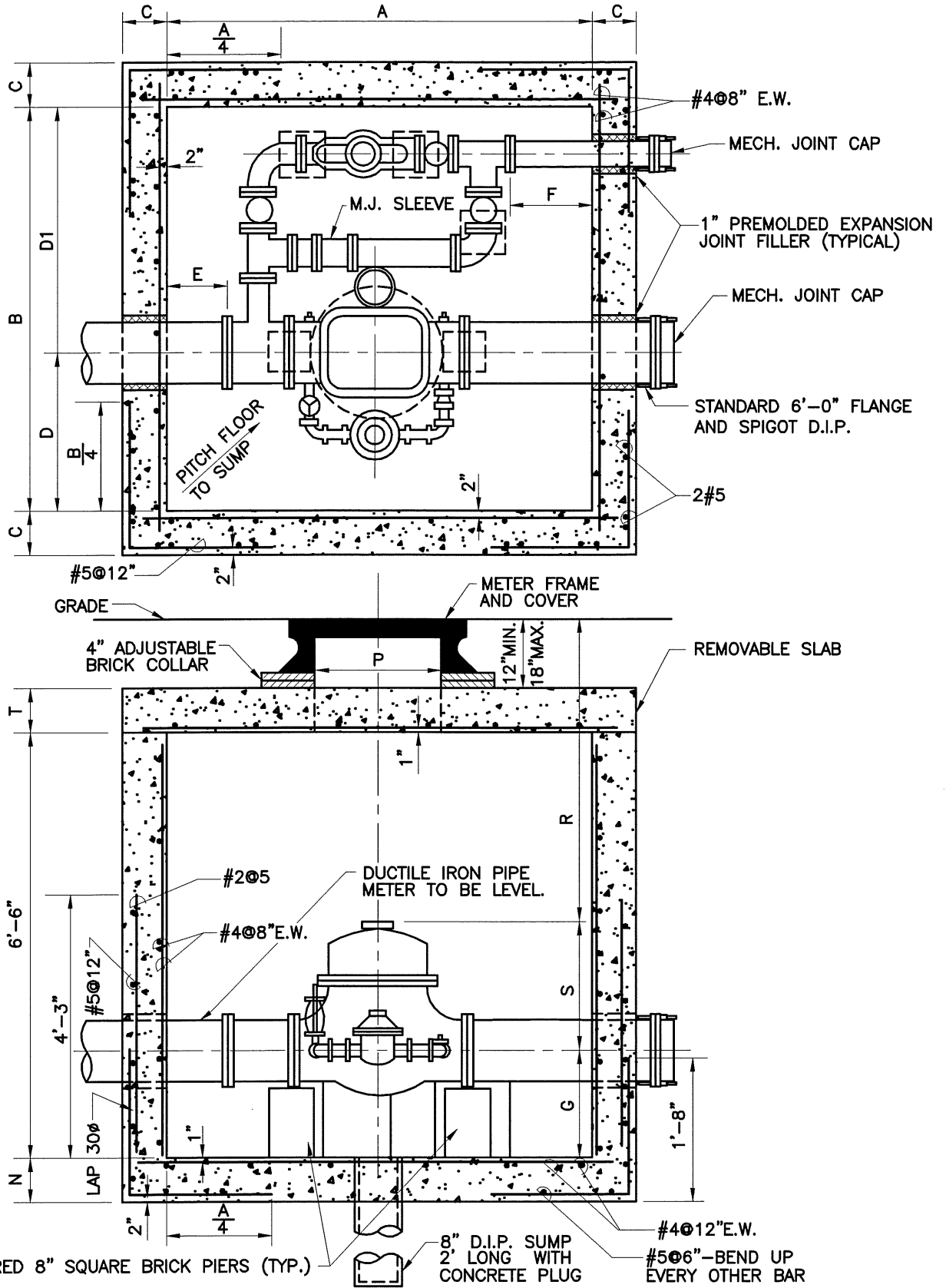
NOTE: ALL JOINTS MUST BE RESTRAINED BACK TO MAIN (ALL-THREAD RODS ARE NOT ACCEPTABLE).

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (3/4", & 6" METERS) WITH TEE AND VALVE (SECTIONAL VAULT)			STANDARD NO. BC 843.02		
			SCALE: NONE	SHEET 1 OF 1	



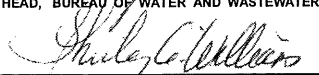


NOTE: ALL JOINTS MUST BE RESTRAINED BACK TO MAIN (ALL-THREAD RODS ARE NOT ACCEPTABLE).

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (3", 4" & 6" METERS) WITH TAPPING SLEEVE VALVE (SECTIONAL VAULT)			STANDARD NO. BC 843.03		
			SCALE: NONE	SHEET 1 OF 1	



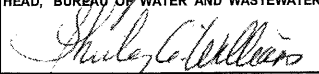


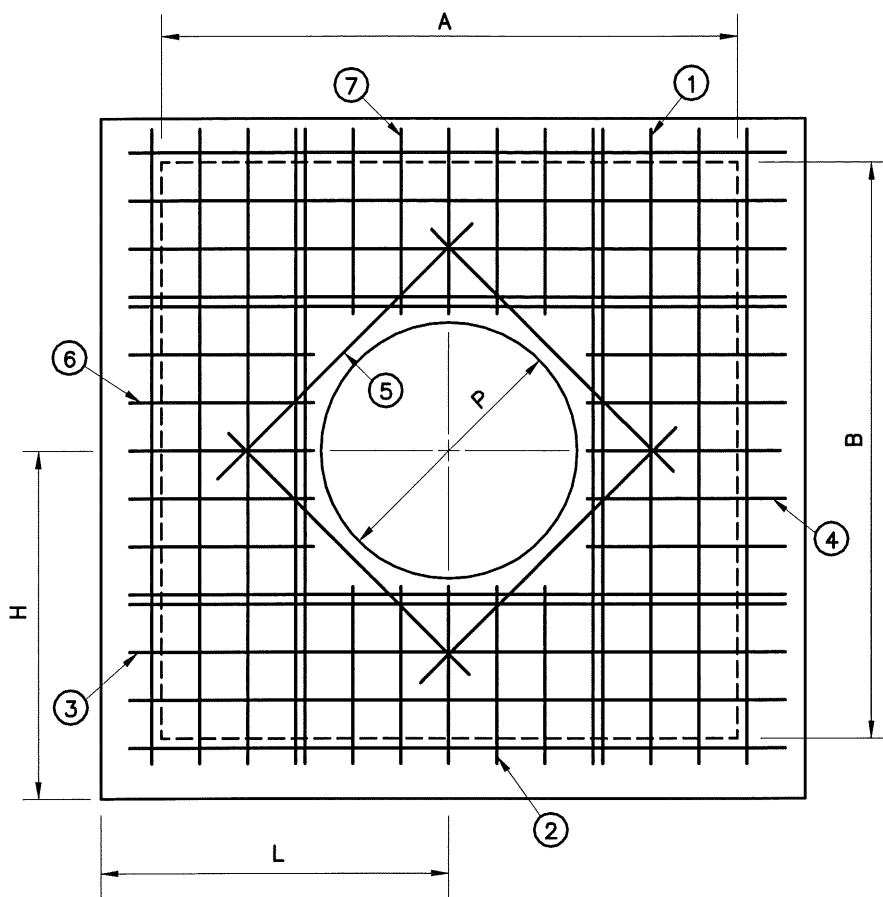
NOTE: CONCRETE SHALL BE MIX 3.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD VAULT FOR 4", 6", 8", & 10" DETECTOR CHECKS WITH LARGE DOMESTIC METERS 1004 1003			STANDARD NO. BC 844.01		
			SCALE: NONE	SHEET 1 OF 3	

	4" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	6" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	8" DETECTOR CHECK W/6" DOM. METER AND 6" BYPASS	8" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	10" DETECTOR CHECK W/6" DOM. METER AND 6" BYPASS	10" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	6'-10"	6"-11 1/2"	8'-2"	7'-1/2"	8'-6"	7'-4 1/2"
B	6'-7 1/2"	7'-1"	8'-2"	7'-6"	8'-6"	7'-10"
C	9"	9"	9"	9"	9"	9"
D	2'-5"	2'-9"	3'-1"	3'-1"	3'-2"	3'-2"
D1	4'-2 1/2"	4'-4"	5'-1"	4'-5"	5'-4"	4'-8"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	9"	11"	11"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-2"	3'-6"	3'-10"	3'-10"	3'-11"	3'-11"
L	3'-3 1/4"	3'-9 1/4"	4'-1 1/4"	4'-1 1/4"	4'-10"	4'-10"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-7" 5'-1"	4'-6" 5'-0"	4'-4" 4'-10"	4'-3" 4'-9"	4'-0" 4'-6"	3'-11" 4'-5"
S	11 3/4"	1'-4 1/4"	1'-10 1/4"	1'-10 1/4"	2'-1 3/4"	2'-1 3/4"

NOTE: FOR 12" D.C. USE 10" D.C. VAULT WITH CORRESPONDING DOMESTIC METER AND BYPASS SIZES.

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8" & 10" DETECTOR CHECKS WITH LARGE DOMESTIC METERS	3 / 2008	
			STANDARD NO. BC 844.01		
			SCALE: NONE	SHEET 2 OF 3	



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"W/ 4"DOM.	9"	#6@6"	14@7'-9"	5@1'-7"	13@8'-0"	5@3'-6"	4@3'-3"	5@1'-8"	5@3'-4"	5.40	1.25	1.88
6"W/ 4"DOM.	9"	#6@6"	14@8'-3"	5@1'-11"	14@8'-1"	5@3'-1"	4@3'-3"	5@2'-2"	5@3'-6"	5.61	1.34	2.02
8"W/ 6"DOM.	10"	#6@5"	19@9'-4"	6@2'-3"	19@9'-4"	6@4'-0"	4@3'-3"	6@2'-6"	6@4'-3"	6.44	1.73	2.88
8"W/ 4"DOM.	9"	#6@5 1/2"	15@8'-8"	5@2'-3"	16@8'-2"	5@2'-10"	4@3'-3"	5@2'-6"	5@3'-7"	5.82	1.42	2.14
10"W/ 6"DOM.	10"	#6@5"	19@9'-8"	6@2'-4"	20@9'-8"	6@3'-7"	4@3'-3"	6@3'-3"	6@4'-6"	6.68	1.85	3.09
10"W/ 4"DOM.	9"	#6@5 1/2"	15@9'-0"	5@2'-4"	17@8'-6"	5@2'-6"	4@3'-3"	5@3'-3"	5@3'-10"	6.03	1.53	2.30



APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

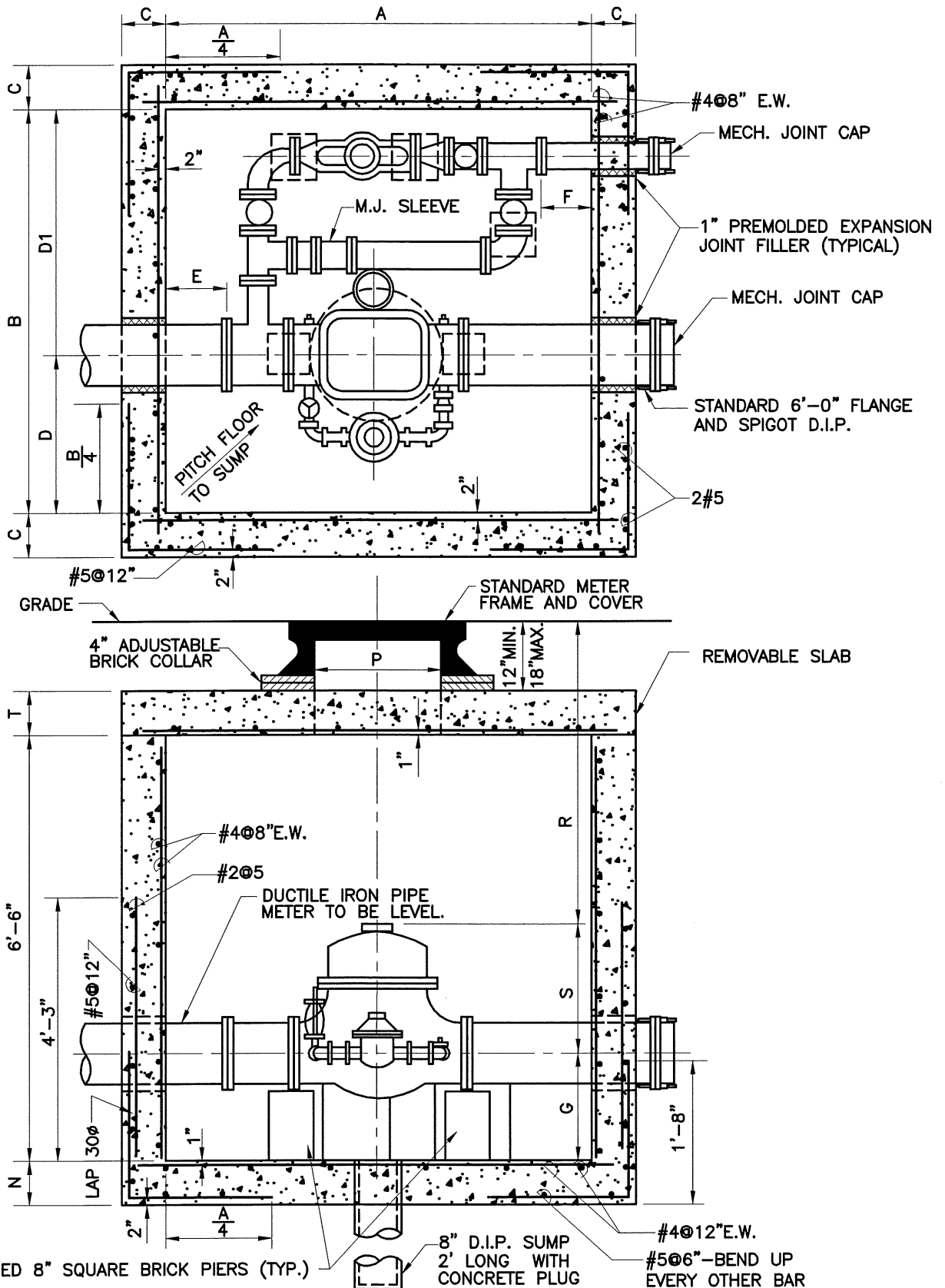
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8" & 10" DETECTOR CHECKS
WITH LARGE DOMESTIC METERS




ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 844.01

SCALE: NONE SHEET 3 OF 3


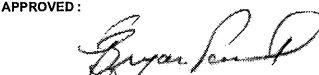
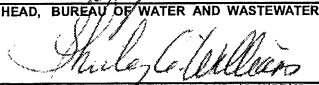


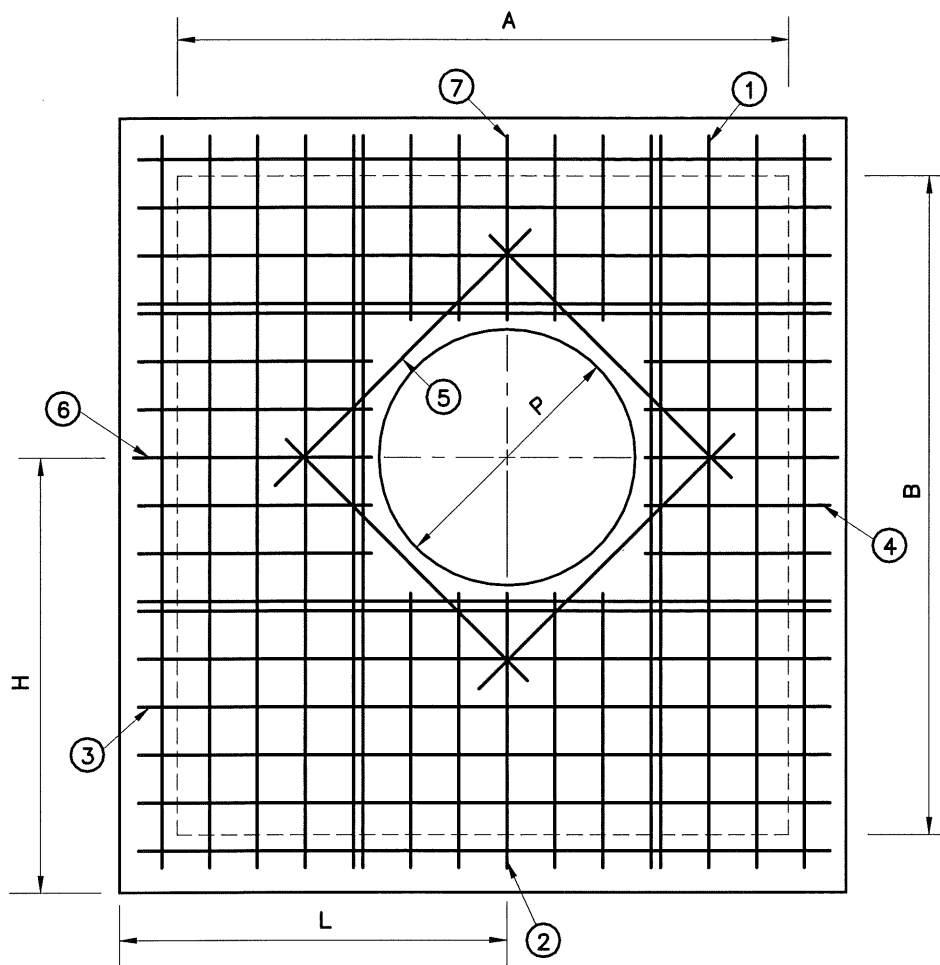
NOTE: CONCRETE SHALL BE MIX 3.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD VAULT FOR 4", 6", 8" & 10" DETECTOR CHECKS WITH REDUCED SIZE LARGE DOMESTIC METERS			STANDARD NO. BC 845.01		
			SCALE: NONE	SHEET 1 OF 3	




	4" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	6" DETECTOR CHECK W/3" DOM. METER AND 4" BYPASS	8" DETECTOR CHECK W/4" DOM. METER AND 6" BYPASS	8" DETECTOR CHECK W/3" DOM. METER AND 4" BYPASS	10" DETECTOR CHECK W/4" DOM. METER AND 6" BYPASS	10" DETECTOR CHECK W/3" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	7'-0"	7'-1 1/2"	8'-3 1/2"	7'-2 1/2"	8'-7 1/2"	7'-6 1/2"
B	6'-6 1/2"	7'-0"	8'-0"	7'-5"	8'-3"	7'-8"
C	9"	9"	9"	9"	9"	9"
D	2'-5"	2'-9"	3'-1"	3'-1"	3'-2"	3'-2"
D1	4'-1 1/2"	4'-3"	4'-11"	4'-4"	5'-1"	4'-6"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	9"	11"	11"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-2"	3'-6"	3'-10"	3'-10"	3'-11"	3'-11"
L	3'-3 1/4"	3'-9 1/4"	4'-1 1/4"	4'-1 1/4"	4'-10"	4'-10"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-7" 5'-1"	4'-6" 5'-0"	4'-4" 4'-10"	4'-3" 4'-9"	4'-0" 4'-6"	3'-11" 4'-5"
S	11 3/4"	1'-4 1/4"	1'-10 1/4"	1'-10 1/4"	2'-1 3/4"	2'-1 3/4"

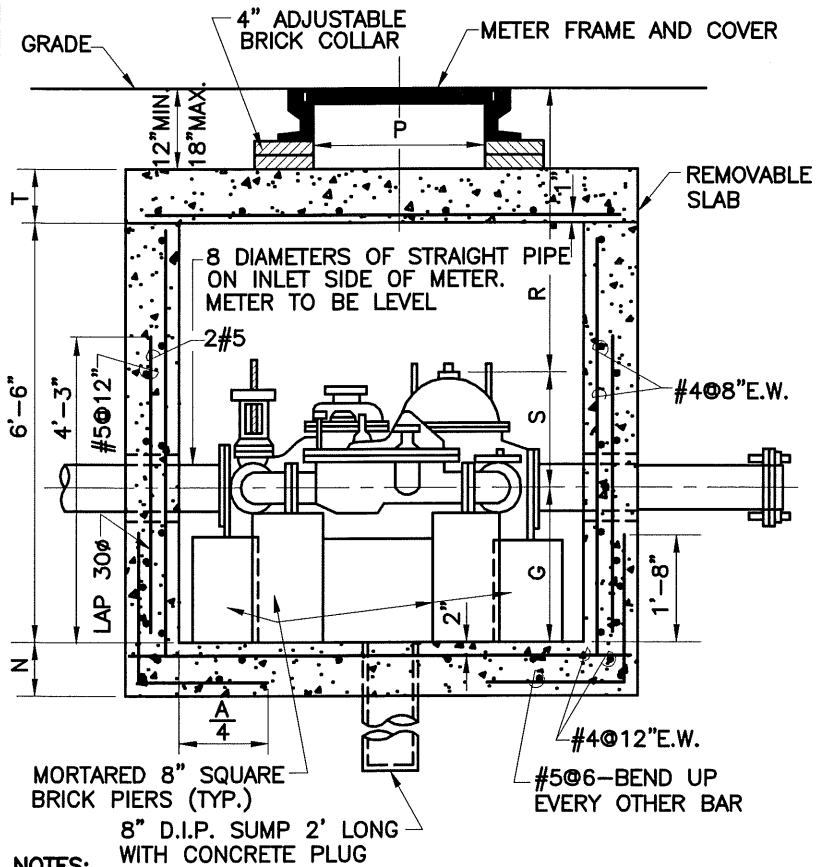
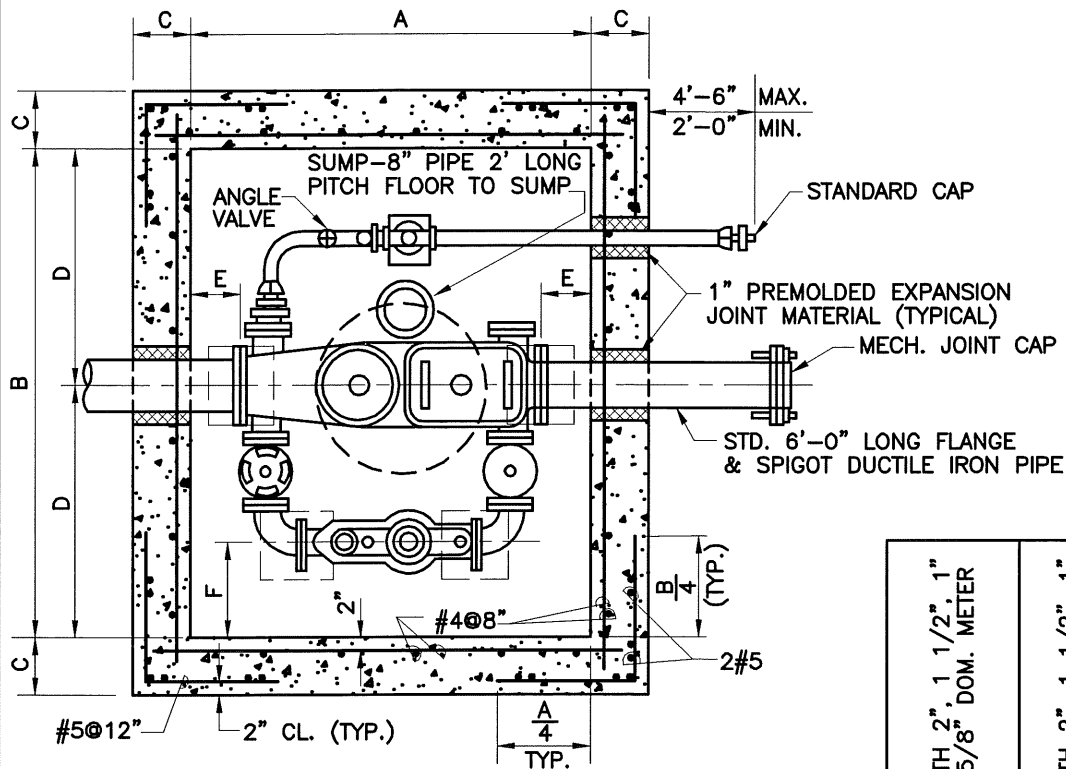
NOTE: FOR 12" D.C. USE 10" D.C. VAULT WITH CORRESPONDING DOMESTIC METER AND BYPASS SIZES.

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", 10" DETECTOR CHECKS WITH REDUCED SIZE LARGE DOMESTIC METERS	3 / 2008	
			STANDARD NO. BC 845.01		
			SCALE: NONE	SHEET 2 OF 3	



ROOF SLAB MATERIALS										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4" W/ 3" DOM	9"	#6@6"	14@7'-8"	5@1'-7"	13@8'-2"	5@3'-8"	4@3'-3"	5@1'-8"	5@3'-3"	5.43	1.27	1.91
6" W/ 3" DOM	9"	#6@6"	14@8'-2"	5@1'-11"	14@8'-3"	5@3'-3"	4@3'-3"	5@2'-2"	5@3'-5"	5.64	1.36	2.04
8" W/ 4" DOM	10"	#6@5"	19@9'-2"	6@2'-3"	19@9'-5"	6@4'-1"	4@3'-3"	6@2'-6"	6@4'-1"	6.42	1.72	2.87
8" W/ 3" DOM	9"	#6@5 1/2"	15@8'-7"	5@2'-3"	16@8'-4"	5@3'-0"	4@3'-3"	5@2'-6"	5@3'-6"	5.82	1.44	2.16
10" W/ 4" DOM	10"	#6@5"	19@9'-5"	6@2'-4"	20@9'-9"	6@3'-8"	4@3'-3"	6@3'-3"	6@4'-3"	6.64	1.83	3.05
10" W/ 3" DOM	9"	#6@5 1/2"	15@8'-10"	5@2'-4"	17@8'-8"	5@2'-7"	4@3'-3"	5@3'-3"	5@3'-8"	6.03	1.53	2.30

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER ROOF SLAB AND CONCRETE QUANTITIES FOR STANDARD VAULT FOR 4", 6", 8" & 10" DETECTOR CHECKS WITH REDUCED SIZE LARGE DOMESTIC METERS	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
	STANDARD NO. BC 845.01			SCALE: NONE	SHEET 3 OF 3



- NOTES:
1. CONCRETE SHALL BE MIX 3.
 2. FOR 12" F.M. USE 10" F.M. VAULT WITH CORRESPONDING DOMESTIC METERS.

SIZE	4"	6"	8"	10"
A	4'-3"	5'-3"	5'-11"	7'-2"
B	5'-7 1/2"	6'-6"	7'-6"	9'-0"
C	9"	9"	9"	9"
D	2'-9 3/4"	3'-3"	3'-9"	4'-6"
E	9"	9"	9"	9"
F	1'-4"	1'-5"	1'-6"	1'-8"
G	2'-8"	2'-5"	2'-2"	2'-4"
H	3'-6 3/4"	4'-0"	4'-6"	5'-3"
K	3'-6 3/4"	4'-0"	4'-6"	5'-3"
L	2'-7"	3'-1"	3'-6"	3'-10"
M	3'-2"	3'-8"	3'-11"	4'-10"
N	6"	6"	6"	6"
P	18"	24"	30"	30"
R	4'-3" TO 4'-9"	4'-4" TO 4'-10"	4'-3" TO 4'-9"	3'-6" TO 4'-0"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	2'-6"



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[Signature]
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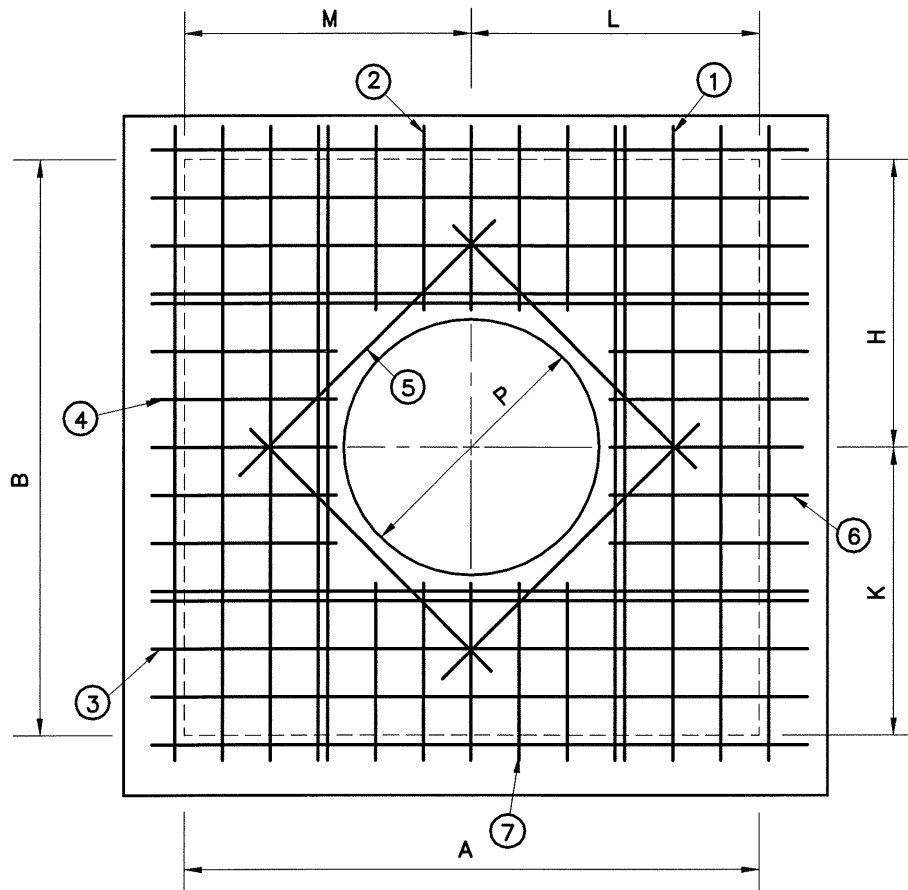
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD VAULT FOR
4", 6", 8", 10", & 12" F.M. METERS
WITH SMALL DOMESTIC METERS

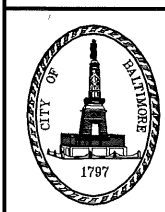
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 846.01

SCALE: NONE SHEET 1 OF 2



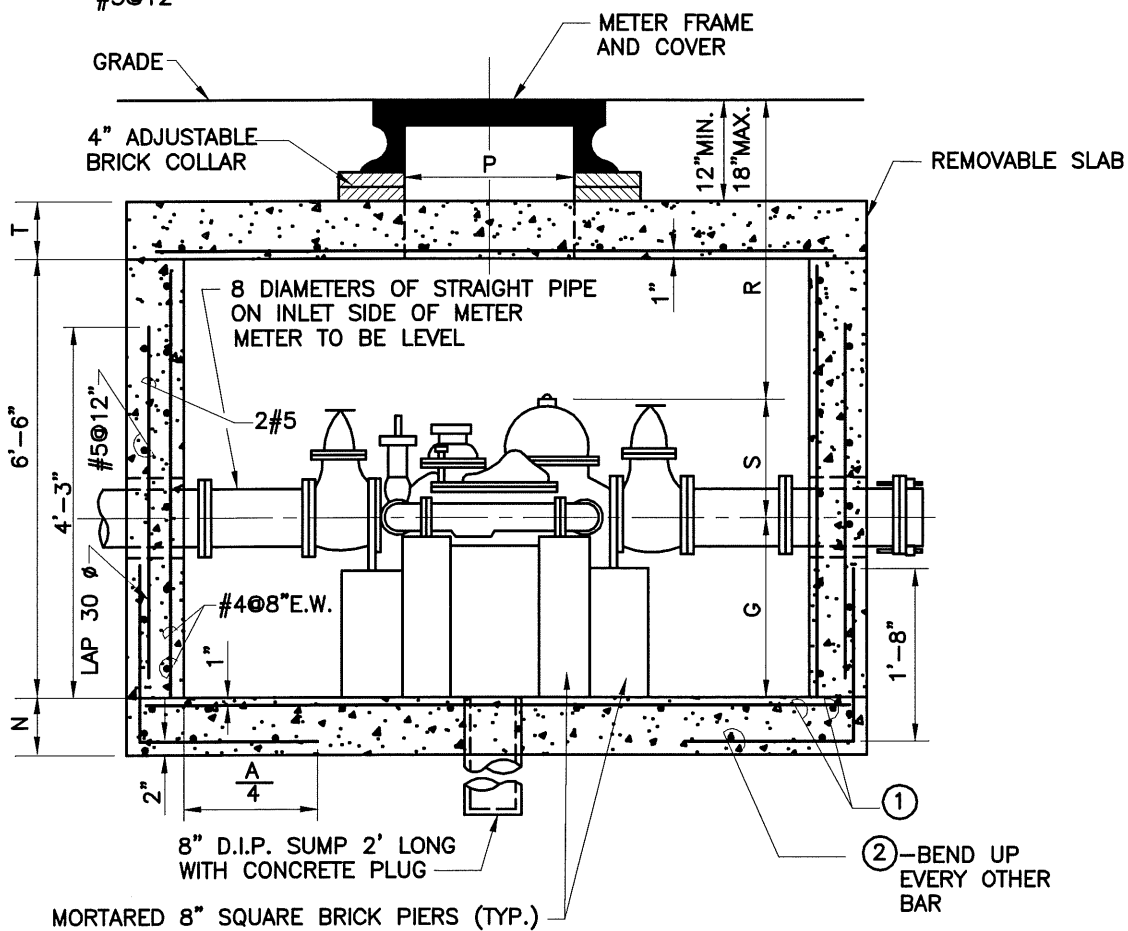
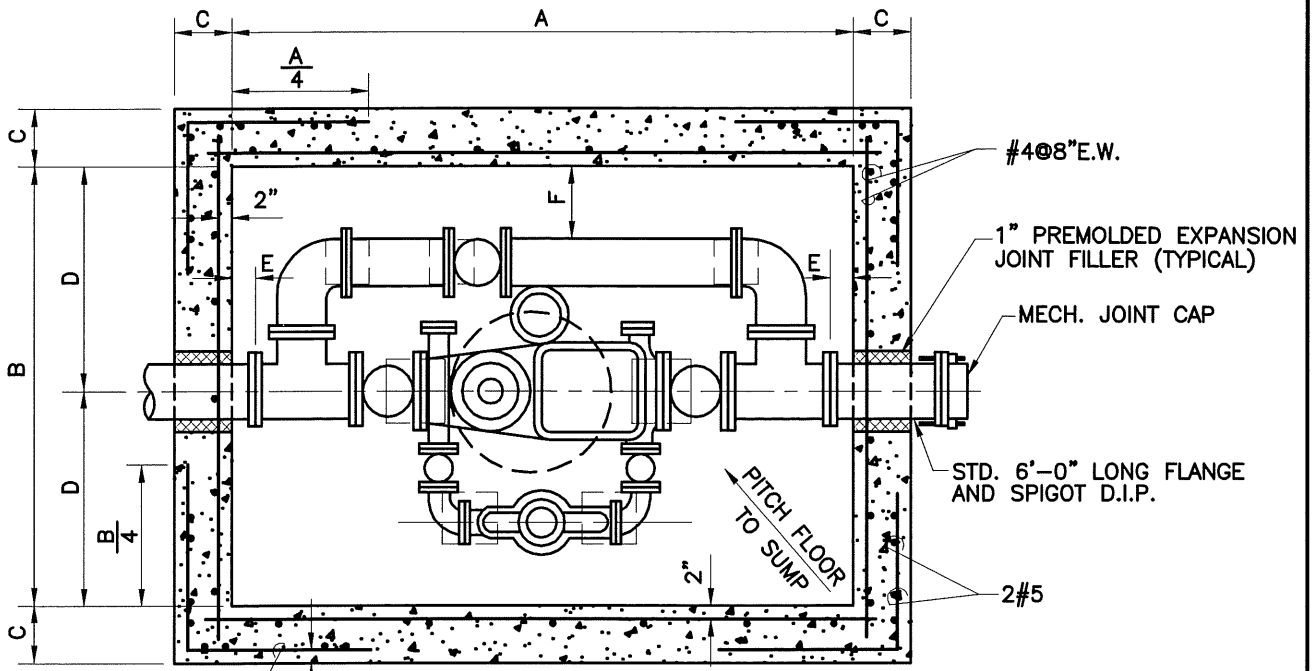
ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"	8"	#6@7"	9@6'-9"	3@2'-6"	11@5'-5"	3@2'-1"	4@3'-3"	3@1'-6"	3@2'-6"	4.11	0.75	1.01
6"	8 1/2"	#6@6"	11@7'-8"	4@2'-8"	14@6'-5"	4@2'-4"	4@3'-3"	4@1'-9"	4@2'-8"	4.81	1.00	1.42
8"	9"	#6@6"	12@8'-8"	5@2'-11"	15@7'-1"	5@2'-4"	4@3'-3"	5@1'-11"	5@2'-11"	5.42	1.24	1.85
10"	10"	#6@6"	14@10'-2"	5@3'-8"	18@8'-4"	5@3'-3"	4@3'-3"	5@2'-3"	5@3'-8"	6.38	1.69	2.81






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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 ROOF SLAB AND CONCRETE QUANTITIES
 FOR STANDARD VAULT FOR
 4", 6", 8", 10", & 12" F.M. METERS
 WITH SMALL DOMESTIC METERS




ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 846.01		
SCALE: NONE	SHEET 2 OF 2	

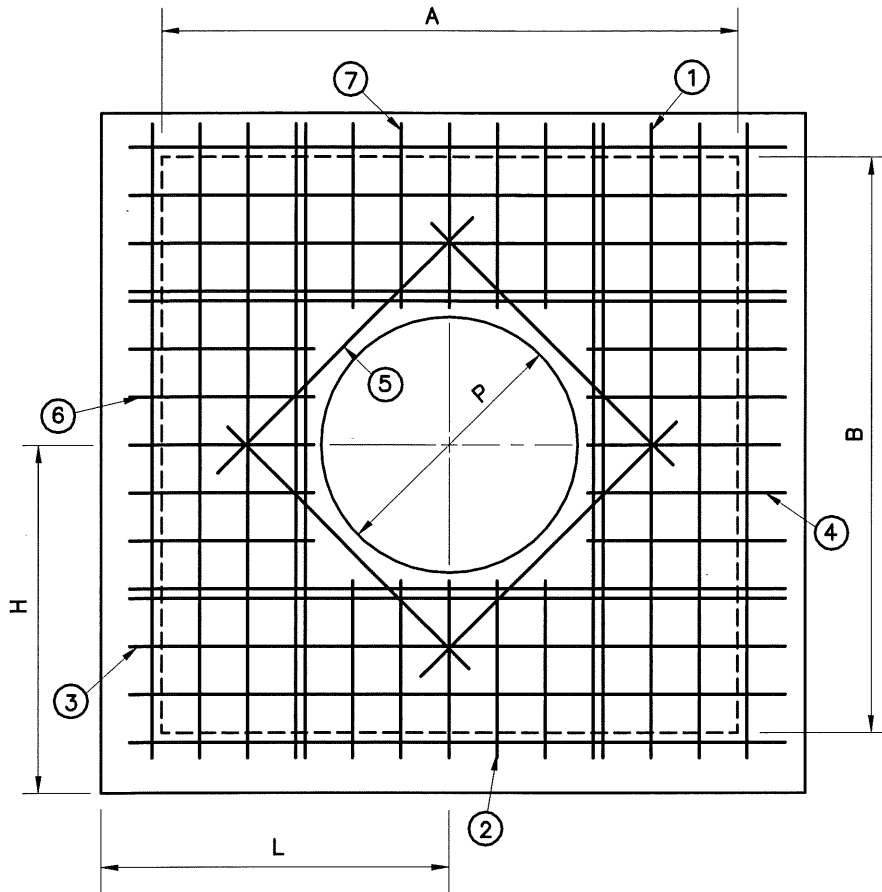


NOTE: CONCRETE SHALL BE MIX 3.




	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
	STANDARD VAULT FOR 4" 10" 12", 10", & 12" F.M. METERS 1011		STANDARD NO. BC 847.01		
			SCALE: NONE	SHEET 1 OF 3	

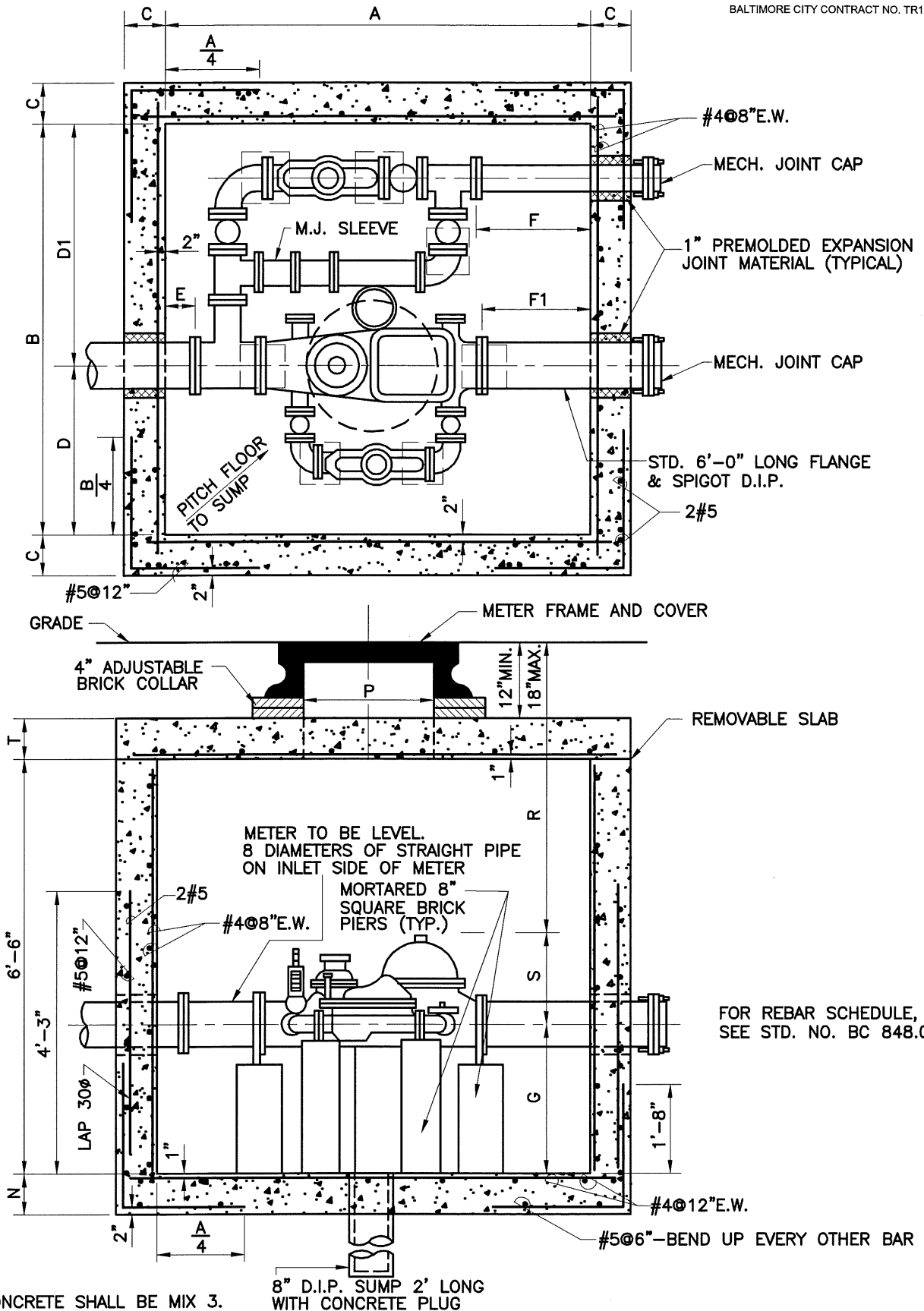
	4" F.M. WITH BYPASS	6" F.M. WITH BYPASS	8" F.M. WITH BYPASS	10" F.M. WITH BYPASS	12" F.M. WITH BYPASS
SIZE	4"	6"	8"	10"	12"
A	7'-11"	9'-8"	10'-10"	13'-0"	13'-6"
B	5'-6"	6'-0"	6'-11"	8'-6"	8'-6"
C	9"	9"	9"	9"	9"
D	2'-9"	3'-0"	3'-5 1/2"	4'-3"	4'-3"
E	9"	9"	9"	9"	9"
F	1'-3"	1'-2"	1'-4"	1'-8"	1'-7"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"
H	3'-6"	3'-9"	4'-2 1/2"	5'-0"	5'-0"
L	4'-8 1/2"	5'-7"	6'-2"	7'-3"	7'-6"
N	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"
R	4'-5" 4'-11"	4'-5" 4'-11"	4'-4" 4'-10"	3'-8" 4'-2"	3'-8" 4'-2"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	2'-6"	2'-6"
①	#4⊕12"E.W.	#4⊕12"E.W.	#4⊕12"E.W.	#4⊕9"E.W.	#4⊕9"E.W.
②	#5⊕6"	#5⊕6"	#5⊕6"	#5⊕4 1/2"	#5⊕4 1/2"

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS	REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS 1012	3 / 2008		
			STANDARD NO. BC 847.01		
			SCALE: NONE	SHEET 2 OF 3	



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"	10"	#6@7"	13@6'-8"	5@1'-11"	9@9'-1"	5@3'-1"	4@3'-3"	5@3'-1"	5@1'-11"	5.42	1.22	2.03
6"	10"	#6@6 1/2"	17@7'-2"	5@2'-2"	11@10'-10"	5@4'-0"	4@3'-3"	5@4'-0"	5@2'-2"	6.20	1.55	2.58
8"	10"	#6@5"	25@8'-1"	6@2'-7 1/2"	17@12'-0"	6@4'-7"	4@3'-3"	6@4'-7"	6@2'-7 1/2"	6.95	1.92	3.20
10"	10"	#6@4 1/2"	33@9'-8"	7@3'-5"	23@14'-2"	7@5'-8"	4@3'-3"	7@5'-8"	7@3'-5"	8.37	2.69	4.48
12"	10"	#6@4 1/2"	33@9'-8"	7@3'-5"	23@14'-8"	7@5'-11"	4@3'-3"	7@5'-11"	7@3'-5"	8.49	2.78	4.63

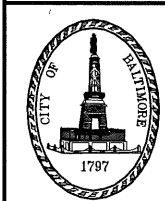
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER ROOF SLAB AND CONCRETE QUANTITIES FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS 1013	ISSUED	REVISED	REVISED
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS 		3 / 2008		
			SCALE: NONE	SHEET 3 OF 3	



NOTE: CONCRETE SHALL BE MIX 3.

8" D.I.P. SUMP 2' LONG WITH CONCRETE PLUG

FOR REBAR SCHEDULE, SEE STD. NO. BC 848.02.





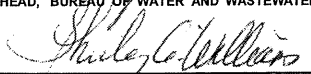
APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

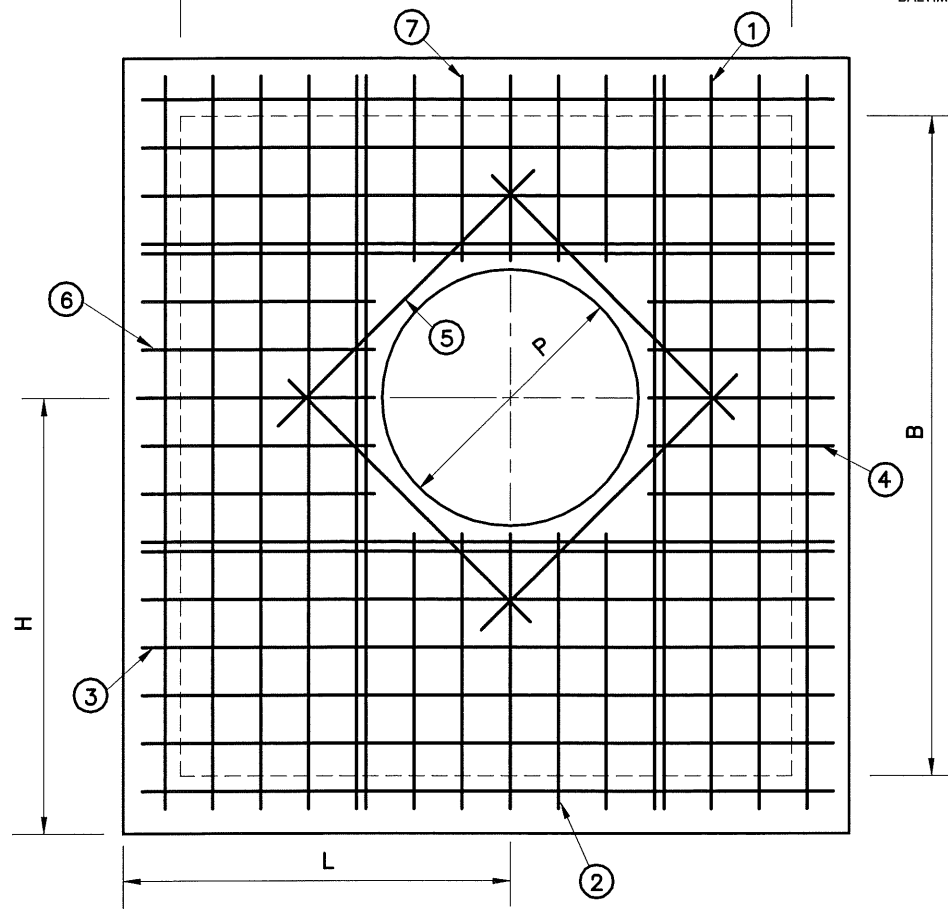
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 STANDARD VAULT FOR
 4", 6", 8", 10", & 12" F.M. METERS
 WITH LARGE DOMESTIC METERS
 1014

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 848.01		
SCALE: NONE	SHEET 1 OF 3	

	4" F.M. WITH 4" DOM. METER AND 4" BYPASS	6" F.M. WITH 4" DOM. METER AND 4" BYPASS	8" F.M. WITH 6" DOM. METER AND 6" BYPASS	8" F.M. WITH 4" DOM. METER AND 4" BYPASS	10" F.M. WITH 6" DOM. METER AND 6" BYPASS	10" F.M. WITH 4" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	6'-10"	6'-11 1/2"	8'-2"	7'-5"	9'-2"	9'-2"
B	7'-10"	7'-7"	8'-9 1/2"	8'-1 1/2"	9'-9"	9'-1"
C	9"	9"	9"	9"	9"	9"
D	2'-10"	3'-3"	3'-9"	3'-9"	4'-6"	4'-6"
D1	4'-2"	4'-4"	5'-1/2"	4'-4 1/2"	5'-3"	4'-7"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	—	—	—
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-7"	4'-0"	4'-6"	4'-6"	5'-3"	5'-3"
L	3'-11 1/2"	4'-8 1/2"	5'-2 1/2"	5'-2 1/2"	6'-2"	6'-2"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-4" 4'-10"	4'-4" 4'-10"	4'-4" 4'-10"	4'-4" 4'-10"	3'-8" 4'-2"	3'-8" 4'-2"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	1'-9 1/2"	2'-6"	2'-6"
F1	—	—	—	9"	11"	11"

NOTE: FOR 12" F.M. USE 10" F.M. VAULT WITH CORRESPONDING DOMESTIC METERS & BYPASS SIZES.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED 3 / 2008	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 	DIRECTOR, DEPARTMENT OF PUBLIC WORKS	REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS WITH LARGE DOMESTIC METERS	STANDARD NO. BC 848.01	
			SCALE: NONE	SHEET 2 OF 3	



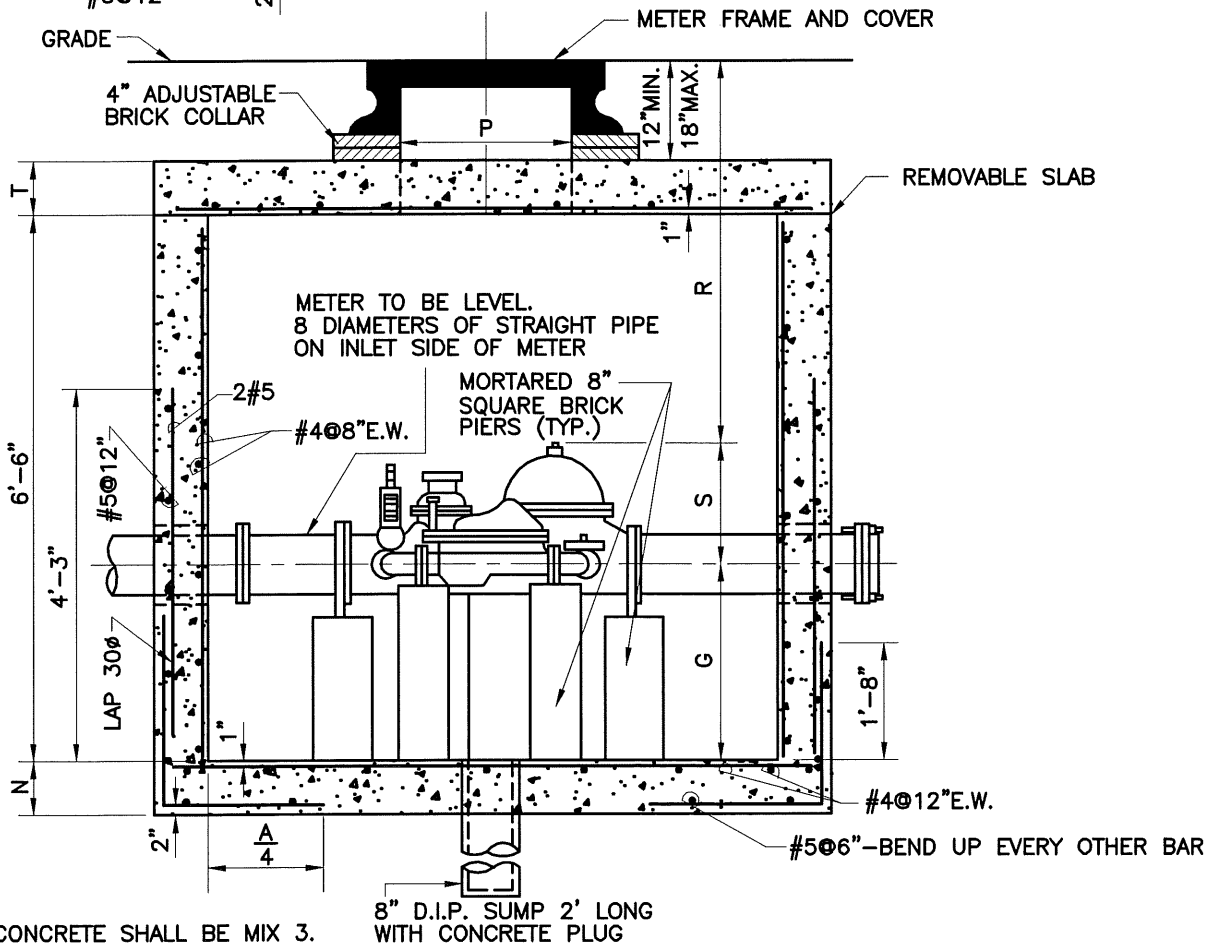
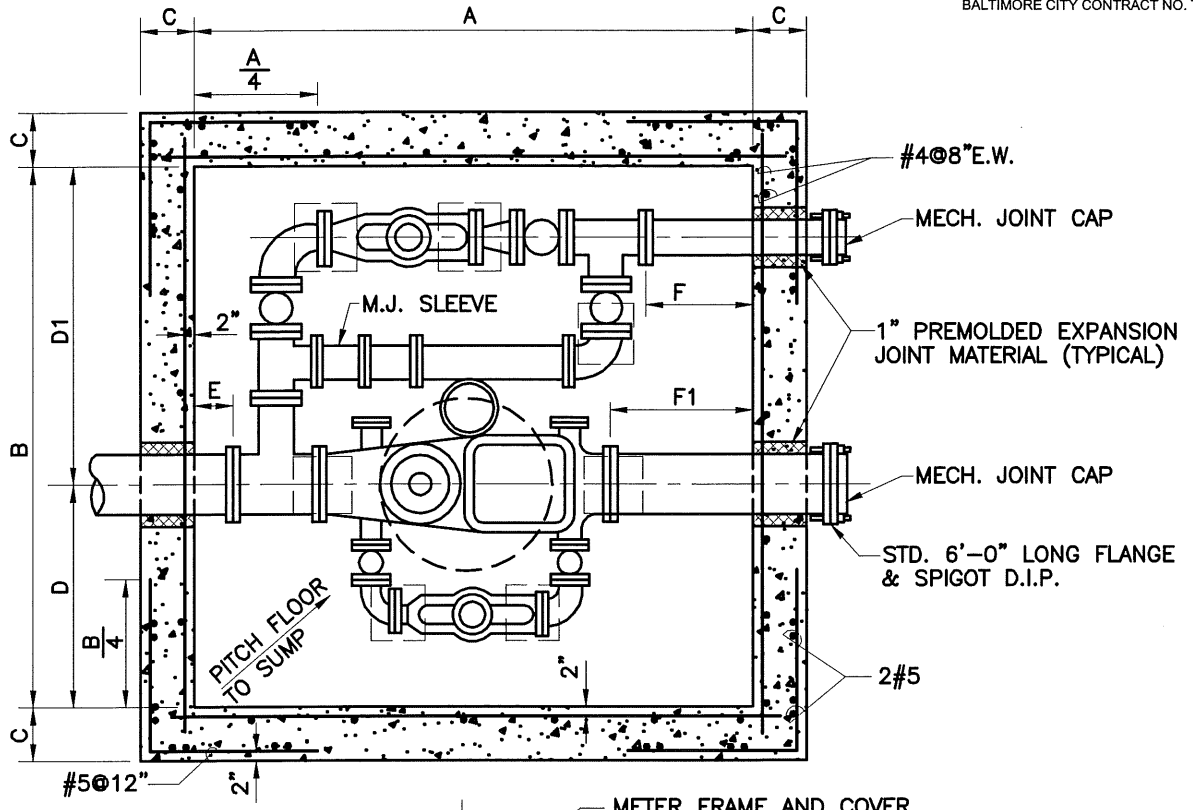
ROOF SLAB MATERIALS										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4" W/ 3" DOM	9"	#6@6"	14@8'-2"	5@2'-0"	14@8'-0"	5@2'-9"	4@3'-3"	5@2'-4"	5@3'-4"	5.54	1.31	1.97
6" W/ 3" DOM	9"	#6@5 1/2"	15@8'-9"	5@2'-5"	16@8'-1"	5@2'-2"	4@3'-3"	5@3'-1"	5@3'-6"	5.79	1.42	2.13
8" W/ 6" DOM	10"	#6@5"	19@9'-11"	6@2'-11"	20@9'-4"	6@2'-10"	4@3'-3"	6@3'-7"	6@4'-2"	6.67	1.84	3.07
8" W/ 3" DOM	10"	#6@6"	15@9'-3"	5@2'-11"	16@8'-7"	5@2'-1"	4@3'-3"	5@3'-7"	5@3'-6"	6.15	1.59	2.65
10" W/ 6" DOM	10"	#6@4 1/2"	23@10'-11"	7@3'-8"	25@10'-4"	7@2'-11"	4@3'-3"	7@4'-7"	7@4'-5"	7.37	2.22	3.70
10" W/ 3" DOM	10"	#6@4 1/2"	23@10'-3"	7@3'-8"	23@10'-4"	7@2'-11"	4@3'-3"	7@4'-7"	7@3'-9"	7.13	2.09	3.48



APPROVED:
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[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER
ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8", 10", & 12" F.M. METERS
WITH LARGE DOMESTIC METERS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 848.01		
SCALE: NONE	SHEET 3 OF 3	



NOTE: CONCRETE SHALL BE MIX 3.

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[Signature]
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[Signature]
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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER



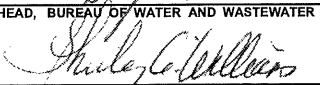
STANDARD VAULT FOR
 4\", 6\", 8\", 10\", & 12\"/>

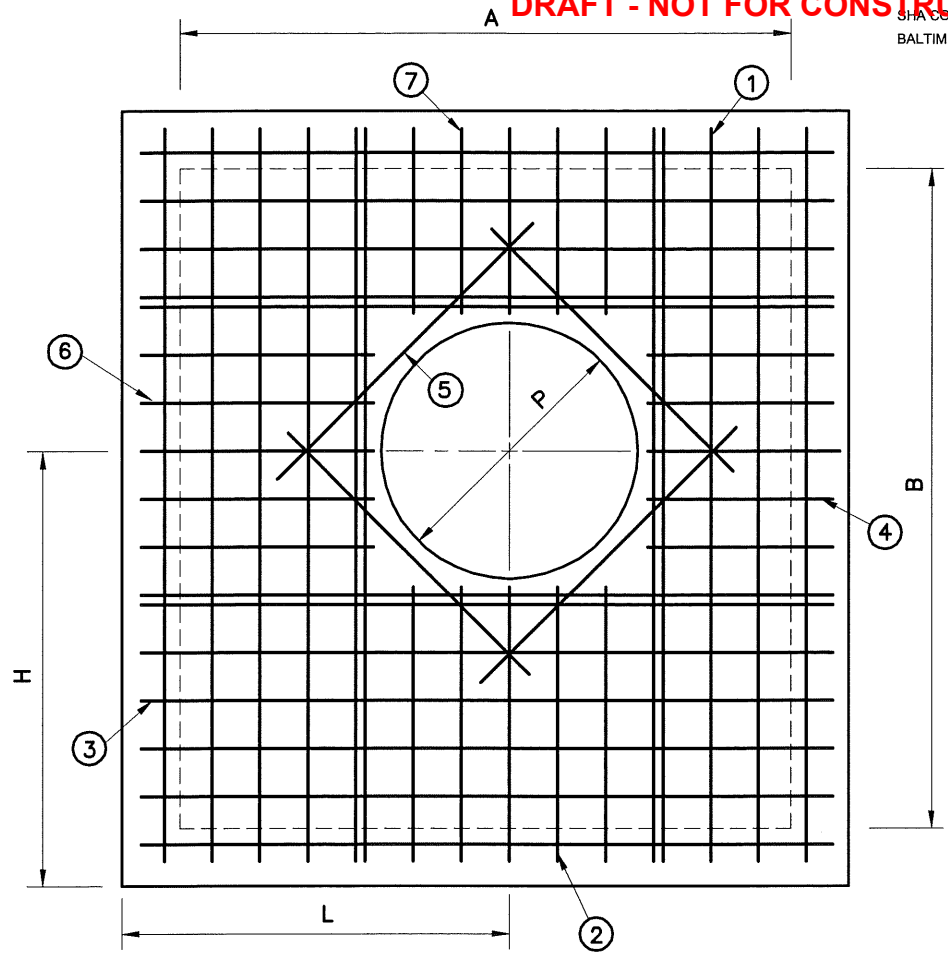
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 849.01
 SCALE: NONE SHEET 1 OF 3

SIZE	4" F.M. WITH 3" DOM. METER AND 4" BYPASS	6" F.M. WITH 3" DOM. METER AND 4" BYPASS	8" F.M. WITH 4" DOM. METER AND 6" BYPASS	8" F.M. WITH 3" DOM. METER AND 4" BYPASS	10" F.M. WITH 4" DOM. METER AND 6" BYPASS	10" F.M. WITH 3" DOM. METER AND 4" BYPASS
A	7'-0"	7'-1 1/2"	8'-3 1/2"	7'-5"	9'-2"	9'-2"
B	6'-11"	7'-6"	8'-7 1/2"	8'-1/2"	9'-7"	9'-0"
C	9"	9"	9"	9"	9"	9"
D	2'-10"	3'-3"	3'-9"	3'-9"	4'-6"	4'-6"
D1	4'-1"	4'-3"	4'-10 1/2"	4'-3 1/2"	5'-1"	4'-6"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	—	—	—
F1	—	—	—	9"	11"	11"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-7"	4'-0"	4'-6"	4'-6"	5'-3"	5'-3"
L	3'-11 1/2"	4'-8 1/2"	5'-2 1/2"	5'-2 1/2"	6'-2"	6'-2"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-4" 4'-10"	4'-4" 4'-10"	4'-4" 4'-10"	4'-3" 4'-9"	3'-8" 4'-2"	3'-7" 4'-1"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	1'-9 1/2"	2'-6"	2'-6"

NOTE: FOR 12" F.M. USE 10" F.M. VAULT WITH CORRESPONDING DOMESTIC METERS & BYPASS SIZES.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED	
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008			
DIRECTOR, DEPARTMENT OF PUBLIC WORKS			REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS WITH REDUCED SIZE LARGE DOMESTIC METERS			STANDARD NO. BC 849.01
			SCALE: NONE	SHEET 2 OF 3		



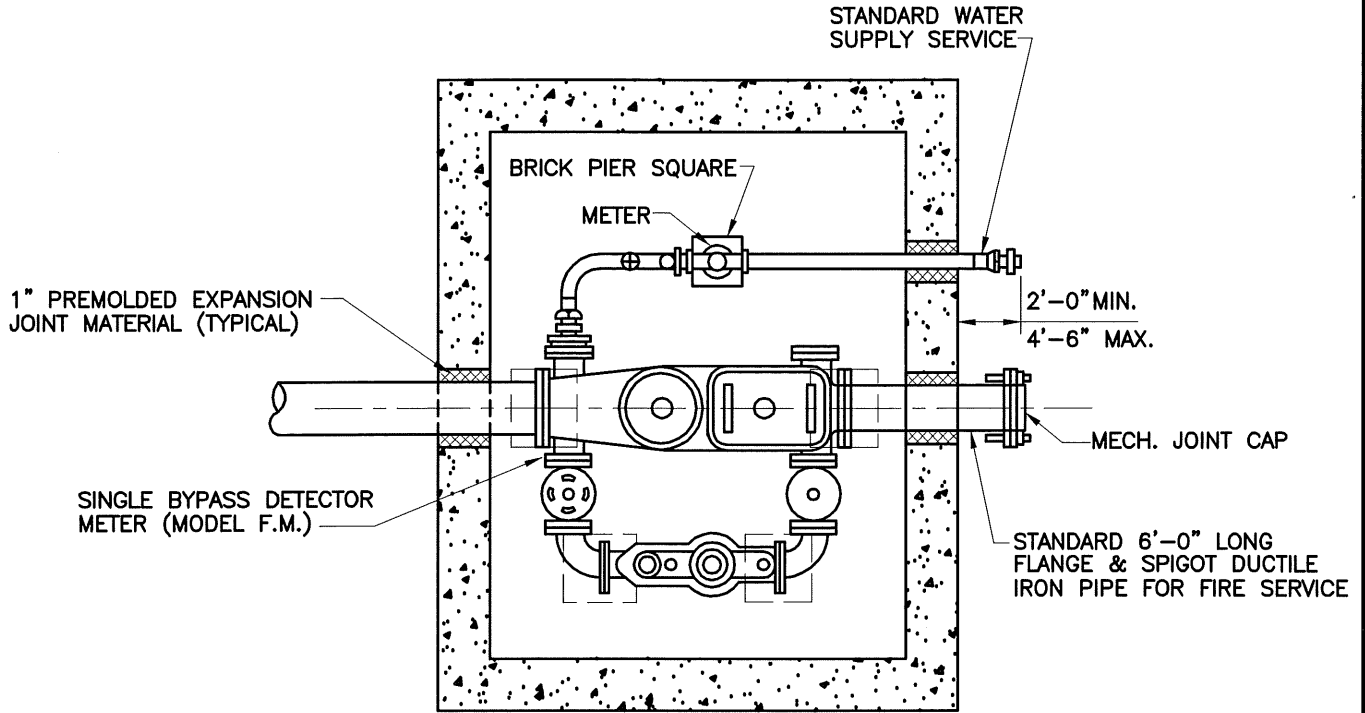
ROOF SLAB MATERIALS										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4" W/ 3" DOM	9"	#6@6"	14@8'-1"	5@2'-0"	14@8'-2"	5@2'-11"	4@3'-3"	5@2'-4"	5@3'-3"	5.57	1.32	1.98
6" W/ 3" DOM	9"	#6@6"	15@8'-8"	5@2'-5"	15@8'-3"	5@2'-4"	4@3'-3"	5@3'-1"	5@3'-5"	5.82	1.44	2.16
8" W/ 4" DOM	10"	#6@5"	20@9'-9"	6@2'-11"	20@9'-5"	6@3'-0"	4@3'-3"	6@3'-7"	6@4'-0"	6.65	1.84	3.07
8" W/ 3" DOM	9"	#6@5 1/2"	17@9'-2"	5@2'-11"	16@8'-7"	5@2'-1"	4@3'-3"	5@3'-7"	5@3'-5"	6.12	1.58	2.37
10" W/ 4" DOM	10"	#6@5"	22@10'-9"	6@3'-8"	22@10'-4"	6@2'-11"	4@3'-3"	6@4'-7"	6@4'-3"	7.31	2.19	3.65
10" W/ 3" DOM	9"	#6@5 1/2"	20@10'-3"	5@3'-8"	19@10'-4"	5@2'-11"	4@3'-3"	5@4'-7"	5@3'-8"	7.10	2.07	3.11



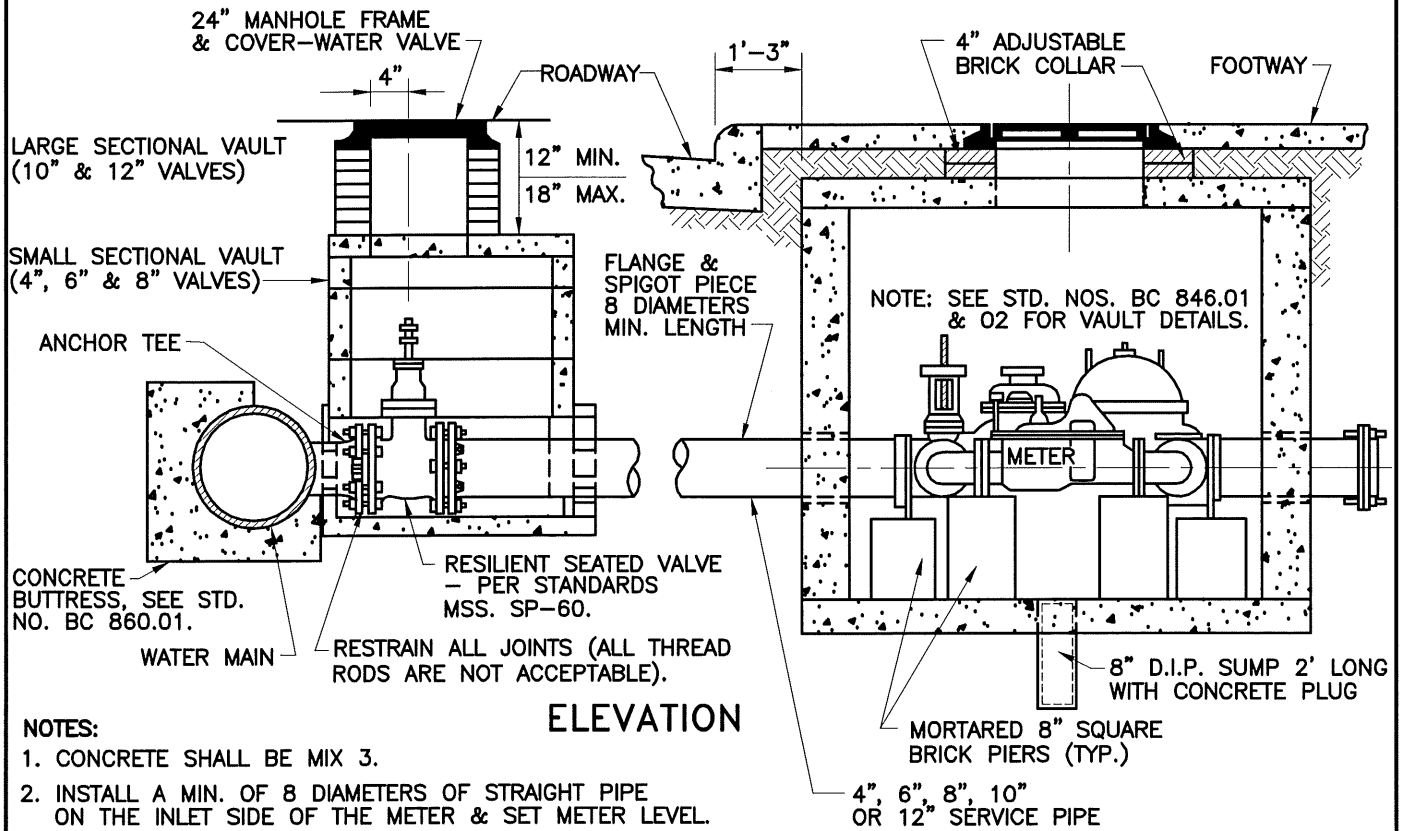
APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER
ROOF SLAB AND CONCRETE QUANTITIES FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS WITH REDUCED SIZE LARGE DOMESTIC METERS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 849.01		
SCALE: NONE	SHEET 3 OF 3	



PLAN (METER VAULT ONLY)



ELEVATION

- NOTES:
1. CONCRETE SHALL BE MIX 3.
 2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER & SET METER LEVEL.



APPROVED:

Bryan...

HEAD, BUREAU OF WATER AND WASTEWATER

Shirley...

DIRECTOR, DEPARTMENT OF PUBLIC WORKS

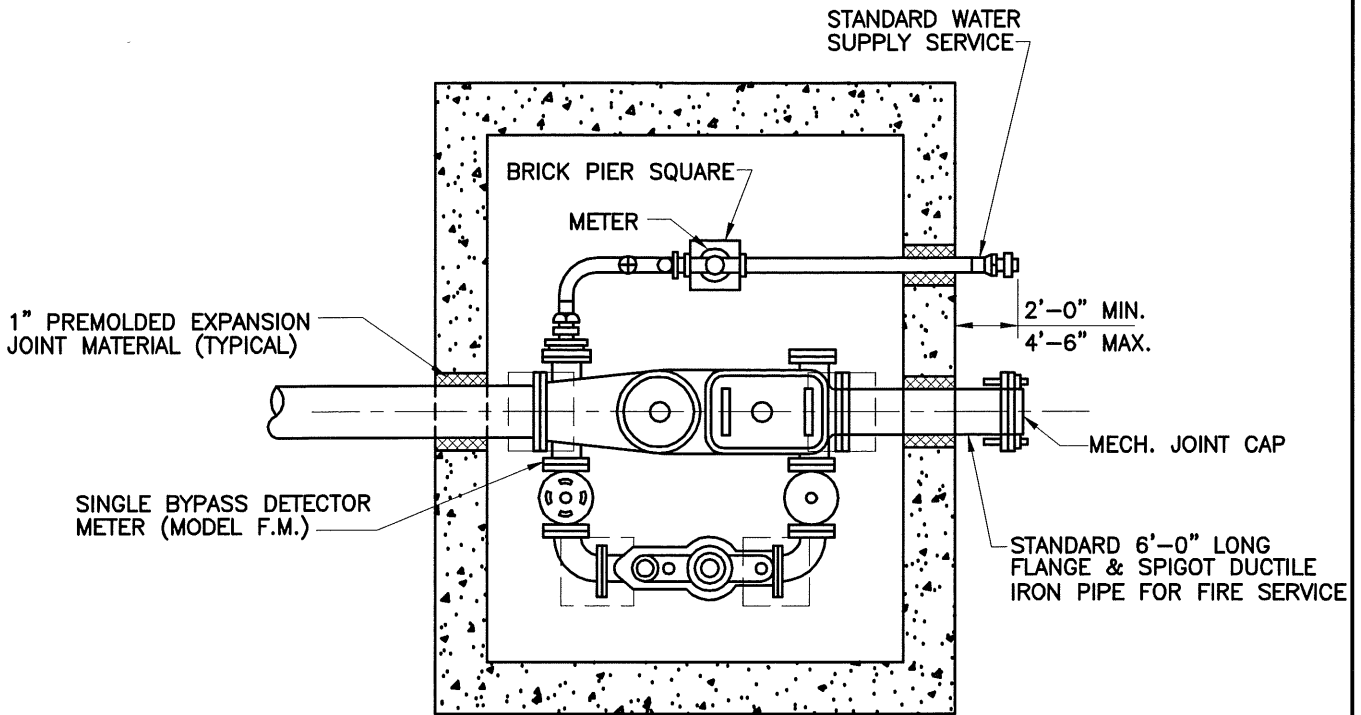
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(OUTSIDE FIRE HYDRANTS) WITH
TEE AND VALVE (SECTIONAL VAULT)

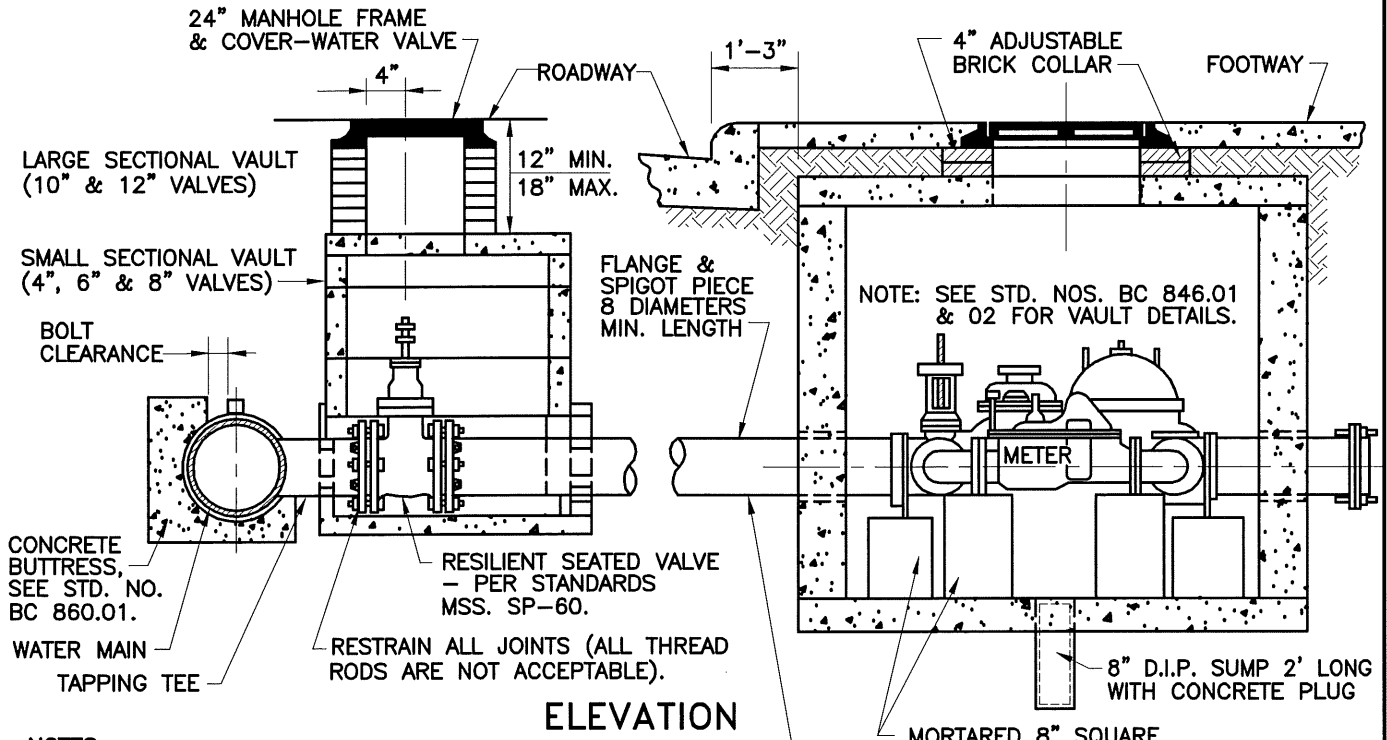
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 850.01

SCALE: NONE SHEET 1 OF 1




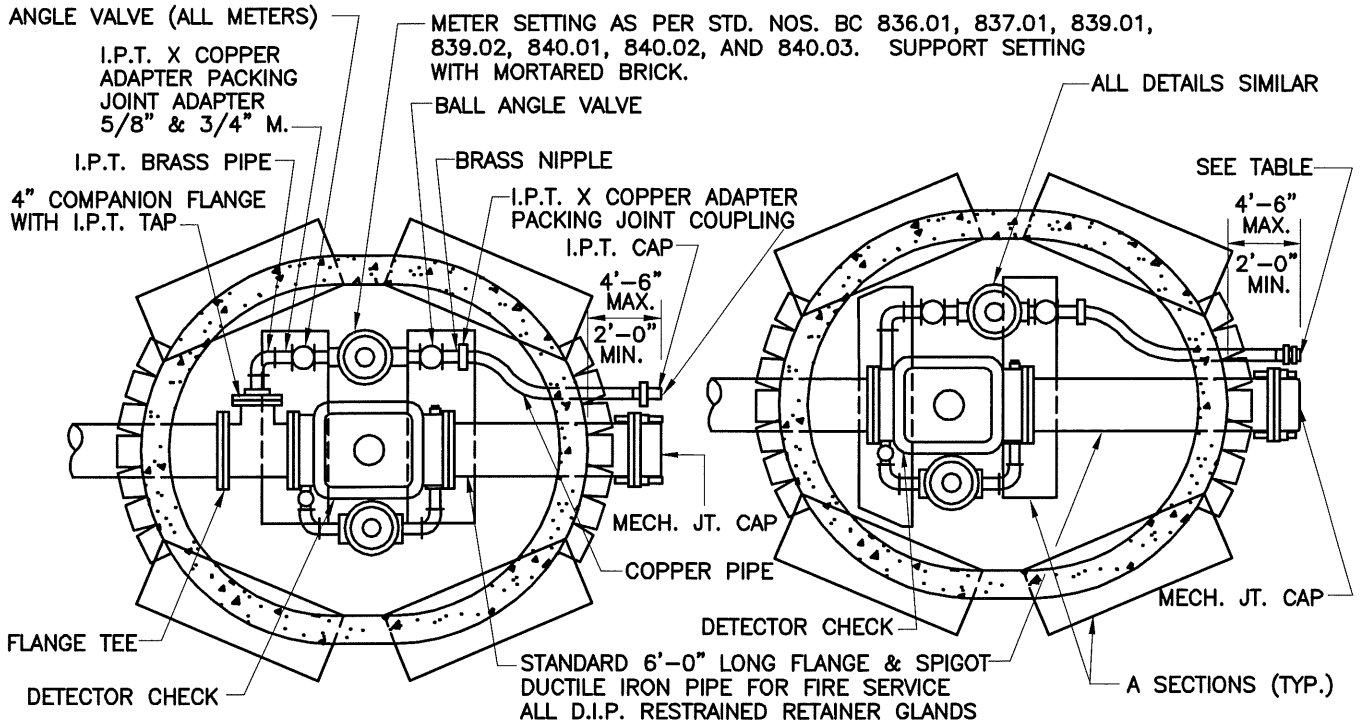
PLAN (METER VAULT ONLY)



ELEVATION

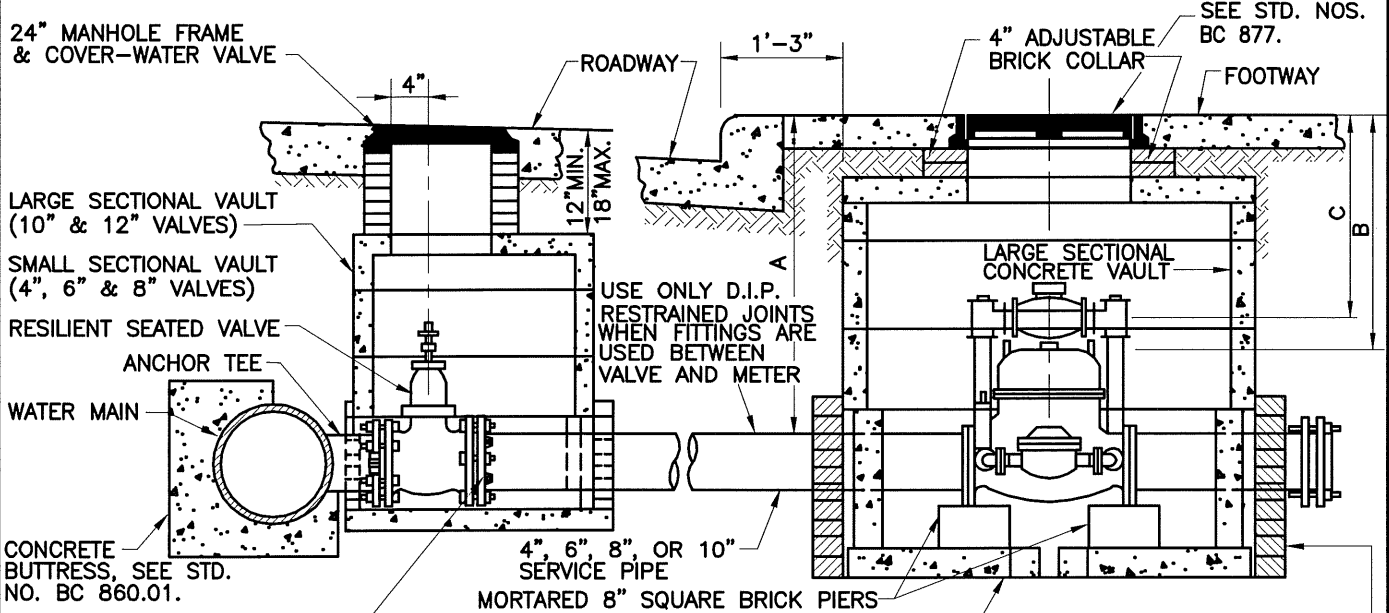
- NOTES:**
1. CONCRETE SHALL BE MIX 3.
 2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER & SET METER LEVEL.

	APPROVED: <i>[Signature]</i> HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES WITH WATER SUPPLY SERVICE (OUTSIDE FIRE HYDRANTS) WITH TAPPING SLEEVE AND VALVE (SECTIONAL VAULT)	ISSUED	REVISED	REVISED
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
STANDARD NO. BC 850.02			SCALE: NONE SHEET 1 OF 1		



W.S.S. WITH TEE

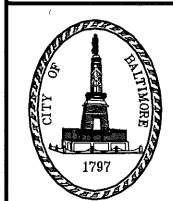
W.S.S. SIDE CONNECTION



RESTRAIN ALL JOINTS (ALL THREAD RODS ARE NOT ACCEPTABLE).
IF DIRECTED BY AN ENGINEER, POUR A 4'x4.5'x4" REINFORCED CONCRETE BASE (#4@12"E.W.) (IN LIEU OF "A" SECTIONS)

D.C. METER	WATER SUPPLY SERVICE		A	B	C
	SIDE CONN.	WITH TEE			
4"	3/4" - 1"	1 1/2", 2"	4'-9"	3'-9"	AS PER STD. NOS. BC 836 TO 840.
6"	3/4"-1 1/2"	2"	5'-4"	4'	
8"	3/4"-2"	N/A	5'-10"	4'	
10"	3/4"-2"	N/A	6'	4'	

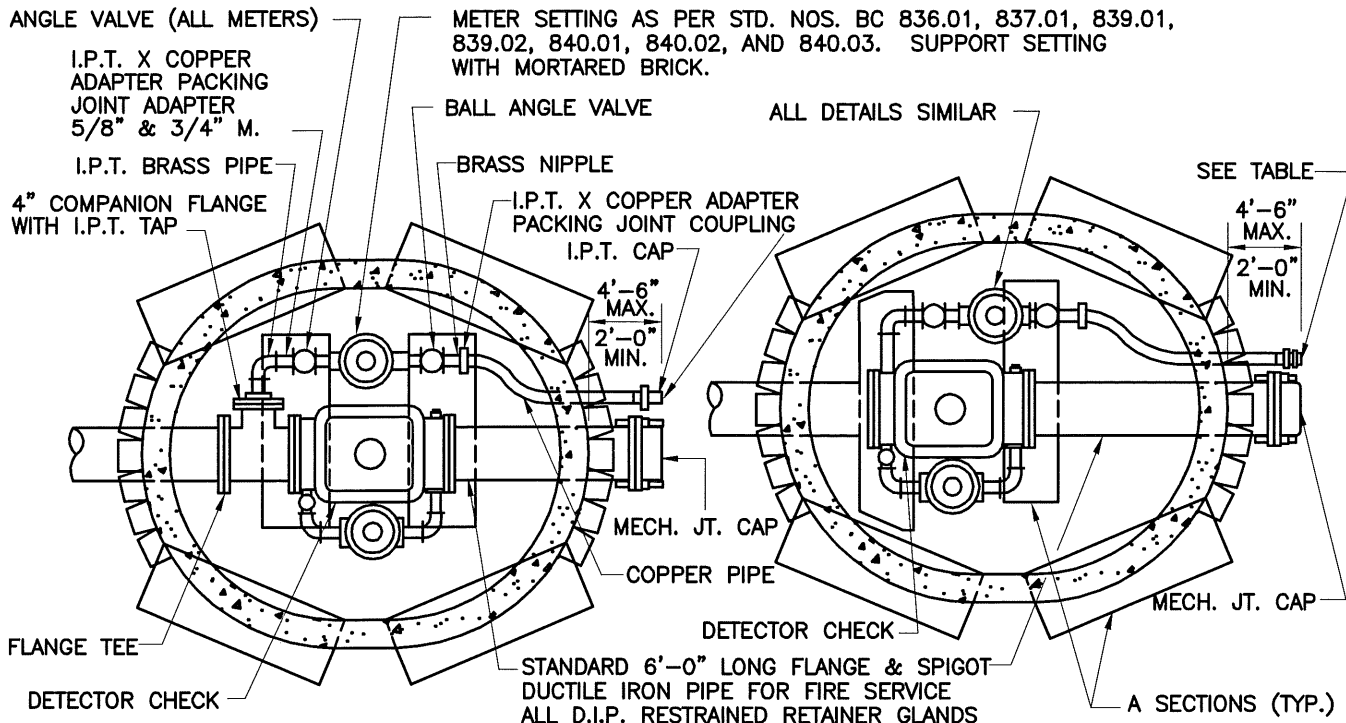
OPENING AROUND PIPE TO BE BRICKED UP ON THE OUTSIDE OF VAULT AFTER METER IS INSTALLED.



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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

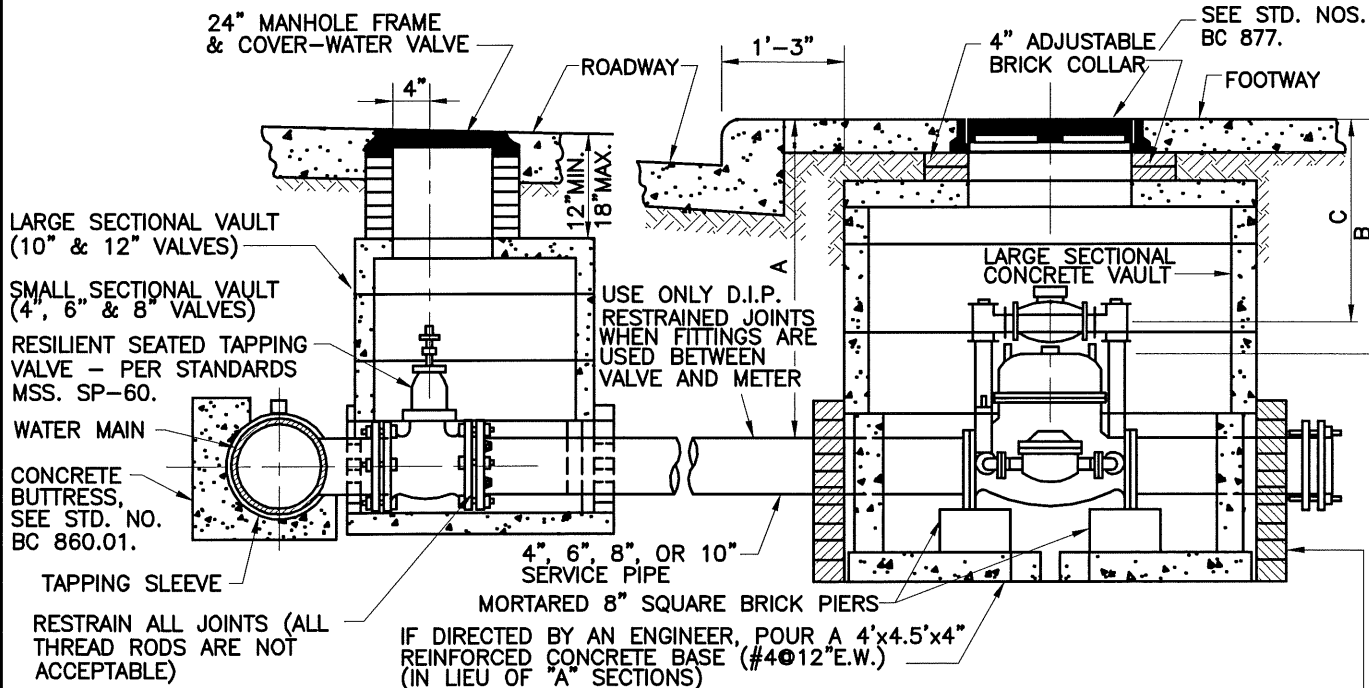
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER
**STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(NO OUTSIDE FIRE HYDRANTS) WITH
TEE VALVE (SECTIONAL VAULT)**

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 851.01		
SCALE: NONE	SHEET 1 OF 1	






W.S.S. WITH TEE

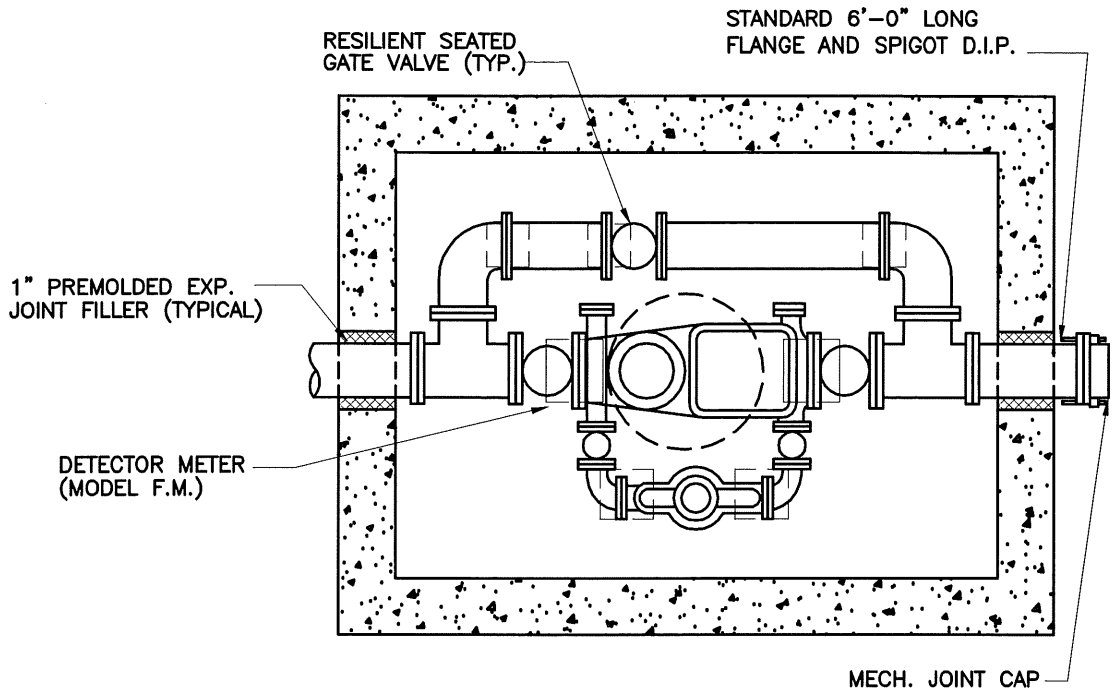
W.S.S. SIDE CONNECTION



D.C. METER	WATER SUPPLY SERVICE		A	B	C
	SIDE CONN.	WITH TEE			
4"	3/4" - 1"	1 1/2", 2"	4'-9"	3'-9"	AS PER STD. NOS. BC 836 TO 840.
6"	3/4"-1 1/2"	2"	5'-4"	4'	
8"	3/4"-2"	N/A	5'-10"	4'	
10"	3/4"-2"	N/A	6'	4'	

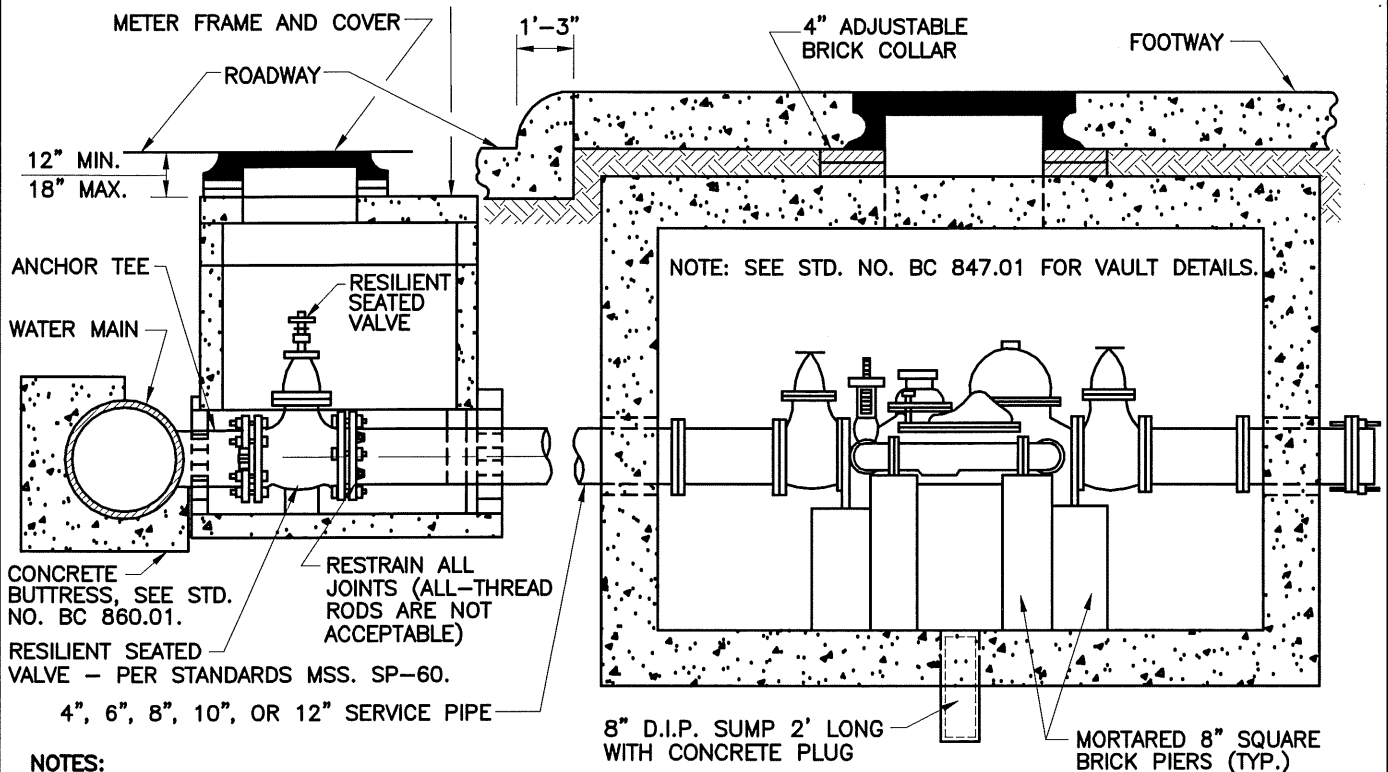
OPENING AROUND PIPE TO BE BRICKED UP ON THE OUTSIDE OF VAULT AFTER METER IS INSTALLED.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES WITH WATER SUPPLY SERVICE (NO OUTSIDE FIRE HYDRANTS) WITH TAPPING SLEEVE AND VALVE (SECTIONAL VAULT)	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 851.02		SCALE: NONE



PLAN (METER VAULT ONLY)

LARGE SECTIONAL VAULT (10" & 12" VALVES)
 SMALL SECTIONAL VAULT (4", 6", & 8" VALVES)



ELEVATION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER AND SET METER LEVEL.



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 HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
 4", 6", 8", 10", & 12" WATER SUPPLY SERVICES
 (4", 6", 8", 10", & 12" COMBINED SERVICES)
 WITH METER AND VALVE (SECTIONAL VAULT)

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 852.01

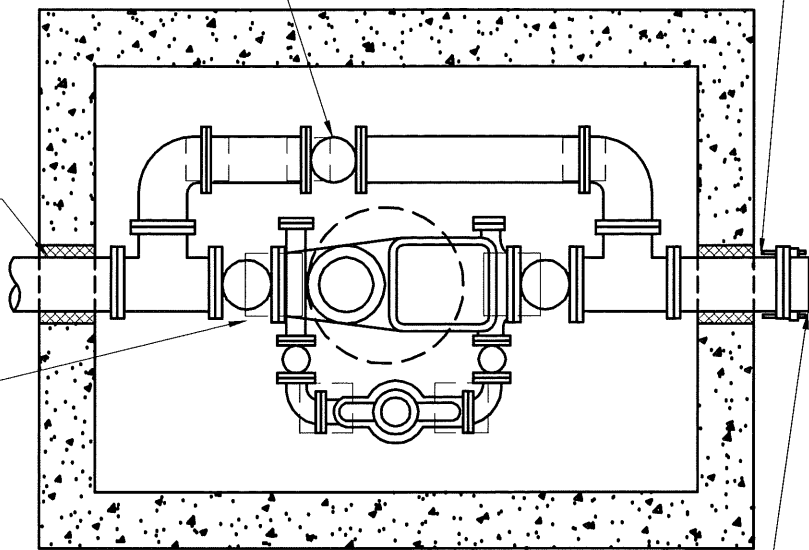
SCALE: NONE SHEET 1 OF 1

1" PREMOLDED EXPANSION JOINT FILLER (TYPICAL)

DETECTOR METER (MODEL F.M.)

RESILIENT SEATED GATE VALVE (TYP.)

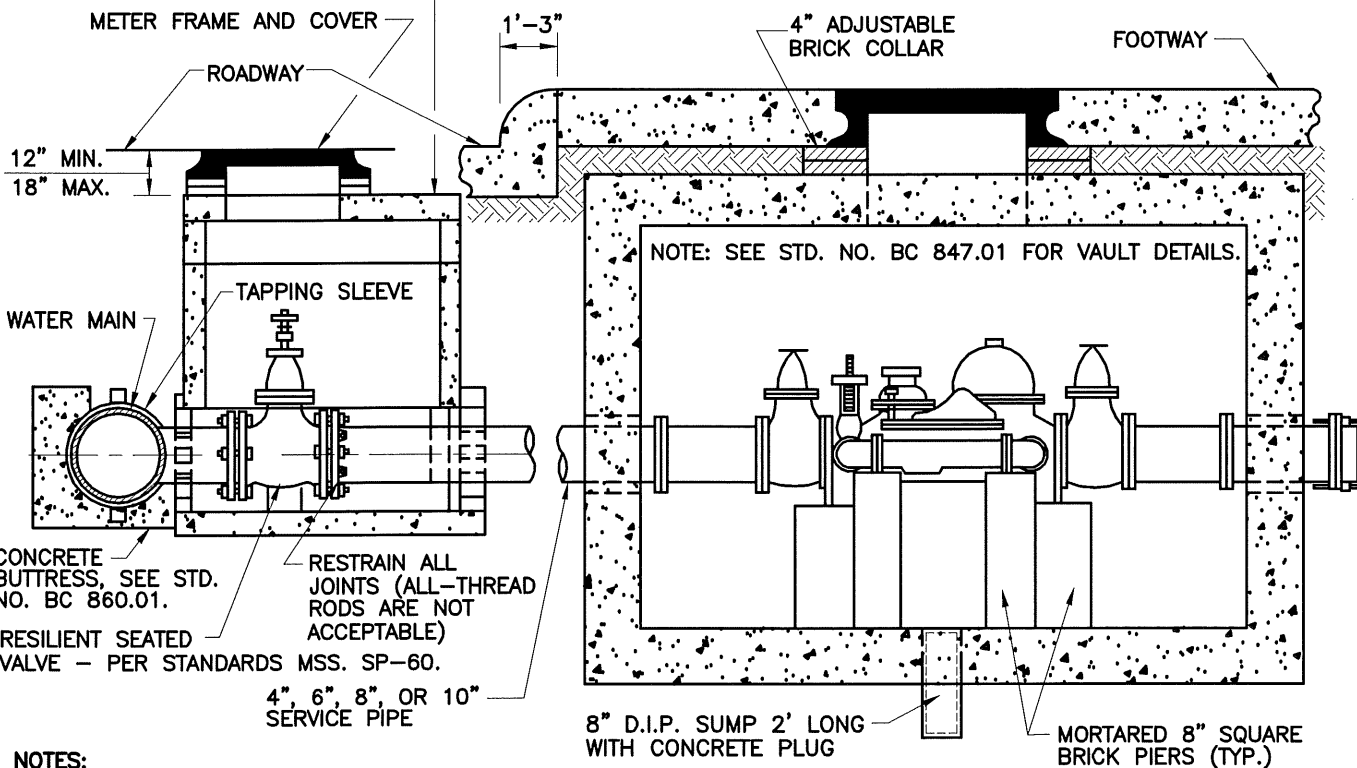
STANDARD 6'-0" LONG FLANGE AND SPIGOT D.I.P.



MECH. JOINT CAP

PLAN (METER VAULT ONLY)

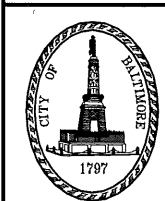
LARGE SECTIONAL VAULT (10" & 12")
 SMALL SECTIONAL VAULT (4", 6", & 8")



ELEVATION

CONCRETE BUTTRESS, SEE STD. NO. BC 860.01.
 RESTRAIN ALL JOINTS (ALL-THREAD RODS ARE NOT ACCEPTABLE)
 RESILIENT SEATED VALVE - PER STANDARDS MSS. SP-60.
 4", 6", 8", OR 10" SERVICE PIPE

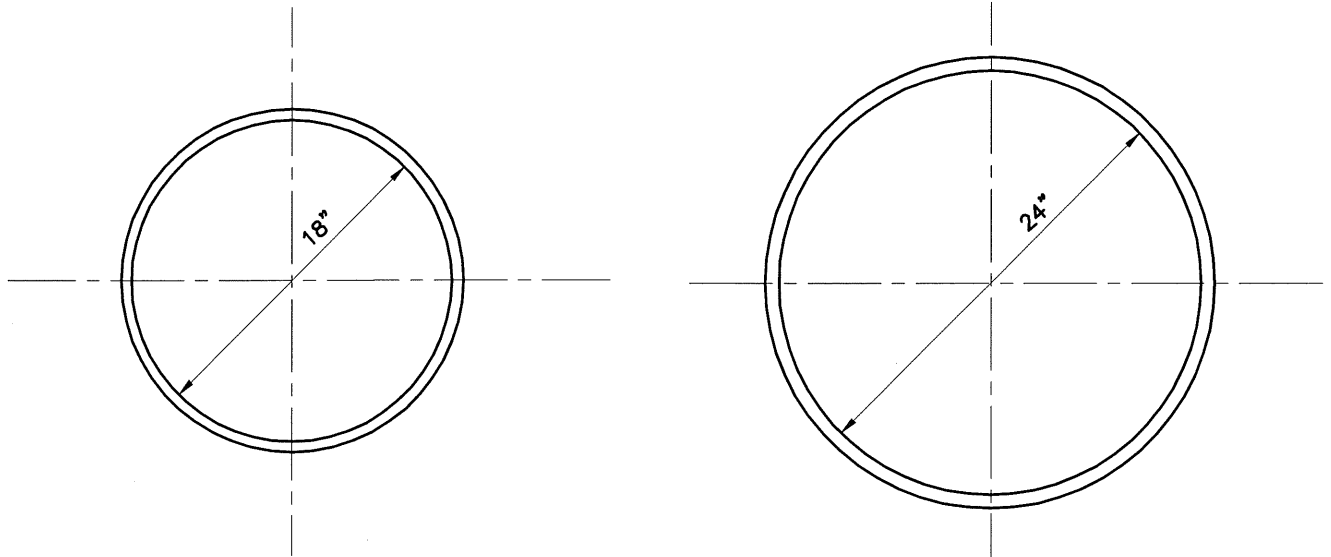
- NOTES:
1. CONCRETE SHALL BE MIX 3.
 2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER AND SET METER LEVEL.



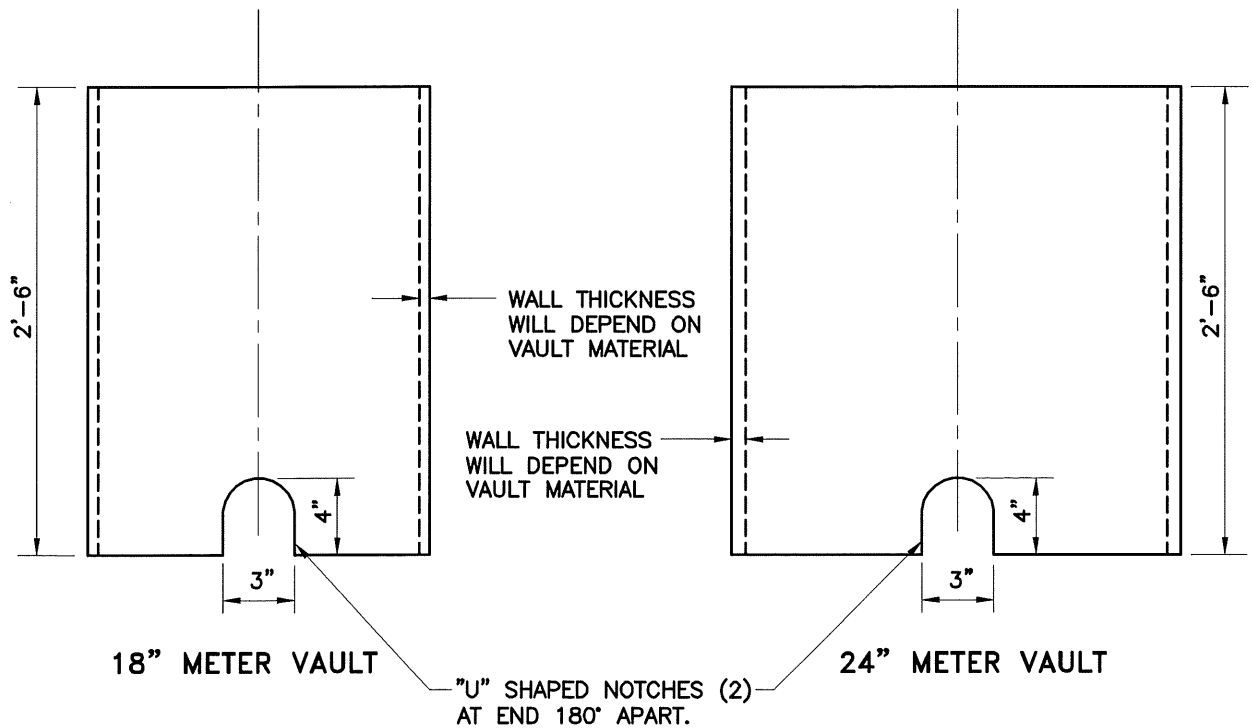
APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS




CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 STANDARD INSTALLATION OF
 4", 6", 8", 10", & 12" WATER SUPPLY SERVICES
 (4", 6", 8", 10", & 12" COMBINED SERVICES)
 WITH TAPPING SLEEVE AND VALVE
 1025 (SECTIONAL VAULT)

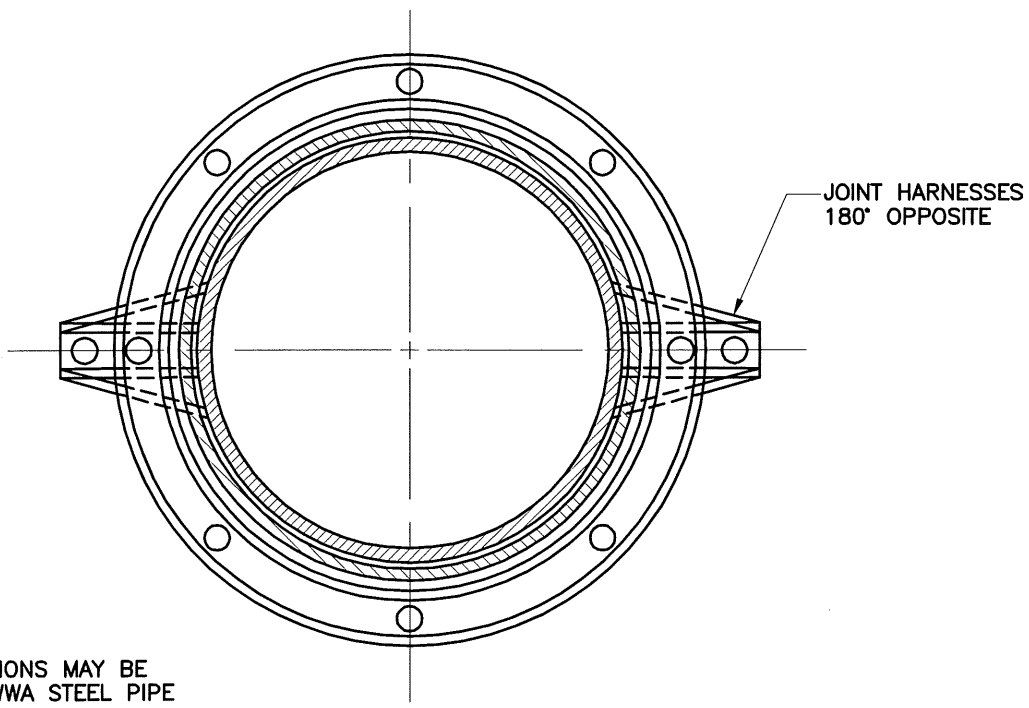
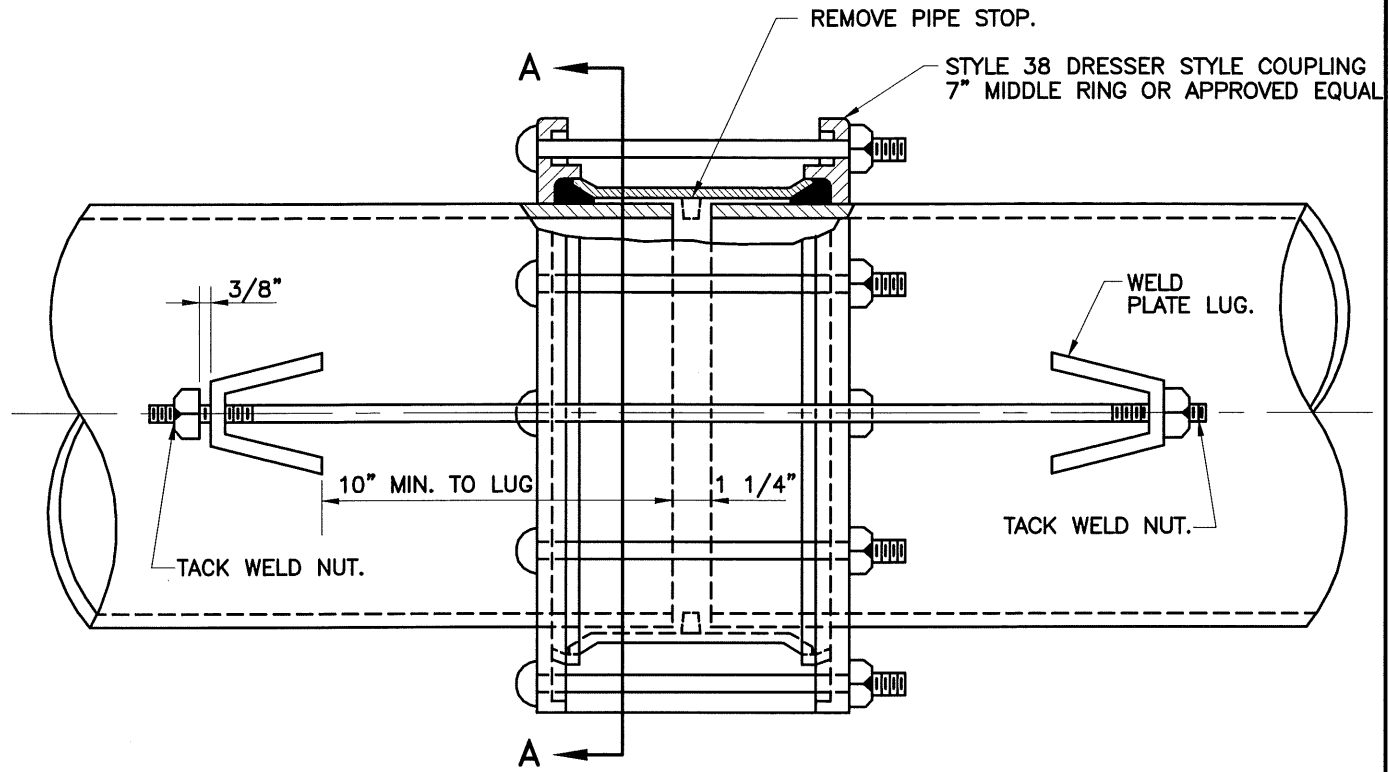
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 852.02		
SCALE: NONE	SHEET 1 OF 1	



NOTE:
METER VAULTS SHOULD BE PVC, PE, FIBERGLASS, OR APPROVED EQUAL.



	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
STANDARD WATER 1027 METER VAULTS 1026			STANDARD NO. BC 853.01		
			SCALE: NONE	SHEET 1 OF 1	



NOTE:
PLATE LUG DIMENSIONS MAY BE
OBTAINED FROM AWWA STEEL PIPE
MANUAL.

SECTION A-A

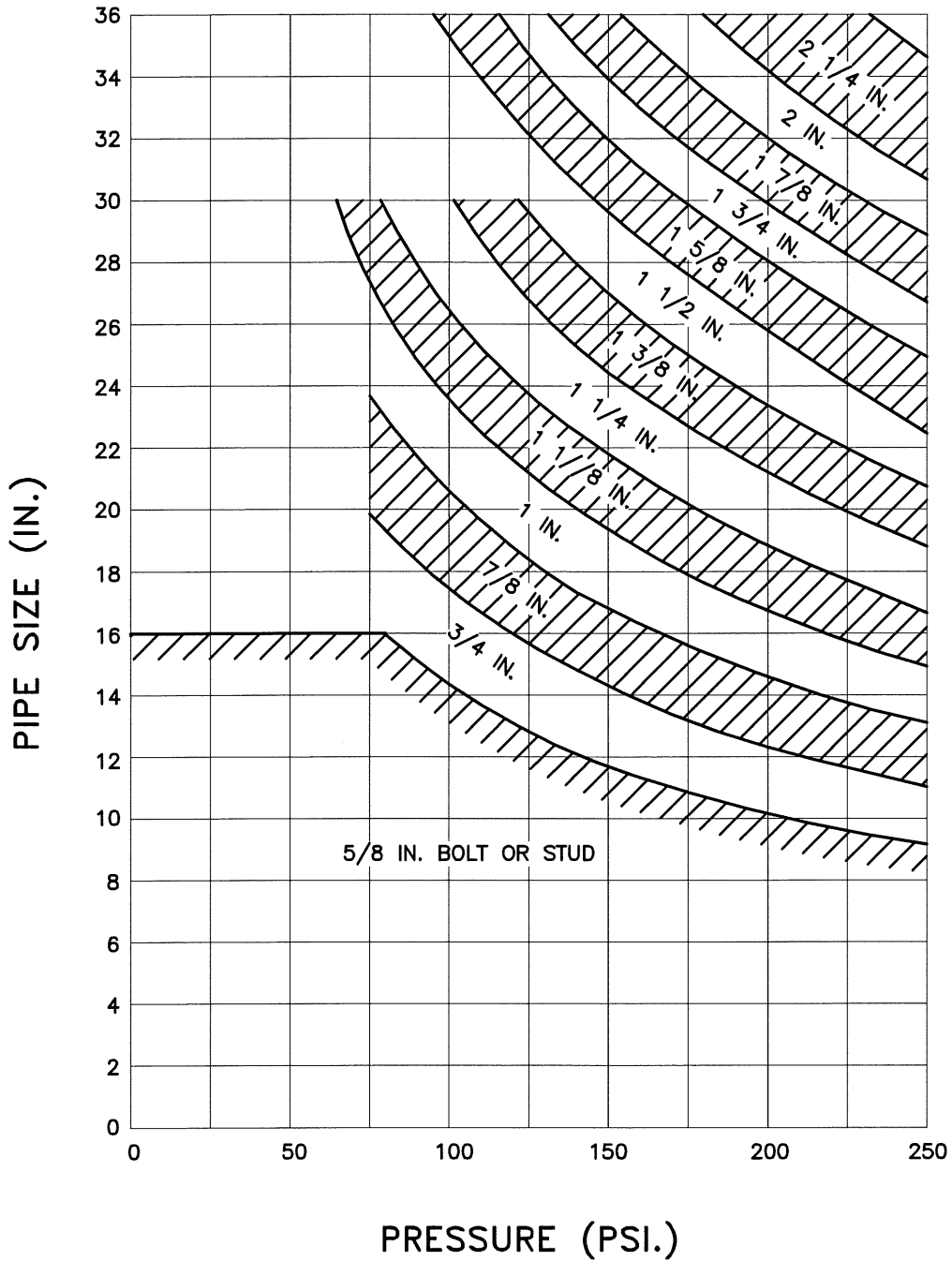


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[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
WATER MAIN ON STRUCTURES
(STEEL PIPE ONLY)
1028
1027

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 854.01		
SCALE: NONE	SHEET 1 OF 1	



NOTE:
 THE BOLT SIZE SHOWN IN A STRIP AREA MAY BE USED FOR ANY COMBINATION OF PIPE SIZE AND PRESSURE LINES INTERSECTING IN THAT AREA.

SOURCE:
 AWWA STEEL PIPE MANUAL



APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

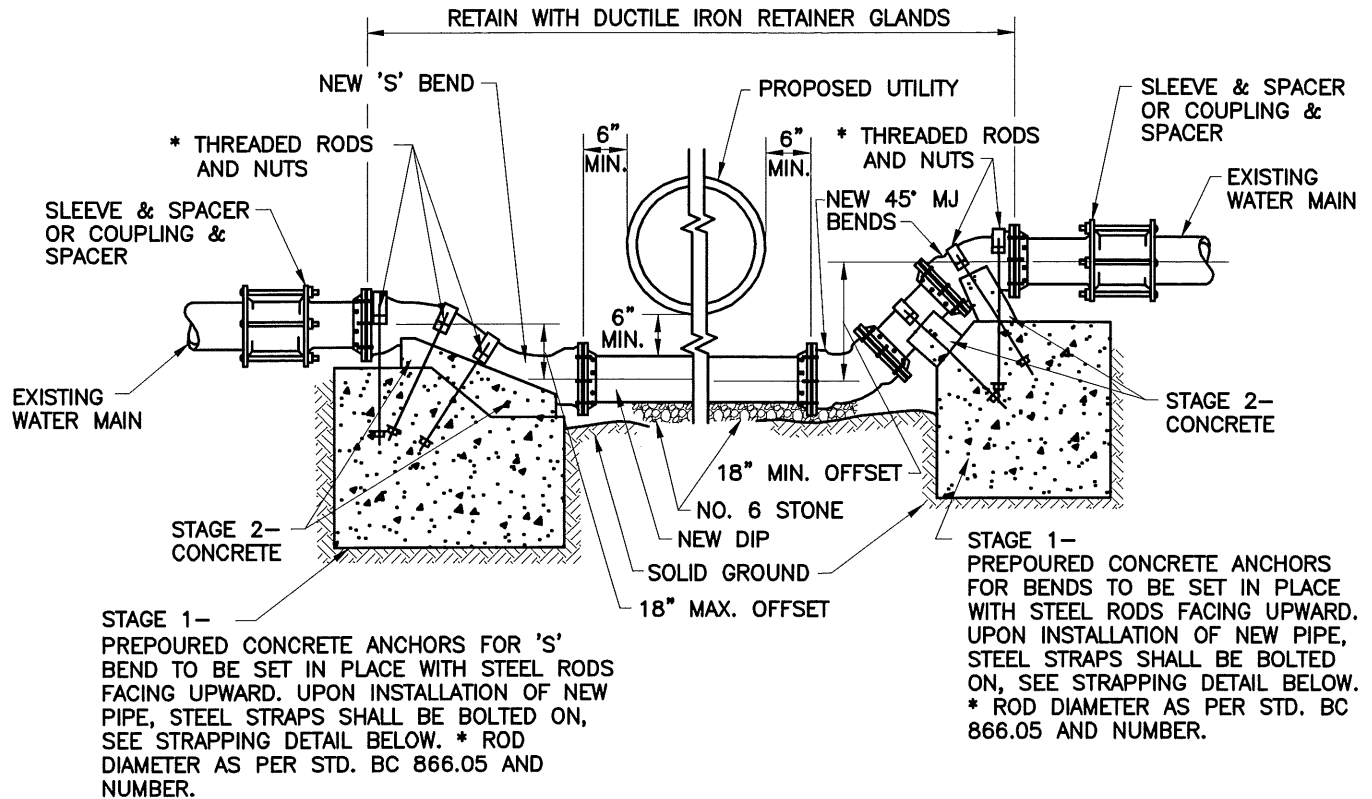
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

BOLT SIZE CHART FOR
 STANDARD INSTALLATION OF
 WATER MAIN ON STRUCTURES
 1028 (STEEL PIPE ONLY)

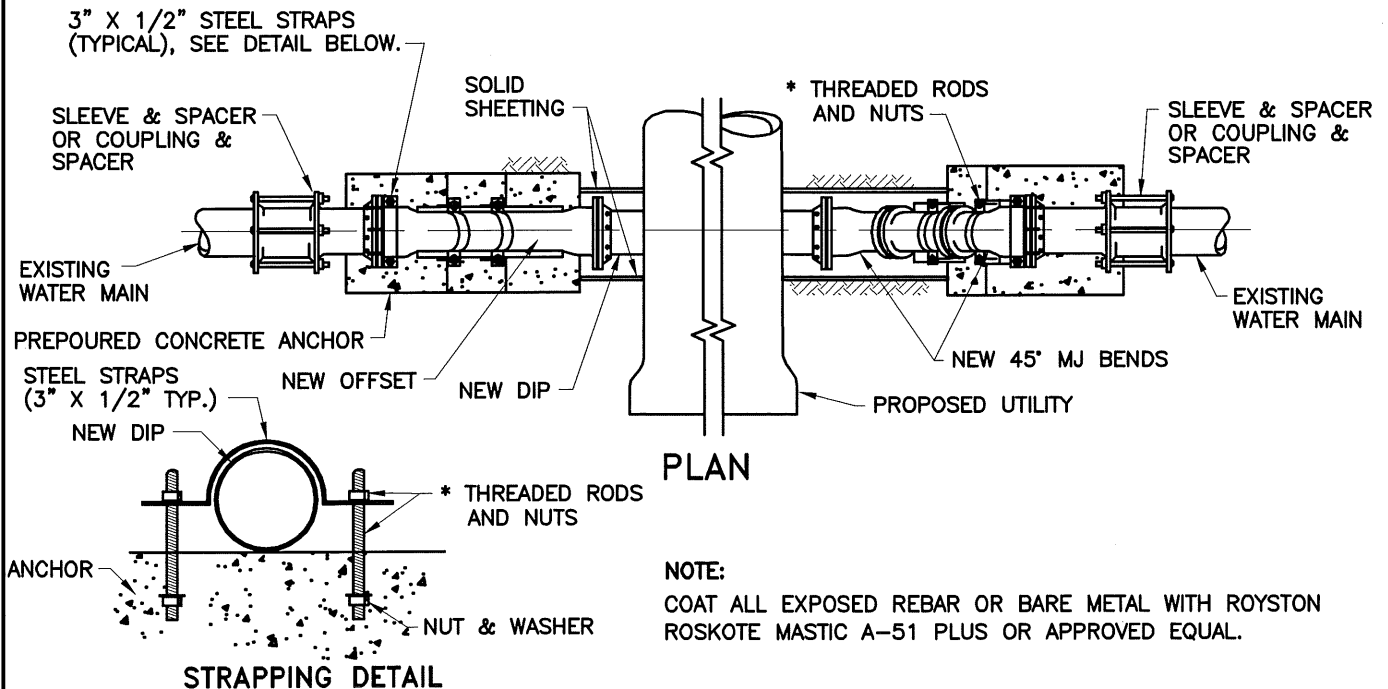
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 854.02		
SCALE: NONE	SHEET 1 OF 1	

'S' BEND ≤ 18" OFFSET

TWO 45° BENDS < 18" OFFSET



ELEVATION



APPROVED:

[Signature]

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[Signature]

DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

WATER MAIN RELOCATION
UNDER PROPOSED UTILITY
1029

ISSUED	REVISED	REVISED
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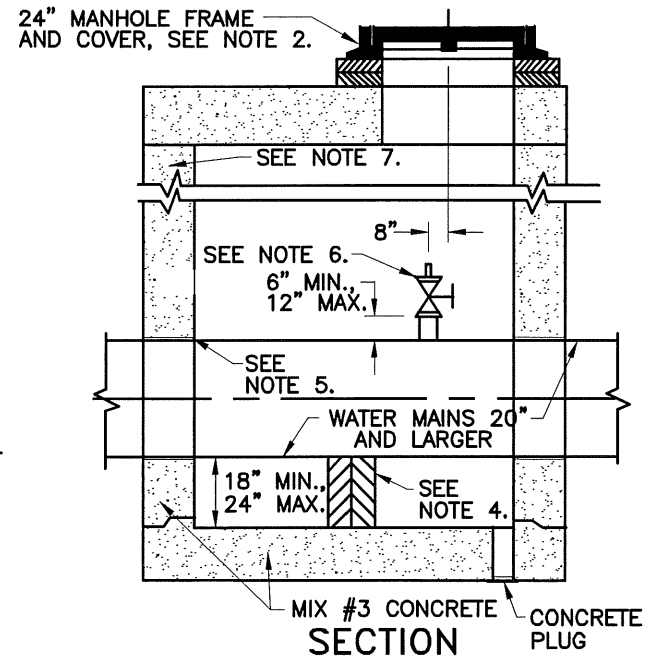
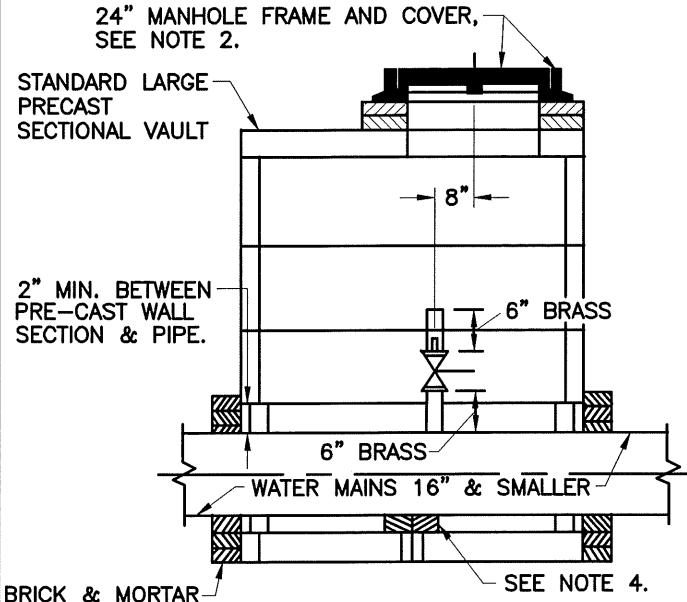
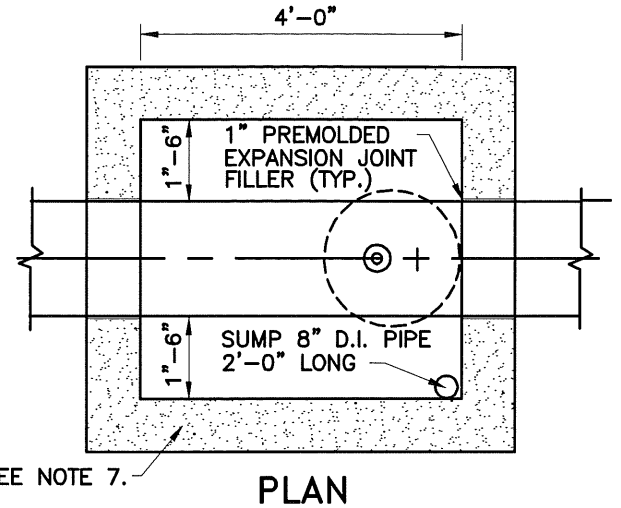
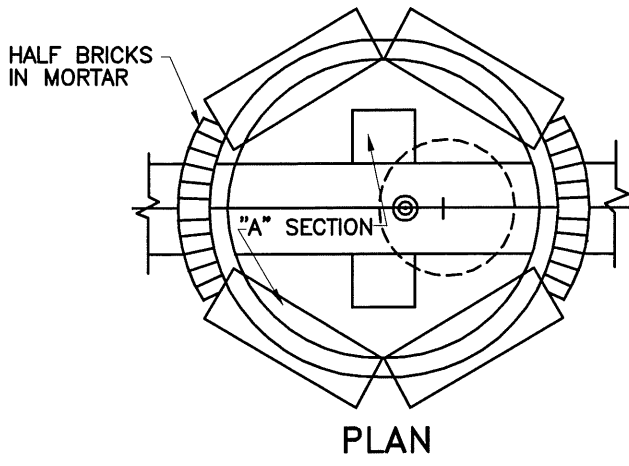
3 / 2008

STANDARD NO.
BC 855.01

SCALE: NONE

SHEET 1 OF 1

DRAFT - NOT FOR CONSTRUCTION

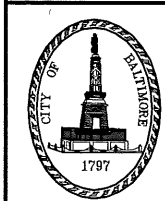


BRICK & MORTAR AROUND PIPE MUST REMAIN ON OUTSIDE OF VAULT WALL

NOTES:

- HYDRANT MAY BE INSTALLED AS AN ALTERNATE TO THE AIR RELEASE VALVE.
- MANHOLE COVER TO BE MARKED "WATER VALVE MAIN VAULT".
- FOR CONNECTION TO 4" DUCTILE IRON PIPE, USE SERVICE SADDLE (FORD FC-202 OR SMITH-BLAIR 315). FOR CONNECTION TO 4"-30" HDPE PIPE, USE APPROVED ELECTROFUSION TAPPING SADDLE.
- SUPPORTS FOR PIPES:
 4" TO 16" PIPES "A" SECTION & 8" BRICK PIER:
 20" TO 30" PIPES: 12" X 12" BRICK PIER;
 36"+ PIPES: 12" WIDE REINF. CONC. CRADLE.
 PROVIDE BOND BREAKER.
- PLACE 1" PREMOLDED EXPANSION JOINT FILLER AROUND PIPE (TYP.) FOR CAST-IN-PLACE STRUCTURES.
- PIPE 36" & LARGER - PROVIDE VERTICAL OUTLET, VALVE & BLIND FLANGE WITH GASKET. DRILL & TAP CENTER OF BLIND FLANGE & PROVIDE FORD FB500-4 CORPORATION WITH LA21-44 EIGHTH BEND OR APPROVED EQUAL.
- CAST-IN-PLACE VAULT (SHOWN) OR PRECAST VAULT WITH DOGHOUSE OPENINGS (NOT SHOWN).
- FOR CONNECTION TO 6" - 12" DUCTILE IRON PIPE, CONTRACTOR MAY INSTALL CORPORATION USING SERVICE SADDLE (FORD FC-202 OR SMITH-BLAIR 315). FOR CONNECTION TO 16" - 30" DUCTILE IRON PIPE, CONTRACTOR MAY INSTALL CORPORATION USING SERVICE SADDLE (FORD FC-202 OR SMITH-BLAIR 317).

TABLE 1	
PIPE DIAMETER	AIR RELEASE ASSEMBLY
4"	1" CORP. WITH TAPPING SADDLE/ GATE VALVE
6"	1" CORP./GATE VALVE
8"-12"	1.5" CORP./GATE VALVE
16"-30"	2" CORP./GATE VALVE
36"-48"	4" RESILIENT GATE VALVE, FL. x FL.
54"+	6" RESILIENT GATE VALVE, FL. x FL.



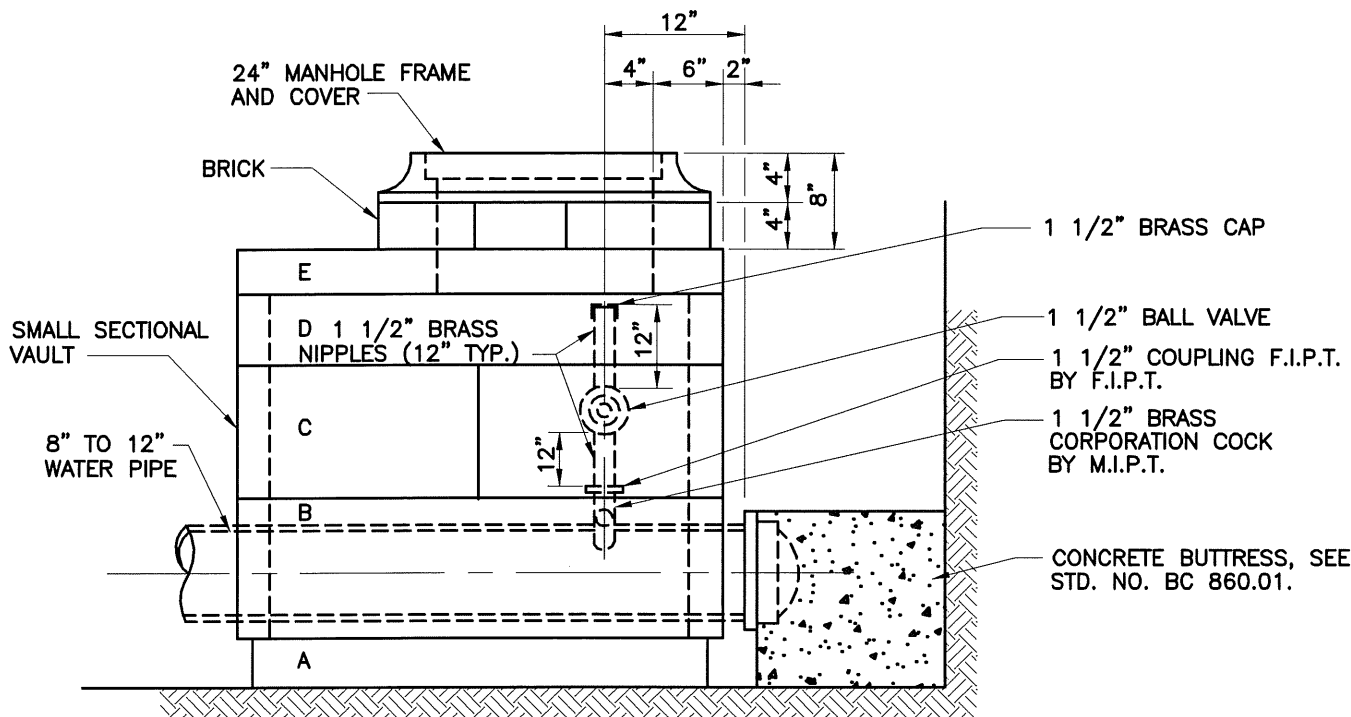
APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD AIR RELEASE VALVE AND VAULT
 PRECAST AND CAST IN PLACE
 1031
 1030

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO. BC 856.01
 SCALE: NONE SHEET 1 OF 1



NOTES:

1. ON 4" AND 6" PIPE (ALL TYPES) USE 1" CORPORATION STOP, 1" GATE VALVE AND 1" PIPE.
2. ON 4" DUCTILE IRON PIPE USE SERVICE SADDLE (FORD FC202 OR SMITH-BLAIR 315).
3. FOR CONNECTION TO 6" - 12" DUCTILE IRON PIPE, CONTRACTOR MAY INSTALL CORPORATION USING SERVICE SADDLE (MUELLER BR-2B, FORD 202B AY MCDONALD 3826, OR APPROVED EQUAL).
4. ON 4" - 12" HDPE PIPE, USE APPROVED ELECTROFUSION TAPPING SADDLE.
5. BRASS PIPE SHALL BE SEAMLESS RED BRASS PIPE, EXTRA STRONG, CONFORMING TO A.S.T.M. B43 - LATEST EDITION.
6. USE HYDRANT FOR PIPES LARGER THAN 12 INCHES IN DIAMETER. CONNECT HYDRANT WITHIN 5 FEET OF END CAP.



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[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

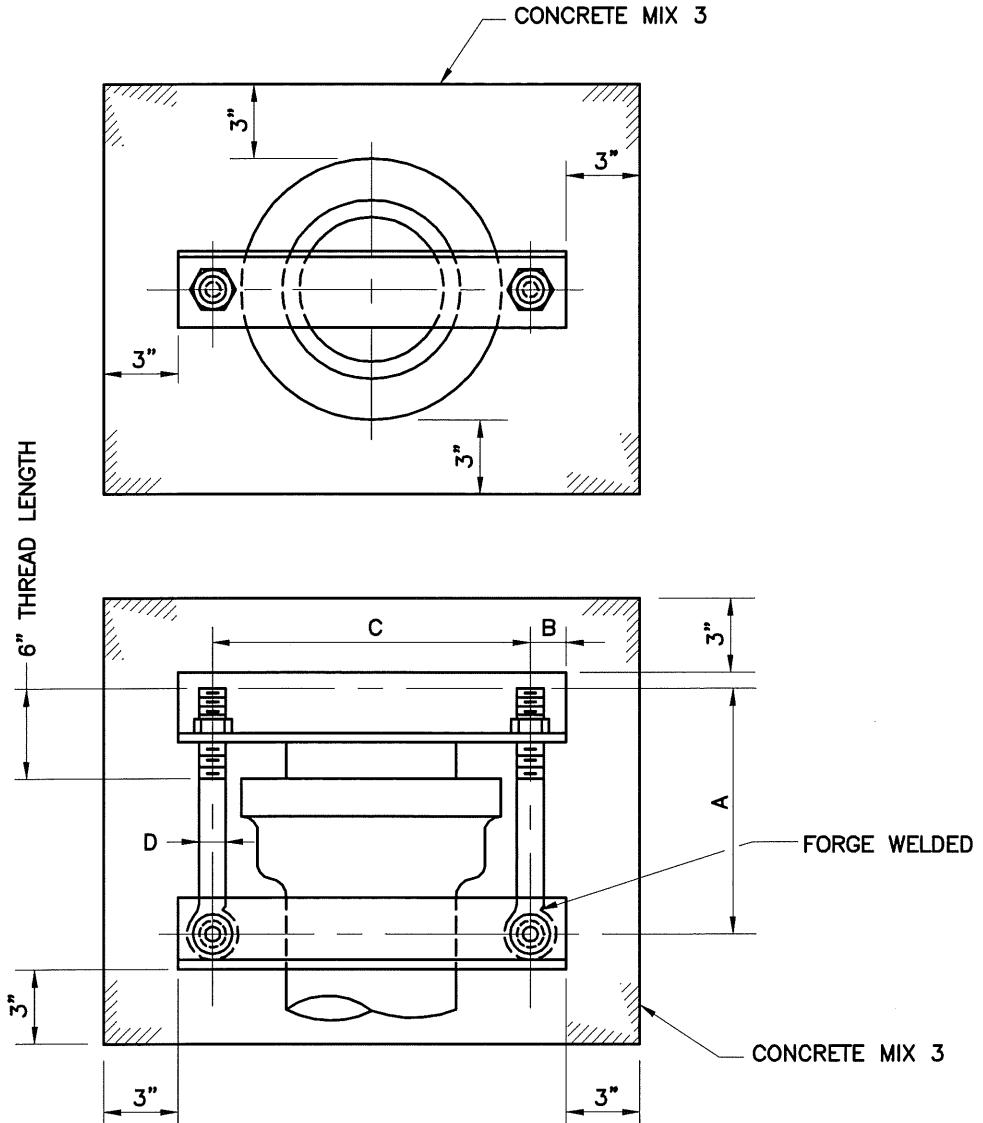
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
 FOR BLOW
 1032
 1031

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 857.01

SCALE: NONE SHEET 1 OF 1



NOTE:
 MAKE HOLES IN ANGLE 1/8" LARGER THAN DIAMETER OF BOLT.

SIZE OF MAIN	SIZE OF ANGLE	C TO C EYE BOLT HOLES "C"	DIA. OF EYEBOLT "D"	LENGTH OF EYEBOLT "A"	NO. U.S. THREADS PER INCH	EDGE DIST. "B"
4"	3"x3"x3/8"	11"	3/4"	12"	10	2"
6"	3"x3"x3/8"	12 1/2"	3/4"	12"	10	2"
8"	3"x3"x3/8"	15"	7/8"	12 1/2"	9	2"
10"	4"x3"x3/8"	17 1/2"	1 1/8"	13 1/2"	7	2"
12"	5"x4"x3/8"	20 3/16"	1 1/2"	14 1/2"	6	2 1/4"
16"	6"x4"x1/2"	25 1/4"	1 5/8"	16 3/4"	5 1/2	2 1/2"
20"	6"x4"x3/4"	30 7/8"	2 1/4"	16 3/4"	4 1/2	3 5/8"



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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
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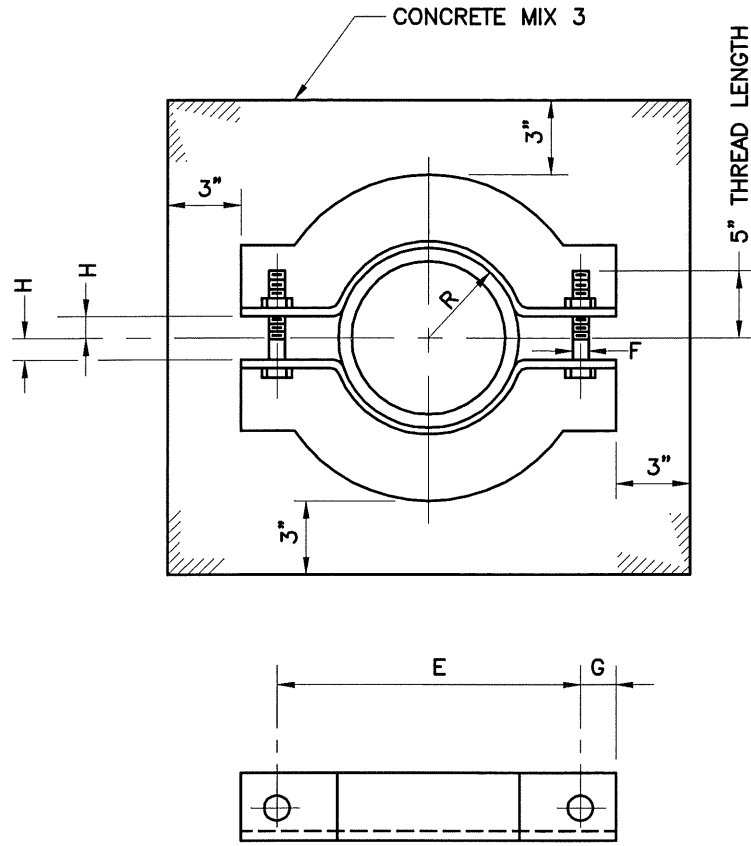
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD
 1033 PLUG CLAMPS - 1
 1032

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 858.01

SCALE : NONE SHEET 1 OF 2



NOTE:
 MAKE HOLES IN ANGLE STRAP 1/8" LARGER THAN DIAMETER OF BOLT.

SIZE OF MAIN	SIZE OF ANGLE STRAP	RADIUS OF STRAP "R"	DISTANCE OF HOLES C TO C "E"	DIA. OF BOLT "F"	EDGE DIST. "G"	"H"
4"	3"x3"x3/8"	2 1/2"	11"	3/4"	2"	1"
6"	3"x3"x3/8"	3 9/16"	12 1/2"	3/4"	2"	1"
8"	3"x3"x3/8"	4 21/32"	15"	7/8"	2"	1 1/4"
10"	4"x3"x3/8"	5 23/32"	17 1/2"	1 1/8"	2"	1 1/4"
12"	5"x4"x3/8"	6 3/4"	20 3/16"	1 1/2"	2 1/4"	1 1/2"
16"	6"x4"x1/2"	8 29/32"	25 1/4"	1 5/8"	2 1/2"	1 1/2"
20"	6"x4"x3/4"	11 1/32"	30 7/8"	2 1/4"	3 5/8"	1 3/4"

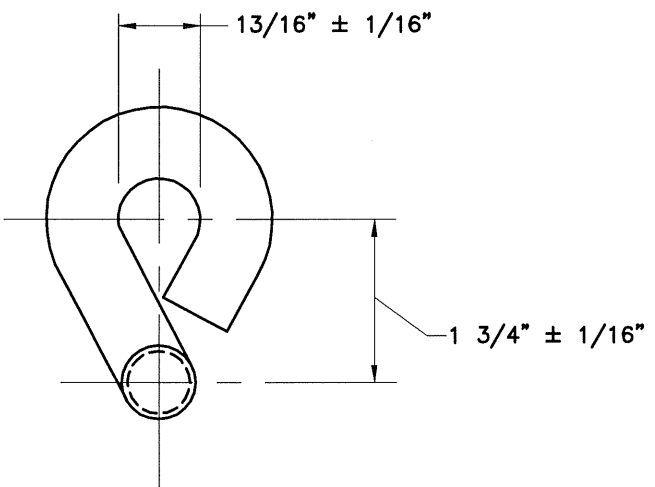
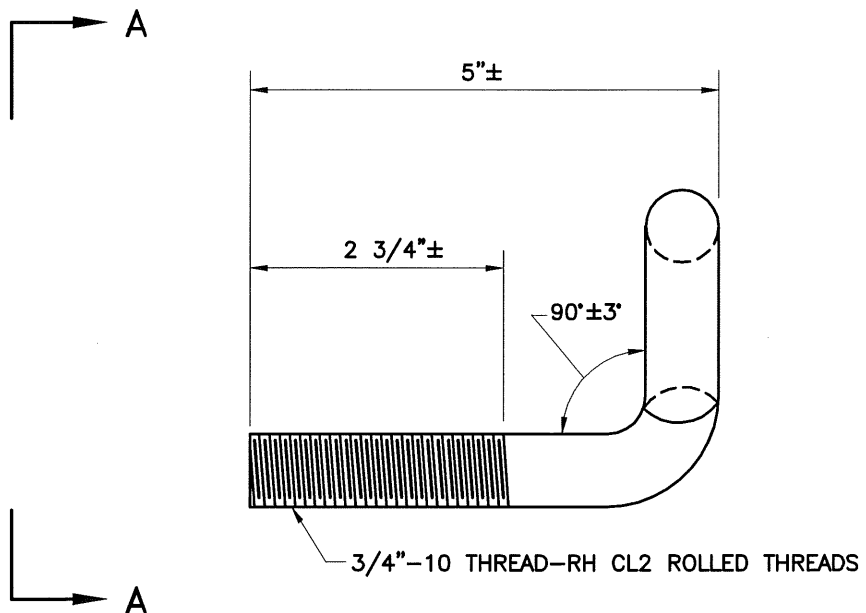


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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD
 1034 PLUG CLAMPS - 2
 1033

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 858.01		
SCALE: NONE	SHEET 2 OF 2	



VIEW A-A

MATERIAL:
 C1010, BLACK ANNEALED
 45,000 TO 55,000 P.S.I. TENSILE
 26,000 TO 35,000 P.S.I. YIELD
 % ELONG. TO 2" 30-45%
 % ELONG. 8" 25-40%

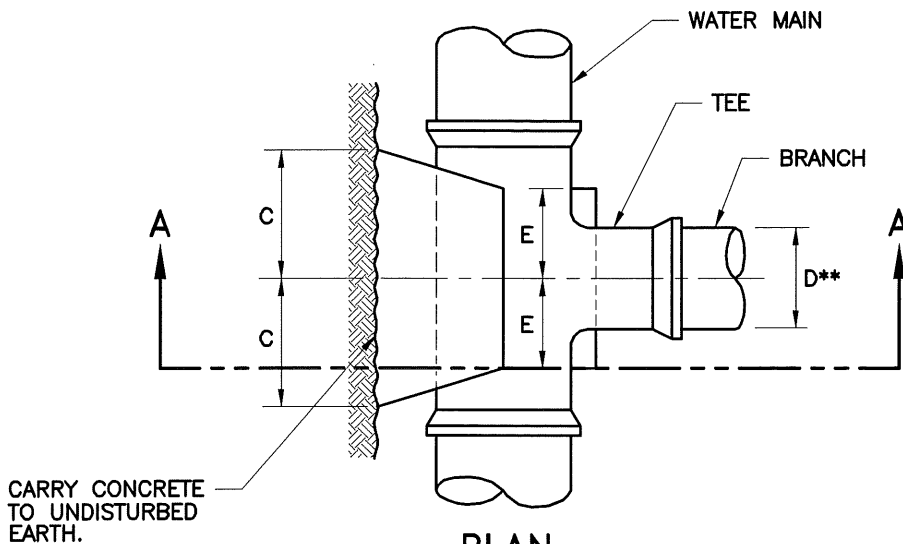


APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

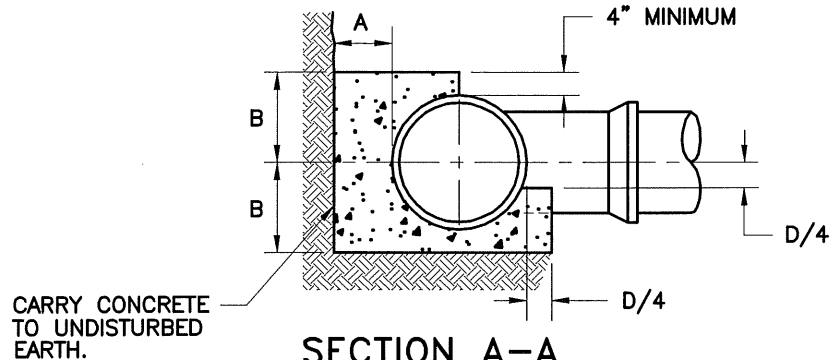
STANDARD TIE BOLT
 1035
 1034

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 859.01		
SCALE: NONE		SHEET 1 OF 1



CARRY CONCRETE TO UNDISTURBED EARTH.

PLAN



CARRY CONCRETE TO UNDISTURBED EARTH.

SECTION A-A

BUTTRESS FOR TEES							
PIPE SIZE OF BRANCH							
D**	4"	6"	8"	10"	12"	16"	20"
A	8"	8"	10"	1'-0"	1'-0"	1'-6"	2'-0"
B	9"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"
C	9"	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"	3'-0"
E	6"	6"	8"	8"	8"	10"	1'-2"




D** INDICATES NOMINAL DIAMETER PIPE SIZES

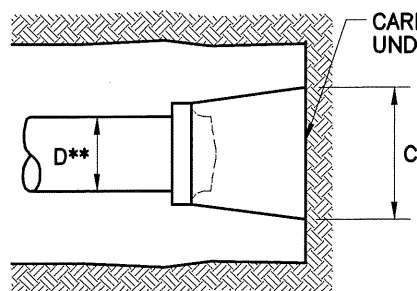
NOTES:

- ALL CONCRETE TO BE MIX 3, f'c = 3,500 PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

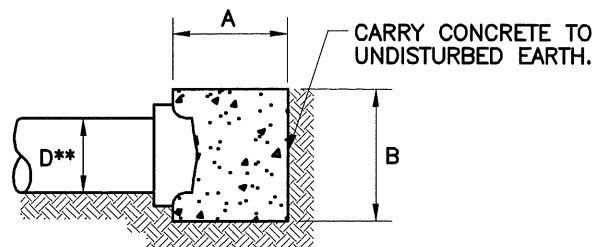
SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
BUTTRESS FOR TEES 1036 (FOR 4" - 20") 1035			STANDARD NO. BC 860.01		
			SCALE: NONE	SHEET 1 OF 1	



PLAN



SECTION



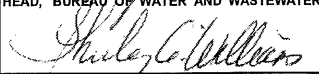
BUTRESS FOR CAPS							
PIPE SIZE							
D**	4"	6"	8"	10"	12"	16"	20"
A	8"	8"	10"	12"	12"	1'-6"	2'-0"
B	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	4'-0"	5'-0"
C	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-6"	5'-6"
D** INDICATES NOMINAL DIAMETER PIPE SIZES							

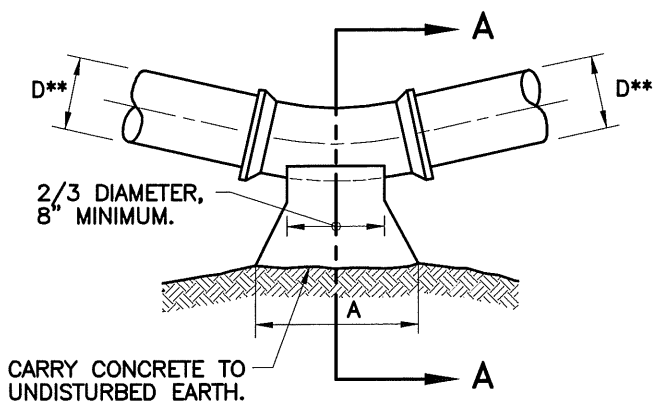
NOTES:

1. ALL CONCRETE TO BE MIX 3, f'c = 3,500 PSI AT 28 DAYS.
2. THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - a. ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - b. OPERATING WATER PRESSURE = 150 PSI.
 - c. DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - d. ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
3. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
4. ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

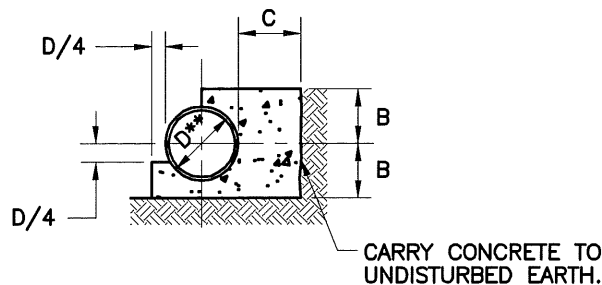
SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- a. DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - b. DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		BUTRESS FOR CAPS 1037 (FOR 4" - 20") 1036	3 / 2008	
			STANDARD NO. BC 861.01		
			SCALE: NONE	SHEET 1 OF 1	



PLAN



SECTION A-A

BUTTRESS FOR HORIZONTAL BENDS								
	D**	PIPE SIZE						
		4"	6"	8"	10"	12"	16"	20"
1/32 BEND	A	9"	9"	1'-0"	1'-0"	1'-6"	2'-0"	3'-0"
	B	9"	9"	9"	1'-0"	1'-0"	1'-0"	1'-0"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"
1/16 BEND	A	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"	3'-0"	3'-0"
	B	9"	9"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"	3'-0"
1/8 BEND	A	1'-6"	1'-6"	2'-0"	2'-6"	3'-0"	4'-0"	4'-6"
	B	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"	2'-0"	2'-6"
	C	1'-0"	1'-0"	1'-0"	2'-0"	2'-6"	3'-0"	4'-0"
1/4 BEND	A	2'-6"	2'-6"	3'-0"	3'-6"	4'-0"	5'-6"	SITE SPECIFIC DESIGN REQUIRED
	B	1'-0"	1'-0"	1'-6"	2'-0"	2'-6"	2'-6"	
	C	1'-6"	2'-0"	2'-6"	2'-6"	3'-6"	4'-0"	

D** INDICATES NOMINAL DIAMETER PIPE SIZES

NOTES:

- ALL CONCRETE TO BE MIX 3, f'c = 3,500 PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



APPROVED: *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

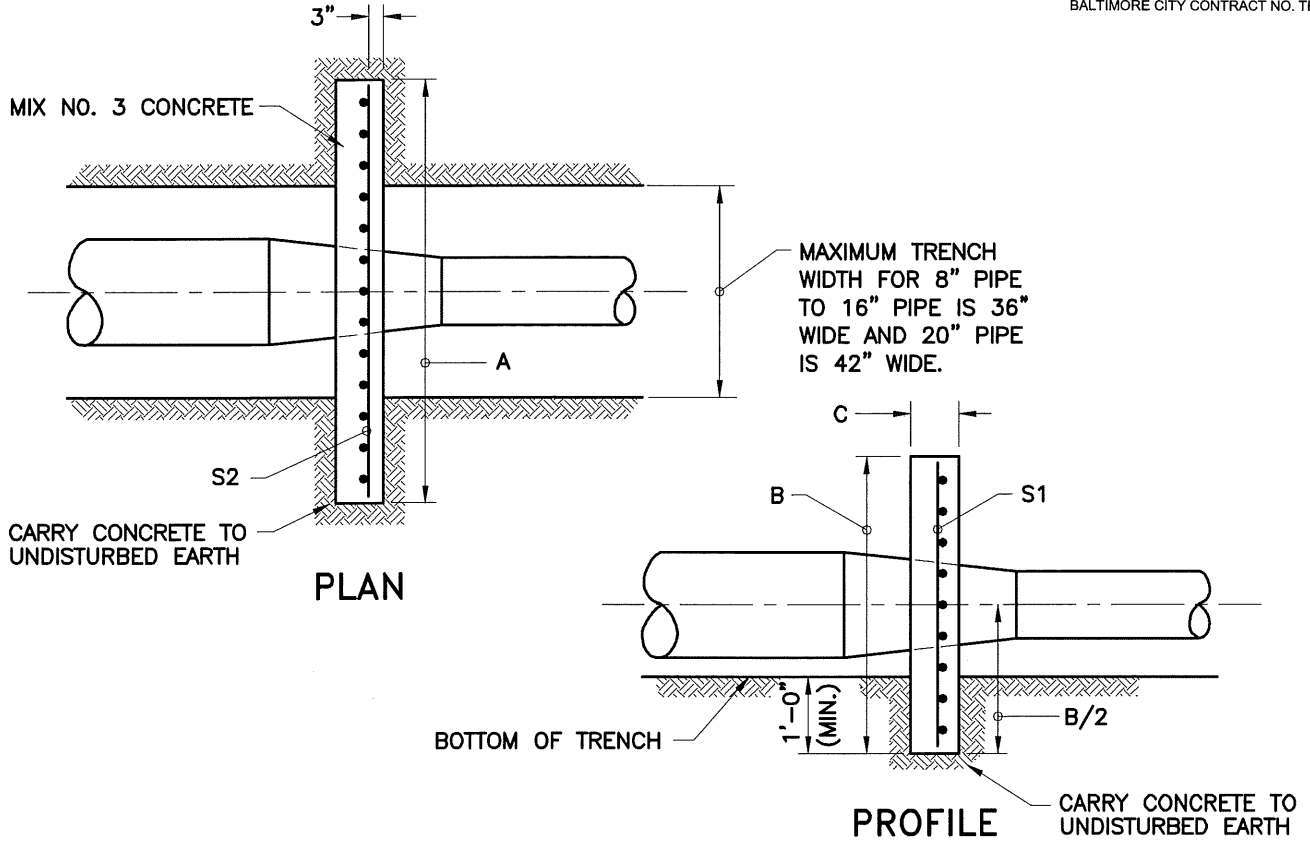
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

BUTTRESS FOR HORIZONTAL BENDS
1038 (FOR 4" - 20")
1037

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 862.01

SCALE: NONE SHEET 1 OF 1






SIZE	A	B	C	S1	S2
8" x 4"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
12" x 4"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
12" x 6"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
12" x 8"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
16" x 6"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6
16" x 8"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6
16" x 10"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6
16" x 12"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6

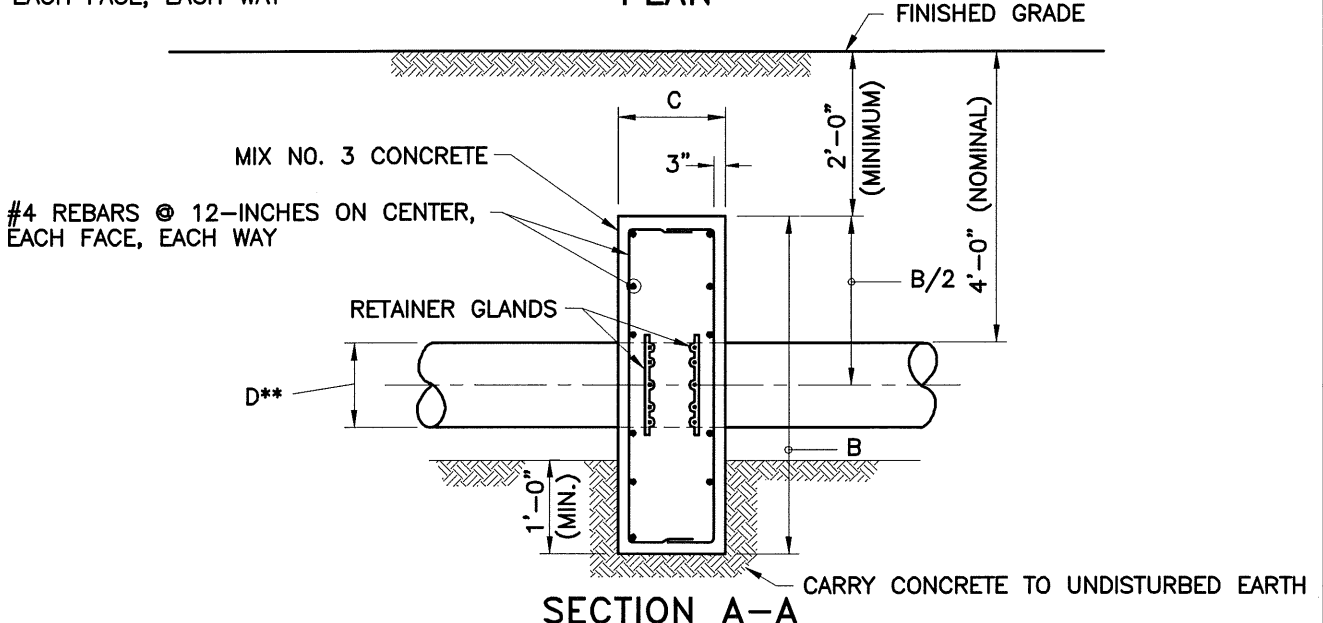
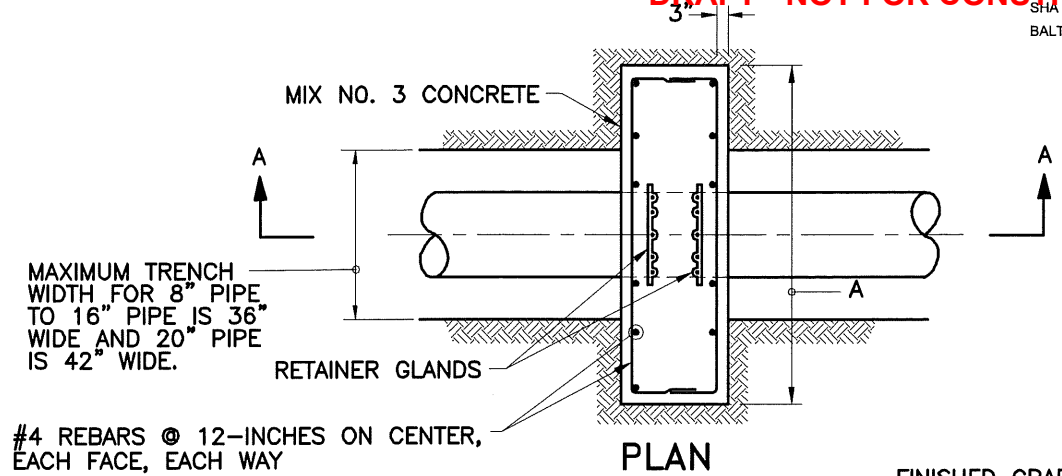
NOTES:

- ALL CONCRETE TO BE MIX 3, f'c = 3,500 PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.
- THRUST BLOCKS FOR REDUCERS CAN ONLY BE INSTALLED ON CONCENTRIC TYPE PIPE REDUCERS.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
THRUST BLOCKS FOR REDUCERS 1038 (FOR 8" X 4" TO 16" X 12")			STANDARD NO. BC 863.01		
			SCALE: NONE	SHEET 1 OF 1	



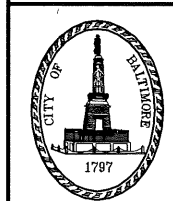
IN-LINE THRUST BLOCK					
PIPE SIZE					
D**	4"	6"	8"	10"	12"
A	4'-6"	5'-0"	5'-0"	6'-0"	6'-0"
B	2'-6"	3'-0"	4'-0"	4'-6"	5'-0"
C	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"
D** INDICATES NOMINAL DIAMETER PIPE SIZES					

NOTES:

- ALL CONCRETE TO BE MIX 3, f'c = 3,500 PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.

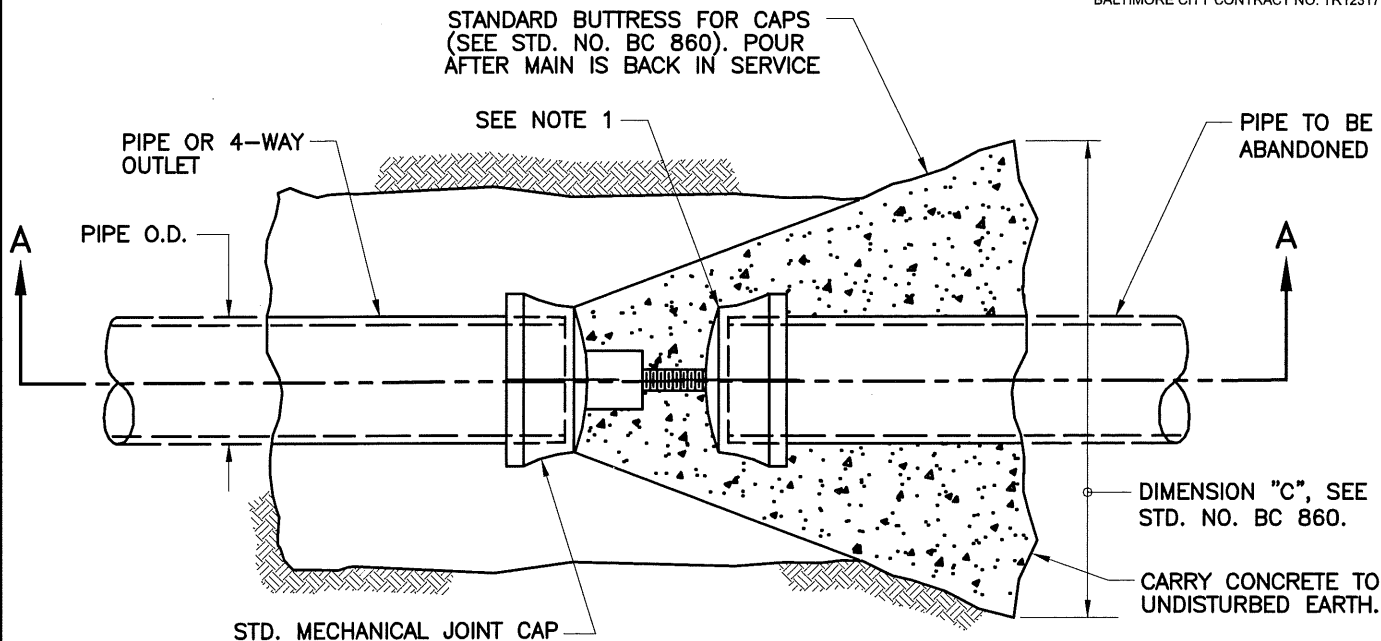


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

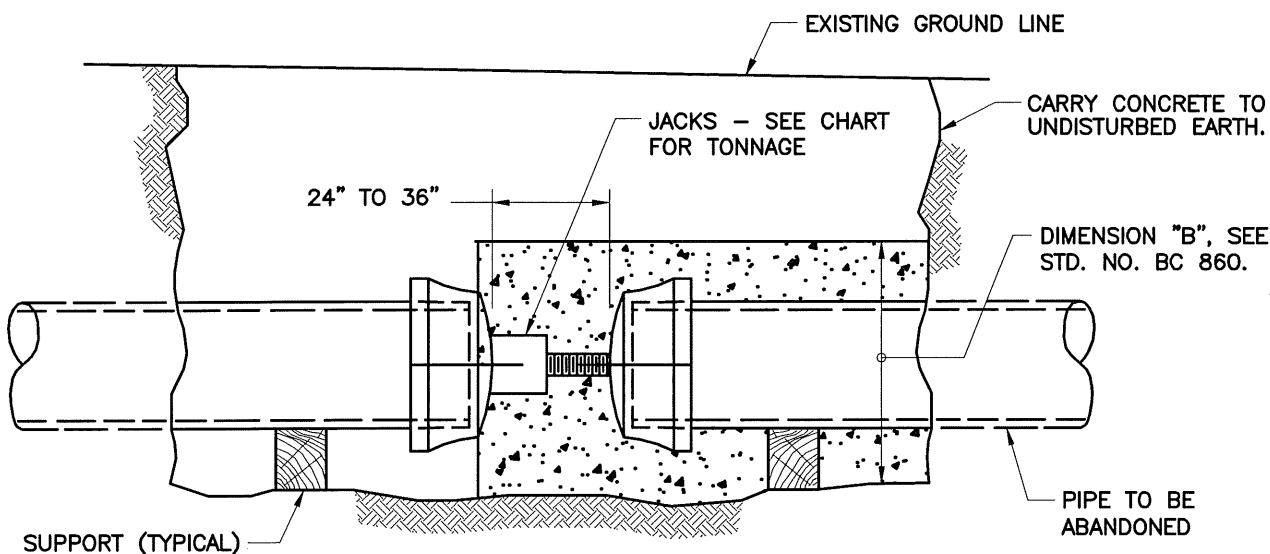
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

IN-LINE THRUST BLOCKS
 1040 (FOR 4" - 12")
 1039

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 864.01		
SCALE: NONE		SHEET 1 OF 1



PLAN VIEW

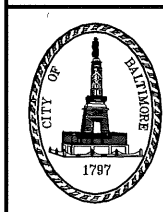


SECTION A-A

NOTES:

1. GLANDS, BOLTS AND GASKETS NOT REQUIRED ON THIS CAP UNLESS LEAKAGE IS PRESENT IN ABANDONED PIPE. FOR CAP DIAMETER >12", JACK LOAD WITH BLOCKING ON CAPS.
2. O.D. MEASURED IN INCHES.
3. IN LIEU OF JACK, STEEL BLOCKING OF SAME CAPACITY MAY BE USED.

JACK TONNAGE CHART	
JACK TONNAGE AT 100 PSI	$\frac{O.D.^2}{25}$ TONS
JACK TONNAGE AT 150 PSI	$\frac{O.D.^2}{16}$ TONS
JACK TONNAGE AT 200 PSI	$\frac{O.D.^2}{12}$ TONS



APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

DOUBLE CAPS, JACK, AND BUTTRESS
(FOR D.I. AND C.I. PIPE ONLY)

1040

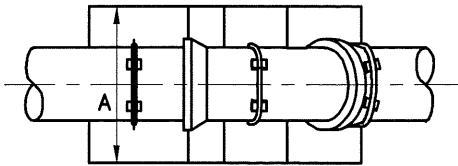
ISSUED	REVISED	REVISED
3 / 2008		

3 / 2008

STANDARD NO.
BC 865.01

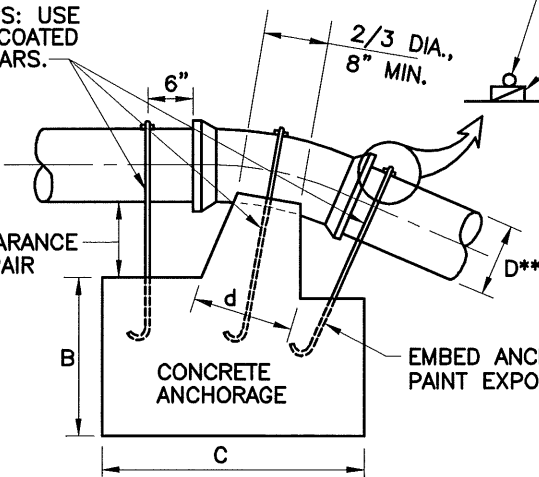
SCALE: NONE

SHEET 1 OF 1



PLAN

ANCHOR BARS: USE USE EPOXY COATED DEFORMED BARS.



ELEVATION

DEFORMED REBAR

DOUBLE-ACTING STAINLESS STEEL WEDGES

2/3 DIA., 8" MIN.

12" CLEARANCE FOR REPAIR CLAMP.

EMBED ANCHOR BARS 30 DIAMETER. PAINT EXPOSED BARS, SEE NOTE 5.

ANCHORAGES FOR UPPER VERTICAL BENDS								
	PIPE SIZE							
	D**	4"	6"	8"	10"	12"	16"	20"
1/32 BEND	A	1'-6"	2'-0"	2'-0"	3'-0"	3'-6"	4'-6"	5'-0"
	B	2'-0"	2'-0"	3'-0"	3'-0"	3'-0"	3'-6"	4'-6"
	C	2'-6"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
1/16 BEND	A	2'-6"	2'-6"	3'-6"	4'-0"	4'-6"	5'-6"	6'-0"
	B	3'-0"	2'-6"	3'-0"	3'-0"	3'-6"	4'-6"	5'-6"
	C	3'-0"	3'-6"	3'-6"	4'-6"	5'-0"	5'-6"	6'-6"
1/8 BEND	A	3'-6"	3'-6"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"
	B	3'-6"	3'-6"	4'-0"	4'-0"	4'-6"	5'-6"	6'-6"
	C	3'-6"	3'-6"	4'-6"	5'-6"	6'-0"	7'-0"	8'-0"

EPOXY COATED ANCHOR BARS			
PIPE SIZE	1/32 BEND	1/16 BEND	1/8 BEND
6"	3-#6	3-#6	3-#6
8"	3-#6	3-#6	3-#6
10"	3-#6	3-#6	3-#6
12"	3-#6	3-#6	3-#6
16"	3-#6	3-#6	3-#6
20"	3-#6	3-#6	3-#6

D** INDICATES NOMINAL DIAMETER PIPE SIZES

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



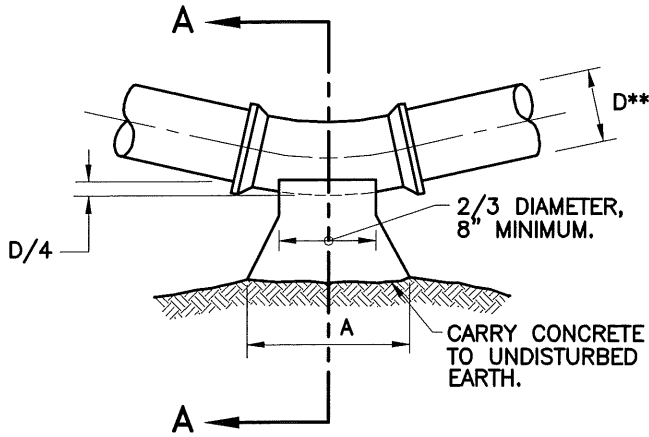
APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

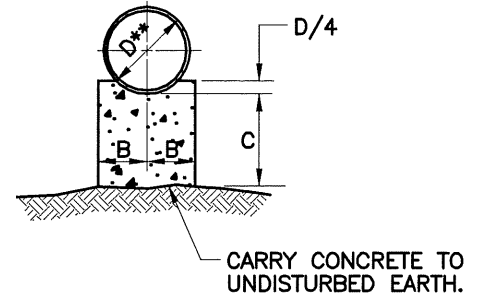
ANCHORAGES FOR UPPER VERTICAL BENDS
 1042 (FOR 4" - 20")
 1041

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO. BC 866.01
 SCALE: NONE SHEET 1 OF 1



ELEVATION



SECTION A-A

BUTRESS FOR LOWER VERTICAL BENDS								
	PIPE SIZE							
	D**	4"	6"	8"	10"	12"	16"	20"
1/32 BEND	A	1'-0"	1'-0"	1'-6"	1'-6"	1'-6"	2'-0"	3'-0"
	B	6"	6"	6"	9"	9"	1'-0"	1'-0"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
1/16 BEND	A	1'-0"	1'-6"	2'-0"	2'-0"	2'-6"	3'-0"	4'-0"
	B	6"	6"	9"	1'-0"	1'-0"	1'-3"	1'-6"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
1/8 BEND	A	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"
	B	6"	9"	1'-0"	1'-0"	1'-3"	2'-0"	2'-3"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"




D** INDICATES NOMINAL DIAMETER PIPE SIZES

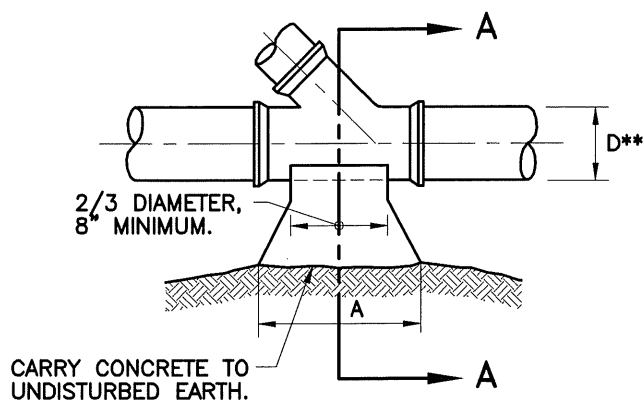
NOTES:

- ALL CONCRETE TO BE MIX 3, f'c = 3,500 PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

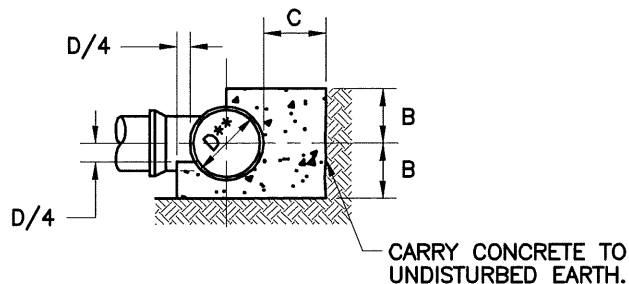
SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	BUTTRESS FOR LOWER VERTICAL BENDS (FOR 4" - 20")	3 / 2008	STANDARD NO. BC 867.01	
		1043 1042	SCALE: NONE		SHEET 1 OF 1



PLAN



SECTION A-A




BUTTRESS FOR WYE CONNECTION							
PIPE SIZE							
D**	4"	6"	8"	10"	12"	16"	20"
A	1'-6"	1'-6"	2'-0"	2'-6"	3'-0"	4'-0"	4'-6"
B	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"	2'-0"	2'-6"
C	1'-0"	1'-0"	1'-0"	2'-0"	2'-6"	3'-0"	4'-0"
D** INDICATES NOMINAL DIAMETER PIPE SIZES							

NOTES:

1. ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
2. THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - a. ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - b. OPERATING WATER PRESSURE = 150 PSI.
 - c. DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - d. ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
3. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
4. ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- a. DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - b. DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.


	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
DIRECTOR, DEPARTMENT OF PUBLIC WORKS		BUTTRESS FOR WYE CONNECTION (FOR 4" - 20")	STANDARD NO. BC 868.01		
			1044 1043	SCALE: NONE	SHEET 1 OF 1

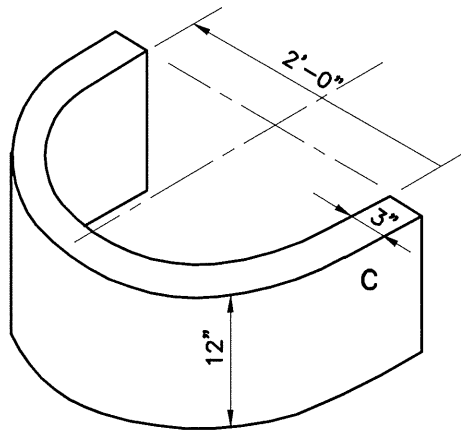
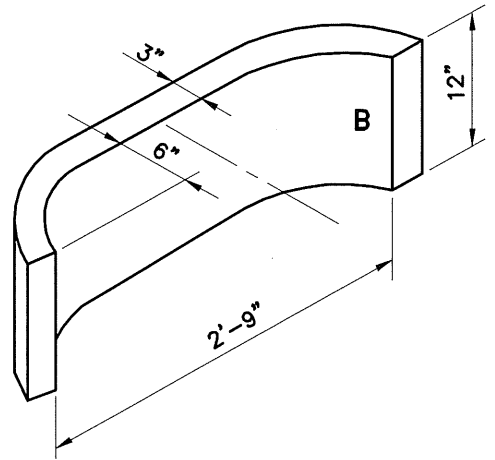
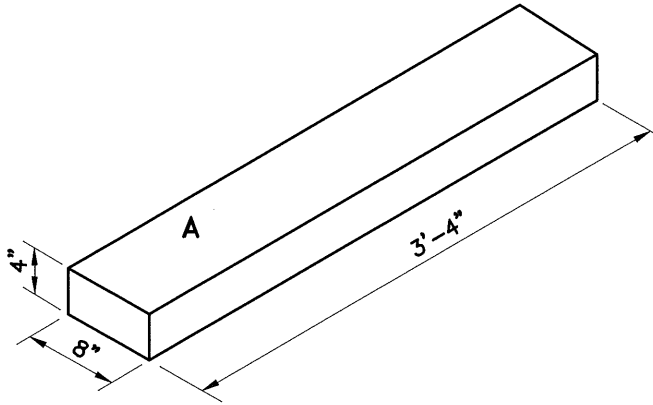
4" VALVE (SMALL VAULT)							6" VALVE (SMALL VAULT)						
COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER	COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER
	A	B	C	D	E			A	B	C	D	E	
1'-6" TO 1'-9"	2	2	0	2	1	1	2'-0" TO 2'-1"	2	2	2	0	1	1
1'-10" TO 2'-3"	2	2	2	0	1	1	2'-4" TO 2'-7"	2	2	2	2	1	1
2'-4" TO 2'-9"	2	2	2	2	1	1	2'-10" TO 3'-1"	2	2	2	4	1	1
2'-10" TO 3'-3"	2	2	2	4	1	1	3'-4" TO 3'-7"	2	2	4	2	1	1
3'-4" TO 3'-9"	2	2	4	2	1	1	3'-10" TO 4'-1"	2	2	4	4	1	1
3'-10" TO 4'-3"	2	2	4	4	1	1	4'-4" TO 4'-7"	2	2	4	6	1	1
4'-4" TO 4'-9"	2	2	4	6	1	1	4'-10" TO 5'-1"	2	2	6	4	1	1

8" VALVE (SMALL VAULT)							10" VALVE (LARGE VAULT)						
COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER	COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER
	A	B	C	D	E			A	B	C	D	E	
1'-11"	2	2	2	0	1	1	2'-3" TO 2'-9"	4	2	2	2	2	1
2'-3" TO 2'-5"	2	2	2	2	1	1	2'-9" TO 3'-3"	4	2	2	4	2	1
2'-9" TO 2'-11"	2	2	2	4	1	1	3'-3" TO 3'-9"	4	2	2	6	2	1
3'-3" TO 3'-5"	2	2	4	2	1	1	3'-9" TO 4'-3"	4	2	4	4	2	1
3'-9" TO 3'-11"	2	2	4	4	1	1	4'-3" TO 4'-9"	4	2	4	6	2	1
4'-3" TO 4'-5"	2	2	4	6	1	1	4'-9" TO 5'-3"	4	2	4	8	2	1
4'-9" TO 4'-11"	2	2	6	4	1	1							

12" VALVE (LARGE VAULT)						
COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER
	A	B	C	D	E	
2'-6" TO 2'-7"	4	2	2	2	2	1
2'-9" TO 3'-1"	4	2	2	4	2	1
3'-3" TO 3'-7"	4	2	2	6	2	1
3'-9" TO 4'-1"	4	2	4	4	2	1
4'-3" TO 4'-7"	4	2	4	6	2	1
4'-9" TO 5'-1"	4	2	4	8	2	1

NOTE:
FOR 10" AND 12" TAPPING SLEEVE AND VALVES,
"F" SECTION SHALL BE SUBSTITUTED FOR "E" SECTION.

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	TABLE OF SECTIONS REQUIRED FOR CONCRETE VALVE VAULTS 1045 1044	STANDARD NO. BC 869.01	SCALE: NONE	SHEET 1 OF 1



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 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

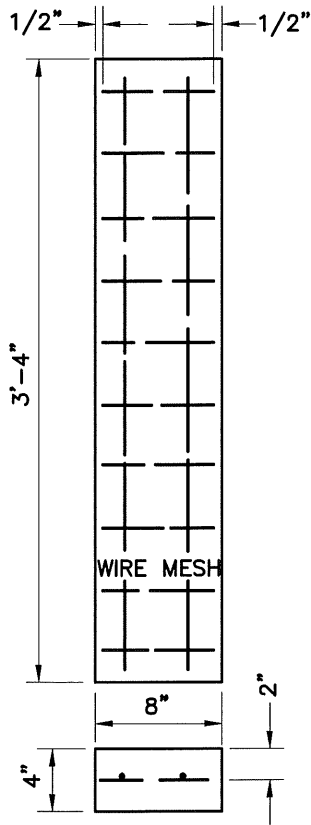
STANDARD SECTIONS FOR
 SMALL CONCRETE VAULTS
 1045

ISSUED	REVISED	REVISED
3 / 2008		

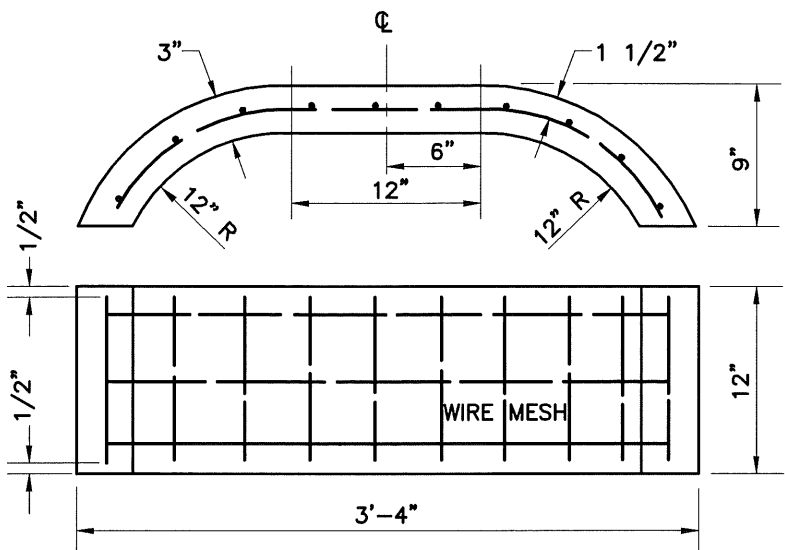
STANDARD NO.
 BC 870.01

SCALE: NONE

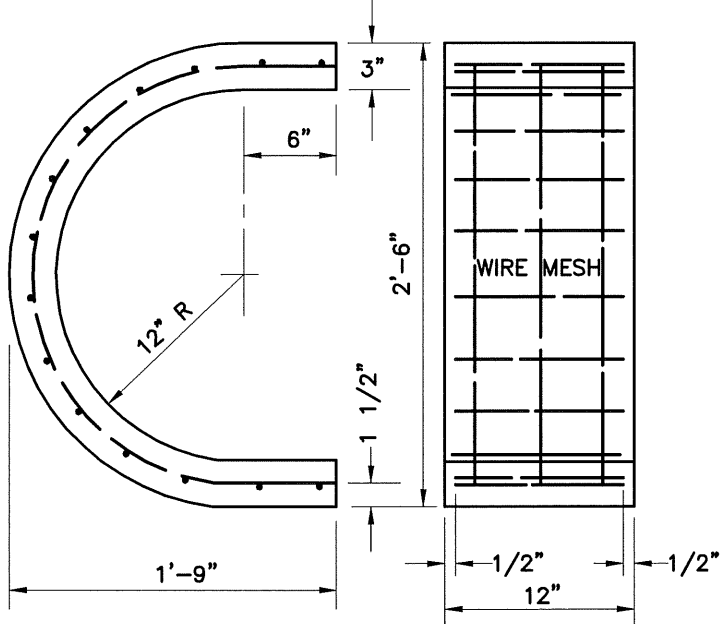
SHEET 1 OF 3



"A" SECTION

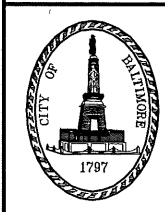


"B" SECTION



"C" SECTION

- NOTES:
1. CONCRETE SHALL BE MIX 3.
 2. WIRE MESH SHALL BE 4"x4" NO. 6 WIRE.



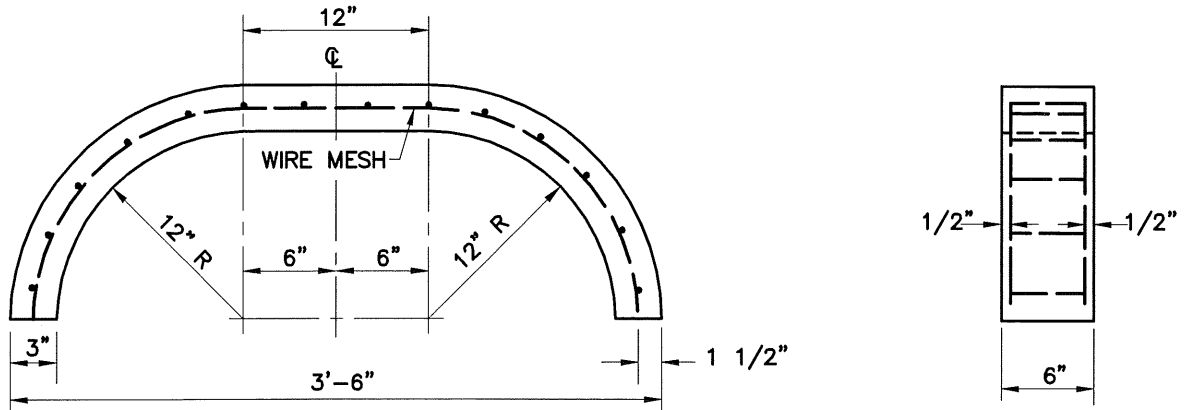
APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

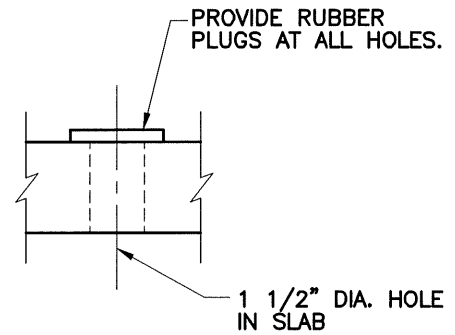
DETAIL OF SMALL
 SECTIONAL CONCRETE VAULT

1046

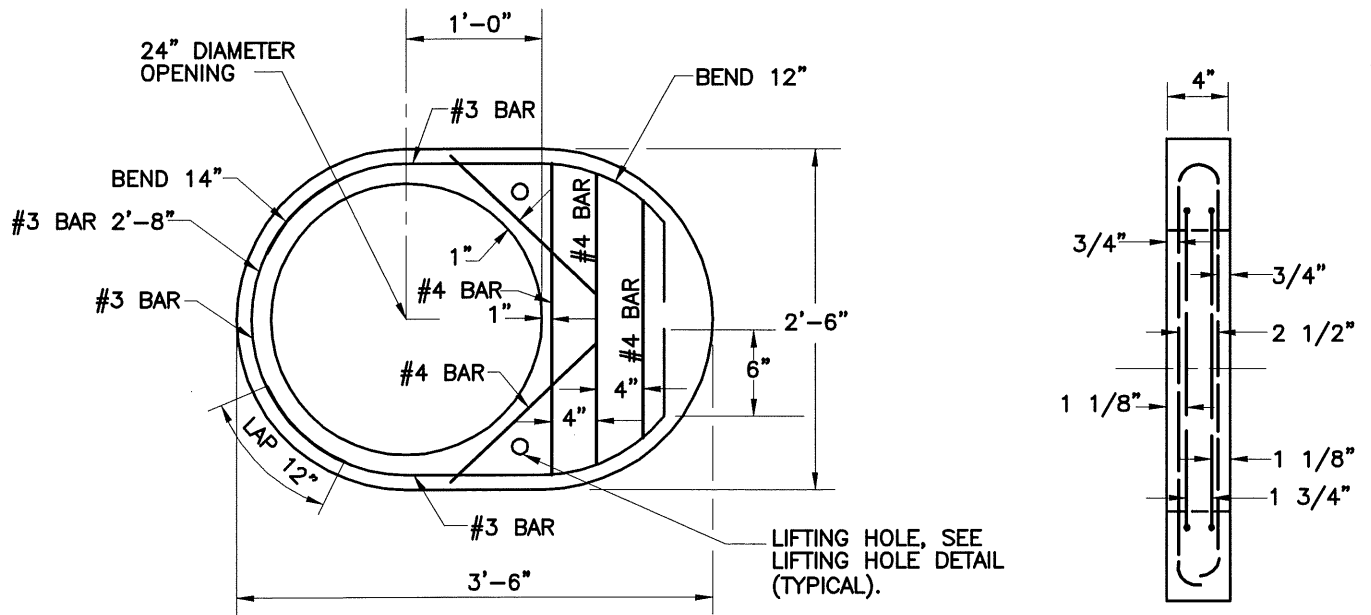
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 870.01		
SCALE: NONE		SHEET 2 OF 3





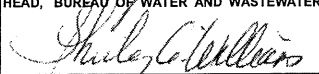
"D" SECTION

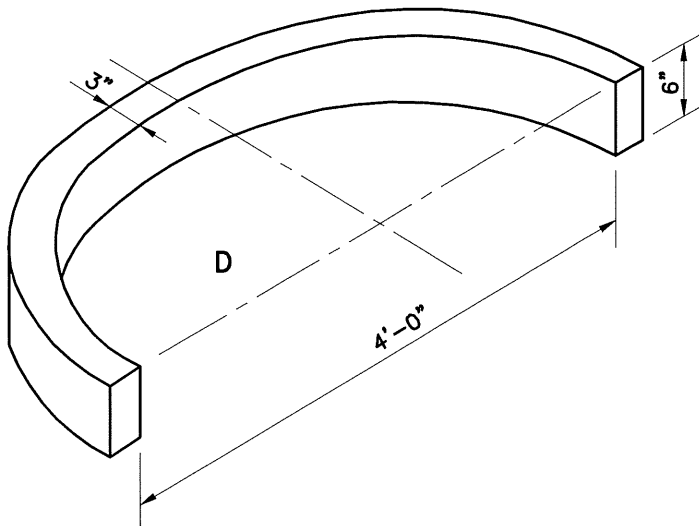
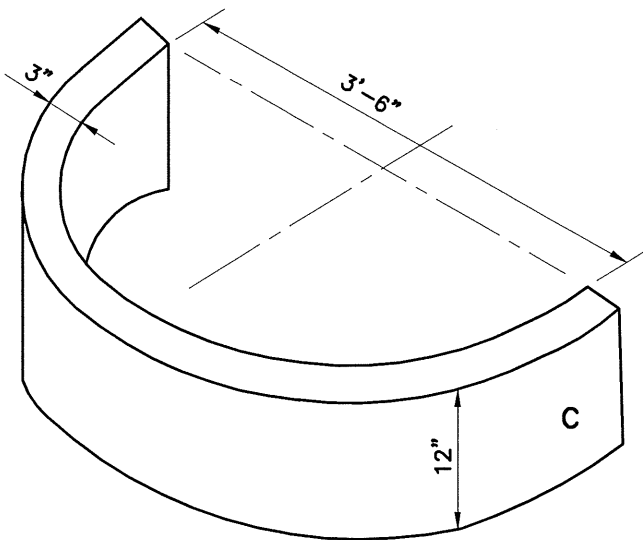
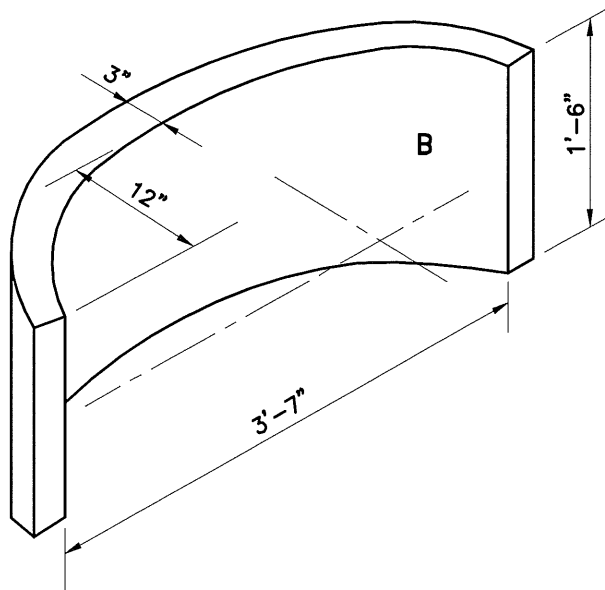
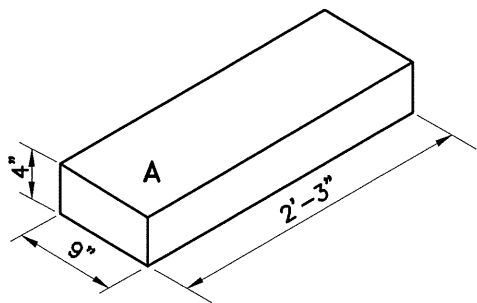


LIFTING HOLE DETAIL



"E" SECTION

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	HEAD, BUREAU OF WATER AND WASTEWATER 		3 / 2008		
DETAILS OF "D" AND "E" SECTIONS - SMALL SECTIONAL CONCRETE VAULT 1048 1047			STANDARD NO. BC 870.01		
			SCALE: NONE	SHEET 3 OF 3	



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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD SECTIONS FOR
 LARGE SECTIONAL CONCRETE VAULTS

1049
 1048

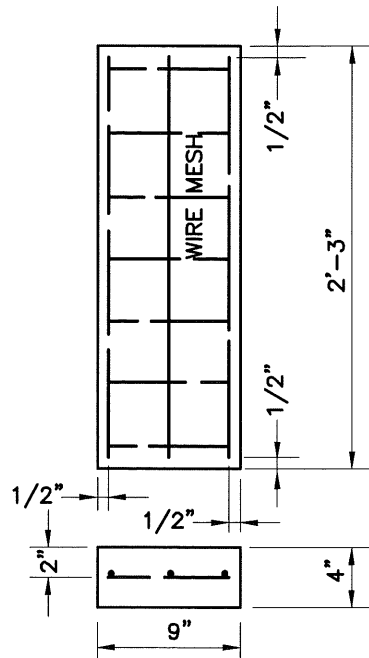
ISSUED	REVISED	REVISED
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3 / 2008

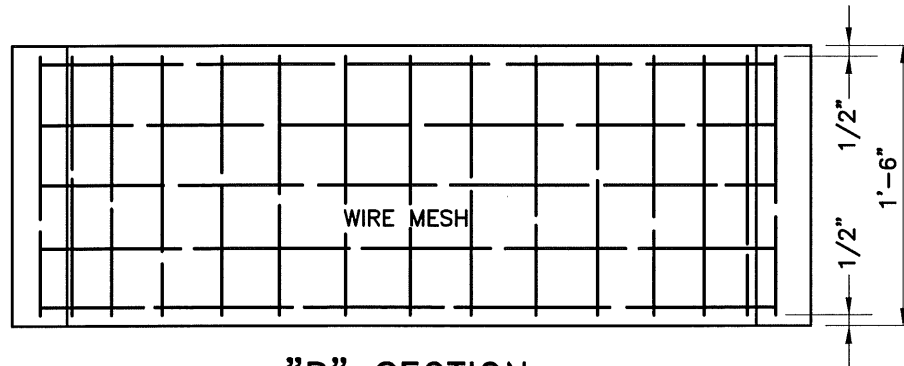
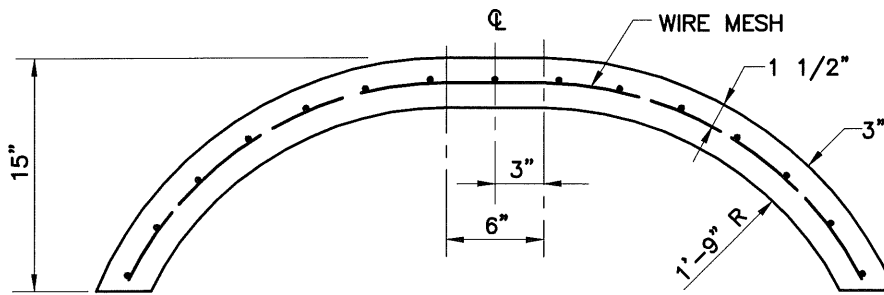
STANDARD NO.
 BC 871.01

SCALE: NONE

SHEET 1 OF 4



"A" SECTION



"B" SECTION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. WIRE MESH SHALL BE 4"x4" NO. 6 WIRE.



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 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

DETAIL OF
 LARGE SECTIONAL CONCRETE VAULT
 1050 "A" & "B" SECTIONS)
 1049

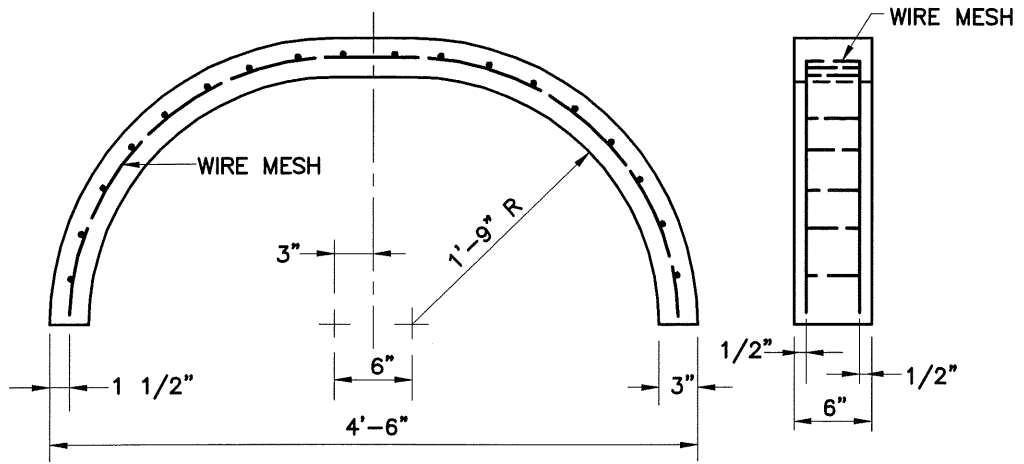
ISSUED	REVISED	REVISED
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3 / 2008

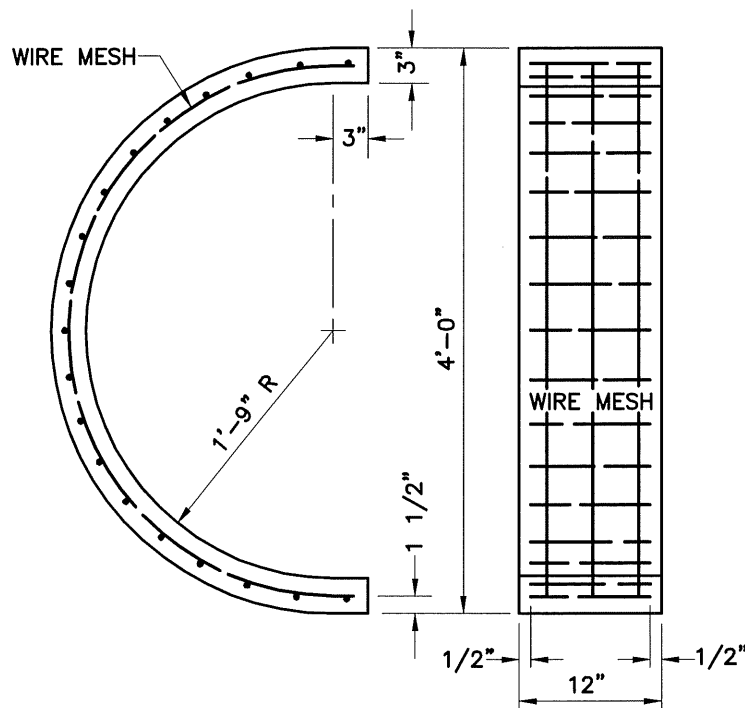
STANDARD NO.
 BC 871.01

SCALE: NONE

SHEET 2 OF 4



"D" SECTION



"C" SECTION

NOTE:
CONCRETE SHALL BE MIX 3.
WIRE MESH SHALL BE 4"x4" NO. 6 WIRE.



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[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

DETAIL OF
LARGE SECTIONAL CONCRETE VAULT
1054 "C" & "D" SECTIONS)
1050

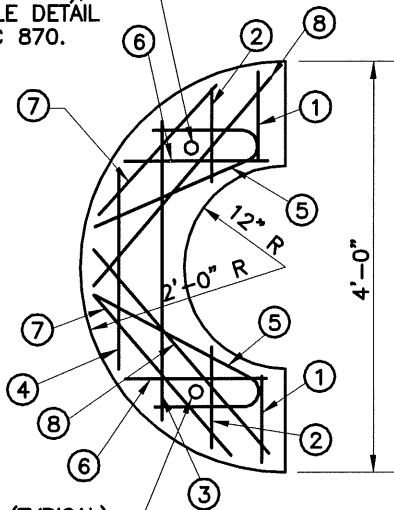
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 871.01

SCALE : NONE SHEET 3 OF 4

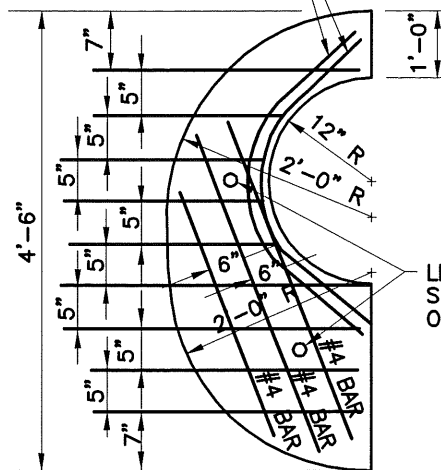
STRAIGHT BARS
ALL OTHERS HOOKED
(SEE TYPICAL DETAIL BELOW)

LIFTING HOLE (TYPICAL),
SEE LIFTING HOLE DETAIL
ON STD. NO. BC 870.



LIFTING HOLE (TYPICAL),
SEE LIFTING HOLE DETAIL
ON STD. NO. BC 870.

"E" SECTION

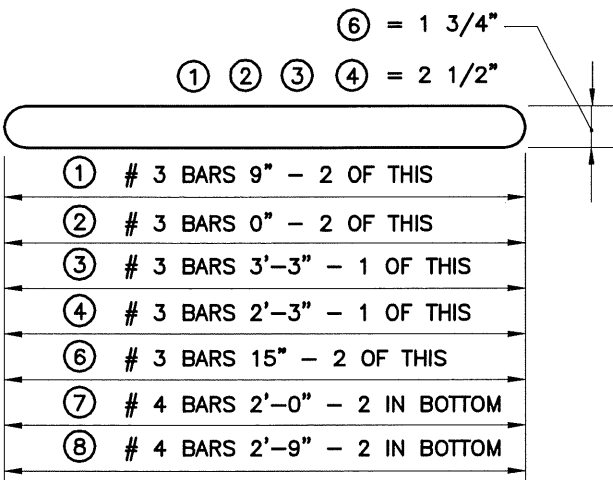
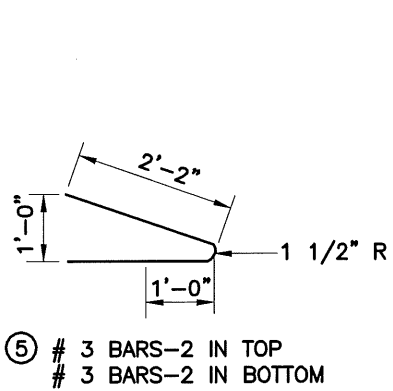


LIFTING HOLE (TYPICAL),
SEE LIFTING HOLE DETAIL
ON STD. NO. BC 870.




"F" SECTION

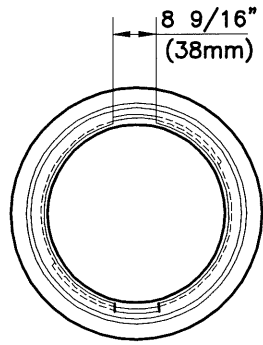
NOTES:

1. CONCRETE SHALL BE 5,000 PSI.
2. REINFORCING BARS SHALL BE FY=60,000 PSI.

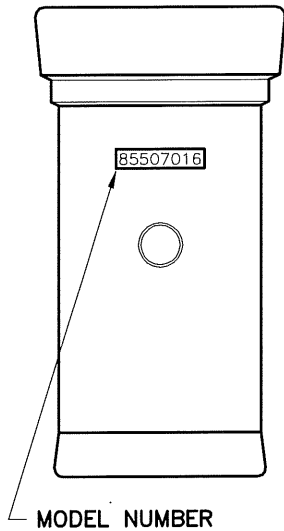


"E" SECTION & "F" SECTION - LARGE VAULT TOP SLAB

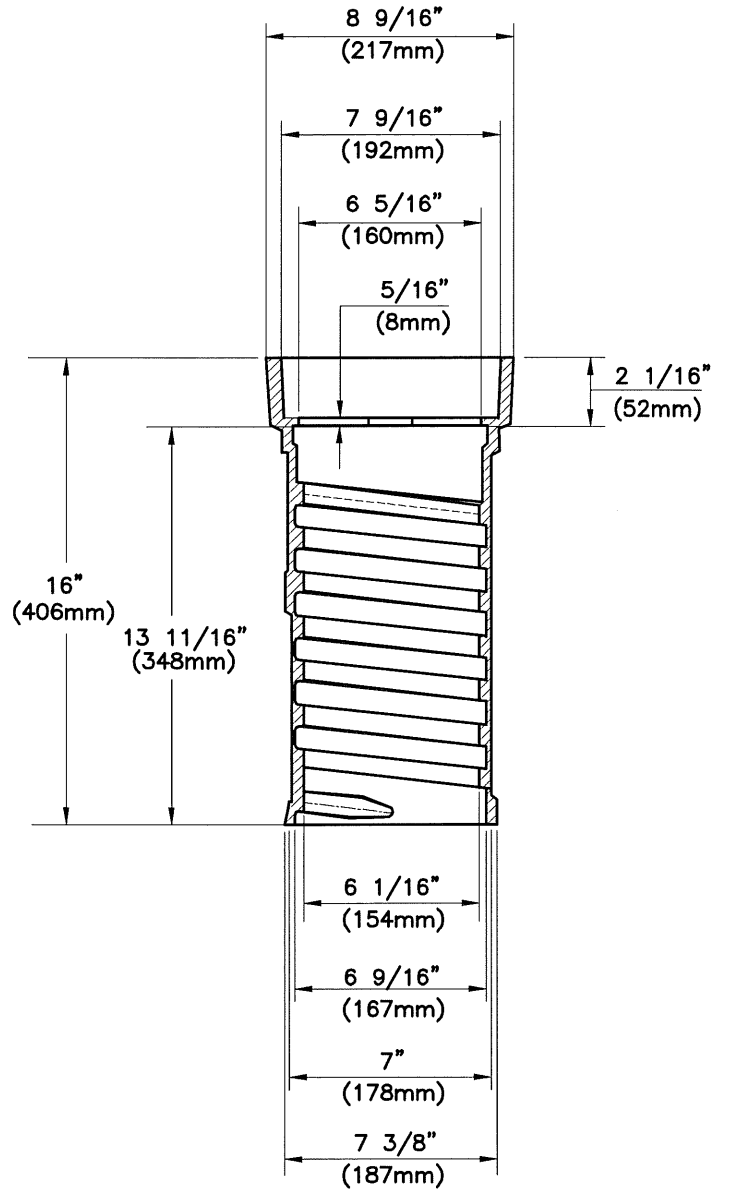
	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
"E" SECTION & "F" SECTION LARGE CONCRETE VAULT 1052 TOP SLAB 1051			STANDARD NO. BC 871.01		
			SCALE: NONE	SHEET 4 OF 4	



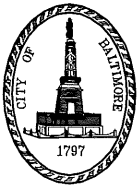


TOP VIEW

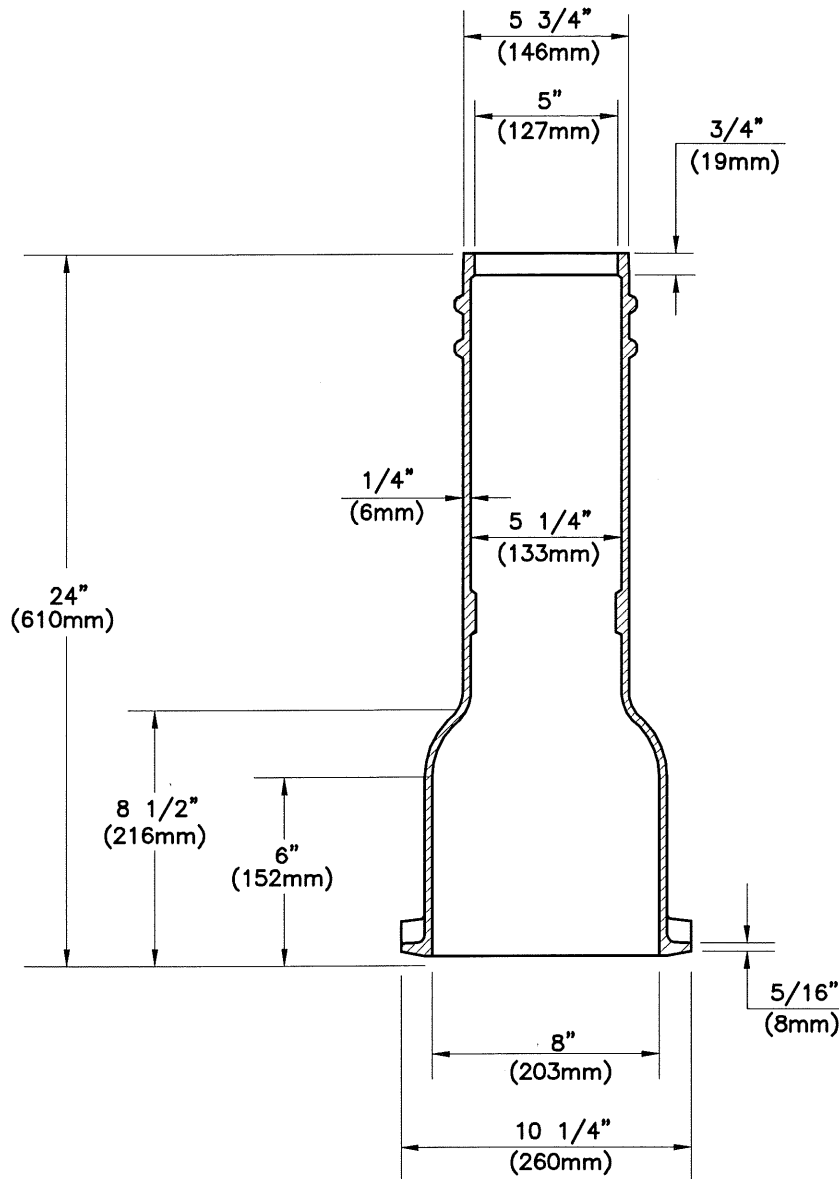


SIDE VIEW

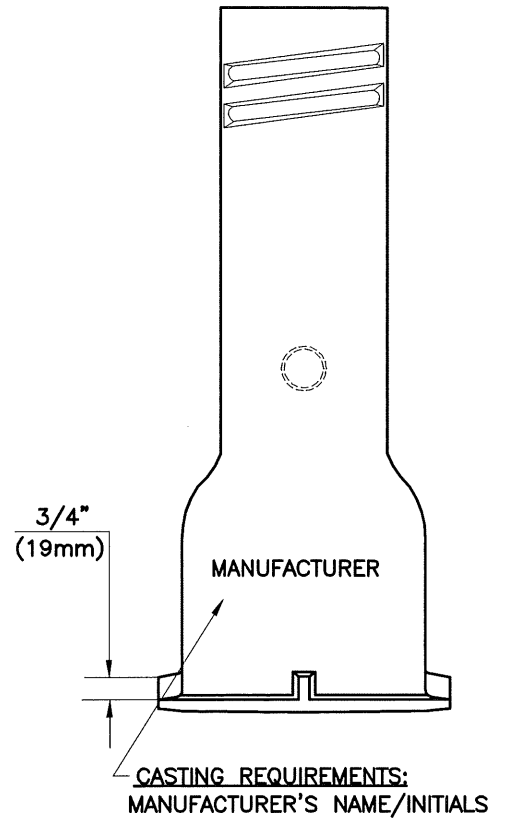


SECTION

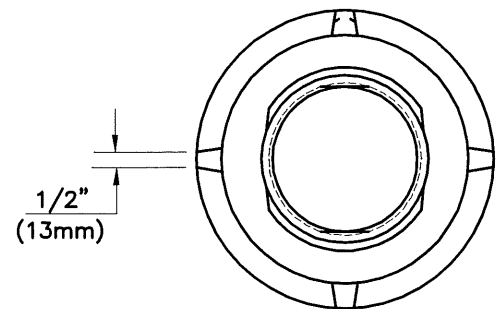
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	HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
		DIRECTOR, DEPARTMENT OF PUBLIC WORKS	7 1/2" ROADWAY BOX TOP 1053 1052	STANDARD NO. BC 872.01	



SECTION



SIDE VIEW



BOTTOM VIEW

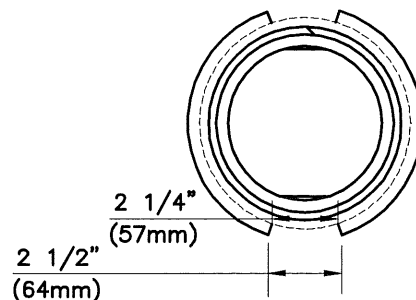


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

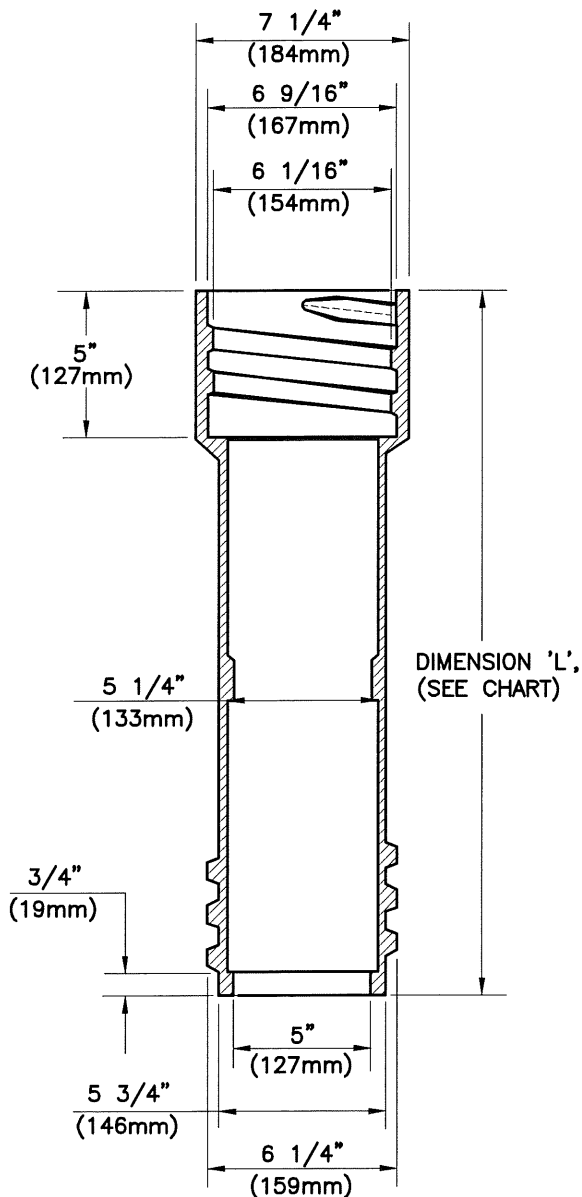
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 7 1/2" ROADWAY BOX BOTTOM
 1054
 1053

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE : NONE		SHEET 2 OF 6

EXTENSION MODEL	DIMENSION 'L'
14-INCH EXTENSION	18" (457mm)
18-INCH EXTENSION	24" (610mm)
24-INCH EXTENSION	30" (762mm)

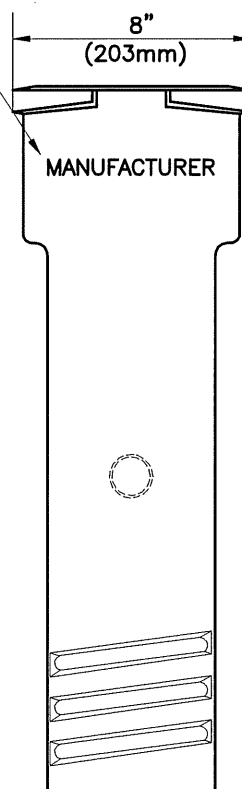


SIDE VIEW

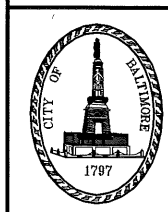


SECTION

CASTING REQUIREMENTS:
 MANUFACTURER'S NAME/INITIALS



SIDE VIEW

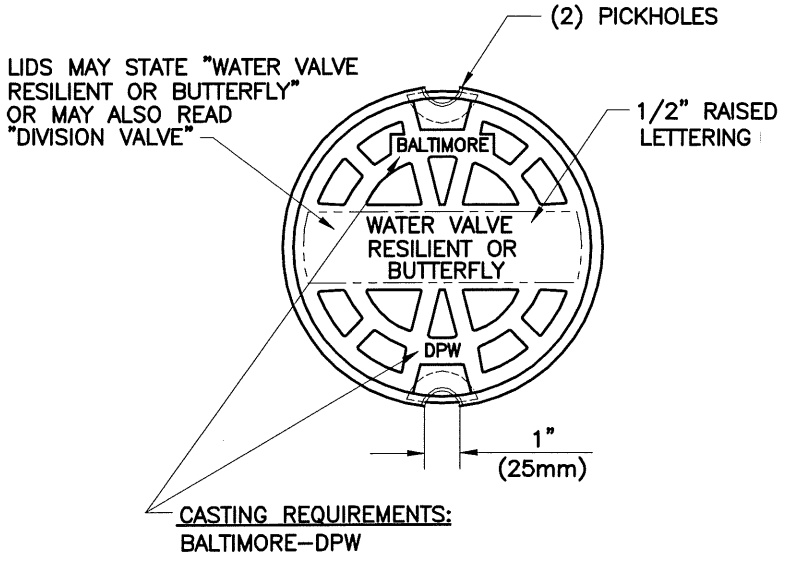


APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

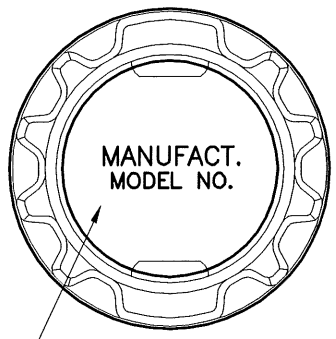
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

7 1/2" ROADWAY BOX EXTENSION
 1055
 1054

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE : NONE	SHEET 3 OF 6	

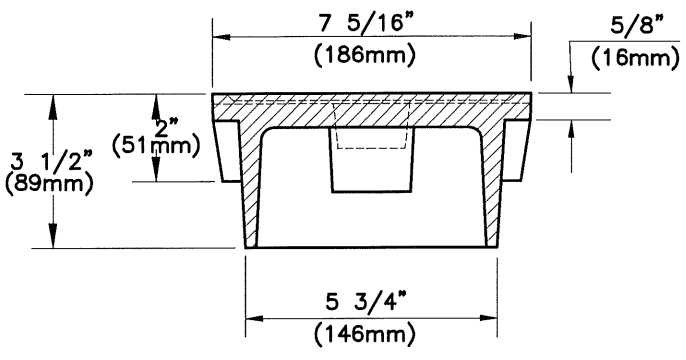


TOP VIEW

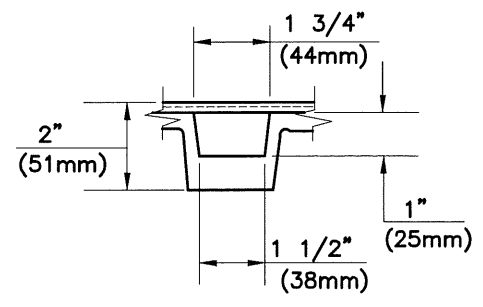


CASTING REQUIREMENTS:
MANUFACTURER'S NAME/INITIALS
MODEL NUMBER

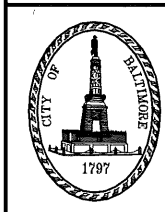
BOTTOM VIEW



SECTION



PICK HOLE DETAIL



APPROVED: *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER

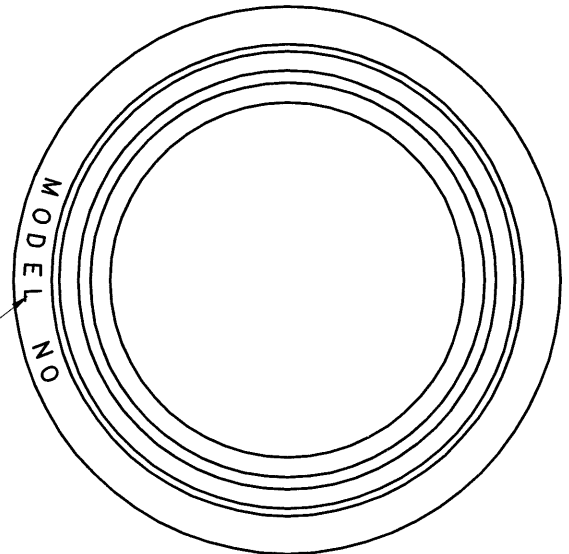
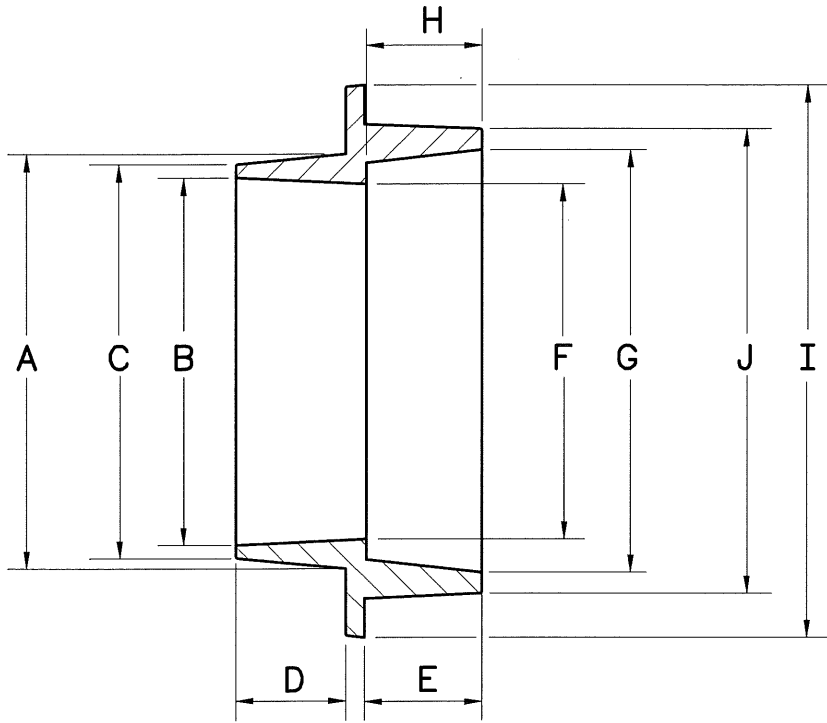
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

7 1/2" ROADWAY BOX LID
(ON RESILIENT OR BUTTERFLY VALVE)

1055
1055

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE: NONE	SHEET 4 OF 6	



CASTING REQUIREMENTS:
 MODEL NUMBER

VALVE BOX RISER CHART

SIZE (INCHES)	DIMENSIONS - INCHES (MILLIMETERS)										ESTIMATED RISER WEIGHT
	A	B	C	D	E	F	G	H	I	J	
1 1/2"	7 1/2" (191mm)	7 1/16" (180mm)	6 7/16" (164mm)	2" (51mm)	1 1/8" (29mm)	6 5/16" (161mm)	7 1/2" (190mm)	2 1/16" (52mm)	9 11/16" (247mm)	8 3/16" (208mm)	9 lbs (4kg)
2"	7 1/2" (191mm)	6 1/2" (166mm)	7 1/16" (180mm)	2" (51mm)	1 5/8" (41mm)	6 5/16" (161mm)	7 1/2" (190mm)	2 1/16" (52mm)	9 3/4" (248mm)	8 3/16" (208mm)	10 lbs (5kg)
2 1/2"	7 1/2" (191mm)	6 9/16" (167mm)	7" (178mm)	2" (51mm)	2 1/8" (54mm)	6 5/16" (161mm)	7 1/2" (190mm)	2 1/16" (52mm)	9 13/16" (249mm)	8 3/16" (208mm)	12 lbs (5kg)



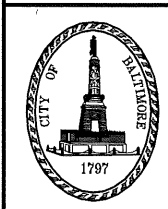
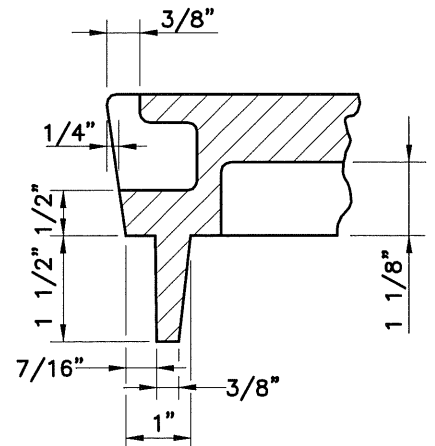
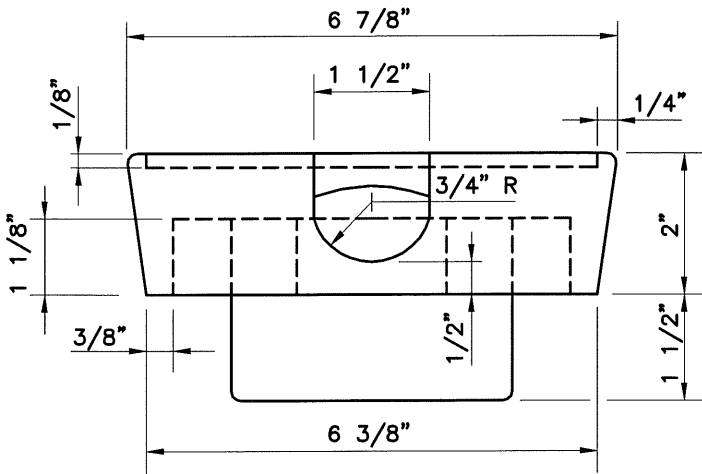
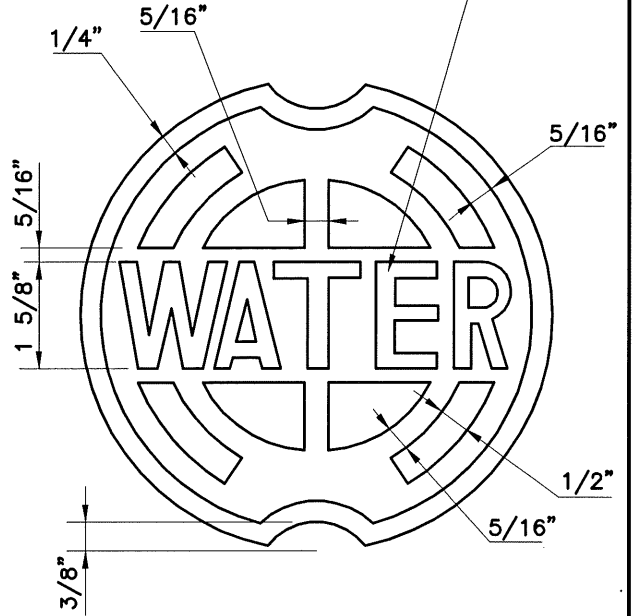
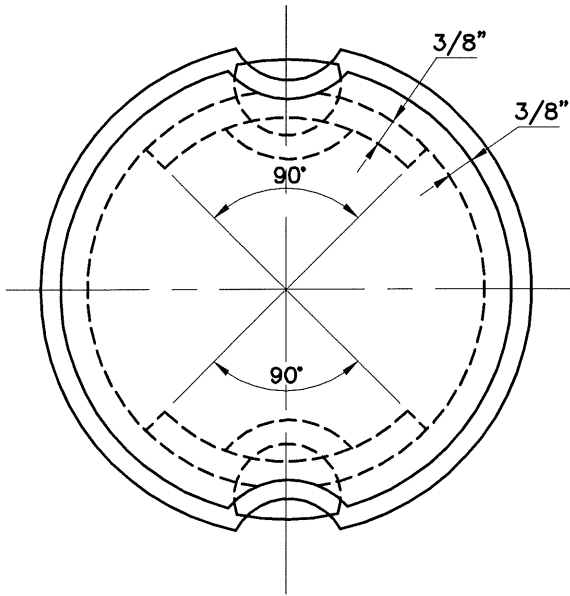
APPROVED: *[Signature]*
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

1 1/2", 2", & 2 1/2" VALVE BOX RISER
 1057 (HEAVY DUTY)
 1056

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE: NONE	SHEET 5 OF 6	

LIDS MAY STATE "WATER"
 OR MAY ALSO READ
 "DIVISION WATER VALVE"



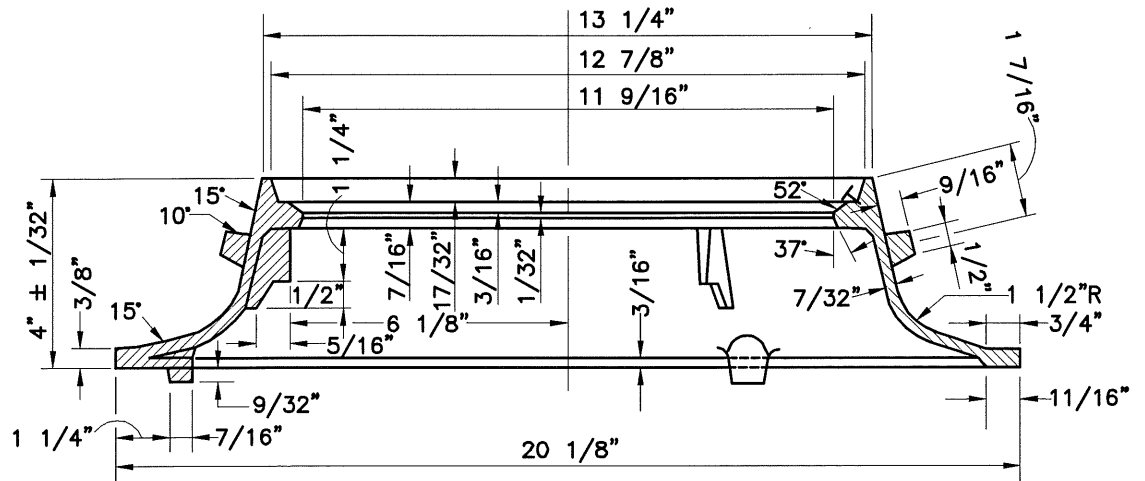
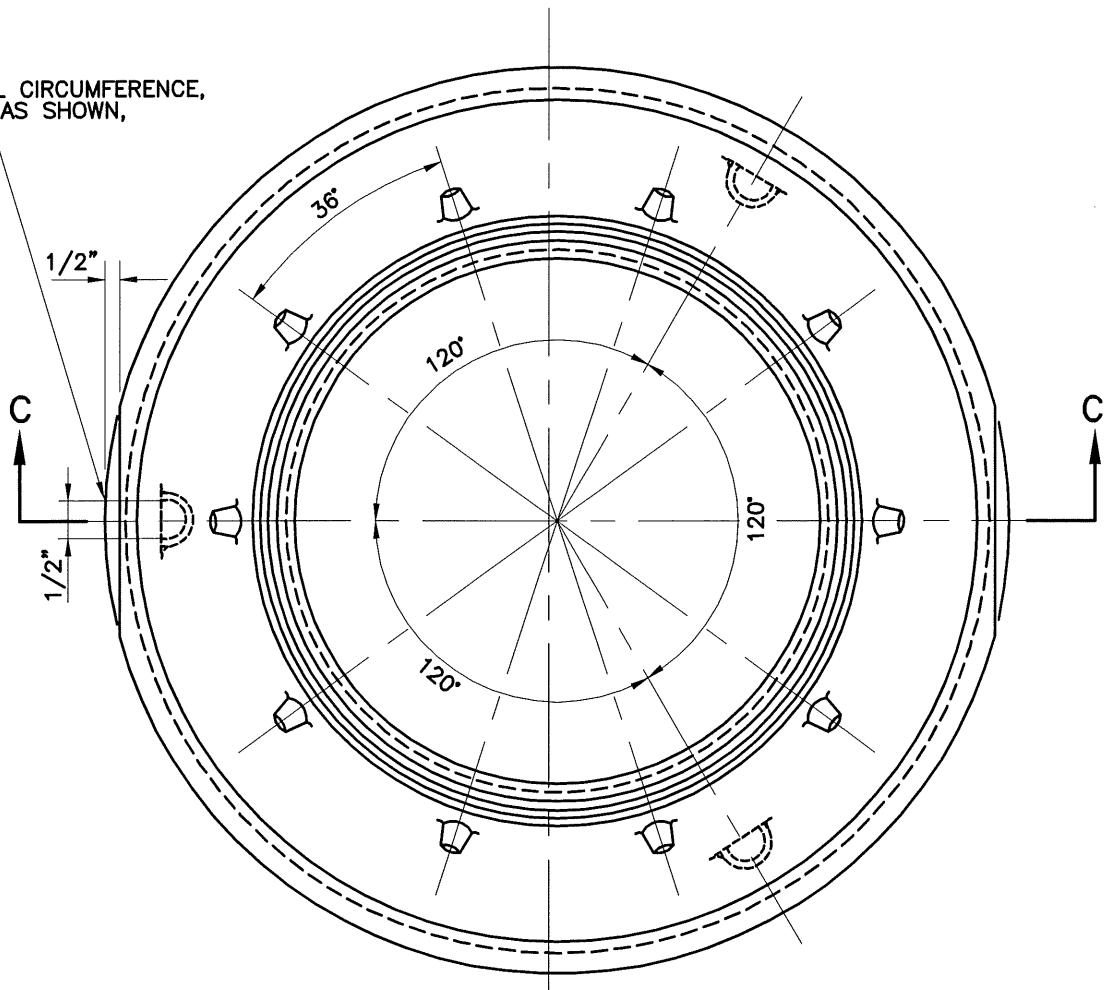
APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD 7 1/2" VALVE COVER - WATER
 1058
 1057

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE : NONE		SHEET 6 OF 6

CASTING WITH FULL CIRCUMFERENCE,
OR SQUARE CUTS AS SHOWN,
IS ACCEPTABLE.



NOTES:

1. AVERAGE WEIGHT OF FRAME - 22 LBS.
2. MATERIAL SHALL BE CAST IRON,
21,000 PSI TENSILE STRENGTH.

SECTION C-C



APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

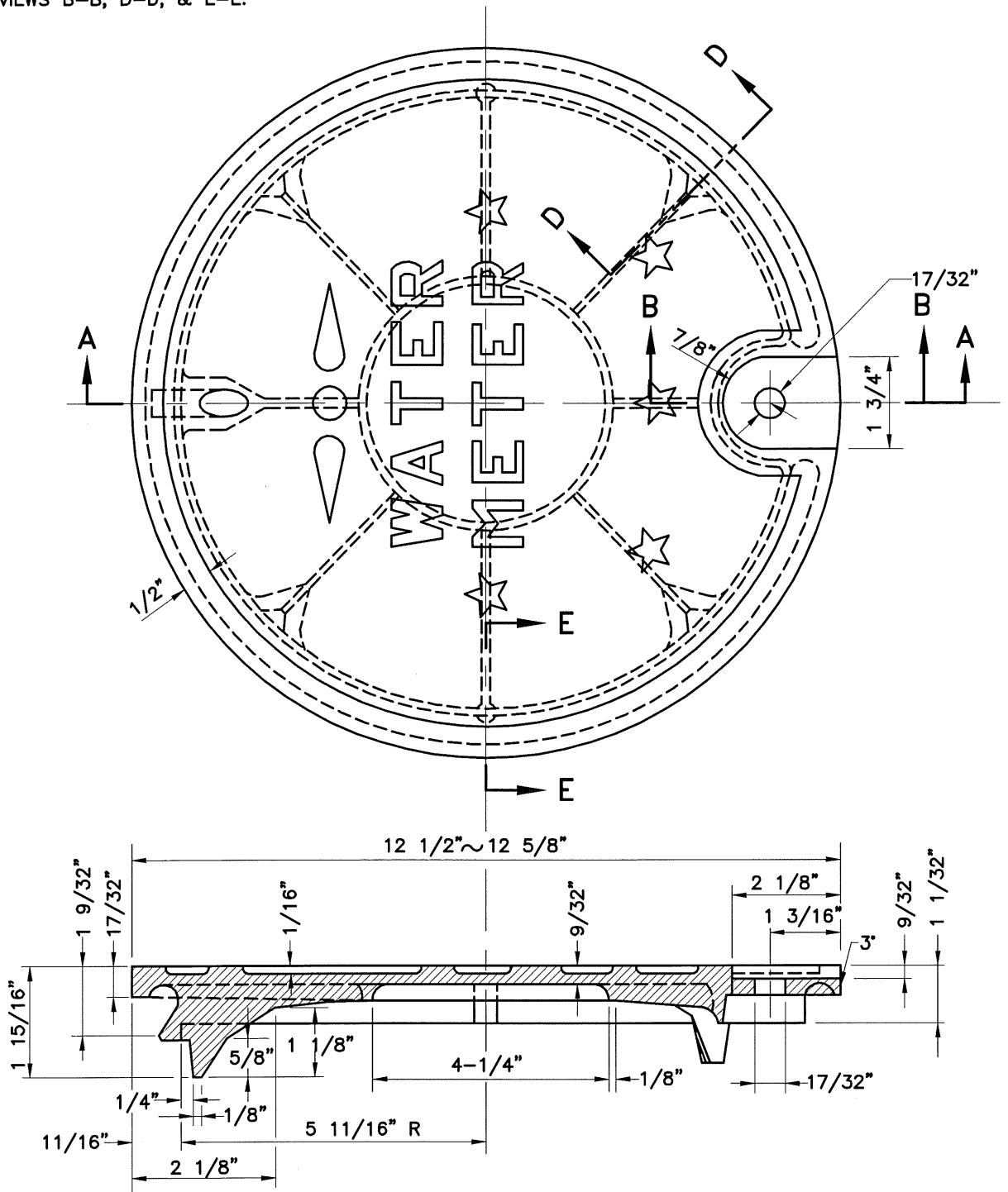
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 12" METER FRAME
1059
1058

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 873.01

SEE STD. NO. BC 863.03 FOR
 SECTION VIEWS B-B, D-D, & E-E.



SECTION A-A

NOTE:
 METER COVER MATERIAL SHALL BE CAST IRON
 21,000 PSI TENSILE STRENGTH. WEIGHT=11LBS.

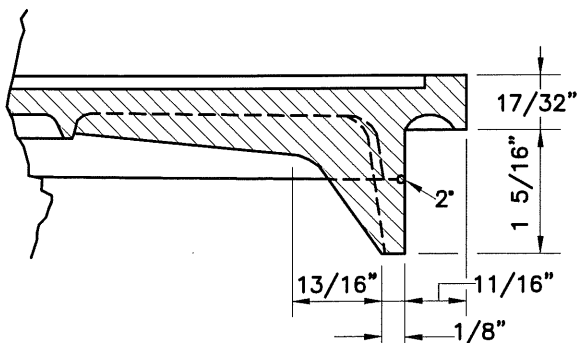


APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

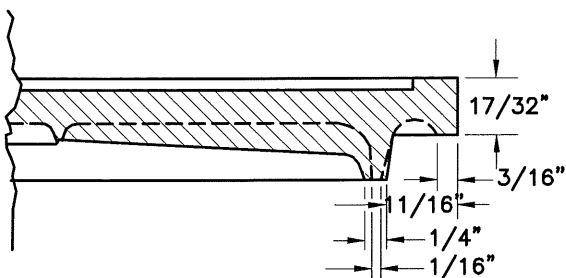
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD 12" METER COVER
 1060
 1059

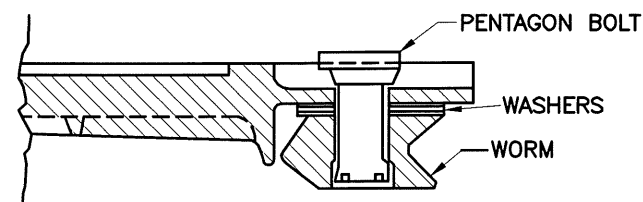
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 873.01		
SCALE: NONE	SHEET 2 OF 3	



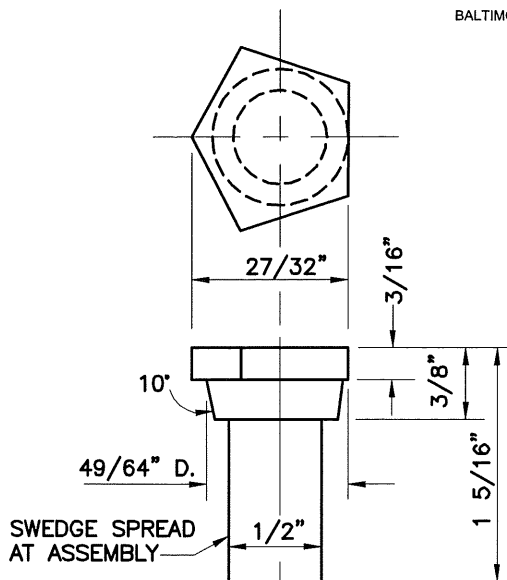
SECTION D-D



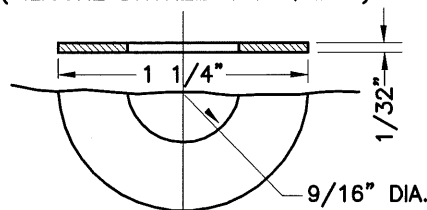
SECTION E-E



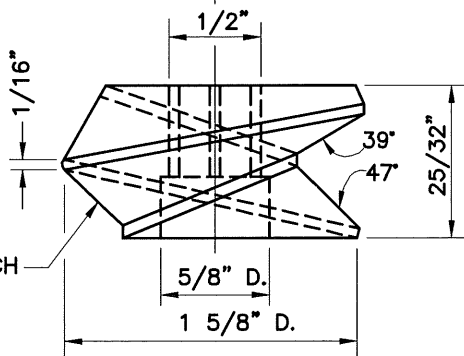
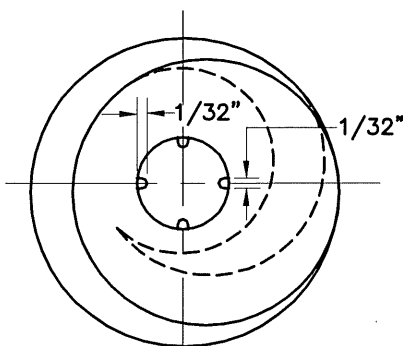
ASSEMBLED SECTION AT B-B



LOCKING BOLT
 (SILICONE BRONZE-1 REQUIRED)



WASHERS (COPPER ALLOY - 1 REQUIRED)
 (NYLON - 1 REQUIRED)



THD. 1-1/2" PER INCH

WORM

(CAST IRON - 1 REQUIRED)



APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD 12" METER COVER -
 LOCKING BOLT AND DETAILS

1061

ISSUED	REVISED	REVISED
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3 / 2008

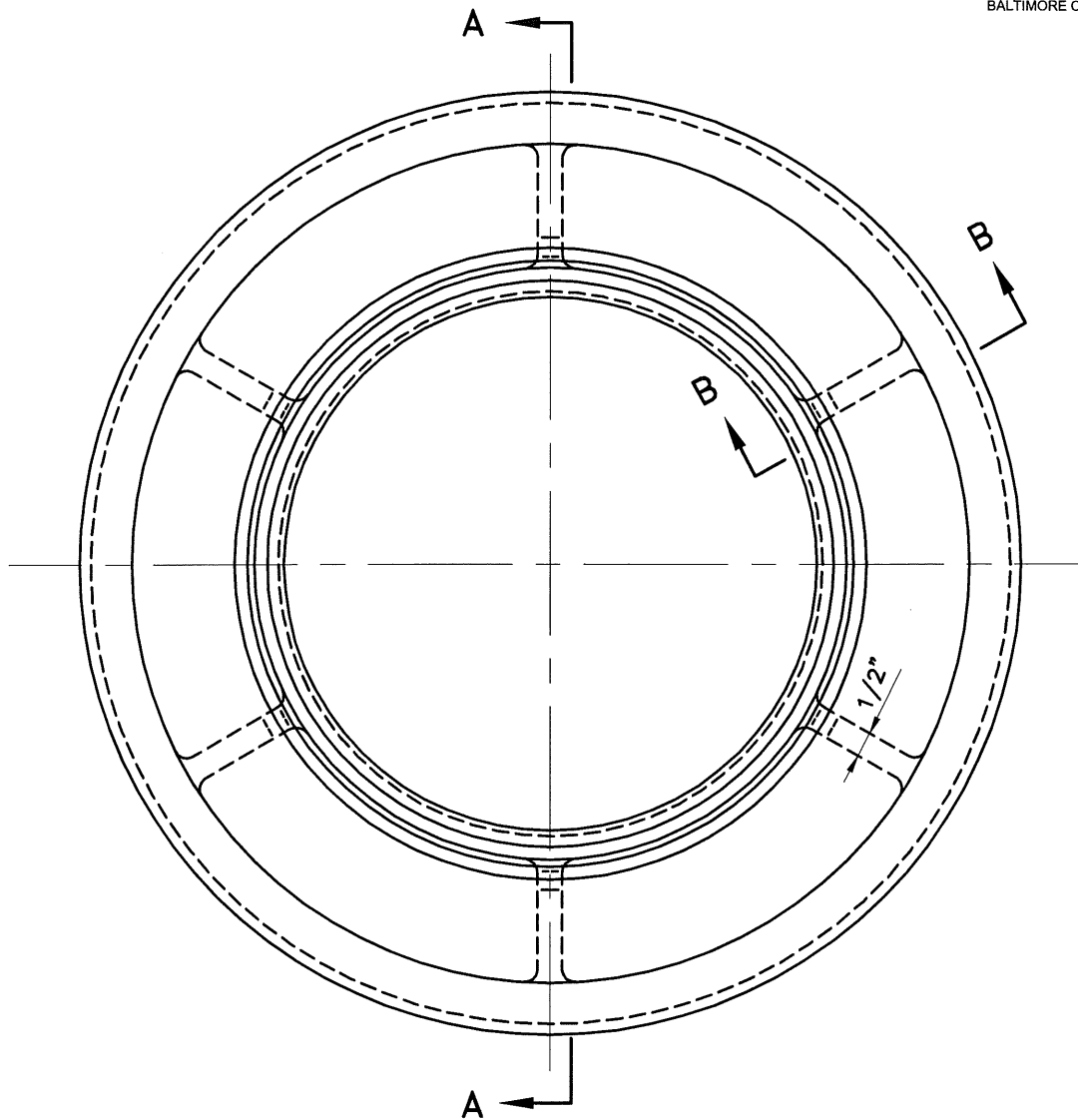
STANDARD NO.
 BC 873.01

SCALE: NONE

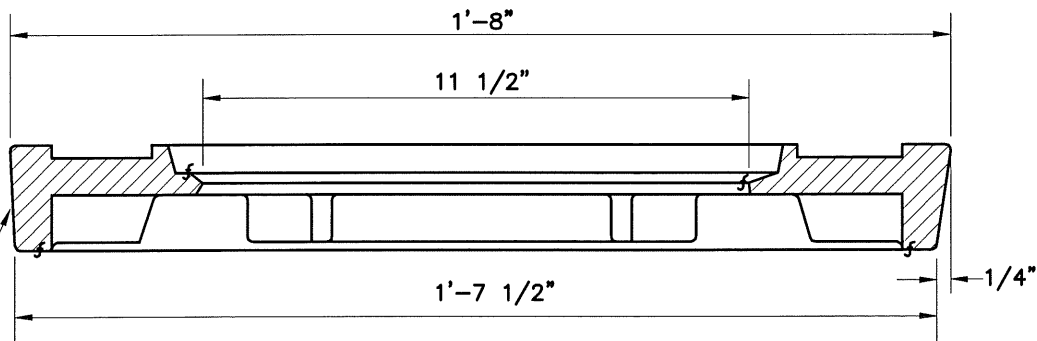
SHEET 3 OF 3

DRAFT - NOT FOR CONSTRUCTION

FIG. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317



PLAN



SECTION A-A

SEE SECTION B-B FOR DETAILS.



APPROVED:

[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER

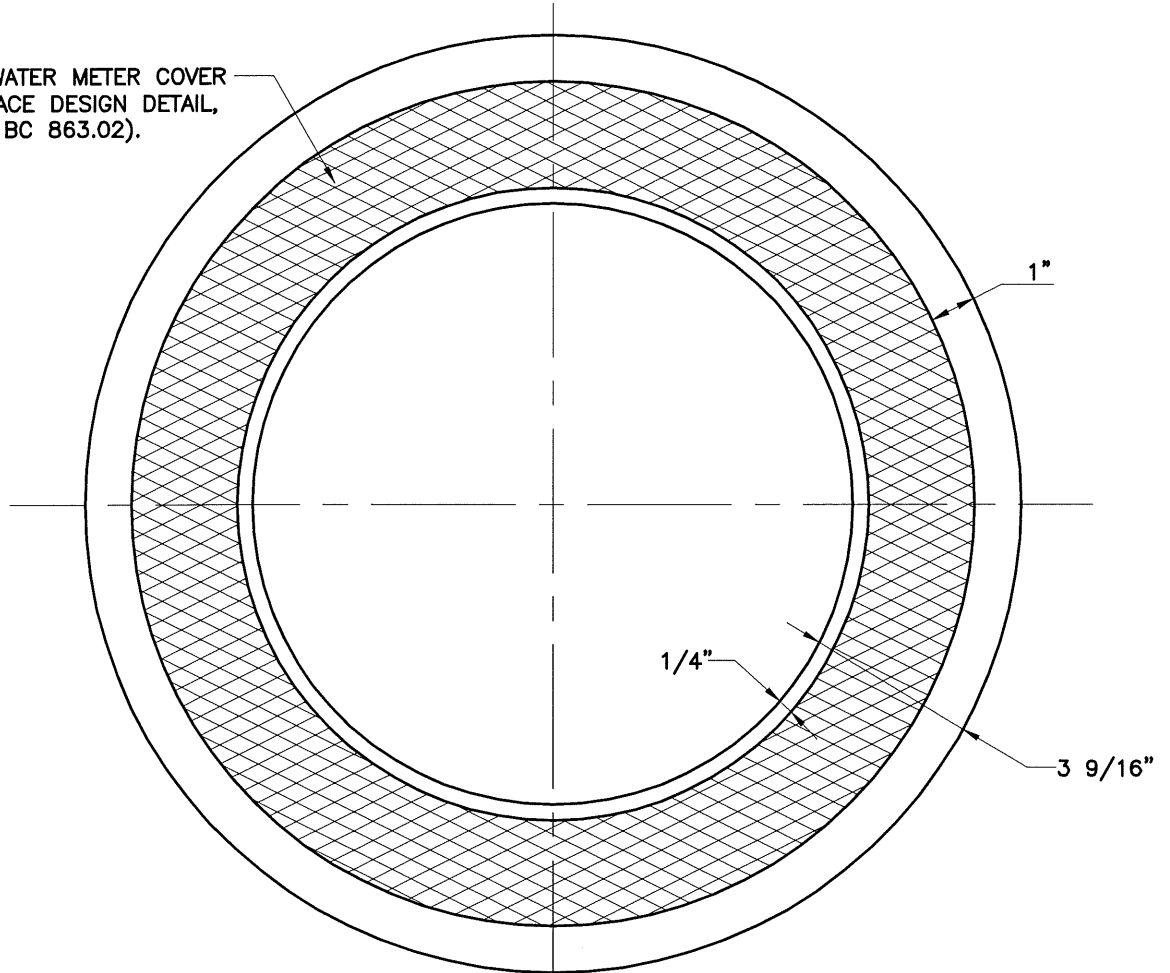
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

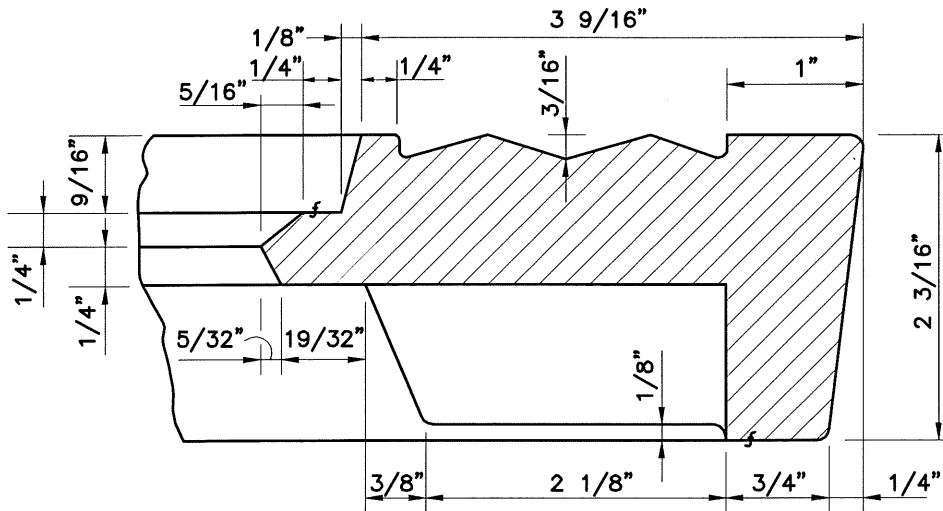
18" X 12" METER FRAME ADAPTER
 1062
 1061

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 874.01		
SCALE: NONE		SHEET 1 OF 2

SEE 12" WATER METER COVER
 FOR SURFACE DESIGN DETAIL,
 (STD. NO. BC 863.02).



GRID PLAN



SECTION B-B

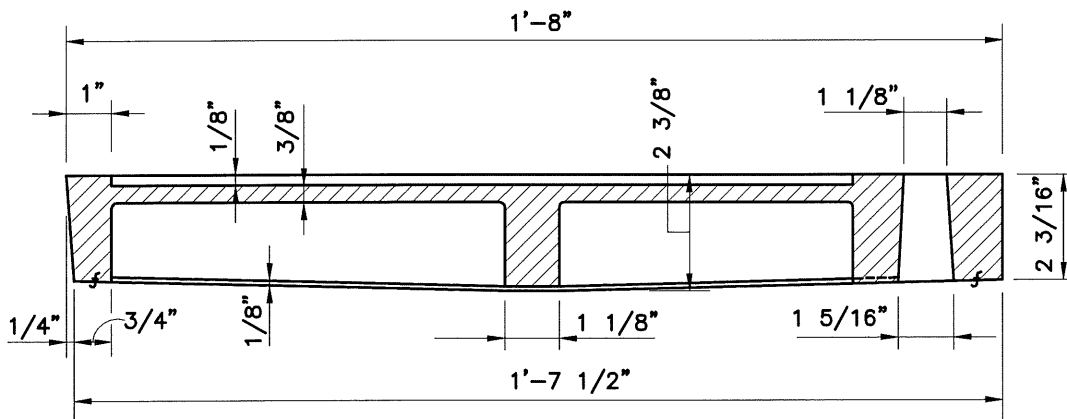
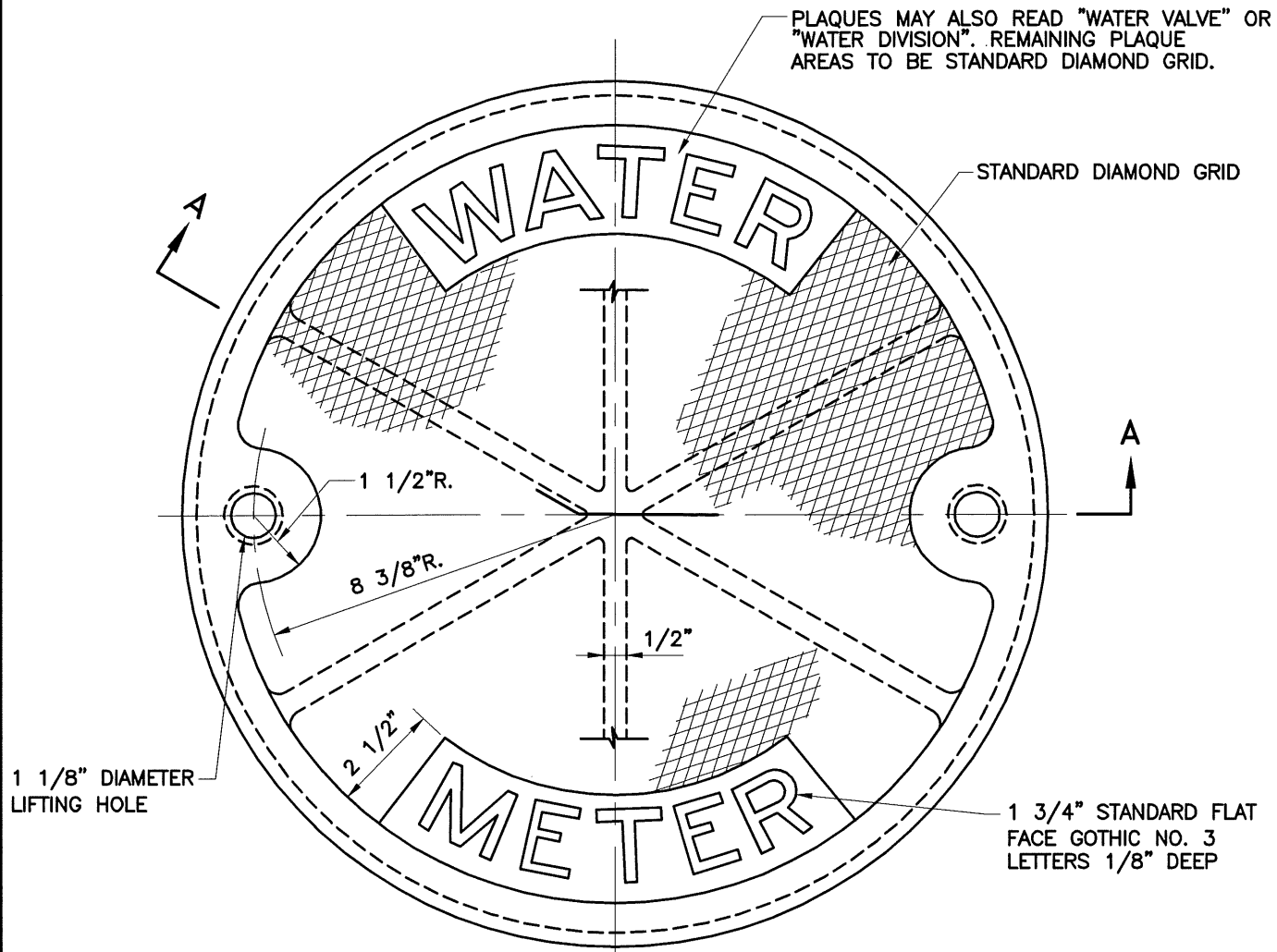


APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS



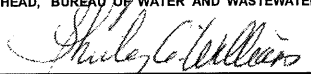
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

18" X 12" METER FRAME ADAPTER
 1063
 1062

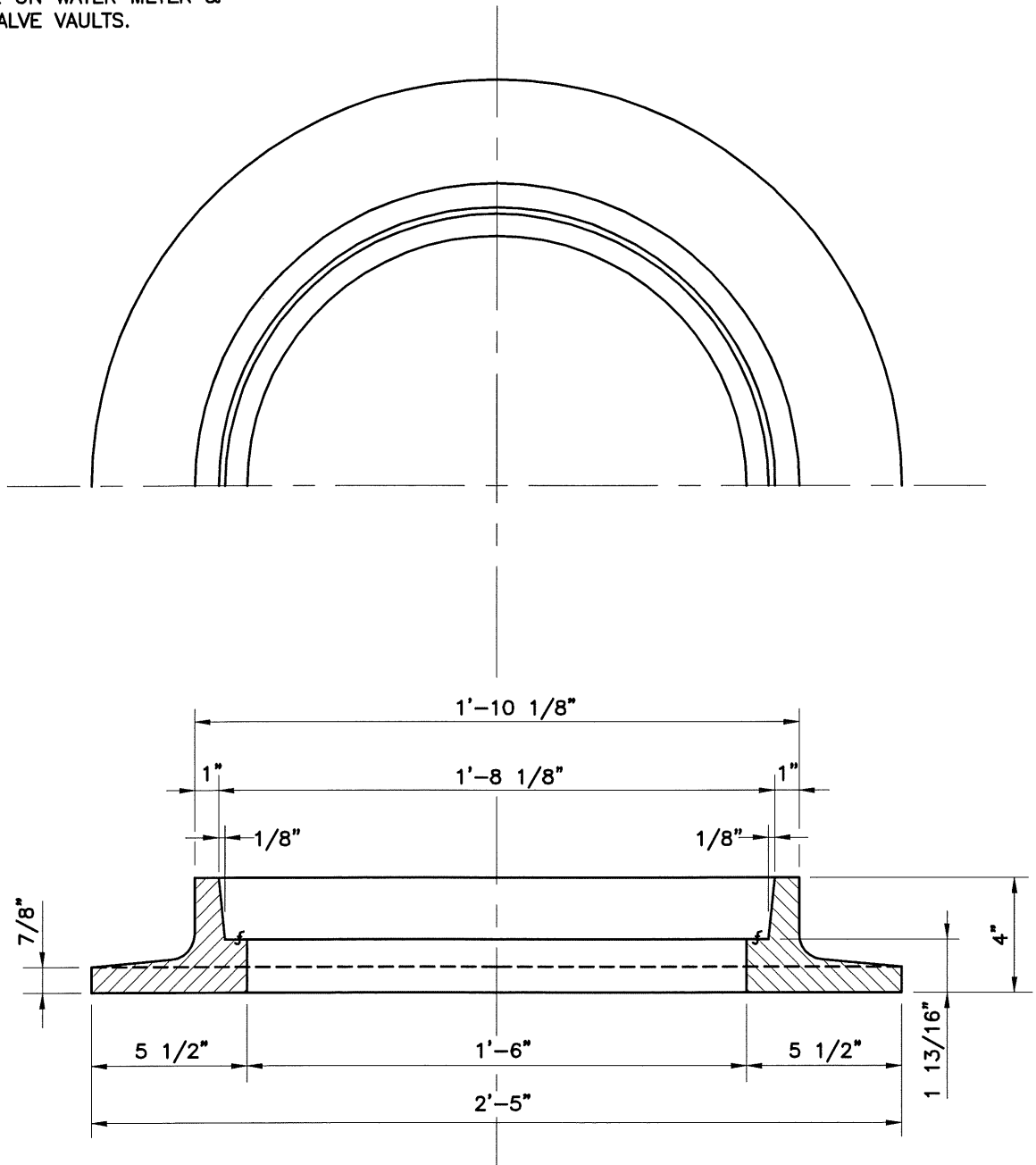
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 874.01		
SCALE : NONE		SHEET 2 OF 2



SECTION A-A

	APPROVED: 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
		DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD 18" MANHOLE COVER - WATER 1064 1063	STANDARD NO. BC 875.01	
			SCALE: NONE	SHEET 1 OF 2	

FOR USE ON WATER METER &
 WATER VALVE VAULTS.



APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD 18" MANHOLE FRAME
 1065
 1064

ISSUED	REVISED	REVISED
3 / 2008		

**STANDARD NO.
 BC 875.01**

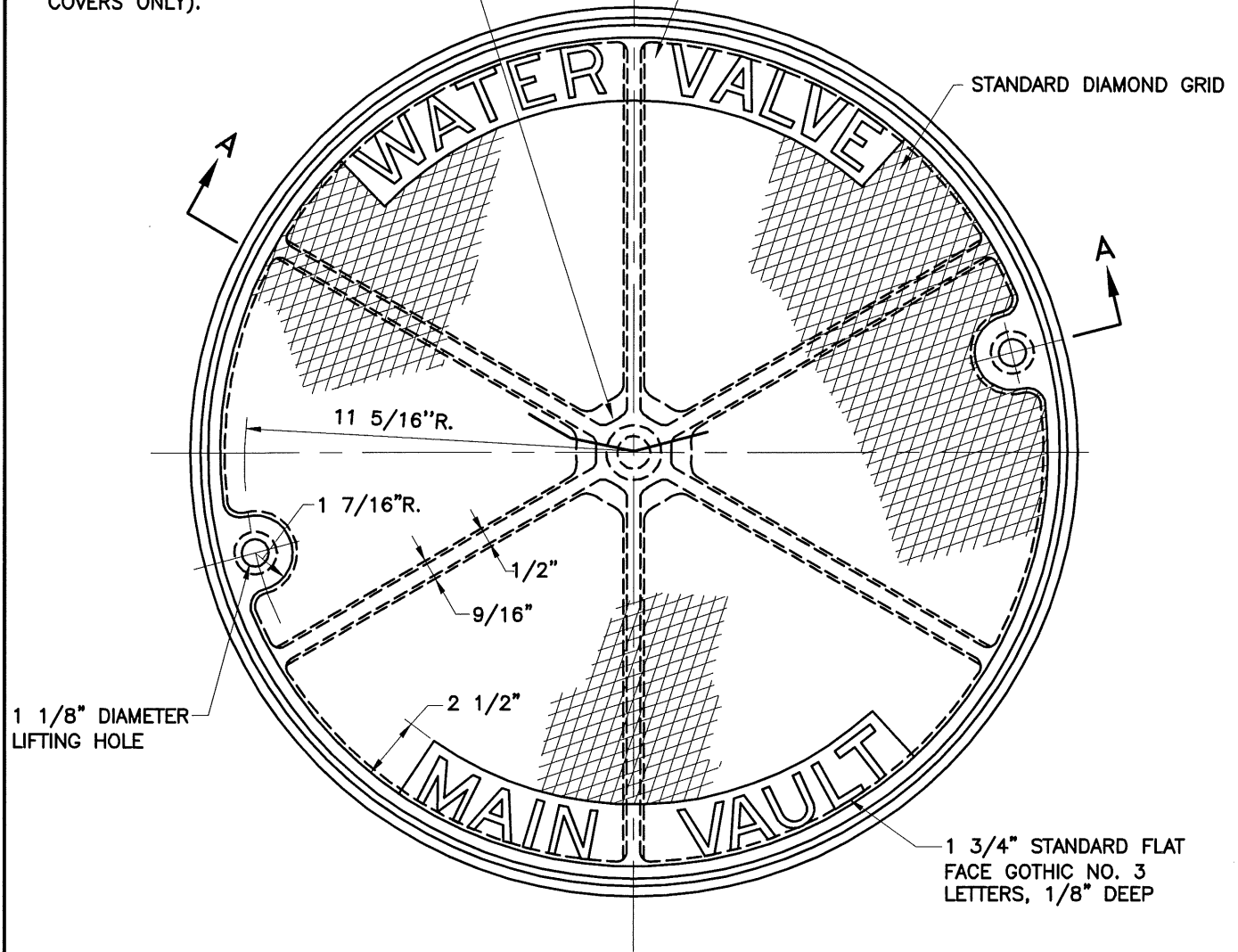
SCALE : NONE

SHEET 2 OF 2

DRAFT - NOT FOR CONSTRUCTION

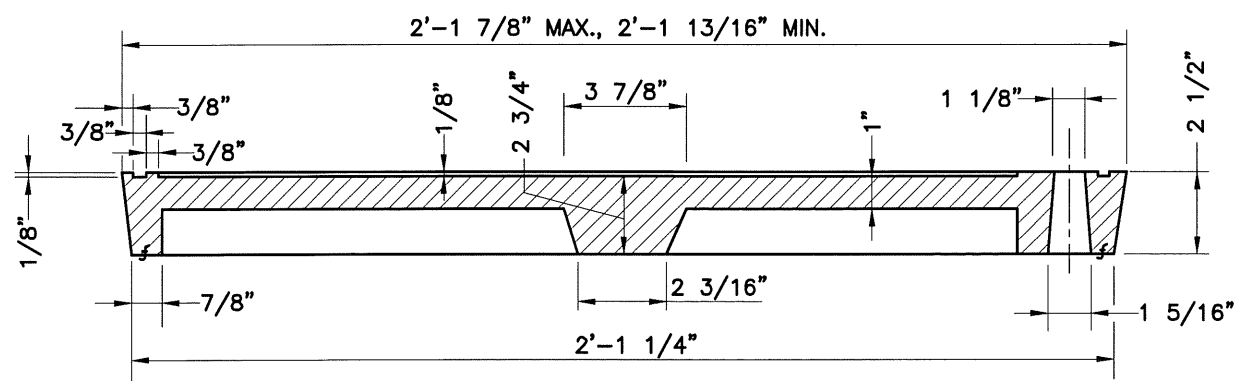
PROVIDE HOLE FOR LOCKING BOLT WHEN REQUIRED (SANITARY AND STORM DRAIN COVERS ONLY).

PLAQUES MAY ALSO READ "WATER METER", "WATER VALVE" OR "WATER VALVE-DIVISION". REMAINING PLAQUE AREAS TO BE STANDARD DIAMOND GRID.



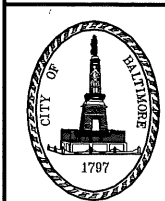
1 1/8" DIAMETER LIFTING HOLE

1 3/4" STANDARD FLAT FACE GOTHIC NO. 3 LETTERS, 1/8" DEEP



SECTION A-A

THIS COVER IDENTICAL WITH STANDARD 24" SANITARY AND STORM DRAIN COVERS (EXCEPT FOR 1" DIAMETER PERFORATIONS IN STORM DRAIN COVERS).



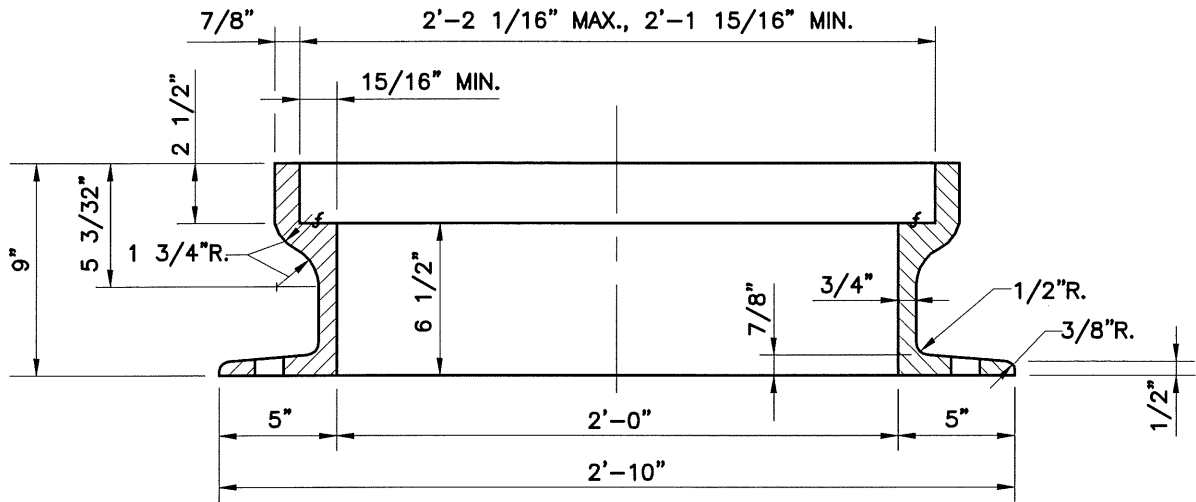
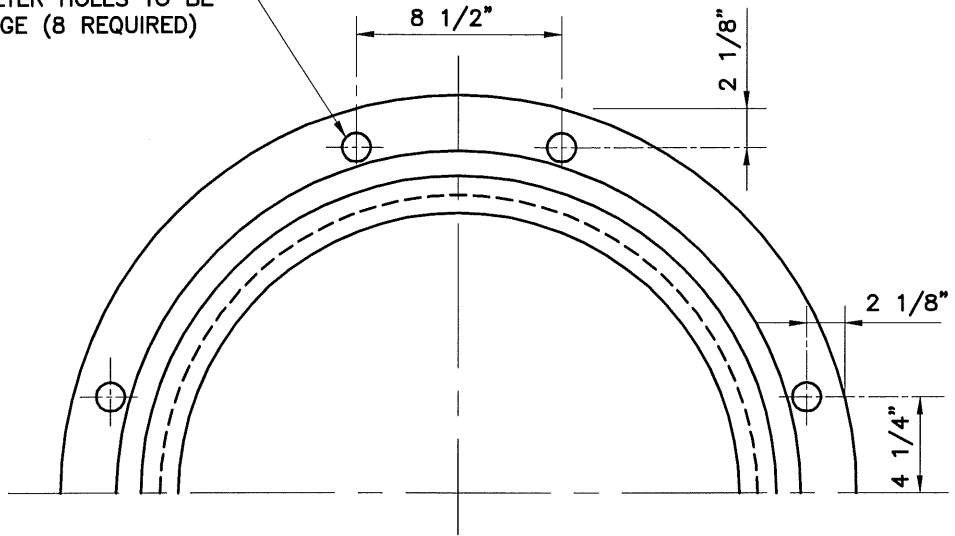
APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 24" MANHOLE COVER - WATER
1066
1065

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 876.01		
SCALE: NONE	SHEET 1 OF 2	

1 1/4" DIAMETER HOLES TO BE
 CAST IN FLANGE (8 REQUIRED)



APPROVED:
[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD 24" MANHOLE FRAME - WATER
 1067
 1066

ISSUED	REVISED	REVISED
3 / 2008		

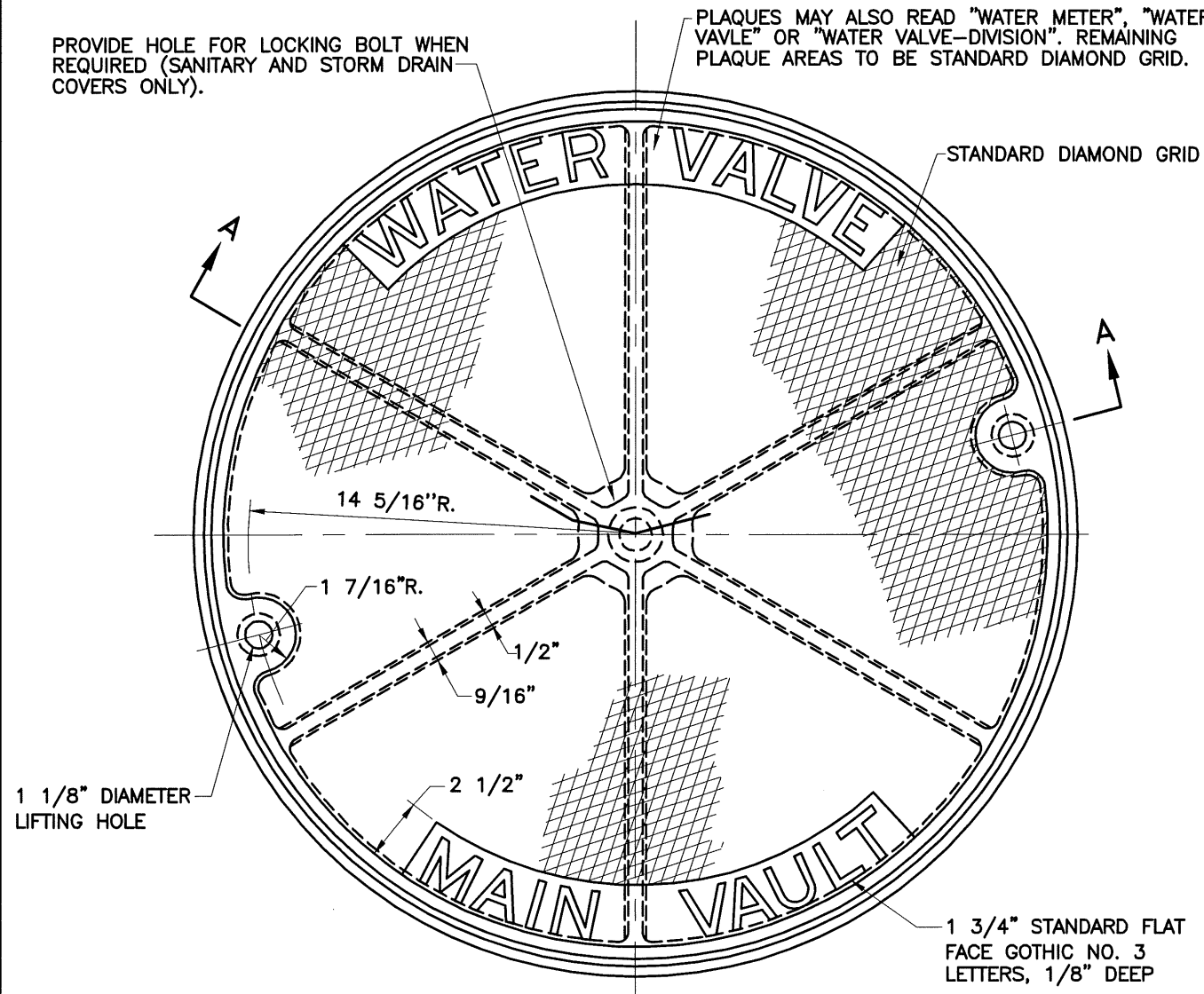
STANDARD NO.
 BC 876.01

SCALE : NONE SHEET 2 OF 2

DRAFT - NOT FOR CONSTRUCTION

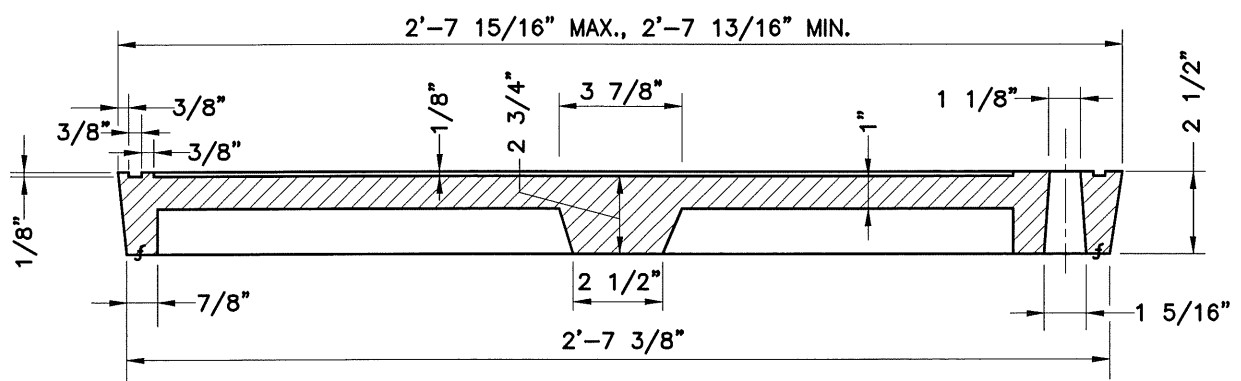
PROVIDE HOLE FOR LOCKING BOLT WHEN REQUIRED (SANITARY AND STORM DRAIN COVERS ONLY).

PLAQUES MAY ALSO READ "WATER METER", "WATER VALVE" OR "WATER VALVE-DIVISION". REMAINING PLAQUE AREAS TO BE STANDARD DIAMOND GRID.





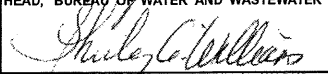
1 1/8" DIAMETER LIFTING HOLE

1 3/4" STANDARD FLAT FACE GOTHIC NO. 3 LETTERS, 1/8" DEEP

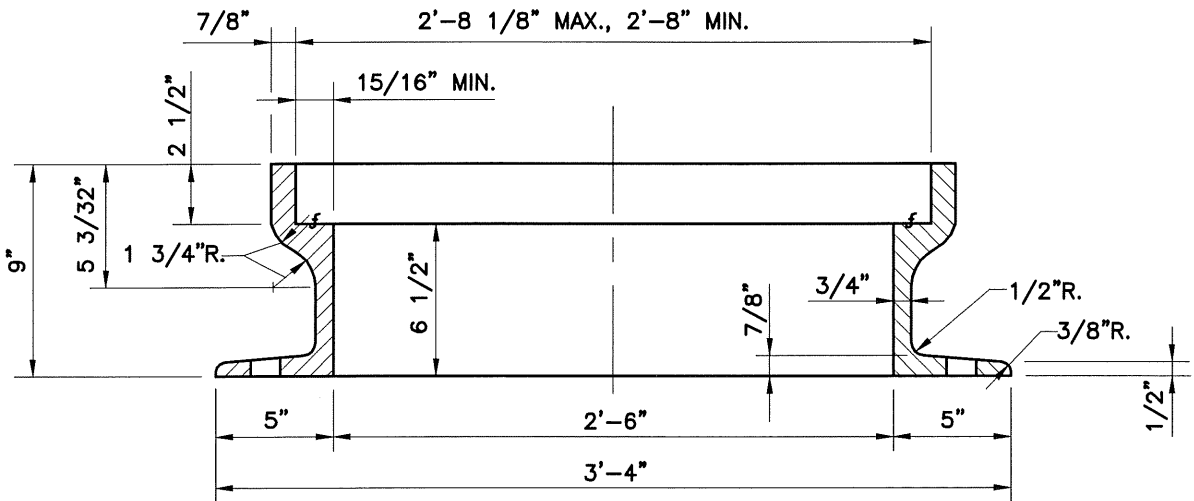
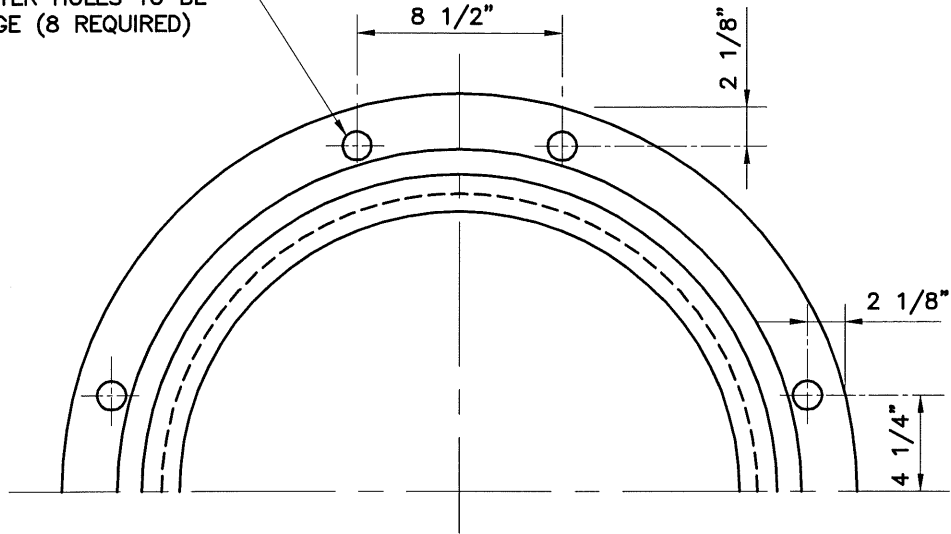


SECTION A-A

THIS COVER IDENTICAL WITH STANDARD 30" SANITARY AND STORM DRAIN COVERS (EXCEPT FOR 1" DIAMETER PERFORATIONS IN STORM DRAIN COVERS).

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
	STANDARD 30" MANHOLE COVER - WATER 1068 1067		STANDARD NO. BC 877.01		SCALE: NONE SHEET 1 OF 2

1 1/4" DIAMETER HOLES TO BE CAST IN FLANGE (8 REQUIRED)



APPROVED:
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER
STANDARD 30" MANHOLE FRAME - WATER
1069
1068

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 877.01		
SCALE: NONE	SHEET 2 OF 2	

EXTRA WORK CERTIFICATION

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS**

CONTRACT NUMBER _____ F.A.P. NO. PENDING, SHA NO. PENDING,
BALTIMORE CITY NO. TR12317

PROJECT CENTRAL AVENUE STREETScape AND HARBOR POINT
CONNECTOR BRIDGE

DATE _____
(Preferably as of end of month)

To the Director of Finance:

In reference to the above referenced contract, we hereby certify that as of the above date no extra work or other conditions that would give rise to additional costs have been authorized either in writing, verbally, or otherwise except that which is represented by fully executed Change Orders Expenditure Authorization Requests and that as of the above date we are not aware of any condition that would give rise to any additional claim upon the Mayor and City Council of Baltimore in reference to the above project, EXCEPT AS FOLLOWS:

CERTIFIED CORRECT:

Name of Contractor

Date of Certification

By: _____
Authorized Signature

THIS FORM MUST ACCOMPANY ALL REQUESTS FOR PAYMENTS.

NOTE: NO INFORMATION OTHER THAN THAT INCLUDED IN OR ATTACHED TO THE ORIGINAL BID DOCUMENT (WHERE SUCH ATTACHMENT IS PERMITTED) WILL BE USED IN DETERMINING AWARD

ORIGINAL
(Not to be Detached)

CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION
F.A.P. NO. PENDING; S.H.A NO. PENDING; BALTIMORE CITY NO. TR12317,
CENTRAL AVENUE STREETScape AND HARBOR POINT CONNECTOR BRIDGE

Opening of Bids _____

Certified Check or Bank Cashier's Check or Bank Treasurer's Check or bid Bond Equal to Five Percent (5%) of Total Bid _____

Days for completion _____ 1460 _____ Consecutive Calendar Days

Liquidated Damages _____ \$2,000 _____ Per Calendar Day

Made this _____ day of _____, 20 _____

By _____
(Name)

(Address)

(NOTE:)The Bidder's name and Address must be inserted above, and in the case of a Firm, the Name of the Firm and of each and every Member of the Firm must be inserted. In case a Bid shall be submitted by or on behalf of any corporation, the Name of such Corporation must be written above).

To the Board of Estimates of Baltimore City

Board Members:

I/We the undersigned Contractor, have familiarized myself/ourselves with the Requirements and Stipulations of the Contract Documents and the site of the proposed work, and fully understand and appreciate the extent and character of the work to be done under the Contract.

I/We propose to furnish all labor, materials and equipment and to do everything except as otherwise provided in the Contract Documents.

Specifications, Special Provisions, Drawings and /or other Contract Documents hereto attached, at the following prices: P-1

ATTENTION ALL BIDDERS:

**IN ORDER TO RECEIVE FINAL
CONTRACT AWARD, A VENDOR
MUST BE REGISTERED ON
eMarylandMarketplace.
TO REGISTER YOUR COMPANY,
CONNECT TO
www.emarylandmarketplace.com
CLICK ON VENDOR
REGISTRATION AND FOLLOW
THE INSTRUCTIONS.**

eMarylandMarketPlace (410) 767-1492.

NOTE: There is no fee to register.



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

3 of 31

GENERAL MATERIAL REQUIREMENTS

CONVICT PRODUCED MATERIALS

Section 1019 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) clarifies that materials produced by convict labor after July 1, 1991 may not be used for Federal-aid highway construction projects unless produced at a prison facility producing convict made materials for Federal-aid construction projects prior to July 1, 1987.

CONTRACT PROVISION BUY AMERICA

This section only applies to projects partially or totally financed with Federal funds. The Contractor shall comply with Section 165 of the Surface Transportation Assistance Act of 1982 as amended by Section 1041(a) and 1048(a) of the Intermodal Surface Transportation Efficiency Act of 1991 with regard to the furnishing and coating of iron and steel products.

The Contract, if awarded, will be awarded to the responsive and responsible bidder who submits the lowest total bid for the Contract based on furnishing Domestic Products unless such bid exceeds the lowest total bid based on furnishing Foreign Products by more than twenty five percent (25%). Foreign Products will not be permitted to be used as a substitution for Domestic ones after the bid has been awarded.

Furnish steel or iron construction materials, including coating, for permanently incorporated work according to 23 CFR 635.410 and as follows:

- (a) All manufacturing processes of steel or iron materials in a product, including coating; and any subsequent process that alters the steel or iron material's physical form or shape, changes its chemical composition, or the final finish; are to occur within the United States (One of the 50 States, the District of Columbia, Puerto Rico, or in territories and possessions of the U.S.). Manufacturing begins with the initial melting and mixing, and continues through the coating stage. The processes include rolling, extruding, machining, bending, grinding, drilling, welding, and coating. The action of applying a coating to steel or iron is deemed a manufacturing process. Coating includes epoxy coating, galvanizing, aluminizing, painting, and any other coating that protects or enhances the value of steel or iron. Any process from the original reduction from ore to the finished product constitutes a manufacturing process for iron.
- (b) The following are considered to be steel manufacturing processes:



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

4 of 31

- (1) Production of steel by any of the following processes:
 - (a) Open hearth furnace.
 - (b) Basic oxygen.
 - (c) Electric furnace.
 - (d) Direct reduction.
- (2) Rolling, heat treating, and any other similar processing.
- (3) Fabrication of the products:
 - (a) Spinning wire into cable or strand.
 - (b) Corrugating and rolling into culverts.
 - (c) Shop fabrication.
- (d) The manufacturing process for a steel/iron product is considered complete when the product is ready for use as an item (e.g., fencing, posts, girders, pipe, manhole cover, etc.) or could be incorporated as a component of a more complex product through a further manufacturing process (e.g., prestressed concrete girders, reinforced concrete pipe, traffic control devices, bearing pads, etc.). A product containing both steel and/or iron components, may be assembled outside the United States and meet Buy America requirements if the constituent steel and iron components (in excess of the minimal amounts permitted) were manufactured domestically and are not modified at the assembly location prior to final assembly.
- (e) If domestically produced steel billets or iron ingots are exported outside of the U.S., as defined above, for any manufacturing process then the resulting product does not conform to the Buy America requirements. Additionally, products manufactured domestically from foreign source steel billets or iron ingots do not conform to the Buy America requirements because the initial melting and mixing of alloys to create the material occurred in a foreign country.
- (f) Due to a nationwide waiver, Buy America does not apply to raw materials (iron ore and alloys), scrap (recycled steel or iron), and pig iron or processed, pelletized, and reduced iron ore.
- (g) For the Buy America provisions to apply, the steel or iron product must be permanently incorporated into the project. If an item is rendered as a “donated material” in accordance with 23 U.S.C. 323 – Donations and Credits, it will have to comply with Buy America requirements. While States and local governments may receive a credit for donated material, this material must generally comply with Buy America requirements. Buy America does not apply to temporary steel items, e.g., temporary sheet piling, temporary



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

5 of 31

bridges, steel scaffolding and falsework. Further, Buy America does not apply to materials which remain in place at the contractor convenience.

- (h) Certifications which document that steel and iron have been manufactured and that coatings for iron or steel have been applied in the United States shall be provided to the Contractor by the manufacturer. The Contractor shall provide the required certifications to the Engineer prior to such items being incorporated into the permanent work. Certifications shall extend to materials utilized in manufactured and fabricated products purchased by the Contractor.
- (i) Products manufactured of foreign steel or iron materials may be used, provided the cost of such products as they are delivered to the project does not exceed 0.1% of the total contract amount, or \$2,500, whichever is greater. If a supplier or fabricator wishes to use a partial fabrication process where domestic and foreign source components are assembled at a domestic location, the “as delivered cost” of the foreign components should include any transportation, assembly and testing costs required to install them in the final product.



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

**ALTERNATE BID
USING FOREIGN PRODUCTS**

When a bidder elects to utilize Foreign Products on one or more items, the following summation indicating the Total Bid using Foreign Products must be completed in addition to the individual item bid tabulations.

The following instructions are given to the bidder in completing the Total Bid summation using Foreign Products:

- 1 - The "Bid Total" for the initial bid using Domestic Products shall be shown on line (1).
- 2 - The subtotal for Item Amounts using Domestic Products shall be shown on line (2), for those items which the Contractor elects to use Foreign Products.
- 3 - The subtotal for Item Amounts using Foreign Products shall be shown on line (3).
- 4 - The total Bid, utilizing Foreign Products shall be shown on line (4). The value is obtained by subtracting subtotal (2) from the Total Bid (1) and then adding subtotal (3).

Bid Total for Bid 1 using Domestic items Line (1) _____

Total of Domestic Items Line (2) - _____

Total of Foreign Items Line (3) + _____

Bid Total using Foreign Items Line (4) _____

ALTERNATE BID - USING FOREIGN PRODUCTS
BIDDER'S INSTRUCTIONS

When the bidder elects to submit a bid for one or more items using Foreign Products, the following form must be used. For each item that Foreign Products are contemplated, the appropriate "Item Numbers", "Approximate Quantities", "Description of Items", "Unit Price or Lump Sum Price", "Item Amount Domestic" and "Item Amount Foreign" shall be tabulated below as specified in the initial bid. The bidder shall indicate the unit price in dollars and cents and show the total cost of the item for each item that utilizes Foreign Products. When all items utilizing Foreign Products have been listed, the bidder shall indicate on Page 4 of 20 the subtotals of the Item Amounts for Domestic Products in Line (2) and for Foreign Products in Line (3).

Item Nos.	Approximate Quantities	Description of Items	Unit Price or Lump Sum Dollars.Cts.	Items Amount Domestic Dollars.Cts.	Items Amount Foreign Dollars.Cts.

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

The foregoing prices are to include and cover the furnishing of all materials and labor requisite and proper and the providing of all necessary machinery, tools, apparatus and means for performing the work and the doing of all the above-mentioned work as set forth, described and shown in the Plans, Specifications and other Contract Documents.

NOTE: Each and Every Person Bidding and Named above, must sign here. In case of Firms, give the first and last Name of Each Member, in full, with residence.

In case a Bid shall be submitted by or in behalf of any Corporation, it must be signed in the Name of such Corporation, by some Authorized Officer or Agent thereof, who shall also subscribe his Name and Office. If practicable, the Seal of the Corporation shall be affixed.

I hereby acknowledge receipt of the following checked Addendum(s) of the Proposal, Duplicate Proposal and/or Plans.

Addendum Numbers 1 2 3 4 5 6 7 8 9 10

I understand that Failure to confirm the receipt of Addendum(s) may be cause for rejection of Bids.

WITNESS _____ (SIGNED) _____
(TITLE) _____
(ADDRESS) _____

WITNESS _____ (SIGNED) _____
(TITLE) _____
(ADDRESS) _____

WITNESS _____ (SIGNED) _____
(TITLE) _____
(ADDRESS) _____



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

BID/PROPOSAL AFFIDAVIT

A. AUTHORIZED REPRESENTATIVE AND AFFIANT

I HEREBY AFFIRM THAT:

I am the (title) _____ and the duly authorized representative of (business) _____ and that I possess the legal authority to make this Affidavit on behalf of myself and the business for which I am acting.

B. CERTIFICATION REGARDING COMMERCIAL NONDISCRIMINATION

The undersigned bidder or offeror hereby certifies and agrees that the following information is correct:

In preparing its bid on this project, the bidder or offeror has considered all proposals submitted from qualified, potential subcontractors and suppliers, and has not engaged in “discrimination” as defined in §19-103 of the State Finance and Procurement Article of the Annotated Code of Maryland. “Discrimination” means any disadvantage, difference, distinction, or preference in the solicitation, selection, hiring, or commercial treatment of a vendor, subcontractor, or commercial customer on the basis of race, color, religion, ancestry, or national origin, sex, age, marital status, sexual orientation, or on the basis of disability or any otherwise unlawful use of characteristics regarding the vendors, supplier’s or commercial customer’s employees or owners. “Discrimination” also includes retaliating against any person or other entity for reporting any incident of “discrimination”. Without limiting any other provision of the solicitation on this project, it is understood that, if the certification is false, such false certification constitutes grounds for the State to reject the bid submitted by the bidder or offeror on this project, and terminate any contract awarded based on the bid. As part of its bid or proposal, the bidder or offeror herewith submits a list of all instances within the past 4 years where there has been a final adjudicated determination in a legal or administrative proceeding in the state of Maryland that the bidder or offeror discriminated against subcontractors, vendors, suppliers, or commercial customers, and a description of the status or resolution of that determination, including any remedial action taken. Bidder or Offeror agrees to comply in all respects with the State’s Commercial Nondiscrimination Policy as described under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland.



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C. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business (as is defined in Section 16-101(b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities, including obtaining or performing contracts with public bodies, has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, §6-220, Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other state or federal law, except as follows (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

D. AFFIRMATION REGARDING OTHER CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies, has:

1. Been convicted under state or federal statute of:
 - (a) a criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract; or
 - (b) fraud, embezzlement, theft, forgery, falsification or destruction of records, or receiving stolen property;
2. Been convicted of any criminal violation of a state or federal antitrust statute;
3. Been convicted under the provisions of Title 18 of the United States Code for violation of the Racketeer Influenced and Corrupt Organization Act, 18 U.S.C. §1961, et seq., or the Mail



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Fraud Act, 18 U.S.C. §1341, et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

4. Been convicted of a violation of the State Minority Business Enterprise Law, Section 14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland;

5. Been convicted of a violation of the Section 11-205.1 of the State Finance and Procurement Article of the Annotated Code of Maryland;

6. Been convicted of conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any law or statute described in subsection (1) through (5) above;

7. Been found civilly liable under a state or federal antitrust statute for acts or omissions in connection with the submission of bids or proposals for a public or private contract;

8. Been found in a final adjudicated decision to have violated the Commercial Nondiscrimination Policy under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland with regard to a public or private contract; or

9. Admitted in writing or under oath, during the course of an official investigation or other proceedings, acts or omissions that would constitute grounds for conviction or liability under any law or statute described in Section B – C and subsections (1) through (8) above, except as follows (indicate reasons why the affirmations cannot be given, and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of the person(s) involved and their current positions and responsibilities with the business, and the status of any debarment):

E. AFFIRMATION REGARDING DEBARMENT

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business’s contracting activities, including obtaining or performing contracts with public bodies, has ever been suspended or debarred (including being issued a limited denial of participation) by any public entity, except as follows (list each debarment or suspension providing the dates of the suspension or debarment, the name of the public entity and the status



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of the proceedings, the name(s) of the person(s) involved and their current positions and responsibilities with the business, the grounds of the debarment or suspension, and the details of each person's involvement in any activity that formed the grounds of the debarment or suspension): _____

F. AFFIRMATION REGARDING DEBARMENT OF RELATED ENTITIES

I FURTHER AFFIRM THAT:

1. The business was not established and it does not operate in a manner designed to evade the application of or defeat the purpose of debarment pursuant to Sections 16-101, et seq., of the State Finance and Procurement Article of the Annotated Code of Maryland; and

2. The business is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business, except as follows (you must indicate the reasons why the affirmations cannot be given without qualification):

G. SUB-CONTRACT AFFIRMATION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, has knowingly entered into a contract with a public body under which a person debarred or suspended under Title 16 of the State Finance and Procurement Article of the Annotated Code of Maryland will provide, directly or indirectly, supplies, services, architectural services, construction related services, leases of real property, or construction.

H. AFFIRMATION REGARDING COLLUSION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business has:



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1. Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;
2. In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the bidder or Offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

I. FINANCIAL DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, the provisions of Section 13-221 of the State Finance and Procurement Article of the Annotated Code of Maryland, which require that every business that enters into contracts, leases, or other agreements with the State of Maryland or its agencies during a calendar year under which the business is to receive in the aggregate \$100,000 or more shall, within 30 days of the time when the aggregate value of the contracts, leases, or other agreements reaches \$100,000, file with the Secretary of State of Maryland certain specified information to include disclosure of beneficial ownership of the business.

J. POLITICAL CONTRIBUTION DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, Election Law Article, §§14-101—14-108, Annotated Code of Maryland, which requires that every person that enters into contracts, leases, or other agreements with the State of Maryland, including its agencies or a political subdivision of the State, during a calendar year in which the person receives in the aggregate \$100,000 or more shall file with the State Board of Elections a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election.

K. DRUG AND ALCOHOL FREE WORKPLACE

(Applicable to all contracts unless the contract is for a law enforcement agency and the agency head or the agency head's designee has determined that application of COMAR 21.11.08 and this certification would be inappropriate in connection with the law enforcement agency's undercover operations.)



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I CERTIFY THAT:

1. Terms defined in COMAR 21.11.08 shall have the same meanings when used in this certification.
2. By submission of its bid or offer, the business, if other than an individual, certifies and agrees that, with respect to its employees to be employed under a contract resulting from this solicitation, the business shall:
 - (a) Maintain a workplace free of drug and alcohol abuse during the term of the contract;
 - (b) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of drugs, and the abuse of drugs or alcohol is prohibited in the business' workplace and specifying the actions that will be taken against employees for violation of these prohibitions;
 - (c) Prohibit its employees from working under the influence of drugs or alcohol;
 - (d) Not hire or assign to work on the contract anyone whom the business knows, or in the exercise of due diligence should know, currently abuses drugs or alcohol and is not actively engaged in a bona fide drug or alcohol abuse assistance or rehabilitation program;
 - (e) Promptly inform the appropriate law enforcement agency of every drug-related crime that occurs in its workplace if the business has observed the violation or otherwise has reliable information that a violation has occurred;
 - (f) Establish drug and alcohol abuse awareness programs to inform its employees about:
 - (i) The dangers of drug and alcohol abuse in the workplace;
 - (ii) The business' policy of maintaining a drug and alcohol free workplace;
 - (iii) Any available drug and alcohol counseling, rehabilitation, and employee assistance programs; and
 - (iv) The penalties that may be imposed upon employees who abuse drugs and alcohol in the workplace;
 - (g) Provide all employees engaged in the performance of the contract with a copy of the statement required by §K(2)(b), above;
 - (h) Notify its employees in the statement required by §K(2)(b), above, that as a condition of continued employment on the contract, the employee shall:



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- (i) Abide by the terms of the statement; and
 - (ii) Notify the employer of any criminal drug or alcohol abuse conviction for an offense occurring in the workplace not later than 5 days after a conviction;
- (i) Notify the procurement officer within 10 days after receiving notice under §K(2)(h)(ii), above, or otherwise receiving actual notice of a conviction;
- (j) Within 30 days after receiving notice under §K(2)(h)(ii), above, or otherwise receiving actual notice of a conviction, impose either of the following sanctions or remedial measures on any employee who is convicted of a drug or alcohol abuse offense occurring in the workplace:
 - (i) Take appropriate personnel action against an employee, up to and including termination; or
 - (ii) Require an employee to satisfactorily participate in a bona fide drug or alcohol abuse assistance or rehabilitation program; and
- (k) Make a good faith effort to maintain a drug and alcohol free workplace through implementation of §K(2)(a)—(j), above.
- 3. If the business is an individual, the individual shall certify and agree as set forth in §K(4), below, that the individual shall not engage in the unlawful manufacture, distribution, dispensing, possession, or use of drugs or the abuse of drugs or alcohol in the performance of the contract.
- 4. I acknowledge and agree that:
 - (a) The award of the contract is conditional upon compliance with COMAR 21.11.08 and this certification;
 - (b) The violation of the provisions of COMAR 21.11.08 or this certification shall be cause to suspend payments under, or terminate the contract for default under COMAR 21.07.01.11 or 21.07.03.15, as applicable; and
 - (c) The violation of the provisions of COMAR 21.11.08 or this certification in connection with the contract may, in the exercise of the discretion of the Board of Public Works, result in suspension and debarment of the business under COMAR 21.08.03.



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L. CERTIFICATION OF CORPORATION REGISTRATION AND TAX PAYMENT

I FURTHER AFFIRM THAT:

1 The business named above is a (domestic ___) (foreign ___) corporation registered in accordance with the Corporations and Associations Article, Annotated Code of Maryland, and that it is in good standing and has filed all of its annual reports, together with filing fees, with the Maryland State Department of Assessments and Taxation, and that the name and address of its resident agent filed with the State Department of Assessments and Taxation is (IF NOT APPLICABLE, SO STATE):

Name: _____
Address: _____

2. Except as validly contested, the business has paid, or has arranged for payment of, all taxes due the State of Maryland and has filed all required returns and reports with the Comptroller of the Treasury, the State Department of Assessments and Taxation, and the Department of Labor, Licensing, and Regulation, as applicable, and will have paid all withholding taxes due the State of Maryland prior to final settlement.

M. CONTINGENT FEES

I FURTHER AFFIRM THAT:

The business has not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency working for the business, to solicit or secure the Contract, and that the business has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency, any fee or any other consideration contingent on the making of the Contract.

N. REPEALED



Maryland Department of Transportation
State Highway Administration

F.A.P. NO. HP 1571 (001)
SHA CONTRACT NO. BC318-013-815
BALTIMORE CITY CONTRACT NO. TR07309

CONTRACT PROVISIONS
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O. ACKNOWLEDGEMENT

I ACKNOWLEDGE THAT this Affidavit is to be furnished to the Procurement Officer and may be distributed to units of: (1) the State of Maryland; (2) counties or other subdivisions of the State of Maryland; (3) other states; and (4) the federal government. I further acknowledge that this Affidavit is subject to applicable laws of the United States and the State of Maryland, both criminal and civil, and that nothing in this Affidavit or any contract resulting from the submission of this bid or proposal shall be construed to supersede, amend, modify or waive, on behalf of the State of Maryland, or any unit of the State of Maryland having jurisdiction, the exercise of any statutory right or remedy conferred by the Constitution and the laws of Maryland with respect to any misrepresentation made or any violation of the obligations, terms and covenants undertaken by the above business with respect to (1) this Affidavit, (2) the contract, and (3) other Affidavits comprising part of the contract.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

Date: _____

By: _____
(Authorized Representative and Affiant)



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COMPREHENSIVE SIGNATURE PAGE 1 OF 2

THE BIDDER IS HEREBY NOTIFIED THAT THIS DOCUMENT SHALL BE SIGNED IN INK IN ORDER FOR THE BID TO BE ACCEPTED. BY SIGNING, THE BIDDER CERTIFIES THAT HE/SHE WILL COMPLY IN EVERY ASPECT WITH THESE SPECIFICATIONS.

FURTHER, I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT (PARAGRAPHS A-N) ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

This bid form shall be filled out legibly in ink or typed. The bid, if submitted by an individual, shall be signed by an individual; if submitted by a partnership, shall be signed by such member or members of the partnership as have authority to bind the partnership; if submitted by a corporation the same shall be signed by the President and attested by the Secretary or an Assistant Secretary. If not signed by the President as aforesaid, there must be attached a copy of that portion of the By-Laws, or a copy of a Board resolution, duly certified by the Secretary, showing the authority of the person so signing on behalf of the corporation. In lieu thereof, the corporation may file such evidence with the Administration, duly certified by the Secretary, together with a list of the names of those officers having authority to execute documents on behalf of the corporation, duly certified by the Secretary, which listing shall remain in full force and effect until such time as the Administration is advised in writing to the contrary. In any case where a bid is signed by an Attorney in Fact the same must be accompanied by a copy of the appointing document, duly certified.

IF AN INDIVIDUAL:

NAME: _____

_____ Street and/or P.O. Box

_____ City State Zip Code Fed ID or SSN

_____ (SEAL) _____
Signature Date

_____ Print Signature

WITNESS: _____

Signature

_____ Print Signature



Maryland Department of Transportation
State Highway Administration

F.A.P. NO. HP 1571 (001)
SHA CONTRACT NO. BC318-013-815
BALTIMORE CITY CONTRACT NO. TR07309

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COMPREHENSIVE SIGNATURE PAGE 2 OF 2

IF A PARTNERSHIP:

NAME OF PARTNERSHIP: _____

_____ Street and/or P.O. Box

_____ City State Zip Code Fed ID or SSN

BY: _____ (SEAL) _____

Member Signature Date

Print Signature

TITLE: _____ WITNESS: _____

Signature

Print Signature

IF A CORPORATION:

NAME OF CORPORATION: _____

_____ Street and/or P.O. Box

_____ City State Zip Code Fed ID or SSN

STATE OF INCORPORATION: _____

BY: _____ (SEAL) _____

Signature Date

Print Signature

TITLE: _____ WITNESS: _____

Secretary's Signature

Print Signature



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MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
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This affidavit must be included with the bid/ proposal. If the bidder/offeror fails to accurately complete and submit this affidavit as required, the bid shall be deemed not responsive or the proposal shall be deemed not susceptible of being selected for award.

In connection with the bid/proposal submitted in response to Solicitation No. _____, I affirm the following:

1. DBE Participation (PLEASE CHECK ONLY ONE)

I have met the overall certified Disadvantaged Business Enterprise (DBE) participation goal of _____ percent (_____ %). I agree that this percentage of the total dollar amount of the Contract for the DBE goal will be performed by certified DBE firms as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

OR

I conclude that I am unable to achieve the DBE participation goal. I hereby request a waiver, in whole or in part, of the goal. Within 10 business days of receiving notice that our firm is the apparent awardee or as requested by the Procurement Officer, I will submit a written waiver request and all required documentation in accordance with COMAR 21.11.03.11. For a partial waiver request, I agree that certified DBE firms will be used to accomplish the percentages of the total dollar amount of the Contract as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

2. Additional DBE Documentation

I understand that if I am notified that I am the apparent awardee or as requested by the Procurement Officer, I must submit the following documentation within 10 business days of receiving such notice: (a) Outreach Efforts Compliance Statement (MDOT DBE Form C - Federally-Funded Contracts); (b) Subcontractor Project Participation Statement (MDOT DBE Form D - Federally-Funded Contracts); (c) DBE Waiver Request documentation per COMAR 21.11.03.11 (if waiver was requested); and (d) Any other documentation required by the Procurement Officer to ascertain bidder's responsibility/ offeror's susceptibility of being selected for award in connection with the certified DBE participation goal.



Maryland Department of Transportation
State Highway Administration

F.A.P. NO. HP 1571 (001)
SHA CONTRACT NO. BC318-013-815
BALTIMORE CITY CONTRACT NO. TR07309

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MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
PAGE 2 OF 2

I acknowledge that if I fail to return each completed document (in 2 (a) through (d)) within the required time, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award or not susceptible of being selected for award.

3. Information Provided to DBE firms

In the solicitation of subcontract quotations or offers, DBE firms were provided not less than the same information and amount of time to respond as were non-DBE firms.

4. Products and Services Provided by DBE firms

I hereby affirm that the DBEs are only providing those products and services for which they are MDOT certified.

I solemnly affirm under the penalties of perjury that the information in this affidavit is true to the best of my knowledge, information and belief.

Company Name

Signature of Representative

Address

Printed Name and Title

City, State and Zip Code

Date



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

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***** STOP *****

FORM INSTRUCTIONS
PLEASE READ BEFORE COMPLETING THIS FORM

1. Please refer to the Maryland Department of Transportation (MDOT) DBE Directory at www.mdot.state.md.us to determine if a firm is certified for the appropriate North American Industry Classification System (“NAICS”) Code **and** the product/services description (specific product that a firm is certified to provide or specific areas of work that a firm is certified to perform). For more general information about NAICS, please visit www.naics.com. Only those specific products and/or services for which a firm is certified in the MDOT Directory can be used for purposes of achieving the DBE participation goal.
2. In order to be counted for purposes of achieving the DBE participation goal, the firm must be certified for that specific NAICS (“DBE” for Federally-funded projects designation after NAICS Code). **WARNING:** If the firm’s NAICS Code is in **graduated status**, such services/products **will not be counted** for purposes of achieving the DBE participation goals. Graduated status is clearly identified in the MDOT Directory (such graduated codes are designated with the word graduated after the appropriate NAICS Code).
3. Examining the NAICS Code is the **first step** in determining whether a DBE firm is certified and eligible to receive DBE participation credit for the specific products/services to be supplied or performed under the contract. The **second step** is to determine whether a firm’s Products/Services Description in the DBE Directory includes the products to be supplied and/or services to be performed that are being used to achieve the DBE participation goal.
4. If you have any questions as to whether a firm is MDOT DBE certified, or if it is certified to perform specific services or provide specific products, please call MDOT’s Office of Minority Business Enterprise at 1-800-544-6056 or send an email to mbe@mdot.state.md.us.



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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
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5. The Contractor's subcontractors are considered second-tier subcontractors. Third-tier contracting used to meet a DBE goal is to be considered the exception and not the rule. The following two conditions must be met before MDOT, its Modal Administrations and the Maryland Transportation Authority may approve a third-tier contracting agreement: (a) the bidder/offeror must request in writing approval of each third-tier contract arrangement, and (b) the request must contain specifics as to why a third-tier contracting arrangement should be approved. These documents must be submitted with the bid/proposal in Part 2 of this DBE Participation Schedule.

6. For each DBE firm that is being used as supplier/wholesaler/regular dealer/broker/manufacturer, please follow these instructions for calculating the **amount of the subcontract for purposes of achieving the DBE participation goal:**
 - A. Is the firm certified as a broker of the products/supplies? If the answer is YES, please continue to Item C. If the answer is NO, please continue to Item B.

 - B. Is the firm certified as a supplier, wholesaler, regular dealer, or manufacturer of such products/supplies? If the answer is YES, continue to Item D. If the answer is NO, continue to Item C only if the DBE firm is certified to perform trucking/hauling services under NAICS Codes 484110, 484121, 484122, 484210, 484220 and 484230. If the answer is NO and the firm is not certified under these NAICS Codes, then no DBE participation credit will be given for the supply of these products.

 - C. For purposes of achieving the DBE participation goal, you may count only the amount of any reasonable fee that the DBE firm will receive for the provision of such products/supplies - not the total subcontract amount or the value (or a percentage thereof) of such products and/or supplies. For Column 3 of the DBE Participation Schedule, please divide the amount of any reasonable fee that the DBE firm will receive for the provision of such products/services by the total Contract value and insert the percentage in Line 3.1.

 - D. Is the firm certified as a manufacturer (refer to the firm's NAICS Code and specific description of products/services) of the products/supplies to be provided? If the answer is NO please continue to Item E. If the answer is YES, for purposes of achieving the DBE participation goal, you may count the total amount of the subcontract. For Column 3 of the DBE Participation Schedule, please divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.



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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
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E. Is the firm certified as a supplier, wholesaler and/or regular dealer? If the answer is YES and the DBE firm is furnishing and installing the materials and is certified to perform these services, please divide the total subcontract amount (including full value of supplies) by the total Contract value and insert the percentage in Line 3.1. If the answer is YES and the DBE firm is only being used as a supplier, wholesaler and/or regular dealer or is not certified to install the supplies/materials, for purposes of achieving the DBE participation goal, you may only count sixty percent (60%) of the value of the subcontract for these supplies/products (60% Rule). To apply the 60% Rule, first divide the amount of the subcontract for these supplies/products only (not installation) by the total Contract value. Then, multiply the result by sixty percent (60%) and insert the percentage in Line 3.2.

7. For each DBE firm that **is not** being used as a supplier/wholesaler/regular dealer/broker/manufacturer, to calculate the **amount of the subcontract for purposes of achieving the DBE participation goal**, divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.

Example: \$ 2,500 (Total Subcontract Amount) ÷ \$10,000 (Total Contract Value) x 100 = 25%

8. Please note that for USDOT-funded projects, a DBE prime may count towards its DBE participation goal work performed by its own forces. Include information about the DBE prime in Part 2.

9. **WARNING:** The percentage of DBE participation, computed using the dollar amounts in Column 3 for all of the DBE firms listed in Part 2, **MUST** at least equal the DBE participation goal as set forth in MDOT DBE Form A – Federally-Funded Contracts for this solicitation. If the bidder/offeror is unable to achieve the DBE participation goals, then the bidder/offeror must request a waiver in Form A or the bid will be deemed not responsive, or the proposal not susceptible of being selected for award. You may wish to use the Goal Worksheet shown below to assist you in calculating the percentage and confirming that you have met the applicable DBE participation goal.



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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
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GOAL WORKSHEET	
Total DBE Firm Participation (Add percentages in Column 3 for all DBE firms listed in DBE Participation Schedule)	(A) _____%
The percentage amount in Box A above should be equal to the percentage amount in Box E below.	
Add <i>Countable</i> Subcontract Amounts (see 6 through 8 of Instructions) for all DBE firms listed in DBE Participation Schedule, and insert in Box B	(B) \$ _____
Insert the Total Contract Amount in Box C	(C) \$ _____
Divide Box B by Box C and Insert in Box D	(D) = _____
Multiply Box D by 100 and insert in Box E	(E) = _____%



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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 2 – DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

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Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED DBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE DBE PARTICIPATION GOAL.

COLUMN 1	COLUMN 2	COLUMN 3
		Unless the bidder/offeror requested a waiver in MDOT DBE Form A – Federally Funded Contracts for this solicitation, the cumulative DBE participation for all DBE firms listed herein must equal at least the DBE participation goal set forth in Form A.
NAME OF DBE SUBCONTRACTOR AND TIER	CERTIFICATION NO. AND DBE CLASSIFICATION	FOR PURPOSES OF ACHIEVING THE DBE PARTICIPATION GOAL, refer to sections 6, 7 and 8 in Part 1 - Instructions. State the percentage amount of the products/services in Line 3.1, except for those products or services where the DBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the DBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule.
<input type="checkbox"/> Please check if DBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 5 of Part 1 - Instructions	Certification Number: <hr/> (If dually certified, check only one box.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American- Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other DBE Classification <hr/>	3.1. TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE- EXCLUDING PRODUCTS/SERVICES FROM SUPPLIERS, WHOLESALERS OR REGULAR DEALERS). _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER) (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS). _____% Total percentage of Supplies/Products x _____ 60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

Please check if Continuation Sheets are attached.



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
CONTINUATION SHEET

PAGE __ OF __

Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED DBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE DBE PARTICIPATION GOAL.

COLUMN 1	COLUMN 2	COLUMN 3
		Unless the bidder/offeror requested a waiver in MDOT DBE Form A – Federally Funded Contracts for this solicitation, the cumulative DBE participation for all DBE firms listed herein must equal at least the DBE participation goal set forth in Form A.
NAME OF DBE SUBCONTRACTOR AND TIER	CERTIFICATION NO. AND DBE CLASSIFICATION	FOR PURPOSES OF ACHIEVING THE DBE PARTICIPATION GOAL, refer to sections 6, 7 and 8 in Part 1 - Instructions. State the percentage amount of the products/services in Line 3.1, except for those products or services where the DBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the DBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule.
<input type="checkbox"/> Please check if DBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 5 of Part 1 - Instructions	Certification Number: <hr/> (If dually certified, check only one box.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American-Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other DBE Classification <hr/>	3.1. TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE- EXCLUDING PRODUCTS/SERVICES FROM SUPPLIERS, WHOLESALERS OR REGULAR DEALERS). _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER) (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS). _____% Total percentage of Supplies/Products x _____ 60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

Please check if Continuation Sheets are attached.



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 3 – CERTIFICATION FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL AS DIRECTED IN THE SOLICITATION.

I hereby affirm that I have reviewed the Products and Services Description (specific product that a firm is certified to provide or areas of work that a firm is certified to perform) set forth in the MDOT DBE Directory for each of the DBE firms listed in Part 2 of this DBE Form B for purposes of achieving the DBE participation goal that was identified in the DBE Form A that I submitted with this solicitation, and that the DBE firms listed are only performing those products/services/areas of work for which they are certified. I also hereby affirm that I have read and understand the form instructions set forth in Part 1 of this DBE Form B.

The undersigned Prime Contractor hereby certifies and agrees that it has fully complied with the State Minority Business Enterprise law, State Finance and Procurement Article §14-308(a)(2), Annotated Code of Maryland which provides that, except as otherwise provided by law, a contractor may not identify a certified minority business enterprise in a bid or proposal and:

- (1) fail to request, receive, or otherwise obtain authorization from the certified minority business enterprise to identify the certified minority business enterprise in its bid or proposal;
- (2) fail to notify the certified minority business enterprise before execution of the contract of its inclusion of the bid or proposal;
- (3) fail to use the certified minority business enterprise in the performance of the contract; or
- (4) pay the certified minority business enterprise solely for the use of its name in the bid or proposal.

I solemnly affirm under the penalties of perjury that the contents of Parts 2 and 3 of MDOT DBE Form B are true to the best of my knowledge, information and belief.

Company Name

Signature of Representative

Address

Printed Name and Title

City, State and Zip Code

Date



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

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INFORMATION REQUIRED TO BE SUBMITTED FOR FEDERALLY ASSISTED CONTRACTS:

(a) Each bidder shall provide the following information:

NAME OF FIRM: _____

_____ Street and/or P.O. Box

_____ City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____ <\$500,000 _____ \$500,000-1,000,000
_____ \$1,000,000-3,000,000 _____ \$3,000,000-5,000,000 _____ \$5,000,000-10,000,000
_____ >\$10,000,000

(b) Each bidder shall provide the following information for each firm quoting or considered as subcontractors and/or suppliers:

NAME OF FIRM: _____

_____ Street and/or P.O. Box

_____ City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____ <\$500,000 _____ \$500,000-1,000,000
_____ \$1,000,000-3,000,000 _____ \$3,000,000-5,000,000 _____ \$5,000,000-10,000,000
_____ > \$10,000,000

NAME OF FIRM: _____

_____ Street and/or P.O. Box

_____ City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____ <\$500,000 _____ \$500,000-1,000,000
_____ \$1,000,000-3,000,000 _____ \$3,000,000-5,000,000 _____ \$5,000,000-10,000,000
_____ > \$10,000,000



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

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NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

Submit additional copies of this page as page 26A of 28, 26B of 28, etc. as necessary, and place them as the last pages in the Invitation for Bids. Place an "X" for "NO" on the last copy. Any additional Copies: ____ NO ____ YES



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

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EXTRA WORK, CONTRACT TIME, BONDING, LIQUIDATED DAMAGES, AND PROPOSAL GUARANTY

EXTRA WORK. It is further proposed to do all "Extra Work" which may be required to complete the work contemplated at unit prices or lump sum prices to be agreed upon in writing prior to starting such extra work, or if such prices or sums cannot be agreed upon, to perform such work on a Force Account basis as specified in TC-7.03.

CONTRACT TIME. To commence work as specified in the "Notice to Proceed" and to prosecute the work to complete the contract within/or before

1460(calendar date)

Any delay in awarding or the execution of this contract will not be considered as a basis for any monetary claim, however, an extension of time may be considered by the Administration, if warranted.

BONDING. When the Contractor's bid is \$100,000 or more, the Contractor shall furnish a Payment Bond and a Performance Bond in the full amount of the Contract Award as security for the construction and completion of the contract in conformance with the Plans, Standard Specifications, revisions thereto, General Provisions and Special Provisions.

To guarantee all of the work performed under this contract to be done in conformance with the Standard Specifications, revisions thereto, General Provisions and Special Provisions in a good workmanlike manner and to renew or repair any work which may be rejected due to defective materials or workmanship, prior to final completion and acceptance of the work, also we have the equipment, labor, supervision and financial capacity to perform this contract either with our organization or with Subcontractors.

LIQUIDATED DAMAGES. The Contractor is hereby advised that liquidated damages in the amount of

\$2,000 dollars per calendar day

will be assessed for unauthorized extensions beyond the contracted time of completion.



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — FEDERAL

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PROPOSAL GUARANTY. A bid security is not required on Contract Proposals under \$100,000.

A bid security totaling at least five percent (5%) of the bid amount will be required on contracts of \$100,000 or over.

Acceptable forms of security for bid guaranty shall be:

- (1) A bond in a form satisfactory to the State underwritten by a company licensed to issue bonds in this State;
- (2) A bank certified check, bank cashier's check, bank treasurer's check, or cash;
- (3) Pledge of security backed by the full faith and full credit of the United States government or bonds issued by the State of Maryland.

Enclosed herewith, find bid security based on at least five percent (5%) of the aggregate amount of the bid submitted, and made payable to the "State of Maryland". This bid security is a Proposal Guarantee (which is understood will be forfeited in the event the contract is not executed, if awarded to the signer of this affidavit).

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

A. BIDDER CERTIFICATION OF WORK CAPACITY AND PREQUALIFICATION CLASSIFICATIONS

We hold Certification No. _____ Expires: _____

We have the Work Capacity to perform this Contract as provided in the Standard Specifications and in accordance with the Rules, Regulations and Requirements of the Baltimore City Contractors Qualification Committee.

Our current Certificate of Prequalification includes Work Classifications covering Contract Items to a total of at least fifty percent (50%) of the Aggregate Amount Bid.

BIDDER

By: _____
Signature Title

Subscribe and sworn to before me this _____ day of _____ 200

(Notary Public)

My Commission Expires _____, 20_____.

Certification CM 32-34

**Certification With Regard To The Performance Of Previous Contracts Or Subcontracts
Clause And The Filing Of
Required Reports**

The Bidder _____, proposed subcontractor _____, hereby certifies that he has _____, has not _____, participated in a previous contract or subcontract subject to the Equal Opportunity Clause, as required by Executive Orders 10925, 11114, or 11246, and that he has _____, has not _____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

(Company)

By: _____

(Title)

Date: _____

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of \$10,000 or under are exempt.)

Currently; Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations. Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60.17 (b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

as Principal, and _____

as Surety, are hereby held and firmly bound unto the Mayor and City Council of Baltimore as Owner, in the amount of at least five Percent (5%) of the Total Bid submitted for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns. Signed this _____ day of _____, 20_____ .

The condition of the above obligation is such that WHEREAS the Principal has submitted to the Board of Estimates of the Mayor and City Council of Baltimore a certain Bid, attached hereto, and hereby made a part hereof to enter into a Contract, in writing, for City of Baltimore, Department of Transportation **F.A.P. NO. PENDING, SHA NO. PENDING, BALTIMORE CITY NO. TR 12317, CENTRAL AVENUE STREETScape AND HARBOR POINT CONNECTOR BRIDGE**

NOW, THEREFORE,

- (a) If said Bid shall be rejected or in the alternate.
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the form of Contract attached here to (properly completed in accordance with said Bid), and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith and shall in all other respects perform the Agreement created by the acceptance of said bid.

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event, exceed the penal amount of this obligation, as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their Hand and Seals, and such of them as are Corporation have caused their Corporate Seals to be hereto affixed and these presents to be signed by their proper Officers, the day and year first set forth above.

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING

SHA CONTRACT NO. PENDING

BALTIMORE CITY CONTRACT NO. TR12317

ATTEST:

PRINCIPAL

(SEAL)

ATTEST:

SURETY

(SEAL)

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

AGREEMENT

THIS AGREEMENT, made this _____ Day of _____

by and between _____

hereinafter called the "Contractor", and the Mayor and City Council of Baltimore, a Municipal Corporation, hereinafter called the "City".

WHEREAS, the Contract designated as for City of Baltimore, Department of Transportation **F.A.P. NO. PENDING, S.H.A. NO. PENDING, BALTIMORE CITY NO. TR12317, CENTRAL AVENUE STREETScape AND HARBOR POINT CONNECTOR BRIDGE** to be performed in strict accordance with the Contract Documents, which Standard Specifications, Plans and other Contract Documents are in all respects made a part hereof, has recently been awarded to the Contractor by the City, through the Agency of its Board of Estimates, at and for a sum equal to the aggregate cost of the work, labor, materials and supplies done or furnished at the prices and rates respectively named therefore in the Proposal attached hereto; and

WHEREAS, it was one of the conditions of said award that a formal Contract should be executed by and between the Contractor and the City evidencing the terms of said award.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH, That the Contractor doth hereby covenant and agree with the City that it will well and faithfully construct, and complete the said Work in accordance with each and every one of the conditions, covenants, stipulations, terms and provisions contained in the Contract Documents, at and for a sum equal to the aggregate cost of the work, labor, materials and supplies done or furnished at the prices and rates respectively named therefore in the Proposal attached hereto, and will well and faithfully comply with and conform to each and every obligation imposed upon it by the Contract Documents, or by the terms of said award. Time is of the essence of this Agreement.

And the City doth hereby covenant and agree with the Contractor that it will pay the Contractor, when due and payable under the terms of the Contract Documents and of said award, the above mentioned sum; and that it will well and faithfully comply with and perform each and every obligation imposed upon it by the Contract Documents or by the terms of said award.

In WITNESS WHEREOF, Said _____
has caused this Agreement to be signed in its name by its President/Vice President and its Corporate Seal to be hereunto and duly attached and the City has caused these presents to be signed by the Mayor of Baltimore City and the Corporate Seal of the City to be hereunto affixed, duly attested by the Custodian of the City Seal.

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F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

ATTEST:

SIGNATURE

SIGNATURE

PRINT NAME AND TITLE (SEAL)

ATTEST:

Mayor and City Council of Baltimore

Custodian of the City Seal

STEPHANIE RAWLINGS-BLAKE,
MAYOR

APPROVAL OF AGREEMENT
FOR
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. **TR 12317**

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

APPROVED:

Associate Solicitor

Director, Department of Transportation

APPROVED:

Chief, Department of Transportation
Transportation Engineering and Construction Division

BONDS

PERFORMANCE BOND

Principal	Business Address of Principal
Surety a Corporation of the State of and authorized to do business in the State of Maryland	Obligee Mayor and City Council of Baltimore

Sum of Bond (Equal to Contract Price)

SUM OF _____ Dollars

(\$ _____)

Contract Number and Identification City of Baltimore Department of Transportation Contract No. TR 12317 CENTRAL AVENUE STREETScape AND HARBOR POINT CONNECTOR BRIDGE	Date of Contract _____, 20__ Date Bond Executed _____, 20__
--	--

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL above named and SURETY above named, are held and firmly bound unto the OBLIGEE above named in the full and just sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL is entering into a certain Contract with the OBLIGEE described and dated, as shown above and attached hereto, and is required under the Provisions of the Public General Laws of Maryland to give a bond conditioned as hereinafter set forth.

NOW THEREFORE, if the PRINCIPAL shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by the OBLIGEE, with or without notice to the SURETY, and during the term or terms of any maintenance, repair, guaranty and warranty required under the Contract, and

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

PERFORMANCE BOND (Cont.)

shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the SURETY being hereby waived, and shall indemnify and save harmless the Mayor and City Council of Baltimore, its agents and employees against and from all costs, expenses, damages, injury or loss to which the said Mayor and City Council of Baltimore, its agents and employees, may be subjected by reason of any wrongdoing, misconduct, want of care or skill, negligence or default on the part of said PRINCIPAL, its agents or employees, or in any manner arising directly or indirectly from any and all causes whatsoever, in or about the execution or performance of the Contract, during the Original term of said Contract and/or any authorized extension or modification thereof and/or during the term or terms of any maintenance, repair, guaranty and warranty required under the Contract, then this obligation shall be null and void; otherwise to remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the OBLIGEE, or the successors or assigns of OBLIGEE.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several Seals on the date indicated above, the Name and corporation seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

ATTEST: as to principal

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

ATTEST: as to surety

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

AGENT (COMPANY): _____

AUTHORIZED BY: _____
NAME AND TITLE

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F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

PERFORMANCE BOND (Cont.)

APPROVED:

APPROVED:

Mayor of Baltimore City

Director, Department of Transportation

Comptroller

Chief, Department of Transportation
Transportation Engineering and Construction Division

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

APPROVED BY BOARD OF ESTIMATES:

Chief Solicitor

Clerk

Date

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

PAYMENT BOND

Principal	Business Address of Principal
Surety a Corporation of the State of and authorized to do business in the State of Maryland	Obligee Mayor and City Council of Baltimore

Sum of Bond (Equal to Contract Price)

SUM OF _____ Dollars

(\$ _____)

Contract Number and Identification City of Baltimore Department of Transportation Contract No. TR12317 CENTRAL AVENUE STREETScape AND HARBOR POINT CONNECTOR BRIDGE	Date of Contract _____, 20__ Date Bond Executed _____, 20__
---	--

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL above named and SURETY above named, are held and firmly bound unto the OBLIGEE above named in the full and just sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL is entering into a certain Contract with the OBLIGEE described and dated, as shown above and attached hereto, and is required under the Provisions of the Public General Laws of Maryland to give a bond conditioned as hereinafter set forth.

NOW THEREFORE, the condition of this obligation is such that if the PRINCIPAL shall promptly make payments to all persons supplying labor and/or material in the prosecution of the work provided for in said Contract and any and all duly authorized extensions and/or modifications of said contract that may hereafter be made, notice of such extensions and/or modifications to the SURETY being hereby waived, and any maintenance, repair, guaranty and warranty required under the Contract, then this obligation to be null and void; otherwise they remain in full force and effect.

PAYMENT BOND (Cont.)

A suit or action commenced hereunder shall comply with applicable Provisions of the Public General Laws of Maryland. No suit or action shall be commenced hereunder against the OBLIGEE, its successors or assigns, nor shall OBLIGEE be liable for any costs or expenses of such suit.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several Seals on the date indicated above, the Name and corporation seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

ATTEST: as to principal

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

ATTEST: as to surety

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

AGENT (COMPANY): _____

AUTHORIZED BY: _____
NAME AND TITLE

DRAFT - NOT FOR CONSTRUCTION

F.A.P. NO. PENDING
SHA CONTRACT NO. PENDING
BALTIMORE CITY CONTRACT NO. TR12317

PAYMENT BOND (Cont.)

APPROVED:

Mayor of Baltimore City

Comptroller

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

Chief Solicitor

APPROVED:

Director, Department of Transportation

Chief, Transportation Engineering and
Construction Division

APPROVED BY BOARD OF ESTIMATES:

Clerk Date