

August 1, 2012

Mr. Wazir Qadri
Baltimore City Department of Public Works
Bureau of Water and Wastewater-Utility Engineering Section
200 Abel Wolman Municipal Building, Room 305
200 N. Holliday Street
Baltimore, MD 21202

Subject: Harbor Point Site Development
Estimated Sewerage Flows

Dear Mr. Qadri:

Since our last February 3, 2012 letter to you regarding the Harbor Point Site Development, the developer has been working with the Department of Planning to get approval of a revised development program. We have accordingly revised the estimated sewerage flows from the proposed Harbor Point Site Development. We are requesting that the City re-run the hydraulic analyses using the revised sewerage flows.

The revised estimated average daily flow for the Harbor Point Development is 0.609 mgd. The estimated peak flow is 2.117 mgd.

Attached to this letter are the calculations for the estimated average and peak flows for the Harbor Point Development. Also attached is the site map.

If you have any question or comments, please feel free to contact me at 410-462-9303.

Sincerely,
RUMMEL, KLEPPER & KAHL, LLP

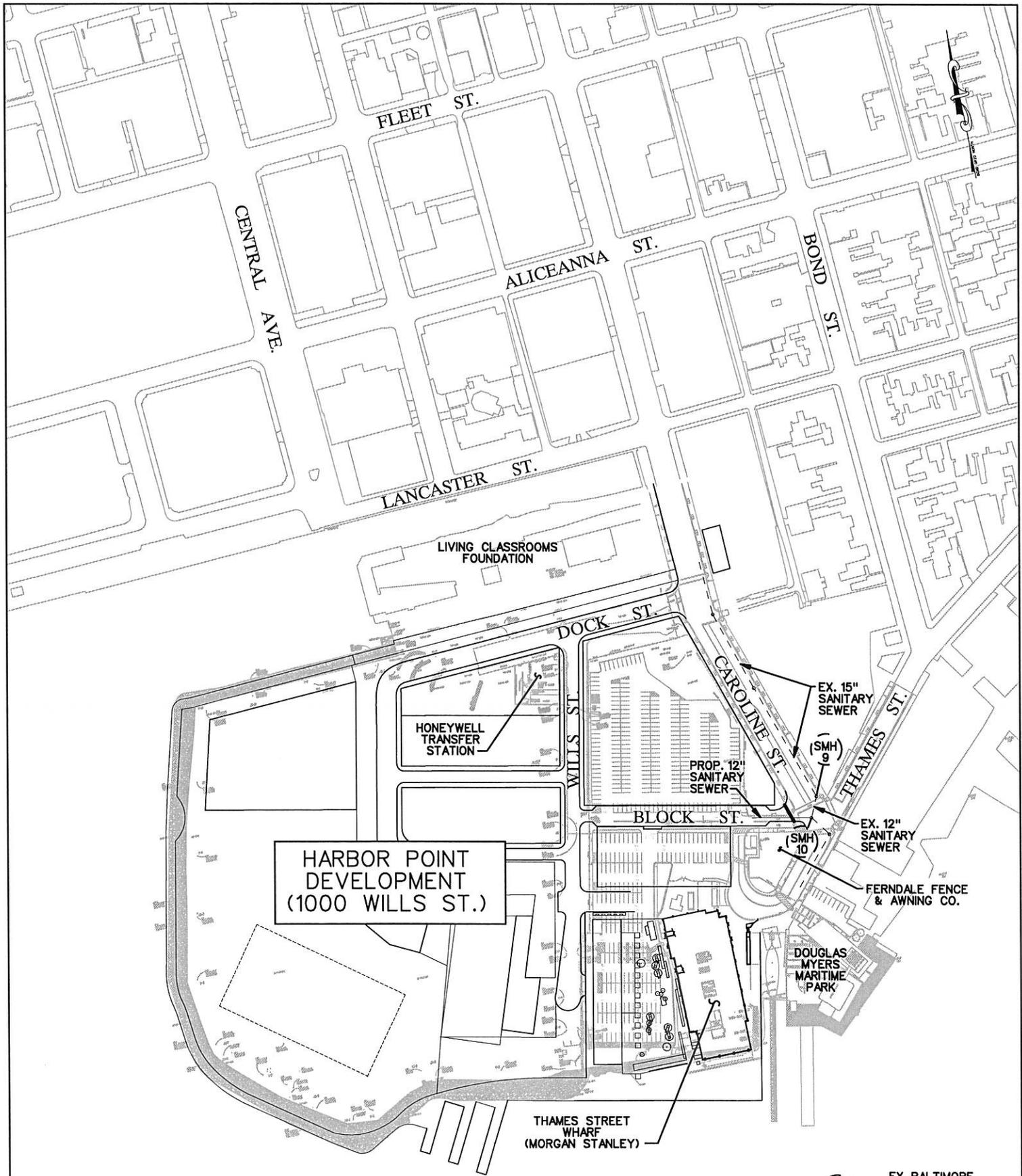


Christopher D. Krupinski, P.E.
Project Manager

Attachments

cc: Michael Wilmore, BCDOT
Marco Greenberg, HEDG
Jonathan Flesher, HEDG
JCM/DJS/RAF/FWS/CDK

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HARBOR POINT
DEVELOPMENT
(1000 WILLS ST.)

(SMH)
9 EX. BALTIMORE
CITY SANITARY
SEWER MANHOLE

HARBOR POINT SEWER FLOW ESTIMATE

7/31/2012

By: DJS

Note: There is no area upstream of the proposed development

Ultimate Average Residential Sewage Flow Rate

Estimated 1,000 apartments with an average size of 725 sq.ft.

$$Q_{\text{APTS}} = 1,000 \text{ apts} \times 3.0 \text{ people/apt} \times 135/\text{gallons/person/day} \\ = 405,000 \text{ gallons/day} = 0.405 \text{ MGD}$$

Ultimate Average Non-Residential Sewage Flow Rate

Offices:

Estimated 1,858,500 sq. ft. of office space

From Design Guidelines for Sewerage Facilities, 1978, the flow rate for office space is 0.09 gallons/day/sq. ft.

$$Q_{\text{OFFICE}} = 1,858,500 \text{ sq. ft.} \times 0.09 \text{ gpd/sq.ft.} = 167,265 \text{ gallons/day} = 0.167 \text{ MGD}$$

Retail:

Estimated 255,500 sq. ft. of retail development

Use 2,500 gallons/day/acre

$$Q_{\text{RETAIL}} = 255,500 \text{ sq. ft.} \times 1 \text{ acre}/43,560 \text{ sq.ft.} \times 2,500 \text{ gallons/day/acre} = 14,664 \text{ gallons/day} = 0.015 \text{ MGD}$$

Hotel:

Estimated 86,000 sq. ft. of hotel space

From Design Guidelines for Sewerage Facilities, 1978, the flow rate for hotel space is 0.25 gallons/day/sq. ft.

$$Q_{\text{HOTEL}} = 86,000 \text{ sq. ft.} \times 0.25 \text{ gpd/sq. ft.} = 21,500 \text{ gpd} = 0.022 \text{ MGD}$$

Total Average Residential + Non-Residential Sewage Flow Rate

Total average residential + non-residential flow rate = $0.405 + 0.167 + 0.015 + 0.022 = 0.609$ MGD

Ultimate Peak Residential Sewage + Non-Residential Rate

$$\text{use } Q_{\text{PEAK}} = 3.2 \times Q_{\text{AVG}}^{(5/6)}$$

$$Q_{\text{PEAK}} = 3.2 \times (0.609)^{(5/6)} = 2.117 \text{ MGD}$$

D. Industrial Wastes

Whenever an appreciable amount of industrial waste is considered for joint treatment with domestic sewage, the waste characteristics must be analyzed, or projected where analysis is not available on the basis of at least 3 similar industrial plants which employ the same process as the one in question.

E. Toxic Wastes

Introduction of toxic wastes into a sewage treatment plant or into its collection system is permitted in accordance with local regulations for toxic waste discharges.

F. Protective and Servicing Facilities

All treatment units shall provide easy access for maintenance and protection for operators. Such features include stairways, walkways, handrails, etc. If sidewalls are extended some distance above the liquid level, convenient walkways must be provided to facilitate maintenance.

II. FLOW PROJECTION

A. Quantity of Flow

In sanitary engineering practice, it is generally accepted that a person will generate 100 gallons of sewage per day containing 0.17 pound of BOD₅. From a hydraulic loading standpoint, 100 gallons of sewage per day represents one person called "one population equivalent." This equivalent population flow, 100 gpcd, has been regarded as the upper limit for domestic flow projection as a daily average.

Unless satisfactory justification can be given for using a lower or higher flow, flow projection shall be based upon the guidelines shown in Table I. Justification which can be supported by calculated figures using 80 percent of water consumption in the service community or substantiated with the sewage flow records obtained from other nearby communities of comparable size and similar activity, will be considered satisfactory. Such justification may be made periodically based on current records and need not be reviewed for each individual project submitted.

Table I - Flow Projection Based Upon Gallons Per Person Per Day

Type of Establishment	Gallons Per Person Per Day (Unless Otherwise Noted)
Airports (per passenger)	5
Apartments-multiple family (per resident)	60
Bathhouses and swimming pool	10
Camps:	
Campground with central comfort stations	35
With flush toilets, no showers	25
Day camps (no meals served)	15
Resort camps (night and day) with limited plumbing	50
Luxury camps	100

**Table I - Flow Projection Based Upon Gallons
Per Person Per Day (Continued)**

Type of Establishment	Gallons Per Person Per Day (Unless Otherwise Noted)
Cottages and small dwellings with seasonal occupancy	50
Country clubs (per resident member)	100
Country clubs (per non-resident member present)	25
Dwellings:	
Boarding houses	50
additional for non-resident boarders	10
Luxury residences and estates	150
Multiple family dwellings (apartments)	60
Rooming houses	40
Single family dwellings	75-100
Factories (gallons per person, per shift, exclusive of industrial wastes)	35
Hospitals (per bed space)	350
Hotels with private baths (2 persons per room)	60
Hotels without private baths	50
Institutions other than hospitals (per bed space)	125
Laundries, self-service (gallons per wash, i.e., per customer)	50
Mobile home parks (per space)	250
Motels with bath, toilet and kitchen wastes (per bed space)	50
Motels (per bed space)	40
Picnic Parks (toilet wastes only) (per picnicker)	5
Picnic Parks with bathhouses, showers and flush toilets	10
Restaurants (per seat)	25
Restaurants (toilet and kitchen wastes per patron)	10
Restaurants (kitchen wastes per meal served)	3
Restaurants, additional for bars and cocktail lounges	2
Schools:	
Boarding	100
Day, without gyms, cafeterias or showers	15
Day, with gyms, cafeteria and showers	25
Day, with cafeteria, but without gyms or showers	20
Service Stations (per vehicle served)	10
Swimming pools and bathhouses	10
Theaters:	
Movie (per auditorium seat)	1
Drive-in (per car space)	5
Travel Trailer Parks without individual water and sewer hook-ups (per space)	50
Travel Trailer Parks with individual water and sewer hook-ups (per space)	100
Workers:	
Construction (at semi-permanent camps)	50
Day, at schools and offices (per shift)	15

An alternative method used to project average daily flows generated from commercial establishments, public service buildings or dwelling units can be figured on the basis of total floor area, number of building units or service seats multiplied by a statistical factor. Guiding factors are given in Table II.

Table II - Guiding Factors For Flow Projection Related With Commercial Establishments, Public Service Buildings or Dwelling Units

Office Buildings	Gross Sq. Ft. x 0.09 =	gpd
Medical Office Buildings	Gross Sq. Ft. x 0.62 =	gpd
Warehouses	Gross Sq. Ft. x 0.03 =	gpd
Retail Stores	Gross Sq. Ft. x 0.05 =	gpd
Supermarkets	Gross Sq. Ft. x 0.20 =	gpd
Drug Stores	Gross Sq. Ft. x 0.13 =	gpd
Beauty Salons	Gross Sq. Ft. x 0.35 =	gpd
Barber Shops	Gross Sq. Ft. x 0.20 =	gpd
Department Store with Lunch Counter	Gross Sq. Ft. x 0.08 =	gpd
Department Store without Lunch Counter	Gross Sq. Ft. x 0.04 =	gpd
Banks	Gross Sq. Ft. x 0.04 =	gpd
Service Stations	Gross Sq. Ft. x 0.18 =	gpd
Laundries & Cleaners	Gross Sq. Ft. x 0.31 =	gpd
Laundromats	Gross Sq. Ft. x 3.68 =	gpd
Car Wash without Wastewater Recirculation Equipment	Gross Sq. Ft. x 4.90 =	gpd
Hotels	Gross Sq. Ft. x 0.25 =	gpd
Motels	Gross Sq. Ft. x 0.23 =	gpd
Dry Goods Stores	Gross Sq. Ft. x 0.05 =	gpd
Shopping Centers	Gross Sq. Ft. x 0.18 =	gpd

Flow projection for country clubs or public parks may be made on the basis of plumbing fixtures. The related statistical flow figures per unit of plumbing fixture are shown in Table III and Table IV.

Table III - Flow Projection for Country Clubs

Type of Fixture	Gallons Per Day Per Fixture
Showers	500
Baths	300
Lavatories	100
Toilets	150
Urinals	100
Sinks	50