

Tamarack Creek Restoration Project **Monitoring/Maintenance plan**

Year of Project Installation: 2022/2023

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Prepared by: ECT

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Estimated Annual Monitoring/Maintenance Cost

Pricing will vary dramatically from site to site and year to year as no two sites are alike. In 2023, the typical price range falls between \$100 and \$1,000 per acre per visit. For estimating purposes, we use an average rate of **\$500 per acre per visit** for stream restoration areas (both bench and sloped), as well as wetland areas at Tamarack Creek, with a total of 6.2 acres. Therefore, the **estimated annual cost** for monitoring and maintenance at this site averages **around \$9,300**, accounting for **3 visits during a year**, subject to factors such as weed infestation, erosion, woody plant encroachment, etc. Over time, time requirements and associated pricing for management also generally decreases to a point but then tends to plateau since weeds will always migrate into a site through water, wind, and animal dispersal (in addition to possible neighbor encroachment, erosion, etc.)

Seasonal Monitoring/Maintenance Schedule

Year 3-5 after installation

*Plan for 3 site visits each year for monitoring and schedule physical maintenance activities as needed.

SPRING	Focus	Description	Maintenance Actions
Erosion	Erosion?	Walk the site to ensure there are no erosion gullies forming, particularly on steeper slopes or below water inflow pipes.	• Repair with additional soil, cover crop, erosion control blanket, and/or stone as needed.
Native herbaceous Plant	Establishment?	Consider using prescribed fire in sites to reduce thatch layer, stimulate native herbaceous plants, and kill or weaken invasive species. For most sites, fire is an important management tool that should be applied to a site every 2-4 years.	• Prescribe burn • Mowing
Turf Invasion	Outcompeting natives?	Target turf grasses that may be outcompeting native species.	• Target turf grasses that may be outcompeting native species.

Year 3-5 after installation - continued

SUMMER	Focus	Description	Maintenance Actions
Weeds	Aggressive biennials presence?	In June, biennials such as sweet-clover, bull or nodding thistles, and teasel should be cut near the ground when buds are forming or plants have been flowering for up to three days. Cut material can be left where it falls unless it's so dense that it will smother adjacent native vegetation. Visit https://www.canr.msu.edu/pestid/resources/plant-and-weed-identification/index for common Michigan weeds identification resources.	• Timed cutting @ base
	Other perennial weed?	Other aggressive perennial weeds such as spotted knapweed, crown-vetch, bird's foot-trefoil, and Canada thistle should be spot-treated with the appropriate herbicide.	• Spot treat
Invasive Species	Reed canary grass & cattail presence?	Reed canary grass and cattail patches should be sprayed or hand-swiped.	• Spray/hand-swipe
	Woody Invasive	Woody invasives should be cut and stump-treated or foliar sprayed, based on the size.	• Cut stump-treated • Foliar spray

FALL	Focus	Description	Maintenance Actions
Invasive species	Reed canary grass & cattail presence?	Retreat reed canary grass and cattail as needed	• Spray • Hand-swipe
	Phragmites presence?	Continue treating Phragmites	• Continue treating Phragmites
	Woody Invasive	Continue spot-treatments of other aggressive perennial and woody invasives as needed.	• Spot treat

Year 5-10 after installation

*Plan for 3 site visits typically June through September in a year every 2 to 3 years. During site visits, conduct monitoring and schedule physical maintenance activities as needed.

SPRING/ SUMMER	Focus	Description	Maintenance Actions
Weeds	Aggressive biennials presence?	In June, biennials such as sweet-clover, bull or nodding thistles, and teasel should be cut near the ground when buds are forming or plants have been flowering for up to three days. Cut material can be left where it falls unless it's so dense that it will smother adjacent native vegetation. Visit https://www.canr.msu.edu/pestid/resources/plant-and-weed-identification/index for common Michigan weeds identification resources.	• Timed cutting @ base
	Other perennial weed?	Other aggressive perennial weeds such as spotted knapweed, crown-vetch, bird's foot-trefoil, and Canada thistle should be spot-treated with the appropriate herbicide.	• Spot treat
Invasive species	Reed canary grass & cattail presence?	Reed canary grass and cattail patches should be sprayed or hand-swiped.	• Spray • Hand-swipe
	Woody Invasive?	Woody invasives should be cut and stump-treated or foliar sprayed, based on the size.	• Cut stump-treated • Foliar spray

FALL	Focus	Description	Maintenance Actions
Invasive species	Reed canary grass & cattail presence?	Retreat reed canary grass and cattail as needed	• Spray • Hand-swipe
	Phragmites presence?	Continue treating Phragmites	• Continue treating Phragmites
	Woody Invasive	Continue spot-treatments of other aggressive perennial and woody invasives as needed.	• Spot treat

Year 10+ after installation

*Plan for 2 site visits typically June through September in a year every 2 to 3 years. During site visits, conduct monitoring and schedule physical maintenance activities as needed.

SUMMER	Focus	Description	Maintenance Actions
Weeds	Aggressive biennials presence?	In June, biennials such as sweet-clover, bull or nodding thistles, and teasel should be cut near the ground when buds are forming or plants have been flowering for up to three days. Cut material can be left where it falls unless it's so dense that it will smother adjacent native vegetation. Visit https://www.canr.msu.edu/pestid/resources/plant-and-weed-identification/index for common Michigan weeds identification resources.	• Timed cutting @ base
	Other perennial weed?	Other aggressive perennial weeds such as spotted knapweed, crown-vetch, bird's foot-trefoil, and Canada thistle should be spot-treated with the appropriate herbicide.	• Spot treat
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FALL	Focus	Description	Maintenance Actions
Invasive species	Reed canary grass & cattail presence?	Retreat reed canary grass and cattail as needed	• Spray • Hand-swipe
	Phragmites presence?	Continue treating Phragmites	• Continue treating Phragmites
	Woody Invasive	Continue spot-treatments of other aggressive perennial and woody invasives as needed.	• Spot treat

Management Tool & Timing

** Pick your management need from the column on the left and learn the timing of the appropriate technique listed in columns.

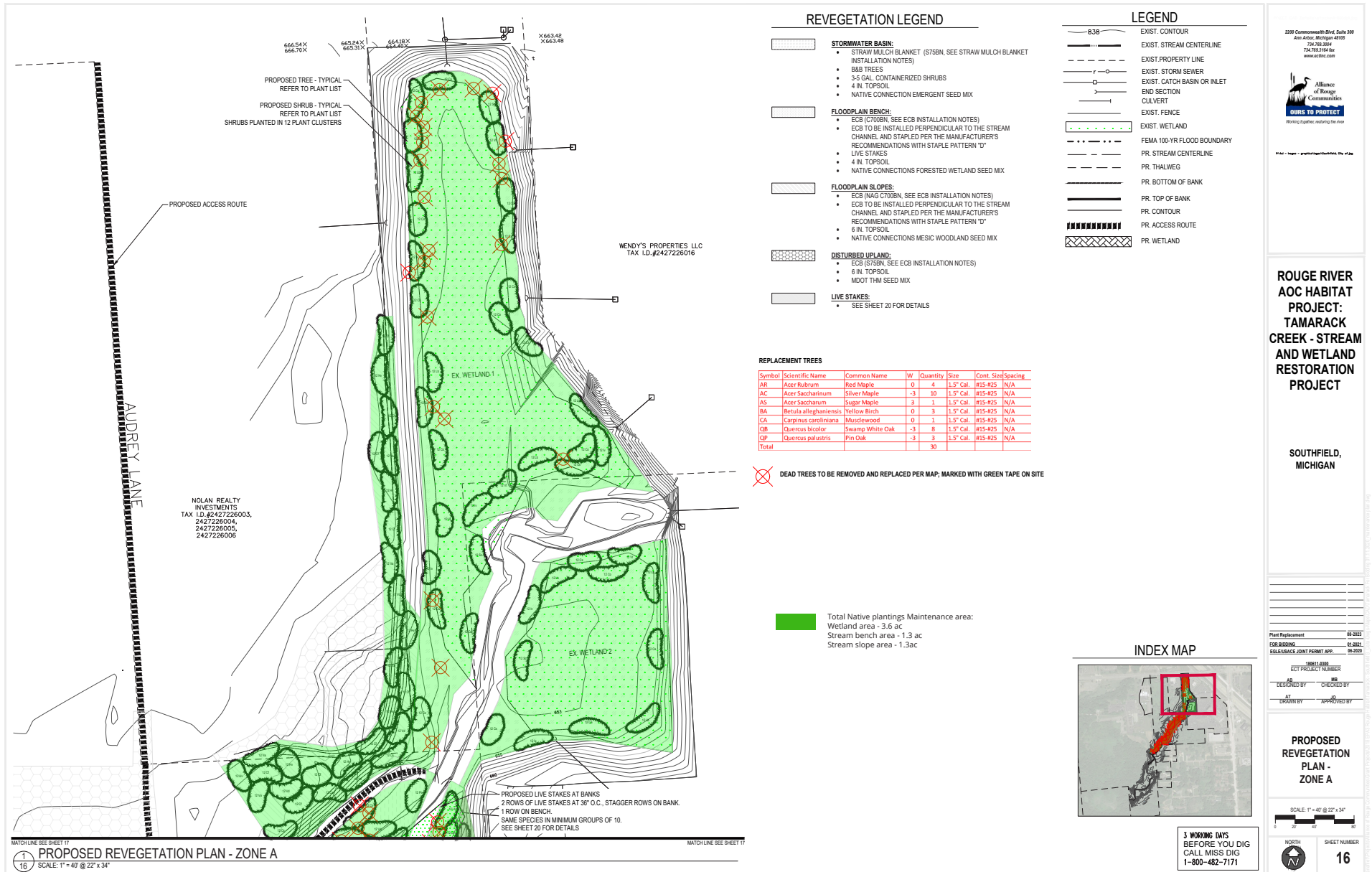
Management Tools		Winter		Spring			Summer			Fall		Winter	Notes	
Month		1	2	3	4	5	6	7	8	9	10	11	12	
General management							June, July/August, and September are ideal times.							Most newly establishing sites need three or more site visits during the first 1-10 years of establishment, and then typically 2-3 after that.
Turf	Turf grass encroachment			Foliar Spray(Rodeo)										
Invasives & Weeds	Reed canary grass control						Foliar Spray(Rodeo)							
	Phragmites control								Foliar Spray (Rodeo)					
	Cattail control						Foliar Spray(Rodeo)							
	Garlic mustard and dame's rocket						Hand pull							Easiest to pull when the plants bolt. Remove pulled material from site
	Crown vetch, bird's foot-trefoil						Foliar Spray(Milestone)							
	Canada thistle, spotted knapweed, other pernicious broad-leaved weeds						Foliar Spray(GLY)							Plants are most susceptible when forming buds and early flower stage
	Woody invasives	Foliar spray: stem<pencil size; Cut stump: stem>= pencil size												Cut-stump: Use Garlon 3a at 54% active ingredient. Stump should be "painted" with herbicide within 5 minutes of cutting and anytime from 6/1 to 3/1.
Mowing/ Cutting	Annuals control						High mowing (4")		High mowing (4")					
	Sweet-clover control						Timed cutting @ base							
	Biennial thistles						Timed cutting @ base							Each time plants develop buds and during early flowering stage
	Early establishment--young natives/many annuals						High mowing (4")		High mowing (4")					

Management Tools		Winter		Spring			Summer			Fall			Winter	Notes
Month		1	2	3	4	5	6	7	8	9	10	11	12	
Reseeding/ Replanting	Bare soil				Re-seeding (for sea- sonally saturated soil)						Re-seeding (for unsatu- rated soil)			Typical rate is 8 lbs per acre. 1/2 this rate when overseeding zones with some native vegetation.
	Erosion		Erosion control blanket + Re-seed											Replace lost soil with clean fill, sow cover crop of annual oats, lay ECB on sloped areas
Herbivore damage	Deer damage; Tree/ shrub dieback	Non-oak <i>spp.</i>	1. Prune 2. Replace/install caging/tree tubes as needed											
	Deer damage; Tree/ shrub dieback	Oak <i>spp.</i>										1. Prune only when dormant 2. Replace/install caging/tree tubes as needed		
	Goose/turkey browse				Fencing									Consider erecting stakes with lines at 1', 2', and 3' heights and mylar flagging tied on lines

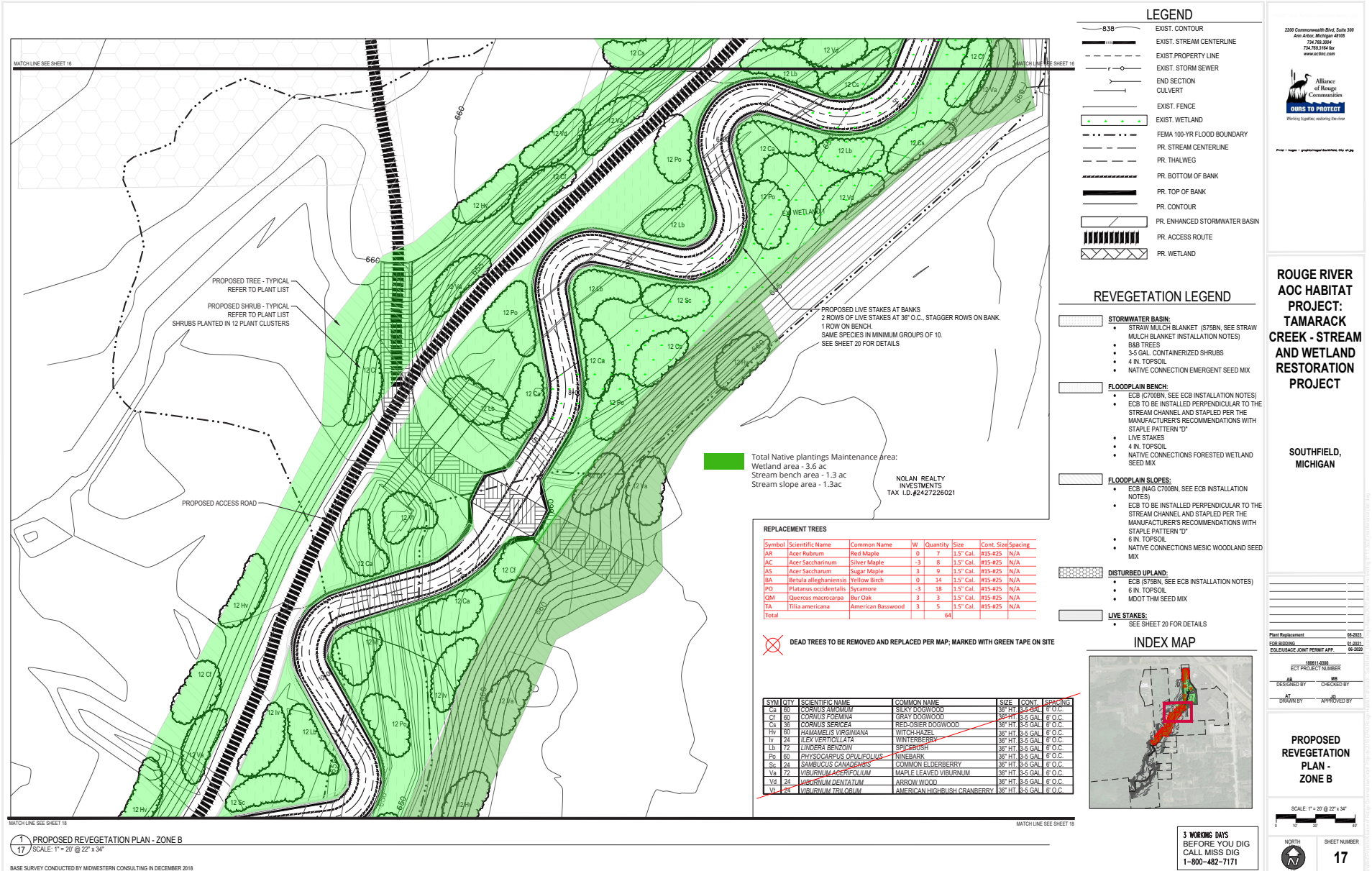
Herbicide applicator qualification

Regarding herbicide applications: The Michigan Department of Agriculture requires applicators who are applying herbicide as part of their work to be licensed applicators. All applicators must take the core exam and categories 4 (right-of-way) and 5 (aquatics) cover all aspects of natural area management.

Site Map (Total area: 6.2 acres)



Site Map - continued



[illegible]

Site Map - continued

