



Building a Long-Term Stewardship Program to Manage and Maintain Urban Stream Improvement and Wetland Projects

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City of Charlotte Storm Water Services

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Storm Water Services Mission



PRIORITIES



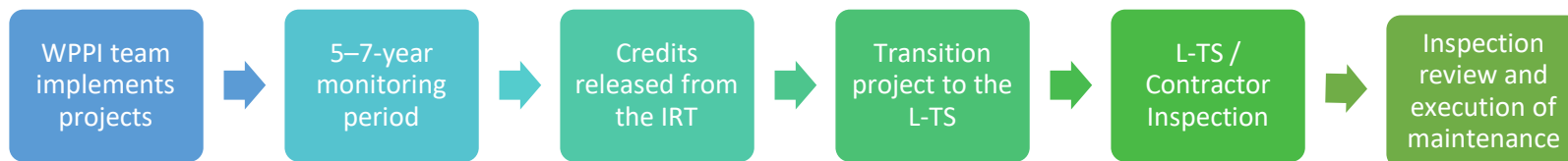
What is the L-TS Program?

- ◁ **Long-Term Stewardship (L-TS) program is necessary to meet requirements set forth by the EPA, NCDEQ, and the Army Corp of Engineers.**
- ◁ **We provide management of city owned stormwater natural resource assets**
 - Closed out stream improvement projects
 - Stormwater Control Measures (SCMs)
- ◁ **Overall Program Initiatives**
 - Enforce regulatory compliance requirements
 - Improve surface water quality
 - Conduct Inspections, maintenance/repairs, evaluations
 - Develop and implement routine operation and maintenance plans
 - Provide cost estimates for maintenance and repairs
 - Provide feedback during the plan review phase for design improvements
- ◁ **Program initially started in 2020**



Stream Improvement Stewardship

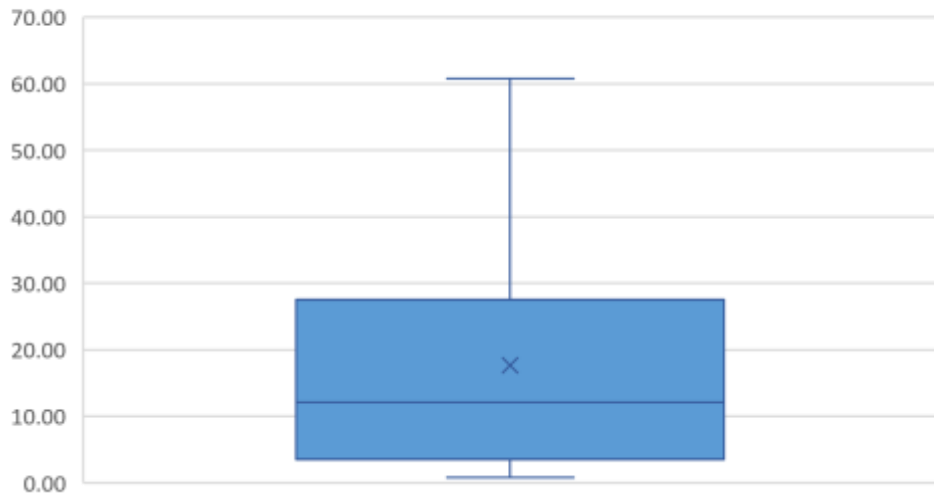
- ◁ After a 5-to-7-year monitoring period, stream and wetland improvement projects are transferred into the L-TS from the Watershed Planning and Project Implementation (WPPI) team.



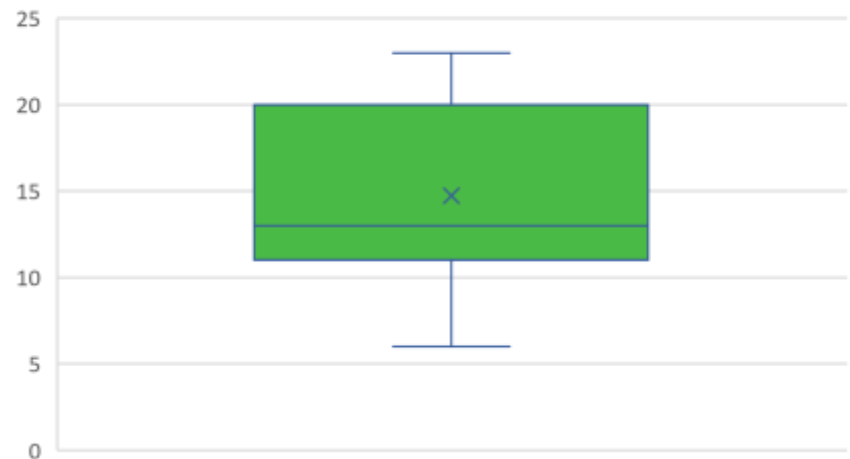
Project Stats

- ◁ 22 stream improvement projects on minor stream systems located in the City of Charlotte.

Stream CE Area (Acres)

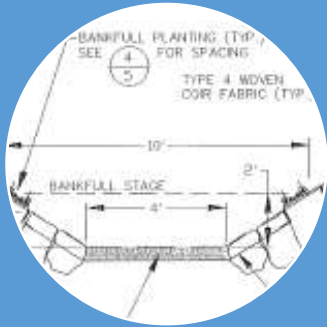


Age of Stream Projects (years)



Majority of stream projects have conservation areas less than 30 acres and are greater than 10 years old.

Building a Long-Term Stewardship Program



Inspection Program Development

- Project history review
- Project transition from WPPI
- ArcGIS Online
- Inspection program standard operating procedures



Inspection Program Implementation

- Field Inspections in ArcGIS Online
- Staff and staff training
- Updates to inspection SOP



Inspection Program Reporting

- Report format development
- Project reporting
- Report review
- Prioritization ranking for maintenance and repairs



Implementation of Maintenance and Repairs

- Service contract building
- Execution of maintenance and repairs based on prioritization order
- Database Tracking



Stream Inspections

- ▽ Conducted annually utilizing ArcGIS Online.
- ▽ Easement boundaries are inspected in late fall and winter. Riparian vegetation is inspected in the late spring early summer.
- ▽ Goal of annual inspections for each project.
- ▽ A minimum of two team members per inspection is recommended for safety purposes.
- ▽ **Developed Inspection SOP**
 - Preparing for the inspection
 - Inspection procedure
 - Collection feature and severity level descriptions
 - Post inspection procedures
 - Example report



LONG-TERM STEWARDSHIP INSPECTION PROGRAM
Standard Operating Procedures

REVISION 1 for City Review

June 2022

PREPARED FOR:



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PREPARED BY:



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1430 S. Mint Street, Suite 104
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Phone: 704.332.7754

Inspection Collection Features

Collection Feature	Description
Boundary Issues	Issues encountered with easement signage, posts, gates, or fencing.
CE Encroachment	Occurrences within the easement that are restricted. Examples include maintaining areas within the easement as yard, new structures in the easement (sheds, fences, hunting stands), yard waste dumping, etc.
Tree Endangerment	Trees within the easement that are at risk of falling onto adjoining property or structures.
Channel Stability	Stream bank erosion or excessive sediment deposition.
Failed Structure	Constructed stream structures (vanes, sills, riffles, root wads, brush toe, etc.) that are failing or at risk of failing.
Beaver Dam	Beaver dams observed within the easement.
Miscellaneous	Issues encountered that do not fall into another category.
Landowner Correspondence	Discussions had with landowners that approach the inspection team.
Invasive Vegetation	Invasive vegetation noted in the field, particularly vines. This may be recorded as a point or as a polygon if the invasive vegetation occupies a larger area.

Stream Inspection Severity Levels

Feature	Issue Feature	Condition	Priority
Invasive* Vegetation	<ul style="list-style-type: none"> • Autumn olive • Bamboo • Chinese lespedeza • Chinese privet • English ivy • Glossy privet • Japanese honeysuckle • Japanese hops • Japanese knotweed • Japanese stiltgrass • Kudzu • Mimosa • Morning glory • Multiflora rose • Oriental bittersweet • Porcelain berry • Princess tree • Tree of heaven • Wisteria 	<ul style="list-style-type: none"> • Mature in age? • Area of coverage • Density? • Warrant prompt following up? 	<p>Low – Invasive species not affecting riparian tree growth inside conservation easement</p> <hr/> <p>Medium – Invasive species beginning to endanger riparian tree growth <i>OR</i> low-density presence of species listed in red</p> <hr/> <p>High – Invasive species endangering tree growth <i>OR</i> high-density species listed in red present</p>

Stream Inspections – ArcGIS Online



Stream Inspection Results

Total issues noted during inspections

Issue Category	Count
Boundary Issue	62
CE Encroachment	238
Tree Endangerment	185
Channel Stability	236
Failed Structure	154
Beaver Dam	33
Miscellaneous	73
LnOwner Correspondence	0
Invasive Vegetation	184

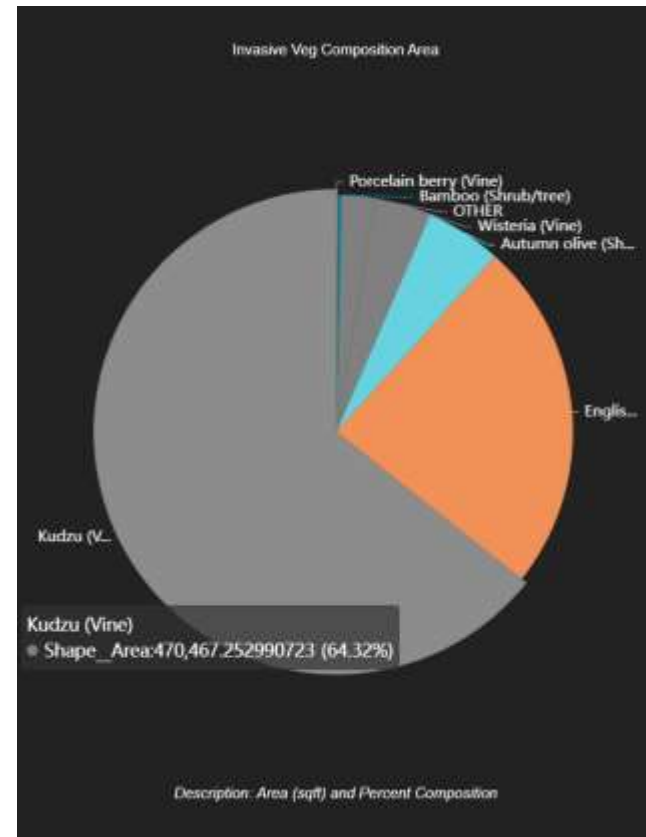
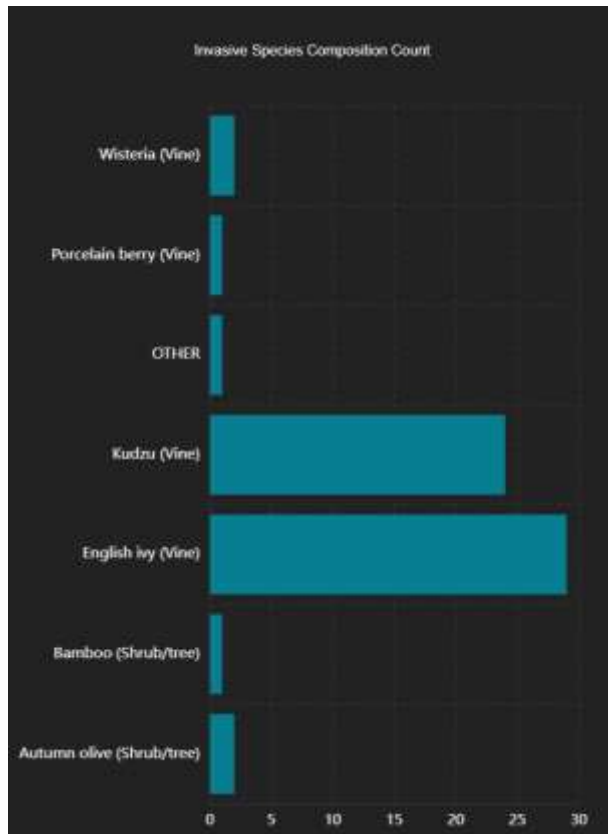


High priority / severity issues noted during inspections

Issue Category	Count
Boundary Issue	25
CE Encroachment	124
Tree Endangerment	63
Channel Stability	17
Failed Structure	2
Beaver Dam	5
Miscellaneous	16
LnOwner Correspondence	0
Invasive Vegetation	60

Stream Inspection Results

Invasive species issues noted as being high severity



You never know what you will find...



Inspection Reporting

- ◊ Project background / introduction
- ◊ Inspection summary
- ◊ High severity issues
- ◊ Field map noted with high severity issues





LONG TERM STEWARDSHIP
MONITORING REPORT

PROJECT NAME	CITY PROJECT NUMBER	INSPECTION DATE
Edwards Branch Watershed Improvement Project	671-04-707	May 18, 2022
MONITORING ORGANIZATION	INSPECTOR	EMAIL ADDRESS
Wildlands Engineering, Inc.	Ella Wickliff Sam Kirk	ewickliff@wildlandseng.com skirk@wildlandseng.com
WEB MAP LINK		
https://wildlands.maps.arcgis.com/apps/webappviewer/index.html?id=d2af55e9393b4f70653dd3eaa314286		

Click the  tool at top left of map and select Edwards Branch to zoom to project.

INTRODUCTION

In 2014, CMSWS restored 2,100 linear feet of Winterfield Tributary and its headwater branches and preserved 4,196 linear feet of Evergreen Tributary for project-specific mitigation credit as part of the Phase III Edwards Branch Watershed Improvement Program. Previous phases of the site included the Sheffield Park CW Stream Restoration and the Edwards Branch Stream Restoration. The required 5-year monitoring period for the final phase of the watershed improvement project (phase III) was completed in 2018. The project is being evaluated for transition into the CMSWS's Long Term Stewardship (L-TS) program.

The following report provides a summary of site conditions observed during the current inspection and highlights high level action items. Detailed inspection notes and photographs are available geospatially in the City of Charlotte L-TS web map (link above).

INSPECTION SUMMARY

Easement: The as-built easement signage layer was not available in the web map during inspection. Therefore, easement sign information was only collected when an easement sign was clearly missing or damaged. Inspectors did not take data to record each sign present on the site and data was not taken for missing signs unless it was at an obvious corner that should have been marked along the easement boundary. Moving forward during site inspections data will be collected to record each sign present or absent on the site when GIS data is unavailable at an assumed distance of 100 feet between markers.

In general, the conservation easement is in poor condition along Edwards Branch throughout the Winterfield and Sheffield neighborhoods, with encroachments present from many of the adjacent residential landowners. Winterfield Tributary and Edwards Branch had easement signage marking the boundary. Most high priority encroachments included permanent structures, fences, or mowing within the easement and are detailed in the High Level Action Items section, below.

The easement around Evergreen Tributary is located within a nature preserve and the easement is in good condition. There are maintained trails throughout the Evergreen Nature Preserve that appear to fall within the conservation easement and one footbridge stream crossing that was noted as low priority. There is also a maintained powerline right of way along the eastern headwater tributary beginning at the dead end of Evergreen Cemetery Drive that appears to cross the conservation easement; however, an issue point was not recorded because the easement boundary was unclear.

Maintenance and Repair Prioritization

◁ Priority Order Ranking

1. **CE Enforcement**
2. Boundary Issues (Sign replacement)
3. Invasive Vegetation (High Severity)
3. Tree Endangerment (High Severity)
4. Beaver Dams (High Severity)
5. Channel Stability (High Severity)
5. Failed Structures (High Severity)

Miscellaneous ranking depends on impact to project and property owners.



Replanting a CE after property owner mowed and cut back vegetation

Maintenance Examples



Challenges

- △ Scale of the undertaking
- △ CE Enforcement on older projects
- △ Development in an urban environment
- △ Proximity to homes
- △ Managing the invasive jungle
- △ Developing contracts to execute maintenance
- △ Property owners and reactionary work
- △ ArcGIS Online and security challenges
- △ Beaver management



Future Program Building



Easement Enforcement

- Develop process for contacting property owners and policies on CE Enforcement.
- Develop public outreach program to educate property owners



Inspection SOP refinement and database development

- Refine severity levels and improve field inspections
- Develop database for long-term data management
- Prioritization ranking for maintenance and repairs



Continue Implementation of Maintenance and Repairs

- Service contract building
- Execution of maintenance and repairs based on prioritization order
- Boundary sign replacement and CE enforcement



Grow Team and Expand Capabilities

- Service contract building
- Expand team to accommodate additional work and tackle restorative level efforts with WPPI team.



Thank you! & Questions?

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