Environmental Assessment

Seasonal Sea Lamprey Barrier on the Sucker River in Alger County, Michigan

Prepared on Behalf of:

Great Lakes Fishery Commission
and the
U.S. Fish and Wildlife Service

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WSP Project No. 325223321
December 2025

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CONTENTS

TABLES

FIGURES

APPENDICES

List of Abbreviations and Acronyms

ac	acres
APE	Area of Potential Effects
ATP	adenosine triphosphate
BMP	Best Management Practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWA	Clean Water Act
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESC	erosion and sediment control
FEMA	Federal Emergency Management Agency
ft	feet
GLFC	Great Lakes Fishery Commission
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
MNFI	Michigan Natural Features Inventory
MDNR	Michigan Department of Natural Resources
NAAQS	National Ambient Air Quality Standards
NCSS	National Cooperative Soil Survey
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NREPA	National Resources and Environmental Protection Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PA	Public Act
PM	particulate matter
SHPO	State Historic Preservation Office
SLCP	Sea Lamprey Control Program
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
WSP	WSP USA

CHAPTER 1 – INTRODUCTION, PURPOSE AND NEED

1.1 BACKGROUND AND PROJECT SETTING

The sea lamprey (*Petromyzon marinus*) is a parasitic fish native to the Atlantic Ocean that invaded the Great Lakes in the early 1900s, causing major ecological and economic damage to regional fisheries. In response, the U.S. Fish and Wildlife Service (USFWS) and the Great Lakes Fishery Commission (GLFC) established the Sea Lamprey Control Program (SLCP), which employs integrated pest management techniques—such as lampricides, traps, pheromones, alarm cues, and physical barriers—to reduce sea lamprey populations and protect valuable fish stocks.

Sea lamprey control is essential for maintaining healthy fisheries in the Great Lakes, especially for species that have been severely impacted by lamprey predation (Kaye 2021). During its 12-to-18-month parasitic phase, a single sea lamprey can kill over 40 pounds of fish (National Oceanic and Atmospheric Administration [NOAA] 2023). Lampricides have become the most widely used method of sea lamprey control in the Great Lakes, used to selectively kill sea lamprey during the larval stage. Much of the lamprey's lifecycle is spent as filter-feeding larvae in tributary streams, making larval population assessments critical for determining where and when control measures should be applied (GLFC 2024a). Although lampricides are widely used to control sea lamprey, they are more expensive than other methods like barriers. On average, for every $1 million invested by GLFC in sea lamprey barriers, an estimated $5.1 million in lampricide treatment costs and $31.1 million in Great Lakes fish value are saved over the barrier's 50-year lifespan (GLFC 2025).

Since the 1950s, targeted control efforts have reduced sea lamprey numbers to about 10 percent of their historical abundance (Zielinski et al. 2019). Seasonal barriers (Figure 1-1) have proven especially effective, blocking lampreys during their spawning runs while allowing native fish to pass for most of the year. Currently, the SLCP is engaged in multiple seasonal barrier projects with partners such as the Michigan Department of Natural Resources (MDNR). Successful projects on streams like Albany, Furnace, and Greene creeks have nearly eliminated the need for chemical treatments, improving stream connectivity and ecosystem health.

In Alger County, Michigan, the Alger County Road Commission, Burt Township, MDNR Fisheries Division, USFWS and GLFC collaborated to remove and replace undersized culverts at the H-58 highway crossing of the Sucker River (Figure 1-2). This work improved road safety and streambank stability, but the culverts served as barriers to upstream movement of sea lamprey and many other aquatic species, including native and other beneficial species. Upstream of the H-58 crossing, lampricide treatments have been used to control lamprey reproduction, but these treatments are costly and complicated by beaver dams, seeps, and remote access. Lampricides also have the potential to negatively affect native species.

Source: GLFC 2024b

Figure 1-1. Typical Low-Head Sea Lamprey Barrier

Figure 1-2. Undersized Culverts at H-58 Sucker River Crossing Prior to Replacement

To address these challenges, the GLFC, USFWS, MDNR and local partners developed a two-phase approach for the Sucker River near Grand Marais, Michigan in Burt Township (Figure 1-3):

- Phase 1: Replace undersized culverts at the H-58 crossing with a free-span bridge, improving fish passage and reducing streambank erosion (completed fall 2025).
- Phase 2: Construct a seasonally operated, in-stream sea lamprey barrier about 20 miles upstream. This barrier would restrict lamprey access to lower stretches of the river, making control efforts more effective and cost-efficient, while also enhancing stream health and connectivity for non-target species.

Funding requested for this project through the USFWS Great Lakes Fish and Wildlife Restoration Act was directed towards conducting feasibility, engineering, design, and some aspects of removal and construction of the existing culvert and new bridge. The match provided by the GLFC would be directed toward the construction of the seasonal sea lamprey barrier in the upper watershed and removal of the existing culvert.

1.2 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act ([NEPA], 42 United States Code [USC] § 4321-4347) is a federal law that establishes a national environmental policy and provides a framework for planning and decision making by federal agencies. Specifically, NEPA requires that federal agencies integrate an interdisciplinary environmental review process that evaluates a range of alternatives, including the No Action Alternative, as part of the decision-making process. This process also establishes a need to include interagency coordination and public participation in the process. In summary, NEPA is intended to promote informed decision making by federal agencies and public participation in the process, as appropriate. Because this project is anticipated to use federal funding requested through the Great Lakes Fish and Wildlife Restoration Act administered by the U.S. Department of Interior (DOI), the USFWS is the lead federal agency for this proposed action. An environmental assessment (EA) is being prepared in accordance with the requirements of NEPA to evaluate the effects of construction and operation of the seasonal barrier (Phase 2) on the Sucker River in Alger County, Michigan. The culvert replacement (Phase 1) was an independent action that was assessed under a separate environmental review under NEPA (categorical exclusion) and was found to have no significant effect on the human environment.

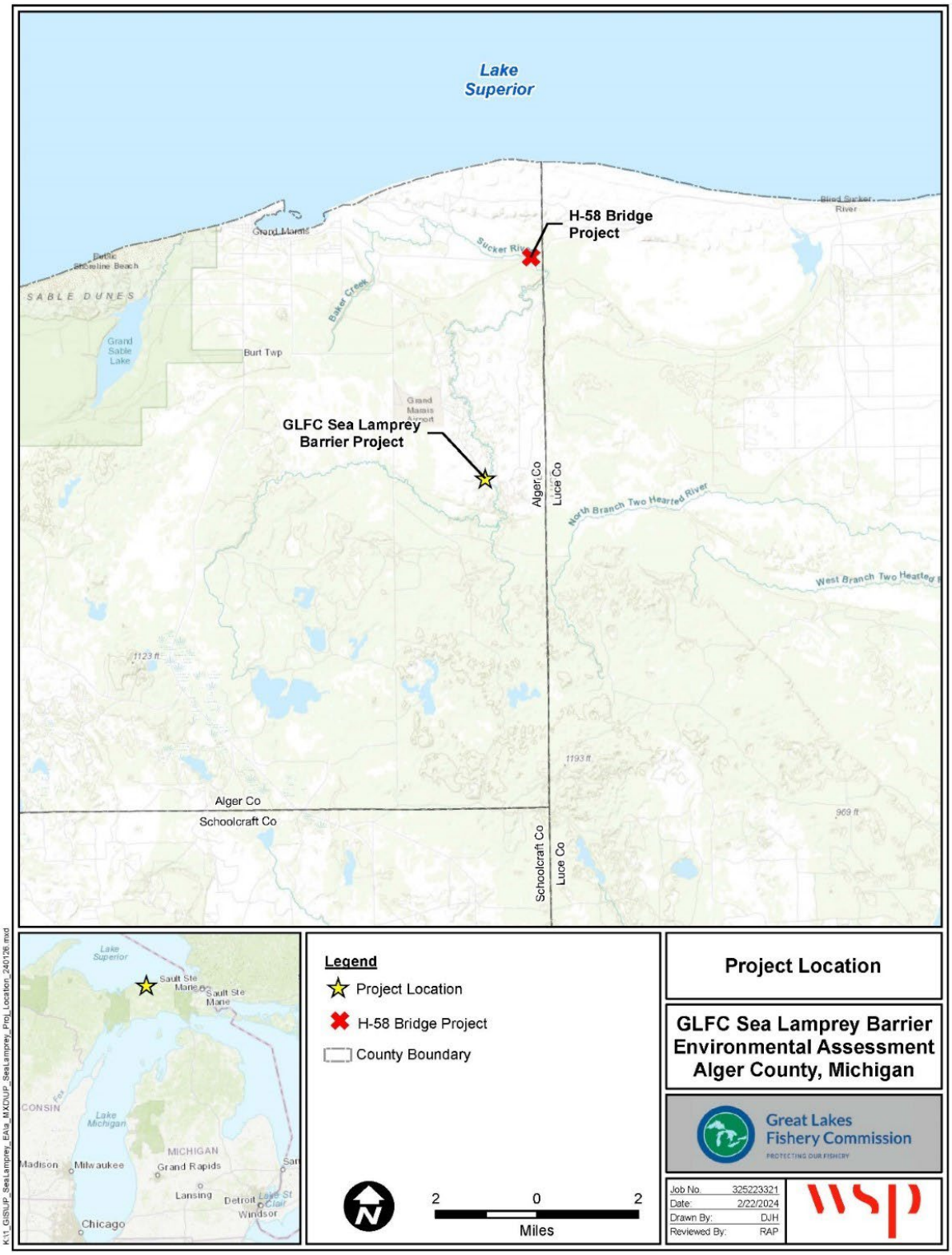

Figure 1-3. Proposed Project Location

1.3 PROPOSED ACTION

The proposed action considered in this EA is to construct and operate a seasonal in-stream sea lamprey barrier on the Sucker River in Alger County, Michigan. This would restrict invasive sea lamprey to the lower part of the river, where their offspring can be more effectively treated with lampricides. The barrier would consist of an adjustable crest weir design, allowing for it to be raised during the sea lamprey spawning migration (approximately March through June) and lowered the rest of the year.

Installing this seasonal barrier approximately 20 miles upstream of the H-58 river crossing would enable effective, temporary blockage of sea lamprey during their spawning run, while preserving stream connectivity and function for non-target fish and other aquatic species throughout the watershed for the rest of the year. By reducing the area infested by sea lamprey, the SLCP can save effort and costs, redirecting resources to manage lamprey populations in other Great Lakes tributaries. This approach would also improve stream health and connectivity, supporting state, federal, and tribal fishery management goals. Once the new barrier is in place, lampricide treatments would no longer be needed for 95 miles of upstream spawning habitat. The GLFC, with support from the USFWS, would oversee the barrier's maintenance and operation throughout its lifespan.

1.4 PURPOSE AND NEED FOR PROPOSED ACTION

The purpose of the proposed action is to prevent invasive sea lampreys from migrating upstream in the Sucker River and its tributaries during their spring spawning season (March through June). By installing a seasonal barrier upstream of the H-58 river crossing, the project aims to block lamprey access to preferred spawning and larval habitats, thereby reducing their population and minimizing the need for chemical treatments (lampricides) in this stretch of the river.

This action is needed because sea lampreys pose a significant threat to native fish populations and the overall health of the Great Lakes ecosystem. Traditional control methods, such as lampricide application, are costly, logistically challenging, and can negatively impact native species. The seasonal barrier offers a more targeted and sustainable solution, allowing for effective lamprey control while improving stream connectivity and habitat quality for non-target aquatic species.

The project supports broader state, federal, and tribal fishery management objectives by:

- Protecting upstream habitats from lamprey infestation,
- Reducing reliance on chemical controls,
- Enhancing ecosystem health and connectivity,
- Aligning with conservation priorities identified by the MDNR for Lake Superior.

1.5 DECISION TO BE MADE

This EA has been prepared to inform USFWS decision makers and the public about the environmental consequences of the proposed action. The decision to be made by USFWS is whether to construct and operate a sea lamprey in-stream seasonal barrier on the Sucker River or take no action. USFWS will use this EA to support the decision-making process and to determine whether an Environmental Impact Statement should be prepared or whether a Finding of No Significant Impact may be issued.

1.6 SCOPE OF THE ENVIRONMENTAL ASSESSMENT AND SUMMARY OF THE PROPOSED ACTION

This EA evaluates the potential environmental, cultural, and socioeconomic impacts of the proposed action. A detailed description of the proposed action and alternatives considered are provided in Chapter 2.

USFWS prepared this EA to comply with NEPA, the DOI Interim Final Rule (43 Code of Federal Regulations [CFR] Part 46), and the DOI NEPA Handbook (516 Departmental Manual 1). USFWS considered the proposed action and determined it has the potential to impact the following environmental resources:

- Geology and Soils
- Hydrology and Floodplains
- Water Quality
- Aquatic Ecology
- Terrestrial Ecology
- Sensitive Species
- Invasive Species
- Wetlands and Waters of the State
- Socioeconomics
- Land Use and Recreation
- Cultural and Historic Resources
- Visual Quality and Aesthetics
- Air Quality
- Solid Waste and Hazardous Waste

USFWS also considered the following resources and determined that impacts were either negligible or would not occur based upon the project setting and the proposed action:

- Noise. The proposed activities include the short-term use of small-scale construction equipment at locations that are distant from sensitive receptors (residences, churches,

etc.). As such, temporary operational construction noise emissions would attenuate to low levels that would not be disruptive or impactful. Operations noise levels would be negligible. Therefore, no impacts from noise would occur from the proposed project.

- Groundwater. The construction of the proposed barrier on the Sucker River, including placement of sheet piling into bedrock up to 15 feet below the river bottom, would cause a seasonal backup of water upstream, resulting in localized effects on groundwater levels and associated discharge to the river (i.e., hydrologic alteration). This would not have a notable effect on groundwater quality or groundwater use.
- Prime Farmland. The project site is located entirely within the Sucker River valley within state forest land and, according to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey, lacks prime farmland resources (USDA NRCS 2024). Therefore, there would be no impact to prime farmland.
- Wild and Scenic Rivers. The Sucker River is not part of the National Wild and Scenic River System and is not included in Michigan's Natural Rivers Program (MDNR 2024a). Therefore, there would be no impact to wild and scenic rivers.
- Coastal Zones. The project site is not included within designated coastal zones of Lake Superior. Therefore, there would be no impact to coastal zones.
- Transportation. The local transportation network in the vicinity of the project site consists of Michigan Highway 77 along with county (i.e., H-58) and local (i.e., Whitewash Road) roads that serve local residents and communities. Use of the local transportation network is expected to occur in support of movement of workers, project materials, and for disposal of solid and hazardous wastes in conjunction with barrier construction. Operation of the barrier would not result in any traffic impacts. The magnitude of temporary project construction related traffic is negligible and is expected to be absorbed by the capacity of the existing transportation network. No impacts are therefore expected on the transportation network.
- Public Health and Safety. Potential effects related to public health and safety were considered. However, given the nature of the construction activities and measures in place dictated by standard operating procedures, the proposed action would not impact any issues associated with public health and safety.

USFWS's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 13112 (Invasive Species), and applicable laws including the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA).

1.7 PROGRAM FUNDING

Funding has been requested for this project through the USFWS Great Lakes Fish and Wildlife Restoration Act and will be directed towards conducting feasibility, engineering, design, and some aspects of removal and construction of the existing culvert and new bridge over the Sucker River. The match provided by the GLFC will be directed toward the construction of the sea lamprey seasonal barrier in the upper watershed and removal of the existing culvert. The GLFC, MDNR, Alger County Road Commission, and Burt Township have decades of combined

experience with similar projects and will be involved in all facets of the process. All work performed for this project by staff of the GLFC, MDNR, Alger County Road Commission, and Burt Township will be done as in-kind and work completed by the project partners will not be drawn from the grant monies.

Applicants have also secured funding from each of the following sources: The Great Lakes Fisheries Trust, The National Fish and Wildlife Foundation – Sustain Our Great Lakes, the MDNR Fish Habitat Program, the Great Lakes Restoration Initiative, and the USFWS National Fish Passage Program.

1.8 PUBLIC AND AGENCY INVOLVEMENT

Public involvement and coordination with local, Tribal, state, and federal resource management agencies is a vital component of the NEPA process. The USFWS and GLFC have engaged the public in a variety of ways during the development of this EA. There is an “interagency” project team that has met periodically as needed since July 2022 and during the preparation of this EA. Agencies and organizations that have participated in the planning process have included but are not limited to the following:

- USFWS
- GLFC
- MDNR, Fisheries Division
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- Alger County Road Commission
- Burt Township
- Bay Mills Indian Community
- Sault Ste. Marie Tribe of Chippewa Indians
- Green Watershed Restoration
- WSP USA (WSP)

This working group provided input on the regulatory requirements, environmental resources, and overall direction of the project. Many of these agency representatives were also available at public meetings held for the project to answer questions regarding agency involvement and authorizations for the project.

1.8.1 Public and Agency Scoping

The USFWS and the GLFC hosted a combined public scoping meeting for the H-58 culvert replacement project and the sea lamprey barrier project EA on October 19, 2023, which had approximately 10 people in attendance. Attendees included local landowners, the local snowmobile club, the Alger County Road Commission, and EGLE. To announce this meeting, the USFWS emailed letters to agency shareholders, placed advertisements in the area newspapers, and posted a flyer at the Burt Township offices. A presentation was given to

communicate the purpose and need for each project, the environmental setting and key project features, barrier project alternatives under consideration, and elements of the NEPA process.

The USFWS, GLFC, MDNR, and Green Watershed Restoration hosted a follow-up public community meeting on September 2, 2025, which had approximately 15 community members in attendance. To announce this meeting, Burt Township placed advertisements in the area papers, on social media, and posted flyers in the area. The USFWS provided information on both phases of the Project and emphasized the need for the proposed action. Twelve in-person community questions were answered. The USFWS also received one written letter of support on September 7, 2025.

Key topics raised at the 2023 scoping meeting included the potential benefits of the proposed action including sea lamprey control, reduction of lampricide use, and potential increase in available habitat for non-target aquatic species in the river; history of sea lamprey seasonal barrier usage; larval and adult sea lamprey survey results; sediment transport in the Sucker River; scouring and stream bank erosion at the existing H-58 crossing; and potential traffic detours during H-58 bridge construction. Questions received at the follow-up community meeting included the current status of H-58 culvert replacement and the timeline for the installation of the seasonal sea lamprey barrier; potential adverse impacts of lampricide use on native species, food for human consumption, and groundwater quality; need for the proposed action; and lifespan of the barrier lift gate.

Correspondence was also conducted with representative agencies to solicit input to the NEPA planning process. No issues were raised by the agencies, and they were generally in support of the project. Trout Unlimited and the Alger County Conservation District Chair provided emails of support. Agency correspondence is provided in Appendix A.

1.8.2 Tribal Coordination

The USFWS and the GLFC have coordinated with the Bay Mills Indian Community and the Sault Ste. Marie Tribe of Chippewa Indians throughout the planning process. These are the most proximate federally recognized Indian Tribes to the project location and they have participated and provided support throughout the process. Formal correspondence with these Tribes has also been conducted to solicit input to the NEPA process (Appendix A), and they will continue to receive updates through the project period. The Tribal Natural Resources Director of the Bay Mills Indian Community and Lead Fisheries Biologist of the Sault Ste. Marie Band of Chippewa Indians recognize the direct benefits this project has to the tribal fishery in the 1836 Treaty Waters of Lake Superior. The project aligns with their priorities to protect and restore native species and the habitats that support them.

1.8.3 Public Review of the Environmental Assessment

Public and agency involvement for the EA included a 30-day public review period. The EA was posted on the GLFC website (www.glfc.org), and its availability was announced in newspapers serving the Alger County, Michigan area. The USFWS also distributed information about the EA's availability to local, state, and federal agencies, as well as to federally recognized tribes, as part of the review process.

1.9 NECESSARY PERMITS OR LICENSES

A number of permits and other authorizations must be obtained to implement the action under consideration. The proposed action would comply with Parts 301 and 303 of the Michigan Natural Resources and Environmental Protection Act (NREPA) and the State of Michigan water quality standards. A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction by the GLFC in addition to any applicable state permits.

Section 106 Historic Review requirements have been met and a determination of no adverse effect on historic properties was issued (see Appendix A for documentation).

The permits/approvals that may be required for the construction and operation of the sea lamprey barrier are listed in Table 1-1.

Table 1-1. Authorizations Required for Sea Lamprey Seasonal Barrier Construction and Operation

Agency	Authority	Requirement	Activity Covered
USFWS	Endangered Species Act	16 USC 1531, et seq.	Consultation regarding potential effect to federally listed species
USFWS	Fish and Wildlife Coordination Act	16 USC 601, et seq.	
EGLE	Natural Resources and Environmental Protection Act	Part 301	Activities in inland lakes and streams, fill placement/stream alteration
EGLE	Natural Resources and Environmental Protection Act	Part 303	Dredge/fill activities in wetlands
EGLE	Federal Clean Water Act	Section 401	Fill activities in “waters of the State”
	33 CFR 330	Section 404	
Michigan State Historic Preservation Office (SHPO)	National Historic Preservation Act	Section 106	Consultation and clearance regarding potential effect to historic properties
Michigan State Forest	MI Administrative Code	Special Use Permit	Installation of proposed barrier on State Forest land.
U.S. Army Corps of Engineers (USACE)	Federal Clean Water Act 33 CFR 330	Section 404	Cooperative consultation with EGLE on Section 404/401 permitting actions
Alger County Building Department	Part 91, Soil Erosion and Sedimentation Control (NREPA 1994 Public Act [PA] 451)	Soil Erosion and Sedimentation Control (Part 91)	Soil erosion and sedimentation control during construction activities

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CHAPTER 2 – ALTERNATIVES

2.1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER DISCUSSION

Several combinations of sea lamprey barrier designs and alternative locations were considered during the planning process for preventing upstream movement of sea lamprey in the Sucker River in Alger County. Justification for eliminating alternatives from further analysis were based on factors relating to:

- Lack of technical feasibility;
- Inability to meet the Project's purpose and need;
- Duplication with other less environmentally damaging or less expensive alternatives;
- Conflict with an up-to-date plan or other policy;
- Severe environmental impact; or,
- As a secondary, supporting reason, economic infeasibility.

2.1.1 Alternative Barrier Designs Evaluated

Barrier designs considered for restriction of sea lamprey during their spawning period to the lower Sucker River include:

- Electrical barrier
- Fixed crest barrier
- Adjustable crest barrier

Installed in stream beds and powered by direct current, electrical barriers deter sea lamprey migration without altering stream flow. However, they are ineffective due to non-specific targeting, high non-target mortality, and vulnerability to power failure (Zielinski et al. 2018). This option was dismissed due to lack of power at the site and failure to meet the project purpose and need.

The low-head in-stream barrier is the most common type of barrier used on the Great Lakes to prevent sea lamprey spawning. This relatively simple barrier creates a two to four-foot drop that prevents sea lampreys from proceeding further upstream. A lip is often used to keep sea lampreys from using their suction-cup mouth to climb over the barrier (GLFC 2014).

Both fixed crest and adjustable crest barriers were considered for this project. The fixed-crest barrier design uses an uninterrupted fixed-crest height and overhanging lip to maintain a vertical drop from the barrier crest (i.e., top of the barrier) to the tailwater (Zielinski et al. 2019). Fixed-crest barriers block upstream movement of adult sea lamprey as well as many non-target

aquatic species. Therefore, this alternative was eliminated from consideration because it would not meet the purpose and need for improved stream connectivity for non-target aquatic species.

Adjustable-crest barriers function similarly to fixed-crest designs but allow for manual or automated adjustment of crest height. This flexibility enables seasonal operation, targeting sea lamprey migration during the spring spawning period. During non-spawning periods, the barrier can be lowered or removed to facilitate passage of flow, debris, sediment, watercraft, and non-jumping native fish (Zielinski et al. 2019). The planning team selected the adjustable-crest barrier as the preferred design, as it meets the project's purpose and need by effectively blocking sea lamprey while minimizing impacts to non-target aquatic species.

2.1.2 Alternative Locations Evaluated

After selecting the in-stream adjustable crest (seasonal) barrier as the preferred design, the project team undertook a thorough process to identify and evaluate possible locations for the barrier. The alternatives considered included:

- Alternative A – No Action
- Alternative B – Near the Fishing Access on Whitewash Road
- Alternative C – Near the Grand Marais Airport.
- Alternative D – At the H-58 River Crossing.
- Alternative E – Near School Forest Road.

To determine which alternatives should be analyzed in detail within this EA, the GLFC applied a set of weighted screening criteria (see Table 2-1). These criteria included:

- Designing for a barrier height less than 6 feet and/or a disturbance area under 8 acres to avoid triggering Michigan Dam regulations.
- Selecting sites that minimize impacts to wetlands and streams.
- Reducing the need for wetland and stream mitigation.
- Ensuring ease of construction and accessibility for ongoing operations.
- Maximizing the distance of reconnected fisheries to enhance ecological benefits.
- Prioritizing locations on state or federal land.
- Securing local community support.
- Creating opportunities for collaboration with partners and public education.

Each alternative was assessed against these criteria to identify the most feasible and beneficial location for the seasonal barrier.

Table 2-1. Alternatives Screening Analysis

Goal	Objective	Weighting Factor[1]	Alternative A – No Action	Alternative B – Near Fishing Access Location (Whitewash Road)	Alternative C – Near Grand Marais Airport	Alternative D – At H-58 Crossing	Alternative E – Near School Forest Road
			Rank Score[2]				
Sea Lamprey Barrier	20-year storm, 18-inch drop create of weir to tailwater	5	5	1	1	1	1
Seasonal Fish Passage	Design to allow for seasonal modifications	5	5	1	1	1	1
Avoid Michigan Dam Regulations	Design for <6ft in height and/or 8-acre maximum disturbance	1	1	5	5	3	2
Wetland and Stream Impacts	Optimize site selection to avoid/minimize construction impacts	2	1	3	3	3	2
Mitigation potential regulatory requirements/ impacts	Avoid or need to address stream/or wetland impacts	3	1	3	3	2	2
Ease of construction and access for operation	Optimize site selection for minimum disturbance and ease of operations	3	1	2	4	1	2
Restored connection of Sucker River fisheries (distance)	Site selection to optimize continuity of fish habitat	4	1	2	3	4	5
Land Ownership	Maximize State Land/Federal Land	5	1	1	1	5	5
Local Support	Improve fishing potential within Sucker River	4	5	1	3	4	5

Goal	Objective	Weighting Factor[1]	Alternative A – No Action	Alternative B – Near Fishing Access Location (Whitewash Road)	Alternative C – Near Grand Marais Airport	Alternative D – At H-58 Crossing	Alternative E – Near School Forest Road
			Rank Score[2]				
Education	Provide public educational opportunities for partners	4	5	1	3	3	2
Lampricide Treatment	Reduce stream length requiring chemical (lampricide) treatments	5	5	3	2	1	1
Total scale-weighted score[3]			**133**	**72**	**93**	**102**	**106**
Ranking[4]			**5**	**1**	**2**	**3**	**4**

[1]Weighting Factor = Importance of the objective on a scale of 1 through 5, where: 5 = Most Important, 1 = Least Important
[2]Rank Score = Scaling factor based on degree to which the alternative meets the objective. Scale of 1 thru 5, where: 1 = Strongly optimizes objective, 5 = Objective poorly optimized or not met at all
[3]Total Score = Sum of weighting factor multiplied by the rank score for each objective. Lower scores indicate higher ranking.
[4]Ranking = Alternatives are ranked from 1 (best) to 5 (least suitable) based on total score.

Alternative C was found to be less suitable due to construction and operational challenges, such as steep banks that complicate access and the need for continuous dewatering with a pump during concrete work, which would require a 24-hour watch. Additionally, this location would provide 2.75 miles less fish passage compared to Alternative B.

While Alternatives D and E offer advantages in terms of construction access and ease, they do not fulfill the project's goal of improving stream connectivity by opening an additional 115 stream miles for non-jumping fish species.

Considering the potential impacts to wetlands and floodplains, results from hydraulic modeling, and the weighted screening criteria outlined in Table 2-1, Alternative B emerged as the preferred option. It ranks highest based on location, engineering feasibility, environmental impacts, and cost.

2.2 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

2.2.1 Alternative A – No Action

The No Action Alternative serves as a baseline against which the environmental impacts of the proposed action are evaluated. It represents the continuation of existing conditions and associated impacts into the future, providing essential context for assessing the magnitude and intensity of changes that may result from implementing an action alternative.

Under this alternative, the GLFC would not undertake construction of a sea lamprey barrier upstream of the H-58 Sucker River crossing. Without this intervention, sea lamprey would continue to migrate upstream to access their spawning and larval rearing habitats. This ongoing migration would undermine current population control efforts, which rely on periodic application of lampricides. Without the barrier, operational efficiencies associated with reduced lampricide use and corresponding cost savings for the SLCP would not be realized.

Although the No Action Alternative does not fulfill the project's purpose and need, it remains a critical point of comparison for evaluating the environmental consequences of implementing the proposed action (Alternative B).

2.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River Near Fishing Access Location (Whitewash Road)

Alternative B consists of the installation of an adjustable crest weir barrier on Michigan State Forest property in Alger County, Michigan near the fishing access on the Sucker River along Whitewash Road (Figure 2-1). For purposes of this EA, the proposed project area and anticipated backwater impacts study area are defined as follows:

- The proposed project area is the approximately 0.9-acre footprint where construction activities (temporary and permanent disturbance areas) and subsequent operation of the barrier would occur.

- The anticipated backwater impacts study area is the approximately 11-acre segment of the Sucker River and riparian habitat located immediately upstream of the proposed project area.

The proposed project area and anticipated backwater impacts study area are shown on Figure 2-2.

Figure 2-1. Proposed Location for the Sea Lamprey Barrier on Sucker River

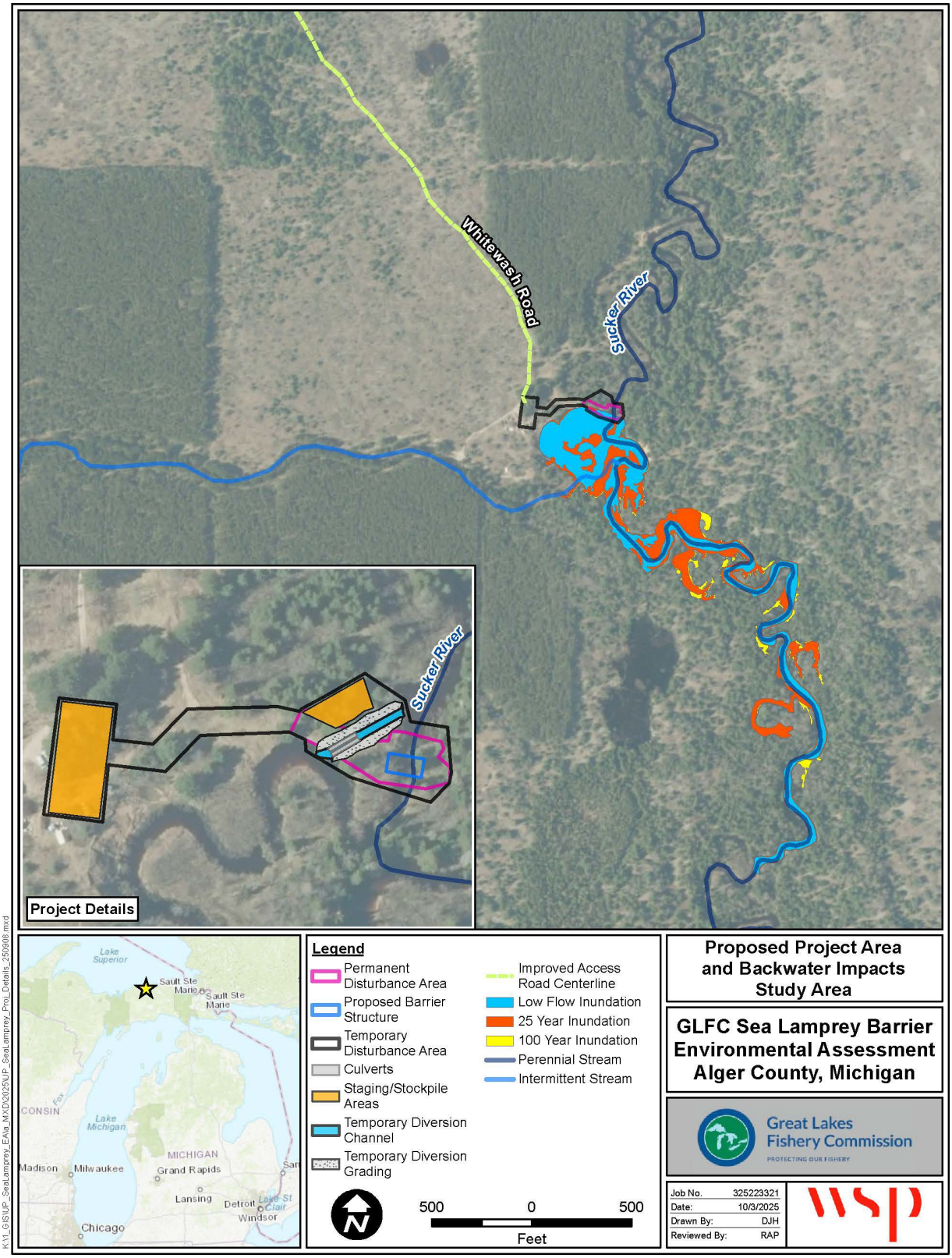


Figure 2-2. Proposed Project Area and Backwater Impacts Study Area

Adjustable/seasonal barriers are engineered to be seasonally operable and hydrologically responsive, with the following key specifications (Zielinski et al. 2019):

- Vertical Differential: Maintains an 18-inch drop from the barrier crest to the tailwater surface during specified flood events.
- Overhanging Lip: A 6-inch lip is installed on the barrier crest.
- Power Redundancy: Mechanized barriers include a backup power source or alternate manual operation method.
- Seasonal Operation Criteria: Seasonal operating period is identified by control agent staff using a combination of: (1) stream temperature (>5 °C); (2) historical trap catches from target stream or surrogate stream; (3) distance of barrier from stream mouth; (4) gradient; and (5) isothermic zone.
- Staffing & Scheduling: Coordinated between control agents and fishery management agencies.
- Hydraulic & Geotechnical Integrity: Verified through analysis to ensure stream and barrier stability during operation.

2.2.2.1 Construction Details

Alternative B proposes the construction of a 145-foot-long cantilevered steel sheet pile wall along and within the banks of the Sucker River (Figure 2-2). This wall would be built to an elevation of 773 feet (NAVD88) and anchored in concrete, extending less than 15 feet into the bedrock to prevent sea lamprey from escaping through natural fissures. The bedrock would be excavated using mechanical methods, avoiding any blasting.

The design includes a steel lift plate gate structure with concrete headwalls, capable of adjusting to multiple weir heights to accommodate various flow conditions, including up to a 100-year flood event (Figure 2-3). Sized for a bankfull width of 32.3 feet, the steel weir would be lowered during late summer, fall, and winter to allow fish passage for all species. During the sea lamprey spawning season, which occurs from March through June, the weir would be raised to block upstream migration. The weir plate would be set at an elevation of 771 feet (NAVD88), maintaining an 18-inch elevation difference between the barrier crest and the tailwater surface during a 25-year flood event, as required to prevent lamprey passage. To protect the riverbanks from erosion, rock riprap or fieldstone would be placed over geotextile fabric on both sides of the spillway. After construction is complete, vegetation would be restored using seed mixes, cover crops, and live stakes harvested from nearby areas.

To facilitate construction, a temporary channel diversion would be installed to redirect river flow through at least two 60-inch culverts or another approved temporary bridge structure, allowing dry access to the barrier site. Construction would proceed in four stages (see Subsection 2.2.2.2), beginning with the installation of temporary cofferdams and the diversion channel. This would be followed by the construction of the steel sheet pile wall, barrier structure, concrete abutments and pier, gates, catwalk, hoists, and rock protection. Additional steps include placing fill and erosion control materials and completing site restoration and stabilization.

A temporary causeway would be built from the west riverbank using approximately 75 cubic yards of heavy riprap. The causeway would have a top width of 25 to 30 feet and a base width of 15 to 18 feet. Construction of the barrier and its components would proceed from east to west.

The project would also require a temporary staging area measuring approximately 67 by 144 feet (0.2 acres), a 0.06-acre stockpile area for excavated materials, and a 21-foot-wide gravel access road extending about 340 feet from Whitewash Road to the barrier site (Figures 2-2 and 2-3). This road would be used during both construction and ongoing operation. Erosion and sediment control (ESC) measures, along with nonpoint source best management practices (BMPs) typical of stream projects, would be implemented to minimize environmental impacts (see Subsection 2.4). Construction debris and excavated bedrock would be disposed of at off-site facilities approved by the USFWS, in compliance with federal, state, and local regulations. Reuse of materials would be considered where appropriate.

The barrier would be operated twice annually: once in the spring to raise the barrier and again in the summer to lower the weir to the original streambed. The GLFC, with support from the USFWS, would oversee the long-term maintenance and operation of the barrier. Two to three personnel would be responsible for raising and lowering the barrier and clearing debris as needed.

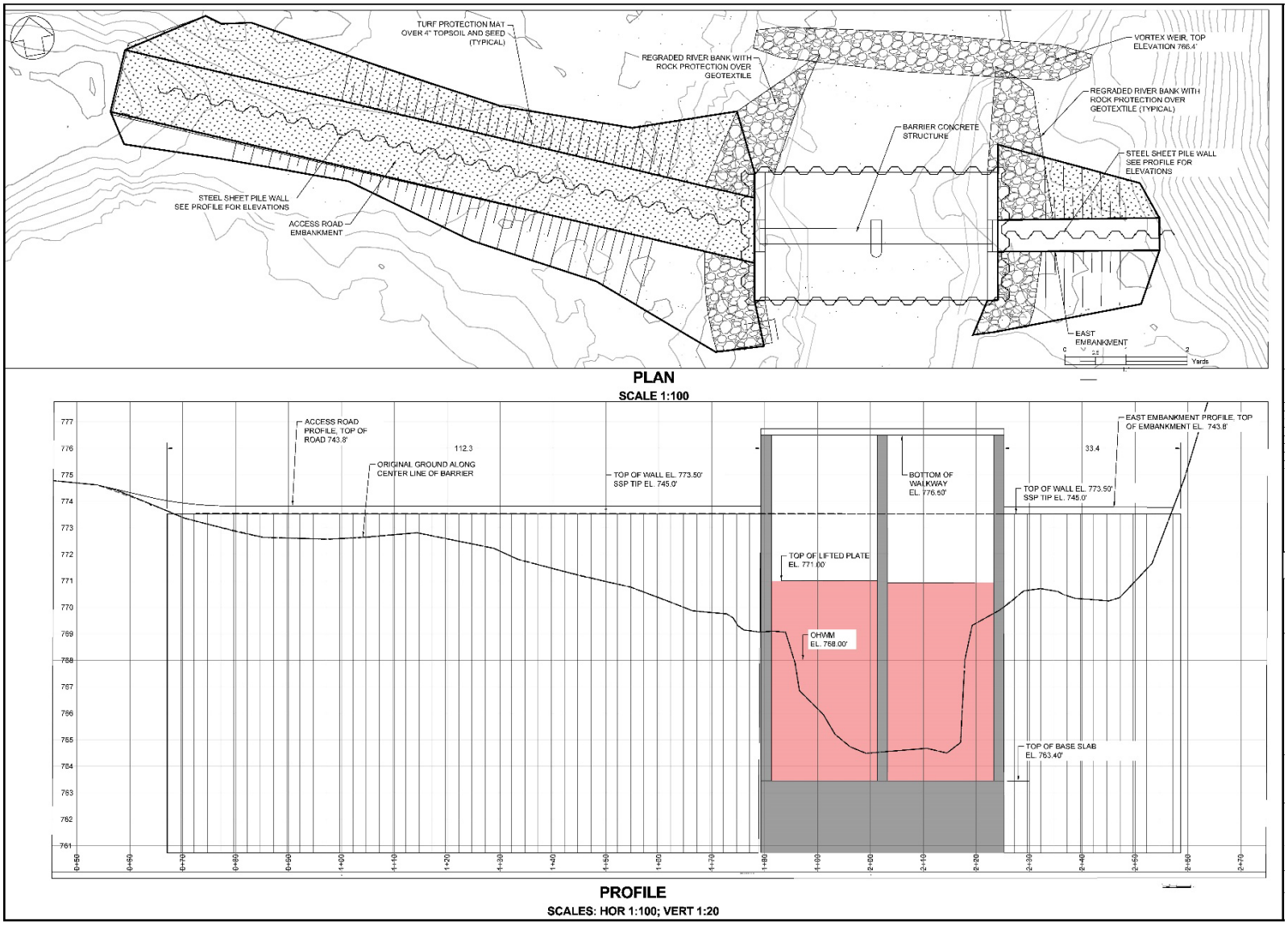
2.2.2.2 Construction Schedule and Sequence

Construction of the proposed barrier is planned for completion within a single construction season (approximately 150-180 days), likely between late spring (May) and fall (October) to take advantage of lower stream flows and reduced risk of ice jams. After the construction of the access road from Whitewash Road to the west side of Sucker River, the construction sequence would follow four main stages:

1. Stage 1: Installation of temporary river diversion channel
    a. Installation of temporary cofferdams
    b. Excavation of channel
    c. Installation of channel stabilization and waterproofing measures
    d. Construction of temporary culverts
    e. Backfill and removal of temporary cofferdams around diversion channel to direct river flow through temporary diversion channel
    f. Place temporary access ramp across channel for access to barrier site
2. Stage 2: Installation of sea lamprey barrier and appurtenances
    a. Installation of steel sheet pile and barrier
    b. Removal of access ramp as required
    c. Construction of cast-in-place concrete slab, abutments, and pier
    d. Installation of gates, catwalk, and hoists
    e. Testing of gates
    f. Installation of rock protection on riverbanks
3. Stage 3: Removal of temporary river diversion channel

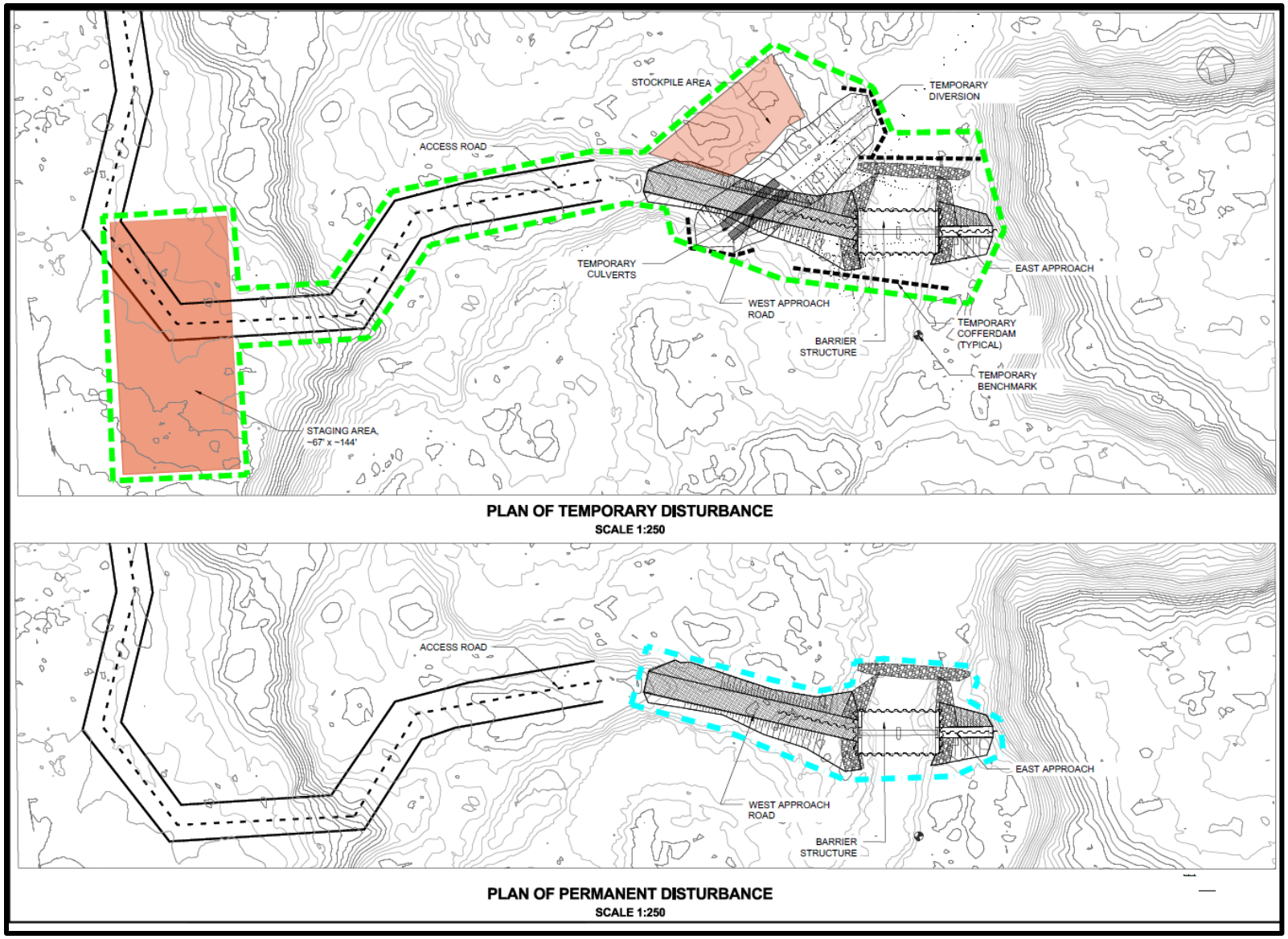
   a. Installation of steel sheet pile on west approach
   b. Removal of temporary cofferdams around barrier
   c. Restoration of river flow through barrier
   d. Reinstallation of cofferdams around temporary river diversion channel
   e. Dewatering of temporary river diversion channel
   f. Removal of temporary culverts
   g. Back fill and restoration of temporary diversion channel
   h. Removal of remaining cofferdams around temporary river diversion channel
4. Stage 4: Restoration and Stabilization of the Site
   a. Final installation of steel sheet pile on west approach
   b. Placement of earth fill on both sides of west approach
   c. Installation of erosion protection
   d. Final restoration of the site

Some variation from the project as described may occur with respect to the sequence of activities, method of construction, disposal of materials, or design details because of unanticipated design improvements, site conditions, or cost-saving measures. Such variations would not result in significant changes to either the overall project design or environmental impact, without the need for further evaluation under the NEPA.



Source: Green Watershed Restoration, LLC 2025

Figure 2-3. Proposed Project Plan and Profile



Source: Green Watershed Restoration, LLC 2025

Figure 2-4. Temporary and Permanent Disturbance Areas

2.3 COMPARISON OF ALTERNATIVES

Based upon the analyses of each resource described in Chapter 3, the anticipated environmental impacts for the project alternatives under consideration are summarized in Table 2-2.

Table 2-2. Environmental Impact Summary by Alternative

Resource	Alternative A – No Action	Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River Near Fishing Access Location (Whitewash Road)
Geology and Soils	No impact.	Short-term and minor impacts to geology due to limited extent of sheet piling into surrounding bedrock. Short-term and minor impacts to soils due to disturbances and erosion during construction. Long-term and minor impacts to soils from streambank erosion associated with intermittent inundation.
Hydrology and Floodplains	No impact.	Long-term and minor impacts due to increased risk of flooding while barrier is in place (March-June). Beneficial impacts due to conservation of species and rare natural community types within the floodplain.
Water Quality	No impact.	Short-term and minor impacts during construction due to potential erosion and sedimentation from earth moving activities. Long-term and minor impacts during operation due to potential sedimentation in flooded areas.
Aquatic Ecology	Short-term adverse impacts (i.e., potential for non-target species mortality) and subsequent long-term impacts (i.e., potential for species population decline) associated with the continued use of lampricides	Short-term and minor impacts during construction due to earth moving activities and potential sedimentation. Long-term and minor impacts during operation to aquatic species that are unable to pass through the barrier during March-June. Beneficial impact during operation by preventing sea lamprey from reaching upstream spawning habitats and reducing length of river that requires lampricide treatment.

Resource	Alternative A – No Action	Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River Near Fishing Access Location (Whitewash Road)
Terrestrial Ecology	No impact.	Temporary and minor impacts during construction and operation due to species displacement. Permanent impacts to 0.2 acres and temporary impacts to 0.7 acres of mainly wetlands and mixed forest—considered negligible in proportion to the amount of surrounding forest and wetlands. Potential intermittent impact to approximately 11 acres within backwater area upstream of the proposed barrier. Potential long-term benefit from creation of emergent wetland conditions suitable for wildlife habitat.
Sensitive Species	Minor, long-term impacts to species that may be sensitive to lampricide use.	"May affect, but not likely to adversely affect" determination for federally listed bats, due to up to 0.4 acres of tree clearing. "No effect" determination for monarch butterflies. Minor, short-term and long-term impacts from construction activity and minimal habitat loss. Reduced lampricide use and enhanced habitat from inundation are expected to provide minor long-term ecological benefits.
Invasive Species	Long-term adverse impacts to the control of invasive species.	Minor short-term adverse impacts due to potential invasive species establishment. Long-term beneficial impact due to invasive species management.
Wetlands and Waters of the State	No impact.	Minor short-term impacts from erosion and sedimentation. Minor short-term (temporary) impacts to 0.12 acres of wetlands from construction disturbances. Minor long-term (permanent) impacts to 0.13 acres of wetlands from construction disturbances and 2.46 acres of wetlands inundated during barrier use. Unavoidable impacts would be addressed through permitting with the EGLE under the NREPA, including restoration with native plant materials and any required mitigation to ensure no net loss of wetlands.
Socioeconomics	No impact.	No impacts on local demographics, low-income and minority populations, or community services. Short-term beneficial impacts to the economy during construction due to employment, associated payroll, and purchasing of materials.

Resource	Alternative A – No Action	Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River Near Fishing Access Location (Whitewash Road)
Land Use and Recreation	No impact on land use. Moderate long-term impacts on recreation activities (i.e., fishing).	Minor short-term impacts associated with the disturbance of 0.7 acres of state forest land during construction. Minor long-term impacts to land use due to the permanent conversion of approximately 0.2 acres of State Forest land. Long-term beneficial impacts to recreational fishing.
Cultural and Historic Resources	No impact.	No impact.
Visual Quality and Aesthetics	No impact.	Short-term, minor alteration of visual quality of the site during construction. Long-term, minor alteration of visual quality due to installation of barrier infrastructure. Minor impacts during operation due to exposure of previously submerged land that may appear unsightly in the short term.
Air Quality	No impact.	Short-term and minor impacts during construction due to emissions and fugitive dust. No impacts during operation.
Solid and Hazardous Waste	No impact.	Short- and long-term minor impacts during construction and operation, respectively. Reduced by effective use of BMPs.

2.4 SUMMARY OF AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

- Maintain a distance of 330 feet, if possible, from active bald eagle nests during the critical nesting period unless it is determined that the birds are accustomed to normal human disturbance from other causes such as proximity to roads and structures.
- Minimize noise and other types of disturbance if migratory birds are observed nesting.
- The action will not include temporary or permanent lighting of roadway(s), facility(ies), and/or parking lot(s).
- Listed bats: Any cutting/trimming of potential roost trees for northern long-eared bat (trees ≥3 inches in diameter [at breast height] with cracks, crevices, cavities, and/or exfoliating bark) will occur outside the summer roosting period for northern long-eared bat (that is, limited to October 31 through April 1). Tree cutting/trimming will not clear ≥20 contiguous acres of forest or fragment a connective corridor between 2 or more forest patches of at least 5 acres.

- Listed bats: Tree cutting/trimming will not clear ≥10 contiguous acres of forest (including both modeled and unmodeled potential habitat) or fragment a connective corridor between 2 or more forest patches of at least 5 acres.
- The project will implement conservation measures listed in the *Project Design Guidelines for Federally Listed Bats in Michigan* to avoid impacts to federally listed bats.
- An approved ESC plan would be implemented to minimize erosion during site preparation using appropriate site-specific BMPs and ESC measures.
- Equipment refueling and maintenance operations would be carried out at designated locations using applicable BMPs
- Appropriate spill prevention, containment, and disposal requirements for hazardous wastes would be implemented to protect construction workers, the public, and the environment in accordance with applicable state and federal regulations.
- All solid waste generated during construction would be managed in accordance with applicable federal, state, and local regulations.
- All temporary impact areas would be re-graded to match pre-construction contours, covered with topsoil, and stabilized using erosion control blankets. Vegetation would be restored using seed mixes of species native to the Upper Peninsula of Michigan and tailored to emergent, upland, and streambank zones, along with cover crops and live stakes harvested from nearby areas. Seeding would occur between March 1 – May 30 or October 15 – December 15, depending on site conditions. Woody shrubs would be planted during dormancy periods or when soil is not frozen, typically within the same seasonal windows.
- Unavoidable impacts to wetlands and waters of the State would be addressed through permitting with the EGLE under the NREPA, including any required appropriate compensatory mitigation to ensure no net loss of wetlands.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 GEOLOGY AND SOILS

3.1.1 Affected Environment

3.1.1.1 Geologic and Topographic Setting

The proposed project is located within the Northern Lacustrine-Influence Upper Michigan Regional Landscape Ecosystem. This is within the Grand Marais Sandy End Moraine and Outwash subsection of the Luce Subsection, which occupies the shores of Lake Superior in the Northeast region of Michigan's Upper Peninsula (Michigan Natural Features Inventory [MNFI] 2009; Albert 1995). This area consists of sandy ridges of end moraine and pitted outwash. Lacustrine deposits of glacial and postglacial origin are also located along the northeastern edge. Along the Lake Superior shoreline, sand dunes, sand spits, and beach ridges form a broad zone characterized by vast expanses of excessively drained sand soils. Outwash plains are concentrated along the southern edge of the subsection, which includes the project area and backwater impacts study area (study area). Most of the moraine ridges and pitted outwash have well-drained, sandy soils. Kettles within the pitted outwash and moraines contain bogs with thick deposits of sphagnum peat (Albert 1995).

The study area contains parts of the Sucker River channel, which measures 10 to 20 feet wide and up to 60 inches deep (MDNR 1975). Erosion around riverbanks within the Sucker River was mitigated from 1956 through 1960 and involved the stabilization of approximately 14,000 linear feet of waterfront (MDNR 1975). However, sediment and erosion control continue to be a problem throughout the region.

The bedrock of the eastern portion of the Upper Peninsula and the entire Lower Peninsula of Michigan is comprised of Paleozoic and Mesozoic sedimentary rocks of Cambrian to Jurassic Age. These gently dipping rocks constitute a large regional geological structure known as the Michigan Basin, which is thousands of feet thick (State of Michigan 2003; Sommers 1984). The Sucker River contains coastal zone sediments, which are generally fine-grained sediment deposited in lagoons, tidal flats, back barriers, and costal marshes (U.S. Geological Survey [USGS] 2004). This area also contains Proglacial sediments that are fine to coarse-grained derived from material eroded and transported by glaciers (USGS 2004).

Karst features in the region include springs that allow for ground water replenishment of the Sucker River. A broad band of outcrops of the Niagara Escarpment in the Upper Peninsula contains numerous karst sinks, springs, and caves. However, Alger County is noted as absent or likely absent of sink holes and caves are infrequent or likely infrequent (MNFI 2024a, b). The Eastern Upper Peninsula Lowlands, which occupies the eastern section of the Upper Peninsula, is characterized by fairly flat topography. Additionally, the Beaches and Dunes area borders Lake Michigan. Low-lying forests populate some parts of this region, while other parts are high

and bare (World Atlas 2024). The elevation along the Sucker River ranges from 600 to 900 feet above sea level (USGS 2025).

A common earthquake measurement is referred to as the peak ground acceleration, which is a measurement of the intensity of ground shaking at a specific location and is typically expressed in terms of gravity. Based on seismic hazard maps from the USGS, Michigan is considered to have a very low risk of significant earthquakes, with a zero percent chance that ground acceleration in the study area will exceed 10 percent of the acceleration due to gravity in the next 50 years (USGS 2005). There are no active faults in the state of Michigan (Bricker 1977). Seismic disturbances related to human activity in the Upper Peninsula is restricted to iron mining in the western portion of the region (Bricker 1977).

3.1.1.2 Soils

Two soil types are mapped within the project area, the Kalkaska sand and the Garlic sand. Kalkaska sand consists of very deep, somewhat excessively drained soils that formed in sandy drifts on outwash plains, valley trains, moraines, and stream terraces (National Cooperative Soil Survey [NCSS] 2018). Land cover on most of this soil type is forest, with some areas of idle cropland or pasture. A small portion of this soil is cultivated with principal crops being small grains, hay, and potatoes. Garlic sand consists of very deep, well drained soils formed in glaciofluvial sediments on dissected moraines, outwash plains and till-floored lake plains. These soils have rapid permeability, meaning that water quickly drains from the upper most layers of soil (NCSS 2004).

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action

Under the No Action Alternative, there would be no changes to geological resources, and no soils would be disturbed as there would be no construction activity under this alternative.

3.1.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Under this alternative, short-term construction activities including clearing and grading have the potential to disturb soil stability and increase erosion within the project area. Additionally, intermittent increases in water levels throughout the backwater impacts study area has the potential to impact streambank erosion in the long term.

BMPs and ESC measures identified in approved plans would be implemented to minimize erosion from short-term construction disturbances. BMPs and ESC measures would include, but would not be limited to, erosion control blankets and seeding on all disturbed areas of the project area. Riverbanks would be stabilized with rock protection and geotextile fabric and would also be seeded in accordance with project plans. Site restoration, as discussed in Section 3.8, along with increased floodplain habitats, as discussed in Sections 3.2, would decrease long-term streambank susceptibility to erosion from intermittent inundation associated with barrier operation.

Short-term impacts to geology during construction would include the placement of sheet piling into bedrock via mechanical excavation less than 15 feet below the river bottom to serve as a cutoff wall to prevent lamprey escapement. The sheet piling would be anchored in concrete. Due to the limited extent of the disturbance as compared to the extensive depth of bedrock at the project site, impacts on geology from construction would be minor.

Long-term impacts to the project are unlikely due to minimal seismic risk and limited karst features in Alger County. Sinkholes and caves are either absent or rare in the area, and Michigan lacks active fault lines. As a result, potential effects from seismic activity or interactions with karst formations are not expected.

In summary, increased floodplain habitat and the implementation of BMPs and ESC measures would result in minor long-term and short-term impacts to soils. The absence of karst and minimal seismic hazards throughout the region, along with the limited extent of disturbances with respect to surrounding geologic resources, would result in only minor short-term impacts to geology.

3.2 HYDROLOGY AND FLOODPLAINS

3.2.1 Affected Environment

3.2.1.1 Hydrologic Setting

Surface water resources within the study area include the Sucker River and an intermittent stream. The Sucker River watershed encompasses approximately 50,000 acres or 8 square miles within the Upper Peninsula of Michigan (MDNR 1975). This watershed is within the hydrologic unit code (HUC) 040202010208, which encompasses Baker Creek, Grand Marais Creek, and the Sucker River (U.S. Environmental Protection Agency [EPA] 2024). The Sucker River is approximately 34.8 miles long with a total drainage area of 58.8 square miles and a contributing drainage area of 48.8 square miles (EGLE 2023a; MDNR 1975). Its waters flow northward through the flat to gently rolling pine plains of eastern Alger County before swinging west and emptying into Lake Superior. The Sucker River has multiple tributary streams including Spring Creek, Haverstock Creek, Blood Creek, Klondike Creek, Porter Creek, and Harvey Creek (MDNR 1975).

The Sucker River measures 10 to 20 feet wide and up to 5 feet deep with a riverbed composed of sand and silty sand with some gravel riffles. Average discharge in the summer is approximately 35 cfs (Green Watershed Restoration, LLC 2024).

3.2.1.2 Flow Characteristics

Within the Sucker River, base flow is primarily associated with the groundwater portion of the river discharge. When surface water runoff is added to base flow, increases in flow can result in flooding. Peak flow rates occur due to snowmelt or rain-on-snow, where snowmelt typically peaks from March through May. Base flow, although relatively constant, varies in magnitude with precipitation and snow-melt within and between years.

The flow rate at School Forest Road downstream of the project area was measured in August of 2014 and at that time had a discharge of 46.53 cfs and a stream velocity of 1.34 feet per second (MDNR 2014). Table 3-1 includes the existing flow rate conditions of Sucker River within the study area.

Table 3-1. Flow Rates and Inundation Areas within the Study Area

Storm Event	Peak Discharge (cfs)	Existing Stage Elevation (feet)	Existing Inundation Area (acres)
Low Flow	60	767.7	1.2
25-Year	300	770.3	2.5
100-Year	360	770.7	3.3

Source: EGLE 2023a
cfs = cubic feet per second

3.2.1.3 Floodplains

As a federal agency, USFWS is subject to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. EO 11988 is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

The portion of the Sucker River within the study area is not mapped on a Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map as part of the National Flood Insurance Program. Based on a survey in 1955, the Sucker River was noted as having flooding from 1 to 3 feet, ranging up to 3 to 5 feet (MDNR 1975). In 2023, Alger County was declared in a state of emergency due to flooding from springtime snow-melt. The governor of Michigan described damages as overwhelmed sewer and storm water systems, burst earthen dams, culvert and embankment failures, silt and debris deposits, and road washouts and closures caused by the accelerated thaw (State of Michigan 2023). Additionally, the Alger County 2021 Hazard Mitigation Plan states that riverine flooding is considered a moderate risk (Alger County Local Emergency Planning Committee 2021).

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Under the No Action alternative, hydrologic conditions on the Sucker River would remain unaltered. Therefore, no impacts to floodplain resources are anticipated from the No Action Alternative.

3.2.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Hydrologic and hydraulic analyses by Green Watershed Restoration, LLC (2025) show that operating the proposed seasonal sea lamprey barrier (March through June) would increase upstream flood elevations (Table 3-2). During a 25-year storm event, the flooded area within the backwater impacts study area would expand from 2.5 acres under current conditions to 9.9 acres under Alternative B—a 296 percent increase. For a 100-year storm, the flooded area would potentially expand from 3.3 acres to 10.8 acres, representing a 227 percent increase (Table 3-2).

Table 3-2. Anticipated Changes in Flow Rates and Inundation Areas within the Study Area When Barrier is Operated (March – June)

Storm Event	Peak Discharge (cfs)	Stage Elevation Downstream (ft)	Stage Elevation Upstream (ft)	Inundation Area with Barrier Up (ac)	Percentage Change from Existing Conditions (%)
Low Flow	60	767.29	771.62	6.1	408
25-Year	300	769.02	77.82	9.9	296
100-Year	360	769.35	773.05	10.8	227

Source: Green Watershed Restoration, LLC 2025

In accordance with EO 11988, the lead federal agency must reduce flood risk, protect human health and safety, and preserve the natural functions of floodplains. While the proposed seasonal sea lamprey barrier may temporarily increase flood elevations and expand floodplain boundaries during spring and early summer (March–June), these impacts are intermittent and occur only while the barrier is in place. Importantly, the affected area consists primarily of undeveloped forested and scrub-shrub wetlands, with no anticipated impact on human health, safety, or property. Instead, the expanded floodplain supports riparian habitat protection, aligns with Burt Township's zoning and comprehensive plan, and enhances recreational use and floodplain connectivity along the Sucker River (see Section 3.10). Riparian zones, shaped by periodic flooding, host rare species and natural communities. Research shows flood flow patterns influence species abundance and distribution (Hupp and Osterkamp 1985), making the barrier's contribution to floodplain conservation beneficial. Overall, Alternative B supports natural floodplain functions—including flood storage, wildlife habitat, fish spawning, and sensitive species protection—and is consistent with EO 11988, with only minor long-term adverse impacts expected.

3.3 WATER QUALITY

3.3.1 Affected Environment

The Sucker River is a cold-water stream that rarely exceeds 70°F, fed primarily by spring-origin tributaries—excluding Harvey Creek—which help maintain low temperatures year-round (MDNR 1975). Historical land use, particularly logging, has contributed to sedimentation throughout the watershed. In the 1870s, the river's channel was reconfigured using wood riprap and sand dikes, increasing sedimentation as the new flow traversed previously dry areas. A

streambank stabilization program improved 14,190 linear feet of the river between 1956 and 1960 (MDNR 1975).

Under the CWA, Section 303(d) requires states to identify impaired waters and develop Total Maximum Daily Loads (TMDLs) to meet water quality standards. Despite sedimentation, waterbodies within HUC 040202010208 were rated in good condition and were not listed as impaired in the EPA's 303(d) reports for 2018, 2020, or 2022 (EPA 2024a).

As discussed further in Section 3.4, the SLCP uses lampricides such as (3-trifluoromethyl-4-nitrophenol) and Bayluscide (2',5-dichloro-4'- nitrosalicylanilide) to manage larval sea lamprey populations in the Great Lakes basin (USFWS 2021). These treatments have proven effective and are not known to pose risks to human health or the environment (GLFC 2019).

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under the No Action Alternative, current conditions of the Sucker River and surrounding study area would be consistent with pre-existing conditions and no changes would be expected to water quality or surface waters.

3.3.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Under Alternative B, short-term water quality impacts may result from construction activities related to installing the seasonal sea lamprey barrier, including a temporary channel diversion and access road. These activities could increase erosion and sedimentation; however, BMPs and ESC measures will be implemented to minimize such effects. The GLFC will follow the *Michigan Nonpoint Source Best Management Practices Manual* (EGLE 2017), and the USFWS will coordinate with EGLE to secure necessary Section 404/401 permits prior to construction. Approved ESC plans will comply with Michigan's Permit-By-Rule requirements.

Long-term impacts may include increased streambank erosion and upstream sediment accumulation due to seasonal inundation while the barrier is in place. This could reduce downstream sediment transport, affecting streambed formation and riparian habitats. However, these effects are expected to be minor and intermittent, occurring only during spring and early summer. Sediment accumulated upstream of the barrier during use would be transported downstream once the barrier is lowered. Given the project's compliance with CWA regulations and permitting, both short- and long-term impacts to water quality are anticipated to be minimal.

3.4 AQUATIC ECOLOGY

3.4.1 Affected Environment

Lake Superior is the least altered of the Great Lakes, yet the lake, its watershed, and its fishery have been significantly degraded. Tributary streams—important for the spawning of many fishes—remain significantly degraded by activities in the watershed, including logging, agriculture, mining, and hydroelectric dams (GLFC 2003). New challenges include effects of

more frequent extreme weather events on fish habitat such as loss of thermal refuge for cold-water species with current warming trends, along with the invasion of non-native species. Of these non-native species, a single sea lamprey can contribute to the mortality of 40 or more pounds of fish during its life as a parasite and contribute to the decline of several fish species (NOAA 2023).

In August 2014, fish community surveys were conducted by the MDNR on the Sucker River in Alger County at sites downstream (School Forest Station) and upstream (Old Seney Road Station) of the H-58 road stream crossing. Table 3-3 describes fish species collected during the surveys (MDNR 2014).

Table 3-3. Fish Species Collected During Electrofishing Surveys on the Sucker River in Alger County, 2014

Species	Number	Percent by number	Weight (pound)	Percent by weight	Total length range (inches)	Average Total Length (inches)
Station: School Forest						
Rainbow trout (*Oncorhynchus mykiss)*	24	29.6	2.9	48.8	1-14	5.5
Longnose dace (*Rhinichthys cataractae)*	19	23.5	0.3	4.9	2-3	3.1
Creek chub *(Semotilus atromaculatus)*	12	14.8	0.6	9.5	3-6	4.9
White sucker (*Catostomus commersonii)*	12	14.8	1.8	29.7	3-9	6.8
Mottled sculpin (*Cottus bairdii*)	11	13.6	0.2	4.1	2-3	3.3
Rock bass (*Ambloplites rupestris)*	2	2.5	0.1	2.2	2-5	4.0
Bluntnose minnow (*Pimephales notatus)*	1	1.2	0.01	0.2	2-2	2.5
Total	**81**		**5.9**			
Station: Old Seney Road						
Brook trout (*Salvelinus fontinalis)*	38	33.3	5.4	77.3	2-9	6.9
Longnose dace (*Rhinichthys cataractae)*	28	24.6	0.3	4.3	1-3	2.6
Coho salmon (*Oncorhynchus kisutch)*	16	14.0	0.1	1.6	3-3	3.5
Bluntnose minnow (*Pimephales notatus)*	10	8.8	0.03	0.4	1-2	2.0
Mottled sculpin (*Cottus bairdii)*	9	7.9	0.2	3.1	1-4	3.2
Rainbow trout (*Oncorhynchus mykiss)*	8	7.0	0.9	12.3	5-7	6.8
Central mudminnow (*Umbra limi)*	3	2.6	0.03	0.4	1-3	2.5
White sucker (*Catostomus commersonii)*	1	0.9	0.04	0.6	4-4	4.5
Yellow perch (*Perca flavescens)*	1	0.9	0.02	0.3	3-3	3.5
Total	**114**		**7**			

At the School Forest station, downstream of H-58, a total of 81 fish (seven species) were captured (Table 3-3). Rainbow trout (*Oncorhynchus mykiss)* (n=24) were the most prevalent in the survey and had an average total length of 5.5 inches and a length range of 1 to 14 inches.

The remainder of the catch consisted of 19 longnose dace (*Rhinichthys cataractae*), 12 creek chub (*Senotilus atromaculatus*), 12 white sucker (*Catostomus commersonil*), 11 mottled sculpin (*Cottus bairdii*), two rock bass (*Ambloplites rupestris*), and one bluntnose minnow (*Pimephales notatus*). Age analysis through scales found four year classes of rainbow trout (ages 0, 1, 2, and 3). Growth for rainbow trout was 0.8 inches below statewide average.

At the Old Seney Road station, upstream of the H-58 crossing, a total of 114 fish were captured and were comprised of nine species (Table 3-3). Brook trout (*Salvelinus fontinalis*) (n=38) were the most common fish captured. Brook trout had an average total length of 6.9 inches and a length range of 2 to 9 inches. The remainder of the catch consisted of 28 longnose dace, 16 coho salmon (*Oncorhynchus kisutch*), 10 bluntnose minnow, nine mottled sculpin, eight rainbow trout, three central mudminnow (*Umbra limi*), one white sucker (*Catostomus commersonii*), and one yellow perch (*Perca flavescens*). Age analysis through scales and spines on brook trout found three year classes (ages 0, 1, and 2). Brook trout growth was 0.6 inches above statewide average. Coho salmon were all age-0 and rainbow trout were all age-1.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action

Under Alternative A, continued use of lampricides—primarily TFM and Bayluscide—would negatively affect the aquatic ecosystem of the Sucker River. While these compounds have been effective in controlling larval sea lampreys in the Great Lakes basin (USFWS 2021), TFM at high concentrations has shown adverse effects on certain fish species, particularly trout, by disrupting ATP-related energy processes and reducing muscle and liver glycogen (Wilkie et al. 2021). Although these effects may not impact overall fish fitness, they are not fully understood. Bayluscide, often used in combination with TFM to reduce dosage requirements, is more toxic due to its higher absorption rate and similar ATP inhibition effects. It also serves as a molluscicide in snail-infested waters. As a result, both short-term and long-term use of lampricides could negatively impact aquatic ecology.

3.4.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Under Alternative B, short-term impacts to fish communities in the Sucker River may occur during construction of the seasonal sea lamprey barrier due to soil disturbance, erosion, and sedimentation. However, these effects are expected to be minor, as BMPs and ESC measures will be implemented to minimize ecological disruption.

Long-term impacts during barrier operation (March–June) are also considered minor. While some fish species may experience temporary migration barriers, the seasonal nature of the barrier allows fall-spawning species like brook trout to migrate upstream unimpeded. Additionally, the barrier would reduce the area exposed to lampricides by 95 stream miles, concentrating treatment in the lower Sucker River. This would benefit aquatic ecology, stream connectivity, reduce chemical exposure, and allow cost savings for the SLCP, which could be redirected to other Great Lakes tributaries. Overall, Alternative B offers ecological benefits while maintaining minimal long-term adverse effects.

3.5 TERRESTRIAL ECOLOGY

3.5.1 Affected Environment

3.5.1.1 Vegetation

The study area is located in the Level III Northern Lakes and Forests (50) ecoregion described as containing coniferous and northern hardwood forests. Within the Level III Northern Lakes and Forests ecoregion, the study area more specifically falls into the Level IV Grand Marais Lakeshore (50x) ecoregion that includes inter-ridge swamps and poorly drained peat wetlands. Northern hardwoods mixed with balsam fir make up the current forested landscape. Pre-settlement vegetation, much of which is still present at differing levels, included Jack pine, red pine, and white pine. Northern hardwood forests have been known to occur with hemlock and white pine in areas that seldom burned. Clay lake plain and poorly drained areas with bedrock near the surface support spruce, tamarack, and white cedar swamps (Omernik and Bryce 2007).

Land cover within the study area is dominated by scrub-shrub wetlands and mixed forest. It was delineated from field surveys, wetland delineations, and aerial photography and is shown in Figure 3-1. Vegetation within 3-mile radius surrounding the project area was evaluated using land cover information obtained from the National Land Cover Database (Dewitz 2023). It is dominated by forested wetlands, mixed forest, and deciduous forest and is shown in Figure 3-2.

The majority of the study area consists of riparian habitats along the Sucker River, including emergent, scrub-shrub, and forested wetlands and upland forested areas. Dominant plant species in the scrub-shrub communities include speckled alder (*Alnus rugosa*), silky dogwood (*Cornus amomum*), nannyberry (*Viburnum lentago*), blue-joint grass (*Calamagrostis gigantea*), sensitive fern (*Onoclea sensibilis*), evergreen woodfern (*Dryopteris intermedia*), spinulose woodfern (*Dryopteris carthusiana*), and white grass (*Leersia virginica*).

Dominant plant species in the emergent wetland communities include seedling alder (*Alnus glutinosa*), joe-pye weed (*Eutochium maculatum*), woolgrass (*Scirpus cyperinus*), blue vervain (*Verbena hastata*), water horehound (*Lycopus americanus*), soft rush (*Juncus effusus*), needle spikerush (*Eleocharis acicularis*), rattlesnake grass (*Glyceria canadensis*), and various sedges (*Carex lacustris, Carex gynandra, Carex tuckermanii, Carex scoparia*, and *Carex pellita*) (Niswander Environmental 2023).

Dominant species in forested wetland communities include balsam fir, white cedar (*Thuja occidentalis*), red maple (*Acer rubrum)*, black spruce (*Picea mariana*), sensitive fern, evergreen woodfern, wooly sedge (*Carex pellita*), nodding sedge (*Carex gynandra*), and fowl manna grass (*Glyceria striata*).

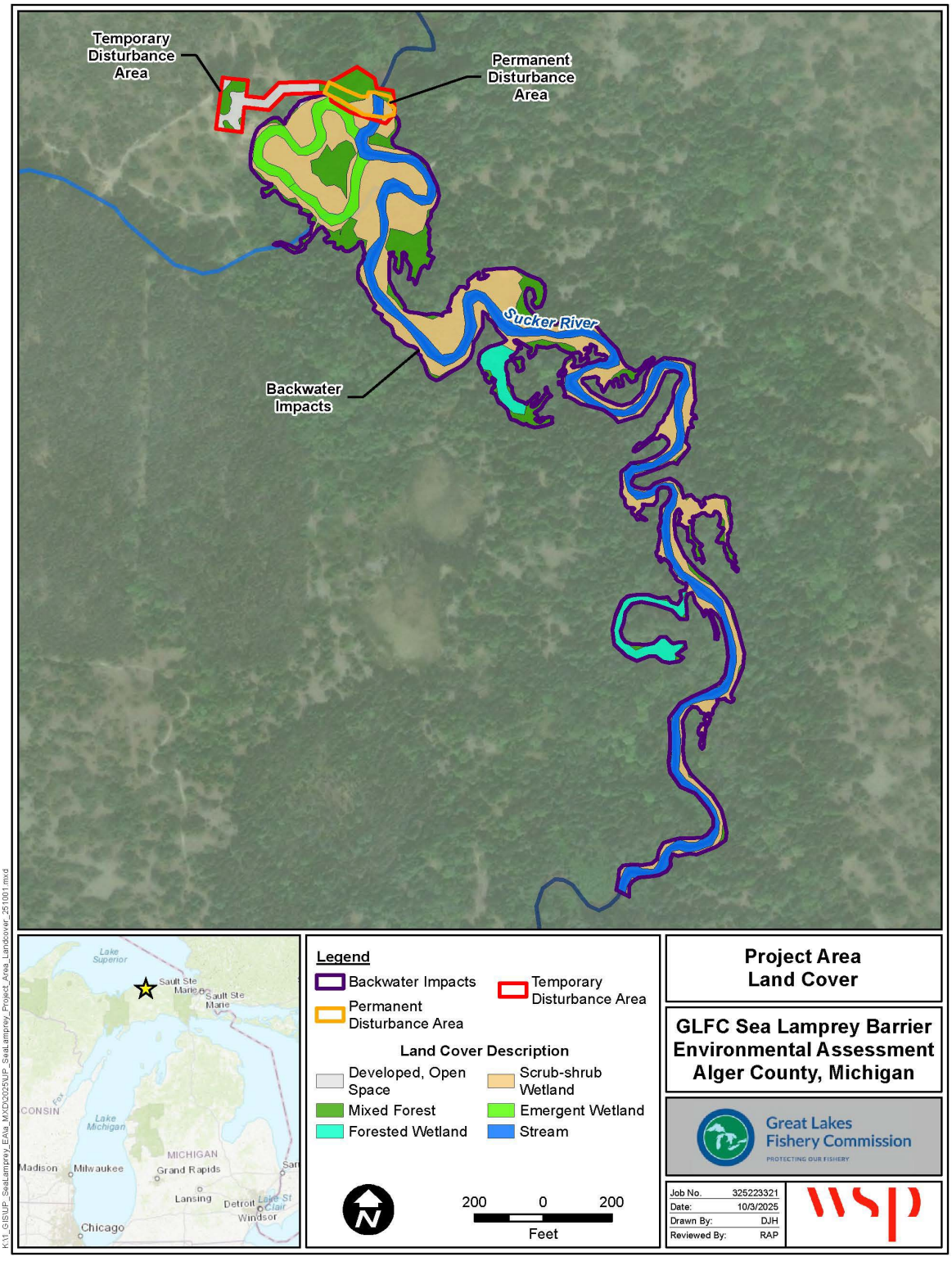


Figure 3-1. Land Cover Types within the Sea Lamprey Barrier Project Area and Backwater Impacts Study Area

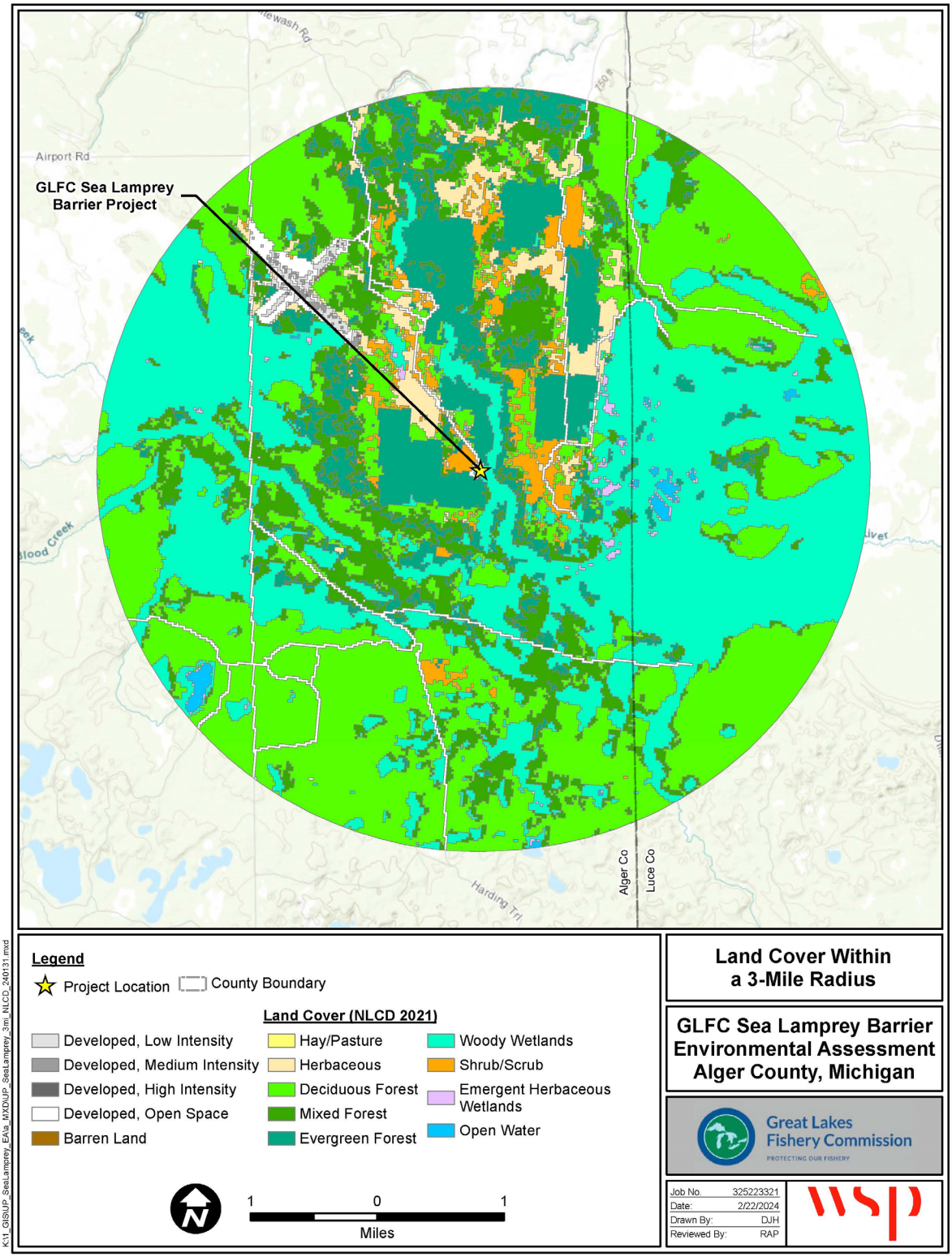


Figure 3-2. Land Cover Within a 3-mile Radius

Upland conditions within the project area include steeply sloped areas adjacent to the Sucker River, as well as vegetative communities associated with higher landscape positions within the Sucker River. Common vegetation observed in the upland areas include white spruce (*Picea glauca*), balsam fir (*Abies balsamea)*, and white pine (*Pinus strobus*), with black cherry (*Prunus serotina*), white birch (*Betula papyrifera*), and maple (*Acer* spp). The understory is dominated by seedlings and saplings of the above-mentioned species, along with bracken fern (*Pteridium aquilinum*), white grass, and evergreen woodfern (Niswander Environmental 2023).

3.5.1.2 Wildlife

Wildlife habitats within the Sucker River valley include areas of open water, wetlands, and forested areas. These habitats support a variety of mammals (muskrats, mink, and beavers), waterfowl (ducks and geese), shorebirds (plovers and sandpipers), wading birds (herons), insects (dragonflies and mayflies), and herpetofauna (salamanders, frogs, toads, snakes, and turtles) (Sargent and Carter 1999). Based on a field survey conducted in October of 2023 by WSP, no evidence of communal wading birds or nests within the project area was observed (WSP 2023). In addition, no caves are known to occur in the vicinity of the project area. More information on sensitive wildlife species with potential to occur in the study area is included in Section 3.6.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action

Under the No Action Alternative, no new construction activities would take place in association with the proposed project. Therefore, there would be no impacts to terrestrial resources under this alternative.

3.5.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

As shown in Table 3-4, the project would result in approximately 0.2 acres of permanent disturbance and around 0.7 acres of temporary disturbance to mostly undeveloped lands in the study area. Impacts to wetlands are described further in Section 3.8.2 (Wetlands and Waters of the State). Additionally, seasonal inundation could affect up to 10.8 acres within the designated backwater impact study area.

Wildlife impacts are expected to be minor, both in the short and long term, and primarily related to limited habitat changes. During construction, some species may temporarily avoid the area, but they are anticipated to return once restoration is complete. Vegetation clearing during construction would affect about 0.3 acres of mixed forest, while permanent impacts would be limited to roughly 0.1 acre. Clearing would be confined to essential construction zones, with staging activities located in an already disturbed parking area to minimize additional disruption. To protect nesting and roosting wildlife, tree removal would be restricted to the period between November 1 and March 31.

Seasonal operation of the barrier may occasionally inundate up to 6 acres of wetlands (see Section 3.8) and up to 2 acres of mixed forest habitat, during 100-year storm events between March and June. Increased inundation is expected to enhance riparian and wetland habitats

over time, offering minor long-term benefits to species such as muskrats, mink, raccoons, waterfowl, amphibians, and reptiles.

Although up to 0.4 acres of mixed forest may be cleared under this alternative, this represents less than 0.01 percent of the surrounding forest cover. Nearby wooded areas would continue to provide habitat for terrestrial wildlife. Therefore, vegetation impacts would be minor.

Table 3-4. Land Use/Land Cover in the Sea Lamprey Barrier Project Area and 3-mile Radius

	Project Area[1]		100-Year Backwater Impacts[1,2] (Barrier Up) (ac.)	3-mile Radius[3] (acres)
Land Cover Type	**Permanent Disturbance (ac.)**	**Temporary Disturbance (ac.)**		
Barren Land	--	--	--	1
Cultivated Crops	--	--	--	--
Deciduous Forest	--	--	--	6,191
Developed, High Intensity	--	--	--	2
Developed, Medium Intensity	--	--	--	22
Developed, Low Intensity	--	--	--	76
Developed, Open Space	--	0.33	--	500
Emergent Herbaceous Wetlands	--	0.02	0.7	59
Evergreen Forest	--	--	--	2,024
Hay/Pasture	--	--	--	1
Herbaceous	--	--	--	511
Mixed Forest	0.09	0.31	2.0	2,623
Open Water/Stream	0.04	0.01	2.7	74
Scrub-shrub Wetlands	0.09	0.02	4.9	--
Shrub/Scrub	--	--	--	496
Woody Wetlands	--	--	0.6	5,962
Total[4]	**0.22**	**0.69**	**10.8**	**18,542**

[1] Dominant vegetation communities and other land cover types in these areas were drawn in GIS based on aerial photographs and information from field surveys/delineations.
[2]100-year backwater impacts are permanent, intermittent, and indirect during periods when the barrier is raised (barrier up). Barrier operation during a continuous 100-year flood event (maximum impact) would result in increased inundation throughout the backwater impacts study area.
[3]Source: Dewitz 2023
[4] Sum of rows may not equal total due to rounding

3.6 SENSITIVE SPECIES

3.6.1 Affected Environment

An endangered species is defined by the ESA, 16 USC §§ 1531-1543, as any species in danger of extinction throughout all or a significant portion of its range, whereas threatened species are those that are at risk of becoming endangered within the foreseeable future throughout all or a significant part of its range. Additionally, the ESA provides protection for species proposed for listing as threatened or endangered. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for federal agencies, as well as other entities engaged in activities that may affect these species.

The USFWS provides an Information for Planning and Consultation (IPaC) web application to generate a list of species and critical habitat information that are known or expected to be on or near a project. The list also includes habitats or species that may be outside the project footprint but may experience direct or indirect impacts. In 2025, an IPaC list was generated for the study area and identified six species that have the potential to occur within the study area (rufa red knot, Pitcher's thistle, northern long-eared bat, monarch butterfly, gray wolf, and Canada lynx) (USFWS 2025). There is no federally designated critical habitat within the study area or within a 3-mile radius of the project area. WSP conducted a field survey of the project area in October 2023 and determined that the project area contains suitable habitat for the gray wolf, Canada lynx, and northern-long eared bat (WSP 2023).

Because the study area is mostly dense riparian forest and wetlands, suitable habitat does not exist for rufa red knot or Pitcher's thistle, as these species require open, sparsely vegetated habitats. Additionally, the presence of suitable summer roosting and foraging habitat for the northern long-eared bat and tricolored bat is unlikely due to the low number of suitable roost trees and relatively dense forested mid-story. According to the MDNR Bat Specialist for the Upper Peninsula, the proposed project area is not within a bat hibernacula buffer or a known roosting tree buffer (John DePue, November 8, 2024).

In addition, the presence of suitable habitat within the study area for the monarch butterfly is unlikely. Summer foraging habitat may be present where nectar producing wildflowers bloom along the Sucker River, and the surrounding coniferous forest (with black cherry intermixed) likely provides suitable roosting habitat during migrations. However, because milkweed, the species' obligate host plant and sole food source for monarch caterpillars, is not documented in the study area and the density of wildflowers is relatively low, the potential for monarch larvae habitat is low.

The state of Michigan provides protection for species considered threatened and endangered under the Endangered Species Act of the State of Michigan (Part 365 of PA 451, 1994 Michigan NREPA). The list of state protected species is developed and maintained by MDNR. This list also includes species of special concern, which are not afforded legal protection but are of concern due to their declining or relict populations in the state. MDNR also identifies extirpated species, which are those that can no longer be found in the state of Michigan, but which can still be found elsewhere in the world. Within Alger County, MDNR has identified 70 protected or rare plant and animal species (MNFI 2024c) (Table 3-5). Of these species in Alger County, five plant

and animal species were listed by the state as endangered, 22 species were identified as threatened, 42 species were considered of special concern, and one species is presumed extirpated.

Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the "taking" of bald and golden eagles and defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The Eagle Act's implementing regulations define disturb as "…to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Ultimately, no eagle nests or other migratory raptor stick nests were observed within the project area during WSP's survey in October of 2023, nor have any observations been reported within Township 49N, Range 13W, Section 36, which encompasses the project area (WSP 2023, MNFI 2024c).

Table 3-5 lists the federally listed, state-listed, and rare species in Alger County and indicates which species may have suitable habitat near the study area.

Table 3-5. Species of Conservation Concern within Alger County

Common Name	Scientific Name	Status[1]		Potential Suitable Habitat within the Study Area[3, 4]
		Federal	State (Rank[2])	
Birds				
Northern goshawk	*Accipiter gentilis*	--	T (S3)	LP
Grasshopper sparrow	*Ammodramus savannarum*	--	SC (S4)	N
Eastern whip-poor-will	*Antrostomus vociferus*	--	T (S3)	N
American bittern	*Botaurus lentiginosus*	--	SC(S3)	N
Red-shouldered hawk	*Buteo lineatus*	--	SC(S4)	P
Piping plover	*Charadrius melodus*	E	E(S2)	N
Yellow rail	*Coturnicops*	--	T(S2)	N
Peregrine falcon	*Falco peregrinus*	--	T(S3)	N
Bald eagle	*Haliaeetus leucocephalus*	--	SC(S4)	LP
Osprey	*Pandion haliaetus*	--	SC(S4)	LP
Black-backed woodpecker	*Picoides arcticus*	--	SC(S2)	Y
Cerulean warbler	*Setophaga cerulea*	--	T(S3)	N
Dickcissel	*Spiza americana*	--	SC(S3)	N
Rufa red knot	*Calidris canatus rufa*	T		N
Sharp-tailed grouse	*Tympanuchus phasianellus*	--	SC(S3S4)	N
Mammals				
Canada Lynx	*Lynx canadensis*	T	E(S1)	Y
Gray Wolf	*Canis Lupus*	E	SC(S4)	Y
Northern flying squirrel	*Glaucomys sabrinus*	--	SC(S5)	Y

Common Name	Scientific Name	Status[1]		Potential Suitable Habitat within the Study Area[3, 4]
		Federal	State (Rank[2])	
Northern long-eared bat	*Myotis septentrionalis*	E	T(S1)	LP
Amphibians/Reptiles				
Mudpuppy	*Necturus maculosus*	--	SC(S3S4)	Y
Smooth green snake	*Opheodrys vernalis*	--	SC(S4)	Y
Insects				
Northern amber bumble bee	*Bombus borealis*	--	SC(S3)	N
Sanderson's bumble bee	*Bombus sandersoni*	--	SC(S2S3)	LP
Yellow banded bumble bee	*Bombus terricola*	--	SC(S2S3)	LP
Basistriga owlet moth	*Hypocoena basistriga*	--	SC(SNR)	LP
American burying beetle	*Nicrophorus americanus*	E	X(SH)	N
Northern blue	*Plebejus idas nabokovi*	--	T(S2)	LP
Incurvate emerald	*Somatochlora incurvata*	--	SC(S3S4)	LP
Monarch butterfly	*Danaus Plexippus*	PT	--	LP
Early hairstreak	*Erora laeta*	--	SC(S1)	N
Lake Huron locust	*Trimerotropis huroniana*	--	T(S2S3)	N
Mollusks		--		
Rainbow	*Cambarunio iris*	--	SC(S3)	Y
Eastern elliptio	*Elliptio complanata*	--	SC(S3)	Y
Creek heelsplitter	*Lasmigona compressa*	--	SC(S3)	Y
Flutedshell	*Lasmigona costata*	--	SC(SNR)	Y
Eastern pondmussel	*Sagittunio nasutus*	--	E(S2)	Y
Fish		--		
Lake sturgeon	*Acipenser fulvescens*	--	T(S2)	N
Lake herring or Cisco	*Coregonus artedi*	--	T(S3)	N
Kiyi	*Coregonus kiyi*	--	SC(S2S3)	N
Shortjaw cisco	*Coregonus zenithicus*	--	E(S2)	N
Spoonhead sculpin	*Cottus ricei*	--	SC(S1S2)	Y
Plants		--		
Canadian milk vetch	*Astragalus canadensis*	--	SC(S1S2)	N
Prairie moonwort or Dunewort	*Botrychium campestre*	--	T(S2)	N
Michigan moonwort	*Botrychium michiganense*	--	T(S2)	LP
Goblin moonwort	*Botrychium mormo*	--	E(S2)	Y
Spatulate moonwort	*Botrychium spathulatum*	--	T(S2)	LP
Autumnal water-starwort	*Callitriche hermaphroditica*	--	SC(S2)	LP
Calypso or fairy-slipper	*Calypso bulbosa*	--	T(S2)	LP
Pitcher's thistle	*Cirsium pitcheri*	T	T(S3)	N
Pallas' bugseed	*Corispermum pallasii*	--	SC(SNR)	N
Douglas's hawthorn	*Crataegus douglasii*	--	SC(S3S4)	N
Ram's head lady's-slipper	*Cypripedium arietinum*	--	SC(S3)	LP
Blue wild-rye	*Elymus glaucus*	--	SC(S3)	LP

Common Name	Scientific Name	Status[1]		Potential Suitable Habitat within the Study Area[3, 4]
		Federal	State (Rank[2])	
Black crowberry	*Empetrum nigrum*	--	T(S2)	N
Fir clubmoss	*Huperzia selago*	--	SC(S3)	LP
Moor rush	*Juncus stygius*	--	E(S1S2)	N
American dune wild-rye	*Leymus mollis*	--	SC(S3)	N
American shore-grass	*Littorella uniflora*	--	SC(S2S3)	N
Small-flowered wood rush	*Luzula parviflora*	--	T(S1)	N
Northern Bluebell	*Mertensia paniculata*	--	SC(SNR)	N
Alternate-leaved water-milfoil	*Myriophyllum alterniflorum*	--	SC(S2S3)	N
Auricled twayblade	*Neottia auriculata*	--	SC(S2S3)	Y
Woodland everlasting	*Omalotheca sylvatica*	--	T(S1)	N
Northern ragwort	*Packera indecora*	--	T(S1)	Y
Butterwort	*Pinguicula vulgaris*	--	SC(S3)	N
Canada rice grass	*Piptatherum canadense*	--	T(S2)	N
Alga pondweed	*Potamogeton confervoides*	--	SC(S3)	N
Lesser pyrola	*Pyrola minor*	--	SC(SNR)	N
Stitchwort	*Stellaria longipes*	--	SC(S2)	N
Lake Huron tansy	*Tanacetum bipinnatum ssp. huronense*	--	SC(S3)	N
Downy oat-grass	*Trisetum spicatum*	--	SC(S2S3)	N
Dwarf bilberry	*Vaccinium cespitosum*	--	T(S1S2)	N

Sources: MNFI 2024c; USFWS 2025
[1] Status Codes: -- = Not Listed by USFWS; E = Listed Endangered; T = Listed Threatened; PE=Proposed Endangered; PT= Proposed Threatened; SC = Species of special concern; X = Extirpated
[2] State Rank: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2). Migratory Species may have separate ranks for different population segments (e.g. S1B, S2N, S4M).
[3] Potential habitats assessed based on species' life history, range, field survey, and consultation with WSP Biologists and Botanists.
[4] Y=Yes, N=No, LP=Low Potential

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action

Under the No Action Alternative, no new construction would occur, and there would be no direct impacts to protected or sensitive species. However, continued use of lampricides to control sea lamprey populations in the Sucker River may result in minor, long-term ecological effects. Some non-target species, including amphibians and invertebrates, may be sensitive to these chemical treatments. While lampricides have been effective in managing sea lamprey, their impacts on non-target species are not fully understood due to limited research.

3.6.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Under Alternative B, construction and operation of the proposed seasonal sea lamprey barrier is expected to have "no effect" on federally protected species such as the rufa red knot, Pitcher's thistle, gray wolf, and Canada lynx due to the absence of suitable habitat and the availability of extensive habitat in the surrounding Upper Peninsula region.

Construction activities would require limited tree removal (up to 0.4 acres) within permanent and temporary impact areas (see Figure 3-1 and Table 3-4). Vegetation clearing would be restricted to essential areas, and staging would occur in a previously disturbed parking area to reduce ecological disruption. Conservation measures listed in the *Project Design Guidelines for Federally Listed Bats in Michigan* would be implemented to avoid impacts to federally listed bats (USFWS 2023). Tree removal would be conducted between October 31 and April 1 to avoid the bat roosting season. Based on guidance from the MDNR Bat Specialist and habitat assessments, impacts to the northern long-eared bat are expected to be minor and short term, with a recommended determination of "may affect, but not likely to adversely affect."

The monarch butterfly, proposed as federally threatened, may occur in the study area, but suitable habitat is limited and of low quality. Therefore, impacts are expected to be minor, and the project is expected to have "no effect" on this species.

Alternative B would have no impacts on bald eagle or migratory raptor stick nests as none were observed during the October 2023 field survey nor have any observations been reported within Township 49N, Range 13W, Section 36, which encompasses the project area (WSP 2023, MNFI 2024c). If nests are identified within 660 feet of construction, coordination with USFWS would be initiated to avoid disturbance during the breeding season.

While some state-listed and sensitive species may inhabit the study area (Table 3-5), impacts would be minimized through BMPs and ESC measures during construction and restoration activities. Minor, short-term behavioral responses may occur during active construction.

In the long term, seasonal inundation from barrier operation (March–June) may alter small areas of habitat, but this is expected to enhance aquatic and wetland ecosystems. Reduced lampricide use and improved habitat connectivity along the Sucker River may benefit listed species by expanding and diversifying available habitat.

Overall, both short- and long-term impacts to listed and sensitive species are expected to be minor, with potential ecological benefits from habitat enhancement and reduced chemical exposure.

3.7 INVASIVE SPECIES

3.7.1 Affected Environment

Invasive species, as defined by EO 13112, are any species that are not native to a particular ecosystem and whose introduction does or is likely to cause economic or environmental harm to human, animal, and plant health. Invasive species are often common in previously disturbed

areas and can include trees, shrubs, vines, grasses, ferns and forbs. Invasive species have the potential to affect the native plant communities adversely because of their ability to spread rapidly and displace native vegetation. According to EO 13112, each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, prevent the introduction of invasive species; detect and control populations of such species; monitor invasive species populations; and provide for the restoration of native species in ecosystems that have been invaded.

Sea lampreys are an invasive parasitic fish species present in all of the Great Lakes and many of its associated tributaries where they spend a significant portion of their lives as filter feeding larvae (GLFC 2024a). Once mature, parasitic sea lamprey enter the Great Lakes and feed upon native fish significantly harming native fisheries and Great Lakes ecosystems. As part of the SLCP, the entire Sucker River system (both upstream and downstream of the H-58 river crossing and associated tributaries) was treated with lampricide in 2022, 2014, 2010, 2006, 1998, and 1994. The lower river (only downstream of the H-58 river crossing) was treated in 2018, 2002, and 1996. Barriers and dams can block spawning-phase sea lampreys from reaching their spawning and larval habitat and reduce the need for lampricide use.

In addition to sea lamprey, several invasive aquatic species have been intentionally or inadvertently introduced into the Great Lakes system and have a strong influence on aquatic communities through predation or competition. Common carp (*Cyprinus carpio*), round goby (*Neogobius melanostomus*), zebra mussel (*Dreissena polymorpha*), and rusty crayfish (*Faxonius rusticus*) are examples of invasive species found in the Great Lakes that could access the Sucker River Watershed and its tributaries (USGS 2012).

Invasive plant species are not widely distributed throughout the study area; however, two species listed by the Michigan Invasive Species Program, spotted knapweed (*Centaurea stoebe*) and wild parsnip (*Pastinaca sativa*), were encountered during an October 2023 field survey of the project area and vicinity (WSP 2023). Spotted knapweed was frequently observed within the disturbed, partially cleared construction staging area, which is currently used by recreational motorists as a parking area. This species was also found along the actively slumping sandy bank and stream access staircase located below the staging area. Wild parsnip was uncommon along the flood scoured, stream terrace of the Sucker River in the project area. Additional non-native species encountered included timothy (*Phleum pratense*), redtop (*Agrostis gigantea*), orange hawkweed (*Hieracium auranticum*), heath speedwell (*Veronica officinalis*), bittersweet (*Solanum dulcamara*), and common sheep sorrel (*Rumex acetosella*).

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action

Under the No Action Alternative, no new construction would occur, and current conditions regarding invasive species would remain unchanged. As a result, sea lamprey in the Sucker River would continue to spawn and reproduce leading to increased parasitic sea lamprey recruitment to Lake Superior and continued negative effects on native fisheries. To counteract the negative impacts of parasitic sea lamprey, no action would therefore require continued ongoing chemical control through lampricide treatments. This continued reliance on lampricides

contributes to long-term adverse impacts on both native and invasive species management in the watershed. Additionally, long-term use of lampricides may lead to a resistance to lampricides in sea lamprey from physiological or behavioral changes over multiple generations, resulting in further adverse impacts to invasive species management long-term.

3.7.2.2 Alternative B – – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Alternative B may result in short-term risks of invasive plant establishment due to exposed soil during construction. However, these risks are expected to be minor, as approved BMPs and ESC measures would be implemented to promptly revegetate disturbed areas with approved seed mixes.

In the long term, the seasonal sea lamprey barrier would confine infestations to the lower Sucker River, allowing for more targeted and efficient lampricide treatments. This would reduce chemical exposure across 95 stream miles, lower control costs, and enable the SCLP to redirect resources to other Great Lakes tributaries. Overall, short-term impacts would be minor, and long-term impacts would be beneficial for invasive species management in the Sucker River watershed.

3.8 WETLANDS AND WATERS OF THE STATE

3.8.1 Affected Environment

Wetlands are those areas inundated by surface or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland fringe areas are also found along the edges of most watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood and erosion control, water quality improvement, wildlife habitat, and recreation opportunities.

In the state of Michigan, the EGLE regulates the discharge of fill material into wetlands under Part 303, Wetlands Protection, of the NREPA, 1994 PA 451, as amended. Part 303 of EGLE's NREPA defines a wetland as "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh" (Act 451 of 1994 Part 303 Section 324.30301). In accordance with Part 303, wetlands are regulated if they are any of the following

- Connected to one of the Great Lakes or Lake St. Clair.
- Located within 1,000 feet of one of the Great Lakes or Lake St. Clair.
- Connected to an inland lake, pond, river, or stream.
- Located within 500 feet of an inland lake, pond, river or stream.
- Not connected to one of the Great Lakes or Lake St. Clair, or an inland lake, pond, stream, or river, but are greater than 5 acres in size.

- Not connected to one of the Great Lakes or Lake St. Clair, or an inland lake, pond, stream, or river, and less than 5 acres in size, but EGLE has determined that these wetlands are essential to the preservation of the state's natural resources and has notified the property owner.

Additionally, wetlands are regulated if they have documented endangered or threatened species or are a rare and imperiled wetland type as defined in Part 303.

In 1984, Michigan received authorization from the federal government to administer Section 404 of the CWA in most areas of the state. As such, wetlands in the project area are regulated at both the state and federal level by the EGLE. Additionally, the purpose of EO 11990 (Protection of Wetlands) is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, EO 11990 requires federal agencies to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. EGLE's definition of a wetland and the protection provided by EO 11990 apply to both public and private lands regardless of zoning or ownership.

Streams are defined, in pertinent part, by Part 301 of the NREPA as: "natural or artificial lake, pond, or impoundment; a river, stream, or creek which may or may not be serving as a drain as defined by the drain code of 1956, 1956 PA 40, Michigan Compiled Law 280.1 to 280.630; or any other body of water that has definite banks, a bed, and visible evidence of a continued flow or continued occurrence of water, including the St. Marys, St. Clair, and Detroit Rivers…". Watercourses are regulated by the State under Part 301 (Inland Lakes and Streams) of NREPA if they exhibit defined banks, a bed, and visible evidence of a continued flow or continued occurrence of water.

Mapped wetlands from the National Wetland Inventory (NWI) within a 3-mile radius of the project area are shown in Table 3-6. The following NWI wetland types are located within 3 miles of the project area: freshwater emergent wetlands; freshwater forested/shrub wetlands, freshwater ponds; lake; and riverine.

Table 3-6. NWI Wetlands within a 3-Mile Radius of the Project Area

Wetland Type	Acres
Freshwater Emergent Wetland	116
Freshwater Forested/Shrub Wetland	4,793
Freshwater Pond	74
Lake	32
Riverine	21
Total	**5,035**

Source: USFWS 2024a

Niswander Environmental completed a wetland field delineation of a 33-acre area (wetlands review area) encompassing the project study area in October of 2023 using the procedures outlined in the USACE 1987 Wetland Delineation Manual, and the Northcentral and Northeast Regional Supplement as required by EGLE, under NREPA (see Appendix C). According to

these procedures, wetlands are identified by the presence of hydric soils, signs of hydrology indicators, and dominant hydrophytic vegetation.

An area of rolling mixed deciduous/evergreen upland forest and dense scrub-shrub wetland was observed at the southern terminus of Whitewash Road, extending south along the Sucker River for approximately 4,000 feet. Upland areas observed within the wetlands review area rise steeply from the river valley and typically sit 20 to 30 feet higher than the wetlands and river (Niswander Environmental 2023).

The results of this delineation indicate the presence of one wetland (Wetland 1), one intermittent stream, and the Sucker River within the wetlands review area (Niswander Environmental 2023). Wetlands and streams within the wetlands review area are shown in Figure 3-3. Wetland 1 is primarily a scrub-shrub wetland that generally follows the Sucker River and includes the river itself, a small intermittent creek channel, an oxbow with minimal flow, an abandoned river channel that has transitioned into emergent wetland, and a cedar swamp. The wetland features vegetation commonly associated with riparian habitat, with a dense plant community dominated by speckled alder. Emergent portions of the wetland are generally confined to the abandoned river channel. Two forested wetland areas occur within Wetland 1, including a perched cedar swamp. Vegetation found in the wetland areas is described in Section 3.5.1.

Niswander Environmental concluded that Wetland 1 would likely be regulated by EGLE under the authority of Section 301 and 303 because it is contiguous to and contains the Sucker River and a small intermittent stream, both state-regulated streams. EGLE has the final authority on the regulatory status of wetlands and watercourses in the State of Michigan (Niswander Environmental 2023).

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action

Under the No Action alternative, no construction activities or fill within wetlands would occur. Therefore, there would be no impacts to wetlands under the No Action Alternative.

3.8.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Construction of the proposed sea lamprey barrier, temporary channel diversion, and access road under Alternative B would result in both short- and long-term direct and indirect impacts to wetlands and streams within the study area. Direct impacts include approximately 0.13 acres (823 cubic yards) of permanent disturbance and 0.12 acres (543 cubic yards) of temporary disturbance to wetland habitats, including scrub-shrub, emergent, and woody wetlands (see Tables 3-7 and 3-8).

Indirect impacts during construction may result from erosion and sedimentation caused by ground disturbance and equipment use. To minimize these effects, BMPs and ESC measures—such as erosion control blankets and seeding—would be implemented. Construction vehicles would remain within designated access and staging/stockpile areas to prevent unnecessary disturbance. Upon completion, all temporarily impacted areas will be regraded, covered with

topsoil and erosion control blankets, and replanted with native seed mixes according to permit specifications.

During seasonal barrier operation (March–June), intermittent, indirect impacts to wetlands and streams may occur due to increased inundation. Modeled inundation impacts within the backwater impacts study area from barrier use during low flow, 25-year storm, and 100-year storm conditions are shown in Table 3-9. A maximum of 5.19 acres of wetland inundation could occur during a 100-year storm event. These impacts are expected to be minor and seasonal.

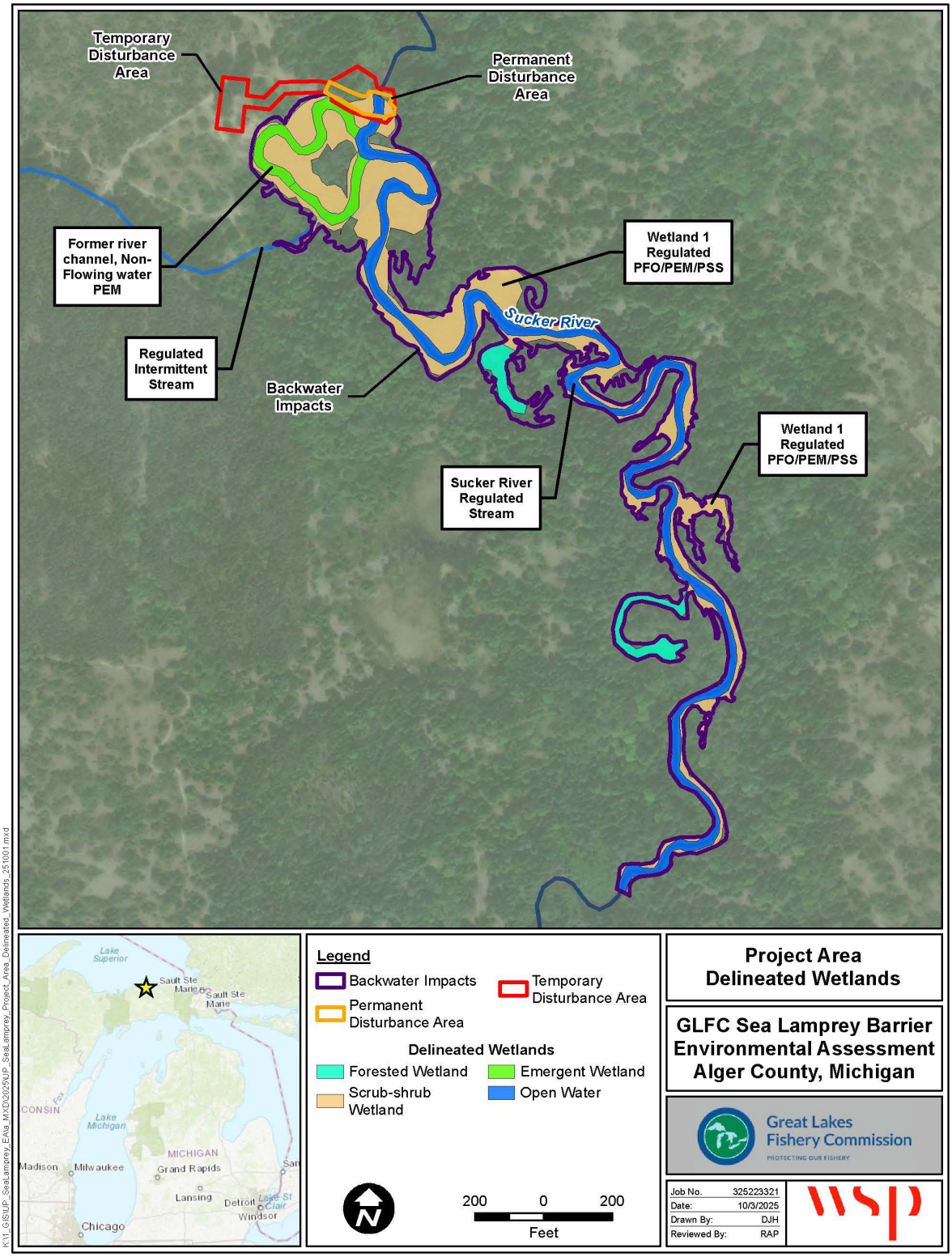


Figure 3-3. Delineated Wetlands and Waters of the State within the Project Area and Backwater Impacts Study Area

Table 3-7. Proposed Permanent Wetland and Stream Impacts

Construction Activity	Impact Type	Wetland Type	Length (feet)	Width (feet)	Depth (feet)	Impact Area (Acres)	Volume (cubic yards)
Vortex Weir, Fish Resting Pool	Fill	Scrub-shrub Stream	40	25.8	1	0.02	38
Riprap, Grading	Fill	Emergent Scrub-shrub Stream	140	16.5	1	0.05	86
Access Road	Fill	Scrub-shrub	50	30.1	2.5	0.03	139
Dam Structure	Fill	Scrub-shrub Stream	53	28.5	10.0	0.03	560
					Total	**0.13**	**823**

Table 3-8. Proposed Temporary Wetland and Stream Impacts

Construction Activity	Impact Type	Wetland Type	Length (feet)	Width (feet)	Depth (feet)	Impact Area (Acres)	Volume (cubic yards)
Cofferdam Installation	Fill	Emergent Scrub-shrub Stream	125	27.9	1	0.08	129
Temporary Channel	Cut	Emergent Scrub-shrub Stream	31	29.3	5	0.02	168
Temporary Channel, Culverts	Cut	Upland	85	11.1	7	0.02	246
					Total	**0.12**	**543**

Table 3-9. Estimated Wetland and Stream Inundation Impacts

Wetland Type	Impact Area (acres)		
	Low Flow	25-Year Flow	100-Year Flow
Emergent	0.69	0.69	0.69
Forested	0.00	0.57	0.59
Scrub-Shrub	1.77	3.58	3.91
Total	**2.46**	**4.84**	**5.19**

GLFC would avoid and minimize impacts to wetlands and other sensitive resources wherever practicable, with final avoidance and minimization strategies determined during the design phase. Unavoidable impacts would be addressed through permitting with the EGLE under the NREPA, including restoration with native plant materials and any required compensatory mitigation to ensure no net loss of wetlands.

In summary, the proposed project would result in the permanent fill of approximately 0.13 acres of wetlands and streams due to construction of the sea lamprey barrier. Additionally, approximately 2.46 acres of wetlands could experience intermittent inundation during seasonal barrier operation (March–June). Any unavoidable impacts to wetlands and waters of the State would be addressed through compliance with EGLE permitting requirements, including mitigation under Part 303 of NREPA. Permit requirements, in combination with BMPs and ESC measures discussed in Section 2.4, would ensure that both short- and long-term direct and indirect impacts to wetlands and streams would be minor, with no net loss of wetland function or area.

3.9 SOCIOECONOMICS

3.9.1 Affected Environment

The relevant area of interest for socioeconomic analysis is defined as the census block group falling within a 1-mile radius of the study area (Block Group 1). As the study area is located in Alger County and the state of Michigan, both are included as appropriate secondary geographic areas of reference. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed action, including any minority or low-income populations. Demographic and economic characteristics of populations within Block Group 1 were assessed using the most recent U.S. Census Bureau (USCB) data available, including 2010 and 2020 Decennial Census counts (USCB 2010; USCB 2020) for total population, and 2018-2022 American Community Survey 5-year estimates (USCB 2022) for the remaining datasets.

3.9.1.1 Demographic and Economic Conditions

Demographic characteristics of Block Group 1 and of the secondary reference geographies are summarized in Table 3-10. Block Group 1 has a total resident population of 930 and is predominantly characterized by low-density rural residential development. Alger County is predominantly rural, with a resident population of 8,842. Since 2010, Block Group 1 has experienced an overall population decline of 13.5 percent and Alger County experienced a

population decline of 7.9 percent, in notable contrast to the population growth experienced by the state of Michigan (2.0 percent).

The median household income in Block Group 1 was $53,088, which is lower than the median household income for Alger County ($55,528) and the state of Michigan ($68,505) (Table 3-10). The percentage of the population falling below the poverty level in Block Group 1 is 4.6 percent, notably lower than Alger County (10.3 percent) and the state of Michigan (13.1 percent) (Table 3-10)

Approximately 86.9 percent of the population within Block Group 1 is white; correspondingly, minority populations are relatively small. Minorities in Block Group 1 include American Indian and Alaskan Native (7.9 percent), Hispanic or Latino (1 percent), and black or African American (0.2 percent). Minority population percentages in Block Group 1 are generally comparable to or less than those of the reference geographies, except for the native population which is somewhat higher than that of the county (3.2 percent) and state (Table 3-10).

Table 3-10. Demographic Characteristics

	Michigan	Alger County, Michigan	Block Group 1, Census Tract 1, Alger County, Michigan
Population[1,2]			
Population, 2020	10,077,331	8,842	930
Population, 2010	9,883,640	9,601	1,075
Percent Change 2010-2020	2.0%	-7.9%	-13.5%
Racial Characteristics[3]			
Not Hispanic or Latino			
White alone, 2022 (a)	73.5%	82.0%	86.9%
Black or African American, 2022 (a)	13.4%	7.8%	0.2%
American Indian and Alaska Native, 2022 (a)	0.3%	3.2%	7.9%
Asian, 2022 (a)	3.2%	0.8%	0.0%
Native Hawaiian and Other Pacific Islander, 2022 (a)	0.0%	0.0%	0.0%
Some Other Race alone, 2022 (a)	0.3%	0.1%	0.0%
Two or More Races, 2022	3.7%	4.2%	4.1%
Hispanic or Latino, 2022	5.5%	2.0%	1.0%
Housing and Income[3]			
Housing units, 2022	4,580,939	6,671	1,082
Median household income, 2018-2022	$ 68,505	$ 55,528	$ 53,088
Persons below poverty level, 2018-2022	13.1%	10.3%	4.3%
Persons below low-income threshold[(b)]	29.5%	34.0%	43.3%

Source: 1. USCB 2010, 2. USCB 2020, 3. USCB 2022
(a) Includes persons reporting only one race.
(b) Low-income threshold is defined as two times the poverty level.

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2022 USCB Poverty Threshold for an individual under the age of 65 is an annual income of $15,225, and for a family of four with two children, it is an annual income of $26,678 (USCB 2022).

For the purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level. More encompassing than the base poverty level, this low-income threshold is a reasonable measure for consideration because current poverty thresholds are often too low to adequately capture the populations adversely affected by low levels of income, especially in high-cost areas.

The percentage of the low-income individuals in Michigan, or those living below the low-income threshold, is approximately 30 percent. Alger County has a higher percentage (34 percent) than the state. Approximately 43 percent of people living within Block Group 1 are considered low-income. Because Block Group 1 does not have a low-income population that either exceeds 50 percent of the total population or significantly exceeds that of any of the reference geographies, it does not meet the criterion for consideration as a low-income population group.

The total minority population (i.e., all non-white and Hispanic or Latino racial groups combined) comprises 26.5 percent of the population of Michigan. Alger County is somewhat less racially diverse, with the total minority population accounting for 18 percent of the population, and Block Group 1 is even less diverse with the total minority population accounting for approximately 13.1 percent of the population. Thus, Block Group 1 does not have minority populations that either exceed 50 percent of the total population or exceed the minority percentage of any of the reference geographies, and, therefore, it does not meet the criterion for consideration as a minority population group.

3.9.1.2 Community Facilities/Services

Community facilities and services include public or publicly funded facilities such as police protection and other emergency services (ambulance/fire protection), schools, hospitals and other health care facilities, libraries, day care centers, churches, parks, and community centers. To identify facilities and emergency services that could be potentially impacted by proposed project activities, the relevant area of interest for community facilities and services comprises a 1-mile radius of the proposed project (community study area) or the service area of various providers, where applicable.

Based on a review of aerial imagery and online information, there are no community facilities and services available within the community study area, other than one community facility, the First Baptist Church of Jerome. Schools and healthcare facilities are located in Grand Marais, approximately 6.3 miles to the northwest, and Newberry, approximately 25 miles to the southeast of the project area. Police protection for the proposed project area is provided by the Michigan State Police and the Alger County Sheriff's Department. The nearest Fire Protection District is the Burt Township Fire Department, located in Grand Marais.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action

Under the No Action Alternative, GLFC would not construct the sea lamprey barrier. As a result, there would be no changes to local demographics, employment, or demand on community services associated with the proposed action. Existing conditions would remain unchanged.

3.9.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

3.9.2.2.1 Demographic Impacts

A relatively small labor force (less than 25 workers) would be required to construct the sea lamprey barrier under Alternative B. The required labor is expected to be available from the regional area and no changes to resident populations are expected. Additionally, no low-income or minority populations were identified in Block Group 1. Consequently, there would be no short- or long-term impacts to local demographics or low-income and minority populations.

3.9.2.2.2 Economic Impacts

Construction activities would temporarily contribute to employment and associated payrolls and would require the purchase of materials and supplies. Capital costs associated with the proposed action would therefore have a minor, direct economic benefit to the local and regional area. Additionally, some beneficial secondary impacts to the economy are also expected in conjunction with the multiplier effects of construction activities. For example, the hospitality and service industries would benefit from the demands brought by the increased construction work force. However, given the relatively small magnitude of the anticipated construction and workforce, short-term, beneficial impacts under Alternative B would be minor.

3.9.2.2.3 Community Facilities and Services

Construction of the sea lamprey barrier is expected to be carried out by regionally based contractors, and no relocations to the area are anticipated. Consequently, there would be no impacts to community services.

3.10 LAND USE AND RECREATION

3.10.1 Affected Environment

3.10.1.1 Land Use

The study area is located in an unincorporated area of eastern Alger County, in the Upper Peninsula of Michigan. It is located to the southeast of Lake Superior and the village of Grand Marais within Burt Township (Figure 1-3). The largest community in Alger County is Munising, the County Seat, located approximately 38 miles to the west of the project area (City of Munising 2024). As shown on Table 3-4, land within a 3-mile radius of the project area consists primarily of undeveloped forest land. The Sucker River is currently used for recreation but had a history of use for logging practices in the 1800s and 1900s (MDNR 1975).

Burt Township has adopted a zoning ordinance and comprehensive plan. The zoning ordinance establishes zoning districts, permitted uses in each district, and regulations for land

development. The comprehensive plan serves as a guide for making land use decisions and planning for future development in the township. The study area lies within the 20,000 square-foot Bay District. This district is established to protect the fragile ecosystem in the coastal area. Residential and recreational uses are allowed, and development in the Bay District must be accomplished in a manner that preserves the qualities found within the Lake Superior coastline as well as protecting the piping plover, a federally endangered species. The comprehensive plan indicates the future development in this district could include small scale commercial or mixed-use development which would be regulated through adherence to zoning requirements related to setbacks and building heights (Burt Township Planning Commission 2023).

3.10.1.2 Recreation

The Sucker River and its tributaries provide many recreational opportunities, including fishing, sightseeing and nature study, canoe/kayaking, camping, swimming, and hiking. The MDNR has designated the Sucker River as a priority habitat conservation project and has implemented a conservation plan to address sedimentation, material movement, and floodplain connectivity to improve stream quality for species such as rainbow trout, longnose sucker (*Catostomus catostomus*), white sucker, brook trout and coho salmon (MDNR 2024b). It is the goal of the MDNR to provide diverse freshwater fishing and recreational opportunities, supported by healthy aquatic environments, which enhance the quality of life in Michigan (MDNR 2023).

3.10.1.3 Managed Areas

Managed areas include lands held in public ownership that are managed by an entity (e.g., MDNR, USDA, U.S. Forest Service) to protect and maintain certain ecological or recreational features. Additionally, these areas can be privately managed by certain entities. The project area is within the Michigan State Forest – Shingleton Forest Management Unit, an MDNR managed area that encompasses over 35,000 acres in several counties. Within a 3-mile radius of the project area there are lands managed by the State of Michigan, the Nature Conservancy, and Camp Oscar Hunting Club (Figure 3-4). Table 3-11 summarizes these areas and their distances from the project area.

The Shingleton Forest Management Unit is primarily managed for timber production, but recreation is an important secondary use. Notable features within the unit include high conservation value sites, ecological reference areas, and designated special conservation areas (MDNR 2013, 2020). Visitors to this management unit can access motorized trails and roads, multiple snowmobile trails, and several state forest campgrounds and boating access points. Other types of recreational uses in the unit include bear hunting, trapping of furbearing species, canoeing, kayaking, blueberry picking, wildlife viewing, and dispersed camping (MDNR 2013).

Table 3-11. Managed Areas within a 3-mile Radius of the Project Area

Managed by	Management Area Name	Acres[1]	Distance from Project Area (miles)[1]
The Nature Conservancy	Two Hearted River Forest Preserve	1,037	1.6
Camp Oscar Hunting Club Inc. (Private)	Camp Oscar Hunting Club	40	2
MDNR Forest Resources Division	Newberry State Forest Area	2,165	1.2
	Shingleton State Forest Area	5,801	0.0
Michigan State Government	National Great Lakes Forest (NGLF) Phase 1 (#4)	930	2.1
	NGLF Phase 2 (#5)	1,466	1.7
	NGLF Phase 4 (#3)	6,780	0.8

[1] Acres and distances from project area are rounded to the nearest tenth.
Source: USGS 2024b

3.10.1.4 Sea Lamprey Threat to Recreation

Since being introduced into Lake Ontario in the mid-1800s, and to the upper Great Lakes beginning in 1921, sea lampreys have inflicted significant economic damage and have harmed the fishery and ecosystem (GLFC 2024a). During the 1950's, at the height of the sea lamprey invasion and before control efforts took place, sea lampreys were responsible for killing more than 100 million pounds of fish annually, or five times the commercial harvest in the upper Great Lakes. This resulted in the loss of tens of thousands of jobs, diminished property values, and dramatically changed the economy in the area (GLFC 2024c). Sea lamprey mitigation began in 1958 in Lake Superior, and by 1986, was applied to five great lakes and their tributaries (Great Lakes Now 2022). Fish community goals for Lake Superior are outlined by GLFC as rehabilitation and maintenance of a diverse, healthy, and self-regulating fish communities, dominated by indigenous species and supporting sustainable fisheries (GLFC 2003). These goals allow for continued rehabilitation and conservation efforts to allow for sustainable recreational fishing.

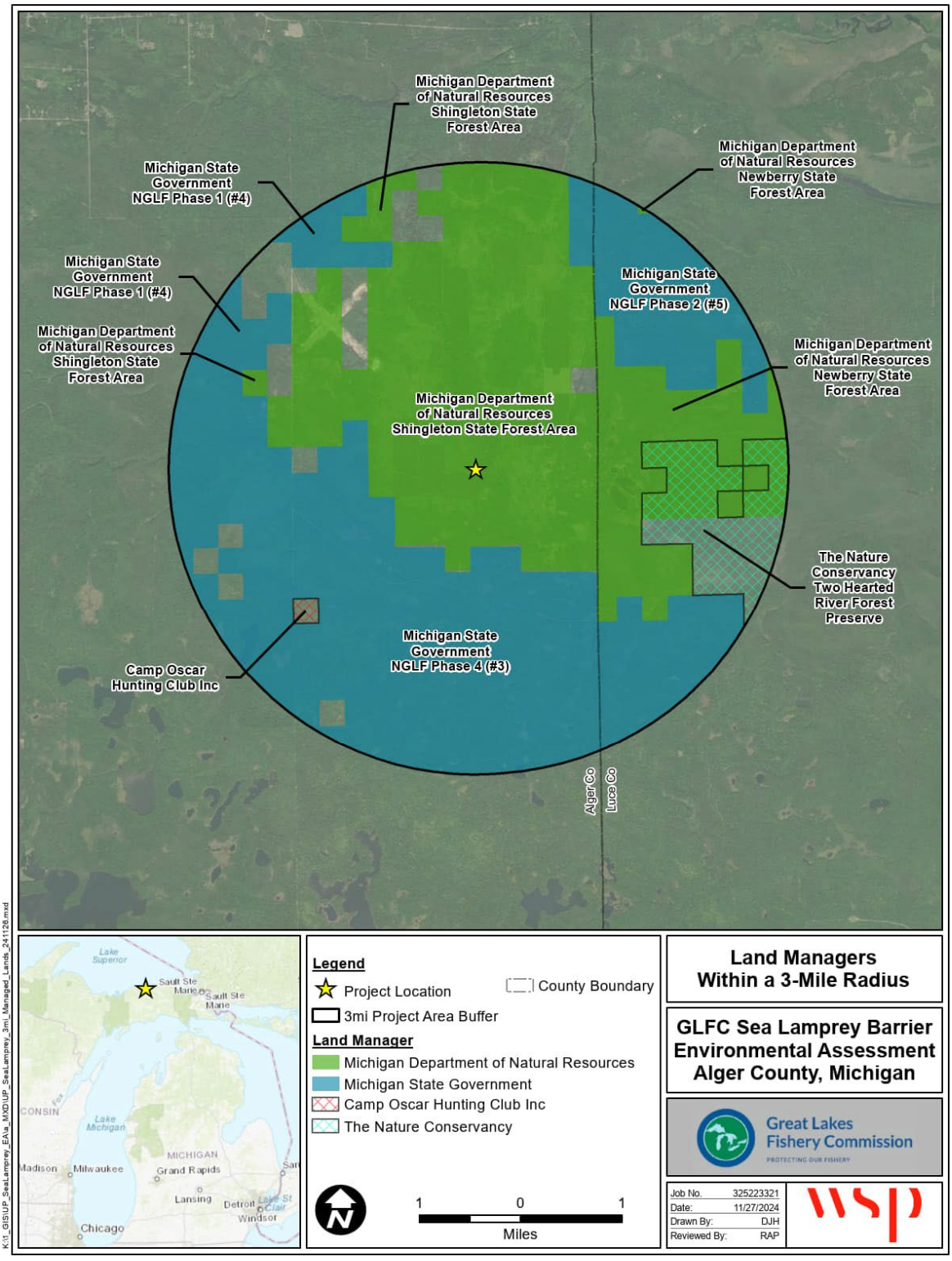


Figure 3-4. Managed Areas within a 3-mile Vicinity of the Project Area

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action

Under the No Action Alternative, there would be no changes or impacts to land use within the study area. Under this alternative, GLFC would not construct and operate a sea lamprey barrier, which would result in moderate, long-term adverse impacts to recreational activities (i.e., fishing) in the region due to continued spawning of sea lamprey upstream.

3.10.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Construction of the sea lamprey barrier and associated infrastructure would result in the permanent conversion of approximately 0.2 acres of primarily forested land within the Lake Superior State Forest – Shingleton Unit. An additional 0.7 acres would be temporarily impacted for access, channel diversion, and staging areas, with full restoration planned post-construction. Given the Shingleton Unit spans nearly 8,000 acres, these changes represent a minor long-term impact to land use.

Importantly, the barrier would enhance recreational fishing in the Sucker River by improving sea lamprey control. This targeted approach would reduce lampricide use upstream, benefiting fish populations and supporting healthier aquatic ecosystems. Similar efforts in Lake Champlain have led to increased numbers and improved health of lake trout and Atlantic salmon, greater angler satisfaction, and a resurgence of lake sturgeon (USFWS 2024b). GLFC's sea lamprey control efforts have already reduced populations by 90 percent in most Great Lakes areas, contributing to long-term ecological and recreational benefits.

In conclusion, Alternative B would result in minor land use impacts and provide long-term recreational benefits through improved fisheries management and habitat quality.

3.11 CULTURAL AND HISTORIC RESOURCES

3.11.1 Affected Environment

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects as well as locations of important historic events. Federal agencies, including USFWS, are required by the NHPA (54 USC 300101 et seq) and by NEPA to consider the possible effects of their projects, activities, and programs (including licenses, permits, or other assistance) on historic properties. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA at 36 CFR Part 800. Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (54 USC 300101 et seq.), Archaeological Resources Protection Act (16 USC 470aa-470mm), and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013). Section 106 of the NHPA requires that federal agencies consider the potential effects of their actions on historic properties and to allow the Advisory Council on Historic Preservation an opportunity to comment on the action. Section 106 involves four steps: (1) initiate the process, (2) identify historic properties, (3) assess adverse effects, and (4) resolve adverse effects. This process is carried out in consultation with the

SHPO and other interested consulting parties, including federally recognized Indian tribes with an interest in the project.

Cultural resources are considered historic properties if they are listed or eligible for listing in the National Register of Historic Places (NRHP), which is maintained by the National Park Service. The NRHP eligibility of a resource is based on the Secretary of the Interior's criteria for evaluation (36 CFR 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling, association, and:

- Are associated with events that have made a significant contribution to the broad patterns of our history; or
- Are associated with the lives of persons significant in our past; or
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value; or
- Have yielded, or may yield, information (data) important in prehistory or history.

An early step in the Section 106 process is to determine the project's area of potential effects (APE). The APE is the geographic area or areas within which an undertaking may (directly or indirectly) cause changes in the character or use of historic properties if such properties exist. Agencies must identify historic properties in the APE, and if any are present, must then assess whether the undertaking would result in any adverse effects on a historic property, in consultation with the SHPOs and tribes. WSP conducted a cultural resources literature and records review of known archaeological and historical resources for the proposed project area and one-mile radius APE. The cultural resources literature and records review indicated there are no previously recorded archaeological or historical resources within the project area and one-mile APE (WSP 2024).

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action

There would be no change in the current conditions under No Action Alternative. Therefore, no impacts to cultural resources would occur under this alternative.

3.11.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Based on the results of the cultural resources literature and records review, there are no previously recorded or NRHP listed archaeological or historical resources within the project APE. Therefore, the proposed project is not expected to impact any known resources. In correspondence dated September 4, 2025, the Midwest Regional Historic Preservation Office concurred that the construction and operation of the sea lamprey seasonal barrier would have no effect on archaeological or historic properties (see Appendix A).

3.12 VISUAL QUALITY AND AESTHETICS

3.12.1 Affected Environment

Visual resources are the various components of the landscape that contribute to the visual character of a place. These components can be natural or human-made and are collectively referred to as the viewshed. The study area is located on a low-lying river corridor along the Sucker River and within the Lake Superior State Forest – Shingleton Unit. The visual environment is predominantly characterized by forested land comprised of northern hardwoods mixed with balsam fir (Omernik and Bryce 2007). The project area is undisturbed except for an open area used by recreationists for parking, which is located west of the Sucker River.

The viewshed of certain receptors, such as dwellings, churches, schools, and outdoor recreation sites, can be vulnerable to visual modifications in the surrounding landscape. Sensitive visual receptors in the viewshed include recreationists on the Sucker River and visitors in the Shingleton Unit of Lake Superior State Forest.

Overall, the viewshed within the project area is of good quality. While an area of the natural landscape has been altered by the development of Whitewash Road, much of the landscape remains natural and undeveloped, with the Sucker River and forested areas providing aesthetically pleasing views.

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – No Action

There would be no change in the current conditions under this alternative; therefore, there would be no impact to the current aesthetics of the site.

3.12.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

The proposed project would result in short-term visual impacts during the 150- to 180-day construction period. Temporary features such as a channel diversion structure with 60-inch culverts, a 340-foot access route from Whitewash Road, construction equipment, and a 0.2-acre staging area would alter the visual character of the site. Exposed riverbanks and increased activity may cause temporary visual disruption, but these impacts would be minor and limited to the construction phase.

Long-term visual impacts would result from the presence and seasonal operation of the barrier, which may alter the natural appearance of the river and streambanks. However, the surrounding landscape would remain largely natural and undeveloped, preserving scenic views of the Sucker River and adjacent forest. Given the limited nature of these changes, long-term visual impacts are expected to be minor.

3.13 AIR QUALITY

3.13.1 Affected Environment

The CAA (as amended) is the comprehensive law that protects air quality by regulating emissions of air pollutants from stationary sources and mobile sources. It requires that the EPA establish National Ambient Air Quality Standards (NAAQS) and directs the states to develop State Implementation Plan to achieve these standards. This is primarily accomplished through permitting programs that establish limits for emissions of air pollutants. The CAA also requires EPA to set standards for emissions of hazardous air pollutants.

NAAQS have been established for pollutants considered harmful to public health and the environment. The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air (EPA 2024b). The following criteria pollutants have been set to protect the public health and welfare:

- Sulfur dioxide (Primary)
- Ozone (Primary and Secondary)
- Nitrogen dioxide (Primary and Secondary)
- Particulate matter (PM) with particle sizes less than or equal to 10 micrometers (Primary and Secondary)
- PM with particle sizes less than or equal to 2.5 micrometers (Primary and Secondary)
- Carbon monoxide (Primary)
- Lead (Primary and Secondary)

In accordance with CAA Amendments of 1990, all counties are designated with respect to compliance, or degree of noncompliance, with the NAAQS. These designations are either attainment, nonattainment, or unclassifiable.

- Attainment – An area with air quality better than the NAAQS.
- Nonattainment – An area with air quality worse than the NAAQS is designated as “non-attainment.” Non-attainment areas are further classified as extreme, severe, serious, moderate, or marginal.
- Unclassified – An area lacks data to form a basis of attainment status.

According to the EPA and the EGLE, Alger County is within attainment of NAAQs and statewide air quality standards as of 2023 (EGLE 2023b).

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action

There would be no change in the current conditions under this alternative; therefore, there would be no impact on air quality.

3.13.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Construction activities would result in emissions from construction equipment and fugitive dust emissions from clearing, grading, and other ground disturbances. Combustion of gasoline and diesel fuels by internal combustion engines would generate localized emissions of carbon monoxide, carbon dioxide, PM, sulphur dioxide, and volatile organic compounds. Overall effects to air quality from construction-associated activities would be temporary and localized, with no emissions during operation of the sea lamprey barrier; therefore, impacts on air quality would be short-term and minor.

3.14 SOLID AND HAZARDOUS WASTE

3.14.1 Affected Environment

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances). The EPA defines hazardous waste as a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Hazardous waste is generated from many sources, ranging from industrial manufacturing process wastes to batteries and may come in many forms, including liquids, solids, gases, and sludges (EPA 2023).

Management of hazardous material and solid waste is primarily regulated by the Resource Conservation and Recovery Act that governs the disposal and cleanup of solid and hazardous wastes, and CERCLA that regulates cleanup at sites contaminated with hazardous substances and pollutants or contaminants. CERCLA established the National Priorities List of contaminated sites and the “Superfund” cleanup program. According to USACE Environmental Regulation 1165-2-132, Hazardous, Toxic and Radioactive Waste includes any material listed as a "hazardous substance" under CERCLA.

Based on the identified historical uses of the project area, historic aerial photographs and topographic maps, and a field survey conducted in October 2023, there is no evidence of current or former significant petroleum product or hazardous substance use, storage, or handling within the project area. A Phase I preliminary site assessment for the presence of hazardous materials was determined not to be necessary. Instead, a review of regulated facilities for hazardous materials within the project area was conducted by searching online records at the EPA NEPA Assist Tool (EPA 2024c) and the EPA’s Envirofacts multisystem search. This review did not identify any hazardous or solid waste sites within the project area.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – No Action

There would be no change in the current conditions under this alternative; therefore, there would be no solid or hazardous waste impacts on either human or environmental receptors.

3.14.2.2 Alternative B – Construction and Operation of Sea Lamprey In-Stream Seasonal Barrier on the Sucker River

Under Alternative B, construction, operation, and maintenance activities would generate varying amounts of solid waste. Solid wastes generated may include land clearing wastes, excess soil and rock, construction debris, and any other solid waste generated during construction. Solid waste generated during project construction, operation, or maintenance would be transported for disposal at a licensed waste management facility.

Various hazardous wastes (e.g., fuels, lubricating oils, etc.) could be produced during construction. Oily wastes generated during servicing of heavy equipment would be managed by off-site vendors who service on-site equipment using appropriate self-contained used oil reservoirs. Appropriate equipment maintenance and storage BMPs would be implemented to protect construction workers, the public, and the environment. If leaks or spills of hazardous materials occur, the workers responding to the incident are required to have the appropriate level of training, as mandated by the Occupational Safety and Health Administration at 29 CFR, Part 1910.

Due to the adherence to applicable disposal and management standards regarding solid and hazardous wastes, including the implementation of BMPs, impacts on solid and hazardous wastes would be minor from both short-term construction activities and long-term operation and maintenance activities.

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CHAPTER 5 LIST OF PREPARERS

The following personnel contributed to this report:

5.1 NEPA PROJECT MANAGEMENT

Name:	**Chris Freiburger (GLFC)**
Education:	M.S., Aquatic Biology/Limnology and B.S., Fishing and Fisheries Sciences and Management
Project Role:	GLFC Project Coordinator and Reviewer
Experience:	Over 30 years of stream restoration experience

Name:	**Pete Hrodey (USFWS)**
Education:	M.S., Fisheries and Aquatic Sciences and B.S., Fisheries and Wildlife
Project Role:	USFWS Project Coordinator and Reviewer
Experience:	Over 15 years of invasive species control experience

Name:	**Rebecca Porath (WSP)**
Education:	M.S., Zoology and B.S., Fisheries and Wildlife
Project Role:	WSP Project Manager, preparation of Description of Proposed Action and Alternatives, impacts assessment
Experience:	24 years of experience in NEPA and environmental compliance

Name:	**William Elzinga (WSP)**
Education:	M.S., Biology and B.S., Biology
Project Role:	Quality and Technical Reviewer
Experience:	over 35 years of professional experience in NEPA

5.2 OTHER CONTRIBUTORS

Name:	**Karen Boulware (WSP)**
Education:	M.S., Resource Planning and B.S., Geology
Project Role:	Technical Review
Experience:	30 years of professional experience in NEPA

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Education:	B.S., Environmental Engineering
Project Role:	Hydrology and Floodplains, Geology and Groundwater
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Name:	**Andrea Johnston (WSP)**
Education:	B.S., Environmental Science
Project Role:	Solid and Hazardous Waste, Public Health and Safety, Land Use, Managed and Natural Areas, Recreation, Sensitive Species
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Name:	**Chelsey Nieman (WSP)**
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Experience:	20 years of experience in freshwater ecosystems and NEPA analysis

Name:	**David Tamsky (WSP)**
Education:	B.A., Environmental Studies
Project Role:	Wetlands, Wildlife, Vegetation
Experience:	2 years of experience in NEPA analysis

APPENDIX A – COORDINATION

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APPENDIX A

COORDINATION

A.1. Letters of Support

A.2. Michigan Department of Natural Resources Bat Coordination

A.3. National Historic Preservation Act Clearance

A.4. EGLE Existing Peak Flows for Sucker River

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A.1. Letters of Support

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Bay Mills Indian Community
12140 W. Lakeshore Drive, Brimley, MI 49715
(906) 248-8649
Fax-(906) 248-3283

February 24, 2022

Chris Freiburger
Sea Lamprey Program Manager
Great Lakes Fishery Commission
2200 Commonwealth Blvd., Suite 100
Ann Arbor, MI 48105-2957

Dear Mr. Freiburger

On behalf of Bay Mills Indian Community, I would like to express support for the United States Fish and Wildlife Service's Proposed project, "Sucker River, Alger County, Culvert replacement at H-58 road crossing and construction of a new seasonal sea lamprey barrier". The goals of the project align with our priorities to protect and restore native species and the habitats that support them. We believe the proposed project would be a significant step forward in improving control of Sea Lamprey populations and in improving and increasing habitat available to native fish populations in this system.

Sincerely,

Paul Ripple
Director of Biological Services
Bay Mills Indian Community
pripple@baymills.org

NATURAL RESOURCES DEPARTMENT

Sault Ste. Marie Tribe of Chippewa Indians

2428 Shunk Road, Sault Ste. Marie, Michigan, 49783
Phone: 906.632.6132 Fax: 906.635.4955

Chris Freiburger
Sea Lamprey Program Manager
Great Lakes Fishery Commission
2200 Commonwealth Blvd., Suite 100
Ann Arbor, MI 48105-2957

Dear Mr. Freiburger,

I am writing in support of the Sucker River, Alger County, culvert replacement at H-58 road crossing and construction of a new seasonal sea lamprey barrier project. This project will have direct impacts to tribal treaty fishing within the 1836 Treaty Waters. This project will support our native species that travel upstream by removing the existing culvert that is perched while still making sure to prevent sea lamprey migration upstream by installing a seasonal sea lamprey barrier.

The Fisheries Management Program of the Sault Ste. Marie Tribe of Chippewa Indians fully supports these efforts to help native species and control sea lamprey spawning within the 1836 Treaty area.

Respectfully,

Brad Silet
Lead Fisheries Biologist
Fisheries Management Program
Sault Ste. Marie Tribe of Chippewa Indians

[EXTERNAL] Sucker River Bridge Replacement Project

John Highlen <jlhighlen@gmail.com>

Tue 10/24/2023 12:27 PM

To:Hrodey, Peter <pete_hrodey@fws.gov>

Hello Pete,

My name is John Highlen. I am President of both the local Trout Unlimited Chapter (Fred Waara Chapter) and the Alger County Conservation District Board of Directors. I received an invitation for the recent public meeting in Grand Marais about the Sucker River Bridge Replacement Project, but was unable to attend. So, I wanted to reach out to let you know that both organizations that I work with very much support projects like this and we would like to stay in the information loop as this project develops. In addition, if you will eventually need help with some manual labor to bring this project to completion, please let me know. Both organizations have been involved with projects like this in the past and we have ready access to a relatively large group of volunteers if needed.

If you would like to discuss ways we may be able to help, please don't hesitate to contact me.

Have a great week!

John Highlen
jlhighlen@gmail.com
(906)343-6610
President, Fred Waara Chapter
Trout Unlimited
Also
President, Alger Conservation District
Board of Directors

Outlook

[E E L] in support of: sea lamprey arrier - Burt township

From Andy and Elise <andyandelise@yahoo.com>
Date Sun 9/7/2025 9:49 AM
o Hrodey, Peter <pete_hrodey@fws.gov>

Dear Mr. Hrodey,

Thank you for coming to Burt Township to talk about the Sea Lamprey barrier project. My husband, Andrew Smits, and I were not free that evening to attend the public meeting, but we are writing now to express our support for the project as outlined by USFWS. We hope the project will proceed as outlined. It seems like a great next step in sea lamprey control and is an excellent use of public funds. Please keep us informed of progress and let us know if we can be of assistance in the future.

We love seeing the Sea Lamprey trucks working around the area. Thank you for your work with USFWS on behalf of Lake Superior and the native fish populations.

Sincerely,
Elise Cormier
Andrew Smits

Mailing: PO Box 136, Grand Marais MI 49839
Street: N13928 Cemetery Road, Grand Marais MI 49839, Burt Township, Alger County
landline: 906-494-2025

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A.2. Michigan Department of Natural Resources Bat Coordination

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From: Shaw, Heather (DNR)
To: Kovacs, Cory (DNR); DePue, John (DNR)
Cc: Scullon, Bill (DNR)
Subject: RE: Review and Statement for Sucker River, Alger County Project
Date: Thursday, November 9, 2023 3:07:04 PM
Attachments: image002.png
image003.png

Hi Cory!

John and I spoke and share the same collective response. There are no known hibernacula within a significant distance of the project location, and unless roost trees are positively identified on site, tree removal in the proposed location should have no impacts to listed species.

If there is anything else you need from me, please let me know.

Thanks!

Heather Shaw, Wildlife Biologist
Michigan Dept. of Natural Resources
Wildlife Division-Cusino/Shingleton
906.203.0549 call/text
906.452.6227 x230 office
Click *Here* to explore Michigan's exceptional grouse and woodcock hunting!

From: Kovacs, Cory (DNR) <KovacsC@michigan.gov>
Sent: Thursday, November 9, 2023 9:03 AM
To: DePue, John (DNR) <DePueJ1@michigan.gov>; Shaw, Heather (DNR) <ShawH2@michigan.gov>
Subject: RE: Review and Statement for Sucker River, Alger County Project

John,
Thank you so much for the response. I will share with our project team. Heather, if you have anything additional to add please feel free to send it my direction.

If the team has any questions or needs additional information, I will certainly let you know.

Thanks again!

Cory Kovacs
MDNR|Fisheries Biologist
Eastern Lake Superior Management Unit
Cell: 906-287-0816
Office: 906-293-5131 x 4071

From: DePue, John (DNR) <DePueJ1@michigan.gov>
Sent: Wednesday, November 8, 2023 11:18 AM
To: Kovacs, Cory (DNR) <KovacsC@michigan.gov>; Shaw, Heather (DNR) <ShawH2@michigan.gov>
Subject: RE: Review and Statement for Sucker River, Alger County Project

Hi Cory and Heather,

The proposed project location is not within a bat hibernacula buffer or a know roosting tree buffer. Although the consultant identified potential bat roost trees, I assume based on tree characteristics, they did not provide details, the trees can be removed outside of the bat active period May 15-August 31 (so remove trees September 1-May 14), see table in attached document. Unless the tress have ben positively identified as bat roost trees following the tree removal guidance should not impact listed bat species.

Let me know if you need more information from me.

John DePue
Wildlife Biologist
Michigan Department of Natural Resources
Baraga Customer Service Center
427 US-41 North
Baraga, MI 49908
(906) 353-6651

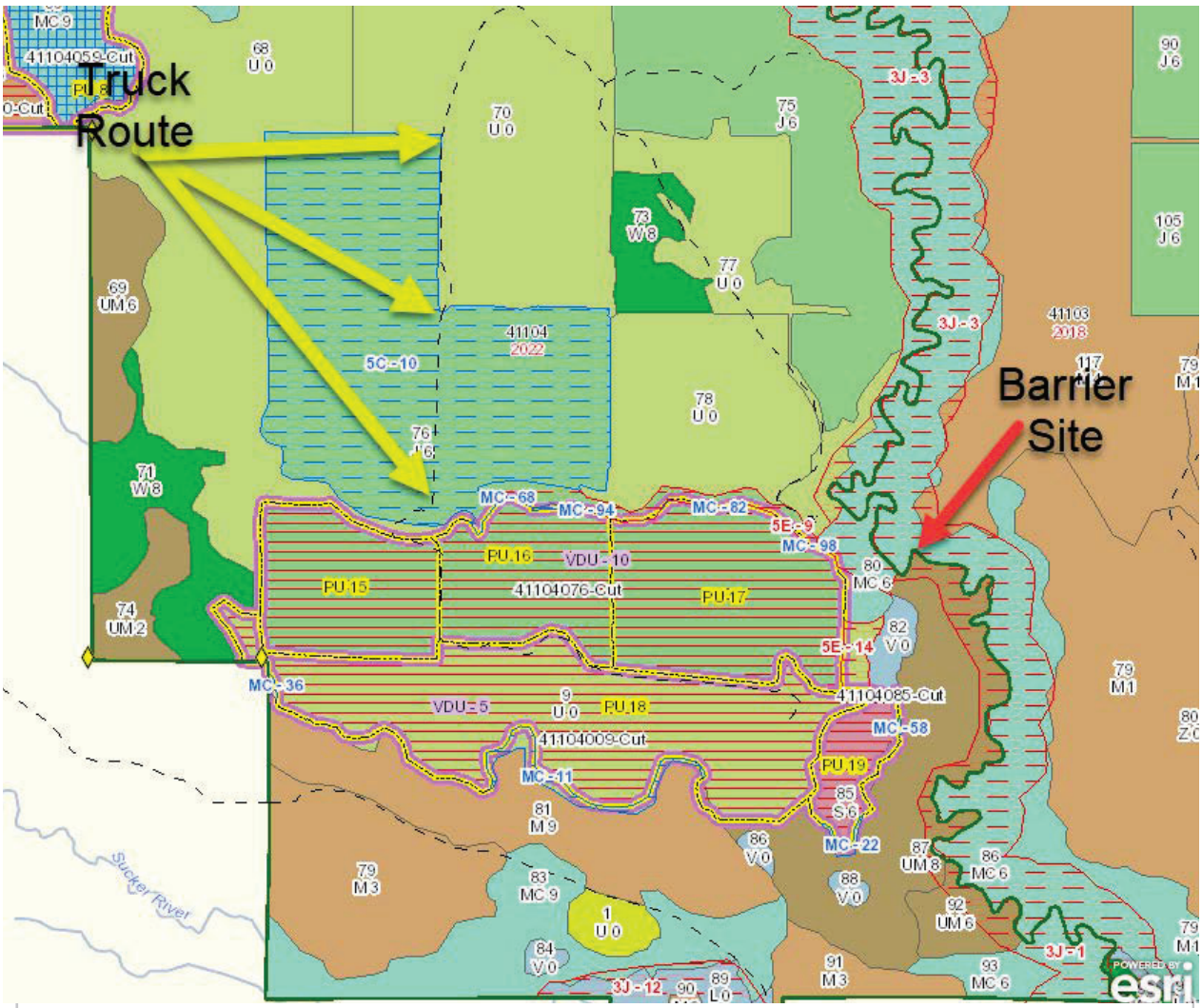
From: Kovacs, Cory (DNR) <KovacsC@michigan.gov>
Sent: Monday, November 6, 2023 3:50 PM
To: Shaw, Heather (DNR) <ShawH2@michigan.gov>; DePue, John (DNR) <DePueJ1@michigan.gov>
Subject: RE: Review and Statement for Sucker River, Alger County Project

It would be great if we could have something this week. Yeah, I know short notice and apologies on that. But we are trying to keep from having the WSP consultants another field day(s).

Burnham did indicate the loggers could use any road from those sales, but most likely the 3 northernmost sales will be trucked out to the north and using the most direct route (see map below). He then indicated any road improvements would be made by them on a "as needed basis". So this could result in the loggers using Whitewash Road too. We have requested from WSP what the exact locations of the potential summer roosting trees might be. They did not indicate this in their report. We hope to hear something from them today or tomorrow on the exact location.

If recommendations from you all could be listed out, that would be very helpful. Limitations? Specs? Timing? Buffers? Anything of the like.

Thanks!



Cory Kovacs
MDNR | Fisheries Biologist
Eastern Lake Superior Management Unit
Cell: 906-287-0816
Office: 906-293-5131 x 4071

From: Shaw, Heather (DNR) <ShawH2@michigan.gov>
Sent: Monday, November 6, 2023 3:38 PM
To: Kovacs, Cory (DNR) <KovacsC@michigan.gov>; DePue, John (DNR) <DePueJ1@michigan.gov>
Subject: RE: Review and Statement for Sucker River, Alger County Project

Hey Cory,
I can start working on this, what is your deadline?

Thanks!

Heather Shaw, Wildlife Biologist
Michigan Dept. of Natural Resources
Wildlife Division-Cusino/Shingleton
906.203.0549 call/text
906.452.6227 x230 office
Click *Here* to explore Michigan's exceptional grouse and woodcock hunting!

From: Kovacs, Cory (DNR) <KovacsC@michigan.gov>
Sent: Friday, November 3, 2023 3:52 PM
To: DePue, John (DNR) <DePueJ1@michigan.gov>
Cc: Shaw, Heather (DNR) <ShawH2@michigan.gov>
Subject: Review and Statement for Sucker River, Alger County Project

John,
Attached is the correspondence (first attachment) starting with Sea Lamprey Control reaching out to the WSP consultants for the EA being conducted on the Sucker River for our Road Stream Crossing and Lamprey barrier project. The biologists for WSP indicated there were 5 potential summer roosting trees for bats around the project area (specifically on the access road). Per our phone call (You and I) our work team is tasked with trying get a review completed for these potential summer roosting trees before the consultants are wrapped up. We are planning to go ahead and include the impacts caused from the access route in the NEPA review, but it would good to have something from our MDNR experts indicating if there is any concerns by improving the access route for construction.

Bob Burnham owes me a phone call, and I will be reaching out to him upon his return Monday (November 6th). I hope to get confirmation about which route the logging contractor is planning to use for the sales sold in Compartment 104. Once that is determined, we will understand more about what we need in terms of a review. Whether that be a tabletop or in the field exercise.

In the interim, could you and Heather please put together a response for the consultant's request for a review of the bat summer roosting trees, bat hibernacula, and any presence of bats in this area? The GPS cords for the proposed barrier location are: 46.597491, -85.887862. This will be helpful for us to respond to their formal request of information for the EA. I did provide a map in the correspondence email of the projected trucking route. However, I do believe the route in question with the roosting trees is the one closest to the west bank of the river.

I greatly appreciate your time and consideration for this request. We had short notice on this because we are trying to get things completed before they walk away for the season and to keep the momentum on the project.

Thank you and please feel free to reach out with any questions.

Cory Kovacs
Fisheries Biologist-Eastern Lake Superior Management Unit
Michigan Department of Natural Resources
Newberry Customer Service Center
5100 State Hwy. M-123
Newberry, MI 49868
Cell: 906-287-0816
Office: 906-293-5131 x 4071

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A.3. National Historic Preservation Act Clearance

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REQUEST FOR MIDWEST RHPO NHPA CLEARANCE

For Undertakings that may have the Potential to Cause Effects on Historic Properties

Project Background:

Project Name: FH 02 Sucker River, Alger County, H-58 road crossing replacement Project Type: Culvert Replacement/Barrier Construction

County: Alger State: Michigan On USFWS land? Yes ☐ No ☒

USFWS Program: Other If Other, please name: Great Lakes Fish and Wildlife Restoration Act

Project Location: Township(s) 49 ☒N ☐S, Range(s) 13 ☐E ☒W, Section(s): 22, 23, 26

Total Project Area Size (in Acres): 40 acres If road/trail, (linear ft, L and W): Approximately 13,200 x 15

USFWS Project Leader: Jessica Barber Station: Marquette Biological Station Phone #: 906 226-1241

If there is a Governmental/NGO partner(s), please name: Michigan DNR, Alger Country Road Commission, Burt Township, Superior Watershed Partnership

Mandatory Attachments (on separate sheets):

1. USGS topographical map and aerial photo, ensuring that the project boundaries are exact.
2. Details of anticipated project activities, i.e. ground/building disturbance (add maps as necessary)
3. Only the relevant sections of design drawings showing soil disturbance boundaries (e.g. planviews)
4. Landuse history and environmental setting of the project area (add maps as necessary)

☒ **Check here if you have done any informal consultation(s) outside the USFWS** (if not, check here ☐)
If so, did you talk with SHPO? Tribes? Did you consult any database with known surveys or sites?
Please attach any information you have regarding your outside informal consultation(s).

☐ **Check here if there has been a field survey done in the project area already** (if not, check here ☒)
If so, who conducted it and when? Did they find any buildings/sites? Please see the next section.
Please attach any information/report(s) you have regarding any previous field survey(s).

☐ **Check here if there are known buildings/sites* in the project area** (if not, check here ☐)
*Sites are such places as artifact scatters, mounds or earthworks, cemeteries, privy pits, old foun ations, ruins, bridges, dams, water control structures, historic roads/trails/fences, and trash pits/piles.

Information needed to be furnished to RHPO if there are known buildings/sites in the project re

1. Age of building(s)/site(s) or date(s) built: _____ RPI # or State #(s) _____
2. **Attach** ground level photographs of both inside and outside of buildings/sites.
3. **Attach** close-up aerial photo or a sketch map illustrating the placement of the buildings/sites in the project area, key the ground photos to the aerial photo/sketch map.
4. **Attach** detailed descriptions of the buildings/sites with emphasis on their size, floor plans and architectural elements. Individually, what kind of physical shape are they in (good, fair or poor)?

Submitted by: Peter Hrodey Date: 8/7/25 Phone #: 906 869-5346

RHPO Only **********

Investigation

☒ No Field Survey Needed
☐ Field Survey Done
- ☐ Phase I (ARPA# _____)
- ☐ Phase II (ARPA# _____)
- ☐ Phase III (ARPA# _____)

**Final Finding by RHPO*

☐ No Potential Effect. ☒ No site/building(s) in APE. No Effect.
☐ Site/Building(s) present, but none are Historic Properties. No Effect.
☐ Historic Property(ies) present, but No Effect/No Adverse Effect.
☐ Historic Property(ies) present, Adverse Effect, Resolved with MOA.

Justify Finding: MI DNR archaeologist conducted a Section 106 review of the access road and WSP conducted a Literature review for the lamprey barrier. Review found no previously recorded or R P listed archaeological or historical resources, or potential sites within the Project Area and one-mile APE.

☐ Stipulations _____

STACI SPERTZEL BLACK — Digitally signed by STACI SPERTZEL BLACK Date: 2025.09.04 13:46:33 -04'00'

USFWS Midwest RHPO | 9/4/2025 (Date) | 2025.MI.FSH.009 (RHPO Project #)

*Although the project has been cleared, inadvertent discoveries are still possible. If so, please stop immediately and contact the RHPO.

REQUEST FOR MIDWEST SHPO/RHPO CLEARANCE

Construction of a seasonal sea lamprey barrier in the Sucker River on MIDNR State Land near Grand Marais, MI

<u>Mandatory Attachment (1)</u>: USGS topographic map and aerial photo, ensuring that project boundaries are exact.

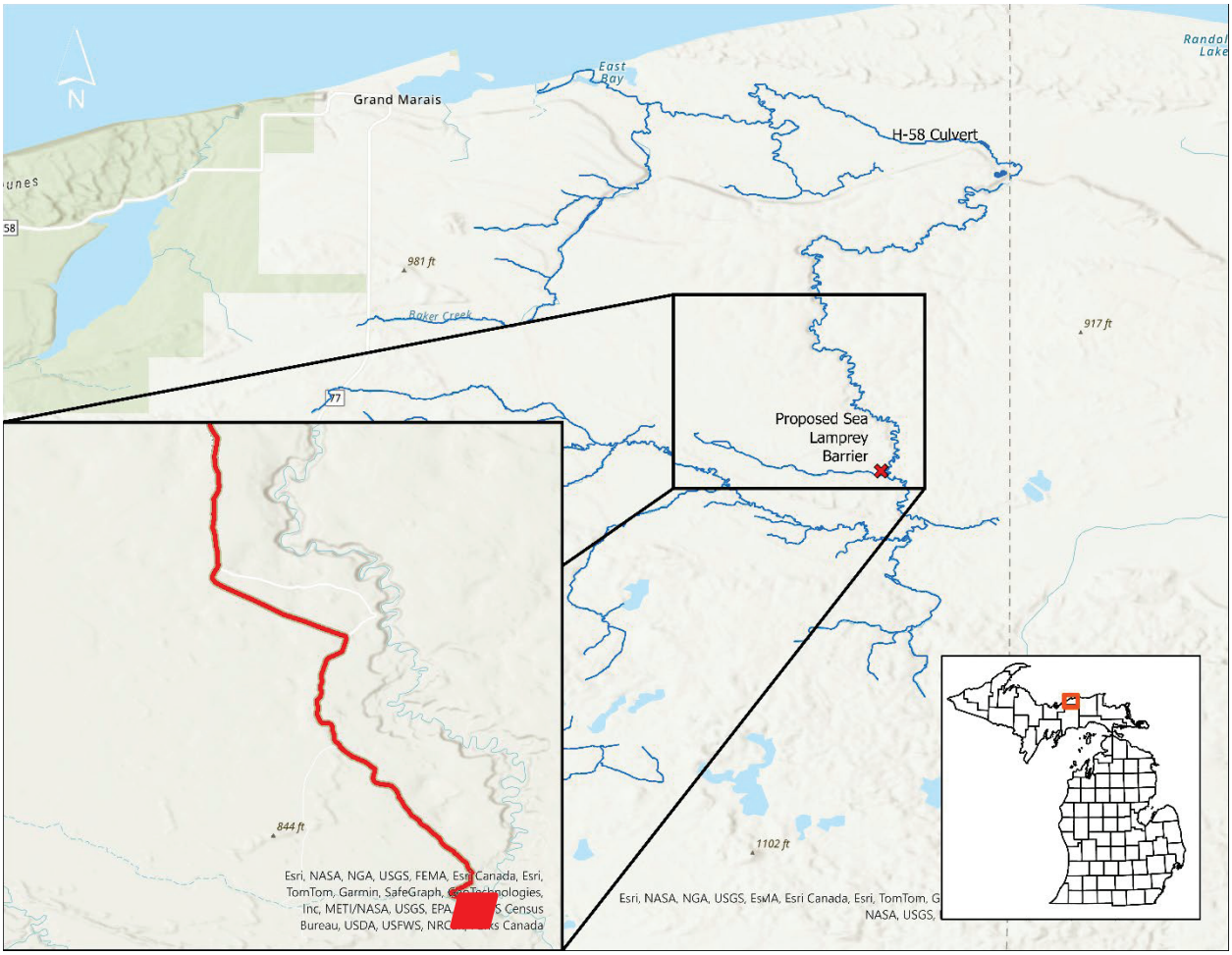

Figure 1. Topographic map of the 2.5-mile section of Whitewash Road and proposed seasonal sea lamprey barrier. The red line and polygon depict the proposed area of disturbance for the project.

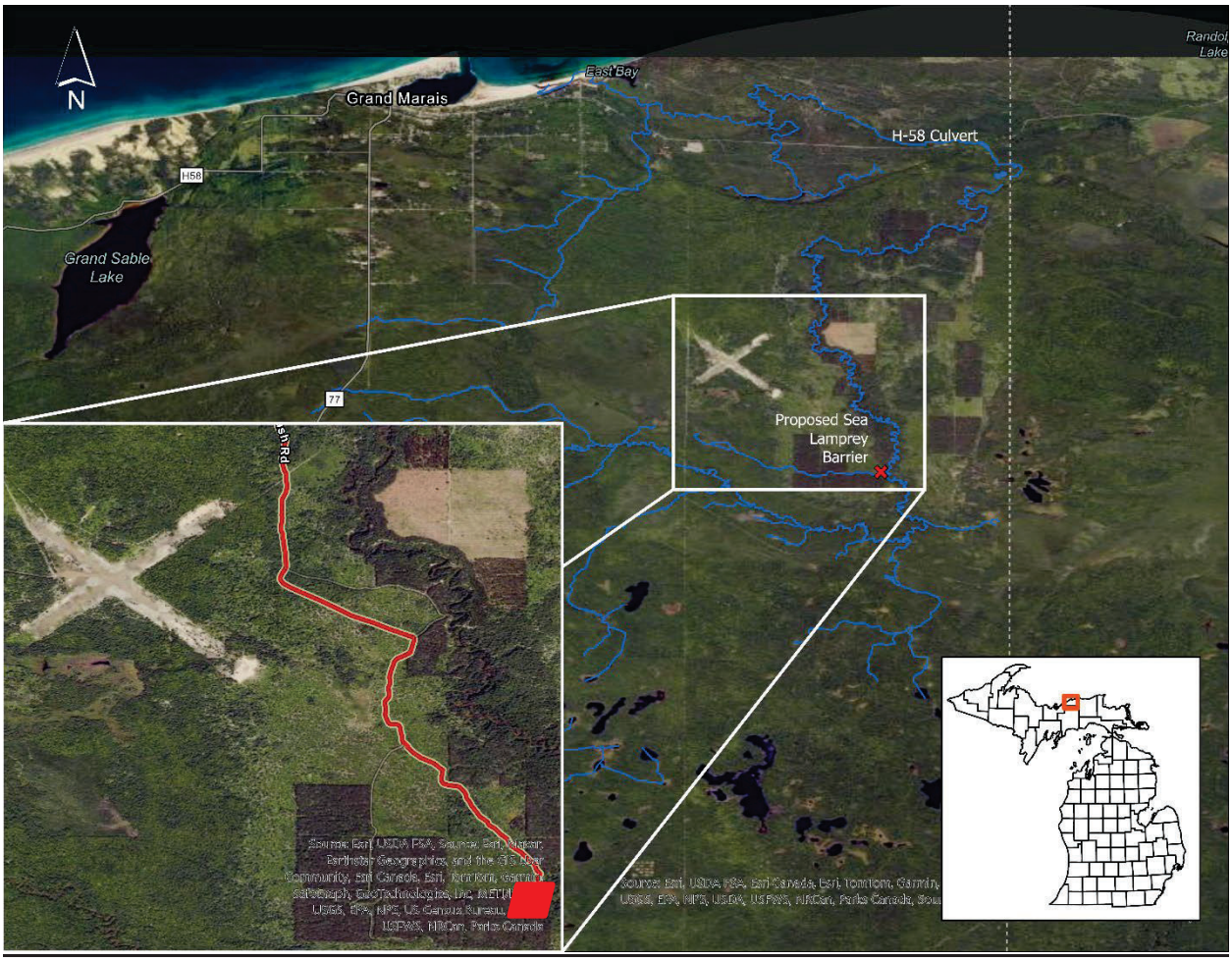

Figure 2. Aerial photograph of the 2.5-mile section of Whitewash Road and proposed seasonal sea lamprey barrier. The red line and polygon depict the proposed area of disturbance for the project.

<u>Mandatory Attachment (2)</u>: Details of anticipated project activities, i.e. ground building disturbance (add maps if necessary).

We are proposing to construct a seasonal sea lamprey barrier near the end of Whitewash Road (Figures 1 and 2). In fall of 2024, we completed imrpovements to Whitewash Road. We are including this again as part of the project as there may be some additional work needed to ensure proper access for cement trucsk, cranes, etc., but we consider this minimal to the overall project as the majority of the work has been completed (Figure 3).

Construction of the seasonal sea lamprey barrier will involve signficant temporary and permanent disturbance to the riparian and in-water habitat of the Sucker River near the end of Whitewash Road (Figure 4). The barrier itselft will be constructed of concrete and sheetpile and will require temporary water diversions and significant ground disturbance (see Mandatory Attachment 3 and attached plans)..

Figure 3. A typical section of Whitewash Road post-widening, fall 2024.


Figure 4. The proposed location of the seasonal sea lamprey barrier on the Sucker River.

Mandatory Attachment (3): Only relevant sections of design drawings showing soil disturbance (e.g. plan views).

Whitewash road access route maintenance/improvement

As was stated previously, during fall of 2024, a 2.5-mile section of Whitewash Road was widened and improved from ~8' to 15' to allow for clearance of construction equipment (Figure 5). We are including this part of the project again as there may be some additional widening, straightening, or augmentation of certain sections to allow for equipment access to the site. Any additional work would be conducted next spring/summer 2026 using a bulldozer or road grader to widen the road by pushing back trees/shrubs as necessary. The crew will feather the edges of the widened section to minimize erosion. We will also consult with MIDNR Wildlife Division and USFWS Ecological Services staff to avoid bat roost trees along the route and will follow any additional guidance they provide. We will apply for an MI DNR land use permit for improving an existing road and will be approved before any other work begins.

Sea lamprey barrier construction

Construction of the seasonal sea lamprey barrier will involve significant temporary and permanent soil disturbance (Figure 6). The main sources of disturbance will be excavation for creating concrete footers as well as driving sheet pile through the streambed and into both riparian areas. This work is expected to take place during summer/fall of 2026. An EA for the project as well as other State (ELGE) permits are in the process of being applied for at this time.

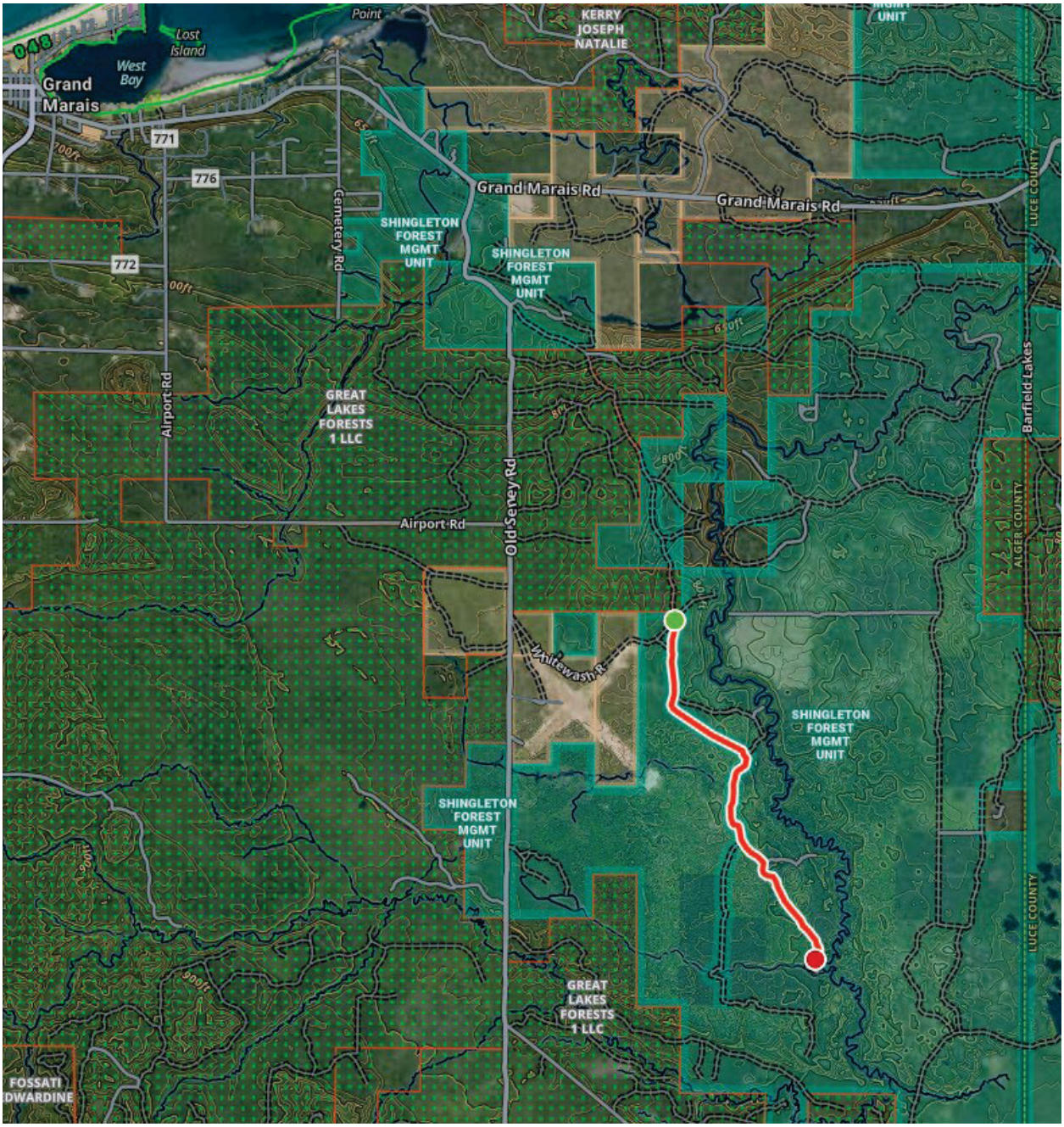

Figure 5. Map of Whitewash Road access route maintenance/improvement area. The red line depicts the proposed area of disturbance for the project

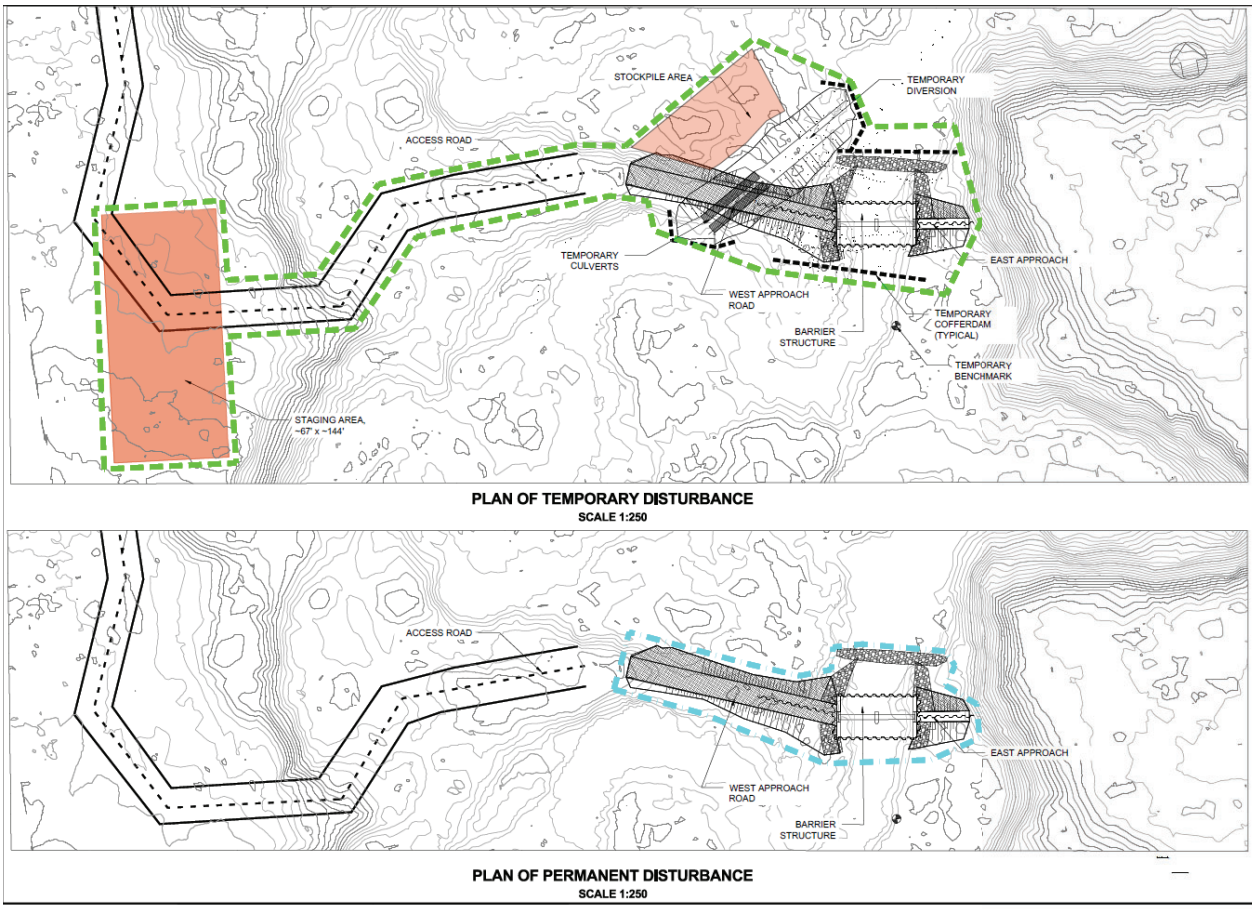

Figure 6. Sea lamprey barrier location/drawings including areas of temporary and permanent disturbance.

Mandatory Attachment (4): Land use history and environmental setting of the project area (add maps as necessary).

The area southeast of Grand Marais, MI is of mixed use recreational and timber lands managed by the MIDNR Forestry Division and Private landowners. Whitewash road is seasonal, part of a snowmobile network and is an important access point to the Shingleton Forest Management Unit, a highly utilized recreational area in the Upper Peninsula. In addition to recreational use, this area does experience wildfires and the nearby airport is used by planes associated with those efforts. This forest is also actively managed by MI DNR Forestry Division and is currently under a compartment review which is scheduled to be bid out for harvest during the next 1-2 years. The road work we have already completed will likely be used by Foresters during their harvest and has been reviewed for State SHPO concerns already (see attached email thread). The riparian area, while part of the compartment review, will not be cut as it is within a forested buffer set up by MIDNR Fisheries Divion. Both the road and the riparian area do not contain any historical sites based on our initial reviews (see attached supporting documentation).

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A.4. EGLE Existing Peak Flows for Sucker River

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Gmail

Keith Anderson <keith@beaverriverconsulting.com>

RE: Flood or Low Flow Discharge Request

EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov> Thu, Nov 10, 2022 at 9:25 AM
To: "keith@beaverriverconsulting.com" <keith@beaverriverconsulting.com>

We have processed the discharge request submitted by email on October 14, 2022 (Process No. 20220645), as follows:

Sucker River 2000 feet upstream of north section line, Section 26, T49N, R13W, Burt Township, Alger County, has a total drainage area of 58.8 square miles and a contributing drainage area of 48.8 square miles. The 50%, 20%, 10%, 4%, 2%, 1%, 0.5%, and 0.2% chance peak flows are estimated to be 180 cubic feet per second (cfs), 230 cfs, 260 cfs, 300 cfs, 330 cfs, 360 cfs, 380 cfs, and 420 cfs, respectively. (Watershed Basin No. 39L Au Train (Lake)).

Please include a copy of this letter with your inspection report or any subsequent application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please contact Ms. Susan Greiner, Hydrologic Studies and Floodplain Management Unit, at 517-927-3838, or by email at: GreinerS@michigan.gov. If you have any questions concerning the hydraulics or the requirements for the dam safety inspection report, please contact Mr. Michael Size of our Dam Safety Unit at 989-619-4295, or by email at: SizeM@michigan.gov. Any questions concerning the hydraulics or the proper procedure for filing for a permit should be directed to Ms. Linda Hansen, Water Resources Division, Upper Peninsula District Office, at 906-250-3169 or email to HansenL6@michigan.gov.

Low flows are provided in a separate email.

-----Original Message-----
From: EGLE-Automated <EGLE-Automated@michigan.gov>
Sent: Friday, October 14, 2022 9:23 AM
To: EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>
Subject: Flood or Low Flow Discharge Request

Requestor: Keith Anderson
Company: Beaver River Consulting
Address: 5752 Eagle View Drive
City/State: Duluth, MN
ZIP Code: 55803
Phone: 2186267450

Date: 10/14/2022
50 percent
20 percent
10 percent
4 percent
2 percent
1 percent
0.2 percent
0.5 percent
Monthly Mean
Contact Agency: Fisheries (DNR)
Contact Person:
Watercourse: Sucker River
Local Name:
County: Alger
City/Township: Burt Township
Section: 26
Town: 49N
Range: 13W
Location: Just East of Whitewash Road where the stream is incised in its valley.
FFR1: Dam
Email: keith@beaverriverconsulting.com

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APPENDIX B – SUCKER RIVER BARRIER DESIGN DRAWINGS

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SUCKER RIVER BARRIER

SUCKER RIVER

GREAT LAKES FISHERY COMMISION &

U.S. FISH & WILDLIFE SERVICE

LIST OF DRAWINGS

GENERAL

D01 - LIMIT OF POTENTIAL TEMPORARY AND PERMANENT DISTURBANCE

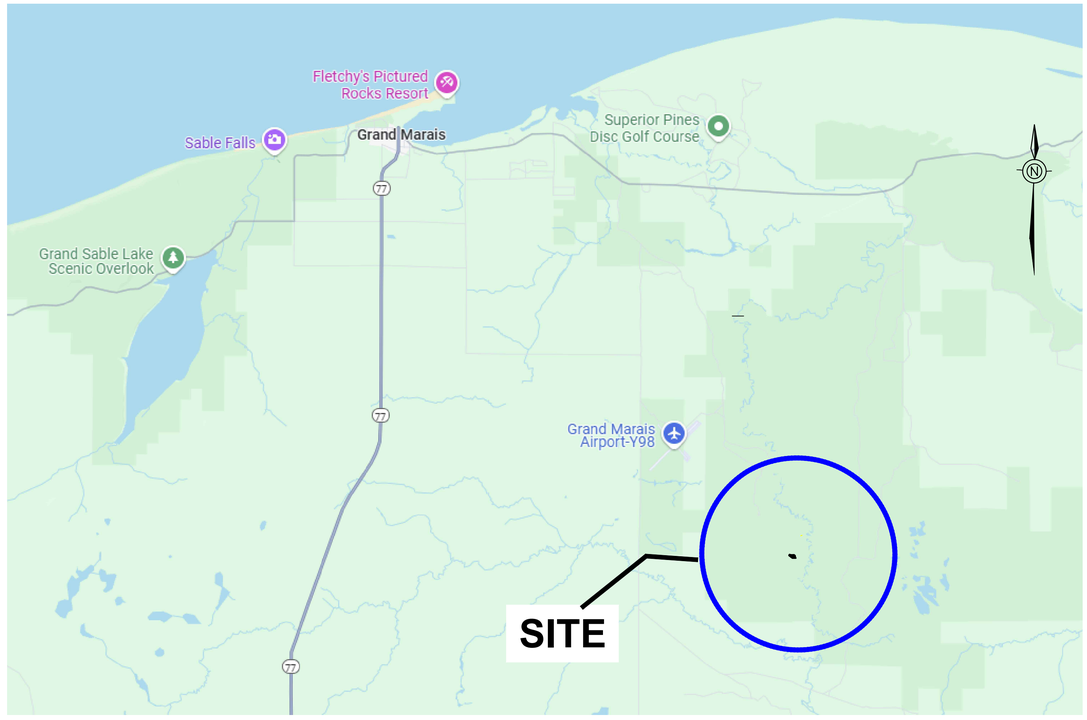
C01 - GENERAL PLAN OF TEMPORARY AND PERMANENT WORKS
C02 - BARRIER SITE PLAN
C03 - SITE PLAN SECTIONS

STAGING

X01 - STAGING PLAN AND CENTRE LINE SECTION
X02 - STAGING SECTIONS
X03 - CONSTRUCTION STAGE 1
X04 - CONSTRUCTION STAGE 2
X05 - CONSTRUCTION STAGE 3
X06 - CONSTRUCTION STAGE 4

STRUCTURAL

S01 - GENERAL ARRANGEMENT
S02 - BARRIER DIMENSIONS
S03 - FOUNDATIONS
S04 - PIERS AND ABUTMENTS
S05 - CATWALK
S06 - CHAIN LINK FENCE
S07 - GATES



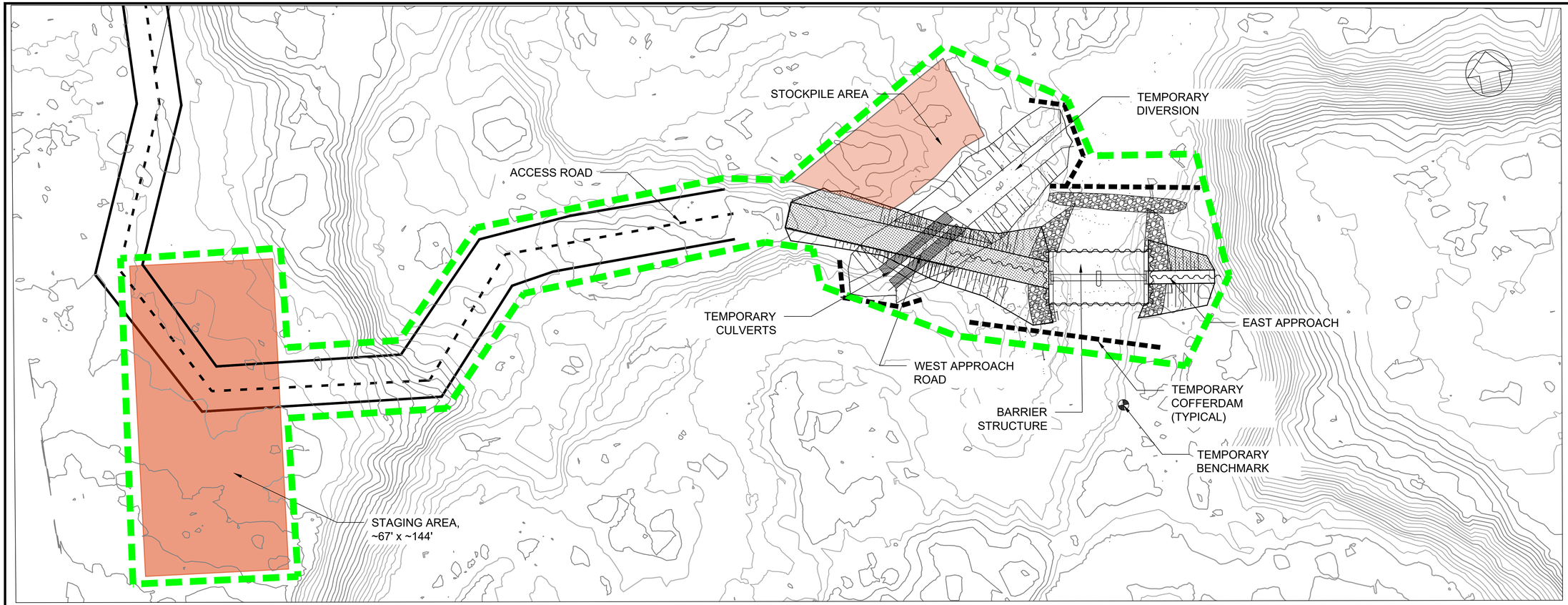
KEY PLAN
NOT TO SCALE

SE, SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

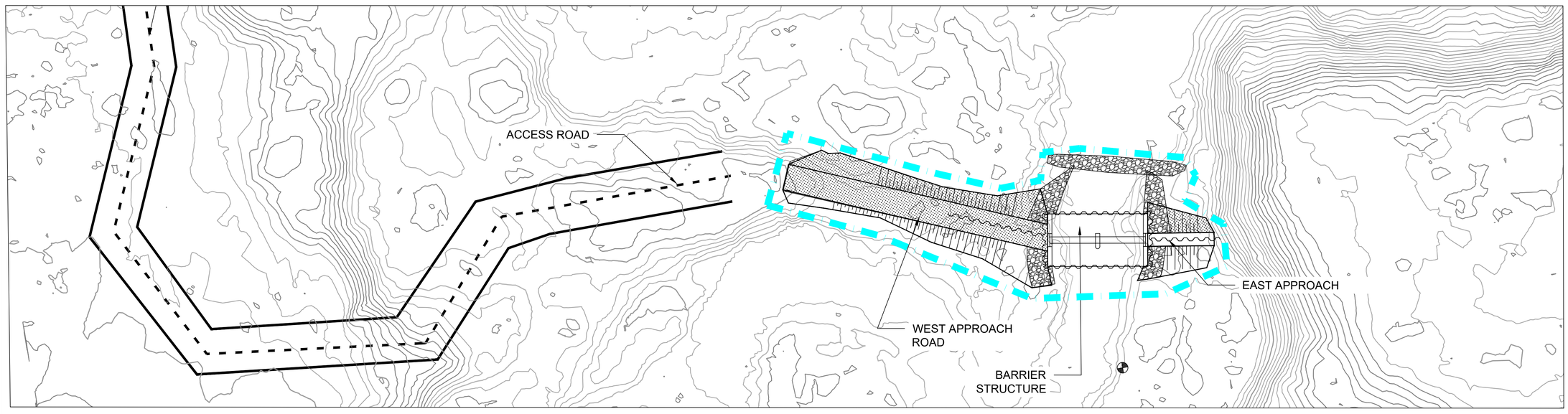
JULY 2025
FOR REVIEW

G. W. RESTORATION



PLAN OF TEMPORARY DISTURBANCE

SCALE 1:250



PLAN OF PERMANENT DISTURBANCE

SCALE 1:250

NOTES:

ALL ELEVATIONS ARE IN FEET AND ARE GEODETIC UNLESS OTHERWISE NOTED.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

LIMIT OF TEMPORARY DISTURBANCE

LIMIT OF PERMANENT DISTURBANCE

SITE BENCH MARK

BENCH MARK No. 1
TOP OF EXISTING CULVERT INLET
EASTING 26526149.235 ft (N046° 35' 56.47")
NORTHING 664046.366 ft (W085° 53' 17.21")

ELEVATION = 767.338 ft.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

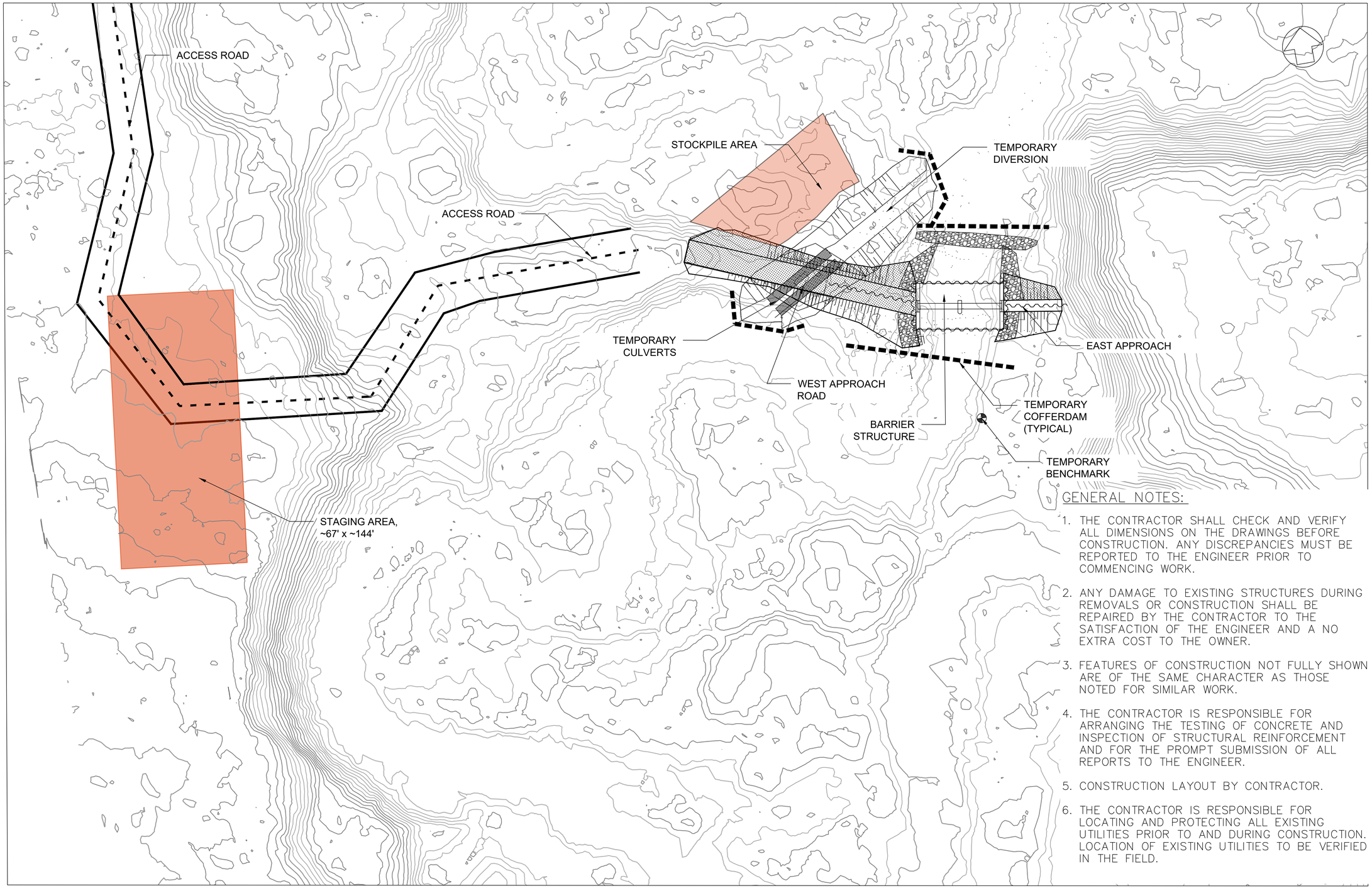
LIMITS OF POTENTIAL TEMPORARY AND PERMANENT DISTURBANCES

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS

DATE: MARCH 2025

SCALE: AS SHOWN

DWG No. **D01**



GENERAL NOTES:

1. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS ON THE DRAWINGS BEFORE CONSTRUCTION. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER PRIOR TO COMMENCING WORK.
2. ANY DAMAGE TO EXISTING STRUCTURES DURING REMOVALS OR CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER AND A NO EXTRA COST TO THE OWNER.
3. FEATURES OF CONSTRUCTION NOT FULLY SHOWN ARE OF THE SAME CHARACTER AS THOSE NOTED FOR SIMILAR WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR ARRANGING THE TESTING OF CONCRETE AND INSPECTION OF STRUCTURAL REINFORCEMENT AND FOR THE PROMPT SUBMISSION OF ALL REPORTS TO THE ENGINEER.
5. CONSTRUCTION LAYOUT BY CONTRACTOR.
6. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION. LOCATION OF EXISTING UTILITIES TO BE VERIFIED IN THE FIELD.

PLAN
SCALE 1:250

NOTES:

ALL ELEVATIONS ARE IN FEET AND ARE GEODETIC UNLESS OTHERWISE NOTED.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

SITE BENCH MARK

BENCH MARK No. 1
TOP OF EXISTING CULVERT INLET

EASTING 26526149.235 ft (N046° 35' 56.47")
NORTHING 664046.366 ft (W085° 53' 17.21")

ELEVATION = 767.338 ft.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SE, SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

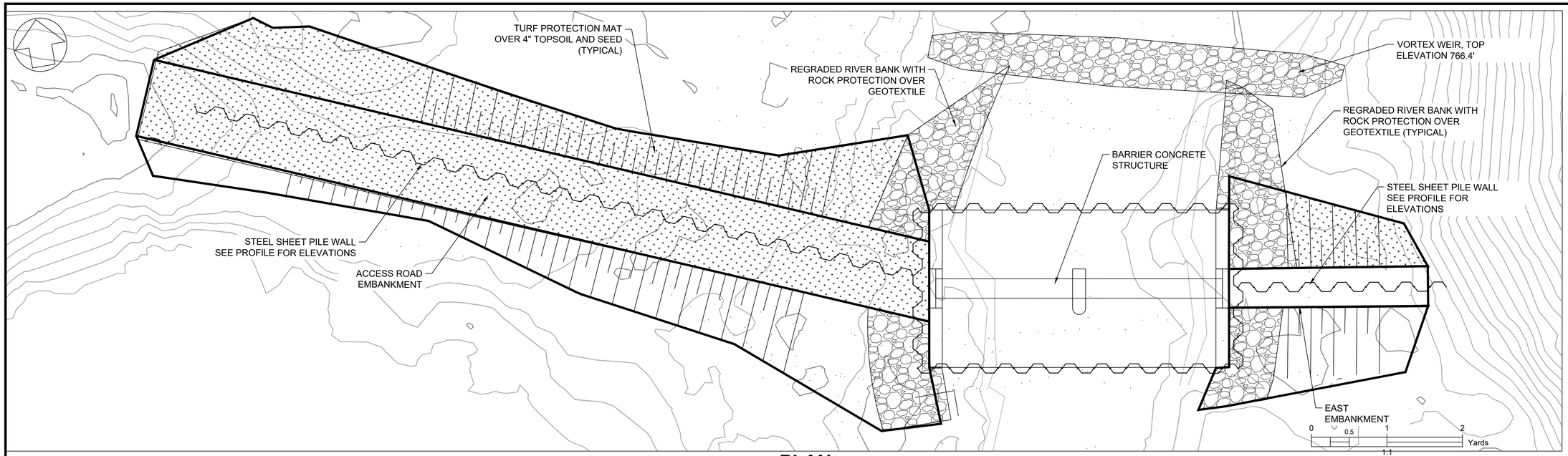
G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

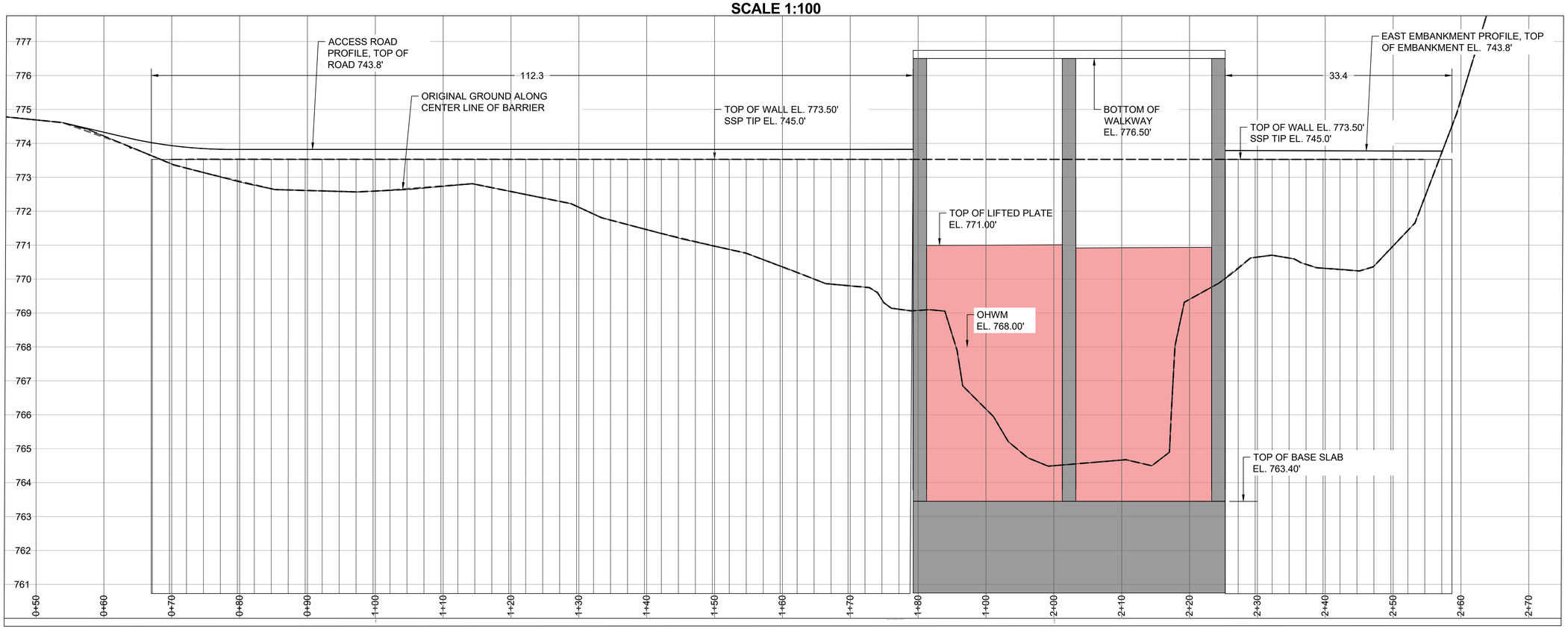
DWG. TITLE **GENERAL PLAN OF TEMPORARY AND PERMANENT WORKS**

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS
DATE: MARCH 2025		
SCALE: AS SHOWN	DWG No.	**C01**



PLAN

SCALE 1:100



PROFILE

SCALES: HOR 1:100; VERT 1:20

NOTES:

ALL ELEVATIONS ARE IN FEET AND ARE GEODETIC UNLESS OTHERWISE NOTED.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

ORDINARY HIGH WATER MARK ELEVATION AT BARRIER SECTION 768.0'

BANKFULL DIMENSIONS:

WIDTH AT TOP OF BANK = 32.3'
BANKFULL DEPTH = 5.5'

BANKFULL AREA = 127 SQ.FT.

SITE BENCH MARK

BENCH MARK No. 1

TOP OF EXISTING CULVERT INLET
EASTING 26526149.235 ft (N046° 35' 56.47")
NORTHING 664046.366 ft (W085° 53' 17.21")

ELEVATION = 767.338 ft.

FOR REVIEW

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

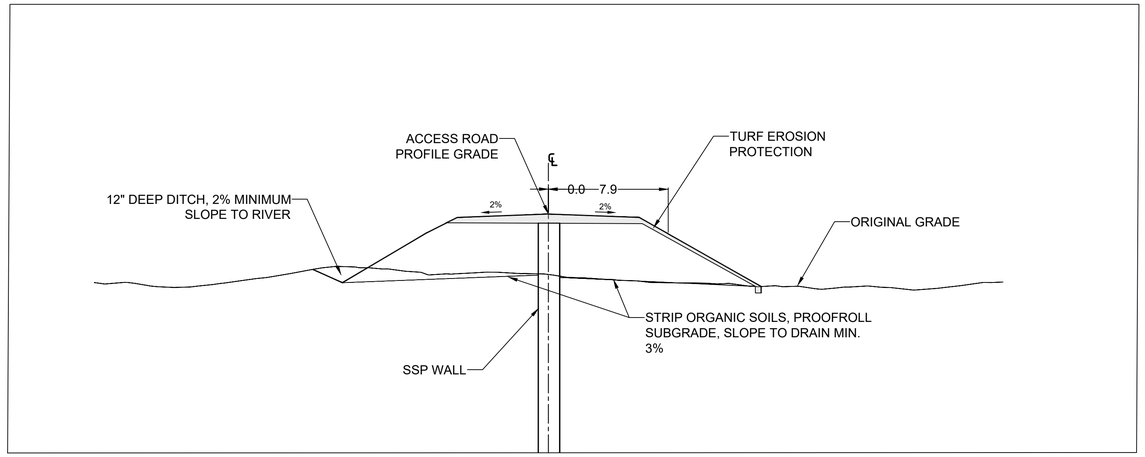
GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

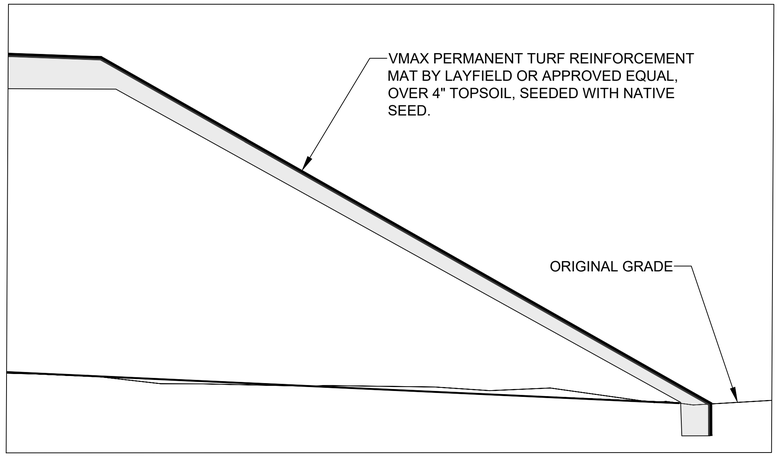
BARRIER SITE PLAN

PROJECT NO:	SN0478	DRAWN BY:	PBR
		DESIGNED BY:	LS
		CHECKED BY:	LS
DATE:	MARCH 2025		
SCALE:	AS SHOWN	DWG No.	C02



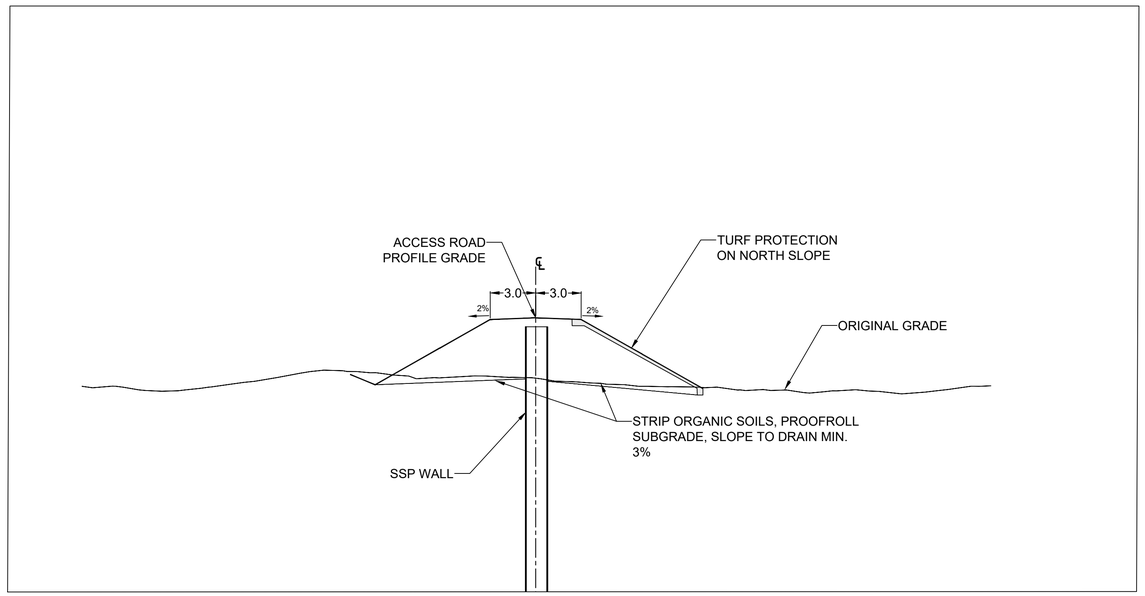
TYPICAL ACCESS ROAD EMBANKMENT SECTION

SCALE 1:50



DETAIL OF TURF EROSION PROTECTION

NOT TO SCALE



TYPICAL EAST EMBANKMENT SECTION

SCALE 1:50

NOTES:

ALL ELEVATIONS ARE IN FEET AND ARE GEODETIC UNLESS OTHERWISE NOTED.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

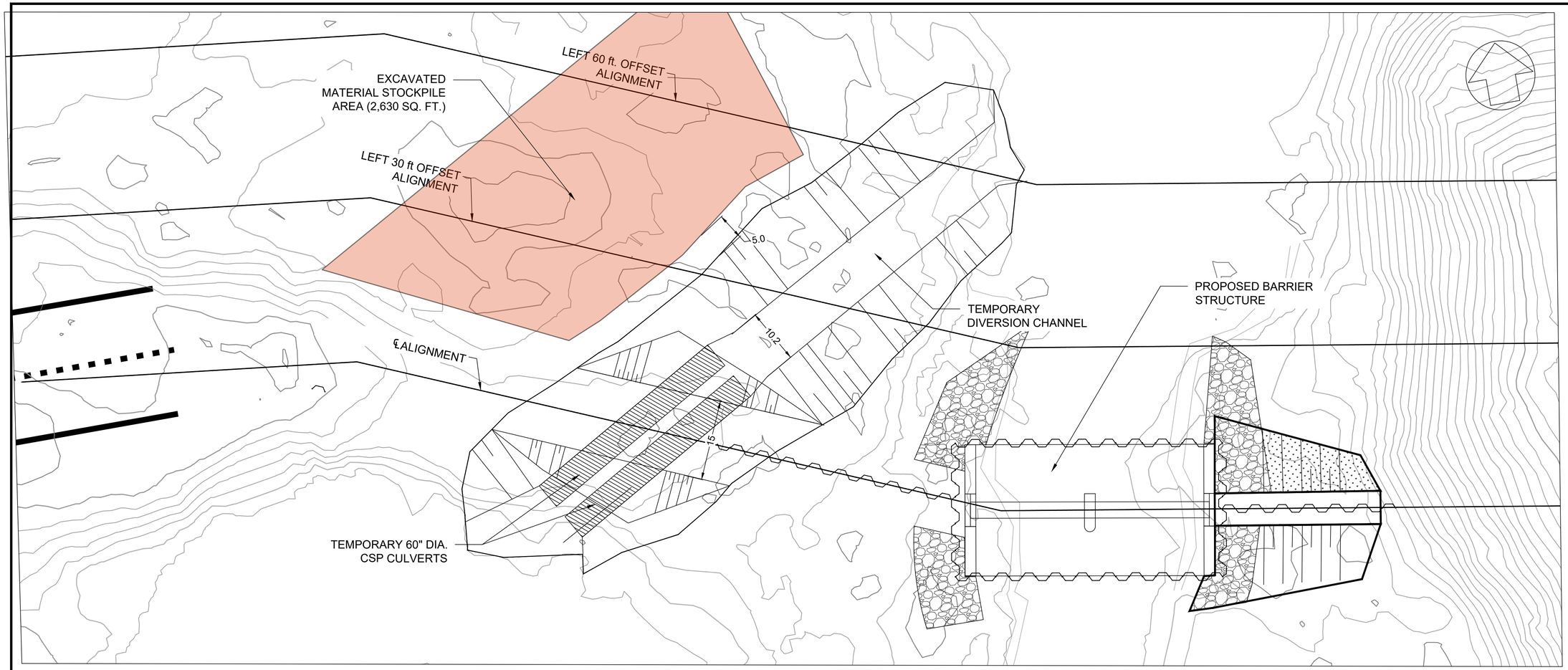
SITE PLAN SECTIONS

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS

DATE: MARCH 2025

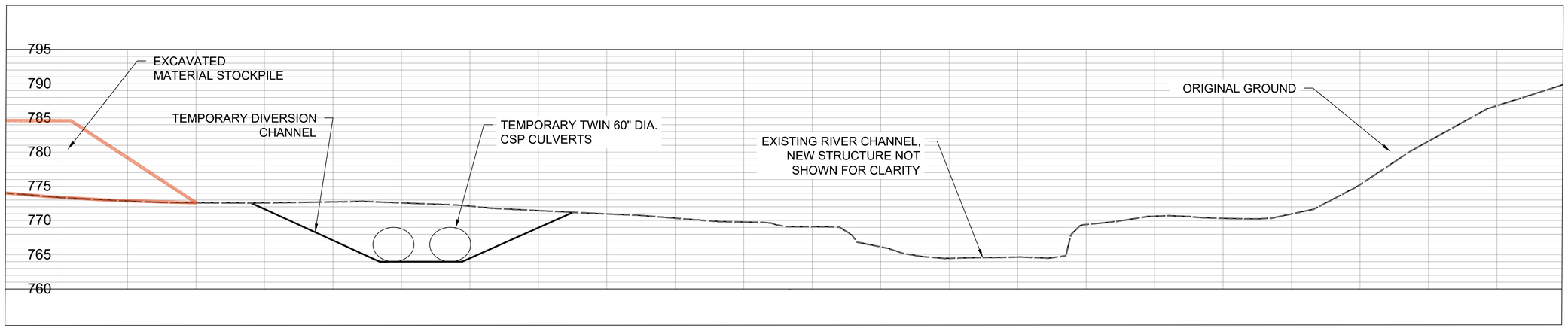
SCALE: AS SHOWN

DWG No. **C03**



PLAN SHOWING LOCATION OF SECTIONS

SCALE 1:100



PROFILE ALONG CENTER LINE

SCALE 1:100

NOTES:

ALL ELEVATIONS ARE IN FEET AND ARE GEODETIC UNLESS OTHERWISE NOTED.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SE, SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

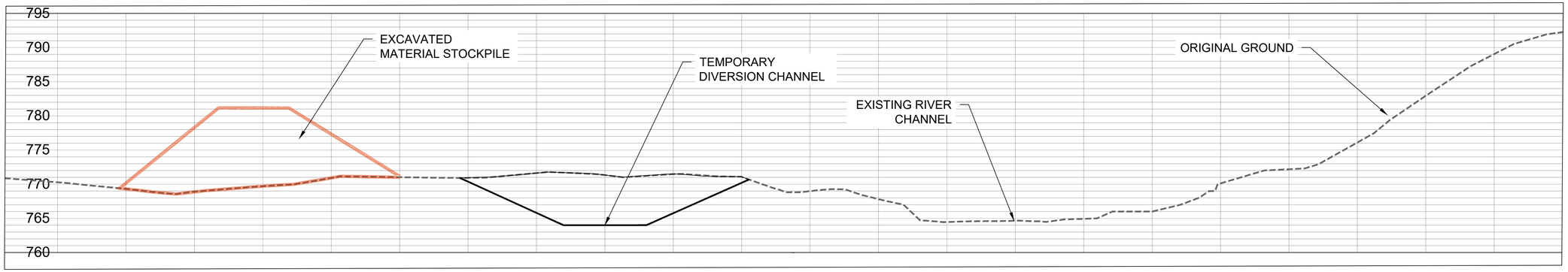
GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

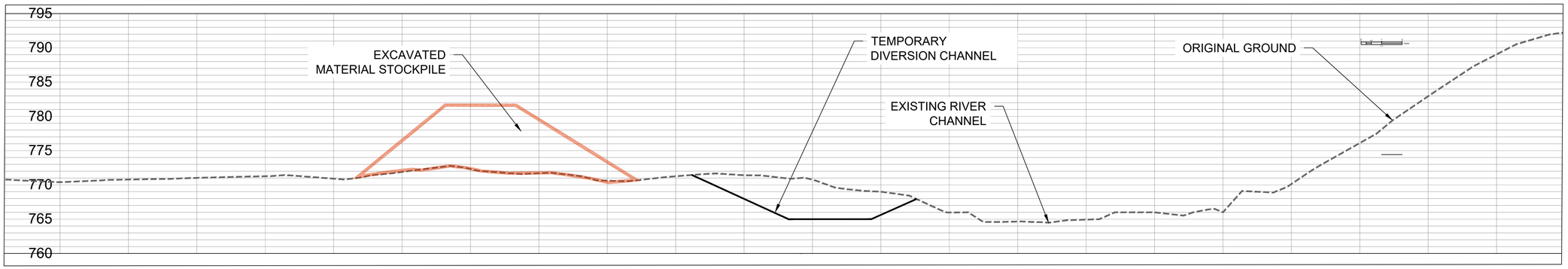
STAGING PLAN AND CENTER LINE SECTION

PROJECT NO:	SN0478	DRAWN BY:	PBR
		DESIGNED BY:	LS
		CHECKED BY:	LS
DATE:	MARCH 2025		
SCALE:	AS SHOWN	DWG No.	**X01**



PROFILE AT LEFT 30' OFFSET

SCALE 1:100

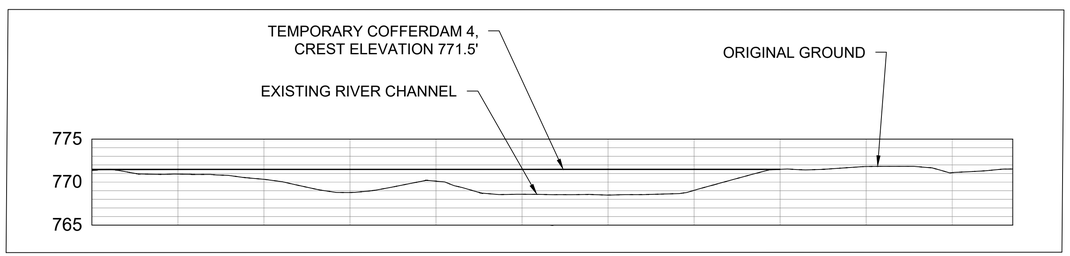


PROFILE AT LEFT 60' OFFSET

SCALE 1:100

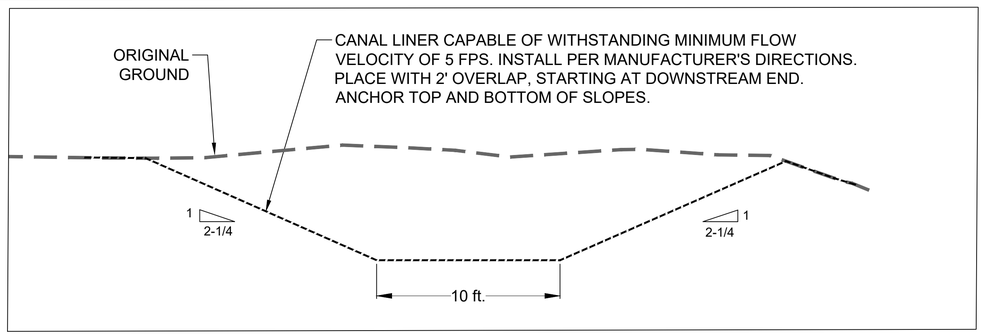
PROFILE OF TEMPORARY COFFERDAM 3

SCALE 1:100



PROFILE OF TEMPORARY COFFERDAM 4

SCALE 1:100



TEMPORARY DIVERSION

NOT TO SCALE

NOTES:

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ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

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GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

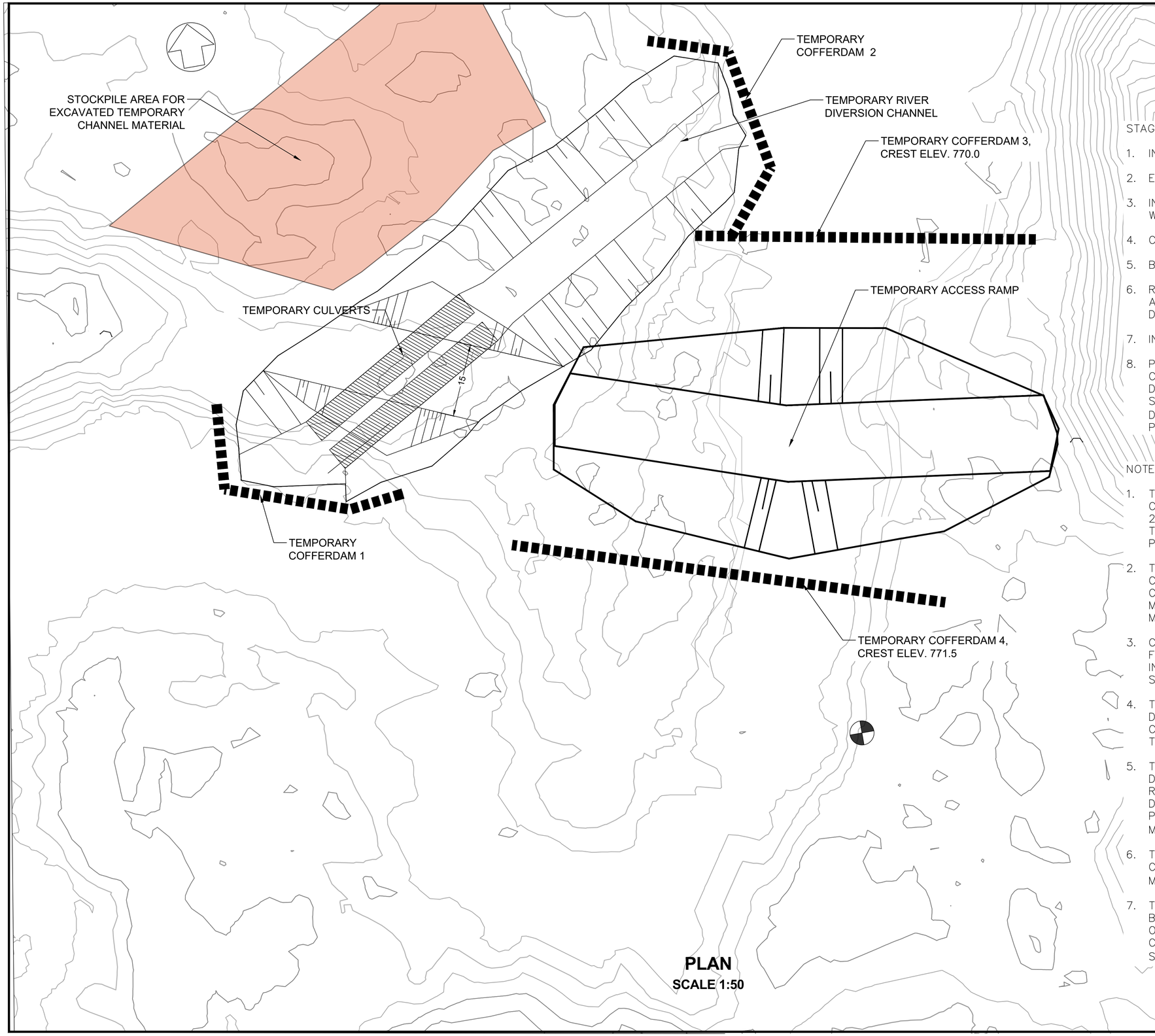
STAGING SECTIONS

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS

DATE: MARCH 2025

SCALE: AS SHOWN

DWG No. **X02**



PLAN
SCALE 1:50

STAGE 1

1. INSTALL TEMPORARY COFFERDAMS 1 AND 2
2. EXCAVATE CHANNEL.
3. INSTALL CHANNEL STABILIZATION AND WATERPROOFING MEASURES.
4. CONSTRUCT TEMPORARY CULVERTS
5. BACKFILL ACCESS ROAD
6. REMOVE TEMPORARY COFFERDAMS 1 AND 2, ALLOW RIVER FLOW INTO TEMPORARY DIVERSION.
7. INSTALL TEMPORARY COFFERDAMS 3 AND 4.
8. PLACE TEMPORARY ACCESS RAMP ACROSS CHANNEL FOR ACCESS AND FOR PILE DRIVING PLATFORM. NOTE THAT THE FILL SHOWN IS SCHEMATIC AND CAN VARY DEPENDING ON THE CONTRACTOR'S PROCEDURES AND DETAILED STAGING.

NOTES

1. THE ELEVATIONS OF THE TEMPORARY COFFERDAMS 3 AND 4 ARE BASED ON THE 25-YEAR FLOOD WATER LEVELS WITH THE TEMPORARY DIVERSION AND CULVERTS IN PLACE.
2. THE CONTRACTOR SHALL DETERMINE THE CREST ELEVATIONS OF ALL TEMPORARY COFFERDAMS, INCLUDING THOSE WITH A MARKED CREST ELEVATION, AS REQUIRED TO MEET THEIR OWN RISK CRITERIA.
3. CONTRACTOR SHALL DESIGN THE COFFERDAM FOR ALL EXPECTED LOADS AND CONDITIONS, INCLUDING HYDROSTATIC PRESSURES, SEEPAGE, SCOUR, DEAD AND LIVE LOADS.
4. THE CONTRACTOR SHALL DESIGN THE DEWATERING SYSTEM REQUIRED TO COMPLETE THE WORK WHILE WORKING IN THE DRY.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESIGN CRITERIA FOR REVIEW. THE DESIGN AND THE SHOP DRAWINGS SHALL BE PREPARED BY A PROFESSIONAL ENGINEER, LICENSED IN MICHIGAN (MI P.E.).
6. THE CONTRACTOR CAN SELECT THE CULVERT MATERIALS AND DIAMETERS. THE MINIMUM DIAMETER IS 60".
7. THE CONTRACTOR CAN USE A TEMPORARY BRIDGE PROVIDED BY THE OWNER, INSTEAD OF THE CULVERTS. IN THAT CASE, THE CONTRACTOR SHALL DESIGN THE BRIDGE SUPPORTS (BY MI P.E.).

NOTES:

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ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SE, SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

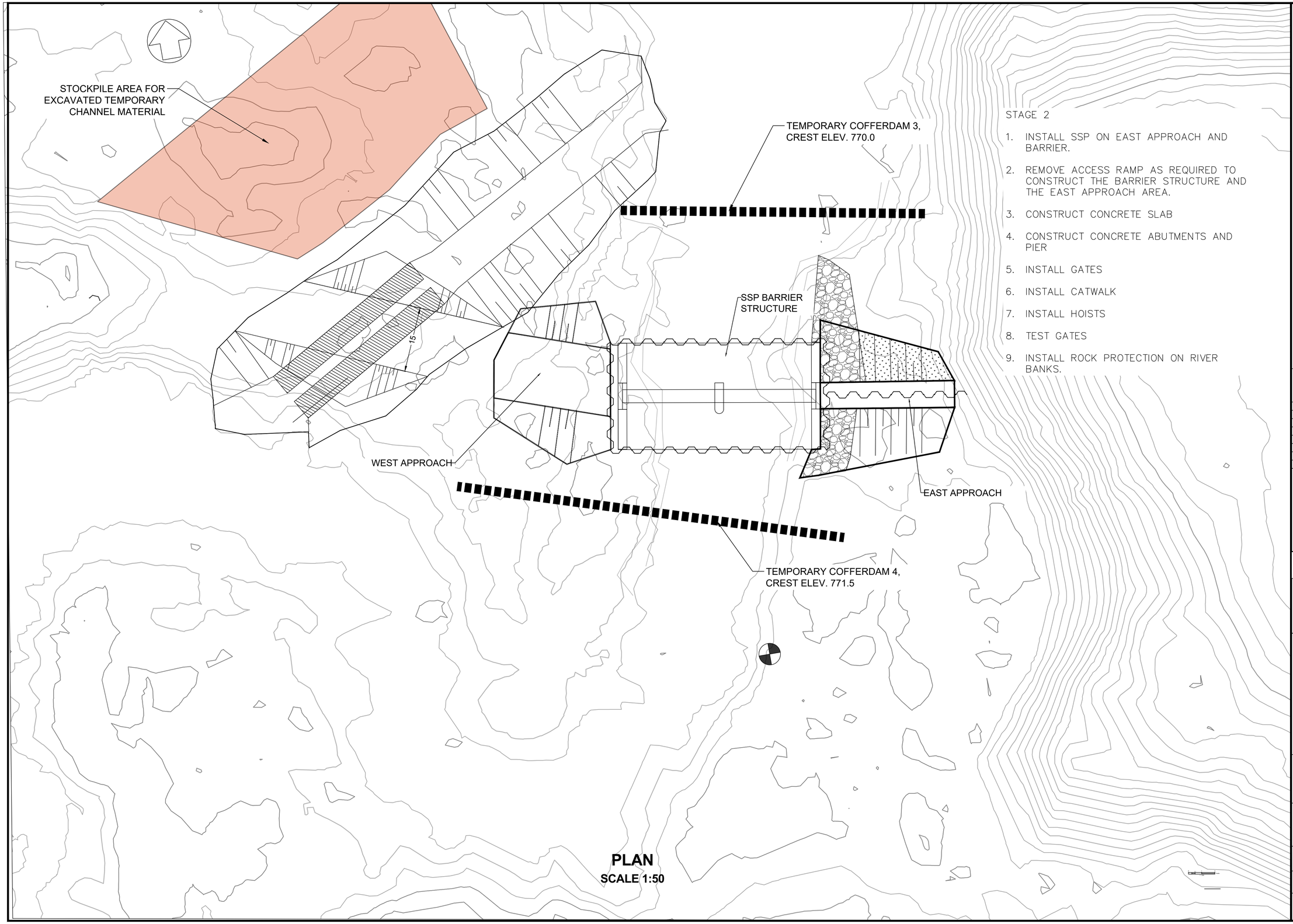
CONSTRUCTION STAGE 1

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS

DATE: MARCH 2025

SCALE: AS SHOWN

DWG No. **X03**



PLAN
SCALE 1:50

STAGE 2

1. INSTALL SSP ON EAST APPROACH AND BARRIER.
2. REMOVE ACCESS RAMP AS REQUIRED TO CONSTRUCT THE BARRIER STRUCTURE AND THE EAST APPROACH AREA.
3. CONSTRUCT CONCRETE SLAB
4. CONSTRUCT CONCRETE ABUTMENTS AND PIER
5. INSTALL GATES
6. INSTALL CATWALK
7. INSTALL HOISTS
8. TEST GATES
9. INSTALL ROCK PROTECTION ON RIVER BANKS.

NOTES:

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ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

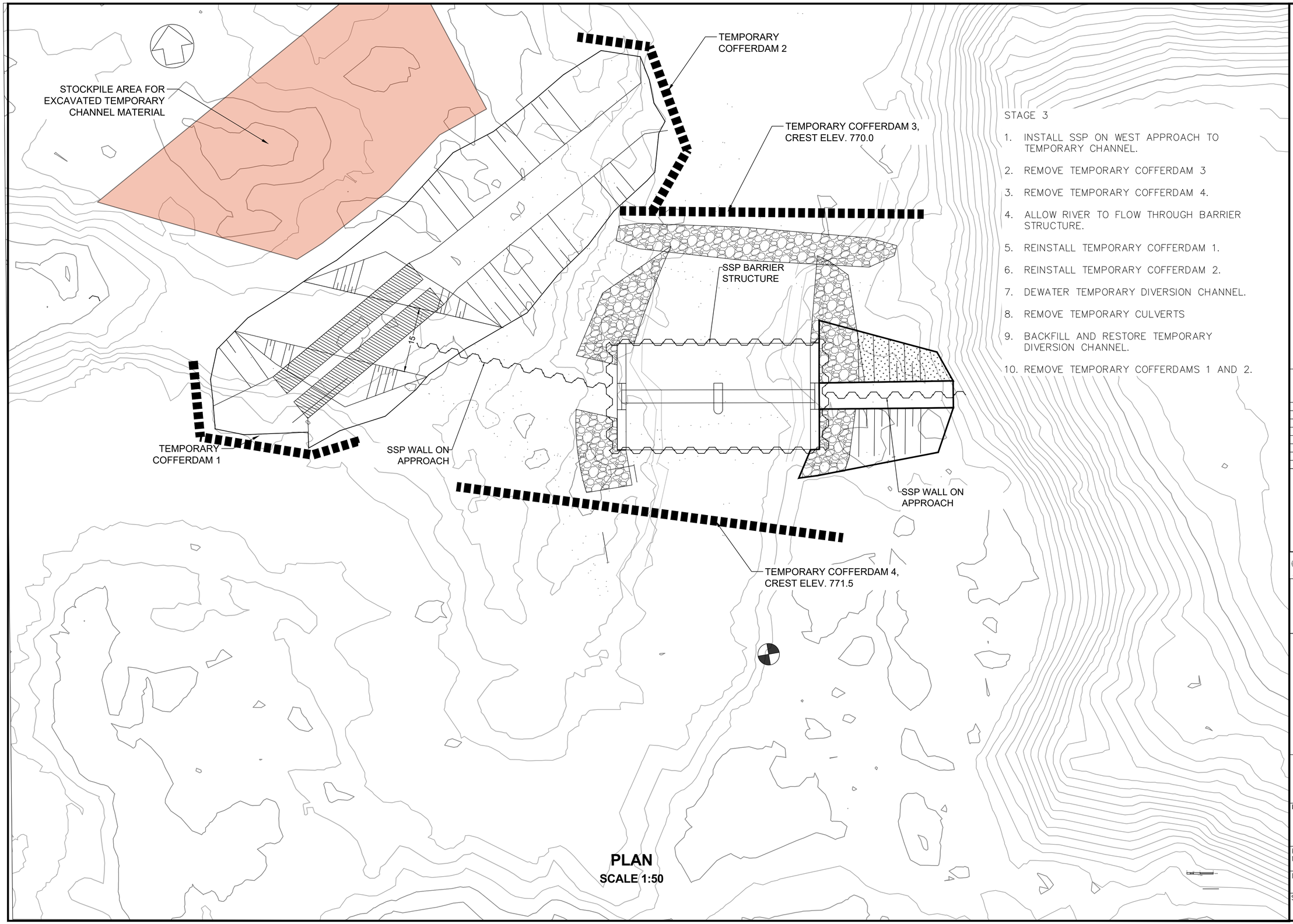
GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

CONSTRUCTION STAGE 2

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS
DATE: MARCH 2025		
SCALE: AS SHOWN	DWG No.	**X04**



PLAN
SCALE 1:50

STAGE 3

1. INSTALL SSP ON WEST APPROACH TO TEMPORARY CHANNEL.
2. REMOVE TEMPORARY COFFERDAM 3
3. REMOVE TEMPORARY COFFERDAM 4.
4. ALLOW RIVER TO FLOW THROUGH BARRIER STRUCTURE.
5. REINSTALL TEMPORARY COFFERDAM 1.
6. REINSTALL TEMPORARY COFFERDAM 2.
7. DEWATER TEMPORARY DIVERSION CHANNEL.
8. REMOVE TEMPORARY CULVERTS
9. BACKFILL AND RESTORE TEMPORARY DIVERSION CHANNEL.
10. REMOVE TEMPORARY COFFERDAMS 1 AND 2.

NOTES:

ALL ELEVATIONS ARE IN FEET AND ARE GEODETIC UNLESS OTHERWISE NOTED.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

1	REVISED DIVERSION CHANNEL	JULY 2025

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

CONSTRUCTION STAGE 3

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS
DATE: MARCH 2025		
SCALE: AS SHOWN	DWG No.	**X05**

STAGE 4

1. FINISH INSTALLING SSP ON WEST APPROACH.
2. PLACE EARTH FILL ON BOTH SIDES OF WEST APPROACH.
3. INSTALL EROSION PROTECTION ON WEST APPROACH AND SLOPES AND ON EAST APPROACH SLOPE.
4. RESTORE SITE.

SSP BARRIER STRUCTURE

WEST APPROACH

EAST APPROACH

PLAN
SCALE 1:50

NOTES:

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ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.

FOR REVIEW

REVISIONS		

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

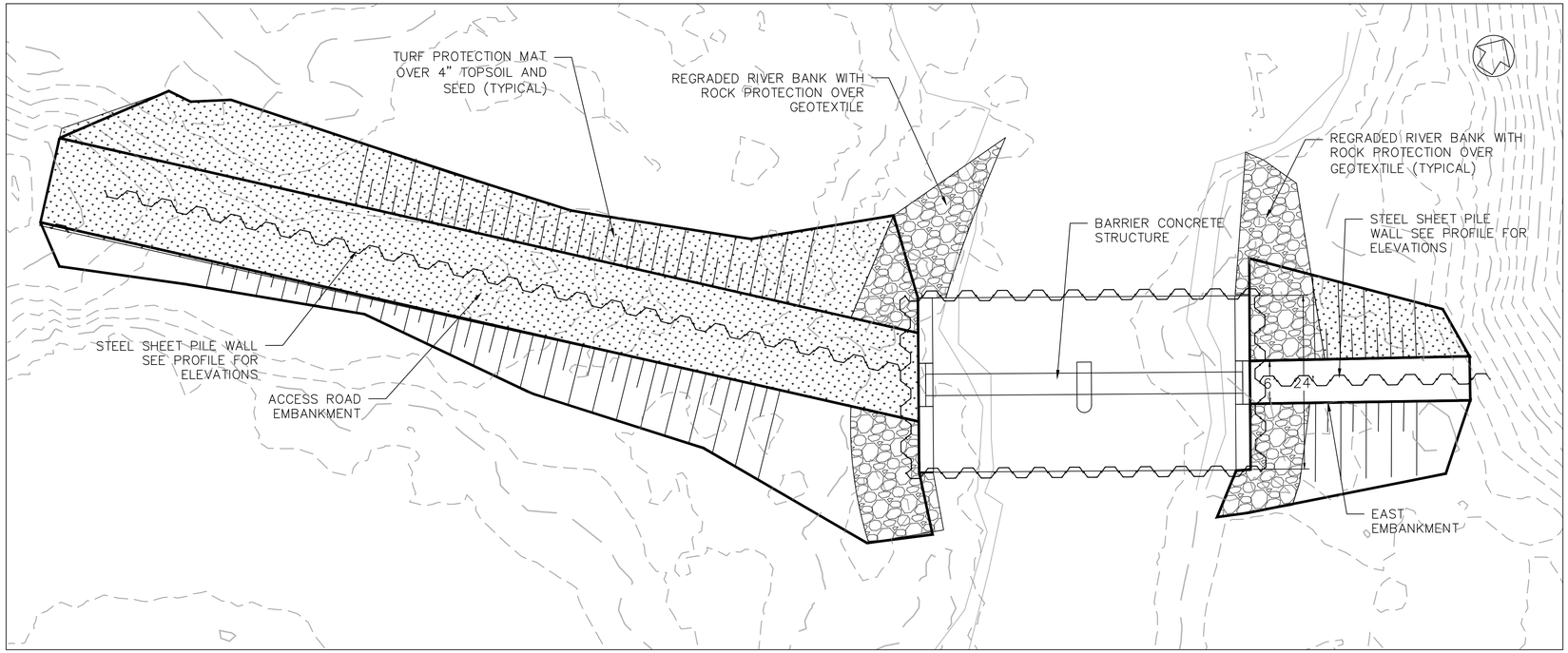
GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE

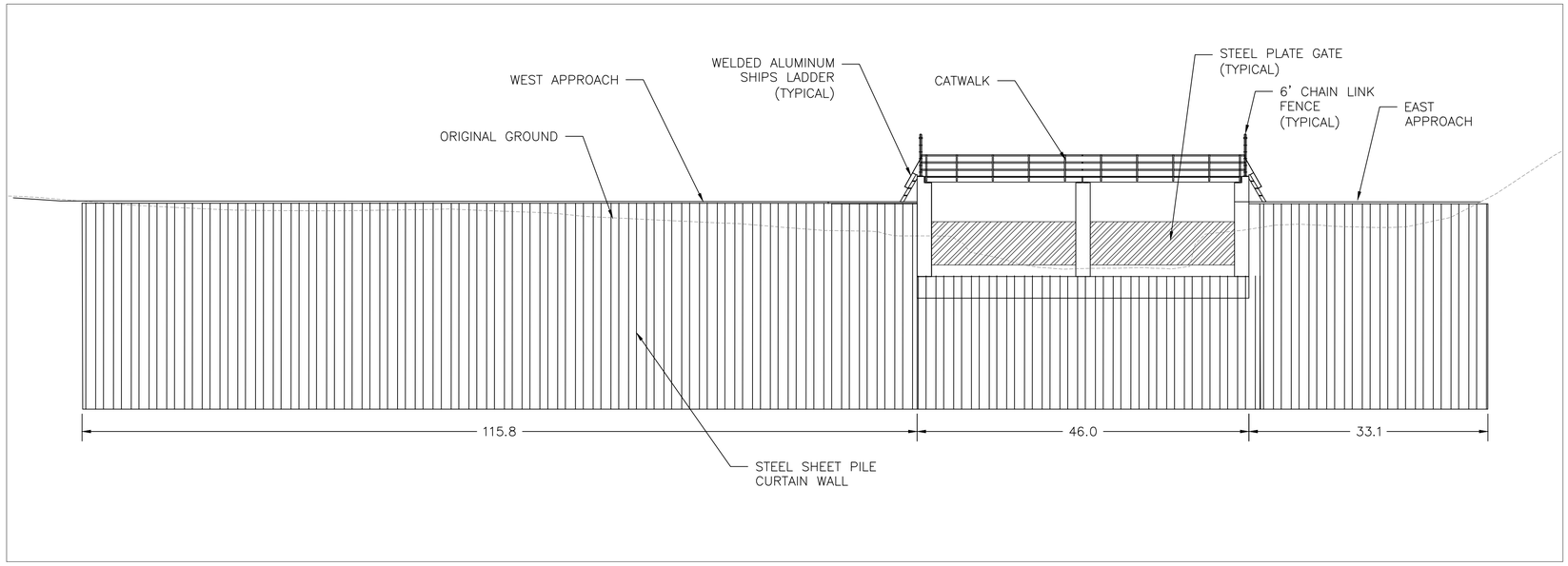
CONSTRUCTION STAGE 4

PROJECT NO: SN0478	DRAWN BY:	PBR
	DESIGNED BY:	LS
	CHECKED BY:	LS
DATE: MARCH 2025		
SCALE: AS SHOWN	DWG No.	**X06**



PLAN

SCALE 1" = 120'



SOUTH ELEVATION

SCALE 1" = 120'

NOTES

CAST IN PLACE CONCRETE

1. CAST IN PLACE CONCRETE TO CONFORM TO ACI 318–25 AND THE FOLLOWING:
   - •DESIGN MIXES SHALL BE SUBMITTED FOR REVIEW.
   - •CONCRETE SHALL BE EXPOSURE CLASSES F3 S3 W2 C1.
   - •CONCRETE STRENGTH – f'c = 5000 psi
   - •AIR CONTENT – 5% TO 8%
   - •WATER/CEMENT RATIO – PER F3 REQUIREMENTS
2. CLEAR COVER TO REINFORCING: 2–3/4" ± 3/4"
3. ALL EXPOSED EDGES AND CONSTRUCTION JOINTS TO BE CHAMFERED 1" UNLESS OTHERWISE NOTED.
4. CURE CONCRETE TO THE REQUIREMENTS OF ACI 318 AND ACI 308R.
5. REINFORCING STEEL SHALL BE CARBON STEEL, CONFORMING TO ASTM A615, GRADE 60.

STRUCTURAL STEEL

1. STEEL SHEET PILE SHALL BE NEW, AS SUPPLIED BY NUCOR SKYLINE, OR APPROVED EQUAL. ASTM A328 STEEL SHEET PILING.
2. SHAPES SHALL BE AS NOTED ON DRAWINGS
3. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 OR ASTM 572, GRADE 50.
   WELDING ELECTRODES : ASTM A5.5
   FASTENERS: ASTM A449
   ANCHOR BOLTS: ASTM A572, GRADE 50.
4. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AISC A360–22W. SUBMIT SHOP DRAWINGS FOR ENGINEER'S REVIEW PRIOR TO FABRICATION.
5. CALCULATIONS FOR CONNECTIONS AND SHOP DETAILS, BEARING THE STAMP OF A REGISTERED PROFESSIONAL ENGINEER, TO BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION AS REQUIRED.
6. SPLICES IN PILES ALLOWED SUBJECT TO APPROVAL BY THE ENGINEER. WELDS IN SUCH SPLICES & MOMENT CONNECTIONS TO BE X–RAYED OR ULTRASONICALLY TESTED BY AN INDEPENDENT TESTING COMPANY.
7. CONTRACTOR SHALL PROVIDE ALL BENT CORNER SECTIONS AND CUSTOM FABRICATED SECTIONS AS REQUIRED TO COMPLETE THE SHEET PILE WALLS AS A CONTINUOUS INTERLOCKED SYSTEM.
8. THE CONTRACTOR MAY MAKE MINOR ADJUSTMENTS TO WALL LAYOUT TO ACCOMMODATE PILE SHAPE, INTERLOCKS, BENDS, ETC. ALL PROPOSED ADJUSTMENTS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

FOR REVIEW

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

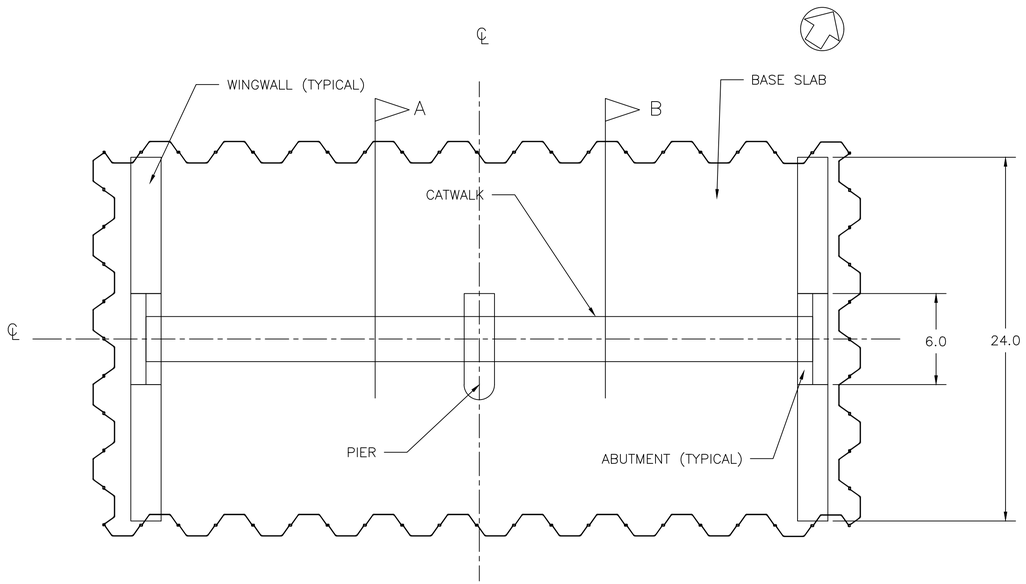
DWG. TITLE
GENERAL ARRANGEMENT

PROJECT NO:		
SN0478	DRAWN BY:	L.S.C.
	DESIGNED BY:	L.S.
	CHECKED BY:	L.S.

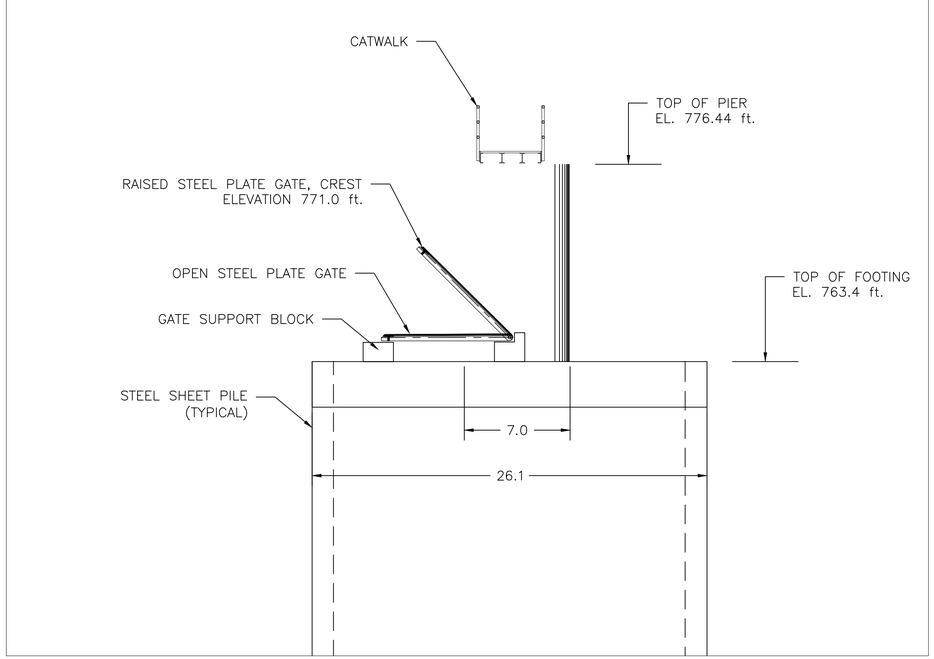
DATE: MARCH 2025

SCALE: AS NOTED

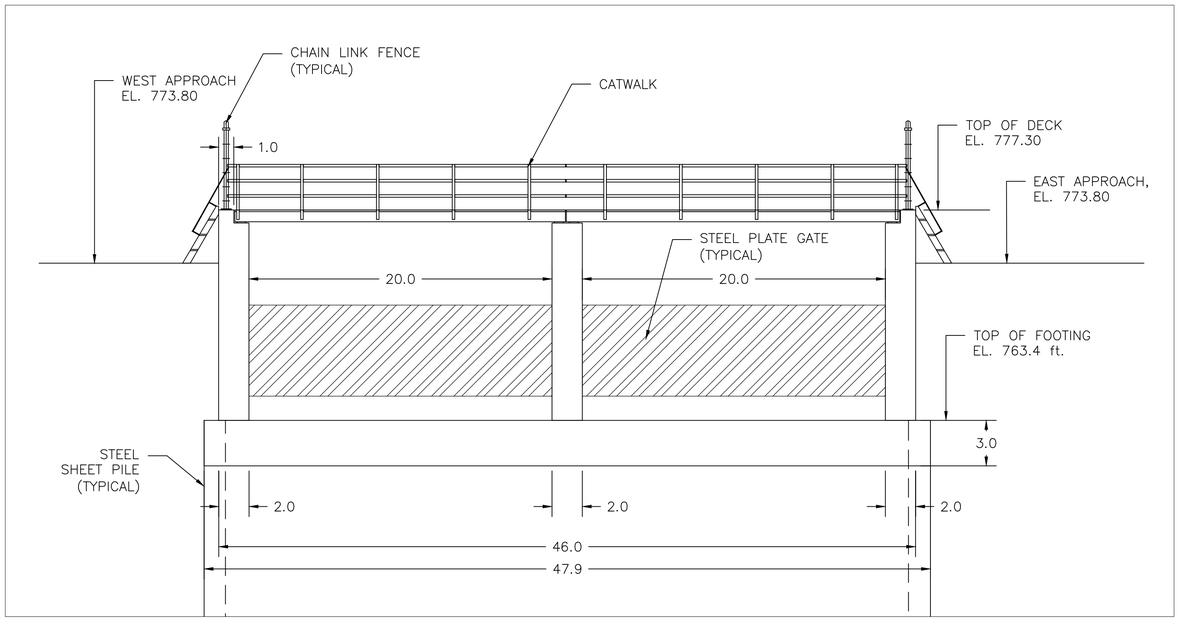
DWG. NO.: **S01**



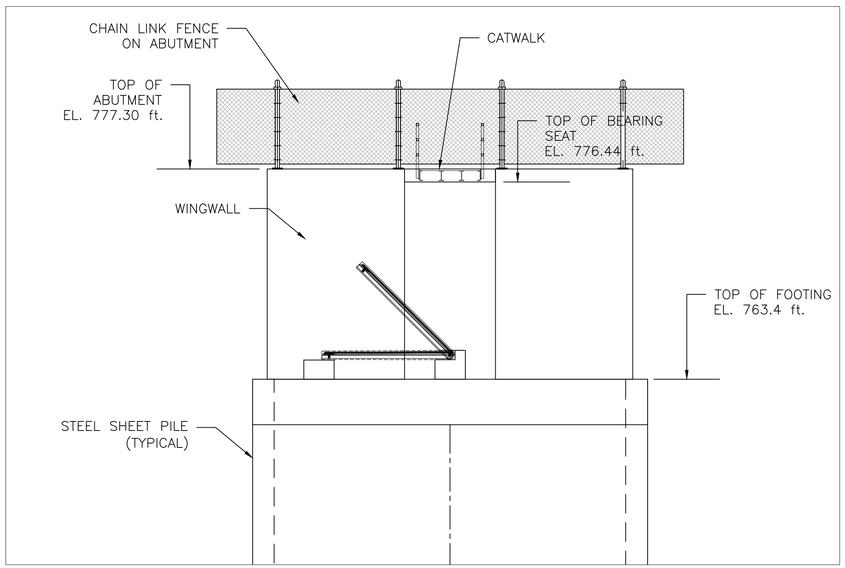
PLAN
SCALE 1" = 60'



SECTION A AT PIER
SCALE 1" = 60'



ELEVATION
SCALE 1" = 60'



SECTION B
SCALE 1" = 60'

FOR REVIEW

REVISIONS

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BEAVER RIVER CONSULTING

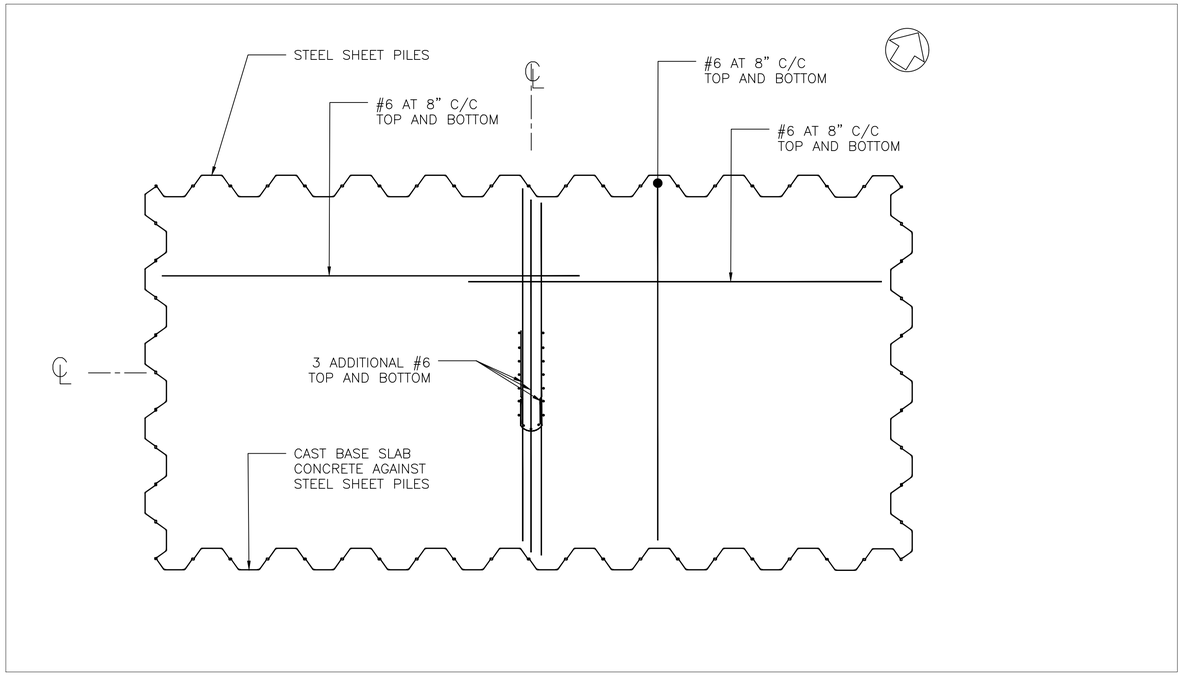
G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

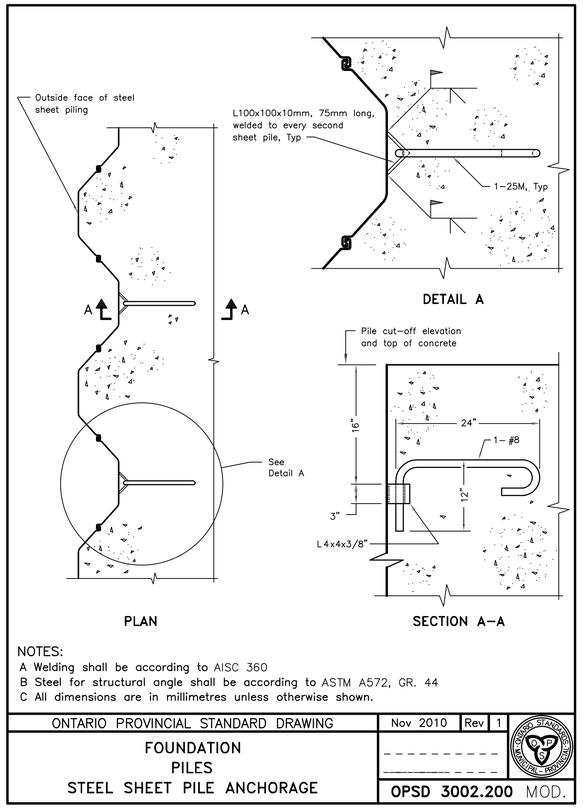
SUCKER RIVER BARRIER

DWG. TITLE
BARRIER DIMENSIONS

PROJECT NO: SN0478	DRAWN BY:	L.S.C.
	DESIGNED BY:	L.S.
	CHECKED BY:	L.S.
DATE: MARCH 2025		
SCALE: 1" = 60'	DWG. NO.:	**S02**



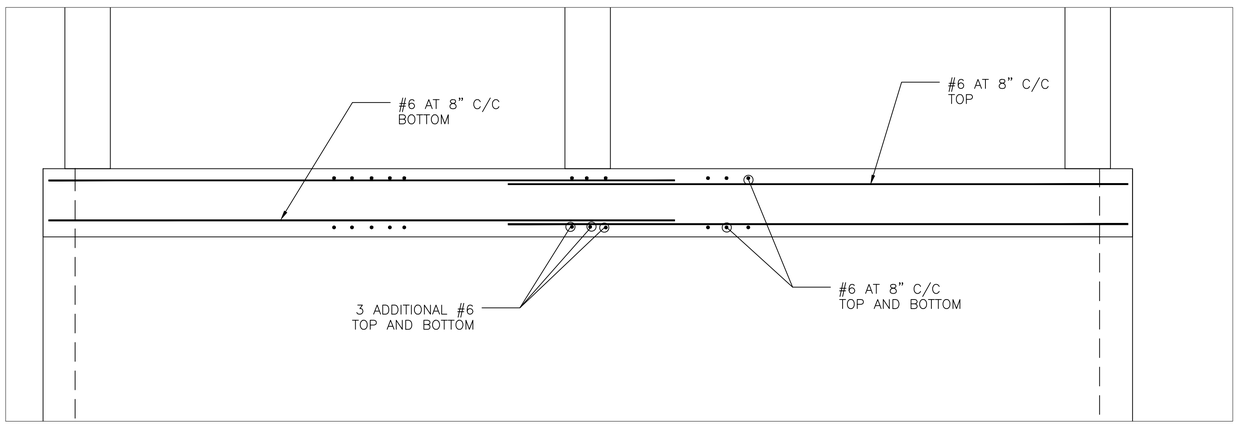
FOUNDATION PLAN
SCALE 1" = 60'



NOTES:
A Welding shall be according to AISC 360
B Steel for structural angle shall be according to ASTM A572, GR. 44
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 1
FOUNDATION PILES STEEL SHEET PILE ANCHORAGE		OPSD 3002.200 MOD.

BASE SLAB ANCHOR TO STEEL SHEET PILE
NOT TO SCALE



BASE SLAB REINFORCEMENT
SCALE 1" = 40'

FOR REVIEW

REVISIONS

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G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE: FOUNDATIONS

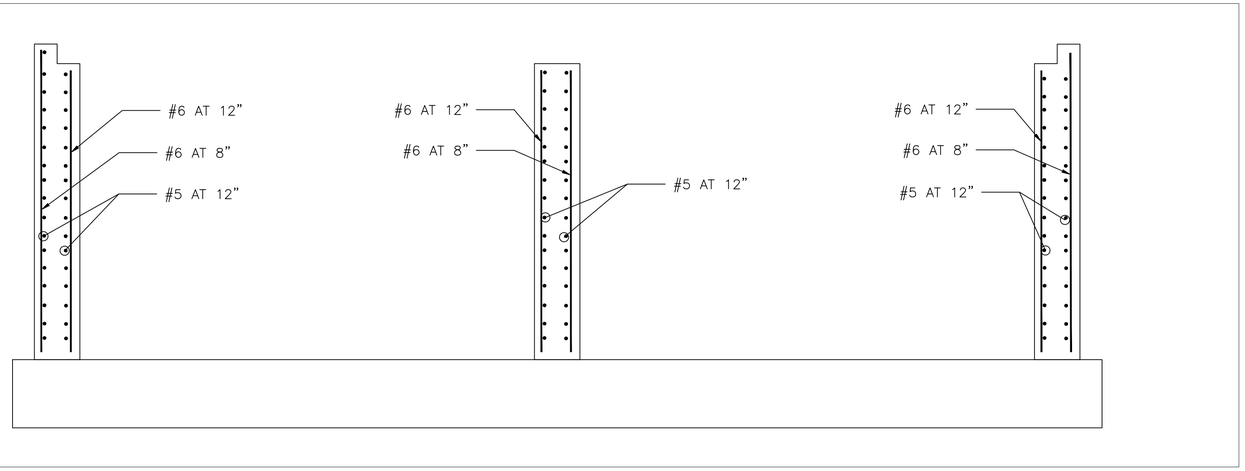
PROJECT NO: SN0478

DRAWN BY: L.S.C.
DESIGNED BY: L.S.
CHECKED BY: L.S.

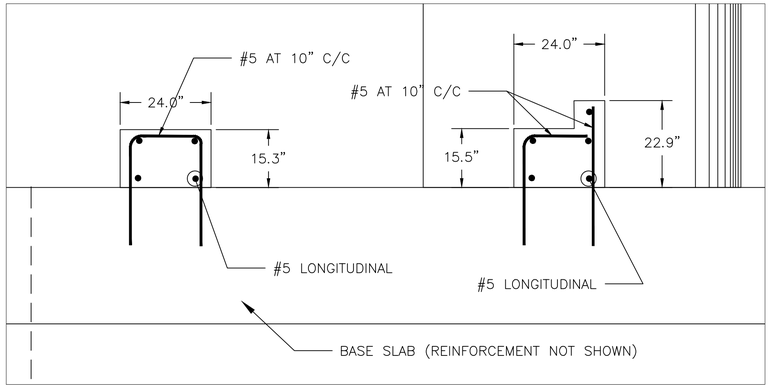
DATE: MARCH 2025

SCALE: AS SHOWN

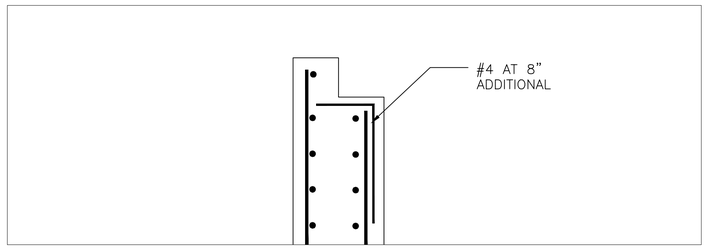
DWG. NO.: **S03**



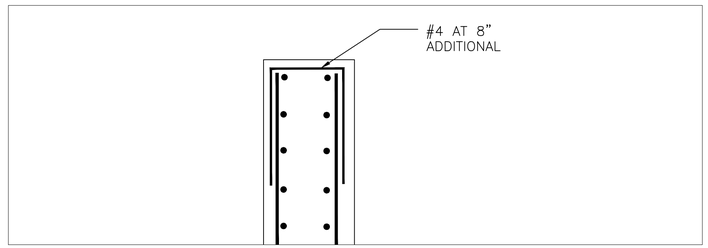
PIER AND ABUTMENTS REINFORCEMENT
SCALE 1" = 40'



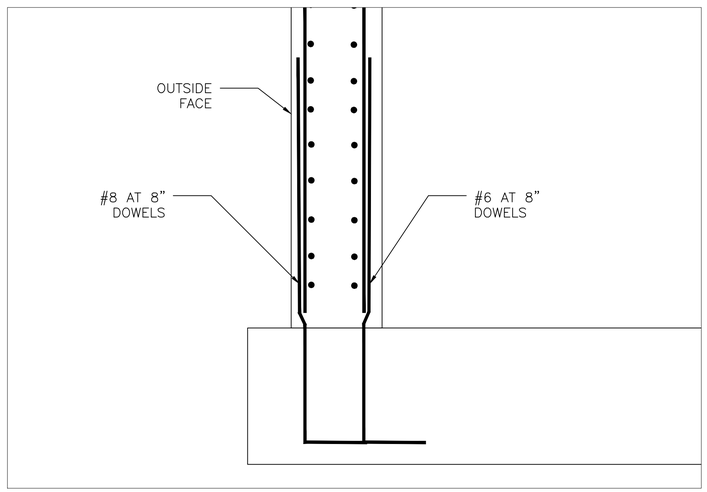
GATE SUPPORT BLOCKS REINFORCEMENT
SCALE 1" = 20'



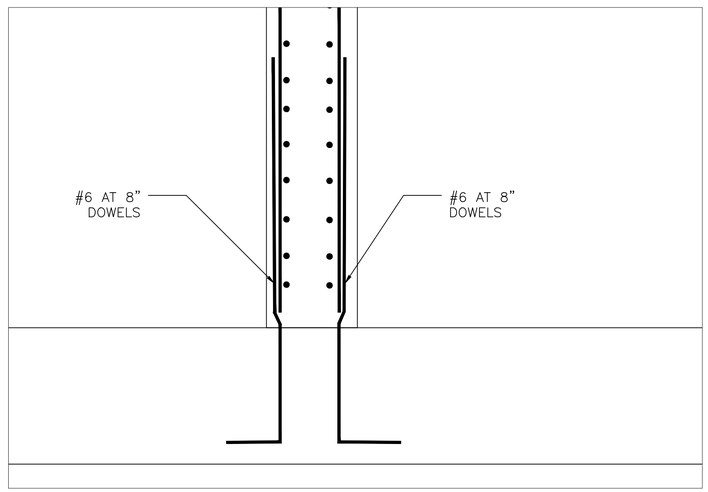
ABUTMENT BEARING SEAT DETAIL (OTHER SIDE SIMILAR)
SCALE 1" = 40'



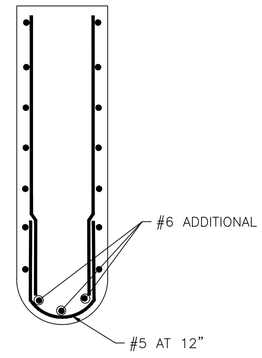
PIER BEARING SEAT DETAIL
SCALE 1" = 40'



ABUTMENT DETAILS (OTHER SIDE SIMILAR)
SCALE 1" = 40'



PIER DETAILS
SCALE 1" = 40'



PIER REINFORCEMENT PLAN
SCALE 1" = 20'

FOR REVIEW

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

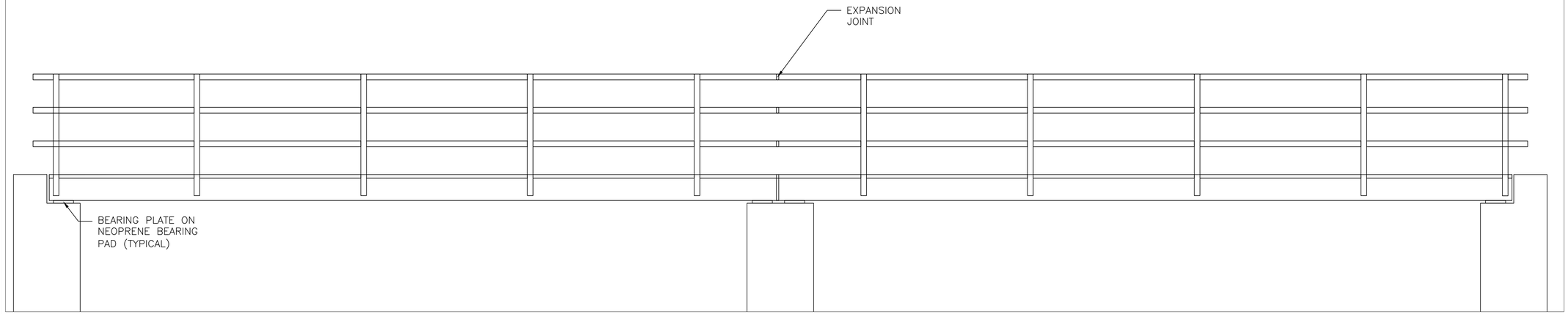
DWG. TITLE
PIER AND ABUTMENTS

PROJECT NO: SN0478	DRAWN BY:	L.S.C.
	DESIGNED BY:	L.S.
	CHECKED BY:	L.S.

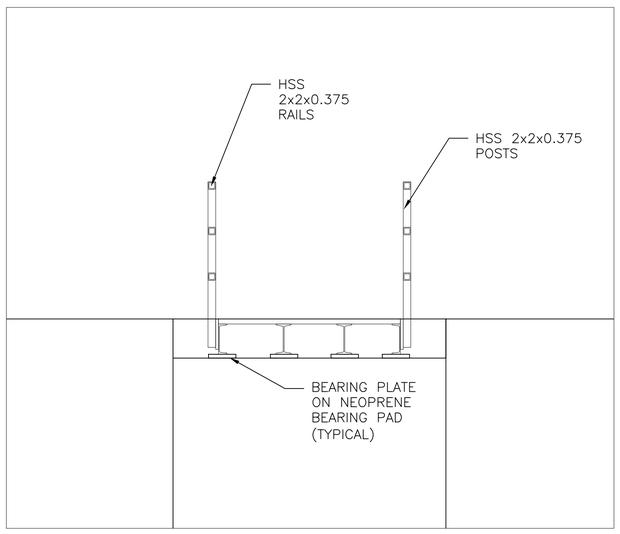
DATE: MARCH 2025

SCALE: AS SHOWN

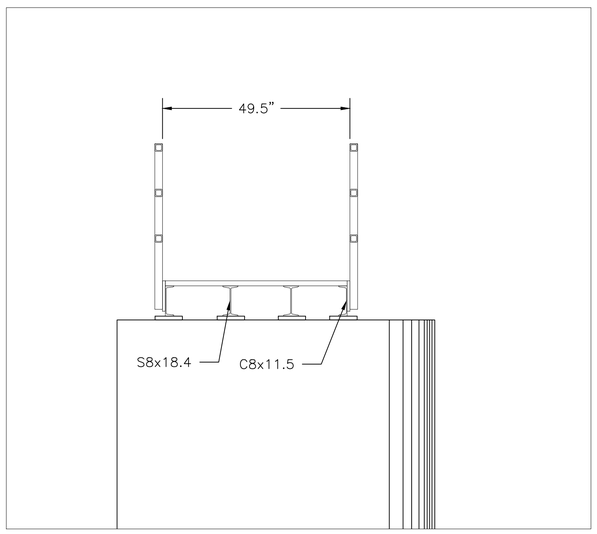
DWG. NO.: **S04**



CATWALK ELEVATION
SCALE 1" = 20'



CATWALK SECTION AT ABUTMENTS
SCALE 1" = 20'



CATWALK SECTION AT PIER
SCALE 1" = 20'

FOR REVIEW

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE: CATWALK

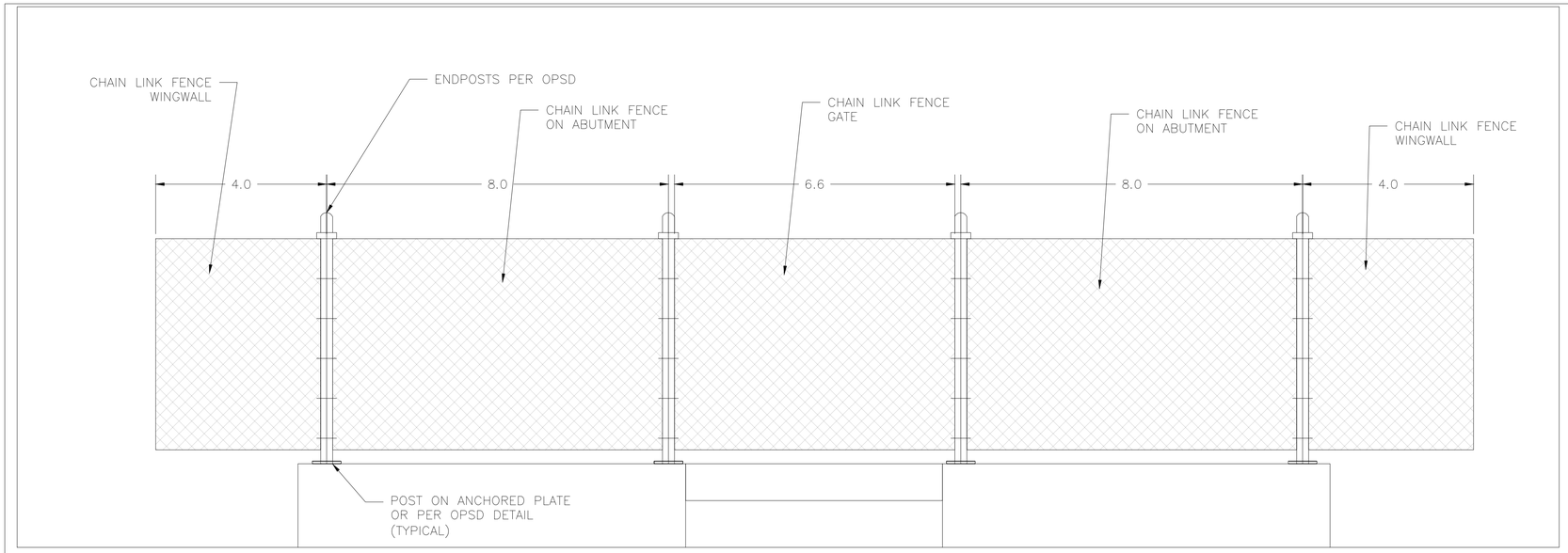
PROJECT NO: SN0478

DRAWN BY:	L.S.C.
DESIGNED BY:	L.S.
CHECKED BY:	L.S.

DATE: MARCH 2025

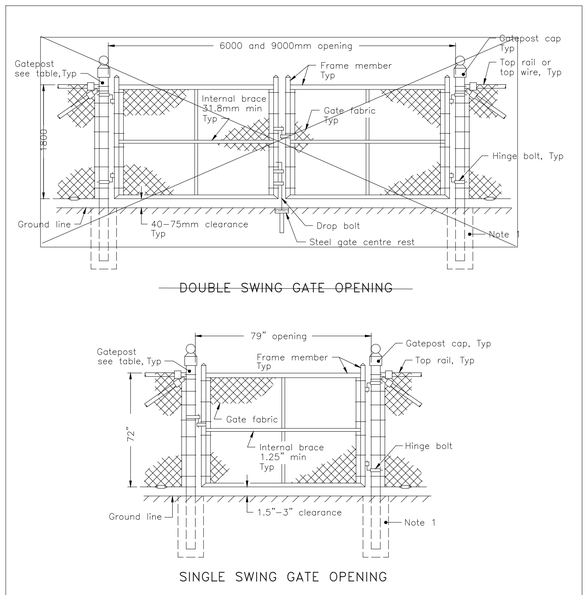
SCALE: AS SHOWN

DWG. NO.: **S05**



CHAIN LINK FENCE ELEVATION

SCALE 1" = 20'



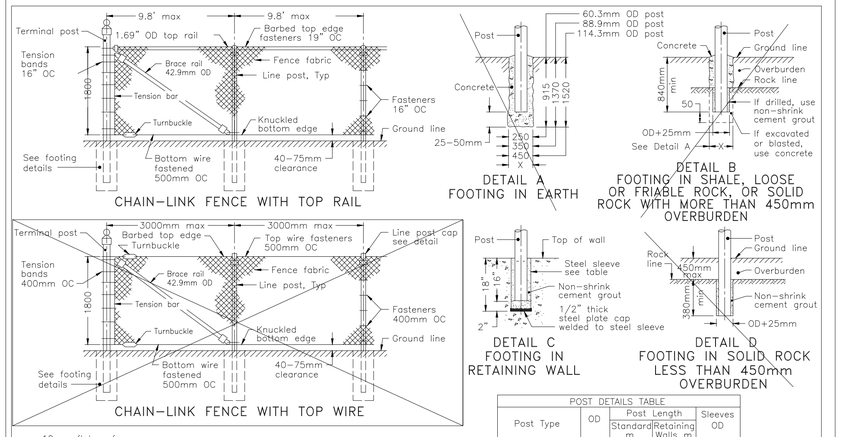
DOUBLE SWING GATE OPENING

SINGLE SWING GATE OPENING

GATE AND GATEPOST DETAILS TABLE			
Gate Type and Max Opening ft	Frame Member Min OD	Post Dia Min OD	Post Length Standard m
Single swing 9.8' ~~Double swing 6.0~~	1.69"	3.5"	102.4"
~~Single swing 4.5 Double swing 9.0~~	~~48.3~~	~~114.3~~	~~2.9~~

NOTES:
1 For footing details refer to OPSD–972.130.
A Gates as viewed from the roadway.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2005	Rev	1
FENCE, CHAIN–LINK COMPONENT – GATE			
	OPSD–972.102MOD		



POST DETAILS TABLE				
Post Type	OD	Post Length Standard m	Post Length Retaining Walls m	Sleeves OD
~~Line post~~	~~60.3~~	~~2.6~~	~~2.0~~	~~88.9~~
Terminal post	3.5"	9.5'	7.5'	4.5"

NOTE:
A Fence as viewed from the roadway.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2005	Rev	1
FENCE, CHAIN–LINK INSTALLATION – ROADWAY			
	OPSD–972.130MOD		

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REVISIONS		

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

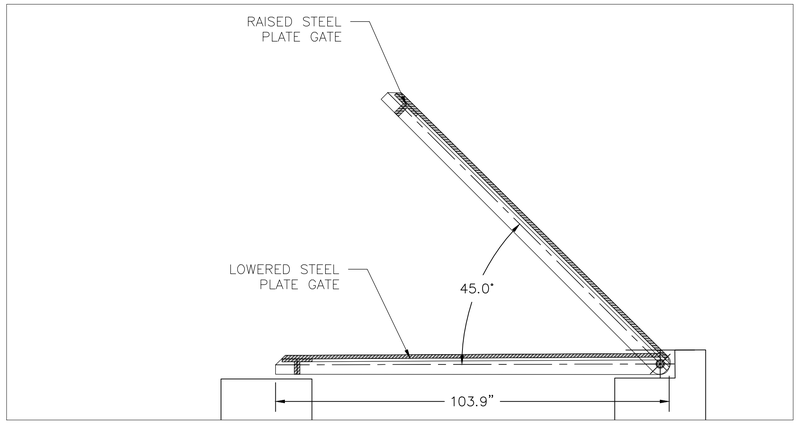
DWG. TITLE
CHAIN LINK FENCE

PROJECT NO: SN0478	DRAWN BY:	L.S.C.
	DESIGNED BY:	L.S.
	CHECKED BY:	L.S.

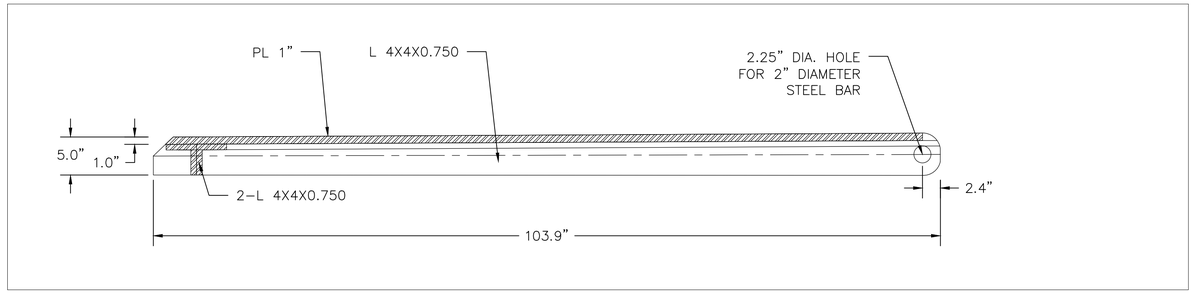
DATE: MARCH 2025

SCALE: AS SHOWN

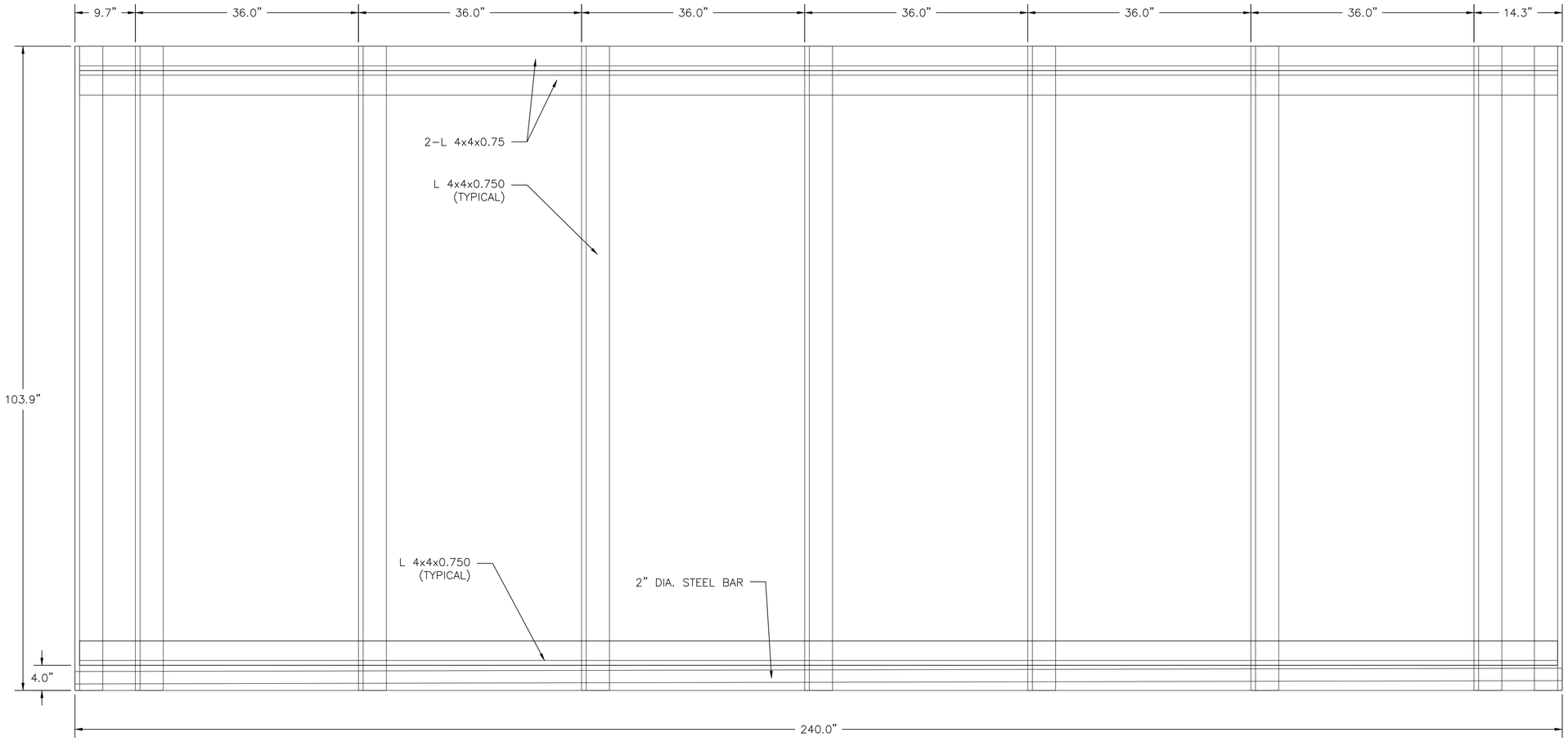
DWG. NO.: **S06**



SECTION OF GATE
SCALE 1" = 20'



SECTION OF GATE
SCALE 1" =10'



GATE ELEVATION
SCALE 1" =10'

FOR REVIEW

REVISIONS

SANCHEZ ENGINEERING INC.

BEAVER RIVER CONSULTING

G. W. RESTORATION

GREAT LAKES FISHERY COMMISSION & U.S. FISH AND WILDLIFE SERVICE

SUCKER RIVER BARRIER

DWG. TITLE
GATES

PROJECT NO: SN0478

DRAWN BY:	L.S.C.
DESIGNED BY:	L.S.
CHECKED BY:	L.S.

DATE: MARCH 2025

SCALE: AS SHOWN

DWG. NO.: **S07**

APPENDIX C – WETLAND DELINEATION REPORT

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October 2023

GWR Sucker River Sea Lamprey Project
Alger County, Michigan
Green Watershed Restoration, LLC

Wetland Delineation Report

NISWANDER ENVIRONMENTAL
9436 Maltby Road, Brighton, MI 48116
810.225.0539 *office* | 810.225.0653 *fax*

Appendices

I. INTRODUCTION

In October 2023, Niswander Environmental (NE) conducted a wetland delineation for Green Watershed Restoration (GWR) of an approximately 33.35-acre area (Review Area) known as the Sucker River Sea Lamprey Project in Alger County, Michigan (Site Location Map, **Appendix A**). It is our understanding that future work involving the proposed installation of a seasonal in-stream sea lamprey barrier on the Sucker River within the Review Area is being considered, and therefore an accurate delineation of any wetlands and watercourses is required.

Our on-site assessment identified one (1) wetland (Wetland 1), one intermittent creek, and the Sucker River within the Review Area (Wetland Location Map, **Appendix A**). It is NE's professional opinion that the wetland within the Review Area and the watercourses are regulated by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) under the authority of Part 301, Inland Lakes and Streams, and Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended (NREPA). Please refer to **Table 2** for a detailed list of the wetland and stream, including NE's professional opinion regarding the State of Michigan's regulatory authority over each resource under the authority of Parts 301/303 of NREPA. Please note that EGLE has the final authority of the location and regulatory status of wetlands in the State of Michigan.

II. METHODS

Potential wetland areas were evaluated in the field using the procedures outlined in the U.S. Army Corps of Engineers (USACE) *1987 Wetland Delineation Manual* ('*87 Manual*), and the Northcentral and Northeast Regional Supplement to the '*87 Manual* as required by EGLE, under NREPA. According to these procedures, wetlands are identified by the presence of hydric soils, signs of hydrology indicators, and dominant hydrophytic vegetation.

Hydric soil indicators are assessed in the field through soil pits that are dug in and around potential wetland areas. The Natural Resource Conservation Service (NRCS) defines a hydric soil as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. To assist in field identification of hydric soils, the NRCS developed the *Field Indicators of Hydric Soils in the United States* (Version 8.2, 2018), which specifies parameters such as soil matrix color, amount and contrast of redox concentrations or depletions, and depth and thickness for a specific soil type such as loamy, clayey, or sandy soils.

Signs of hydrology within potential wetland areas are also investigated. Standing water or saturated soils, water marks on trees, drift lines, sediment deposits, and water-stained leaves (among others) are examples of primary indicators of hydrology, while secondary indicators include drainage patterns, geomorphic position on the landscape, moss trim lines, crayfish burrows, and surface soil cracks. Either one primary or two secondary indicators are necessary in determining the presence of wetland hydrology.

Dominant vegetation for wetland areas is determined by estimating the percent cover for all species in the tree, shrub, forb, and vine stratums. Based on using the percent cover and the "50/20 rule"

as defined in the '*87 Manual*, dominant species are determined for each stratum. The USACE *National Wetland Plant List* has assigned every species that occurs in wetland an indicator status as to the likelihood that it will occur in wetland areas. These indicator statuses are obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and upland (UPL). Those species with ratings of FAC, FACW, and OBL are considered to be hydrophytes (most likely to occur in wetland environments). Wetland vegetation is confirmed when, under normal circumstances, more than 50 percent of the dominant species from all strata are FAC, FACW, and/or OBL. An area has non-hydrophytic (non-wetland) vegetation when 50 percent or more of the dominant species from all strata are rated as FACU and/or UPL. Areas that meet the three criteria of hydric soils, wetland hydrology, and hydrophytic vegetation are considered wetlands. There are certain cases where only two of the criteria are required to be met (for more explanation, see Chapter 5, Difficult Wetland Situations, of the Northcentral and Northeast Regional Supplement).

During an on-site delineation, the boundary of the wetland is identified by verifying the presence/absence of the three criteria and marking this boundary with pink Wetland Delineation flagging labeled using an alpha-numbering system (A1, A2, A3, etc.).

Under Part 303 (Wetlands Protection) of NREPA, wetlands are regulated if they are greater than 5 acres in size, connected to or within 500 feet of an inland lake, pond, river, drain, or stream (*i.e.*, watercourse), within 1,000 feet of a Great Lake, defined as Waters of the U.S. as the term is used in Section 502(7) of the Federal Water Pollution Control Act, has documented Endangered or Threatened species, or is a rare and imperiled wetland type as defined in Part 303. Watercourses are regulated by the State under Part 301 (Inland Lakes and Streams) of NREPA if they exhibit defined banks, a bed, and visible evidence of a continued flow or continued occurrence of water. EGLE has the final authority on the regulatory status of wetlands and watercourses in the State of Michigan.

III. AVAILABLE MAPPING & DATA

USGS Topographic Map

The U.S. Geological Survey (USGS) topographic map indicates that elevations on the Review Area range from 770 to 800 feet above mean sea level (**Appendix A** USGS Topographic Map). The topographic map depicts wetlands associated with the Sucker River and an un-named tributary to the river within the Review Area. USGS topographic maps typically show only the more distinct wetland and water features and should be utilized for preliminary analysis only. Field mapping is necessary to determine the actual existence, type, and boundaries of wetlands and water features.

National Wetland Inventory

The U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) map, a national wetland mapping program, was reviewed prior to the site inspection (**Appendix A** NWI Map). The NWI map depicts the Sucker River and its associated forested and scrub-shrub wetland (PSS/PFO) along the river corridor, within the Review Area. However, since NWI maps are remotely compiled from aerial photography, they may not show all wetlands in a given area, nor accurately characterize all wetlands shown. These maps should be used only for preliminary

analysis, and field mapping is necessary to determine the on the ground presence, type, and boundaries of wetlands.

USDA NRCS Soils Map

The USDA-NRCS Soil Survey was reviewed prior to the site inspection. The soil report identified two (2) soil types within the Review Area. Neither of these soils was identified as hydric. A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA-NRCS 2017). Hydric soils are one of three diagnostic criteria used to determine whether or not an area is a wetland. Field soil analysis is necessary to accurately identify hydric soil conditions.

Table 1. NRCS Soils Map Units

Soil Unit Symbol	Soil Unit Name	Drainage Class	Hydric Rating
242D	Kalkaska sand, 6-15%	Somewhat excessively drained	No
246E	Garlic sand, 15-35%	Well drained	No

IV. RESULTS

The Review Area is limited to a densely vegetated area located at the southern terminus of Whitewash Road, extending south along the Sucker River for approximately 4,000 river feet. This area is comprised of rolling mixed deciduous/evergreen upland forest and dense scrub-shrub wetland along the river. Upland areas within the Review Area rise steeply from the river valley, and often sit 20-30 feet higher than the wetlands and river.

Wetlands & Streams

Wetlands are defined, in pertinent part, by Part 303 of NREPA as: "...land characterized by the presence of water at a frequency and duration sufficient to support and that under normal circumstances does support wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh..."

Streams are defined, in pertinent part, by Part 301 of NREPA as: "natural or artificial lake, pond, or impoundment; a river, stream, or creek which may or may not be serving as a drain as defined by the drain code of 1956, 1956 PA 40, MCL 280.1 to 280.630; or any other body of water that has definite banks, a bed, and visible evidence of a continued flow or continued occurrence of water, including the St. Marys, St. Clair, and Detroit Rivers…"

The on-site assessment identified a single wetland (Wetland 1), the Sucker River, and an intermittent creek within the Review Area. The wetland and stream locations are depicted in the Wetland Location Map provided in **Appendix A**.

Site Photographs depicting conditions at the time of the site investigation are provided in **Appendix B** and Wetland Data Forms are provided in **Appendix C**. The flagged wetland boundary was GPS located in the field using a sub-meter Trimble DA2.

Wetland 1 (Flags A1-A32, B1-B171, C1-C7, and D1-D168)

Wetland 1 (9.09 acres of wetland and 3.05 acres of river) is primarily a scrub-shrub wetland within the Review Area. This wetland generally follows the Sucker River throughout the Review Area, and includes the river itself, a small intermittent creek channel, an oxbow with minimal flow, an abandoned river channel that has transitioned into emergent wetland, and a cedar swamp. The wetland features vegetation commonly associated with riparian habitat, with a dense plant community dominated by speckled alder (*Alnus rugosa*). Other species commonly observed withing the scrub-shrub zone include sapling balsam fir (*Abies balsamea*) and red maple (*Acer rubrum*), silky dogwood (*Cornus amomum*), nannyberry (*Viburnum lentago*), blue-joint grass (*Calamagrostis gigantea*), sensitive fern (*Onoclea sensibilis*), evergreen woodfern (*Dryopteris intermedia*), spinulose woodfern (*Dryopteris carthusiana*), and white grass (*Leersia virginica*).

Emergent portions of the wetland, which are generally confined to the abandoned river channel, consist of seedling alder, joe-pye weed (*Eutochium maculatum*), woolgrass (*Scirpus cyperinus*), blue vervain (*Verbena hastata*), water horehound (*Lycopus americanus*), soft rush (*Juncus effusus*), needle spikerush (*Eleocharis acicularis*), rattlesnake grass (*Glyceria canadensis*), and various sedges (*Carex lacustris*, *Carex gynandra*, *Carex tuckermanii*, *Carex scoparia*, and *Carex pellita*).

Two forested wetland areas occur within Wetland 1, including a perched cedar swamp. These forested wetland areas contain balsam fir, white cedar (*Thuja occidentalis*), red maple, black spruce (*Picea mariana*), sensitive fern, evergreen woodfern, wooly sedge (*Carex pellita*), nodding sedge (*Carex gynandra*), and fowl manna grass (*Glyceria striata*).

Primary and secondary indicators of hydrology were present within each of the three wetland types (Emergent [PEM], Scrub-Shrub [PSS], and Forested [PFO]). The PEM area exhibited Saturation, pockets of Surface Water, a High Water Table, Oxidized Rhizospheres, Geomorphic Position, and a positive FAC-Neutral Test. PSS areas also exhibited Saturation, pockets of Surface Water, Geomorphic Position, and a positive FAC-Neutral Test. The PFO areas presented Saturation, pockets of Surface Water, a High Water Table, Water Marks, Water-Stained Leaves, Geomorphic Position, Micotopographic Relief, and a positive FAC-Neutral Test.

Soils of each wetland type within Wetland 1 were determined to be hydric when hydric soil indicators such as a Sandy Redox (PEM and PSS) or Histosol (PFO) were observed.

Wetland 1 will be regulated by EGLE since it is contiguous to and contains the Sucker River and a small intermittent stream, both state-regulated streams.

Table 2. Wetland Delineation Data: Wetland Type & Regulatory Status

Wetland ID	Wetland Flags	Wetland Type	State Regulated?
WETLAND 1	A1-A32, B1-B171, C1-C7, & D1-D168	PEM/PSS/PFO	Regulated

Upland Areas

The upland (non-wetland) areas present throughout the Review Area were confined to steeply sloped areas adjacent to the Sucker River. These areas were dominated by white spruce (*Picea glauca*), balsam fir, and white pine (*Pinus strobus*), with black cherry (*Prunus serotina*), white birch (*Betula papyrifera*), and maple (*Acer* spp). The understory is dominated by seedlings and saplings of the above-mentioned species, along with bracken fern (*Pteridium aquilinum*), white grass, and evergreen woodfern. NE determined these areas to be upland based on vegetation, lack of hydrology indicators, non-hydric soils, and topographic position.

V. REGULATORY CONSIDERATIONS

Wetland Regulations by the State of Michigan

Wetlands are regulated under Part 303, Wetland Protection, of P.A. 451 of 1994, the Natural Resources and Environmental Protection Act (NREPA).

In accordance with Part 303, wetlands are regulated if they are any of the following:

(i) Is a water of the United States as that term is used in section 502(7) of the federal water pollution control act, 33 USC 1362.
(ii) Is contiguous to the Great Lakes, Lake St. Clair, an inland lake or pond, or a stream. As used in this subparagraph, "pond" does not include a farm or stock pond constructed consistent with the exemption under section 30305(2)(g).
(iii) Is more than 5 acres in size.
(iv) Has the documented presence of an endangered or threatened species under part 365 or the endangered species act of 1973, Public Law 93-205.
(v) Is a rare and imperiled wetland.

The following activities are prohibited within regulated wetlands without an EGLE permit:

- Deposit or permit the placing of fill material in a wetland.
- Dredge, remove, or permit the removal of soil or minerals from a wetland.
- Construct, operate, or maintain any use or development in a wetland.
- Drain surface water from a wetland.

Inland Lakes and Streams Regulation by the State of Michigan

Inland lakes and streams are protected under Part 301, Inland Lakes, and Streams, of the NREPA. EGLE assumes authority over natural or artificial inland lakes that are greater than five acres in size, and natural or created streams that have definite banks, a bed, and visible evidence of a continued flow or continued occurrence of water.

The following activities are prohibited within regulated inland lakes and streams without an EGLE permit:

- Dredging or filling bottomland;
- Constructing, enlarging, extending, removing, or placing a structure on bottomland;
- Erecting, maintaining, or operating a marina;
- Creating, enlarging, or diminishing an inland lake or stream;

- Structurally interfering with the natural flow of an inland lake or stream;
- Constructing, dredging, commencing, extending, or enlarging an artificial canal, channel, ditch, lagoon, pond, lake, or similar waterway where the purpose is ultimate connection with an existing inland lake or stream, or where any part of the artificial waterway is located within 500 feet of the ordinary high-water mark of an existing inland lake or stream;
- Connecting any natural or artificially constructed waterway, canal, channel, ditch, lagoon, pond, lake or similar water with an existing inland lake or stream for navigation or any other purpose.

Local Regulations
Burt Township
According to the EGLE Website, Burt Township does not have a local wetland ordinance.

VI. FINDINGS AND RECOMMENDATIONS

As indicated in this report, NE identified one wetland area, including the Sucker River and an intermittent stream, within the Review Area (Wetland Location Map, Appendix A). It is NE's professional opinion that all the wetlands and streams are regulated by EGLE under the authority of Parts 301 and 303 of NREPA since these areas either are greater than 5 acres in size or otherwise contiguous or are stream channels. NE did not identify any non-regulated wetland within the Review Area.

Please note that EGLE has the final authority of the location and regulatory status of wetland/streams in the state of Michigan. An EGLE permit may be required for any proposed work (*e.g.*, filling, dredging, construction, draining, discharging storm water, and/or other wetland development) that takes place within the boundaries of a regulated wetland/stream.

VII. REFERENCES

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Appendix A

SITE MAPPING

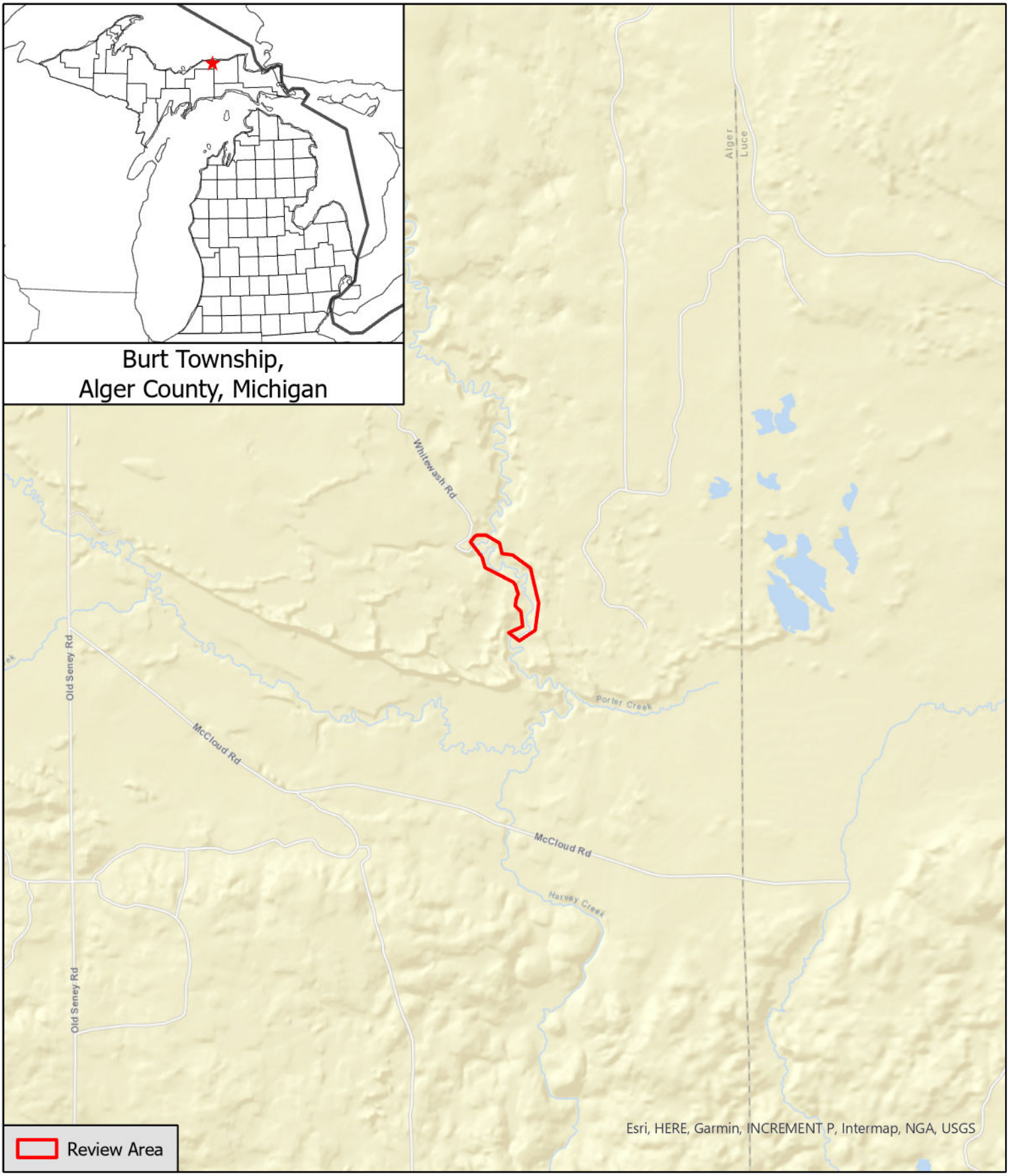

Figure 1. Site Location Map

NE 1816 GWR Sucker River
Section 35 of Burt Township (T.49N, R.13W)
Alger County, Michigan
Delineation Date: October 10th-13th, 2023
Map Date: October 24, 2023

0 1,500 3,000 6,000
Feet

N
W E
S

NISWANDER ENVIRONMENTAL
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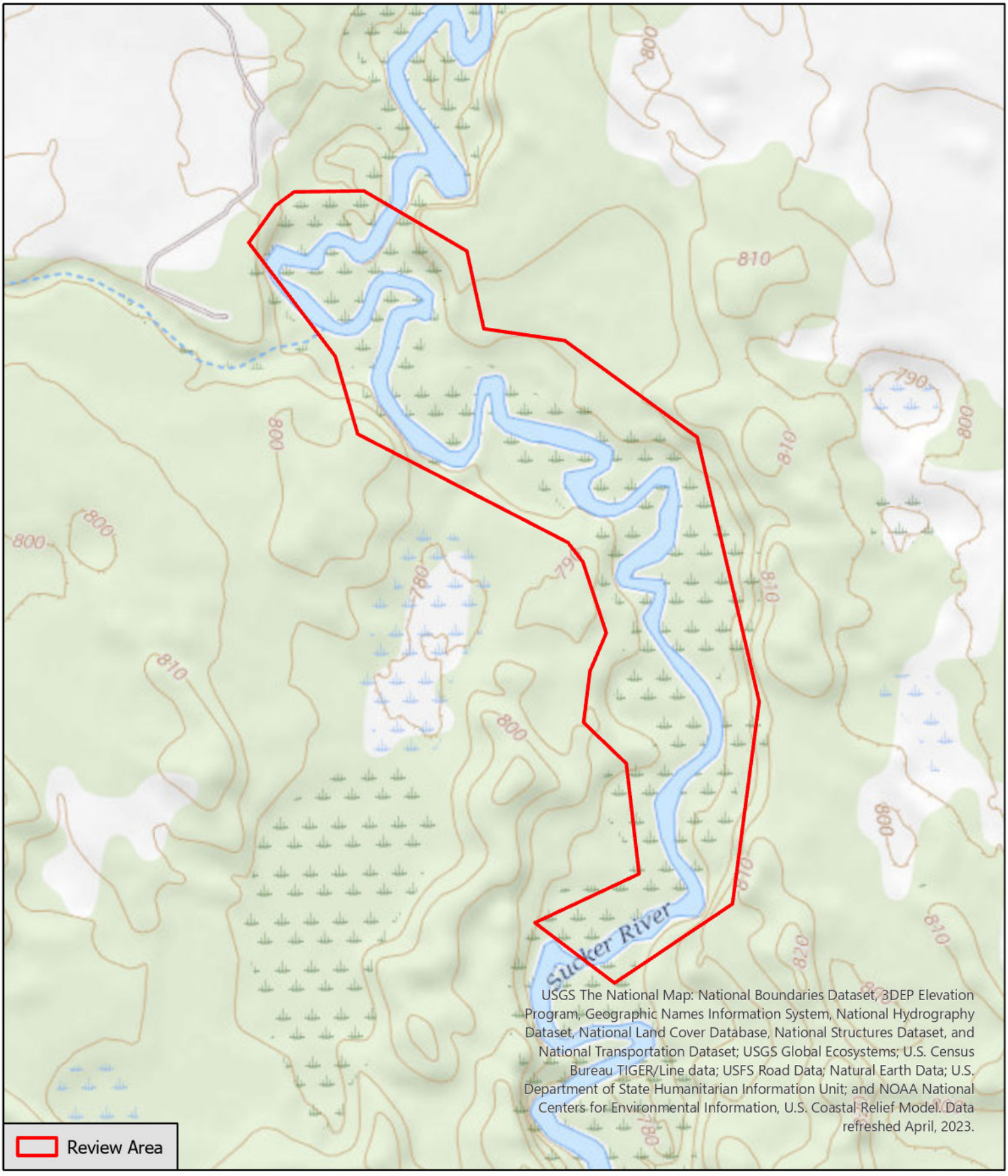

Figure 2. USGS The National Map

NE 1816 GWR Sucker River
Section 35 of Burt Township (T.49N, R.13W)
Alger County, Michigan
Delineation Date: October 10th-13th, 2023
Map Date: October 24, 2023

0 200 400 800
Feet

N
W E
S

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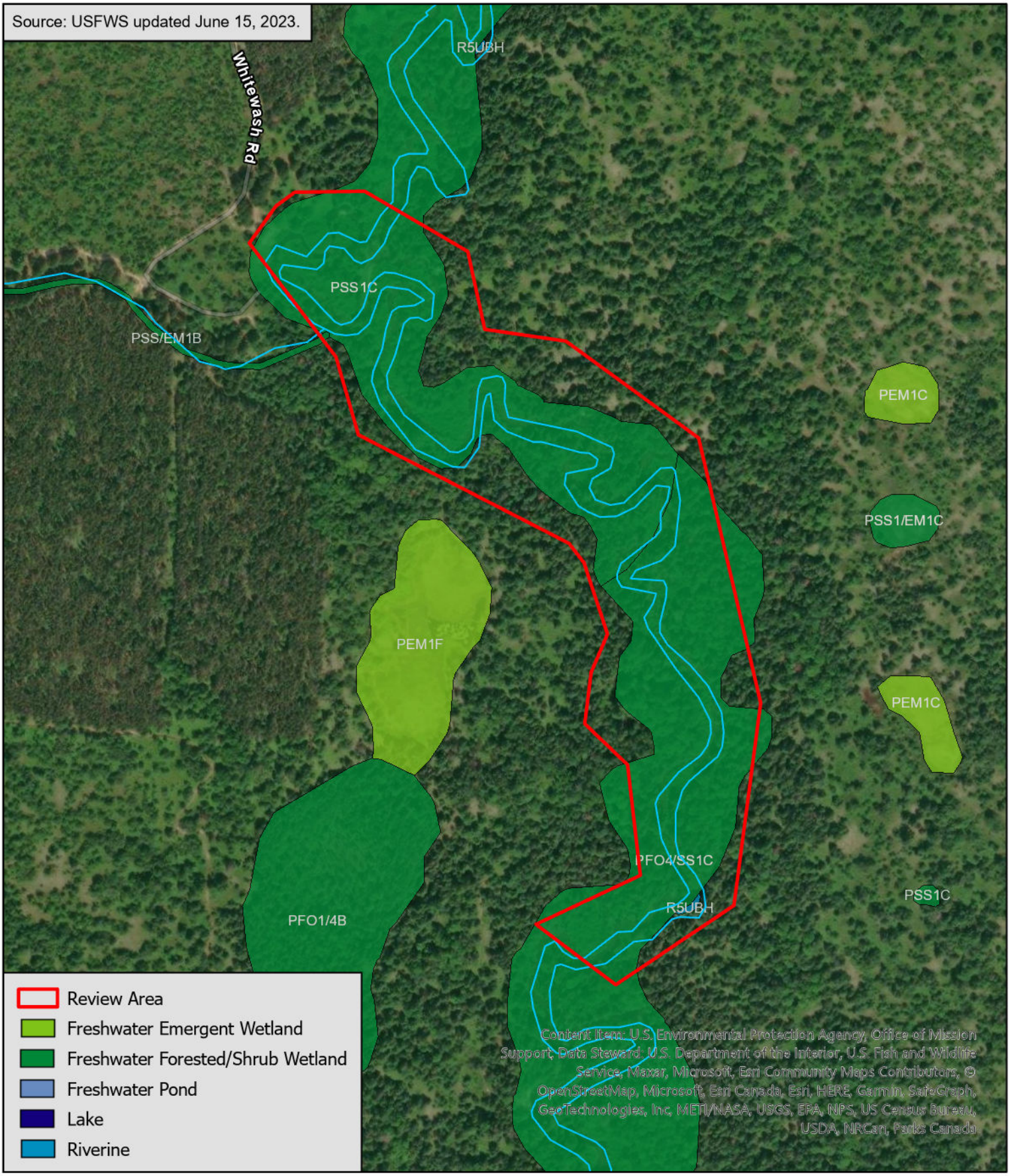

Figure 3. USFWS NWI Map

NE 1816 GWR Sucker River
Section 35 of Burt Township (T.49N, R.13W)
Alger County, Michigan
Delineation Date: October 10th-13th, 2023
Map Date: October 24, 2023

0 200 400 800 Feet

N W E S

NISWANDER ENVIRONMENTAL
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810.225.0539 *office* | 810.225.0653 *fax*

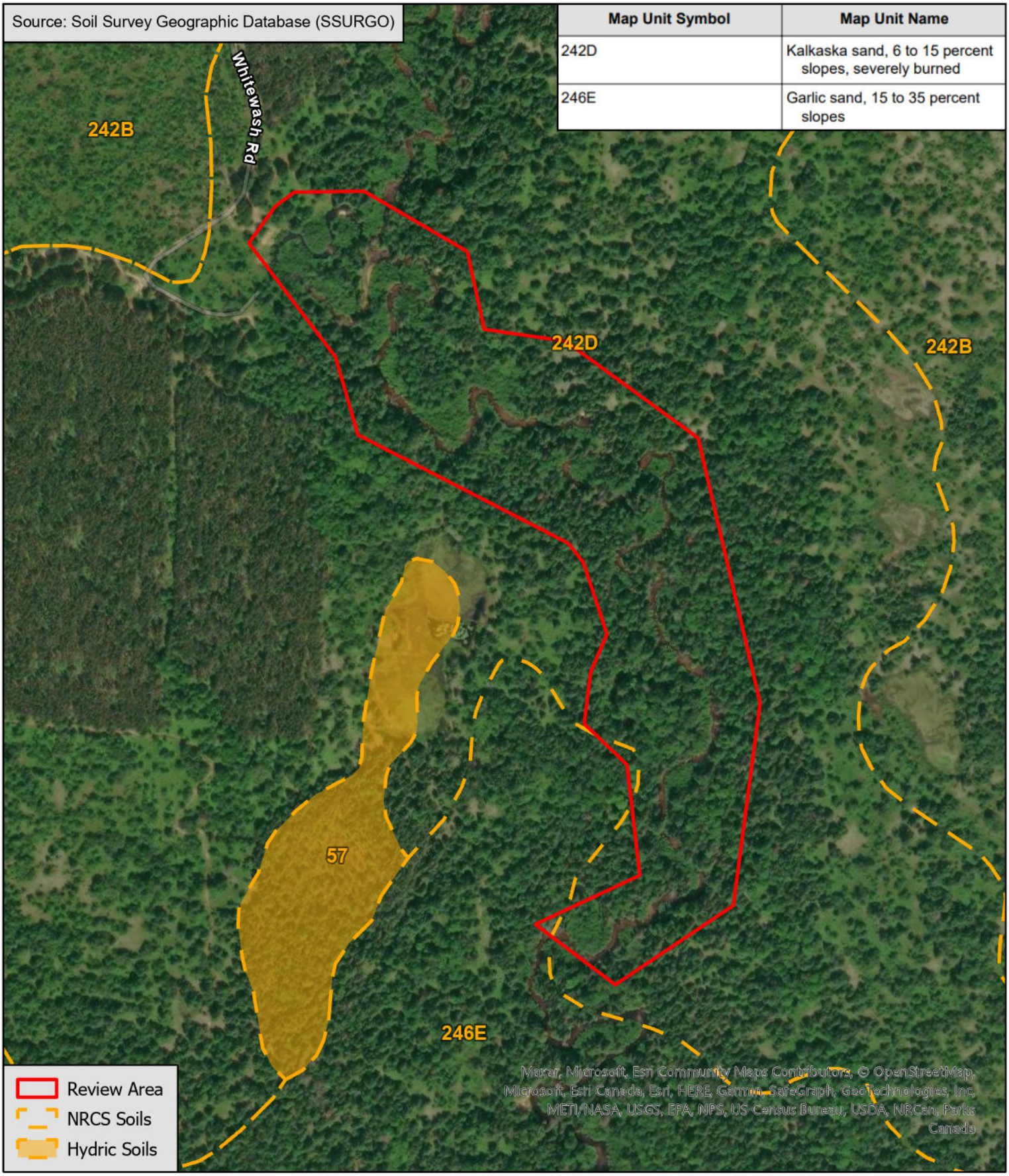

Figure 4. USDA-NRCS Soils Map

NE 1816 GWR Sucker River
Section 35 of Burt Township (T.49N, R.13W)
Alger County, Michigan
Delineation Date: October 10th-13th, 2023
Map Date: October 24, 2023

0 200 400 800
Feet

N
W E
S

NISWANDER ENVIRONMENTAL
9436 Maltby Road, Brighton, MI 48116
810.225.0539 *office* | 810.225.0653 *fax*

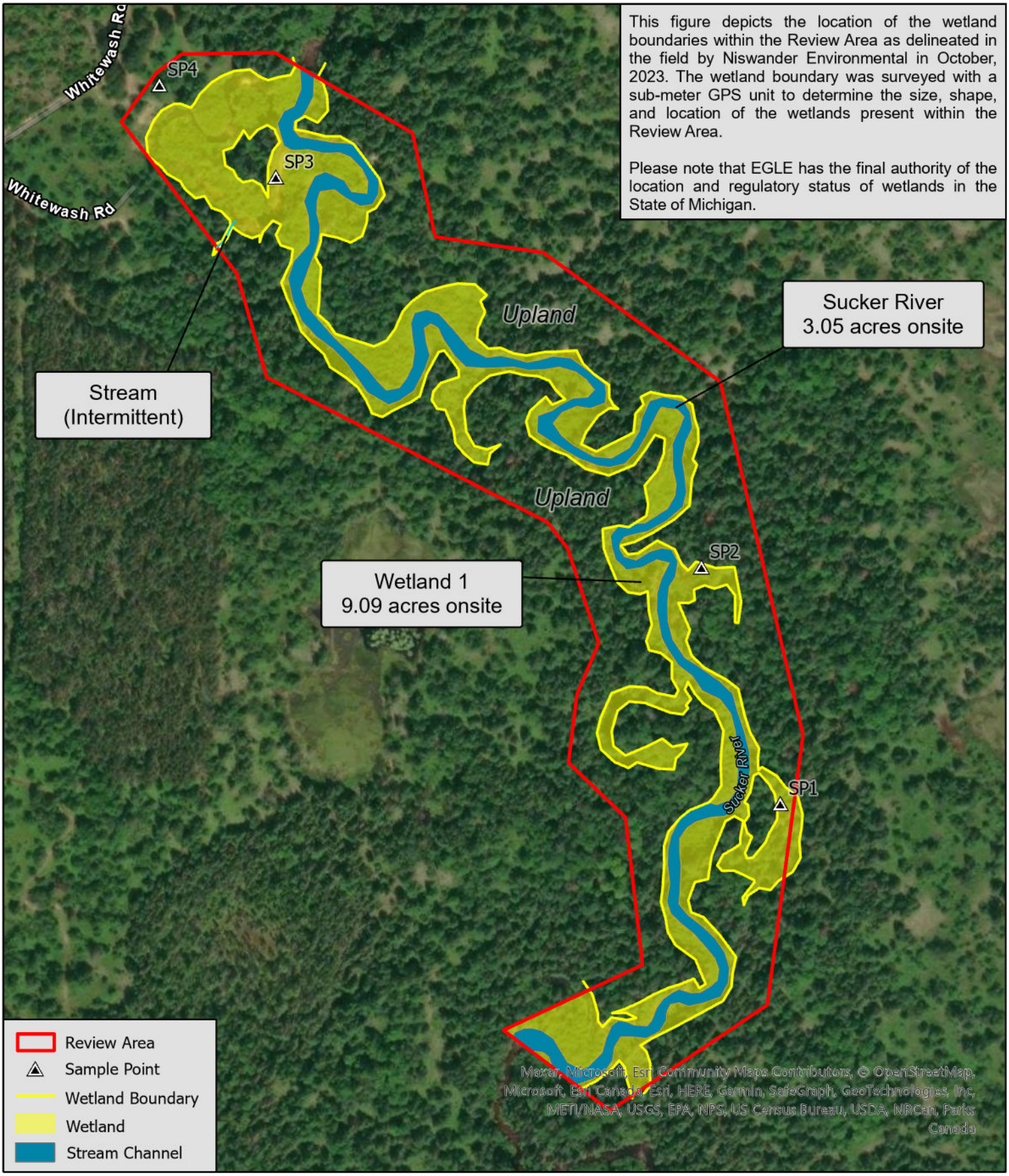

Figure 5. Wetland Location Map

NE 1816 GWR Sucker River
Section 35 of Burt Township (T.49N, R.13W)
Alger County, Michigan
Delineation Date: October 10th-13th, 2023
Map Date: October 24, 2023

0 150 300 600 Feet

N W E S

NISWANDER ENVIRONMENTAL
9436 Maltby Road, Brighton, MI 48116
810.225.0539 *office* | 810.225.0653 *fax*

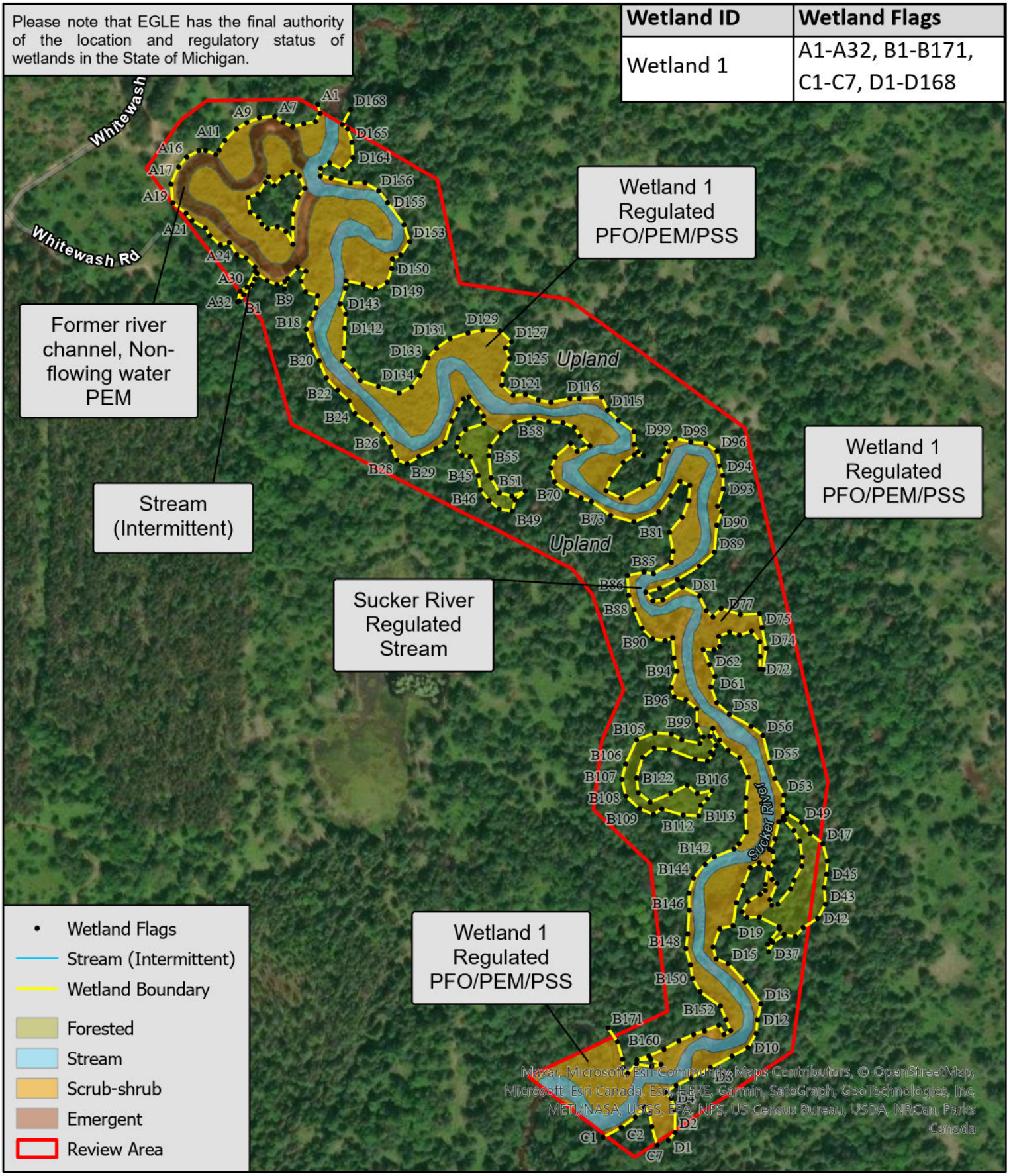

Figure 6. Wetland Type & Flag Location Map

0 150 300 600 Feet

NE 1816 GWR Sucker River
Section 35 of Burt Township (T.49N, R.13W)
Alger County, Michigan
Delineation Date: October 10th-13th, 2023
Map Date: October 24, 2023

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Appendix B

SITE PHOTOGRAPHS

GWR Sucker River Wetland Delineation
Site Photographs
Photos Taken October 10 – 13, 2023

Photo 1
Representative overview photo of the Review Area in the Sucker River valley.

Photo 2
Representative photo of the Sucker River as it flows through the Review Area. This clear, cold-water stream flows north into Lake Superior.

Site Photographs

Photo 3
Representative photo of upland forest conditions within the Review Area. Most of the upland forest canopy consists of white spruce, balsam fir, black cherry, white pine, and maple.

Photo 4
Although a vast majority of the Review Area is forested, there are numerous smaller upland clearings that tend to be dominated by bracken fern, white grass, and various tree and shrub seedlings.

Site Photographs

Photo 5
Most of the river corridor is buffered by scrub-shrub wetland (PSS), typically dominated by tag alder. One wetland (Wetland 1) was delineated within the Review Area.

Photo 6
Representative photo of a dense alder thicket.

Site Photographs

Photo 7
Representative photo of PSS wetland within the Review Area. Although dominated by alder, other species such as blue joint grass, sedge, sensitive fern, spinulose woodfern, silky dogwood, nannyberry, and sapling balsam fir and red maple are common.

Photo 8
Representative scrub-shrub portion of Wetland 1.

Site Photographs

Photo 9
Representative photo of forested wetland (PFO), located near the western edge of the Review Area.

Photo 10
A perched cedar swamp is located in the southeastern sections of the Review Area.

Site Photographs

Photo 11
The cedar swamp area is dominated by white cedar and balsam fir with some red maple and black spruce, and a diverse understory comprised of fowl manna grass and various ferns and sedges.

Photo 12
Representative photo of perched forested wetland habitat within Wetland 1.

Site Photographs

Photo 13
Photo of an abandoned river channel (oxbow) that is now vegetated, located in the northern portions of the Review Area.

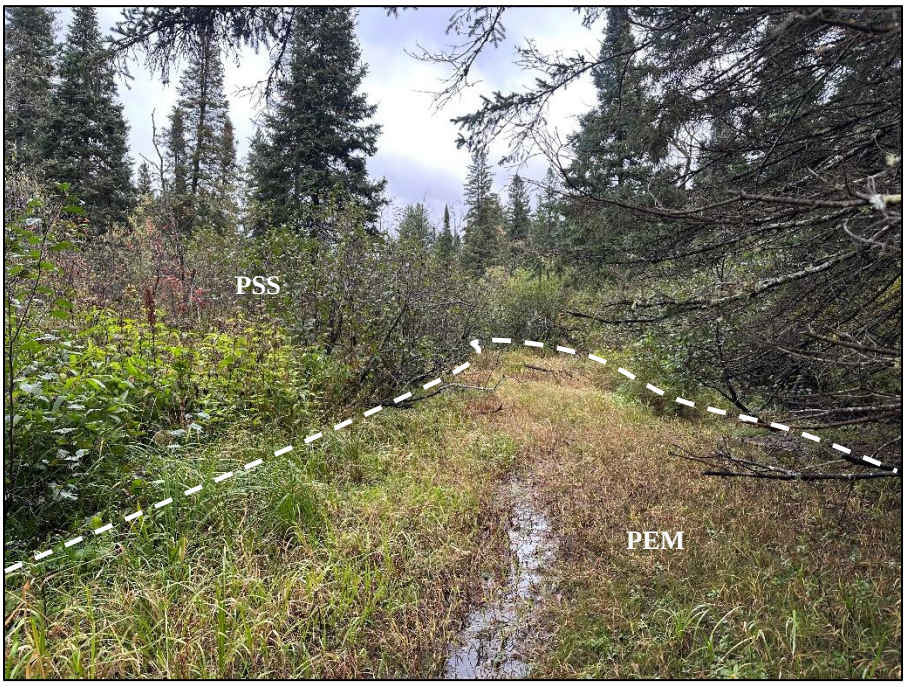

Photo 14
The oxbow is now an emergent wetland (PEM), that contains joe pye weed, woolgrass, soft rush, spikerush, and numerous sedge species.

Site Photographs

Photo 15
Emergent vegetation within the abandoned river channel.

Photo 16
Proposed location of a future seasonal sea lamprey barrier.

Site Photographs

Photo 17
Representative soil plot for PSS wetlands along the river channel. Soils were confirmed as hydric when a Sandy Redox was observed.

Site Photographs

Photo 18
Representative soil plot for the forested wetland area, taken from within the cedar swamp area of Wetland 1. Soils here are hydric and consist of a Histosol (muck).

Site Photographs

Photo 19
Representative soil plot for an emergent wetland (PEM), taken within the oxbow portion of Wetland 1. Soils here are hydric and exhibit a Sandy Redox.

Site Photographs

Photo 20
Representative soil plot for upland areas adjacent to Wetland 1. Soils here are sandy and were confirmed as non-hydric.

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Appendix C

WETLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NE 1816 GWR Sucker River City/County: Burt Twp./Alger Sampling Date: 2023-10-11

Applicant/Owner: Green Watershed Restoration / State of Michigan (landowner) State: Michigan Sampling Point: SP-1

Investigator(s): J. Bridgland / C. Walterhouse Section, Township, Range: Sec. 35, T49N, R13W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): _____

Subregion (LRR or MLRA): K 94B Lat: 46.594497 Long: -85.883725 Datum: WGS 84

Soil Map Unit Name: 242D - Kalkaska sand - 6-15% slope NWI classification: PSS1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: SP-1 Wetland 1 (PFO)

Remarks: (Explain alternative procedures here or in a separate report.)

Representative PFO data plot associated with Wetland 1; perched cedar swamp on terrace above Sucker River; Wetland 1 is regulated due to size and direct connection to river

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ✔ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 0
Water Table Present?	Yes ✔	No _____	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Pockets of inundation throughout perched PFO area; saturated muck soils in most of this area.

VEGETATION – Use scientific names of plants. Sampling Point: SP-1

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	50	✔	FAC
2. Thuja occidentalis	20	✔	FACW
3. Acer rubrum	10		FAC
4. Picea mariana	5		FACW
5.			
6.			
7.			
	85	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Abies balsamea	20	✔	FAC
2. Alnus incana	15	✔	FACW
3. Thuja occidentalis	5		FACW
4. Betula papyrifera	5		FACU
5.			
6.			
7.			
	45	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Carex pellita	85	✔	OBL
2. Dryopteris intermedia	70	✔	FAC
3. Carex gynandra	5		OBL
4. Thuja occidentalis	2		FACW
5. Betula papyrifera	2		FACU
6. Abies balsamea	2		FAC
7. Rubus hispidus	2		FACW
8. Acer rubrum	2		FAC
9.			
10.			
11.			
12.			
	170	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	49	x 2 =	98
FAC species	154	x 3 =	462
FACU species	7	x 4 =	28
UPL species	0	x 5 =	0
Column Totals:	300 (A)		678 (B)

Prevalence Index = B/A = 2.26

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Perched cedar swamp with muck soils above PSS and river; wetland/upland interface determined by topography and transition from wetland species to upland vegetation such as white birch, black cherry, white spruce, and choke cherry.

SOIL

Sampling Point: SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 2/1	100					Muck	saturated muck soils
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ✔ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

muck soils

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NE 1816 GWR Sucker River City/County: Burt Twp. / Alger Co Sampling Date: 2023-10-11

Applicant/Owner: Green Watershed Restoration / State of Michigan (landowner) State: Michigan Sampling Point: SP-2

Investigator(s): J. Bridgland / C. Walterhouse Section, Township, Range: Sec.36, T49N, R13W

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Undulating Slope (%): _____

Subregion (LRR or MLRA): K 94B Lat: 46.596035 Long: -85.884434 Datum: WGS 84

Soil Map Unit Name: 242D - Kalkaska sand, 6-15% slopes NWI classification: PSS1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: SP-2 - Wetland 1 (PSS)

Remarks: (Explain alternative procedures here or in a separate report.)

Representative data plot for PSS portion of Wetland 1; most of this wetland along the Sucker River is PSS and dominated by speckled alder; regulated due to direct connection to river

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturated at the surface

VEGETATION – Use scientific names of plants. Sampling Point: SP-2

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	5	✔	FAC
2. Picea glauca	2	✔	FACU
3.			
4.			
5.			
6.			
7.			
	7 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Alnus incana	85	✔	FACW
2. Abies balsamea	5		FAC
3.			
4.			
5.			
6.			
7.			
	90 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Carex tuckermanii	80	✔	OBL
2. Onoclea sensibilis	30	✔	FACW
3. Carex gynandra	20		OBL
4. Iris versicolor	2		OBL
5. Anemone canadensis	2		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	134 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	102	x 1 =	102
FACW species	117	x 2 =	234
FAC species	10	x 3 =	30
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	231 (A)		374 (B)

Prevalence Index = B/A = 1.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Dominated by alder

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	2.5Y 3/2	100					Loamy Sand	
4 - 18	10YR 4/2	70	10YR 3/6	30	C	M	Sand	sand with some clay
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ✔ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NE 1816 GWR Sucker River City/County: Burt Twp. / Alger Sampling Date: 2023-10-12

Applicant/Owner: Green Watershed Restoration / State of Michigan (landowner) State: Michigan Sampling Point: SP-3

Investigator(s): J. Bridgland / C. Walterhouse Section, Township, Range: Sec 35, T49N, R13W

Landform (hillslope, terrace, etc.): Oxbow Local relief (concave, convex, none): Concave Slope (%): _____

Subregion (LRR or MLRA): K 94B Lat: 46.598597 Long: -85.888378 Datum: WGS 84

Soil Map Unit Name: 242D - Kalkaska sand, 6-15-% slope NWI classification: PSS1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: Wetland 1 - SP-3 (PEM)

Remarks: (Explain alternative procedures here or in a separate report.)

Representative data plot for emergent (PEM) area associated with Wetland 1; SP-3 is located in an abandoned river channel, or oxbow that is now dominated by emergent vegetation; regulated due to size and direct connection to Sucker River

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ✔ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Pockets of standing water within the oxbow, but not within the data plot; PSS adjacent; upland/wetland interface determined by steep slope to upland forest that is dominated by white spruce, balsam fir, and black cherry; oxidized rhizospheres observed in upper 4 inches

VEGETATION – Use scientific names of plants. Sampling Point: SP-3

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea glauca	5	✔	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Alnus incana	10	✔	FACW
2. Viburnum nudum	5	✔	FACW
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Scirpus cyperinus	40	✔	OBL
2. Eutrochium maculatum	40	✔	OBL
3. Lycopus americanus	20		OBL
4. Juncus effusus	10		OBL
5. Glyceria canadensis	10		OBL
6. Eleocharis acicularis	10		OBL
7. Alnus incana	5		FACW
8. Carex lacustris	5		OBL
9. Carex scoparia	2		FACW
10. Anemone canadensis	2		FACW
11. Juncus tenuis	1		FAC
12.			
	145 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	135	x 1 =	135
FACW species	24	x 2 =	48
FAC species	1	x 3 =	3
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	165 (A)		206 (B)

Prevalence Index = B/A = 1.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Oxbow area is dominated by emergent species, particularly joe-pye weed and woolgrass in this area, but other areas were dominated by sedge; oxbow is located between alder thicket and upland forest

SOIL

Sampling Point: SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	90	10YR 3/6	10	C	PL / M	Sand	saturated sand
4 - 18	10YR 4/2	90	10YR 2/1	10	D	M	Sand	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ✔ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

oxidized rhizospheres and concentrations observed in upper 4"; dark depletions observed below 4"

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NE 1816 GWR Sucker River City/County: Burt Twp. / Alger Sampling Date: 2023-10-13

Applicant/Owner: Green Watershed Restoration / State of Michigan (landowner) State: Michigan Sampling Point: SP-4

Investigator(s): J. Bridgland / C. Walterhouse Section, Township, Range: Sec. 35, T49N, R13W

Landform (hillslope, terrace, etc.): Upland, Flat Local relief (concave, convex, none): Undulating Slope (%): _____

Subregion (LRR or MLRA): K 94B Lat: 46.599205 Long: -85.889459 Datum: WGS 84

Soil Map Unit Name: 242D - 6-15% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	If yes, optional Wetland Site ID: Wetland 1 - SP-4 (UPL)

Remarks: (Explain alternative procedures here or in a separate report.)

Representative data plot for upland areas adjacent to Wetland 1; located atop slope adjacent to Sucker River

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology observed at time of inspection

VEGETATION – Use scientific names of plants. Sampling Point: SP-4

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus strobus	60	✔	FACU
2. Prunus serotina	20	✔	FACU
3.			
4.			
5.			
6.			
7.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Prunus virginiana	20	✔	FACU
2. Acer rubrum	20	✔	FAC
3. Prunus serotina	10		FACU
4. Picea glauca	10		FACU
5. Pinus strobus	5		FACU
6.			
7.			
	65	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Pteridium aquilinum	25	✔	FACU
2. Leersia virginica	20	✔	FACW
3. Acer rubrum	10		FAC
4. Abies balsamea	10		FAC
5. Prunus serotina	2		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	67	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	40	x 3 =	120
FACU species	152	x 4 =	608
UPL species	0	x 5 =	0
Column Totals:	212 (A)		768 (B)

Prevalence Index = B/A = 3.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

failed FAC-Neutral test - does not meet criteria for wetland

SOIL

Sampling Point: SP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					Loamy Sand	
4 - 16	2.5Y 6/1	100					Sand	light gray sand
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

non-hydric