



HURON-CLINTON
metroparks

Huron Meadows Metropark Stormwater Management Plan

September 2019



Prepared by: **OHM**



Advancing Communities®

Table of Contents

❖ Stormwater Structure Recommendations	3
❖ Stormwater Structure Maps	6
❖ Streambank Summary and Recommendation Maps	8
❖ Shoreline Summary and Recommendation Maps	15
❖ Green Infrastructure Concepts and Maps	17
❖ Recommendation Summary Tables	21

Huron Meadows Metropark Stormwater Structure Recommendations

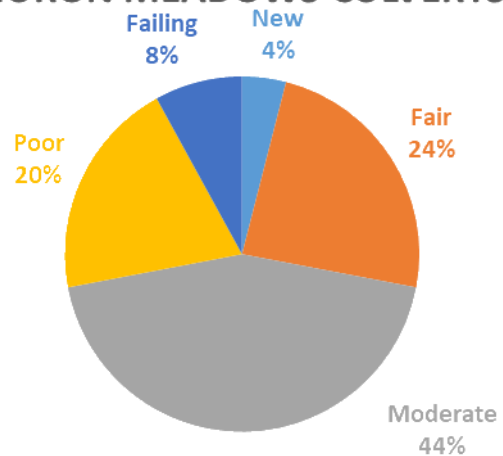
Table 1. Summary of Huron Meadows Culvert Inspection and Maintenance Needs

Culvert Rating	Number of Culverts	Culverts Needing Immediate Cleanout	Culverts Needing Future Cleanout	Culverts Needing Replacement or Repair
New	1	0	0	0
Fair	6	0	1	0
Moderate	11	0	2	0
Poor	6	1*	3*	5
Failing	2	2*	0	2
Total:	26	3*	6*	7
Repair Cost:		\$0	\$299	\$42,751

*Culvert may be replaced before it can be cleaned out.



HURON MEADOWS CULVERTS



Left: Failing culvert in Huron Meadows Metropark. Right: Proportion of culverts in each condition category.

Table 2. Individual Culvert Replacement Costs

Culvert ID	Diameter (in)	Length (ft)	Condition	Maintenance Need	Cost Opinion
CUL-HUR-001	12	51	Poor	Replacement	\$6,329
CUL-HUR-002*	12	15	Failing	Replacement	\$1,963
CUL-HUR-004^	18	60	Poor	Full Liner	\$5,501
CUL-HUR-008*	30	26	Poor	Replacement	\$6,443
CUL-HUR-009*	12	16	Failing	Replacement	\$1,963
CUL-HUR-010*	12	34	Poor	Replacement	\$4,210
CUL-HUR-013	12	41	Moderate	Future Cleanout	\$142
CUL-HUR-018*	18	55	Poor	Replacement	\$8,242
CUL-HUR-019	10	25	Fair	Future Cleanout	\$89
CUL-HUR-022*	18	54	Poor	Replacement	\$8,100
CUL-HUR-024	24	14	Moderate	Future Cleanout	\$68
Total:					\$43,050

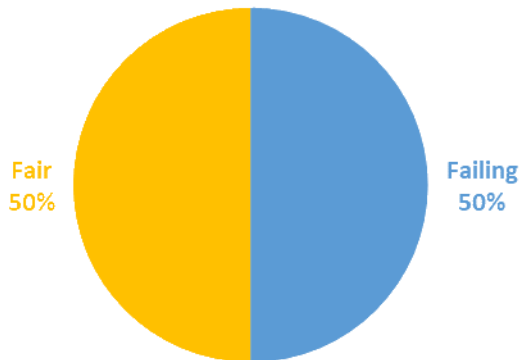
**Culvert may be replaced before it needs to be cleaned out.*

^Televised

Table 3. Summary of Huron Meadows Outfall Inspection and Maintenance Needs

Outfall Rating	Number of Outfalls	Outfalls Needing Immediate Cleanout	Outfalls Needing Future Cleanout	Outfalls Needing Replacement or Repair
New	0	0	0	0
Fair	1	0	0	0
Good	0	0	0	0
Poor	0	0	0	0
Failing	1	0	0	1
Total:	2	0	0	1
Repair Cost:				\$6,250

HURON MEADOWS OUTFALLS



Proportion of outfalls in each condition category. Right: Damaged catchbasin leading to outfall in failing condition in Huron Meadows Metropark.

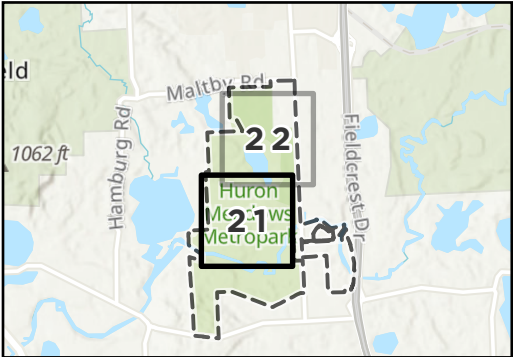
Table 4. Individual Outfall Replacement Costs





















Outfall ID	Diameter (in)	Condition	Maintenance Need	Cost Opinion
SDC-HUR-005	12	Failing	Replacement	\$6,250
Total:				\$6,250

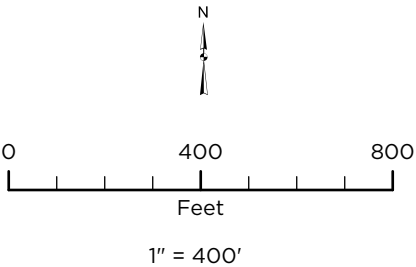
Stormwater Structure Ratings

Hudson Mills Metropark

Map Sheet: 21 of 48



Outfalls (Field Rating)	Gravity Main (Pipe Rating Index)
 Failing	 1
 Poor	 2
 Moderate	 3
 Fair	 4
 New	 5
Culverts (Field Rating)	 Gravity Main (Other)
 Failing	 Culvert (Other)
 Poor	Roads
 Moderate	 Roads
 Fair	 Park Boundary
 New	
 (Not Rated)	



Source: Data provided by Huron-Clinton Metroparks, State of Michigan, OHM Advisors, NearMap and ESRI. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl.

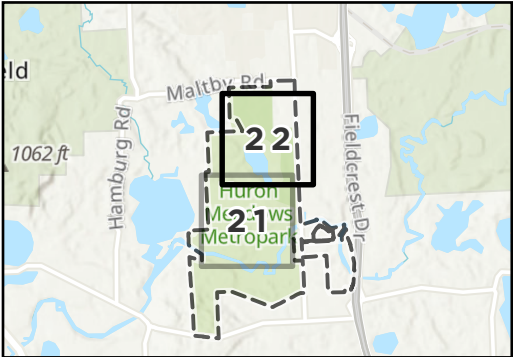
Map Published: October 23, 2019



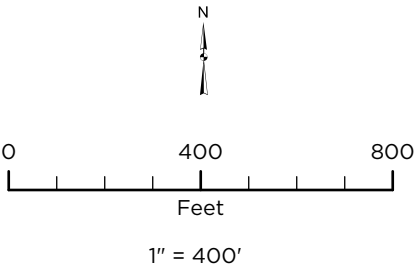
Stormwater Structure Ratings

Hudson Mills Metropark

Map Sheet: 22 of 48



Outfalls (Field Rating)	Gravity Main (Pipe Rating Index)
Failing	1
Poor	2
Moderate	3
Fair	4
New	5
	Gravity Main (Other)
Culverts (Field Rating)	Roads
Failing	Roads
Poor	Park Boundary
Moderate	
Fair	
New	
(Not Rated)	



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Map Published: October 23, 2019

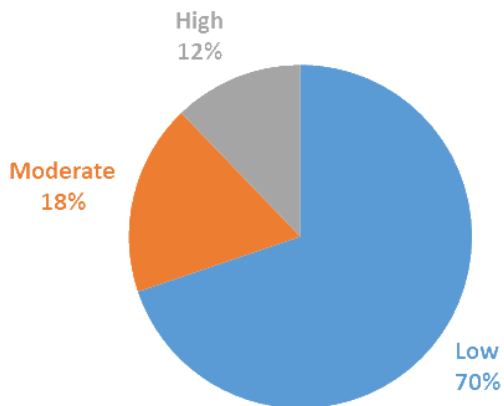


Huron Meadows Metropark Streambank Summary and Recommendations

Table 5. Huron Meadows Erosion Severity Summary

Erosion Condition	Feet of Streambank (miles)	Cost of Restoration
Very High	0.0 (0.0)	
High	1,578 (0.30)	\$2,420,000
Moderate	2,329 (0.44)	\$401,000
Low	9,030 (1.71)	
Very Low	0 (0.0)	
Total:	14,926 (2.83)	\$2,821,000

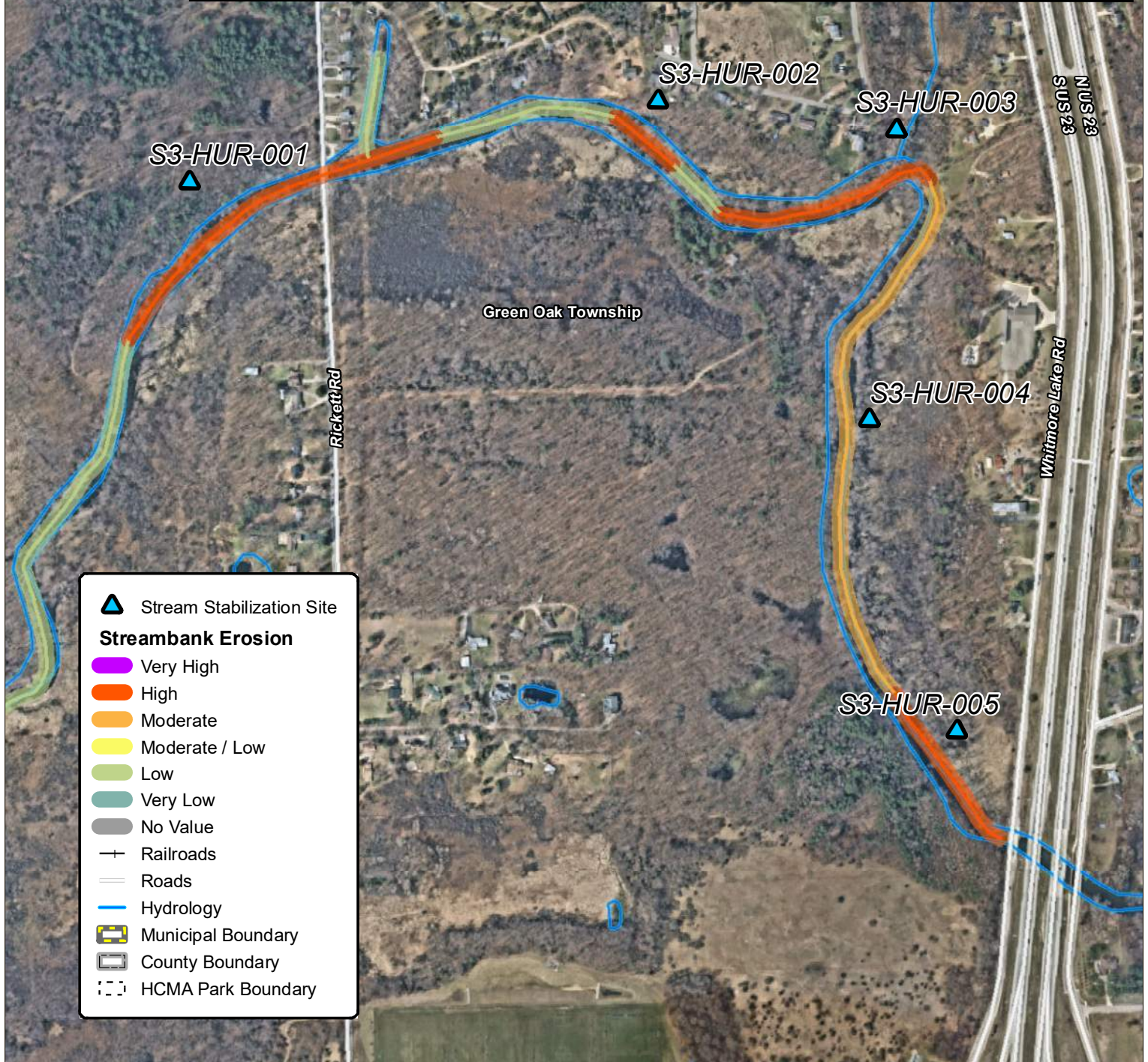
HURON MEADOWS EROSION SEVERITY



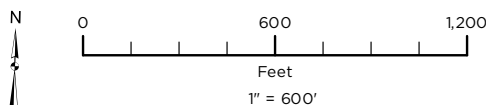
Left: Proportion of stream in each erosion severity category. Right: Moderate erosion on a bank in Huron Meadows Metropark.

Huron Meadows Metropark - Recommended Streambank Stabilization

Site	Length, ft	Streambank Erosion	Rec Treatment	Unit Price, \$/ft	Cost
001	1,579.56	High	Soil Lifts with Live Stakes	678	\$1,071,000.00
002	309.47	High	Soil Lifts with Live Stakes	678	\$210,000.00
003	932.69	High	Soil Lifts with Live Stakes	678	\$633,000.00
004	2,328.54	Moderate	Coir Block with Live Stakes	172	\$401,000.00
005	746.20	High	Soil Lifts with Live Stakes	678	\$506,000.00
Note: Includes cost to stabilize both banks					\$2,821,000.00



Huron Meadows Metropark Streambank Stabilization Siting



Source: Data provided by OHM Advisors, Huron Clinton Metroparks and Near Map. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: June 27, 2019



S3-HUR-001

▲ Stream Stabilization Site

⋯ HCMA Park Boundary

Streambank Erosion

Very High

High

Moderate

Moderate / Low

Low

Very Low

No Value

— Roads

— Municipal Boundary

— Hydrology

S3-HUR-001

Length: 1,579.56 ft

Recommended Treatment: Soil Lifts with Live Stakes

Construction Cost: \$1,071,000

Hammel Rd

Huron River Dr

Green Oak Township

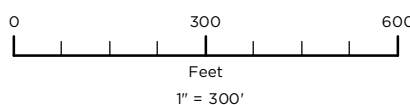
S3-HUR-001

Rickett Rd

Hollister Rd



Huron Meadows Metropark Streambank Stabilization Siting



Source: Data provided by OHM Advisors, Huron Clinton Metroparks and Near Map. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl

Map Published: June 25, 2019



S3-HUR-002

▲ Stream Stabilization Site

⋯ HCMA Park Boundary

Streambank Erosion

Very High

High

Moderate

Moderate / Low

Low

Very Low

No Value

Roads

Municipal Boundary

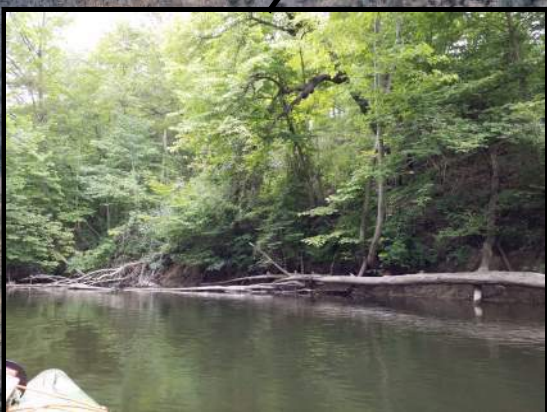
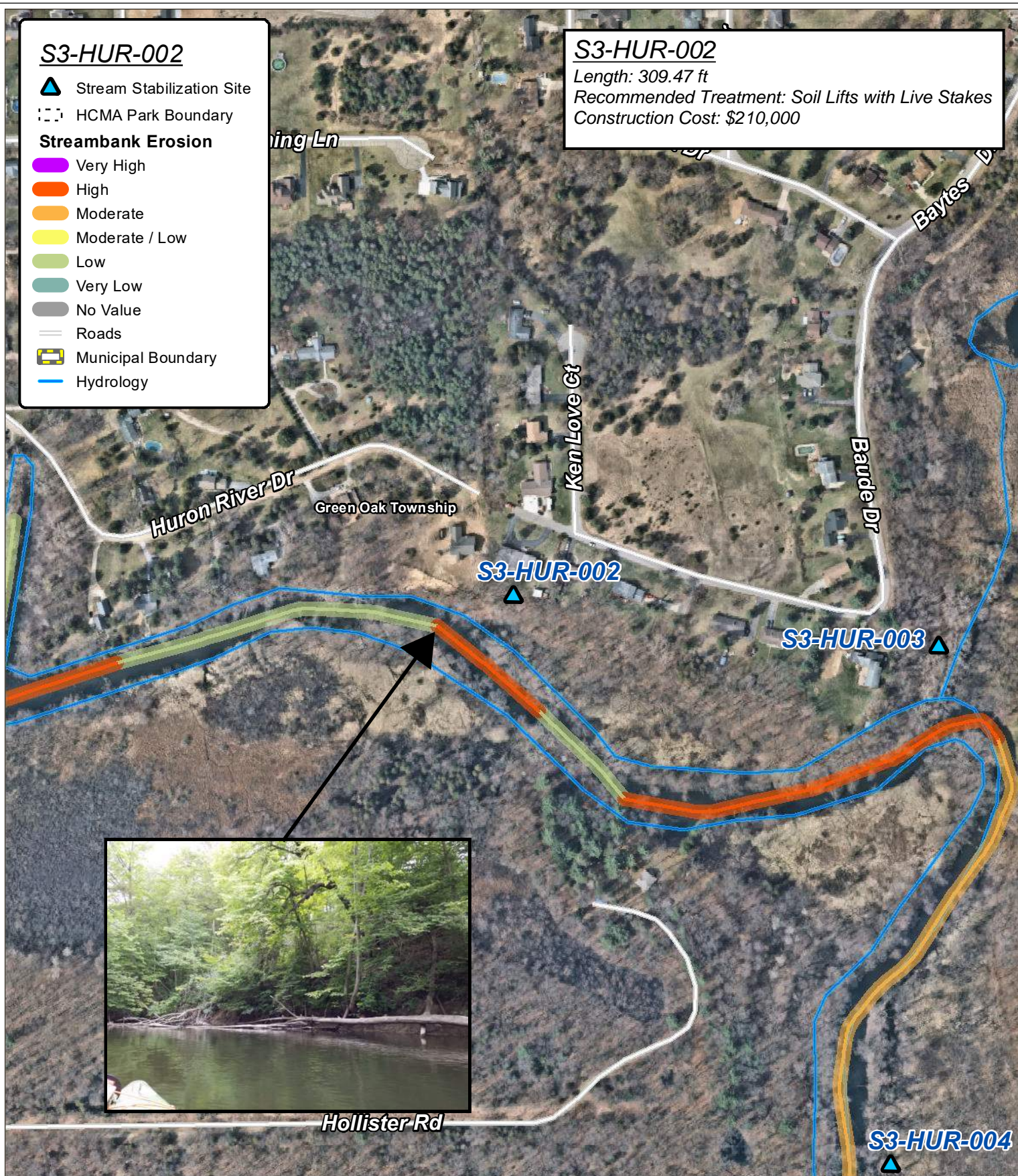
Hydrology

S3-HUR-002

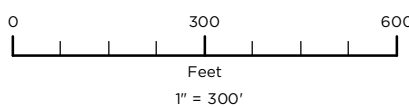
Length: 309.47 ft

Recommended Treatment: Soil Lifts with Live Stakes

Construction Cost: \$210,000



Huron Meadows Metropark Streambank Stabilization Siting



Source: Data provided by OHM Advisors, Huron Clinton Metroparks and Near Map. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

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Map Published: June 25, 2019



S3-HUR-003

▲ Stream Stabilization Site

⋯ HCMA Park Boundary

Streambank Erosion

Very High

High

Moderate

Moderate / Low

Low

Very Low

No Value

Roads

Municipal Boundary

Hydrology

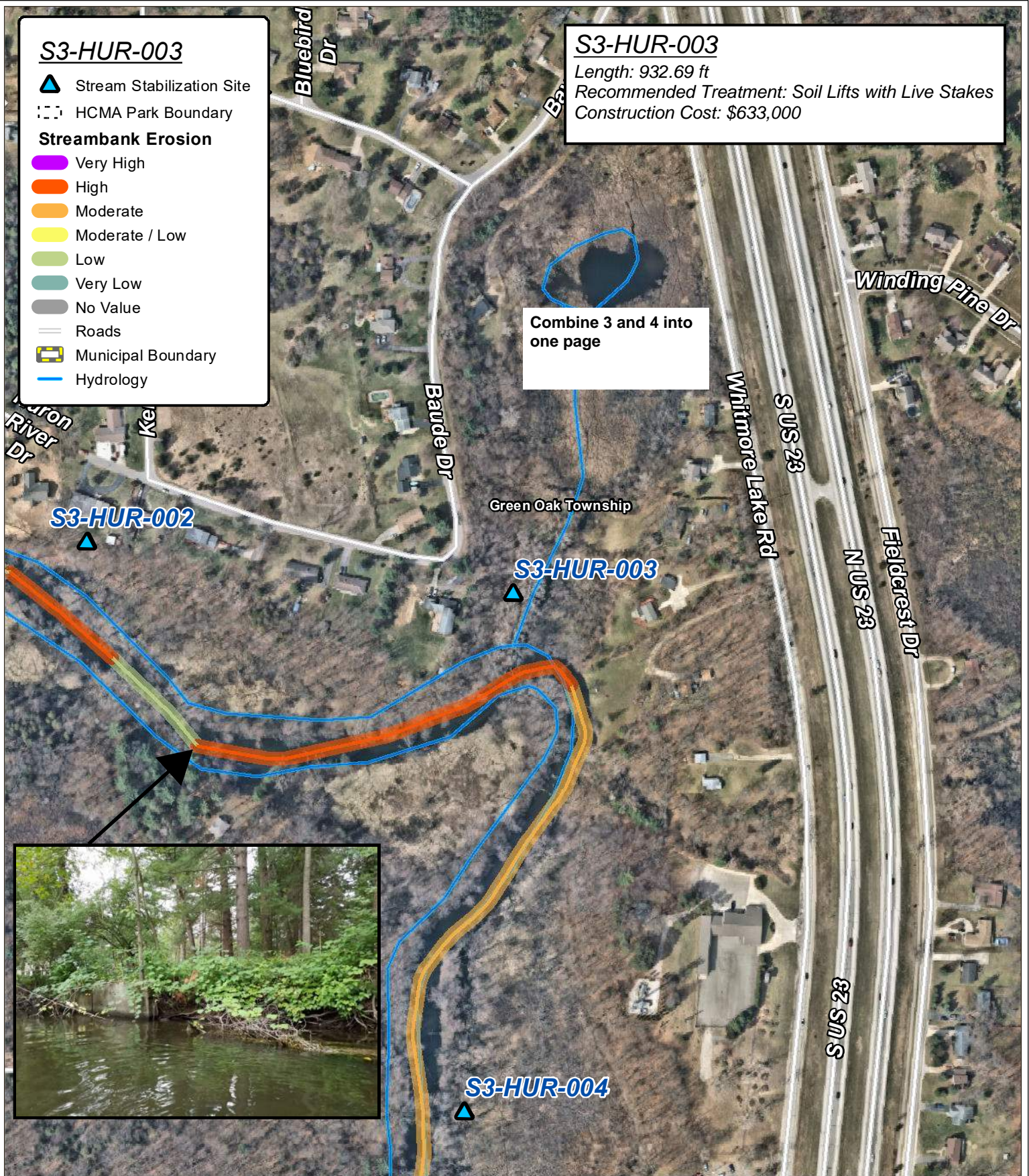
S3-HUR-003

Length: 932.69 ft

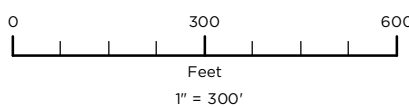
Recommended Treatment: Soil Lifts with Live Stakes

Construction Cost: \$633,000

Combine 3 and 4 into one page



Huron Meadows Metropark Streambank Stabilization Siting



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S3-HUR-004

▲ Stream Stabilization Site

⋯ HCMA Park Boundary

Streambank Erosion

Very High

High

Moderate

Moderate / Low

Low

Very Low

No Value

Roads

Municipal Boundary

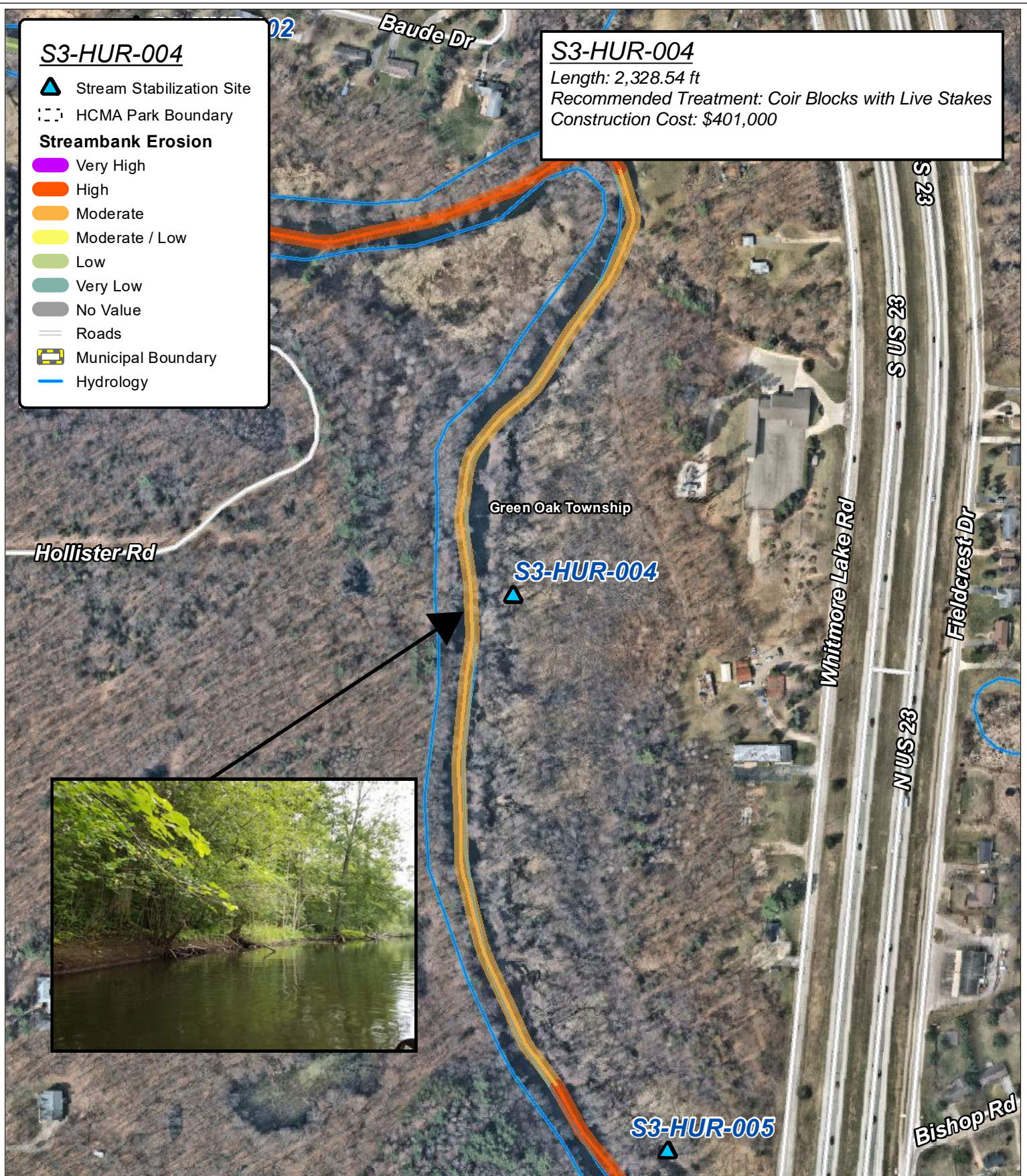
Hydrology

S3-HUR-004

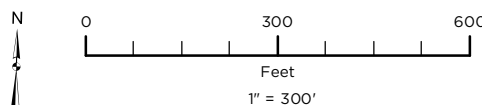
Length: 2,328.54 ft

Recommended Treatment: Coir Blocks with Live Stakes

Construction Cost: \$401,000



Huron Meadows Metropark Streambank Stabilization Siting



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Map Published: June 25, 2019



S3-HUR-005

▲ Stream Stabilization Site

HCMA Park Boundary

Streambank Erosion

Very High

High

Moderate

Moderate / Low

Low

Very Low

No Value

Roads

Municipal Boundary

Hydrology

▲ S3-HUR-004

S3-HUR-005

Length: 746.20 ft

Recommended Treatment: Soil Lifts with Live Stakes

Construction Cost: \$506,000

Green Oak Township

S3-HUR-005

Whitmore Lake Rd

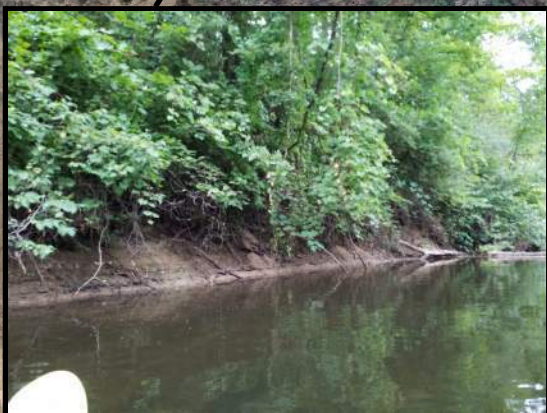
SUS 23

NUS 23

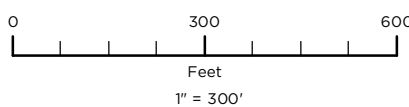
Fieldcrest Dr

Bishop Rd

Fernbrooke Dr



Huron Meadows Metropark Streambank Stabilization Siting



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Map Published: June 25, 2019



Huron Meadows Metropark Shoreline Summary and Recommendations



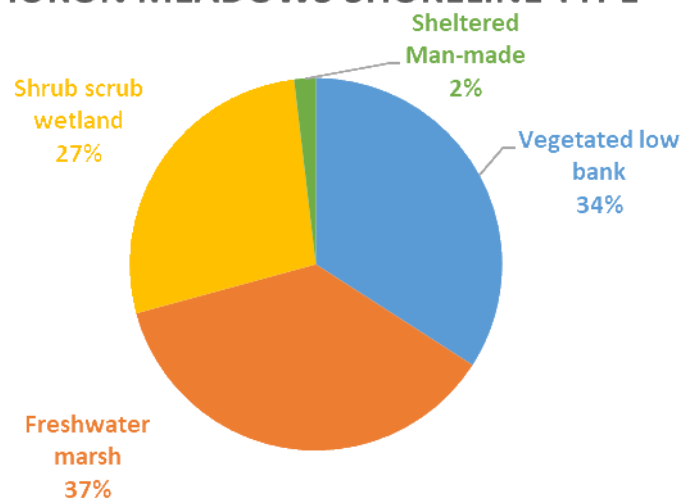
Minor slumping in Huron Meadows Metropark.

Table 6. Shoreline Inspection Summary

Erosion Condition	Length of Shoreline (ft)
Major	0.0
Minor	375.2
None	10,248.9
Total:	10,624.1
Restoration Cost:	NA

The shoreline in Huron Meadows consists of several small lakes and ponds, but restoration activity is only recommended on Maltby Lake.

HURON MEADOWS SHORELINE TYPE



Proportion of each shoreline type present in Lower Huron Metropark.

SLR-HUR-001

Length: 200 Ft

Recommended Treatment: Detail E

Area is a high quality wetland and its diversity is threatened by the small amount of invasive species found here.



SLR-HUR-001

Site	Length, Ft	Recommended Treatment	Unit Price	Cost
001	200	E	\$3,000/acre	NA
TOTAL				\$ -

SLR-HUR-001

Shoreline Rehab Site

Invasive Vegetation Pt

Invasive Type

- Black Alder
- Cattail
- Multiple
- Other
- Phragmites

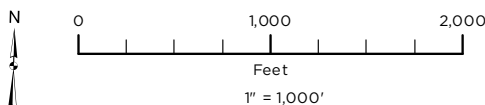
Shoreline Condition

Stumping Severity

- Major
- Minor
- None

- HCMA Park Boundary
- Roads
- Hydrology

Kensington Metropark Shoreline Rehabilitation Siting



Source: Data provided by OHM Advisors, Huron Clinton Metroparks and Near Map. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

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Huron Meadows Metropark Green Infrastructure Recommendations

In Huron Meadows, the green infrastructure practices listed in Table 1 are recommended to improve water quality and ameliorate flooding issues in the park where feasible. These practices are also outlined on the attached green infrastructure maps.

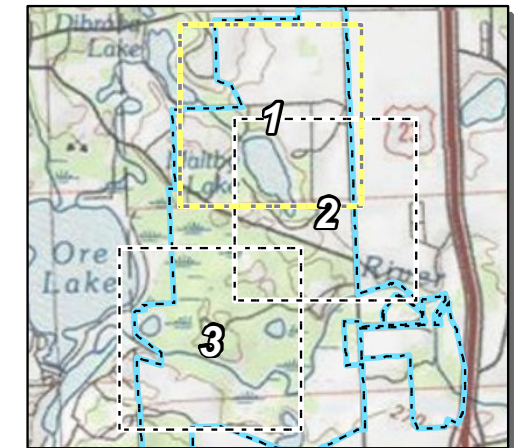
Table 7. Huron Meadows Green Infrastructure Recommendations

Site ID	Site	Practice Type	Treatment Surface Area (ft ²)	Cost Opinion	Cost per sq ft of Treatment Area (\$/ft ²)
GI-HUR-01	Shelter C	Naturalized Swale	2,415	\$4,106	\$1.70
GI-HUR-02	Shelter B	Native Prairie	10,646	\$12,420	\$1.17
GI-HUR-03	Shelter A	Bioswale	1,418	\$11,265	\$7.94
GI-HUR-04	Golf Course Ski Center	Bioswale	2,550	\$20,258	\$7.94
GI-HUR-05	Golf Course Ski Center	Bioswale	1,550	\$12,314	\$7.94
GI-HUR-06	Golf Course Ski Center	Porous Pavement	6,364	\$158,723	\$25.00
GI-HUR-07	Golf Course Ski Center	Bioswale	1,005	\$7,984	\$7.94
GI-HUR-08	Golf Course Ski Center	Bioswale	2,480	\$19,702	\$7.94
GI-HUR-09	Shelter C	Native Prairie	7,246	\$8,454	\$1.17
Total:			35,674	\$255,226	

Huron Meadows Metropark

Green Infrastructure
Recommendation Areas

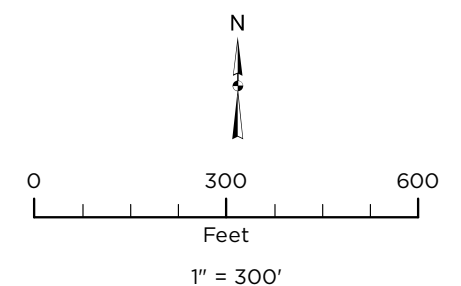
Area: 1 of 3



Recommendation Area

GSI Type

-  Bioswale (5)
-  Porous Pavement (1)
-  Stormwater Gravity Main
-  HCMA_swCulvert (17)
-  HCMA Park Boundary
-  Roads



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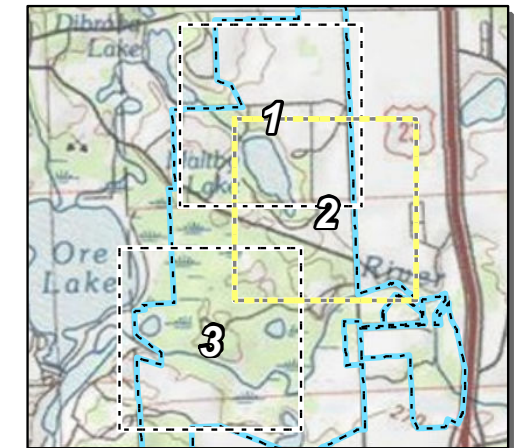
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Int'l Feet

Map Published: October 1, 2019

Huron Meadows Metropark






Green Infrastructure
Recommendation Areas

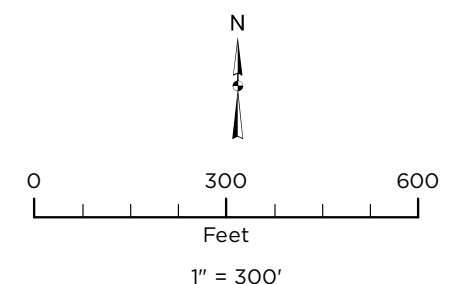
Area: 2 of 3



Recommendation Area

GSI Type

-  Native Prairie (1)
-  Stormwater Gravity Main
-  HCMA_swCulvert (2)
-  HCMA Park Boundary
-  Roads



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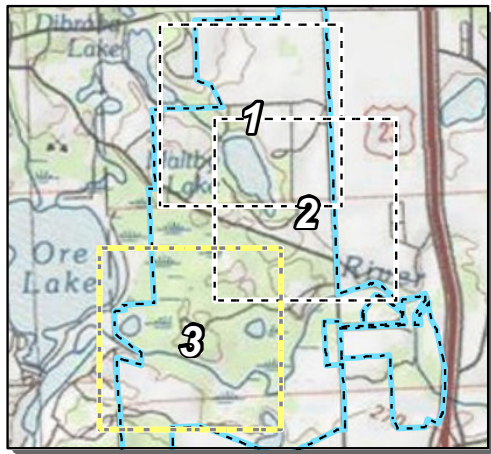
Map Published: October 1, 2019



Huron Meadows Metropark

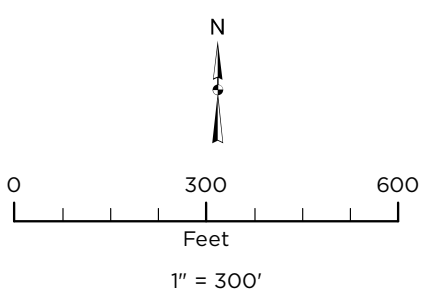
Green Infrastructure Recommendation Areas

Area: 3 of 3



Recommendation Area

- GSI Type**
- Native Praire (1)
 - Naturalized Swale (1)
 - Stormwater Gravity Main
 - HCMA_swCulvert (3)
 - HCMA Park Boundary
 - Roads



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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 IntlFeet

Map Published: October 1, 2019



Huron Meadows Metropark Recommendation Prioritization

Each table in this section is prioritized, with the most urgent projects listed first. Projects with **red** Site IDs need immediate attention. Projects with **green** Site IDs can be accomplished by HCMA staff. **Bold** projects may be eligible for grant funding. Underlined projects may be good volunteer or education opportunities. All other projects will likely require annual budget allocations to complete.

Table 8. Huron Meadows Culvert Repair Priorities

Culvert ID	Diameter (in)	Length (ft)	Condition	Maintenance Need	Cost Opinion
CUL-HUR-009	12	16	Failing	Replacement	\$1,963
CUL-HUR-002	12	15	Failing	Replacement	\$1,963
CUL-HUR-008	30	26	Poor	Replacement	\$6,443
CUL-HUR-004	18	60	Poor	Full Liner	\$5,501
CUL-HUR-018	18	55	Poor	Replacement	\$8,242
CUL-HUR-022	18	54	Poor	Replacement	\$8,100
CUL-HUR-001	12	51	Poor	Replacement	\$6,329
CUL-HUR-010	12	34	Poor	Replacement	\$4,210
CUL-HUR-024	24	14	Moderate	Future Cleanout	\$68
CUL-HUR-013	12	41	Moderate	Future Cleanout	\$142
CUL-HUR-019	10	25	Fair	Future Cleanout	\$89
Total:					\$43,050

Table 9. Huron Meadows Outfall Repair Priorities

Outfall ID	Diameter (in)	Condition	Maintenance Need	Cost Opinion
SDC-HUR-005	12	Failing	Replacement	\$6,250
Total:				\$6,250

Table 10. Huron Meadows Stream Stabilization Priorities

Stream Stabilization Site ID	Length (ft)	Erosion Severity	Recommended Treatment	Unit Cost (\$/ft)	Cost Opinion
S3-HUR-001	1,579.56	High	Soil Lifts with Live Stakes	678	\$1,071,000
S3-HUR-003	932.69	High	Soil Lifts with Live Stakes	678	\$633,000
S3-HUR-002	309.47	High	Soil Lifts with Live Stakes	678	\$210,000
S3-HUR-005	76.20	High	Soil Lifts with Live Stakes	678	\$506,000
S3-HUR-004	2,328.54	Moderate	Coir Block with Live Stakes	172	\$401,000
Total:					\$2,821,000

Table 11. Huron Meadows Shoreline Rehabilitation Priorities

Shoreline Restoration Site ID	Length (ft)	Recommended Treatment	Unit Cost (\$/ft)	Cost Opinion
SLR-HUR-001	200	E (Invasive Species Removal)	\$3,000/acre	NA

Table 12. Huron Meadows Green Infrastructure Installation Priorities

Site ID	Site	Practice Type	Treatment Surface Area (ft ²)	Cost Opinion	Cost per sq ft of Treatment Area (\$/ft ²)
<u>GI-HUR-05</u>	<u>Golf Course Ski Center</u>	<u>Bioswale</u>	<u>1,550</u>	<u>\$12,314</u>	<u>\$7.94</u>
<u>GI-HUR-03</u>	<u>Shelter A</u>	<u>Bioswale</u>	<u>1,418</u>	<u>\$11,265</u>	<u>\$7.94</u>
<u>GI-HUR-07</u>	<u>Golf Course Ski Center</u>	<u>Bioswale</u>	<u>1,005</u>	<u>\$7,984</u>	<u>\$7.94</u>
GI-HUR-02	Shelter B	Native Prairie	10,646	\$12,420	\$1.17
GI-HUR-09	Shelter C	Native Prairie	7,246	\$8,454	\$1.17
GI-HUR-01	Shelter C	Naturalized Swale	2,415	\$4,106	\$1.70
GI-HUR-04	Golf Course Ski Center	Bioswale	2,550	\$20,258	\$7.94
GI-HUR-08	Golf Course Ski Center	Bioswale	2,480	\$19,702	\$7.94
GI-HUR-06	Golf Course Ski Center	Porous Pavement	6,364	\$158,723	\$25.00
Total:			35,674	\$255,226	