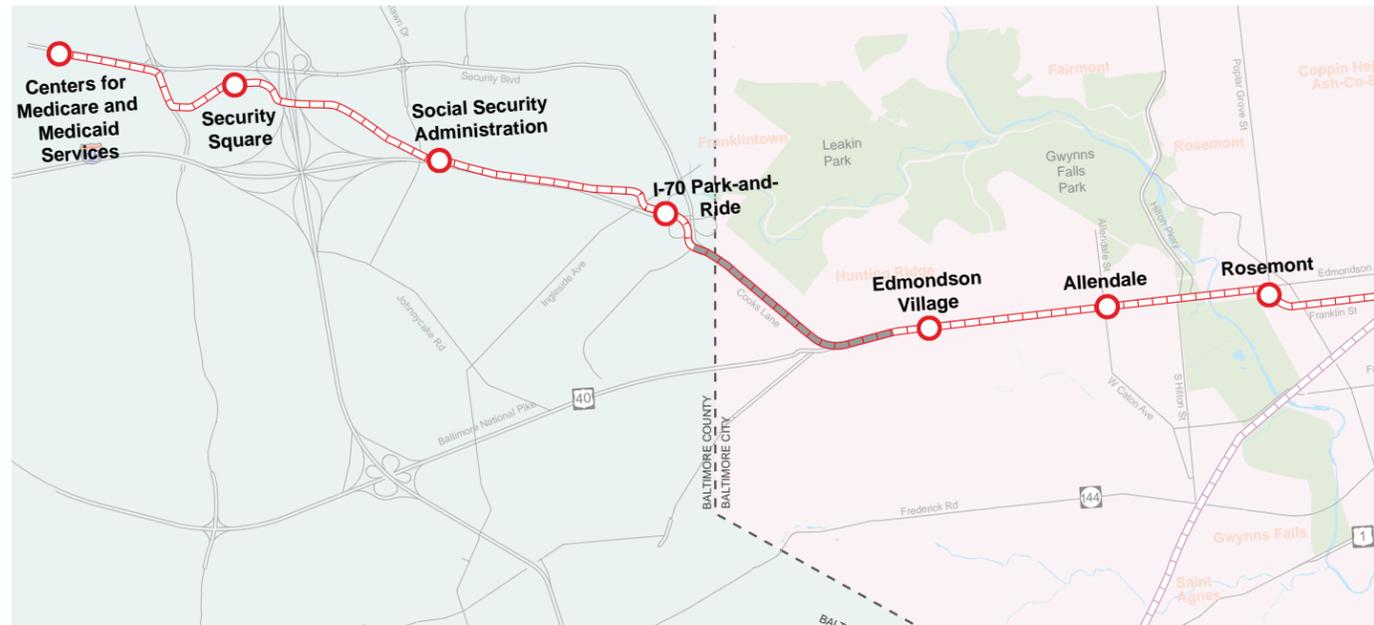


DESIGN GREEN!

BEST PRACTICES FOR SUSTAINABLE,
SAFE STREET DESIGN FOR THE **RED LINE**

BALTIMORE CITY DEPARTMENT OF TRANSPORTATION





The Red Line is a 14.5 mile light rail transit project running east-west through the City of Baltimore and into Baltimore County, but it represents much more than a new transport option. It will help create a cleaner, greener Baltimore with safer streets and more integrated, livable communities.

In 2008, the Red Line Community Compact established four deliverable goals – improve water quality, use clean energy, increase green space, and promote safety and accessibility that support economic development and community revitalization.

As an extension to the Compact, *Design Green!* is a reference for planners, engineers, designers, community representatives and others as they work together to bring physical and sustainable improvements to the communities adjacent to the Red Line and the City as a whole. By integrating improvements such as innovative green technology, enhanced public spaces, and augmented transportation facilities from the earliest stages of design, the project will more readily promote a healthy urban environment. In doing so, the project will encourage active living and sustainable transportation choices, contributing to the success of the Red Line and the revitalization of Baltimore.

INCREASE GREEN SPACE ALONG THE ROUTE

- green tracks
- green roof
- trees
- landscaping elements
- small parks and plazas
- interpretive signs
- public art

CREATE A SAFE AND ACCESSIBLE RED LINE

- rail with trail
- sidewalks a minimum of 6 feet wide, additional space for landscaping in curb strip
- street furniture
- pedestrian-level lighting
- open landscaping
- clear and concise wayfinding signage
- bike racks
- bike lockers and bike lids
- bike lanes
- crosswalks a minimum of 12 feet wide
- raised crosswalk or speed table
- curb extensions



EXECUTIVE SUMMARY

- refuge islands
- forced turn island
- driver stop bar 6-10 feet back from crosswalk
- textured, colored and/or patterned pavements
- ramps and detectable warning surfaces
- countdown pedestrian signals (cps) with Lead pedestrian interval (LPI)
- accessible pedestrian signals (aps)
- two-stage crosswalks
- train approaching signs/signals
- embedded pedestrian lights
- embedded roadway lights

REALIZE THE ECONOMIC AND ENVIRONMENTAL BENEFITS OF CLEAN ENERGY USE

- regenerative braking technology
- recycled materials
- energy efficient roof design
- solar power
- LED lighting
- recycling/trash bins
- utility connections: electricity, water, gas

LEVERAGE WATER QUALITY IMPROVEMENT OPPORTUNITIES

- micro-bioretenion
- rain gardens
- modular wetland inlet box
- bio-swailes and slopes
- constructed wetlands
- porous/pervious pavement
- curb breaks
- reinforced turf

- green technology design elements
- public space design elements
- transportation design elements



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INTRODUCTION

RED LINE PROJECT BACKGROUND

THE RED LINE IS A 14.5 MILE LIGHT RAIL TRANSIT PROJECT RUNNING EAST-WEST THROUGH THE CITY OF BALTIMORE AND INTO BALTIMORE COUNTY. MUCH MORE THAN A NEW TRANSPORT OPTION, IT WILL GENERATE ECONOMIC DEVELOPMENT, SPARK COMMUNITY REVITALIZATION, IMPROVE PUBLIC HEALTH, AND RESHAPE THE PUBLIC SPACES IN BALTIMORE.

These objectives come together under one overarching goal: **The Red Line will help create a cleaner, greener Baltimore with safer streets and more integrated, livable communities.** To learn more about the Red Line Community Compact, visit www.gobaltimoredline.com.



A team of 23 elected, civic, business and community leaders from throughout the Baltimore region put together a complete Regional Rail Plan for the metropolitan area. The plan identifies building the Red Line as the #1 priority for creating a viable, successful system.

The Red Line Community Compact is a landmark agreement between the City of Baltimore, the Maryland Transit Administration (MTA), and numerous local non-profit organizations to define the success of the project on community terms. Among other economic and

neighborhood goals, the Red Line Community Compact cites 14 livability and sustainability objectives to enhance the environment and increase safety. It was signed by over 60 community partners.



INCREASE GREEN SPACE ALONG THE RED LINE

As part of designing and constructing the Red Line, the City will work with communities along the Red Line corridor to do the following:

- Make excellent connections between the Red Line and existing trail systems: Gwynns Falls Trail, Jones Falls Trail and the Waterfront Promenade in Canton.
- Look for opportunities to create green space along the Red Line for biking, walking and as a natural buffer between the system and the neighborhoods.
- Utilize this green space as a means to better integrate the Red Line into the community as a transition and as neighborhood commons for entertainment and exercise.

CREATE A SAFE AND ACCESSIBLE RED LINE

The Red Line must not just be accessible for the elderly and people with disabilities; it must be convenient. MTA

will include features such as low-floor vehicle boarding and elevators in the final design of the Red Line.

- The Red Line will be designed with pedestrian safety in mind. The City will coordinate with MTA and communities to ensure that positive guidance measures are used to steer pedestrians toward safe crossing locations and that “safe routes to schools” concepts are used near schools along the Red Line. The MTA and the City will work together to improve the quality of pedestrian signals near stations, including the implementation of “countdown” pedestrian signals.
- The City will work with affected communities on alterations to traffic patterns caused by construction of the Red Line.
- The City will coordinate with MTA to maximize pedestrian safety through access to crosswalks, especially in neighborhoods where the Red Line runs on the surface.

REALIZE THE ECONOMIC AND ENVIRONMENTAL BENEFITS OF CLEAN ENERGY USE ON THE RED LINE

Major infrastructure projects like the Red Line can accelerate the use of renewable energy resources to provide cleaner energy for transit and the community. If designed properly, this project can result in a zero-emissions service. MTA will consider the following strategies as part of Red Line construction:

- Design Red Line buildings and facilities to conform to recognized sustainability criteria such as LEED (Leadership in Energy and Environmental Design).
- Work with local utilities to utilize clean energy production sources to meet the new energy demands of Red Line and associated energy users.
- Investigate the generation of energy as a revenue source for the Red Line and possible sources of funding/grants.

COMMUNITY COMPACT GOALS AND STRATEGIES

- Replace all buses in the MTA fleet with diesel hybrid electric models as current buses are retired.

LEVERAGE WATER QUALITY IMPROVEMENT OPPORTUNITIES

By partnering with the agencies responsible for implementing and regulating water quality, such as the Baltimore City Department of Public Works and Maryland Department of the Environment, MTA will seek to do the following as part of the Red Line construction process:

- Increase green space and reduce impervious surfaces through project landscaping.
- Determine and implement improvements to the man-made drainage system crossing or being impacted by the Red Line.
- Use best management practices for stormwater management at all Red Line parking facilities.



**BALTIMORE
SUSTAINABILITY PLAN
GOALS**

**TOWARD OUR VISION OF A CLEAN BALTIMORE:
*Cleanliness Goals***

1. Eliminate litter throughout the city
2. Sustain a clean and maintained appearance of public land
3. Transform vacant lots from liabilities to assets that provide social and environmental benefits

**TOWARD OUR VISION OF A HEALTHY
BALTIMORE: *Pollution Prevention Goals***

1. Reduce Baltimore's greenhouse gas emissions by 15% by 2015
2. Improve Baltimore's air quality and eliminate Code Red days
3. Ensure that Baltimore water bodies are fishable and swimmable
4. Reduce risks from hazardous materials
5. Improve the health of indoor environments

**TOWARD OUR VISION OF AN EFFICIENT
BALTIMORE: *Resource Conservation Goals***

1. Reduce Baltimore's energy use by 15% by 2015
2. Reduce Baltimore's water use while supporting system maintenance
3. Minimize the production of waste
4. Maximize reuse and recycling of materials

**TOWARD OUR VISION OF A GREEN
BALTIMORE: *Greening Goals***

1. Double Baltimore's tree canopy by 2037
2. Establish Baltimore as a leader in sustainable, local food systems
3. Provide safe, well-maintained recreational space within 1/4 mile of all residents
4. Protect Baltimore's ecology and bio-diversity

**TOWARD OUR VISION OF A MOBILE
BALTIMORE: *Transportation Goals***

1. Improve public transit services
2. Make Baltimore bicycle and pedestrian friendly
3. Facilitate shared-vehicle usage
4. Measure and improve the equity of transportation
5. Increase transportation funding for sustainable modes of travel

**TOWARD OUR VISION OF AN AWARE
BALTIMORE: *Education & Awareness Goals***

1. Turn every school in Baltimore City into a green school
2. Ensure all city youth have access to environmental stewardship programs and information
3. Raise the environmental awareness of the Baltimore community
4. Expand access to information on sustainability

**TOWARD OUR VISION OF AN INVESTED
BALTIMORE: *Green Economy Goals***

1. Create green jobs and prepare City residents for these jobs
2. Make Baltimore a center for green business
3. Support local Baltimore businesses
4. Raise Baltimore's profile as a forward-thinking, green city



Design Green! should be used as a reference to help deliver the 14 sustainability objectives identified in the Red Line Community Compact. The document provides specific examples of design elements found in Baltimore or other major cities in the U.S. or Europe that increase safety, improve air and water quality, increase green space and encourage excellent design. It illustrates how innovative and realistic recommendations will benefit the communities adjacent to the Red Line and the City as a whole. By planning, designing and funding for such components from the earliest stages, these guidelines will more readily promote a healthy urban environment that encourages active living and sustainable transportation choices.

The examples outlined in this document have been shown to increase safety, preserve natural resources and improve air and water quality. To achieve such goals, elements must be placed within communities appropriately. Therefore, these guidelines recommend how to appropriately determine which and where design elements should be placed for the maximum benefit.

A HEALTH IMPACT ASSESSMENT OF THE RED LINE INDICATED THAT BUILDING THE PROJECT AND IMPLEMENTING CERTAIN DESIGN FEATURES COULD RESULT IN SIGNIFICANT COMMUNITY AND HEALTH BENEFITS OVER TIME. IN THE SHORT TERM, THEY WILL:

- Improve stormwater treatment for the health of the Chesapeake Bay
- Make neighborhoods greener
- Reduce pedestrian injuries and fatalities.
- Improve neighborhood mobility.

IN THE LONG TERM, SUCH DESIGN ELEMENTS HAVE THE POTENTIAL TO REALIZE EVEN BROADER LIVABILITY IMPACTS, SUCH AS:

- Increased property values
- Crime reduction
- Cleaner air
- Reduced rates of asthma
- Fewer cases of heart disease, reduced obesity
- Protection from summer heat

This toolkit of best practices puts forth a set of recommendations for realizing a safe, sustainable and well-designed Red Line transit corridor. It is by no means an exhaustive list of design elements that have the potential to achieve this goal, and it is not intended to replace a detailed design manual for the project. Rather, it is the hope of the City of Baltimore and the MTA that these guidelines be used as a resource and a starting point for discussion and dialogue for how the Red Line project can help create a cleaner, greener Baltimore with safer streets, good design and more integrated and livable communities.

USING THE GUIDELINES

Design Green! includes design features and recommendations for their use, and is intended to be a reference and resource guide for policymakers, engineers and designers working on the Red Line project. In addition, these guidelines will serve as a practical resource for the Red Line Station Area Advisory Committees (SAACs), who represent

residents, businesses, and institutions along the corridor and have a critical role in station design. Professionals and local residents working in other cities where light rail will be constructed may also find this document valuable.

When considering the design elements listed in the following guide, every decision should assess how each element will impact:

- Sustainability
- Livability
- Accessibility
- Social cohesion

At the same time, the needs of each community must be considered independently. In addition to the broad considerations above, design and communications decisions should also take into account literacy and mobility challenges. Making the Red Line accessible for people with limited abilities will benefit all riders.

PURPOSE AND INTENT OF THIS DOCUMENT



PRIORITIES AND ACTIONS

1 INCREASE GREEN SPACE ALONG THE ROUTE

THE CITY OF BALTIMORE WOULD LIKE MTA TO CONSIDER THE FOLLOWING RECOMMENDATIONS WHEN DECIDING HOW EACH DESIGN ELEMENT MAY BEST BE INCORPORATED INTO THE PROJECT. THESE ELEMENTS HAVE BEEN ORGANIZED BY THE FOUR ENVIRONMENTAL GOALS FROM THE RED LINE COMMUNITY COMPACT AND BY THEIR TYPOLOGY; ■ TO UTILIZE GREEN TECHNOLOGY ■ TO ENHANCE PUBLIC SPACE, AND ■ TO IMPROVE TRANSPORTATION.

- Strategically orient structures and other devices (e.g. stormwater bioretention areas) to maximize connectivity and permeability between stations, as well as among stations, residences and businesses.
- Consider safety and security and how landscaping interacts with lighting.
- Enhance existing streetscapes.
- Identify as much space as possible to plant trees; secondarily, ensure there is space for smaller landscaping.



BALTIMORE, MD

New trees planted as part of the Eaton Street Block Project

CASE STUDY: REHABILITATING GREEN SPACE

Highlandtown has one of the lowest tree canopies counts in Baltimore. However, since 2009, the Southeast Community Development Corporation (CDC), in partnership with TreeBaltimore has planted more than 100 trees in the neighborhood. With additional support from Chesapeake Bay Trust and TreeBaltimore, the Southeast CDC plans to plant approximately 200 more in 2011. Not only have they put trees in the ground—they have also mobilized and educated residents about the importance of urban street trees.



CHICAGO, IL

Paseo Prairie Garden at the Logan Square Station, Blue Line "L" train

Starting in 2005, a dedicated group of residents and non-profit supporters began to transform a lawn-sized lot outside the Logan Square Blue Line stop in Chicago from a vacant space to a small, activated public park with the goal to make walking to transit more enjoyable. The Paseo Prairie Garden was planted with native prairie grasses and other self-sustaining plants, and sculptures were installed along the wall bordering the transit entrance. While the Chicago Transit Authority provided limited maintenance of the area prior to the garden, this

project is an example of communities working together to provide a more pleasant, dynamic connection between the neighborhood and the transit station, with benefits for commuters, local businesses, families, and older residents.

DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
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 **GREEN TRACKS**

	Enhances appearance of tracks; provides seasonal interest of color and texture; helps manage stormwater.	Green tracks reduce noise, lessen urban heat island effect, have the potential to reduce pollution.
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 **GREEN ROOF**

 <small>patrick ross photography</small>	Reduces heat island effect. Aesthetically pleasing, provides stormwater mitigation.	Reduce noise, urban heat island effect, and pollution.
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 **TREES**

	Reduce the heat island effect, improve air quality by reducing CO2 and particulates in the air. Add color and creates a sense of community.	Reduce noise, urban heat island effect, and pollution. Promote positive mental health. Provide shade in summer. Green plants also provide a calming visual break in the urban landscape.
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 **LANDSCAPING ELEMENTS**

	Enhance neighborhoods. Reduce quantity/improve quality of stormwater runoff; create sense of place.	Reduce noise, urban heat island effect, and pollution. Promote positive mental health. Green elements also provide a calming visual break in the urban landscape.
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APPROPRIATE USE	CITY GOALS
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GREEN TRACKS

Installed along surface tracks. Include stormwater treatment to maximum extent practicable. Orient access to tracks to ensure safety; use signage to keep off tracks.	Comprehensive Master Plan LIVE Goal #2: Elevate the design and quality of the city's built environment.
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GREEN ROOF

For buildings and structures: Traction-power sub-stations and maintenance facility; consider for stations.	Sustainability Resource Conservation Goal #1: Reduce Baltimore's energy use by 15% by 2015.
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TREES

Successful trees require larger tree pits, tree panels or layer beds. It may be more efficient to set aside space to plant several trees together rather than individually. The use of technology such as Silva Cells® may make inclusion of trees more feasible in narrow ROW. Trees must be included along surface alignment.	TreeBaltimore Initiative; Sustainability Greening Goals #1: Double Baltimore's tree canopy by 2037, and #4: Protect Baltimore's ecology and bio-diversity; Pollution Prevention Goal #2: Improve Baltimore's air quality and eliminate Code Red days. Comprehensive Master Plan PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.
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LANDSCAPING ELEMENTS

Select the right plant for the right place - urban tolerant plants, minimum risk of utility conflicts and future maintenance, increase biodiversity. Include at stations and along ROW between stations.	TreeBaltimore Program Sustainability Greening Goals #3: Provide safe, well-maintained recreational space within ¼ mile of all residents, and #4: Protect Baltimore's ecology and bio-diversity. Comprehensive Master Plan PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.
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	PUBLIC SPACE DESIGN ELEMENTS
	TRANSPORTATION DESIGN ELEMENTS

DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 SMALL PARKS AND PLAZAS		
	<p>Community connectivity, creates a sense of place, opportunity for tree planting, reduces heat island effect. Opportunity for public art and entertainment.</p>	<p>Promote healthy outdoor activity for children and all neighborhood residents.</p>
 INTERPRETIVE SIGNS		
	<p>Highlight neighborhood history and culture. Educate the community and riders about the development of the Red Line and its environmental benefits. Provide feedback to the community that their ideas have become reality.</p>	<p>Appropriate signs along active transport routes can provide tips on physical fitness and information on the health benefits of public transit.</p>
 PUBLIC ART		
	<p>Incorporating neighborhood-themed components and/or artwork will add significant character to each station area.</p>	<p>Promotes positive mental health and social connectivity.</p>

APPROPRIATE USE	CITY GOALS
	
<p>Locations to be determined in conjunction with Station Area Advisory Committee process. Provide adequate seating. Where space allows, consider playground equipment.</p>	<p>TreeBaltimore Program Sustainability Greening Goals #3: Provide safe, well-maintained recreational space within ¼ mile of all residents; Cleanliness Goal #3: Transform vacant lots from liabilities to assets that provide social and environmental benefits. Comprehensive Master Plan PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.</p>
	
<p>At stations and important landmarks along the corridor.</p>	<p>Sustainability Education & Awareness Goals #3: Raise environmental awareness of the Baltimore community and #4: Expand access to information on sustainability.</p>
	
<p>Include artwork at all stations and place at intervals throughout the corridor as space and funding allow. Investigate potential to use recycled materials. Consider environmentally-themed artworks.</p>	<p>Comprehensive Master Plan LIVE Goal #2: Elevate the design and quality of the City's built environment; PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.</p>

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2 CREATE A SAFE AND ACCESSIBLE RED LINE

In partnership with MTA, the City of Baltimore would like the following recommendations to be considered when deciding how each design element may best be incorporated into the project:

- Use principles from *Complete Streets*¹: Design the track, roadway and sidewalk to maximize safety, accessibility and comfort for pedestrians, cyclists, transit vehicles and drivers.
- Maximize accessible routes: People should be able to access all stations directly by foot, bike or bus transfer without having to navigate barriers such as walls, large parking lots or unsafe street crossings.
- Assess and consider driver visibility of pedestrians, especially at intersections.
- Give particular attention to pedestrian safety near schools, applying the Safe Routes to School concept to all elementary, middle and high schools.
- Reference the Baltimore City Bicycle Master Plan and consult with DOT's bicycle program throughout the design process to maximize safe connections among transport modes.
- Utilize the Institute for Transportation Engineers' guidelines for *Context Sensitive Solutions* to design safe streets for both transit and car traffic.
- Use principles from *Crime Prevention Through Environmental Design* (CPTED) to improve safety by reducing potential settings for crime and protecting transit users, nearby residents, and the general public.

“ I support surface alignment of the Red Line on Boston Street because it represents a visible move to a greener Baltimore. ”

–Canton resident

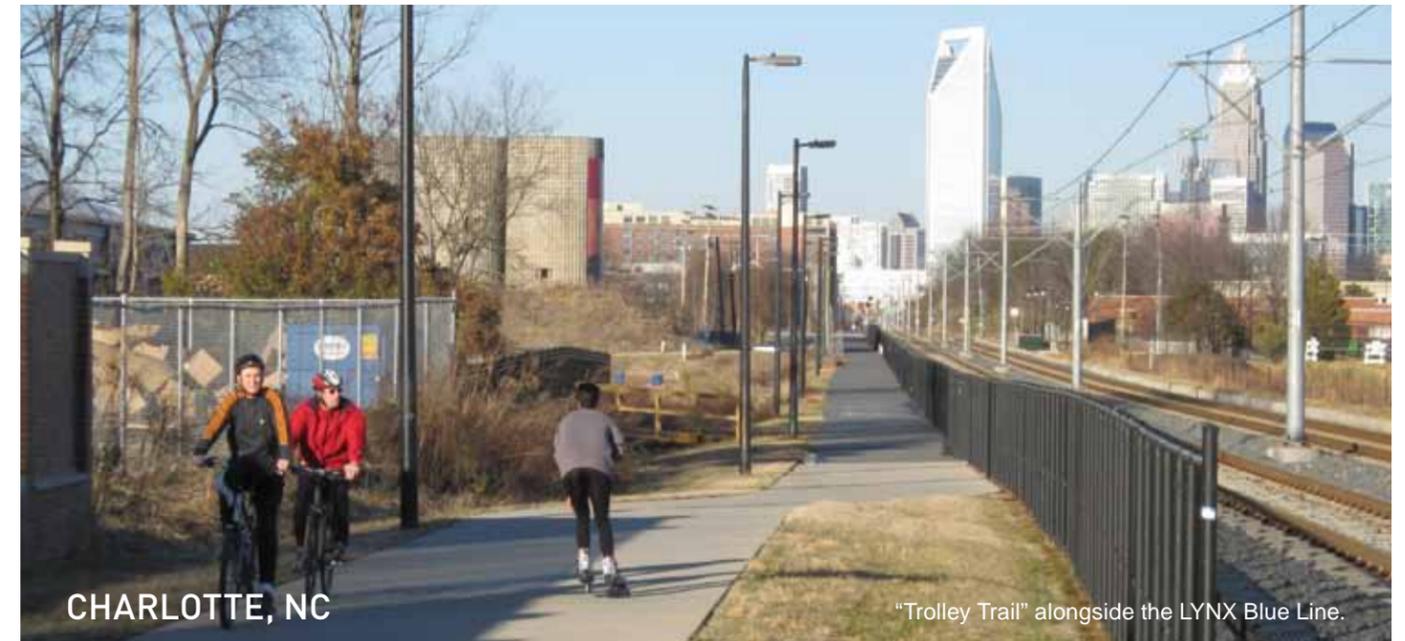


BALTIMORE, MD

Lancaster Street Bike Lane

CASE STUDY: IMPROVING SAFETY AND ACCESSIBILITY

Since the completion of the Baltimore City Bicycle Master Plan in 2006, Baltimore City Department of Transportation has added 77 miles of bike lanes to City streets and installed bike parking racks in numerous Baltimore neighborhoods. Above, a new bike lane in Howard Park offers a safe place for cyclists to ride and helps provide connections within a dense residential community. Adding more bike lanes and other bike facilities will serve to grow the network and further encourage use of this sustainable mode of transport throughout the city.



CHARLOTTE, NC

"Trolley Trail" alongside the LYNX Blue Line.

Rail-with-Trail, Charlotte, NC

Directly alongside Charlotte's LYNX Blue Line runs a 3.3 mile rail-with-trail project that is safe, well-lit and landscaped. With paths 8-12 feet wide, pedestrians and cyclists can now access the transit line or enjoy a unique recreational amenity. This successful project, situated on a former industrial area, now connects residential neighborhoods, shopping, restaurants, downtown and sports arenas. Apartment complexes and condominiums line some parts of the greenway, and at any station along the route, trail users can get

on the LYNX line, which allows bicycles on board during all operating hours. With the option to avoid road congestion, this off-road facility has noticeably enhanced Charlotte's transportation landscape.

DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 RAIL WITH TRAIL		
	<p>Improve safety and the overall health of city residents by increasing opportunities for physical activity.</p>	<p>Improve cyclist safety; long term reductions in heart disease and improved mental health.</p>
 SIDEWALKS		
	<p>A minimum width of 6 feet and additional space for landscaping in the curb strip allows pedestrians to easily pass one another and offer more space for socializing. Trees and plantings beautify the street, make it more inviting and can help manage stormwater.</p>	<p>Supports increased community connections and sense of social support in neighborhoods. Supports healthy outdoor activity.</p>
 STREET FURNITURE		
	<p>Make street more inviting for residents and transit users.</p>	<p>Offers places to rest and relax, visit with neighbors, provides numerous mental health benefits.</p>
 PEDESTRIAN-LEVEL LIGHTING		
	<p>Lighting is crucial for public safety, both at stations and surrounding areas. Pedestrian-level lighting reduces light pollution and offers a more pleasant walking experience at night.</p>	<p>Pedestrian-level lighting provides a more even illumination of the street (rather than pools of light with dark areas in between). Creates less potential for assault. Increased sense of security and peace of mind.</p>

APPROPRIATE USE	CITY GOALS
<p>Re-use construction access road as trail along tracks from Canton Crossing to Highlandtown, in old Norfolk-Southern rail bed. Consider similar amenity along Interstate 70 between the I-70 Park and Ride and the Social Security Administration. Paved trail should be at least 12 feet wide to accommodate users in both directions.</p>	<p>Baltimore Bicycle Master Plan Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
<p>Everywhere that MTA rebuilds sidewalks. The use of Silva Cells® or similar technology make the inclusion of trees more feasible in narrow ROW. A wider, eight foot sidewalk is recommended in areas with heavy pedestrian traffic.</p>	<p>Sustainability Transportation Goals: #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation. Comprehensive Master Plan PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.</p>
<p>Place benches at station stops and at regular intervals along the surface alignment.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
<p>Install at stations and nearby areas along the alignment where the Red Line runs on the surface. Consider "dark skies friendly" ornamental lighting to add character and reduce light pollution. Consider growth of landscaping when placing lighting.</p>	<p>Comprehensive Master Plan LIVE Goal #2: Elevate the design and quality of the City's built environment; PLAY Goal #2: Improve night life, entertainment, and recreation experiences for residents and visitors.</p>

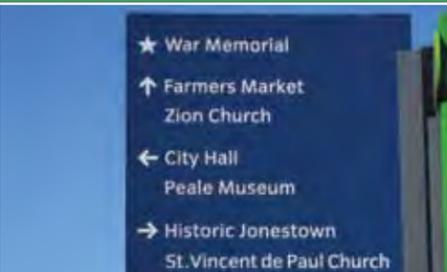
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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
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 **OPEN LANDSCAPING**

	Residents and riders feel safe and more likely to use transit.	Reduced potential for assault; increased sense of security and peace of mind.
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 **CLEAR AND CONCISE WAYFINDING SIGNAGE**

	Wayfinding signs assist pedestrians and cyclists to efficiently access stations, as well as direct transit riders to nearby services, cultural/tourist sites, neighborhoods and Baltimore's trail network near the Red Line: the Gwynn's Falls and Jones' Falls trails.	Reduce confusion, assist people of all abilities to access services quickly and efficiently. Services include: healthcare, childcare, grocery, educational and support services.
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 **BIKE RACKS**

	Protected bike parking encourages people to bike to the train.	Amenities that support cycling have been shown to increase the use of this mode, which leads to many physical and mental health benefits.
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 **BIKE LOCKERS AND BIKE LIDS**

	Provide improved security for long-term bike parking.	Increases the use of this mode, which leads to many physical and mental health benefits.
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APPROPRIATE USE	CITY GOALS
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OPEN LANDSCAPING

Use in proximity to designated points of entry at stations and points of entry potentially opportunistic to criminals.	Comprehensive Master Plan LIVE Goal #2: Elevate the design and quality of the City's built environment.
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CLEAR AND CONCISE WAYFINDING SIGNAGE

Installed at least 2 blocks from stations in all directions. All signs must be simple, clear and readable for all ability levels. Consider children, low literacy, limited English proficiency, and visual/non-verbal cues for signs. Use Baltimore Green Map as a resource.	Comprehensive Master Plan LIVE Goal #3: Improve transportation access and choice for city residents.
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BIKE RACKS

Place under cover at all stations, including underground stations.	Baltimore Bicycle Master Plan Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.
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BIKE LOCKERS AND BIKE LIDS

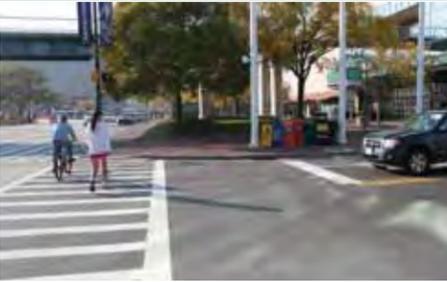
Particularly critical at outlying stations that also provide parking, such as the I-70 Park-and-Ride, as well as at MARC transfer stations.	Baltimore Bicycle Master Plan Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation. Comprehensive Master Plan LIVE Goal #3: Improve transportation access and choice for city residents.
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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 BIKE LANES		
	Provides safer space for bicyclists to access stations and indicate to drivers that they must share the road with bicyclists	Reduction in pedestrian crashes or near-misses; improved pedestrian behavior. Safer for elderly, young and people with disabilities. Green space significantly improves air quality and reduces the heat island effect in summer.
 CROSSWALKS		
	A minimum width of 12 feet keeps pedestrians safer in intersections.	Reduce conflicts between pedestrians and vehicles; improve pedestrian safety and security.
 RAISED CROSSWALK OR SPEED TABLE		
	Traffic calming, leading to slower traffic and more connectivity for pedestrians between sidewalk and street.	Improve pedestrian visibility, safety and security.
 CURB EXTENSION		
	Increases pedestrian safety by making pedestrians more visible, provides a buffer between pedestrians and parked cars, narrows crossing distance and provides excellent space for micro-bioretenation for stormwater treatment and greening.	Reduction in pedestrian crashes or near-misses; improved pedestrian behavior. Safer for elderly, young and people with disabilities. Green space significantly improves air quality and reduces the heat island effect in summer.

APPROPRIATE USE	CITY GOALS
<p>Include bike lanes in Red Line parking lots, provide connections to or away from stations from roads accessing station areas.</p>	<p>Baltimore Bicycle Master Plan Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation. Comprehensive Master Plan LIVE Goal #3: Improve transportation access and choice for city residents.</p>
<p>Place at the shortest crossing distance throughout the surface alignment. At high volume intersections or those shown to be dangerous, crosswalks should be wider.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
<p>Place at the shortest crossing distance throughout the surface alignment; works well together with curb extensions. Strongly recommended for crosswalks that access surface stations in the median of the roadway.</p>	<p>Sustainability Transportation Goal #2: Make Baltimore bicycle and pedestrian friendly,</p>
<p>Use at intersections throughout the surface alignment. Place everywhere that MTA rebuilds sidewalks and/or corners where on-street parking exists, while taking into account bus stops, truck routes, other potential conflicts. Beneficial to use at crossings such as those that access shopping centers or schools.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>

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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 REFUGE ISLANDS		
	<p>Refuge islands provide a safe area for pedestrians who are unable to cross entire roadway in one signal cycle. Provide excellent space for micro-bioretenment for stormwater treatment and greening; enhance neighborhoods.</p>	<p>Reduction in pedestrian crashes or near-misses; improved pedestrian behavior. Safer for elderly, young and people with disabilities. Green space significantly improves air quality and reduces the heat island effect in summer.</p>
 FORCED TURN ISLAND		
	<p>Traffic calming, forcing drivers to slow in approach to a main road, raising driver attention to pedestrian and transit traffic. Reduce traffic in neighborhoods—drivers choose through roads instead.</p>	<p>Improve pedestrian safety and security; reduce potential conflicts between cars and pedestrians or transit vehicles.</p>
 DRIVER STOP BAR		
	<p>Keep drivers from pulling into crosswalks at stoplights.</p>	<p>Reduce conflicts between pedestrians and vehicles. Improve pedestrian safety and security.</p>
 TEXTURED, COLORED AND/OR PATTERNED PAVEMENTS		
	<p>Alert drivers to brake for pedestrians and make crosswalks more visible to pedestrians. Create a sense of place at intersections.</p>	<p>Improve pedestrian safety and security.</p>

APPROPRIATE USE	CITY GOALS
<p>Use in the median of crosswalks. Edmondson Avenue and Boston Street are particularly busy thoroughfares where refuge islands are essential. They may not be as significant in other surface locations.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
<p>For streets that will no longer have access across the surface alignment. Although cars will be forced to the right or left, bicycles should still have access through the intersection. Include other safety measures to demarcate change in traffic pattern.</p>	<p>Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation. Green Economy Goal #4: Raise Baltimore's profile as a forward-thinking, green city.</p>
<p>Set driver stop bar 6-10 feet back from crosswalk for maximum safety. Include at all intersections along the surface alignment.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
<p>Use throughout the surface alignment to increase safety at intersections.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>

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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 RAMPS AND DETECTABLE WARNING SURFACES		
	<p>ADA required; these amenities also make sidewalks and street crossings easier for all users, regardless of ability.</p>	<p>Improve pedestrian safety, facilitate ease of use and comfort, reduce potential for injury.</p>
 COUNTDOWN PEDESTRIAN SIGNALS (CPS) WITH LEAD PEDESTRIAN INTERVAL (LPI)		
	<p>Countdown signals assist pedestrians in timing their walk through an intersection. Offering pedestrians a lead time to begin crossing the street gives priority to residents and other pedestrians rather than vehicles.</p>	<p>CPS and LPI have been shown to reduce pedestrian injury and risk of injury from crashes. They also improve driver safety at intersections with high pedestrian use. LPI makes pedestrians more visible to drivers turning right or left.</p>
 ACCESSIBLE PEDESTRIAN SIGNALS (APS)		
	<p>Make street crossing safer and more accessible for people with disabilities.</p>	<p>Protects pedestrians of all abilities and supports healthy activity.</p>
 TWO-STAGE CROSSWALKS		
	<p>Increase options for pedestrians to cross where Red Line runs on surface. These signals would make crossings safer by preventing pedestrians from having to walk long distances to signalized intersections. Likely reduce jaywalking. Potential to calm traffic.</p>	<p>Reduced jaywalking and risk for pedestrian crashes, also improve driver safety at intersections where many pedestrians cross. Protects pedestrians of all abilities and supports healthy activity.</p>

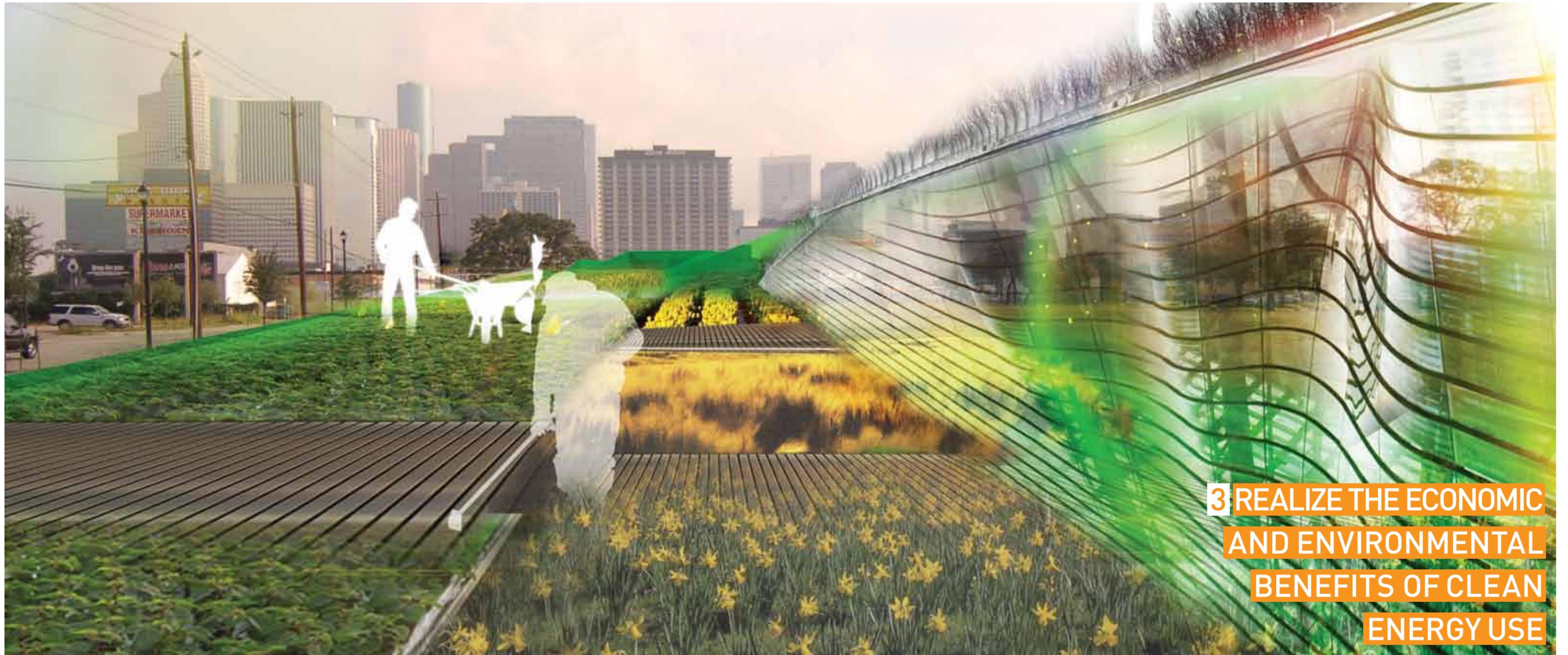
APPROPRIATE USE	CITY GOALS
	
<p>Use at street corners throughout the surface alignment. Place everywhere that MTA rebuilds sidewalks and/or corners.</p>	<p>Sustainability Transportation Goals #1: Improve transit services, #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
	
<p>All intersections along the surface alignment. CPS are already required for all new signal installations and replacements.</p>	<p>Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
	
<p>Use for signals at station crossings.</p>	<p>Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>
	
<p>Place at intersections with former traffic signals where Red Line runs on the surface in median of busy roads. For safety, two-stage crosswalks cannot line up across the street; can be operated in a hot-button fashion to give better service and/or run "free" during off peak hours. Need to be well-timed with train.</p>	<p>Sustainability Transportation Goals #2: Make Baltimore bicycle and pedestrian friendly, #4: Measure and improve the equity of transportation.</p>

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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
TRAIN APPROACHING SIGNS/SIGNALS		
	Assist drivers and pedestrians in making smarter choices about when to cross the street.	Reduce potential for conflict between trains and both pedestrians and cars. Improve driver and pedestrian safety.
EMBEDDED PEDESTRIAN LIGHTS		
	Create sense of safe space at night and an easy to follow path to stations.	Increase safety.
EMBEDDED ROADWAY LIGHTS		
 <small>hess lighting</small>	Alert drivers to stay in their lane and flash to serve as a secondary warning for approaching train.	Increase driver nighttime safety.

APPROPRIATE USE	CITY GOALS
TRAIN APPROACHING SIGNS/SIGNALS	
Wherever the Red Line will run on the surface and will encounter car and pedestrian traffic. Signs and signals should be highly visible.	Sustainability Transportation Goal #4: Measure and improve the equity of transportation. Comprehensive Master Plan LIVE Goal #3: Improve transportation access and choice for city residents.
EMBEDDED PEDESTRIAN LIGHTS	
Install at surface stations on walkways approaching station and / or on floor of station.	Comprehensive Master Plan PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.
EMBEDDED ROADWAY LIGHTS	
Embed along inner edge of driving lane. Install where the Red Line runs on the surface. Suggestion for minimal installation: use on roadway in approach to stations.	Sustainability Transportation Goal #4: Measure and improve the equity of transportation. Comprehensive Master Plan PLAY Goal #3: Increase attractiveness of Baltimore's natural resources and open spaces.

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3 REALIZE THE ECONOMIC AND ENVIRONMENTAL BENEFITS OF CLEAN ENERGY USE

The City of Baltimore would like MTA to consider the following recommendations when deciding how each design element may best be incorporated into the project:

- Consider the most energy efficient method to construct, operate and maintain the Red Line. This includes the energy costs for transporting materials during construction, manufacturing of materials used, heating and cooling loss from buildings, and the energy required to operate trains and stations.

- Strategically orient structures to maximize energy production or conservation.
- Recycle materials on-site to the extent practicable (e.g. asphalt).
- Consider safety and security and the placement of landscaping elements when locating lighting.
- Include space for interpretive/educational signage to raise awareness about green innovations used on the Red Line.

“ Baltimore needs to enter a new era, a sustainable era, and I believe the Red Line can help us do that. ”

–Highlandtown resident



BALTIMORE, MD

MTA Hybrid Bus

CASE STUDIES: UTILIZING CLEAN ENERGY

Starting in 2008, MTA began to transition their entire bus fleet to diesel electric hybrid vehicles. As old buses are retired, they are replaced with clean, quiet vehicles that are more fuel efficient and less disruptive in neighborhoods. Along with the Red Line, this initiative is creating a more sustainable transit network that uses energy wisely and is better for the environment while also more pleasant to ride. Full phase-in of hybrid buses is planned by 2017.

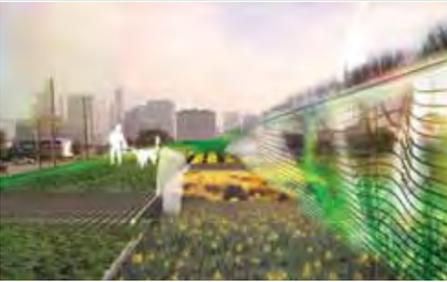


PORTLAND, OR

Rendering of TriMet's downtown South Terminus which will support renewable energy production

TriMet, the transit provider for Portland, Oregon constructed a large steel structure near the Portland State University campus that will support wind turbines and solar panels as part of a renewable energy project. That energy will go into supporting the light rail system. At a cost of \$1.2 million in federal stimulus funds, the structure will wrap around several buildings at TriMet's light rail terminus and will also conceal signals, communication equipment and the substation buildings at the station.

PRIORITIES AND ACTIONS: REALIZE THE ECONOMIC AND ENVIRONMENTAL BENEFITS OF CLEAN ENERGY USE

DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 REGENERATIVE BRAKING TECHNOLOGY		
	Baltimore can be an example to other cities on how to use new and efficient technologies. Regenerative braking is more energy efficient, resulting in lower electric costs for the state and taxpayers.	In the long term, any technology that minimizes use of electricity can contribute to cleaner air for the region.
 RECYCLED MATERIALS		
	Cost-saving, potential to support local business.	Use of recycled or natural materials have fewer adverse health effects.
 ENERGY EFFICIENT ROOF		
	Prevents high indoor temperatures, reduces energy needed to cool buildings in summer.	Reduce the "heat island effect" to keep communities cooler during summer.
 SOLAR POWER		
	Reduces energy costs, raises awareness about alternative forms of energy, makes structures powered by solar panels more resilient in case of an energy crisis.	Use of solar power reduces need for energy from fossil fuels, thereby creating less emissions and improving air quality. General benefits also.

APPROPRIATE USE	CITY GOALS
Throughout the alignment.	Sustainability Resource Conservation Goal #1: Reduce Baltimore's energy use by 15% by 2015; Green Economy Goal #4: Raise Baltimore's profile as a forward-thinking, green city.
Consider for: railroad ties, asphalt, concrete, ballast, and any other building materials (e.g. insulation for buildings).	Sustainability Resource Conservation #4: Maximize use of recycled materials; Green Economy Goal #3: Support local Baltimore Business and #4: Raise Baltimore's profile as a forward-thinking, green city.
The appropriate energy efficient roof may be different for the maintenance facility, traction power sub-stations, surface stations, or parking facilities, including solar, reflective, or green roof designs.	Sustainability Resource Conservation Goal #1: Reduce Baltimore's energy use by 15% by 2015; Green Economy Goal #4: Raise Baltimore's profile as a forward-thinking, green city.
Use determined from analysis of availability of direct sunlight and suitability of rooftop or other structure. Use along the corridor to power signals, stations, and/or maintenance facility.	Sustainability Pollution Prevention Goal #1: Reduce Baltimore's greenhouse gas emissions by 15% by 2015; Resource Conservation Goal #1: Reduce Baltimore's energy use by 15% by 2015. Comprehensive Master Plan LIVE Goal #2: Elevate the Design and Quality of the City's Built Environment.

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PRIORITIES AND ACTIONS: REALIZE THE ECONOMIC AND ENVIRONMENTAL BENEFITS OF CLEAN ENERGY USE

DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 LED LIGHTING		
	Bright, even lighting contributes to safer neighborhoods and makes transit more accessible. Use of alternative energy results in lower electric costs for the state and taxpayers.	Well-placed lighting reduces risk of injury and assault and allows people to safely go out at night, increasing physical activity.
 RECYCLING/TRASH BINS		
	Enhance aesthetics in a community.	Keep the community cleaner, encourage stewardship of community space.
 UTILITY CONNECTIONS: ELECTRICITY, WATER		
	Communities and riders benefit from having services at stations. Provision of utility hook-ups will support future placement of food/beverage kiosks and other vendors.	Increased sense of community and activity at stations; supports positive social environment.

APPROPRIATE USE	CITY GOALS
Electric signs, lighting at stations, pedestrian street lights along the corridor	Sustainability Resource Conservation Goal #1: Reduce Baltimore's energy use by 15% by 2015.
In addition to stations, place Red Line branded recycling and trash receptacles at regular intervals along the surface alignment. Use recycled materials to manufacture bins.	Sustainability Cleanliness Goal #2: Sustain a clean and maintained appearance of public land; Resource Conservation Goal #4: Maximize use of recycled materials; Education & Awareness Goal #3: Raise environmental awareness of Baltimore community; Green Economy Goals #3: Support local Baltimore Business
At stations throughout the line, with priority for Park and Ride and underground stations.	Comprehensive Master Plan Live Goal #1: Build human and social capital by strengthening neighborhoods

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**4 LEVERAGE
WATER QUALITY
IMPROVEMENT
OPPORTUNITIES**

The City of Baltimore would like MTA to consider the following recommendations when deciding how each design element may best be incorporated into the project:

- Support the goals of the Baltimore City Sustainability Plan.
- Utilize the City's Direct Harbor Watershed Plan (DHWP) and Gwynn's Falls Plan as a guide to develop complementary mitigation.
- Utilize the Baltimore City Stormwater Management Plan as a guide for determining the appropriateness of specific treatment options.
- Refer to the Baltimore Watershed Agreement (2006) between Baltimore County and Baltimore City to improve their common watershed. Specifically plan to include action items from the Phase I Action Plan (2009).
- Investigate improvement and mitigation opportunities at off-site locations, such as school yards, especially when stormwater management within the right-of-way will be too challenging or costly.
- Complete an alternatives analysis before making final choices on where to put different stormwater management facilities.

“ I think a critical piece of all of this will be the catalytic nature of the Red Line. Transit brings places alive. Transit brings other investors. Transit brings retailers, it brings service industry. It's going to really make this area pop. ”

–Poppleton resident

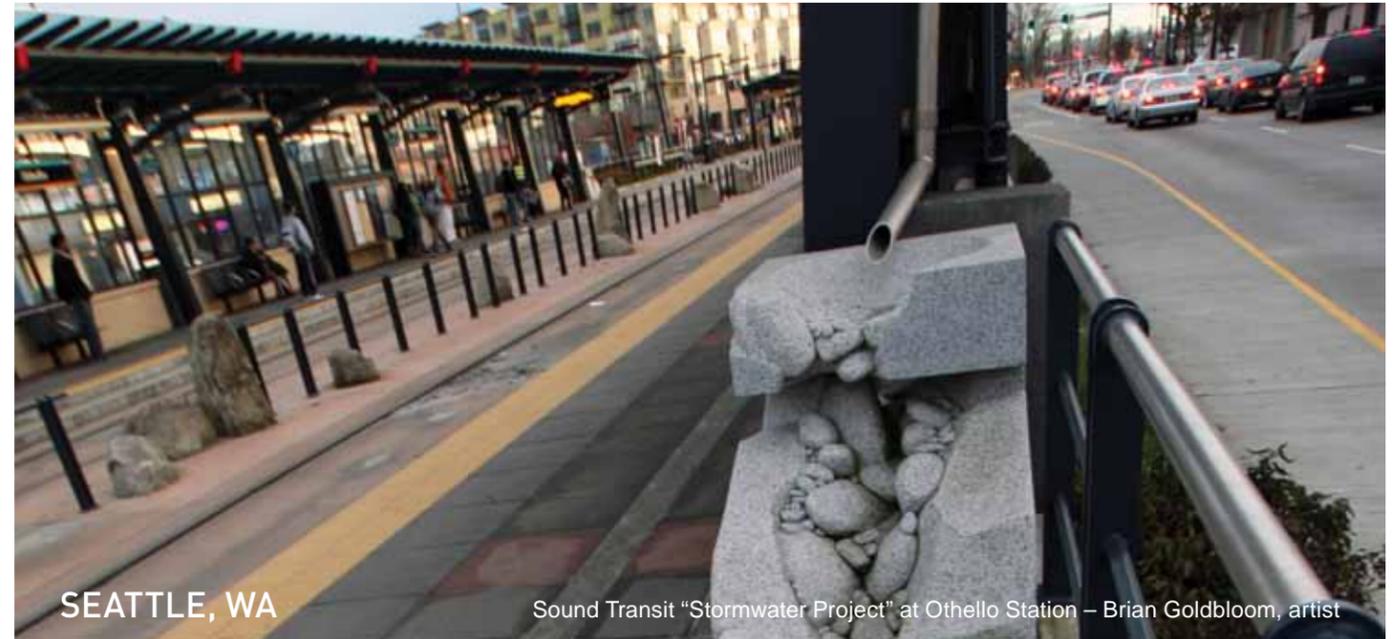


BALTIMORE, MD

Plaza Bioretention – Intersection of Baltimore Street and Frederick Avenue

CASE STUDY: INTEGRATING STORMWATER MANAGEMENT

Many of the neighborhoods surrounding the Red Line corridor in West Baltimore are part of the Gwynn's Falls watershed. The Center for Watershed Protection, a local non-profit, and Baltimore City Department of Public Works produced attractive street improvements that help manage and filter stormwater before it flows into the Inner Harbor and Chesapeake Bay. Above, a bioretention area serves not only these purposes, but also provides a micro-habitat for urban wildlife. Flowers and shrubs anchor the site, beautify pedestrian areas and make the street more inviting, adding to the character of the neighborhood.



SEATTLE, WA

Sound Transit "Stormwater Project" at Othello Station – Brian Goldbloom, artist

Along Seattle's Central Link Light Rail, stormwater management has been integrated into public art features. The result is both functional and visually appealing. Inspired by stonework included in Japan's Osaka Castle, an artist designed eight granite stormwater catchbasins that flank the ends of station shelters and include a unique design of channels seemingly carved out by the rain water. Water traveling from shelters' roofs drains into discrete planter boxes below, allowing it to be filtered before entering the city's sewer system.

DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 MICRO-BIORETENTION		
	<p>Buffers between street and sidewalks.. Reduces runoff volume and peak runoff rate.</p>	<p>Improves mental health and provides a calming visual break in the urban landscape.</p>
 RAIN GARDENS		
	<p>Improves water quality. Attractive landscaping feature with perennial native plants. Can be small, informal, home-owner style or large complex bioretention gardens. Requires less maintenance.</p>	<p>Green plants improve mental health and provide a calming visual break in the urban landscape and can improve air quality.</p>
 MODULAR WETLAND INLET BOX		
	<p>Easy to fit into tight urban area, provides space for plantings (e.g. in curb strip). Reduces runoff volume and reduces peak runoff rates.</p>	<p>Green plants, even in small areas, improve mental health and provide a calming visual break in the urban landscape.</p>

APPROPRIATE USE	CITY GOALS
	
<p>Place in medians, refuge islands, curb extensions, sidewalk curb strips, parking lot islands.</p>	<p>Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable.</p>
	
<p>Use in larger contiguous areas such as curb strips.</p>	<p>Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable; Greening Goal #4: Protect Baltimore's ecology and bio-diversity.</p>
	
<p>Linear, to be used in areas where other options will not suffice.</p>	<p>Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable.</p>

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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 BIO-SWALES AND SLOPES		
	<p>Aesthetically beneficial; Reduces runoff volume, reduces peak runoff rates, and improves water quality. Opportunity for tree planting to improve air quality. Requires less maintenance than other technologies.</p>	<p>Green plants improve mental health and provide a calming visual break in the urban landscape.</p>
 CONSTRUCTED WETLANDS		
	<p>Creates new habitat. Visually pleasing. Provides the public with the opportunity to learn, experience, and explore a wetland meadow.</p>	<p>Can provide area for outdoor activity for exercise, exploration and mental health benefits. Supports local wildlife.</p>

APPROPRIATE USE	CITY GOALS
	
<p>In parking lots to absorb automotive pollutants, at downspouts to slow and direct rooftop rainwater, along impervious surface to slow rainwater. Appropriate for park and ride lots and maintenance facility.</p>	<p>Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable; Greening Goal #4: Protect Baltimore's ecology and bio-diversity.</p>
	
<p>Use if options for environmental site design to manage stormwater are unavailable. Along I-70, at Canton Crossing and north along Norfolk-Southern Railroad, area adjacent to Bayview MARC, in median or sides of Rte. 40 expressway, or offsite mitigation.</p>	<p>Baltimore City Stormwater Management Ordinance.</p>

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DESIGN ELEMENT	COMMUNITY BENEFITS	HEALTH BENEFITS
 POROUS/PERVIOUS PAVEMENTS		
	Reduces urban heat island effect, provides a more permeable surface for storm water to infiltrate; enhances neighborhoods.	Better sidewalks facilitate physical activity that improves cardiovascular health.
 CURB BREAKS		
	Direct connection to open spaces and less demarcation between spaces. Replenishes and protects ground water.	Improve mental health and provides a calming visual break in the urban landscape.
 REINFORCED TURF		
	Reduces heat island effect. Improved visual appeal over asphalt. Allows for tree islands to be dispersed throughout the site.	More trees throughout the corridor will cool the area and improve air quality for residents.

APPROPRIATE USE	CITY GOALS
Used in areas where pavement is required, e.g. Sidewalks and parking areas along the alignment.	Baltimore Watershed Agreement (2006): Phase I Action Plan (2009); Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable.
Use within ROW along Route 70 and for retrofit of offsite areas, such as school yards and parking lots. Can combine with rain gardens and micro-bioretenion.	Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable.
Use for Red Line parking lots or in parking bays with paved drive aisles.	Sustainability Pollution Prevention Goal #3: Ensure that Baltimore water bodies are fishable and swimmable.

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NEXT STEPS

IMPLEMENTING THE GUIDELINES AND THE ENGINEERING PROCESS

AS PART OF THEIR COMMITMENT TO THE **RED LINE COMMUNITY COMPACT**, MTA HAS PLEDGED TO COLLABORATE WITH BALTIMORE CITY TO APPLY THESE GUIDELINES DURING THE PRELIMINARY ENGINEERING AND FINAL DESIGN PHASES OF THE PROJECT. COMPLETE IMPLEMENTATION OF THESE RECOMMENDATIONS WILL ALSO REQUIRE ONGOING PARTNERSHIPS AMONG MANY PARTIES, INCLUDING MTA, CITY OF BALTIMORE, NON-PROFIT GROUPS, EDUCATIONAL INSTITUTIONS AND COMMUNITIES THROUGHOUT THE CORRIDOR. THIS PARTNERSHIP IS KEY TO FULLY REALIZING THE COMMUNITY BENEFITS ENVISIONED BY THE COMMUNITY COMPACT AND IN THIS DOCUMENT.

During Preliminary Engineering and Final Design phase, MTA will determine the exact parameters of the scope, schedule, and budget of the Red Line transit project. At this time, the guidelines will enrich the project by promoting environmental and safety improvements. During the Preliminary Engineering phase, a multitude

of design elements, context-sensitive solutions and procedures will be considered. This phase is an ideal time for MTA to incorporate as many of these safety and environmental features as feasible. Preliminary Engineering and Final Design procedures cover the following activities:

- Defining the exact boundaries of the construction area.
- Identifying all environmental impacts and provisions for mitigating potential negative impacts.
- Designing all major or critical project elements so that no significant unforeseen impacts, relative to their costs or schedule, will result.
- Completing all cost estimates to the level of confidence necessary for the MTA to implement its financing strategy.
- Defining procurement requirements.
- Confirming local funding commitments to the project.

To ensure that many elements of the *Design Green!* Manual are reasonably incorporated into the Red Line, Baltimore City DOT will coordinate with the MTA engineering and design team throughout the Preliminary Engineering and Final Design phases, and in particular

during the formulation of the Design Criteria. During this time, Baltimore City DOT and MTA hope to implement as many green technology, public space and transportation elements as possible within reasonable constraints of funding, engineering and community requests.

In addition, it is expected that this best practices toolkit will be used to inform other stakeholders throughout the design process. Together, Baltimore City DOT and MTA will present this guide to members of the Station Area Advisory Committees (SAACs) so that they, too, have the benefit of this toolkit as they provide inputs to the design process for the development of safe, environmentally sustainable stations, station areas, and other project elements.

Complete Streets

Baltimore City passed a Complete Streets policy in November 2010, calling for safer and more accessible streets throughout the city. Complete streets are designed to consider the safety and utility needs of everyone using the road. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities all have access to a complete street. A complete street could include any of the following: sidewalks, bike lanes, special bus lanes, accessible transit stops, frequent crossing opportunities, median islands, accessible pedestrian signals, curb extensions, and more.

Resource: National Complete Streets Coalition
www.completestreets.org

CPTED

Crime prevention through environmental design (CPTED) is a multi-disciplinary approach to deter criminal activity through design of the natural and built environment. CPTED strategies are based upon influencing potential offenders' decisions before committing a criminal act.

Resource: International CPTED Association
www.cpted.net

Safe Routes to School

Safe Routes to School programs enable community leaders, schools and parents to improve safety and encourage more children, including children with disabilities, to safely walk and bicycle to school. In the process, programs can help reduce traffic congestion and improve health and the environment, making communities more livable for everyone.

Resource: National Center for Safe Routes to School
www.saferoutesinfo.org/

Bicycle Master Plan

Baltimore City adopted the the Bicycle Master Plan in 2006 and the DOT is responsible for implementing it. The plan sets goals and identifies strategies to coordinate the integration of bicycles into the city's existing infrastructure. Bringing more bike lanes and other facilities to city streets is necessary to improve safety and support the creation of a truly multi-modal transportation system.

Resource: Baltimore City Department of Planning
www.baltimorecity.gov/Government/AgenciesDepartments/Transportation/Planning/BikeBaltimore/Information/BicycleMasterPlanandMaps.aspx

Comprehensive Master Plan

In 2000, PlanBaltimore created the framework for what Baltimoreans want Baltimore to be: a world-class city. In 2006, LIVE • EARN • PLAY • LEARN focused those policy recommendations into concise goals and strategies to move the City of Baltimore forward. It covers issues related to zoning, capital improvement and the policies affecting capital improvement spending.

Resource: Baltimore City Department of Planning
www.baltimorecity.gov/Government/AgenciesDepartments/Planning/ComprehensiveMasterPlan/TheMasterPlan.aspx

Context Sensitive Solutions

Context Sensitive Solutions is an approach to project development that engages stakeholders and assesses a project's context to create complete solutions. An understanding of the landscape and the community is essential, as well as including goals that extend beyond the transportation problem, such as livability as sustainability. At each step, inclusiveness, flexibility, and creativity fuel development of fresh answers and increase success.

Resource: Federal Highway Administration
www.fhwa.dot.gov/context/css_primer/index.htm



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 Baltimore Red Line
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stimulate Baltimore's economy, engage the existing labor supply, offer opportunities at many levels, make excellent connections between the red line and the existing trail system, look for opportunities to create green space for biking and walking, the red line will include low-floor vehicle boarding and elevators at some locations, a system of safe, well-maintained connections for pedestrians and

