



EPAs Integrated Municipal Planning Guidance:

Brownfields and Stormwater in Practice

Environmental | Toxic Tort | Litigation

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Cleveland | Columbus | Cincinnati

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Overview

- Addressing redevelopment in context of wet weather obligations
 - Economic and fiscal context
 - Legal context
 - Creating “legal space” to integrate planning
 - New DC stormwater permit compels integration
- MSDGC “SWEP” Approach and Brownfields
 - Wet weather strategy
 - Sustainable infrastructure
 - Lick Run Watershed Brownfields Example
- Conclusion

Context

- Economic and fiscal
 - Ohio cities face challenging trends
 - Post-manufacturing economy
 - Brownfields and legacies
 - Declining utility revenues
 - Population movement- “no growth sprawl”
 - Stormwater fees growing as revenue model
 - Wet weather costs and equity
- Legal Context
 - Wet weather and stormwater regulation requirements and enforcement
 - Permits
 - Consent Decrees
 - Administrative Order on Consent
 - Brownfields often require active government participation

Is EPA Policy following economic reality?

Maybe?

- April 20, 2011 Stoner/Giles Green Infrastructure Memo
 - “Green Infrastructure” can be used for NPDES and enforcement compliance
- October 27, 2011 Stoner/Giles Integrated Planning Memo
 - Draft framework document issued Jan 2012

EPA Draft Integrated Planning Framework

- Note: Framework Document Due 3/31/12
- Draft sets out likely plan elements
- Draft outlines principles
 - Maintain existing regulatory standards
 - Allow muni to balance CWA requirements to address most pressing issues first
 - Plan development is muni responsibility, with Regulator review

Is EPA Policy following economic reality?

Maybe Not?

- October 7, 2011 DC Stormwater NPDES Permit
 - Considered by some as a new national model;
 - Extensive obligations for green roofs, tree plantings, and other activities;
 - Multiple plans required for approval;
 - Extensive monitoring, modeling and outreach obligations.
- *Compare: 'Philly First Fruits'*

Washington DC October 7, 2011

Stormwater NPDES permit

- Considered by some as a new national model;
- Extensive obligations for green roofs, tree plantings, and other activities;
- Multiple plans required for approval;
- Extensive monitoring, modeling and outreach obligations.

What should a prudent muni do?

- Integrate all economic development, environmental compliance and infrastructure planning
- Identify the best, cost-effective plan that is affordable and achieves the best environmental improvement for the dollar
- Examine sources of non-local funding and cost-recovery options
- Identify options to enable private side LEED-type development

Case Study of Integrated Planning

- Cincinnati MSD's Project Groundwork: Can daylighting a creek and redeveloping an industrial neighborhood be a cheaper route to CWA compliance than a huge tunnel?

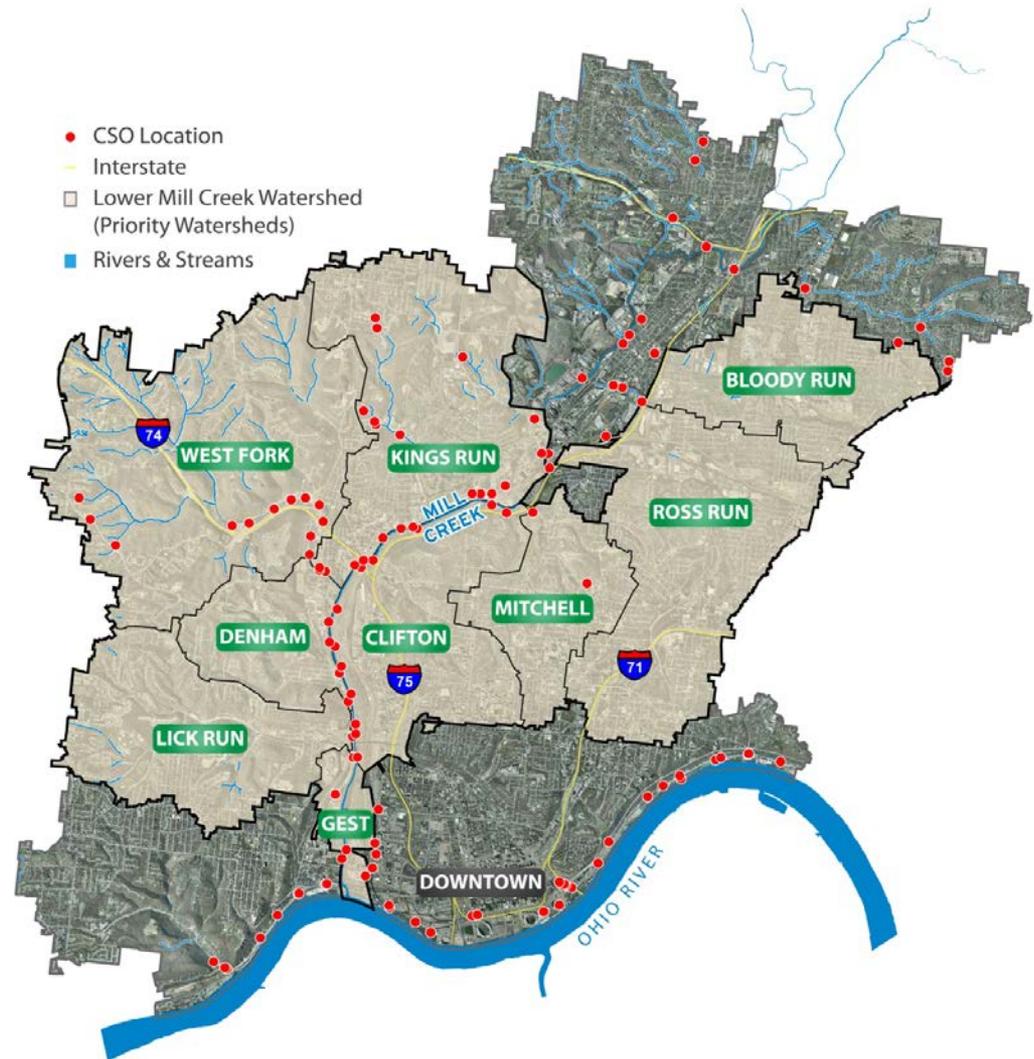
Cincinnati MSD Consent Decree

- 2009
 - Phased Approach
 - Wet weather/stormwater for CSO Control
 - Generally allow green infrastructure
 - Lower Mill Creek Study & Alternatives include green and sustainable
 - Alternative due December 31, 2012

Focus on the Lower Mill Creek Watershed

MSD is focusing on watersheds within the Lower Mill Creek that experience high volumes of CSOs.

7 BG CSO



MSD Sustainable Infrastructure Planning

ASSET-CENTRIC APPROACH



Sewer Infrastructure Focus

Isolated Decision-making

Risk-based, End-of-Pipe Solutions

HOW DO MSD ASSETS
IMPACT NATURAL SYSTEMS?



HOW DO NATURAL SYSTEMS
IMPACT MSD ASSETS?

NATURAL SYSTEMS-BASED APPROACH



Systems Focus

Integrated Decision-making

Multi-objective Solutions

Paradigm Shift

SWEP Process

- SWEP process incorporates natural systems analysis, economic and sociological information for informed decision making
 - Moves “silos” to coordinating among “partners”
- Brownfields redevelopment is one aspect of SWEP process and “integrated planning”

Objectives

Data Compilation and Inventory Analysis

- Define initial watershed goals and objectives
- Collect existing data
- Identify initial issues

Identify Opportunities and Constraints

- Conduct initial watershed analysis
- Identify potential projects
- Conduct preliminary analysis
- Prioritize Alternatives

Develop Solutions and Action Plans

- Conduct analysis at sub-watershed level
- Define overall watershed synthesis plan

Develop Implementation Plan

- Complete initial design
- Complete more detailed engineering analysis
- Develop Business Case

SWEP Steps

Step 1

Develop Watershed Goals

Compile Natural and Built Systems Data, Policy Issues, and Watershed Projects

Compile Built Systems Data

Inventory Analysis

Coarse Evaluation of Watershed and Potential Partners

Revisit Watershed Goals and Objectives

Conduct Urban Audit

Watershed Level of Service Report

Step 2

Conduct Existing Conditions Modeling

Identify Opportunities for CSO Reductions

Identify Watershed Strategies/Alternatives

Conduct Modeling and Develop Preliminary Costs

Verify and Enhance Watershed Goals

Evaluation and Prioritize Watershed Strategies-Alternatives

Conduct Coarse BCE

Draft Opportunities and Constraints Report

CFAC Engagement

Revisit Watershed Goals and Objectives

Final Opportunities and Constraints Report

Step 3

Refine Watershed Strategies-Alternatives

Conduct Modeling and Develop O of M Costs

Conduct BCE on Sub-watershed Alternatives

Evaluate and Prioritize Sub-watershed Alternatives

Watershed Synthesis Report

Revisit Watershed Goals

Step 4

Refine, Update, Verify Alternatives

CFAC Engagement

Update Risk Register

Finalize BCE

Public Involvement

Revisit Watershed Goals and Objectives

Final BCE Report

Data & Tools

- GIS: Land use/cover, physical and natural resource data, impervious surface, utilities, infrastructure,
- Sustainability Tool

- WQ and H&H models
- Financial Analysis protocol
- Risk Assessment Tool
- BCE Protocol
- Alternatives Analysis Tool
- Sustainability Tool

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Responsibilities

- MSD and Partner agencies
- Contractors

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- CFAC

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- MSD
- Contractors
- CFAC

Policy Gap Analysis Major Findings

Policy Gap



- Most of the identified BMPs are allowed; but the Cincinnati Municipal Ordinances and MSD/SMU Rules and Regulations may not explicitly state their allowed use or provide detailed design specifications

Corrective Action

- Hamilton County Storm Water District/MSD/SMU working together on Stormwater Technical Design Manual as a practical resource for developers

Policy Gap



- Cincinnati Municipal Ordinances were insufficient for compliance with NPDES Phase II MS4 stormwater permit

Corrective Action

- SMU has already drafted ordinances necessary for compliance which will undergo public review in Dec. 2011

Policy Gap



- Stormwater policy for land development is mostly focused on peak flow reduction vs. onsite detention and retention

Corrective Action

- MSD/SMU reviewing Rules and Regulations

Policy Gap



- Parking code based on minimum standard which produces more impervious cover than necessary

Corrective Action

- Land Development Code will comprehensively review land development stormwater policies (e.g. parking lot code, subdivision code, landscaping code)



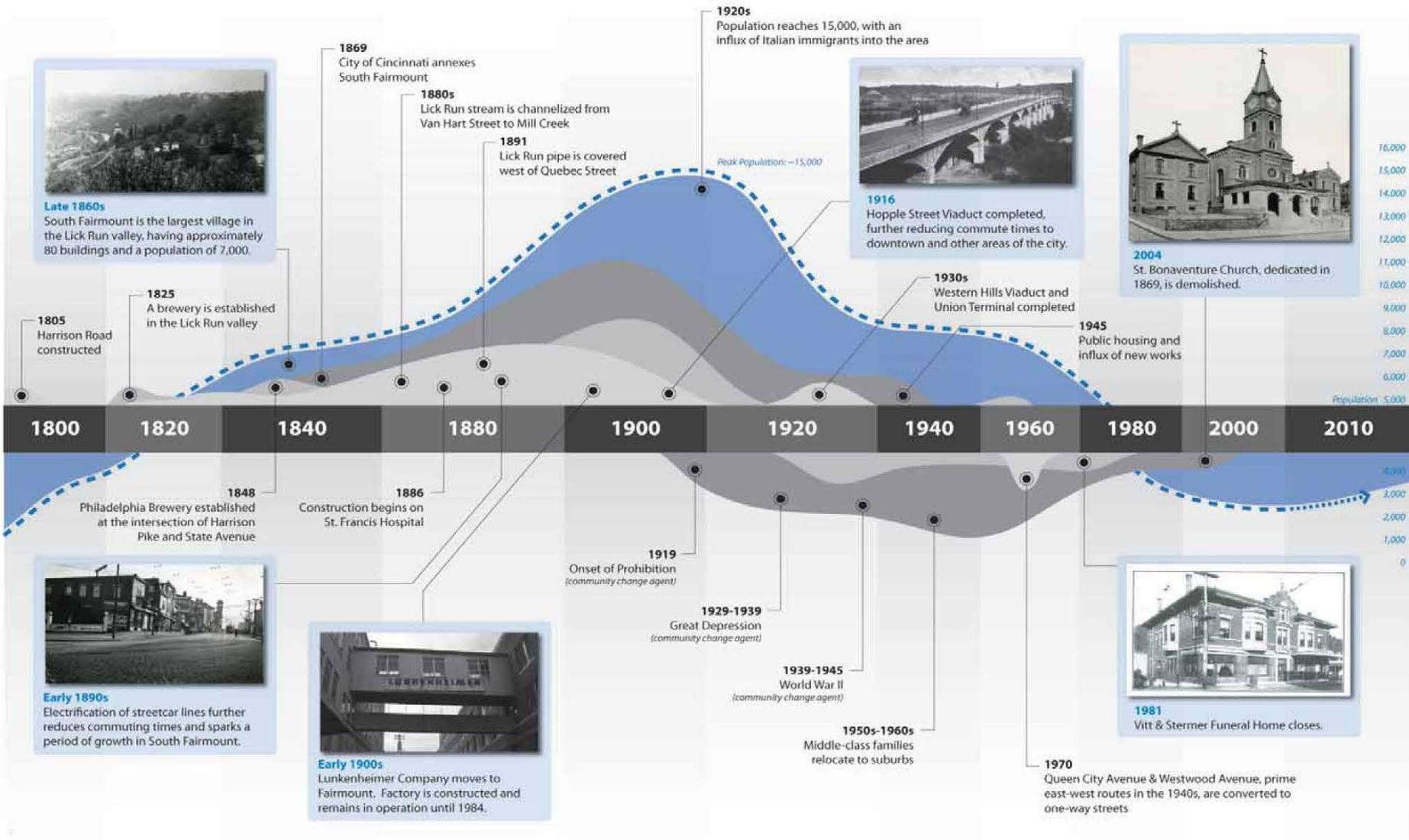
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HARRISON AVE. East from QUEEN CITY AVE, TO BEEKMAN ST.



S. FAIRMOUNT 1913



Late 1860s
South Fairmount is the largest village in the Lick Run valley, having approximately 80 buildings and a population of 7,000.

1869
City of Cincinnati annexes South Fairmount

1880s
Lick Run stream is channelized from Van Hart Street to Mill Creek

1891
Lick Run pipe is covered west of Quebec Street

1920s
Population reaches 15,000, with an influx of Italian immigrants into the area



1916
Hopple Street Viaduct completed, further reducing commute times to downtown and other areas of the city.



2004
St. Bonaventure Church, dedicated in 1869, is demolished.

16,000
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000

1805
Harrison Road constructed

1825
A brewery is established in the Lick Run valley.

1848
Philadelphia Brewery established at the intersection of Harrison Pike and State Avenue



Early 1890s
Electrification of streetcar lines further reduces commuting times and sparks a period of growth in South Fairmount.

1886
Construction begins on St. Francis Hospital



Early 1900s
Lunkenheimer Company moves to Fairmount. Factory is constructed and remains in operation until 1984.

1919
Onset of Prohibition (community change agent)

1929-1939
Great Depression (community change agent)

1939-1945
World War II (community change agent)

1950s-1960s
Middle-class families relocate to suburbs



1981
Vitt & Stermer Funeral Home closes.

1970
Queen City Avenue & Westwood Avenue, prime east-west routes in the 1940s, are converted to one-way streets

1800 1820 1840 1880 1900 1920 1940 1960 1980 2000 2010

4,000
3,000
2,000
1,000
0

Focus on the Lick Run Watershed

•The Lick Run watershed is home to CSO #005, the largest CSO in Hamilton County. The watershed was named after a stream - called Lick Run - that once ran between Queen City and Westwood avenues and discharged into Mill Creek. The stream was enclosed within a 19.5-foot diameter combined sewer called the Lick Run interceptor, which runs under 3,700 feet of streets and buildings in South Fairmount.

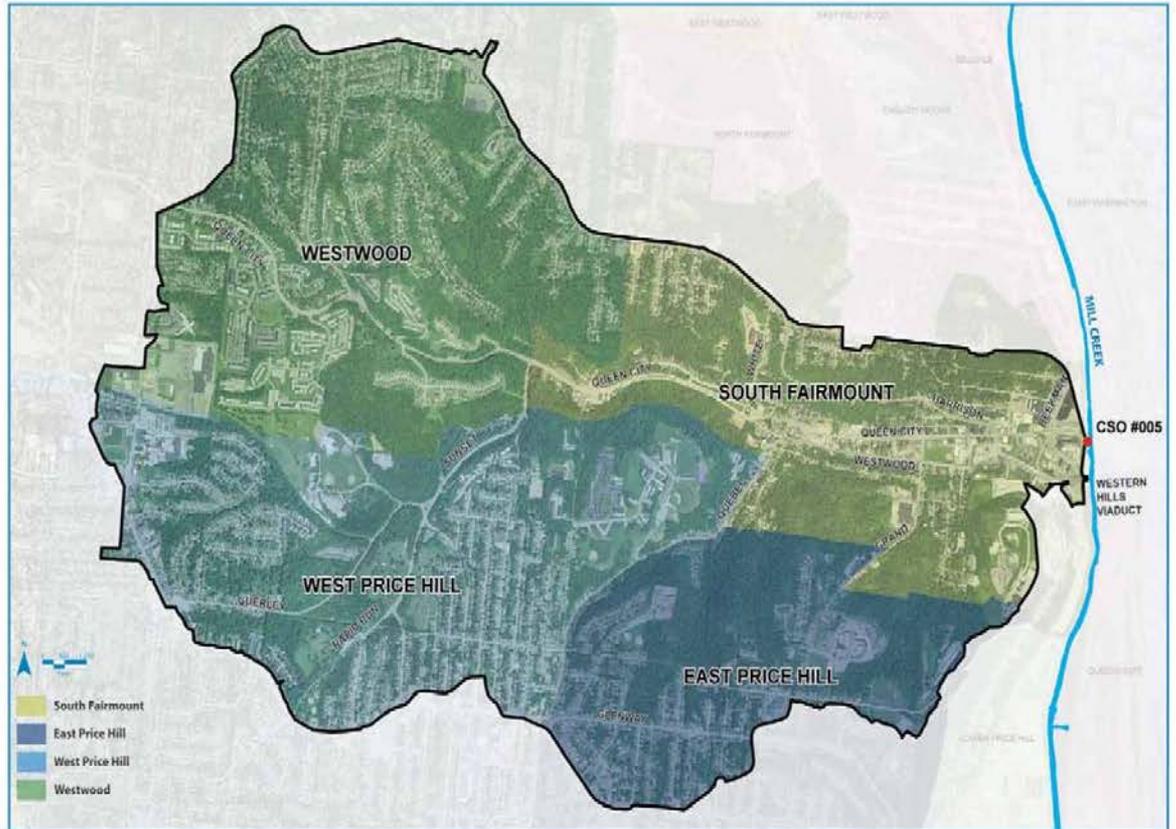
•When it rains, the Lick Run interceptor sewer can become filled beyond its capacity. Excess flow is diverted - untreated - through the CSO #005 outfall to the Mill Creek.

•Overflow History

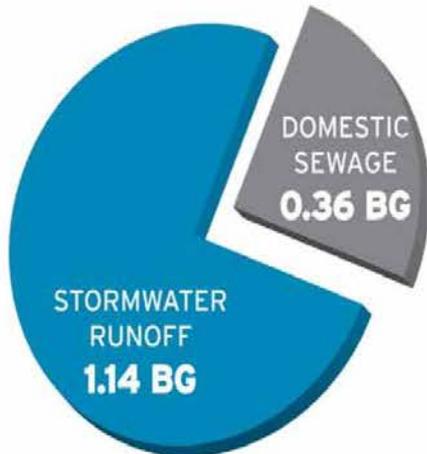
•In a typical year, 1.7 billion gallons of combined sewage and stormwater overflow from CSO #005 into the Mill Creek. Of that total, less than 25% is sewage - the rest comes from stormwater and what used to be natural stream flow.

•Watershed Characteristics

•The Lick Run watershed covers about 2,700 acres on Cincinnati's west side. It includes Cincinnati's South Fairmount neighborhood and portions of East and West Price Hill and Westwood. It is roughly bounded by Harrison Avenue to the north, Ferguson Avenue to the west, Glenway Avenue to the south and the Mill Creek to the east.



•Lick Run Watershed Neighborhoods



Long-term Watershed Vision Plan

How could MSD's investment support future public/private investments?

Additional investment in the Lick Run watershed - identified in the preliminary long-term vision plan - could be achieved over time with support from public and private investment. Long-term investment is envisioned to include:

- viable, walkable **neighborhood business district**
- **enhanced transportation network**
- **multi-use Cultural Trail**
- **market-driven land development**
- additional **streetscape improvements**
- **enhanced civic/recreation hub**
- additional **public amenities** (e.g., benches, lighting, trash receptacles, wayfinding)

*The Long-term Watershed Vision Plan (not shown) can be viewed in the presentation for Community Design Workshop #3. Visit: www.projectgroundwork.org/lickrun and follow the links under Community Involvement.

In Your Words...

Written comments from workshop participants:

"We can see our money being used in a more useful way: creating waterway, business opportunities, recreation."
~ resident, Lick Run Watershed

"It needs to be sure not to remove current businesses but seek rather to provide relocation opportunities for them to remain and be a part of the new revitalized community."
~ resident, Lick Run Watershed

"[The] plan selection is most useful to Lick Run Valley residents and most economical to MSD patrons also."
~ property owner

"The plan has gotten the support of the Lick Run Valley inhabitants."
~ resident, Lick Run Watershed

For updates on the Lick Run Project, please continue to visit: www.projectgroundwork.org/lickrun. You can also contact MSD Engineering Customer Service at (513) 557-3594 or send an e-mail to MSD.Communications@cincinnati-oh.gov.



Lick Run Community Design Workshop #3

On Thursday, February 23, 2012, the Metropolitan Sewer District of Greater Cincinnati (MSD) hosted its third of three "Community Design Workshops" at Orion Academy (charter school) in South Fairmount to gather public input on the proposed Lick Run Alternative Project.

What's the Lick Run Alternative?

The Lick Run Project is a series of underground storm sewers and natural, above ground waterways to transport stormwater and natural drainage to the Mill Creek. This storm sewer separation project would eliminate about 800 million gallons of combined sewer overflows (CSOs) annually into the Mill Creek. It is one of several watershed-based solutions being proposed to the U.S. EPA and other regulators as an alternative to a deep, underground storage tunnel and enhanced high-rate treatment facility.

The central element of this project is an urban waterway in South Fairmount between Queen City and Westwood avenues, east of White Street.

Focus of Community Design Workshop #3

The workshop featured an overview presentation, Q&A, and small group breakout sessions to evaluate the strengths, weaknesses, and potential refinements for the preliminary Lick Run Master Plan. The plan was developed with input from the first two Community Design Workshops, held in August and October 2011. The results of Community Design Workshop #3 are summarized inside.

Preliminary Lick Run Master Plan

The preliminary Lick Run Master Plan contains the Lick Run Alternative project, including a refined preliminary design concept for the proposed urban waterway in South Fairmount. In addition, the plan includes a preliminary Long-term Watershed Vision Plan that identifies additional public amenities that could be achieved over the long term through public or private investment.

The three Community Design Workshops played a critical role in this process. The community's willingness to share ideas, suggestions and concerns, complete surveys and engage in constructive dialogue helped directly shape the master plan. Although this phase of the effort is complete we encourage you to remain engaged and informed.

What's Next?

Preliminary findings on the Lick Run Alternative and the tunnel will be presented to the Hamilton County Board of County Commissioners for consideration in March 2012. In December 2012, MSD will submit its preferred remedy for resolving CSOs in the Lower Mill Creek watershed to the U.S. EPA and other regulators.

Major Findings from the Workshop

Breakout Session Feedback:

- Perceived **strengths** of the proposed urban waterway include: **lower up-front & lifetime costs, potential for urban revitalization, neighborhood beautification, ecological benefits, and attention paid to the historic fabric.**
- Perceived **weaknesses** of the proposed urban waterway include: **impact to existing businesses, traffic and parking issues, lack of identified funding, and lack of clear economic benefit provided by green space.**
- Participants reinforced the importance of **preserving as many existing and historic buildings as possible, addressing public transportation opportunities, encouraging urban infill for future development, and coordinating with future Harrison Avenue and Western Hills Viaduct projects.**

LICK RUN WATERSHED

RESULTS OF COMMUNITY INPUT
COMMUNITY DESIGN WORKSHOP #3

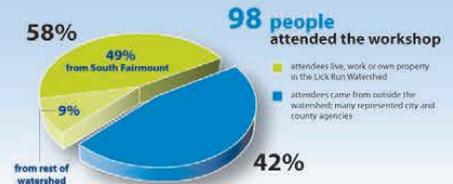
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93% of respondents support the proposed Lick Run Alternative, compared to 5% who support the deep tunnel and 2% who are unsure. (41% of attendees responded to this question)

71% of respondents attended a prior Community Design Workshop. (35% of attendees responded to this question)

93% of respondents said that after seeing the presentation, they have a better understanding of what MSD is proposing to implement as part of the alternative solution for CSO reduction. (47% of attendees responded to this question)



South Fairmount Corridor

These preliminary design concepts for a proposed urban waterway in South Fairmount (Cincinnati, Ohio) were developed by the Metropolitan Sewer District of Greater Cincinnati (MSD) with input from the community and public/private partners. The concepts were presented for public review at the Lick Run Community Design Workshop #3 on February 23, 2012 in Cincinnati as part of a preliminary Lick Run Master Plan. They will undergo additional refinement prior to integration into a final plan. The U.S. EPA has final approval over implementation of this project.

Perceived Strengths

- Potential for urban revitalization, including the promotion of urban infill and a more livable, walkable community
- Enhanced beauty and aesthetics of neighborhood
- Ecological and environmental benefits
- Lower up-front & lifetime costs
- Attention given to neighborhood's history
- Improved neighborhood identity & quality of life

Perceived Weaknesses

- Impact on local jobs and businesses
- Parking accommodations fall short of demand
- Lack of identified funding
- Economic benefits of green space not clear
- Traffic noise could detract from ambiance of the waterway
- Waterway could split the neighborhood north and south

Suggested Refinements

- Preserve existing and historic buildings where possible
- Address public transportation
- Create incentives for homeowner implemented sustainable strategies (i.e., rain barrels, rain gardens)
- Include farmers market & dog park from CDW#2
- Coordinate with future Harrison Avenue & Western Hills Viaduct
- Promote urban infill (redevelopment of existing properties)

Preliminary Urban Waterway Plan

This plan shows the preliminary urban waterway concept, which was developed based on public feedback from the first two Community Design Workshops and through discussions with local public agencies (e.g., Cincinnati Department of Transportation & Engineering, Cincinnati Recreation Commission), community groups (e.g., South Fairmount Business Association, South Fairmount Community Council), and other partners.

If approved by the Board of County Commissioners and Regulators, this plan represents the "Base Project," or what could be constructed by 2018 to meet MSD's mandated schedule for Consent Decree compliance in the Lower Mill Creek.

Enabled Impact Projects (formerly referred to as "Early Success Projects") are pilot projects constructed to demonstrate innovative green infrastructure strategies while helping reduce the volume of stormwater runoff entering MSD's combined sewer system. Examples include bioinfiltration (rain gardens) and pervious pavement.

Any land north of the proposed urban waterway shown as greenspace could potentially be repurposed as part of the Long-term Vision

1 Immanuel United Church Enabled Impact Project	2 St. Francis Enabled Impact Project	3 San Antonio Church Enabled Impact Project
Proposed Storm Sewer	Proposed Green Street Features	Proposed Maintenance/Multi-Purpose Trail
Existing Building	Potential to remain pending additional hydraulic and engineering design refinements	Potential relocation pending partner funding identification and structural integrity of resources

Headwaters Gateway District



(Looking Northwest) This image depicts the daylighting of stormwater into the proposed urban waterway. The proposed urban waterway will contain water quality features (limestone rock) and a well-vegetated riparian edge. Rain gardens will help to intercept stormwater from Queen City Avenue and direct it into the waterway. Lighting is included to ensure the multi-purpose trail on Westwood is well lit and safe for pedestrians.

Urban Ravine District



(Looking South toward Westwood) This image depicts the character of the proposed urban waterway through the Urban Ravine. The waterway contains a heavily-vegetated riparian edge, trees, and limestone rock. The height of the retaining wall from Westwood is visible. A pedestrian railing and lighting along the maintenance path and overlooks are included for safety (and as required by code).

Civic Recreation Hub

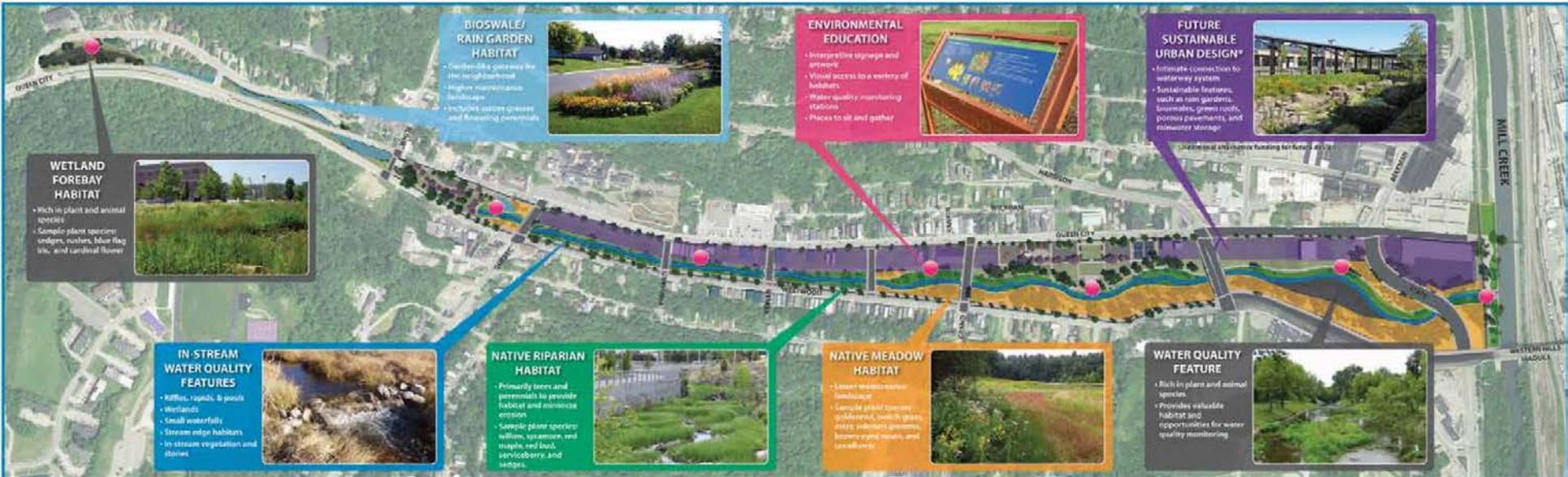


(Looking Northwest) This image depicts the character of the proposed urban waterway near the Civic Recreation Hub. Native vegetation is included to help reduce maintenance needs and to provide water quality benefits during high flow events. The pedestrian bridge in the background is above the modeled 100-year floodplain elevation so during large volume rain events, water elevations would be contained within the heavily-planted area.

Eastern Gateway District



(Looking South toward Westwood) This image depicts the character of the proposed urban waterway at the water quality feature. The multi-purpose path provides safe, well-lit access. During low volume rain events, runoff flows north of the water quality feature to Mill Creek. During high volume rain events, water flows both north of and into the water quality feature. This feature provides valuable terrestrial and aquatic habitat.



MILL CREEK

ALLEN HILLS WALKWAY

WALKWAY

WALKWAY

WALKWAY

WALKWAY

WALKWAY

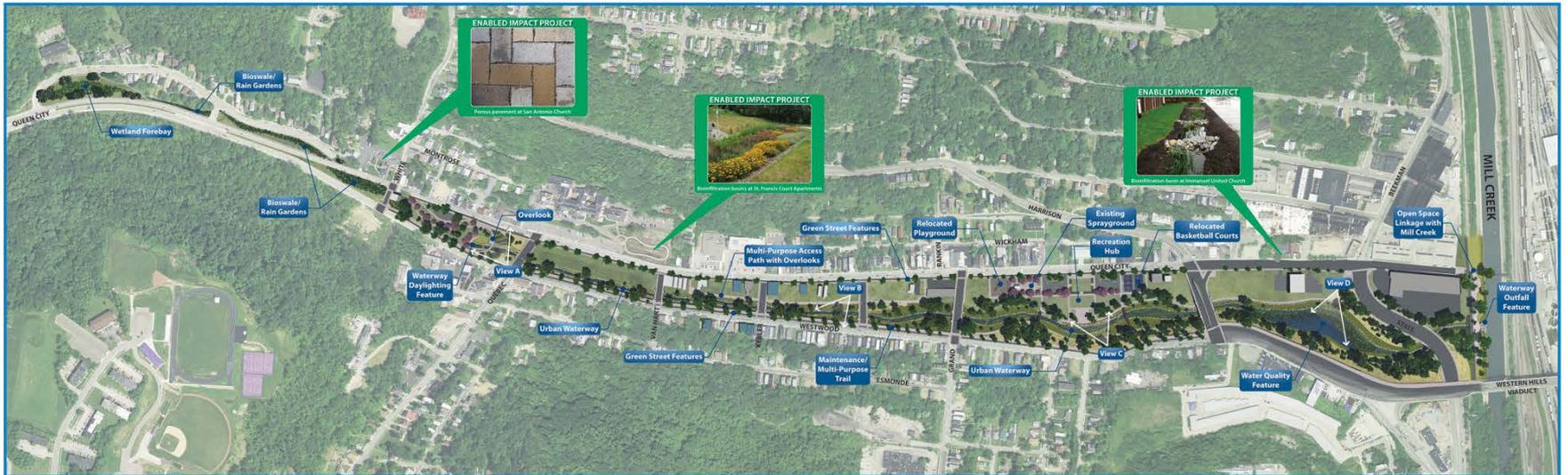
WALKWAY

WALKWAY

WALKWAY

PRELIMINARY URBAN WATERWAY PLAN

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View A (Looking Northwest)



View B (Looking Southwest)



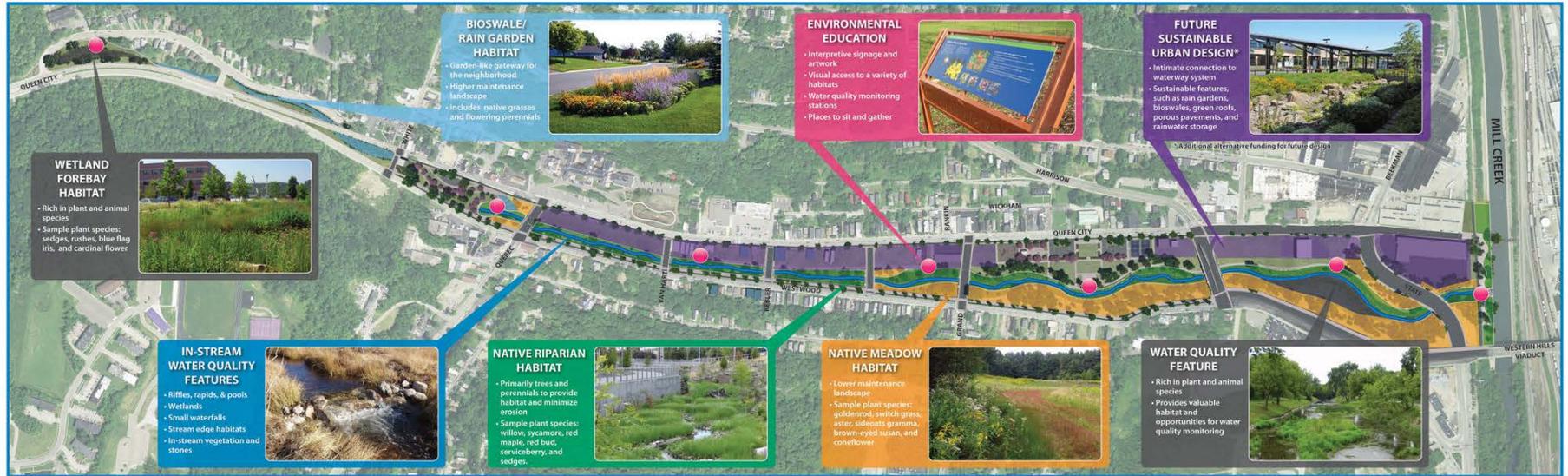
View C (Looking Northwest)



View D (Looking Southwest)

URBAN WATERWAY CHARACTER & ECOLOGY

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Natural

NETWORK OF CSO REDUCTION SOLUTIONS

1 Rainfall = Stormwater Runoff



On an **undeveloped landscape**, stormwater runoff:

- Slows and filters through vegetation & soil
- Infiltrates into the ground

On a **developed landscape**, stormwater runoff:

- Increases in volume, velocity, pollution, and temperature
- Minimally infiltrates into the ground
- Can negatively impact natural waterways

2 Runoff Diversion



A network of community solutions more effectively manages stormwater runoff by:

- Reducing inputs to the combined sewer system
- Reducing pollution
- Replenishing groundwater
- Improving natural systems

Stormwater management strategies can be applied all homes, in neighborhoods, and throughout the Lick Run Watershed.

3 Household Strategies



Stormwater best management practices (BMPs) that residents can incorporate at home include:

- Downspout disconnection (where permitted)
- Rain gardens & bioswales
- Rain barrels & cisterns
- Green roofs
- Trees and other plantings
- Porous pavements

4 Neighborhood Strategies



Stormwater BMPs that can be implemented in neighborhoods include:

- Reduced pavement width (where possible)
- Porous pavements
- Street trees and stormwater planters
- Collecting and treating stormwater in parks and open spaces

5 Source Control Strategies



Proposed **source control strategies** include:

- New storm sewers to capture stormwater runoff and reduce the volume of stormwater entering combined sewers
- Natural conveyance strategies to capture, infiltrate, and treat stormwater

6 Structural Stormwater BMPs



Structural stormwater BMPs trap heavy sediment like sand, and they collect floatable trash and debris. These structures are designed to be easily accessed and maintained.

7 Proposed Urban Waterway



The proposed urban waterway:

- Conveys captured stormwater runoff to Mill Creek
- Improves water quality
- Provides wildlife habitat
- Includes an open space network
- Provides opportunities for environmental education

8 Healthier Mill Creek



The proposed urban waterway will help reduce combined sewer overflows (CSOs) and improve water quality in Mill Creek.

The integrated source control strategies in the Lick Run Watershed, combined with other sustainable infrastructure projects in the corner Mill Creek watersheds, will gradually treat this end-of-pipe regional resource.

MSD's Proposed Solutions in the Lick Run Watershed



Lick Run Watershed: Stormwater Flow Diagram

