



**To:** Members of Dublin City Council  
**From:** Dana L. McDaniel, City Manager  
**Date:** May 4, 2022  
**Initiated By:** Robert E. Ranc, Jr., Deputy City Manager/Chief Operating Officer  
Paul A. Hammersmith, PE, Director of Engineering/City Engineer  
C. Aaron Stanford, PE, Deputy Director of Engineering – Utilities  
**Re:** Waterways Maintenance Program Update

## Summary

The City of Dublin values the environment and recognizes Dublin's waterways are of great importance and contribute to the health, safety, and general welfare of the public. The preservation, maintenance, and improvement of the waterways and the connected habitat are crucial to the protection of these natural resources.

The Waterway Maintenance Program is a new initiative that was approved with the adoption of the 2022-2026 Capital Improvements Program. The mission of the Waterways Maintenance Program is to preserve and maintain the forty eight (48) miles of open watercourses within the City, preserving their storm water carrying capacity, addressing any critical items of maintenance, and protecting the environmental health of the waterways. This program will specifically focus on:

- Ensuring Dublin's waterways are kept clear of unnatural debris and other blockages.
- Maintaining the conveyance capacity of open watercourses, especially in areas that have FEMA designated floodway and floodplain.
- Reducing and eliminating illicit discharges into City waterways.
- Protecting and improving the riparian habitat that is a part of the stream ecosystem.
- Protecting and improving water quality within the waterways.
- Providing a comprehensive program to address the issues identified during waterways inspections performed over the past several years.

EMH&T was selected as the design consultant to assist the City with reviewing the current state of the waterways, providing analysis of the areas of concern, and developing a work program that can be used to meet the goals of the program.

The scope of EMH&T's work for the program includes:

- The review and analysis of approximately 535 waterway inspection reports completed by Franklin Soil and Water Conservation District (FSWCD) over the past four years.
- The review of reports and site visits to 25 sample locations to verify the accuracy of the reports and ensure site conditions have not changed since the time of original inspection.
- Creation of an Excel database compiling the data of the individual inspection reports.
- Analysis of the existing data to determine waterways on private properties, categorization of the types of private properties (residential, commercial, etc.), and providing the ownership information for the private properties through which waterways run.

- Identification and mapping of City-owned land/waterway easements and recommendation of channel maintenance activities.
- An interactive GIS map that includes property lines, public utilities, streams, FSWCD surface drainage features, mapped Stream Corridor Protection Zones (SCPZs), and spatial data developed by FSWCD related to their inspection reports. The GIS map includes links to the FSWCD inspection reports, as well as channel maintenance locations within City-owned parcels and easements dedicated to the City.
- Inspections located on City property and City-owned easements have been evaluated and the appropriate maintenance activity has been determined along with a preliminary Engineers Estimate of Probable Construction Cost (EOPCC) for the necessary maintenance activity.
- The developed scoring system is based on FSWCD's condition score, degree of channel instability, water quality/habitat impairments, threat to public/private property, constructability and access. The inspection points have been organized and grouped into project areas based on location and then prioritized using the developed scoring criteria. The maintenance schedule has been developed so that all necessary maintenance on City owned property, or areas where the City has maintenance responsibility through a drainage or other easements, will be completed over a 5-year timeframe.

The Phase 2 scope for the program is currently underway and will be completed by the end of May 2022. The remaining work will include:

- Environmental review of riparian habitat/permitting.
- Recommendations of integrating and improving the riparian habitat along each waterway.
- Development of an assessment toolbox to these locations that will lead to the implementation of the enhancement recommendations.
- Guidance on the development of educational materials for property owners and the larger community to encourage good stewardship of stream channels and riparian corridors.

### **Proposed Program Budget and Implementation Schedule**

EMH&T provided an April 6, 2022 summary memo, "Dublin Waterways Maintenance Program – Phase1", for the Program which is included in the materials provided via BoardPaq. This memo, along with detailed project cost analysis, provided an initial program budget for City owned/responsible areas of \$3,040,000. This total cost was the summation of the estimated project costs of the 59 separate Project Areas for City owned or responsible areas which included 150 inspection locations.

After detailed review by Staff of all project areas and associated inspection data, areas were identified where smaller stream blockages, or items such as blocked storm outfalls, could be more quickly addressed by City Staff or through separate contracts with debris removal contractors or City Staff. Of the 76 total debris blockages, 25 were identified as blockages to be addressed by City Staff.

Additionally, there were areas of erosion identified that, through review, were determined to be minor and showed no potential for damage to existing infrastructure. The inspection score assigned to each point was invaluable, as the team was able to review the points of channel erosion that could require bank stabilization. As the program was refined, there were areas of erosion that had a low inspection score, identified as being lower than a score of 36. This score, due to the criteria created, indicated that these areas are not rated as severe, nor were they determined to be a danger to public infrastructure, which was reflected in the criticality score. Through review of each of those points, it

was determined that these inspection points did not need to be addressed immediately and could be placed on a list of areas to monitor. Of the 74 total erosion inspection points, 30 points were identified as areas to be monitored.

These changes enabled the team to reduce the overall program budget to approximately \$1,750,000. This amount allocates \$460,000 for debris removal and \$1,290,000 for bank stabilization due to erosion. This overall budget was then allocated over a 5-year time period, which results in an annual budget of \$350,000 per year.

### **Private Property Stream Maintenance**

A considerable amount of the waterways in the City of Dublin are located on private property, with no maintenance responsibility designated to the City through an existing easement. Of the original 535 points of inspection, 349 (65%), are located on private property. The proposed program does not include projects to address issues on private property, nor does it include any private property issues in the proposed budget. Additionally, the Law Director has provided an opinion of the City's responsibilities regarding maintenance work necessary within waterways located on private property.

The Law Director's memo concludes that the City does not have a legal obligation to provide stream maintenance (including blockage removal) on private properties within the City. The City does have the ability, under certain circumstances, to require a private property owner within the City to conduct stream maintenance or, if the property owner refuses, to complete the necessary maintenance and assess the costs of such work back to the property owner. In addition, if the City decided that it wanted to undertake the costs of such work, it could execute a right of entry with the property owner so that the City could legally enter the property to perform the necessary work.

### **Recommendation**

The information provided regarding the Waterways Maintenance Program is to assist the Committee in reviewing the proposed Waterways Maintenance Program and make a recommendation to City Council for Program implementation. Staff recommends the Waterways Maintenance Program be implemented over a 5-year time period as detailed in the proposed summary of project costs and scores. This implementation schedule will require annual funding of \$350,000. Staff recommends beginning the Program implementation this year (2022). There are sufficient funds in the CIP to begin this work and staff will bring forward a request in the Q3 supplemental for additional necessary funds.

Further, staff recommends continuing the current practice regarding waterways on private property, with the maintenance of such waterways remaining the responsibility of the associated property owner(s). Staff is available for any questions or further discussion regarding the information presented herein, and any other topic related to the Waterways Maintenance Program.



**Waterways Maintenance Program**  
**Public Services Committee**  
**May 11, 2022**





A photograph of a family walking away from the camera on a dirt path through a dense forest. The scene is bathed in a warm, golden light, suggesting sunset or sunrise. The path is flanked by tall trees and thick undergrowth. In the foreground, a young boy in a striped shirt and shorts walks on the left, a young girl in a striped shirt and shorts in the middle, and a woman in a white t-shirt and dark pants on the right, carrying a bag. The overall mood is peaceful and nostalgic.

# Introduction



## Introduction

The City of Dublin values the environment and recognizes that our water quality is of great importance and contributes to the health, safety and welfare of the public. Furthermore, the waterways have important stormwater conveyance functions that reduce the probability of flooding to the community.

The City is developing a Waterways Maintenance Program that will:

- Ensure that waterways are kept clear of unnatural debris and other blockages.
- Maintain the conveyance capacity of the open watercourses, especially in areas that have FEMA designated floodway and floodplain.
- Reduce and eliminate illicit discharges into City waterways.
- Improve the natural riparian habitat that is a part of the stream ecosystem.
- Improve and protect the water quality of the streams.



## Why is this important

- Water is an important natural resource
- Adds value to properties and the community
- Protects public safety through flood protection and water quality preservation
- Riparian and aquatic habitats



# City of Dublin Waterways Maintenance Program

Presentation to City of Dublin Public Services Committee

May 11, 2022

The logo for EMH&T, featuring the letters 'E', 'M', 'H', and 'T' in a white serif font, each contained within a separate blue square, with an ampersand between 'H' and 'T'. The squares are arranged in a horizontal row and are set against a light gray diamond-shaped background.

EMH&T

The logo for Stantec, consisting of a white circular icon with a stylized 'S' shape inside, followed by the word 'Stantec' in a white sans-serif font, all contained within a white rectangular box.

Stantec





# Presentation Agenda

1. Project Overview
2. Waterway Inspections & Data Analysis
3. Maintenance Program Development Approach
4. GIS Mapping Tool
5. Inspection Scoring
6. Program Cost Estimates
7. Work Map Demonstration
8. Program Summary
9. Questions



# Project Overview

Waterways contribute to the health, safety, and general welfare of the public.

## Program Goals:

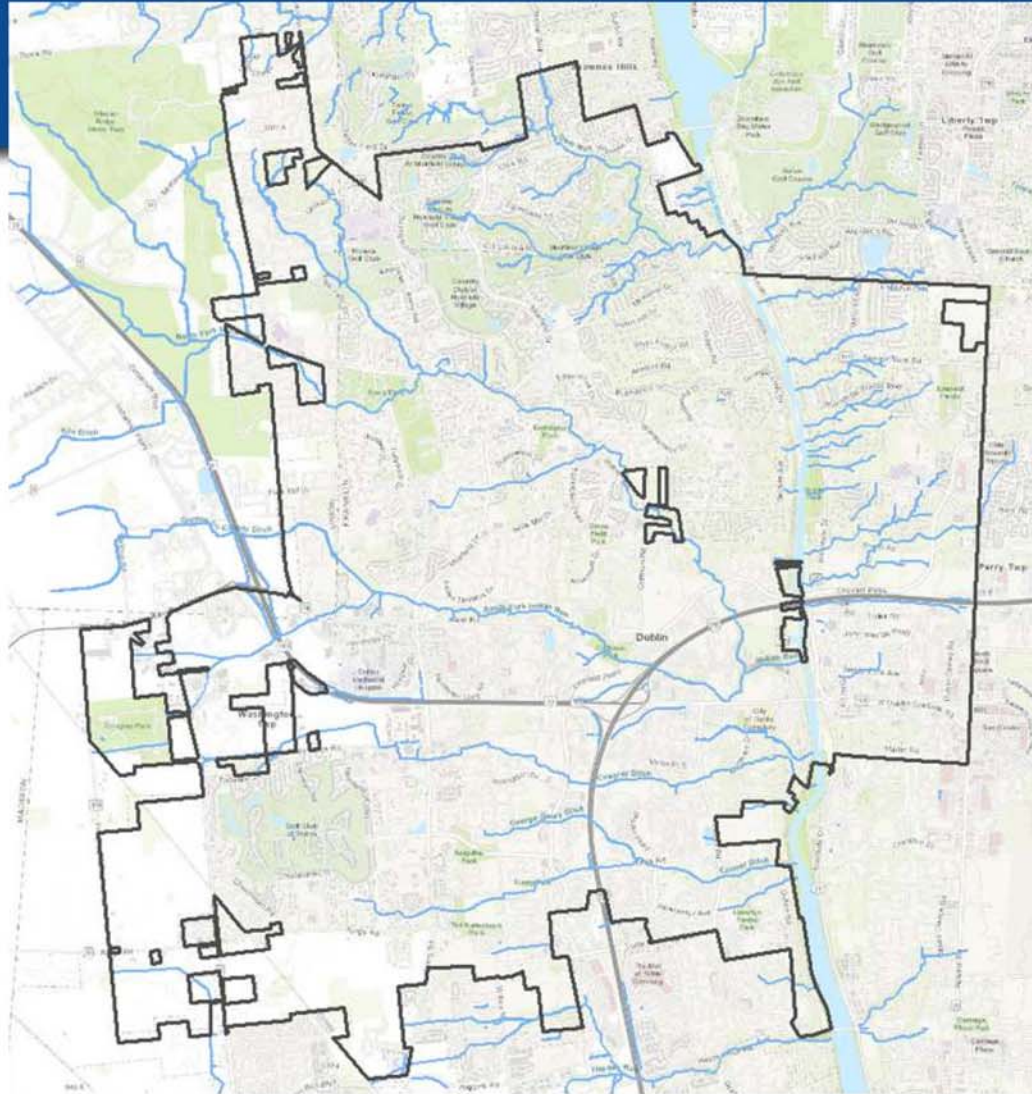
- Preserve and improve the stability and flood carrying capacity of the City's waterways.
- Protect riparian corridors and infrastructure.

## Scope of Services:

- Analyze existing inspection data
- Determine waterway maintenance responsibility (City vs. private)
- Identify maintenance needs
- Assist with prioritizing maintenance needs
- Maintenance cost estimates
- Recommended riparian vegetation enhancements

# Project Overview

Approximately 48 miles of waterways within the City




# Waterway Inspections

## Franklin Soil and Water Conservation District (FSWCD)

- 535 Inspection conducted between 2018-2021
- Spatial and descriptive information
  - Channel blockages
  - Channel erosion
  - Outfall blockages
  - Yard debris/dump sites
- Inspection data archived by the City using CityWorks.

City of Dublin Inspection Report		Condition Score
WATERWAY INSPECTION		0
<b>Location:</b>	<b>Inspected By:</b> FRANKLIN, SOIL WATER	
<b>Facility ID:</b> 0	<b>Insp. Date:</b> 12/9/2020 12:44:44PM	
<b>Inspection ID:</b> 29191	<b>Status:</b> COMPLETE	
<b>Closed By:</b>	<b>Date Closed:</b>	
<b>Work Order Id:</b>		
<b>Observation:</b>		
<b>Repairs:</b>		
<b>Recommendation:</b>		
<b>Inspection Data:</b>		
Yard Debris: UNCHECK		
Erosion:		
Channel Blockage: CHECKED		
Dump Site: UNCHECK		
Standing Water: UNCHECK		
Outfall Blockage: UNCHECK		
General Issue:		
Immediate Attention: UNCHECK		



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10/7/2021



# Waterway Inspections – Channel/Outfall Blockage





# Waterway Inspections – Channel Erosion



# Waterway Inspections – Yard Debris/Dump Site



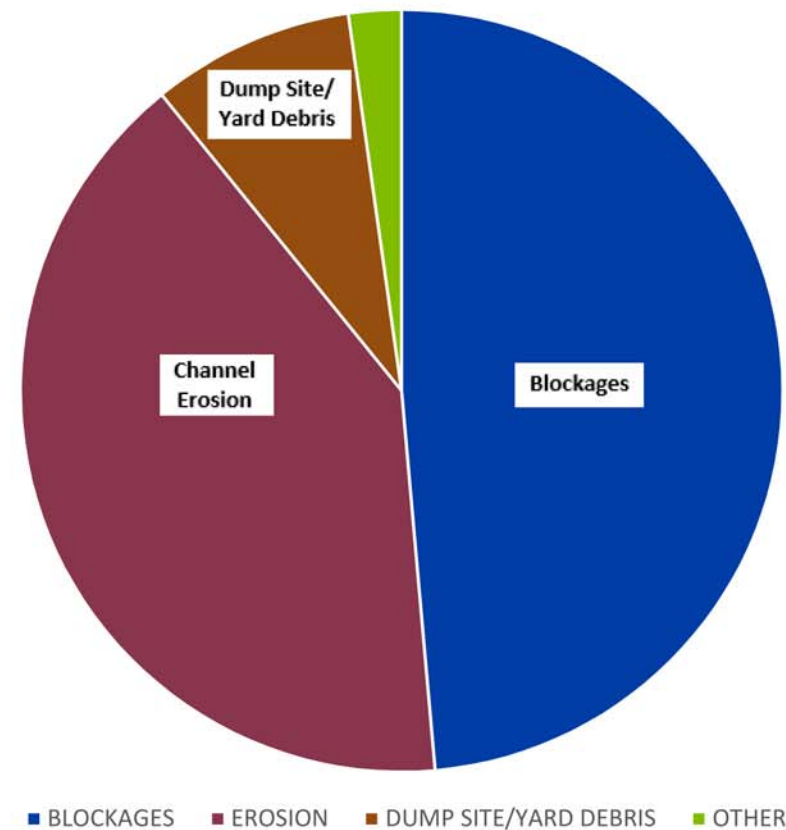


# Data Analysis

Approximately 48 Miles of Waterways

- 535 FSWCD Inspection Reports
  - 260 – Channel Blockages (49%)
  - 217 – Channel Erosion (41%)
  - 46 – Dump Site/Yard Debris (9%)
  - 12 – Other Concerns (1%)

INSPECTIONS





# Program Development Approach

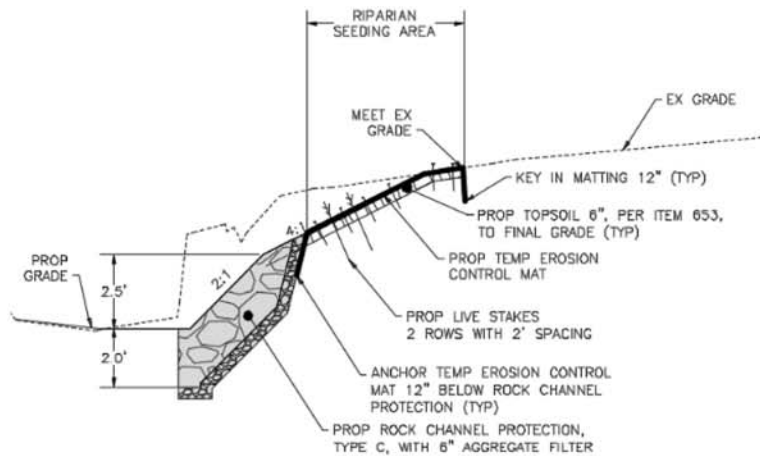
## Inspection Report Analysis

- Field investigations to confirm inspection report information and to formulate an opinion on how future inspections can be improved.
- Spatial location of inspections relative to City-owned land/easements.
- Organization of inspection data into a Scoring and Project Cost Tool.

# Program Development Approach

## Identify Required Channel Maintenance Activities

- Establish a typical channel erosion stabilization method
- Determine project costs based on estimating material quantities/project duration.





# GIS Mapping Tool

- GIS-based Work Map
- Problem Type
- Inspection Locations
  - Private Property (349 Locations)
  - City-owned Property (161 Locations)
  - Private Property with a Drainage Easement (25 Locations)

- |                    |                                |
|--------------------|--------------------------------|
| ● Channel Blockage | City Owned Properties          |
| ▲ Dump Site        | ■                              |
| ● Erosion          | Dublin_Inspections - Easements |
| ▲ Outfall Blockage | ▮                              |
| ● Yard Debris      |                                |



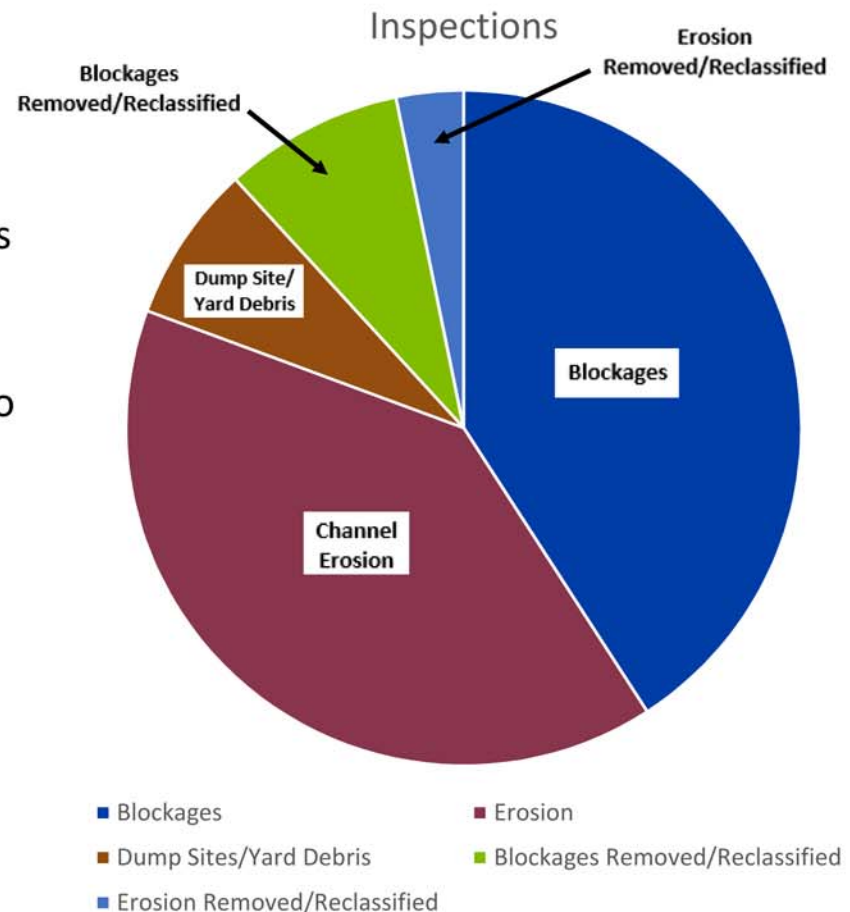
# Inspection Located on City Property/Drainage Easements

## 186 Inspection Locations Reviewed

- Approximately 100 sites field verified
- 22 sites removed or reclassified based on field visits
  - 16 Blockages
  - 6 Erosion
- 14 dump site/yard debris locations removed (City to resolve with property owners)

## 150 Inspection Locations Analyzed

- Channel Blockages – 76 (51%)
- Channel Erosion – 74 (49%)





# Inspection Location Removal

## Inspection 37995 - Blockage

2019



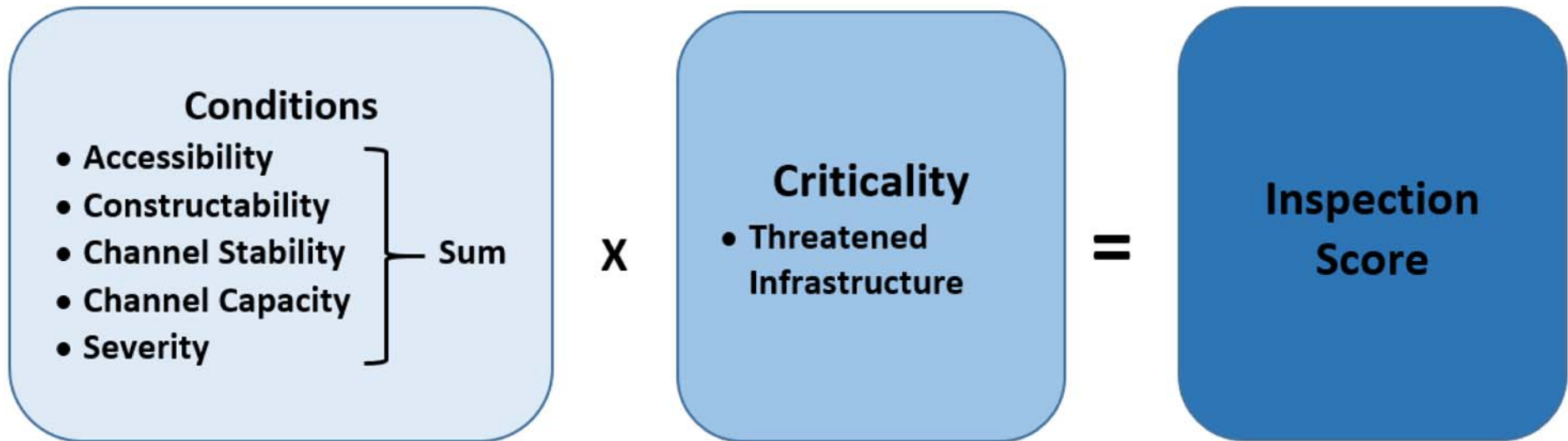
2022



Eliminated Erosion Inspections – Noted as blockages or determined to be stable

# Inspection Scoring

## Waterways Maintenance Inspection Scoring



# Inspection Scoring

## Conditional Scores

### Access (1-3)

Score	Access Determination
1	Requires work agreement from multiple property owners
2	Requires work agreement from a single property owner
3	Located entirely on City-owned property/drainage easement

### Constructability (1-3)

Score	Constructability Determination
1	Requires extensive land disturbance/vegetation clearing
2	Requires moderate land disturbance/vegetation clearing
3	Requires minimal land disturbance/vegetation clearing

### Channel Stability/Capacity - Relative Potential Improvement (1-3)

Score	Determination	
	Bank Erosion Area	Blockage
1	< 200 Ft <sup>2</sup>	< 25%
3	200 Ft <sup>2</sup> - 500 Ft <sup>2</sup>	25% - 55%
5	> 500 Ft <sup>2</sup>	> 55%

### Severity Score (1-10)

Score	Determination	
	Bank Erosion	Blockage
1	No threat anticipated	No adverse impacts to flooding
5	Threat anticipated within 2-5 years	Potential future flooding concerns
10	Threat anticipated within 0-2 years	Increased flooding threat to infrastructure



# Inspection Scoring

## Criticality

### Threatened Infrastructure Criticality (1-5)

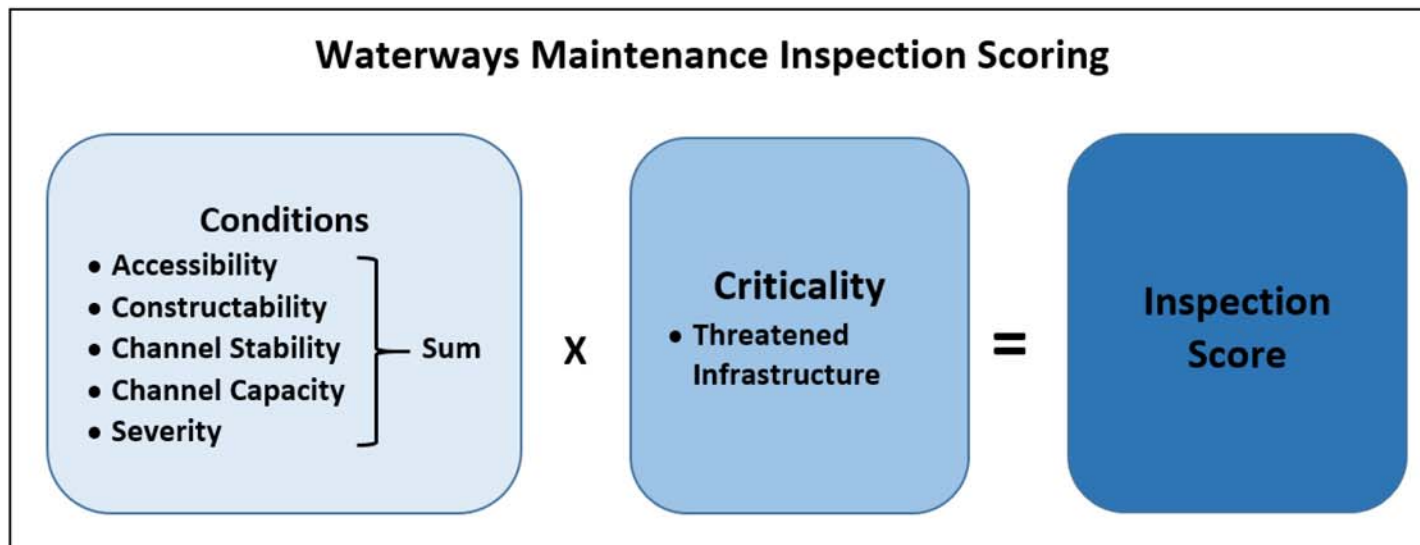
Assign a score based on Asset Type

Threatened Infrastructure Structure Type	Asset Type	Criticality
Railroad	Transportation	5
Highway	Transportation	5
1-4 Lane Road	Transportation	4
Parking Lots	Transportation	3
Driveway	Transportation	3
Multi-Use Pathways (trails, golf course path, sidewalk, footbridge, etc.)	Transportation	2
Multiple Occupancy Building (hospital, apartment building, office building/business, strip mall, etc.)	Buildings	5
Residential Single-Family Home	Buildings	4
Other Non-Occupied	Buildings	2
Utility	Utility	3
Open Space	Open Space	1

# Inspection Scoring

## Inspection Scoring Range

- Scores range between 6 and 95
- Higher scores indicate an increased threat to infrastructure due to erosion or flooding
- Scores used to assist with prioritization of maintenance activities



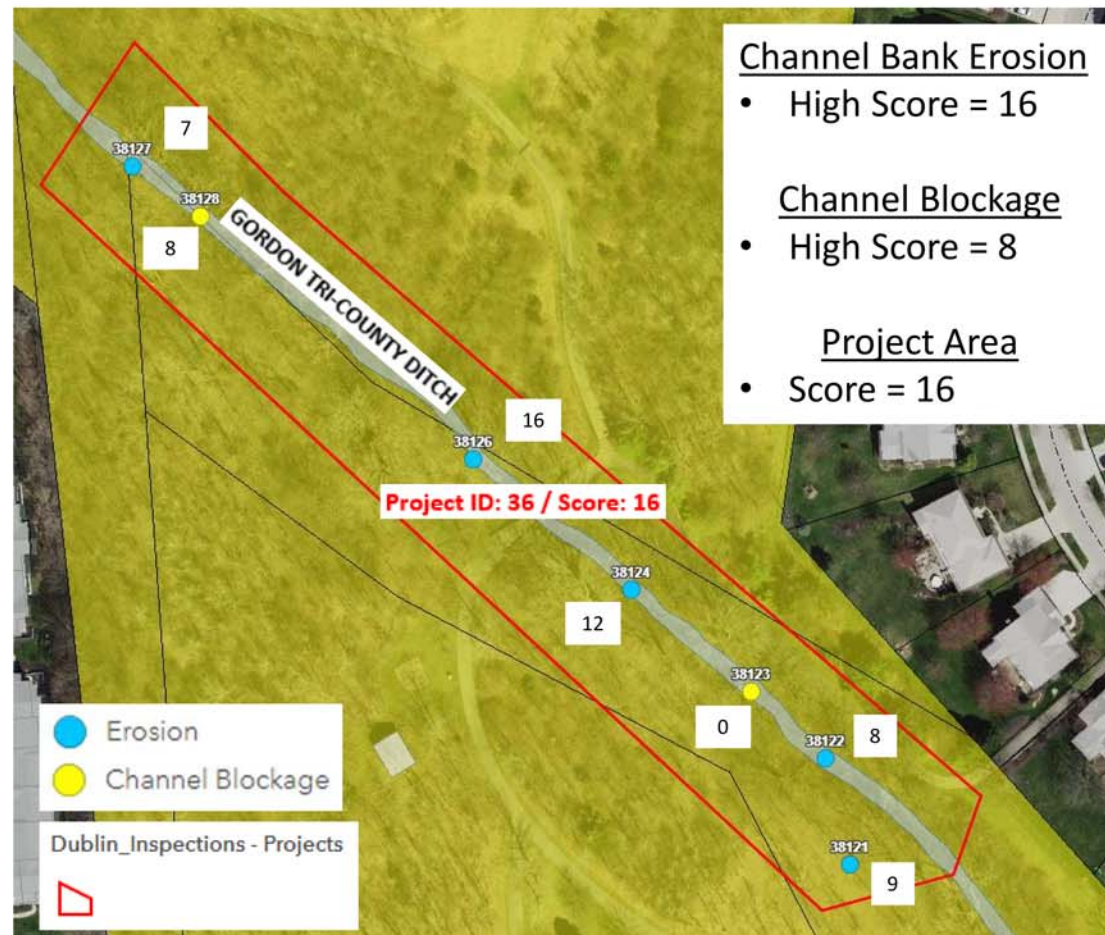
# Project Areas

## 59 Project Areas

- Grouping the 150 inspection locations based on proximity
- Reduces costs for engineering, permitting, and construction
- Each project area is separated into debris removal and channel stabilization activities

## Project Area Scoring

- Provided High for each project area.



# Project Cost Estimates – Bank Stabilization

- Based on typical section for channel bank stabilization
- Unit Costs reflect project scale (small, medium, large)
- Estimated quantities based on field observations and desktop evaluation
- Engineering costs
- Permitting costs
- Construction administration

Bank Stabilization OPCC						
PROJECT AREA: OPINION OF PROBABLE PROJECT COST						
CITY OF DUBLIN						
PROJECT AREA NAME: 27						
EROSION MAX SCORE: 48	EROSION AVG SCORE: 19.5	NO. OF INSPECTION POINTS INCLUDED: 6				
BANK STABILIZATION						
					Date Estimated:	April 14, 2022
Item No.	Description	Quantity	Units	Unit Cost	Item Cost	
201	Clearing and Grubbing	1	LS	\$3,000	\$3,000	
203	Excavation	140	CY	\$25	\$3,500	
203	Embankment	50	CY	\$25	\$1,250	
601	Rock Channel Protection, Type C, With Filter	140	CY	\$150	\$21,000	
623	Construction Layout Stakes	1	LS	\$4,000	\$4,000	
624	Mobilization	1	LS	\$5,000	\$5,000	
653	Topsoil Furnished and Placed	35	CY	\$45	\$1,575	
671	Erosion Control Mat, Type C	210	SY	\$9	\$1,890	
SPEC	Dewatering Allowance and Erosion and Sediment Control	1	LS	\$6,000	\$6,000	
SPEC	Seeding and Mulching	270	SY	\$3	\$810	
SPEC	Planting, incl. Vegetated Bank Stabilization	1	LS	\$6,000	\$6,000	
SPEC	Site Restoration	1	LS	\$3,000	\$3,000	
SPEC	Maintenance of Traffic	1	LS	N/A	N/A	
					SUBTOTAL =	<b>\$57,025</b>
					CONCEPTUAL LEVEL CONTINGENCY (30%) =	\$17,100
					<b>OPINION OF PROBABLE CONSTRUCTION COST =</b>	<b>\$80,000</b>
					SURVEY, ENGINEERING (25% OF ESTIMATED CONSTRUCTION COST) =	\$20,000
					SECTION 404 NATIONWIDE PERMIT 13 =	\$8,000
					FLOODPLAIN PERMIT (INC. NO-RISE DETERMINATION) =	\$5,000
					CONSTRUCTION ADMINISTRATION (10% OF ESTIMATED CONSTRUCTION COST) =	\$8,000
					<b>OPINION OF PROBABLE PROJECT COST =</b>	<b>\$130,000</b>



# Project Cost Estimates – Debris Removal

- Utilizes cost data provided by the Northeast Ohio Regional Sewer District for their regional channel maintenance program - \$3,600/day
- Unit Costs based on project scale (small, medium, large)
- No engineering/permitting costs

## Debris Removal OPCC

PROJECT AREA: OPINION OF PROBABLE PROJECT COST					
CITY OF DUBLIN					
PROJECT AREA NAME: 27					
SEDIMENT/DEBRIS MAX SCORE: 12		SEDIMENT/DEBRIS AVERAGE SCORE: 12		NO. OF INSPECTION POINTS INCLUDED: 1	
Date Estimated: April 14, 2022					
Item No.	Description	Quantity	Units	Unit Cost	Item Cost
201	Clearing and Grubbing	1	LS	\$500	\$500
624	Mobilization	1	LS	\$1,000	\$1,000
SPEC	Sediment/Debris Removal	1	DAY	\$2,800	\$2,800
SPEC	Seeding and Mulching	10	SY	\$3	\$30
SPEC	Site Restoration	1	LS	\$1,000	\$1,000
SPEC	Maintenance of Traffic	1	LS	N/A	N/A
				SUBTOTAL =	<b>\$5,330</b>
				CONCEPTUAL LEVEL CONTINGENCY (30%) =	<b>\$1,600</b>
				<b>OPINION OF PROBABLE CONSTRUCTION COST =</b>	<b>\$10,000</b>

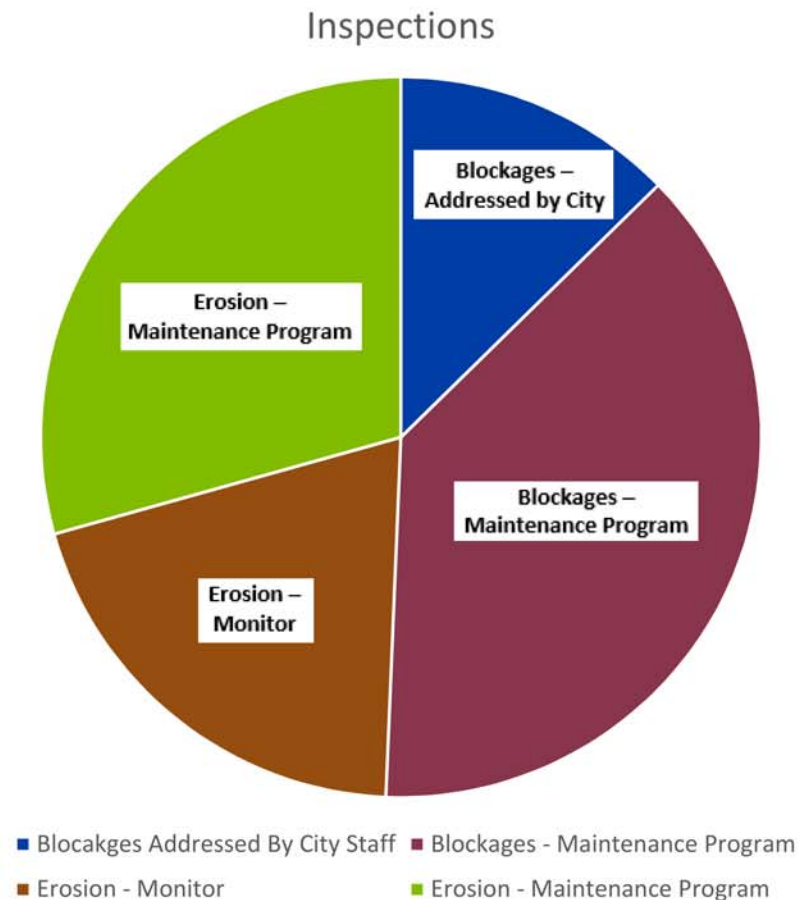


# City Maintenance Staff vs. Program

## 150 Inspection Locations Analyzed

- Channel Blockages Total – 76
  - Blockages to be addressed by City Staff = 25
  - Blockages to be incorporated within Program = 51
- Channel Erosion Total – 74
  - Erosion areas to be monitored – 30
  - Erosion areas to be incorporated within Program = 44

Maintenance Program Budget – 95 Inspections



# Construction Cost Estimates



**95 Inspection Locations**  
**39 Project Areas**  
**Total Estimated Project Costs =**  
**\$1,750,000**



**Debris Removal**  
**51 Inspections**  
**\$460,000**

**Bank Stabilization**  
**44 Inspections**  
**\$1,290,000**

## MEMO

Date: April 6, 2022

To: Aaron Stanford, PE, CSSBB, Paul Hammersmith, PE, City of Dublin

From: James Akins, CPESC

Subject: Dublin Waterways Maintenance Program – Phase 1

Copies: Miles Hebert, PE, CFM, EMH&T, Dave Gleason, PE, ENVSP, Stantec

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This memo summarizes Waterways Maintenance Program Phase 1 services provided by EMH&T and Stantec in assisting the City with identifying waterway maintenance needs and programmatic-level budgetary support documentation. Our findings and recommendations are a result of the review of inspection reports prepared by the Franklin Soil and Water Conservation District (FSWCD), inspection verification of a limited number of inspection locations, data analysis, and project communication with City staff.

### Inspection Report Analysis

There are approximately 48 miles of waterways within the City of Dublin. FSWCD provided inspection services across these waterways on behalf of the City from 2018-2021. Inspection data and photos generated by FSWCD were provided to us by the City for analysis resulting from 535 inspection locations. Data provided within the inspection reports consisted of an Inspection ID number, inspection concern, location, and photos. Observation notes were provided for approximately half of the inspection locations. The field inspections identified locations of stream channel erosion, channel blockage, yard debris, and dump sites. Channel erosion severity was additionally classified as being minor, moderate, and major. The provided FSWCD inspection information was combined with our limited field visits and various mapping resources to formulate the documentation being provided to the City in support of developing the Waterways Maintenance Program. Provided below is a breakdown of the observations provided in the FCSWD field inspection data.

Total Field Inspection Locations = 535

- Channel Erosion = 217
- Channel/Outlet Blockage = 260
- Yard Debris = 27
- Dump Sites = 19
- Other = 12

### Mapping

We worked with the City in obtaining data associated with the inspection reports and developing a GIS base map. The map identifies the inspection locations and number as indicated on the Franklin SWCD reports, and symbology based upon the reported observation. The data within the inspection reports were linked to the inspection locations along with provided photographs.

To determine the number of inspection locations the City will further evaluate and consider addressing as part of the overall Waterway Maintenance Program, we identified the inspection locations on City owned



property and on private property within a recorded drainage easement. Site improvement plans and recorded plats were provided by the City to assist with determining the location of drainage easements along waterways within, which were digitized to create a drainage easement layer within the GIS base map. It was determined that 186 of the FSWCD field inspections are located on City property or within drainage easements. Provided below is a breakdown of the FCSWD field inspection data with respect to City owned property and recorded easements.

Total Field Inspection Locations = 535

- Locations on City Property = 161
- Locations on Private Property with Drainage Easements = 25
- Locations on Private Property without Identified Drainage Easements = 349

Per the direction of the City, the 186 identified inspection locations were further evaluated to assist with the development of the Waterways Maintenance Program. The inspections were analyzed to determine maintenance needs, the 'severity' of the existing channel condition, and a preliminary estimate of the associated project cost. Provided below is a breakdown of the quantities associated with the observed channel conditions.

Waterways Maintenance Program Inspections = 186

- Erosion = 83
  - Approximately 5,590 feet of channel erosion identified resulting from field investigations and desktop review of the inspection photos and aerial imagery.
- Blockage = 89
  - Approximately 600 cubic yards of debris identified resulting from field investigations and desktop review of the inspection photos and aerial imagery.
- Dump Sites/Yard Debris = 14

The photographs associated with the inspection locations noting dump sites and yard debris were reviewed to determine if the noted observations were a result of the property owner attempting to address channel erosion. If no channel erosion condition was apparent, then these inspection locations were removed from further consideration. The City will further evaluate these locations to determine the appropriate actions, such as property owner notification and distribution of education materials to discourage this activity.

Information provided in the FSWCD reports associated with stream channel blockages did not estimate the amount of debris required to be removed, channel capacity reduction, or potential impacts to infrastructure or property resulting from flooding. Information provided within the channel erosion related inspections indicated an estimated eroded bank height but did not provide eroded bank length or an indication of potential impacts to adjacent property and infrastructure. To improve future inspection reporting, quantifiable data associated with the noted channel concerns should be collected, as well as identifying potential threats to infrastructure and property and identifying accessibility challenges by the City to address the concerns.

#### Inspection Report Database

Resulting from the collection of the inspection reports and GIS mapping, an overall Inspection Report Database was prepared. The database includes each inspection number, observation, and location. It also identifies whether the location is on City property, private property, or within a drainage easement. Site plan names and City assigned project numbers associated with the drainage easement mapping layer development are also identified in the database.

### Inspection Location Field Investigations

To assist with evaluation of the FSWCD inspection reports and to determine the sufficiency of the provided information within the reports, some of the inspection locations were visited by representatives of the consultant team to compare to the report findings and collect additional information to assist with program development. Field investigations were conducted at 25 locations throughout the City. These locations were comprised of 20 sites on City owned property and 5 sites on private property within drainage easements. These 25 sites encompass approximately 100 of the 186 inspection locations under evaluation.

Resulting from the conducted field services, it was determined that a number of identified channel blockages were no longer present or their locations have changed. This is mainly the result of the timing of the originally performed inspections (2018 - 2021) in comparison to the field services conducted in 2022. The field visits performed by the consultant team supported the determination of the total channel bank eroded areas, estimated volume of material required to stabilize the channel bank, and the potential for impacts to infrastructure and property.

### Desktop Reviews

For the 86 inspection locations not visited by the consultant team, a desktop evaluation of the inspection reports, photos, and GIS mapping as completed to estimate eroded channel area and debris accumulation associated with channel blockage concerns. Resulting from the field services and inspection desktop evaluations, quantities associated with eroded channel areas and debris material removal volumes were determined and used to assist with scoring the field inspection locations.

### Individual Inspection Location Scoring

A scoring system was developed to evaluate the severity and opportunity for addressing of each of the 186 inspection locations, and each location has been assigned a score. Inspection concerns that were determined not to be currently present as a result of the field services were not included within the scoring exercise.

The scoring process and individual inspection scores are identified within the Inspection Scoring Spreadsheet. The inspection scores ranged from as low as 6 to a high score of 95. The resulting scores can be used by the City as a tool when determining priority maintenance needs. Higher scores indicate a higher potential risk to infrastructure and are either located entirely on City property or only requires establishing working agreements for access to the area of concern with a single property owner.

### Project Areas

In evaluating the 186 inspection locations, Project Areas were created that include multiple contiguous field inspection locations. A total of 59 Project Areas were identified, identification numbers assigned, and locations mapped in the GIS base map. Proximity and accessibility were taken into consideration when developing the Project Areas.

### Project Area Scoring

Scores were assigned to each of the 59 Project Areas, based upon the highest scored individual inspection within the grouping. Higher scores indicate an inspection location with a higher potential risk to infrastructure and are either located entirely on City property or only requires a work agreements for access to the project area from a single property owner. Scores for each Project Area are identified on the Project Area Scoring Spreadsheet. For each Project Area, adjacent inspections located on private property without a drainage easement were identified within the spreadsheet. These inspections are identified for the City's consideration

when developing actual waterway maintenance improvement projects, but are not accounted for in the provided project costs, described below.

#### Project Area Opinion of Probable Construction Cost (OPCC)

To assist the City with determining a Waterways Maintenance Program budget, a preliminary Opinion of Probable Construction Costs (OPCC) was prepared for each of the 59 Project Areas. Total Project Costs were prepared that include construction, engineering, permitting and construction administration costs. A Project Cost spreadsheet was prepared and included as part of the project deliverables. The spreadsheet identifies a description of the material items along with unit costs associated with stabilizing eroded channel banks and the removal of channel blockages within the Project Areas. Assumptions made for each unit cost are identified within the various tabs included in the cost spreadsheet. In addition, a typical stream channel stabilization detail is included and was used in determining the items required to incorporate within the list of unit costs in addressing channel erosion concerns.

A total of 59 Project Costs were generated encapsulating the 186 inspection locations. The individual Project Cost spreadsheets are included in the deliverable package for evaluation by the City. The total combined Project Costs of the 59 Project Areas is \$3,040,000. The City can use this estimate to assist with developing an overall Waterways Maintenance Program annual budget.

#### Waterways Maintenance Program - Phase 1 Deliverables

The following documents are considered as an attachment to this memo:

- Waterways Inspection Database
- Inspection Scoring Spreadsheet (186 Inspections)
- Project Area OPCC Spreadsheet (Project Area OPCC development)
- Project Area Scoring Spreadsheet (59 Project Areas consisting of 186 evaluated inspections)
- Project Area OPCC's (59 Project Areas)
- Waterways Maintenance Program Mapping



## MEMORANDUM

**TO:** Dana L. McDaniel, City Manager

**FROM:** Jennifer D. Readler, Law Director  
Jesse J. Shamp

**DATE:** April 8, 2022

**RE:** Stream Clearing and Maintenance Obligations

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### **I. BACKGROUND**

The City of Dublin partnered with the Franklin County Soil and Water Conservation District and EMH&T to conduct a large, 400 inspection point, waterway analysis within the City (the “Analysis”). The Analysis was conducted to review blockages, bank stabilization, and other potential waterway concerns within the City. The Analysis revealed multiple points of concern which included 157 issues on City-owned property while the remainder fell on privately owned property. The cost of remediation for these erosion issues will likely be significant.

Relatedly, last fall, a large sycamore tree fell across a stream between two properties located near Coffman Road and Brand Road in Washington Township (“Township”). Neither of these properties or the stream between the properties is located within the corporate limits of the City (although they do fall within a pocket of the Township that is surrounded by the City). The two property owners cleared the tree from their respective yards, but the tree removal company advised them that the Township was required to clear the portion of the large tree crossing the stream. The remains of the tree within the stream, combined with recent rainfall, is now causing flooding into the rear yards of the affected and adjacent properties.

The Township’s legal counsel advised that the Township has neither a duty nor the authority to remove the tree from the stream. Under Ohio common law, the land beneath and next to a stream is the property of the adjacent landowners while the water flowing through the stream is a “public good” and not ownable by any party. Eric Richter, the Township Administrator, reached out to the City regarding its position on the blockage within the Township.

The Law Department was asked to provide an overview of a strategy for implementing necessary stream maintenance within the City and an opinion as to the Township attorney’s position on the Township blockage.

## **II. QUESTIONS PRESENTED AND BRIEF ANSWERS**

### **A. Part One – The City**

Whose legal duty is it to conduct stream maintenance within the City? What is the best approach for implementing the stream maintenance that needs to be undertaken based on the Analysis?

A landowner has the primary authority and responsibility to clear stream blockages on private property. The City Code does not require the City to clear such blockages. However, if the City so desires, there are circumstances in which the City can undertake the duty of clearing stream blockages. Generally, the City would need to execute right of entry agreements with private property owners to permit City employees or contractors to enter private property to perform stream maintenance work if the City decided to undertake such a responsibility.

### **B. Part Two – The Township**

Who is responsible, or permitted, to clear stream blockages within the Township?

The Township attorney's legal opinion regarding the Township's obligations and authority to clear streams is generally correct, with one caveat. It did not address Ohio R.C. 505.82 which grants authority to township trustees to clear stream blockages and charge the costs for such removal to the property owner. The City has no responsibility to clear stream blockages outside of its corporate limits.

## **III. ANALYSIS**

### **A. Part One – The City**

The Ohio Department of Natural Resources (ODNR) publishes helpful guides about common issues that face landowners and government entities with respect to streams, forests, and other natural features. Two guides relevant to this discussion are attached to this memorandum for further background information. In the Stream Debris and Obstruction Removal Guidance, the ODNR makes clear that the Ohio Revised Code does not impose a duty upon municipalities to remove obstructions from streams, but that a municipality does have the authority to undertake that duty if it so desires.

Ohio R.C. 715.47 provides that “[a] municipal corporation may fill or drain any lot or land within its limits on which water at any time becomes stagnant, remove all putrid substances from any lot, and remove all obstructions from culverts, covered drains, or private property, laid in any natural watercourse, creek, brook, or branch, which obstruct the water naturally flowing therein, causing it to flow back or become stagnant, in a way prejudicial to the health, comfort, or convenience of any of the citizens of the neighborhood.” The permissive language of this section makes clear that a city is not barred from enacting legislation that permits entrance to private property to remove obstructions of waterways.

Dublin Zoning Code, Section 94.04 states that “[n]o person shall fail to comply with the following requirements within the lawful time after service or publication of the notice or

resolution is made as required by law: ... [to] remove all obstructions from culverts, covered drains or natural watercourses as provided in R.C. 715.47.” Moreover, Section 95.08(E) of the Dublin Zoning Code states that “[n]o owner, occupant, or person in charge of any lot or parcel of ground shall cause or permit water to accumulate thereon and become stagnant, permit culverts, drains, or other natural watercourses thereon to become obstructed, or cause or permit any putrid or unsanitary substance to accumulate thereon.” If the property owner fails to remedy an obstruction, the City can perform or contract for the work and then place a lien against the property owner for the costs. But again, the City is not obligated to take this action.

Westerville codified a similar example clarifying its authority to enter private property to remove waterway obstructions. Its zoning code defines such obstructions as public nuisances and in W.C.O. 1175.04, the City prohibits the maintenance of any public nuisance and includes, as one example, “[a]ny improper or inadequate drainage on property which causes flooding, interferes with the use of, or endangers in any way the streets, sidewalks, parks or other City-owned property of any kind; *or any unauthorized condition which blocks, hinders, or obstructs in any way, the natural flow of branches, streams, creeks, surface waters, ditches or drains.*” After notice and an opportunity to correct, it then permits the City Zoning Officer to abate the nuisance and assess costs to the owner.

The City Code does contain two other chapters (Chapter 53–Stormwater Management and Stream Protection; Chapter 151–Flood Control) that could impose stream maintenance obligations on private property owners within the City in the future. However, the areas in which these chapters can be enforced are somewhat limited.

Chapter 53 only applies to developments within the City. Developments are required to have a stormwater management system designed for flood protection, erosion control, and pollution abatement. Chapter 53 also outlines stream corridor protection zones (“SCPZ”) and the regulations specific to those zones such as a prohibition on drilling or using motorized vehicles within an SCPZ.

Chapter 151 applies to “all areas of special flood hazards within the jurisdiction of the city.” The special flood hazard areas are designated by the “Flood Insurance Stud[ies]” for Franklin, Delaware, and Union counties. Section 151.05 indicates that no structure or land can be altered without the applicant being in full compliance with the provisions of such chapter. Chapter 151 outlines the regulations imposed to reduce the chances of a flooding. For example, the regulations in Chapter 151 relate to fill activities, the floodway, anchoring, and utilities. As review of these chapters concluded, it became clear that while these chapters could have application to stream maintenance matters under certain circumstances, they will generally not be the most relevant on this issue given their limited application.

The Law Department consulted with the Engineering Department and concluded that the City did not make any commitments regarding stream blockages or maintenance in the City’s new Community Plan. Thus, no City policies appear to create an obligation for the City to undertake any stream maintenance on private properties. As outlined above, if a private property owner fails to remove blockages from streams, the City can use the Zoning Code as an enforcement mechanism. Alternatively, if the City does not want to wait for the property owner to perform the



work, it could execute a right of entry with said property owner and then perform the work at its own cost.

*B. Part Two – The Township*

As to the tree that fell within Washington Township, the opinion of the Township’s legal authority is generally correct and accurately recites the common law provisions regarding stream maintenance. There is one provision that could permit the Township Trustees to act to remove the obstruction. Under Ohio R.C. 505.82, township trustees can adopt a resolution declaring an emergency that threatens life or property and that requires the owner of “an undedicated road or stream bank in unincorporated territory” to remove “snow, ice, debris, or other obstructions from the road or bank.” If the owner declines, the township can remove the obstruction and charge the costs back to the landowner. The application of this code section would require including the stream bed within the “stream bank” and, at this time, there has not been any case law on this provision.

The Dublin City Code does not obligate the City to clear trees or other debris that has fallen across streams on private property outside of its corporate limits. The City Code does have a Stormwater Management and Stream Protection chapter, but that chapter expressly applies to areas within the development jurisdiction of the City as explained above.

Based on the updated information provided by the Township Administrator, the Township is likely going to take action to remove the obstruction in this case. If the City did decide to become involved in the Township tree matter the potential future implications should be considered. Meaning, if the City decides to assist a Township resident in funding the removal of an obstruction residents of the City will likely expect the City to remedy all stream blockages within in the City moving forward.

**IV. CONCLUSION**

The City does not have a legal obligation to provide stream maintenance (including blockage removal) on private properties within the City. The City does have the ability, under certain circumstances, to require a private property owner within the City to conduct stream maintenance or, if the property owner refuses, to complete the necessary maintenance and assess the costs of such work back to the property owner. Also, if the City decided that it wanted to undertake the costs of such work, it could execute a right of entry with the property owner so that the City could legally enter the property to perform the necessary work.

As to any issues outside of the corporate limits, the City has no obligation to perform stream maintenance.



# OHIO STREAM MANAGEMENT GUIDE

“Who Owns Ohio's Streams?”

Guide No. 02

Over the years, Ohio citizens have frequently contacted the Department of Natural Resources seeking assistance in the resolution of problems they have encountered related to water resources. Many of the questions posed have concerned the authorities and duties of government, as well as the rights and responsibilities of individuals, with regard to surface water. This fact sheet poses some of the more frequently-asked questions, and provides the responses which have been passed along. It is intended to assist the lay person in understanding the basic legal concepts involved with some of Ohio's more common water rights issues. A more comprehensive analysis can be obtained through review of the references cited, which is strongly recommended. For those persons involved in water rights conflicts, this fact sheet is intended as a prelude to consultation with an attorney, not as a substitute for it.

**Who owns Ohio's streams?** Ohio's Constitution does not address this question, nor has there been a statute enacted in Ohio to address it. So the answer must be derived from the common law.

**What is “the common law”?** The common law, in this context, is the system of law initially developed in England by the higher courts and stated in the written opinions of these courts based on general customs or on reason and fixed principles of justice.<sup>1&2</sup> English common law had been adopted in the American colonies prior to the Revolutionary War, and those parts of it that were consistent with the Constitution of the United States were retained. Since then, opinions of federal and state courts in this country have modified, refined, and added to the common law of the United States and the State of Ohio.

**What if the federal or state government passes a law that contradicts the common law?** This type of law, called a statute, overrides the common law. Common law is used by the courts to interpret statutes and to determine the outcome of cases in which statutes are not controlling.

**Are there situations not addressed by the common law?** Yes, but because the common law is founded on the “laws of nature and the dictates of reason”, even in the absence of a precedent it is

adaptable to new situations and circumstances.<sup>1&2</sup> A precedent is a past decision of a higher court (an appeals court or supreme court) which serves as an example for other courts to follow in similar cases. In situations where there is no clear precedent to follow, it is difficult to predict how the common law may be adapted or modified. Even in situations where there is a clear precedent, it still may be modified or reversed by a new court decision and a new precedent established. Significant changes to the common law, which normally are the result of Ohio or U.S. Supreme Court decisions, occur due to changing circumstances, an expanding knowledge base, and changing attitudes in society and in the courts.

**So what does the common law say about who owns Ohio's streams?** There are two components to a stream, the water flowing in it and the land beneath the water. The nature of flowing water makes it impossible for a landowner to exercise the kind of control over it that is essential for it to be considered private property. Despite a landowner's efforts to retain it, the water will inevitably seep into the ground or evaporate into the air or flow downhill onto the next property. Water is a “public good” and not ownable as private property. Landowners do have rights to make use of the water flowing through their property including the right to withdraw it and otherwise control it to the extent that nature permits, so long as the rights of others are not infringed upon.<sup>3</sup> Such rights are known as “riparian rights”, meaning they are derived through the ownership of streamside property.

As to who owns the land beneath a stream, under Ohio common law the owner of the land beside the stream also owns the land beneath it. If the land on each side is owned by two different owners, then each owns to the center of the stream unless otherwise specified by the landowners' deeds. On navigable streams there is a public right of navigation, spelled out originally in the Northwest Ordinance, which states that navigable waters shall be common highways, forever free to the people of the United States. On such streams, boaters have the right to navigate on the stream, regardless of who owns the land beside it. Because of this, some have claimed that the owners of land beside a navigable stream do not own the land beneath it. But Ohio courts have long held that the owners of the land on the banks of a navigable

stream are also owners of the beds to the middle of the stream, as in the common law.<sup>4</sup> One exception is the submerged land beneath the Ohio portion of Lake Erie, which is owned and held in trust for the public by the State of Ohio.

**Does a landowner who owns the land on both sides of a stream (and, therefore, beneath the stream as well) have the right to construct a dam across it?** There are no constitutional provisions and, in most instances, no statutes that address this type of action. Under the common law, dam construction is allowed so long as it doesn't infringe on the rights of others. If a dam is constructed so that the water retained behind it backs up onto an upstream landowner's property and causes harm, the dam owner may be held liable in court for an unreasonable interference with the flow of surface water.<sup>5</sup> If the dam curtails the flow of water downstream and prevents reasonable uses by downstream property owners, the dam owner may also be held liable in court. If the dam collapses during a normal flood and causes harm to downstream landowners, the dam owner may likewise be held liable.<sup>6</sup> On navigable streams, the construction of a dam may interfere with the public's right to navigate the stream. This could result in a court decision disallowing a dam because it is an impediment to the public's right of navigation.<sup>7</sup>

There are also both state and federal statutes which are, in some instances, relevant to construction of a dam. Depending on the size of the dam and the amount of water it would retain, it may fall under the jurisdiction of Ohio's dam safety statute which requires a construction permit from the Ohio Department of Natural Resources, Division of Soil and Water Resources.<sup>8</sup> The purpose of the dam safety program is to require that dams are designed and constructed according to appropriate specifications to assure their structural integrity and the public safety. On a few large rivers in Ohio, construction of dams and other impediments to navigation is regulated by the U.S. Army Corps of Engineers. Impediments to navigation on these streams are generally not permitted.<sup>9</sup> Construction of a dam may also constitute placement of fill into waters of the United States, which may require a federal permit, also from the U.S. Army Corps of Engineers.<sup>10</sup> The federal and state statutes which are relevant to dam construction are outlined in Guide 06 Permit Checklist for Stream Modification Projects.

**Whether or not a stream is navigable seems to affect landowner rights in Ohio. What is a navigable stream and how can I find out if a particular stream is navigable?** Under Ohio common law, navigability cannot be determined by a precise formula which fits every stream under all circumstances and at all times. This means that the courts must decide the navigability of streams one at a time, on a case-by-case basis. Factors provided as

guidelines for the courts include the stream's capacity for boating in its natural condition, its capacity for boating after the making of reasonable improvements and its accessibility to public destinations.<sup>11</sup> A natural temporary obstruction to navigation, such as a logjam or sandbar, does not destroy the otherwise navigable nature of a stream.

Traditionally, a test of navigability has been whether a stream is used or could be used as a highway for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water. Recently, the definition of navigability has been broadened to include a stream's capacity for recreational navigation as well. The modern view is that navigation for pleasure and recreation is as important in the eyes of the law as navigation for commercial purposes.<sup>12</sup> At any rate, under Ohio common law it is not possible to know with certainty whether or not a specific stream is subject to the public's right of navigation until a court has made such a determination.

Navigability is also defined in different ways by several federal and state statutes based upon the regulatory jurisdictions of the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. These definitions are relevant only within the context of the statutes in which they appear. More information about these statutes and their applicability can be found in Guide 06 Permit Checklist for Stream Modification Projects. Fact sheets explaining Section 404 permits and Section 401 water quality certifications are available from the Ohio Environmental Protection Agency by calling (614) 644-2001.<sup>13</sup>

**Do landowners along a stream have the right to improve drainage on their land and route the drainage outlets into the stream?** Again, there are no constitutional provisions or statutes which address this concern. Under the common law in Ohio, landowners have the right to make a reasonable use of their land, even though altering the flow of surface water may cause harm to others. Landowners incur liability only when their harmful interference with the flow of surface water is unreasonable.<sup>14</sup>

**But if the outlet is a "natural watercourse," aren't property owners allowed to discharge drainage water into it even if it does cause damage downstream?** Yes, but only if their actions are reasonable. Historically, the courts in Ohio maintained that upstream landowners could place surface water above and beyond the natural flow into natural watercourses without being liable to downstream owners.<sup>15</sup> However, more recent court decisions have applied a "reasonable use" rule instead. Under this rule, landowners are neither permitted to dispose of surface water any way they wish nor are they prohibited from interfering with the natural flow of surface water to the detriment of others. Landowners

are liable for damages caused by their interference with the natural flow of surface water only when their actions are “unreasonable”.<sup>14</sup>

**Who determines when the harmful interference with the flow of surface water is unreasonable?** The reasonability of an alteration of the flow of surface water is decided by the courts on a case-by-case basis. A landowner along a stream who believes he or she has been harmed by another streamside landowner’s actions must seek relief through court action. The court determines whether or not the harm is significant and material, whether it is unreasonable, and what the appropriate remedy should be. If the court determines that the harm is significant and material and that it is unreasonable, it may require that the action causing the harm be discontinued by granting an injunction against it. The court may also allow the action causing the harm to continue, but specify that compensation for damages be paid.

**If a drainage improvement diverts water into a stream from land that does not naturally drain into that stream, isn’t that illegal?** Not necessarily. Historically, when the courts in Ohio allowed upstream landowners to place surface water above and beyond the natural flow into natural watercourses without being liable to downstream owners, one of the conditions was that none of the additional water could come from outside the watershed.<sup>15</sup> However, since the courts have been applying the reasonable use rule, the prohibition on diversion may no longer apply.<sup>16</sup> Under the reasonable use rule, such a diversion may be allowed unless a court determines that it constitutes a harmful interference with the flow of surface water that is unreasonable.

It is important to note that a state statute overrides the common law for diversions of water out of either the Lake Erie or Ohio River Basins in quantities greater than 100,000 gallons per day. A permit from the Ohio Department of Natural Resources is required for such diversions.<sup>17</sup> And under federal statute, diversions out of the Lake Erie Basin, regardless of quantity, must have the approval of all the Great Lakes States’ Governors.<sup>18</sup>

**Who is responsible for clearing natural obstructions, such as logjams and sandbars, from streams to keep them free flowing?** It is not clear that anyone has such a responsibility. Governmental entities at the municipal, county, state, and federal levels have the statutory **authority** to undertake stream clearing and drainage improvement projects, but no governmental entity at any level has been assigned by statute the **responsibility** for such activities. The common law also does not specify that property owners must keep the streams flowing through their property clear of natural obstructions. Natural obstructions in a stream on one property may

cause harm to upstream property owners by reducing the stream’s capacity for conveying runoff, resulting in flooding or reducing the effectiveness of artificial drainage systems. If these problems were caused by a landowner’s actions, such as the construction of a dam across the stream, this harm would be actionable in court. It is unclear whether or not a landowner’s inaction in failing to remove natural obstructions from the stream is similarly actionable.

On watercourses where drainage improvements have been made under authority of County Ditch<sup>19</sup> statutes, there are requirements for maintenance that may include removal of logjams, sandbars, and other natural obstructions. A county ditch project doesn’t change a streamside landowner’s basic rights to the use of the watercourse and, in fact, improves its capacity for carrying away excess water. The county (or a joint county board for multi-county drainage projects) retains a maintenance easement along the stream, and is required by the statute to maintain the original drainage project.<sup>20</sup> Landowners pay an annual maintenance assessment for these services. There are similar maintenance provisions on streams where water management improvement projects have been undertaken by one of Ohio’s Conservancy Districts.<sup>21</sup>

Municipal governments also have the authority to undertake stream clearing and drainage improvement projects, and some cities and villages have enacted ordinances requiring that streams be maintained in their free-flowing states within the municipal boundaries.

The statutory authorities available for removing obstructions are discussed in Guide 04, A Catalog of Contacts for Stream Topics. The Ohio Department of Natural Resources recommends that, before an obstruction removal project is begun, consultation be made with the applicable local, state, and federal agencies listed in Guide 06, Permit Checklist for Stream Modification Projects. The extent of permit requirements will depend on the location and design of the particular project.

## REFERENCES:

- 1 H.C. Black, 1968, Black’s Law Dictionary, Definitions of Terms and Phrases of American and English Jurisprudence, Ancient and Modern, Revised Fourth Edition, edited by the publisher’s editorial staff, West Publishing Company, St. Paul, Minnesota.
- 2 P.B. Gove, editor in chief, 1966, Webster’s Third New International Dictionary of the English Language Unabridged, G.&C. Merriam Company, Springfield, Massachusetts.
- 3 3 Kent Comm. 439 (3d, 1836); VI-A Amer. L. of Prop. § 28.55 (1954); Cooper v. Williams, (1831), 4 Ohio St. 253, 287; Salem Iron Co. v. Hyland, (1906), 74



- Ohio St. 160, 165. An excellent discussion on this topic and on water rights generally can be found in: Callahan, C.C. & J.R. Hanson, 1979, Principles of Water Rights Law in Ohio, 2nd edition, Ohio Department of Natural Resources, Division of Soil and Water Resources, Columbus, Ohio. Additional information specific to water withdrawal rights can be found in: Hanson, J.R., A.F. Woldorf, & L.P. Black, 1991, Water Rights—An Overview of Ohio Water Withdrawal Law, 2nd edition, Ohio Department of Natural Resources, Division of Soil and Water Resources, Columbus, Ohio.
- 4 Gavit v. Chambers, (1828), 3 Ohio St. 496.
  - 5 Fox v. Fostoria, (1897), 14 OCC 471, rev. on other grounds, 60 Ohio St. 340; Neff v. Sullivan, 9 OD Repr. 765.
  - 6 East Liverpool City Ice Company v. Mattern, (1920), 101 Ohio St. 62.
  - 7 State ex rel. Brown v. Newport Concrete Company, (1975), 44 Ohio App. 2d 121.
  - 8 Ohio Revised Code, § 1521.06.
  - 9 Federal River and Harbor Act of 1899, Section 10.
  - 10 Federal Water Pollution Control Act Amendments of 1972, Section 404.
  - 11 Coleman v. Schaeffer, (1955), 163 Ohio St. 202.
  - 12 Mentor Harbor Yachting Club v. Mentor Lagoons, (1959), 170 Ohio St. 193.
  - 13 Section 404 Permits and Section 401 Water Quality Certifications, Ohio Environmental Protection Agency fact sheets.
  - 14 McGlashan v. Spade Rockledge Corp., (1980), 62 Ohio St. 2d 55. See also: Myotte v. Mayfield, (1977), 54 Ohio App. 2d 97; Chudzinski v. Sylvania, (1976), 53 Ohio App. 2d 151; Masley v. Lorain, (1976), 48 Ohio St. 2d 334. An excellent discussion on this and related topics can be found in: Brown, L.C. and J.L. Stearns, Ohio's Drainage Laws—An Overview, Bulletin 822, OSU Extension, Columbus, Ohio.
  - 15 Munn v. Horvitz, (1964), 175 Ohio St. 521.
  - 16 Joseph, v. Wyss, (1991), 72 Ohio App. 3d 199.
  - 17 Ohio Revised Code, §1501.32.
  - 18 Federal Water Resources Development Act of 1986, Section 1109.
  - 19 Ohio Revised Code, Chapters 6131, 6133, 6135, and 6137.
  - 20 The maintenance requirement applies only to county ditch projects done after 1957.
  - 21 Ohio Revised Code, Chapter 6101.

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. All Guides, including an **Index of Titles**, are available from the Ohio Department of Natural Resources Division of Soil and Water Resources at:



The Ohio Department of Natural Resources  
 Division of Soil and Water Resources  
 2045 Morse Road, Bldg B  
 Columbus, Ohio 43229-6693


The guides are also available on-line as web pages and PDF files so you may print high quality originals at your location. You will find the guides on-line at: <http://www.ohiodnr.gov/soilandwater/>.

For more information call the ODNR, Division of Soil and Water Resources at 614/265-6740. Each Guide is designed to be easily and clearly reproduced and can be bound in a notebook. **Single copies are available free of charge. When distributing guides at meetings or in mailings, please use the printed editions or the PDF file as a master for reproducing**

Prepared by the Ohio Department of Natural Resources, Leonard P. Black, Division of Soil and Water Resources, principal author. Input from staff of several ODNR divisions and other local, state and federal agencies is used in the development of the Ohio Stream Management Guides. Funding for the production of the Ohio Stream Management Guides is provided in part through a federal grant under section 319 of the Clean Water Act. This Ohio Stream Management Guide is not intended to function as advice on legal issues. Please contact an attorney if legal advice is required.

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## **PREFACE**

Over the years, Ohio citizens have frequently contacted the Department of Natural Resources seeking assistance in the resolution of problems they have encountered related to water resources. One of the most common concerns raised by private landowners involves the situation in which trees and other debris accumulate in stream channels and obstruct stream-flow through their properties. These obstructions, sometimes referred to as logjams, may become large enough to disrupt existing drainage patterns and contribute to flooding. In-stream debris often gets lodged behind bridge and culvert openings, which can cause higher flood levels and result in additional land inundation and property damage. Some streams also serve as recreational boating resources, and logjams may interfere with canoeing or other small watercraft navigation. This fact sheet poses some of the frequently raised questions regarding logjams, and provides responses from the Ohio Department of Natural Resources.

## **WHAT IS A LOGJAM?**

A logjam is any woody vegetation, with or without other debris, which obstructs a stream channel and creates a backwater condition. Logjams occur naturally, providing beneficial stream structure and cover for fish and wildlife and allowing nutrient-rich sediment to be deposited on adjacent floodplains. However, Ohio's streams are also expected to function as efficient drainage outlets, conveying water off the land in a timely manner. Logjams may inhibit this drainage function.

## **DO LOGJAMS CONTRIBUTE TO FLOODING?**

Yes, especially during small-scale floods. Since a logjam and the backwater pool created behind it take up volume in the stream channel or floodplain, less natural storage is available when a flood event occurs. This can elevate the level of small-scale flood events, those that occur several times a year. Such impacts can be significant to farm fields and residences in the floodplain and to particularly low-lying, flood-prone areas. A logjam can also lengthen the duration of inundation during these floods, which can have a significant impact on crops planted in floodplain fields.

The amount by which a logjam reduces the floodplain's natural storage capacity is inadequate to make a significant difference in flood elevation during large-scale flood events. Thus, removing logjams is generally not considered an effective measure to mitigate large-scale floods. Large-scale flood events can create, relocate, or enlarge logjams, though, by carrying debris from the floodplain into the stream channel and blocking bridge and culvert openings, resulting in localized impacts.

## **HOW DOES A LOGJAM FORM?**

A logjam most commonly forms when a relatively large object, often a tree that has fallen into a stream channel, becomes wedged or blocked across the streambed. Sometimes human activities induce stream obstructions, like when trimmings from tree pruning or large appliances and other litter are dumped in a stream or left in a floodplain and subsequently are carried into the stream by high water. When

an object obstructs the channel, it slows the flow and creates a pool of water behind it. As the water slows or stops behind the object, sediment suspended in the water settles out. The deposited sediment adds to the obstruction and causes additional debris to be trapped on and behind it. As more sediment and debris accumulate around and behind the obstruction, the logjam becomes larger and more tightly packed, forming a natural dam across the stream.

## **WHY SHOULD LOGJAMS BE REMOVED?**

The formation of a logjam is a natural phenomenon and there are beneficial as well as detrimental impacts. A logjam provides structure and cover for fish and other aquatic organisms. The pool created behind the logjam provides critical aquatic habitat during low flow conditions, and the stirring and mixing oxygenates the water as it cascades over, around, and through the logjam.

A logjam may also negatively impact the stream. A tightly packed stream obstruction can act as a barrier to fish migration. Other problems caused by logjams are more insidious. A stream's energy is naturally channeled toward the route of least resistance, which is often around the obstruction. As the stream's flow is directed around an obstruction, it scours away the stream bank until a new channel is created. As the stream flows in its new channel around the logjam, it is re-directed toward the opposite bank. This begins a process, depicted in Figure 1, in which the stream's energy is directed subsequently from one bank to the other as the water flows downstream, eroding the stream banks and undercutting riparian vegetation as it creates a series of meanders. In an undeveloped watershed, where the streamside vegetation



on a newly cut channel is similar to the vegetation on the original channel, such meandering and channel relocation is not really a problem. In a developed watershed, where the streamside vegetation consists of a narrow corridor with adjacent farm fields and housing tracts, stream meandering and relocation can inflict considerable riparian property damage and also degrade the quality of the stream habitat as the limited riparian habitat is destroyed.

## IS THERE A GOVERNMENT AGENCY RESPONSIBLE FOR REMOVING LOGJAMS IN ORDER TO KEEP OHIO STREAMS FREE FLOWING?

No. Governmental entities at the municipal, county, state, and federal levels have the statutory authority to undertake stream clearing and drainage improvement projects, but no governmental entity at any level has been assigned by statute the responsibility for such logjam removal activities. For more information on legal responsibilities regarding logjams see Guide 02, Who Owns Ohio Streams? The Ohio Department of Natural Resources recommends that, before an obstruction removal project is begun, there should be consultation with the applicable local, state, and federal regulatory agencies listed in Guide 06, Permit Checklist for Stream Modification Projects. The extent of permit requirements will depend on the location and design of the particular project.

Technical, educational, and other assistance may be available for obstruction removal projects. Township trustees, county engineers, soil & water conservation districts, conservancy districts, local emergency management agency and floodplain management coordinators, and staff with The Ohio State University Extension may all be possible sources of information or assistance to individuals. State agencies (e.g., the Ohio Department of Natural Resources, the Ohio Environmental Protection Agency) and federal agencies (e.g., the USDA Natural Resource Conservation Service) may also provide assistance to organized groups.

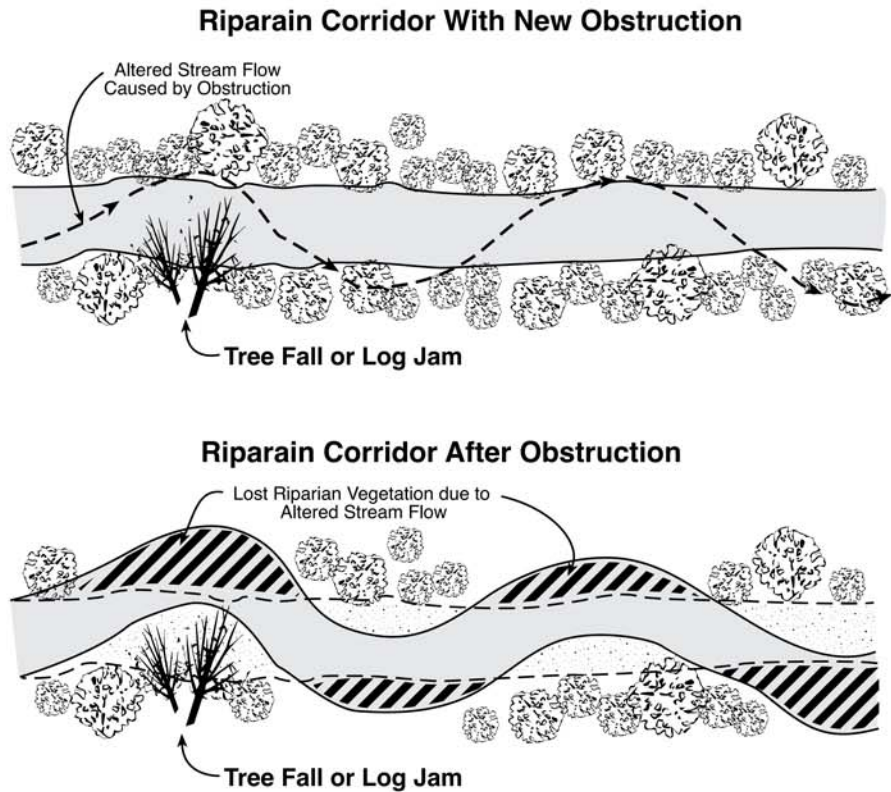


Figure 1. Effects of Obstruction on Riparian Corridor

Successful logjam removal projects have been undertaken in Ohio on many streams, some by volunteers and others using state and local appropriations and/or landowner assessments.

## ARE RIPARIAN PROPERTY OWNERS REQUIRED TO REMOVE LOGJAMS FROM STREAMS ON THEIR PROPERTY?

Landowners generally are not required by statute to remove logjams from streams on their properties. Statutes do exist that grant county commissioners (Ohio Revised Code § 6151.14) and township trustees (Ohio Revised Code § 505.82) the authority to remove stream obstructions on private property and charge the costs of removal back to the property owner; however, these statutes are rarely used. The common law also does not specify that landowners must keep the streams flowing through their properties clear of natural obstructions. An obstruction to streamflow on one property can result in damages to upstream properties by reducing the stream's capacity for conveying runoff, contributing to flooding,

or reducing the effectiveness of artificial drainage systems. Landowners have the right to pursue civil litigation for damages to their property caused by the unreasonable actions of others, but it is unclear whether a landowner's inaction in failing to remove natural stream obstructions could be successfully litigated. For more information on this subject, see Guide 02, Who Owns Ohio Streams?

While they are not required to remove logjams, landowners can contribute to the stability and overall health of their streams by proactively removing obstructions to flow. Such activities, especially on streams with limited riparian habitat, help maintain the multiple use nature of streams for fish and wildlife, drainage, recreation, and other purposes. A regular program for stream maintenance and obstruction removal may alleviate the need for a large, expensive channel restoration project later on.

## HOW SHOULD IT BE DETERMINED WHAT ACTIVITIES ARE NEEDED ON A STREAM?

The easiest way to deal with log-

jams is to remove them before significant sediment and debris has been deposited. Riparian landowners should conduct routine stream inspections twice a year to identify fallen trees and other debris on their properties that need to be removed from the stream and floodplain. Special inspections should be made following large storm events, during which debris is commonly deposited. A volunteer organization could be formed to undertake annual stream walks or canoe trips of the entire stream (with landowner permission and support) to identify obstructions that need to be removed, develop a work plan of needed activities, and perhaps even assist landowners in the obstruction removal. Such a group can serve a valuable function to riparian landowners by building support throughout the watershed for a regular inspection and maintenance program.

## HOW SHOULD STREAM OBSTRUCTIONS BE REMOVED AND WHAT TOOLS ARE NEEDED?

Fallen trees and other debris in the floodplain should be removed, buried, or secured as soon as possible. Fallen trees and other debris encountered in the stream should be removed at the earliest appropriate time. Standing trees should be left as they are. All debris should be buried, secured, or removed from the floodplain so that it won't be re-deposited during the next flood. Debris removal should be conducted only during low flow periods, which typically occur during late summer, autumn, and winter. Small debris can be removed from the channel without any tools or equipment. Larger logs and trees across the channel will need to be cut into manageable pieces and dragged out of the stream. Accumulated sediment can be raked and grubbed to remove vegetation. Large equipment should not be placed within the stream channel. Any disturbed areas along the stream channel should be seeded immediately to avoid unnecessary streambank erosion. If stream bank erosion has already occurred where a logjam has been removed, bank stabilization may be appropriate. For more information on bank stabilization methods, see Guide 07,

Restoring Stream Banks With Vegetation, Guide 08, Trees for Ditches, Guide 11, Tree Kickers, Guide 12, Evergreen Revetments, Guide 13, Forested Buffer Strips, Guide 14, Live Fascines, Guide 15, Gabion Revetments, Guide 16, Rip Rap Revetments, and Guide 17, Live Cribwalls.

The following equipment is typically used for logjam removal projects: hand tools to facilitate removal of small debris; articulated log skidders with cable winches to remove larger logs; a chain saw or reciprocating saw to cut large logs and trees to manageable size; an adequate length of cable, chain, or rope to attach to the logs to facilitate their removal; a tractor, truck, or team of draft horses on the top of the stream bank to pull the logs out of the stream; and a wagon or truck on which to load the debris for subsequent removal from the floodplain.

Large logjams that are already well established need to be left for properly trained and equipped crews to remove. Specialized power equipment and explosives should never be used by anyone other than highly trained experts. The use of expensive and elaborate equipment is often not necessary when landowners take the time to perform routine maintenance and upkeep on their properties.

## WHAT PRECAUTIONS SHOULD BE TAKEN BEFORE AND DURING AN OBSTRUCTION REMOVAL PROJECT?

The Ohio Department of Natural Resources recommends a consultation with the county engineer and local floodplain coordinator prior to initiation of an obstruction removal project. All tractors and other wheeled or tracked vehicles need to be kept out of the stream channel and well away from the top of the bank. Logjam removal activities should never be attempted alone, and a crew leader should be appointed to keep visual contact with everyone on the crew. The utmost caution should be taken to protect the personal safety of all workers. To avoid unnecessary damage to the streambank or riparian corridor, a single route to and from the project site should be utilized.

## REFERENCES

Mecklenburg, Dan, Rainwater and Land Development—Ohio's Standards for Stormwater Management, Land Development, and Urban Stream Protection, 2nd edition, 1996, the Ohio Department of Natural Resources in cooperation with the USDA Natural Resources Conservation Service and the Ohio Environmental Protection Agency.

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. All Guides, including an Index of Titles, are available from the Ohio Department of Natural Resources. To obtain copies contact the ODNR Division of Soil and Water Resources at 2045 Morse Road, Building B-2, Columbus, Ohio 43229-6693 or 614/265-6740 or mailto: water@dnr.state.oh.us.

For more information about the project call ODNR, Division of Soil and Water Resources at 614/265-6740. Each Guide is designed to be easily and clearly reproduced and can be bound in a notebook. Single copies are available free of charge. When distributing guides at meetings or in mailings, please use printed editions as a master for reproducing the number of copies you need, or you may print high quality originals from PDF files available on-line at: <http://www.ohiodnr.gov/soilandwater/>

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