Phase III Stream Assessment Study: Potential Stream Restoration Projects

Strawberry Run and Taylor Run

December 5, 2018
Tonight’s Agenda

• Introduce the project team
• Why stream restoration?
• Healthy stream characteristics
• City’s Stream Assessment Program
• Project selection
• Finished project examples
• Next steps
Project Team

Consultant

City Departments

Wood Environment & Infrastructure Solutions

Transportation and Environmental Services (T&ES)

Department of Project Implementation (DPI)

Recreation, Parks and Cultural Activities (RPCA)
Project Drivers

1. Water quality and improving local streams is a City priority
2. Local benefits: enhanced water quality, improved habitat, protection of property
3. State and EPA require development of Total Maximum Daily Loads (TMDLs) for impaired streams
Chesapeake Bay TMDL
Chesapeake Bay TMDL Cleanup Mandates

- Enforced through the City’s stormwater permit
- Requires ~1/4 of the City to be retrofit for water quality treatment before 2028
- Dense urban nature of the City limits potential solutions
- Stream restoration is one of the more cost-efficient approaches

<table>
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<tr>
<th>MS4 Permit Cycle</th>
<th>% Total</th>
<th>Approx. Acres</th>
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</thead>
<tbody>
<tr>
<td>Phase I (2013 - 2018)</td>
<td>5%</td>
<td>120 - 130</td>
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<tr>
<td>Phase II (2018 - 2023)</td>
<td>35%</td>
<td>660</td>
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<tr>
<td>Phase III (2023 - 2028)</td>
<td>60%</td>
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<td>Total All Phases</td>
<td>100%</td>
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**What Makes a Stream Healthy?**

1. Bed stability and diversity
2. Sediment transport balance
3. In-stream habitat & flow diversity
4. Bank stability (native plant roots)
5. Riparian buffer (streamside forest)
6. Active floodplain
7. Healthy watershed

“Multiple Benefits” or “Co-Benefits”
Stream Pyramid

1. **HYDROLOGY**
   - Transport of water from the watershed to the channel

2. **HYDRAULIC**
   - Transport of water in the channel, on the floodplain, and through sediments

3. **GEOMORPHOLOGY**
   - Transport of wood and sediment to create diverse bed forms and dynamic equilibrium

4. **PHYSICOCHEMICAL**
   - Temperature and oxygen regulation; processing of organic matter and nutrients

5. **BIOLOGY**
   - Biodiversity and the life histories of aquatic and riparian life

*Courtesy of Stream Mechanics*
Scour
Scour – Field Examples

Outfall to Holmes Run

Strawberry Run

Taylor Run
Stream Assessment Program

Phase I  Stream Categorization
Mapping of streams, defining limits, and stream categorization

Phase II  Assessment of Streams
Stream habitat, infrastructure impacts, problem areas, characteristics

Phase III  Project Identification
Potential project sites evaluated and ranked. Conceptual designs for top projects.
Potential Projects – Stream Segments

- Unnamed Tributary near Walleston Ct.
- Strawberry Run near Taft Avenue
- Taylor Run near Chinquapin Park
- Holmes Run north of N. Beauregard St.
- Timber Branch near Ivy Hill Cemetery
Unnamed Tributary near Walleston Ct.
Strawberry Run near Taft Avenue
Taylor Run near Chinquapin Park
Holmes Run north of N. Beauregard St.
Timber Branch near Ivy Hill Cemetery
# Phase III Stream Assessment

## Evaluation of Potential Projects

- Field Assessment
- Recommendations
- Decision Matrix and Priority Ranking

<table>
<thead>
<tr>
<th>Number</th>
<th>Ranking Criteria</th>
<th>Importance Score 1-10</th>
<th>Normalized Weight</th>
<th>Unnamed Tributary near Waterston Court</th>
<th>Strawberry Run near Taft Avenue</th>
<th>Taylor Run near Chinquapin Park</th>
<th>Holmes Run, north of H Beavergard St.</th>
<th>Timber Branch near Ivy Hill Cemetery</th>
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<td>Cost per M. of Phosphorous</td>
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<td>MS4 Draining to Project Site</td>
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Strawberry Run
Strawberry Run
Strawberry Run
Taylor Run
Phase III Stream Assessment

Conceptual Designs and Cost Estimates

- Conceptual Designs
- Using Natural Channel Design (NCD) which emulates natural river systems
- Planning Level Cost Estimates

~900 ft
~1900 ft
Natural Channel Design

- Riffle
- Step-Pools
- Cascade
- Log Vane
Conceptual Designs

Strawberry Run

Taylor Run
Feasibility

Potential Construction Access
Benefits

- Habitat
- Native Vegetation
- Water Quality
- Aesthetics
Strawberry Run – Downstream Project

Before

After
Strawberry Run – Downstream Project

Before

After
Joint Base Andrews

Before

After

Courtesy of Wood Environment & Infrastructure Solutions
Cullers Run

Before

After

Courtesy of Wood Environment & Infrastructure Solutions
Cullers Run

Courtesy of Wood Environment & Infrastructure Solutions
North Mill Creek

Before

After

Courtesy of Wood Environment & Infrastructure Solutions
Big Rocky Run

Before

After

Courtesy of Wood Environment & Infrastructure Solutions
Habitat...
Next Steps & What To Expect

**Outreach**
- Public and Stakeholder Outreach
- Consider feedback in designs
- More outreach...

**Finalize Phase III Stream Assessment**
- Outfall Conceptual Designs – Dec. 2018
- Report – January 2019

**Funding**
- Applied for matching 50/50 state grants
Next Steps & What To Expect

Continue with Design
(may depend on grant funding)

- 30%, 60%, 90%, Final
- Topographic survey
- Tree survey
- Refine designs
City Contact Information

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