



DRAFT

Draft Environmental Assessment
**Lakeshore Boulevard Coastal Resilient Infrastructure
Project**

*City of Marquette, Marquette County, MI
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List of Acronyms, Chemical Formulas, and Abbreviations

AADT	Average Annual Daily Traffic	NAAQS	National Ambient Air Quality Standards
ACS	American Community Survey	NEPA	National Environmental Policy Act
APE	Area of Potential Effect	NFWF	National Fish and Wildlife Foundation
bgs	below ground surface	NHPA	National Historic Preservation Act
CAA	Clean Air Act	NO ₂	Nitrogen Dioxide
CEQ	Council on Environmental Quality	NO _x	Nitrogen Oxides
C.F.R.	Code of Federal Regulations	NOAA	National Oceanic and Atmospheric Administration
CO	Carbon Monoxide	NPDES	National Pollution Discharge Elimination System
CWA	Clean Water Act	NRCS	Natural Resources Conservation Service
CY	cubic yards	NREPA	Michigan Natural Resources and Environmental Protection Act
EA	Environmental Assessment	NRHP	National Register of Historic Places
EFH	Essential Fish Habitat	O ₃	Ozone
EGLE	Michigan Department of Environment, Great Lakes, and Energy	OSHA	Occupational Safety and Health Administration
EJ	Environmental Justice	Pb	Lead
EO	Executive Order	PCB	Polychlorinated Biphenyls
EPA	Environmental Protection Agency	PDM	Pre-Disaster Mitigation
FEMA	Federal Emergency Management Agency	PM	Particulate Matter
FONSI	Finding of No Significant Impact	PVC	polyvinyl chloride
GLRI	Great Lakes Restoration Initiation	RCRA	Resource Conservation and Recovery Act
GLQWA	Great Lakes Water Quality Agreement	SO ₂	Sulfur Dioxide
HASP	Health and Safety Plan	SWP	Superior Watershed Partnership and Land Trust
HEPA	High-Efficiency Particulate Air	USACE	United States Army Corp of Engineers
LARA	Michigan Department of Licensing and Regulatory Affairs	U.S.C.	United States Code
MarqTran	Marquette County Transit Authority	USFWS	United States Fish and Wildlife Service
M.C.L.	Michigan Compiled Law	USGS	United States Geological Survey
MCMP	Michigan Coastal Management Program	VOC	Volatile Organic Compound
MDOT	Michigan Department of Transportation		
mph	miles per hour		
MSP	Michigan State Police		
NAVD	North American Vertical Datum		

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1 BACKGROUND

1.1 Project Authority

The City of Marquette, Michigan, the subrecipient, proposes to relocate a section of Lakeshore Boulevard away from the shore of Lake Superior to reduce hazards associated with flooding, severe storms, and erosion. The subrecipient has applied to the Federal Emergency Management Agency (FEMA) through the Michigan State Police (MSP) for a grant of \$2.7 million under the Pre-Disaster Mitigation (PDM) Grant Program (Project Number PDMC-PJ-05-MI-2018-011). The PDM Grant Program is authorized under Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 United States Code (U.S.C.) § 5133. The PDM Grant Program assists communities in implementing hazard mitigation measures as part of a sustained pre-disaster hazard mitigation program. The program's goal is to reduce the overall risk of future hazard events to people and property and reduce reliance on federal funding in the case of future disasters.

This environmental assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; President's Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations [C.F.R.] Parts 1500 to 1508); U.S. Department of Homeland Security Instruction 023-01; and FEMA Instruction 108-01-1, NEPA implementing procedures. FEMA is required to consider potential environmental impacts before funding or approving actions and projects. The purpose of this EA is to meet FEMA's responsibilities under NEPA and to analyze the potential environmental impacts of the proposed project. FEMA will use the findings in this EA to determine whether to prepare an environmental impact statement for the proposed project or to issue a finding of no significant impact (FONSI).

In accordance with federal laws and FEMA regulations, the EA process for a proposed federal action must include an evaluation of alternatives and a discussion of the potential environmental impacts. As part of this NEPA review, the requirements of other environmental laws and executive orders are addressed.

1.2 Project Location

The proposed project is located within the city limits of Marquette, Marquette County, Michigan. The City of Marquette is the largest city in Michigan's Upper Peninsula and is located on the western shore of Lake Superior (see **Figure 1 of Appendix A**). The city is approximately 11.4 square miles in size and has a population of approximately 21,081, based on the 2013–2017 5-year American Community Survey (ACS) estimates (U.S. Census Bureau 2017).

The project area includes 4,200 linear feet of Lakeshore Boulevard between, and including, sections of Hawley Street and Wright Street, and associated water, sanitary sewer, storm sewer, and electric utilities. The area also includes approximately 48 acres of adjacent vacant land owned by the City of Marquette and the shoreline of Lake Superior (see **Figures 2 and 3 of Appendix A**). Lakeshore Boulevard is a two-lane road classified as a major collector that runs

along the coast of Lake Superior, providing access between the northern and southern sections of the city. The vacant land includes the former Cliffs-Dow industrial site that was acquired by the city in 1997 (*The Mining Journal* 2019). Currently, the vacant property is comprised of trees and other vegetation, abandoned drives, dirt lots, and concrete slabs where the former industrial buildings were located.

Pre-settlement maps and Michigan Natural Features Inventory confirm that the proposed project area was once a natural sand beach with a dune and swale complex and intermittent coastal wetlands. The shoreline at Lakeshore Boulevard is now heavily armored with a long continuous ridge of stone revetment that is 3,250 feet long. Built in 1939, the revetment is made of stone and broken concrete and does not meet modern engineering standards. This structure is deteriorating because of its age, wave action, sand migration to the north, and storms from the lake (National Fish and Wildlife Foundation [NFWF] 2019). Lakeshore Boulevard provides access to parks and recreational areas north of the city, Presque Isle Park and Clark Lambros Beach Park, and the Presque Isle Power Plant (a coal-fired power plant no longer in operation).

1.3 Purpose and Need

The objectives of FEMA's PDM Grant Program are to provide assistance to eligible state, territory, and local governments, along with federally recognized tribal governments, and to help implement sustained pre-disaster natural hazard mitigation programs. The purpose of the project is to reduce the risk of future damages and closures from flooding, severe storms, and erosion to Lakeshore Boulevard and to stabilize a portion of the Lake Superior shoreline.

The project is needed because of historically unprecedented shoreline erosion and flooding caused by the height of Lake Superior water levels and increased frequency and intensity of storm events. These storm events cause flooding and winter ice and debris buildup that result in closures and damage to Lakeshore Boulevard. A storm in October 2017 resulted in 28.8-foot waves and hurricane-force wind gusts of up to 77 miles per hour (mph) along the shore of Lake Superior in the project area, both historical records. The 2017 storm resulted in two drownings and millions of dollars in shoreline damage, including an estimated \$120,000 in damage to Lakeshore Boulevard and several days of road closure (NFWF 2019).

The erosion, flooding, and damages from increasingly frequent storms and higher water levels often close Lakeshore Boulevard for days, and sometimes months at a time between Hawley Street to the north and Fair Avenue to the south. These closures prevent traffic access along this major collector road. One of the longest closures occurred between November 2018 and March 2019 owing to damage from winter ice and debris buildup. The subsequent ground freezing prevented road repairs until the spring thaw (City of Marquette 2018). The Proposed Action (see **Section 2.2**) meets the purpose and need for this project.

2 ALTERNATIVE ANALYSIS

NEPA requires FEMA to evaluate alternatives to the proposed project and describe the environmental impacts of each alternative. NEPA also requires an evaluation of the No Action alternative, which is the future condition without the project. This section describes the No Action alternative, the Proposed Action, the Relocation of Lakeshore Boulevard Only, and reviews the alternatives that were previously considered but dismissed.

2.1 Alternative 1 – No Action

Under the No Action alternative, the proposed segment of Lakeshore Boulevard would not be relocated inland. Elevation and hardening of the road would also not occur. Storms and high waters would continue to damage the road, causing closures and preventing access to parks and recreational facilities north of the city. The multiuse bike path adjacent to the road would remain in place and would likely be unusable during times of road closures. The existing utility infrastructure would remain without relocation or expansion, likely becoming inaccessible for repairs during flooding events. Erosion would continue at the site, increasing the risk of further damage and closures. The vacant land owned by the subrecipient would likely remain vacant and unused much further into the future. The concrete revetment would be retained but would continue to deteriorate.

2.2 Action Alternative 2 – Proposed Action

The Proposed Action has two components: (1) relocation of Lakeshore Boulevard inland and (2) stabilization of the shoreline. The shoreline stabilization component would repurpose the current location of the boulevard to include habitat restoration and provide improved public access to areas along the shore of Lake Superior.

2.2.1 Relocation of Lakeshore Boulevard

The first component of the project would relocate a 4,200-foot segment of Lakeshore Boulevard (Road Relocation) 300 to 400 feet westward (inland) onto vacant property owned by the City of Marquette. See **Figure 4** of **Appendix A** for the design the Road Relocation component of the project and **Appendix G** for the design plans. The relocated road would be elevated 4 to 5 feet above its existing elevation. The Road Relocation component would occur in five stages:

- Stage 1: Mobilization, Maintenance of Traffic, and Erosion Control
- Stage 2: Utility Construction
- Stage 3: Earthwork and Roadbed Relocation
- Stage 4: Roadway Surfacing
- Stage 5: Restoration of Roadway Safety Features

Stage 1: Mobilization, Maintenance of Traffic, and Erosion Control

Stage 1 would involve the mobilization of construction equipment and removal of pavement from a portion of the existing roadway. This stage would include the following activities:

- Staging of equipment on two unpaved areas on the city land—the first location would be adjacent to Wright Street in the southwest corner of the property and the second location would be in the middle of the property off Lakeshore Boulevard, as shown in **Figure 4**. Both staging areas would be accessed from existing gated dirt roads.
- Removal of Lakeshore Boulevard starting approximately 500 feet north of the intersection at Hawley Street and extending to approximately 400 feet south of the intersection at Wright Street.
- Removal of approximately 50 feet of Hawley Street and 950 feet of Wright Street westward of their respective intersections with Lakeshore Boulevard.
- Removal of the back drive for the Biolife Plasma Services.
- Excavation for a new stormwater detention pond, which would be located east of the relocated road and just south of a proposed roundabout. The detention pond would be excavated approximately 6 feet to an elevation of 602 feet above sea level (North American Vertical Datum of 1988 [NAVD88]).
- Relocation and buildup of the roadbed to elevations 611 to 615 feet above sea level (NAVD88) with the sides sloped to match the surrounding grade.
- Stockpiling of excavated fill on-site to be used as clean fill for later stages of the project.
- Removal of trees and vegetation within the project footprint, approximately 200 feet of reinforced concrete pipe, the existing multiuse path adjacent to Lakeshore Boulevard, fencing on the eastern property line of the city land, and wooden bollards.

Stage 2: Utility Construction

During Stage 2, the new sewer, water, stormwater, and electrical utilities would be constructed and include the following activities (see **Figure 4** of **Appendix A**):

- Installation of an 8-inch polyvinyl chloride (PVC) pipe for a new sewer line that would connect to the existing line on the vacant lot and then run approximately 900 feet south adjacent to the west side of the relocated road, terminating approximately 900 feet north of the proposed roundabout.
- Installation of a second 8-inch PVC pipe along the south edge of the parcel along Wright Street starting near the southwest corner of the site and terminating approximately 550 feet east.
- Installation of an 8-inch ductile iron water main for the waterline that would run adjacent to the new sewer line and connect to the water main located next to where the new sewer line would begin.
- Installation of a new water line adjacent to the relocated Lakeshore Boulevard, starting north of the proposed roundabout and running along the north side of Wright Street, where it would connect to an existing water main.

- Installation of seven new stormwater lines at the following locations:
 - A 12-inch stormwater line aligned parallel to Lake Superior, crossing Hawley Street approximately 30 feet west of the relocated Lakeshore Boulevard.
 - A 38 × 60-inch elliptical stormwater main (culvert), 88 feet long, that would cross Lakeshore Boulevard just south of Hawley Street and convey stormwater through a stream to Lake Superior.
 - Three 12-inch diameter stormwater lines that would cross the proposed Lakeshore Boulevard at stations 26+50, 34+00, and 42+00 (see **Appendix G**).
 - A 12-inch stormwater line that would accommodate four catch basins in the roundabout and empty into the stormwater detention basin.
 - A 43 × 68-inch elliptical pipe that would direct the Wright Street storm sewer into the detention pond.
- New street lighting placed around the proposed roundabout and extending approximately 400 feet past each intersection of the circle. Lighting elements include approximately 3,900 feet of conduit, 9,000 feet of cable, 16 light poles, and 1 lighting control panel.

The new elliptical stormwater main culvert at Station 48+00 would replace the existing culvert and would include the placement of 8 cubic yards of rock riprap at both the inlet and outlet to the culvert at Lake Superior below the Ordinary High Water Mark (OHWM) (see the plans provided in **Appendix G**). The riprap would be placed in a 24 × 18 × 4 foot area at the culvert inlet, and in a 17 × 18 × 4 foot area at the culvert outlet to Lake Superior.

Stage 3: Earthwork and Roadbed Relocation

Stage 3 would involve earthwork and relocation of the roadbed, and would include the following activities:

- Relocating the roadbed approximately 300 to 400 feet inland from the shoreline. The disturbed area for the relocated road segment would be approximately 4,200 feet long and approximately 80 feet wide.
- Grading the roadbed to elevate the road 4 to 5 feet and then sloping the shoulders to match the slope of the surrounding area with on-site fill (stockpiled in Stage 2) placed at the center of the graded roadbed to form a raised roadbed approximately 40 feet wide and 4 to 5 feet higher than the existing ground.
- Adding topsoil and grass seed adjacent to the graded roadbed (20 feet on each side) to match the additional height of the fill and sloped down toward the base of the graded earthwork.
- Installing a foundation for a new roundabout at the intersection of Wright Street and Lakeshore Boulevard. The circle would have a radius of approximately 60 feet with construction disturbing an additional 20 feet beyond the circle.
- Installing a 4 × 10-foot spillway from the roundabout connecting to a 4 × 40 foot riprap over geotextile channel that drains to the detention pond.

- Placing 760 tons of large rock with an average size of 1 cubic yard along a short segment of the eastern side of Lakeshore Boulevard south of the roundabout to protect the roadbed. The rock armoring would be 325 feet long, 15 feet wide, and 6 feet high.

Stage 4: Roadway Surfacing

Stage 4 would involve road paving, turf restoration, and landscaping. This stage of the project would include the following activities:

- Installing a 32-feet wide and 8-inch deep aggregate base at the center of the roadbed with asphalt paving on top.
- Placing gravel on the remaining 4-foot sections of fill on each side of the paved road.
- Grading the former roadbed to provide temporary floodwater storage, green space, and public access to the lakeshore before the Shoreline Restoration phase of the project (see **Section 2.2.2**).

Stage 5: Restoration and Installation of Roadway Safety Features

Stage 5 encompasses the installation of roadway barriers and other safety features, including the following:

- Installing concrete and a colored stamped concrete truck apron surrounding natural vegetation.
- Installing stamped concrete dividers at each intersection between incoming and outgoing traffic lanes.
- Installing street signs, road painting, road safety equipment, and landscaping.

2.2.2 Shoreline Stabilization, Habitat Restoration, and Public Multiuse Trail

The second component of the Proposed Action (Shoreline Restoration) would be implemented between the relocated Lakeshore Boulevard and the shoreline of Lake Superior (where the road is currently located). This component of the project would strengthen up to 4,200 linear feet of shoreline and create 38 acres of natural coastal habitat. The description of the shoreline and revetment restoration design is based on information provided in the project application materials (Baird 2013, Baird 2014) and information provided by the Superior Watershed Partnership and Land Trust (SWP) (SWP 2019a).

Two concepts of the Shoreline Restoration component have been developed over the last six years by the City of Marquette and SWP. The City Commission approved design was developed in 2013 and is shown in **Figure 5 of Appendix A**. The SWP developed a revised concept for Shoreline Restoration in 2019 which is shown in **Figure 6 of Appendix A**. Both concepts are preliminary for the purpose of the EA and may be further refined by the City of Marquette or SWP. The 2019 concept includes a beach cell and a break in the revetment toward the northern portion of the project area, which the 2013 concept does not.

The Shoreline Restoration component would be implemented by the SWP and funded by the NFWF. The SWP is a 501(c)(3) nonprofit organization that provides technical, educational, and

monitoring assistance on Great Lakes protection initiatives with an emphasis on Lake Superior, Lake Michigan, and Lake Huron (SWP 2019a). The NFWF is also a 501(c)(3) nonprofit organization established by the United States Congress in 1984 (NFWF 2019). The non-FEMA funded Shoreline Stabilization and Restoration component is included as part of the Proposed Action because it is dependent on the relocation of Lakeshore Boulevard.

Work would occur along approximately 4,200 LF of Lake Superior's shore using a green-gray hybrid infrastructure method (NFWF 2019). This method would entail the creation of 38 acres of contiguous natural habitat that would include 3 acres of beach, 16 acres of dune and swales, 3 acres of coastal wetland, and 16 acres of upland terrestrial habitat (SWP 2019b).

Approximately 3,500 linear feet of the existing revetment would also be removed and replaced with a new shoreward erosion control stone armor (City of Marquette 2020). The cross-section of the new stone armor structure would be designed for a 200-year storm event (combined 20-year waves and 10-year water levels) as is typical for the U.S. Army Corps of Engineers (USACE) design on the Great Lakes (Baird 2014). The stone armor would be designed to provide shoreline protection while allowing for portions of the shoreline to be restored to natural beach (NSFW 2019). The revetment would also be designed to provide a direct line of sight to the lake from the relocated road and the multiuse pathway (City of Marquette 2020). The Shoreline Restoration component would also include built elements such as a parking lot and trail system (NFWF 2019).

Shoreline stabilization would include the following components:

- **Integrate Green/Gray Armoring.** Green/Gray armoring is hybrid engineering that integrates natural elements (green) with built infrastructure (gray). This element would remove the current rock and concrete barrier on the shoreline and replace it with a combination of stone armoring and native grasses and other plantings.
- **Restore and Recreate Natural Beach and Dune and Swale Features Behind the Shoreline Rock Revetment.** Natural land shaping would provide space to create dune and swale areas to naturalize the area and provide a variety of habitats. The land shaping would allow for the natural storage of stormwater. The stone armoring would provide engineered gaps to allow for the development of beaches (NSFW 2019).
- **Incorporate ADA-Accessible Public Access and Trail System.** The Shoreline Restoration component of the project would expand public access to the Lake Superior shoreline by constructing an accessible parking lot and multiuse trails that comply with the Americans with Disabilities Act (ADA). The parking lot would be located next to the relocated Lakeshore Boulevard. The proposed multi-use trails would be constructed along the hard armoring and through the native plantings/dune areas that are proposed in the design. ADA-accessible hard surface paved trails and boardwalks would be constructed where appropriate (NFWF 2019).

NFWF grant funding would also be used for public engagement to promote the replication of these sustainable techniques throughout the Great Lakes region. Final design plans for the

Shoreline Restoration component have not been developed, but would likely not change significantly to alter the impact analysis within the EA.

2.3 Alternative 3 – Relocation of Lakeshore Boulevard Only

The third alternative would have the same scope of work as the Road Relocation component of the Proposed Action but would not include the NFWF-funded Shoreline Restoration component (described in **Section 2.2.2**). Lakeshore Boulevard would be relocated as described in **Section 2.2.1** and the area where the road currently exists would be graded to provide floodwater storage and opportunities for green space.

2.4 Alternatives Considered and Eliminated from Further Consideration

Between 2012 and 2015, the City of Marquette, in cooperation with SWP, completed a coastal engineering study and alternatives analysis for the section of the shoreline in the project area to determine how to best mitigate against future damage in the area. The two-phase study, funded by the National Oceanic and Atmospheric Administration (NOAA) and the Michigan Department of Environment, Great Lakes, and Energy (EGLE), included public engagement on five design alternatives (Baird 2013). Of the five alternatives, the Proposed Action (originally referred to as the “Restore Revetment” conceptual alternative) described in **Section 2.2** was selected based on the desired public uses and cost. It was also selected because the public indicated a desire for the least amount of change and wanted to preserve the road and shoreline for future public uses.

The other four conceptual alternatives described below were considered but dismissed from further analysis because of cost and desired public uses (Baird 2013). The first alternative, Remove Existing Revetment, does not include the relocation of Lakeshore Boulevard, while the other three alternatives do include road relocation, as described in Section 2.2.1.

- **Remove Existing Revetment.** Under this alternative, the armor stone and concrete would be removed along 3,500 feet of shoreline. The shoreline would likely become a sediment source and experience an erosional trend, which could eventually cause Lakeshore Boulevard to become permanently lost owing to erosion. This alternative was eliminated because it did not address the purpose of the project to prevent road closures, provide shoreline stabilization, or improve aesthetics and access to the area.
- **Landward Beach Development.** Under this alternative, a new shoreline protection system would be constructed, including stone revetments and beach cells. This alternative proposed these structures to restore the natural functions of the shoreline following road relocation. The beach cells would be created through excavation and placement of beach fill material. This alternative was dismissed because of cost and impacts on the aesthetic values of the shoreline.
- **Nearshore Breakwaters Beach Development.** This alternative was similar to the Landward Beach Development alternative but proposed the additional installation of a series of nearshore parallel breakwaters to stabilize the beach fill material. The

subrecipient determined that this alternative was cost-prohibitive and would reduce the aesthetic value of the area.

- **Rubble-Mound Groin Beach Development.** This alternative proposed the installation of a series of stone groin structures perpendicular to the shoreline. The structures would create a series of beach cells that would extend the entire length of the project area. This alternative was dismissed because of cost and impacts on the aesthetic value of the area.

3 AFFECTED ENVIRONMENT AND CONSEQUENCES

This section describes the natural and human environment potentially affected by the alternatives, evaluates potential impacts, and recommends measures to avoid or reduce those impacts. When possible, quantitative information is provided to establish potential impacts, and the potential impacts are evaluated qualitatively based on the criteria listed in **Table 3-1**. The “study area” generally includes the treatment area and access and staging areas needed for the proposed action. If the study area for a particular resource category is different from the project area, the differences will be described in the appropriate subsection.

Table 3-1 Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
None/Negligible	The resource area would not be affected, or changes or benefits would be either nondetectable or, if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, although the changes would be small and localized. Impacts or benefits would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional scale impacts/benefits. Impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse effects.
Major	Changes would be readily measurable and would have substantial consequences on a local or regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, but long-term changes to the resource would be expected.

3.1 Preliminary Screening of Assessment Categories

Based on a preliminary screening of resources and the project’s geographic location, the following resources do not require a detailed assessment.

- *Coastal Barrier Resources System (CBRS)*. The Coastal Barrier Resources Act is not applicable because the project is not within or near a CBRS unit (U.S. Fish and Wildlife Service [USFWS] 2019a).
- *Prime and Unique Farmland*. The Farmland Policy Protection Act is not applicable because none of the soils in the project area are classified by the Natural Resources Conservation Service (NRCS) as prime farmland, unique farmland, or farmland of statewide importance (NRCS 2019). The project is also located within the census-designated urbanized area of Marquette, Michigan.

- *Seismic Risks.* Executive Order (EO) 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction does not apply because there is low seismic risk in the project area based on seismic hazard maps developed by the U.S. Geological Survey (USGS).
- *Sole Source Aquifers.* There are no sole-source aquifers regulated by the Safe Drinking Water Act of 1974 in the vicinity of the project area (EPA 2019a).
- *Essential Fish Habitat (EFH).* The Magnuson-Stevens Fishery Conservation and Management Act does not apply because there are no Habitat Areas of Particular Concern and no EFH Areas identified at the project site according to the NOAA Essential Fish Habitat Mapper (NOAA 2020).
- *Wild and Scenic Rivers.* The Wild and Scenic Rivers Act, 16 U.S.C. § 1271 et seq., is not applicable because there are no federally designated wild and scenic rivers in the project areas based on a review of the National Wild and Scenic Rivers System website maintained by the National Park Service (NPS 2019). The closest federally designated wild and scenic river is the Yellow Dog River, located in the Ottawa National Forest, approximately 100 miles southwest of the project area.

3.2 Physical Environment

3.2.1 Geology, Soils, and Topography

Bedrock geology was characterized using USGS geological maps of the U.S. (USGS 2019b). Underlying bedrock in the project area consists of gneiss and amphibolite. The bedrock formed during the Late Archean period (4 to 2.5 billion years ago) and is primarily of volcanic origin.

Soils in the project area consist of Urban Land type soils and were identified using the U.S. Department of Agriculture (USDA) NRCS Web Soil Survey (USDA 2019). The NRCS reports that approximately 99 percent of the project area is composed of Udipsamments-Urban land complex soils, and approximately 1 percent is Croswell-Deford complex soils (see **Figure 7 of Appendix A**). Soils of the Udipsamments-Urban land complex consist of very deep, excessively drained soils and occur in residential, commercial, and industrial sites (USDA 2007). The Croswell series consists of very deep, moderately well-drained soils, and occurs in sandy glaciofluvial deposits (USDA 2017).

Topography in the project area consists of relatively flat lakeshore slope with elevation ranging from 606 to 612 feet NAVD88 (USGS 2019a). Until recently, the shoreline of the project area had limited erosion because of the stone and broken concrete revetment (Baird 2013). However, in the past decade, increasingly frequent storms and higher water levels began to erode the revetment wall and soils westward of the wall (NFWF 2019). The subrecipient forecasts erosion rates to continue and possibly increase in the project area.

Alternative 1 – No Action

Under the No Action alternative, shoreline stabilization measures would not be implemented in the project area. There would be no effect on geology. There would be minor long-term impacts from erosion to shoreline soils, the stone revetment, infrastructure, and soils westward of the revetment. Potential soil loss in the area could further undermine Lakeshore Boulevard and infrastructure on the project site. The stormwater runoff would likely continue to erode soils in the project area as well. Under the No Action alternative, erosion could change the topography by altering slopes; however, because of the relatively level topography of the area, the change would be negligible.

Action Alternative 2 – Proposed Action

Bedrock depth is over 1000 feet below the project site, and the geology would not be impacted by the Proposed Action (USGS 2018).

Relocation of Lakeshore Boulevard would have minor short-term impacts on soils and topography resulting from the excavation of the existing road and placement of on-site clean fill to construct and elevate the relocated road. Relocation of Lakeshore Boulevard would involve the excavation of 17,000 cubic yards of fill to remove the existing road and to construct the stormwater detention pond. The excavated material would be used to elevate the road 4 to 5 feet above its existing grade to elevations ranging from 607 to 614 feet NAVD88, which would result in a minor long-term impact on the topography in the project area. The subbase for the road would require an additional 13,643 cubic yards (CY) of fill. The excavated material would be stored on-site. Off-site fill would be compliant with Part 91 of the Michigan Natural Resources and Environmental Protection Act (NREPA), Soil Erosion and Sedimentation Control (Michigan Compiled Laws [MCL] 324.9101).

The Shoreline Restoration component would have minor short-term impacts on soils and topography from site preparation, removal and restoration of the stone revetment, and creation of the beach, dunes, swales, and coastal wetlands. The Shoreline Restoration component would involve both fill and excavation, as summarized in **Table 3-2**. Portions of the revetment would be filled into Lake Superior below the OHWM.

Table 3-2 Shoreline Restoration Fill and Excavation

Item	Unit	Quantity
Site Preparation (Excavation)		
Removal of Existing Revetment	CY	39,000
Grading	CY	3,200
Revetment Construction (3,500 linear feet) (Fill)		
Armor Stone	Ton	35,000
Filter Stone	Ton	12,600
Bedding Stone	Ton	6,800
Splash Pad Stone	Ton	4,900

Item	Unit	Quantity
Geotextile Fabric	Square yards	13,600
Beach/Dunes/Swales/Coastal Wetlands/Fill		
General Fill	CY	25,000
Topsoil (6 inches)	CY	18,000

Source: Baird 2013.

The Shoreline Restoration component would provide minor long-term benefits to soils and topography in the project area by implementing measures that would limit soil erosion in the long-term. The removal and replacement of the stone revetment and the addition of dunes, swales, and coastal wetlands plus native plantings associated with those features would stabilize soils in the area. Soils would be protected from stormwater runoff through the extended stormwater infrastructure, detention pond, native plantings, and the microtopography provided by the dunes, swales, and coastal wetlands. The revetment would stabilize the shoreline and prevent erosional losses from waves and storm surge. The stabilization of the shoreline and adjacent soils would protect the relocated road against future erosion damage.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have minor short-term impacts on soils and topography, as described under the Proposed Action for the relocation of the road. This alternative would provide minor long-term benefits by reducing future erosion damage from increasingly frequent storms and higher water levels. However, moving the road away from the shoreline would not have the added protection from the Shoreline Restoration component because the excavation and fill would not occur. The road relocation includes the extended stormwater infrastructure and detention pond which would reduce somewhat erosion from stormwater, but as no work would be done on the revetment and inland areas, the shoreline soils would be exposed to future erosion risk.

3.2.2 Water Resources and Water Quality

Water resources include surface water, groundwater, stormwater, and drinking water (wetlands are evaluated in **Section 3.3.2**). The project area is adjacent to Lake Superior, which is regulated as a water of the United States and water of the state of Michigan under federal and state law. Surface waters and wetlands in the project area are shown in **Figure 8 of Appendix A**.

The Clean Water Act (CWA) of 1977, 33 U.S.C. § 1251 et seq., regulates the discharge of pollutants into water, with various sections falling under the jurisdiction of USACE and the U.S. Environmental Protection Agency (EPA) or as delegated to the state. Section 404 of the CWA establishes USACE permit requirements for discharge of dredged or fill materials into waters of the United States. Section 401 of the CWA is administered by EGLE and provides regulations for the protection of water quality on projects that involve dredge or fill in waters of the United States (Michigan Administrative Code R 323.1041 et seq.). Under the National Pollution Discharge Elimination System (NPDES) (Section 402 of the CWA), regulation of both point and

nonpoint pollutant sources, including stormwater and stormwater runoff, has been delegated to the state and is administered by EGLE. USACE regulation of activities within navigable waters is also authorized under the Rivers and Harbors Act of 1899, 33 U.S.C. § 403 et seq. Activities affecting waters of Lake Superior would be regulated under both the CWA and the Rivers and Harbors Act. Lake Superior is considered a water of the state and regulated under the NREPA (MCL 324.3101(aa)).

Lake Superior is also protected under the Great Lakes Water Quality Agreement (GLWQA), an international agreement between the United States and Canada to restore and protect the waters of the Great Lakes. A partnership between nine federal agencies is implementing the Great Lakes Restoration Initiative (GLRI) to accelerate efforts to protect and restore the Great Lakes through federal agency coordination (GLRI 2020). The GLRI developed action plans that set goals every five years with specific focus areas (EPA 2019b). The current Action Plan, Action Plan III, has five areas of focus:

1. Toxic Substances and Areas of Concern (see **Section 3.4**)
2. Invasive Species (see **Section 3.3.5**)
3. Nonpoint Source Pollution Impacts on Nearshore Health
4. Habitats and Species (see **Section 3.3.1**)
5. Foundations for Future Restoration Actions (see **Section 4**)

Lake Superior is further managed under the Lakeside Action and Management Plan under the GLWQA.

The project area is located along the shoreline of Lake Superior. Lake Superior is the largest and deepest of the Great Lakes, with an average depth of approximately 1,332 feet and surface area of 31,700 square miles (EGLE 2020b). The Lake Superior watershed drains approximately 49,300 square miles (EPA 2020a) and is the least developed and least populated of all the Great Lakes, serving only 2 percent of Michigan's population (EGLE 2020b). The Lake Superior watershed is largely forested with little agricultural use because of a cool climate and poor soil (EPA 2020a). A stream runs parallel to Hawley Street near the intersection of Lakeshore Boulevard, as shown in **Figure 8 of Appendix A**. There are no other streams within the project area; although, the project area is just south of the mouth of the Dead River.

Groundwater underlying the project area is contained within sandstone bedrock and glacial deposit aquifers (Doonan and Van Alstine 1982). The water table in the project area is fairly shallow and generally ranges 2–8 feet below grade (Trimedia 2019). Groundwater contamination from previous industrial use of the former Cliffs-Dow site is being monitored by the City of Marquette (Trimedia 2019). Groundwater concentrations in some locations at the former Cliffs-Dow site exceed the groundwater/surface water interface (GSI) acute mixing zone criteria, indicating groundwater has the potential to cause adverse impacts on water quality in Lake Superior. Additional sampling of the groundwater contamination is ongoing, and EGLE requires continued monitoring and treatment (see **Section 3.4** for additional information).

EPA defines “water quality” as “the condition of a water body as it relates to purposes such as recreation, scenic enjoyment, aquatic habitat, and human health.” Water quality is regulated by both the CWA and Michigan Compiled Laws (MCL 323.1041 et seq.). EPA provides information on water quality in Lake Superior at the Marquette Water Department Critical Assessment Zone (CAZ). The Water Department maintains a water filtration plant at 320 North Lakeshore Boulevard, approximately 1.25 miles south of the project area. The Lake Superior Intake is in compliance with Sections 303 and 305 of the CWA. EPA reports that the Marquette Water Department CAZ does not meet water quality standards for fish consumption because of dioxins and chlordane in water, and mercury and polychlorinated biphenyls (PCBs) in fish tissue (EPA 2016a). Atmospheric deposition, tributary loadings, and the dynamic exchange and cycling between air, water, and sediment within the Great Lakes’ basins are the key factors influencing contaminant levels in Great Lakes fish (EGLE 2019a).

Stormwater runoff affects water quality in surface waters, such as Lake Superior. The sub-watershed in which the project area is located includes the City of Marquette and is approximately 50 percent developed with commercial and residential uses (EPA 2020b). Contaminants, including nutrients and hazardous materials from industrial sources, can be transported from roads, developed areas, and disturbed soils during storm events and flooding.

The Marquette Water Utility provides drinking water to the City of Marquette. Drinking water is drawn from Lake Superior and treated at the city’s water filtration plant (Marquette Water Utility 2018). The 2018 Marquette Water Utility *Drinking Water Report* notes that none of the regularly monitored contaminant levels are above EPA standard levels for drinking water (Marquette Water Utility 2018).

Alternative 1 – No Action

Under the No Action alternative, flooding of the roadway and surrounding land would continue, causing long-term, moderate adverse impacts on water quality in Lake Superior as a result of sedimentation from soil erosion and pollutants from runoff. No impact on, or withdrawal of, groundwater is anticipated under the No Action alternative.

Alternative 2 – Proposed Action

Minor short-term impacts on water quality would occur for both the Relocation of Lakeshore Boulevard and the Shoreline Restoration components of the Proposed Action. During construction, exposed soil is highly vulnerable to erosion by wind and water. Eroded soil endangers water resources by reducing water quality and causing the siltation of habitat for aquatic species. Clearing and grading during construction would cause the temporary loss of vegetation and exposure of soil to the elements. To mitigate potential impacts from erosion during construction, the City of Marquette would be responsible for obtaining a Soil Erosion and Construction Storm Water permit in accordance with the state law (MCL 324.9112).

Relocation of Lakeshore Boulevard would result in minor short-term impacts on water resources and water quality from disturbance of sediments caused by excavators and other heavy

equipment to remove the existing road and construct the relocated road. No surface waters were identified in the construction staging areas; therefore, no impact is anticipated in these areas. As described in **Section 2.2.1**, relocation of the road would involve the removal of an existing culvert structure near the Hawley Street and Lakeshore Boulevard intersection and installation of a new 88 feet long × 5 feet span × 3.2 feet rise concrete cross culvert (see plans provided in **Appendix G**). Replacement of the culvert would result in a negligible long-term impact on water resources. The subrecipient obtained permits from the USACE and EGLE for impacts relating to the culvert replacement, as described in **Section 6.1**. Minor, short-term impacts on water resources and water quality from construction runoff would be minimized with the implementation of Best Management Practices (BMPs), and mitigation measures specified in the permits (see **Section 6.2**). Agency correspondence and copies of the permits are provided in **Appendix C**.

Relocation of Lakeshore Boulevard would have minor long-term benefits on water quality through the reduction of sedimentation and pollutants from road runoff with the improved stormwater infrastructure. Discharge of pollutants, including sediments, would be reduced through the construction of a new storm sewer curb and other stormwater infrastructure components.

The Shoreline Restoration component of the Proposed Action would also result in short- and long-term impacts on water resources and water quality. Minor short-term construction-related impacts would result from disturbance of sediments by excavators and other heavy equipment for excavation and fill activities in Lake Superior to (1) remove and replace the stone revetment, (2) create 38 acres of new habitats, and (3) construct trails and parking areas. Restoration of the stone revetment along the shoreline would entail the placement of new fill below the OHWM of Lake Superior, approximately 3,500 feet in length.

Minor long-term impacts on Lake Superior would result from the permanent fill used to replace the stone revetment. The long-term impacts of the fill would represent a minor to moderate change from the existing condition because the revetment restoration would replace the existing failing revetment in approximately the same location. The restored revetment would be more effective at preventing shoreline erosion but might have greater impacts on coastal processes. The City of Marquette would need to obtain permits to implement shoreline restoration activities in accordance with the CWA and state law (see **Section 6.1**).

The Shoreline Restoration component would provide moderate long-term benefits to water resources and water quality by creating 38 acres of contiguous natural coastal habitat. The habitat would be planted with native vegetation that would serve, store, and filter stormwater runoff from the relocated road. The natural beach, dunes, and swale features would be created with clean sand fill. The Proposed Action is also in alignment with the GLRI Action Plan III through nonpoint source pollution reduction. No withdrawal of groundwater is anticipated for the Proposed Action; however, there is potential to encounter contaminated groundwater during the installation of the utilities and the related trench excavation (see **Section 3.4** for the evaluation of hazardous materials).

Alternative 3 – Relocation of Lakeshore Boulevard Only

Relocation of Lakeshore Boulevard would result in minor short-term impacts on water resources and water quality as a result of sediment disturbance by excavators and other heavy equipment while removing the existing road, constructing the relocated road, and installing the new culvert near the intersection of Hawley Street and Lakeshore Boulevard. No surface waters were identified in the construction staging areas; therefore, no impact is anticipated in these areas. The subrecipient has obtained permits for the impacts of the road relocation, as described in **Section 6.1**. Minor, short-term impacts on water resources and water quality from construction runoff would be minimized with the implementation of Best Management Practices (BMPs), and mitigation measures specified in the permits (see **Section 6.2**). Agency correspondence and copies of the permits are provided in **Appendix C**.

3.2.3 Floodplain Management (Executive Order 11988)

Executive Order (EO) 11988, Floodplain Management, requires federal agencies to minimize occupancy and modification of the floodplain. Specifically, EO 11988 prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. FEMA's regulations for complying with EO 11988 are promulgated in 44 C.F.R Part 9. The eight-step decision-making process to ensure compliance with EO 11988 is provided in **Appendix B**.

The design flood or 1-percent-annual-chance (100-year) floodplain elevation at this location on Lake Superior is 604.6 feet NAVD 88, as noted in the Flood Insurance Study (FIS) of Marquette, Michigan and All Jurisdictions (FEMA 2011). The same study shows the 500-year Base Flood Elevation (BFE) as 605 feet NAVD 88. The project area is almost entirely within the X zone—or Area of Minimal Flood Hazard—and is adjacent to the 100-year floodplain of Lake Superior. The construction staging areas are also not located in the mapped floodplain. The portion of the project area north of Hawley Street is within the 100-year floodplain of Lake Superior, as shown in Flood Insurance Rate Map (FIRM) panel #26103C0495D effective 04/19/2016 for the City of Marquette, and in **Figure 9a, 9b** and **9c** of **Appendix A**. The figures are orientated north to south to illustrate the mapped floodplain in the project area.

The shoreline of the project area is covered by a stone and broken concrete revetment that provides some protection from the effects of storms and higher water levels. The revetment has been eroded and damaged from these actions over time, reducing its functionality (Baird 2013). The revetment does not provide suitable habitat for fish or wildlife, nor does it permit recreational uses of the shoreline.

Alternative 1 – No Action

Under the No Action alternative, there would be no construction, and therefore, no direct modification of the floodplain. However, there would be long-term, minor impacts from continued erosion of the revetment and areas where the revetment may be breached from increasingly frequent storms and higher water levels. A breach would allow damage to the road from flooding and result in additional erosion. The revetment would continue to degrade,

negatively affecting habitat for fish and wildlife species and limiting recreational uses of the shoreline.

Action Alternative 2 – Proposed Action

Relocation of Lakeshore Boulevard would result in minor short-term impacts on floodplains as a result of sediment disturbance by excavators and other heavy equipment and due to the removal of vegetation in the area of the mapped floodplain north of Hawley Street. The placement of fill at this location in the mapped floodplain would be required to reduce the elevation of the relocated roadway to meet the road's current elevation. The placement of this fill would have negligible long-term impacts on flood elevations or floodplain functions. Coordination with the local floodplain administrator would be required to ensure compliance with local floodplain ordinances.

Overall, the relocation and elevation of Lakeshore Boulevard 300–400 feet from the mapped floodplain would provide minor long-term benefits by reducing damages and road closures caused by flooding. The improved stormwater infrastructure would mitigate against flood damage to Hawley Street from floodwaters to the north by increasing its load capacity to carry stormwater away from the street. Part of the stormwater infrastructure just south of Hawley Street requires the construction of a conveyance (culvert) 8 cubic yards of fill within the Lake Superior floodplain. The subrecipient has obtained permits for these activities from the USACE under NWP 14 (File Number LRE-2018-01031-38-N19) and EGLE (Permit No. WRP019036). See **Section 6.1** for additional information.

The Shoreline Restoration component would have minor short-term impacts on the floodplain as a result of sediment disturbance by excavators and other heavy equipment for the removal and restoration of the stone revetment and construction of the road north of Hawley Street. The restored revetment would include more fill in the floodplain than the existing revetment, but there would be less erosion and sedimentation into the floodplain. Because the fill would be in Lake Superior, no effect on flood elevations is anticipated. Placement of fill in the mapped floodplain where the new road would be constructed, north of Hawley Street, would have a negligible long-term impact.

The Shoreline Restoration component would create 38 acres of contiguous natural habitats for wildlife that would include dune and swale complexes, coastal wetlands, and planting of native vegetation. The natural habitats would provide minor long-term benefits to support the natural and beneficial functions of the floodplain. These improvements would buffer the lakeshore. At gaps in the revetment, the restored habitats would benefit from the ecosystem processes of the floodplain. The Shoreline Restoration component would create natural habitats for wildlife in the area behind the revetment, but there would be no fish or wildlife habitat along the shoreline edge on the revetment. The Shoreline Restoration component would also provide improved public access parallel to the lakeshore, but a large stone revetment would remain along the lakeshore between recreational users and the lake. The creation of small pocket beaches could

provide minor improvements for both fish and wildlife habitats as well as public access to the water.

In the long-term, the Shoreline Restoration component would also mitigate against erosion and sedimentation. The dunes, swales, and wetlands would provide natural filtration and slow the velocity of stormwater runoff, thus improving water quality and reducing erosion. The Shoreline Restoration component would also provide stability with stone armoring.

Alternative 3 - Relocation of Lakeshore Boulevard Only

Relocation of Lakeshore Boulevard would result in negligible to minor short-term impacts on floodplains as a result of sediment disturbance by excavators and other heavy equipment, as well as the removal of vegetation in the area of the mapped floodplain north of Hawley Street. Placement of fill in the mapped floodplain to construct the road north of Hawley Street would have a negligible long-term impact. Because the fill would be placed in the floodplain associated with Lake Superior, no effect on flood elevations is anticipated.

The Lakeshore Boulevard Only alternative would provide a minor long-term benefit by reducing flood damages but would have a minor long-term impact on habitat availability and public access. This alternative would move the road away from the hazards of the adjacent floodplains—increasingly frequent storms and higher water levels—and would mitigate against flood damage to the infrastructure. The protection provided by the natural buffer and the restored revetment, included in the Shoreline Restoration component, would not occur. Natural habitat for wildlife in the area would not be created and public access would not be improved.

3.2.4 Air Quality

The Clean Air Act (CAA), 42 U.S.C. § 7401 et seq., requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national air quality standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Current criteria pollutants are carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), lead (Pb), particulate matter (PM), and sulfur dioxide (SO₂).

Federally funded actions in nonattainment and maintenance areas are subject to EPA conformity regulations, 40 C.F.R. Parts 51 and 93. The air conformity analysis process ensures that emissions of air pollutants from planned federally funded activities would not affect the state's ability to achieve the CAA goal of meeting the NAAQS. Section 176(c) of the CAA requires that federally funded projects must not cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone. Activities that would cause an exceedance of the NAAQS or cause an area to fall out of attainment status would be considered a significant impact. The emissions from construction activities are subject to air conformity review.

Under the general conformity regulations, a determination for federal actions is required for each criteria pollutant or precursor in nonattainment or maintenance areas where the action's direct and indirect emissions have the potential to emit one or more of the six criteria pollutants at rates equal to or exceeding the prescribed *de minimis* rates for that pollutant. The prescribed annual rates are 50 tons of volatile organic compounds (VOCs) and 100 tons of nitrogen oxides (NO_x) (O₃ precursors) and 100 tons of PM_{2.5}, SO₂, or NO_x (PM_{2.5} and precursors).

An area is classified as nonattainment when it does not meet NAAQS standards. According to EPA's NAAQS county attainment record, Marquette County is in attainment for all NAAQS criteria pollutants (EPA 2019c).

Alternative 1 – No Action

Construction activities would not occur under the No Action alternative. Detours and road work from Lakeshore Boulevard closures resulting from storm damage would likely continue and would cause a minor increase in localized emissions. Therefore, short- and long-term impacts on air quality would be minor with increased road closures and work.

Action Alternative 2 – Proposed Action

The Proposed Action would have short-term impacts on air quality owing to the use of construction equipment with diesel and gasoline engines. During the construction phase, exposed soil could temporarily increase airborne particulate matter into the project area. Emissions from construction equipment could have minor temporary effects on the levels of some pollutants, including CO, VOCs, NO₂, O₃, and PM. Emissions would be temporary and localized, and only minor impacts to air quality in the project area would occur. BMPs and mitigation measures for air quality impacts are provided in **Section 6.2**.

Long-term negligible impacts on air quality are anticipated and an air permit would not be required for the Proposed Action. The Proposed Action would not increase traffic capacity and would reduce emissions from road repairs in the long-term.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have impacts similar to the Proposed Action, but with less short-term emissions. There would be a reduction in construction activity because the Shoreline Restoration component would not be implemented.

3.2.5 Coastal Zone Management

The Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., enacted in 1972, was established to preserve, protect, develop, and, where possible, restore or enhance the resources of the nation's coastal zone. Section 307 of the CZMA requires federal actions, within or outside of the coastal zone, to be consistent with the enforceable policies of a state's federally approved coastal management program (NOAA 2019). The EGLE Office of Coastal Management is

responsible for managing the Michigan Coastal Management Program (MCMP). The MCMP has five areas of concentration (EGLE 1978):

- Natural Hazard to Development: Includes erosion and flood-prone areas.
- Sensitive to Alteration or Disturbance: Includes ecologically sensitive areas (wetlands), natural areas, sand dunes, and islands.
- Fulfilling Recreational or Cultural Needs: Includes areas recognized for recreational, historic, or archaeological values.
- Natural Economic Potential: Includes water transportation, mineral and energy, prime industrial, and agricultural areas.
- Intensive or Conflicting Use: These encompass coastal lakes, river mouths, bays, and urban areas.

Under the NREPA, the MCMP has 32 associated state statutes and associated administrative rules to administer the state's coastal management program (EGLE 2020a). Part of the coastal zone consistency evaluation includes considering the scenic and aesthetic enjoyment of the resource and having public access to the resource as defined by 15 C.F.R. § 930.11.

In Michigan, the coastal zone includes the shorelines of Lake Superior, Huron, Michigan, and Erie, up to 500 feet inland in most areas. The coastal zone at the project area is located up to 500 feet from the shoreline. Nearly all of the project area and both construction staging areas are located in the coastal zone of Lake Superior, as shown in **Figure 10 of Appendix A**.

Alternative 1 – No Action

Under the No Action alternative, there would be continued long-term, minor impacts on the coastal zone in the project area. Erosion mitigation measures would not be implemented, and there would be a continued risk of revetment damage that could increase the risk of erosion and road damage rates. Flooding in the area would not be mitigated to reduce the risk of damage. The revetment impact would be twofold: continue to create a barrier to the scenic value and prevent public recreational access to the shoreline. These continued risks to natural hazards and lack of public access to the shore are not consistent with the MCMP.

Action Alternative 2 – Proposed Action

Relocation of Lakeshore Boulevard would result in minor short-term impacts on coastal resources as a result of sediment disturbance by excavators and other heavy equipment to remove the existing road and construct the relocated road. The construction staging areas would also be located within the coastal zone. In the long-term, the Relocation of Lakeshore Boulevard would minimize the threats to human safety and property by relocating Lakeshore Boulevard away from the natural hazards caused by the shoreline and would be consistent with MCMP.

The Shoreline Restoration component would cause minor short-term construction-related impacts in the coastal zone as a result of sediment disturbance by excavators and other heavy equipment. Excavation and construction activities in Lake Superior would include removal and

replacement of the stone revetment, creation of new habitat areas, and construction of the trail and parking areas.

The Proposed Action would have long-term moderate impacts on the coastal zone in and near the project area (see **Section 4**). The project would be consistent with MCMP's areas of concentration by:

- Removing infrastructure from a natural hazard area
- Improving stormwater management
- Providing public recreational access to the shoreline
- Minimizing shoreline erosion
- Improving terrestrial habitat

The Proposed Action would be consistent with the MCMP and the following areas of concentration:

- Area of Natural Hazard to Development: The Proposed Action would minimize the threats to human safety and property from storm damage and high water levels by removing vulnerable infrastructure from the shoreline and adding natural buffers.
- Areas Sensitive to Alteration or Disturbance: The Proposed Action would improve sensitive areas through the Shoreline Stabilization component by increasing natural coastal habitat with the added natural dunes, swales, wetlands, and vegetative areas.
- Fulfilling Recreational or Cultural Needs: The Proposed Action provides increased aesthetic values of the coastal area through the removal of the stone revetment and providing access to the shoreline. It will promote increased recreational opportunities with added parking, trails, and shoreline access.

The Proposed Action would have minor short-term impacts on coastal resources as a result of sediment disturbance by excavators and other heavy equipment to remove the existing road and construct the relocated road. In the long-term, the Shoreline Restoration component would create 38 acres of natural habitat behind the restored revetment that would include dune and swale complexes, coastal wetlands, and planting of native vegetation. Creation of the natural habitats would provide minor long-term benefits to the coastal zone. The natural habitats created would benefit ecosystem processes of the coastal zone beyond the revetment. The creation of small pocket beaches could provide minor improvements in both fish and wildlife habitat and public access to the water. The Shoreline Restoration component would also mitigate against erosion and sedimentation and the dunes, swales, and wetlands would provide natural filtration to slow the velocity of stormwater runoff, improve water quality, and reduce erosion. Restoration of the stone revetment would stabilize the shore with stone armoring; however, it would maintain a visual barrier between recreational users and Lake Superior. The Shoreline Restoration component would also provide improved public access parallel to the lakeshore by constructing ADA-accessible trails and parking.

FEMA provided the EA scoping document to the EGLE Water Resource Division on November 25, 2019, and EGLE responded with a CZMA consistency determination on December 18, 2019 (see correspondence in **Appendix C**). Coastal zone consistency is dependent on compliance with the conditions specified in the approved EGLE permit issued for the Relocation of Lakeshore Boulevard component of the project (Permit# WRP019036 V 1). For the Shoreline Restoration component, the City of Marquette would need the appropriate federal and state permits for impacts on waters of the U.S. and waters of the state of Michigan and comply with the conditions of those future permits to maintain consistency with the MCMP. See **Section 6.2** for the EGLE permit conditions and **Appendix C** for a copy of the EGLE permit.

Alternative 3 - Relocation of Lakeshore Boulevard Only

Relocation of Lakeshore Boulevard would result in minor short-term impacts on coastal resources as a result of sediment disturbance by excavators and other heavy equipment to remove the existing road and construct the relocated road. In the long-term, the Relocation of Lakeshore Boulevard Only alternative would benefit the coastal zone by minimizing the threats to human safety and property by relocating Lakeshore Boulevard away from the natural hazards caused by the shoreline and still be consistent with MCMP. This alternative would not provide the benefit of restoring the shoreline area, increasing natural coastal habitat, and promoting increased recreational opportunities. Compliance with permit conditions, as described under the Proposed Action, would be required (see **Section 6.2**).

3.3 Biological Environment

3.3.1 Terrestrial and Aquatic Environment

Marquette County is largely forested with tree stands consisting of jack pine (*Pinus banksiana*), various species of aspen, oak, pine, and birch, and understory plants such as rough fescue (*Festuca altaica*), common stinkhorn (*Phallus impudicus*), sweet fern (*Comptonia peregrina*), Allegheny plum (*Prunus alleghaniensis*), and big bluestem (*Andropogon gerardii*) (Marquette County Forestry Commission 2017).

Terrestrial habitat in the project area consists primarily of an open former industrial site with evidence of fill, concrete foundations, and soil disturbance. The project area was once the site of a large industrial complex called the Cliffs-Dow Plant. Nearly all the aboveground structures related to the Plant were demolished. The remaining land has been vacant for decades and, overall, the former industrial site presently serves as a poor terrestrial habitat (see **Section 3.4** for additional information).

The project area is now dominated by grasses and weedy species, including Canada goldenrod (*Solidago canadensis*) and tansy (*Tanacetum vulgare*). Small patches of upland forest stands are also present and consist of red pine (*Pinus resinosa*), Jack pine (*Pinus banksiana*), paper birch (*Betula papyrifera*), white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), and bigtooth aspen (*Populus grandidentata*). Terrestrial wildlife in the project area may include raccoon (*Procyon*

litor), coyote (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), and various species of squirrels.

Small depressional wetland areas are also present in the project area (see **Section 3.3.2** for additional information). Vegetation in the wetland areas includes common aspen (*Populus tremula*), balsam poplar (*Populus balsamifera*), quaking aspen (*Populus tremuloides*), grey alder (*Alnus incana*), and red osier dogwood (*Cornus sericea*), with an understory consisting of reed canarygrass (*Phalaris arundinacea*), Arctic bramble (*Rubus acaulis*), Joe Pye weed (*Eutrochium purpureum*), and field horsetail (*Equisetum arvense*)

Aquatic habitat in the project area includes the shoreline of Lake Superior, which is directly adjacent to and east of Lakeshore Boulevard. Shoreline habitat consists primarily of a rock revetment with stones ranging in size from cobbles to armor stones and pieces of broken concrete (Baird 2014). Because of its cool temperatures, relatively small watershed, and geologic youth, Lake Superior is classified as a low productivity lake that offers few nutrients and minerals. Nearshore habitats are warmer, more nutrient-rich, and support a greater variety of species than deeper, colder, open waters (Sea Grant Michigan n.d.).

Lake Superior supports many species of fish in the vicinity of the project area, including brown trout (*Salmo trutta*), cisco (*Coregonus* sp.), lake trout (*Salvelinus namaycush*), round whitefish (*Prosopium cylindraceum*), splake (*Salvelinus fontinalis* × *Salvelinus namaycush*), and yellow perch (*Perca flavescens*) (Michigan Department of Natural Resources 2018).

Common waterbird sightings near the project area include common loon (*Gavia immer*), red-necked grebe (*Podiceps grisegena*), long-tailed duck (*Clangula hyemalis*), and red-breasted merganser (*Mergus serrator*) (Cornell Lab of Ornithology 2020).

Alternative 1 – No Action

Under the No Action alternative, there would be minor, long-term, adverse impacts on the terrestrial and aquatic environment. Continued flooding of the roadway and resulting soil disturbance and surface runoff could contain pollutants that would impact water quality. The existing shoreline revetment would continue to degrade from age and poor engineering. Algae, water insects, and mollusks attach themselves to hard surfaces and are fed upon by fish.

The open, grassy, disturbed portion of the project area does not currently provide a viable habitat for wildlife, and this situation would continue unchanged. Invasive species in the project area would continue to grow in an uncontrolled manner (see **Section 3.3.4** for an evaluation of invasive species).

Alternative 2 – Proposed Action

Relocation of Lakeshore Boulevard would cause minor short-term impacts on the terrestrial habitat, such as soil disturbance and removal of vegetation, while the existing roadway is being demolished and the relocated road is being constructed. Relocation would also cause minor long-term impacts on the habitat: removal of 1.5 acres of trees, the permanent loss of 0.004

acres of wetlands (Wetland C), and removal of some invasive vegetation. The impact on Wetland C is authorized through the NWP 14 and EGLE permit described under the Proposed Action (see **Section 6.1** for additional information regarding permits). Seed and mulch landscaping would be planted on either side of the relocated road in accordance with EGLE BMP standards.

The Shoreline Restoration component would cause minor short-term impacts on terrestrial and aquatic habitats, including the removal of the existing revetment, construction of the new revetment structure, and excavation/fill activities to create beach cells, dunes, and swale features. Shoreline restoration would also provide minor long-term benefits through the creation of 38 acres of contiguous natural habitat in the project area that would comprise 3 acres of beach, 16 acres of dune and swales, 3 acres of coastal wetland, and 16 acres of upland terrestrial habitat. These areas would serve as native habitats near the shore, behind the restored revetment. The Shoreline Restoration component would remove 2.3 acres of existing trees (mostly poplar and alder) but would plant new trees in the restoration area. The Shoreline Restoration component could also result in the filling of Wetland A, which is 0.364 acres in size, shown in **Figure 11** of **Appendix A**. During the restoration work, it is possible that this wetland could be partially filled or reconfigured to develop the dune and swale complexes. However, because the Shoreline Restoration component proposes to create 3 acres of new coastal wetlands, there would be a net increase in wetland area even if the project impacted this existing wetland. The new revetment would continue to cause long-term minor impacts on the shore/aquatic habitat, but there may be at least one pocket beach that could provide some long-term benefits to aquatic life and water birds.

Alternative 3 – Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would result in minor short-term impacts on terrestrial habitat while the existing roadway is being demolished and the relocated road is being constructed, resulting in soil disturbance and removal of vegetation. Relocation of Lakeshore Boulevard Only would also result in minor long-term impacts on habitats from the removal of 1.5 acres of trees, the permanent loss of 0.004 acres of wetlands (Wetland C), and removal of some invasive vegetation. The impact on Wetland C is authorized through the NWP 14 and EGLE permit described under the Proposed Action (see **Section 6.1** for additional information regarding permits). Seed and mulch landscaping would be installed on either side of the relocated road, in accordance with EGLE BMP standards.

The Relocation of Lakeshore Boulevard Only alternative would not include the Shoreline Restoration component. Aquatic conditions would remain the same or worsen over time. The trees removed to relocate the road would not be replaced. In the long-term, erosion and flooding could continue to cause adverse impacts on terrestrial and aquatic environments.

3.3.2 Wetlands (Executive Order 11990)

Executive Order (EO) 11990, Protection of Wetlands, requires federal agencies to take action to minimize the loss of wetlands. FEMA regulation 44 C.F.R. Part 9, *Floodplain Management and Protection of Wetlands*, sets forth the policy, procedures, and responsibilities to implement and

enforce EO 11990. EO 11990 prohibits FEMA from funding activities in a wetland unless no practicable alternatives are available. The NEPA compliance process requires federal agencies to consider direct and indirect impacts on wetlands which may result from federally funded actions. The eight-step decision-making process to ensure compliance with EO 11990 is provided in **Appendix B**.

USACE and EPA define wetlands as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (40 C.F.R. 122.2).

The National Wetlands Inventory (NWI) was reviewed to identify potential wetlands in the project area (USFWS 2019b). The NWI classifies Lake Superior as a Lacustrine System, which includes both wetlands and deepwater lake habitats. Under federal regulations, because of a lack of vegetation, Lake Superior does not fit the criteria as a wetland. The subrecipient completed a wetland delineation of the project area in October 2018, which is the basis for the analysis. The delineation identified three wetland areas totaling 0.6 acres within the project area, as shown in **Figure 11** of **Appendix A**. Wetland A totals 0.364 acres, Wetland B totals 0.043 acres, and Wetland C totals 0.004 acres.

The identified wetlands may be generally categorized as freshwater forested/shrub wetlands. The 2018 delineation identified several tree and plant species in the wetland areas: tree stratum dominated by paper birch (*Betula papyrifera*), European aspen (*Populus tremula*), and balsam poplar (*Populus balsamifera*); a sapling/shrub stratum dominated by gray alder (*Populus balsamifera* and *Alnus incana*); and an herbaceous stratum dominated by dwarf raspberry (*Rubus acaulis*) and Canada goldenrod (*Solidago canadensis*). Reed canarygrass (*Phalaris arundinacea*), an invasive weed of concern in the state, was also found during the delineation. Soils were consistently reported as being saturated to the surface and meeting the “sandy mucky mineral” hydric soil indicator. All sample locations were heavily disturbed by industry, with evidence of fill and soil disturbance being prevalent.

Alternative 1 – No Action

Under the No Action alternative, there would be no project-related short- or long-term impacts on the identified wetlands because there would be no relocation of the roadway or utilities.

Alternative 2 – Proposed Action

Relocation of Lakeshore Boulevard would result in minor short-term impacts on wetlands from the construction activities occurring near Wetlands A and B. Relocation of Lakeshore Boulevard would result in the permanent loss of Wetland C because the relocated road would fill this wetland. This loss of 0.004 acres of freshwater forested/shrub wetland would be a minor, permanent, adverse impact. The City of Marquette obtained authorization for this wetland impact from USACE (NWP 14) and EGLE (Permit Number WRP019036). Copies of the permits are provided in **Appendix C**. Compliance with the BMPs and mitigation measures outlined in the

USACE and EGLE permits is required to keep this impact below the level of significance. The permit conditions are described in **Section 6.2**.

The Shoreline Restoration component of the Proposed Action could result in the fill of additional wetland areas, specifically Wetland A, which is 0.364 acres in size. It is possible that this wetland could be partially filled or reconfigured while the restoration work to develop the dune and swale complexes is being conducted. However, because the Shoreline Restoration component proposes to create 3 acres of new coastal wetlands, there would be a net increase in wetland area, even if the project impacted the existing wetland area. The City of Marquette would be responsible for obtaining the appropriate federal and state permits to implement the shoreline restoration activities.

Minor short-term impacts on wetlands would be mitigated with temporary erosion and sediment barriers installed prior to the commencement of construction.

Alternative 3 – Relocation of Lakeshore Boulevard Only

Impacts on wetlands resulting from the Relocation of Lakeshore Boulevard Only alternative would be limited to the 0.004 acres (172 square feet) at Wetland C and the continued erosion that would not be mitigated by the Shoreline Restoration component. The impact was authorized through the NWP 14 and EGLE permit described under the Proposed Action. Copies of the permits are provided in **Appendix C**. Compliance with the BMPs and mitigation measures outlined in the USACE and EGLE permits is required to keep this impact below the level of significance. The permit conditions are described in **Section 6.2**.

3.3.3 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973, 16 U.S.C. § 1531, provides a framework for the conservation of endangered and threatened species and their habitats. Federal agencies are required to ensure that actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of any listed species (including plant species) or result in the destruction or adverse modification of designated critical habitats for such species.

In October 2019, via the Information for Planning and Consultation (IPaC) tool, FEMA obtained a list of species with the potential to occur in the project vicinity. There was no federally designated critical habitat within the project area. The IPaC tool identified the potential for four listed species to occur in or near the project area: Canada lynx (*Lynx canadensis*), Gray wolf (*Canis lupus*), Northern long-eared bat (*Myotis septentrionalis*), and Red knot (*Calidris canutus rufa*).

As described in **Section 3.3.1**, the project area consists primarily of open disturbed areas of a former industrial site, dominated by grasses and weedy species. While stands of trees are present, the project area does not provide mature forest habitat to support the Northern long-eared bat. There is no suitable habitat to support Canada lynx or gray wolf in the project area. Red knots utilize sandy beaches and mudflat habitats, but none are present in the project area. Therefore, no federally listed species would be expected to be present in the project area.

Alternative 1 – No Action

The No Action alternative would not directly impact federally listed threatened or endangered species because there would be no construction. Also, owing to the lack of suitable habitat, no listed species are expected to occur in the project vicinity.

Alternative 2 – Proposed Action

Northern long-eared bats tend to roost in trees near water; although unlikely, there is the potential that removal of 3.8 acres of trees under the Proposed Action could affect some bat habitat. In October 2019, FEMA submitted an online Northern long-eared bat 4(d) determination key and received verification from USFWS that any take of the bats that may occur as a result of the Proposed Action is not prohibited under the ESA Section 4(d) rule adopted for the species (see **Appendix C**).

Canada lynx and gray wolf would not be expected to be present in the project area due to a lack of suitable habitat. Red knot may migrate through the project area between May and September but would not be expected to use the project area because of the lack of beach and mudflat habitats for foraging. If present, red knots would be able to move away from project activities and would not be affected. FEMA made a “no effect” determination for all four federally listed species identified as having the potential to occur in the project area. In December 2019, FEMA contacted USFWS to request comment on the agency’s no effect determination. The USFWS responded by email on January 13, 2020, stating that the agency does not provide concurrence with “no effect” determinations and had no further comment. Correspondence between USFWS and FEMA is provided in **Appendix C**.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have no effect on threatened and endangered species similar to the findings for the Proposed Action. Because this alternative would only remove 1.5 acres of trees, the potential to affect Northern long-eared bat habitat would be considerably less.

3.3.4 Migratory Birds

A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. The Migratory Bird Treaty Act (MBTA) of 1918, as amended, 16 U.S.C. §§ 703–711, protects migratory birds and their nests, eggs, and body parts from harm, sale, or other injurious actions. All native birds, including common species such as American robin (*Turdus migratorius*) and American crow (*Corvus brachyrhynchos*) are protected by the MBTA. The project area would support migratory birds.

The Bald and Golden Eagle Protection Act, 16 U.S.C. § 668, prohibits the take, possession, sale, or other harmful action of any golden (*Aquila chrysaetos*) or bald eagle (*Haliaeetus leucocephalus*), alive or dead, including any part, nest, or egg (16 U.S.C. § 668(a)). A search of IPaC in October 2019 identified several migratory bird species, including the bald eagle, which may be present in

the project area, depending on the season (USFWS Consultation reference code 03E16000-2020-SLI-0051). In response to a request from FEMA, USFWS confirmed in December 2019 that there are no known bald eagle nests in the project area (see **Appendix C** for related USFWS correspondence).

Alternative 1 – No Action

The No Action alternative would not directly impact migratory birds because there would be no construction. The existing degraded habitat conditions would persist, providing poor cover and forage for migratory birds.

Alternative 2 – Proposed Action

Relocation of Lakeshore Boulevard would have negligible short-term impacts on migratory bird species because of the poor quality of the existing habitat. There would be minor long-term impacts from the removal of approximately 1.5 acres of scattered trees, impacts on Wetland C (shown in **Figure 11** of **Appendix A**), and removal of other vegetation along the relocated road alignment that could serve as habitat for migratory birds. Seed and mulch landscaping would be planted on either side of the relocated road in accordance with EGLE BMP standards.

The Shoreline Restoration component of the Proposed Action would also have negligible short-term impacts on migratory bird species because of the poor quality of the existing habitat. The Shoreline Restoration component would result in impacts from the removal of 2.3 acres of scattered trees, the potential for fill in Wetland A (shown in **Figure 11** of **Appendix A**), and the placement of fill into Lake Superior to restore the revetment. The Shoreline Restoration component would have minor long-term benefits on migratory bird species by establishing 38 acres of new contiguous natural habitat that would include 3 acres of beach, 16 acres of dunes and swales, 3 acres of coastal wetland, and 16 acres of upland terrestrial habitat. Revegetation of the shoreline and establishment of beach cells and dune and swale features would benefit migratory birds that favor nearshore and shoreline habitats in the long term. The tree removal and impact on Wetland A would be offset by new plantings and the creation of new coastal wetlands in the shoreline restoration area.

BMPs to avoid and minimize impacts on migratory birds are provided in **Section 6.2**.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have negligible short-term impacts on migratory bird species because of the poor quality of the existing habitats. The alternative would result in minor long-term impacts on migratory birds caused by the filling of Wetland C, the removal of 1.5 acres of trees, and the removal of other vegetation along the relocated roadway that could serve as habitat. The trees removed to relocate the road would not be replaced. Seed and mulch landscaping would be planted on either side of the relocated road in accordance with EGLE BMP standards.

This alternative would not include the creation of 38 acres of new contiguous natural habitat under the Shoreline Restoration component. Without measures to restore native vegetation and habitats, invasive weed species would likely outcompete native plant species resulting in minor, long-term impacts on migratory birds.

3.3.5 Invasive Species

EO 13112, Invasive Species, requires federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts caused by invasive species. The State of Michigan has also established laws that prohibit the possession and sale of certain invasive plant and animal species under Part 413 of the NREPA Transgenic and Nonnative Organisms (M.C.L. 324.41301 et seq.) and the Michigan Seed Law (Michigan Administrative Code R 285.715.7). The Michigan Invasive Species Coalition is a state organization that assists regional and local working groups to control invasive species in the state (Michigan Invasive Species Coalition 2020). At the local level, the Lake to Lake Cooperative Invasive Species Management Area (CISMA) supports the control of invasive species in the Upper Peninsula area, including Marquette County (CISMA 2020a).

The CISMA identifies several weeds as of concern in Marquette County that also may be present in the project area: glossy buckthorn (*Fangula alnus*), garlic mustard (*Alliaria petiolate*), spotted knapweed (*Cenaurea stoebe*), European swamp thistle (*Cirsium palustre*), and butterbur (*Petasites hybridus*) (CISMA 2020b). Reed canarygrass (*Phalaris arundinacea*), an invasive plant of concern in Michigan, was identified in the project area during the October 2018 wetland delineation.

Although Lake Superior is not thought to support zebra mussel (*Dreissena polymorpha*) infestations because of low temperatures and lack of nutrients, zebra mussels have been identified in four locations: in the major ports of Duluth, Minnesota and Thunder Bay, Ontario, Canada, the Apostle Islands, Wisconsin (Antholt 2019) and Isle Royal, Michigan (Nissen 2018). Zebra mussels have not been observed in the waters adjacent to the project area.

Alternative 1 – No Action

The No Action alternative would have no project-related impacts because construction would not occur. However, there could be minor long-term, adverse impacts on the area as invasive plant species would continue to persist in open, disturbed areas.

Action Alternative 2 – Proposed Action

Relocation of Lakeshore Boulevard could have minor short-term impacts from the potential spread of invasive weeds caused by construction activities. Construction activities on land could result in the transport of reed canarygrass or other invasive weed species outside of the project area as both cuttings and attached to vehicles.

The Shoreline Restoration component could also result in minor short-term impacts from the spread of invasive weeds or invasive aquatic species during construction. Construction activities on land could result in the transport of reed canarygrass or other invasive weed species outside of the project area as both cuttings and attached to vehicles. Work in Lake Superior for the restoration of the revetment could involve marine equipment for the excavation and fill used to remove and replace the existing revetment. Any marine equipment used would be cleaned thoroughly before being placed in the water and before being moved to other bodies of water following construction. The Shoreline Restoration component would have moderate, long-term, beneficial effects by removing invasive plant species and restoring native habitats on 38 acres of the shoreline area.

BMPs to avoid and minimize the spread of invasive species are provided in **Section 6.2**.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative could have minor short-term impacts from the potential spread of invasive weeds caused by construction activities. Construction activities on land could result in the transport of reed canarygrass or other invasive weed species outside of the project area as both cuttings and attached to vehicles.

The Relocation of Lakeshore Boulevard Only alternative would result in minor long-term impacts from the spread of invasive weeds. Invasive weed species would continue to persist and perhaps spread in the disturbed lands around the road because there would be no restoration of natural habitats along the shoreline. No project-related, aquatic invasive species impacts are anticipated as there would be limited in-water work using land-based equipment.

BMPs to avoid and minimize the spread of invasive species are provided in **Section 6.2**.

3.4 Hazardous Materials

Hazardous materials are any items or agents (biological, chemical, radiological, or physical) that have the potential to cause harm to humans, animals, or the environment either by itself or through interaction with other factors. Sites within or adjacent to the project area, regulated by federal hazardous materials laws such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), were identified using the EPA Envirofacts and NEPAassist websites (EPA 2019d, EPA 2019e).

Envirofacts and NEPAassist identified five regulated sites within a 0.5-mile radius of the project area, as summarized in **Table 3-3**. The five sites are regulated through programs under RCRA. None of these sites are within the project area. NEPAassist did not identify any sites in the project area or vicinity listed in the toxic release inventory, water dischargers (NPDES), EPA Brownfields Program, or Superfund (National Priorities List) facilities databases (EPA 2019d, 2019e).

Table 3-3: Federally Regulated Sites in the Project Vicinity

Site No.	Site Name	Address	Applicable Law/Regulations	Notes
1	Duquaine Inc	1744 Presque Isle Ave Marquette, MI 49855	Resource Conservation and Recovery Act	Conditionally Exempt Small Quantity Generator
2	Gold Eagle Supply Inc	475 River Park Cir Marquette, MI 49855	Resource Conservation and Recovery Act	Conditionally Exempt Small Quantity Generator
3	Marquette Police Department	1816 Presque Isle Ave Marquette, MI 49855	Resource Conservation and Recovery Act	Ignitable Waste
4	Pioneer Labs	375 River Park Cir Marquette, MI 49855	Resource Conservation and Recovery Act	Small Quantity Generator
5	Upfront and Company Inc.	600 Hawley St Marquette, MI 49855	Resource Conservation and Recovery Act	Conditionally Exempt Small Quantity Generator

Source: EPA 2019d.

Most of the project area is located on the state-regulated former Cliffs-Dow Plant Site (EGLE Facility ID 52000003) and is owned by the City of Marquette (EGLE 2020c). EGLE regulates the site under two parts of the NREPA, Part 201, Environmental Remediation (M.C.L. 324.20101 et seq.; Michigan Administration Rules R 299.1 to 299.51021) and Part 31, Water Resources Protection (M.C.L. 324.3101 et seq.).

The Cliffs-Dow Plant site is a former charcoal pig iron and wood chemical plant that operated from 1902 to 1969. Wastes and by-products generated at the site throughout its operational history include VOCs, specifically benzene, toluene, ethylbenzene, semi-volatile organic compounds, specifically phenolic compounds, e.g., 2-methyl phenol, 4-methyl phenol, 2,4-dimethylphenol; and metals (Trimedia 2019). A limited source removal in 2011 removed 845 tons of buried tar materials for disposal as non-hazardous special waste. This tar material is referred to as “source material” as it is the primary source of contamination from the site to the environment. The approximate boundary of the former Cliffs-Dow Plant complex is shown in **Figure 12 of Appendix A**. The entire plant was located west of the existing Lakeshore Boulevard and no plant operations are known to have occurred along the lakeshore.

Low-level contamination in the soil above the water table is known to exist across the project area (Barr 1998). However, contamination was generally detected at concentrations below the Part 201 Generic Cleanup Criteria and Screening Levels for residential use and is not expected to present a risk during the construction of the projects (see soil testing results tables in

Appendix G). The site uses are restricted to non-residential only because of the probability that pockets of source material or zones of high concentration contamination could exist in the soil at the site. Soil samples collected from areas adjacent to and removed, along with the tar source material removed in 2011, contained contaminants at concentrations that exceed the Part 201 Generic Residential Contact criteria, but not the Commercial Direct Contact criteria (Trimedia 2010).

Groundwater at the site is contaminated at concentrations that exceed various state criteria as well as federal maximum contaminant levels established in the Safe Drinking Water Act (see groundwater results tables in **Appendix G**) (Trimedia 2019). The depth to groundwater varies from about 8 feet below ground surface (bgs) in the upgradient portion of the project area to 2 feet bgs near the lakeshore. A relatively narrow groundwater contaminant plume has been defined that starts on the upgradient side of the project area (see **Figure 13 of Appendix A**), crosses underneath the project area, and then continues before discharging to Lake Superior through a groundwater-surface water interface. Subsurface activities within the footprint of the contaminant plume could encounter contaminated groundwater or vapors emanating from VOCs in the groundwater plume. Groundwater use at the site is prohibited.

The characteristics of the site's hydrogeology, including the groundwater-surface water interface and groundwater flow regimes, are currently being studied by the City of Marquette and EGLE. Future compliance activities by the city include the installation of additional monitoring wells and groundwater sampling to further define the vertical and horizontal extent of groundwater contamination at the site.

Alternative 1 – No Action

Under the No Action alternative, the City of Marquette would continue to work with EGLE to monitor the site's contamination and would take actions as required under state law to contain or clean up the site. Because there would be no construction under the No Action alternative, there would be no impacts related to hazardous materials.

Action Alternative 2 – Proposed Action

The Proposed Action would not involve the addition of any hazardous materials or chemicals to the site, nor would it increase the overall risk of hazardous materials known to already exist in the environment. Construction equipment used for the project would have small quantities of gasoline and fuel, but no releases are anticipated from these machines as they would be kept in good working order in accordance with state and local ordinances.

Based on surface and shallow subsurface soil sampling results, hazardous materials are not known to be present at concentrations that pose a risk to human health or the environment. The possibility exists that additional source material could be encountered that would represent a moderate short-term impact to onsite workers through direct, dermal contact and inhalation of VOCs emanating from the source material, and a potential minor impact to residents near the site through inhalation of VOCs.

Relocation of Lakeshore Boulevard would also result in moderate short-term impacts from the potential to encounter contaminated groundwater during excavation activities. Workers may be exposed to the contaminated groundwater through direct, dermal contact and inhalation of VOCs emanating from the groundwater. Excavation work conducted below the water table would require a substantial effort to dewater and would generate a substantial amount of contaminated water requiring disposal in accordance with applicable local, state, and federal regulations. Dewatering in the groundwater plume would negatively impact the City's site investigation work by interfering with the natural groundwater flow.

The subrecipient plans to use fill obtained from the project area (on-site fill) to elevate the relocated road. There are two main areas where on-site fill material would be excavated from 1) the proposed stormwater detention basin area; and 2) a knoll area northwest of the intersection of Wright Street and Lakeshore Boulevard near the proposed roundabout. The subrecipient reports that the ground material in these locations is a mixture of sand with traces of slag, cinders, and brick pieces. Material from these locations would be used as the bottom layer of fill under the relocated road. After the on-site material is placed and compacted, it would be covered with 2 feet of clean sand, 8 inches of road gravel, and 3.5 inches of asphalt. Any issues related to potential soil contamination would be addressed in coordination with EGLE. The clean fill (sand) would come from an off-site sandpit where there is no known contamination and where the sand has passed Michigan Department of Transportation (MDOT) tests for road construction. The road gravel would also pass MDOT tests and come from a clean pit. This layer arrangement would place a clean material cap over any potentially contaminated material used to elevate the road.

The potential to encounter hazardous materials along the shoreline is lower than in the areas where the Lakeshore Boulevard would be relocated. All source material encountered on the former Cliffs-Down Plant site have been located in the areas where plant operations occurred. In addition, although the groundwater plume does pass under a portion of the shoreline area, the groundwater plume along the lakeshore has lower concentrations and is deeper below ground surface where it should not be encountered.

Contingency plans, in the form of design specifications, would be prepared if source material is encountered in any part of the project area and submitted to EGLE for approval. These specifications would detail the procedures that would be implemented by the subrecipient to identify, manage, and dispose of source material in accordance with applicable local, state, and federal regulations. If source material is encountered and removed, its removal would positively impact the remediation of the groundwater plume by removing a source of contaminant loading to groundwater. See **Section 6.2** for project conditions related to hazardous materials.

A Health and Safety Plan (HASP) has been prepared the City of Marquette to establish the health and safety hazards associated with site work and the control measures selected to protect workers. The HASP has been prepared for the relocation of Lakeshore Boulevard only and requires approval prior to work commencement. The HASP has been written to comply with the

requirements of 29 CFR 1910.120(b) and with the City of Marquette Health and Safety Program. A separate HASP may be required for the Shoreline Restoration component of the project.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have slightly lower impacts related from hazardous materials than the Proposed Action because there would be less construction activity. There would be no excavation to restore the revetment, create the dune, swale or coastal wetland features, or for the construction of ADA-accessible trails and parking.

3.5 Socioeconomics

3.5.1 Zoning and Land Use

The City of Marquette is responsible for the development and enforcement of the city's zoning code, the official zoning map (City of Marquette 2019), and the master land use plan titled *City of Marquette Community Master Plan* (City of Marquette 2015). The zoning code and map specify the permitted land uses within the project area, while the master land use plan guides potential future development for zoned areas. These documents were used to evaluate the project's consistency with local zoning and land use.

The City of Marquette's official zoning map shows that the project area is currently zoned for municipal uses (City of Marquette 2019a) (See **Figure 14 of Appendix A**). The municipal use zoning designation includes Lakeshore Boulevard, the shoreline, and the portion of the vacant land that is within the project area. The remaining vacant land owned by the City outside the project area is also zoned for mixed-use and Planned Unit Development zones (BioLife Plasma Services) to the northwest of the vacant land. Most of this vacant land is part of the former Cliffs-Dow Plant site (see **Section 3.4**) that the City of Marquette intends to redevelop consistent with its Brownfield Redevelopment Plan. The land north of the project area is designated as "multiple-family residential" and as "civic" to the south of the project area.

The City's Community Master Plan shows a "Lakeshore Boulevard Relocation" area that aligns with the project area on the future land use map (See **Figure 15 of Appendix A**) (City of Marquette 2015). The remainder of the land in the project area is planned for mixed-use residential and commercial development. The site is currently designated for non-residential use only, and regulatory conditions would have to be met to develop the land (see **Section 3.4**).

Alternative 1 – No Action

The No Action alternative would have a negligible impact on existing zoning for properties within the project area, and there would be no immediate changes to existing land uses. The remaining vacant municipal land would not become mixed-use since it requires the "Lakeshore Boulevard Relocation" to function (see **Section 4.0 Cumulative Impacts**). Since the land would remain undeveloped, the No Action alternative is not consistent with the City of Marquette Community Master Plan (City of Marquette 2015).

Action Alternative 2 – Proposed Action

The Proposed Action would have negligible short and long-term impacts on land use as there is no conflict with any of the existing land uses or zoning in the project area. The Proposed Action would be consistent with the future land use proposed for the project area in the Community Master Plan, which recommends the relocation of Lakeshore Boulevard and restoration of the shoreline for public access. This alternative would allow the remaining vacant land to be developed consistent with the city's plans and State of Michigan law.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have a negligible short and long-term impacts on land use as there is no conflict with any of the existing land uses or zones in the project area. This alternative would include the road relocation and installation of the expanded utilities, which would allow the remaining vacant land to be developed for mixed-use consistent with the city's plans and State of Michigan law. However, the shoreline would not be restored and would not be consistent with the Community Master Plan that recommends the implementation of both components of the project (City of Marquette 2015).

3.5.2 Noise

The Noise Control Act of 1972 defines "noise" as an undesirable sound. Noise is regulated at the federal level by the Noise Control Act of 1972, 42 U.S.C. § 4901, et seq. Noise standards developed by EPA (1974) provide a basis for state and local governments' judgments in setting local noise standards. The City of Marquette has established a noise ordinance that limits the production of excessive noise and limits construction noises to the hours of 7:00 am to 6:00 pm on weekdays for non-emergency work (Code of Ordinances City of Marquette, Michigan § 22-30). There is a residential area 500 feet to the west of the project area that is defined as a noise-sensitive land use using Federal Highway Administration noise abatement criteria (23 CFR § 772.5).

Alternative 1 – No Action

The No Action alternative would not change ambient noise levels in the project area. Closure of Lakeshore Boulevard, resulting from flooding, would reroute traffic noises to other routes, but that noise would likely not exceed local ordinance thresholds. There would be no short- or long-term changes in noise levels.

Action Alternative 2 – Proposed Action

The Proposed Action would cause short-term changes in the ambient noise levels in the area associated with construction activities. Short-term impacts related to construction activities would include trucks hauling materials to the site and the operation of equipment such as mass excavators for dredge and fill activities. Minor traffic noise would also be expected from construction vehicles and haul trucks arriving and departing from the project area and from

rerouted traffic on Presque Isle Avenue. Construction noise levels would follow local city ordinances (Code of Ordinances City of Marquette, Michigan § 22-30) to protect noise-sensitive areas. Although the relocated road would be elevated and traffic noise might carry farther than it currently does, the road would still be approximately 500 feet from the nearest residential use, and any long-term change in noise levels would be negligible.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have the same impacts related to noise as the Proposed Action.

3.5.3 Public Services and Utilities

The City of Marquette is served by municipal police and fire departments and a municipal public school district. The hospital closest to the project site, Marquette General Hospital, is 1.5 miles southwest at 815 West Baraga Avenue. No police, fire, public schools, or municipal facilities are located within or adjacent to the project area. Northern Michigan University, a state-funded public university, has athletic facilities bordering the southern portion of the project area.

The City of Marquette Public Works Department provides stormwater, sewer, refuse collection, wastewater treatment, and street repair services to the project site and bordering areas. The Marquette Board of Light and Power provides electricity services, and Semco Energy provides natural gas. Existing water, sanitary sewer, storm sewer, and electric utilities in the form of street lighting are currently present in the project area.

Alternative 1 – No Action

The No Action alternative would have a minor impact on public services in the project area. Road closures due to storm damage would continue to require detours and could cause delays for emergency vehicles from increased travel distances on detour routes; however, the detour size would likely not have a measurable effect to travel times. Traffic on detoured routes is not expected to rise to a level that would impact emergency vehicle travel times. Police presence would likely be required during times of road repair, reducing the availability of police resources in the City of Marquette.

The No Action alternative would have a negligible short-term impact and a minor long-term impact on public services and utilities. Additional water, stormwater, and sewer utilities would not be constructed. The current utility infrastructure would likely be adequate to service the development envisioned in the Community Master Plan. The current water, stormwater, and sewer utilities are buried and would likely remain protected from increasingly frequent storms and higher water levels in the short-term but could eventually become exposed due to erosion in the area in the long-term. The road, including street lighting, would continue to require repairs from storm damage, potentially causing a burden on the City of Marquette Public Works Department and resulting in deferred repairs in other parts of the City.

Action Alternative 2 – Proposed Action

The Proposed Action would have a minor short-term impact on public services from construction detours and the operation of construction equipment and vehicles into and out of the site. Current water, stormwater, and sewer utilities would not be expected to be shut down during construction, and construction would likely not cause any short-term impacts on utility services in the area. If utilities do need to be temporarily shut off during construction, the subrecipient would follow local ordinances regarding shut down procedures and notification.

The Proposed Action would provide minor long-term benefits to public services by reducing the potential for future road closures due to flooding, which would provide a more reliable route for emergency vehicle access. Water, stormwater, and sewer utilities would be extended in the project area, which would improve stormwater management and increase water and sewer coverage for the City of Marquette. Utilities would remain underground and would be protected from storm impacts. The new street lighting would also be protected from storm surge and winter heaves due to the relocation of the road and the protection of the natural buffers.

Police presence would be required to control traffic during construction, and the City of Marquette has developed a traffic control plan that requires police presence in controlling and directing detoured traffic (see **Appendix G**).

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have a minor short-term impact on public services resulting from construction detours and the operation of construction equipment into and out of the site. The construction period is anticipated to be shorter than that of the Proposed Action, however. This alternative would provide minor long-term benefits to public services and utilities. The number of road closures would likely be reduced but may still occur more frequently than the Proposed Action since the revetment would not be restored. Impacts on utilities would be similar to the Proposed Action. The water, stormwater, and sewer utilities would have the same underground protection. Street lighting would benefit from the road relocation by moving it away from the shoreline but would not benefit from the added protection from the Shoreline Restoration component.

3.5.4 Traffic and Circulation

Data on roads and transit services were obtained from the Michigan Department of Transportation (MDOT) and the Marquette County Transit Authority (Marqtran). Lakeshore Boulevard is classified as a major collector that had an Average Annual Daily Traffic (AADT) volume of 4,316 vehicles in 2011 (the last reporting year) (MDOT 2011). The other streets impacted by the project area, Hawley Street and Wright Street, had an AADT volume of 4,039 and 11,464, respectively, in 2011. Presque Isle Avenue, located parallel to Lakeshore Boulevard, is the detour route used when Lakeshore Boulevard is closed and had an AADT volume of 8,078 in 2011.

The Marquette County Transit Authority (Marqtran) provides fixed-route and paratransit bus service to the city. Lakeshore Boulevard is not directly served by any Marqtran bus routes. The North Marquette Shuttle Route is the closest bus route in proximity to the project area. The route runs along sections of Presque Isle Avenue parallel to the project area. The closest bus stop is on Wilkinson Avenue, approximately half a mile west of Lakeshore Boulevard and approximately a 0.75-mile walk to the shoreline (Marqtran 2001).

There is currently no pedestrian or bicycle access to the shoreline because Lakeshore Boulevard and the stone revetment are adjacent to the shoreline of Lake Superior, creating a barrier to the public. The only recreational access in the area is a section of the Marquette Multi-Use Path, which is adjacent to Lakeshore Boulevard on the west side of the road (landside). The Marquette Multi-Use Path is a 19-mile paved trail that circles the eastern portion of the city and provides access to neighborhoods, shopping, business districts, city attractions, and recreation sites (Trailink 2020).

Alternative 1 – No Action

The No Action alternative would have both minor short- and long-term impacts on traffic and circulation in the area. Lakeshore Boulevard would remain in its current location. Road damage and closures would likely continue and potentially increase, resulting in continued traffic detours around the area. The road closures would increase automobile traffic on Presque Isle Avenue. The increase in traffic could potentially cause some minor delays in the Marqtran North Route in the long-term. Projections by the City of Marquette show that if Lakeshore Boulevard is left in place, continued erosion may wash out the road completely in approximately fifty years, leaving the community without the major collector (Baird 2013).

Pedestrian access to the shoreline adjacent to Lakeshore Boulevard would continue to be unavailable with the road and stone revetment remaining along the edge of the lake. The section of the Marquette Multi-Use Path along Lakeshore Boulevard would likely close in the foreseeable future and may erode away along with the road.

Action Alternative 2 – Proposed Action

The Relocation of Lakeshore Boulevard would result in minor, short-term increases in automobile traffic on surrounding roadways resulting from construction detours, and from the operation of construction vehicles and equipment to and from the site. Relocation of Lakeshore Boulevard would provide minor long-term benefits to traffic and circulation in and around the project area. Once the road is completed, road closures from increasingly frequent storms and higher water levels would be reduced and potentially eliminated, reducing detour traffic on other roads. The Proposed Action would not increase the capacity of the road, but it would increase the reliability of travel along the road. Traffic mitigation measures would not be required as the project is not expected to cause increased roadway traffic in the area.

The Shoreline Restoration would also result in additional minor, short-term increases in automobile traffic on surrounding roadways from the operation of construction vehicles and

equipment to and from the site and from construction detours. The Shoreline Restoration component would provide minor long-term benefits to traffic and circulation in the area by providing further mitigation against flood damage, reducing road closures and detours further (as a result of the restoration of the revetment and the improved stormwater filtration capacity). The Shoreline Restoration component would also provide minor long-term benefits to pedestrians and bicyclists. It would improve access to the shoreline through the construction of ADA-compliant parking lots and trails in the restoration area. Traffic may increase with the addition of the parking lots, but impacts would likely be negligible compared to the existing daily traffic volumes. The Marquette Multi-Use Path would be rerouted within the restoration area and would be protected by the natural buffer provided by the dunes and swales. Restoration of the stone revetment and addition of a beach would also improve pedestrian access to the lake.

Police presence would be required to control traffic during construction, and the City of Marquette has developed a traffic control plan that requires police presence in controlling and directing detoured traffic for the Relocation of Lakeshore Boulevard (see **Appendix G**).

Alternative 3 - Relocation of Lakeshore Boulevard Only

During construction, the Relocation of Lakeshore Boulevard Only alternative would result in minor short-term increases in automobile traffic on surrounding roadways resulting from construction detours, and the operation of construction vehicles and equipment to and from the site.

The Relocation of Lakeshore Boulevard alternative would provide a minor long-term benefit to automobile traffic and circulation in and around the project area. It would have similar impacts as the Proposed Action but without the added protection from the Shoreline Restoration component. Road closures would be reduced due to the relocation and elevation of the road. Increasingly frequent storms and higher water levels may still impact Lakeshore Boulevard without the added protection of the restored revetment and natural buffer of the dunes and swales. The Marquette Multi-Use Path would remain in its current location and would be more susceptible to damage from increasingly frequent storms and higher water levels.

Police presence would be required to control traffic during construction, and the City of Marquette has developed a traffic control plan that requires police presence in controlling and directing detoured traffic for the Relocation of Lakeshore Boulevard (see **Appendix G**).

3.5.5 Environmental Justice (Executive Order 12898)

EO 12898, Federal Actions to Address Environmental Justice (EJ) in minority and low-income Populations, requires agencies to identify and address disproportionately high and adverse human health or environmental effects their activities may have on minority or low-income populations. EJSCREEN, a screening and mapping tool developed by EPA, was used to identify low-income and minority populations in the project area based on the 2013–2017 ACS developed by the U.S. Census Bureau (EPA 2018d).

Minority or low-income populations can in a project area can be identified by meeting either one or both of the following criteria:

- The affected area (e.g., census block group) contains 50 percent or more minority persons or 25 percent or more low-income persons.
- The percentage of minority or low-income persons in an affected area (e.g., census block group) is more than 10 percent greater than the average of the surrounding county.

The project area is located within a single census block group (ID# 261030006001) in the City of Marquette. According to the ACS, the total population of the block group was 1,019 persons in 2017. About 15 percent of the population in the census block group is minority. Racial composition in the census block is summarized in **Table 3-4**. Low-income residents make up 73 percent of the population of the census block group based on EPA EJScreen data (EPA 2016b). In comparison, the poverty rate in Marquette County is 25 percent. The minority population in the census block makes up less than 50 percent of the population, but the low-income population is more than 25 percent of the county average population. Therefore, this census block is considered to be low-income due to the number of low-income residents compared to the county average.

Table 3-4: Minority Populations

Race	Project Area Block Group 261030006001		Marquette County	
	Population	Percentage	Population	Percentage
Total Population	1,019	--	67,145	--
White	883	86.6	65,080	96.9
Black or African American	29	2.8	1,103	1.6
Asian	6	0.6	561	0.8
American Indian and Alaska Native	0	0.0	584	0.9
Native Hawaiian and Other Pacific Islander	0	0.0	32	0.0
Some Other Race/Multiracial	101	9.8	145	0.2
Hispanic ¹	22	2.2	964	1.4
Total Minority Population^{2,3}	158	15.4	3,389	5.0

Source: EPA 2018d.

Notes:

¹ The terms Hispanic and Latino can apply to members of any race, including respondents who self-identified as "White." The total numbers of Hispanic and Latino residents for each geographic region are tabulated separately from the racial distribution by the U.S. Census Bureau.

² A minority is defined in CEQ's environmental justice guidance as a member of the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), or Hispanic (CEQ 1997).

³ "Total Minority" includes all people who are not "White alone," plus Hispanics and Latinos who identify as white alone.

Alternative 1 – No Action

Under the No Action alternative, damages to, and closure of, Lakeshore Boulevard would likely continue. Lakeshore Boulevard does not provide direct access to any residential or other services besides recreational facilities to the north that would disproportionately hinder the EJ populations. Therefore, road damages and closures would have a negligible effect on the EJ populations.

Action Alternative 2 – Proposed Action

The Proposed Action would not have any disproportionately high and adverse effects on EJ populations. Minor short-term construction-related effects would include noise, traffic, and air quality impacts. Increased traffic from construction detours is not likely to increase to a level that would disproportionately affect EJ populations. Construction activity would be limited to areas that are currently vacant, city-owned land and therefore would not impact EJ population dwellings. EJ populations would benefit from improved access to the shoreline and new recreational opportunities. No business or residential displacement or relocations are proposed, and no long-term impacts from traffic, noise or air quality on EJ populations are anticipated.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would not have any disproportionately high and adverse effects on EJ populations. This alternative would have similar short-and long-term impacts on EJ populations during construction as the Proposed Action, however, there would not be the added benefit of improved public access provided by the Shoreline Restoration component.

3.5.6 Safety and Security

The Occupational Safety and Health Act requires safe and healthful conditions for working men and women by setting and enforcing standards; and providing training, outreach, and education and compliance assistance. The act created the Occupational Safety and Health Administration (OSHA) which established construction standards under 29 C.F.R. 1926. The Michigan Department of Licensing and Regulatory Affairs (LARA) has adopted Construction Safety Standards as conferred by sections 19 and 21 Michigan Occupational Safety and Health Act 1974 PA 154. The construction and safety standards set forth general rules for the safe use, operation, and maintenance of equipment, and for safe work practices pertaining to all employers and employees performing construction operations.

Safety risks currently at the project areas include increasingly frequent storms and higher water levels that cause damages and closures of Lakeshore Boulevard.

Alternative 1 – No Action

Under the No Action alternative, construction activity would not occur, and a HASP would not be required for construction activities. Hazardous conditions and damages would continue at

Lakeshore Boulevard which would have a long-term minor impact on safety at Lakeshore Boulevard.

Action Alternative 2 – Proposed Action

Standard construction-related safety risks would occur for construction workers at the project site. During construction, site safety from the equipment would be ensured by the contractors performing the work following standard industry safety practices. A HASP would be developed for the site that includes safety measures for site control, personal protection, an emergency response plan, and safety measures for dealing with emergency and hazards including waste. Equipment, materials, and the project site would be inaccessible to the public in accordance with Chapter 10 of the City of Marquette ordinances. If all safety protocols are followed there would be a negligible impact on safety and security during construction.

Post-construction, mitigation measures from the project would reduce natural hazard impacts to Lakeshore Boulevard through mitigation against increased storms, wave action, and winter heaves potentially reducing safety risks to the public using the road.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have the same impacts as the Proposed Action with the exception of not having the added protection from hazards provided by the shoreline restoration component.

3.6 Historic and Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, 16 U.S.C. § 470f, requires that federal agencies consider the potential effects on cultural resources of actions it proposes to fund. Cultural resources are defined as prehistoric or historic archaeology sites, historic standing structures, historic districts, objects, artifacts, cultural properties of historic or traditional significance—referred to as Traditional Cultural Properties—that may have religious or cultural significance to federally-recognized Indian Tribes (Tribes), or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons.

Cultural resources listed, eligible for listing, or potentially eligible for listing on the National Register of Historic Places (NRHP) are subject to protection from adverse impacts resulting from a federally funded undertaking. To be considered eligible, a cultural resource must meet one or more of the criteria regarding the resource's significance, as well as demonstrate integrity of features or other characteristics that are related to that significance. Eligibility criteria for listing a property in the NRHP are detailed in 36 C.F.R. 60. Sites not yet evaluated may be considered potentially eligible for inclusion in the NRHP and are afforded the same regulatory consideration as nominated properties. In Michigan, the State Historic Preservation Office (SHPO) is an agency under the Michigan Economic Development Corporation. The SHPO maintains records of known historic properties in the state.

Pursuant to 36 C.F.R. 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. Within the APE, impacts on cultural resources are evaluated for both historic structures (aboveground cultural resources) and archaeology (belowground cultural resources).

In addition to the NHPA, FEMA must also comply with other federal laws that relate to historic and cultural resources:

- American Indian Religious Freedom Act of 1978, 42 U.S.C. § 1996, which provides for the protection and preservation of American Indian sites, possessions, and ceremonial and traditional rites.
- Archaeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa–470 mm, which provides for the protection of archaeological resources on public lands and Indian lands.
- Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001–3013, in cases where Native American cultural Items are found on federal and tribal lands.

To comply with the NHPA, the City of Marquette completed a Phase I Survey for historic properties in 2013. The investigation defined an APE that included and extended further than the project area and construction staging areas defined for the project being evaluated in this EA. Following the 2013 investigation, NOAA initiated consultation with the SHPO to confirm the finding that no historic properties would be affected if the project were implemented. The SHPO concurred with the finding of No Effect on December 12, 2013 (see correspondence in **Appendix C**). In December 2019, FEMA initiated a new consultation with the SHPO confirming the previous findings of no effect by the SHPO. To date, no response from the SHPO has been received. Pursuant to 36 CFR 800.4(d)(l)(i), having received no response within 30 days from the SHPO, THPO or any consulting parties, FEMA's Section 106 responsibilities have been fulfilled and FEMA will proceed with the captioned undertaking.

3.6.1 Historic Structures

The 2013 Phase I Survey of the APE noted two historic structural features, which were part of the once extensive Cliffs-Dow industrial complex. The first structure represents the remains of a large industrial building of unknown purpose that was razed. Nearly all the above-ground structural remains related to the feature have been removed. Consequently, due to its badly preserved condition, the survey determined that the structure did not appear to have any remaining historical significance. The second structure is a smaller industrial structure that was likely a pump house or other related building that housed equipment that was used to bring water into the Cliffs-Dow industrial complex from Lake Superior. While this structure has not been razed, it does not appear to have any significance other than it was once part of the Cliffs-Dow complex.

Alternative 1 – No Action

The No Action alternative would have no effect on historic structures listed or eligible for listing in the NRHP because none were identified in the APE.

Action Alternative 2 – Proposed Action

The Proposed Action would have no effect on historic structures listed or eligible for listing in the NRHP because none were identified in the APE.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have no effect on historic structures listed or eligible for listing in the NRHP because none were identified in the APE.

3.6.2 Archaeological Resources

The 2013 Phase I Survey of the APE did not recover any prehistoric or historic archaeological materials and due to the nature of the historic land use in the APE the survey determined that it was highly unlikely any intact prehistoric material is present. The survey concluded that due to the high degree of historic disturbance and later modern efforts to reclaim the site including razing buildings, there would be no archaeologically significant findings.

Alternative 1 – No Action

The No Action alternative would have no effect on known archaeological resources as no construction or ground disturbance activities would occur and such resources are not expected to be present.

Action Alternative 2 – Proposed Action

The Proposed Action would have no effect on any known archaeological sites. The following project conditions would provide additional protection to unknown archaeological sites:

- The subrecipient will monitor ground disturbance during the construction phase. Should human skeletal remains or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site shall cease and the subrecipient will notify the coroner's office (in the case of human remains), the recipient (Michigan State Police), and FEMA. FEMA will notify the SHPO, the Leech Lake Band of Ojibwe Tribal Historic Preservation Office, and the Office of the State Archaeologist.
- All borrow or fill material must come from pre-existing stockpiles or commercially procured material from a pre-existing source. If this is not the case, the subrecipient shall inform FEMA of the fill source so required agency consultations can be completed and FEMA approval will be required prior to beginning ground disturbing activities.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have no effect on any known archaeological sites. The same conditions applied to the Proposed Action would be implemented under the Relocation of Lakeshore Boulevard Only alternative.

3.6.3 Tribal Coordination and Religious Sites

EO 13175, Consultation and Coordination with Indian Tribal Governments, directs federal agencies, “to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes....”

Requests for information on the presence or absence of known archaeological and Indian religious sites within the proposed project area were submitted to federally recognized tribal nations with potential interests in the project. On November 25, 2019, FEMA initiated consultation with the following tribal nations:

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy’s Reservation of Montana
- Grand Traverse Band of Ottawa and Chippewa Indians
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little Traverse Bay Bands of Odawa Indians
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Sokaogon Chippewa Community

FEMA sent a letter to each tribe with details about the project location and proposed activity and requested comments from each tribal government within 30 days of the date of the letter. FEMA received a response from the Chippewa Cree Tribe of the Rocky Boy’s Reservation of Montana identifying another tribal nation representative that may have an interest in the project. FEMA also received a response from the Leech Lake Band of Ojibwe noting that the Tribe did not have information on any known recorded sites of religious or cultural importance in the area. The Tribe stated that “should any human remains, or suspected human remains be encountered, all work will cease, and the following personnel should be notified immediately: County Sheriff’s Office and the Office of the State Archaeologist. If any human remains or culturally affiliated objects are inadvertently discovered, this will prompt the process to which the Band will become informed.” Correspondence with the tribal nations is provided in **Appendix D**.

Alternative 1 – No Action

The No Action alternative would have no effect on known archaeological or Indian religious sites as no construction or ground disturbance activities would occur.

Action Alternative 2 – Proposed Action

The Proposed Action would have no effect on known archaeological or Indian religious sites. If any human or archaeological remains are encountered during project construction, work will stop immediately and FEMA and SHPO will be notified. FEMA will then notify the Leech Lake Band of Ojibwe Tribal Historic Preservation Office.

Alternative 3 - Relocation of Lakeshore Boulevard Only

The Relocation of Lakeshore Boulevard Only alternative would have no effect on known archaeological or Indian religious sites. If any human or archaeological remains are encountered during project construction, work will stop immediately and FEMA and SHPO will be notified. FEMA will then notify the Leech Lake Band of Ojibwe Tribal Historic Preservation Office.

3.7 Comparison of Alternatives

Table 3-5 Comparison of Alternatives

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
Geology, Soils, and Topography			
<ul style="list-style-type: none">• Minor long-term impacts from continued soil erosion.• Negligible impacts to topography	<ul style="list-style-type: none">• Minor short-term impacts from excavation and site preparation.• Minor Long-term benefit from shoreline restoration and new stone armoring.	<ul style="list-style-type: none">• Minor short-term, minor impacts from soil excavation.• Minor long-term impacts from continued soil erosion.	<ul style="list-style-type: none">• See Section 6.2, General Project Conditions
Water Resources and Water Quality			
<ul style="list-style-type: none">• Minor long-term impacts from sedimentation, soil erosion, and pollutants from stormwater runoff.• No impact on groundwater.	<ul style="list-style-type: none">• Minor short-term impact on water quality during construction caused by excavators and other heavy equipment for fill and excavation.• Negligible long-term impact from the placement of fill (riprap) in Lake Superior for a culvert outlet.• Minor long-term benefit from improved stormwater infrastructure.	<ul style="list-style-type: none">• Minor short-term impact on water quality during construction caused by excavators and other heavy equipment for fill and excavation.• Negligible long-term impact from the placement of fill (riprap) in Lake Superior for a culvert outlet.• Minor long-term benefits on water quality from the stormwater	<ul style="list-style-type: none">• See Section 6.2, General Project Conditions

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
	<ul style="list-style-type: none"> • Moderate long-term impacts on Lake Superior from the permanent fill used to replace the stone revetment. • Minor long-term benefits to water resources and water quality from the creation of 38 acres of contiguous natural coastal habitat and from the stormwater infrastructure improvements. • Groundwater impacts described under hazardous materials. 	<p>infrastructure improvements.</p> <ul style="list-style-type: none"> • Groundwater impacts described under hazardous materials. 	
Floodplain Management			
<ul style="list-style-type: none"> • Minor long-term impacts from continued erosion of the revetment and areas where the revetment may be breached could cause harm to the floodplain and city infrastructure. 	<ul style="list-style-type: none"> • Minor short-term impacts from disturbance of sediments. • Negligible long-term impacts from the placement of fill in the mapped floodplain in the area North of Hawley Street to relocate the road. • Minor long-term benefits from the reduction in damages and road closures caused by flooding. • Minor long-term benefits on floodplain 	<ul style="list-style-type: none"> • Negligible to minor short-term impacts from disturbance of sediments. • Negligible long-term impacts from the placement of fill in the mapped floodplain in the area North of Hawley Street to relocate the road. • Minor long-term benefits from the reduction in damages and road closures caused by flooding. 	<ul style="list-style-type: none"> • See Section 6.2, Floodplain Management

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
	functions from the creation of 38 acres of contiguous natural coastal habitat.		
Air Quality			
<ul style="list-style-type: none"> Minor short and long-term impacts from continued equipment emissions for road repairs. 	<ul style="list-style-type: none"> Minor short-term impacts from construction equipment emissions and exposed soils. Negligible long-term impact. 	<ul style="list-style-type: none"> Minor, short-term impacts from construction equipment emissions and exposed soils. Negligible long-term impact. 	<ul style="list-style-type: none"> See Section 6.2, Air Quality
Coastal Zone Management			
<ul style="list-style-type: none"> Long-term minor impact from erosion and flooding. 	<ul style="list-style-type: none"> Minor short-term impact from sediment disturbance. Moderate long-term impacts to MCMP's area of concentrations when combined with regional wide coastal projects. 	<ul style="list-style-type: none"> Minor short-term impact from sediment disturbance. Long-term benefit to coastal infrastructure only. 	<ul style="list-style-type: none"> See Section 6.2, General Project Conditions.
Terrestrial and Aquatic Environment			
<ul style="list-style-type: none"> Minor long-term impacts from continued flooding of Lakeshore Boulevard, resulting in soil disturbance and surface runoff. Disturbed portion of the project area does not currently provide a viable habitat for wildlife and invasive species would continue to grow in 	<ul style="list-style-type: none"> Minor short-term impacts while the existing Lakeshore Boulevard is being demolished and the relocated road is being constructed resulting in soil disturbance and removal of vegetation. Minor short-term impacts while the existing revetment is being removed, the new revetment 	<ul style="list-style-type: none"> Minor short-term impacts while the existing Lakeshore Boulevard is being demolished and the relocated road is being constructed resulting in soil disturbance and removal of vegetation. Minor long-term impacts from the removal of trees, the permanent loss of one wetland and removal 	<ul style="list-style-type: none"> None

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
an uncontrolled manner.	<p>structure is built, and from the excavation and fill activities to create the beach cells, dune and swale features.</p> <ul style="list-style-type: none"> • Minor short-term impact from the removal of trees, fill in two wetlands and removal of some invasive vegetation. Native trees would be replanted in the restoration area. • Seed and mulch landscaping would be planted on either side of the relocated road in accordance with EGLE BMP standards. • Minor long-term benefits through the creation of 38 acres of contiguous natural habitat that would include 3 acres of beach, 16 acres of dune and swales, 3 acres of coastal wetland, and 16 acres of upland terrestrial habitat. 	<p>of some invasive vegetation. The trees removed to relocate Lakeshore Boulevard would not be replaced.</p> <ul style="list-style-type: none"> • Seed and mulch landscaping would be planted on either side of the relocated road in accordance with EGLE BMP standards. • Aquatic conditions would remain the same or worsen over time. • Erosion and flooding could continue to cause adverse impacts on terrestrial and aquatic environments in the long-term. 	
Wetlands			
<ul style="list-style-type: none"> • No project-related short or long-term impacts. 	<ul style="list-style-type: none"> • Minor short-term impact on two wetlands from construction activities for the Relocation of Lakeshore Boulevard. 	<ul style="list-style-type: none"> • Minor short-term impact on two wetlands from construction activities for the Relocation of Lakeshore Boulevard. 	<ul style="list-style-type: none"> • See Section 6.2, General Project Conditions

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
	<ul style="list-style-type: none"> • Permanent fill of one wetland 0.004 acres in size for the Relocation of Lakeshore Boulevard. • The Shoreline Restoration component could result in the fill or reconfiguration of a second wetland 0.364 acres in size. • Minor long-term benefit from the creation of 3 acres of new coastal wetlands that would result in a net increase in wetland area even if the project impacted the two existing wetlands. 	<ul style="list-style-type: none"> • Permanent fill of one wetland 0.004 acres in size. 	
Threatened and Endangered Species			
• No Effect	• No Effect	• No Effect	• None
Migratory Birds			
• No direct short- or long-term impacts.	<ul style="list-style-type: none"> • Negligible short-term impacts because of the poor quality of the existing habitat for migratory birds. • Minor long-term impacts on trees, wetlands, and vegetation that may serve as migratory bird habitat. 	<ul style="list-style-type: none"> • Negligible short-term impacts because of the poor quality of the existing habitat for migratory birds. • Minor long-term impacts on trees, wetlands, and vegetation that may serve as migratory bird habitat. The trees removed to relocate 	• See Section 6.2, Migratory Birds

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
	<ul style="list-style-type: none"> Minor long-term benefits from the creation of 38 acres of new habitats including new tree plantings. 	Lakeshore Boulevard would not be replaced.	
Invasive Species			
<ul style="list-style-type: none"> Minor long-term impact as invasive species persists in the area. 	<ul style="list-style-type: none"> Minor short-term impact from the potential spread of invasive weeds outside of the project area as both cuttings and attached to construction equipment and vehicles. Minor short-term impact from the potential spread of invasive aquatic species through the use of marine equipment for the Shoreline Restoration component. Long-term benefits as invasive species would be replaced by native species. 	<ul style="list-style-type: none"> Minor short-term impact from the potential spread of invasive weeds outside of the project area as both cuttings and attached to construction equipment and vehicles. Minor long-term impact as invasive weeds continue to persist in the project area and perhaps spread in the disturbed lands around the road. 	<ul style="list-style-type: none"> See Section 6.2, Invasive Species
Hazardous Materials			
<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> The Proposed Action would not involve the addition of any hazardous materials or chemicals to the site, nor would it increase the overall risk of hazardous materials known to 	<ul style="list-style-type: none"> The Relocation of Lakeshore Boulevard Only alternative would not involve the addition of any hazardous materials or chemicals to the site, nor would it increase the overall risk of hazardous 	<ul style="list-style-type: none"> See Section 6.2, Hazardous Materials

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
	<p>already exist in the environment.</p> <ul style="list-style-type: none"> • Moderate short-term impact to onsite workers through direct, dermal contact and inhalation of VOCs emanating from the source material. • Potential minor short-term impact to residents near the site through inhalation of VOCs emanating from the source material. • Moderate short-term impacts from the potential for workers to encounter contaminated groundwater. 	<p>materials known to already exist in the environment.</p> <ul style="list-style-type: none"> • Moderate short-term impact to onsite workers through direct, dermal contact and inhalation of VOCs emanating from the source material. • Potential minor short-term impact to residents near the site through inhalation of VOCs emanating from the source material. • Moderate short-term impacts from the potential for workers to encounter contaminated groundwater. 	
Zoning and Land Use			
<ul style="list-style-type: none"> • Negligible impact on zoning and land use. • Inconsistent with the City of Marquette Community Master Plan. 	<ul style="list-style-type: none"> • Negligible impact on zoning and land use. • Consistent with the City of Marquette Community Master Plan. 	<ul style="list-style-type: none"> • Negligible impact on zoning and land use. • Inconsistent with the City of Marquette Community Master Plan. 	<ul style="list-style-type: none"> • None
Noise			
<ul style="list-style-type: none"> • Negligible impact 	<ul style="list-style-type: none"> • Minor short-term impacts associated with construction. • Negligible long-term impact. 	<ul style="list-style-type: none"> • Minor short-term impacts associated with construction. • Negligible long-term impact. 	<ul style="list-style-type: none"> • See Section 6.2, Noise
Public Services and Utilities			

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
<ul style="list-style-type: none"> • Minor short and long-term impact to public services resources and utilities. • Minor long-term impact on utilities if exposed to erosion. 	<ul style="list-style-type: none"> • Minor short-term impact on public services from construction detours and the operation of construction equipment to and from the site. • Minor long-term benefits from the reduction in flooding to Lakeshore Boulevard. • Negligible short-term impact on utilities unless there is an unlikely need to shut services for utility extension. 	<ul style="list-style-type: none"> • Minor short-term impact on public services from construction detours and the operation of construction equipment to and from the site. • Minor long-term benefits from the reduction in flooding to Lakeshore Boulevard. • Negligible short-term impact on utilities unless there is an unlikely need to shut services for utility extension. • The number of road closures would likely be reduced but may still occur more frequently than the Proposed Action since the revetment would not be restored. 	<ul style="list-style-type: none"> • None
Traffic and Circulation			
<ul style="list-style-type: none"> • Minor long-term impact on traffic levels on alternative routes with future Lakeshore Boulevard closures caused by flooding damage. 	<ul style="list-style-type: none"> • Minor short-term impact from construction detours, and the operation of construction vehicles and equipment to and from the site. • Minor long-term benefit from the reduction in road closures. • 	<ul style="list-style-type: none"> • Minor short-term impact from construction detours, and the operation of construction vehicles and equipment to and from the site. • Minor long-term benefit from the reduction in road closures. • 	<ul style="list-style-type: none"> • None

No Action Impacts	Proposed Action Impacts	Relocation of Lakeshore Boulevard Only Impacts	Mitigation
Environmental Justice			
• Negligible effect	• Negligible effect, not disproportionate or adverse.	• Negligible effect, not disproportionate or adverse.	• None
Safety and Security			
• The long-term minor impact from hazardous conditions and damages at Lakeshore Boulevard.	<ul style="list-style-type: none"> • Negligible short-term impact as long as all construction safety measures are followed. • Minor long-term impact of hazard reduction measures. 	<ul style="list-style-type: none"> • Negligible short-term impact as long as all construction safety measures are followed. • Minor long-term impact from hazard reduction measures but would not have the added protection from the Shoreline Stabilization component. 	• See Section 6.2, Safety and Security
Historic Structures			
• No Effect	• No Effect	• No Effect	• None
Archaeological Resources			
• No Effect	No Effect	• No Effect	• See Section 6.2, Archeological, Tribal, and Religious Sites
Tribal and Religious Sites			
• No Effect	• No Effect	• No Effect	• See Section 6.2, Archeological, Tribal, and Religious Sites

4 CUMULATIVE IMPACTS

This section evaluates the potential cumulative impacts associated with the implementation of the Proposed Action. Cumulative impacts are defined in CEQ regulations for implementing NEPA (40 C.F.R. § 1508.7) as:

“The impacts of a proposed action when combined with impacts of past, present, or reasonably foreseeable future actions undertaken by any agency or person.”

CEQ regulations require an assessment of cumulative effects during the decision-making process for federal projects. Cumulative impacts can result from individually minor but collectively significant actions. For the purpose of the cumulative impact analysis, the project area was expanded to include the entire vacant land owned by the City of Marquette and the surrounding coastal area up to half a mile from the project site (see **Figure 16 of Appendix A**).

Besides the Proposed Action, the subrecipient identified plans to rezone and develop the remaining 28 acres of vacant land inland of the relocated Lakeshore Boulevard to mixed-use development in their Master Plan (City of Marquette 2015). The mixed-use residential and commercial development would be functionally dependent on both the Proposed Action and the Relocation of Lakeshore Boulevard Only alternative. The development would require the access provided by the relocated Lakeshore Boulevard. It also would require access to the proposed expanded water and sewer utilities to provide those utilities to the potential development. In February 2019, the subrecipient issued a Request of Developer Qualifications for the remaining vacant land (City of Marquette 2019b) with an intent to sell the land approved by the City Commission in July of 2019 (City of Marquette 2019c).

The Proposed Action is part of a larger effort by the City of Marquette, the SWP, and the State of Michigan to mitigate against flooding, storm action, and winter heave damages along the City's shoreline and surrounding wetlands. Below is a list of recently completed and proposed mitigation and natural restoration projects within half a mile of the project site (see **Figure 16 of Appendix A**):

- **2014 Great Lakes Restoration Initiative:** Project elements included creating a larger stormwater retentions area and adding 0.7 acres of native wetland plantings, and adding riparian buffers. The improvements were designed to allow stormwater to stay in the drainage area longer and allow bacteria and pollutants to filter out at a slower rate.
- **2015 Great Lakes Restoration Initiative:** Project planted approximately 2,500 trees along the southern bank of the Dead River between Lakeshore Boulevard and Hawley Street. This initiative also includes tree planting on the shore of Middle Bay between Peter White Dr and Lakeshore Boulevard. The purpose of the project was to reduce stormwater runoff into the Dead River and Middle Bay.
- **2016 Great Lakes Restoration Initiative:** A coastal wetland restoration project that included 9.5 acres of wetland habitat enhancement, 2.5 acres of coastal wetland restoration, 2 acres of beach restoration, the establishment of conservation easements on 15 acres, and the planting of 1000 trees.
- **2017 Great Lakes Restoration Initiative:** The storm drain on Wright Street between Presque Island Ave and Lakeshore Boulevard was disconnected from Lake Superior to reduce stormwater runoff into the lake by approximately 9 million gallons annually.

- **2019 Armoring of Lakeshore Boulevard:** Project hardens the shoreline at Lakeshore Boulevard between Fair Avenue and Pine Street to protect Lakeshore Boulevard from erosion loss. Approximately 1,400 feet of shoreline was armored with rock riprap.
- **2020 Michigan Coastal Management Program:** This project is pending, and proposes to restore 9 acres of coastal habit, which could improve coastal resiliency of 1,200 LF of shoreline just south of the project area along Lakeshore Boulevard.

Below are the resources that would have additional impacts when combined with the above projects and the alternatives discussed in the EA.

4.1 Soils and Topography

When combined with the City of Marquette's mitigation and natural restoration projects, the Shoreline Stabilization component of the Proposed Action would create a city-wide barrier to mitigate against stormwater runoff. It would reduce runoff into the other project areas, but that impact would negligible since most runoff flows towards Lake Superior (SWP 2020). The stone armoring would reduce soil erosion from storm and wave action at the project site. Therefore, the cumulative effect on soils would be a minor benefit to adjacent projects by reducing accretion and erosion impacts.

4.2 Water Resources and Water Quality

When the Proposed Action is considered together with the other mitigation and restoration projects along the shoreline of Lake Superior in Marquette, a larger natural coastal habitat buffer would be created that would buffer a considerable length of lakeshore. This buffer would reduce pollution and stormwater runoff from entering Lake Superior by providing for natural filtering and infiltration. Therefore, the cumulative effect on water resources would be a moderate impact on water quality in waters adjacent to the City of Marquette.

4.3 Biological Environment

The addition of the Proposed Action along the shoreline of Lake Superior to other past and future projects would create a larger, interconnected natural area. The extended natural area would provide additional habitat that would allow for greater movement of terrestrial species in the area. Larger habitat areas provide enhanced habitat benefits that are greater than the sum of the parts. Therefore, the cumulative effect would be a moderate beneficial impact to the biological environment of the City of Marquette.

4.4 Hazardous Materials

The former Cliffs-Dow Plant site is currently designated for non-residential use only, and regulatory conditions would have to be met to develop the land as described in **Section 3.4**. The envisioned mixed-use development would be located above a portion of the contaminated land and groundwater plume. Monitoring would continue at both the project site in compliance with

state law and under the supervision of EGLE. Mixed-use development could potentially lease space to commercial hazardous waste producers. These producers would be required to follow all EGLE and EPA regulations in managing hazardous waste as to not further contaminate the land.

The former Cliffs-Dow Plant site is currently under the management of the City of Marquette's Brownfields Development Authority. The City of Marquette's Brownfields Development Authority has been working with potential developers to ensure the sale and future use of the land adjacent to the project site is compliant with hazardous materials and remediation regulations and that all responsibilities of remediation and monitoring are the responsibility of the land purchaser.

If all federal, state, and local requirements are followed during and after the development of the mixed-use land, the cumulative effect would be a long-term negligible impact on hazardous waste on-site as long as any potential hazardous waste producers follow EGLE and EPA hazardous waste management and the existing contamination would be contained or disposed of per local and state regulations.

5 PUBLIC PARTICIPATION

The City of Marquette conducted an extensive public involvement process in the development of the Proposed Action described below under "Subrecipient Outreach".

This EA is available for agency and public review and comment for a period of 30 days. The public information process includes a public notice with information about the Proposed Action in *The Mining Journal*. This EA is available on FEMA's website at <https://www.fema.gov/recent-environmental-documents-public-notice-region-v>. The EA is also available on the City of Marquette website at <https://www.marquettetmi.gov/>.

A hard copy of this EA is available for review at:

City Clerk's Office – City of Marquette
300 West Baraga Ave
Marquette, MI 49855

This EA reflects the evaluation and assessment of the federal government, the decision-maker for the federal action; however, FEMA will take into consideration any substantive comments received during the public review period to inform the final decision regarding grant approval and project implementation. The public is invited to submit written comments by emailing duane.castaldi@fema.dhs.gov or via mail to:

Duane Castaldi, Regional Environmental Officer
Attn: Lakeshore Boulevard Coastal Resilient Infrastructure Project EA Comments
FEMA Region V
536 South Clark Street, 6th Floor

Chicago, IL 60605

If FEMA receives no substantive comments from the public and/or agency reviewers, this EA will be adopted as final, and FEMA will issue a FONSI. If FEMA receives substantive comments, it will evaluate and address those comments as part of the FONSI documentation and may consider whether changes to the grant or project implementation are appropriate.

Subrecipient Outreach

During Phase I of the project (2012-2013), opportunities for public involvement were provided through public input meetings that were held on June 4, 2012, with an estimated 45 attendees and March 26, 2013, with an estimated 40 attendees. Additional public outreach included a presentation at the City of Marquette Open House on February 5, 2013, with approximately 79 to 100 attendees, 6 newspaper articles distributed throughout the Upper Peninsula, 3 news broadcasts from local news stations in the Upper Peninsula, and distribution of a public newsletter to approximately 1,300 households. An additional public meeting was held on March 25, 2014, to summarize the Phase I preliminary design and explain how the design would be used to develop the Phase II final engineering plan. The meeting informed residents of the project schedule as well as opportunities for public participation during Phase II, which included the design review of the Proposed Action.

From 2018 to 2020 the City of Marquette and SWP continued to host public presentations and information sessions for City residents. These included a Work Session Presentation on February 28, 2019; a Public Information Session on April 3, 2019; a Special Meeting on May 7th, 2019; and a Work Session on January 2, 2020 (Marquette 2020). Project information was also shared via local and regional media outlets that include local newspapers and television news broadcasts.

6 MITIGATION MEASURES AND PERMITS

6.1 Permits

The subrecipient has obtained permits for impacts on waters of the U.S. and waters of the state in accordance with Clean Water Act and State of Michigan law (Michigan Compiled Law [M.C.L.] 324.30301 et seq.). The U.S. Army Corps of Engineers (USACE) has authorized the road relocation fills through a Nationwide Permit 14, Linear Transportation Projects, on December 17, 2019 (USACE File Number LRE-2018-01031-38-N19). The subrecipient also obtained a permit from EGLE to place fill in wetlands and Lake Superior for the road relocation pursuant to Michigan law (Permit Number WRP019036 dated October 18, 2019). See **Appendix C** for copies of the permits.

Table 6-1 summarizes the necessary permits to implement the Proposed Action and their status.

Table 6-1: Permit Summary

Issuing Agency	Resource	Permit Title	Applicable Regulation/Law	Status
USACE	Wetlands	Nationwide Permit 14	Clean Water Act	USACE has issued an NWP 14 permit for the Road Relocation component of the Proposed Action. See Appendix C . The Shoreline Restoration component may also require a permit which has not been obtained.
EGLE	Wetlands	Wetlands Protection	NREPA Part 303	EGLE has issued an NREPA Part 303 permit for the Road Relocation component of the Proposed Action. See Appendix C . The Shoreline Restoration component also would require a permit which has not been obtained.
EGLE	Coastal	Great Lakes Submerged Lands	NREPA Part 325	EGLE has issued an NREPA Part 325 permit for the Road Relocation component of the Proposed Action. See Appendix C . The Shoreline Restoration component also would require a

Issuing Agency	Resource	Permit Title	Applicable Regulation/Law	Status
				permit which has not been obtained.
EGLE	Soils (Erosion)	Soil Erosion and Construction Stormwater	NREPA Part 91	Not complete.
Local Floodplain Administrator	Floodplains	Floodplain Development	National Flood Insurance Program	Not complete.

6.2 Project Conditions

The subrecipient is responsible for compliance with federal, state, and local laws and regulations, including obtaining any necessary permits prior to beginning construction activities, and adhering to any conditions laid out in these permits. Any substantive change to the scope of work will require re-evaluation by FEMA for compliance with NEPA and any other laws or EOs. Failure to comply with FEMA grant conditions may jeopardize federal funding.

General Project Conditions

1. The subrecipient is responsible for obtaining and complying with all required local, state, and federal permits and approvals.
2. If deviations from the proposed scope of work result in substantial design changes, the need for additional ground disturbance, additional removal of vegetation, or any other unanticipated changes to the physical environment, the subrecipient must contact FEMA so that the revised project scope can be evaluated for compliance with NEPA and other applicable environmental laws.

The following conditions address mitigation of impacts to Water Resources and Water Quality, Wetlands, Soils, and Coastal Zone Management:

3. Prior to beginning work, the subrecipient will coordinate with the Michigan County Enforcing Agent (CEA) to determine permitting needs under Part 91 of the NREPA, Soil Erosion and Sedimentation Control. The subrecipient is required to obtain a Soil Erosion and Construction Stormwater permit (Michigan Compiled Laws 324.9112).
4. The currently issued permits are for the Road Relocation component of the project. Further coordination with EGLE and USACE is required prior to construction of the Shoreline Restoration component of the project in compliance with the Clean Water Act and the Michigan Natural Resource and Environmental Protection Act.

5. The subrecipient is responsible for compliance with all conditions required by the following permits, as well as any others required by this project:
 - NWP 14 (File Number LRE-2018-01031-38-N19)
 - EGLE Permit No. WRP019036
 - EGLE Permit under NREPA Part 91, Soil Erosion and Construction Stormwater (forthcoming)

Floodplain Management

6. The subrecipient will obtain written approval or a permit from the City of Marquette floodplain manager for both the Relocation of Lakeshore Boulevard and the Shoreline Stabilization components of the project and the subrecipient must follow all conditions of approval.
7. Construction staging and access for the Proposed Action will occur outside the mapped floodplain to the extent practical.

Air Quality

8. To reduce the emission of criteria pollutants, construction equipment engine idling will be minimized to the extent practicable and engines will be kept properly maintained.
9. Open construction areas will be minimized and watered as needed to minimize particulates such as fugitive dust.

Noise

10. The subrecipient will minimize noise impacts by limiting construction activities to allowable construction noise hours consistent with the city's noise ordinance (Code of Ordinances City of Marquette, Michigan § 22-30).

Hazardous Materials

11. During work on any portion of the former Cliffs-Dow site, the subrecipient will ensure that it meets its due care obligations in accordance with Section 20107a of Part 201 and Section 21304c of Part 213 of the Michigan Natural Resource and Environmental Protection Act, 1994 PA 451 and Part 201's Rules. In addition, relocation of any contaminated soil will be performed in accordance with Section 20120c of Part 201.
12. The subrecipient will develop design specifications to detail the procedures that the contractors will follow to identify, manage, and dispose of source materials, or other heavily contaminated materials, in accordance with all local, state, and federal regulations. These specifications sections should include, but are not limited to, procedures that address Safety, Health, and Emergency Response Procedures; Environmental Protection Procedures; Contaminated Soil Excavation; Transportation and Disposal of Contaminated Material; and Contaminated Dewatering and Drainage.
13. EGLE will be notified if source material or other heavily contaminated material is encountered.

14. No dewatering will be allowed between STA 25+00 and 32+00, and between the lines extending west and east from the proposed road as shown in **Appendix G** of the EA.

Migratory Birds

15. Vegetation removal should be avoided during the migratory bird nesting season (approximately February 15 to August 15) to the extent practicable.

Invasive Species

16. The contractors will ensure that any seed and mulch landscaping complies with state regulations regarding prohibited and restricted weed species (Michigan Administrative Code R 285.715.7).
17. The contractors will wash soil and plant material off all equipment tires and treads each time before leaving the project site.
18. Cuttings of invasive weeds will be stored away from non-infested areas to prevent spreading seeds or other propagules, and they will be transported carefully out of the project area.
19. Any invasive plants will be placed into dark plastic bags and put in the trash.
20. Prior to leaving the site, water will be drained from marine equipment used for in-water work.
21. All equipment and vehicles will be disinfected and dried before being removed from the project area.

Safety and Security

22. To minimize risks to safety and human health, construction activities will be performed using qualified personnel trained to use the required equipment properly.
23. The construction site will be secured from public access.
24. All construction activities will be conducted in accordance with the standards specified in the Occupational Safety and Health Administration (OSHA) regulations and LARA Construction and Safety Standards.
25. All conditions of the project Health and Safety Plan will be adhered to.

Archeological, Tribal, and Religious Sites

26. The subrecipient will monitor ground disturbance during the construction phase. Should human skeletal remains or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site shall cease and the subrecipient will notify the coroner's office (in the case of human remains), the recipient (Michigan State Police), and FEMA. FEMA will notify the SHPO, the Leech Lake Band of Ojibwe Tribal Historic Preservation Office, and the Office of the State Archaeologist.
27. All borrow or fill material must come from pre-existing stockpiles or commercially procured material from a pre-existing source. If this is not the case, the subrecipient shall

inform FEMA of the fill source so required agency consultations can be completed and FEMA approval will be required prior to beginning ground disturbing activities.

7 CONSULTATIONS AND REFERENCES

The following agencies were consulted during the preparation of this EA:

7.1 Federal, State, and Local Agencies

- National Oceanic and Atmospheric Administration, Office for Coastal Management, Policy, Planning, and Communications Division
- U.S. Army Corps of Engineers, Marquette Field Office
- U.S. Environmental Protection Agency Region V, NEPA Implementation Section
- U.S. Fish and Wildlife Service, Great Lakes Restoration Initiative
- U.S. Fish and Wildlife Service, East Lansing Field Office
- Michigan Department of Environment, Great Lakes, and Energy, Water Resources Division
- Michigan Department of Environment, Great Lakes, and Energy, Remediation and Redevelopment Division
- State Historic Preservation Office, Michigan Economic Development Corporation
- Superior Watershed Partnership and Land Trust

7.2 Tribal Nations

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Grand Traverse Band of Ottawa and Chippewa Indians
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little Traverse Bay Bands of Odawa Indians
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Sokaogon Chippewa Community

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8 LIST OF PREPARERS

Federal Emergency Management Agency

Reviewers	Experience and Expertise	Role in Preparation
Duane Castaldi	Regional Environmental Officer	Project Monitor
Maureen Cunningham	Regional Counsel	Legal Review
Nicholas Dorochoff	Deputy REO	Technical Monitor
Jessica Eleff	Environmental Protection Specialist	Region V Staff

CDM Smith

Preparers	Experience and Expertise	Role in Preparation
Malena Foster	GIS Specialist	GIS/Graphics
John Grabs	Geology and Hazardous Materials	Hazardous Materials
Alan Hachey, AICP	Technical Environmental Lead	Technical Lead
Jennifer Jones	Senior Environmental Scientist	Water Resources and Water Quality, Wetlands, Habitat, Threatened and Endangered Species, Migratory Birds, and Invasive Species
Megan Regal	Environmental Planner	Water Resources and Water Quality, Wetlands, Habitat, Threatened and Endangered Species, Migratory Birds, and Invasive Species
Kate Stenberg, Ph.D.	Senior NEPA Specialist	Technical Review
Brandon Webb	Environmental Planner	NEPA Documentation

APPENDICES

Appendix A Maps and Figures

Appendix B Floodplain Management Eight-Step Documentation

Appendix C Agency Correspondence

Appendix D Tribal Nation Consultation

Appendix E Public Notice

Appendix F Public Comments

Appendix G Design Plans

Appendix A Maps and Figures



Figure 1: Regional Project Location Map



Figure 2: Project Area



Figure 3: Property Boundaries



Figure 4: Road Relocation Design

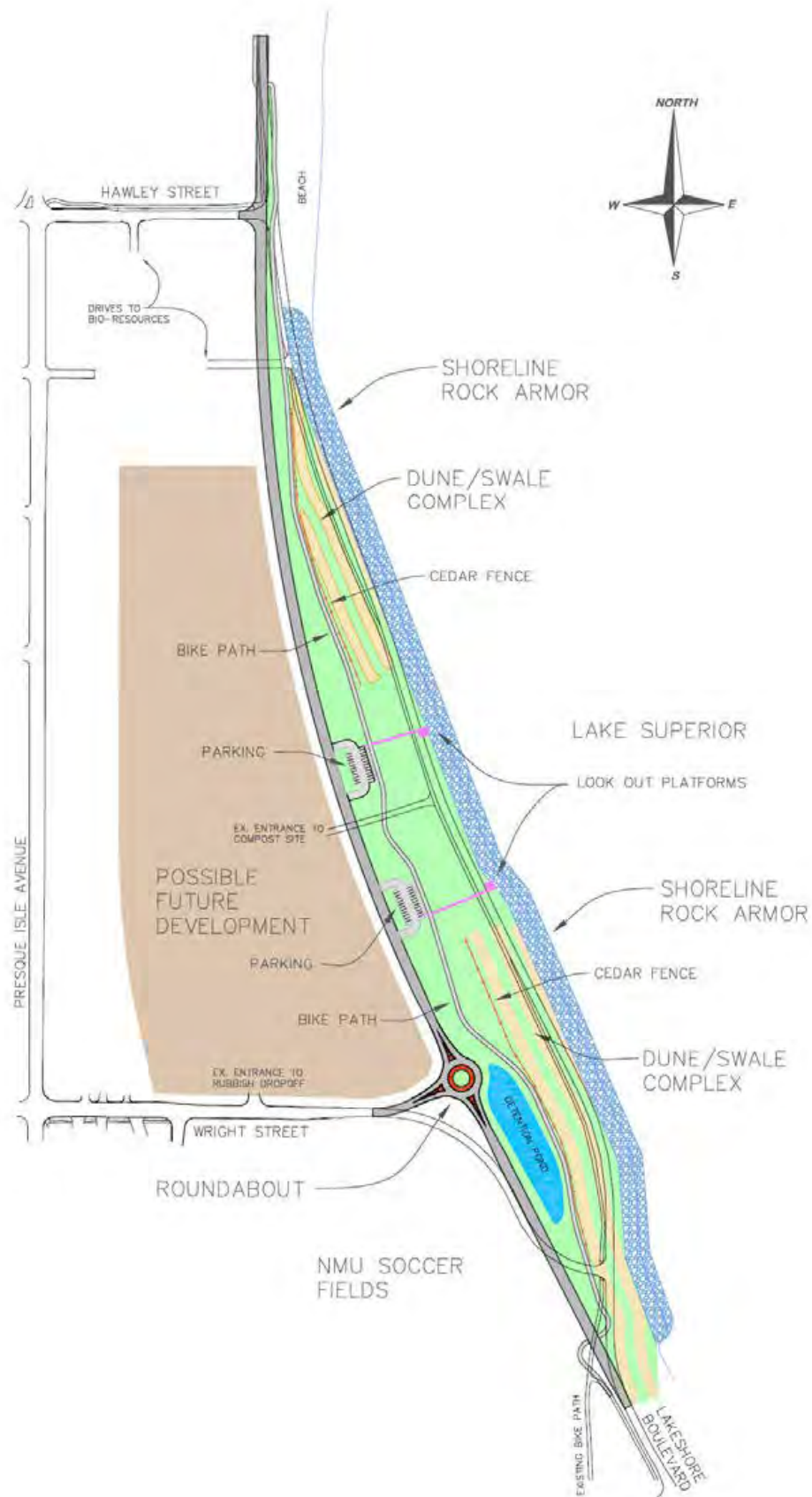


Figure 5: Shoreline Restoration Concept – City Commission Approved Design (2013)



Figure 6: Shoreline Restoration Concept – Superior Watershed Partnership (2019)

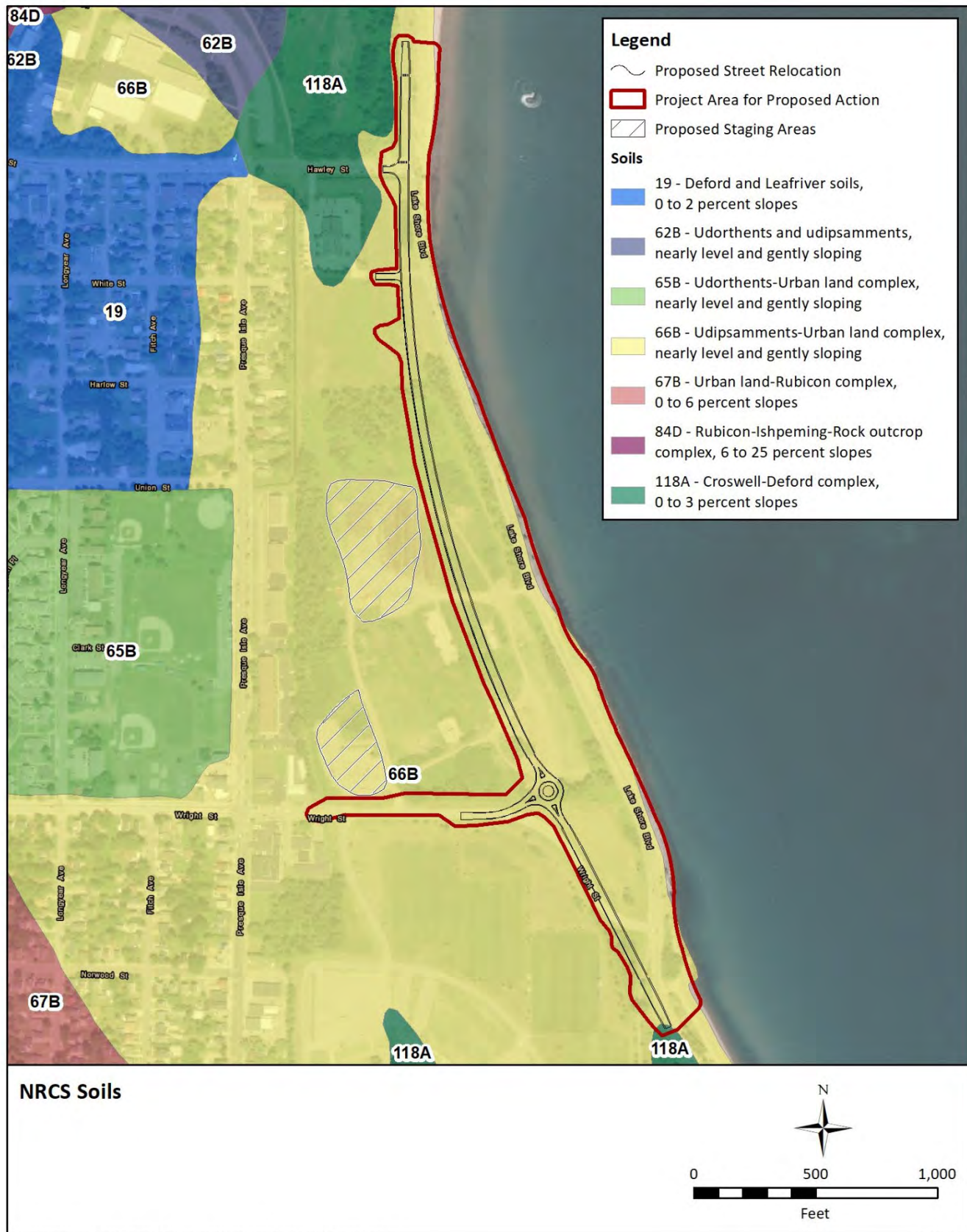


Figure 7: Project Area Soils



Figure 8: Surface Waters and Wetlands

Figure 9a: FIRMette
FIRM Panel #26103C0495D effective 04/19/2016

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **1/20/2020 at 3:02:57 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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46°34'25.66"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

46°34'0.92"N

87°23'16.75"W

Figure 9b: FIRMette
FIRM Panel #26103C0495D effective 04/19/2016

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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46°34'17.96"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

46°33'53.22"N

87°23'14.20"W

Figure 9c: FIRMette
FIRM Panel #26103C0495D effective 04/19/2016

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

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This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



46°34'3.51"N

87°23'46.01"W

0 250 500 1,000 1,500 2,000 Feet

1:6,000

46°33'38.78"N

87°23'46.01"W



Figure 10: Coastal Zone Boundary

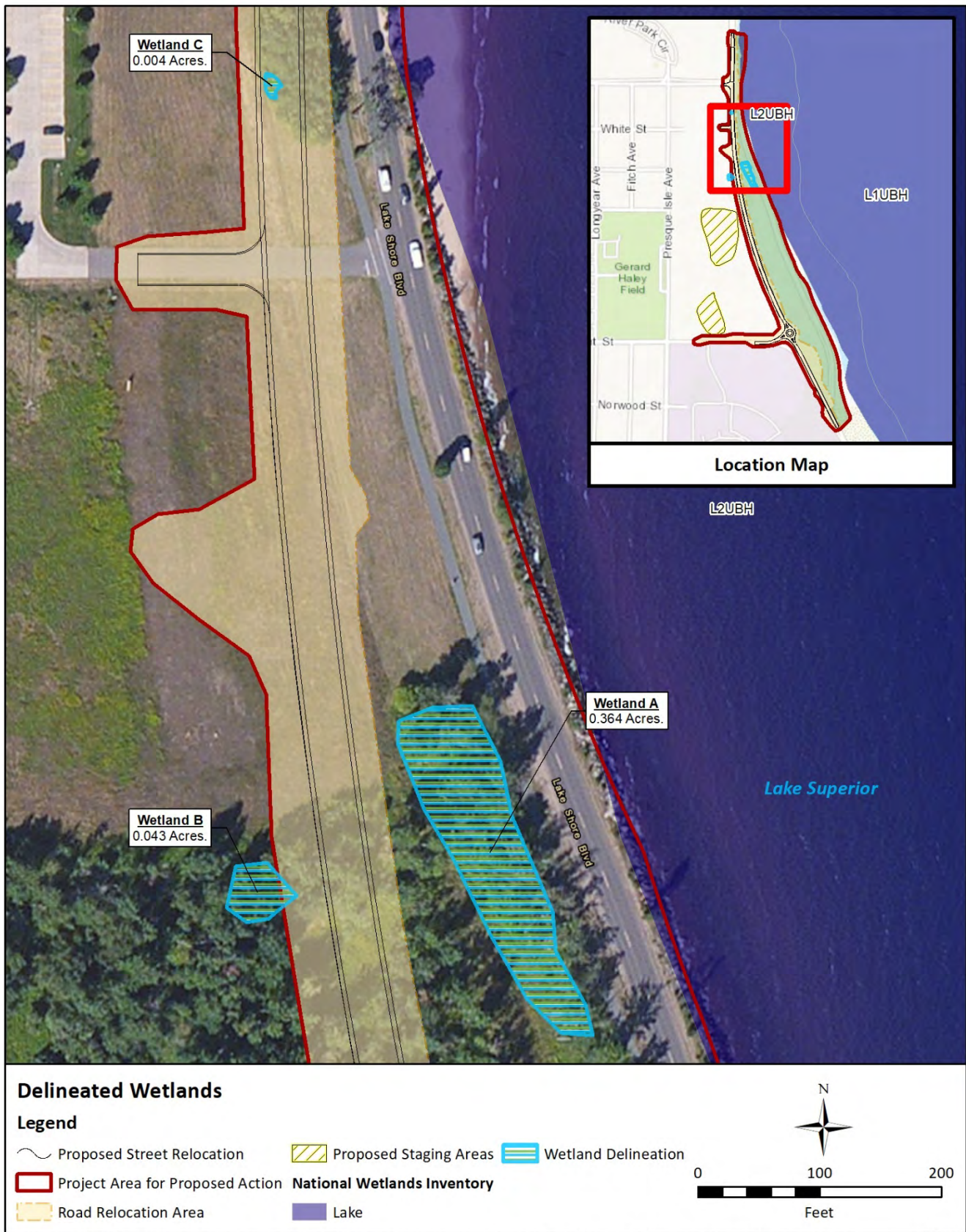


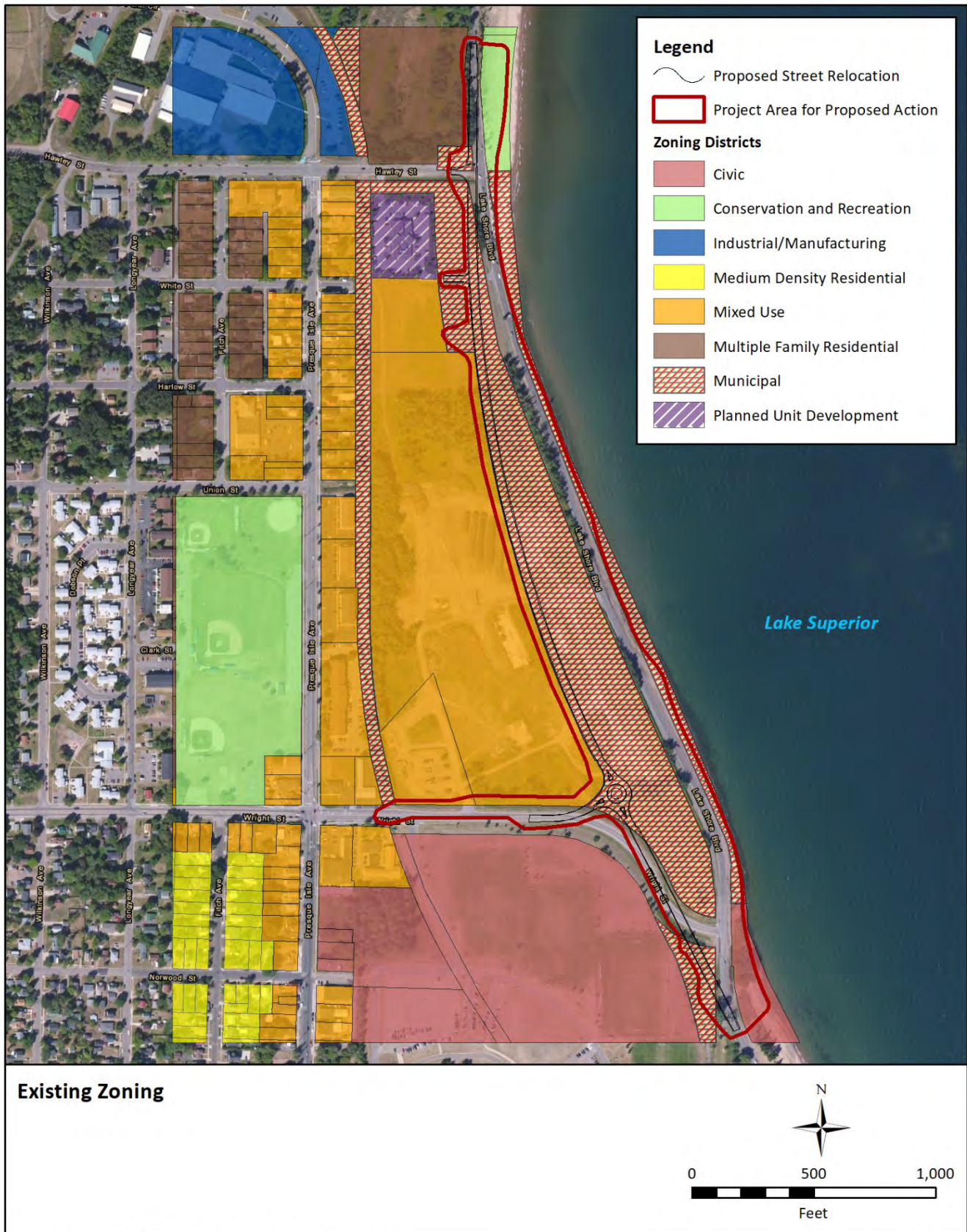
Figure 11: Delineated Wetlands



Figure 12: Former Cliffs-Dow Site Boundary



Figure 13: Monitoring Well Locations and Approximate Groundwater Plume Extent



Sources: Project Areas: CDM Smith, 2019; Basemap: ESRI World Imagery.

Figure 14: Existing Zoning



Sources: Project Areas: CDM Smith, 2019; Basemap: ESRI World Imagery.

Figure 15: Future Land Use



Figure 16: Project Area for Cumulative Effects

Appendix B Floodplain Management Eight-Step Documentation

EXECUTIVE ORDER 11988

FLOODPLAIN MANAGEMENT CHECKLIST (44 CFR Part 9)

TITLE: Lakeshore Boulevard Coastal Resilient Infrastructure Project

PROPOSED ACTION: Realignment of Lakeshore Boulevard and natural shoreline stabilization from a point approximately 500 feet north of Hawley Street (46.571957, -87.393363) extending to approximately 400 feet south of the intersection at Wright Street (46.561366, -87.388996) in Marquette, Michigan.

APPLICABILITY: Actions which have the potential to affect floodplains or their occupants, or which are subject to potential harm by location in floodplains.

☒ **YES** ☐ **NO** The proposed action could potentially adversely affect the floodplain.

☒ **YES** ☐ **NO** The proposed action could potentially be adversely affected by the floodplain.

Remarks: Project contains mitigation measures to avoid impacts to the structure from future flooding events.

IF BOTH ANSWERS ARE NO, REVIEW IS COMPLETED, OTHERWISE CONTINUE WITH REVIEW.

Mark the review steps required per applicability: ☒ 1 / ☒ 2 / ☒ 3 / ☒ 4 / ☒ 5 / ☒ 6 / ☒ 7 / ☒ 8

CRITICAL ACTION: ☐ **YES** Review against 500 Year floodplain
☒ **NO** Review against 100 Year floodplain

SCOPE OF WORK: The Proposed Action would protect Lakeshore Boulevard and stabilize 4,200 feet of Lake Superior shoreline through a two-component project. The first component proposes to realign Lakeshore Boulevard 300 to 400 feet inland and elevate it 4 to 5 feet to mitigate against erosion and flooding from Lake Superior. Other elements of the first component include extending sewer, water, and stormwater utilities in the project area, building a detention pond southeast of the intersection of Lakeshore Boulevard and Wright Street, and realigning street lighting. Some of the road work at the north end of the project area would be within the 100-year floodplain.

The second component is the restoration of 4,200 feet of shoreline where Lakeshore Boulevard was located. This component includes the restoration and strengthening of the natural systems of the shoreline through the creation of 38 acres of contiguous habitat that would include 3 acres of beach, 16 acres of dune and swales, 3 acres of coastal wetland, and 16 acres of upland terrestrial habitat. This component also includes restoring the stone armoring revetment along the lakeshore that would be partially located within the floodplain. The revetment would be used as a flood barrier to mitigate against flooding and storm surge from Lake Superior. The Shoreline Restoration component would also include built elements such as a parking lot and trail system.

The Proposed Action would mitigate against erosion and storm damage and create a natural barrier for stormwater runoff through natural buffers created under the Shoreline Restoration component. The Shoreline Restoration component would also introduce more natural elements, benefiting habitat functions and providing public access to the lakeshore.

STEP NO. 1: Determine whether the proposed action is in the 100-year floodplain, or, for critical actions, in the 500-year floodplain.

Flood Hazard Data

- ☒ **YES** ☐ **NO** A portion of the project is located within an "AE" zone area of 100-yr flooding, per Flood Insurance Rate Map (FIRM) panel # 26103C0495D, dated April 19, 2016.

Wetland Data

- ☐ The project is located in a wetland as mapped by the U.S. Fish and Wildlife Service's National Wetlands Inventory. Wetland Classification Code: Dated: .
- ☒ The proposed action may be in a wetland based on evaluation from soil surveys, aerial photographs, site visit or other data
- ☐ The project is outside of a designated wetland but has potential to affect the wetland, including support or encouragement of wetland development

**IF THE ANSWERS IS YES, CONTINUE WITH THE FOLLOWING STEPS;
OTHERWISE REVIEW IS COMPLETE.**

STEP NO. 2: Notify the public at the earliest possible time of the intent to carry out an action in a floodplain and involve the affected and interested public in the decision-making process.

- ☐ Notice was provided as part of a disaster cumulative notice.
Newspaper:
Date:
- ☒ Project-specific notice provided.
Publication: *The Mining Journal*
Date: July 9, 2019
- ☐ Per allowances noted at 44 CFR Part 9.12(d)6, this notice is understood to meet the requirements of both Steps 2 and 7.
-

STEP NO. 3: Identify and evaluate practicable alternatives to locating the proposed action in a floodplain (including alternatives sites, actions and the "no action" option). If a practicable alternative exists outside the floodplain, FEMA must locate the action at the alternative site.

☐ YES ☒ NO Is there a practicable alternative site location outside of the floodplain / wetland?

Remarks: The subrecipient completed a coastal engineering and alternative analysis study for the project in 2013. The purpose of the study was to formulate alternatives for shoreline improvements along Lakeshore Boulevard which is currently subject to road flooding and ice build-up in the winter. Five conceptual alternatives were developed that ranged from removing the revetment, installing stone revetments, adding nearshore parallel breakwaters, constructing rubble mound groins, and the Proposed Action. Based on this engineering study and public input, the Proposed Action was found to provide the most effective and feasible combination of erosion control measures while providing natural habitat and public access. A second engineering study was completed in 2014 that finalized the requirements for the Proposed Action.

☐ YES ☒ NO Is there a practicable alternative action outside of the floodplain / wetland that will not affect the floodplain / wetland?

Remarks: There is no practicable location to move the portion of Lakeshore Boulevard north of Hawley Street that is in the 100-year floodplain to that would be outside of the floodplain. The relocated road alignment needs to connect to the rest of Lakeshore Boulevard. North of Hawley Street, the 100-year floodplain extends from Lake Superior to the development along the next street west; therefore, there is no practicable location that would be outside of the floodplain

☐ YES ☒ NO Is the No Action Alternative the most practicable alternative?

Remarks: The No Action Alternative is not practicable because the shoreline would continue to erode, placing city infrastructure at continuing risk for failure. The No Action Alternative is also not consistent with the Michigan Coastal Management Program, which has established policies for the control of shoreline erosion on Lake Superior.

IF ANY ANSWER IS YES, THEN FEMA SHALL TAKE THAT ACTION AND THE REVIEW IS CONCLUDED.

STEP NO. 4: Identify and evaluate practicable alternatives to locating the proposed action in a floodplain (including alternatives sites, actions and the "no action" option). If a practicable alternative exists outside the floodplain, FEMA must locate the action at the alternative site.

- ☐ YES ☒ NO Is the Proposed Action based on incomplete information?
- ☒ YES ☐ NO Is the proposed action in compliance with the NFIP?
- ☐ YES ☒ NO Does the proposed action increase the risk of flood loss?
- ☐ YES ☒ NO Will the proposed action result in an increased base discharge or increase the flood hazard potential to other properties or structures?
- ☒ YES ☐ NO Does the proposed action minimize the impact of floods on human health, safety and welfare?
- ☐ YES ☒ NO Will the proposed action induce future growth and development, which will potentially adversely affect the floodplain?
- ☒ YES ☐ NO Does the proposed action involve dredging and/or filling of a floodplain?
- ☐ YES ☒ NO Will the proposed action result in the discharge of pollutants into the floodplain?
- ☒ YES ☐ NO Does the proposed action avoid long- and short-term adverse impacts associated with the occupancy and modification of floodplains?
- ☒ YES ☐ NO Will the proposed action result in any indirect impacts that will affect the natural values and functions of floodplains or wetlands?
- ☐ YES ☒ NO Will the proposed action forego an opportunity to restore the natural and beneficial values served by floodplains?
- ☒ YES ☐ NO Does the proposed action restore and/or preserve the natural and beneficial values served by floodplains?
- ☒ YES ☐ NO Will the proposed action result in an increase to the useful life of a structure or facility?

Remarks: The project would move Lakeshore Boulevard away from the floodplain and reduce the potential for flood damage along the lakeshore. This would extend the useful life of the road. The road relocation component would also include new stormwater detention and management facilities that would help reduce shoreline erosion. The culvert under Lakeshore Boulevard at Hawley Street would be replaced and new erosion protection at the inlet and outlet would be installed. This new culvert may help flood waters north of Hawley Street to drain to Lake Superior more quickly during a flood event. The road relocation component north of Hawley Street would not change the existing condition in the floodplain as the realigned Lakeshore Boulevard would be tied into the existing roadway in this area.

The coastal floodplain in the project area has been protected by a stone revetment that does not meet modern engineering standards that has been degraded by continued erosion, storm surge, and winter heaves. The Shoreline Restoration component of the project would replace the revetment with a new stone armor revetment and add natural habitat to provide stormwater buffers and flood protection.

The road relocation would fill 0.004 acres of delineated wetland and the Shoreline Restoration component may result in the fill of 0.364 acres of another delineated wetland. However, the Shoreline Restoration component would create approximately 3 acres of wetlands for a net gain of about 2.6 acres of wetlands.

To address potential floodplain, water, wetland, and coastal resource impacts, the subrecipient will implement a variety of best management practices and mitigation measures. In addition, the subrecipient has obtained permits to construct the Road Relocation component in accordance with the National Flood Insurance Act, Clean Water Act, and Coastal Zone Management Act including: 1) Coordination with the local floodplain administrator for a potential floodplain development permit, City of Marquette, MI and 2) Section 401 Water Quality Certification and 404 permit from the EGLE and US Army Corps of Engineers, respectively, in accordance with the CWA. Correspondence related to the permit approvals, and permits, is provided in Appendix C of the Environmental Assessment. Compliance with all applicable permit conditions and adherence to the permits will be a condition of the grant and will avoid and minimize potential impacts.

STEP NO. 5: Minimize the potential adverse impacts to or within floodplains identified under Step 4; restore and preserve the natural and beneficial values served by floodplains.

☒ **YES** ☐ **NO**

For sites in the 100-Year floodplain, were flood hazard reduction techniques applied to the proposed action to minimize the flood impacts?

☒ **YES** ☐ **NO**

Were avoidance and minimization measures applied to the proposed action to minimize the short and long-term impacts on the 100-Year floodplain?

☒ **YES** ☐ **NO**

Were measures implemented to restore and preserve the natural and beneficial values of the floodplain?

Remarks: The road realignment component will move Lakeshore Boulevard farther away from potential flooding and provide some stormwater detention. The shoreline restoration component is intended to restore some natural and beneficial values of the floodplain, including creation of a dunes, swales, and wetlands, and would restore some floodplain habitat and reduce erosion and sedimentation. The restored stone armor revetment would reduce flooding impacts from Lake Superior.

STEP NO. 6: **Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others, and its potential to disrupt floodplain values and second, if alternatives preliminarily rejected at Step 3 are practicable in light of the information gained in Steps 4 and 5. FEMA shall not act in a floodplain unless it is the only practicable location.**

- ☒ **YES** ☐ **NO** The action is still practicable at a floodplain site considering the exposure to flood risk and ensuing disruption of natural values.
- ☒ **YES** ☐ **NO** The floodplain site is the only practicable alternative.
- ☒ **YES** ☐ **NO** There is no potential for limiting the action to increase the practicability of previously rejected sites outside the floodplain and alternative actions.
- ☒ **YES** ☐ **NO** Minimization of harm to or within the floodplain can be achieved using all practicable means.
- ☒ **YES** ☐ **NO** The action in a floodplain clearly outweighs the requirement of E.O. 11988 and EO 11990.

Remarks: The Proposed Action is the most practicable alternative as it reduces floodplain risks to infrastructure while returning the floodplain to a more natural state. Limiting the action would reduce the benefits provided to the floodplain and all minimization of harm to or within the floodplain can be achieved through the Proposed Action.

STEP NO. 7: **Prepare and provide the public with a finding and public explanation of any final decision that the floodplain is the only practicable alternative.**

- ☐ Per allowances noted at 44 CFR Part 9.12(d)6, notice provided under Step 2 is understood to meet the requirements of both Steps 2 and 7.
- ☐ Notice was provided as part of a disaster cumulative notice.
 Newspaper:
 Date:
- ☒ Project-specific notice provided.
 Publication: *The Mining Journal*
 Date: Planned for March, 2020

AFTER PROVIDING THE FINAL NOTICE, FEMA SHALL, WITHOUT GOOD CAUSE SHOWN, WAIT AT LEAST 15 DAYS BEFORE CARRYING OUT THE PROPOSED ACTION.

STEP NO. 8: Review the implementation and post-implementation phases of the proposed action to ensure that the requirements stated in Section 9.11 are fully implemented. Oversight responsibility shall be integrated into existing processes (44 CFR §9.11).

☒ **YES** ☐ **NO**

Was grant conditioned on review of implementation and post-implementation phases to ensure compliance with EO 11988 and EO 11990?

Remarks: The proposed project will be conducted in accordance with applicable floodplain management requirements. Conditions identified in Step 4 will be implemented.

**FAILURE TO COMPLY WITH CONDITIONS ENUMERATED
IN THE RECORD OF ENVIRONMENTAL CONSIDERATION
MAY JEOPARDIZE FEDERAL FUNDING.**

Appendix C Agency Correspondence



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, DETROIT DISTRICT
MARQUETTE FIELD OFFICE
115 SOUTH LAKESHORE BOULEVARD, SUITE C
MARQUETTE, MICHIGAN 49855-4652

REPLY TO
ATTENTION OF:

December 17, 2019

Engineering & Technical Services
Regulatory Office
File Number LRE-2018-01031-38-N19

Jim Compton
City of Marquette
300 West Baraga Avenue
Marquette, Michigan 49855

Dear Mr. Compton:

Please refer to your application for a Department of the Army (DA) permit to discharge fill in wetlands and in Lake Superior associated with the relocation of Lakeshore Boulevard between Wright Street and Hawley Street, Marquette, Michigan. We have verified that the project is authorized by Nationwide Permit 14, Linear Transportation Projects, as published in the Federal Register.

You may proceed with the work per the following project description, attached drawings, and attached general and special conditions:

Install sediment barriers. Discharge 25 cubic yards of fill in an irregularly-shaped 21' x 15' wetland area: 0.004 acres of wetland loss. Install 88' of 5' x 3.2' elliptical culvert, at inlet invert elevation 602.44', IGLD 1985, and outlet invert elevation 602.0', IGLD 1985. Discharge 8 cubic yards of riprap in a 24' x 18' x 4' area at the culvert inlet and in a 17' x 18' x 4' area at the culvert outlet.

Special Conditions:

1. If you discover any unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately stop work in that area and notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
2. All dredged and/or excavated materials will be disposed of in upland location(s) with no placement in, or return to, any waterway or wetland. Liability for proper placement of all materials, including those disposed of off-site by any party, notwithstanding ownership, remains with the permittee.
3. All fill shall consist of clean, inert materials from an upland source. The fill material must be free from toxic substances, fines, oil and grease, debris, wood,

general refuse, plaster, and other pollutants, and shall contain no broken asphalt, oil-based material, or metal.

4. Erosion controls, such as silt fencing, shall be placed to prevent discharge material from entering wetlands or waterways. These must be erected prior to starting work, and their effectiveness must be maintained until all work at the site is completed and the area has been stabilized against erosion.

5. This permit does not authorize the discharges of dredged or fill material, including preliminary grading or incidental movement of soils, for access or haul roads, or to construct storage or staging areas or pads. Any temporary or permanent discharges of dredged or fill material into wetlands or other waters of the United States, and any other activities waterward of the contiguous contour of the Ordinary High Water Mark, other than that shown on the attached plans, shall not be initiated without prior written authorization from this office.

Any construction activity other than that shown on the plans may not qualify for the authorization. If you contemplate any changes or additional activities from those depicted on the plans, please submit them to this office for authorization review prior to any construction. On completion of the work, you must fill in and return the enclosed COMPLETION REPORT.

This verification is invalid until you obtain an appropriate state permit/certification or waiver thereof. You must not initiate activities authorized under the NWP until all required State authorizations have been received. If local approvals are required, we recommend you contact the appropriate local government body directly.

We are obligated to provide recipients of permit verifications with a jurisdictional determination (JD) when requested to do so. The Corps of Engineers has the following options with respect to JDs: (1) Approved Jurisdictional Determinations (AJD), which are considered "official" JDs and can be administratively appealed; (2) Preliminary Jurisdictional Determinations (PJD), which are non-binding JDs and advise an affected party that the Corps of Engineers believes there may be waters of the United States on the property that fall under the Corps' regulatory authority and enables the Corps and a permit applicant or other affected party to resolve certain jurisdiction and permit issues without expending time on making an official determination of the Corps' jurisdiction; and (3) No Jurisdiction Determination (NJD), which is used in situations where issuance of a JD is deemed unnecessary by a permit applicant or other affected party because Corps' jurisdiction is undisputed (e.g., work is in a navigable water of the United States) or not subject to question. The NJD option requires less documentation than a PJD and likewise enables the Corps and a permit applicant or other affected party to resolve jurisdiction and permit issues without expending time on an official determination of the Corps' jurisdiction.

Per the information in your application and information gained during our inspection of the project site, we have determined that your project will occur in a navigable water of the United States and in wetlands adjacent to a navigable water of the United States subject to the Detroit District, U.S. Army Corps of Engineers' regulatory authority under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Our listing of navigable waters under the Corps' regulatory authority within the Detroit District's geographic area can be found at:

<http://www.lre.usace.army.mil/Missions/Regulatory-Program-and-Permits>. As there was no question regarding the Corps' regulatory jurisdiction during our evaluation of the application, we do not intend to include a JD with this permit verification. Our intent to not issue a JD in this instance does not preclude you from requesting a PJD or an AJD at any time. As noted above, an AJD would provide an official determination of jurisdictional waters on a site and can be administratively appealed.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 18, 2022. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant nationwide permit is modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this nationwide permit.

As per 33 CFR 325, Appendix A, representatives from this office are allowed to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of the Nationwide Permit.

Should you have any questions, please contact me at the above address, by E-Mail at Jean.M.Battle2@usace.army.mil, or by telephone at (906) 228-2833. In all communications, please refer to File Number LRE-2018-01031-38-N19.

We are interested in your thoughts and opinions concerning your experience with the Detroit District, Corps of Engineers Regulatory Program. If you are interested in letting us know how we are doing, you can complete an electronic Customer Service Survey from our web site at: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Alternatively, you may contact us and request a paper copy of the survey that you may complete and return to us by mail or fax. Thank you for taking the time to complete the survey, we appreciate your feedback.

Sincerely,

Jean Battle
Regulatory Project Manager
Marquette Field Office

Enclosures

Copy Furnished

EGLE, J. Gustafson (52-LAKESHORE BOULEVARD RELOCATION)

A. Nationwide Permit General Conditions:

To qualify for NWP authorization, the permittee must comply with the following general conditions, as appropriate. These conditions are selected from those published in the Federal Register that are particularly relevant to the construction and/or operation of this particular authorized activity. The complete text is available at our website

<http://www.lre.usace.army.mil/Missions/RegulatoryProgramandPermits.aspx> under "Detroit Regulatory Quick" select "Detroit District General Permit Types" and then choose "Nationwide Permits with Michigan Regional Conditions" OR "Nationwide Permits with Indiana Regional Conditions"; or, you may contact the Detroit District directly for the information. We have done our best to verify that your project complies with the others, where applicable.

1. Navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre- construction course, condition,

capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of

separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/ THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the

maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

B. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.



NOTICE OF AUTHORIZATION

Permit Number: WRP019036 v. 1

Site Name: 52-Lakeshore Boulevard Relocation

Date Issued: October 18, 2019

Expiration Date: October 18, 2024

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; specifically:

- ☐ Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- ☐ Part 301, Inland Lakes and Streams.
- ☒ Part 303, Wetlands Protection.
- ☐ Part 315, Dam Safety.
- ☐ Part 323, Shorelands Protection and Management.
- ☒ Part 325, Great Lakes Submerged Lands.
- ☐ Part 353, Sand Dunes Protection and Management.

Authorized activity:

As part of the relocation of Lakeshore Boulevard between Station 11+00 and 53+60 place a maximum of 25 cubic yards of fill in 172 square feet (0.004 acres) of wetland near Station 45+50. Remove the existing structure near the Hawley Street intersection (Station 48+00) and install an 88-foot long by 5-foot span by 3.2-foot rise concrete cross culvert with 8 cubic yards of rock riprap below the Ordinary High-Water Mark (OHWM) elevation of Lake Superior.

A U.S. Army Corps of Engineers permit is required prior to performing any work authorized by this permit.

All work shall be performed according to the attached plans and permit conditions.

To be conducted at property located in: Marquette County, Waterbody: Lake Superior/wetland Section 11, Town 48N, Range 25W, City of Marquette

Permittee:

City of Marquette
300 W. Baraga
Marquette, MI 49855

John Gustafson
Marquette District Office
Water Resources Division
906-203-9887

*This notice must be displayed at the site of work.
Laminating this notice or utilizing sheet protectors is recommended.
Please refer to the above permit number with any questions or concerns.*

**EGLE-WRD
WRP019036 v1.0
Approved
Issued On:10/18/2019
Expires On:10/18/2024**



**MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
WATER RESOURCES DIVISION
PERMIT**

Issued To:

City of Marquette
300 W. Baraga
Marquette, MI 49855

Permit No: WRP019036 v.1
Submission No.: HNS-GFR5-68KE2
Site Name: 52-Lakeshore Boulevard Relocation
Issued: October 18, 2019
Expires: October 18, 2024

This permit is being issued by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

- | | |
|--|---|
| <input type="checkbox"/> Part 301, Inland Lakes and Streams | <input type="checkbox"/> Part 323, Shorelands Protection and Management |
| <input checked="" type="checkbox"/> Part 303, Wetlands Protection | <input checked="" type="checkbox"/> Part 325, Great Lakes Submerged Lands |
| <input type="checkbox"/> Part 315, Dam Safety | <input type="checkbox"/> Part 353, Sand Dunes Protection and Management |
| <input type="checkbox"/> Part 31, Water Resources Protection (Floodplain Regulatory Authority) | |

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Authorized Activity:

As part of the relocation of Lakeshore Boulevard between Station 11+00 and 53+60 place a maximum of 25 cubic yards of fill in 172 square feet (0.004 acres) of wetland near Station 45+50. Remove the existing structure near the Hawley Street intersection (Station 48+00) and install an 88-foot long by 5-foot span by 3.2-foot rise concrete cross culvert with 8 cubic yards of rock riprap below the Ordinary High-Water Mark (OHWM) elevation of Lake Superior.

A U.S. Army Corps of Engineers permit is required prior to performing any work authorized by this permit.

All work shall be performed according to the attached plans and permit conditions.

Waterbody Affected: Lake Superior/wetland
Property Location: Marquette County, City of Marquette, Town/Range/Section 48N25W11

Authority granted by this permit is subject to the following limitations:

- Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
- The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.

EGLE-WRD
WRP019036 v1.0
Approved
Issued On:10/18/2019
Expires On:10/18/2024

- C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
- D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
- E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
- F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.
- G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
- H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
- I. This permit shall not be assigned or transferred without the written approval of EGLE.
- J. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
- K. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
- L. In issuing this permit, EGLE has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, EGLE may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
- M. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
- N. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, EGLE may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
- O. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from EGLE. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by EGLE prior to being implemented.
- P. This permit may be transferred to another person upon written approval of EGLE. The permittee must submit a written request to EGLE to transfer the permit to the new owner. The new owner must also submit a written request to EGLE to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all the above information may be provided to EGLE. EGLE will review the request and, if approved, will provide written notification to the new owner.
- Q. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
- R. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- S. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).
- T. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
- U. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
- V. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.

- W. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.
- X. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

Authority granted by this permit does not waive any jurisdiction of the United States Army Corps of Engineers or the need for a federal permit, if required.

Authority granted by this permit does not waive compliance requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA. Any discharge of sediment into waters of the state and/or off the road right-of-way is a violation of this permit, Part 91, and Part 31, Water Resources Protection, of the NREPA. A violation of these parts subjects the permittee to potential fines and penalties.

This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.

The permittee is responsible for acquiring all necessary easements or rights-of-way before commencing any work authorized by this permit. All construction operations relating to or part of this project shall be confined to the existing right-of-way limits or other acquired easements.

Temporary soil erosion and sedimentation control measures shall be installed before or upon commencement of the earth change and shall be maintained daily. Temporary soil erosion and sedimentation control measures shall be maintained until permanent soil erosion and sedimentation control measures are in place and the area is stabilized. Permanent soil erosion and sedimentation control measures for all slopes, channels, ditches, or any disturbed area shall be installed within five (5) calendar days after final grading or the final earth change has been completed.

All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.

All raw earth within 100 feet of a lake, stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets in accordance with the following dates: September 20th for the Upper Peninsula, October 1st for the Lower Peninsula north of US-10, and October 10th for the Lower Peninsula south of US-10.

This permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.

This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the EGLE, will be for a five-year period beginning at the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.

If the project, or any portion of the project, is stopped and lies incomplete for any length of time other than that encountered in a normal work week, every precaution shall be taken to protect the incomplete work from erosion, including the placement of temporary gravel bag riprap, temporary seed and mulch, or other acceptable temporary protection.

Prior to construction, the permittee shall provide a final Health and Safety Plan (HASP) demonstrating how excavated soil, potential contaminated soils and materials, and groundwater from any dewatering operations will be handled during construction of the project

All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed on upland (non-wetland, non-floodplain or non-bottomland), prepared for stabilization, and stabilized with sod and/or seed and mulch in such a manner so as to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain

All fill/backfill shall consist of clean inert material that will not cause siltation nor contain soluble chemicals, organic matter, pollutants, or contaminants. All fill shall be contained in such a manner so as not to erode into any surface water, floodplain, or wetland. All raw areas associated with the permitted activity shall be stabilized with sod and/or seed and mulch, riprap, or other technically effective methods as necessary to prevent erosion.

During removal of the existing structure, every precaution shall be taken to prevent debris from entering any watercourse. Any debris reaching the watercourse during the removal and/or reconstruction of the structure shall be immediately retrieved from the water. All material shall be disposed of in an acceptable manner consistent with local, state, and federal regulations.

Prior to the removal of the existing structures, cofferdams of steel sheet piling, gravel bags, clean stone, coarse aggregate, concrete or other acceptable barriers shall be installed to isolate all construction activity from the water. The barriers shall be maintained in good working order throughout the duration of the project. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site.

All cofferdam and temporary steel sheet pile shall then be removed in its entirety, unless specifically shown to be left in place on the accepted plans. Cofferdam and sheet pile that is left in place shall be cut off at the elevation shown on the plans and shall be a minimum of one foot below the stream bottom.

If the project, or any portion of the project, is stopped and lies incomplete for any length of time other than that encountered in a normal work week, every precaution shall be taken to protect the incomplete work from erosion, including the placement of temporary gravel bag riprap, temporary seed and mulch, or other acceptable temporary protection.

Rock riprap shall be placed so that it does not interfere with flows in and out of the culvert.

Prior to the start of construction, all adjacent non-work wetland areas shall be protected by properly trenched sedimentation barrier to prevent sediment from entering the wetland. Orange construction fencing may be installed as needed to prohibit construction personnel from entering or performing work in these areas. Sedimentation barrier shall be maintained daily throughout the construction process. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site. The sedimentation barrier shall then be removed in its entirety and the area restored to its original configuration and cover.

Issued By: _____


John Gustafson
Marquette District Office
Water Resources Division
906-203-9887

cc: City of Marquette Clerk
Marquette County CEA
USACE – Marquette
EGLE RRD – Steve Harrington

EGLE-WRD
WRP019036 v1.0
Approved
Issued On:10/18/2019
Expires On:10/18/2024

From: [Castaldi, Duane](#)
To: [Hachey, Alan S.](#); [Eleff, Jessica](#)
Cc: [Dorochoff, Nicholas](#)
Subject: FW: NEPA Scoping Document -- Marquette, Michigan
Date: Wednesday, December 18, 2019 2:58:00 PM

From: Soucy, Sean (EGLE) <SoucyS@michigan.gov>
Sent: Wednesday, December 18, 2019 1:55 PM
To: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Subject: RE: NEPA Scoping Document -- Marquette, Michigan

Hello Duane,

Beyond the 'road relocation' EGLE Permit WRP019036 V 1 dated 10/18/19, the coastal restoration work will likely require additional EGLE permitting under Part 303, *Wetlands Protection*, and Part 325, *Great Lakes Submerged Lands*. Any fill or excavation work below the Ordinary High Water Mark of 602.6' IGLD 1985, or work below existing water levels (Lake Superior is currently higher than 602.6' IGLD 85) will require a Part 325 permit. A Part 303 permit will be required as there is a previously identified pocket of regulated wetland between Wright and Hawley Streets that will be impacted by the coastal restoration work.

Aside from unknown issues that could arise during the permit review process, completion of this project could prove to be very beneficial to Lake Superior, the City of Marquette, and its residents.

Not only would critical infrastructure be relocated and protected from further severe erosion and ongoing maintenance work, but a very long section of armored shoreline would be removed and replaced with a restored natural shoreline with created pockets of dune and swale wetlands.

Additionally, the public would benefit from increased access to the Lake Superior shoreline.

Thanks for allowing EGLE to comment on this proposal. Feel free to call or e-mail with any questions.

Sean Soucy

Water Resources Division – Marquette District Office
Department of Environment, Great Lakes, and Energy
Phone: 906-250-0588
Michigan.gov/EGLE

From: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Sent: Monday, December 2, 2019 10:10 AM
To: Soucy, Sean (EGLE) <SoucyS@michigan.gov>
Subject: RE: NEPA Scoping Document -- Marquette, Michigan

Good Morning.

Thank you for writing. From EGLE Water Resources, FEMA is interested to hear what additional

permits would be required for either the road re-location or the work along the shoreline of Lake Superior once the road has been moved. We do have the EGLE Permit WRP019036 V 1 dated 10/18/19 and will require that the project follow all terms and conditions of that permit. That appears to be specifically for the road relocation.

Beyond regulatory permitting, we are interested to hear if EGLE has any general concerns or comments on the project that need to be included in the Environmental Assessment.

Once we draft the EA we will send EGLE a link to an online copy of the document.

Thanks

Duane D. Castaldi
Regional Environmental Officer
U.S. Department of Homeland Security
FEMA Region V

536 South Clark Street, 6th Floor
Chicago, IL 60605
O: 312-408-5549
E: duane.castaldi@fema.dhs.gov

From: Soucy, Sean (EGLE) <SoucyS@michigan.gov>
Sent: Monday, December 2, 2019 7:55 AM
To: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Subject: RE: NEPA Scoping Document -- Marquette, Michigan

Good morning Duane,

I haven't prepared written comments for a FEMA project before. Is there any information in particular you're interested in?

Thanks for the help.

Sean Soucy
Water Resources Division – Marquette District Office
Department of Environment, Great Lakes, and Energy
Phone: 906-250-0588
Michigan.gov/EGLE

From: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Sent: Monday, November 25, 2019 4:13 PM
To: Soucy, Sean (EGLE) <SoucyS@michigan.gov>
Subject: NEPA Scoping Document -- Marquette, Michigan

Good Afternoon.

Please find attached a NEPA scoping document for a proposed FEMA project in Marquette, Michigan.

A hard copy will go out in the mail this afternoon.

Thanks

Duane D. Castaldi
Regional Environmental Officer
U.S. Department of Homeland Security
FEMA Region V

536 South Clark Street, 6th Floor
Chicago, IL 60605
O: 312-408-5549
E: duane.castaldi@fema.dhs.gov



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING



LIESL EICHLER CLARK
DIRECTOR

December 18, 2019

Duane Castaldi
FEMA Region V
536 South Clark Street 6th Floor
Chicago, IL 60605-1521

Dear Mr. Castaldi:

Subject: Federal Consistency Determination, 2019 FEMA Pre-Disaster Mitigation Grant
Program Funding, Lakeshore Boulevard Coastal Resilient Infrastructure Project,
City of Marquette, Marquette County, Michigan

Staff of the Water Resources Division has reviewed this phase of the project for consistency with Michigan's Coastal Management Program (MCMP), as required by Section 307 of the Coastal Zone Management Act, PL 92-583, as amended (CZMA). Thank you for providing the opportunity to review this proposed activity.

Our review indicates that portions of these projects are located within Michigan's coastal management boundary and are subject to consistency requirements.

A determination of consistency with MCMP requires evaluation of a project to determine if it will have an adverse impact on coastal land or water uses or coastal resources. Projects are evaluated using the permitting criteria contained in the regulatory statutes administered by the Department of Environment, Great Lakes, and Energy. These statutes constitute the enforceable policies of the Coastal Management Program.

Provided all required permits are issued and complied with, no adverse impacts to coastal resources are anticipated from these projects as described in the information you forwarded to our office. Issuance of all required permits will certify the activity for which the permits were issued as consistent with MCMP. If no permits are required, these projects shall be considered consistent as of the date of this letter.

This consistency determination does not waive the need for permits that may be required under other federal, state or local statutes. Please call me if you have any questions regarding this review.

Sincerely,

Chris Antieau
Field Operations Support Section
Water Resources Division
517-290-5732



FEMA

December 12, 2019

Lynzi Barnes, Designated Federal Officer
Great Lakes National Program Office
US EPA – Great Lakes Restoration Initiative
77 W Jackson Blvd (G-9J)
Chicago, IL 60604-3507

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project
City of Marquette, Marquette County, Michigan
46.5671, -87.3935
PDMC-PJ-05-MI-2018-011

Dear Ms. Barnes:

The Michigan State Police Emergency Management & Homeland Security Division and the City of Marquette have requested funding from the Federal Emergency Management Agency (FEMA) to support the captioned Pre-Disaster Mitigation Grant Program (PDM) project. The objectives of FEMA's PDM Program are to aid eligible state, territory, and local governments, along with federally recognized tribal governments, in the implementation of sustained pre-disaster natural hazard mitigation programs.

The enclosed scoping document sets forth the draft purpose and need and potential areas of concern associated with the proposed project. This information is provided here in accord with the Council on Environmental Quality's regulations for complying with the National Environmental Policy Act to advise other agencies of FEMA's intent to prepare an Environmental Assessment for this project, note areas of expected environmental concern, and solicit any early comment regarding the project.

Specifically, FEMA is interested in coordinating with the Great Lakes Restoration Initiative to learn more about the involvement of the Great Lakes Restoration Initiative and whether or not any NEPA documents have already been developed for this project.

FEMA looks forward to any comments you may have on this project as we prepare the Environmental Assessment. You are welcome to respond by email or mail. If you have questions, please contact me at 312-408-5549 or at duane.castaldi@fema.dhs.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Duane", followed by a long horizontal flourish.

Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

DEC 19 2019

Duane D. Castaldi
Regional Environmental Officer
Federal Emergency Management Agency, Region 5
U.S. Department of Homeland Security
536 South Clark Street, 6th Floor
Chicago, Illinois 60605-1521

REPLY TO THE ATTENTION OF:

Re: Scoping Comments for the Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County, Michigan

Dear Mr. Castaldi:

The U.S. Environmental Protection Agency received your request for comments to inform the Draft Environmental Assessment (EA) for the project referenced above. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. The Federal Emergency Management Agency (FEMA) is the lead agency under NEPA. The Michigan State Police Emergency Management and Homeland Security Division and the City of Marquette are the project proponents.

The proposal would: (1) relocate Lakeshore Boulevard and stormwater infrastructure inland, (2) stabilize the shoreline, (3) restore habitat, (4) construct a multi-use trail, and (5) construct new utility infrastructure for potential future development. EPA recognizes the substantial environmental benefits of well-planned habitat restoration along shorelines of the Great Lakes. Scoping materials also establish a strong need for action, explaining that the area experiences unprecedented coastal damage due to higher Lake Superior water levels and increased occurrences and intensity of storms. To assist FEMA in addressing the project need in a manner that best protects human health and the environment, EPA offers comments on coordination around restoration initiatives, climate resiliency, hazardous materials, and other topics in the enclosed: (1) Detailed Scoping Comments and (2) Construction Emission Control Checklist.

Thank you for the opportunity to review this project. When the NEPA document becomes available, please send an electronic copy to Jen Tyler, the lead reviewer for this project, at tyler.jennifer@epa.gov. Ms. Tyler is also available at 312-886-6394.

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth A. Westlake", is written over a horizontal line.

Kenneth A. Westlake
Deputy Director, Tribal and Multimedia Programs Office
Office of the Regional Administrator

Enclosures:

Detailed Scoping Comments
Construction Emission Control Checklist

CC Via Email:

Dave Stensaas, City Planner, City of Marquette
Stephanie Swart, Michigan Department of Environment, Great Lakes, and Energy
Mike Ripley, Chippewa-Ottawa Resource Authority
Ann McCammon Soltis, Great Lakes Indian Fish and Wildlife Commission

Coordination Related to Other Restoration Projects

The Lake Superior Lakewide Action and Management Plan (LAMP)¹ is a binational ecosystem-based management strategy for protecting, restoring, and maintaining the water quality of Lake Superior. The LAMP is developed and implemented by over 23 binational governmental agencies around the lake, together known as the Lake Superior Partnership. Liz LaPlante is EPA's project manager for the Lake Superior LAMP, and she coordinates with habitat and restoration projects under the Great Lakes Restoration Initiative. Ms. LaPlante may be a helpful resource for the project team. She is available at 312-353-2694 and at laplante.elizabeth@epa.gov.

Recommendations for the EA:

Coordinate with EPA's Liz LaPlante on restoration plans to ensure alignment with (1) the goals, objectives, and priority projects under the 2015 Lake Superior LAMP and (2) the Great Lakes Restoration Initiative Action Plan 3 objectives.²

Ecological and Habitat Restoration

The project would restore 38 acres of natural coastal habitat with funding from the National Fish and Wildlife Foundation. Restoration would include integrating geomorphic reduction and softening of existing armoring through native plantings, construction of a rubble mound revetment along the coast, and restoration and recreation of natural beach and dune and swale features.

Recommendations for the EA:

- Ensure that the proposed project would align with the goals and objectives of the Lake Superior LAMP, especially with regard to habitat restoration, climate resiliency, and green infrastructure. Include a supporting discussion in the EA.
- Incorporate pollinator-friendly habitat into restoration efforts. For guidance, see Michigan State University's Michigan Pollinator Initiative³ and the Michigan Department of Agriculture and Rural Development's Managed Pollinator Protection Plan.⁴
- Commit to revegetate all disturbed green spaces using native species whenever feasible, and describe plans for controlling invasive species.
- Describe tree loss, and, if applicable, discuss mitigation. Mitigation could include, but is not limited to, replanting of native hardwood tree species on site or assisting local, county, or state agencies with ongoing or planned reforestation efforts.

¹ The 2015-2019 Lake Superior LAMP is available at: https://www.epa.gov/sites/production/files/2016-10/documents/lake_superior_lamp_2015-2019.pdf

² The Great Lakes Restoration Plan Action Plan 3 is available at: <https://www.epa.gov/sites/production/files/2019-10/documents/glri-action-plan-3-201910-30pp.pdf>

³ Michigan State University's Michigan Pollinator Initiative is available at: <https://pollinators.msu.edu/>

⁴ Michigan Department of Agriculture and Rural Development's Managed Pollinator Protection Plan is available at: https://www.michigan.gov/mdard/0,4610,7-125-2390_76976---.00.html

Public Outreach on Mitigation

Throughout demolition and construction, keeping the community informed of required mitigation measures and providing a venue for resident complaints can help to ensure mitigation measures are followed.

Recommendations for the EA:

In the EA, commit to promote public awareness of mitigation measures throughout project implementation. For example, commit to list all applicable measures (such as specific dust control measures and time restrictions for construction vehicle idling, among others) on a bulletin, and post the bulletin at easily visible locations within and adjacent to the project area. Include a contact name and phone number for people to call if they have questions or observe protective measures not being followed. We also recommend prominently posting such information online (e.g., the City of Marquette's website) and at community buildings, such as libraries.

Climate Resiliency

The proposed project would address damages that have resulted, and continue to result, from higher Lake Superior water levels and increased frequency and intensity of storms. Such changes are in line with current findings and future modeling results prepared by the U.S. Global Change Research Program (USGCRP). USGCRP reports that, across the Midwestern U.S., statistically significant increases in flood risk and severity are well documented. Extreme heat, heavy downpours, and flooding will continue to affect infrastructure.⁵

Recommendations for the EA:

- Include an analysis to support the proposal to move the road 300-400 feet and raise it 3-4 feet. How were these numbers reached? Understanding the basis for these numbers would help EA readers to gauge the potential long-term protectiveness and associated environmental impacts. Describe the target design standards, including storm surge level and flood zone designation.
- Describe changing precipitation, flooding, and temperature conditions, as reported by the USGCRP.
- Assess whether project infrastructure would likely be resilient to such changes throughout the expected life of the roadway.
- Consider whether it would be reasonable to consider alternatives at different inland distances from the coast and/or at different elevations.
- Ensure that coastal restoration work would be resilient to changing climate conditions, and document the analysis and design considerations in the EA.
- Incorporate resiliency and adaptation plans or measures, such as additional stormwater capacity and use of permeable pavements. Use EPA's Climate Change Adaptation Resource Center⁶ to view case studies and identify appropriate mitigation strategies.

⁵ U.S. Global Change Research Program, 2017 Climate Science Special Report: Fourth National Climate Assessment (NCA4), Volume 1, page 241.

⁶ EPA's Climate Change Adaptation Resource Center is available at <https://www.epa.gov/arc-x>.

Hazardous Materials

A former industrial site is in the project area and includes abandoned drives and concrete slabs where the former buildings were located. For the safety of the public and project construction workers, it is important to investigate possible contamination upfront, use the information to compare project alternatives, and develop measures to avoid, minimize, and mitigate adverse impacts, if needed. Investigating and addressing potential contamination challenges early in the process can also avoid future project delays or accidental exposures or releases.

Recommendations for the EA:

- Conduct a Phase I site assessment of the former industrial site to identify potential sources of contamination. This would include background and historical investigations and preliminary property inspections. Consider past industrial uses and the presence of underground storage tanks and any disposal areas. For guidance, see ASTM International Standard E1527-13, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process." If applicable, include a map in the EA indicating potential areas of concern and discuss findings.
- If the Phase I site assessment suggest that the site may be contaminated, then conduct a Phase II investigation at key locations where contamination is suspected. Phase II assessments include sampling activities to identify the types and concentrations of contaminants and the areas of contamination. If a Phase II assessment is conducted, summarize findings in the EA.
- Describe any plans for future soil and groundwater testing in the EA.
- Ensure that any hazardous waters, soils, or other materials would not be released due to project activities, and document protective measures within the EA, if applicable.
- Commit to provide training to promote workers' ability to identify and address hazards related to the former industrial site.
- Prior to construction, develop a plan to address the potential discovery of hazardous materials.

Aquatic Resources

If wetlands or other aquatic resources may be impacted by the proposed project, then it is important for the NEPA document to assess direct and indirect impacts to inform decision-making.

Recommendations for the EA:

- Delineate wetlands in the project area, include the delineation in the NEPA document, and assess whether any wetlands could be directly or indirectly impacted by the project.
- Discuss compliance with Section 401 and Section 404 of the Clean Water Act (CWA).
- If applicable, describe proposed wetland mitigation types, ratios, and potential locations. Include mitigation sequencing per the CWA Section 404(b)(1) Guidelines (first avoid, then minimize, then mitigate) and describe how mitigation would comply with the 2008 Mitigation Rule.
- If applicable, disclose the proximity of trees that would be cleared to aquatic resources.
- Discuss methods for tree clearing. Specify whether trees would be mechanically cleared or cut at their base, leaving trunks intact. This differentiation is important for regulatory requirements under Section 404 of the CWA, if waters may be impacted.

- If applicable, include commitments to implement the following measures to minimize unavoidable impacts during construction:
 - Perform construction in wetlands during frozen ground conditions, if feasible.
 - Minimize the width of temporary access roads.
 - Use easily-removable materials for construction of temporary access roads and staging areas (e.g., swamp/timber mats) in lieu of materials that sink (e.g., stone, rip-rap, wood chips).
 - Use swamp/timber mats or other alternative matting to distribute the weight of the construction equipment. This would minimize soil rutting and compaction.
 - Use vehicles and construction equipment with wider tires or rubberized tracks, or use low-ground-pressure equipment to further minimize impacts during construction access and staging.
 - Use long-reach excavators, where appropriate, to avoid driving or staging in wetlands.
 - Place mats under construction equipment to contain any spills.

Air Quality

The proposed project would result in emissions from construction equipment. Temporary construction emissions have the potential to impact human health, especially in sensitive populations, such as elderly people, children, and those with impaired respiratory systems.

Recommendations for the EA:

- Discuss potential emissions sources from the construction phase of the proposed project. Consider material hauling trips and use of construction equipment.
- Identify and commit to specific measures to reduce construction emissions. Options include: (1) requiring dust suppressant strategies, such as use of tarps and watering soils, (2) limiting idling time for construction trucks and heavy equipment, and (3) soliciting bids that require zero-emission technologies or advanced emission control systems. See additional best practices in the enclosed Construction Emission Control Checklist.
- Establish material hauling routes away from places where children live, learn, and play, to the extent feasible. Consider homes, schools, daycare centers, and playgrounds. In addition to air quality benefits, careful routing may protect children from vehicle-pedestrian accidents.

Threatened and Endangered Species Impacts

Section 7 of the Endangered Species Act (ESA) directs all federal agencies to ensure that any action they authorize, fund, or carry-out does not jeopardize the continued existence of a threatened or endangered species or proposed or designated critical habitat. Implementing regulations found at 50 CFR Part 402 specify how federal agencies are to fulfill their ESA Section 7 consultation requirements.

Recommendations for the EA:

- Use the U.S. Fish and Wildlife Service (FWS) "Information for Planning and Conservation" tool to obtain a list of trust resources in the project area. The list would include species that are listed as threatened or endangered under ESA, candidate species

for listing, critical habitat, and migratory birds protected under the Migratory Bird Treaty Act.⁷

- Determine whether the proposed action may affect trust resources. If trust resources may be affected, engage in consultation with FWS. Document coordination and formal consultation in the EA with the goal of aligning NEPA and ESA Section 7 consultation processes.
- Coordinate with the Michigan Department of Natural Resources to determine whether any state-listed species could be impacted by the proposed project, and document coordination in the EA.

⁷ FWS Information for Planning and Conservation (IPaC) tool is available at: <https://ecos.fws.gov/ipac/>

U.S. Environmental Protection Agency
Construction Emission Control Checklist

Consider measures that apply to the proposed project from the following list.

Mobile and Stationary Source Diesel Controls

Purchase or solicit bids that require the use of vehicles that are equipped with zero-emission technologies or the most advanced emission control systems available. Commit to the best available emissions control technologies for project equipment in order to meet the following standards.

- On-Highway Vehicles: On-highway vehicles should meet, or exceed, the EPA exhaust emissions standards for model year 2010 and newer heavy-duty, on-highway compression-ignition engines (e.g., long-haul trucks, refuse haulers, shuttle buses, etc.).⁸
- Non-road Vehicles and Equipment: Non-road vehicles and equipment should meet, or exceed, the EPA Tier 4 exhaust emissions standards for heavy-duty, non-road compression-ignition engines (e.g., construction equipment, non-road trucks, etc.).⁹
- Locomotives: Locomotives servicing infrastructure sites should meet, or exceed, the U.S. EPA Tier 4 exhaust emissions standards for line-haul and switch locomotive engines where possible.¹⁰
- Marine Vessels: Marine vessels hauling materials for infrastructure projects should meet, or exceed, the latest U.S. EPA exhaust emissions standards for marine compression-ignition engines (e.g., Tier 4 for Category 1 & 2 vessels, and Tier 3 for Category 3 vessels).¹¹
- Low Emission Equipment Exemptions: The equipment specifications outlined above should be met unless: 1) a piece of specialized equipment is not available for purchase or lease within the United States; or 2) the relevant project contractor has been awarded funds to retrofit existing equipment, or purchase/lease new equipment, but the funds are not yet available.

Consider requiring the following best practices through the construction contracting or oversight process:

- Establish and enforce a clear anti-idling policy for the construction site.
- Use onsite renewable electricity generation and/or grid-based electricity rather than diesel-powered generators or other equipment.
- Use electric starting aids such as block heaters with older vehicles to warm the engine.
- Regularly maintain diesel engines to keep exhaust emissions low. Follow the manufacturer's recommended maintenance schedule and procedures. Smoke color can signal the need for maintenance (e.g., blue/black smoke indicates that an engine requires servicing or tuning).

⁸ <http://www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm>

⁹ <http://www.epa.gov/otaq/standards/nonroad/nonroadci.htm>

¹⁰ <http://www.epa.gov/otaq/standards/nonroad/locomotives.htm>

¹¹ <http://www.epa.gov/otaq/standards/nonroad/marineci.htm>

- Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site.
- Repower older vehicles and/or equipment with diesel- or alternatively-fueled engines certified to meet newer, more stringent emissions standards (e.g., plug-in hybrid-electric vehicles, battery-electric vehicles, fuel cell electric vehicles, advanced technology locomotives, etc.).

Fugitive Dust Source Controls

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative, where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Occupational Health

- Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel-equipment operators to perform routine inspection, and maintaining filtration devices.
- Position the exhaust pipe so that diesel fumes are directed away from the operator and nearby workers, reducing the fume concentration to which personnel are exposed.
- Use enclosed, climate-controlled cabs pressurized and equipped with high-efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.

Subject: FW: U.S. EPA Scoping - Lakeshore Blvd Project in Marquette, MI
Attachments: 2019_12_19_EPAScopingFEMA-LakeShoreBlvdCoastalResilientInfrastProject.pdf; Lakeshore Boulevard, Marquette, Michigan Scoping Document.pdf

From: Castaldi, Duane
Sent: Monday, December 23, 2019 12:57 PM
To: laplante.elizabeth@epa.gov
Subject: FW: U.S. EPA Scoping - Lakeshore Blvd Project in Marquette, MI

Good Afternoon.

FEMA Region V recently sent a NEPA scoping document to the EPA and in their response they suggested that we share our scoping document with you. We are currently drafting our Environmental Assessment and would welcome any comments that you may have.

The EPA's response is attached as well as the Scoping document.

Thanks

Duane D. Castaldi
Regional Environmental Officer
U.S. Department of Homeland Security
FEMA Region V

536 South Clark Street, 6th Floor
Chicago, IL 60605
O: 312-408-5549
E: duane.castaldi@fema.dhs.gov

From: Tyler, Jennifer (Blonn) <Tyler.Jennifer@epa.gov>
Sent: Thursday, December 19, 2019 3:04 PM
To: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Subject: U.S. EPA Scoping - Lakeshore Blvd Project in Marquette, MI

Hi Duane,
Please find U.S. EPA's scoping comments attached for the Lakeshore Boulevard Coastal Resilient Infrastructure Project. Thank you for the opportunity to review!
Best,
Jen

Jen (Blonn) Tyler
NEPA Reviewer

Tribal & Multi-media Programs Office
U.S. Environmental Protection Agency, Region 5
77 W. Jackson Boulevard
Chicago, Illinois 60604
312-886-6394
Tyler.Jennifer@epa.gov

From: Westlake, Kenneth <westlake.kenneth@epa.gov>
Sent: Monday, November 25, 2019 3:58 PM
To: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Cc: Tyler, Jennifer (Blonn) <Tyler.Jennifer@epa.gov>
Subject: RE: NEPA Scoping Document -- Marquette, Michigan

Duane,
Thanks for forwarding this EA scoping opportunity. I have assigned it to Jen Tyler of my staff.
Ken

From: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Sent: Monday, November 25, 2019 3:00 PM
To: Westlake, Kenneth <westlake.kenneth@epa.gov>
Subject: NEPA Scoping Document -- Marquette, Michigan

Good Afternoon.

Please find attached a NEPA scoping document for a proposed FEMA project in Marquette, Michigan.

A hard copy will go out in the mail this afternoon.

Thanks

Duane D. Castaldi
Regional Environmental Officer
U.S. Department of Homeland Security
FEMA Region V

536 South Clark Street, 6th Floor
Chicago, IL 60605
O: 312-408-5549
E: duane.castaldi@fema.dhs.gov

From: [Castaldi, Duane](#)
To: [Hachey, Alan S.](#)
Subject: FW: Bald Eagle Nesting Sites in Michigan, Federal Project in Marquette, MI
Date: Tuesday, November 26, 2019 9:17:24 AM
Attachments: [Lakeshore Boulevard, Marquette, Michigan Scoping Document.pdf](#)

From: Castaldi, Duane
Sent: Tuesday, November 26, 2019 8:17 AM
To: chris_mensing@fws.gov
Cc: Dorochoff, Nicholas <Nicholas.Dorochoff@fema.dhs.gov>
Subject: Bald Eagle Nesting Sites in Michigan, Federal Project in Marquette, MI

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project
City of Marquette, Marquette County, Michigan
46.5671, -87.3935
PDMC-PJ-05-MI-2018-011

Dear Mr. Mensing:

The Michigan State Police Emergency Management & Homeland Security Division and the City of Marquette have requested funding from the Federal Emergency Management Agency (FEMA) to support the captioned Pre-Disaster Mitigation Grant Program (PDM) project. The objectives of FEMA's PDM Program are to aid eligible state, territory, and local governments, along with federally recognized tribal governments, in the implementation of sustained pre-disaster natural hazard mitigation programs.

The enclosed scoping document sets forth the draft purpose and need and potential areas of concern associated with the proposed project. This information is provided here in accord with the Council on Environmental Quality's regulations for complying with the National Environmental Policy Act to advise other agencies of FEMA's intent to prepare an Environmental Assessment for this project, note areas of expected environmental concern, and solicit any early comment regarding the project.

FEMA will separately reach out of the USFWS Michigan Field Office to conduct Section 7 consultation. **We are reaching out directly to you to see if there are any known Bald Eagle Nests within the project vicinity.** The latitude and longitude is provided above and a detailed map to the project vicinity is attached within the scoping document.

This project was entered into IPAC on October 17, 2019, and was assigned a consultation code of 03E16000-2020-SLI-0051.

FEMA looks forward to any information you may have related to the Bald and Golden Eagle

Protection Act as we prepare the Environmental Assessment. We would appreciate a response within 30 days. You are welcome to respond by email or mail. If you have questions, please contact me at 312-408-5549 or at duane.castaldi@fema.dhs.gov.

Sincerely,

Duane D. Castaldi

Regional Environmental Officer

U.S. Department of Homeland Security

FEMA Region V

536 South Clark Street, 6th Floor

Chicago, IL 60605

O: 312-408-5549

E: duane.castaldi@fema.dhs.gov



FEMA

December 10, 2019

Mr. Scott Hicks, Field Office Supervisor
Michigan Ecological Services Field Office
U.S. Fish and Wildlife Service
2651 Coolidge Road, Suite 101
East Lansing, MI 48823

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project
City of Marquette, Marquette County, Michigan
46.5671, -87.3935
PDMC-PJ-05-MI-2018-011
USFWS Consultation Code: 03E16000-2020-SLI-0051

Dear Mr. Hicks:

The Federal Emergency Management Agency (FEMA) is requesting your concurrence with a no effect determination under Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) regarding a proposed project to relocate Lakeshore Boulevard in Marquette, Marquette County, Michigan. The project is proposed for funding under FEMA's Pre-Disaster Mitigation Program, PDMC-PJ-05-MI-2018-011. FEMA will prepare an Environmental Assessment for this project and the project scoping document is included for your review.

Four federally endangered, threatened, candidate, or species of concern are known to occur in Marquette County based on the USFWS Information for Planning and Consultation (IPaC) database: Canada Lynx (T), Gray Wolf (E), Northern Long-eared Bat (T), and Red knot (T).

FEMA is making a "no effect" determination for the Canada Lynx, Gray Wolf, and Red Knot and is requesting USFWS concurrence with that determination for inclusion in the Environmental Assessment. FEMA has determined that the mobility of the Canada Lynx and Gray Wolf will result in no effect to these species during the relocation of Lakeshore Boulevard. It is possible that the Red Knot may migrate through Michigan between May and September, but as the species does not nest in Northern Michigan there would be no effect to the species. FEMA will condition the project to require construction vehicles to follow standard BMPs and avoid direct contact with wildlife.

Finally, the Northern Long-eared bat (NLEB) is a listed species in Marquette County and the road relocation project will require the removal of several large trees. However, the project area is adjacent to City of Marquette and Lake Superior and does not support mature, intact interior forest habitat required by NLEB. FEMA completed the online NLEB 4(d) determination key on October 17, 2019 and received the attached verification letter. Therefore, FEMA assumes the action is consistent with the Programmatic Biological Opinion dated January 5, 2016. As stated previously, habitat for NLEB is not present in the project area and therefore, FEMA anticipates there would be no effect on NLEB.

FEDERAL ACTIONS INCLUDED IN THIS CONSULTATION

Through a FEMA PDM grant, the City of Marquette is proposing the relocation of Lakeshore Boulevard along Lake Superior. The site is more specifically identified on the enclosed maps and in the table below.

Proposed Facility	Latitude	Longitude
Lakeshore Boulevard	46.5671	-87.3935

The Proposed Action has two components: 1) relocation of Lakeshore Boulevard inland and 2) stabilization of the shoreline, habitat restoration, and construction of a public multi-use trail in the project area where Lakeshore Boulevard is currently located.

The first component of the project (Road Relocation) would relocate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland onto a vacant lot owned by the City of Marquette. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The relocated road would be elevated about 3 to 4 feet higher than its current elevation to further mitigate against wave and flood damage. The project would implement a roundabout design at the Lakeshore Boulevard/Wright Street intersection to improve safety and operations. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure that would serve the rest of the vacant lot for potential future development.

The second component of the Proposed Action (Shoreline Restoration) would be implemented between the relocated Lakeshore Boulevard and the shoreline of Lake Superior (where the road is currently located). This project would restore and strengthen approximately 4,200 linear feet of shoreline and create 38 acres of natural coastal habitat. This element of the project, with the exception of a detention basin, would be funded by the National Fish and Wildlife Foundation (NFWF). The NFWF is a 501(c)(3) nonprofit organization established by the United States Congress in 1984.

Shoreline restoration would include integrating geomorphic reduction and softening of existing armoring through native plantings, construction of a rubble mound revetment along the coast, restoration and recreation of natural beach and dune/swale features, addition of a detention basin southeast of the new roundabout where Wright Street and Lakeshore Boulevard meet, and incorporation of ADA accessible public access and a trail system (NFWF 2019). The Shoreline Restoration is functionally dependent on the FEMA-funded Road Relocation because it requires the removal of Lakeshore Boulevard to move forward.

AVOIDANCE AND MINIMIZATION MEASURES

FEMA will condition the project to require construction vehicles to follow standard BMPs and avoid direct contact with wildlife.

DETERMINATION

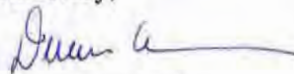
As noted above, the federal actions covered by this request for concurrence are taking place within Gray Wolf, Canada Lynx, NLEB and Red knot range. FEMA has a responsibility to ensure that its actions will not likely result in the adverse impact to these species. The project will have no effect on the species identified. Shoreline restoration will benefit migrating birds and other species.

FEMA completed an IPAC and Determination Key review on the USFWS website. The consultation code is 03E16000-2020-SLI-0051.

FEMA finds that this project will have no effect on the four listed species.

FEMA requests your concurrence with this effect determination and input on any additional conservation measures required to ensure accuracy of this determination. Thank you for your attention and assistance. Should you have any questions, please contact FEMA Region V Environmental Officer, Duane Castaldi, Duane.Castaldi@fema.dhs.gov or at 312-408-5549.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures:

Lakeshore Boulevard Scoping Document, November 25, 2019

USFWS Official Species List, October 17, 2019

USFWS Northern Long-eared Bat Verification Letter, October 17, 2019



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

Phone: (517) 351-2555 Fax: (517) 351-1443

<http://www.fws.gov/midwest/endangered/section7/s7process/step1.html>

In Reply Refer To:

October 17, 2019

Consultation Code: 03E16000-2020-TA-0051

Event Code: 03E16000-2020-E-00125

Project Name: Lakeshore Blvd Road Relocation, Marquette, MI

Subject: Verification letter for the 'Lakeshore Blvd Road Relocation, Marquette, MI' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear Duane Castaldi:

The U.S. Fish and Wildlife Service (Service) received on October 17, 2019 your effects determination for the 'Lakeshore Blvd Road Relocation, Marquette, MI' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"^[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, the Action is consistent with activities analyzed in the PBO. The Action may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the PBO satisfies and concludes your responsibilities for this Action under ESA Section 7(a)(2) with respect to the northern long-eared bat.

Please report to our office any changes to the information about the Action that you submitted in IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation. If the Action is not completed within one year of the date of this letter, you must update and resubmit the information required in the IPaC key.

This IPaC-assisted determination allows you to rely on the PBO for compliance with ESA Section 7(a)(2) only for the northern long-eared bat. It **does not** apply to the following ESA-protected species that also may occur in the Action area:

- Canada Lynx, *Lynx canadensis* (Threatened)
- Gray Wolf, *Canis lupus* (Endangered)
- Red Knot, *Calidris canutus rufa* (Threatened)

If the Action may affect other federally listed species besides the northern long-eared bat, a proposed species, and/or designated critical habitat, additional consultation between you and this Service office is required. If the Action may disturb bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act is recommended.

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

Lakeshore Blvd Road Relocation, Marquette, MI

2. Description

The following description was provided for the project 'Lakeshore Blvd Road Relocation, Marquette, MI':

FEMA funding will be used to relocate a 4,200 linear feet stretch of Lakeshore Blvd that is vulnerable to high water, waves, and erosion. The road will be moved inland about 400 feet. Opportunity to improve the land between the Lake and the relocated road will exist to improve floodplain storage, green space, and public access.

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/46.56780045618592N87.39322796565784W>

**Determination Key Result**

This Federal Action may affect the northern long-eared bat in a manner consistent with the description of activities addressed by the Service's PBO dated January 5, 2016. Any taking that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Therefore, the PBO satisfies your responsibilities for this Action under ESA Section 7(a)(2) relative to the northern long-eared bat.

Determination Key Description: Northern Long-eared Bat 4(d) Rule

This key was last updated in IPaC on May 15, 2017. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for Federal actions is to assist determinations as to whether proposed actions are consistent with those analyzed in the Service's PBO dated January 5, 2016.

Federal actions that may cause prohibited take of northern long-eared bats, affect ESA-listed species other than the northern long-eared bat, or affect any designated critical habitat, require ESA Section 7(a)(2) consultation in addition to the use of this key. Federal actions that may affect species proposed for listing or critical habitat proposed for designation may require a conference under ESA Section 7(a)(4).

Determination Key Result

This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information you provided, this project may rely on the Service's January 5, 2016, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* to fulfill its Section 7(a)(2) consultation obligation.

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

Yes

2. Have you determined that the proposed action will have "no effect" on the northern long-eared bat? (If you are unsure select "No")

No

3. Will your activity purposefully **Take** northern long-eared bats?

No

4. Is the project action area located wholly outside the White-nose Syndrome Zone?

Automatically answered

No

5. Is the project action area located within 0.25 miles of a known northern long-eared bat hibernaculum?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency

Automatically answered

No

6. Is the project action area located within 150 feet of a known occupied northern long-eared bat maternity roost tree?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency

Automatically answered

No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

From: [Castaldi, Duane](#)
To: [Hachey, Alan S.](#)
Subject: FW: Response to Lakeshore Blvd Coastal Resilient Infrastructure Project
Date: Thursday, December 12, 2019 1:41:33 PM
Attachments: [EPA GLRI Marquette Scoping Letter.pdf](#)

Alan – with the response below I sent the scoping document along to the recommend contact. The letter sent is attached for your reference.

Thanks,
Duane

From: Steiger-Meister, Katie <katie_steiger-meister@fws.gov>
Sent: Thursday, December 5, 2019 2:40 PM
To: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Subject: Response to Lakeshore Blvd Coastal Resilient Infrastructure Project

Mr. Castaldi,

I received your letter in the mail regarding the Lakeshore Boulevard project.

First, I would like to clarify that the U.S. Fish and Wildlife Service is a partner in the implementation of the Great Lakes Restoration Initiative, but the overall program is managed by the U.S. EPA. I encourage you to reach out to Lynzi Barnes (barnes.edlynzia@epa.gov). She will be able to connect you to the most appropriate point of contact at U.S. EPA.

Related to your request for U.S. Fish and Wildlife Service information related to the project, the Service has an online planning tool, <https://ecos.fws.gov/ipac/>, that will allow you to learn about any potential resources issues. If you have any further questions, please reach out to Scott Hicks (517-351-6274) at the Michigan Ecological Services Field Office.

Regards,

Katie

--

Kaitlin Steiger-Meister, Ph.D.
U.S. Fish and Wildlife Service | Great Lakes Region
Acting Deputy Assistant Regional Director, External Affairs

Office:(612) 713-5317 Mobile:(612) 723-4839

From: [Castaldi, Duane](#)
To: [Hachey, Alan S.](#)
Subject: FW: [EXTERNAL] Bald Eagle Nesting Sites in Michigan, Federal Project in Marquette, MI
Date: Friday, December 27, 2019 10:28:40 AM

From: Mensing, Chris <chris_mensing@fws.gov>
Sent: Friday, December 27, 2019 9:20 AM
To: Castaldi, Duane <Duane.Castaldi@fema.dhs.gov>
Cc: Dorochoff, Nicholas <Nicholas.Dorochoff@fema.dhs.gov>
Subject: Re: [EXTERNAL] Bald Eagle Nesting Sites in Michigan, Federal Project in Marquette, MI

Duane,

We do not have any records of bald eagle nests in the vicinity of the proposed project. Our records may be incomplete, so we would appreciate being contacted if you observe a bald eagle nest or nesting behavior during project surveys and/or implementation.

Chris

Chris Mensing, Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Michigan Ecological Services Field Office
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
517-351-8316 (office)
517-351-1443 (fax)
chris_mensing@fws.gov

On Tue, Nov 26, 2019 at 9:17 AM Castaldi, Duane <Duane.Castaldi@fema.dhs.gov> wrote:

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project
City of Marquette, Marquette County, Michigan
46.5671, -87.3935
PDMC-PJ-05-MI-2018-011

Dear Mr. Mensing:

The Michigan State Police Emergency Management & Homeland Security Division and the City of Marquette have requested funding from the Federal Emergency Management Agency (FEMA) to support the captioned Pre-Disaster Mitigation Grant Program (PDM) project. The objectives of

Castaldi, Duane

From: Ihnken, Matthew <matthew_ihnken@fws.gov>
Sent: Monday, January 13, 2020 8:23 AM
To: Castaldi, Duane
Subject: Informal Consultation Lake Shore Boulevard, Marquette, MI PDMC-PJ-05-MI-2018-011

Duane,

I have reviewed your request for concurrence for a no effect determination for the Lake Shore Boulevard Coastal Resilient Project in the City of Marquette, Michigan. The Service does not provide concurrence with no effect determinations, as such we have no further comment.

Thank you for the opportunity to provide comments on this project.

Regards,

Matt Ihnken, CWB®
Fish & Wildlife Biologist
Transportation Liaison

U.S. Fish & Wildlife Service
Michigan Ecological Services Field Office
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316
(517) 351-8474



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE

SCOTT WOOSLEY
EXECUTIVE DIRECTOR

December 12, 2013

JOSH LOTT
NOAA/OCRM
N/ORM COASTAL PROGRAMS DIVISION
1305 EAST-WEST HIGHWAY
SILVER SPRING MD 20910

RE: ER13-32 Lakeshore Boulevard Redesign & Lake Superior Restoration Project, Section 11,
T48N, R25W, Marquette, Marquette County (NOAA)

Dear Mr. Lott,


Under the authority of Section 106 of the National Historic Preservation Act of 1966, amended, we have reviewed the survey for the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the NOAA's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the NOAA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected," **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at (517) 335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,



Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG:sb

Copy: Keith Whittington, City of Marquette





FEMA

December 2, 2019

Martha MacFarlane-Faes
Deputy State Historic Preservation Officer
State Historic Preservation Office
Cultural Resources Management Section
Michigan Economic Development Corporation
300 North Washington Square
Lansing, MI 48913

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project (ER13-32)
City of Marquette, Marquette County
T48N R25W S11 and T48N R25W S14 / Project No. PDMC-PJ-05-MI-2018-011

Dear Ms. MacFarlane-Faes:

Pursuant to Section 106 of the National Historic Preservation Act, I am writing this letter to reopen and conclude consultation for the captioned Pre-Disaster Mitigation Grant Program project, initially submitted for consultation by the National Oceanic and Atmospheric Administration in 2013.

In accordance with 36 CFR §800.11, I am enclosing documentation regarding this undertaking and its effect on historic properties. The documentation provides the justification for FEMA's finding of no historic properties affected; the purpose of this communication is to seek concurrence in that finding.

Please provide your final response by fax, email or mail. Pursuant to 36 CFR 800.4(d)(1), if we receive no response from your office within thirty (30) days, we will consider FEMA's responsibilities under Section 106 fulfilled and will move forward with this undertaking. For your convenience, we have included a response area below. If you have questions or comments, please contact me at 312-408-5549 or at duane.castaldi@fema.dhs.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "Duane Ca".

Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi+++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project (ER13-32)
City of Marquette, Marquette County
T48N R25W S11 and T48N R25W S14 / Project No. PDMC-PJ-05-MI-2018-011

- ☐ Under the authority of the National Historic Preservation Act of 1966, as amended, the Michigan State Historic Preservation Office *concurs* with FEMA's finding that the captioned undertaking will result in *no historic properties affected*.
- ☐ Under the authority of the National Historic Preservation Act of 1966, as amended, the Michigan State Historic Preservation Office *objects* to FEMA's finding that the captioned undertaking will result in *no historic properties affected* for the reasons provided below:

Michigan State Historic Preservation Office

Date

STATE HISTORIC PRESERVATION OFFICE Application for Section 106 Review

SHPO Use Only			
<input type="checkbox"/> IN	Received Date	____ / ____ / ____	Log In Date ____ / ____ / ____
<input type="checkbox"/> OUT	Response Date	____ / ____ / ____	Log Out Date ____ / ____ / ____
	Sent Date	____ / ____ / ____	

Submit one copy for each project for which review is requested. This application is required. Please type. Applications must be complete for review to begin. Incomplete applications will be sent back to the applicant without comment. Send only the information and attachments requested on this application. Materials submitted for review cannot be returned. Due to limited resources we are unable to accept this application electronically.

I. GENERAL INFORMATION

☐ THIS IS A NEW SUBMITTAL ☐ THIS IS MORE INFORMATION RELATING TO ER# 13-32

- a. Project Name: Lakeshore Boulevard Coastal Resilient Infrastructure Project (PDMC-PJ-05-MI-2018-011)
- b. Project Address (if available): Vicinity of 2050 Presque Isle Ave, Marquette, MI 49855
- c. Municipal Unit: City of Marquette County: Marquette
- d. Federal Agency, Contact Name and Mailing Address (*If you do not know the federal agency involved in your project please contact the party requiring you to apply for Section 106 review, not the SHPO, for this information.*): Duane Castaldi, Regional Environmental Officer, FEMA Region V, 536 South Clark Street, 6th Floor, Chicago, IL 60605
- e. State Agency (if applicable), Contact Name and Mailing Address: N/A
- f. Consultant or Applicant Contact Information (if applicable) *including mailing address*: N/A

II. GROUND DISTURBING ACTIVITY (INCLUDING EXCAVATION, GRADING, TREE REMOVALS, UTILITY INSTALLATION, ETC.)

DOES THIS PROJECT INVOLVE GROUND-DISTURBING ACTIVITY? ☒ YES ☐ NO (If no, proceed to section III.)

Precise project location map (preferably USGS 7.5 min Quad with quad name, date, and location) with previously recorded archaeological sites visible (this site information is available to qualified archaeologists at the SHPO Office) Portions, photocopies of portions, and electronic USGS maps are acceptable as long as the location is clearly marked.

- a. USGS Quad Map Name: Marquette, MI 2017 (see attached)
- b. Township: 48N Range: 25W Section: 11
- c. Site plan showing limits of proposed excavation. Description of width, length and depth of proposed ground disturbing activity: See attached
- d. Previous land use and disturbances: pig iron and charcoal production, chemical recovery operations (1898-1933); chemical and charcoal production (1935-1969)
- e. Current land use and conditions: composting, domestic refuse transfer station, snow storage (1997-present)
- f. Did you check the State Archaeological Site Files located at the SHPO? ☒ YES ☐ NO

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)

Note: Every project has an APE.

- a. Provide a detailed written description of the project (plans, specifications, Environmental Impact Statements (EIS), Environmental Assessments (EA), etc. **cannot** be substituted for the written description): See continuation sheet
- b. Provide a localized map indicating the location of the project; road names must be included and legible.
- c. On the above-mentioned map, identify the APE.
- d. Provide a written description of the APE (physical, visual, auditory, and sociocultural), the steps taken to identify the APE, and the justification for the boundaries chosen. See continuation sheet

IV. IDENTIFICATION OF HISTORIC PROPERTIES

- a. List and date **all** properties 50 years of age or older located in the APE. **The Section 106 Above-Ground Resources inventory form is the preferred format for providing this information and a completed form should be included as an attachment to this application.** If the property is located within a National Register eligible, listed or local district it is only necessary to identify the district: See continuation sheet
 - b. Describe the steps taken to identify whether or not any **historic** properties exist in the APE and include the level of effort made to carry out such steps: See continuation sheet
 - c. Based on the information contained in "b", please choose one:
☐ Historic Properties Present in the APE
☒ No Historic Properties Present in the APE
 - d. Describe the condition, previous disturbance to, and history of any historic properties located in the APE:
-

V. PHOTOGRAPHS

Note: All photographs must be keyed to a localized map.

- a. Provide photographs of the site itself.
 - b. Provide photographs of all properties 50 years of age or older located in the APE (faxed or photocopied photographs are not acceptable).
-

VI. DETERMINATION OF EFFECT

**Note: you must provide a statement explaining/justifying your determination.
Include statement as an attachment if necessary.**

- ☒ No historic properties affected based on [36 CFR § 800.4(d)(1)], **please provide the basis for this determination.**
- ☐ No Adverse Effect [36 CFR § 800.5(b)] on historic properties, **explain why the criteria of adverse effect, 36 CFR Part 800.5(a)(1), were found not applicable.**
- ☐ Adverse Effect [36 CFR § 800.5(d)(2)] on historic properties, **explain why the criteria of adverse effect, [36 CFR Part 800.5(a)(1)], were found applicable.**

***Please print and mail completed form and required information to:
State Historic Preservation Office, Cultural Resources Management Section
Michigan Economic Development Corporation
300 North Washington Square, Lansing, MI 48913***



FEMA

December 2, 2019

—Continuation Sheet—

Lakeshore Boulevard Coastal Resilient Infrastructure Project (ER13-32)

City of Marquette, Marquette County

Project No. PDMC-PJ-05-MI-2018-011

46.566681, -87.391959 / T48N R25W S11 and T48N R25W S14

**Description of
Undertaking and
APE:**

In 2013, the National Oceanic and Atmospheric Administration (NOAA) consulted with the SHPO on this undertaking. The SHPO requested an archaeological survey, and in 2013 a Phase I Archaeological Survey was conducted in the APE. The SHPO reviewed the survey, and on December 12, 2013, determined that the undertaking would not affect historic properties (ER13-32).

The City of Marquette has now applied for Pre-Disaster Mitigation (PDM) Grant Program funding administered by the Federal Emergency Management Agency (FEMA) to complete the undertaking. The PDM funding was requested to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland, at approximately 46.566681, -87.391959 (latitude, longitude) in Marquette County, Michigan. The relocation will start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project will also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin.

Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation (NFWF), such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration.

The ground disturbance for the road relocation and associated infrastructure work to be funded by FEMA will be limited to an area approximately 4,267 feet long by 76 feet wide by 6 feet deep (7.4 acres), with 27,800 cy of excavation for the utility installation and detention pond. The full project area, including staging areas and work funded by NFWF, is approximately 40 acres.

The APE includes the footprint of the activity, including ground-disturbing activity, and extends beyond the construction footprint to account for temporary and visual effects, including the area from which the work will be visible. These APEs are illustrated on the attached maps.

**Steps Taken to
Identify Historic
Properties:**

Archaeology

In response to FEMA's request for archaeological information, on October 22, 2019, the SHPO noted that in 2013 a Phase I Archaeological Survey was conducted in the APE at the request of the SHPO for Project ID ER13-32. The survey included pre-field research, surface pedestrian transects, and excavation of shovel test pits, but failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings. The survey, as described above, had no significant findings.

The SHPO's response also noted two known archaeological sites (Site Nos. 20MQ3 and 20MQ325) within the APE¹. Site No. 20MQ3 is identified as a prehistoric Native American village. The site is not field verified and could not be relocated during the survey.

Site No. 20MQ325 was identified in the 2013 survey and consists of two historic structural features that remain from the razed Cliffs-Dow industrial complex. The complex was first developed in 1898 by the Cleveland Cliffs Iron Company for pig iron and charcoal production². The facility expanded into chemical recovery operations, and at one time was the largest charcoal-fired pig iron facility in the world³. The plant closed in 1933, but in 1935 was reopened when the Cliffs-Dow subsidiary corporation was formed with Dow Chemical Company. Dow demolished the blast furnace and made improvements to focus on production of chemical and charcoal products, along with chemical recovery operations⁴. The large industrial complex featured brick buildings, multiple rail lines, and numerous service structures⁵. The facility was ultimately closed in 1969 due to tightening pollution standards and increased operating costs. The buildings were demolished, and the City of Marquette currently uses the open space for composting, a domestic refuse transfer station, and snow storage.

The two structures in Site No. 20MQ325 are a large rectangular concrete foundation with remains of a brick wall base around the perimeter (considered the remains of an industrial building of unknown purpose), and a low square concrete-walled structure with corrugated metal roofing and two iron rods projecting from within (likely the remains of a pump house).

Site No. 20MQ325 does not retain its integrity of design, materials, and workmanship, and furthermore does not contain important information to contribute to our understanding of history or prehistory, and is therefore not eligible under Criterion D.

For these reasons, there is low probability that artifacts eligible for listing on the National Register of Historic Places (NRHP) under Criterion D will be encountered in this undertaking.

¹ See Maps.

² John B. Anderton, "Phase I Archaeological Survey of Lakeshore Boulevard Redesign and Lake Superior Shoreline Restoration Project ER13-32, Marquette, Michigan," (2013), 6.

³ Anderton, "Phase I Archaeological Survey," 7.

⁴ Anderton, "Phase I Archaeological Survey," 7.

⁵ See Maps and Photos 8-9.

FEMA will require the project applicant to comply with standard conditions, including the following: If ground disturbing activities occur during construction, applicant will monitor ground disturbance and if any potential archeological resources are discovered, will immediately cease construction in that area and notify the State and FEMA.

Standing Structures

The nearest resource listed in the National Register of Historic Places is the Longyear Hall of Pedagogy-Northern Michigan University located on West Kaye Avenue at Presque Isle Avenue (NPS #80001880), approximately half a mile southwest of the APE for this undertaking. Although the ca. 1907 Collegiate Gothic hall is still listed on the NRHP, the building was razed in 1993.⁶

The last remains of the Cliffs-Dow complex are addressed above, and the only extant structure within the APE is a medical facility less than forty-five years of age.

No standing structures eligible for listing in the NRHP are present within the APE.

Determination of Eligibility:	Based on the information provided here, FEMA has determined that no properties within the APE are eligible for listing on the National Register of Historic Places.
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Finding:	FEMA finds that this undertaking will result in <i>no historic properties affected</i> .
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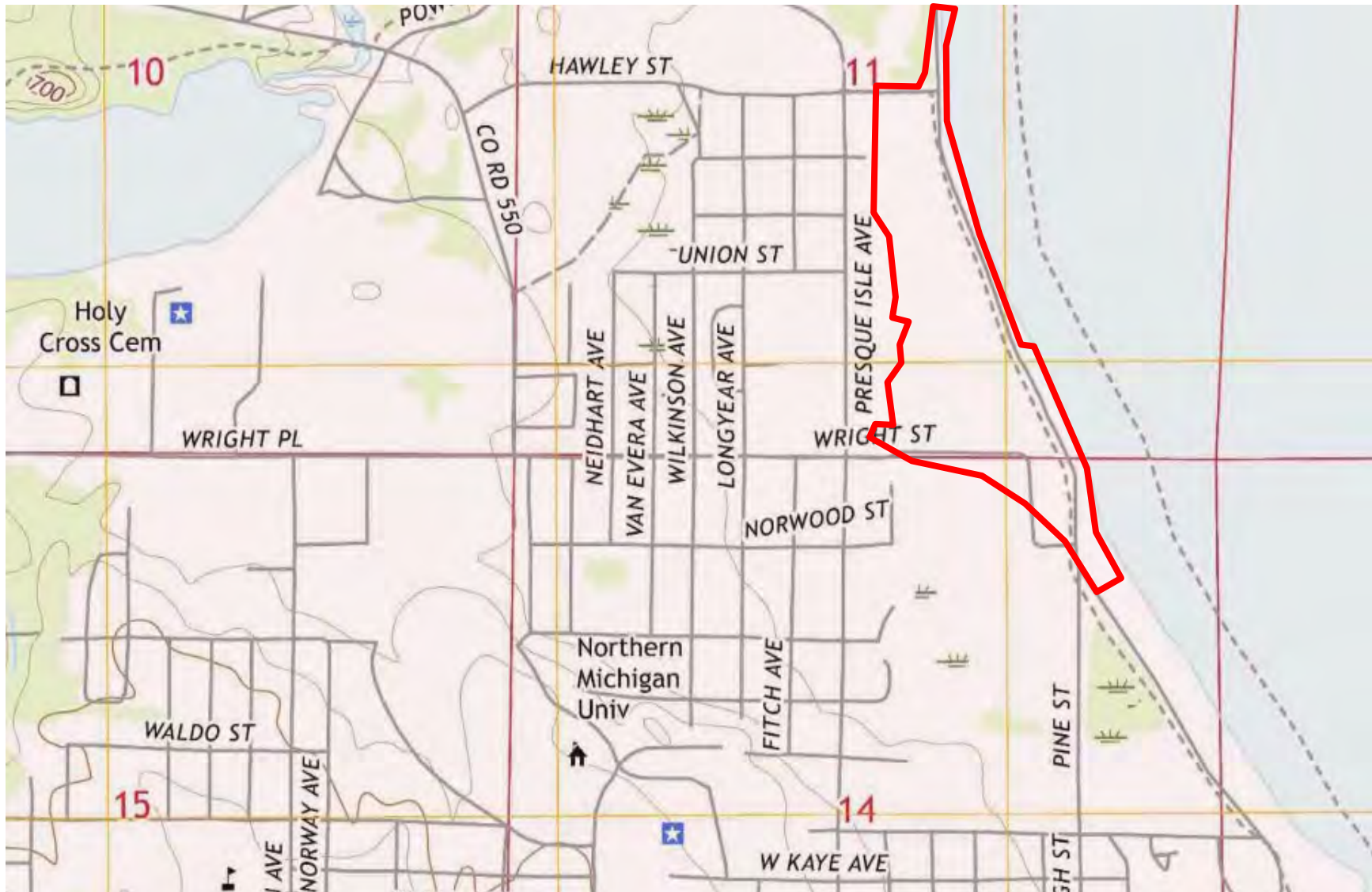
⁶ “Longyear Hall of Pedagogy,” Northern Michigan University, accessed November 27, 2019, <https://www.nmu.edu/archives/longyear-hall-pedagogy>.

APE for road relocation and utility improvements marked in red, for shoreline restoration in green, and for staging areas in hatched lines.



APE including visual effects marked in red.

USGS Map "Marquette, MI 2017" 1:24000, enlarged to show detail

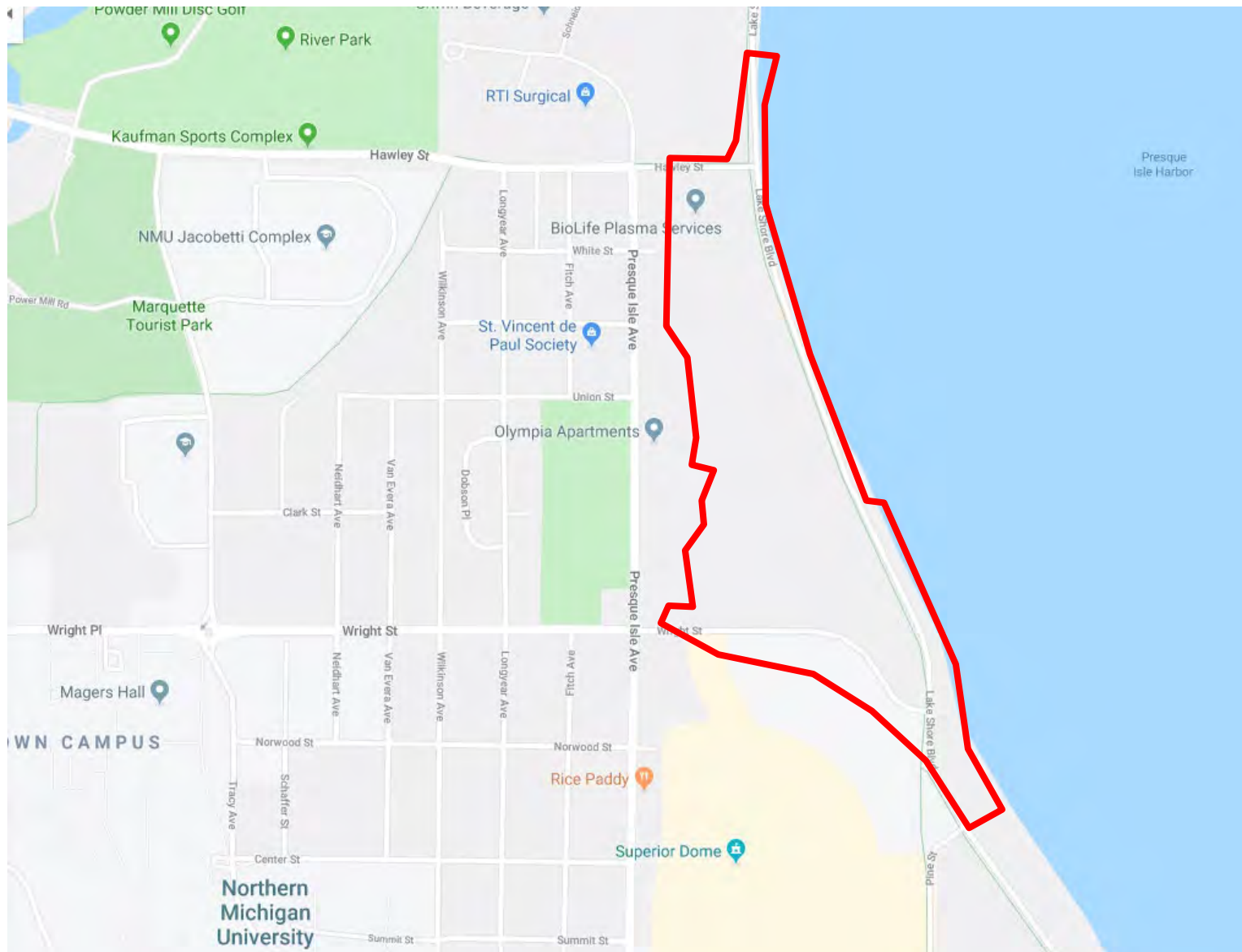


APE including visual effects marked in red.

USGS Map "Marquette, MI" 1:62500 with previously recorded archaeological sites identified by SHPO



APE including visual effects marked in red (Google Maps).



APE including visual effects marked in red (GoogleEarth, 2019 Imagery).



APE including visual effects marked in red on 1951 aerial (<https://www.historicaerials.com/>).





Photo 1: View of project area, facing south (Superior Watershed Partnership image, 2019).



Photo 2: View of project area, facing north (Superior Watershed Partnership image, 2019).



Photo 3: View of southern extent of project area (far right), facing west; intersection of Lakeshore Boulevard and Wright Street at right (Great Lakes Shoreviewer, accessed November 26, 2019, <http://www.greatlakesshoreviewer.org/#/great-lakes>).



Photo 4: View of project area, facing west (Great Lakes Shoreviewer, accessed November 26, 2019, <http://www.greatlakesshoreviewer.org/#/great-lakes>).



Photo 5: View of northern extent of project area, facing west; intersection of Lakeshore Boulevard and Hawley Street at center (Great Lakes Shoreviewer, accessed November 26, 2019, <http://www.greatlakesshoreviewer.org/#/great-lakes>).



Photo 6: High resolution ortho-mosaic photo of southern half of the project area (Superior Watershed Partnership image, Tyler Penrod, 2019).



Photo 7: High resolution ortho-mosaic photo of northern half of the project area (Superior Watershed Partnership image, Tyler Penrod, 2019).



Photo 8: ca. 1950 aerial photo of project area, facing south (City of Marquette image).



Photo 9: View of floor of Structure 1 in Site No. 20MQ325, facing north (John B. Anderton, "Phase I Archaeological Survey of Lakeshore Boulevard Redesign and Lake Superior Shoreline Restoration Project ER13-32, Marquette, Michigan" (2013)).



U.S. Department of Homeland Security
536 South Clark Street, 6th Floor
Chicago, Illinois 60605-1521

FEMA

MEMORANDUM

TO: File

FROM: Jessica Eleff, Environmental Protection Specialist 

DATE: February 25, 2020

SUBJECT: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County, Michigan, PDMC-PJ-05-MI-2018-011 (ER13-32)

Documentation meeting the requirements of 36 CFR §800.11 was sent to the State Historic Preservation Office (SHPO) on December 2, 2019, supporting FEMA's finding of no historic properties affected. To date, no response from the SHPO has been received.

Pursuant to 36 CFR 800.4(d)(1)(i), having received no response within 30 days from the SHPO, THPO or any consulting parties, FEMA's Section 106 responsibilities have been fulfilled and FEMA will proceed with the captioned undertaking.

Appendix D Tribal Nation Consultation



FEMA

November 25, 2019

Adam Van Zile, Tribal Historic Preservation Officer
Sokaogon Chippewa Community
Mole Lake Band of Lake Superior Chippewa Indians
3051 Sand Lake Road
Crandon, Wisconsin 54520

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Van Zile:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Sokaogon Chippewa Community or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Sokaogon Chippewa Community to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Sokaogon Chippewa Community in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Sokaogon Chippewa Community or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Sokaogon Chippewa Community.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi ++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Sokaogon Chippewa Community has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Sokaogon Chippewa Community has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Sokaogon Chippewa Community

Date



FEMA

November 25, 2019

Wanda McFaggen, Tribal Historic Preservation Officer
St. Croix Chippewa Indians of Wisconsin
24663 Angeline Avenue
Webster, Wisconsin 54893

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. McFaggen:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the St. Croix Chippewa Indians of Wisconsin or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the St. Croix Chippewa Indians of Wisconsin to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the St. Croix Chippewa Indians of Wisconsin in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the St. Croix Chippewa Indians of Wisconsin or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the St. Croix Chippewa Indians of Wisconsin.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The St. Croix Chippewa Indians of Wisconsin has no interest in the area potentially affected by the captioned undertaking.
- ☐ The St. Croix Chippewa Indians of Wisconsin has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

St. Croix Chippewa Indians of Wisconsin

Date



FEMA

November 25, 2019

Jaime Arsenault, Tribal Historic Preservation Officer
White Earth Band of Ojibwe
P.O. Box 418
White Earth, Minnesota 56591

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Arsenault:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the White Earth Band of Ojibwe or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the White Earth Band of Ojibwe to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the White Earth Band of Ojibwe in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the White Earth Band of Ojibwe or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the White Earth Band of Ojibwe.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The White Earth Band of Ojibwe has no interest in the area potentially affected by the captioned undertaking.
- ☐ The White Earth Band of Ojibwe has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

White Earth Band of Ojibwe

Date



FEMA

November 25, 2019

Marvin DeFoe, Tribal Historic Preservation Officer
Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
88385 Pike Road, HWY 13
Bayfield, Wisconsin 54814

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. DeFoe:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

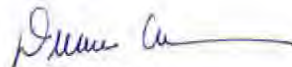
We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Red Cliff Band of Lake Superior Chippewa
Indians of Wisconsin

Date



FEMA

November 25, 2019

Kade Ferris, Tribal Historic Preservation Officer
Red Lake Band of Chippewa Indians of Minnesota
P.O. Box 274
Red Lake, Minnesota 56671

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Ferris:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Red Lake Band of Chippewa Indians of Minnesota or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Red Lake Band of Chippewa Indians of Minnesota to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Red Lake Band of Chippewa Indians of Minnesota in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Red Lake Band of Chippewa Indians of Minnesota or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Red Lake Band of Chippewa Indians of Minnesota.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Red Lake Band of Chippewa Indians of Minnesota has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Red Lake Band of Chippewa Indians of Minnesota has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Red Lake Band of Chippewa Indians of
Minnesota

Date



FEMA

November 25, 2019

Aaron Payment, Chairperson
Sault Ste. Marie Tribe of Chippewa Indians of Michigan
523 Ashmun Street
Sault Ste. Marie, Michigan 49783

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Chairperson Payment:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Sault Ste. Marie Tribe of Chippewa Indians of Michigan or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Sault Ste. Marie Tribe of Chippewa Indians of Michigan to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Sault Ste. Marie Tribe of Chippewa Indians of Michigan in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Sault Ste. Marie Tribe of Chippewa Indians of Michigan or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Sault Ste. Marie Tribe of Chippewa Indians of Michigan.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Sault Ste. Marie Tribe of Chippewa Indians of Michigan has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Sault Ste. Marie Tribe of Chippewa Indians of Michigan has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Sault Ste. Marie Tribe of Chippewa Indians of
Michigan

Date



FEMA

November 25, 2019

Melissa Wiatroluk, Deputy Tribal Historic Preservation Officer
Little Traverse Bay Bands of Odawa Indians
7500 Odawa Circle
Harbor Springs, Michigan 49740

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Wiatroluk:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Little Traverse Bay Bands of Odawa Indians or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Little Traverse Bay Bands of Odawa Indians to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Little Traverse Bay Bands of Odawa Indians in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Little Traverse Bay Bands of Odawa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Little Traverse Bay Bands of Odawa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Little Traverse Bay Bands of Odawa Indians has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Little Traverse Bay Bands of Odawa Indians has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Little Traverse Bay Bands of Odawa Indians

Date



FEMA

November 25, 2019

David Grignon, Tribal Historic Preservation Officer
Menominee Indian Tribe of Wisconsin
W3426 Cty VV West
P.O. Box 910
Keshena, Wisconsin 54135-0910

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Grignon:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Menominee Indian Tribe of Wisconsin or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Menominee Indian Tribe of Wisconsin to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Menominee Indian Tribe of Wisconsin in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Lac Vieux Desert Band of Lake Superior Chippewa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- e Bad River Band of Lake Superior Tribe of Chippewa Indianse
- Bay Mills Indian Community, Michigane
- e Bois Forte Band of Chippewa Indianse
- e Chippewa Cree Tribe of the Rocky Boy'se Reservation of Montanase
- e Fond du Lac Band of Lake Superiore Chippewae
- e Grand Traverse Band of Ottawa and Chippewa Indianse
- e Keweenaw Bay Indian Community
- e Lac Courte Oreilles Band of Lake Superiore Chippewa Indians of Wisconsin
- e Lac Vieux Desert Band of Lake Superiore Chippewa Indianse
- e Leech Lake Band of Ojibwee
- e Little River Band of Ottawa Indianse
- e Little Traverse Bay Bands of Odawae Indianse
- e Menominee Indian Tribe of Wisconsin
- e Minnesota Chippewa Tribese
- e Red Cliff Band of Lake Superiore Chippewa Indians of Wisconsin
- e Red Lake Band of Chippewa Indians of Minnesotase
- e Sault Ste. Marie Tribe of Chippewae Indians of Michigane
- e Sokaogon Chippewa Communitye
- e St. Croix Chippewa Indians of Wisconsin
- e White Earth Band of Ojibwee

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Lac Vieux Desert Band of Lake Superior Chippewa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi *****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Menominee Indian Tribe of Wisconsin has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Menominee Indian Tribe of Wisconsin has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Menominee Indian Tribe of Wisconsin

Date



FEMA

November 25, 2019

Catherine Chavers, President
Minnesota Chippewa Tribe
P.O. Box 217
Cass Lake, Minnesota 56633

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear President Chavers:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Minnesota Chippewa Tribe or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Minnesota Chippewa Tribe to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Minnesota Chippewa Tribe in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Minnesota Chippewa Tribe or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocity Boy's Reservation of Montanan
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Minnesota Chippewa Tribe.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Minnesota Chippewa Tribe has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Minnesota Chippewa Tribe has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Minnesota Chippewa Tribe

Date



FEMA

November 25, 2019

Daisy McGeshick, Tribal Historic Preservation Officer
Lac Vieux Desert Band of Lake Superior Chippewa Indians
PO Box 249
Watersmeet, Michigan 49969

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. McGeshick:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Lac Vieux Desert Band of Lake Superior Chippewa Indians or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Lac Vieux Desert Band of Lake Superior Chippewa Indians to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Lac Vieux Desert Band of Lake Superior Chippewa Indians in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Lac Vieux Desert Band of Lake Superior Chippewa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Lac Vieux Desert Band of Lake Superior Chippewa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi *****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Lac Vieux Desert Band of Lake Superior Chippewa Indians has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Lac Vieux Desert Band of Lake Superior Chippewa Indians has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Lac Vieux Desert Band of Lake Superior
Chippewa Indians

Date



FEMA

November 25, 2019

Amy Burnette, Tribal Historic Preservation Officer
Leech Lake Band of Ojibwe
190 Sailstar Drive NE
Cass Lake, Minnesota 56633

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Burnette:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Leech Lake Band of Ojibwe or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Leech Lake Band of Ojibwe to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Leech Lake Band of Ojibwe in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Leech Lake Band of Ojibwe or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Leech Lake Band of Ojibwe.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Leech Lake Band of Ojibwe has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Leech Lake Band of Ojibwe has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Leech Lake Band of Ojibwe

Date



FEMA

November 25, 2019

Larry Romanelli, Ogema
Little River Band of Ottawa Indians
2608 Government Center Drive
Manistee, Michigan 49660

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Romanelli:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Little River Band of Ottawa Indians or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Little River Band of Ottawa Indians to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Little River Band of Ottawa Indians in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Little River Band of Ottawa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Little River Band of Ottawa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Little River Band of Ottawa Indians has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Little River Band of Ottawa Indians has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Little River Band of Ottawa Indians

Date



FEMA

November 25, 2019

Thurlow "Sam" McClellan, Chairman
Grand Traverse Band of Ottawa and Chippewa Indians
2605 N.W. Bayshore Dr.
Peshawbestown, Michigan 49682

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Chairman McClellan:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Grand Traverse Band of Ottawa and Chippewa Indians or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Grand Traverse Band of Ottawa and Chippewa Indians to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Grand Traverse Band of Ottawa and Chippewa Indians in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and stormwater infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Grand Traverse Band of Ottawa and Chippewa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Grand Traverse Band of Ottawa and Chippewa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Grand Traverse Band of Ottawa and Chippewa Indians has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Grand Traverse Band of Ottawa and Chippewa Indians has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Grand Traverse Band of Ottawa and Chippewa
Indians

Date



FEMA

November 25, 2019

Gary F. Loonsfoot, Jr., Tribal Historic Preservation Officer
Keweenaw Bay Indian Community
16429 Beartown Road
Baraga, Michigan 49908

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Loonsfoot:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Keweenaw Bay Indian Community or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Keweenaw Bay Indian Community to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Keweenaw Bay Indian Community in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing stormwater infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Keweenaw Bay Indian Community or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Keweenaw Bay Indian Community.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi+++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Keweenaw Bay Indian Community has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Keweenaw Bay Indian Community has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Keweenaw Bay Indian Community

Date



FEMA

November 25, 2019

Brian Bisonette, Tribal Historic Preservation Officer
Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
13394 West Trepania Road
Hayward, Wisconsin 54843

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Bisonette:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

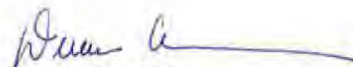
We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Lac Courte Oreilles Band of Lake Superior
Chippewa Indians of Wisconsin

Date



FEMA

November 25, 2019

Edith Leoso, Tribal Historic Preservation Officer
Bad River Band of Lake Superior Tribe of Chippewa Indians
P.O. Box 39
Odanah, Wisconsin 54861

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Leoso:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Bad River Band of Lake Superior Tribe of Chippewa Indians or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Bad River Band of Lake Superior Tribe of Chippewa Indians to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Bad River Band of Lake Superior Tribe of Chippewa Indians in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

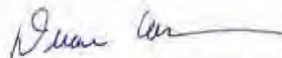
We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Bad River Band of Lake Superior Tribe of Chippewa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Bad River Band of Lake Superior Tribe of Chippewa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi *****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Bad River Band of Lake Superior Tribe of Chippewa Indians has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Bad River Band of Lake Superior Tribe of Chippewa Indians has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Bad River Band of Lake Superior Tribe of
Chippewa Indians

Date



FEMA

November 25, 2019

Paula Carrick, Tribal Historic Preservation Officer
Bay Mills Indian Community, Michigan
12140 W. Lakeshore Drive
Brimley, Michigan 49715

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Carrick:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Bay Mills Indian Community, Michigan or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Bay Mills Indian Community, Michigan to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Bay Mills Indian Community, Michigan in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

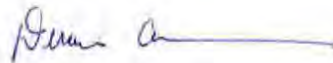
We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Bay Mills Indian Community, Michigan or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Bay Mills Indian Community, Michigan.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Bay Mills Indian Community, Michigan has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Bay Mills Indian Community, Michigan has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Bay Mills Indian Community, Michigan

Date



FEMA

November 25, 2019

Bev Miller, Tribal Historic Preservation Officer
Bois Forte Band of Chippewa Indians
1500 Bois Forte Road
Tower, Minnesota 55790

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Miller:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Bois Forte Band of Chippewa Indians or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Bois Forte Band of Chippewa Indians to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Bois Forte Band of Chippewa Indians in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

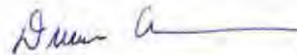
We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Bois Forte Band of Chippewa Indians or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Bois Forte Band of Chippewa Indians.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Bois Forte Band of Chippewa Indians has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Bois Forte Band of Chippewa Indians has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Bois Forte Band of Chippewa Indians

Date



FEMA

November 25, 2019

Jonathan Windy Boy, Tribal Historic Preservation Officer
Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
9740 Upper Box Elder Road
P.O. Box 230
Box Elder, Montana 59521

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Mr. Windy Boy:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

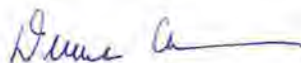
We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
- Fond du Lac Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
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- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Chippewa Cree Tribe of the Rocky Boy's
Reservation of Montana

Date



FEMA

November 25, 2019

Jill Hoppe, Tribal Historic Preservation Officer
Fond du Lac Band of Lake Superior Chippewa
1720 Big Lake Road
Cloquet, Minnesota 55720

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

Dear Ms. Hoppe:

The Federal Emergency Management Agency (FEMA) recognizes the special and unique legal relationship that exists between the federal government and federally-recognized American Indian Tribes (Tribes). FEMA also recognizes that Tribes may attach religious and cultural significance to historic properties located on aboriginal, ancestral, or ceded lands that are not contiguous with reservation lands. For this reason, FEMA consults with Tribes regarding the possible effects of FEMA-funded undertakings on cultural properties of historic or traditional significance, sometimes referred to as Traditional Cultural Properties (TCPs). The purpose of this communication is to provide information regarding the captioned FEMA-funded project and to invite comment on whether the Fond du Lac Band of Lake Superior Chippewa or other Tribes have interests in the areas potentially affected by this undertaking.

In accordance with the National Historic Preservation Act and other legislation, FEMA determined that the captioned project constitutes a federally-assisted undertaking, requiring review under Section 106 of the National Historic Preservation Act of 1966, as amended. In accord with 36 CFR 800.2(c)(2)(ii), FEMA is providing this opportunity for the Fond du Lac Band of Lake Superior Chippewa to identify concerns about historic properties that may be affected by this undertaking. If such concerns exist, FEMA will include the Fond du Lac Band of Lake Superior Chippewa in ongoing consultations regarding this undertaking with the Michigan State Historic Preservation Office (SHPO).

The City of Marquette proposes to relocate and elevate a 4,200-foot segment of Lakeshore Boulevard 300 to 400 feet inland. The relocation would start at Hawley Street to the north, intersect at Wright Street in a new roundabout, and reconnect at the current intersection of Wright Street and Lakeshore Boulevard at the southern end of the project area. The project would also include the relocation of existing storm water infrastructure and the construction of new water, electric, sewer and storm water infrastructure, including a detention basin. Additional shoreline restoration work will be completed in the project area with funding from the National Fish and Wildlife Foundation, such as native plantings, rubble mound revetment restoration, beach restoration, creation of dune/swale complexes, the addition of a multi-use trail, and approximately 38 acres of habitat restoration. The enclosed map identifies the exact project location. A Phase I Archaeological Survey was conducted in the project area in 2013, which failed to recover any prehistoric archaeological materials, and identified no significant historic or archaeological findings.

We invite your comments on the potential impacts this undertaking may have on lands traditionally used by or sacred to the Fond du Lac Band of Lake Superior Chippewa or other Native American groups. We understand the sensitive nature of much of the information regarding TCPs and assure you in advance that any information you provide will be considered privileged and confidential. In order to safeguard TCPs of interest to Native Americans, we are contacting the following Tribes to request information regarding their interest in this undertaking.

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Bay Mills Indian Community, Michigan
- Bois Forte Band of Chippewa Indians
- Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana
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- Grand Traverse Band of Ottawa and Chippewa Indians
- Keweenaw Bay Indian Community
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Bands of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Minnesota Chippewa Tribe
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Band of Chippewa Indians of Minnesota
- Sault Ste. Marie Tribe of Chippewa Indians of Michigan
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- White Earth Band of Ojibwe

Receiving notice of your interest to join the consultation regarding this undertaking or notice of Tribes other than those listed above that may have an interest in this undertaking would improve FEMA's efforts to protect resources that may exist in the areas noted on the enclosures. A response form has been provided for your convenience.

If you have questions or information that will help us protect properties having cultural importance, do not hesitate to contact me at 312-408-5549 or duane.castaldi@fema.dhs.gov. We would appreciate a response by mail or email from your office within thirty (30) days. If we receive no response within that time, FEMA will move forward with the project without comment from the Fond du Lac Band of Lake Superior Chippewa.

Sincerely,



Duane Castaldi
Regional Environmental Officer
FEMA Region V

Enclosures

+++++++You may fax this page to 312-408-5551, Attn: Duane Castaldi +++++++

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Fond du Lac Band of Lake Superior Chippewa has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Fond du Lac Band of Lake Superior Chippewa has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☐ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.

Fond du Lac Band of Lake Superior Chippewa

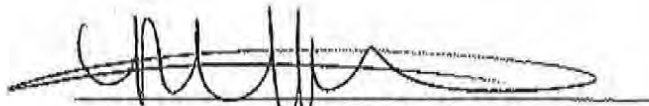
Date

Lakeshore Boulevard Coastal
Resilient Infrastructure Project,
City of Marquette, Marquette
County, Michigan
T48N R25W S11 and
T48N R25W S14
(PDMC-PJ-05-MI-2018-11)
November 25, 2019
Page 2

*****You may fax this page to 312-408-5551, Attn: Duane Castaldi*****

Re: Lakeshore Boulevard Coastal Resilient Infrastructure Project, City of Marquette, Marquette County,
Michigan
T48N R25W S11 and T48N R25W S14
(PDMC-PJ-05-MI-2018-11)

- ☐ The Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana has no interest in the area potentially affected by the captioned undertaking.
- ☐ The Chippewa Cree Tribe of the Rocky Boy's Reservation of Montana has an interest in the area potentially affected by the captioned undertaking and wishes to consult with FEMA and SHPO. Contact information is provided below.
- ☒ The Tribal Nations noted below may have an interest in the area potentially affected by this undertaking.


Chippewa Cree Tribe of the Rocky Boy's
Reservation of Montana

12/19/2019
Date

Please Contact:

Melody Bernard

Iresponse, LLC

9140 Upper Box Elder Rd

Box Elder UT 59521

(406) 395-5877



LEECH LAKE BAND OF OJIBWE

Tribal Historic Preservation Office

Amy Burnette, Tribal Historic Preservation Officer
Sheila Gotchie, Office Manager

December 5, 2019

US Department of Homeland Security
Federal Emergency Management Agency
Attn: Duane Castaldi
536 South Clark Street, 6th Floor
Chicago, IL 60605-1521

RE: Proposed Lakeshore Boulevard Coastal Resilient Infrastructure Project
Marquette, Marquette County, Michigan
LL THPO No. 19-363-NCRI

Dear Mr. Castaldi,

Thank you for the opportunity to comment on the above referenced project. It has been reviewed pursuant to the responsibilities given the Tribal Historic Preservation Officer (THPO) by the National Historic Preservation Act of 1966, as amended in 1992, and the Procedures of the Advisory Council on Historic Preservation (38CFR800).

I have reviewed the documentation. After careful consideration of our records, I have determined that the Leech Lake Band of Ojibwe does not have any known recorded sites of religious or cultural importance in this area.

Should any human remains or suspected human remains be encountered, all work shall cease and the following personnel should be notified immediately: County Sheriff's Office and the Office of the State Archaeologist. If any human remains or culturally affiliated objects are inadvertently discovered, this will prompt the process to which the Band will become informed.

Please note the above determination does not "exempt" future projects from Section 106 review. In the event of any other tribe notifying us of concerns for a specific project, we may reenter into the consultation process.

You may contact me at (218) 335-2940 if you have questions regarding our review of this project. Please refer to the LL-THPO Number as stated above in all correspondence with this project.

Respectfully submitted,

Amy Burnette

Tribal Historic Preservation Officer

Appendix E Public Notice

Federal Emergency Management Agency
PUBLIC NOTICE
Notice of Availability of the Draft Environmental Assessment
For Lakeshore Boulevard Coastal Resilient Infrastructure Project in Marquette,
Michigan

Environmental Assessment (EA) for the Lakeshore Boulevard Coastal Resilient Infrastructure Project (Application Number: PDMC-PJ-05-MI-2018-011).

Interested persons are hereby notified that the Federal Emergency Management Agency (FEMA)/Department of Homeland Security (DHS) is proposing to assist in the funding of a project located in the City of Marquette, Marquette County, Michigan. In accordance with the National Environmental Policy Act (NEPA) of 1969 and the implementing regulations of FEMA, an EA is being prepared to assess the potential impacts of each of the proposed alternatives on the human and natural environment. This also provides public notice to invite public comments on the proposed project in accordance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands. In addition, this notice and the draft EA provide information to the public on potential impacts to historic and cultural resources from the proposed undertaking, as outlined in the National Historic Preservation Act (NHPA) of 1966.

This EA is available for agency and public review and comment for a period of 30 days. The EA is available on FEMA's website at <https://www.fema.gov/recent-environmental-documents-public-notice-region-v>. The EA is also available on the City of Marquette website at <https://www.marquettemi.gov/>. Interested parties may request an electronic copy of the EA from either of those websites.

A hard copy of the EA is available for review at:

City Clerk's Office – City of Marquette
300 West Baraga Ave
Marquette, MI 49855

Written comments regarding this environmental action should be received no later than 5 p.m. on April 22, 2020, by mail to Duane Castaldi, Regional Environmental Officer, FEMA Region V, 536 South Clark Street, 6th Floor, Chicago, IL 60605-1521; or by email at Duane.Castaldi@fema.dhs.gov. If no substantive comments are received by the above deadline, the draft EA and associated Finding of No Significant Impact (FONSI) will become final and be published by FEMA. Substantive comments will be addressed as appropriate in the final documents.

The public may request a copy of the final environmental documents from Duane Castaldi at the address listed above.

Appendix F Public Comments

Appendix G Design Plans

THE CITY OF MARQUETTE LAKESHORE BOULEVARD RELOCATION-PHASE 1

MARQUETTE PROJ. NO. MQ13-500

STANDARDS:

EXCEPT WHERE OTHERWISE INDICATED ON THESE PLANS OR IN THE PROPOSAL AND SUPPLEMENTAL SPECIFICATIONS CONTAINED THEREIN, ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2012 VERSION, AND THE 2005 MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

DESIGN STANDARD

THE PROPOSED IMPROVEMENTS COVERED BY THESE PLANS ARE IN ACCORDANCE WITH RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES 2004 EDITION

MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD PLANS

WHERE THE FOLLOWING ITEMS ARE CALLED OUT ON THE PLANS, THEY ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD PLAN GIVEN BELOW OPPOSITE EACH ITEM UNLESS OTHERWISE INDICATED.

- R-83-B UTILITY TRENCHES
- R-96-D SOIL EROSION & SEDIMENTATION CONTROL MEASURES
- R-28-H SIDEWALK RAMP AND DETECTABLE WARNING DETAILS
- R-30-G CONCRETE CURB AND CONCRETE CURB & GUTTER
- R-86-D PRECAST CONCRETE END SECTION FOR PIPE CULVERT
- R-39-i TRANSVERSE PAVEMENT JOINTS
- R-40-H LOAD TRANSFER ASSEMBLIES FOR TRANSVERSE JOINTS
- R-41-G LONGITUDINAL PAVEMENT JOINTS

TRAFFIC AND SAFETY STANDARDS PLANS

- * WZD-100-A GROUND DRIVEN SIGN SUPPORTS FOR TEMPORARY SIGNS
- * WZD-125-E TEMPORARY TRAFFIC CONTROL DEVICES

UTILITIES

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, THE CONTRACTOR SHALL CALL MISS DIG AT 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED.

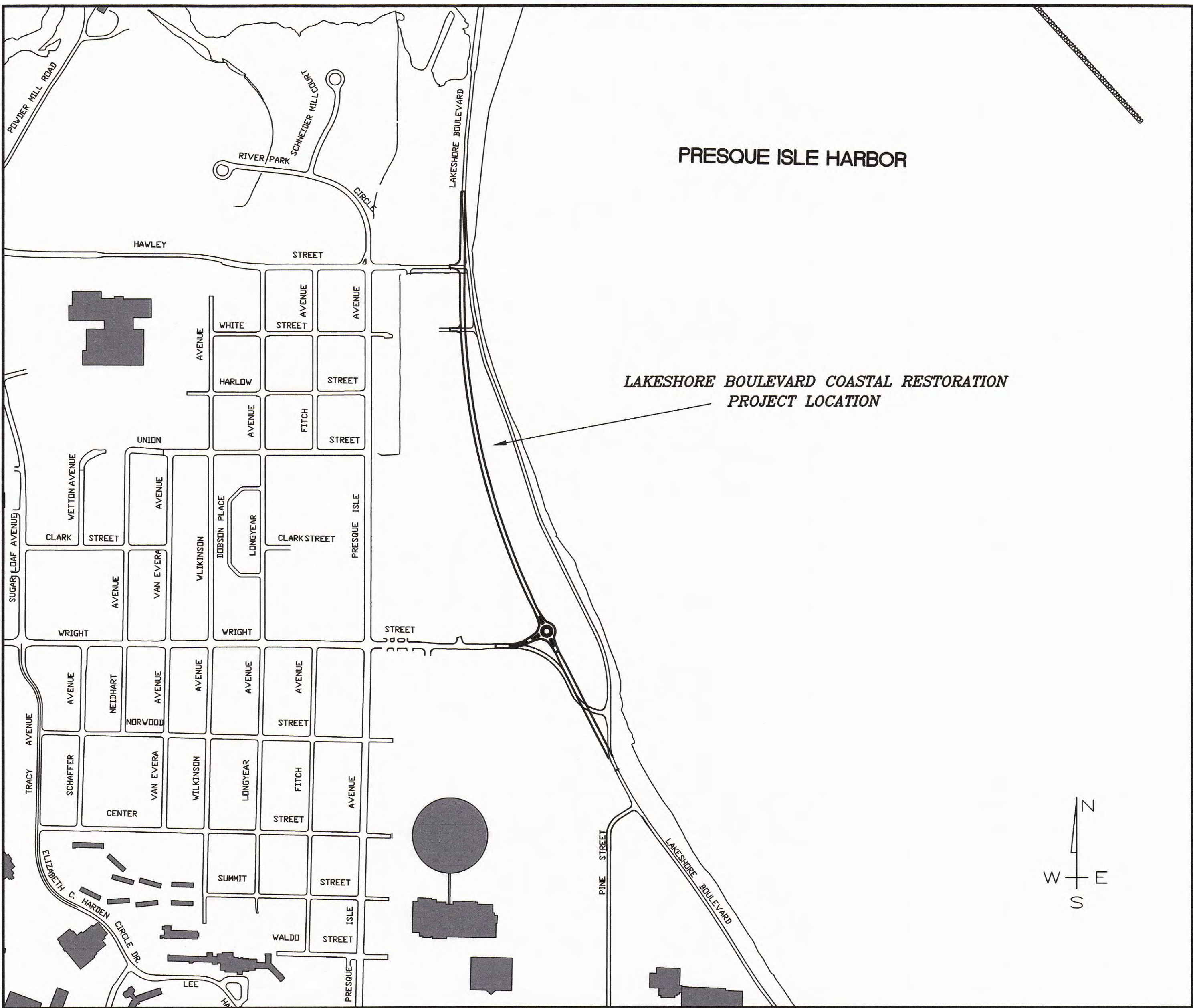
THE FOLLOWING UTILITIES ARE LOCATED IN OR NEAR THE RIGHT-OF-WAY FOR THIS PROJECT:

SANITARY SEWER MAIN
WATERMAIN
GAS MAIN
UNDERGROUND TELEPHONE
OVERHEAD ELECTRICAL AND CABLE
UNDERGROUND ELECTRICAL
UNDERGROUND FIBER OPTICS

LEGEND

- | | |
|---|----------------------------|
| EXISTING STORM SEWER | PROPOSED SANITARY SEWER |
| EXISTING SANITARY SEWER | PROPOSED WATER MAIN |
| EXISTING WATER MAIN | PROPOSED STORM SEWER |
| EXISTING GAS MAIN/SERVICE | ROW RIGHT OF WAY |
| EXISTING TELECOMMUNICATION CABLE | PROPERTY LINE, APPROXIMATE |
| EXISTING ELECTRIC CABLE | |
| EXISTING LIGHT POLE | PROPOSED CATCH BASIN |
| EXISTING SANITARY/STORM SEWER MANHOLE | PROPOSED MANHOLE |
| EXISTING POWER POLE | PROPOSED WATER VALVE |
| GUY ANCHOR | PROPOSED FIRE HYDRANT |
| EXISTING CATCH BASIN | PROPOSED 6" SIDEWALK |
| EXISTING TRAFFIC SIGN | PROPOSED 4" SIDEWALK |
| EXISTING WATER VALVE | PROPOSED ADA RAMP (6") |
| EXISTING FIRE HYDRANT | HMA, 1.3A |
| SOIL BORING LOCATION AND NUMBER | |
| EXISTING WATER SHUT OFF - RECORD LOCATION | |

LOCATION MAP



PUBLIC UTILITIES

MARQUETTE BOARD OF LIGHT AND POWER
2200 WRIGHT STREET
MARQUETTE, MICHIGAN 49855
PH. (906) 228-0300

CHARTER COMMUNICATIONS
359 US-41 EAST
NEGAUNEE, MICHIGAN 49866
PH. (906) 228-2900

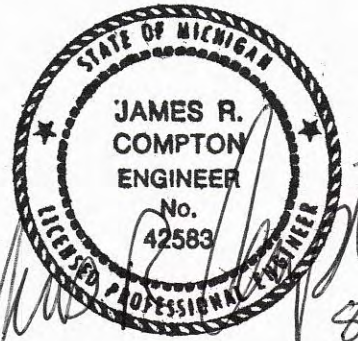
MARQUETTE WATER AND SEWER DEPARTMENT
850 WEST BARAGA AVENUE
MARQUETTE, MICHIGAN 49855
PH. (906) 228-0444

AT&T
3255 US-41 WEST
MARQUETTE, MICHIGAN 49855
PH. (906) 221-2121

SEMCO ENERGY
34 US-41 EAST
NEGAUNEE, MICHIGAN 49866
PH. (906) 475-9901

INDEX OF SHEETS

- 1 COVER SHEET
- 2 REMOVAL AND EARTHWORK PLAN
- 3 TYPICAL ROAD CROSS SECTIONS
- 4 TYPICAL OTHER CROSS SECTIONS
- 5 ROUNDABOUT DETAILS
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- 22 WRIGHT STREET PLAN AND PROFILE
- 23 HAWLEY INTERSECTION AND DITCH
- 24 SESC PLAN
- 25 TRAFFIC CONTROL PLAN
- 26 HORIZ. AND VERT. CONTROL AND SANITARY SCHEMATIC
- 27 WATER AND STORM SEWER SCHEMATIC
- 28 WATER DETAILS
- 29 SANITARY DETAILS
- 30 STORM DETAILS
- 31 LIGHTING PLAN
- 32 LIGHTING DETAILS



For Joint Permit

CONTRACT FOR LAKESHORE BOULEVARD RELOCATION-PHASE 1

MUNICIPAL APPROVAL:

L. MICHAEL ANGELI DATE

KEITH WHITTINGTON, CITY ENGINEER DATE

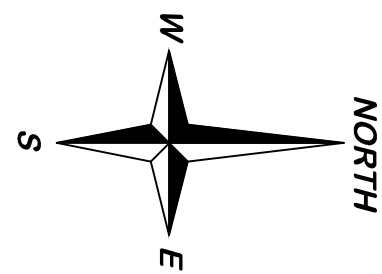
PREPARED UNDER THE SUPERVISION OF:

JAMES R. COMPTON, ENGINEER DATE
P.E. NO. 042583



CITY OF MARQUETTE

CITY ENGINEER'S OFFICE
300 WEST BARAGA AVENUE
MARQUETTE, MICHIGAN 49855
PH. (906) 228-0440



- ① REMOVE AND DISPOSE OF LAKESHORE BOULEVARD PAVEMENT ON SOUTH AND NORTH END OF PROJECT AS HATCHED. ALSO REMOVE PAVEMENT FROM BIO-RESOURCE DRIVE TO EXTENT PROPOSED AS SHOWN. PAID FOR AS "PAVT, REM"
- ② REMOVE AND DISPOSE OF PAVEMENT ONLY FROM STATION 3+01 TO 4+00. REMOVE AND DISPOSE OF PAVEMENT AND ROAD GRAVEL ON WRIGHT STREET FROM STATION 4+001 TO EXISTING LAKESHORE BOULEVARD AS HATCHED. GRADE AREA AS SHOWN ON PLAN. PAID FOR AS "PAVT, REM" AND "EXCAVATION, EARTH".
- ③ REMOVE AND DISPOSE OF PAVEMENT ON HAWLEY STREET FROM STATION 2+58.5 TO EXISTING LAKESHORE BOULEVARD. PAID FOR AS "PAVT, REM".
- ④ REMOVE AND DISPOSE OF BIKE PATH PAVEMENT ON THE SOUTH AND NORTH END OF PROJECT AS HATCHED. PAID FOR AS "PAVT, REM".
- ⑤ THIS MATERIAL SHALL BE REMOVED FROM THIS AREA DOWN TO ELEVATION 614 ROUGH GRADE, STOCKPILED AND USED AS CLEAN FILL AS DIRECTED BY THE ENGINEER. WORK PAID FOR AS "EXCAVATION, EARTH" AND "EMBANKMENT, CIP".
- ⑥ THIS MATERIAL SHALL BE REMOVED FROM THIS AREA DOWN TO ELEVATION 611 AND STOCKPILED. THIS MATERIAL IS PREDOMINATELY RIPRAP AND CAN BE USED ON THIS PROJECT IF SCREENED AND MEETS SPECIFICATIONS. MATERIAL FROM THIS PILE THAT MEETS CLASS II REQUIREMENTS CAN BE USED AS FILL. THIS WORK QUANTITY IS INCLUDED IN "EXCAVATION, EARTH" AND "EMBANKMENT, CIP".
- ⑦ THIS MATERIAL SHALL BE REMOVED FROM THIS AREA DOWN TO ELEVATION 615 ROUGH GRADE, STOCKPILED AND USED AS CLEAN FILL AS DIRECTED BY THE ENGINEER. WORK PAID FOR AS "EXCAVATION, EARTH" AND "EMBANKMENT, CIP".
- ⑧ BEFORE REMOVING 43X68 RCP, CONTRACTOR SHALL EXCAVATE TWO EXPLORATORY HOLES DOWN TO ELEVATION 602 AS DIRECTED BY ENGINEER IN ORDER TO DETERMINE SOIL CONDITIONS. PAID FOR AS "EXPLORATORY PIT". ONCE APPROVED BY ENGINEER, EXCAVATE POND DOWN TO ELEVATION 602 AND PLACE MATERIAL UNDER SPLAY OF ROAD. SEE CROSS SECTIONS. PAID FOR AS "EXCAVATION, EARTH AND "EMBANKMENT".
- ⑨ REMOVE TREES AND GRUB STUMPS AS NECESSARY. PAID FOR AS "CLEARING AND GRUBBING". INDIVIDUAL TREES OR GROUPS OF TREES ON SITE NOT SPECIFICALLY SHOWN WILL STILL NEED TO BE REMOVED AS PART OF THIS PROJECT. CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE SITE TO QUANTIFY THESE TREES.
- ⑩ CAREFULLY REMOVE THIS 60' OF 12" RCP AND RELAY IT AT 0.5% SLOPE. CAREFULLY REMOVE CB AND REINSTALL TO NEW LOCATION TO THE SOUTHWEST. REMOVAL WORK SHALL BE INCLUDED IN THE PAY ITEM "EXCAVATION, EARTH". REUSE OF PIPE, IF APPROVED, SHALL BE PAID FOR AS "SEWER, CL III, 12 INCH, TR DET B". CB AND CASTING PAID FOR WITH PROJECT PAY ITEMS.
- ⑪ CAREFULLY REMOVE 152 FEET OF 43X68 ELLIPTICAL RCP. 60 FEET OF THIS PIPE SHALL BE REUSED. REMOVAL WORK SHALL BE INCLUDED IN THE PAY ITEM "EXCAVATION, EARTH".
- ⑫ REMOVE FENCE ALONG PROJECT FROM GATE ON WRIGHT STREET TO JUST WEST OF PROPOSED SANITARY AND WATER MAIN WORK NEAR STATION 45+26. PAID FOR AS "FENCE, REM". REUSE SOME FENCE AND ONE GATE AROUND EXISTING WET WELL AS SHOWN ON SHEET 12. PAID FOR AS "REUSE FENCE AND GATE". DISPOSAL OF THE REST OF UNUSED FENCE SHALL BE COVERED IN PAY ITEM "FENCE, REM".
- ⑬ TELEPHONE PEDESTAL, ELECTRICAL BOX AND UTILITY POLE TO BE MOVED BY OTHERS.
- ⑭ CAREFULLY REMOVE WOODEN BOLLARDS FROM STA 11+00 TO NORTH END. REINSTALL AS SHOWN ON SHEETS 18 AND 30. PAID FOR AS "REMOVE AND REINSTALL BOLLARD".
- ⑮ ABANDON MONITORING WELLS. WELLS TO BE ABANDONED ARE MW600 A,B&C, UPG 200 A,B&C AND THREE AT STA. 45+05 AND TWO AT STA 47+11. TO ABANDON REMOVE OUTSIDE CASING, FILL WELL PIPE WITH BENTONITE POWDER AND CUT PIPE JUST BELOW GROUND LEVEL. PAID FOR AS "ABANDON MONITORING WELL". SEE PLAN SHEET FOR LOCATIONS.
- ⑯ DITCH THIS AREA TO DRAIN TO PCB#7. PAID FOR AS "EXCAVATION, EARTH".

PAY ITEMS (THIS SHEET)

7122	SYD - PAVT, REM
17875	CYD - EXCAVATION, EARTH
*14855	CYD - EMBANKMENT, CIP
1	LS - CLEARING AND GRUBBING
3050	FT - FENCE, REM
8	EA - UTILITY EXPLORATION

* THIS NUMBER IS COMPACTED IN PLACE. IT DOES NOT INCLUDE TOPSOIL, ROAD PAVEMENT STRUCTURE OR BIKE PATH PAVEMENT STRUCTURE.

GENERAL PROJECT PAY ITEMS

1	LS - MOBILIZATION, \$130,000 MAX.
1	LS - PROJECT CLEANUP
1	LS - DEWATERING

DEWATERING WILL BE NECESSARY FOR INSTALLATION OF SANITARY SEWER AND WATERMAIN. DEWATERING WATER SHALL BE SENT INTO THE SANITARY SEWER. SENDING THE DEWATERING WATER INTO THE NEW SANITARY SEWER AS IT PROGRESSES IS ACCEPTABLE.

IMPORTANT! ALL DISTURBED SOIL WITHIN PARCEL BOUNDARY SHALL REMAIN ON SITE.

WRIGHT STREET

EXISTING SANITARY SEWER

REINSTALL THIS SECTION OF FENCE AFTER WATERMAIN WORK.

EXISTING SANITARY SEWER

WETLAND B. 0.043 ACRES. DO NOT DISTURB

WETLAND C. 0.004 ACRES. STRIP TOPSOIL AND FILL

WETLAND WEST OF THIS LINE. DO NOT DISTURB

WETLAND A. 0.364 ACRES. DO NOT DISTURB

0 200 400 Feet



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300 WEST BARAGA AVE., MARQUETTE, MI 49855
PHONE (906)228-0440

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INTERNAL REVIEW 8/18/14	
PRELIM DRAFT 8/12/19	
PERMIT 8/29/19	
REVISION FOR PERMIT 9/16/19	

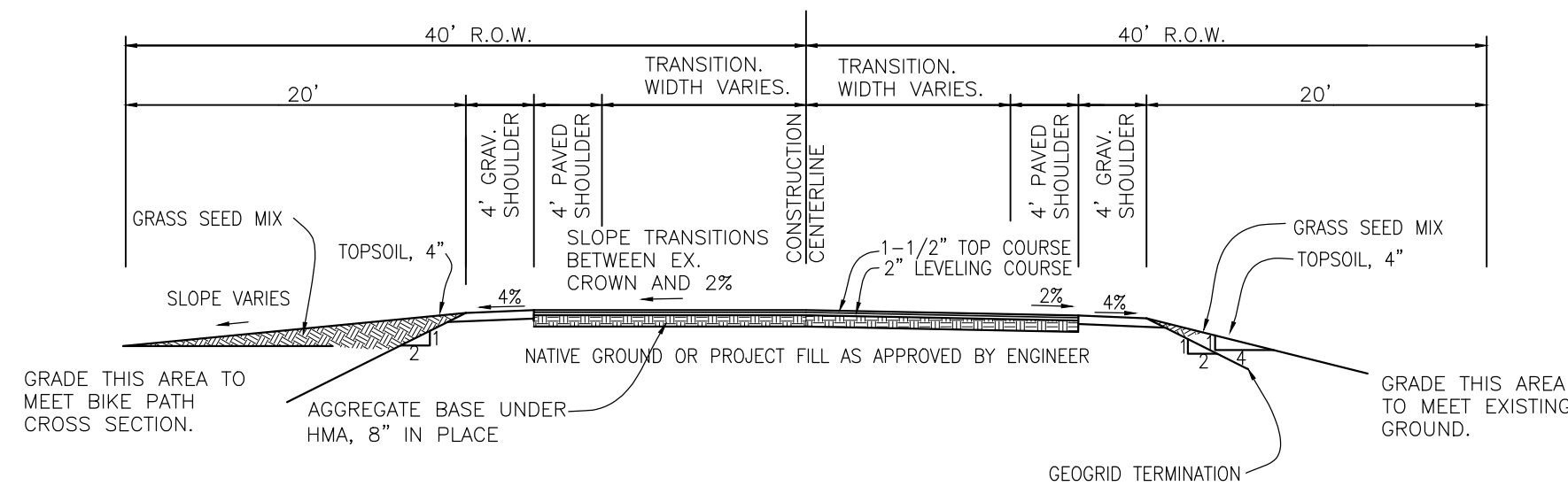
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DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: ---J-/PROJECTS...MASTERBASEMAP.dwg

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VERT. SCALE: N.A.

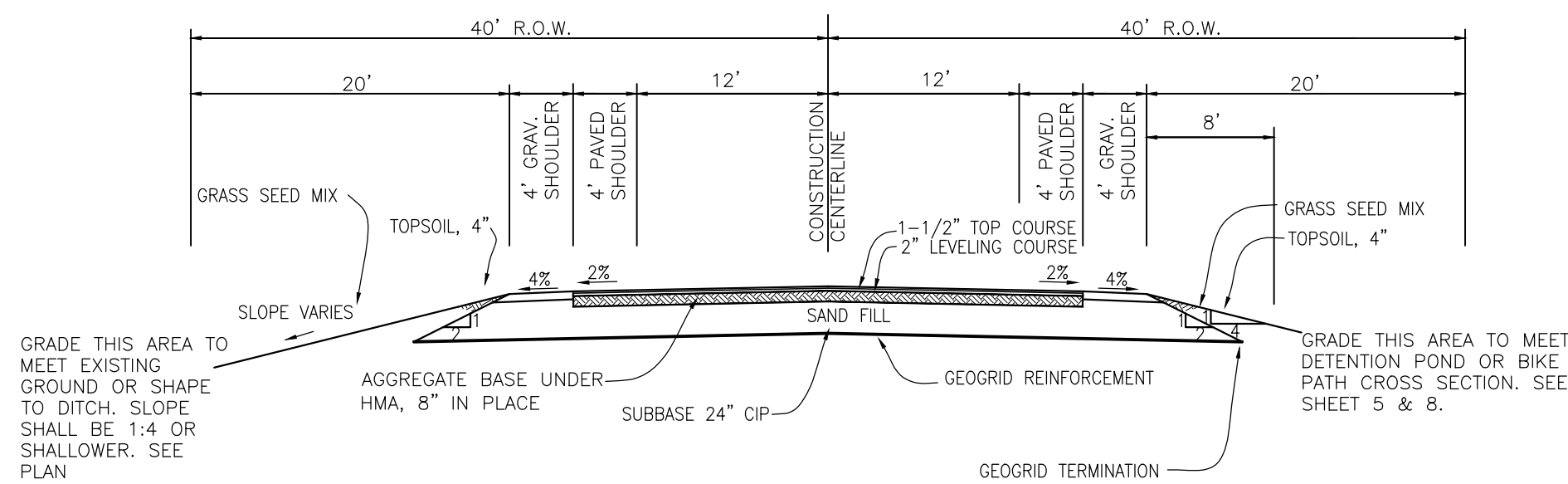
LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
REMOVAL AND EARTHWORK PLAN

PROJECT MQ13-500
SHEET 2 OF 32

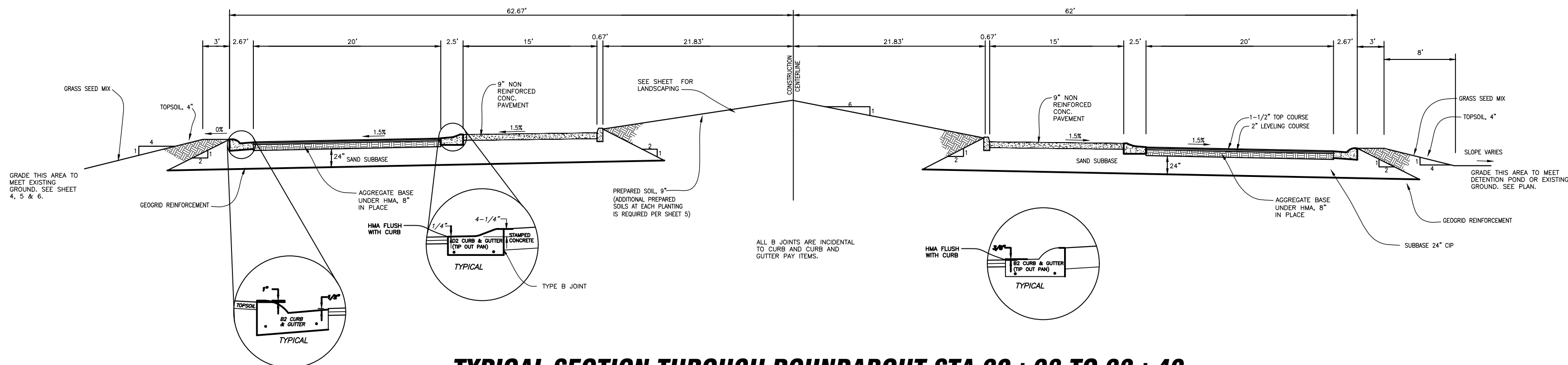




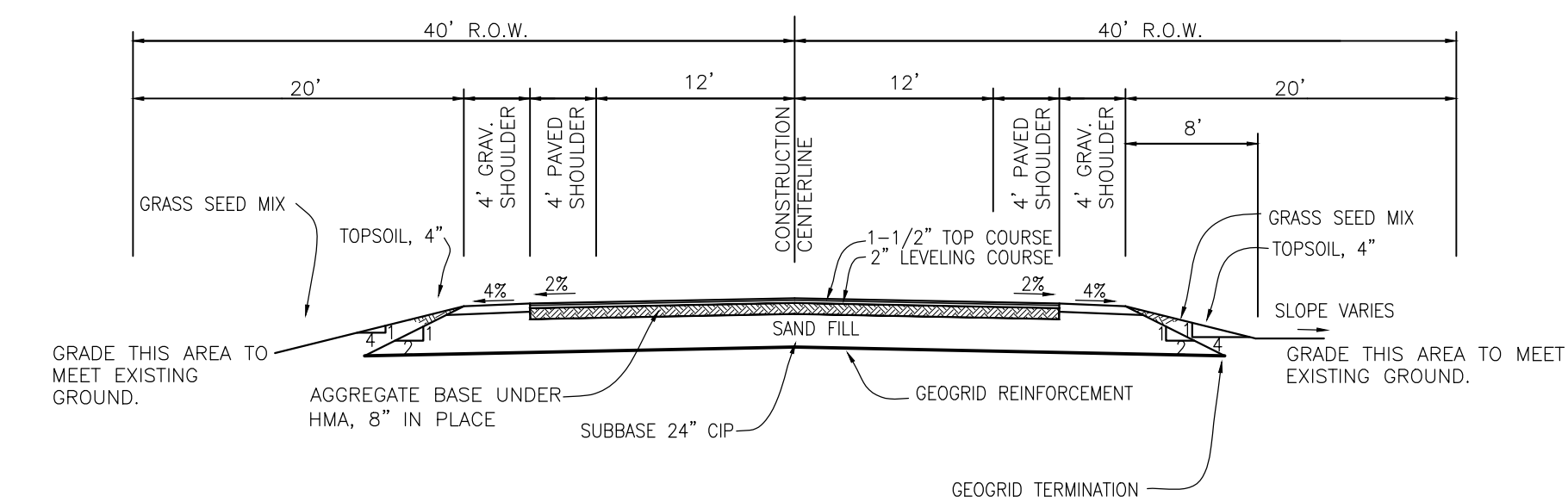
LAKESHORE BLVD. ROADWAY ALIGNMENT: STA 11+00 TO STA 12+00
TRANSITION FROM EXISTING TO PROPOSED CROSS SECTION



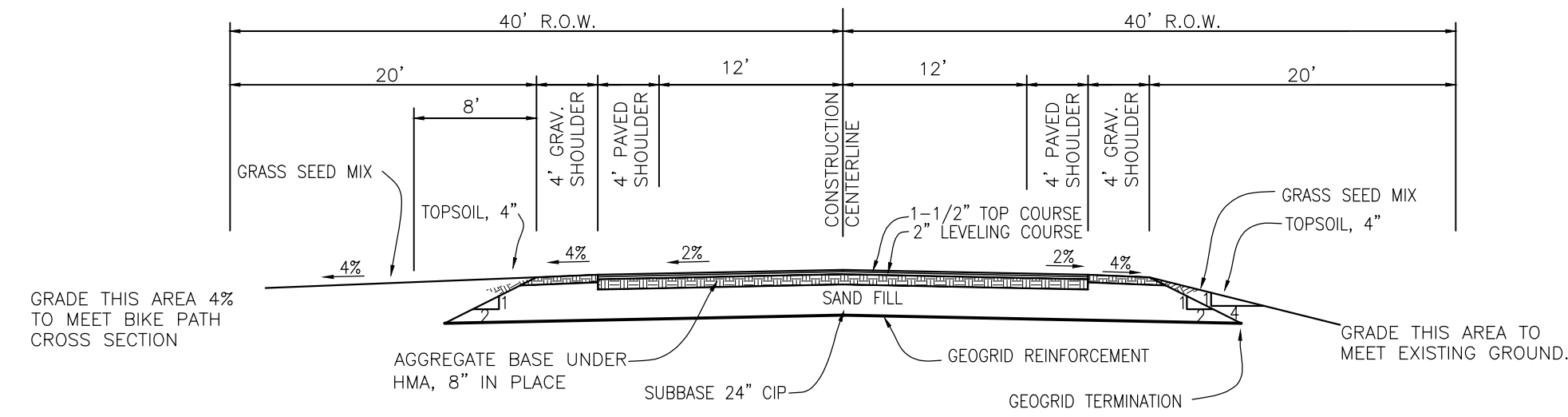
LAKESHORE BLVD. ROADWAY ALIGNMENT: STA 13+26 TO STA 16+75
BIKEPATH CROSSING TO WIDENED AREA NEXT TO POND



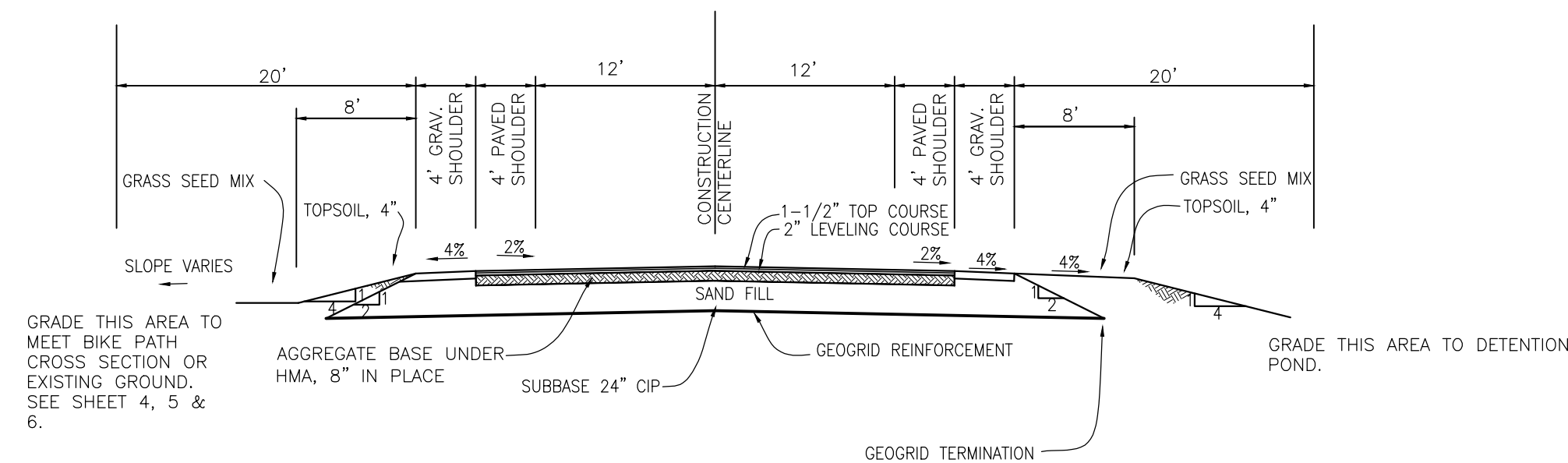
TYPICAL SECTION THROUGH ROUNDABOUT STA 20+28 TO STA 23+49



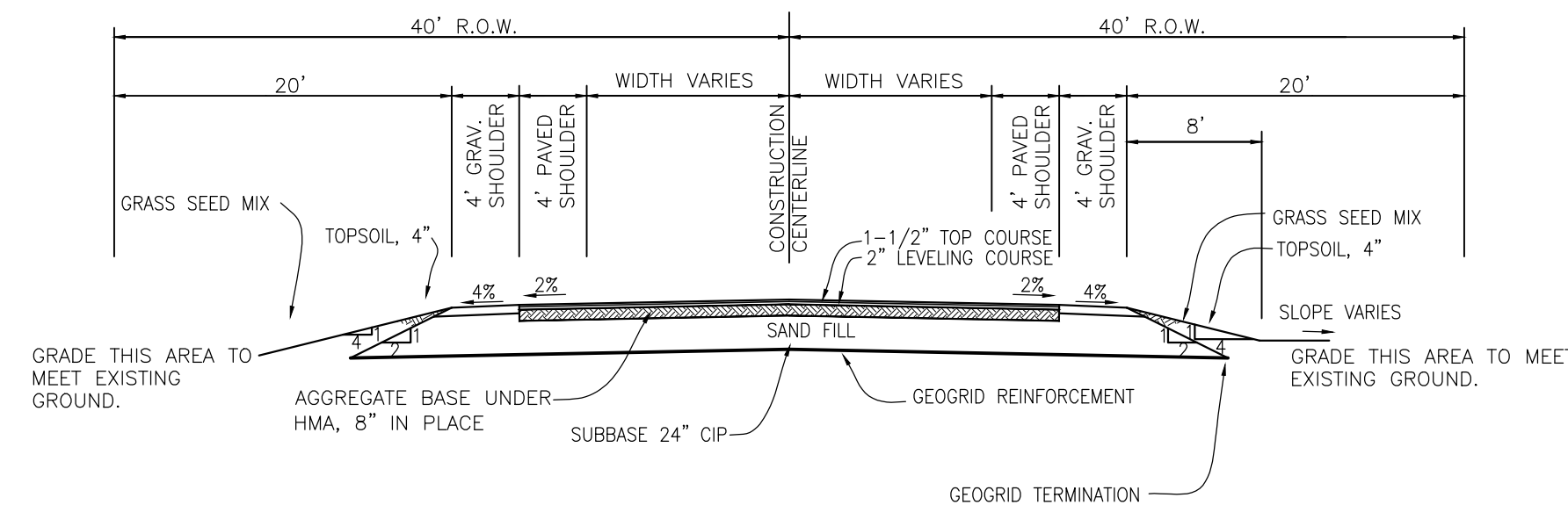
LAKESHORE BLVD. ROADWAY ALIGNMENT: STA 24+49 TO STA 39+50



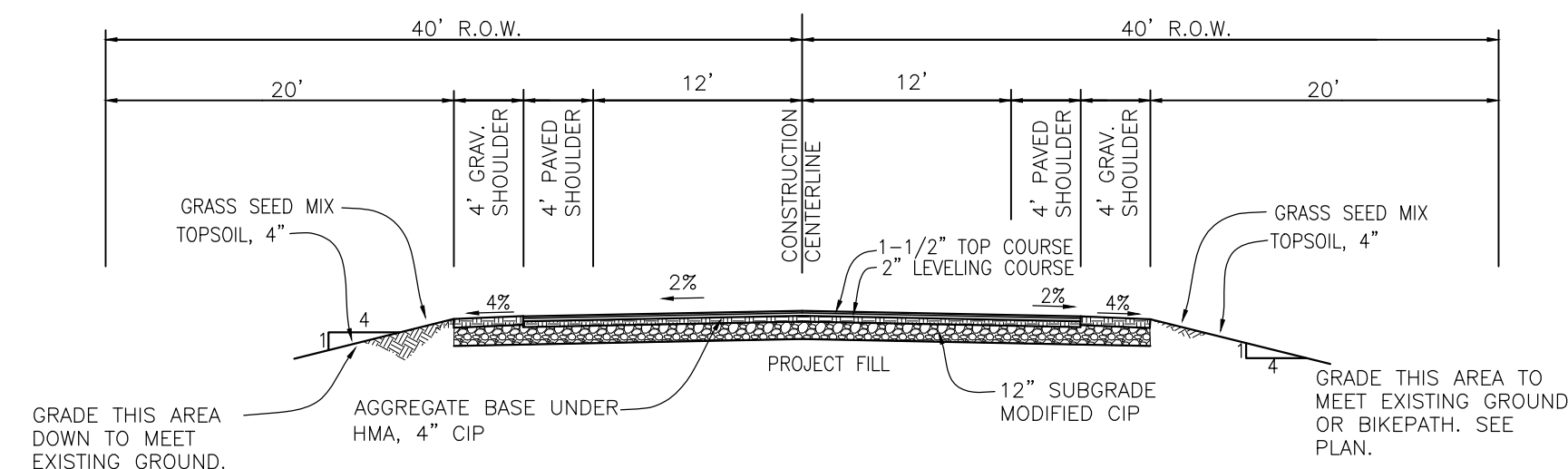
LAKESHORE BLVD. ROADWAY ALIGNMENT: STA 12+00 TO STA 13+26
TO BIKEPATH CROSSING



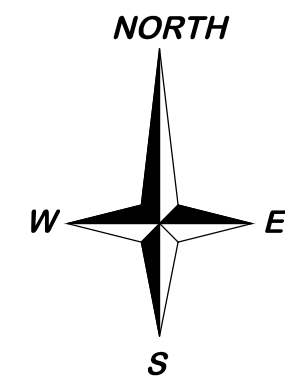
LAKESHORE BLVD. ROADWAY ALIGNMENT ALONG POND: STA 16+75 TO STA 20+28
WIDENED AREA NEXT TO POND TO ROUNDABOUT
FOR STA 20+28.78 TO 23+48.89 SEE ROUNDABOUT SECTION BELOW AND SHEET 5



LAKESHORE BLVD. ROADWAY ALIGNMENT: STA 23+49 TO STA 24+49
TRANSITION FROM NORTH OF ROUNDABOUT TO PROPOSED CROSS SECTION



LAKESHORE BLVD. ROADWAY ALIGNMENT: STA 39+50 TO STA 47+79
FOR STATION 47+79 TO 49+02 SEE HAWLEY ST INTERSECTIN DETAIL SHEET 23



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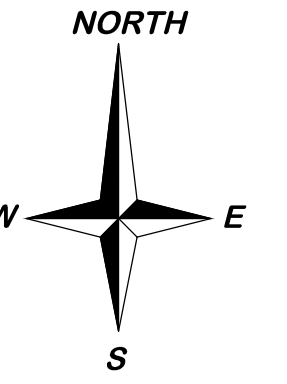
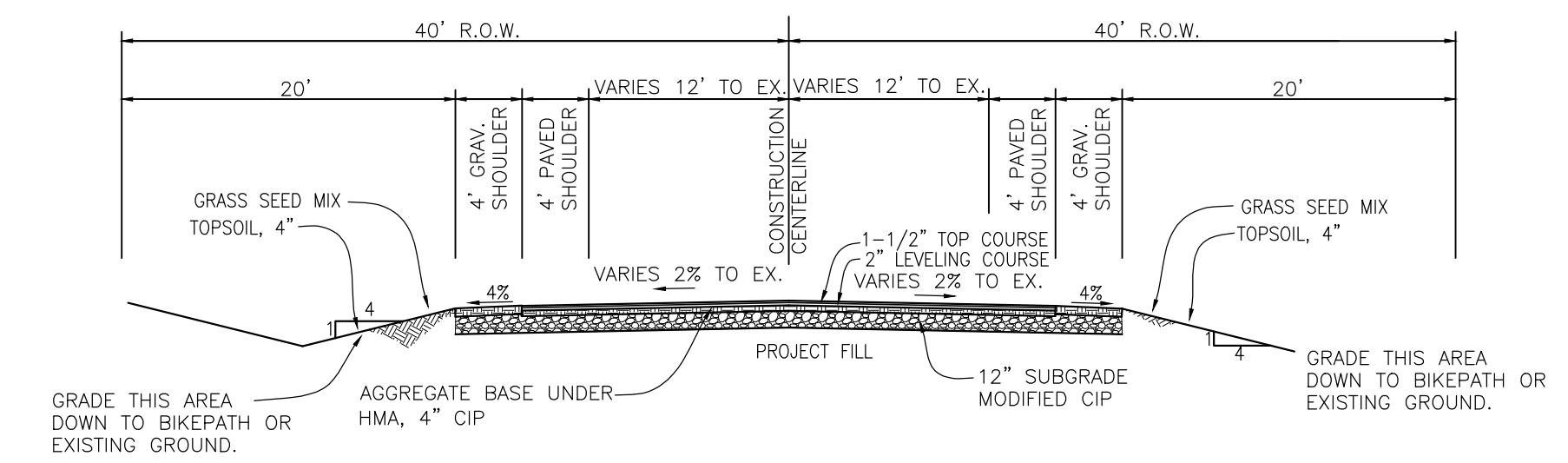
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PERMIT 8 29 19	

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DATE:
FILE NAME: J:/PROJECTS...MASTERCROSSSECTIONS.dwg

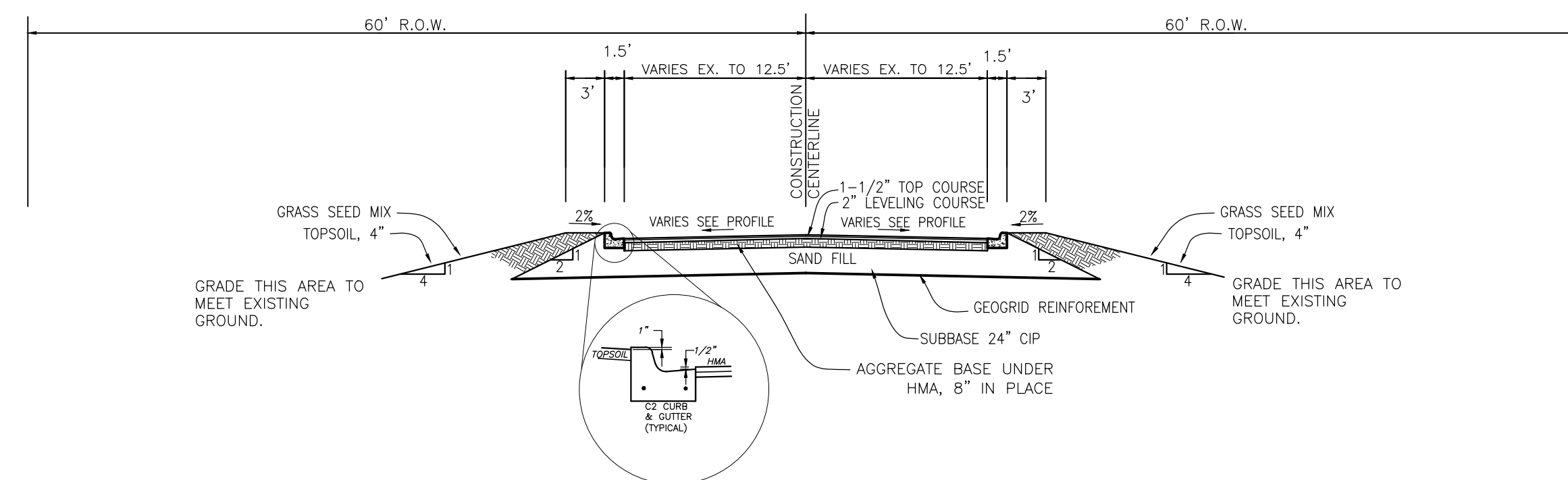
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VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
TYPICAL ROAD CROSS SECTIONS

PROJECT MQ13-500
SHEET 3 OF 32



LAKESHORE BLVD ROADWAY ALIGNMENT: STA 52+67.05 TO STA 53+67.05



60' R.O.W.

15' 12.5' 12.5' 15'

CONSTRUCTION CENTERLINE

1-1 1/2" TOP COURSE LEVELING COURSE

2"

SAND FILL

GEGRID REINFORCEMENT

SUBBASE 24" CIP

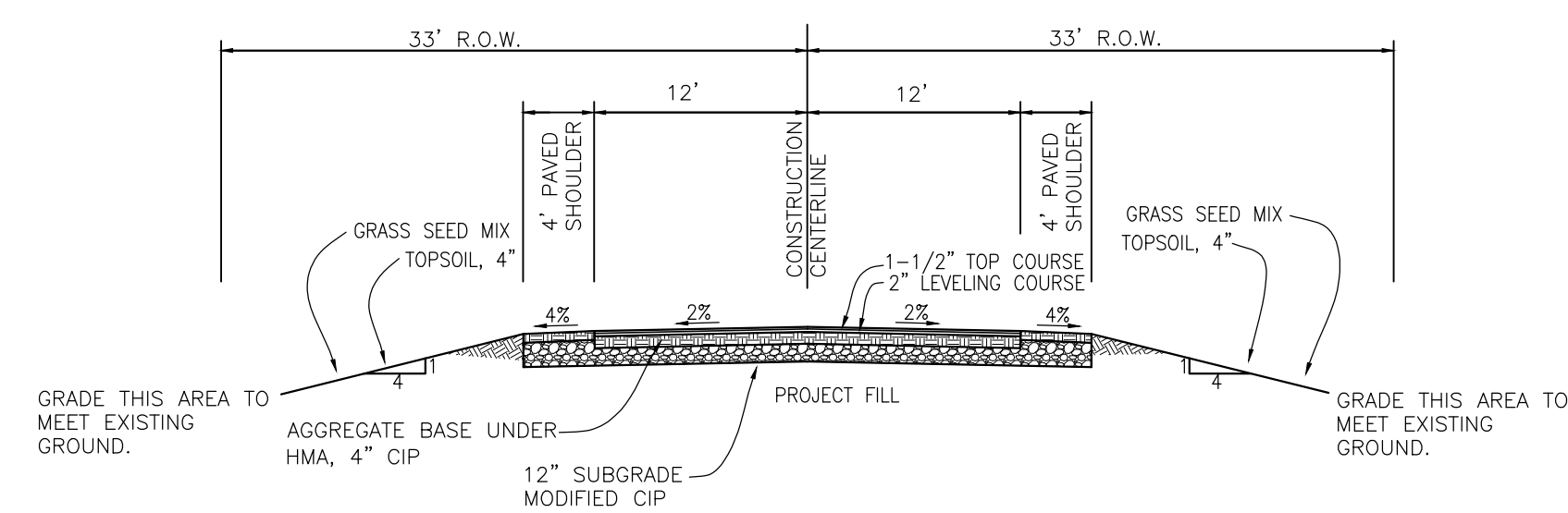
AGGREGATE BASE UNDER HMA, 8" IN PLACE

6" CURB & GUTTER (TYPICAL)

GRASS SEED MIX TOPSOIL, 4"

GRADE THIS AREA TO MEET EXISTING GROUND.

WRIGHT STREET ROADWAY ALIGNMENT: STA 4+00 TO STA 5+00



1' WIDE, 6" THICK GRAVEL SHOULDER

TOPSOIL, 4"

1-1/2" TOP COURSE, HMA LVSP

1-1/2" LEVELING COURSE, HMA LVSP

AGGREGATE BASE UNDER HMA, 6" IN PLACE

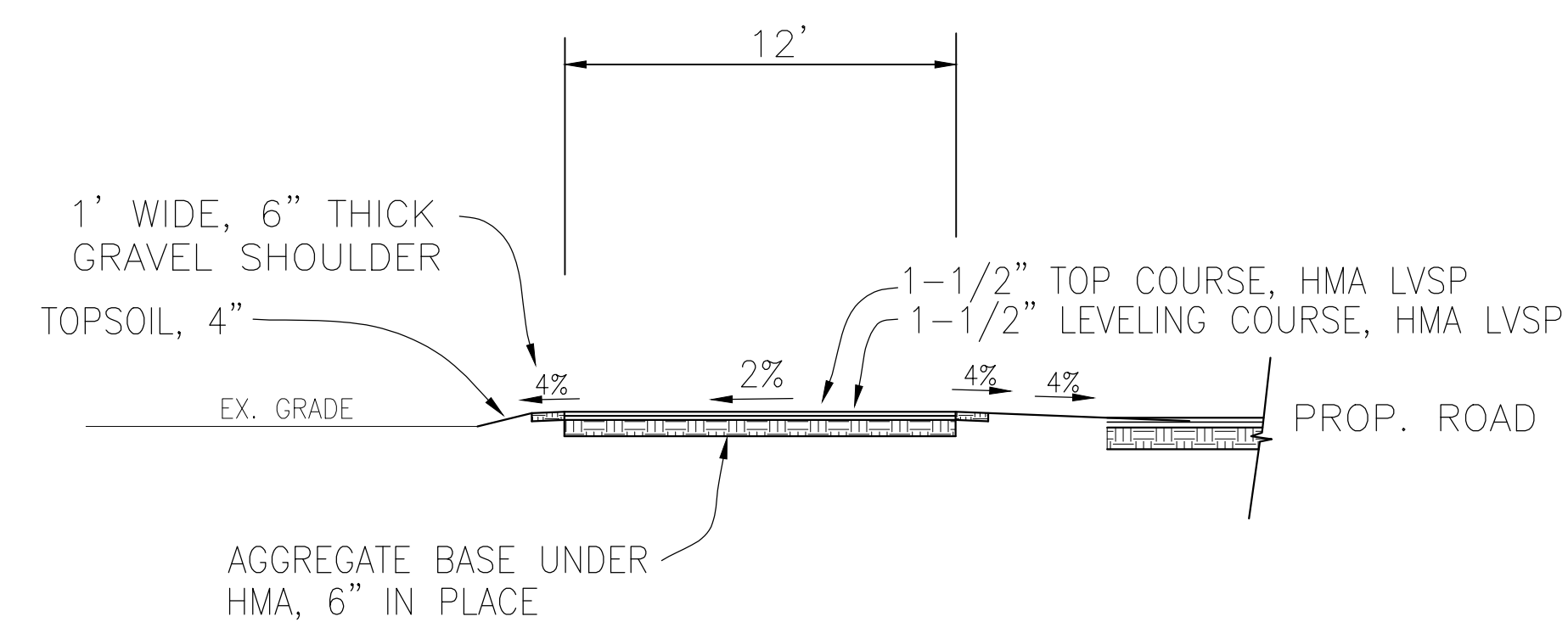
4% 2% 4%

SLOPE VARIES

GRADE THIS AREA TO MEET ROAD CROSS SECTION, SEE SHEET 3, 5 & 6.

GRADE THIS AREA TO MEET DUNE, PARK, ARMOR OR EXISTING GROUND, SEE PLAN AND SHEET 3, 5 & 6.

TYPICAL BIKE PATH CROSS SECTION STA 52+03 TO STA 53+60



WHERE SHOWN ON THE PLAN, PLACE 4' WIDE BY 1' DEEP DITCH.

PLACE 6' WIDE STRIP OF SOD CENTERED ON DITCH.

TYPICAL DITCH CROSS SECTION



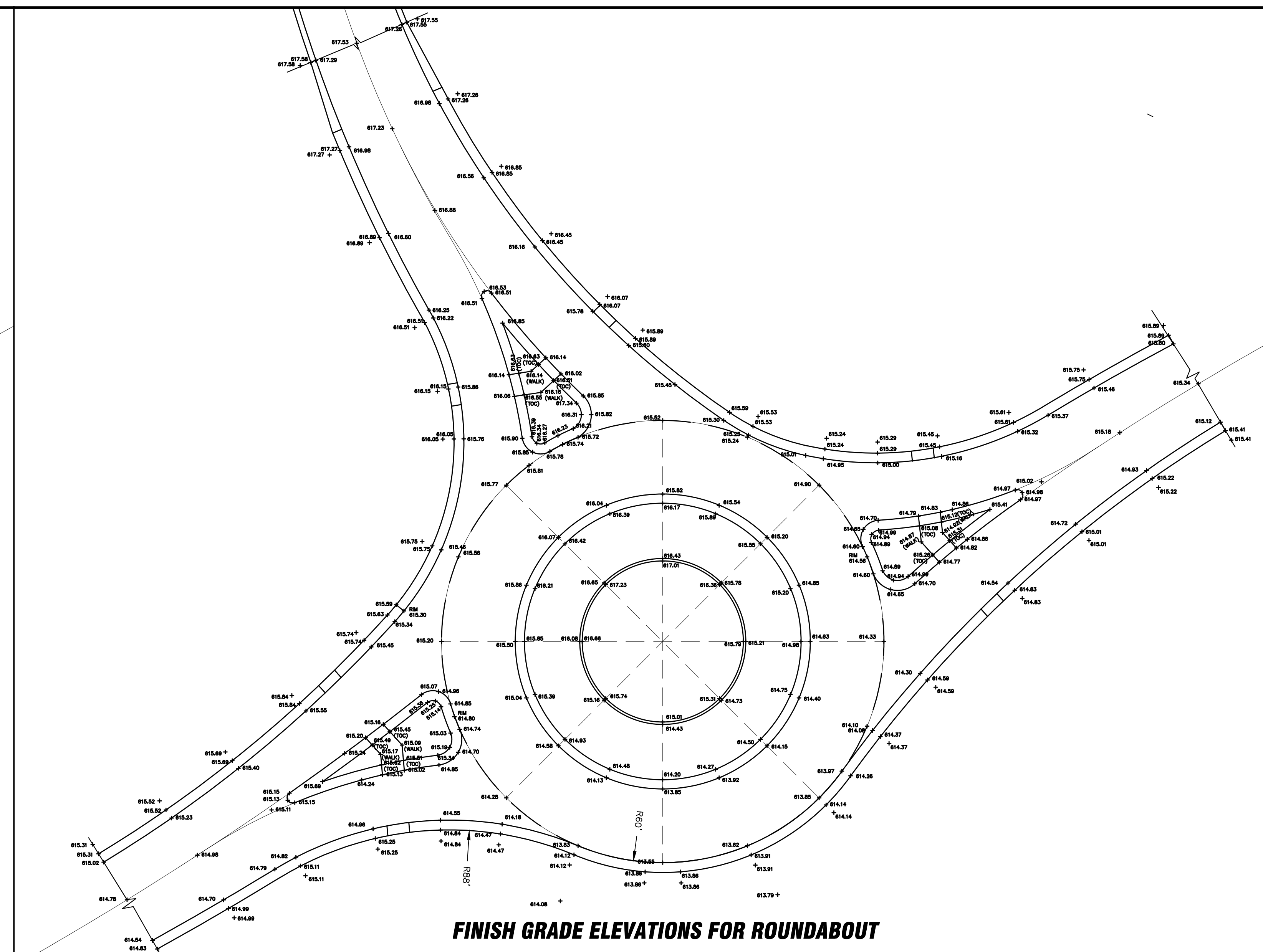
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. INTERNAL REVIEW 6/10/14
. PRELIM DRAFT 8 12 19
. PERMIT 8 29 19

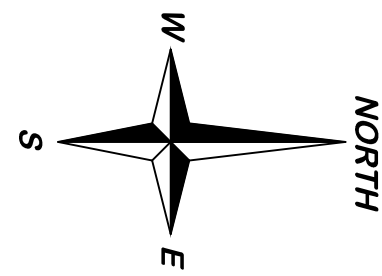
HOR. SCALE: 1" = 10'
VERT. SCALE: N.A.

Utility
Notification
Organization

Three full days before you dig
call the Miss Dig system
1-(800)-482-7171

PROJECT MQ13-500
SHEET 4 OF 32





RESTORATION (THIS SHEET)

148	TON - HMA 5E3	3733	SYD - TOPSOIL SURFACE, FURN, 4 INCH
197	TON - HMA, 4E3	3733	SYD - MULCH
93	TON - HMA, LVSP	3733	SYD - MULCH ANCHORING
477	SYD - SHOULDER, CL I, 6 INCH	170	LB - SEEDING, MIXTURE TDS
1561	SYD - AGGREGATE BASE, 8 INCH	112	FT - PAVT MRKG, POLYUREA, 4 INCH, WHITE
488	SYD - AGGREGATE BASE, 6 INCH	900	FT - PAVT MRKG, POLYUREA, 6 INCH, WHITE
1553	CYD - SUBBASE, 24 INCH	53	EA - REMOVE AND REINSTALL BOLLARD
2532	SYD - GEOGRID	760	TON - ARMOR ROCK
		60	FT - PAVT MRKG, POLYUREA, 24 INCH, WHITE

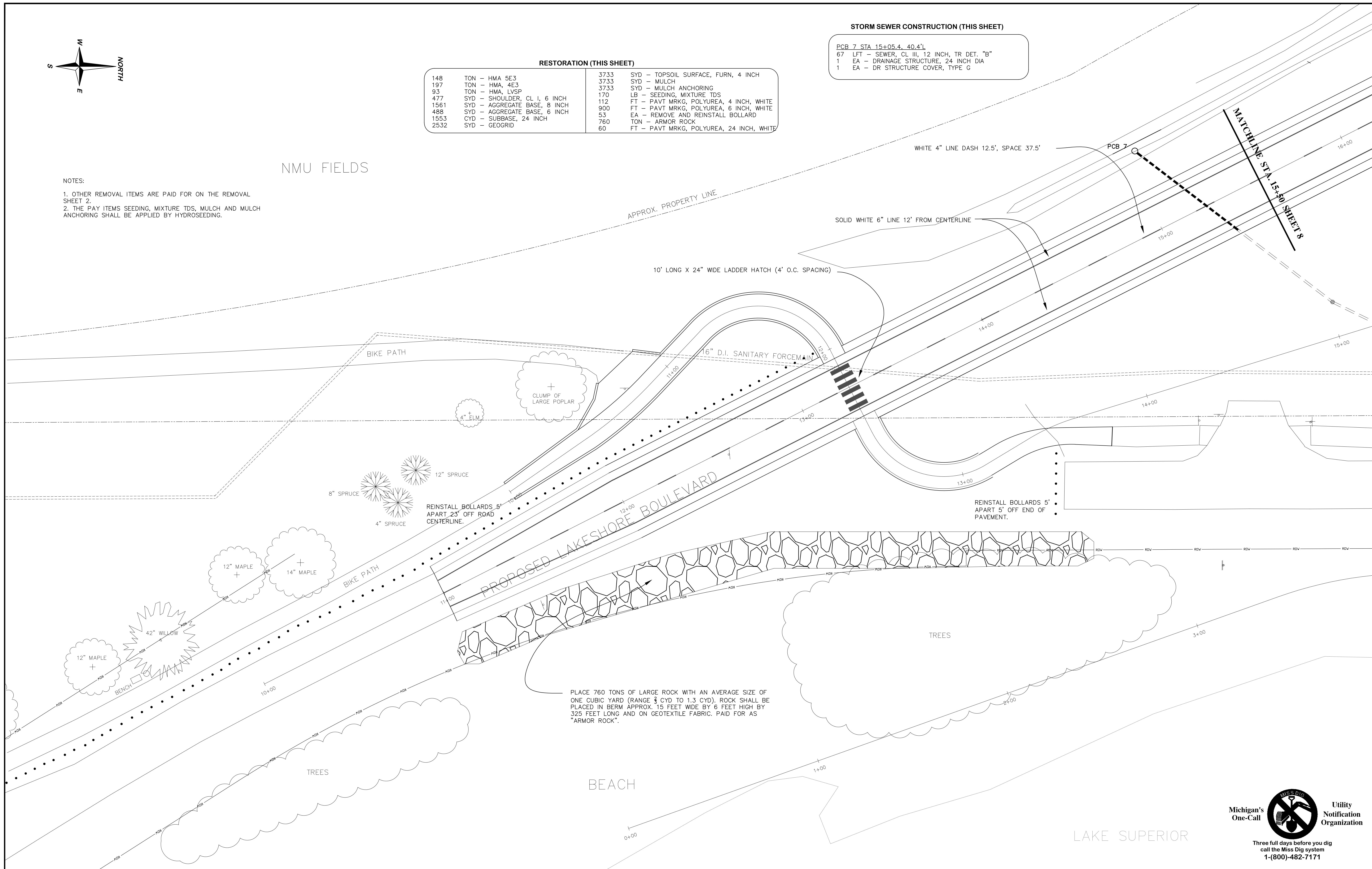
STORM SEWER CONSTRUCTION (THIS SHEET)

PCB 7 STA 15+05.4, 40.4'L
67 LFT - SEWER, CL III, 12 INCH, TR DET. "B"
1 EA - DRAINAGE STRUCTURE, 24 INCH DIA
1 EA - DR STRUCTURE COVER, TYPE G

NOTES:

1. OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
2. THE PAY ITEMS SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.

NMU FIELDS



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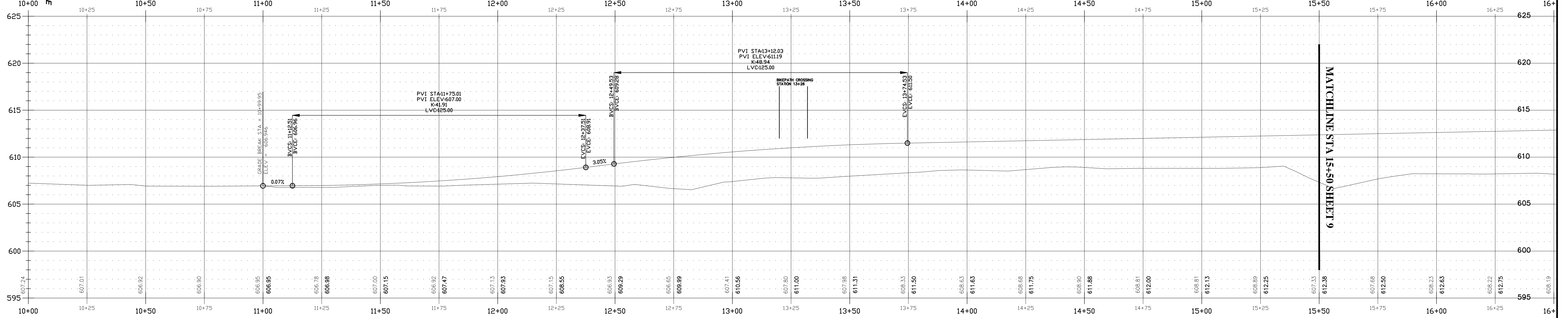
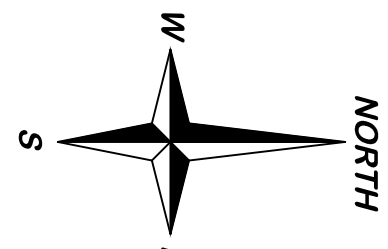
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DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: ---J:/PROJECTS....MASTERBASEMAP.dwg

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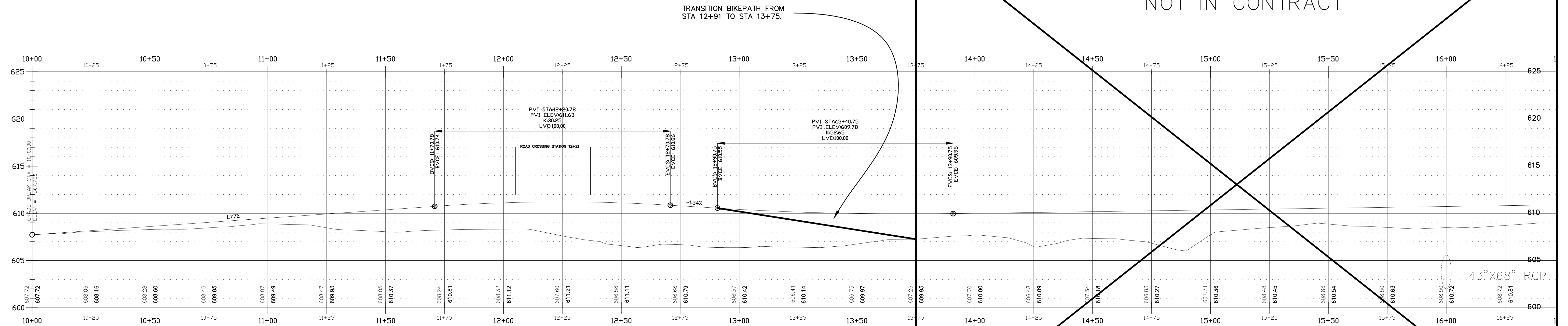
LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
PROPOSED ROAD AND BIKE PATH PLAN

PROJECT MQ13-500
SHEET 6 OF 32





ROAD PROFILE



BIKE PATH PROFILE

NOT IN CONTRACT

43"X68" RCP



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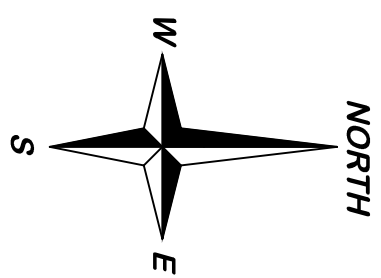
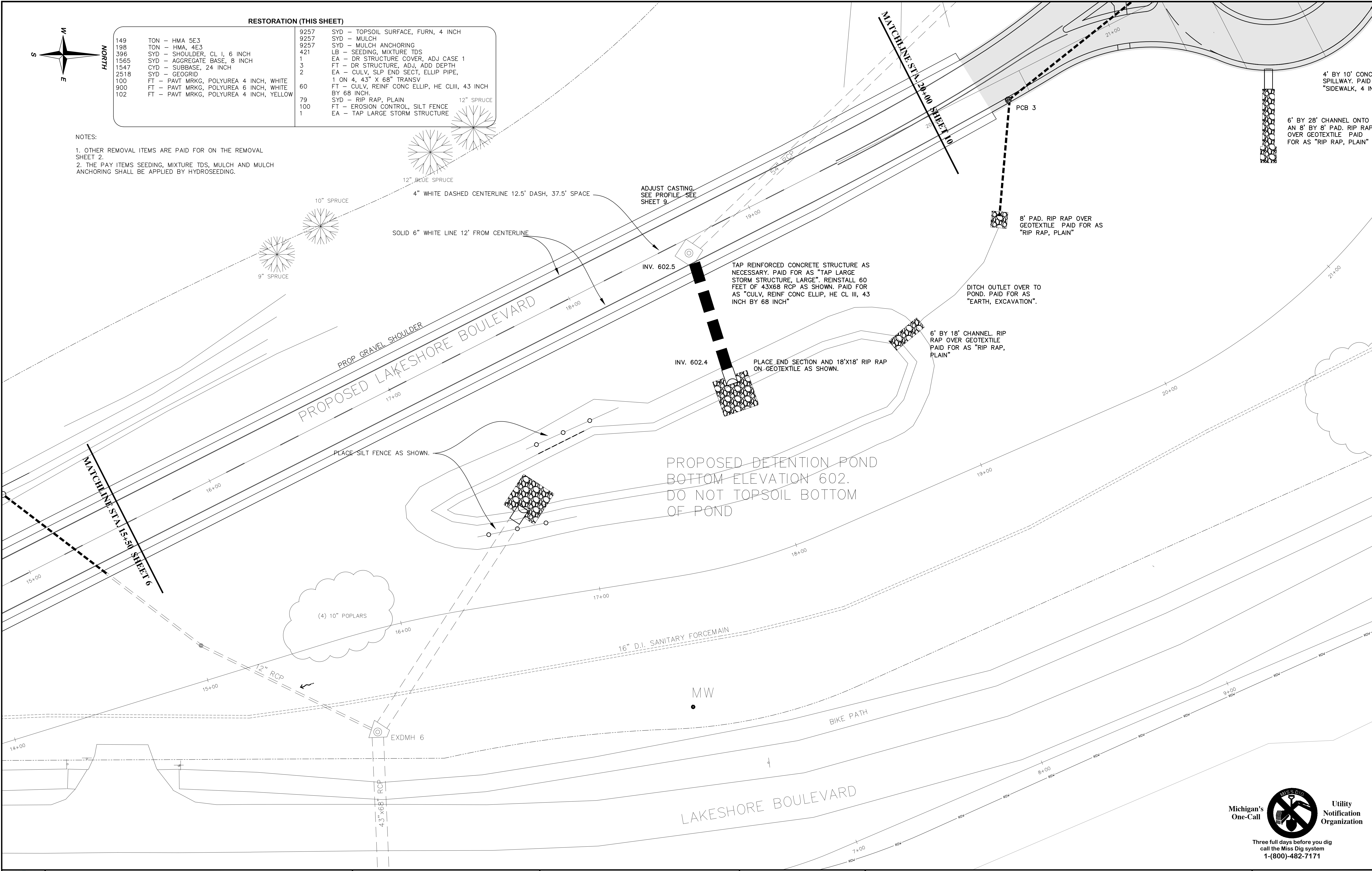
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INTERNAL REVIEW 6/11/14	
PRELIM DRAFT 8 12 19	
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FILE NAME: ---J-/PROJECTS...MASTERBASEMAP.dwg

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LAKE SHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
ROAD PROFILE

PROJECT MQ13-500
SHEET 7 OF 32

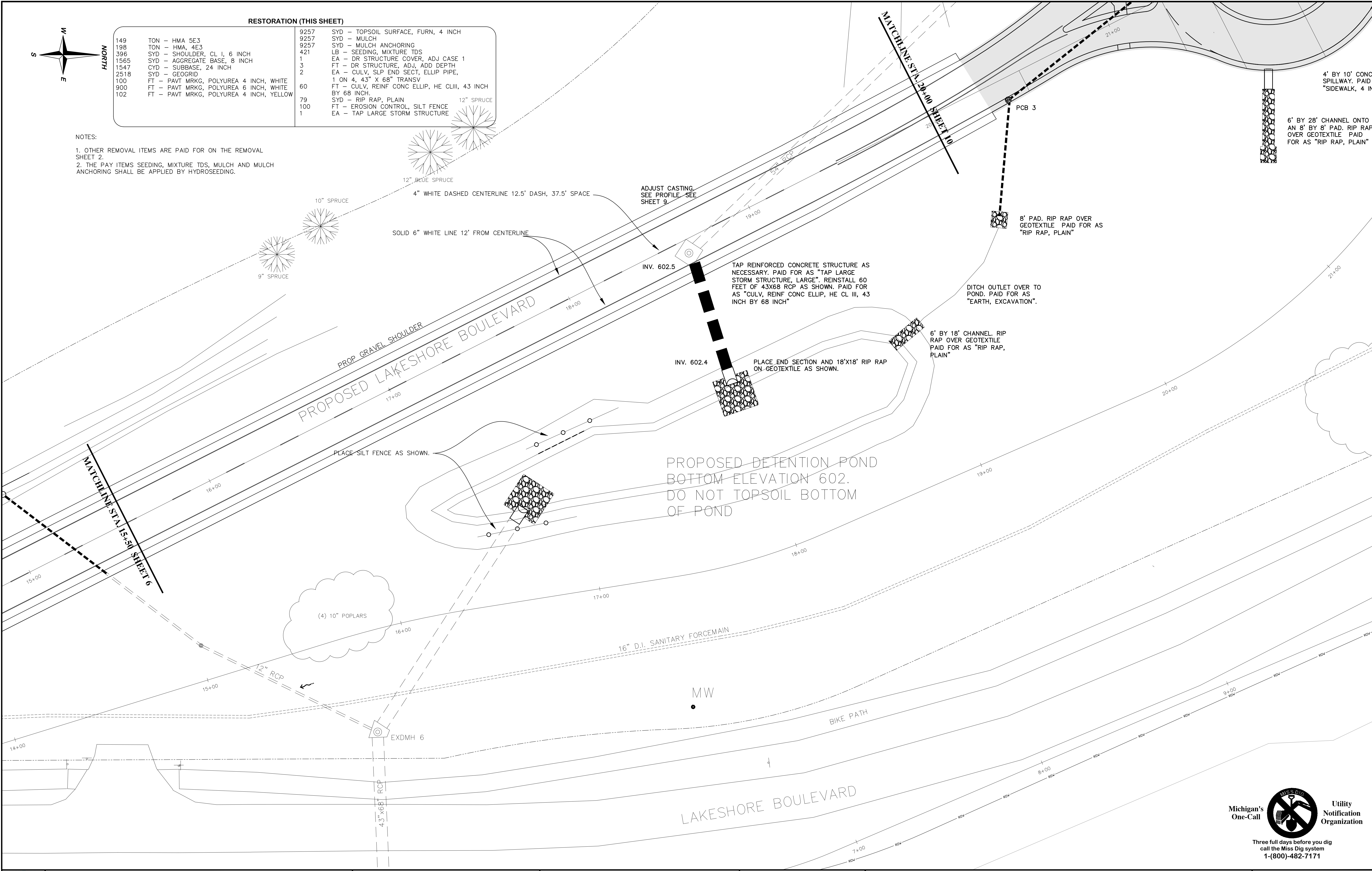


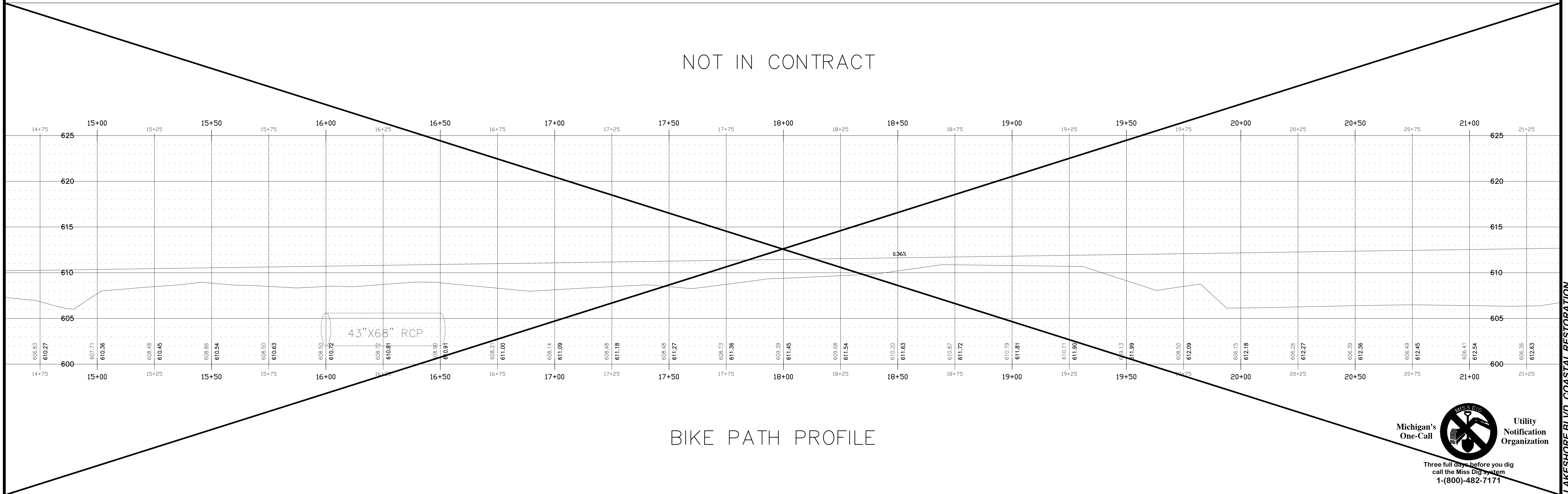
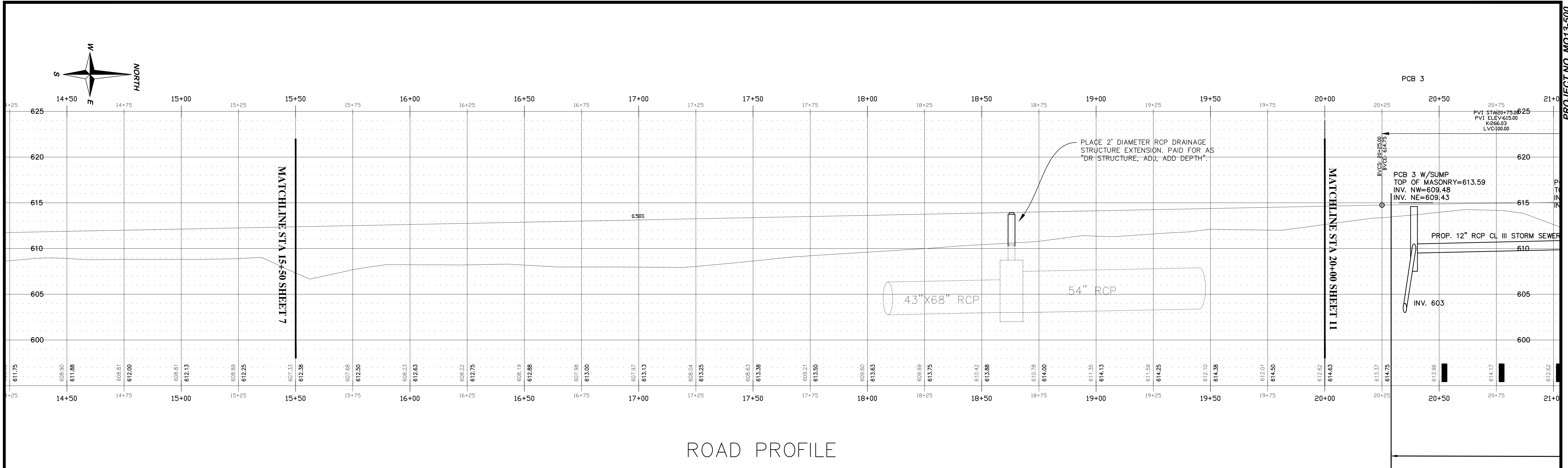
RESTORATION (THIS SHEET)			
149	TON	-	HMA 5E3
198	TON	-	HMA, 4E3
396	SYD	-	SHOULDER, CL I, 6 INCH
1565	SYD	-	AGGREGATE BASE, 8 INCH
1547	CYD	-	SUBBASE, 24 INCH
2518	SYD	-	GEOGRID
100	FT	-	PAVT MRKG, POLYUREA 4 INCH, WHITE
900	FT	-	PAVT MRKG, POLYUREA 6 INCH, WHITE
102	FT	-	PAVT MRKG, POLYUREA 4 INCH, YELLOW
9257	SYD	-	TOPSOIL SURFACE, FURN, 4 INCH
9257	SYD	-	MULCH
9257	SYD	-	MULCH ANCHORING
421	LB	-	SEEDING, MIXTURE TDS
1	EA	-	DR STRUCTURE COVER, ADJ CASE 1
3	FT	-	DR STRUCTURE, ADJ, ADD DEPTH
2	EA	-	CULV, SLP END SECT, ELLIP PIPE, 1 ON 4, 43" X 68" TRANSV
60	FT	-	CULV, REINF CONC ELLIP, HE CLIII, 43 INCH BY 68 INCH
79	SYD	-	RIP RAP, PLAIN
100	FT	-	EROSION CONTROL, SILT FENCE
1	EA	-	TAP LARGE STORM STRUCTURE

- NOTES:
- OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
 - THE PAY ITEMS SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.

4' BY 10' CONC SPILLWAY. PAID FOR AS "SIDEWALK, 4 INCH"

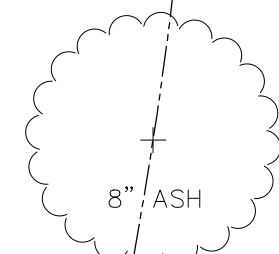
6' BY 28' CHANNEL ONTO AN 8' BY 8' PAD. RIP RAP OVER GEOTEXTILE. PAID FOR AS "RIP RAP, PLAIN"





PROJECT NO. MQ13-500

LAKESHORE BLVD. COASTAL RESTORATION



WRIGHT STREET STATION 5+00 TO 6+31
138 LFT - WATER MAIN, DI 8" CL 52, T.D. G
1 EA - ELBOW 8" 45 DEG. (M.J.)
138 FT - POLYETHYLENE PIPE WRAP

LAKESHORE BLVD STATION 22+37 TO 25+50	
1	EA - GATE VALVE AND BOX, 8"
1	EA - TEE, 8"x6" (M.J.)
1	EA - ANCHORING / COUPLING, 6" (24" LONG)
7	LFT - WATER MAIN, DI 6" CL 52, T.D. G
1	EA - GATE VALVE AND BOX, 6"
1	EA - FIRE HYDRANT
2	EA - ELBOW 8" 45 DEG.
319	FT - WATER MAIN, DI 8" CL 52, T.D. G
326	FT - POLYETHYLENE PIPE WRAP
88	CYD - CONCRETE REINFORCE

USE RETAINER GLANDS ON ALL MECHANICAL JOINTS
ALL GASKETS SHALL BE NITRILE. SEE SPECS.

CONCRETE SLABS AND FOOTINGS SHALL BE REMOVED TO
ACCOMMODATE WATERMAIN PLACEMENT AS PER
ENGINEER.

1 Ea - SERV TAP, 1 INCH
1 Ea - CURB STOP AND BOX, 1 INCH
30 Ft - WATER SERVICE, 1 INCH COPPER, TYPE K
1 Ea - IRRIGATION PIT
70 Ft - CONDUIT, SCHEDULE 80 PVC, 3 INCH

PCB 3 - 20+38.69, 10.58'R
PCB 4 (4' DIA.) - 21+27.25, 7.61'L
PCB 5 - 21+29.38, 40.33'L
PCB 6 - 22+49.82, 5.47'R

DET. POND TO PCB 3

58 LFT - SEWER, CL III, 12 INCH, TR DET. "B"
1 EA - DRAINAGE STRUCTURE, 24" DIA.
1 EA - DRAINAGE STRUCTURE COVER, TYPE K, MODIFIED
1 EA - CULV END SECT, CONC, 12 INCH

PCB 3 TO PCB 4

90 LFT - SEWER, CL III, 12 INCH, TR DET. "B"
1 EA - DRAINAGE STRUCTURE, 48" DIA.
1 EA - DRAINAGE STRUCTURE COVER, TYPE B

PCB 5 TO PCB 4

PCB 5 TO PCB 4

33	LFT - SEWER, CL III, 12 INCH, TR DET. "B"
1	EA - DRAINAGE STRUCTURE, 24" DIA.
1	EA - DRAINAGE STRUCTURE COVER, TYPE K, MODIFIED

PCB 4 TO PCB 6

123 LFT - SEWER, CL III, 12 INCH, TR DET. "B"
1 EA - DRAINAGE STRUCTURE, 24" DIA.
1 EA - DRAINAGE STRUCTURE COVER, TYPE B

EXDMH WRIGHT STREET STA 5+96.57, 24.72R

1 EA - DR STRUCTURE COVER, ADJ. CASE 2
2.42 FT - DR STRUCTURE ADJ. ADD DEPTH

77	TON - HMA 5E3	
102	TON - HMA, 4E3	
201	SYD - SHOULDER, CL 1, 6 INCH	
808	SYD - AGGREGATE BASE, 8 INCH	
803	CYD - SUBBASE, 24 INCH	
1335	SYD - GEGRID	
50	FT - PAVT MRKG, POLYUREA, 4 INCH, WHITE	
458	FT - PAVT MRKG, POLYUREA, 6 INCH, WHITE	
586	FT - PAVT MRKG, POLYUREA, 4 INCH, YELLOW	

10409 SYD - TOPSOIL SURFACE, FURN, 4 INCH
10409 SYD - MULCH
10409 SYD - MULCH ANCHORING
473 LB - SEEDING, MIXTURE TDS
1 EA - DR STRUCTURE COVER, ADJ CASE 2
3 FT - DR STRUCTURE, ADJ, ADD DEPTH
34 SYD - RIP RAP, PLAIN
40 SFT - SIDEWALK, 4"

NOTES:

1. OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
2. THE PAY ITEMS SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.

PROPOSED IRRIGATION PIT
WITH EMPTY 3" CONDUIT
TO CENTER OF ROUNDABOUT
FOR FUTURE IRRIGATION.
IRRIGATION PIT DETAIL
INCLUDED WITH ELECTRIC
DETAILS.

— SOLID WHITE 6" LINE 12' FROM CENTERLINE

WHITE 4" LINE DASH 12.5'. SPACE 37.5'

(2) 4" SOLID YELLOW LINES EACH 135 FEET LONG

4' BY 10' CONCRETE
SPILLWAY. PAID FOR AS
"SIDEWALK, 4 INCH".

6' BY 28' CHANNEL ONTO
AN 8' BY 8' PAD. RIP RAP
OVER GEOTEXTILE PAID
FOR AS "RIP RAP, PLAIN"

(2) 4" SOLID YELLOW LINES EACH 135 FEET LONG

8' PAD. RIP RAP OVER
GEOTEXTILE PAID FOR AS
"RIP RAP. PLAIN"

DITCH OUTLET OVER TO
POND. PAID FOR AS
"EARTH EXCAVATION"



**CITY ENGINEER'S OFFICE
MARQUETTE, MICHIGAN
300 WEST BARAGA AVE., MARQUETTE, MI 49855
PHONE (906)228-0440**

REVISIONS:

REVISIONS:

INTERNAL REVIEW	6/5/14
PRELIM DRAFT	8 12 19
PERMIT	8 29 19

DESIGN BY: JAMES R. COMPTON, PROJECT ENGINEER
DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: J:\PROJECTS...MASTERBASEMAP.dwg

HOR. SCALE: 1" = 20'
VERT. SCALE: N.A.

LAKESHORE BLVD. COASTAL RESTORATION
MARQUETTE, MICHIGAN
PROPOSED ROAD PLAN

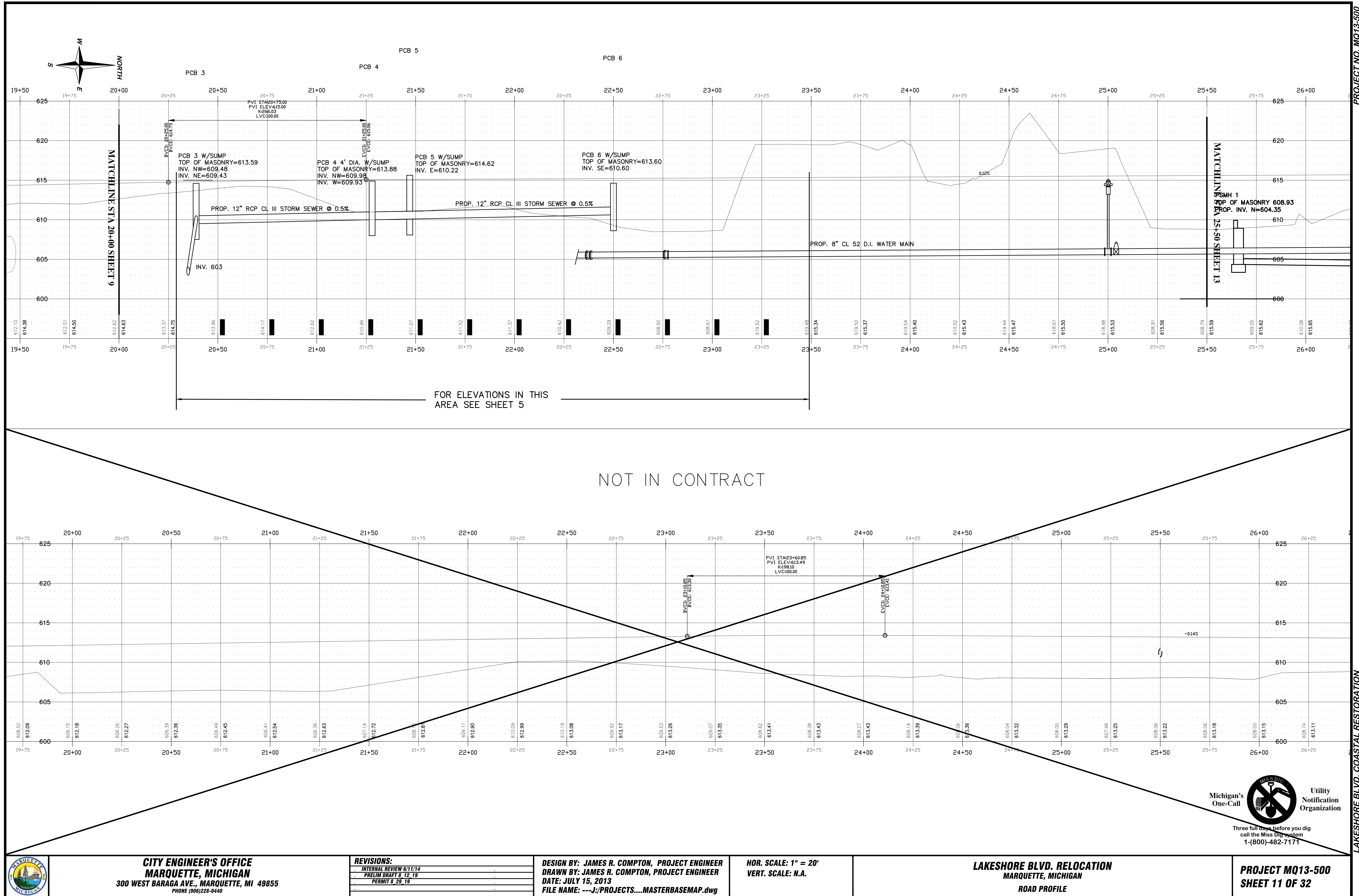
PROJECT MQ13-500
SHEET 10 OF 32

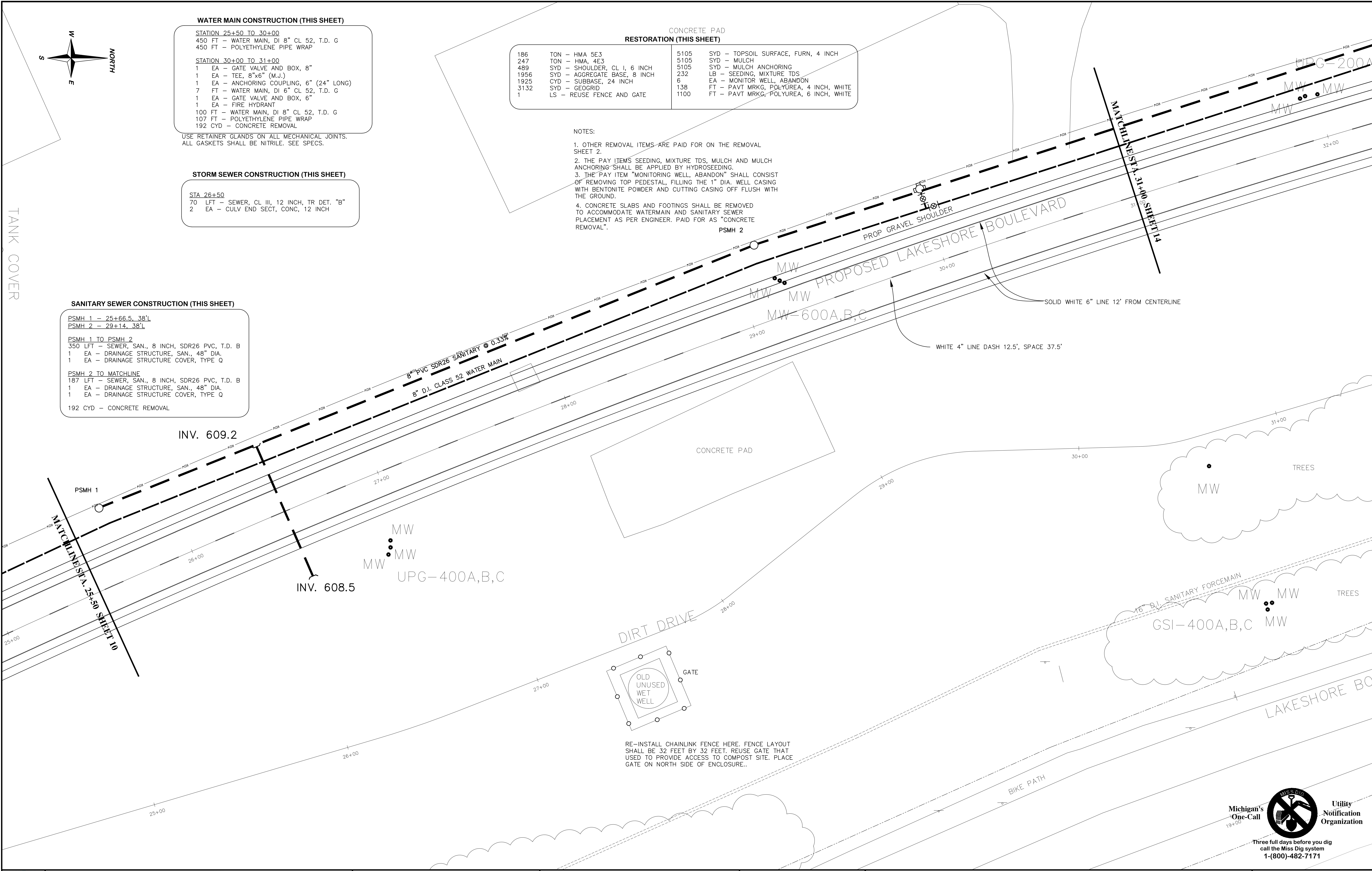


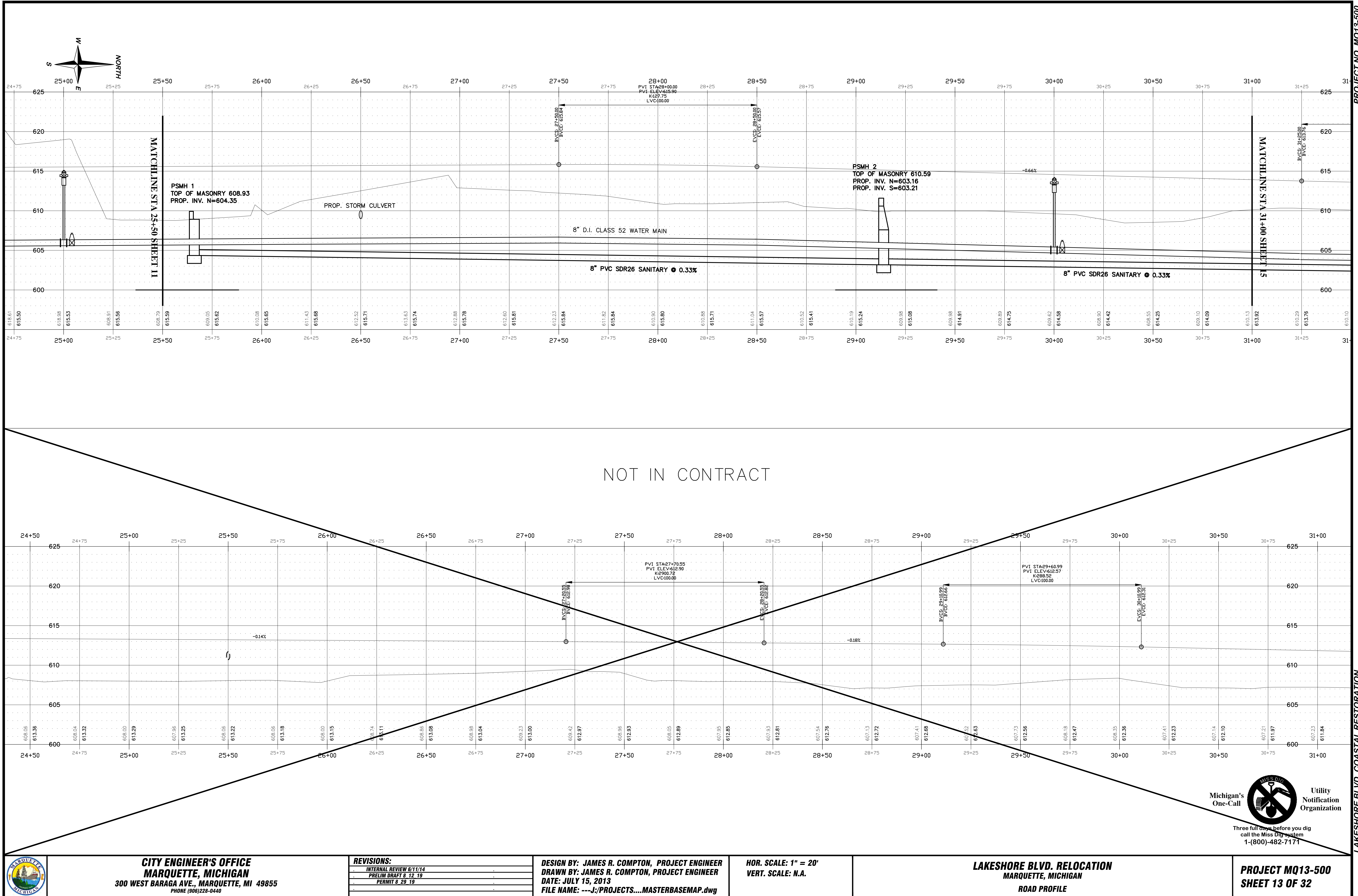
Michigan's One-Call

~~Utility
Notification
Organization~~

Three full days before you dig
call the Miss Dig system
1-(800)-482-7171







STATION 31+00 TO 35+00
400 FT - WATER MAIN, DI 8" CL 52, T.D. G
400 FT - POLYETHYLENE PIPE WRAP

STATION 35+00 TO 37+00
1 EA - GATE VALVE AND BOX, 8"
1 EA - TEE, 8"x6" (M.J.)
1 EA - ANCHORING COUPLING, 6" (24" LONG)
7 LFT - WATER MAIN, DI 6" CL 52, T.D. G
1 EA - GATE VALVE AND BOX, 6"
1 EA - FIRE HYDRANT
200 FT - WATER MAIN, DI 8" CL 52, T.D. G
207 FT - POLYETHYLENE PIPE WRAP
46 CYD - CONCRETE REMOVAL

STORM SEWER CONSTRUCTION (THIS SHEET)

203	TON - HMA SE3	3978	SYD - TOPSOIL SURFACE, FURN, 4 INCH
270	TON - HMA, 4E3	3978	SYD - MULCH
534	SYD - SHOULDER, CL 1, 6 INCH	3978	SYD - MULCH ANCHORING
2134	SYD - AGGREGATE BASE, 8 INCH	181	LB - SEEDING, MIXTURE TDS
2101	CYD - SUBBASE, 24 INCH	3	EA - MONITOR WELL, ABANDON
3418	SYD - GEOGRID	150	FT - PAVT MRKG, POLYUREA, 4 INCH, WHITE
		1200	FT - PAVT MRKG, POLYUREA, 6 INCH, WHITE

PSMH 3 - 32+61, 38'
PSMH 4 - 36+11, 38'

MATCHLINE TO PSMH 3
162 LFT - SEWER, SAN., 8 INCH, SDR26 PVC, T.D. B
1 EA - DRAINAGE STRUCTURE, SAN., 48" DIA.
1 EA - DRAINAGE STRUCTURE COVER, TYPE Q

PSMH 3 TO PSMH 4
353 LFT - SEWER, SAN., 8 INCH, SDR26 PVC, T.D. B
1 EA - DRAINAGE STRUCTURE, SAN., 48" DIA.
1 EA - DRAINAGE STRUCTURE COVER, TYPE Q

PSMH 4 TO MATCHLINE
89 LFT - SEWER, SAN., 8 INCH, SDR26 PVC, T.D. B

46 CYD - CONCRETE REMOVAL

1. OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
2. THE PAY ITEM SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.
3. CONCRETE SLABS AND FOOTINGS SHALL BE REMOVED TO ACCOMMODATE WATERMAIN AND SANITARY SEWER PLACEMENT AS PER ENGINEER. PAID FOR AS "CONCRETE REMOVAL".
4. THE PAY ITEM "MONITORING WELL, ABANDON" SHALL CONSIST OF REMOVING TOP PEDESTAL, FILLING THE 1" DIA. WELL CASING WITH BENTONITE POWDER AND CUTTING CASING OFF FLUSH WITH THE GROUND.

INV. 607.5

WHITE 4" LINE DASH 12.5', SPACE 37.5'

BIKE PATH

LAKESHORE BOULE

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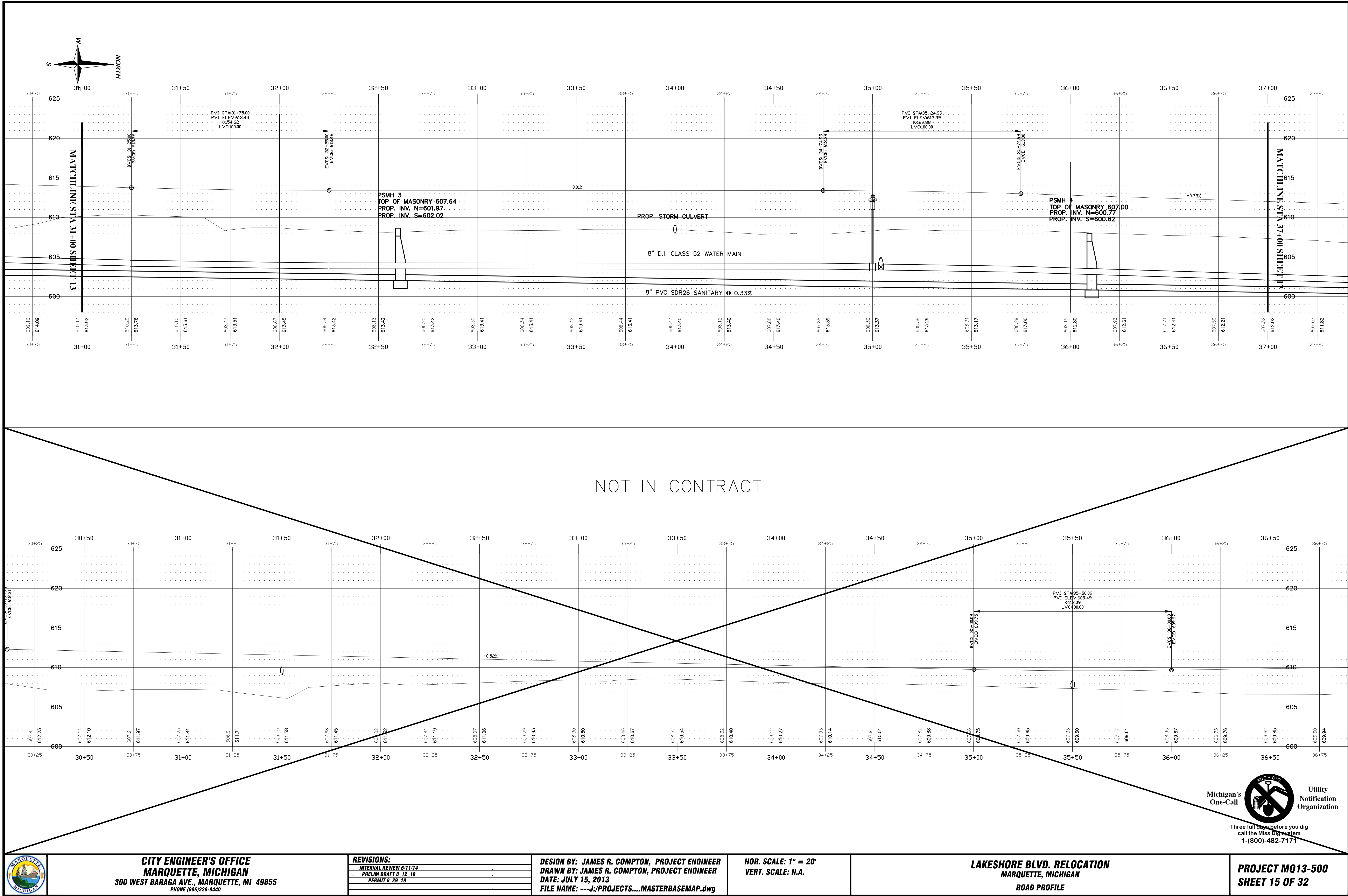


REVISIONS:

INTERNAL REVIEW 6/5/14
PERMIT 8 29 19

HOR. SCALE: 1" = 20'
VERT. SCALE: N.A.

PROJECT MQ13-500
SHEET 14 OF 32



CITY ENGINEER'S OFFICE
MARQUETTE, MICHIGAN
300 WEST BARAGA AVE., MARQUETTE, MI 49855
PHONE (906)228-0440

REVISIONS:	
INTERNAL REVIEW 8/11/14	
PRELIM DRAFT 8 '12 '19	
PERMIT 8 '29 '19	

DESIGN BY: JAMES R. COMPTON, PROJECT ENGINEER
DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: ---J:/PROJECTS....MASTERBASEMAP.dwg

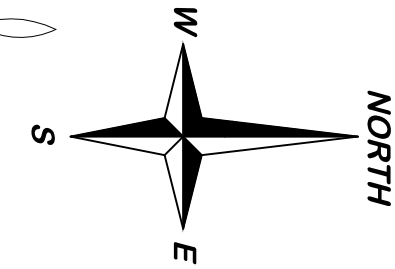
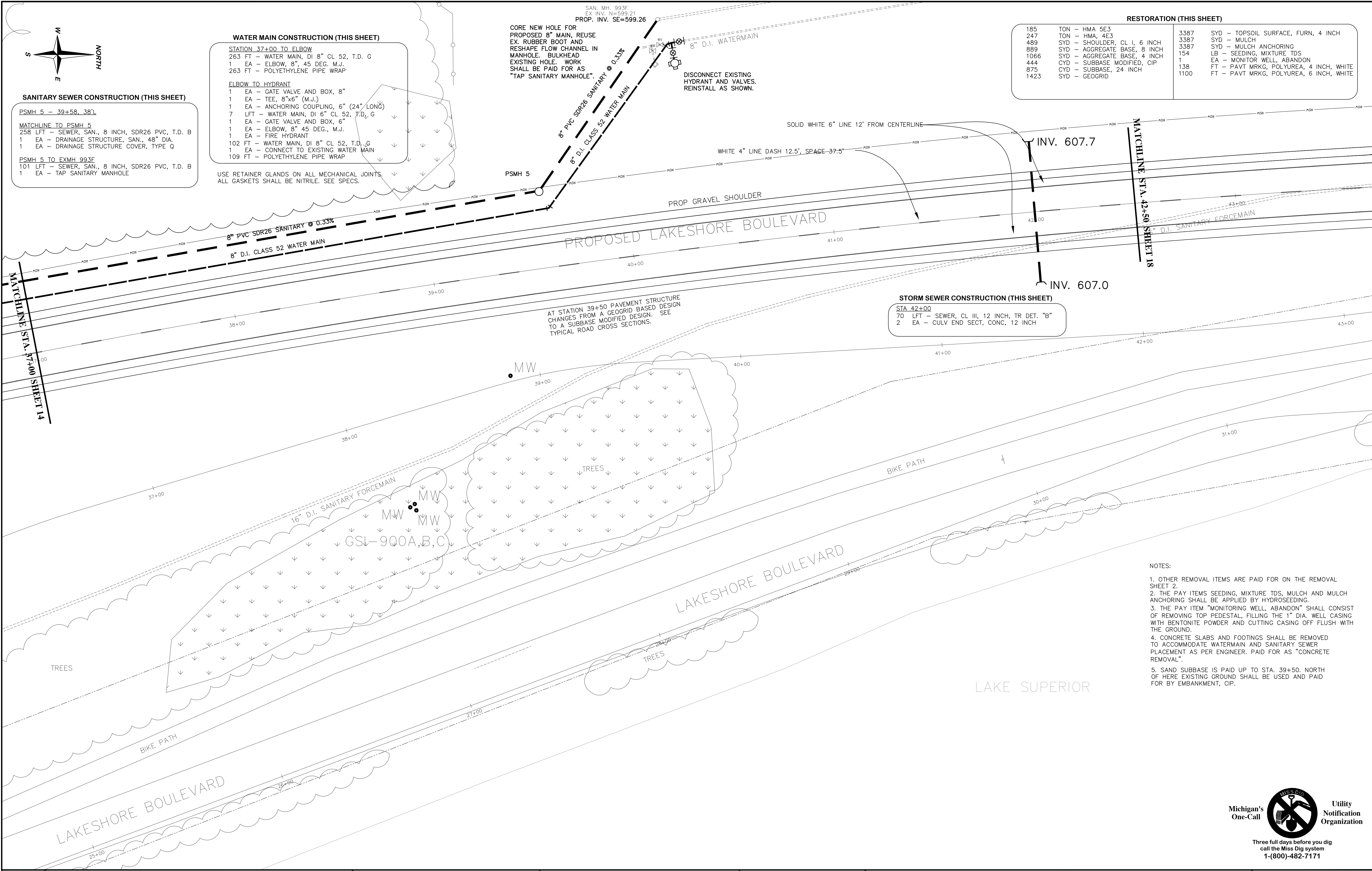
HOR. SCALE: 1" = 20'
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
ROAD PROFILE

PROJECT MQ13-500
SHEET 15 OF 32



PROJECT NO. MQ13-500
LAKESHORE BLVD. COASTAL RESTORATION



SANITARY SEWER CONSTRUCTION (THIS SHEET)

PSMH 5 - 39+58, 38" I
MATCHLINE TO PSMH 5
258 LFT - SEWER, SAN., 8 INCH, SDR26 PVC, T.D. B
1 EA - DRAINAGE STRUCTURE, SAN., 48" DIA.
1 EA - DRAINAGE STRUCTURE COVER, TYPE Q
PSMH 5 TO EXMH 993F
101 LFT - SEWER, SAN., 8 INCH, SDR26 PVC, T.D. B
1 EA - TAP SANITARY MANHOLE

WATER MAIN CONSTRUCTION (THIS SHEET)

STATION 37+00 TO ELBOW
263 FT - WATER MAIN, DI 8" CL 52, T.D. G
1 EA - ELBOW, 8", 45 DEG. M.J.
263 FT - POLYETHYLENE PIPE WRAP
ELBOW TO HYDRANT
1 EA - GATE VALVE AND BOX, 8"
1 EA - TEE, 8"x6" (M.J.)
1 EA - ANCHORING COUPLING, 6" (24" LONG)
7 LFT - WATER MAIN, DI 6" CL 52, T.D. G
1 EA - GATE VALVE AND BOX, 6"
1 EA - ELBOW, 8" 45 DEG., M.J.
1 EA - FIRE HYDRANT
102 FT - WATER MAIN, DI 8" CL 52, T.D. G
1 EA - CONNECT TO EXISTING WATER MAIN
109 FT - POLYETHYLENE PIPE WRAP

USE RETAINER GLANDS ON ALL MECHANICAL JOINTS.
ALL GASKETS SHALL BE NITRILE. SEE SPECS.

CORE NEW HOLE FOR
PROPOSED 8" MAIN, REUSE
EX. RUBBER BOOT AND
RESHAPE FLOW CHANNEL IN
MANHOLE. BULKHEAD
EXISTING HOLE. WORK
SHALL BE PAID FOR AS
"TAP SANITARY MANHOLE".

DISCONNECT EXISTING
HYDRANT AND VALVES.
REINSTALL AS SHOWN.

PROPOSED LAKESHORE BOULEVARD

AT STATION 39+50 PAVEMENT STRUCTURE
CHANGES FROM A GEOGRID BASED DESIGN
TO A SUBBASE MODIFIED DESIGN. SEE
TYPICAL ROAD CROSS SECTIONS.

STORM SEWER CONSTRUCTION (THIS SHEET)

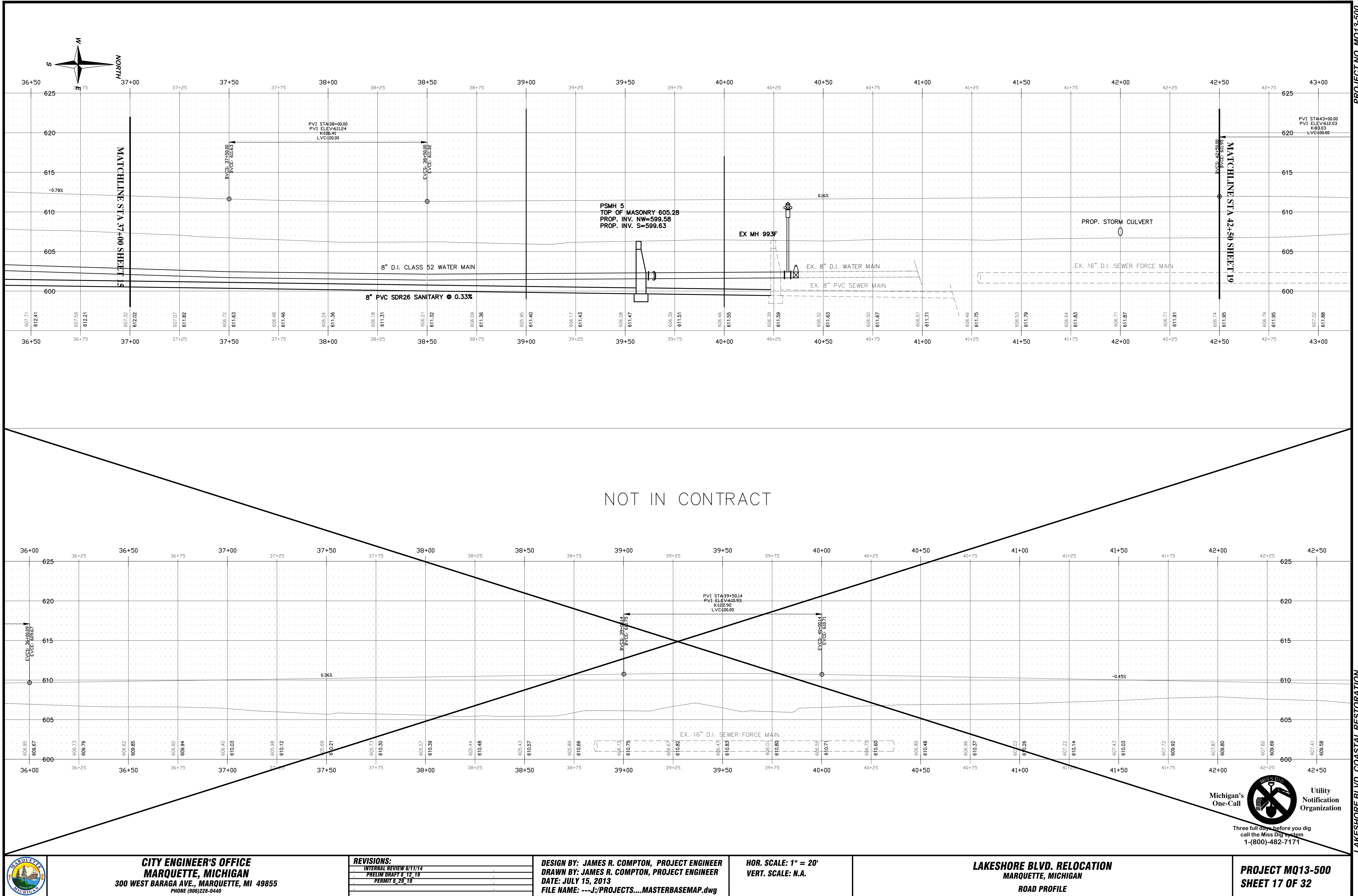
STA 42+00
70 LFT - SEWER, CL III, 12 INCH, TR DET. "B"
2 EA - CULV END SECT, CONC, 12 INCH

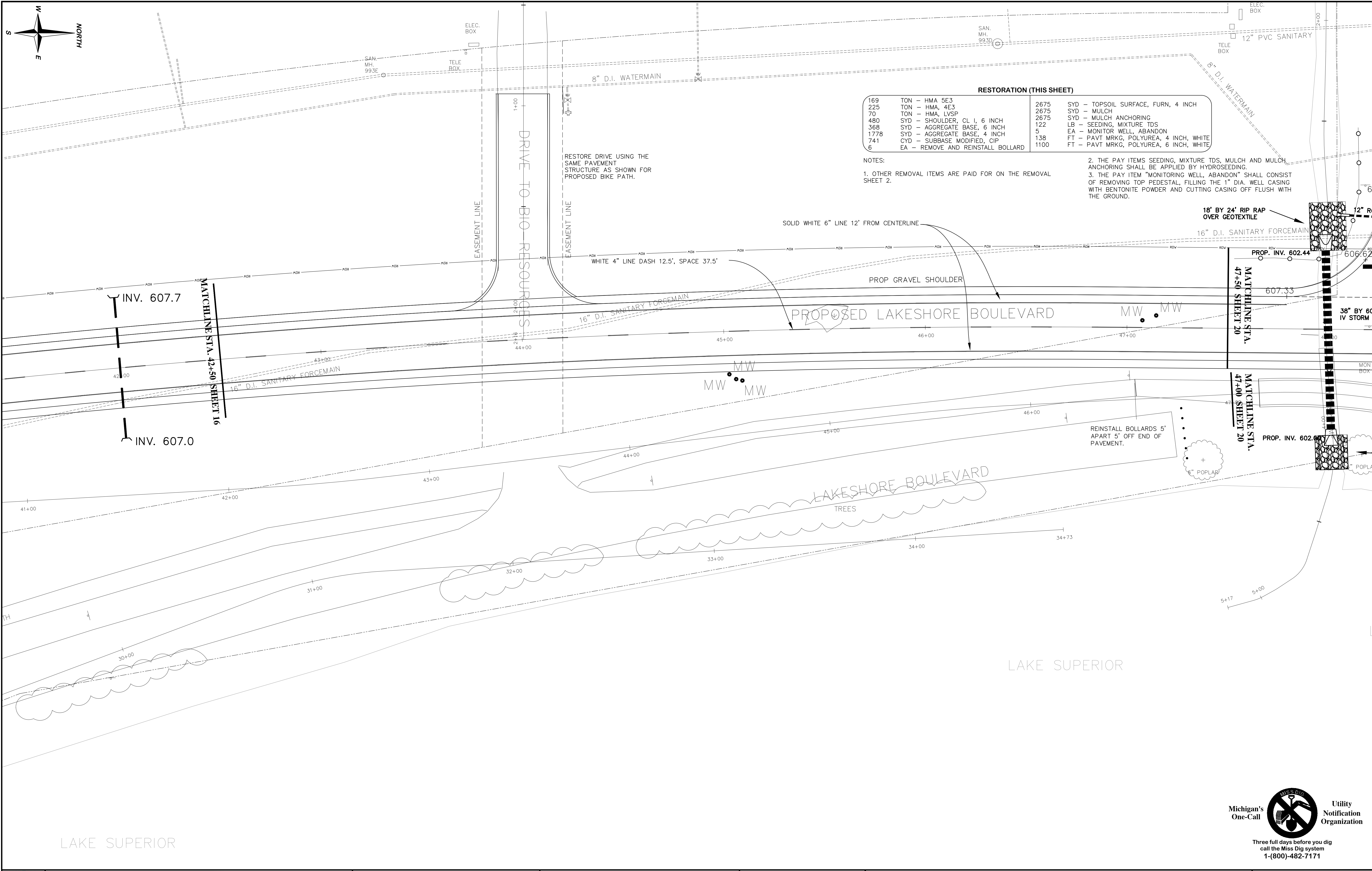
RESTORATION (THIS SHEET)

185	TON - HMA 5E3	3387	SYD - TOPSOIL SURFACE, FURN, 4 INCH
247	TON - HMA, 4E3	3387	SYD - MULCH
489	SYD - SHOULDER, CL I, 6 INCH	3387	SYD - MULCH ANCHORING
889	SYD - AGGREGATE BASE, 8 INCH	154	LB - SEEDING, MIXTURE TDS
1066	SYD - AGGREGATE BASE, 4 INCH	1	EA - MONITOR WELL, ABANDON
444	CYD - SUBBASE MODIFIED, CIP	138	FT - PAVT MRKG, POLYUREA, 4 INCH, WHITE
875	CYD - SUBBASE, 24 INCH	1100	FT - PAVT MRKG, POLYUREA, 6 INCH, WHITE
1423	SYD - GEOGRID		

NOTES:

1. OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
2. THE PAY ITEMS SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.
3. THE PAY ITEM "MONITORING WELL, ABANDON" SHALL CONSIST OF REMOVING TOP PEDESTAL, FILLING THE 1" DIA. WELL CASING WITH BENTONITE POWDER AND CUTTING CASING OFF FLUSH WITH THE GROUND.
4. CONCRETE SLABS AND FOOTINGS SHALL BE REMOVED TO ACCOMMODATE WATERMAIN AND SANITARY SEWER PLACEMENT AS PER ENGINEER. PAID FOR AS "CONCRETE REMOVAL".
5. SAND SUBBASE IS PAID UP TO STA. 39+50. NORTH OF HERE EXISTING GROUND SHALL BE USED AND PAID FOR BY EMBANKMENT, CIP.

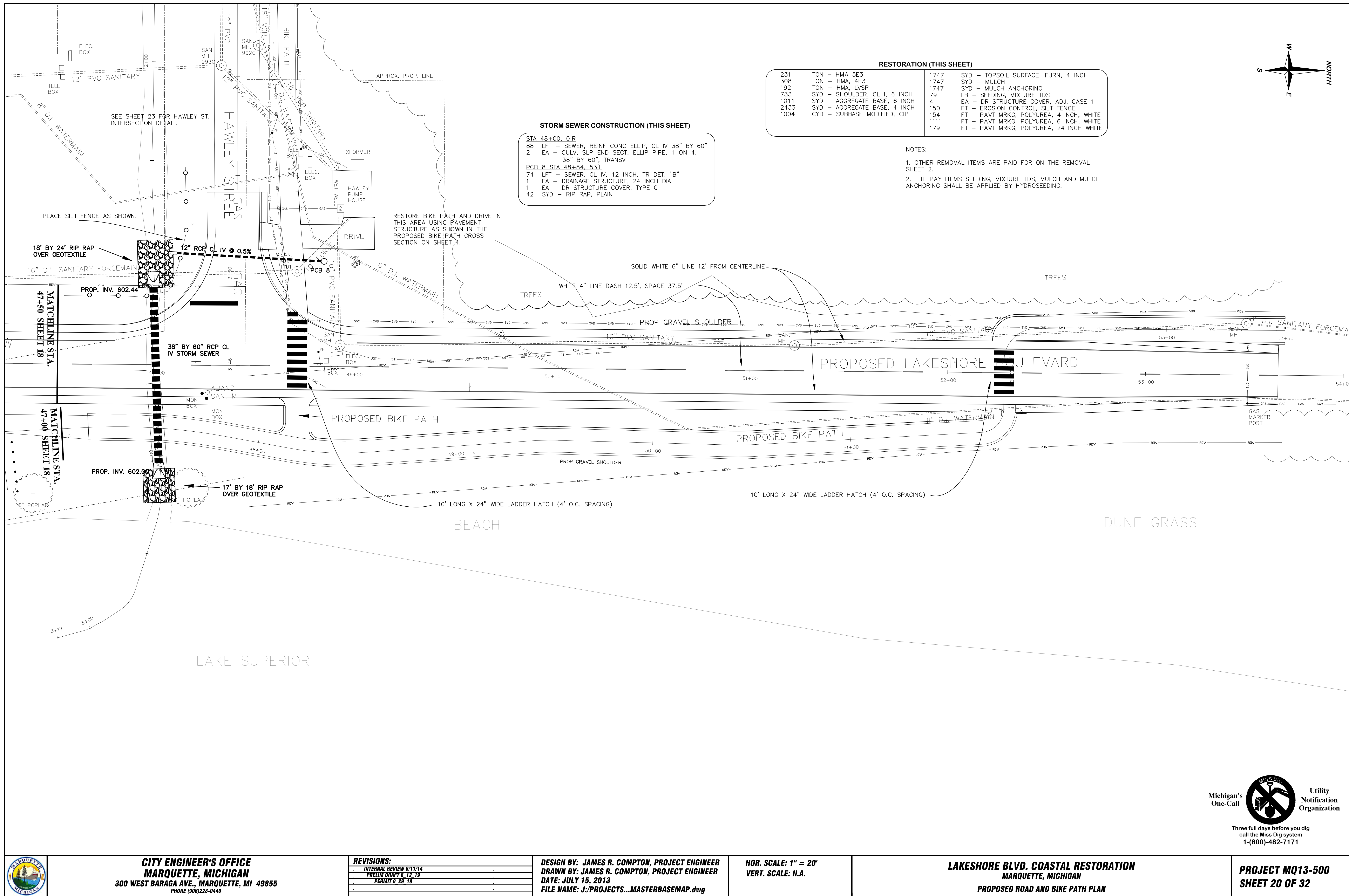




RESTORATION (THIS SHEET)			
169	TON - HMA 5E3	2675	SYD - TOPSOIL SURFACE, FURN, 4 INCH
225	TON - HMA, 4E3	2675	SYD - MULCH
70	TON - HMA, LVSP	2675	SYD - MULCH ANCHORING
480	SYD - SHOULDER, CL 1, 6 INCH	2675	LB - SEEDING, MIXTURE TDS
368	SYD - AGGREGATE BASE, 6 INCH	5	EA - MONITOR WELL, ABANDON
1778	SYD - AGGREGATE BASE, 4 INCH	138	FT - PAVT MRKG, POLYUREA, 4 INCH, WHITE
741	CYD - SUBBASE MODIFIED, CIP	1100	FT - PAVT MRKG, POLYUREA, 6 INCH, WHITE
6	EA - REMOVE AND REINSTALL BOLLARD		

- NOTES:
- OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
 - THE PAY ITEMS SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.
 - THE PAY ITEM "MONITORING WELL, ABANDON" SHALL CONSIST OF REMOVING TOP PEDESTAL, FILLING THE 1" DIA. WELL CASING WITH BENTONITE POWDER AND CUTTING CASING OFF FLUSH WITH THE GROUND.





RESTORATION (THIS SHEET)

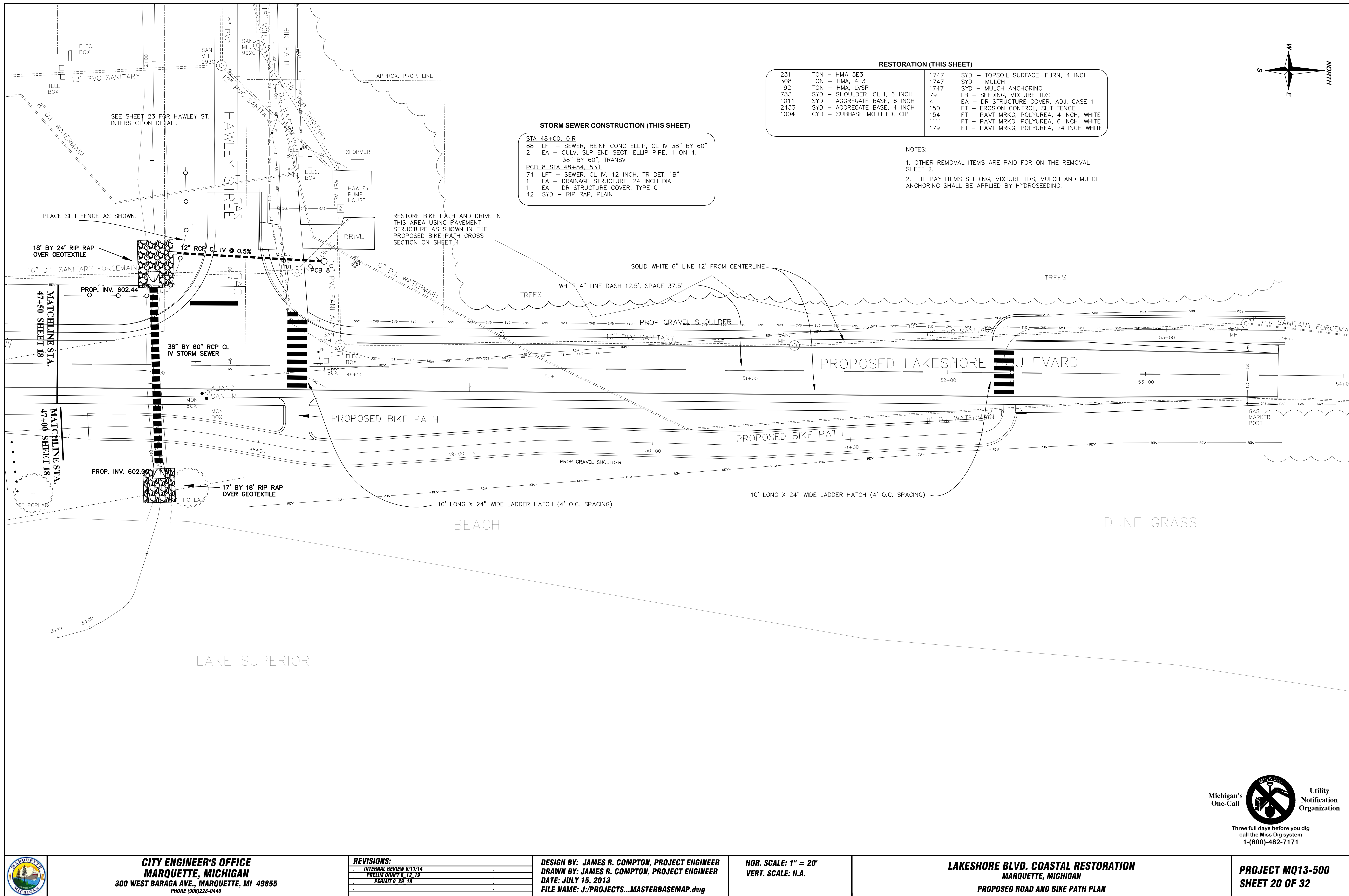
231	TON	-	HMA 5E3	1747	SYD	-	TOPSOIL SURFACE, FURN, 4 INCH
308	TON	-	HMA, 4E3	1747	SYD	-	MULCH
192	TON	-	HMA, LVSP	1747	SYD	-	MULCH ANCHORING
733	SYD	-	SHOULDER, CL I, 6 INCH	79	LB	-	SEEDING, MIXTURE TDS
1011	SYD	-	AGGREGATE BASE, 6 INCH	4	EA	-	DR STRUCTURE COVER, ADJ. CASE 1
2433	SYD	-	AGGREGATE BASE, 4 INCH	150	FT	-	EROSION CONTROL, SILT FENCE
1004	CYD	-	SUBBASE MODIFIED, CIP	154	FT	-	PAVT MRKG, POLYUREA, 4 INCH, WHITE
				1111	FT	-	PAVT MRKG, POLYUREA, 6 INCH, WHITE
				179	FT	-	PAVT MRKG, POLYUREA, 24 INCH WHITE

NOTES:

1. OTHER REMOVAL ITEMS ARE PAID FOR ON THE REMOVAL SHEET 2.
2. THE PAY ITEMS SEEDING, MIXTURE TDS, MULCH AND MULCH ANCHORING SHALL BE APPLIED BY HYDROSEEDING.

STORM SEWER CONSTRUCTION (THIS SHEET)

STA 48+00.00'R
88 LFT - SEWER, REINF CONC ELLIP, CL IV 38" BY 60"
2 EA - CULV, SLP END SECT, ELLIP PIPE, 1 ON 4,
38" BY 60", TRANSV
PCB 8 STA 48+84.53'L
74 LFT - SEWER, CL IV, 12 INCH, TR DET. "B"
1 EA - DRAINAGE STRUCTURE, 24 INCH DIA
1 EA - DR STRUCTURE COVER, TYPE G
42 SYD - RIP RAP, PLAIN

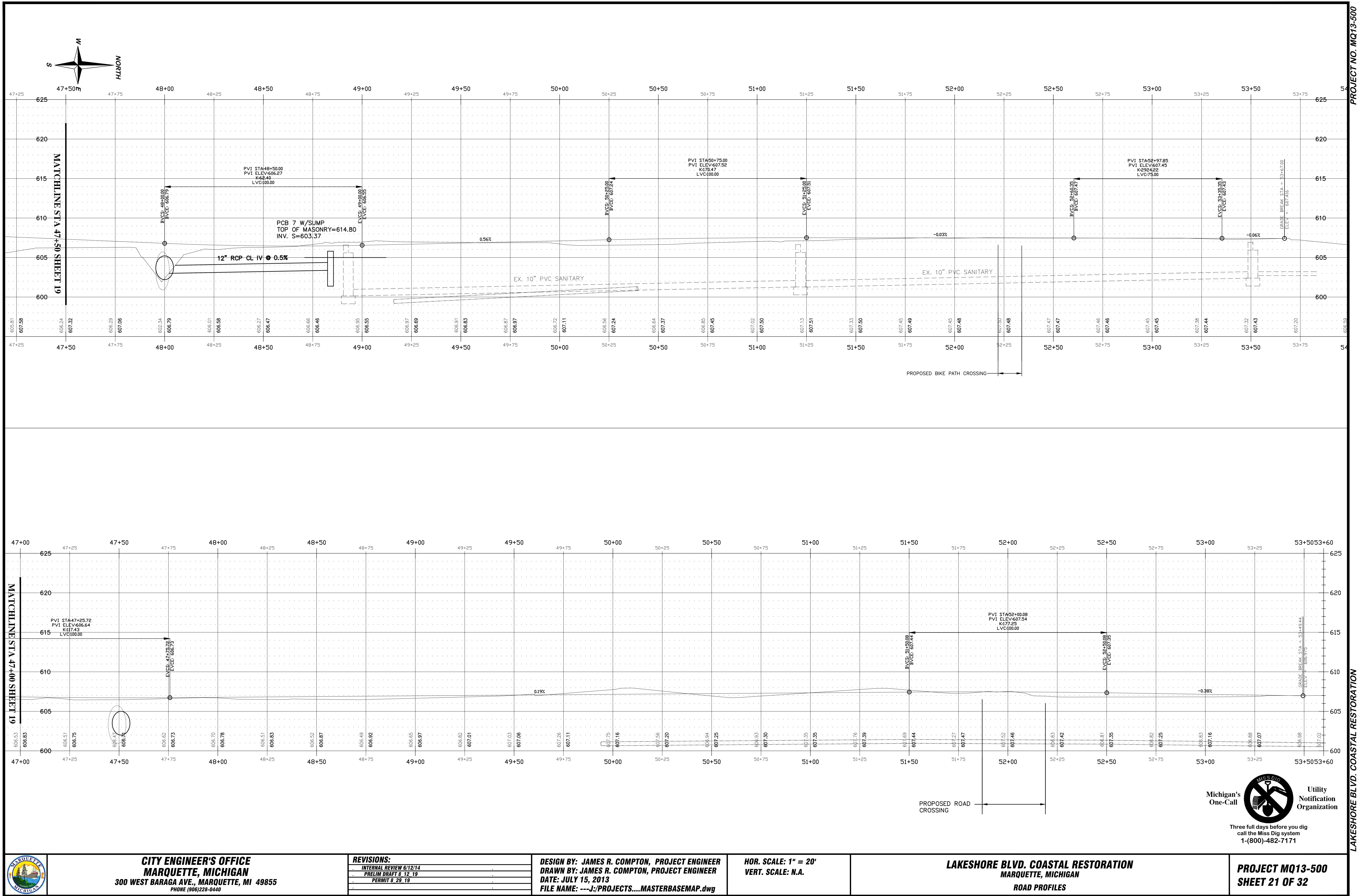




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300 WEST BARAGA AVE., MARQUETTE, MI 49855
PHONE (906)228-0440

REVISIONS:	
INTERNAL REVIEW	6/12/14
PRELIM DRAFT	8/12/19
PERMIT	8/29/19

DESIGN BY: JAMES R. COMPTON, PROJECT ENGINEER
DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: ---J\PROJECTS....MASTERBASEMAP.dwg

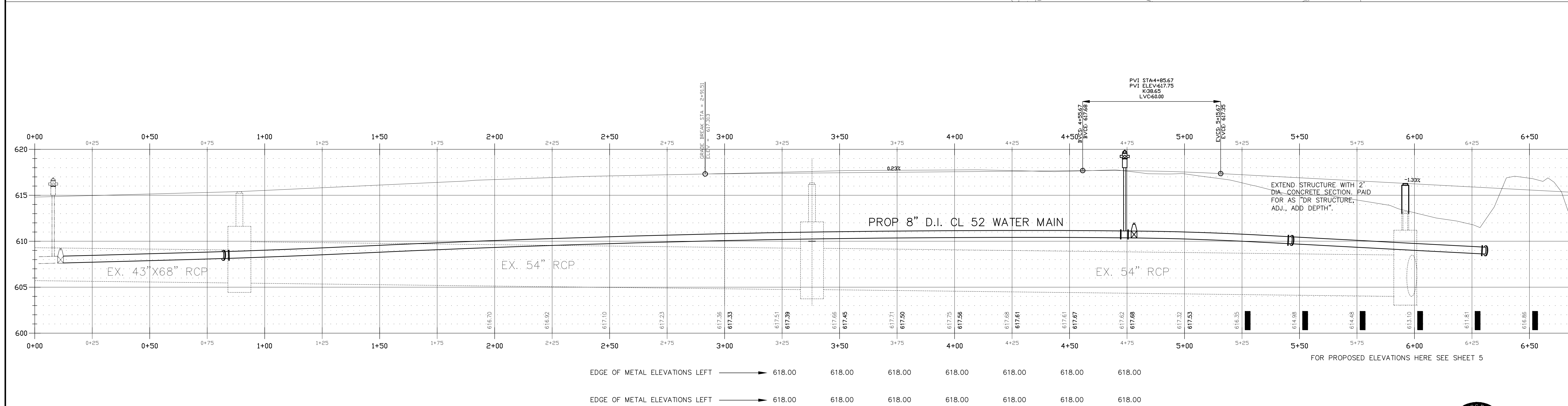
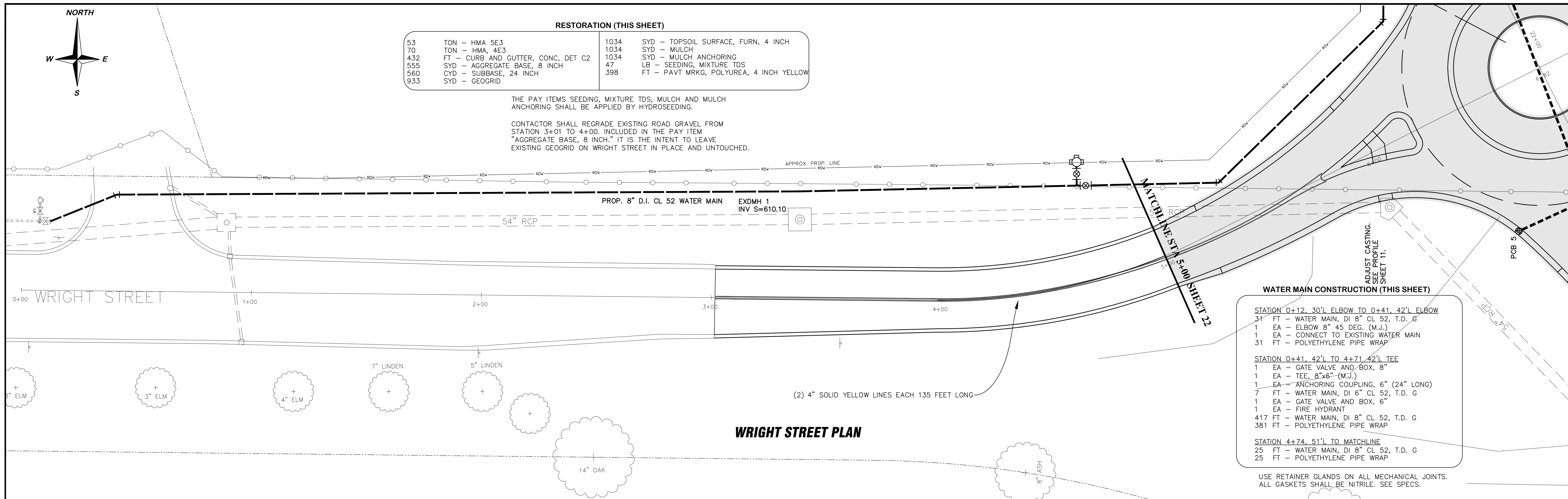
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VERT. SCALE: N.A.

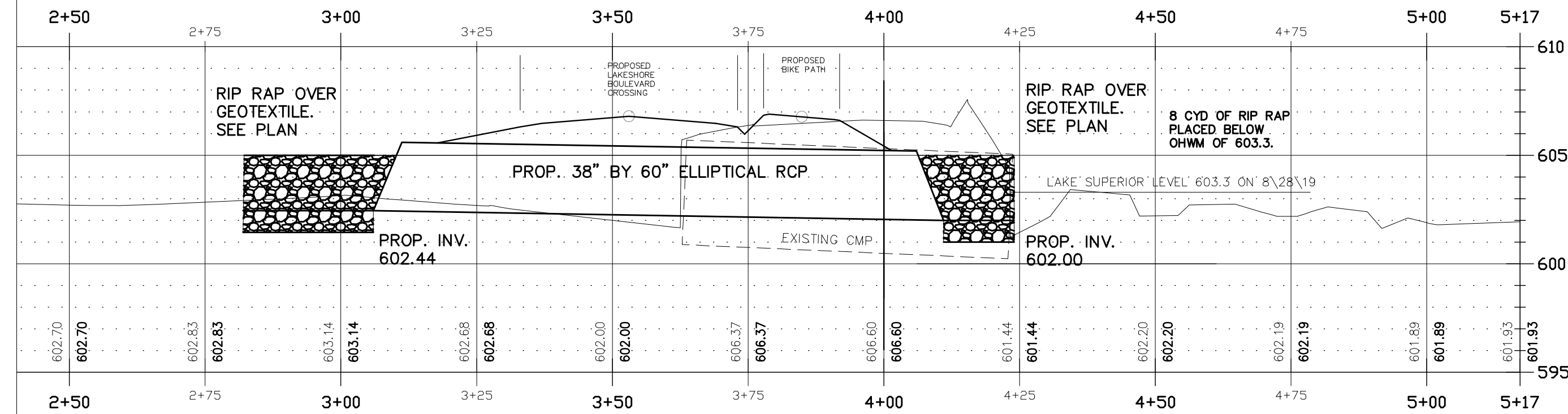
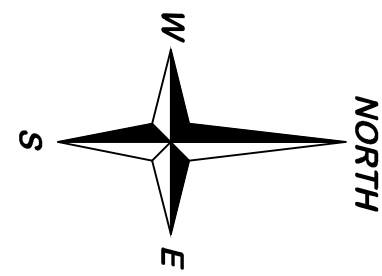
LAKESHORE BLVD. COASTAL RESTORATION
MARQUETTE, MICHIGAN
ROAD PROFILES



PROJECT MQ13-500
SHEET 21 OF 32

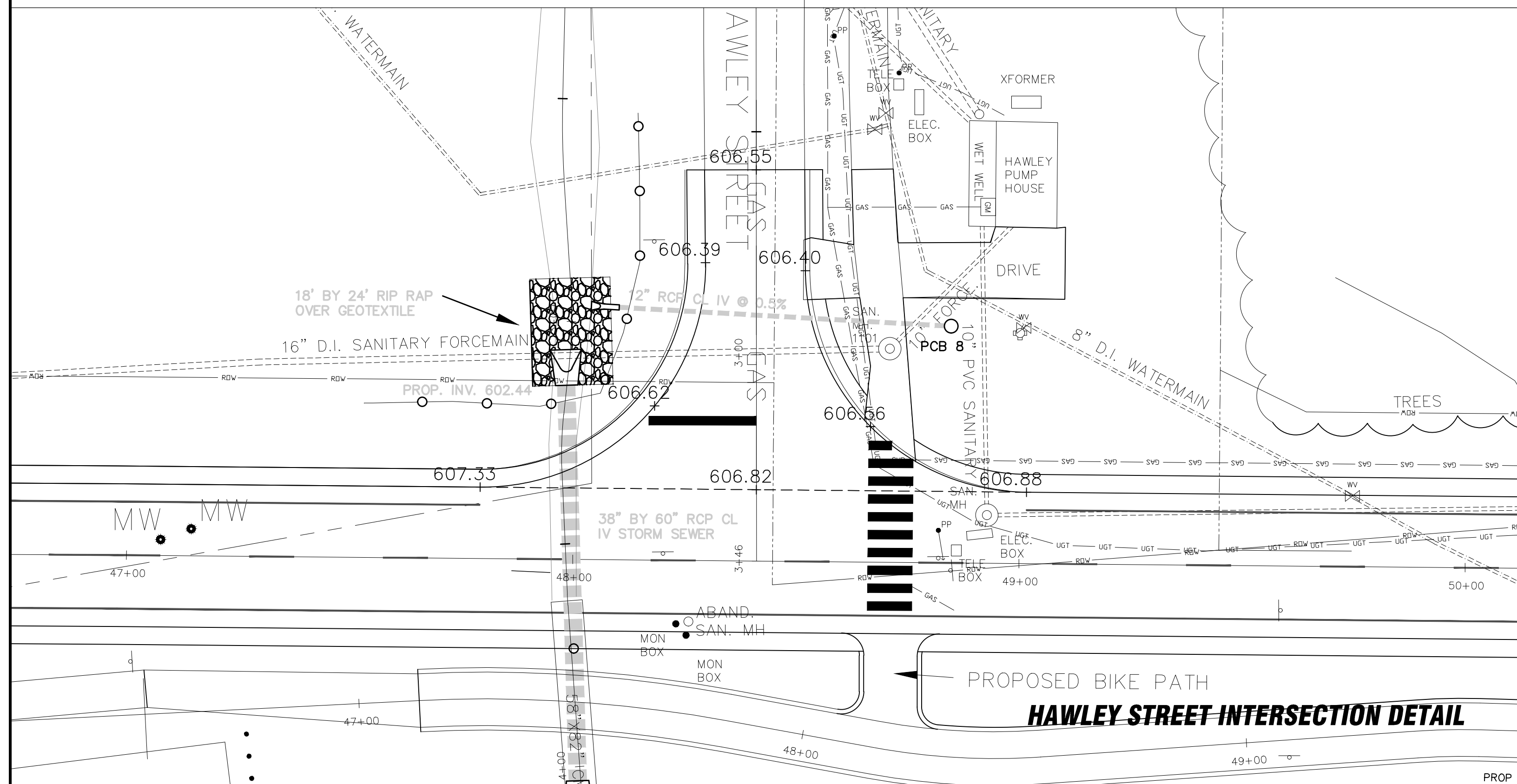
PROJECT NO. MQ13-500
LAKESHORE BLVD. COASTAL RESTORATION



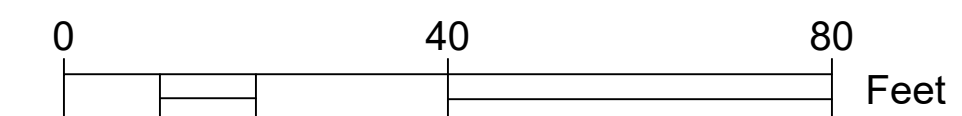


HAWLEY DITCH CULVERT CROSSING

AT PROPOSED ROAD STATION 48+00



HAWLEY STREET INTERSECTION DETAIL



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REVISIONS:

INTERNAL REVIEW 6/13/14	
PRELIM DRAFT 8/12/19	
PERMIT 8/29/19	
PERMIT REVISION 5/16/19	

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DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: ---J-/PROJECTS....MASTERBASEMAP.dwg

HOR. SCALE: 1" = 20'
VERT. SCALE: 1"=4'

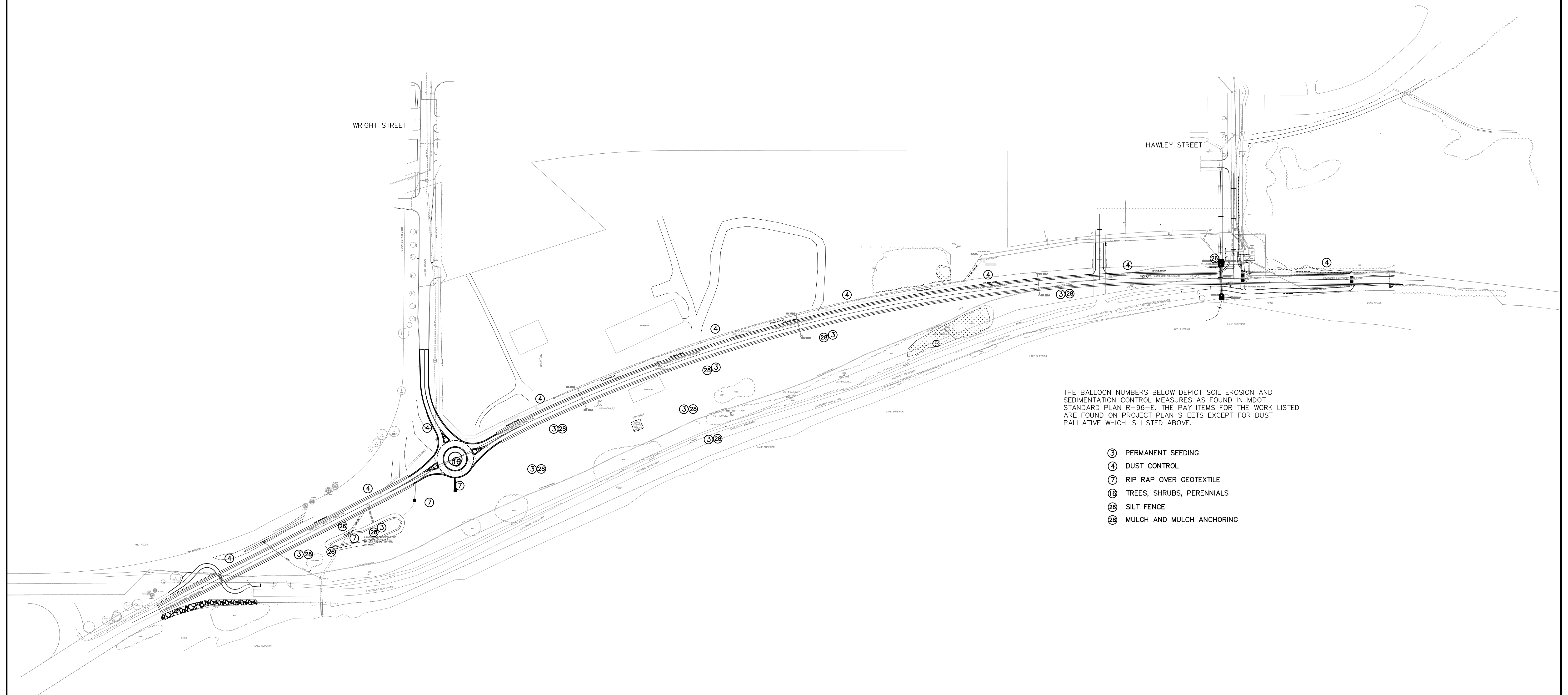
LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
HAWLEY DITCH AND INTERSECTION DETAIL

PROJECT MQ13-500
SHEET 23 OF 32

PAY ITEMS (THIS SHEET)

20 TON - DUST PALLIATIVE, APPLIED

DUST PALLIATIVE SHALL BE PLACED AS DIRECTED BY THE ENGINEER.



THE BALLOON NUMBERS BELOW DEPICT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES AS FOUND IN MDOT STANDARD PLAN R-96-E. THE PAY ITEMS FOR THE WORK LISTED ARE FOUND ON PROJECT PLAN SHEETS EXCEPT FOR DUST PALLIATIVE WHICH IS LISTED ABOVE.

- ③ PERMANENT SEEDING
- ④ DUST CONTROL
- ⑦ RIP RAP OVER GEOTEXTILE
- ⑩ TREES, SHRUBS, PERENNIALS
- ⑫ SILT FENCE
- ⑮ MULCH AND MULCH ANCHORING



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PHONE (906)228-0440**

REVISIONS:	
INTERNAL REVIEW 6/16/14	
PRELIM DRAFT 8 12 19	
PERMIT 8 29 19	

DESIGN BY: JAMES R. COMPTON, PROJECT ENGINEER
DRAWN BY: JAMES R. COMPTON, PROJECT ENGINEER
DATE: JULY 15, 2013
FILE NAME: ---J-/PROJECTS...MASTERBASEMAP.dwg

HOR. SCALE: 1" = 150'
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
SOIL EROSION AND SEDIMENTATION CONTROL PLAN

PROJECT MQ13-500
SHEET 24 OF 32

PHASE A

FROM STATION 20+28 TO 47+00 INCLUDING ROUNDABOUT W/APPROACHES AND POND. THIS PHASE SHALL BE DONE LEAVING ALL ADJACENT ROADS ACTIVE.

PHASE B

FROM STATION 47+00 TO NORTH END OF PROJECT INCLUDING BIKEPATH.. TRAFFIC REGULATOR CONTROL SHALL BE USED FOR THIS PHASE.

PHASE C

REST OF PROJECT WORK NOT DONE IN PHASE A & B.

NOTES

PHASE A SHALL BE DONE FIRST.

PHASE B SHALL BE DONE AFTER PHASE A. TRAFFIC SHALL BE PLACED ON HAWLEY AND LAKESHORE NORTH OF HAWLEY AS SOON AS PHASE IS DONE..

PHASE C SHALL BE DONE AFTER PHASE A AND B.

TEMPORARY SIGNING FOR ENTIRE PROJECT

SIGN	TYPE	DESCRIPTION	MAX. NO. EACH	DIMENSIONS (INCHES)
		PLASTIC DRUM, HIGH INTENSITY, LIGHTED	50	
B-III		BARRICADE, TYPE III, HIGH INTENSITY	12	
D3-1a	IIB	LAKESHORE BLVD	11	24x8
G20-2	IIB	END ROAD WORK	2	36x18
M4-9	IIB	DETOUR (ARROW STRAIGHT)	6	30x24
M4-9(L)	IIB	DETOUR (ARROW TO LEFT)	3	30x24
M4-9(R)	IIB	DETOUR (ARROW TO RIGHT)	3	30x24
M4-10(L)	IIB	DETOUR IN ARROW LEFT	2	48x18
M4-10(R)	IIB	DETOUR IN ARROW RIGHT	1	48x18
R11-2	IIB	STREET CLOSED	4	48x30
R11-4	IIB	STREET CLOSED TO THRU TRAFFIC	3	60x30
SPECIAL	IIB	BIKE PATH CLOSED	2	24x24
W20-2	IIB	DETOUR AHEAD	5	48x48
W20-3	IIB	STREET CLOSED AHEAD	5	48x48

NOTES:

ACCESS TO LAKESHORE BOULEVARD NORTH OF PROJECT SHALL BE MAINTAINED AT ALL TIMES. WHEN WORK IS BEING DONE ON LAKESHORE BOULEVARD NORTH OF HAWLEY, TRAFFIC REGULATOR CONTROL SHALL BE USED.

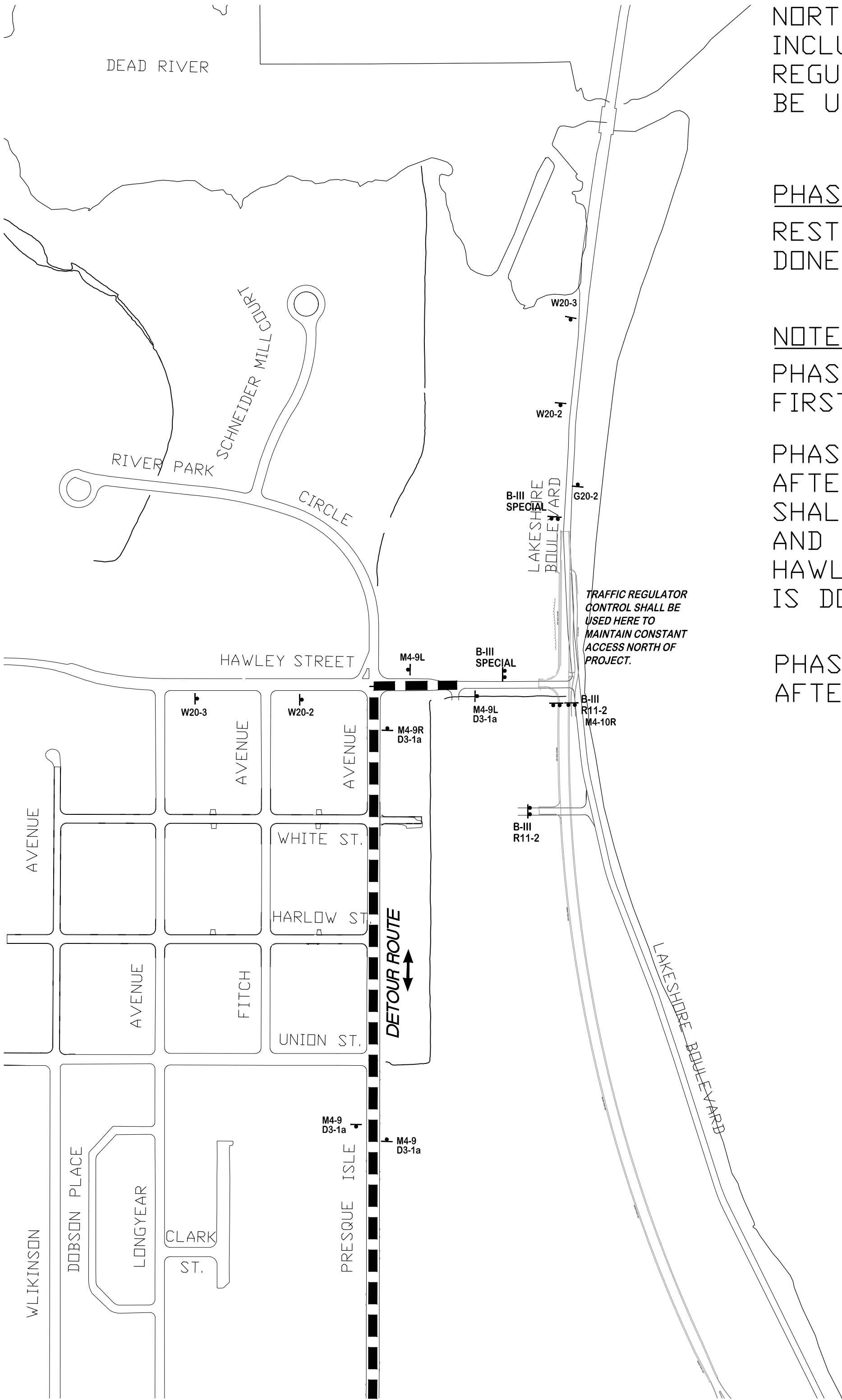
ALL REMOVED SIGNAGE AND POSTS ARE TO BE STOCKPILED ON SITE AND TURNED OVER TO THE CITY OF MARQUETTE PUBLIC WORKS DEPARTMENT.

ALL PROPOSED SIGNAGE WILL BE PROVIDED AND PLACED BY THE CITY OF MARQUETTE PUBLIC WORKS DEPARTMENT.

THE CONTRACTOR SHALL COORDINATE WITH PUBLIC WORKS TO ENSURE ALL SIGNAGE IS PLACED PRIOR TO STREET BEING OPENED TO TRAFFIC.

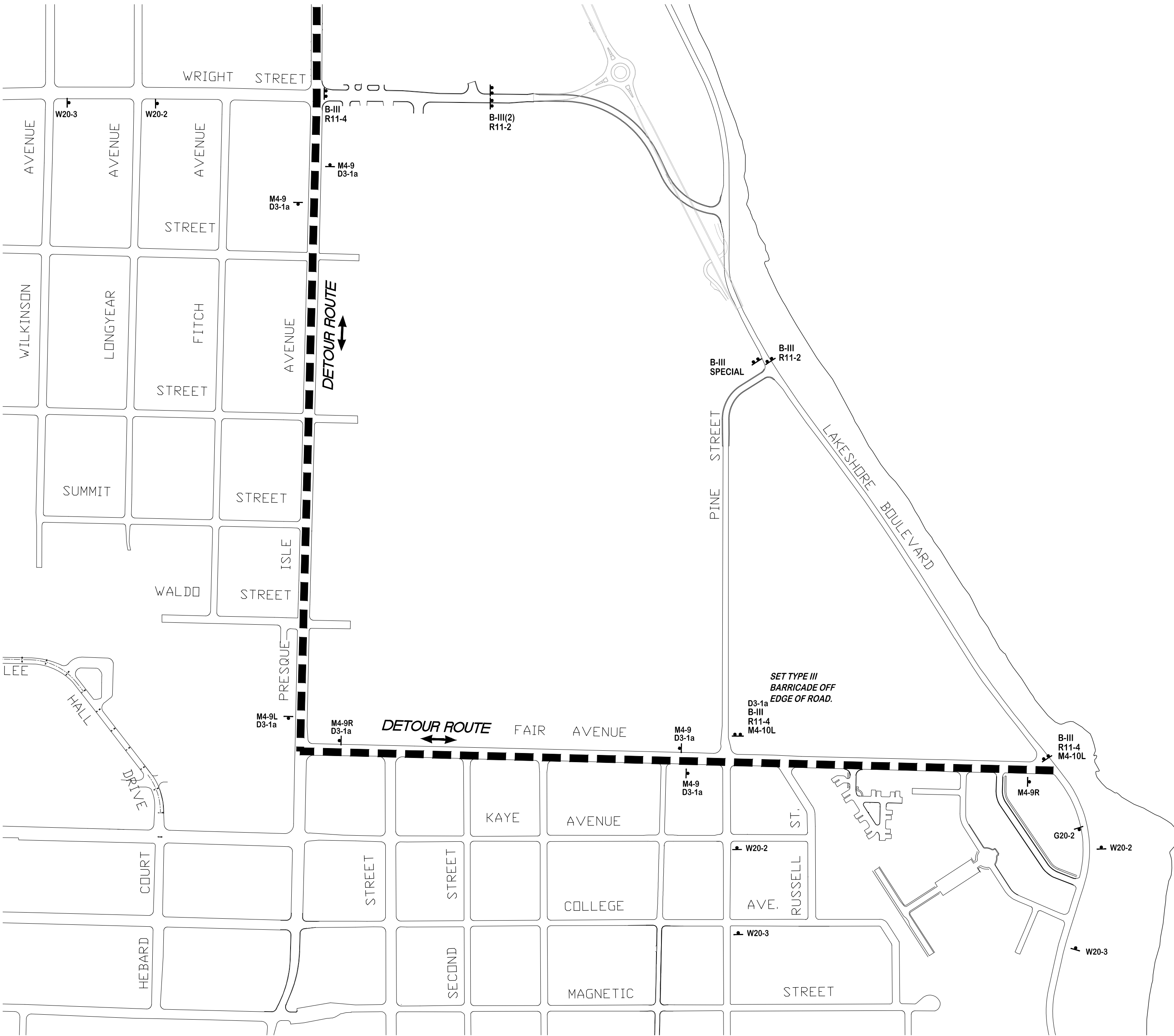
TEMPORARY SIGNING PAY ITEMS FOR ENTIRE PROJECT

50	EA - PLASTIC DRUM, HIGH INTENSITY, LIGHTED, FURN
50	EA - PLASTIC DRUM, HIGH INTENSITY, LIGHTED, OPER
342	SFT - SIGN, TYPE B, TEMP. PRISMATIC, FURN
342	SFT - SIGN, TYPE B, TEMP. PRISMATIC, OPER
10	EA - BARRICADE, TYPE 3, HIGH INTENSITY, FURN
10	EA - BARRICADE, TYPE 3, HIGH INTENSITY, OPER
1	LS - TRAFFIC REGULATOR CONTROL



PHASE B & C -TRAFFIC CONTROL PLAN - WRIGHT STREET TO HAWLEY STREET

SCALE: 1" = 300'



PHASE B & C - TRAFFIC CONTROL PLAN - WRIGHT STREET TO FAIR AVENUE

SCALE: 1" = 300'



CITY ENGINEER'S OFFICE
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300 WEST BARAGA AVE., MARQUETTE, MI 49855
PHONE (906)228-0440

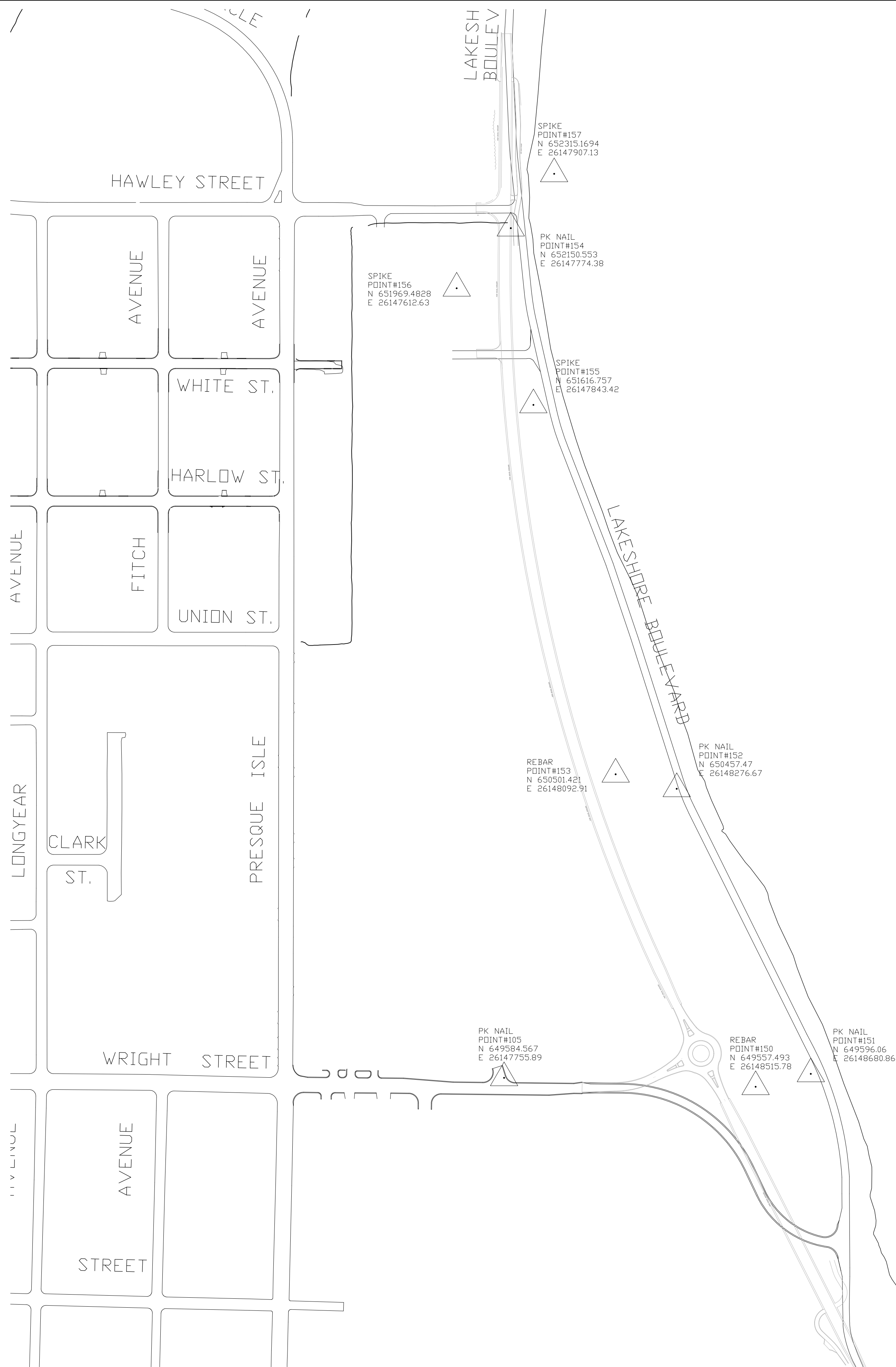
REVISIONS:	
PRELIMINARY	05-22-14
PRELIMINARY UPDATE	8.12.19
PERMIT	8.29.19

DESIGN BY: JAMES COMPTON P.E.
DRAWN BY: JAMES COMPTON P.E.
DATE: MAY 22, 2014
FILE NAME: UTILITY SCHEMATICS.dwg

HOR. SCALE: 1" = 300'
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
TRAFFIC CONTROL PLAN

PROJECT MQ13-500
SHEET 25 OF 32



VERTICAL AND HORIZONTAL CONTROL

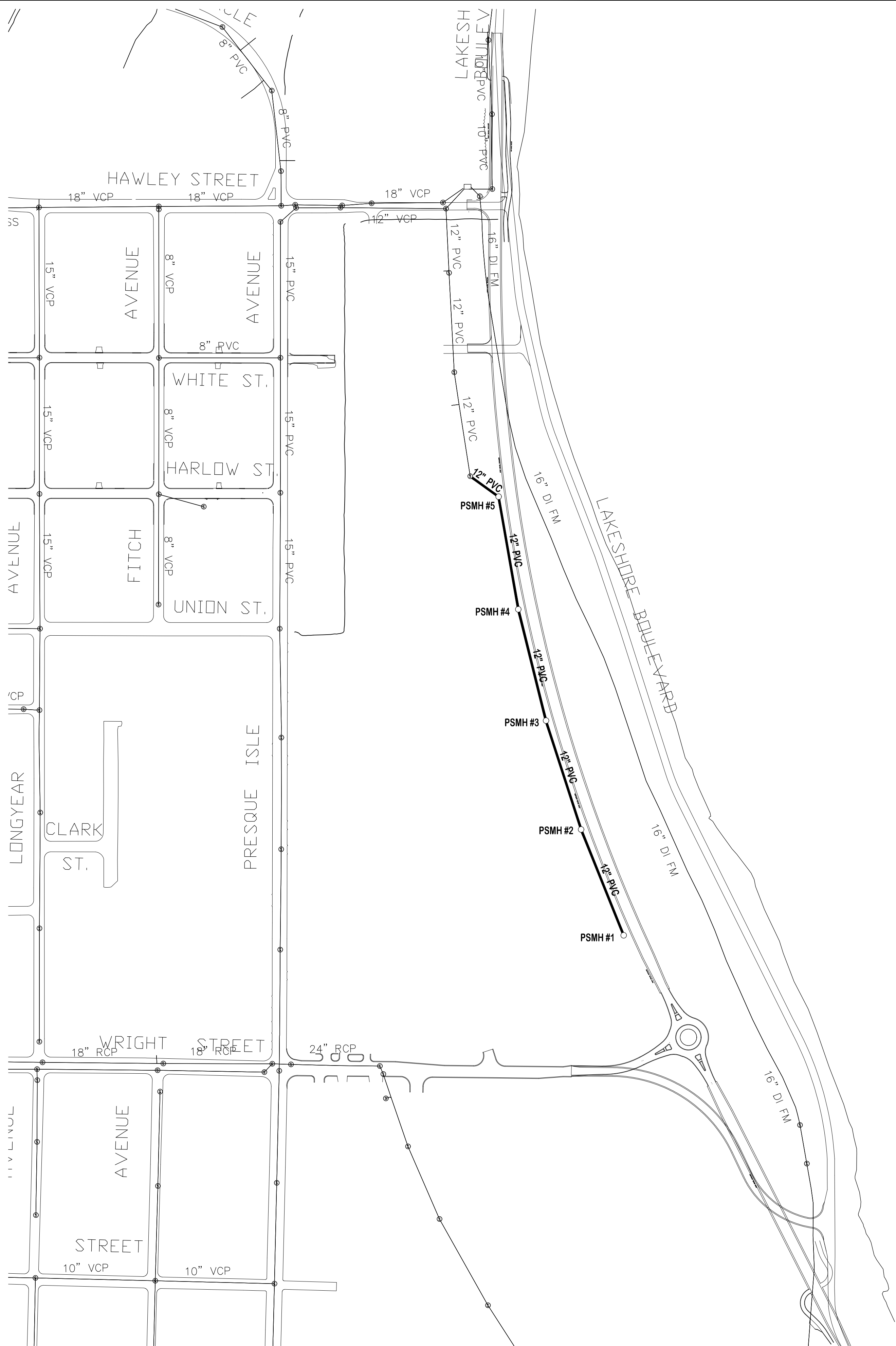
SANITARY SEWER LEGEND

	EXISTING SANITARY SEWER MAIN
	EXISTING SANITARY MANHOLE
	PROPOSED SANITARY SEWER MAIN
	PROPOSED SANITARY MANHOLE

NOTE:
THIS SCHEMATIC DRAWING IS FOR
INFORMATIONAL PURPOSES ONLY.
EXACT LOCATION OF VALVES, HYDRANTS,
AND MANHOLES SHALL BE FIELD VERIFIED.
PROPOSED WORK SHALL BE REFERENCED
FROM PLAN SHEETS OF CONSTRUCTION
SET OF DRAWINGS.



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SANITARY SYSTEM SCHEMATIC

SCALE: 1" = 200'



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PHONE (906)228-0440

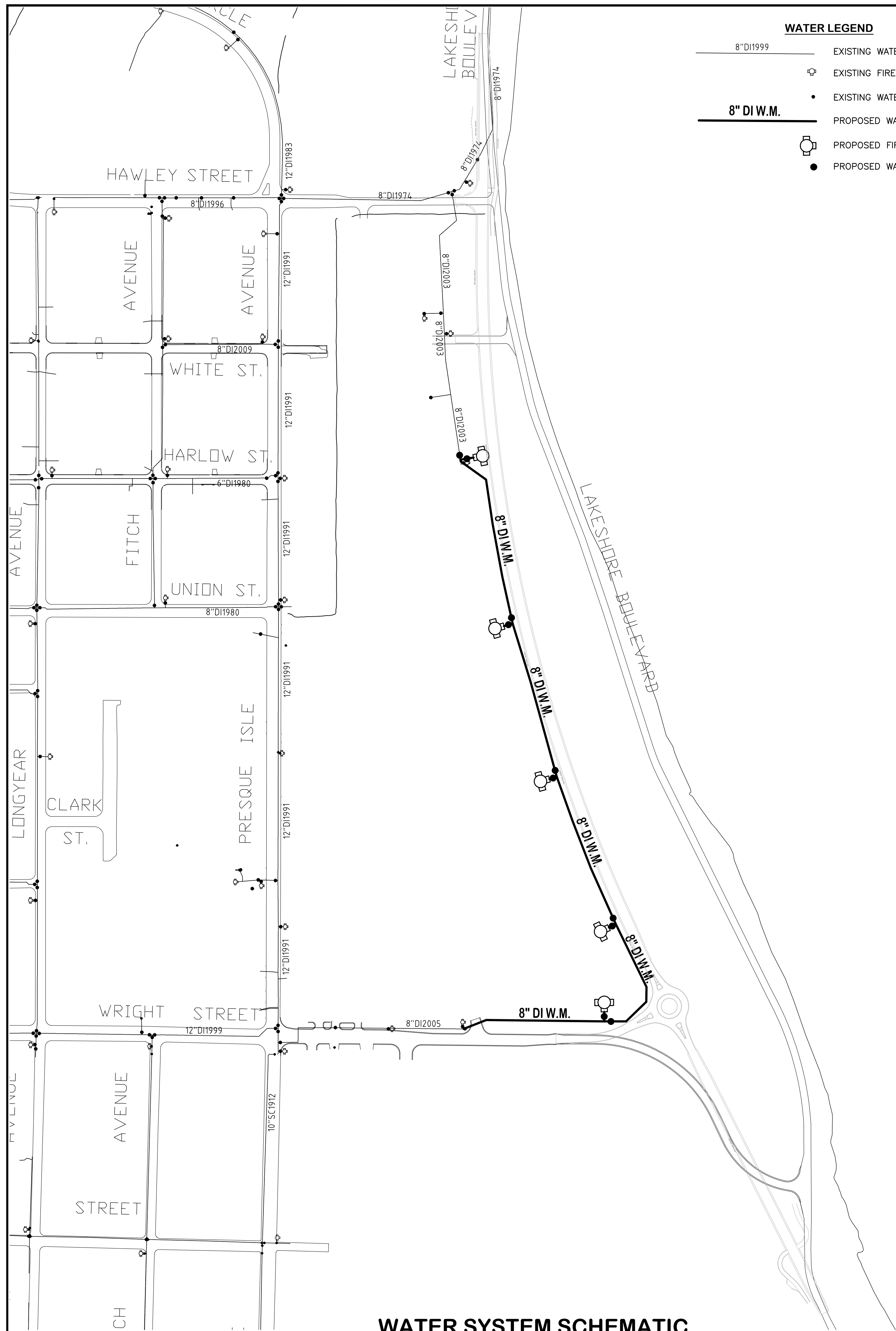
REVISIONS:	
PRELIMINARY	05-22-14
UPDATE	8.12.19
PERMIT	8.29.19

DESIGN BY: JAMES COMPTON P.E.
DRAWN BY: JAMES COMPTON P.E.
DATE: MAY 22, 2014
FILE NAME: UTILITY SCHEMATICS.dwg

HOR. SCALE: 1" = 200'
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
HORIZONTAL AND VERTICAL CONTROL AND SANITARY SCHEMATIC

PROJECT MQ13-500
SHEET 26 OF 32

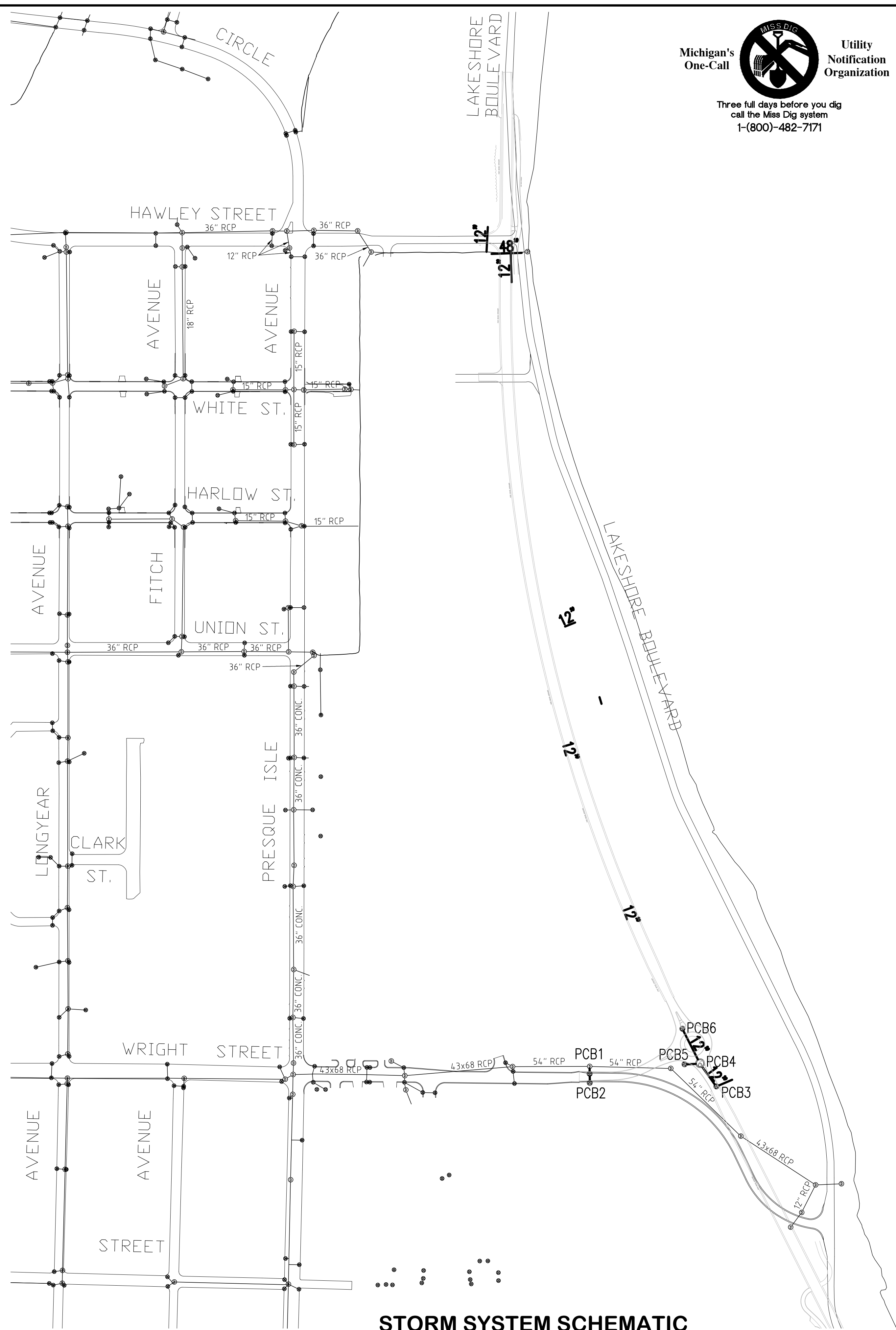


- WATER LEGEND**
- 8" DI 1999 EXISTING WATER MAIN
 - EXISTING FIRE HYDRANT
 - EXISTING WATER VALVE
 - 8" DI W.M. PROPOSED WATER MAIN
 - PROPOSED FIRE HYDRANT
 - PROPOSED WATER VALVE

- STORM SEWER LEGEND**
- 12" RCP EXISTING STORM SEWER MAIN
 - EXISTING STORM MANHOLE
 - EXISTING CATCH BASIN
 - 12" PROPOSED STORM SEWER MAIN
 - PDMH4 PROPOSED STORM MANHOLE
 - PCB2 PROPOSED CATCH BASIN



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PRELIMINARY	05-22-14
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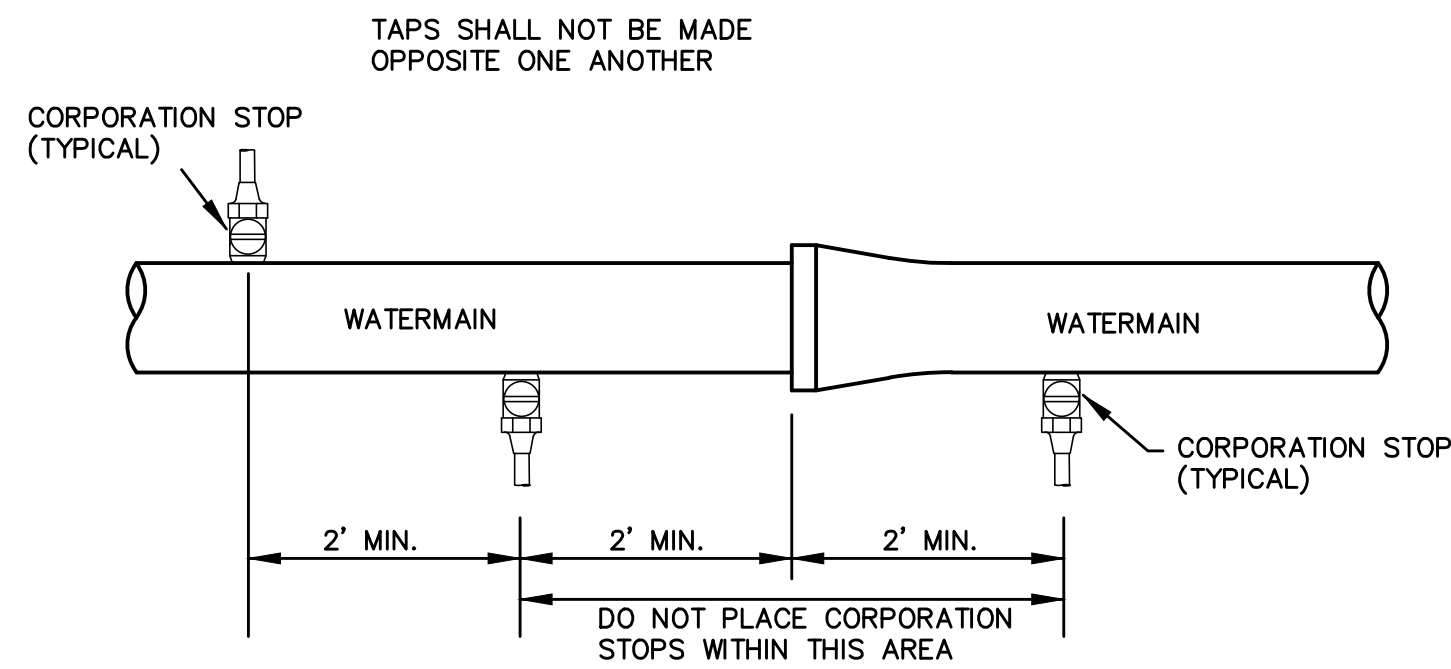
DESIGN BY: JAMES COMPTON P.E.
DRAWN BY: JAMES COMPTON P.E.
DATE: MAY 22, 2014
FILE NAME: UTILITY SCHEMATICS.dwg

HOR. SCALE: 1" = 200'
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
WATER AND STORM UTILITY SCHEMATICS

PROJECT MQ13-500
SHEET 27 OF 32

TAP SPACING ON WATERMAIN

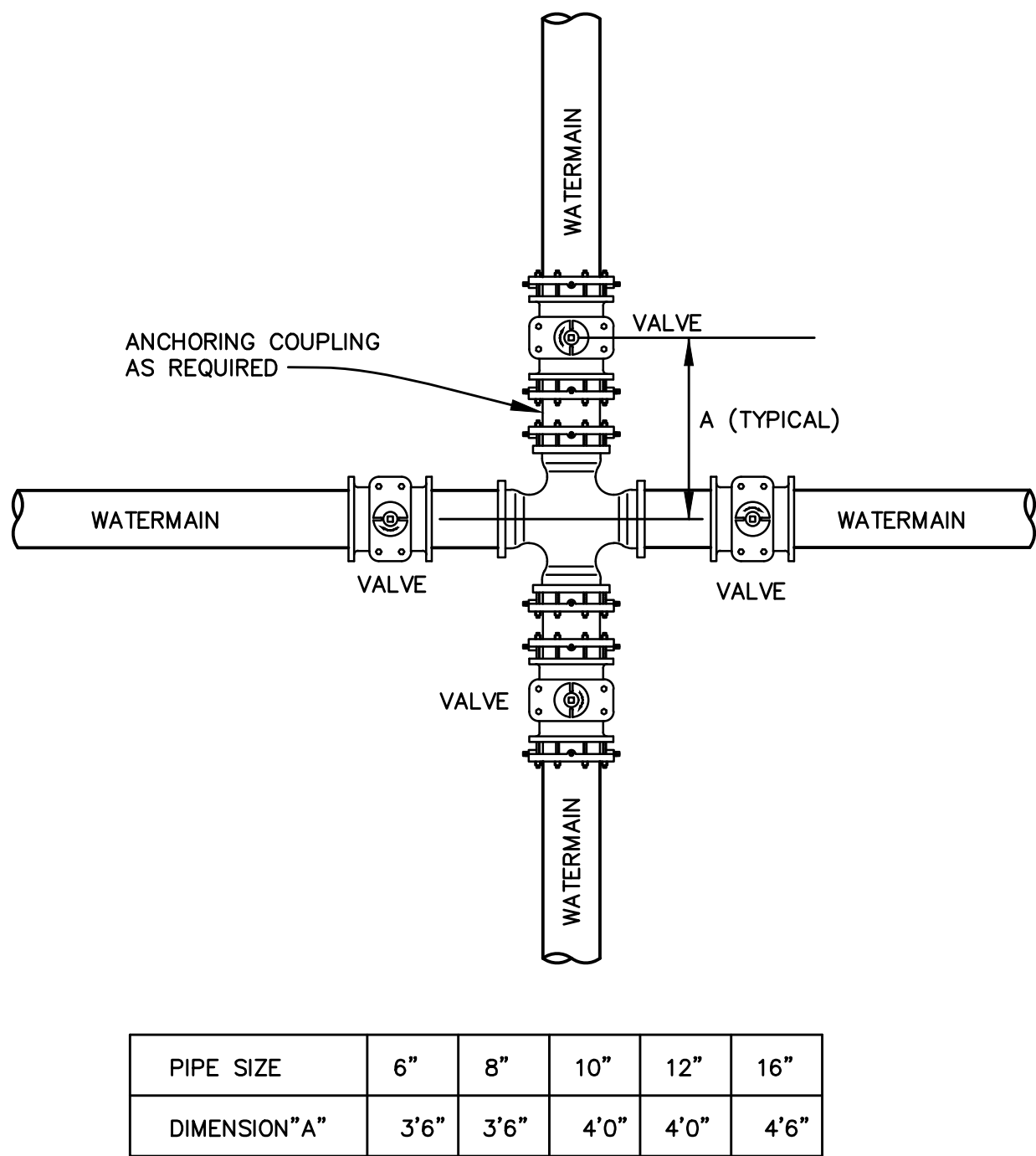


PIPE RESTRAINT SCHEDULE

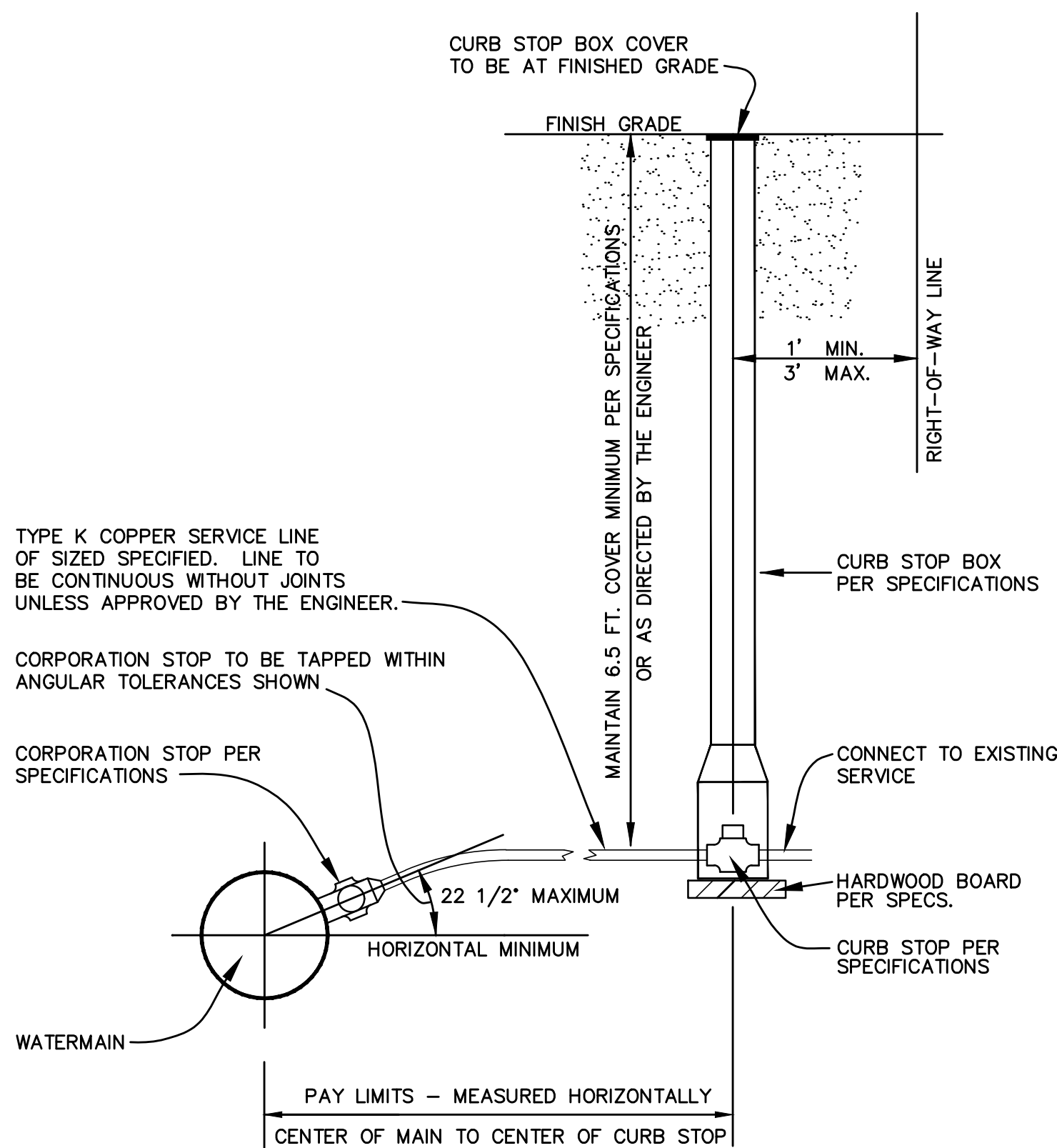
PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET (1)									
	HORIZONTAL BENDS				DEAD ENDS (2)	45° VERTICAL BENDS		REDUCER ONE SIZE REDUCTION	REDUCER TWO SIZE REDUCTION	
	TEE, 90°	45°	22-1/2°	11-1/4°		UPPER	LOWER			
4	23	9	5	2	55	23	8	—	—	
6	32	13	6	3	77	32	11	21	—	
8	40	17	8	4	100	41	14	21	49	
12	56	23	11	6	141	58	20	40	81	
16	71	29	14	7	181	75	25	41	96	
20	84	35	17	8	218	90	30	42	94	
24	96	40	19	10	253	105	35	42	106	
30	112	47	22	11	303	125	41	59	117	

1. RESTRAIN ALL PIPE JOINTS WITHIN THE DISTANCE SHOWN ON THE TABLES MEASURED FROM THE POINT OF CONNECTION.
2. ISOLATION VALVES SHALL BE TREATED AS DEAD ENDS WITH RESTRAINT ON BOTH SIDES OF THE VALVE.

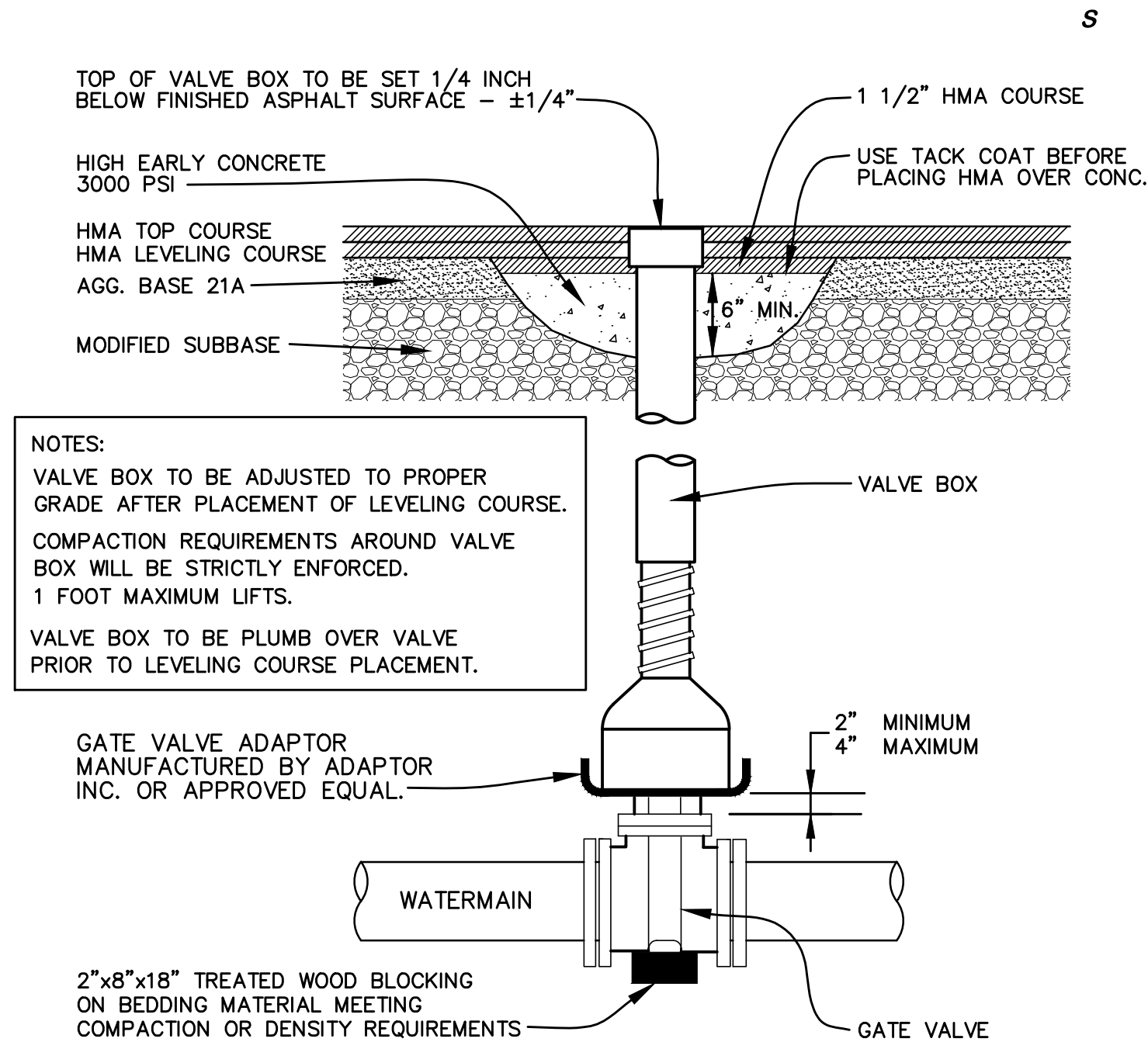
STANDARD VALVE LOCATION



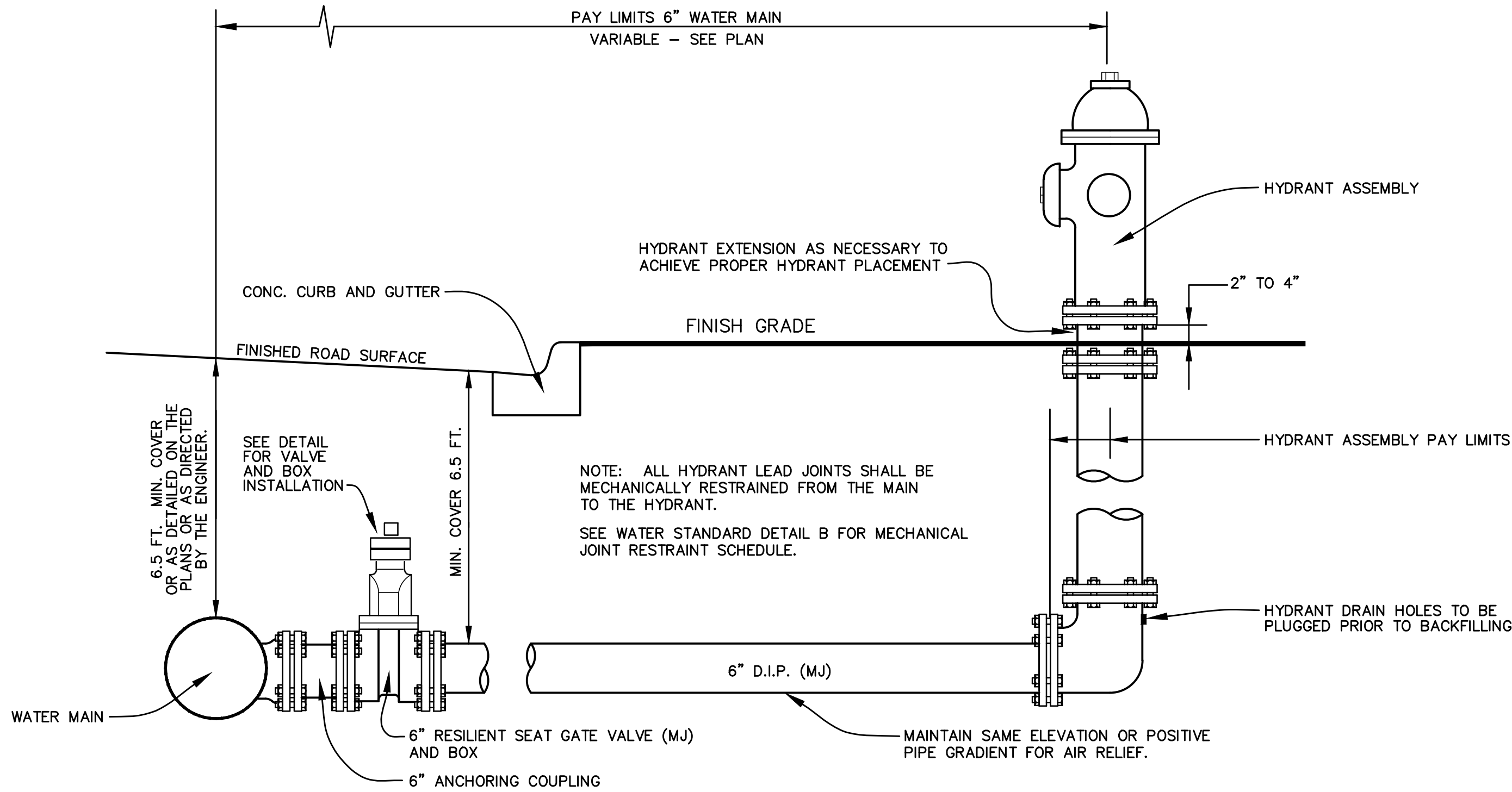
TYPICAL SERVICE CONNECTION



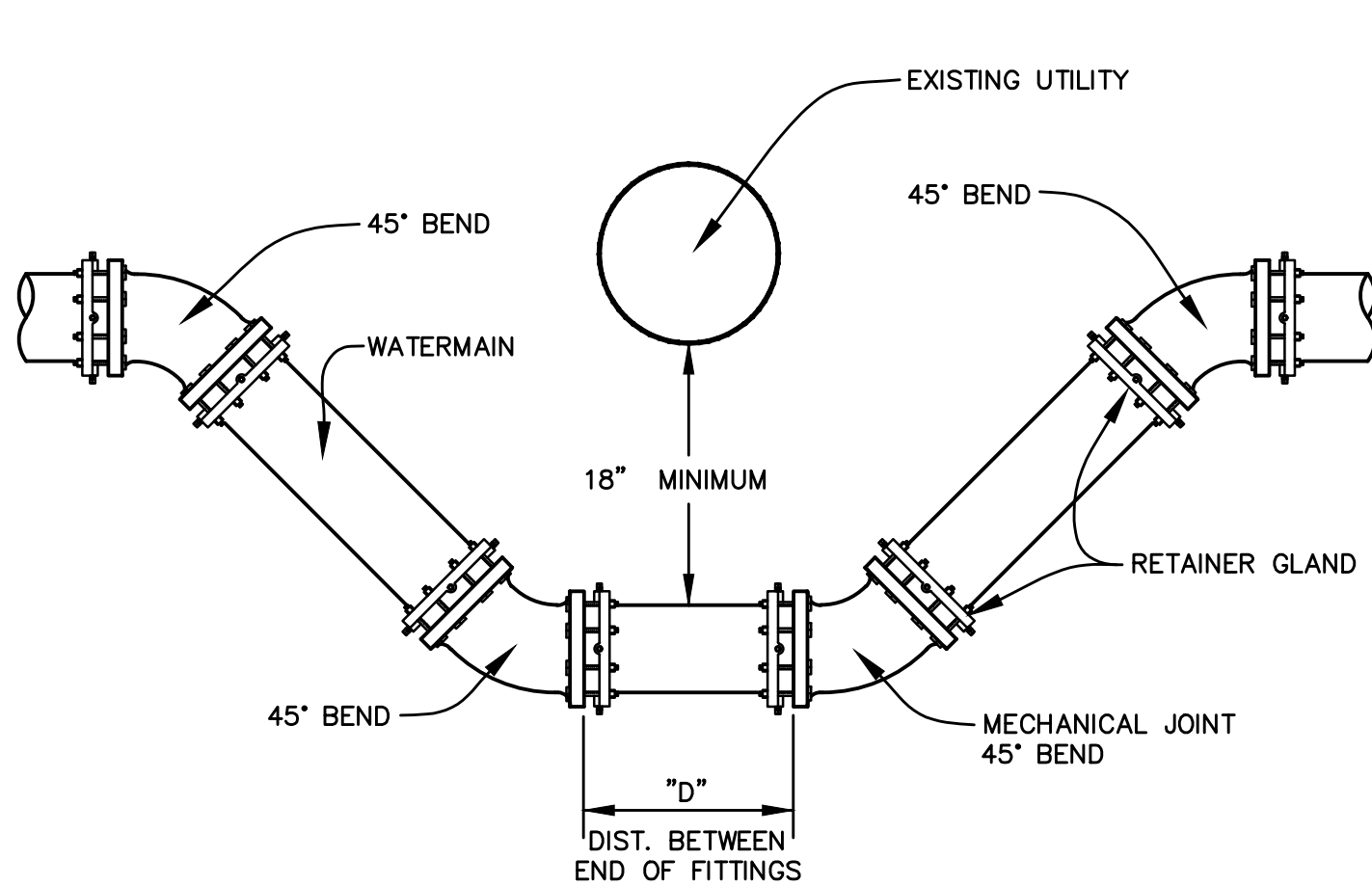
TYPICAL VALVE BOX INSTALLATION



TYPICAL HYDRANT CONNECTION



WATER MAIN CROSSING DETAIL

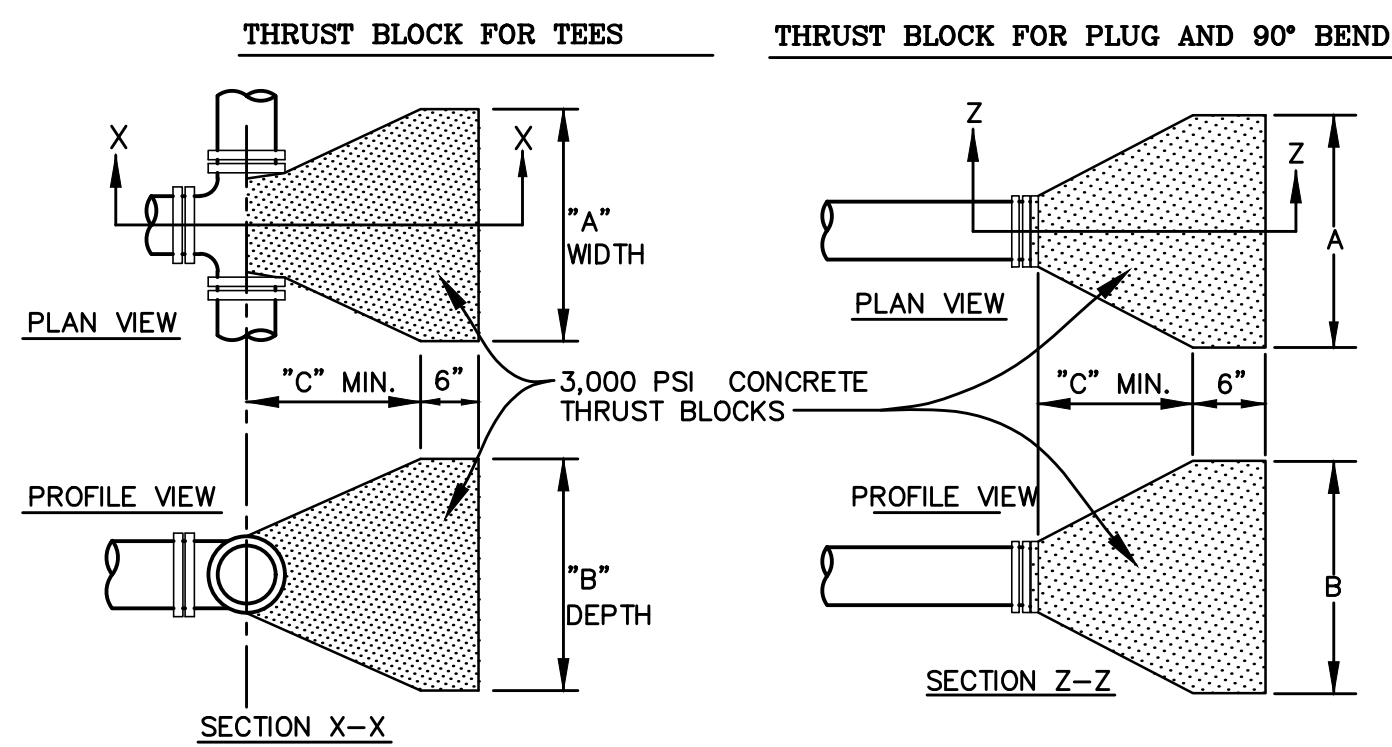


ALL JOINTS TO BE MADE UP USING MECHANICAL JOINT FITTING WITH RETAINER GLANDS. THE ENGINEER MAY ALLOW OTHER TYPES OF JOINT RESTRAINTS IF CIRCUMSTANCES WARRANT.

SEE WATER VALVE STANDARD LOCATION DETAIL (ABOVE) FOR MECHANICAL JOINT RESTRAINT SCHEDULE.

WATERMAIN DIA.	MINIMUM DIMENSION (INCH)	I.D. EXISTING UTILITY			
		≤12"	≤24"	≤36"	≤48"
6"	D	13"	17"	22"	28"
8"	D	14"	14"	19"	25"
10"	D	14"	14"	16"	22"
12"	D	15"	15"	15"	19"
16"	D	15"	15"	15"	19"

THRUST BLOCK DETAIL



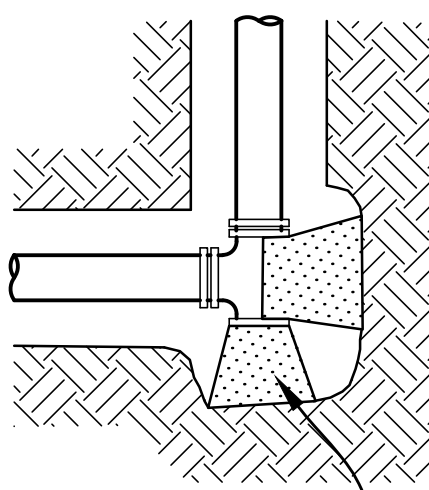
SCHEDULE FOR TEES AND/OR PLUGS

W.M. SIZE	MIN. THRUST BLOCK DIM.			BEARING SQ. FT.
	A (MIN)	B (MIN)	C (MIN)	
6"	1'6"	1'6"	12"	2.2
8"	2'3"	2'3"	1'3"	5.1
10"	2'6"	2'6"	1'6"	6.3
12"	3'0"	3'0"	1'9"	9.0
16"	4'0"	4'0"	2'10"	16.0

1. THE SHAPE OF THE BACK OF THE BLOCK MAY VARY AS LONG AS THE BEARING AREA IS NO LESS THAN THE AREA SHOWN IN THE TABLES AND THE POUR IS AGAINST FIRM UNDISTURBED EARTH.

2. JOINTS SHALL BE KEPT FREE OF CONCRETE AND A NON-ABRASIVE BARRIER APPROVED BY THE ENGINEER SHALL BE PLACED BETWEEN THE THRUST BLOCK AND ALL MECHANICAL JOINTS.

3. DIMENSIONS ARE BASED ON A SURGE PRESSURE OF 150 PSI AND SAFE BEARING LOADS OF 2 TONS PER SQ. FT. IN CLEAN DRY SAND



POUR AGAINST UNDISTURBED EARTH

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INTERNAL REVIEW 6/19/14	
PRELIM DRAFT 8 12 19	
PERMIT 8 29 19	

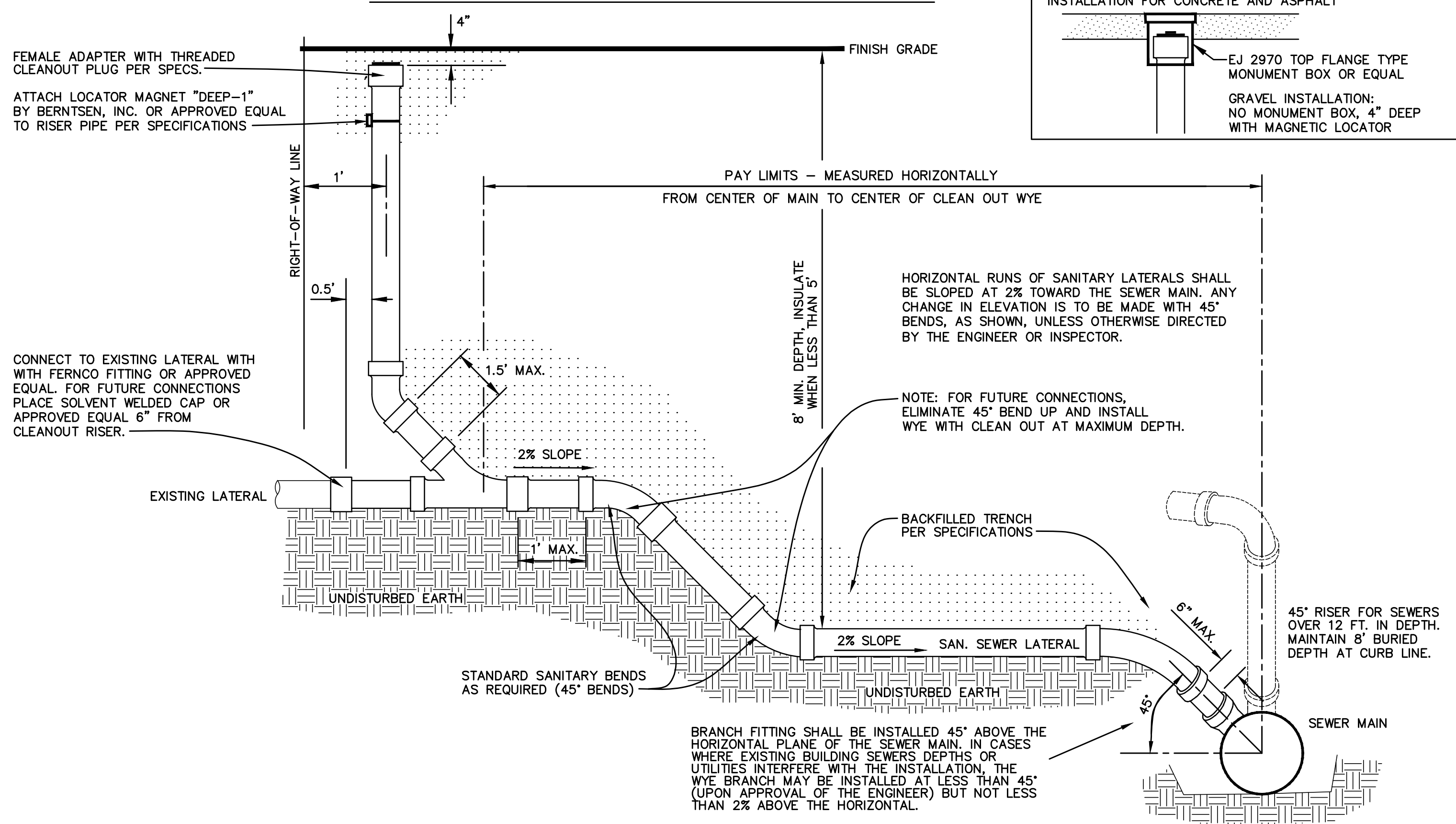
DESIGN BY: KEITH WHITTINGTON, CITY ENGINEER
DRAWN BY: JAMES COMPTON
DATE: 6/19/
FILE NAME: J:PROJECTS/MQ13-500.....WATER.dwg

HOR. SCALE: 1" = 20'
VERT. SCALE: N.A.

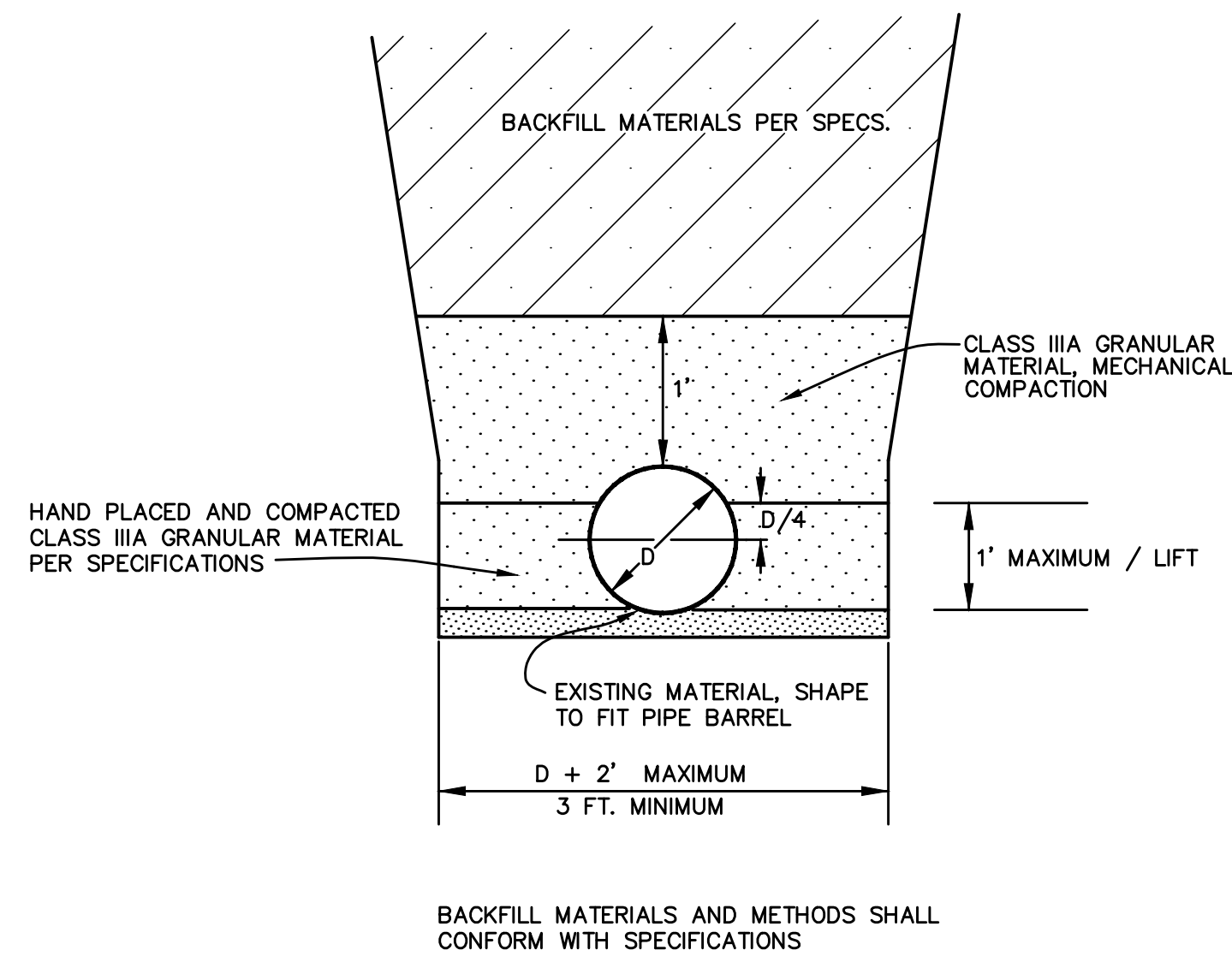
LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
WATER DETAILS

PROJECT MQ13-500
SHEET 28 OF 32

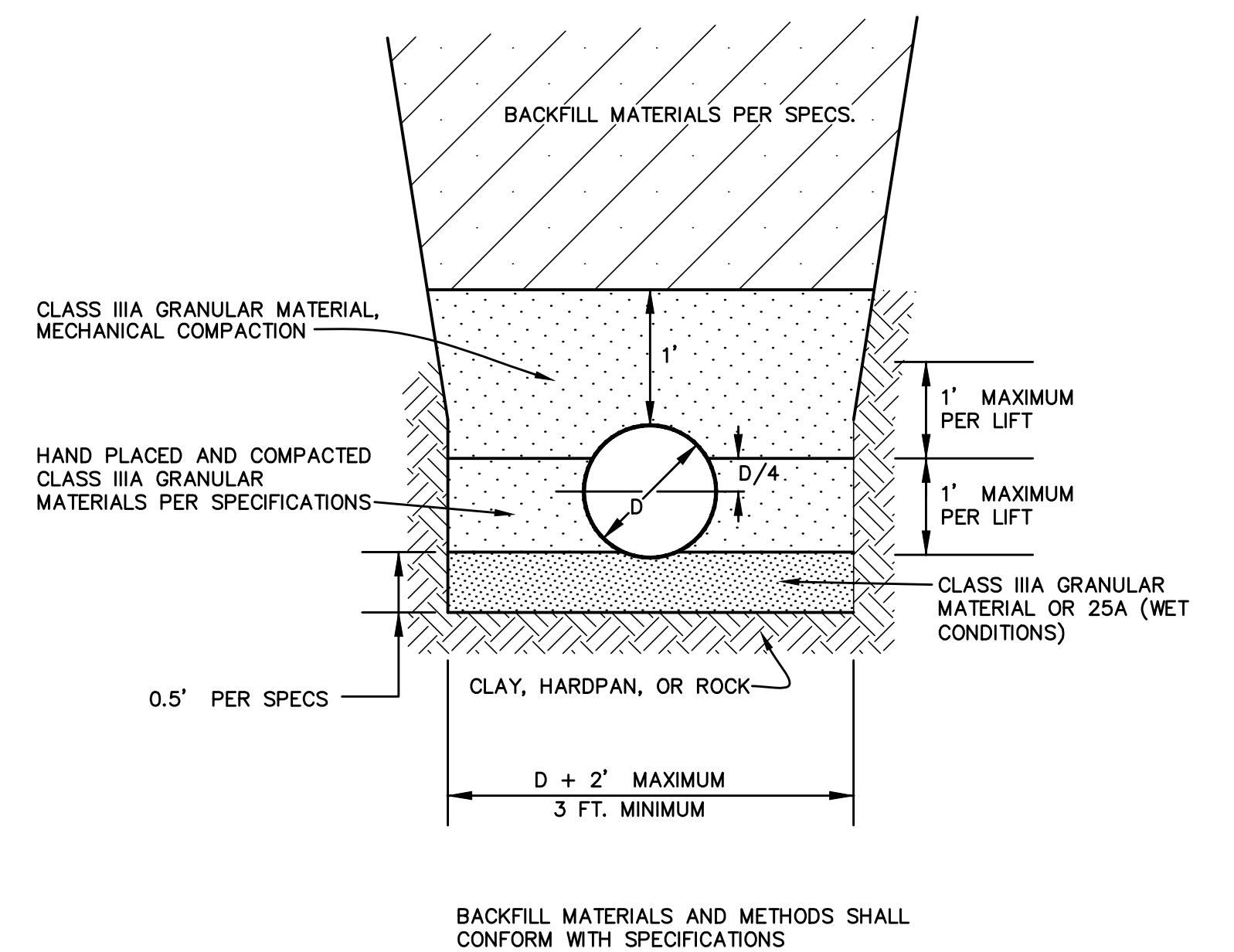
SANITARY SEWER LATERAL RISER DETAIL



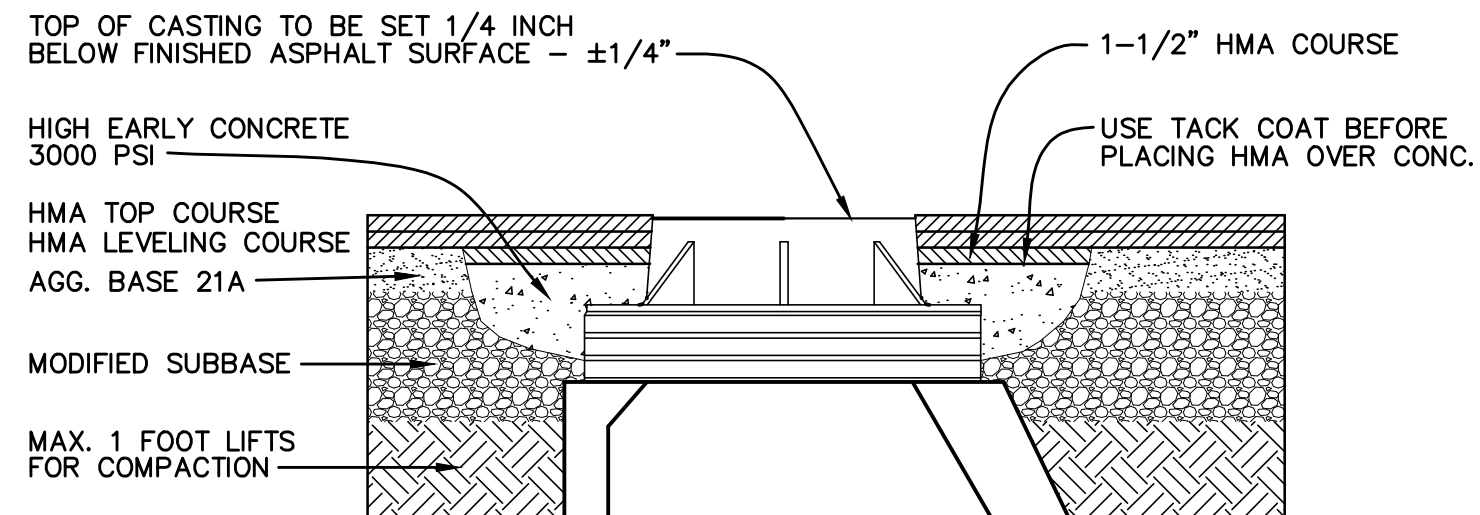
PIPE BEDDING DETAIL "G" IN SAND AND GRAVEL



PIPE BEDDING DETAIL "G" IN CLAY, HARDPAN, AND ROCK OR WHERE NATURAL MATERIAL IS UNDERCUT DURING EXCAVATION



TYPICAL MANHOLE COVER INSTALLATION

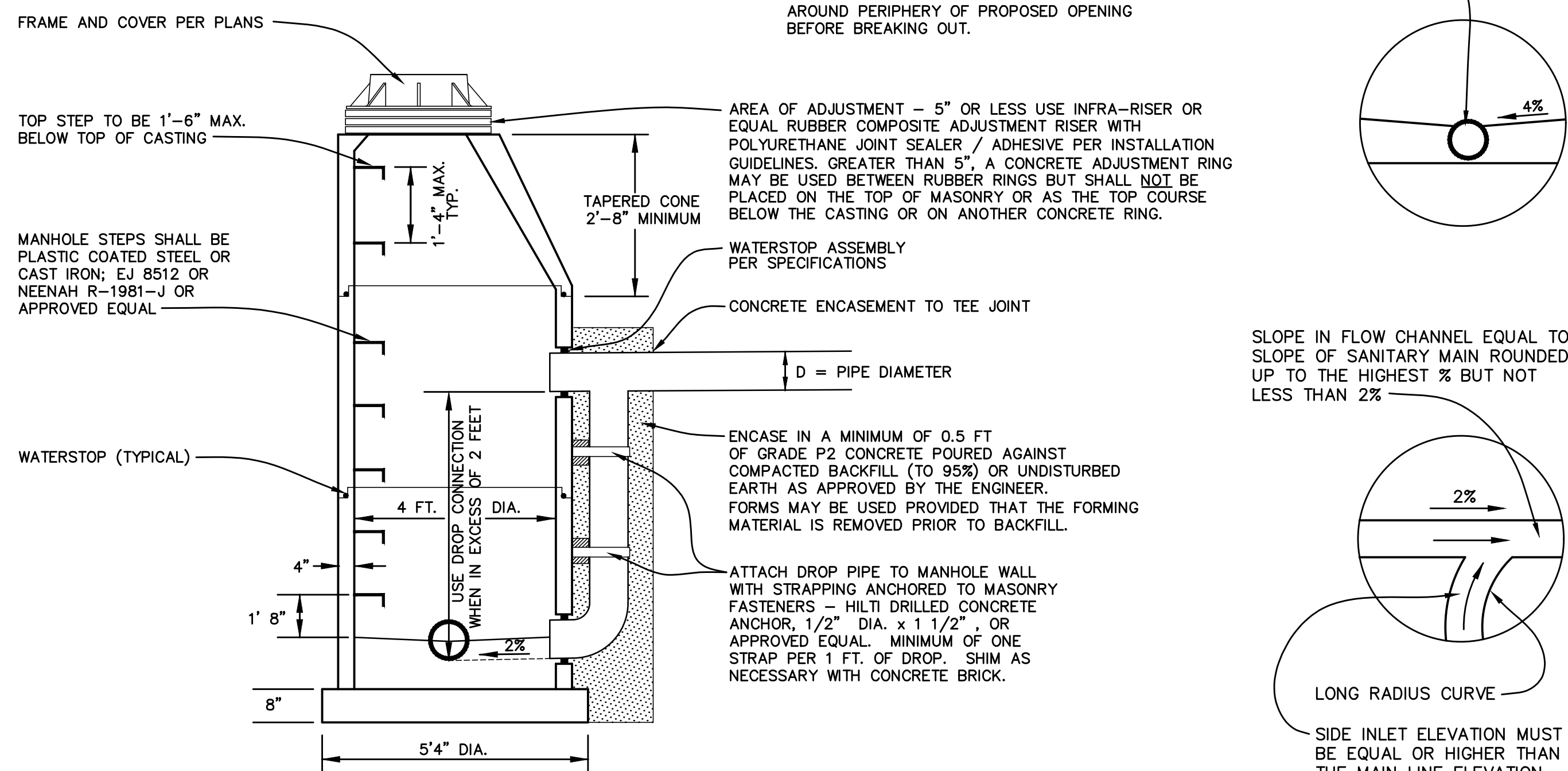


STANDARD CONCRETE DROP MANHOLE

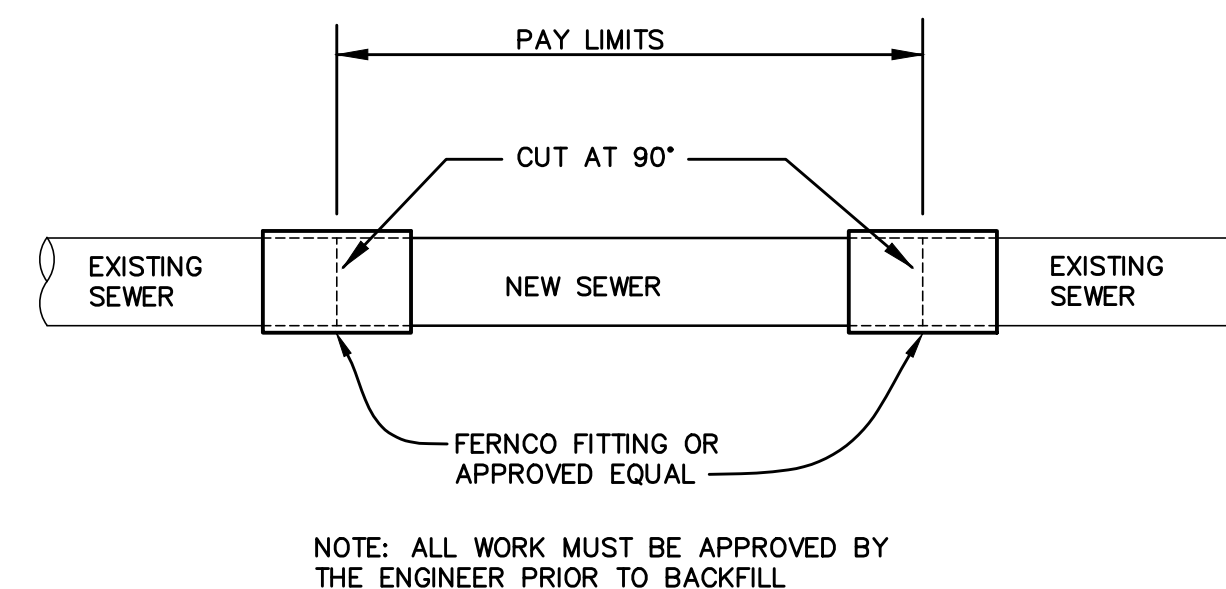
REFER TO M.D.O.T. STANDARD PLANS FOR OTHER CONFIGURATIONS

DROP PIPE DIAMETER SHALL BE THE SAME DIAMETER AS THE INCOMING PIPE, UNLESS NOTED OTHERWISE.

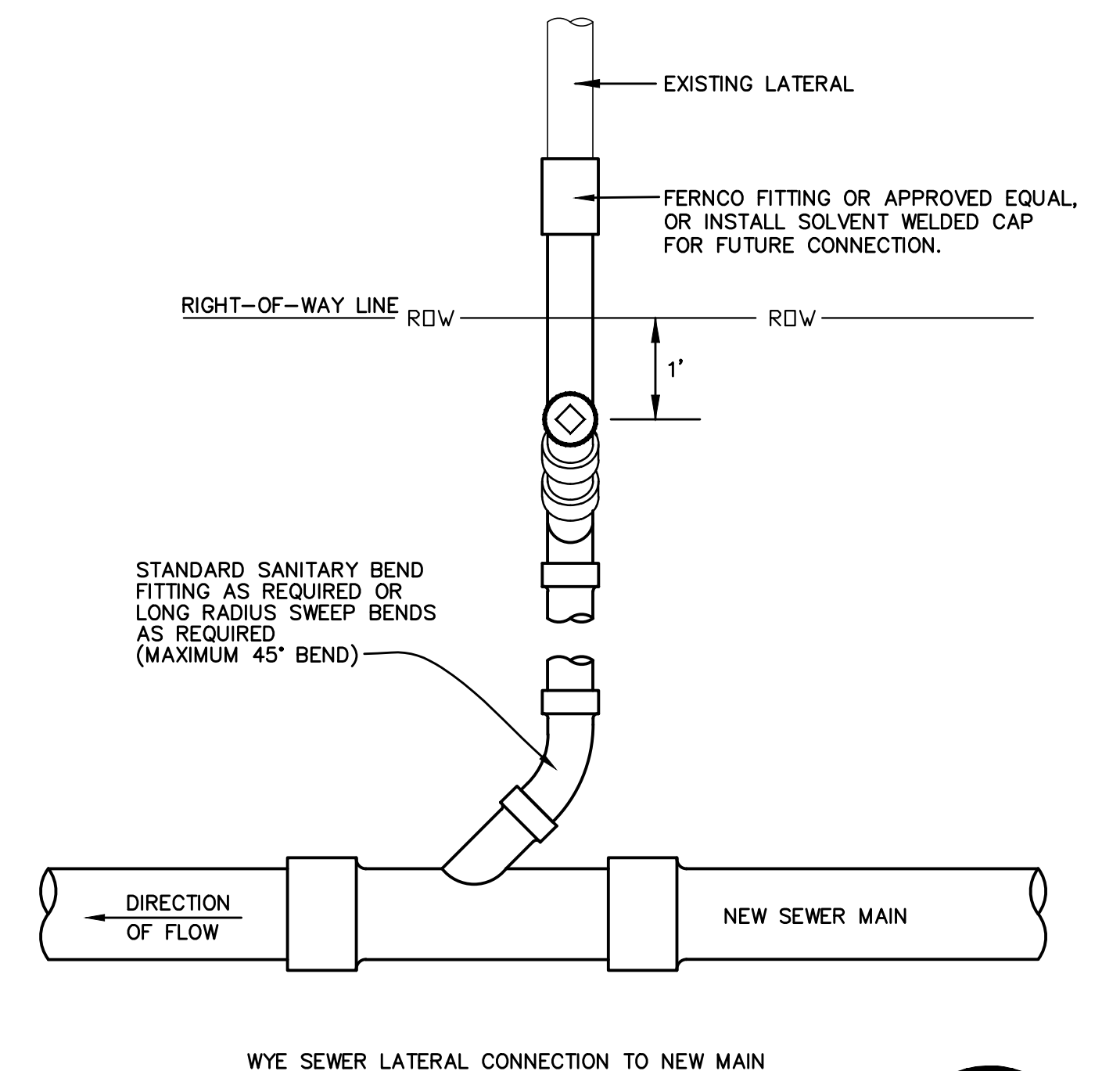
FOR DROP OPENINGS ON EXISTING MANHOLES, DRILL HOLES AT 4" CENTER - CENTER AROUND PERIPHERY OF PROPOSED OPENING BEFORE BREAKING OUT.



SANITARY SEWER LATERAL REPAIR DETAIL AND SANITARY SEWER POINT REPAIR



PLAN VIEW OF SANITARY SEWER LATERAL



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REVISIONS:

INTERNAL REVIEW 6/19/14	
PRELIM DRAFT 8 12 19	
PERMIT 8 29 19	

DESIGN BY: KEITH WHITTINGTON, CITY ENGINEER
DRAWN BY: JAMES COMPTON
DATE: 6/19/
FILE NAME: J:PROJECTS/MQ13-500.....WATER.dwg

HOR. SCALE: 1" = 20'
VERT. SCALE: N.A.

LAKEHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
SANITARY AND FENCE DETAILS

PROJECT MQ13-500
SHEET 29 OF 32



FRAME AND COVER AS SPECIFIED

AREA OF ADJUSTMENT - 5" OR LESS USE INFRA-RISER OR EQUAL RUBBER COMPOSITE ADJUSTMENT RISER WITH POLYURETHANE JOINT SEALER / ADHESIVE PER INSTALLATION GUIDELINES. GREATER THAN 5" A CONCRETE ADJUSTMENT RING MAY BE USED BETWEEN RUBBER RINGS BUT SHALL NOT BE PLACED ON THE TOP OF MASONRY OR AS THE TOP COURSE BELOW THE CASTING OR ON ANOTHER CONCRETE RING.

6" WRAPPED GEOTEXTILE SUBGRADE UNDERDRAIN UNDER THE PAVEMENT IN AREAS DESIGNATED ON THE PLANS.

2'-0" DIA.

4" MIN.

2'-0" SUMP

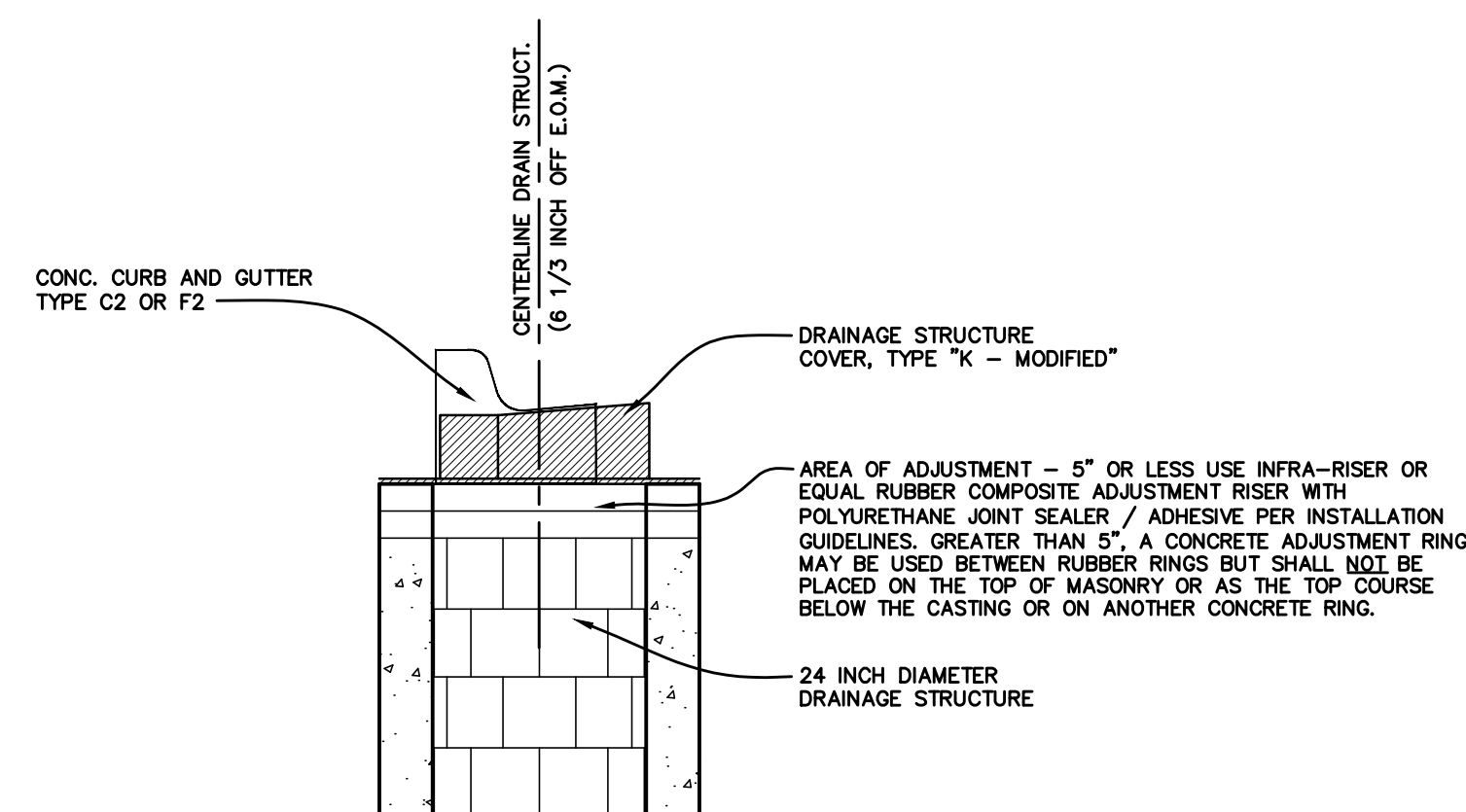
WHOLE SECTION AS SPECIFIED

1/4-PLACE COFFED

MIN.

COMPACTED GRANULAR MATERIAL AS SPECIFIED, MIN. 4"

UNDISTURBED SUBGRADE



Technical drawing of a manhole assembly showing various components and dimensions. The drawing is a cross-section view of a vertical manhole structure. At the top, there is a frame and cover assembly. Below this is a precast concrete manhole section. The manhole section has a diameter of 4'-0" and a height of 16' MAX. TYP. The manhole section is supported by a precast concrete base or poured-in-place material. The base is 4" MIN. thick. The manhole section is surrounded by a 6" compacted granular material. The entire assembly is set in undisturbed earth. The drawing includes labels for various components and dimensions:

- FRAME AND COVER AS SPECIFIED; SET FRAME AND COVER 1/4" BELOW TOP OF PAVEMENT
- AREA OF ADJUSTMENT - 5" OR LESS USE INFRA-RISER OR EQUAL RUBBER COMPOSITE ADJUSTMENT RISER WITH POLYURETHANE JOINT SEALER / ADHESIVE PER INSTALLATION GUIDELINES. GREATER THAN 5", A CONCRETE ADJUSTMENT RING MAY BE USED BETWEEN RUBBER RINGS BUT SHALL NOT BE PLACED ON THE TOP OF MASONRY OR AS THE TOP COURSE BELOW THE CASTING OR ON ANOTHER CONCRETE RING.
- 1'-5" MAX.
- 4'-0" DIA.
- 16' MAX. TYP.
- ALUMINUM OR REINFORCED POLYPROPYLENE STEPS, 16" SPACING MAX.
- PRECAST CONCRETE MANHOLE SECTIONS OR 6" CONCRETE BLOCK AS SPECIFIED
- 4" MIN.
- 6" MIN.
- 2'-0" MIN.
- 8" MIN.
- PRECAST CONCRETE BASE OR POURED-IN-PLACE AS SPECIFIED
- 6" COMPACTED GRANULAR MATERIAL AS SPECIFIED
- UNDISTURBED EARTH
- MORTAR FILLET (TYP.)

Diagram illustrating the cross-section of a bridge deck structure, showing the relationship between the concrete deck, HMA courses, and the subbase.

Labels and Tolerances:

- TOP OF CASTING TO BE SET $1\frac{1}{4}$ INCH BELOW FINISHED ASPHALT SURFACE - $\pm 1\frac{1}{4}$ "
- HMA TOP COURSE
- HMA LEVELING COURSE
- AGG. BASE 21A
- MODIFIED SUBBASE
- MAX. 1 FOOT LIFTS FOR COMPACTION
- 1- $\frac{1}{2}$ " HMA COURSE
- USE TACK COAT BEFORE PLACING HMA OVER CONC.

K COAT BEFORE
 HMA OVER CONG.

FRAME AND COVER AS SPECIFIED
 SET FRAME AND COVER 1/4" BELOW
 TOP OF PAVEMENT

AREA OF ADJUSTMENT - 5" OR LESS USE INFRA-RISER OR
 EQUAL RUBBER COMPOSITE ADJUSTMENT RISER WITH
 POLYURETHANE JOINT SEALER / ADHESIVE PER INSTALLATION
 GUIDELINES. GREATER THAN 5", A CONCRETE ADJUSTMENT RING
 MAY BE USED BETWEEN RUBBER RINGS BUT SHALL NOT BE
 PLACED ON THE TOP OF MASONRY OR AS THE TOP COURSE
 BELOW THE CASTING OR ON ANOTHER CONCRETE RING.

PRECAST CONCRETE MANHOLE
 CONE AND MANHOLE SECTIONS
 AS SPECIFIED

6'-0" STANDARD
 5'-4" MINIMUM

1'-0" MAX

ALUMINUM OR REINFORCED
 POLYPROPYLENE STEPS,
 16" SPACING MAX.

PLAN VIEW

PRECAST CONE
 SECTION

MANHOLE FRAME
 AND COVER

SECTIONAL PLAN A-A'

MANHOLE STEPS

PRECAST CONE SECTION

FLEXIBLE AND WATER-
 TIGHT JOINTS

MORTAR FILLET

PRECAST CONCRETE OR
 POURED-IN-PLACE BASE
 AS SPECIFIED

6" COMPACTED GRANULAR
 MATERIAL AS SPECIFIED

UNDISTURBED EARTH

5'-0" OR 6'-0" DIA.

2'-6"

1/2 PIPE
 DIA.

2'-5"

2" MAX

4" MIN.

8"

W

E

The diagram illustrates the construction of a silt fence system. The top portion is an elevation view showing two adjacent sections, labeled SECTION A and SECTION B. Each section contains a grid representing the silt fence fabric. A flow arrow labeled 'FLOW' indicates the direction of water movement from left to right. A vertical line separates the two sections, and a horizontal line indicates the ground level. A label 'STAPLE SPACING 6 INCH (MAX.)' points to the vertical line. The bottom portion is a plan view showing the silt fence sections joined by a staple and posts. The plan view shows two sections, labeled SECTION A and SECTION B, joined by a staple and posts. The plan view shows the silt fence sections joined by a staple and posts. The plan view shows the silt fence sections joined by a staple and posts.

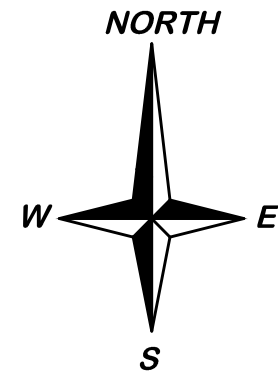
1. DIMENSIONS NOT LABELED ARE IN INCHES
2. ALTERNATE PRE-ASSEMBLED SILT FENCE OPTIONS WILL BE ALLOWED AS LONG AS SPECIFIED DIMENSIONS ARE SATISFIED. FOLLOW MANUFACTURER'S INFORMATION FOR INSTALLATION PROCEDURES.

The figure consists of two diagrams: an Elevation view (top) and a Plan view (bottom).
Elevation View: Shows a vertical pile driven into the ground. The ground surface is labeled 'EXISTING GROUND (UNDISTURBED)'. The area above the ground is labeled 'LIMITS OF CLEARING'. A horizontal arrow labeled 'VARIES' indicates the distance from the pile to the 'FILL SLOPE'. A horizontal arrow labeled 'FLOW' points towards the pile.
Plan View: Shows the pile's position relative to the 'TOE OF SLOPE'. A horizontal arrow labeled 'VARIES' indicates the distance from the pile to the toe of the slope. A horizontal arrow labeled 'FLOW' points towards the pile. A vertical dimension line labeled 'SPACING TO PILE MAXIMUM' is shown on the left side of the pile.

Diagram illustrating the components and dimensions of a trench box installation:

- 3 FT. LONG POST (MIN.)
- SUPPORT MESH
- GEOTEXTILE FABRIC
- BACKFILLED AND COMPACTED SOIL
- FLOW
- 8 INCH TRENCH
- 6"
- 1.5 FT. (MIN.)
- POST DRIVEN 1.5 FT. INTO GROUND (MIN.)





LIGHTING ITEMS

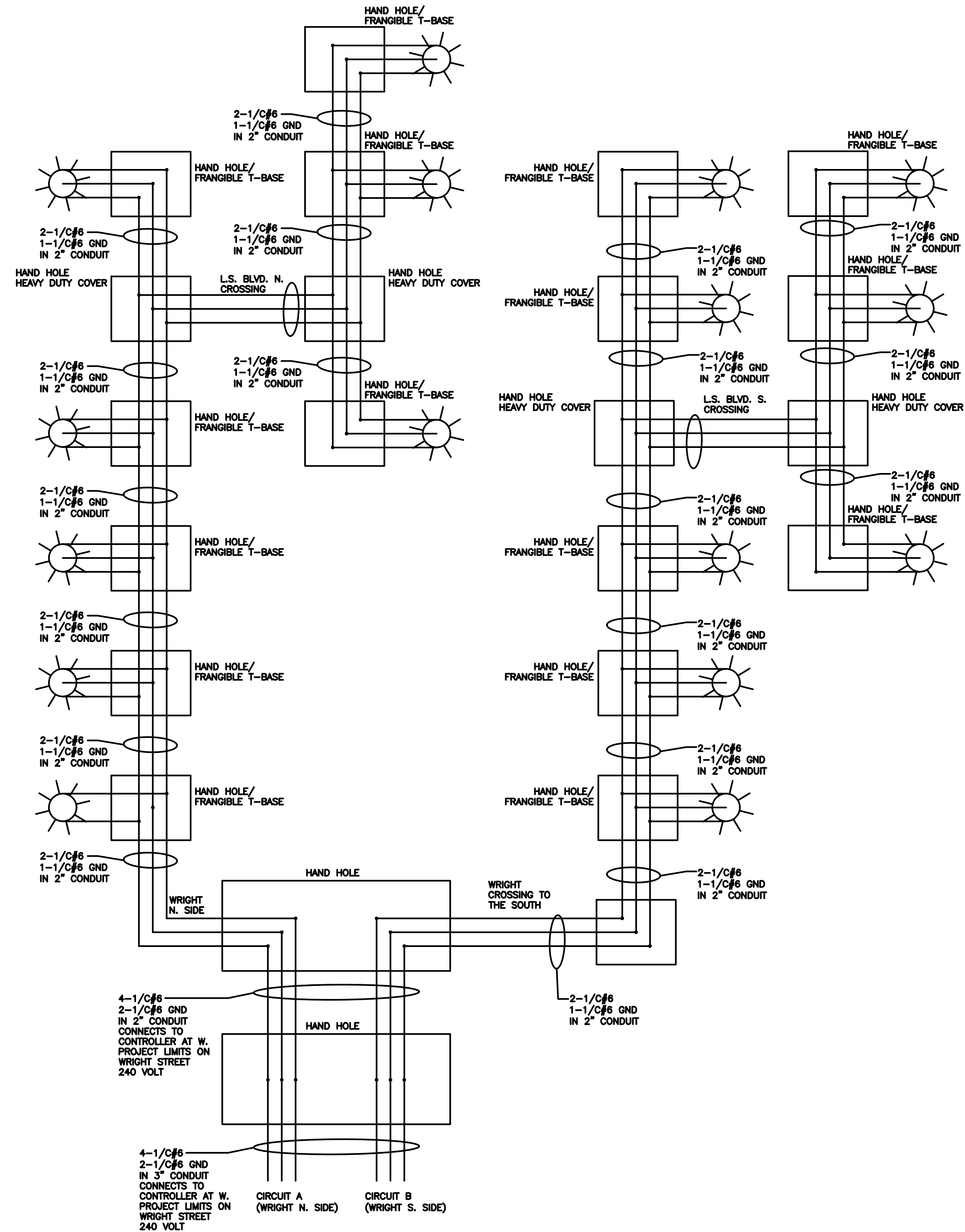
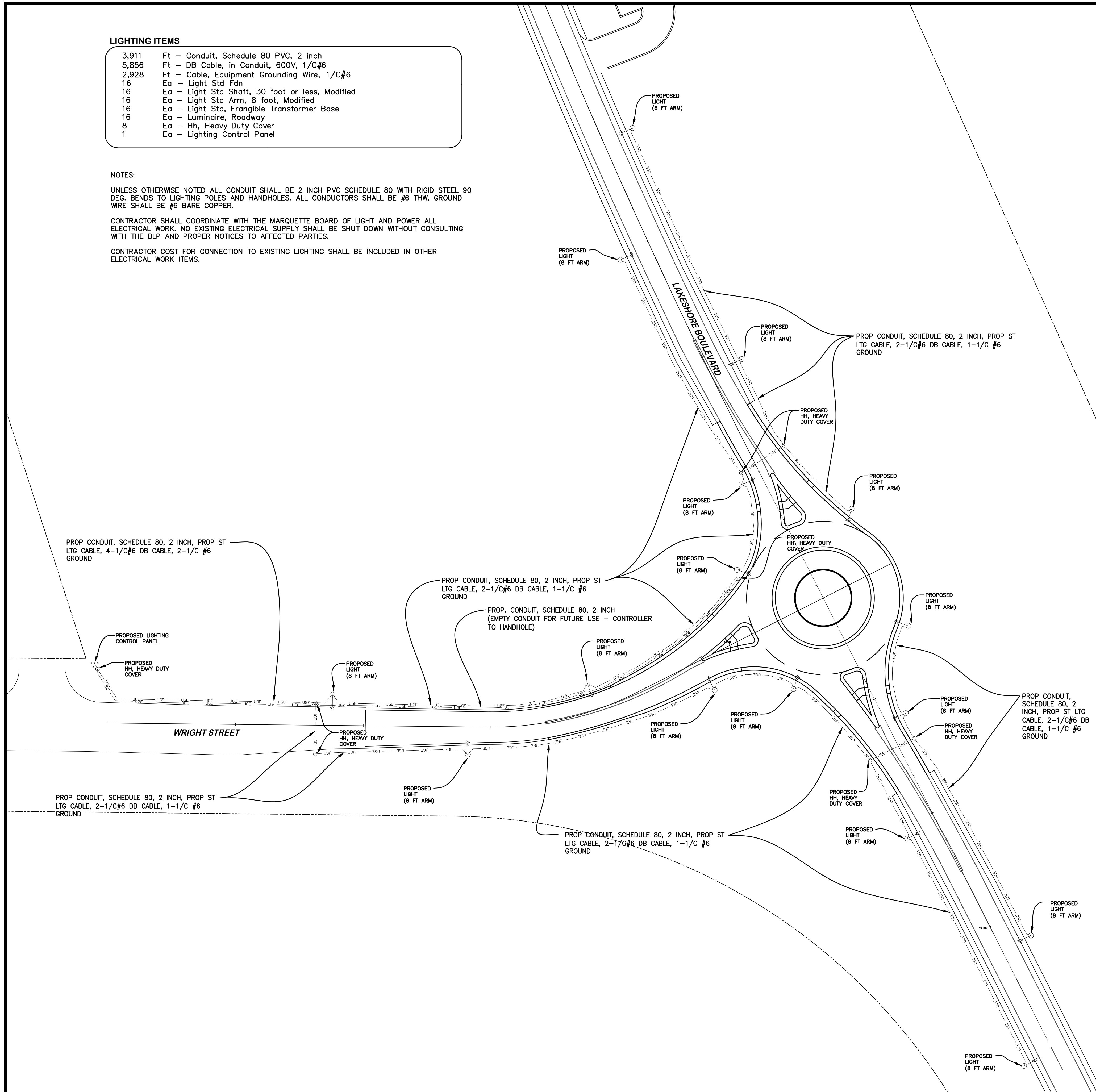
3,911	Ft - Conduit, Schedule 80 PVC, 2 inch
5,856	Ft - DB Cable, in Conduit, 600V, 1/C#6
2,928	Ft - Cable, Equipment Grounding Wire, 1/C#6
16	Ea - Light Std Fdn
16	Ea - Light Std Shaft, 30 foot or less, Modified
16	Ea - Light Std Arm, 8 foot, Modified
16	Ea - Light Std, Frangible Transformer Base
16	Ea - Luminaire, Roadway
8	Ea - Hh, Heavy Duty Cover
1	Ea - Lighting Control Panel

NOTES:

UNLESS OTHERWISE NOTED ALL CONDUIT SHALL BE 2 INCH PVC SCHEDULE 80 WITH RIGID STEEL 90 DEG. BENDS TO LIGHTING POLES AND HANDHOLES. ALL CONDUCTORS SHALL BE #6 THW, GROUND WIRE SHALL BE #6 BARE COPPER.

CONTRACTOR SHALL COORDINATE WITH THE MARQUETTE BOARD OF LIGHT AND POWER ALL ELECTRICAL WORK. NO EXISTING ELECTRICAL SUPPLY SHALL BE SHUT DOWN WITHOUT CONSULTING WITH THE BLP AND PROPER NOTICES TO AFFECTED PARTIES.

CONTRACTOR COST FOR CONNECTION TO EXISTING LIGHTING SHALL BE INCLUDED IN OTHER ELECTRICAL WORK ITEMS.



WRIGHT/ LAKESHORE LIGHTING WIRING DIAGRAM

NO SCALE

*HANDHOLES AT STREET LIGHTS ARE PART OF THE BREAKAWAY BASE. INCLUDED WITH THE LIGHT POLE



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REVISIONS:

PRE-LIM LIGHTING PLAN	1.8.19
PERMIT	8.29.19

DESIGN BY: MHK
DRAWN BY: MHK
DATE: 1-8-19
FILE NAME: ----.dwg

HOR. SCALE: 1" = 40'
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
LIGHTING PLAN

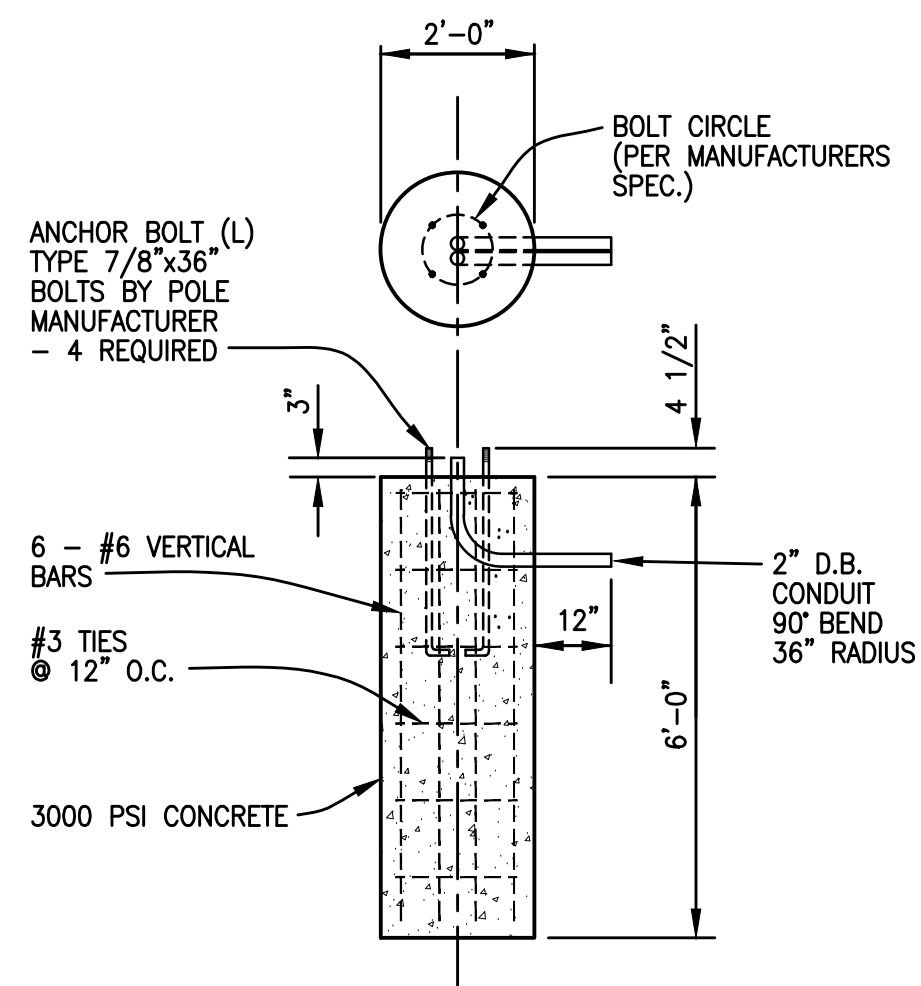
Michigan's
One-Call



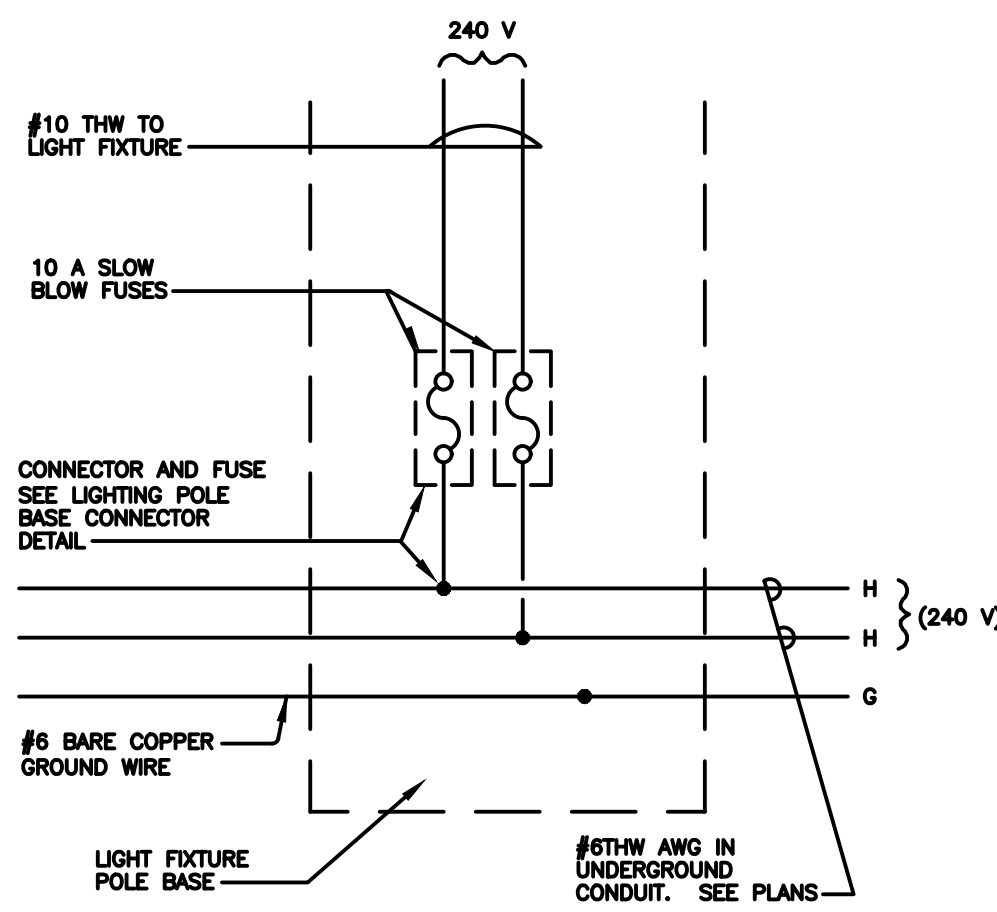
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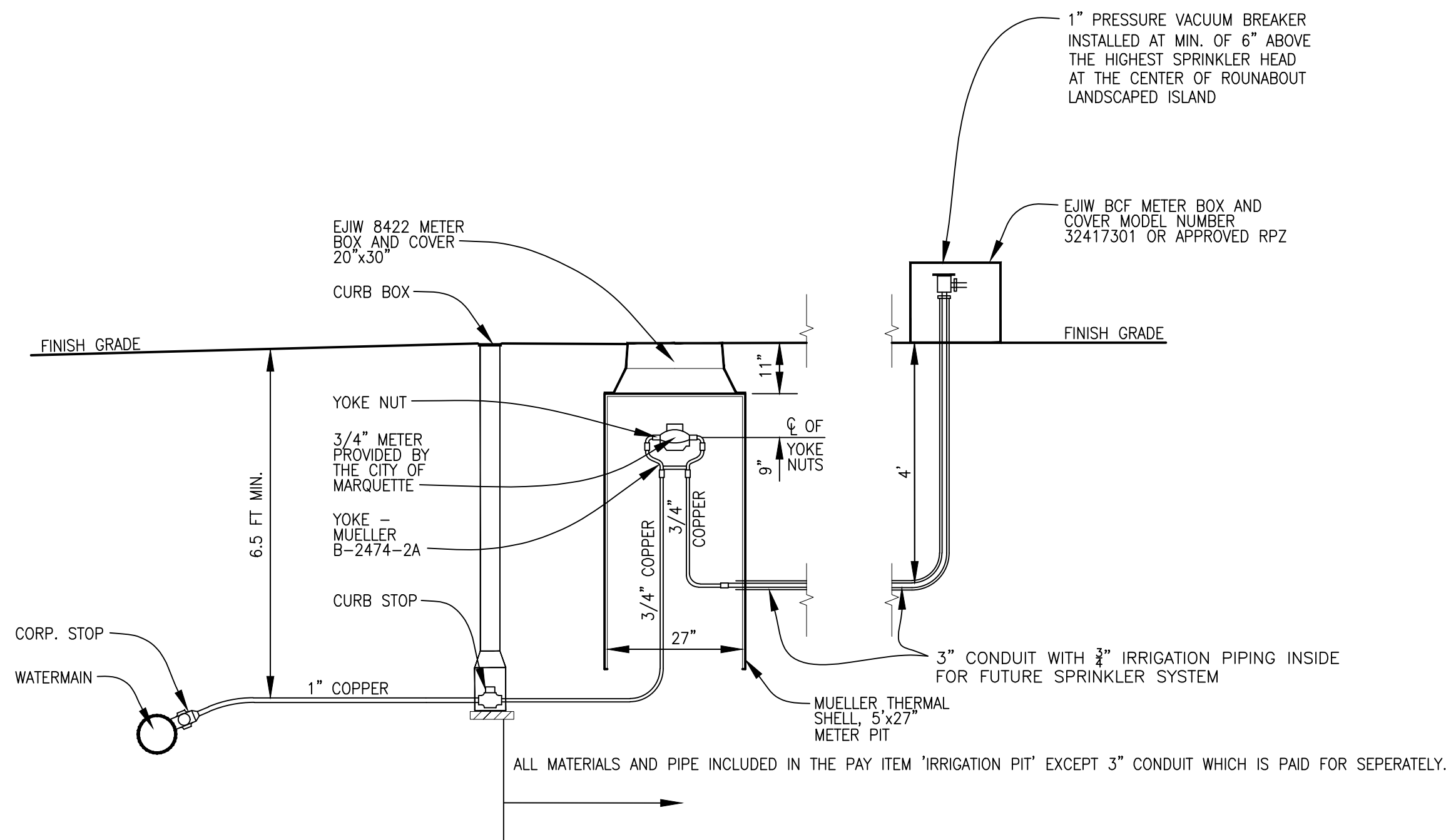
PROJECT MQ13-500
SHEET 31 OF 32



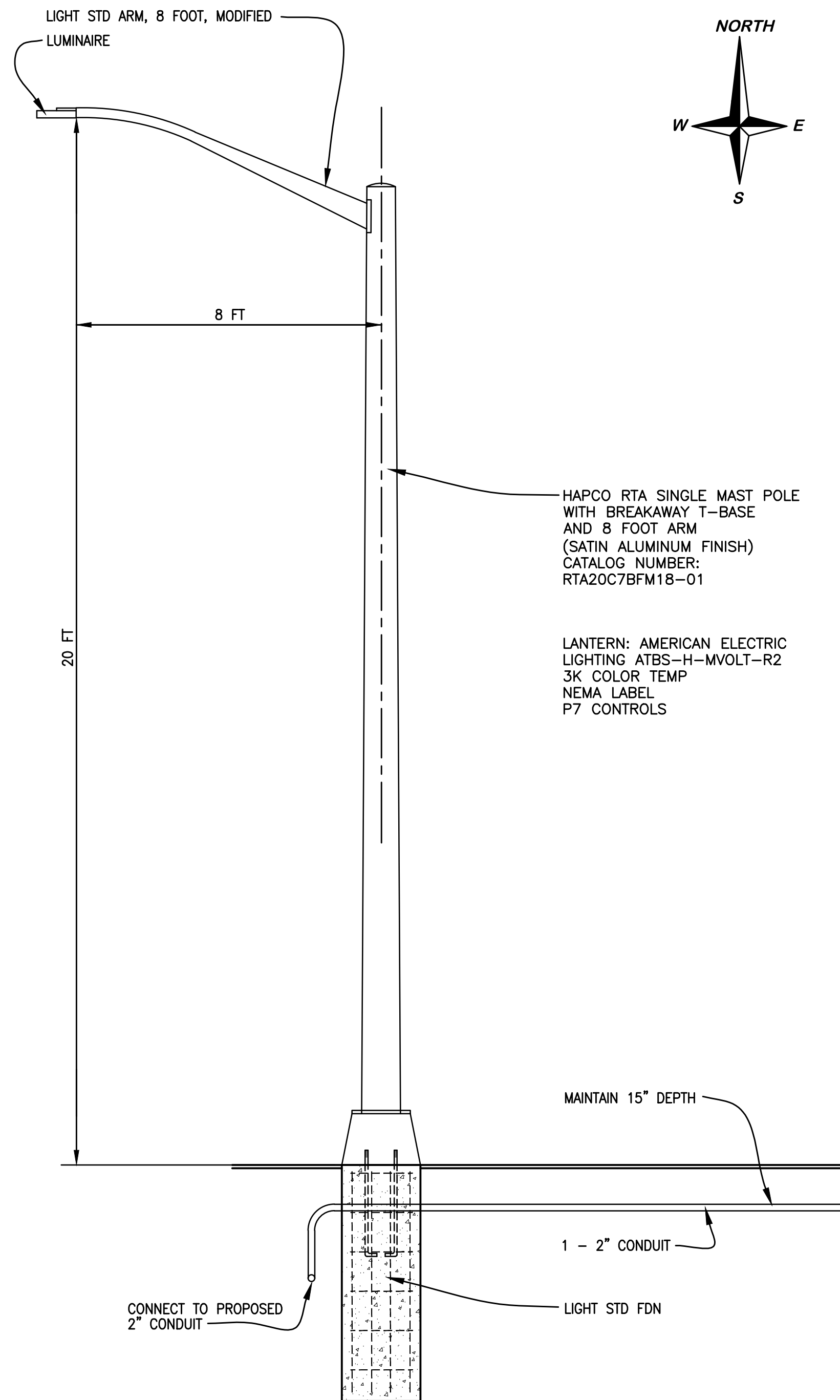
STREET LIGHT POLE FOUNDATION
NO SCALE



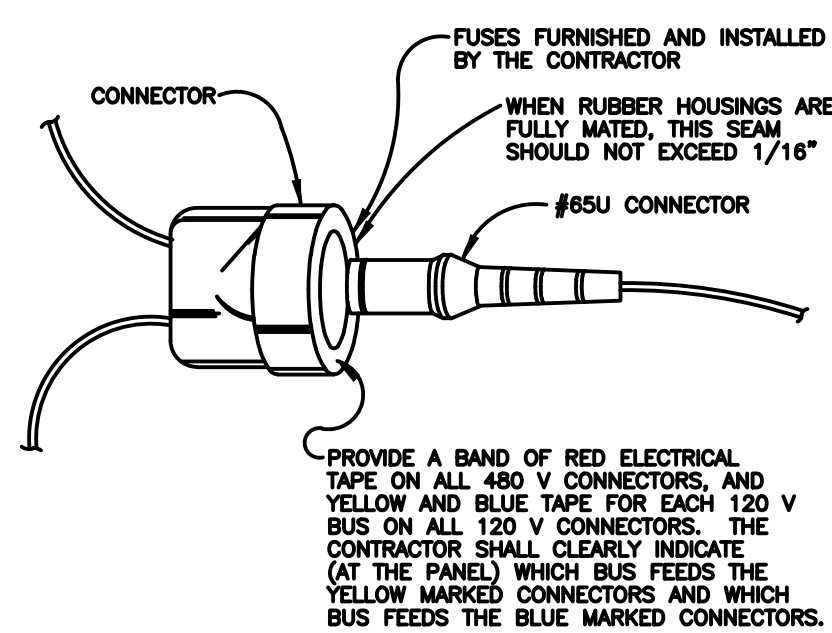
WIRING DIAGRAM
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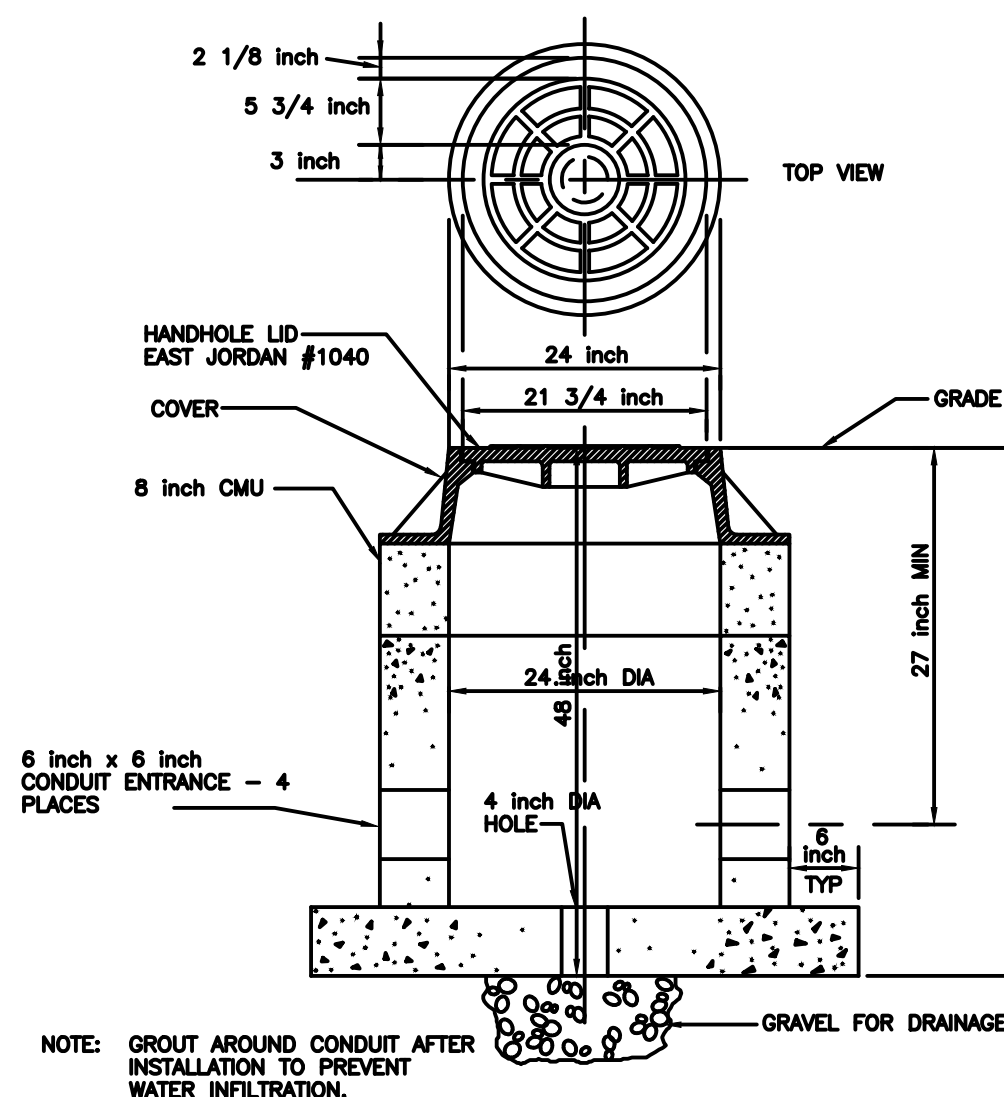
IRRIGATION PIT DETAIL
NO SCALE



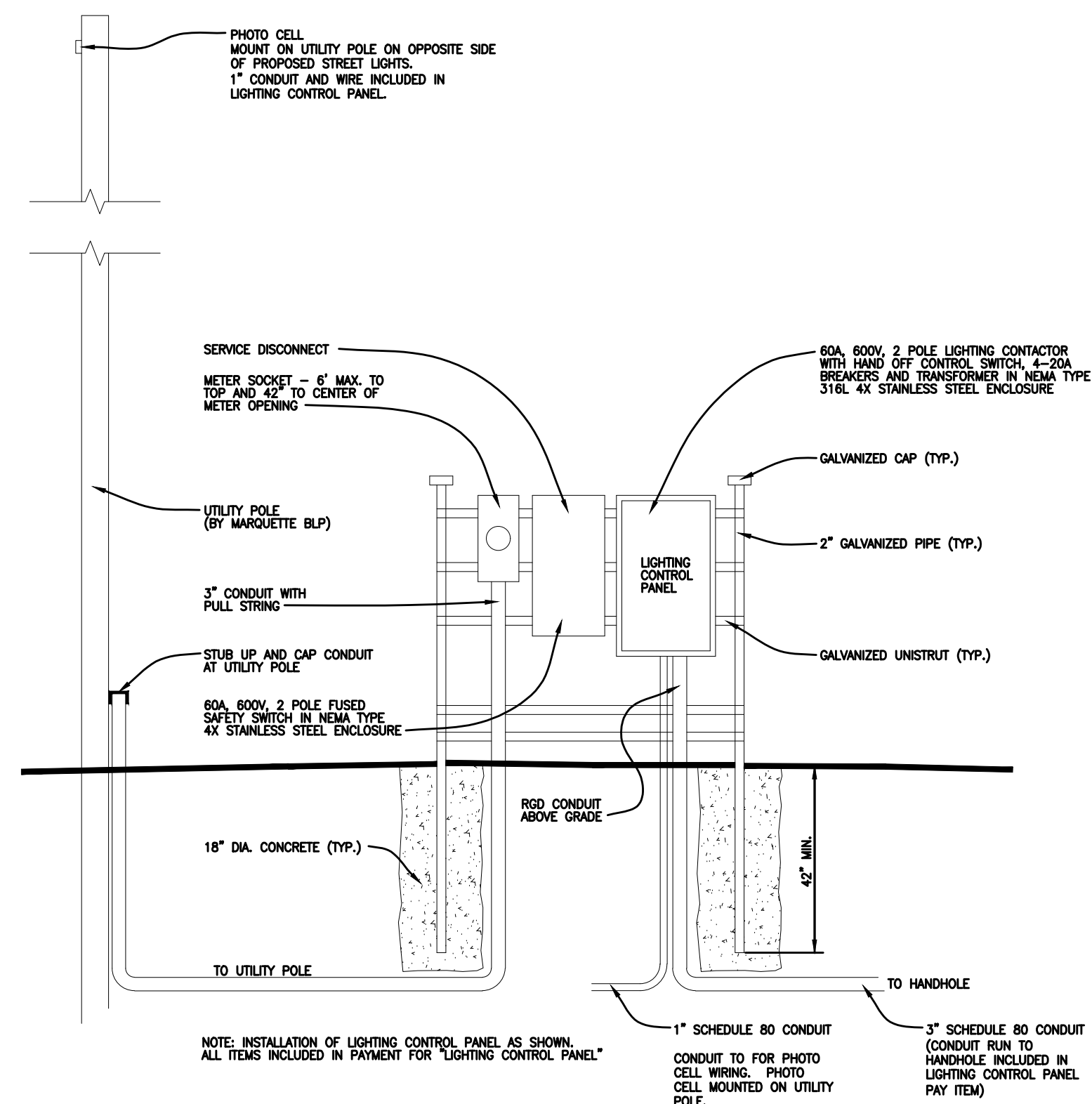
LIGHT POLE
NO SCALE



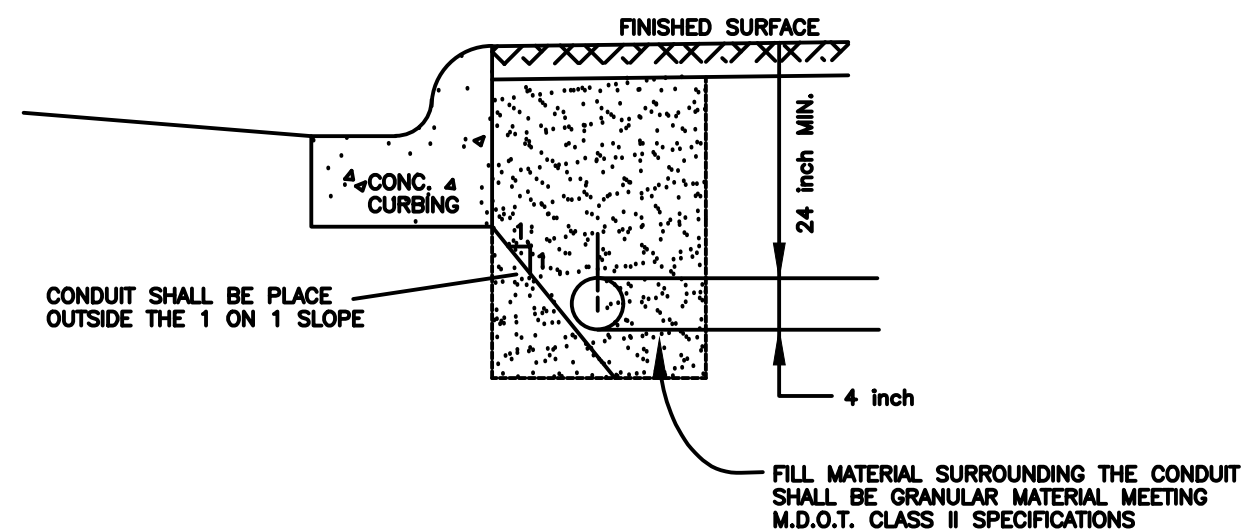
LIGHTING POLE BASE CONNECTOR DETAIL
NO SCALE



ELECTRIC HANDHOLE DETAIL
NO SCALE



ELECTRIC HANDHOLE DETAIL
NO SCALE



CONDUIT PLACEMENT DETAIL BEHIND CURB
NO SCALE

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CITY ENGINEER'S OFFICE
MARQUETTE, MICHIGAN
300 WEST BARAGA AVE., MARQUETTE, MI 49855
PHONE (906)228-0440

REVISIONS:	
PRE-LIM LIGHTING PLAN	1.8.19
PERMIT	8.29.19

DESIGN BY: MHK
DRAWN BY: MHK
DATE: 1-8-19
FILE NAME: ----.dwg

HOR. SCALE: N.A.
VERT. SCALE: N.A.

LAKESHORE BLVD. RELOCATION
MARQUETTE, MICHIGAN
LIGHTING DETAILS

PROJECT MQ13-500
SHEET 32 OF 32

ALTERNATIVE MONITORING POINT SUMMARY REPORT JULY 2019

Former Cliffs Dow Site
City of Marquette
Marquette County, Michigan

Prepared for:
City of Marquette
1100 Wright Street
Marquette, Michigan 49855

Date: September 6, 2019
Revised: November 1, 2019
TriMedia Project Number 99-059



TRIMEDIA
JOB NUMBER
99-059

SHEET TITLE:
Monitoring Well
Locations

FIGURE NUMBER
2

DESIGNED: MAK	DATE	DESCRIPTION:	ISSUED:
DRAWN: KKK			
CHECKED: RJW			
APPROVED: RJW			

City of Marquette
Former Cliffs - Dow Site
Monitoring Well Locations
Marquette, Michigan





Table 1 - Summary of Laboratory Analytical Results
UPG-100 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100CR	UPG-100CR	UPG-100CR	UPG-100CR	UPG-100CR										
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	4.7-9.7	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	16.4-21.4'	41.3-46.3'	41.3-46.3'	41.3-46.3'	41.3-46.3'	41.3-46.3'									
					Date of Collection	10/28/2009	4/15/2010	7/21/2010	10/18/2010	10/18/2011	6/5/2012	10/24/2012	6/13/2013	1/2/2014	8/6/2014	11/23/2015	11/28/2016	11/28/2017	12/3/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	10/18/2011	6/7/2012	10/24/2012	6/13/2013	1/2/2014	8/6/2014	11/23/2015	11/28/2016	11/29/2017	12/3/2018	10/28/2009	4/15/2010	7/21/2010	10/18/2010	12/3/2018								
					Date of Analysis	11/6/2009	4/28/10	7/28/2010	10/22/2010	10/27/2011	6/9/2012	10/30/2012	6/21/2013	1/8/2014	8/15/2014	11/26/2015	12/2/2016	12/1/2017	12/10/2018	10/16/2009	4/27/2010	7/29/2010	10/22/2010	10/27/2011	6/8/2012	10/30/2012	6/21/2013	1/8/2014	8/15/2014	11/29/2015	12/2/2016	12/2/2017	12/10/2018	11/5/2009	4/27/2010	7/28/2010	10/22/2010	12/10/2018								
71432	1	--*	130	200 (X)	Benzene	ND	2.6	4.2	6.3	9.4	6.7	5.4	5.2	ND	4.8	9.5	6.1	5.5	6.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	5.3	8.2	ND	ND	ND	ND	ND								
100414	1	320	200	18	Ethylbenzene	4.2	62	95	98	130	150	140	93	180	87																															
95636	1	310	190	17	1,2,4-Trimethylbenzene	5.6	70	130	99																																					
1330207	3	890	540	41	Xylenes, Total	9.2	130	230	250	320	360	280	250	390	250																															

SVOCs						UPG-100A																UPG-100B																UPG-100CR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B</

CARBONYL COMPOUNDS							UPG-100A													
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID															
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"	4.7-9.7"		
					Date of Collection	10/8/2009	4/15/2010	7/21/2010	10/18/2010	10/18/2011	6/5/2012	10/24/2012	-	-	-	-	-	-	11/28/2017	-
					Date of Analysis	10/15/2009	4/22/2010	7/28/2010	10/28/2011	6/9/2012	10/30/2012	-	-	-	-	-	-	12/1/2017	-	
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND	NS	
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND	NS	

WATER QUALITY PARAMETERS						UPG-100A																UPG-100B																UPG-100CR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters		Part 201 Generic Cleanup Criteria	Sample ID	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100A	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B	UPG-100B</

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
UPG-200 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					UPG-200A										UPG-200B					UPG-200C						
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200B	UPG-200B	UPG-200B	UPG-200B	UPG-200B	UPG-200C	UPG-200C	UPG-200C	UPG-200C	UPG-200C	
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	10.6-15.6'	10.6-15.6'	10.6-15.6'	10.6-15.6'	10.6-15.6'	33.3-38.3'	33.3-38.3'	33.3-38.3'	33.3-38.3'	33.3-38.3'
					Date of Collection	11/3/2009	4/15/2010	7/21/2010	10/18/2010	1/2/2014	8/7/2014	11/24/2015	11/28/2016	11/29/2017	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	
					Date of Analysis	11/12/2009	4/27/2010	7/28/2010	10/22/2010	1/8/2014	8/18/2014	11/29/2015	12/2/2016	12/2/2017	12/6/2018	10/16/2009	4/27/2010	7/28/2010	10/22/2010	12/6/2018	10/17/2009	4/27/2010	7/28/2010	10/22/2010	12/6/2018	
71432	1	--*	130	200 (X)	Benzene (I)	21	26	35	9	12	8	3	1	ND	1.4	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	
100414	1	320	200	18	Ethylbenzene (I)	56	49	61	25	37	30	4.6	6.9	ND	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
108883	1	2,600	--*	270	Toluene (I)	1.2	4.2	2.8	2.2	ND	1.6	2.2	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
95636	1	310	190	17	1,2,4-Trimethylbenzene (I)	5.4	12	12	13	23	8.7	4.1	4.5	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
108678	1	810	500	45	1,3,5-Trimethylbenzene (I)	1.3	1.7	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1330207	3	890	540	41	Xylenes, Total (I)	10	22	22	16	22	11	8	3.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

SVOCs					UPG-200A										UPG-200B					UPG-200C					
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200B	UPG-200B	UPG-200B	UPG-200B	UPG-200B	UPG-200C	UPG-200C	UPG-200C	UPG-200C	UPG-200C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	10.6-15.6'	10.6-15.6'	10.6-15.6'	10.6-15.6'	10.6-15.6'	33.3-38.3'	33.3-38.3'	33.3-38.3'	33.3-38.3'	33.3-38.3'
					Date of Collection	10/8/2009	4/15/2010	7/21/2010	10/18/2010	1/2/2014	-	-	-	-	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018
					Date of Analysis	10/16/2009	4/22/2010	7/29/2010	10/27/2010	1/8/2014	-	-	6/26/2013	-	12/6/2018	10/16/2009	4/23/2010	7/29/2010	10/26/2010	12/6/2018	10/16/2009	4/23/2010	7/29/2010	10/26/2010	12/6/2018
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	0.34	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	17	10	3.3	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

WATER QUALITY PARAMETERS					UPG-200A										UPG-200B					UPG-200C					
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200A	UPG-200B	UPG-200B	UPG-200B	UPG-200B	UPG-200B	UPG-200C	UPG-200C	UPG-200C	UPG-200C	UPG-200C	
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	5.0-10.0'	10.6-15.6'	10.6-15.6'	10.6-15.6'	10.6-15.6'	10.6-15.6'	33.3-38.3'	33.3-38.3'	33.3-38.3'	33.3-38.3'	33.3-38.3'
				Date of Collection	10/8/2009	4/15/2010	7/21/2010	10/18/2010	1/2/2014	8/7/2014	11/24/2015	11/28/2016	11/29/2017	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	
				Date of Analysis	10/8/2009	4/15/2010	7/21/2010	10/18/2010	1/2/2014	8/7/2014	11/24/2015	11/28/2016	11/29/2017	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	10/8/2009	4/15/2010	7/21/2010	10/18/2010	11/30/2018	
-	-	6.5-9.0	6.5-9.0	pH	7.7	6.5	7.8	7.5	7.0	6.8	7.0	6.9	6.9	6.6	7.8	6.9	8.0	7.5	7.1	7.9	7.4	8.3	7.5	7.3	
-	-	-	NE	ORP	-25.9	80.1	37.4	-18.9	39.4	-3.7	-322.6	-59.5	-77.2	-90.5	-35.4	39.8	31.9	-56.3	-102.3	-43.2	7.6	43.9	-88.3	-118.3	
-	-	-	(EE)	DO	0.4	1.1	0.1	1.3	0.3	0.4	0.6	0.0	0.0	1.3	0.2	1.2	0.1	1.4	0.2	0.4	1.1	0.2	0.7	0.3	

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

	Exceeds Mixing Zone-Based GSI Acute Criteria
	Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnoes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELScan be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELScan be located on MDEQ's website



Table 1 - Summary of Laboratory Analytical Results
UPG-300 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						UPG-300A			UPG-300B			UPG-300C		
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-300A	UPG-300A	UPG-300A	UPG-300B	UPG-300B	UPG-300B	UPG-300C	UPG-300C	UPG-300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.8-9.8'	4.8-9.8'	4.8-9.8'	19.7-24.7'	19.7-24.7'	19.7-24.7'	47.0-52.0'	47.0-52.0'	47.0-52.0'
					Date of Collection	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018
					Date of Analysis	10/15/2009	4/26/2010	12/10/2018	10/15/2009	4/26/2010	12/10/2018	10/15/2009	4/27/2010	12/10/2018
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND	ND	2.8	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND

SVOCs						UPG-300A			UPG-300B			UPG-300C		
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-300A	UPG-300A	UPG-300A	UPG-300B	UPG-300B	UPG-300B	UPG-300C	UPG-300C	UPG-300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.8-9.8'	4.8-9.8'	4.8-9.8'	19.7-24.7'	19.7-24.7'	19.7-24.7'	47.0-52.0'	47.0-52.0'	47.0-52.0'
					Date of Collection	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018
					Date of Analysis	10/15/2009	4/22/2010	12/10/2018	10/15/2009	4/22/2010	12/10/2018	10/15/2009	6/26/2013	12/10/2018
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND

WATER QUALITY PARAMETERS						UPG-300A			UPG-300B			UPG-300C		
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	UPG-300A	UPG-300A	UPG-300A	UPG-300B	UPG-300B	UPG-300B	UPG-300C	UPG-300C	UPG-300C	
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	4.8-9.8'	4.8-9.8'	4.8-9.8'	19.7-24.7'	19.7-24.7'	19.7-24.7'	47.0-52.0'	47.0-52.0'	47.0-52.0'	
				Date of Collection	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018	
				Date of Analysis	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018	10/8/2009	4/15/2010	12/3/2018	
-	-	6.5-9.0	6.5-9.0	pH	7.6	6.7	7.1	7.7	7.0	7.3	7.9	7.4	7.3	
-	-	-	NE	ORP	-9.9	87.2	-58.4	-24.1	109.0	-78.0	-34.2	72.3	126.2	
-	-	-	(EE)	DO	0.4	0.8	0.26	0.5	0.8	0.22	2.6	2.2	1.0	

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site
Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)
* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis
Footnoes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website
Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017
--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria/Loading or the Acute Criteria is protective of the Chronic Criteria/Loading



Table 1 - Summary of Laboratory Analytical Results
UPG-400 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

[illegible]

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Exceeds denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria
Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the **PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS** can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

-- Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading

Footnotes and acronyms for the **PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS** can be located on MDEQ's website



Table 1 - Summary of Laboratory Analytical Results
UPG-500 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						UPG-500A	UPG-500B	UPG-500C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-500A	UPG-500B	UPG-500C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.84-9.84'	19.34-24.34'	36.90-44.60'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/24/2019	7/19/2019	7/19/2019
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND

SVOCs						UPG-500A	UPG-500B	UPG-500C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-500A	UPG-500B	UPG-500C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.84-9.84'	19.34-24.34'	36.90-44.60'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/24/2019	7/19/2019	7/19/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND

WATER QUALITY PARAMETERS					UPG-500A	UPG-500B	UPG-500C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	UPG-500A	UPG-500B	UPG-500C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	4.84-9.84'	19.34-24.34'	36.90-44.60'
				Date of Collection	7/11/2019	7/11/2019	7/11/2019
				Date of Analysis	7/11/2019	7/11/2019	7/11/2019
-	-	6.5-9.0	6.5-9.0	pH	6.2	6.9	7.2
-	-	-	NE	ORP	-27.6	-163.7	-196.1
-	-	-	(EE)	DO	2.7	0.3	0.3

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site
Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)
* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis
Footnoes and acronyms for the *PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS* can be located on MDEQ's website
Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017
--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
UPG-500 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					UPG-600A	UPG-600B	UPG-600C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-600A	UPG-600B	UPG-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.32-8.32'	19.56-24.56'	39.56-44.56
					Date of Collection	7/11/2019	7/11/2019	7/11/2019
					Date of Analysis	7/19/2019	7/19/2019	7/19/2019
71432	1	--*	130	200 (X)	Benzene	4.2	12	ND
100414	1	320	200	18	Ethylbenzene	320	990	480
108883	1	2,600	--*	270	Toluene	5.8	1,100	100
95636	1	310	190	17	1,2,4-Trimethylbenzene	39	440	84
108678	1	810	500	45	1,3,5-Trimethylbenzene	12	120	ND
1330207	3	890	540	41	Xylenes, Total	630	4,100	1,700

SVOCs					UPG-600A	UPG-600B	UPG-600C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	UPG-600A	UPG-600B	UPG-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.32-8.32'	19.56-24.56'	39.56-44.56
					Date of Collection	7/11/2019	7/11/2019	7/11/2019
					Date of Analysis	7/19/2019	7/19/2019	7/19/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	980	130
95487	10	1,400	840	(J)	2-Methylphenol	ND	90	19
106445	10	450	275	(J)	3&4-Methylphenol	ND	270	10
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	97	ND
91203	5	200	120	11	Naphthalene	12	400	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND

WATER QUALITY PARAMETERS					UPG-600A	UPG-600B	UPG-600C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	UPG-600A	UPG-600B	UPG-600C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	3.32-8.32'	19.56-24.56'	39.56-44.56
				Date of Collection	7/11/2019	7/11/2019	7/11/2019
				Date of Analysis	7/11/2019	7/11/2019	7/11/2019
-	-	6.5-9.0	6.5-9.0	pH	6.8	6.9	7.5
-	-	-	NE	ORP	-93.5	-68.3	-71.7
-	-	-	(EE)	DO	0.3	1.1	1.2

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnoes and acronyms for the *PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS* can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-100 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

[illegible][illegible][illegible][illegible]

Notes:

- All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
- ND - Compound not detected at a concentration greater than the laboratory's method detection limit
- NS - Not Sampled
- NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

	Exceeds Mixing Zone-Based GSI Acute Criteria
	Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8200 (VOCs), 8270 (SVOCs), EPA 8315-A (Carbonyl)

MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the **PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS** can be located on MDEQ's website

Mixing Zone-Based GSI criteria reflect MDEQ-developed criteria for site November 7, 2017

Chronic Criteria are based on the reasonable maximum exposure for compound to exceed **Acute Criteria/Loading** or the **Acute Criteria/Loading**

(F) - Sample filtered using 0.45 µm inline filter



Table 1 - Summary of Laboratory Analytical Results
GSI-200 -Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

[illegible]

SVOCs						GSI-200A																GSI-200B																GSI-200C																	
Chemical Abstracts Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria		Sample ID		GSI-200A																GSI-200B																GSI-200C															
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval Date of Collection	Screened Interval Date of Analysis	GSI-200A																GSI-200B																GSI-200C																
							GSI-200A																GSI-200B																GSI-200C																
							GSI-200A																GSI-200B																GSI-200C																
105679	5	2,700	--	380	2,4-Dimethylphenol	ND	ND	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.5	NA	ND	ND	ND	ND	NS	NS	NS	2.3	NS	460	1500	870	160	47	ND	NS	NS	NS	NS	870	1600														
95487	10	1,400	840	2,4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	NS	NS	NS	2.8	NS	160	590	ND	ND	ND	ND	ND	NS	NS	NS	350	190													
106445	10	450	275	38,4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	NS	NS	NS	23	NS	280	910	ND	ND	ND	ND	ND	NS	NS	NS	160	160													
132549	4	--	44	4,0	Dibenzofuran	ND	ND	ND	0.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	NS	NS	NS	150	NS	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	ND	ND													
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.55	NA	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	55	NS	ND	7.8	ND	ND	ND	ND	ND	NS	NS	NS	ND	ND													
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	270	ND	ND	ND	ND	1.5	ND	ND	NS	NS	NS	9.1	ND												
108952	5	--	5,000	210	Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	54	47	ND	ND	ND	ND	ND	NS	NS	NS	NS	21	ND												

[illegible][illegible]

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

	Exceeds Mixing Zone-Based GSI Acute Criteria
	Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the **PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVEL** can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

-- Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-300 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					GSI-300A			GSI-300B			GSI-300C			
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-300A	GSI-300A	GSI-300A	GSI-300B	GSI-300B	GSI-300B	GSI-300C	GSI-300C	GSI-300C
					Screened Interval	4.7-9.7'	4.7-9.7'	4.7-9.7'	18.5'-23.5'	18.5'-23.5'	4.7-9.7'	44.0-49.0'	44.0-49.0'	4.7-9.7'
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Date of Collection	10/8/2009	4/15/2010	11/27/2018	10/8/2009	4/15/2010	11/27/2018	10/8/2009	4/15/2010	11/27/2018
					Date of Analysis	10/17/2009	4/29/2010	11/30/2018	10/17/2009	4/29/2010	11/30/2018	10/17/2009	4/29/2010	11/30/2018
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND

SVOCs						GSI-300A			GSI-300B			GSI-300C		
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-300A	GSI-300A	GSI-300A	GSI-300B	GSI-300B	GSI-300B	GSI-300C	GSI-300C	GSI-300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.7-9.7'	4.7-9.7'	4.7-9.7'	18.5-23.5'	18.5-23.5'	4.7-9.7'	44.0-49.0'	44.0-49.0'	4.7-9.7'
					Date of Collection	10/9/2009	4/15/2010	11/27/2018	10/9/2009	4/15/2010	11/27/2018	10/9/2009	4/15/2010	11/27/2018
					Date of Analysis	10/16/2009	4/23/2010	11/30/2018	10/16/2009	4/23/2010	11/30/2018	10/16/2009	6/26/2013	11/30/2018
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND

CARBONYL COMPOUNDS						GSI-300A			GSI-300B			GSI-300C		
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-300A	GSI-300A	GSI-300A	GSI-300B	GSI-300B	GSI-300B	GSI-300C	GSI-300C	GSI-300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.7-9.7'	4.7-9.7'	4.7-9.7'	18.5-23.5'	18.5-23.5'	4.7-9.7'	44.0-49.0'	44.0-49.0'	4.7-9.7'
					Date of Collection	-	-	11/27/2018	-	-	11/27/2018	-	-	11/27/2018
					Date of Analysis	-	-	11/30/2018	-	-	11/30/2018	-	-	11/30/2018
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	ND	NS	NS	ND	NS	NS	ND
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS

WATER QUALITY PARAMETERS					GSI-300A			GSI-300B			GSI-300C		
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-300A	GSI-300A	GSI-300A	GSI-300B	GSI-300B	GSI-300B	GSI-300C	GSI-300C	GSI-300C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	4.7-9.7'	4.7-9.7'	4.7-9.7'	18.5-23.5'	18.5-23.5'	4.7-9.7'	44.0-49.0'	44.0-49.0'	4.7-9.7'
				Date of Collection	10/9/2009	4/15/2010	11/27/2018	10/9/2009	4/15/2010	11/27/2018	10/9/2009	4/15/2010	11/27/2018
				Date of Analysis	10/9/2009	4/15/2010	11/27/2018	10/9/2009	4/15/2010	11/27/2018	10/9/2009	4/15/2010	11/27/2018
-	-	6.5-9.0	6.5-9.0	pH	7.6	6.6	6.8	7.7	6.7	6.9	7.9	7.3	7.4
-	-	-	NE	ORP	-22.5	85.8	-87.9	-47.8	72.7	-86.1	-50.2	64.2	-54.5
-	-	-	(EE)	DO	0.4	0.9	0.4	0.6	0.4	0.3	0.3	0.6	0.4

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the**PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS** can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-400 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

[illegible][illegible][illegible][illegible]

Notes:

- All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
- Compound not detected at a concentration greater than the laboratory's method detection limit
- NS = Not Sampled
- NE = Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

- Exceeds Mixing-Zone-Based GSI Acute Criteria
- Exceeds Mixing-Zone-Based GSI Chronic Criteria
- Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)
- MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the **PART 201 CRITERIA/PART 23 RISK BASED SCREENING LEVELS** can be located on MDEQ's website

Mixing-Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

For information on the health effects of the chemicals listed on this table, visit the MDEQ website or the Acute Criteria is protective of the Chronic Criteria/Land



Table 1 - Summary of Laboratory Analytical Results
GSI-500 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					GSI-500A																	GSI-500B							GSI-500C						
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C			
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'			
					Date of Collection	4/16/2009	4/16/2010	7/23/2010	10/19/2010	2/10/2011	10/19/2011	6/4/2012	10/22/2012	6/13/2013	1/3/2014	8/7/2014	11/25/2015	11/29/2016	11/29/2017	11/29/2018	7/10/2019	10/29/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019		
					Date of Analysis	10/27/2009	4/29/2010	7/28/2010	10/23/2010	2/16/2011	10/27/2011	6/7/2012	10/30/2012	6/21/2013	1/9/2014	8/15/2014	12/3/2015	12/2/2016	12/2/2017	12/6/2018	7/17/2019	11/4/2009	4/29/2010	7/28/2010	10/25/2010	12/6/2018	7/17/2019	10/24/2009	4/29/2010	7/28/2010	10/24/2010	12/6/2018	7/17/2019		
71432	1	--*	130	200 (X)	Benzene	16	53	68	130	35	17	43	9.5	19	45	41	23	20	11	11	8.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
100414	1	320	200	18	Ethylbenzene	9.2	65	120	220	14	15	26	3.2	11	48	46	2.2	1.4	ND	ND	1.2	1.1	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND		
108883	1	2,600	--*	270	Toluene	ND	2.6	23	14	2.1	ND	1.2	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	4.2	48	94	2	ND	1.9	ND	ND	ND	9.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	7.6	9.5	ND	ND	ND	ND	ND	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1330207	3	890	540	41	Xylenes, Total	4.2	21	110	140	13	7.8	22	ND	4.4	16	9.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		

SVOCs					GSI-500A																	GSI-500B						GSI-500C									
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C					
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'				
					Date of Collection	10/16/2009	4/16/2010	7/23/2010	10/19/2010	2/10/2011	10/19/2011	6/4/2012	10/22/2012	6/13/2013	-	-	-	-	-	-	-	-	-	11/29/2018	7/10/2019	10/29/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019
					Date of Analysis	10/23/2009	4/24/2010	7/30/2010	10/27/2010	2/16/2011	10/26/2011	6/7/2012	6/26/2013	6/21/2013	-	-	-	-	-	-	-	-	-	12/6/2018	7/17/2019	11/4/2009	4/24/2010	7/30/2010	10/26/2010	12/6/2018	7/17/2019	10/26/2009	4/24/2010	7/30/2010	10/26/2010	12/6/2018	7/17/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	0.67	ND	ND	ND	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	0.47	ND	ND	ND	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
91203	5	200	120	11	Naphthalene	ND	ND	11	31	ND	ND	ND	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			

CARBONYL COMPOUNDS					GSI-500A																	GSI-500B					GSI-500C								
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C			
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'		
					Date of Collection	10/16/2009	4/16/2010	7/23/2010	10/19/2010	2/10/2011	10/19/2011	6/4/2012	10/22/2012	6/13/2013	-	-	-	-	-	-	-	11/29/2018	7/10/2019	-	-	-	-	11/29/2018	7/10/2019	-	-	-	-	11/29/2018	7/10/2019
					Date of Analysis	10/23/2009	4/24/2010	7/30/2010	10/27/2010	2/16/2011	10/26/2011	6/7/2012	6/26/2013	6/21/2013	-	-	-	-	-	-	-	12/6/2018	7/17/2019	-	-	-	-	12/3/2018	7/17/2019	-	-	-	-	12/3/2018	7/17/2019
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND	ND	NS	NS	NS	NS	ND	ND	NS	NS	NS	NS	ND	ND		
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		

WATER QUALITY PARAMETERS					GSI-500A																	GSI-500B					GSI-500C						
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500A	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500B	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C	GSI-500C		
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	23.3-28.3'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'	48.1-53.1'		
			Date of Collection	10/16/2009	4/16/2010	7/23/2010	10/19/2010	2/10/2011	10/19/2011	6/4/2012	10/22/2012	6/13/2013	1/3/2014	8/7/2014	11/25/2015	11/29/2016	11/29/2017	11/29/2018	7/10/2019	10/29/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019		
			Date of Analysis	10/16/2009	4/16/2010	7/23/2010	10/19/2010	2/10/2011	10/19/2011	6/4/2012	10/22/2012	6/13/2013	1/3/2014	8/7/2014	11/25/2015	11/29/2016	11/29/2017	11/29/2018	7/10/2019	10/29/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	7/10/2019		
			pH	7.5	6.2	6.7	6.9	6.8	6.7	7.0	7.4	6.8	7.0	7.0	6.9	6.9	6.8	6.8	6.7	8.1	6.9	7.2	6.9	7.8	7.5	7.7	6.9	6.7	7.6	7.4	7.4	7.4	
-	-	6.5-9.0	6.5-9.0	NE	ORP	14.7	104.0	22.3	-42.4	NA	-70.8	-76.8	-92.6	-126.5	-64.6	-87.9	-7.7	-79.2	-87.4	-105.4	-104.3	25.1	65.5	20.4	-85.9	-130.1	-176.5	17.5	88.5	27.9	-13.4	-88.9	-137.4
-	-	-	(EE)	DO	0.6	0.6	0.1	1.7	0.4	0.3	0.6	0.3	0.3	0.3	0.4	0.5	0.0	0.1	1.3	0.3	0.5	0.4	0.1	0.9	0.2	0.3	0.3	0.5	0.2	0.4	0.3	0.3	

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site
Bold denotes criteria that has been exceeded
Exceeds Mixing Zone-Based GSI Acute Criteria
Exceeds Mixing Zone-Based GSI Chronic



Table 1 - Summary of Laboratory Analytical Results
GSI-600 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-600A					GSI-600B					GSI-600C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600C	GSI-600C	GSI-600C	GSI-600C	GSI-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'
					Date of Collection	10/8/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/29/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/8/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018
					Date of Analysis	10/17/2009	4/29/2010	7/28/2010	10/23/2010	12/4/2018	11/6/2009	4/29/2010	7/28/2010	10/23/2010	12/4/2018	10/20/2009	4/29/2010	7/28/2010	10/23/2010	12/4/2018
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

SVOCs						GSI-600A					GSI-600B					GSI-600C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600C	GSI-600C	GSI-600C	GSI-600C	GSI-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'
					Date of Collection	10/9/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/9/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/9/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018
					Date of Analysis	10/16/2009	4/23/2010	7/29/2010	10/26/2010	12/4/2018	10/16/2009	4/23/2010	6/26/2013	10/26/2010	12/4/2018	10/16/2009	4/23/2010	7/29/2010	10/26/2010	12/4/2018
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	0.51	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

CARBONYL COMPOUNDS						GSI-600A					GSI-600B					GSI-600C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600C	GSI-600C	GSI-600C	GSI-600C	GSI-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'
					Date of Collection	-	-	-	-	11/28/2018	-	-	-	-	11/28/2018	-	-	-	-	11/28/2018
					Date of Analysis	-	-	-	-	11/30/2018	-	-	-	-	11/30/2018	-	-	-	-	11/30/2018
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	NS	NS	ND	NS	NS	NS	NS	ND	NS	NS	NS	NS	ND
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

WATER QUALITY PARAMETERS					GSI-600A					GSI-600B					GSI-600C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600A	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600B	GSI-600C	GSI-600C	GSI-600C	GSI-600C	GSI-600C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	4.9-9.9'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	18.4-23.4'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'	40.1-45.1'
				Date of Collection	10/8/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/9/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/8/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018
				Date of Analysis	10/8/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/9/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018	10/8/2009	4/15/2010	7/22/2010	10/18/2010	11/28/2018
-	-	6.5-9.0	6.5-9.0	pH	7.6	6.6	7.3	7.4	6.9	7.6	6.5	7.6	7.4	7.0	7.7	7.0	7.8	7.1	7.7
-	-	-	NE	ORP	-4.9	71.5	-11.1	-43.0	-85.2	-34.4	79.8	7.2	-47.3	-87.2	31.4	52.7	-3.6	-62.5	-112.4
-	-	-	(EE)	DO	0.3	0.8	0.1	1.0	0.2	0.3	0.6	0.1	0.9	0.2	0.2	0.7	0.1	0.7	0.2

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site
Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)
* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis
Footnotes and acronyms for the**PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS** can be located on MDEQ's website
Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017
--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-700 - Groundwater VOCs/SVOCs/ Metals
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					GSI-700A																				GSI-700B																				GSI-700C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-7

Chemical Abstract Service Number		MDEQ OP Memo 2 TDL		SVOCs										GSI-700A										GSI-700B										GSI-700C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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							Screened Interval	Date of Collection	Date of Analysis	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A

CARBONYL COMPOUNDS					GSI-700A																GSI-700B																GSI-700C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700A	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700B	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-700C	GSI-

WATER QUALITY PARAMETERS					GSI-700A															GSI-700B				
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Table 1 - Summary of Laboratory Analytical Results
GSI-800 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-800A						GSI-800B					GSI-800C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800C	GSI-800C	GSI-800C	GSI-800C	GSI-800C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'
					Date of Collection	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/11/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018
					Date of Analysis	10/24/2009	4/29/2010	7/28/2010	10/24/2010	11/13/2010	12/6/2018	10/26/2009	4/29/2010	7/28/2010	10/24/2010	12/6/2018	10/24/2009	4/29/2010	7/29/2010	10/24/2010	12/6/2018
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	2.0	2.4	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	1.5	ND	13	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	1.1	ND	ND	6.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	9.6	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

SVOCs						GSI-800A						GSI-800B					GSI-800C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800C	GSI-800C	GSI-800C	GSI-800C	GSI-800C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'
					Date of Collection	10/16/2009	4/16/2010	7/23/2010	10/19/2010	-	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018
					Date of Analysis	10/26/2009	4/24/2010	7/30/2010	10/27/2010	-	12/6/2018	10/21/2009	6/26/2013	7/31/2010	10/26/2010	12/6/2018	10/26/2009	4/24/2010	7/31/2010	10/26/2010	12/6/2018
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

CARBONYL COMPOUNDS					GSI-800A						GSI-800B					GSI-800C					
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800C	GSI-800C	GSI-800C	GSI-800C	GSI-800C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'
					Date of Collection	-	-	-	-	-	11/29/2018	-	-	-	-	11/29/2018	-	-	-	-	11/29/2018
					Date of Analysis	-	-	-	-	-	12/3/2018	-	-	-	-	12/3/2018	-	-	-	-	12/3/2018
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	ND	NS	NS	NS	NS	ND
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

WATER QUALITY PARAMETERS					GSI-800A						GSI-800B					GSI-800C				
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800A	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800B	GSI-800C	GSI-800C	GSI-800C	GSI-800C	GSI-800C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	9.1-14.1'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	19.5-24.5'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'	44.6-49.6'
				Date of Collection	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/11/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018
				Date of Analysis	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/11/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018	10/16/2009	4/16/2010	7/23/2010	10/19/2010	11/29/2018
-	-	6.5-9.0	6.5-9.0	pH	7.5	6.3	7.0	6.8	8.7	7.1	7.9	7.1	7.3	7.6	7.8	8.1	7.3	6.8	6.8	8.1
-	-	-	NE	ORP	24.8	92.9	39.0	-38.6	-26.9	-64.6	15.1	76.4	39.4	-18.7	-134.1	6.7	79.8	85.3	-16.7	-117.4
-	-	-	(EE)	DO	0.3	0.6	0.3	0.6	1.4	0.2	0.6	0.4	0.2	0.5	0.3	0.2	0.5	0.1	0.5	0.2

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site
Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria
Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)
* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis
Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website
Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017
--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-900 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-900A			GSI-900B			GSI-900C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-900A	GSI-900A	GSI-900A	GSI-900B	GSI-900B	GSI-900B	GSI-900C	GSI-900C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	16.8-21.8'	16.8-21.8'	16.8-21.8'	41.4-46.4'	41.4-46.4'
					Date of Collection	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010
					Date of Analysis	10/24/2009	4/24/2010	12/10/2018	10/26/2009	4/29/2010	12/10/2018	10/26/2009	4/29/2010
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	ND	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND	ND	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	ND	ND	ND	ND	ND

SVOCs						GSI-900A			GSI-900B			GSI-900C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-900A	GSI-900A	GSI-900A	GSI-900B	GSI-900B	GSI-900A	GSI-900C	GSI-900C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	16.8-21.8'	16.8-21.8'	16.8-21.8'	41.4-46.4'	41.4-46.4'
					Date of Collection	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010
					Date of Analysis	10/26/2009	4/24/2010	12/10/2018	10/26/2009	4/23/2010	12/10/2018	10/26/2009	4/29//2010
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND	ND	ND	ND	
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	ND	ND	

CARBONYL COMPOUNDS						GSI-900A			GSI-900B			GSI-900C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-900A	GSI-900A	GSI-900A	GSI-900B	GSI-900B	GSI-900A	GSI-900C	GSI-900C
		Acute Criteria	Chronic Criteria	Groundwater	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	16.8-21.8'	16.8-21.8'	16.8-21.8'	41.4-46.4'	41.4-46.4'
				Surface Water	Date of Collection	-	-	12/3/2018	-	-	12/3/2018	-	-
				Interface	Date of Analysis	-	-	12/6/2018	-	-	12/6/2018	-	-
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	ND	NS	NS	ND	NS	NS
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	NS	NS	NS

WATER QUALITY PARAMETERS					GSI-900A			GSI-900B			GSI-900C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-900A	GSI-900A	GSI-900A	GSI-900B	GSI-900B	GSI-900A	GSI-900C	GSI-900C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	9.1-14.1'	9.1-14.1'	9.1-14.1'	16.8-21.8'	16.8-21.8'	16.8-21.8'	41.4-46.4'	41.4-46.4'
				Date of Collection	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010
				Date of Analysis	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010	12/3/2018	10/19/2009	4/16/2010
-	-	6.5-9.0	6.5-9.0	pH	7.8	6.6	7.0	8.0	7.1	7.8	8.3	7.5
-	-	-	NE	ORP	28.8	100.7	-53.6	24.0	91.8	-92.8	9.9	84.3
-	-	-	(EE)	DO	0.6	0.7	0.2	0.3	0.6	0.2	0.2	0.9

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site
Bold denotes criteria that has been exceeded

	Exceeds Mixing Zone-Based GSI Acute Criteria
	Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-1000 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-1000A	GSI-1000B	GSI-1000C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1000A	GSI-1000B	GSI-1000C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.88-8.88'	19.12-24.12'	39.56-44.56'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/23/2019	7/19/2019	7/19/2019
71432	1	--*	130	200 (X)	Benzene	ND	36	ND
100414	1	320	200	18	Ethylbenzene	130	170	3.6
108883	1	2,600	--*	270	Toluene	150	270	7.7
95636	1	310	190	17	1,2,4-Trimethylbenzene	98	93	1.7
108678	1	810	500	45	1,3,5-Trimethylbenzene	16	22	ND
1330207	3	890	540	41	Xylenes, Total	460	530	11

SVOCs						GSI-1000A	GSI-1000B	GSI-1000C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1000A	GSI-1000B	GSI-1000C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.88-8.88'	19.12-24.12'	39.56-44.56'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/23/2019	7/19/2019	7/19/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	20	520	17
95487	10	1,400	840	(J)	2-Methylphenol	6.6	38	ND
106445	10	450	275	(J)	3&4-Methylphenol	23	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	6	ND	ND
91203	5	200	120	11	Naphthalene	47	76	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND

CARBONYL COMPOUNDS						GSI-1000A	GSI-1000B	GSI-1000C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1000A	GSI-1000B	GSI-1000C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.88-8.88'	19.12-24.12'	39.56-44.56'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/23/2019	7/19/2019	7/19/2019
75070	100	2,400	1,430	130	Acetaldehyde	ND	ND	ND

WATER QUALITY PARAMETERS					GSI-1000A	GSI-1000B	GSI-1000C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-1000A	GSI-1000B	GSI-1000C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	3.88-8.88'	19.12-24.12'	39.56-44.56'
				Date of Collection	7/11/2019	7/11/2019	7/11/2019
				Date of Analysis	7/11/2019	7/11/2019	7/11/2019
-	-	6.5-9.0	6.5-9.0	pH	6.5	6.6	7.7
-	-	-	NE	ORP	-105.7	-87.0	-103.9
-	-	-	(EE)	DO	0.3	0.2	1.06

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria/Loading or the Acute Criteria is protective of the Chronic Criteria/Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-1100 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.35-8.35'	19.00-24.00'	19.00-24.00'	39.26-44.26'	39.26-44.26'
					Date of Collection	7/11/2019	7/11/2019	7/31/2019	7/11/2019	7/31/2019
					Date of Analysis	7/19/2019	7/19/2019	8/6/2019	7/19/2019	8/6/2019
71432	1	--*	130	200 (X)	Benzene	ND	6.6	5.6	ND	5.6
100414	1	320	200	18	Ethylbenzene	ND	140	160	160	190
108883	1	2,600	--*	270	Toluene	ND	81	73	230	340
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	210	250	98	110
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	62	70	30	32
1330207	3	890	540	41	Xylenes, Total	ND	500	580	570	730

SVOCs						GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.35-8.35'	19.00-24.00'	19.00-24.00'	39.26-44.26'	39.26-44.26'
					Date of Collection	7/11/2019	7/11/2019	7/31/2019	7/11/2019	7/31/2019
					Date of Analysis	7/19/2019	7/19/2019	8/2/2019	7/19/2019	8/2/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	800	1,200	9,000	1,100
95487	10	1,400	840	(J)	2-Methylphenol	ND	160	ND	1,800	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	60	320	15,000	1,100
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	46	46	ND	ND
91203	5	200	120	11	Naphthalene	ND	440	640	140	13
108952	5	--*	5,000	210	Phenol	ND	ND	ND	850	ND

CARBONYL COMPOUNDS						GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.35-8.35'	19.00-24.00'	19.00-24.00'	39.26-44.26'	39.26-44.26'
					Date of Collection	7/11/2019	7/11/2019	7/31/2019	7/11/2019	7/31/2019
					Date of Analysis	7/19/2019	7/19/2019	-	7/19/2019	-
75070	100	2,400	1,430	130	Acetaldehyde	ND	ND	NS	ND	NS

WATER QUALITY PARAMETERS					GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-1100A	GSI-1100B	GSI-1100B	GSI-1100C	GSI-1100C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	3.35-8.35'	19.00-24.00'	19.00-24.00'	39.26-44.26'	39.26-44.26'
				Date of Collection	7/11/2019	7/11/2019	7/31/2019	7/11/2019	7/31/2019
				Date of Analysis	7/11/2019	7/11/2019	7/31/2019	7/11/2019	7/31/2019
-	-	6.5-9.0	6.5-9.0	pH	6.6	6.7	6.8	6.9	6.8
-	-	-	NE	ORP	-61.4	-83.2	-113.1	-99.1	-143.4
-	-	-	(EE)	DO	0.4	0.3	1.1	1.0	1.0

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria/Loading or the Acute Criteria is protective of the Chronic Criteria/Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-1200 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-1200A	GSI-1200B	GSI-1200C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1200A	GSI-1200B	GSI-1200C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	5.26-10.26'	19.68-24.68'	39.11-44.11'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/24/2019	7/19/2019	7/19/2019
71432	1	--*	130	200 (X)	Benzene	ND	1.5	ND
100414	1	320	200	18	Ethylbenzene	ND	1.4	19
108883	1	2,600	--*	270	Toluene	ND	ND	31
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	15
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	67

SVOCs						GSI-1200A	GSI-1200B	GSI-1200C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1200A	GSI-1200B	GSI-1200C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	5.26-10.26'	19.68-24.68'	39.11-44.11'
					Date of Collection	7/16/2019	7/11/2019	7/11/2019
					Date of Analysis	7/24/2019	7/19/2019	7/19/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	2,900
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	210
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	5,800
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	68

CARBONYL COMPOUNDS						GSI-1200A	GSI-1200B	GSI-1200C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1200A	GSI-1200B	GSI-1200C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	5.26-10.26'	19.68-24.68'	39.11-44.11'
					Date of Collection	7/21/2019	7/11/2019	7/11/2019
					Date of Analysis	7/24/2019	7/19/2019	7/19/2019
75070	100	2,400	1,430	130	Acetaldehyde	ND	ND	ND

WATER QUALITY PARAMETERS					GSI-1200A	GSI-1200B	GSI-1200C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-1200A	GSI-1200B	GSI-1200C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	5.26-10.26'	19.68-24.68'	39.11-44.11'
				Date of Collection	7/11/2019	7/11/2019	7/11/2019
				Date of Analysis	7/11/2019	7/11/2019	7/11/2019
-	-	6.5-9.0	6.5-9.0	pH	6.9	6.7	7.0
-	-	-	NE	ORP	-23.2	-171.2	-232.8
-	-	-	(EE)	DO	1.2	0.2	0.26

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
GSI-1300 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						GSI-1300A	GSI-1300B	GSI-1300C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1300A	GSI-1300B	GSI-1300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.89-8.89'	19.80-24.80'	39.49-44.49'
					Date of Collection	7/11/2019	7/11/2019	7/11/2019
					Date of Analysis	7/19/2019	7/19/2019	7/19/2019
71432	1	--*	130	200 (X)	Benzene	ND	ND	2.8
100414	1	320	200	18	Ethylbenzene	ND	280	27
108883	1	2,600	--*	270	Toluene	ND	140	17
95636	1	310	190	17	1,2,4-Trimethylbenzene	1.2	290	6
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	79	1.1
1330207	3	890	540	41	Xylenes, Total	ND	890	76

SVOCs						GSI-1300A	GSI-1300B	GSI-1300C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1300A	GSI-1300B	GSI-1300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.89-8.89'	19.80-24.80'	39.49-44.49'
					Date of Collection	7/11/2019	7/11/2019	7/11/2019
					Date of Analysis	7/19/2019	7/19/2019	7/19/2019
105679	5	2,700	--*	380	2,4-Dimethylphenol	ND	80	32
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	44	ND
91203	5	200	120	11	Naphthalene	ND	180	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND

CARBONYL COMPOUNDS						GSI-1300A	GSI-1300B	GSI-1300C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	GSI-1300A	GSI-1300B	GSI-1300C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	3.89-8.89'	19.80-24.80'	39.49-44.49'
					Date of Collection	7/11/2019	7/11/2019	7/11/2019
					Date of Analysis	7/19/2019	7/19/2019	7/19/2019
75070	100	2,400	1,430	130	Acetaldehyde	ND	ND	ND

WATER QUALITY PARAMETERS					GSI-1300A	GSI-1300B	GSI-1300C
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	GSI-1300A	GSI-1300B	GSI-1300C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	3.89-8.89'	19.80-24.80'	39.49-44.49'
				Date of Collection	7/11/2019	7/11/2019	7/11/2019
				Date of Analysis	7/11/2019	7/11/2019	7/11/2019
-	-	6.5-9.0	6.5-9.0	pH	6.7	6.9	7.7
-	-	-	NE	ORP	-131.8	-40.7	-70.5
-	-	-	(EE)	DO	0.3	1.2	1.2

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading



Table 1 - Summary of Laboratory Analytical Results
MW-500 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					MW-500A			MW-500B													MW-500C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-500A	MW-500A ¹	MW-500A	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500C	MW-500C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.98-9.98	4.98-9.98	4.98-9.98	19.98-24.98	19.98-24.98	19.98-24.99	19.98-24.99	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	44.98-49.98	44.98-49.98
					Date of Collection	9/6/2010	11/30/2018	12/5/2018	9/2/2010	2/9/2011	10/18/2011	6/5/2012	10/24/2012	6/13/2013	1/3/2014	8/6/2014	11/23/2015	11/29/2016	11/28/2017	11/30/2018	9/2/2010	11/30/2018
					Date of Analysis	9/17/2010	12/6/2018	12/10/2018	9/6-7/2010	2/16/2011	10/22/2011	6/12/2012	10/31/2012	6/21/2013	1/9/2014	8/15/2014	11/26/2015	12/2/2016	12/1/2017	12/7/2018	9/7/2010	12/7/2018
71432	1	--*	130	200 (X)	Benzene	ND	NS	ND	3	ND	2.5	15	ND	4.0	10	10	ND	ND	2.4	3.2	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	NS	ND	43	120	110	85	89	60	160	69	58	35	92	71	1.9	ND
108883	1	2,600	--*	270	Toluene	ND	NS	ND	38	200	180	69	160	140	270	90	69	6.1	42	24	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	NS	ND	96	140	180	120	150	130	190	110	120	48	95	94	1.4	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	NS	ND	27	34	43	30	35	31	46	28	34	13	25	24	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	NS	ND	120	360	310	240	260	170	470	210	160	22	280	140	3.4	ND

SVOCs					MW-500A			MW-500B													MW-500C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-500A	MW-500A	MW-500A	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500C	MW-500C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.98-9.98	4.98-9.98	4.98-9.98	19.98-24.98	19.98-24.98	19.98-24.99	19.98-24.99	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	44.98-49.98	44.98-49.98
					Date of Collection	9/6/2010	11/30/2018	12/5/2018	9/2/2010	2/9/2011	10/18/2011	6/5/2012	10/24/2012	6/13/2013	1/8/2014	8/6/2014	11/23/2015	11/29/2016	11/28/2017	11/30/2018	9/2/2010	11/30/2018
					Date of Analysis	9/14/2010	12/7/2018	12/10/2018	9/11/2010	2/16/2011	10/28/2011	6/9/2012	6/26/2013	6/21/13-6/26/13	1/16/2014	8/15/2014	11/26/2015	12/1/2016	12/1/2017	12/7/2018	9/10/2010	12/7/2018
42669020	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	NS	ND	1,700	1,100	1,500	1,800	1,600	3,600	2,800	720	ND	620	230	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	NS	ND	540	400	340	430	160	2,000	76	130	ND	ND	8.4	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	NS	ND	1,700	1,100	1,100	1,900	640	5,700	200	92	11	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	NS	ND	ND	160	150	ND	160	210	120	210	21	29	17	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	NS	33	800	450	640	1,100	660	960	530	710	390	390	260	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	NS	ND	ND	160	120	180	80	900	10	ND	ND	17	ND	ND	ND

CARBONYL COMPOUNDS					MW-500A			MW-500B													MW-500C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-500A	MW-500A	MW-500A	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500C	MW-500C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.98-9.98	4.98-9.98	4.98-9.98	19.98-24.98	19.98-24.98	19.98-24.99	19.98-24.99	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	44.98-49.98	44.98-49.98
					Date of Collection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/28/2017	-	-
					Date of Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12/1/2017	-	-
75070	100	2,400	1,430	130	Acetaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND	NS	NS	NS
50000	100	NE	NE	120	Formaldehyde	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	ND	NS	NS	NS

WATER QUALITY PARAMETERS					MW-500A			MW-500B													MW-500C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters		Part 201 Generic Cleanup Criteria	Sample ID	MW-500A	MW-500A ¹	MW-500A	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500B	MW-500C	MW-500C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	6.5-9.0	Screened Interval	4.98-9.98	4.98-9.98	4.98-9.98	19.98-24.98	19.98-24.98	19.98-24.99	19.98-24.99	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	23.3-28.3	44.98-49.98	44.98-49.98
					Date of Collection	9/6/2010	11/30/2018	12/5/2018	9/2/2010	2/9/2011	10/18/2011	6/5/2012	10/24/2012	6/13/2013	1/3/2014	8/6/2014	11/23/2015	11/29/2016	11/28/2017	11/30/2018	9/2/2010	11/30/2018
					Date of Analysis	9/6/2010	11/30/2018	12/5/2018	9/2/2010	2/9/2011	10/18/2011	6/5/2012	10/24/2012	6/13/2013	1/3/2014	8/6/2014	11/23/2015	11/29/2016	11/28/2017	11/30/2018	9/2/2010	11/30/2018
-	-	6.5-9.0	6.5-9.0	pH		8.9	6.5	6.55	8.5	7.2	6.7	6.9	7.0	7.0	6.9	NA	7.2	6.9	6.9	8.4	7.7	
-	-	-	NE	ORP		35.7	-85.9	-64.6	-49.8	-252.5	-115.9	-84.7	-101.8	-130.1	-73.9	-73.4	NA	-134	-201.3	-124.5	-124.1	-167.2
-	-	-	(EE)	DO		0.85	0.22	0.22	0.6	0.2	0.3	0.3	0.3	0.2	0.9	0.3	NA	0.1	0.2	0.2	0.3	0.2

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnotes and acronyms for the *PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS* can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading

¹ - 11/30/2018 VOC sample containers broken in transit due to freezing, additional samples collected on 12/5/2018.



Table 1 - Summary of Laboratory Analytical Results
MW-600 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs					MW-600A		MW-600B		MW-600C			
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID		MW-600A	MW-600A	MW-600B	MW-600B	MW-600C	MW-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval		4.78-9.78	4.78-9.78	19.53-24.53	19.53-24.53	49.74-54.74	49.74-54.74
					Date of Collection		9/6/2010	11/30/2018	9/2/2010	11/30/2018	9/2/2010	11/30/2018
					Date of Analysis		9/17/2010	12/6/2018	9/7/2010	12/6/2018	9/6/2010	12/6/2018
71432	1	--*	130	200 (X)	Benzene	1.2	1.2	ND	ND	ND	ND	
100414	1	320	200	18	Ethylbenzene	ND	2.2	ND	ND	3.3	ND	
108883	1	2,600	--*	270	Toluene	ND	1.0	ND	ND	ND	ND	
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	ND	1.2	ND	
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	
1330207	3	890	540	41	Xylenes, Total	ND	4.2	ND	ND	3.0	ND	

SVOCs						MW-600A		MW-600B		MW-600C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-600A	MW-600A	MW-600B	MW-600B	MW-600C	MW-600C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	4.78-9.78	4.78-9.78	19.53-24.53	19.53-24.53	49.74-54.74	49.74-54.74
					Date of Collection	9/6/2010	11/30/2018	9/2/2010	11/30/2018	9/2/2010	11/30/2018
					Date of Analysis	9/14/2010	12/6/2018	9/7/2010	12/6/2018	9/7/2010	12/6/2018
42669020	5	2,700	--*	380	2,4-Dimethylphenol	ND	19	ND	ND	43	6.0
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND	ND	ND

WATER QUALITY PARAMETERS					MW-600A		MW-600B		MW-600C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	MW-600A	MW-600A	MW-600B	MW-600B	MW-600C	MW-600C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	4.78-9.78	4.78-9.78	19.53-24.53	19.53-24.53	49.74-54.74	49.74-54.74
				Date of Collection	9/6/2010	11/30/2018	9/2/2010	11/30/2018	9/2/2010	11/30/2018
				Date of Analysis	9/6/2010	11/30/2018	9/2/2010	11/30/2018	9/2/2010	11/30/2018
-	-	6.5-9.0	6.5-9.0	pH	8.9	6.5	8.2	7.3	7.1	7.8
-	-	-	NE	ORP	-17.6	-54.7	-30.8	-83.8	36.7	-125.8
-	-	-	(EE)	DO	0.5	1.3	0.6	0.2	1.2	0.3

Notes:

All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)

ND - Compound not detected at a concentration greater than the laboratory's method detection limit

NS - Not Sampled

NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnoes and acronyms for the *PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS* can be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading

Footnotes and acronyms for the *PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS* can be located on MDEQ's website



Table 1 - Summary of Laboratory Analytical Results
MW-700 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						MW-700B		MW-700C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-700B	MW-700B	MW-700C	MW-700C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	19.59-24.59	19.59-24.59	44.64-49.64	44.64-49.64
					Date of Collection	9/2/2010	12/3/2018	9/2/2010	12/3/2018
					Date of Analysis	9/6/2010	12/10/2018	9/6/2010	12/10/2018
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	ND

SVOCs						MW-700B		MW-700C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-700B	MW-700B	MW-700C	MW-700C
		Acute Criteria	Chronic Criteria		Screened Interval	19.59-24.59	19.59-24.59	44.64-49.64	44.64-49.64
					Date of Collection	9/2/2010	12/3/2018	9/2/2010	12/3/2018
					Date of Analysis	9/7/2010	12/10/2018	9/7/2010	12/10/2018
42669020	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND

WATER QUALITY PARAMETERS					MW-700B		MW-700C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	MW-700B	MW-700B	MW-700C	MW-700C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	19.59-24.59	19.59-24.59	44.64-49.64	44.64-49.64
				Date of Collection	9/2/2010	12/3/2018	9/2/2010	12/3/2018
				Date of Analysis	9/2/2010	12/3/2018	9/2/2010	12/3/2018
-	-	6.5-9.0	6.5-9.0	pH	6.8	7.6	6.3	7.5
-	-	-	NE	ORP	-6.7	26.7	23.4	118.1
-	-	-	(EE)	DO	0.9	0.2	1.3	1.5

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded

Exceeds Mixing Zone-Based GSI Acute Criteria

Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnoes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELScan be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELScan be located on MDEQ's website



Table 1 - Summary of Laboratory Analytical Results
MW-800 - Groundwater VOCs & SVOCs
Former Cliffs Dow Site
Marquette, Michigan
TriMedia Project Number: 99-059

VOCs						MW-800B		MW-800C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-800B	MW-800B	MW-800C	MW-800C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	19.69-24.69	19.69-24.69	42.90-47.90	42.90-47.90
					Date of Collection	9/2/2010	12/3/2018	9/2/2010	12/3/2018
					Date of Analysis	9/6/2010	12/10/2018	9/6/2010	12/10/2018
71432	1	--*	130	200 (X)	Benzene	ND	ND	ND	ND
100414	1	320	200	18	Ethylbenzene	ND	ND	ND	ND
108883	1	2,600	--*	270	Toluene	ND	ND	ND	ND
95636	1	310	190	17	1,2,4-Trimethylbenzene	ND	ND	ND	ND
108678	1	810	500	45	1,3,5-Trimethylbenzene	ND	ND	ND	ND
1330207	3	890	540	41	Xylenes, Total	ND	ND	ND	ND

SVOCs						MW-800B		MW-800C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Water Quality Based Effluent Limits		Part 201 Generic Cleanup Criteria	Sample ID	MW-800B	MW-800B	MW-800C	MW-800C
		Acute Criteria	Chronic Criteria	Groundwater Surface Water Interface	Screened Interval	19.69-24.69	19.69-24.69	42.90-47.90	42.90-47.90
					Date of Collection	9/2/2010	12/3/2018	9/2/2010	12/3/2018
					Date of Analysis	9/7/2010	12/10/2018	9/7/2010	12/10/2018
42669020	5	2,700	--*	380	2,4-Dimethylphenol	ND	ND	ND	ND
95487	10	1,400	840	(J)	2-Methylphenol	ND	ND	ND	ND
106445	10	450	275	(J)	3&4-Methylphenol	ND	ND	ND	ND
132649	4	--*	44	4.0	Dibenzofuran	ND	ND	ND	ND
91576	5	340	210	19	2-Methylnaphthalene	ND	ND	ND	ND
91203	5	200	120	11	Naphthalene	ND	ND	ND	ND
108952	5	--*	5,000	210	Phenol	ND	ND	ND	ND

WATER QUALITY PARAMETERS					MW-800B		MW-800C	
Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Field Measured Parameters	Part 201 Generic Cleanup Criteria	Sample ID	MW-800B	MW-800B	MW-800C	MW-800C
		Mixing Zone Based Criteria	Groundwater Surface Water Interface	Screened Interval	19.69-24.69	19.69-24.69	42.90-47.90	42.90-47.90
				Date of Collection	9/2/2010	12/3/2018	9/2/2010	12/3/2018
				Date of Analysis	9/2/2010	12/3/2018	9/2/2010	12/3/2018
-	-	6.5-9.0	6.5-9.0	pH	8.4	7.7	7.9	7.4
-	-	-	NE	ORP	-52.7	2.5	-27.9	45.4
-	-	-	(EE)	DO	0.6	1.4	0.9	0.3

Notes:
All results are presented in micrograms per liter (µg/L) or parts per billion (ppb)
ND - Compound not detected at a concentration greater than the laboratory's method detection limit
NS - Not Sampled
NE - Indicates criteria not established for the site

Bold denotes criteria that has been exceeded NE
Exceeds Mixing Zone-Based GSI Acute Criteria (EE)
Exceeds Mixing Zone-Based GSI Chronic Criteria

Analytical Methods EPA 8260 (VOCs), 8270 (SVOCs), EPA 8315A (Carbonyl)

* MDEQ Operations Memorandum 2 TDL not met for laboratory analysis

Footnoes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELScan be located on MDEQ's website

Mixing Zone-Based GSI Criteria reflect MDEQ-developed criteria for site November 7, 2017

--* Indicates there is either no reasonable potential for compound to exceed Acute Criteria>Loading or the Acute Criteria is protective of the Chronic Criteria>Loading

Footnotes and acronyms for thePART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELScan be located on MDEQ's website

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MDEQ
Marquette ERD

Site Investigation Report

***Former Cliffs-Dow Plant
Marquette, Michigan***

March 1998

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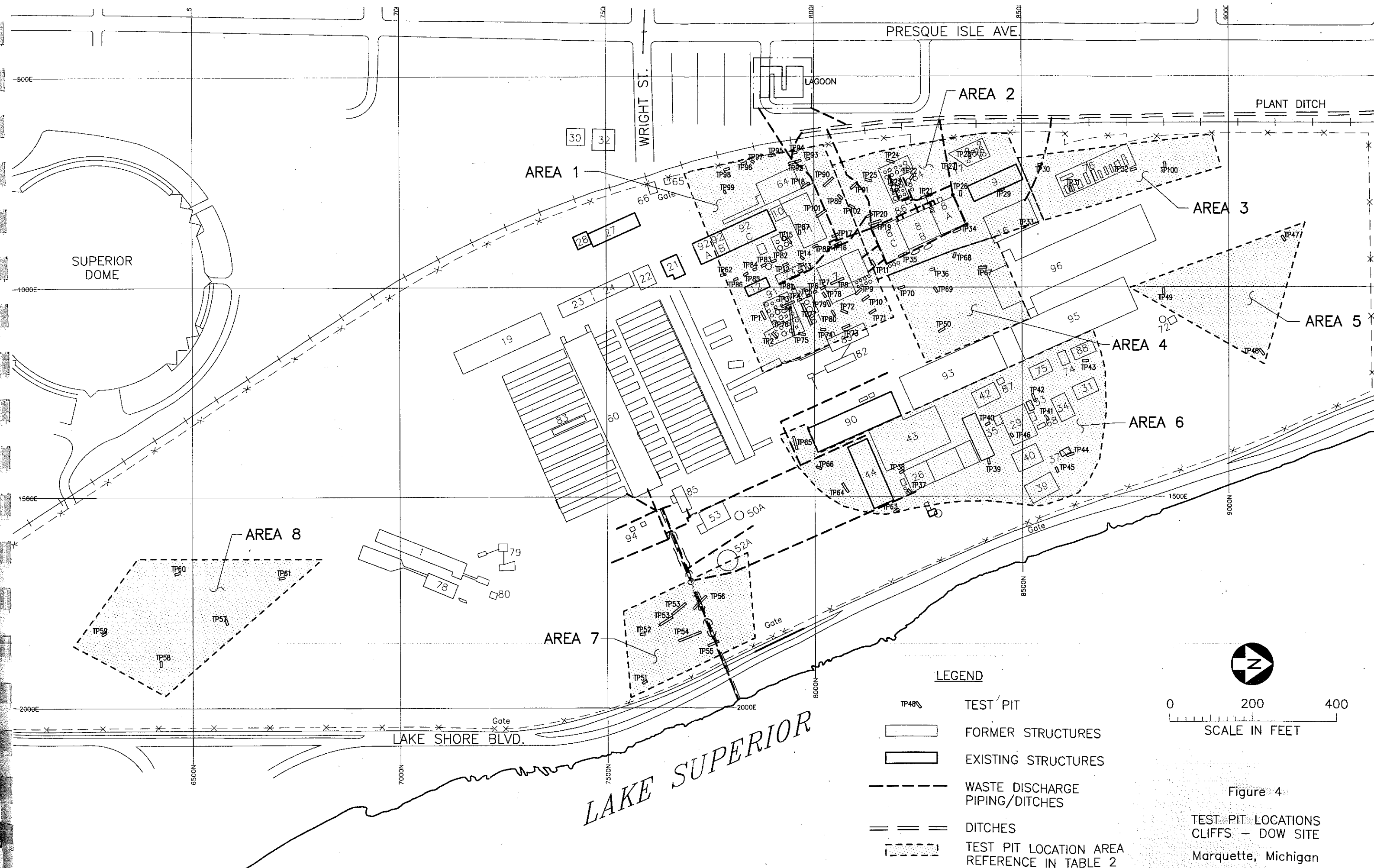
Engineering Company

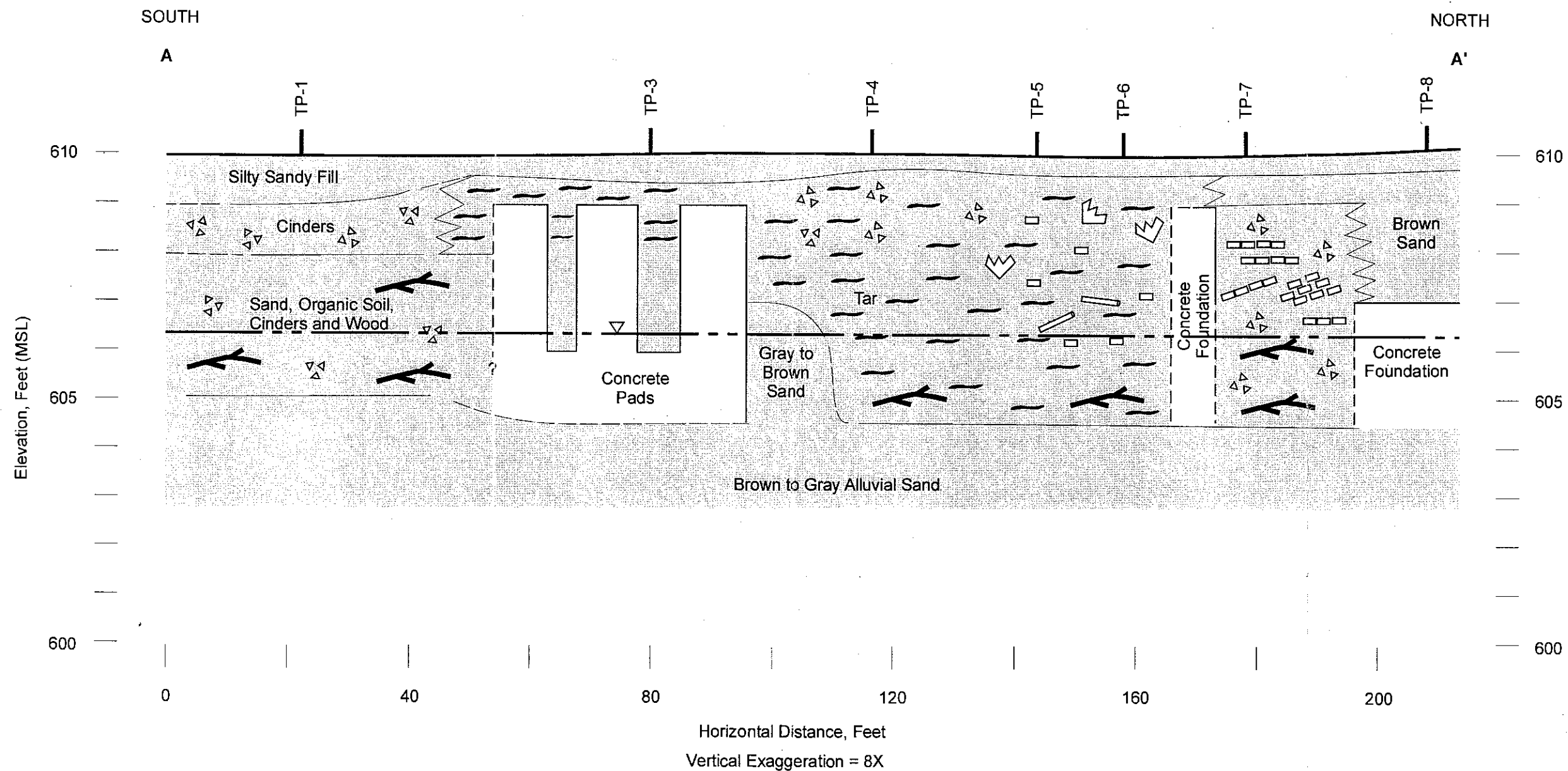
8300 Norman Center Drive

Minneapolis, MN 55437

Phone: (612) 832-2600

Fax: (612) 832-2601



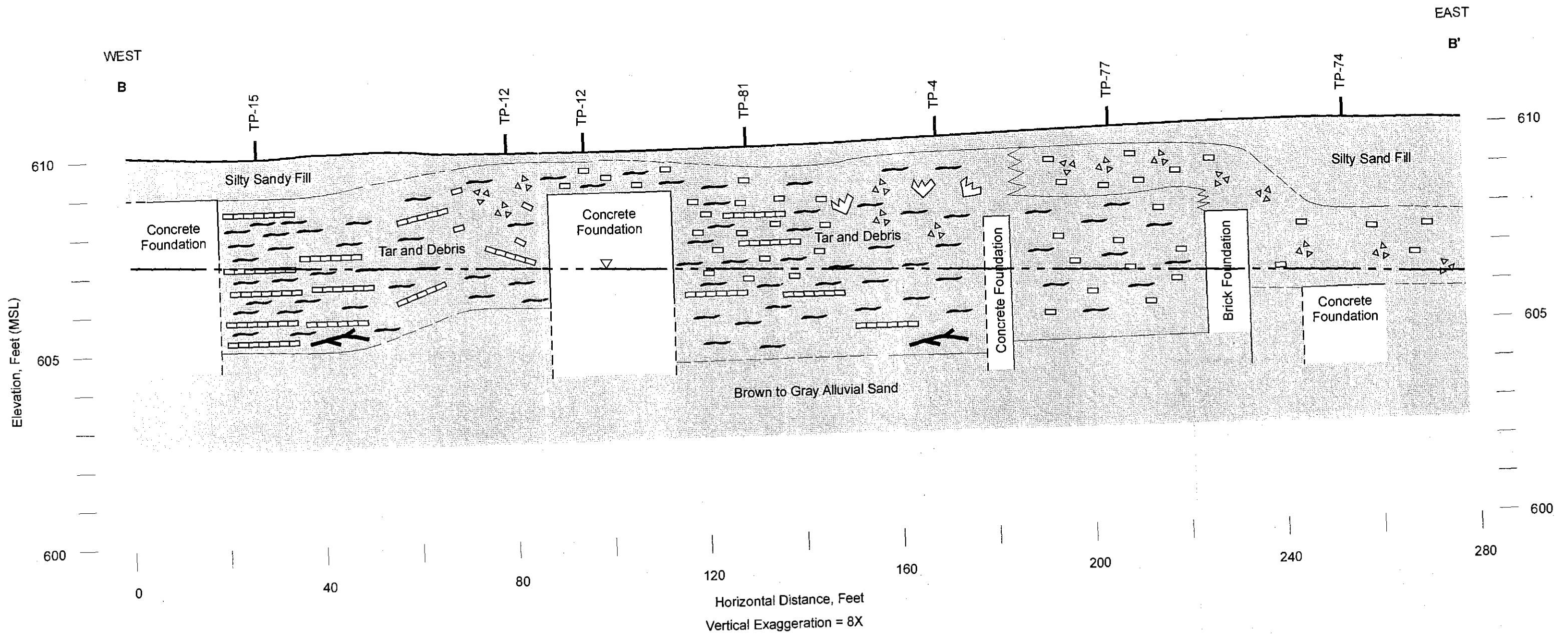


- Debris Includes:**
- Bricks
 - Metal Pipe Scrap
 - Wood
 - Cinders/Charcoal
 - Concrete, Gravel or Slag
 - Tar
 - Sand

- TP-12 Test Pit Location
- Geologic Contact (Dashed where Approximate)
- Water Table

Figure 6
SOURCE AREA CROSS-SECTION A-A'

Cliffs-Dow Site
Marquette, Michigan

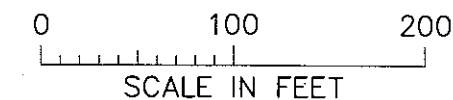


Debris Includes:

- Bricks
- Metal Pipe Scrap
- Wood
- Cinders/Charcoal
- Concrete, Gravel or Slag
- Tar
- Sand

- TP-12 Test Pit Location
- Geologic Contact (Dashed where Approximate)
- Water Table

Figure 7
SOURCE AREA CROSS-SECTION B-B'
Cliffs-Dow Site
Marquette, Michigan



LEGEND

- TP48 TEST PIT
- FORMER STRUCTURES
- EXISTING STRUCTURES
- WASTE DISCHARGE PIPING/DITCHES
- ND TOTAL PHENOLS (mg/kg)
- 0.169 BTEX (mg/kg)

NO TAR OR OTHER PRODUCT
OBSERVED IN THIS AREA.

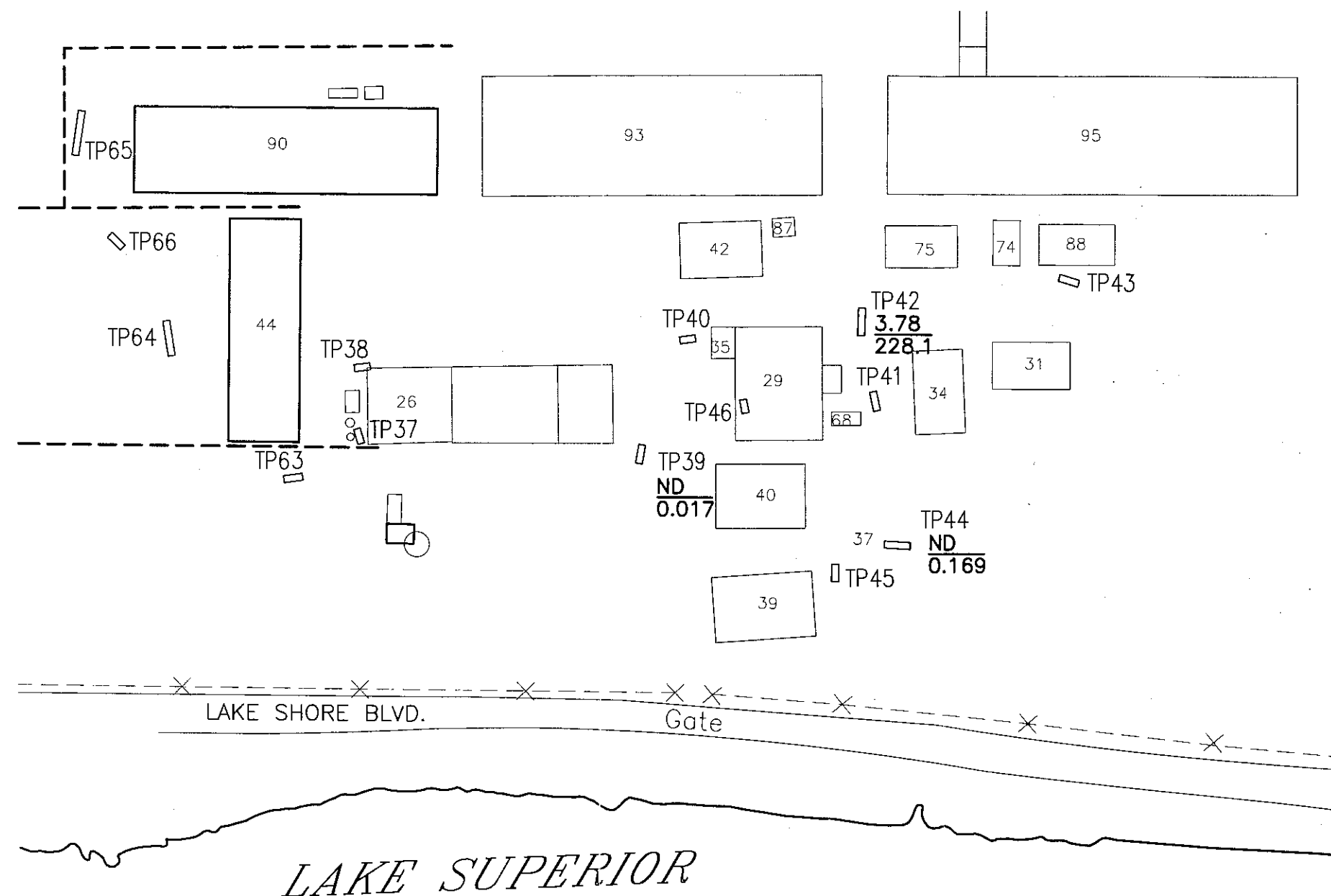


Figure 8

FORMER POWER & MAINTENANCE AREA
SOIL QUALITY MAP
CLIFFS - DOW SITE
Marquette, Michigan

Table 3
Soil Sample Analytical Results - Summary of Detected Parameters (Cliffs Dow Plant Site)

Parameter	Michigan Generic Industrial Direct Contact	Michigan Generic Residential Direct Contact	Michigan Generic 20X GSI Value	Michigan GSI SWP Value	TP-1 2-5' 9-23-97	TP-3 2' 9-23-97	TP-3 4' 9-23-97	TP-7 4' 9-23-97	TP-11 5.5' 9-23-97	TP-21 1-2' 9-24-97	TP-23 1-4' 9-24-97	TP-24 3-4' 9-25-97	TP-27 2' 9-25-97	TP-28 3' 9-25-97	TP-29 4.5' 9-25-97	TP-31 5-6' 9-25-97	TP-33 3-5.5' 9-25-97
Volatiles-BETX (8260) mg/kg																	
Benzene	850	98	4.00	0.76	0.54	0.35	<0.27	<0.16	<0.37	<13	1.0	<0.010	<0.010	5.4	<0.21	<0.22	0.43
Ethyl benzene	72,000	11,000	0.36	0.25	10	16	3.4	1.2	24	78	6.1	<0.010	<0.010	520	<0.21	2.4	0.27
Toluene	160,000	24,000	2.80	1.10	4.9	17	2.9	0.69	6.0	150	15	<0.010	0.018	540	<0.21	2.9	1.8
Xylenes (total)	1,000,000	200,000	0.70	0.46	30	63	19	2.9	240	250	58	<0.030	<0.030	3000	<0.62	15	0.62
Metals mg/kg																	
Arsenic (mg/kg)	100	6.6	ID	ID	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (mg/kg)	400	400	0.38 B	ID	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Parameters																	
Acetaldehyde mg/kg	97,000	14,000	NS	NS	-	-	-	-	-	<4.8	-	-	-	-	-	-	-
Acetic Acid mg/kg	420,000	63,000	NS	NS	-	-	-	-	-	1.4	1.4	-	-	2.0	4.9	-	-
Acrylic Acid mg/kg	390,000	58,000	NS	NS	-	-	-	-	-	<0.2	<0.2	-	-	0.2	0.3	-	-
Ethanol mg/kg	1,000,000	1,000,000	NS	NS	-	-	-	-	-	<1300	-	-	-	-	-	-	<2.2
Formaldehyde mg/kg	130,000	20,000	NS	NS	-	-	-	-	-	<1.0	-	-	-	-	-	-	-
Formic Acid mg/kg	1,000,000	150,000	NS	NS	-	-	-	-	-	0.5	1.0	-	-	0.8	2.7	-	-
Isobutanol mg/kg	240,000	35,000	NS	NS	-	-	-	-	-	<130	-	-	-	-	-	-	<0.22
Isopropanol mg/kg	48,000	7,000	NS	NS	-	-	-	-	-	<130	-	-	-	-	-	-	<0.22
Methanol mg/kg	370,000	55,000	NS	NS	-	-	-	-	-	4.2	-	-	-	-	-	-	<2.7
Percent Solids (%)	NS	NS	NS	NS	26	84	94	79	68	78	43	87	75	25	61	57	23
Total Organic Carbon (%)	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Propanol mg/kg	140,000	21,000	NS	NS	-	-	-	-	-	<1300	-	-	-	-	-	-	<2.2
Semivolatile Organics mg/kg																	
Acenaphthene	810,000	76,000	0.38	4.3	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
Anthracene	1,000,000	420,000	NS	NS	-	95	5.9	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene (c)	210	14	NS	NS	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene (c)	21	1.4	NS	NS	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
Benzo(b&k)fluoranthene (c)	210/2,100	14 / 140	NS	NS	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	11,000	700	NS	NS	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
Chrysene (c)	21,000	1,400	NS	NS	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate	540,000	51,000	NS	NS	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	ID	ID	NS	NS	-	59	5.1	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	230,000	21,000	0.24	0.1	350	2000	55	42	43	73	420	<0.33	1.6	310	-	720	<0.33
Fluoranthene	540,000	51,000	NS	NS	-	110	4.4	-	-	-	-	-	-	-	-	-	-
Fluorene	540,000	51,000	NS	NS	-	110	5.6	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	94	6.2	ID	ID	-	<50	<3.3	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	160,000	15,000	NS	NS	-	330	43	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	37,000	5,500	NS	NS	<12	1300	15	3.6	<3.3	23	140	<0.33	0.56	70	-	100	<0.33
4-Methylphenol	23,000	2,100	NS	NS	<12	2700	33	11	19	90	300	<0.33	0.63	260	-	130	<0.33
Naphthalene	160,000	15,000	0.26	0.85	-	180	37	-	-	-	-	-	-	-	-	-	-
Phenanthrene	16,000	1,500	0.048	1.1	-	300	10	-	-	-	-	-	-	-	-	-	-
Phenol	450,000	66,000	NS	NS	<12	1100	5.2	<3.3	<3.3	5.1	41	<0.33	<0.33	24	-	<19	<0.33
Pyrene	340,000	32,000	NS	NS	-	120	4.3	-	-	-	-	-	-	-	-	-	-

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Table 3
Soil Sample Analytical Results - Summary of Detected Parameters (Cliffs Dow Plant Site)

Parameter	Michigan Generic Industrial	Michigan Generic Residential	Michigan Generic 20X GSI	Michigan GSI	TP-34	TP-34	TP-39	TP-42	TP-44	TP-48	TP-49	TP-51	TP-52	TP-54	TP-56	TP-57	TP-58
	Direct	Direct		SWP	1-3'	5.5'	1-2'	3.5'	3.5'	3'	1.5-3.5'	4'	2'	0.5-3.5'	0.5-4'	4-5'	2-3'
	Contact	Contact	Value	Value	9-25-97	9-25-97	9-26-97	9-26-97	9-26-97	9-26-97	9-26-97	9-29-97	9-29-97	9-29-97	9-29-97	9-29-97	9-29-97
Volatiles-BTEX (8260) mg/kg																	
	850	88	4.00	0.76			<0.010		<0.010	<0.010	<0.010				<0.010		
	72,000	11,000	0.36	0.25			<0.010		0.017	<0.010	<0.010				<0.010		
	160,000	24,000	2.80	1.10			0.017		0.042	<0.010	<0.010				0.023		
	1,000,000	200,000	0.70	0.46			<0.030		0.11	<0.030	<0.030				0.090		
Metals mg/kg																	
Arsenic (mg/kg)	100	6.6	ID	ID													
Lead (mg/kg)	400	400	0.38 B	ID													
Other Parameters																	
Acetaldehyde mg/kg	97,000	14,000	NS	NS													
Acetic Acid mg/kg	420,000	63,000	NS	NS													
Acrylic Acid mg/kg	390,000	58,000	NS	NS													
Ethanol mg/kg	1,000,000	1,000,000	NS	NS													
Formaldehyde mg/kg	130,000	20,000	NS	NS													
Formic Acid mg/kg	1,000,000	150,000	NS	NS													
Isobutanol mg/kg	240,000	35,000	NS	NS													
Isopropanol mg/kg	48,000	7,000	NS	NS													
Methanol mg/kg	370,000	55,000	NS	NS													
Percent Solids (%)	NS	NS	NS	NS	67	21	89	73	86	93	86				79		
Total Organic Carbon (%)	NS	NS	NS	NS							0.23						
n-Propanol mg/kg	140,000	21,000	NS	NS													
Semivolatile Organics mg/kg																	
Acenaphthene	810,000	76,000	0.38	4.3	<75	<390											
Anthracene	1,000,000	420,000	NS	NS	<75	<390	<0.33	<0.66	<0.66							6.7	
Benzo(a)anthracene (c)	210	14	NS	NS	<75	<390	<0.33	<0.66	<0.66							4.2	
Benzo(a)pyrene (c)	21	1.4	NS	NS	<75	<390	<0.33	<0.66	<0.66							2.6	
Benzo(b&k)fluoranthene (c)	210/2,100	14 / 140	NS	NS	<75	<390	<0.33	<0.66	<0.66							2.3	
bis(2-Ethylhexyl)phthalate	11,000	700	NS	NS	<75	<390	<0.33	<0.66	<0.66							<1.7	
Chrysene (c)	21,000	1,400	NS	NS	<75	<390	<0.33	<0.66	<0.66							6.4	
Di-n-butylphthalate	540,000	51,000	NS	NS	<75	<390	0.46	0.66	<0.66							<1.7	
Dibenzofuran	ID	ID	NS	NS	<75	<390	<0.33	<0.66	<0.66							<1.7	
2,4-Dimethylphenol	230,000	21,000	0.24	0.1	530	1500	<0.33	2.9	<0.66	<0.33	<0.33				<1.7		
Fluoranthene	540,000	51,000	NS	NS	<75	<390	<0.33	<0.66	<0.66							1.8	
Fluorene	540,000	51,000	NS	NS	<75	<390	<0.33	<0.66	0.89							3.5	
Hexachlorobenzene	94	6.2	ID	ID	<75	<390	<0.33	<0.66	<0.66							<1.7	
2-Methylnaphthalene	160,000	15,000	NS	NS	750	<390	0.58	9.9	11							6.0	
2-Methylphenol	37,000	5,500	NS	NS	290	1100	<0.33	<0.66	<0.66	<0.33	<0.33					<1.7	
4-Methylphenol	23,000	2,100	NS	NS	860	2900	<0.33	0.88	<0.66	<0.33	<0.33					<1.7	
Naphthalene	160,000	15,000	0.26	0.85	830	<390	<0.33									<1.7	
Phenanthrene	16,000	1,500	0.048	1.1	<75	<390	0.52	<0.66								19	
Phenol	450,000	66,000	NS	NS	220	1200	<0.33	<0.66	<0.66	<0.33	<0.33					<1.7	
Pyrene	340,000	32,000	NS	NS	<75	<390	<0.33	<0.66	<0.66							6.4	

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Table 3
Soil Sample Analytical Results - Summary of Detected Parameters (Cliffs Dow Plant Site)

Parameter	Michigan Generic Industrial	Michigan Generic Residential	Michigan Generic 20X GSI	Michigan GSI	TP-60	TP-61	TP-61	TP-66	TP-67	TP-71	TP-77	TP-82	TP-85	TP-86	TP-87	TP-88	TP-89
	Direct	Direct		SWP	3-5'	2-4'	4-6'	4-5'	2-4'	4'	3'	2'	1-4'	0.5-4'	1-4'	1-4'	3'
	Contact	Contact	Value	Value	9-29-97	9-30-97	9-30-97	9-30-97	9-30-97	10-01-97	10-01-97	10-01-97	10-01-97	10-01-97	10-01-97	10-01-97	10-02-97
	850	88	4.00	0.76		<0.025		<0.010	0.044	<0.010							
	72,000	11,000	0.36	0.25		<0.025		<0.010	0.11	0.018							
	160,000	24,000	2.80	1.10		<0.025		<0.010		0.028							
	1,000,000	200,000	0.70	0.46		<0.075		0.048		0.085							
Metals mg/kg																	
Arsenic (mg/kg)	100	6.6	ID	ID													
Lead (mg/kg)	400	400	0.38 B	ID													
Other Parameters																	
Acetaldehyde mg/kg	97,000	14,000	NS	NS													
Acetic Acid mg/kg	420,000	63,000	NS	NS													
Acrylic Acid mg/kg	390,000	58,000	NS	NS													
Ethanol mg/kg	1,000,000	1,000,000	NS	NS													
Formaldehyde mg/kg	130,000	20,000	NS	NS													
Formic Acid mg/kg	1,000,000	150,000	NS	NS													
Isobutanol mg/kg	240,000	35,000	NS	NS													
Isopropanol mg/kg	48,000	7,000	NS	NS													
Methanol mg/kg	370,000	55,000	NS	NS													
Percent Solids (%)	NS	NS	NS	NS		48		70	52	58		91					51
Total Organic Carbon (%)	NS	NS	NS	NS													
n-Propanol mg/kg	140,000	21,000	NS	NS													
Semivolatile Organics mg/kg																	
Acenaphthene	810,000	76,000	0.38	4.3		<0.35											
Anthracene	1,000,000	420,000	NS	NS		<0.35											
Benzo(a)anthracene (c)	210	14	NS	NS		<0.35											
Benzo(a)pyrene (c)	21	1.4	NS	NS		<0.35											
Benzo(b&k)fluoranthene (c)	210/2,100	14 / 140	NS	NS		<0.35											
bis(2-Ethylhexyl)phthalate	11,000	700	NS	NS		0.53											
Chrysene (c)	21,000	1,400	NS	NS		<0.35											
Di-n-butylphthalate	540,000	51,000	NS	NS		0.83											
Dibenzofuran	ID	ID	NS	NS		<0.35											
2,4-Dimethylphenol	230,000	21,000	0.24	0.1		<0.35		<0.33									
Fluoranthene	540,000	51,000	NS	NS		<0.35											
Fluorene	540,000	51,000	NS	NS		<0.35											
Hexachlorobenzene	94	6.2	ID	ID		<0.35											
2-Methylnaphthalene	160,000	15,000	NS	NS		0.35											
2-Methylphenol	37,000	5,500	NS	NS		<0.35		<0.33	47	8.7		180					2700
4-Methylphenol	23,000	2,100	NS	NS		<0.35		<0.33	160	17		410					3800
Naphthalene	160,000	15,000	0.26	0.85		<0.35											
Phenanthrene	16,000	1,500	0.04B	1.1		<0.35											
Phenol	450,000	65,000	NS	NS		<0.35		<0.33	18	5.5		150					1400
Pyrene	340,000	32,000	NS	NS		<0.35											

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Table 3
Soil Sample Analytical Results - Summary of Detected Parameters (Cliffs Dow Plant Site)

Parameter	Michigan Generic Industrial/ Direct Contact	Michigan Generic Residential/ Direct Contact	Michigan Generic 20X GSI Value	Michigan GSI SWP Value	TP-90 3-4' 10-02-97	TP-96 1' 10-02-97	TP-98 3' 10-02-97	TP-99 1-4' 10-02-97	TP-101 3' 10-02-97
Volatiles-BETX (6260) mg/kg									
Benzene	850	88	4.00	0.76	-	<0.13	-	<0.18	5.7
Ethyl benzene	72,000	11,000	0.36	0.25	-	0.24	-	<0.18	92
Toluene	160,000	24,000	2.80	1.10	-	0.46	-	<0.18	140
Xylenes (total)	1,000,000	200,000	0.70	0.46	-	0.81	-	<0.54	340
Metals mg/kg									
Arsenic (mg/kg)	100	6.6	ID	ID	-	-	-	-	-
Lead (mg/kg)	400	400	0.38 B	ID	-	-	-	-	-
Other Parameters									
Acetaldehyde mg/kg	97,000	14,000	NS	NS	-	-	-	-	-
Acetic Acid mg/kg	420,000	63,000	NS	NS	-	-	-	-	-
Acrylic Acid mg/kg	390,000	58,000	NS	NS	-	-	-	-	-
Ethanol mg/kg	1,000,000	1,000,000	NS	NS	-	-	-	-	-
Formaldehyde mg/kg	130,000	20,000	NS	NS	-	-	-	-	-
Formic Acid mg/kg	1,000,000	150,000	NS	NS	-	-	-	-	-
Isobutanol mg/kg	240,000	35,000	NS	NS	-	-	-	-	-
Isopropanol mg/kg	48,000	7,000	NS	NS	-	-	-	-	-
Methanol mg/kg	370,000	55,000	NS	NS	-	-	-	-	-
Percent Solids (%)	NS	NS	NS	NS	-	93	-	69	73
Total Organic Carbon (%)	NS	NS	NS	NS	-	-	-	-	-
n-Propanol mg/kg	140,000	21,000	NS	NS	-	-	-	-	-
Semivolatile Organics mg/kg									
Acenaphthene	810,000	76,000	0.38	4.3	-	-	-	-	<60
Anthracene	1,000,000	420,000	NS	NS	-	-	-	-	<60
Benzo(a)anthracene (c)	210	14	NS	NS	-	-	-	-	<60
Benzo(a)pyrene (c)	21	1.4	NS	NS	-	-	-	-	<60
Benzo(b&k)fluoranthene (c)	210/2,100	14 / 140	NS	NS	-	-	-	-	<60
bis(2-Ethylhexyl)phthalate	11,000	700	NS	NS	-	-	-	-	<60
Chrysene (c)	21,000	1,400	NS	NS	-	-	-	-	<60
Di-n-butylphthalate	540,000	51,000	NS	NS	-	-	-	-	<60
Dibenzofuran	ID	ID	NS	NS	-	-	-	-	<60
2,4-Dimethylphenol	230,000	21,000	0.24	0.1	-	560	-	<1.7	1100
Fluoranthene	540,000	51,000	NS	NS	-	-	-	-	<60
Fluorene	540,000	51,000	NS	NS	-	-	-	-	<60
Hexachlorobenzene	94	6.2	ID	ID	-	-	-	-	<60
2-Methylnaphthalene	160,000	15,000	NS	NS	-	-	-	-	560
2-Methylphenol	37,000	5,500	NS	NS	-	170	-	<1.7	670
4-Methylphenol	23,000	2,100	NS	NS	-	580	-	<1.7	1000
Naphthalene	160,000	15,000	0.26	0.85	-	-	-	-	500
Phenanthrene	16,000	1,500	0.048	1.1	-	-	-	-	<60
Phenol	450,000	66,000	NS	NS	-	77	-	<1.7	380
Pyrene	340,000	32,000	NS	NS	-	-	-	-	<60

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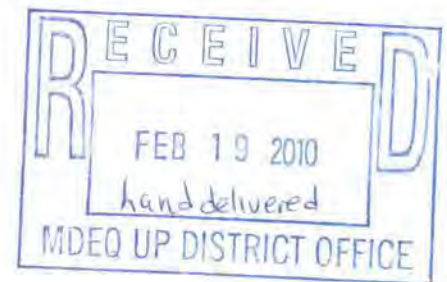
Revised

INTERIM RESPONSE INVESTIGATION SUMMARY

SOIL AND GROUNDWATER INVESTIGATIONS AND REMEDIAL RESPONSE RECOMMENDATIONS

Former Cliffs-Dow Plant Site Marquette, Michigan

Prepared for:
City of Marquette
300 West Baraga Avenue
Marquette, Michigan 49855



Date: December 15, 2009; revised February 19, 2010
TriMedia Project Number 99-059

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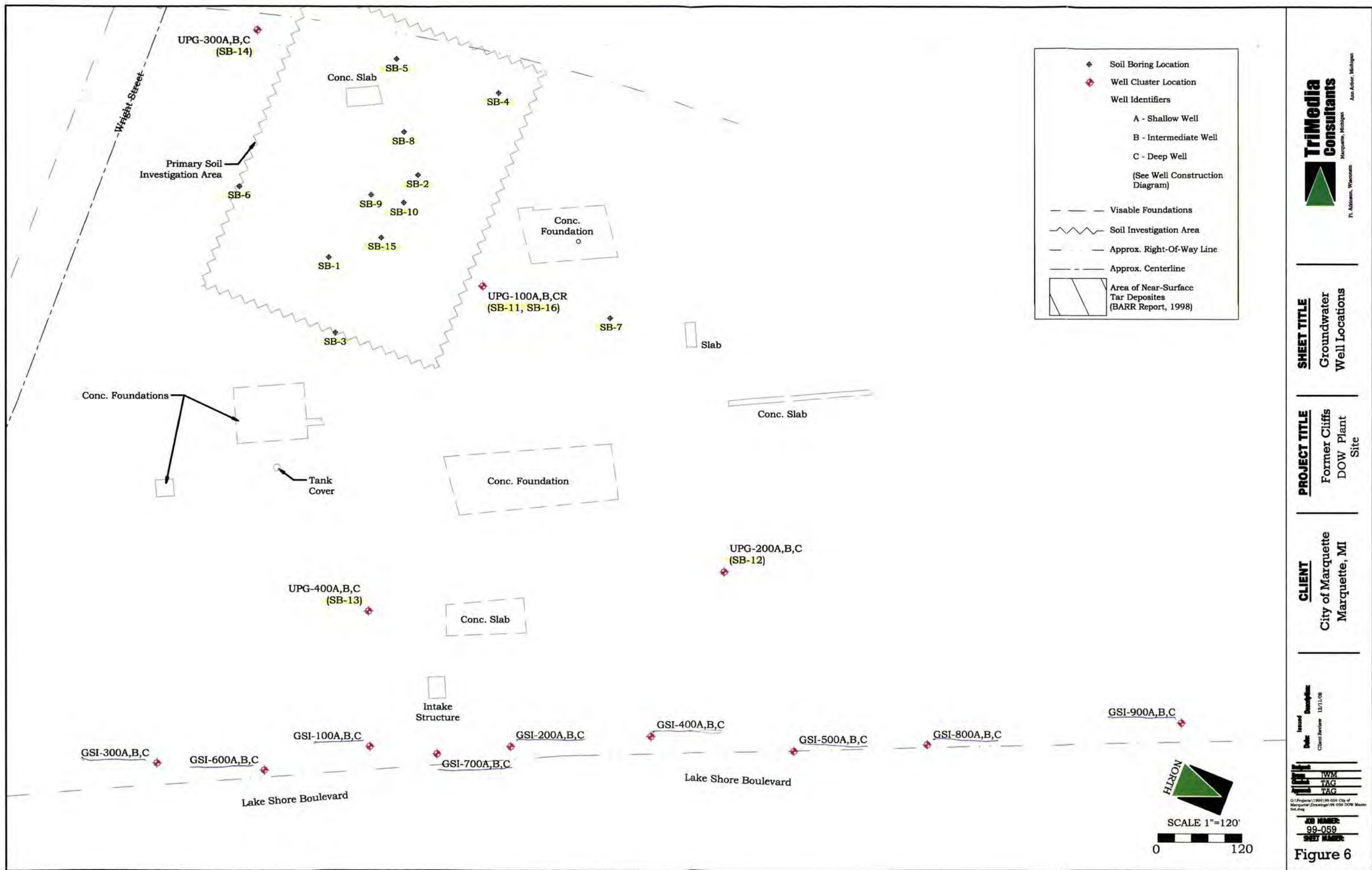


Table 1A
Summary of Laboratory Analytical Results - Soil VOCs
Former Cliffs Dow Plant Site
Marquette, Michigan
TriMedia Project Number 99-059

Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Part 201 Tier I Risk-Based Screening Levels			Sample ID	SB-1	SB-1	SB-1	SB-1	SB-2	SB-2	SB-6	SB-11 (UPG 100C)	SB-13 (UPG-400C)	SB-15 (SB-42 No.2)
		Groundwater Surface Water Interface Protection	Soil Volatilization to Indoor Air Inhalation	Direct Contact	Sample Depth	1-2'	2.5-3.5'	7-8'	9-10'	1-2'	8-9'	2-3'	6-8'	8-10'	2-4'
					Sample Description	Charcoal/sand/debri	Tar/sand	Tar/sand	Tar/sand	Tar	Impacted sand (black)	Impacted sand (black)	Sand (brown)	Impacted sand (black)	Tar
					Date of Collection	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/31/2009	9/21/2009	9/21/2009	9/24/2009
					Date of Analysis	9/3/2009	9/2/2009	9/2/2009	8/31/2009	9/2/2009	8/31-9/2/09	9/10/2009	10/5/2009	10/5/2009	10/1/2009
71432	50	4,000 (X)	8,400	4.0E+5(C)	Benzene (l)	120	15,000	2,900	ND	2,900	1,700	91	ND	ND	20,000
78933	750	44,000	27,000,000 (C)	27,000,000 (C,DD)	2-Butanone (l)								1,300	810	35,000
100414	50	360	140,000	140,000 (C)	Ethylbenzene (l)	1,900	88,000	22,000	590	28,000	28,000	760	940	ND	140,000
591786	2,500	NA	1,800,000	2.5E+6 (C)	2-Hexanone								ND	ND	37,000
98828	250	ID	390,000 (C)	3.9E+5 (C)	Isopropyl benzene								ND	420	19,000
103651	100	NA	ID	8,000,000	n-Propylbenzene								690	2,200	49,000
100425	50	2,200	5.2E+5 (C)	5.2E+5 (C)	Styrene								ND	ND	18,000
108883	100	2,800	250,000 (C)	250,000 (C)	Toluene (l)	2,400	200,000	46,000	760	51,000	48,000	230	230	ND	270,000
95636	100	570	110,000 (C)	110,000 (C)	1,2,4-Trimethylbenzene (l)	12,000	130,000	31,000	570	54,000	28,000	12,000	16,000	17,000	210,000
108678	100	1,100	94,000 (C)	94,000 (C)	1,3,5-Trimethylbenzene (l)	7,600	40,000	9,500	150	15,000	12,000	510	6,100	7,500	60,000
1330207	150	700	150,000 (C)	150,000 (C)	Xylenes, Total (l)	23,000	360,000	89,000	2,300	100,000	95,000	1,900	5,600	1,100	620,000

Notes:
All results are presented in parts-per-billion (µg/kg-dry)
NA - Not Applicable or Not Available
ND - Not Detected
Criteria has been met or exceeded/Result meets or exceeds Criteria
In combination with no data, indicates that the sample was not analyzed for the constituent.
Analytical Method EPA 8260
Footnotes and acronyms for the PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS are attached

Table 1B
Summary of Laboratory Analytical Results - Soil SVOCs
Former Cliffs Dow Plant Site
Marquette, Michigan
TriMedia Project Number 99-059

CAS	MDEQ OP Memo 2 TDL	Part 201 Tier I Risk-Based Screening Levels			Sample ID	SB-1	SB-1	SB-1	SB-1	SB-2	SB-2	SB-6	SB-11 (UPG-100C)	SB-13 (UPG-400C)	SB-15 (SB-42 No.2)	(SB-16) UPG-100CR
		Groundwater Surface Water Interface Protection	Commercial II Soil Volatilization to Indoor Air Inhalation	Commercial II Direct Contact	Sample Depth	1-2'	2.5-3.5'	7-8'	9-10'	1-2'	8-9'	2-3'	4-8'	8-10'	2-4'	51-53'
					Sample Description	Charcoal/	Tar/sand	Tar/sand	Tar/sand	Tar	Impacted sand	Impacted	Sand (brown)	Impacted sand	Tar	
					Date of Collection	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/31/2009	9/21/2009	9/21/2009	9/24/2009	10/19/2009
					Date of Extraction	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/4/2009	9/28/2009	9/28/2009	9/28/2009	10/29/2009
					Date of Analysis	9/3/2009	9/3/2009	9/3/2009	9/3/2009	9/3/2009	9/3/2009	9/8/2009	9/30/2009	9/30/2009	9/30-10/1/09	10/30/2009
83329	330	4,400	350,000,000	130,000,000	Acenaphthene								ND	ND	22,000	ND
120127	330	ID	1,000,000,000 (D)	730,000,000	Anthracene								ND	ND	23,000	ND
56553	330	NLL	NLV	80,000	Benzo(a)anthracene (Q)								480	ND	11,000	ND
205992	330	NLL	ID	80,000	Benzo(b)fluoranthene (Q)								990	ND	ND	ND
50328	330	NLL	NLV	8,000	Benzo(a)pyrene (Q)								840	ND	ND	ND
132649	330	1,700	ID	ID	Dibenzofuran								ND	800	ND	ND
105679	330	7,600	NLV	36,000,000	2,4-Dimethylphenol	40,000	1,700,000	1,100,000	7,100	750,000	850,000	ND	5,100	ND	2,500,000	540
206440	330	5,500	1,000,000,000 (D)	130,000,000	Fluoranthene								340	ND	13,000	ND
86737	330	5,300	1.0E+9 (D)	87,000,000	Fluorene								ND	460	ND	ND
91576	330	ID	ID	26,000,000	2-Methylnaphthalene								2,000	21,000	530,000	ND
95487	330	(J)	(J)	(J)	2-Methylphenol	17,000	1,100,000	480,000	3,000	560,000	1,400,000	ND	16,000	ND	1,800,000	1,300
106445	330	(J)	(J)	(J)	4-Methylphenol	31,000	2,000,000	1,200,000	6,900	850,000	2,800,000	ND	34,000	ND	3,100,000	600
1319773		1,400	NLV	36,000,000	Methylphenol, Total	48,000	3,100,000	1,680,000	9,900	1,410,000	4,200,000	0	50,000	0	4,900,000	1,900
91203	330	870	470,000	52,000,000	Naphthalene								920	16,000	300,000	ND
98953	50	3,600 (X)	170,000	340,000	Nitrobenzene								ND	ND	160,000	ND
85018	330	5,300	5,100,000	5,200,000	Phenanthrene								770	ND	67,000	ND
108952	330	4,200	NLV	1.2E+7 (C,DD)	Phenol	7,900	650,000	280,000	1,200	280,000	4,000,000	ND	17,000	ND	1,100,000	800
129000	330	ID	1,000,000,000 (D)	84,000,000	Pyrene								600	ND	29,000	ND

Notes:
All results are presented in parts-per-billion (µg/kg-dry)
NA - Not Applicable or Not Available
ND - Not Detected
Criteria has been met or exceeded/Result meets or exceeds Groundwater Surface Water Interface (GSI) Criteria
In combination with no data, indicates that the sample was not analyzed for the constituent.
Analytical Method EPA 8270
Footnotes and acronyms for the PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS are attached

Table 1C
Summary of Laboratory Analytical Results - Soil Metals
Former Cliffs Dow Plant Site
Marquette, Michigan
TriMedia Project Number 99-059

Chemical Abstract Service Number	MDEQ OP Memo 2 TDL	Statewide Default Background Level	Part 201 Tier I Risk-Based Screening Levels			Sample ID	SB-1	SB-1	SB-1	SB-1	SB-2	SB-2	SB-6	SB-11 (UPG 100C)	SB-13 (UPG 400C)
			Groundwater Surface Water Interface Protection	Soil Volatilization to Indoor Air Inhalation	Commercial II Direct Contact	Sample Depth	1-2'	2.5-3.5'	7-8'	9-10'	1-2'	8-9'	2-3'	4-8'	8-9'
						Date of Collection	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/31/2009	9/21/2009	9/21/2009
						Date of Extraction	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/1/2009	9/8/2009	9/29/2009	9/29/2009
						Date of Analysis	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/2/2009	9/10/2009	9/29/2009	9/29/2009
7440382	100	5,800	70,000 (X)	NLV	37,000	Arsenic	1,300	5,200	550	620	680	530	3,400	5,800	900
7440393	100	75,000	(G,X)	NLV	37,000,000	Barium								170,000	4,000
7440439	200	1,200	(G,X)	NLV	2,100,000	Cadmium								ND	ND
16065831	2000	18,000	(G,X)	NLV	1,000,000,000 (D)	Chromium								3,600	2,500
7440508	1000	32,000	(G)	NLV	73,000,000	Copper								230,000	2,200
7439921	1000	21,000	(G,M,X)	NLV	9.0E+5 (DD)	Lead	7,800	43,000	2,100	1,200	9,200	ND	8,900	26	20,000
varies	50	130	50 (M); 1.2	89,000	580,000	Mercury								300	320
7440020	1000	20,000	(G)	NLV	150,000,000	Nickel	2,700	29,000	ND	1,000	2,200	ND	5,100		
7782492	200	410	400	NLV	9,600,000	Selenium								680	450
7440224	100	1,000	100 (M); 27	NLV	9,000,000	Silver								150	ND
7440666	1000	47,000	(G)	NLV	630,000,000	Zinc	9,100	31,000	2,700	5,800	16,000	ND	29,000	34,000	3,400

Notes:
All results are presented in parts-per-billion (µg/kg-dry)
NA - Not Applicable or Not Available
ND - Not Detected
Criteria has been met or exceeded/Result meets or exceeds Criteria
In combination with no data, indicates that the sample was not analyzed for the constituent.
Analytical Method EPA 6020A, Except Mercury EPA 7471
Footnotes and acronyms for the PART 201 CRITERIA/PART 213 RISK BASED SCREENING LEVELS are attached