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WIP Project Delivery Options

Municipal Separate Storm Sewer System Permit (MS4)
Baltimore City
Watershed Implementation Plan (WIP)
Project Delivery Methods

By

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WIP Project Delivery Options Outlines

- Background
- WIP Project Locations
- WIP Project Types
- Challenges / Solutions
- Project Funding/Delivery Methods
- Design and Construction Cost/Ac
- Current Program Status
- Accomplishments
- Lessons Learned
- Looking Forward
- Questions



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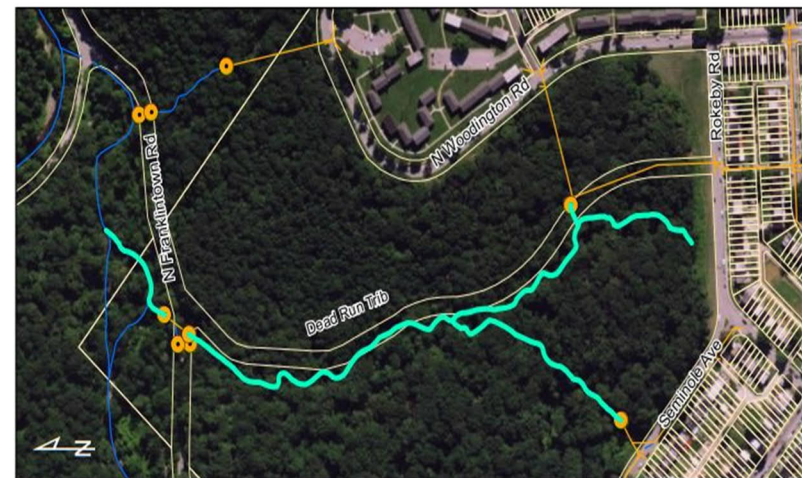
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Background

City of Baltimore's MS4 Permit

- Permit issued December 27, 2013
- Completion is December 27, 2018
- City is required to restore over 4,041 acres of impervious surface area by December 2018 to meet the required strategies and the 20% of the untreated area in the City
- WIP identified 1,191 equivalent impervious acres by installing stormwater management projects including traditional Best Management Practices (BMPs), Environmental Site Design (ESD) practices, and Alternative BMPs



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Background (cont.)

City of Baltimore's MS4 Permit

- 2,766 equivalent impervious acres by employing a variety of programs to improve water quality, including mechanical street sweeping, preventive inlet cleaning, and Illicit Discharge Detection and Elimination (IDDE)
- 279 equivalent impervious acres by fostering partnerships to encourage private development of stormwater management
- Estimated cost for WIP projects combined is approximately \$136 million (design, construction, PAS, Trees, ROE's, CM, and engineering salaries)

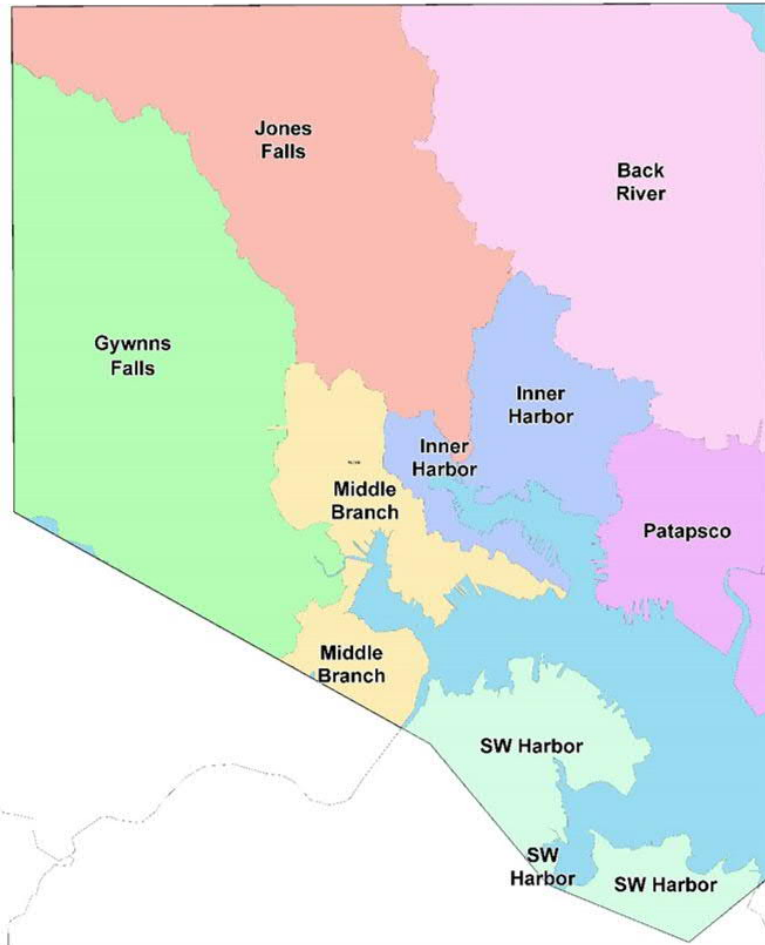


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WIP Project Locations



The WIP is a plan for achieving the 20% restoration requirement set out in the permit, in addition to attaining applicable waste load allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body.

- Jones Falls
- Gwynns Falls
- Inner Harbor
- SW Harbor
- Middle Branch
- Back River
- Patapsco

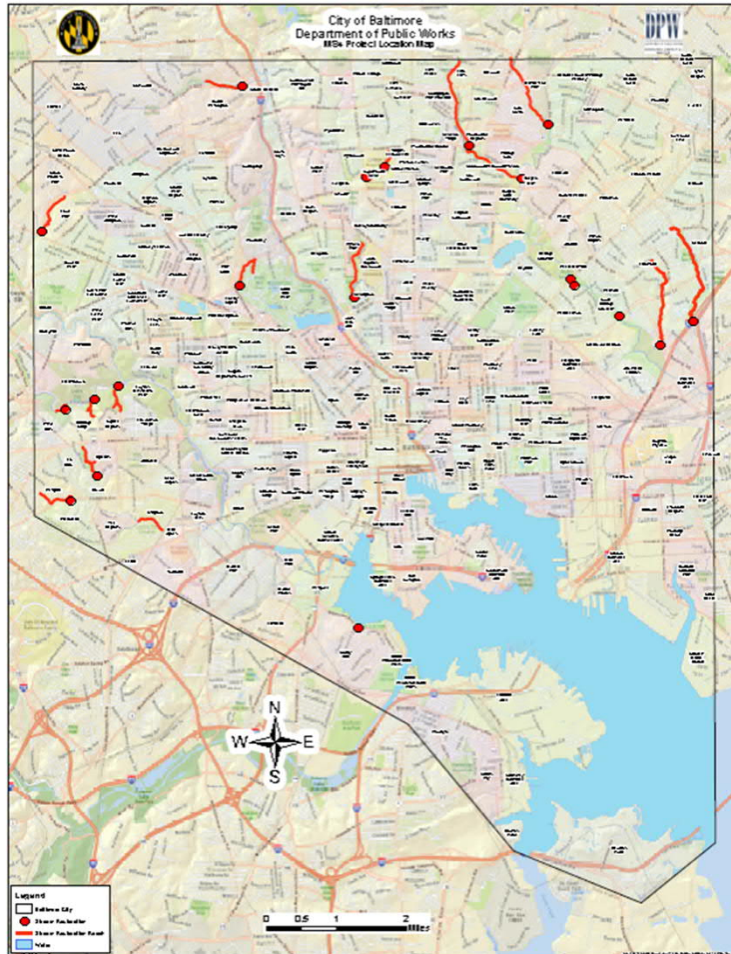


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WIP Project Locations (Cont.)



Type of Projects

Type of Bundle	Total projects	Remarks
Alternative BMPs (Stream Restoration)	17	One stream is completed
ESD Practices	12	Micro-Bio-Retention= 33 Curb Bump Outs= 183 Impervious Area = 13
Alternative BMP (Impervious Area Removal/Lot Greening)	13	Schools Tree Planting
Structural / Traditional BMPs	4	Ponds

WIP Project Types

Structural / Traditional BMPs

Installing new ponds, wetlands, and large bio-retention facilities are typically in parks or major right-of-ways. (14 million).



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WIP Project Types (Cont.)

Environmental Site Design (ESD) Practices

ESD Practices are small stormwater facilities that treat 5 acres or less, including micro-bioretenion, rain gardens, enhanced filters, permeable paving, and green roofs. Given the small size of these practices, they fit well into Baltimore's urban environment of streets, parking lots, small parks, and school grounds (32 million).



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WIP Project Types (Cont.)

Alternative BMPs (Stream Restoration)

Approximately 60% of Baltimore's streams are highly degraded along the main stem, with eroding banks, collapsing outfalls, and exposed sewer lines. Stream restoration is an opportunity to reduce erosion and sedimentation, increase natural channel flow, and improve the health of the stream and adjacent riparian areas. (79 million)



WIP Project Types (Cont.)

Alternative BMP (Impervious Area Removal/Lot Greening)

Unused impervious parking spaces are used to construct bio-retentions, grass swale, sand filter, curb bump outs, grassed playground, tree planting etc. (12 million).



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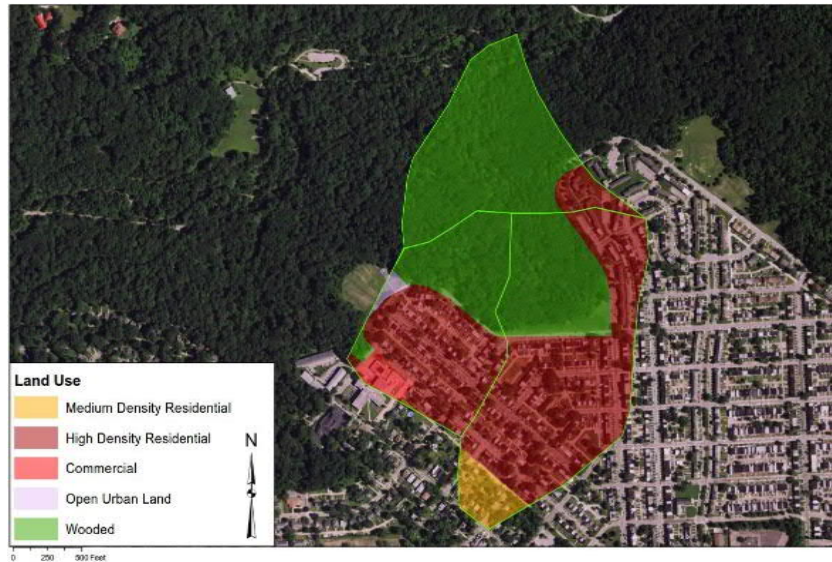
Challenges / Solutions

Challenge

- Right-of-Entry Agreements (ROE's)
- Need additional project site locations to meet City Target
- Design and construction schedules

Solution

- Regular meetings with DOT and Chief of Legal and Regulatory Affairs to develop streamlining the process
- Select additional site locations and meet with stakeholders
- Work with designers to develop an aggressive action plan to deliver project in shortest time



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Challenges / Solutions

Challenge

- OCAL approvals
- Contract Advertisement/ EAR Process

Solution

- Assigned Expeditors to help the designers with Erosion & Sediment Control Permits
- Met Contract Administration to schedule for the design NTP and advertisements
- Work with CA to help expedite the bid advertisements



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Challenges / Solutions

Challenge

- Competition with other jurisdictions for qualified contractors
- Increasing construction costs
- Permits
- Staffing



Solution

- Conducted two contractor workshops and continue email blast
- Updated the construction estimate and met with Fiscal to discuss impact
- Met with MDE and other permit agencies to develop submittal schedule.
- Program Management Team (PMT) held training sessions, and City is adding new engineers

Program Funding Methods

- Funding Programs used by the City (Traditional Loans & Fees)
 - State Revolving Funding (SRF)
 - Water Infrastructure Finance and Innovation Act (WIFIA)
 - Private and non profit sources
 - Others (Stormwater Utilities Fees)
- Others (Not used by City)
 - Public-Private Partnerships (P3)
 - Cost Sharing
 - Capital Market

C13 Pre-Construction



C13 Post-Construction



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Program Delivery Methods

Project Delivery Methods used by the City

Traditional Design-Bid-Build (DBB)

- Procured early (less cost, longer time)

Project Delivery Methods NOT used by the City

Indefinite Delivery/ Indefinite Quantity (ID/IQ)

- Design Phase (Save procurement time, high cost, less time)

Design/Build (DB)

- Procured after 30% design (less cost, less time)

Contract and Management At Risk (CMAR) contracts.

- (high cost, less time)

The City selected the DBB approach to implement the current WIP, may consider implementation of other delivery methods to expedite project delivery in the future.



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Design Cost per Ac

Type of Projects	Current Eq. Acres	Design Budget	Average Design Cost /Ac
Structural Traditional BMP's (Ponds)	103.91	\$ 2,915,502	\$ 28,057
ESD's	47.05	\$ 2,554,517	\$ 54,293
Alternative BMP's (Streams)	777.10	\$ 7,020,223	\$ 9,033
Alternative BMP's (Other)	48.28	\$ 1,013,202	\$ 20,985
Total	976.34	\$ 3,503,444	

For Ponds & ESD's:

- Average Design Cost increased (more than the WIP) due to less credit obtained during the design
- Actual areas of treatment were identified during design (Not identified in WIP)

For Streams:

- Average Design Cost is less than WIP.

By selected Longer stream lengths



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Construction Cost per Ac

Type of Projects	Current Eq. Acres	Construction Budget	Average Construction Cost /Ac
Structural Traditional BMP's (Ponds)	103.91	\$ 20,055,000	\$ 193,003
ESD's	47.05	\$ 13,188,477	\$ 280,307
Alternative BMP's (Streams)	777.10	\$ 62,829,836	\$ 80,851
Alternative BMP's (Other)	48.28	\$ 9,188,000	\$ 190,306
Total	976.34	\$ 105,261,313	

For Ponds & ESD's:

- Selected sites did not provide required credit – i.e. Fewer and smaller sites were available for projects.

For Streams:

- Average construction Cost is less than WIP

By selecting Longer stream length



Construction Cost per Ac (Including other Services)

Type of Projects	Current Eq. Acres	Construction Budget	Average Construction Cost /Ac
Structural Traditional BMP's (Ponds)	103.91	\$ 28,464,414	\$ 273,933
ESD's	47.05	\$ 19,750,961	\$ 419,786
Alternative BMP's (Streams)	777.10	\$ 93,094,570	\$ 119,797
Alternative BMP's (Other)	48.28	\$ 13,717,270	\$ 284,119
Total	976.34	\$ 155,027,215	

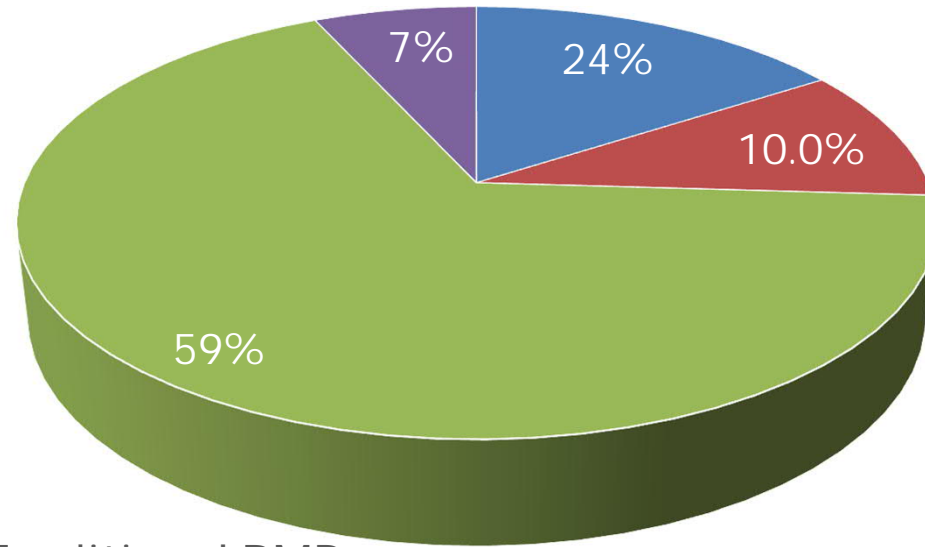
- Cost increased: WIP budget did not include (Post Award Services, Tree Mitigation, ROE, Construction Management, City Engineer's Salaries)



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WIP Cost per Project Type



- Structural/Traditional BMPs
- Environmental Site Design (ESD) Practices
- Alternate BMPs (Stream Restoration)
- Alternate BMPs (Impervious Area Removal/Lot Greening)



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Current Program Status

Bundle #	8/1/16	10/1/16	12/1/16	2/1/17	4/1/17	6/1/17	8/1/17	10/1/17	12/1/17	2/1/18	4/1/18	6/1/18	8/1/18	10/1/18	12/1/18	2/1/19	4/1/19	6/1/19
SDC 7760R																		
ER 4097		Procurement		Construction 5 Month														
ER 4019		Procurement		Construction 12 Month														
ER 4020		Procurement		Re-Advertise		Construction 12 Month												
SDC 7788		Design		Procurement		Construction 12 Month												
ER 4131		Design		Construction 12 Month														
ER 4125		Design		Procurement		Construction 8 Month												
ER 4126		Design		Procurement		Construction 8 Month												
ER 4130		Design		Procurement		Construction 8 Month												
ER 4018		Design		Procurement 6 Month		Construction 10 Month												
ER 4021		Design		Procurement		Construction 24 Month												
ER 4122		Design		Procurement		Construction 10 Month												
ER 4129		Design		Procurement		Construction 8 Month												
ER 4127		Design		Procurement		8 Month Construction												
ER 4045		Design		Procurement		10 Month Construction												
ER 4046		Design		Procurement		Construction 11 Month												
ER 4047		Design		Procurement		Construction 10 Month												
ER 4050		Design		Procurement		Construction 10 Month												
ER 4124		Design		Procurement		Construction 11 Month												
ER 4054		Design		Procurement		Construction 11 Month												
ER 4107		Design		Procurement		Construction 11 Month												
ER 4110		Design		Procurement		Construction 11 Month												

12/27/2016



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Accomplishments

Project Status	Current WIP Acres	Number of Bundles	% of WIP
Expenditure Authorization Request (EAR)	37	2	4%
Design	596.1	17	64%
Advertisement Phase	283.0	3	26%
Construction	27.9	2	2%
Completed	32.1	2	3%

- Team is continuously looking for new site locations to earn more credits.



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Lessons Learned

- Start the planning and identify project sites early.
- Adopt adaptive management strategies and discuss with City
- Coordinate with city agencies
- Develop ROE process and Obtain the ROE approvals early
- Avoid existing utilities
- Identify more BMPs
- Develop guidelines and as-built drawing standards

B15 Pre-Construction

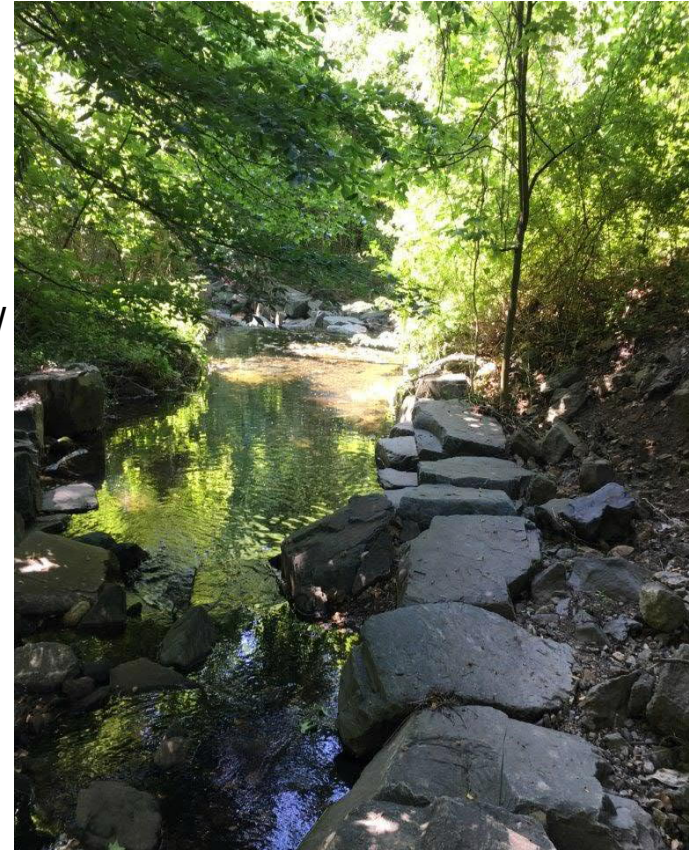


B15 Post-Construction



Looking Forward

- WIP is a living plan (plan, design, implement, evaluate, adjust)
- To Minimize design and construction cost by choosing appropriate site locations
- To Minimize the risk by selecting other project delivery methods
- To Develop inspection program
- To Develop Maintenance program
- To Develop monitoring program
- Document new innovative ideas during design and construction
- Recommend ways to improve the program



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Questions?

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