

# **Remedial Action Work Plan**

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**Mackinaw Bay  
Whitefish, Montana**

**BNSF Railway Company**

**1296021.32  
May 2012**

**Kennedy/Jenks Consultants**

**REMEDIAL ACTION WORK PLAN  
MACKINAW BAY  
WHITEFISH, MONTANA**

**Prepared for**

**BNSF RAILWAY COMPANY**

**Prepared by**

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## **1.0 INTRODUCTION**

This remedial action work plan (RAWP) has been prepared on behalf of BNSF Railway Company (BNSF) by Kennedy/Jenks Consultants. Upon favorable review and approval of this RAWP, BNSF plans to perform the work described here in on a voluntary basis in cooperation with the U.S. Environmental Protection Agency (EPA).

### **1.1 BACKGROUND AND PURPOSE**

During September 2010, EPA conducted a site visit to Mackinaw Bay on Whitefish Lake in response to a request from the City of Whitefish to evaluate reports that sediment containing diesel-range organics (DRO) were present near the shoreline. The DRO in sediment is believed to be residual from the 31 July 1989 freight train derailment that reportedly released #2 diesel fuel into the bay. At the time of the derailment, BNSF conducted an immediate response action to mitigate the release. Visual signs of residual DRO-containing sediment (affected sediment) were noted during the site visit, and EPA requested BNSF address remediation of these affected sediments voluntarily.

This RAWP describes the approach to affected sediment remedial action (RA) to be undertaken at Mackinaw Bay in 2012 (referred to herein as MB RA). Engineering and scientific services for implementation of this RAWP are being provided by Kennedy/Jenks Consultants. A construction contractor for MB RA has not yet been selected.

## 1.2 PREVIOUS SITE REMEDIATION AND INVESTIGATION

Previous remediation documentation, as described in the October 1989 *Revised Remedial Action Plan* prepared by ReTec, Inc. and the *Remediation Response Site Report* prepared by the Montana Department of Environmental Quality's (DEQ), states an initial volume of 90 cubic yards of DRO-containing soil/sediment were removed along the Mackinaw Bay shoreline, with a follow-up interim action involving the removal of an additional 140 cubic yards of affected sediment from along the shoreline.

In response to EPA's September 2010 site visit, BNSF requested Kennedy/Jenks Consultants conduct a sediment sampling investigation in November 2010. The findings of this investigation were documented in the *Sediment Sampling and Analysis Report, Mackinaw Bay Derailment Site Whitefish Lake, Flathead County, Montana* (SAR), dated December 2010. This SAR has been submitted to both EPA and DEQ.

On 27 October 2011, a team from Kennedy/Jenks Consultants and Sands Surveying, Inc. of Kalispell, Montana, conducted additional Mackinaw Bay design study characterization work and a bathymetric survey. The purpose of the characterization was to acquire design level information regarding the spatial distribution and volume of affected sediment in Mackinaw Bay. The affected sediment deposits vary thicknesses between 0.25 feet and approximately 1.25 feet. The affected areas were delineated and cross sections generated (both of which are shown in the construction drawings presented with this RAWP in Appendix A.

## **2.0 REMEDIATION GOALS**

MB RA will be performed under the supervision of EPA's On-Scene Coordinator (OSC), who will determine the compliance of the RA with EPA's authority. EPA has communicated to BNSF that the primary cleanup criterion for the remediation is to address affected sediment that can generate iridescent petroleum sheen in water when disturbed or agitated. EPA requires that confirmation sampling and laboratory analysis be performed to document conditions following the completion of the RAs.

EPA has acknowledged, on the Whitefish River remedial activities, there are typical background levels for total petroleum hydrocarbon (TPH) concentration found in sediment from surface water features that are used for recreational purposes (such as motorized boating) and are receiving water bodies for urban stormwater runoff. Mackinaw Bay, in particular, is heavily used during the summer months by recreational boaters as a place to congregate on the lake.

EPA is focused on a goal of locating and removing lake-bottom sediment that can produce a visible iridescent petroleum sheen in water when disturbed. EPA has applied a TPH target concentration range of 400 to 1,500 milligrams per kilogram (mg/kg) TPH as DRO for the Whitefish River remedial activities as a guidance tool to evaluate the adequacy affected sediment RA. The same target concentration range will be applied for evaluation of the adequacy of affected sediment RA performed at Mackinaw Bay. As guidance, this range does not represent a cleanup standard, but, instead, provides an indication as to whether the TPH concentrations found in the lake bottom following RA are consistent with those concentrations expected to be present based upon field observations.

### 3.0 PLANNED MACKINAW BAY REMEDIAL ACTION WORK ITEMS

The following describes the MB RA work scope items for actions/activities that will be completed by BNSF pursuant to EPA's request.

**Item MBRA1 – Develop Mackinaw Bay RAWP.** The technical approach for, and scope of, the MB RA was developed by a team of engineers and scientists in consultation with experienced specialists and contractors. The overall technical approach for the MB RA involves mechanical dredge removal of affected sediment.

Selection of mechanical dredge removal as the preferred Mackinaw Bay RA technique takes into account the remediation and environmental protection goals, as well as consideration of construction time, logistics, site access, and property access requirements for the Mackinaw Bay activities. Using a mechanical dredge in-the-wet approach is intended to address the remediation goals in a timely manner with minimal impact to the public.

Major considerations that were used in designing the dredge removal approach include:

- Affected sediment proximity to the shoreline
- Affected sediment and lake bottom characteristics
- Establishing dredge limits to ensure adequate removal
- Sediment disturbance and re-suspension
- The preservation of shoreline vegetation and habitat.

**Item MBRA2 – Confer with EPA and DEQ.** BNSF and Kennedy/Jenks Consultants will meet (via telephone conference call) with EPA and DEQ for advice and consultation to build consensus regarding the scope and approach presented.

**Item MBRA3 – Revise and Finalize MB RA Work Plan (if needed).** Based upon the presentation to EPA under Item MBRA2, EPA comments will be amended and incorporated into the Work Plan as needed.

**Item MBRA4 – Develop MB RA Project Manual and Drawings.** A project manual and design drawings, including dredge removal limit plans and sections and details, were developed to secure bids from construction contractors and are presented in Appendix A. Technical proposals, including construction means and methods, will be solicited from prequalified contractors as part of the construction contractor selection process.

**Item MBRA5 – Select Construction Contractor.** Based upon review of proposals, BNSF will select a qualified construction contractor to perform the work.

**Item MBRA6 – Public Outreach / Community Relations.** It is anticipated EPA will take the lead on proactively communicating MB RA plans to the public and addressing public inquiries with support from BNSF and its consultant. BNSF and its consultant will participate in a public meeting as arranged by EPA.

**Item MBRA7 – Mackinaw Bay Construction.** Mobilization to implement this work will occur in either the spring or fall of 2012. Due to the high recreational use of Whitefish Lake and the publicly used boat launch needed for construction access, it is important that construction takes place during one of the “shoulder seasons.” The mobilization date will be coordinated with EPA but is tentatively set for 1 May 2012. The construction contractor, Kennedy/Jenks Consultants, and all subcontractors are required to prepare site-specific Health and Safety Plans (HASPs).

The following overview describes the anticipated MB RA.

*MB RA Construction (2012) Overview.* Affected sediment will be removed (in accordance with the criteria outline under MBRA1 above) from one, or more, contiguous areas within Mackinaw Bay. It is anticipated RA work in this area can be accomplished in approximately 4 to 6 weeks using a mechanical dredging approach. Production rates will determine the actual construction duration. Work will be conducted within fully



enclosed dredge management units (DMUs) to reduce potential re-suspension and deposition of affected sediment to the lake bottom. Likely enclosures will consist of contiguous impermeable floating turbidity curtains that circle the entire DMU.

*Field Office Facilities.* Separate field offices will not be supplied for MB RA activities. However, office space provided for the Whitefish River Remedial Activities (2012) will be available for Kennedy/Jenks Consultants Resident Engineer (RE), BNSF, and EPA, as needed.

*Exclusion Zone and Decontamination Facilities.* An exclusion zone will be established, as needed, in areas where handling of affected sediment is anticipated. The work area will be signed with floating and flashing buoys and closed to the public. Boat and equipment will be decontaminated in accordance with the project requirements.

*Spill Response and Contingency Plan.* A Spill Response and Contingency Plan (SRCP) will be requested from the selected Contractor. Submittal and review of the SRCP will be required prior to launching watercraft or equipment onto Whitefish Lake. The SRCP will be required to address spill prevention, countermeasures, response, and reporting activities for sediment transport, equipment transport, equipment fueling, and all additional over-water activities where the potential for a release exists. A copy of the SCRP will be provided to EPA and DEQ following review and acceptance.

*Affected Sediment Removal.* This work will consist of removing approximately 450 cubic yards of affected sediment from an approximately 16,000-square foot area of Mackinaw Bay. Affected sediment will be removed using a mechanical dredge approach. The mechanical dredge will consist of some form of barge mounted equipment (excavator or similar) with a bucket that seals closed during material removal. Launching of construction equipment will occur at the City Beach boat launch, which may require temporary construction access improvements.

Prior to beginning removal operations, best management practices (BMPs), including deployment of oil sorbent booms and impermeable floating silt curtains, will be used to enclose the work area.

De-snagging operations, if needed, will occur in the work area to remove large snags and debris that could disrupt dredging operations. De-snagging operations will be conducted using barge mounted equipment (grapples or an excavator) with debris being loaded and separated on the barge. De-snagging operations will occur within the enclosed work areas (e.g., DMUs). DRO-containing material will be transported back to the Whitefish Lake access area and loaded out for disposal at an approved facility. Natural debris unaffected by DRO, such as large rocks and trees, will be replaced in their approximate original location. Affected sediment removal for the areas and depths indicated in the construction drawings will occur after de-snagging operations by use of mechanical dredging. Excess water will be decanted from the affected sediments onsite and within the work zone by tilting the excavator bucket. Visible sheen that may be produced as part of the decanting process will be collected from the water surface using oil sorbent boom or pads. Over-dredging considerations and dredge cut confirmation requirements are addressed in Appendix A in the project manual prepared as part of the engineering design.

Confirmation samples will be collected from dredged areas as requested by EPA and DEQ. Discrete samples will be collected from the removal area using a spacing interval based upon an approximate 25-foot square grid. Confirmation samples will be analyzed for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH). Samples that exceed the EPH screen will also be fractionated and analyzed for polycyclic aromatic hydrocarbons (PAHs).

In accordance with discussions with the EPA On-Scene Coordinator, dredged areas will not be backfilled. Final dredge cut bathymetry will be documented and submitted to EPA in the Construction Completion report.

*Affected Sediment Handling, Storage, and Disposal.* Affected sediment will be placed in lined shipping containers (roll-offs) and transported across Whitefish Lake to the construction access point. From the construction access point, the roll-off containers will be transported by truck to the existing sediment treatment facility located within the BNSF railyard. The existing treatment facility consists of a dewatering cell constructed with polymer sheeting and berms for runoff/runoff control. Sediments will be deposited into the dewatering cell and allowed to drain naturally. Following initial dewatering, an

additive, such as quick-lime, will be mixed in with the affected sediments (if needed) prior to loading into railcars for transportation to the Gascoyne Landfill in North Dakota or another appropriately permitted land disposal facility. The affected sediment will be profiled prior to disposal by collecting and analyzing samples, as required by the landfill.

Drained water from the sediment will be processed using the existing water treatment system for the Whitefish River Remediation project. The DEQ requested sampling protocol used in 2011 will be maintained for 2012 water treatment and this consists of weekly sampling for the following constituents: biochemical oxygen demand (BOD), total suspended solids (TSS), hardness, dissolved metals, total metals, nitrogen, nitrate + nitrite, total nitrogen, total phosphorus, polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), extractable petroleum hydrocarbons (EPH), and oil and grease.

*Upland Restoration and Temporary Construction Access.* The removal action described in this RAWP will have minimal impact to the lakeshore and is not anticipated to require restoration activity. Upland areas affected by contractor activities, if any, will be restored to as near as practicable pre-existing condition in accordance with EPA requirements. Any temporary construction access improvements made by the Contractor to the City Beach boat access will be removed, and the boat access will be returned to its original condition. City Beach restoration efforts will be coordinated with the City of Whitefish's Director of Parks and Recreation.

**Item MBRA8 – Prepare MB RA Construction Completion Report.** A concise report with record drawings documenting the MB RA construction will be prepared. The report will document the construction means and methods, affected sediment volume removed, the boundaries of the affected sediment removal area, confirmation sampling analytical results, and other construction information. The report will compare EPH results to the TPH target concentration range of 400 to 1,500 milligrams per kilogram (mg/kg) for TPH as diesel range organics. EPA has determined this TPH target concentration to be appropriate for removal of sediment containing weathered diesel to achieve protection of water quality under the Clean Water Act. The MB RA Construction Completion Report will be submitted to EPA and DEQ within 60 days of MB RA construction completion and demobilization.

# Appendix A

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## Project Manual Review Issue Specifications and Drawings

## SECTION 02140

### SEDIMENT DEWATERING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section includes all work shown on the Drawings including:
  - 1. Mobilize/demobilize to and from site all personnel and equipment necessary for completing the work.
  - 2. Dewatering of dredged sediments to meet landfill requirements.
  - 3. Loadout of dewatered sediments into railcars.
  - 4. Detain and treat dewatering effluent from dredging activities and sediment dewatering.
- B. Construction Methodology: Contractor is responsible for determining the means, methods, and construction sequence of the work. All requirements for environmental protection (Section 01140 of Whitefish River – Lower Reach Remedial Action (2011)) shall apply.
- C. Representative samples of treated effluent shall be analyzed and shall be shown to meet requirements prior to initial discharge into the river.
- D. All wastewater treatment plant and wastewater treatment requirements shall comply with Section 02140 of Whitefish River – Lower Reach Remedial Action (2011).
- E. Sediment dewatering facilities shall utilize, to the extent possible, existing dewatering and wastewater treatment facilities installed as part of the Whitefish River – Lower Reach Remedial Action (2011).

##### 1.02 REFERENCE STANDARDS AND TECHNICAL GUIDANCE

- A. ASTM D4643 - 08 Standard Test Method for Determination of Water (Moisture) Content of Soil by Microwave Oven Heating.

##### 1.03 SUBMITTALS

- A. Submit to the Engineer, as provided in Section 01300 (Whitefish River – Lower Reach Remedial Action (2011)) or elsewhere, information noted below.
  - 1. Written confirmation that wastewater generated from sediment dewatering activities will be process through the treatment system set up for the Whitefish River – Lower Reach Remedial Action, and effluent discharge will meet the same criteria as required by said project.

#### PART 2 - PRODUCTS

##### 2.01 SEDIMENT DEWATERING SYSTEM

- A. Provide all materials, labor, equipment, temporary power, testing services, and any associated appurtenances for the Contractor designed sediment dewatering system.

- B. Chemicals: If the contractor chooses to use a chemical such as lime to aid in meeting dewatering requirements, provide a written request and procedure that is proposed to aid in dewatering the material to be loaded into the rail cars.

## PART 3 - EXECUTION

### 3.01 SEDIMENT DEWATERING

- A. Contractor shall dewater sediment to meet rail transport and landfill disposal requirements by use of chemical, absorbent, and/or mechanical means. Contractor shall test dewatered sediments for moisture content once per 250 cubic yards of materials processed in accordance with the testing procedures outlined in ASTM D4643 - 08 Standard Test Method for Determination of Water (Moisture) Content of Soil by Microwave Oven Heating. This may be done either onsite or at a local testing laboratory (see potential local geotechnical labs below). Contractor shall demonstrate to Engineer that the conditioned material has a moisture content of 35%, or less, prior to material being loaded out into railcars.
  - 1. Local Geotechnical Laboratories:
    - a. CMG Engineering, Inc.  
P.O. Box 5159  
1097 Trumble Creek Road  
Kalispell, MT 59903  
(406) 257-8156
    - b. Terracon  
1075 Trumble Creek Road  
Kalispell, MT 59901  
(406) 257-6479
- B. Contractor shall be responsible for treating sediment dewatering effluent in accordance with all applicable regulations and requirements herein.
- C. Contractor shall load sediment directly into railcars provided by BNSF or, if cars are unavailable at any given time during the removal process, transport the dewatered solids to temporary stockpiling areas as described below.

### 3.02 SEDIMENT STORAGE, SEDIMENT HANDLING, AND RAILCAR LOADOUT

- A. Sediment shall be transferred from the lake bottom to the existing upland dewatering.
- B. Contractor shall load dewatered sediment into railcars as cars are made available by BNSF. Railcars are expected to be open-top service cars with sides up to 13.5 feet high over which the sediment must be conveyed for proper loading. Contractor shall verify sidewall height during pre-construction meeting. Rail car spotting is at the discretion of local BNSF Operations and the Contractor should not anticipate empty cars to be spotted on Fridays, Saturdays, or Sundays.
- C. ***The Contractor's sediment load out methods shall take into consideration that the employees of the Contractor or any subcontractors shall NOT, at any time, move, climb upon or enter railcars, or set and release car brakes. Rail car movement and spotting will be conducted by BNSF personnel.*** Prior to loading, Contractor shall visually verify that all bottom hatches on railcars are shut and latches are in the locked position. After loading, Contractor shall verify with onsite BNSF personnel that cars are properly loaded and approved for movement.

Prior to conducting loading operations, the Engineer will coordinate a safety briefing during which BNSF personnel will provide training to the Contractor regarding railcar loading procedures.

- D. Contractor shall not overload railcars. The Contractor shall coordinate with local mechanical shop foreman to have his loading personnel trained on proper railcar loading. In general, the gaps between the car springs should not be compressed to less than 1-inch. Cars overloaded by the Contractor shall be reduced at the Contractor's expense.
- E. Engineer will coordinate with BNSF to provide railcars for loading. The cars will be stored in the Whitefish railyard, but will not necessarily be spotted on the loading track until needed. Contractor shall provide Engineer with estimated loading dates and times as far in advance as possible, such that the Engineer can request car spotting services from BNSF personnel.
- F. The Contractor is advised that the railcars provided by BNSF are Service Cars and are not watertight. Should leakage appear from the loaded railcars, the cars will be re-spotted to the load out track. The Contractor will be responsible for capturing, treating, and discharging any water that leaks from the loaded cars. Cars will be monitored and not released for transport until the leakage has substantially subsided. If measures such as additional loaded sediment moisture content reduction or railcar sealing are required to render the loaded railcars suitable to transport to the sediment disposal facility, such measures shall be undertaken by the Contractor at no additional cost to Owner.

### 3.03 MEASUREMENT AND PAYMENT

- A. Sediment Dewatering
  - 1. Measurement for this unit cost will be by the cubic yard of unconsolidated dredged sediment dewatered as measured through a pre- and post-dredge bathymetric survey of the lake bottom as described in Section 02483. The Contractor shall make monthly estimates of cubic yards of sediment dewatered by conducting progress measurements as described in Section 02483.
  - 2. Payment for sediment dewatering shall include all materials, chemicals, equipment, labor and services required to dewater and load out the sediment dredged from the lake, and all other associated work for which payment is not specifically provided for in the bid proposal. Payment will be made at the contract unit price for the Sediment Dewatering bid item for quantities up to and included the Bid Quantity, based on the Contractor's monthly estimate of the volume of sediment dredged. These volumes shall be favorably reviewed by the Engineer prior to submittal for payment. Final payment shall be made at the Contract unit price for the Sediment Dewatering bid item for the actual quantity dredged. Quantities in excess of the plan quantity and dredging beyond the plan limits must be approved by the Engineer and the Owner prior to commencement. Payment beyond the Contract quantity will only be made after approval by the Engineer and the Owner. Payment for dewatering volumes less than the plan quantity will also be made at the contract unit price.

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## SECTION 02390

### EQUIPMENT DECONTAMINATION

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes: Requirements for decontaminating equipment leaving the sediment removal areas. This includes cleaning the equipment returning to the loading area. Clean all equipment at the completion of the project.

##### 1.02 SUBMITTALS

- A. Not required, but the contractor's methods shall be evaluated based on the final decontaminated condition of the equipment. If more decontamination is required by the engineer, perform that additional decontamination.

#### PART 2 - PRODUCTS (NOT APPLICABLE TO THE PROJECT)

#### PART 3 - EXECUTION

##### 3.01 REQUIREMENTS

- A. Provide a decontamination system at all areas where loading, unloading, and moving of sediment is occurring.
- B. Adequately decontaminate equipment and prevent dripping, spoiling, and all other potential loss of impacted materials prior to movement across Whitefish Lake.
- C. Provide water or other method to clean the equipment. Contain all decontamination water and removed contaminants, and treat the water to the standards provided in Section 02140, 3.01 C., prior to discharge at all decontamination locations.

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## SECTION 02483

### MECHANICAL DREDGING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes:
  - 1. Providing all labor, materials, equipment, and incidentals necessary to mechanically dredge and transport unconsolidated sediment to the limits shown on the Drawings and specified herein.
  - 2. Providing all labor, materials, equipment, and incidentals necessary to install and remove floating turbidity barrier(s) around active Dredging Management Units (DMU's) as the work progresses.
- B. Construction Methodology: Contractor is responsible for determining the means, method, and sequence of the work. All requirements for environmental protection (Section 01140 – Environmental Protection as issued with Whitefish River – Lower Reach Remedial Action (2011)) shall apply.
- C. Related Sections:
  - 1. Section 01140: Environmental Protection (as issued with Whitefish River – Lower Reach Remedial Action (2011))
  - 2. Section 02140: Sediment Dewatering
  - 3. Section 02905: Restoration (as issued with Whitefish River – Lower Reach Remedial Action (2011))
  - 4. Section 02999: Water Quality Monitoring During Dredging

##### 1.02 SUBMITTALS

- A. Prepare and submit an Emergency Response Plan (ERP) for responding to a release of a petroleum product (such as fuel or oil from equipment or sediment) both at the work site and while moving across the lake. The Plan shall detail Contractor's proposed precautions and response to minimize the amount of impact to the lake should there be a release. The ERP should include details with regard to clean-up and reporting procedures following a potential release.
- B. Floating turbidity barrier shop drawings including floating freeboard, typical panel dimensions, materials, ballast weight, and connection details.
- C. Prepare and submit an Operations Plan showing Contractor's planned DMU's work phasing plan, and plans for floating turbidity barrier installation.
- D. Submit dredge equipment details for all equipment selected by the Contractor that will be on the lake during the project. Included type, make, model, age of equipment, and electronic positioning equipment that will be used to determine dredge removal depths.
- E. Prepare and submit a plan for all temporary construction improvements needed at the Whitefish City Beach boat launch. Include truck travel paths, a plan view, and written description of any temporary obstructions, schedule, and plans for restoring the area to its original condition.

## PART 2 - PRODUCTS

### 2.01 FLOATING TURBIDITY BARRIER AND OIL BOOM

- A. Floating turbidity barrier shall have adequate freeboard to support the curtain and contain surface contaminants within the active DMU. The barrier should be constructed of impermeable PVC coated nylon fabric or Engineer approved equivalent, have adequate curtain depth to reach the bottom of the lake after dredge removal, and have a positive connection system between panels. Oil absorber booms must also be provided as described in Part 3 of this section.
- B. Oil absorber booms shall be floating sorbent style booms that will not sink when saturated with oil. Booms shall have mesh outer casings with sock filled interiors that will not shed, locking and overlapping connections, and a continuous rope reinforced center that runs the length of the boom.

## PART 3 - EXECUTION

### 3.01 SITE PREPERATION AND ACCESS

- A. Work Zone Preparation
  - 1. The Contractor is not permitted to have construction equipment or personnel on private property without prior written authorization from the property owner.
  - 2. The Contractor shall not utilize, disturb, or impact any wetland areas.
  - 3. Locate and protect any and all utilities within the project and staging areas. If any damage occurs to an existing utility during operations, the Contractor shall immediately notify the utility and the Engineer, and repair, or have repaired, the utility in question.
  - 4. Protect the work limits against entry from the public including the immediate dredging vicinity (DMU's). Erect and maintain floating signage with flashing indicators near the work zone to warn boaters of hazards within the waterway.
  - 5. Any release of a petroleum product (such as fuel or oil from equipment or sediment) to Whitefish Lake, which is a waterway of the United State, is a reportable incident. The Contractor shall take great care to insure all equipment and machinery is in good working order. When equipment is being fueled, spill prevention measures shall be used to insure any potential drips or spills are captured.
  - 6. All dredging activities shall comply with the noise ordinance for the City of Whitefish which can be found at: <http://www.whitefish.govoffice.com/>
  - 7. Install and maintain floating oil absorber booms at least 50 feet beyond the work zone and within areas protected by floating turbidity curtains.
- B. Site Access
  - 1. Primary access to the Whitefish Lake and work areas will be from the City Beach boat launch.
  - 2. Any additional site access that the Contractor feels is required shall be secured in writing by the Contractor. Any fee associated with this access is the Contractor's responsibility. The Contractor shall provide a copy of the access agreement, including a restoration plan, to the Engineer.

### 3.02 DREDGING SYSTEM AND COMPONENTS

- A. Floating Turbidity Barrier and Oil Absorber Boom

1. Install floating turbidity barriers around all active DMU's. Barriers should remain in place and secured for all de-snagging and dredging activities.
  2. Secure barriers within the lake without entering private property.
  3. Adequately weight the base of the curtains against blowouts due to work activities.
  4. Install floating oil absorber booms around the interior of the DMU to absorb any oil sheen that may be produced as a result of the operations.
- B. Mechanical Dredge
1. The mechanical dredge equipment selected by the Contractor shall have adequate reach to access the depths to the dredge cuts as shown in the Drawings. The dredge equipment shall have a closeable style bucket to reduce the re-suspension of impacted material, reduce turbidity, and allow for the decanting of excess water.
  2. The mechanical dredge equipment shall be equipped with accurate, real-time, navigational and dredging control system with vertical accuracy of not more than 0.5 feet and horizontal accuracy of not more than 3 feet. The software shall record dredge activity and automatically adjust for pitch and roll.
  3. The mechanical dredge equipment shall be maintained in a good condition so as to eliminate any spills or oil leaks. A spill response kit shall be maintained on the dredge (or barge) and used in case of accidental release of petroleum to the lake.

### 3.03 DEBRIS REMOVAL

- A. Remove all debris including logs, brush, garbage, and other deleterious materials, both on the surface and buried, that are likely to interfere with mechanical dredging operations. The initial topographic survey has identified some of the larger debris that is visible from the surface. Logs and debris shown in the Drawings are not meant to be all-inclusive and the Contractor is herein notified to anticipate buried debris within the sediment.
- B. Debris and de-snagging operations shall take place within an area protected by floating turbidity curtains and oil boom.
- C. Debris with impacted sediments shall be separated from non-impacted debris. Debris with impacted sediments shall be transported to the railyard and loaded into railcars for transport to an approved facility. Non-impacted debris may be segregated at the work site and returned to its original location.
- D. Offloading of removed debris shall take place over a Contractor designed and installed trans-loading area that is capable of capturing dripping sediments and not releasing them into the lake. The trans-loading area should incorporate bermed sides and polyethylene sheeting of not less than 6 mil thickness or thicker to perform its intended purpose of containing the sediments.

### 3.04 MECHANICAL DREDGING OPERATIONS

- A. Dredge to the elevations and limits shown in the Drawings, until a non-petroleum impacted condition is achieved, or as directed by the Engineer.
- B. Perform ongoing sounding and/or surveys as needed to determine compliance with the limits and elevations shown on the Drawings.

- C. Allow the Engineer access to monitor ongoing operations and notify the Engineer when the limits have been reached. The Engineer will perform field confirmation tests to determine if additional material needs to be removed. If needed, remove additional material at the Engineer's direction. The Engineer will collect confirmation samples for expedited laboratory analysis at the Owner's expense. Lab analysis is use by the EPA to help determine whether affected sediment removal is satisfactory. EPA's OSC will notify Engineer if additional dredge removal will need to be performed.

### 3.05 BATHYMETRIC SURVEY

- A. All survey work conducted by the Contractor shall utilize a professional surveyor licensed in the state of Montana.
- B. Pre-Dredging Bathymetric Survey: The Contractor will be supplied with a copy of the Engineer's pre-dredging bathymetric survey. They shall either accept this survey as the Contract Survey, or conduct a detailed pre-dredging bathymetric survey at their own expense. If a pre-dredge survey is conducted by the Contractor, a pre-dredging bathymetric map shall be developed and submitted to the Engineer in ACAD Civil 3D version 2011 with the surface created by the surveyor. Provide survey information in digital DWG format.
- C. The Engineer's pre-dredging bathymetric survey was performed by:  
Sand's Surveying, Inc.  
2 Village Loop  
Kalispell, MT 59901  
(406) 755-6481
- D. Control Points: Vertical and horizontal control has been set at two locations near the work area. The removal elevation limits are based on this vertical control and the Contractor shall tie their vertical system to this control.
- E. Sediment Volume Estimates: The Contractor shall periodically conduct bathymetric measurements of the dredged lake bottom area and calculate the volume dredged in that time period. Submit the new Bathymetric data files to the Engineer for verification of the quantities. The submittal interval shall be no greater than the DMU limits set by the Contractor. The Contractor shall calculate volume of sediment dredged and provide this information to the Engineer for review and acceptance prior to submittal for payment.
- F. Post-Dredging Bathymetric Survey: Conduct a detailed post-dredging bathymetric survey following dredge removal. Provide the data files in ACAD Civil 3D version 2011 with surface created by the surveyor.
- G. Final Bathymetric Survey: Conduct a detailed final bathymetric survey following dredge removal and incorporate this into the "as built" plans (including cross sections) showing the pre-dredging and post-dredging lake bottom. Cross sections shall be at an interval of not greater than 100 feet as measured along stationing alignment. These "as built" drawings shall be prepared and signed by a Montana licensed surveyor or Montana licensed engineer. Provide all files used to create these drawings in ACAD Civil 3D version 2011 with surfaces included in the drawings.

### 3.06 BACKFILLING, FINISH GRADING, AND RESTORATION

- A. Backfill of the lake bottom is not required as part of this removal activity.
- B. The contractor shall restore any areas impacted by the work to pre-project conditions or as detailed in the Drawings and specifications, unless otherwise directed by Engineer.
- C. Contractor shall be responsible for restoring, in compliance with all applicable regulations, any shoreline slopes, surface soil, and vegetation that are damaged or removed during the project in accordance with Section 02905 – Restoration (as issued with Whitefish River – Lower Reach Remedial Action (2011)).
- D. The Contractor shall clean up, restore, and remove all impact and appurtenances associated with dredging operations. All materials utilized by the Contractor during construction shall be removed from the work zone; including survey stakes, debris, flagging, temporary survey controls, and any other construction materials.

### 3.07 MEASUREMENT AND PAYMENT

- A. Mechanical Dredging
  - 1. Measurement for this unit cost will be by the cubic yard of sediment dredged, measured through a pre- and post-dredging bathymetric survey. The Contractor shall make monthly estimates of cubic yards of sediment dredged by conducting periodic bathymetric measurements as described above.
  - 2. Payment Limits: Dredge payment will be up to, but not exceeding, the limits shown on the Drawings. The Engineer may increase or decrease those limits, thus increasing or decreasing the payment limit, as needed to insure all required sediments are removed. Payment will **not** be made for over-dredging beyond the limits shown in the drawings without written authorization from the Engineer.
  - 3. Payment for mechanical dredging shall include all materials, equipment, labor and services required to mechanically dredge Whitefish Lake to the limits shown on the Drawings, and all other associated work for which payment is not specifically provided for in the bid proposal. Payment will be made at the contract unit price for the Mechanical Dredging bid item for quantities up to and including the Bid Quantity, based on the Contractor's monthly estimate of the volume of sediment dredged. These volumes shall be favorably reviewed by the Engineer prior to submittal for payment. Final payment shall be made at the Contract unit price for the Mechanical Dredge bid item for the actual quantity dredged. Quantities in excess of the plan quantity and dredging beyond the plan limits must be approved in writing by the Engineer and the Owner prior to commencement. Payment beyond the Contract quantity will only be made after written approval by the Engineer and the Owner. Payment for dredge volumes less than the plan quantity will also be made at the contract unit price, but only to the lesser volume.

END OF SECTION

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## SECTION 02999

### WATER QUALITY MONITORING DURING DREDGING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes: Requirements for providing water quality monitoring any time dredging is occurring.

##### 1.02 TEMPORARY CONTROLS

- A. Water Control: Water control, treatment, and discharge shall be conducted as described in Section 02140.

#### PART 2 - PRODUCTS

##### 2.01 TURBIDIMETER

- A. Provide a Hach Portable Turbidimeter Analysis System, model 2100Qis01 with USB+Power Module model number LZV813, or Engineer approved equivalent.
- B. Provide the optional barcode scanner and software to create bar codes for operator and sample location to easily enter the data into the unit during testing.
- C. Provide not less than 25 StabCal primary calibration standards in 1" sealed vials with standards calibrated for 10, 20, 100, and 800 NTU. Should the standards drop to 20 units available, order and additional 10 of each.

#### PART 3 - EXECUTION

##### 3.01 TURBIDITY MONITORING

- A. The Contractor shall conduct the dredging operations in a manner to minimize turbidity. Floating turbidity barriers with weighted curtains shall be used to contain turbid waters resulting from the dredging operation. Turbidity monitoring is not required until such time a visible turbidity plume is observed beyond the turbidity curtain and in excess of 15 feet from the active dredge operation at which time turbidity monitoring will be required at the Contractor's expense. Monitoring will be continued until the turbidity beyond the turbidity curtain is less than 10 NTUs above background.
- B. If required, turbidity readings shall be taken not more than 15 feet beyond the active Dredge Management Unit (DMU) at no less than three (3) equally spaced intervals around the DMU.
- C. Monitoring for turbidity, as measured in NTUs, is to be collected and analyzed in compliance with the following conditions:
  - 1. All in-lake samples are to be collected with a Kemmerer, Van Dorn, or similar sampler that is designed to collect in-situ water samples.

2. All turbidity measurements shall be performed using Portable Turbidimeter. The instrument shall be calibrated prior to each monitoring event or in accordance with the manufacturer's recommendations.
- D. Limits: The limit of increase in turbidity shall be no greater than 10 NTU above background turbidity measurement. Background turbidity measurements shall be taken approximately 100 feet beyond the active dredging operations at a location where no conditions exists that could carry turbidity to the sampling location.
- E. Copies of the daily turbidity monitoring reports shall be submitted to the Engineer daily. The following information must be recorded each day in a monitoring report.
  1. Monitoring Report data requirements:
    - a. If no turbidity is noted for the day's work activity, this should be noted in the daily monitoring report.
    - b. Location
    - c. Date and time of day the sample was collected.
    - d. Total depth at the sample location and the depth of the sample.
    - e. Antecedent weather conditions and wind direction.
    - f. Equipment used for sample collection and analysis.
    - g. Location map indicating the numbered locations of all sampling sites.
    - h. Certification by the individual collecting and analyzing the sample that they performed the test.
  2. The following measures will be taken immediately whenever turbidity levels exceed allowable levels:
    - a. Immediately cease all work contributing to the turbidity criteria stated herein.
    - b. Implement corrective actions, as needed, to prevent the continued exceedance of the turbidity limit stated herein.
    - c. Immediately notify the Engineer if an exceedance occurs. The exceedance report shall include a description of corrective actions being taken or proposed to be taken.

### 3.02 VISIBLE SHEEN

- A. At no time is a visible iridescent petroleum sheen allowed outside the active DMU. If a sheen is noted, immediately cease all dredging activities and clean up affected areas using oil sorbent pads and booms.
- B. The presence of, or lack of, sheen both inside and outside the active DMU should be noted in the Daily Monitoring Report.

### 3.03 DAILY MONITORING REPORTS

- A. Provide the signed daily monitoring reports as described in this section to the engineer the morning after the previous day's work.

END OF SECTION

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## Drawings



# WHITEFISH LAKE - MACKINAW BAY REMEDIAL ACTION

## WHITEFISH, MONTANA

BY KENNEDY/JENKS CONSULTANTS

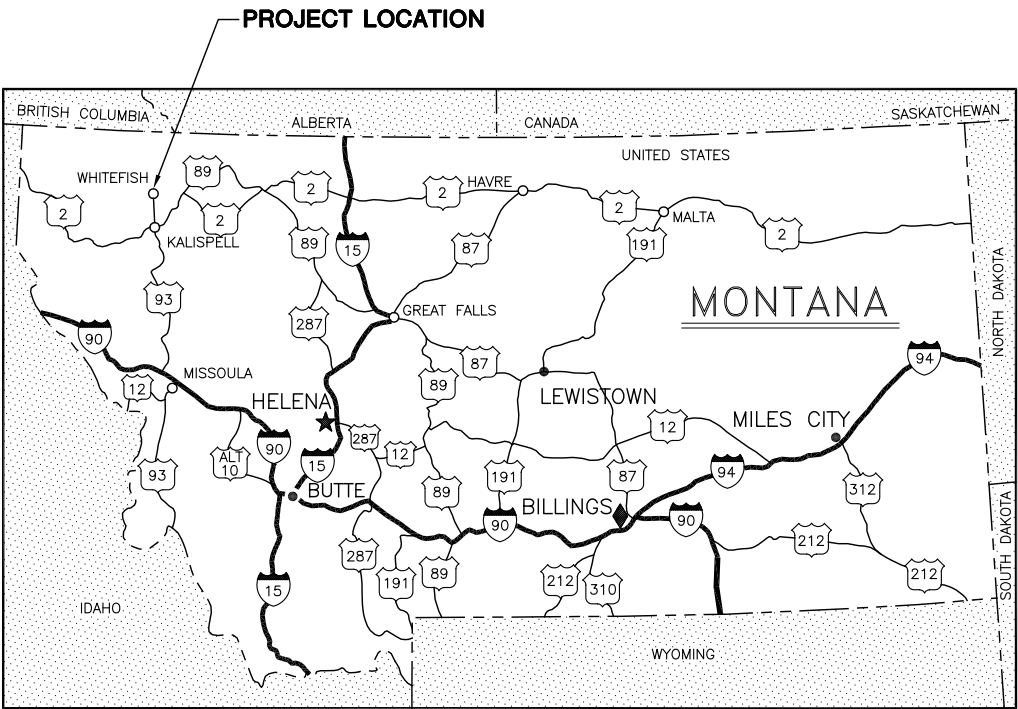
LIST OF DRAWINGS

GENERAL

DWG NO.	TITLE
G-1	TITLE SHEET
G-2	ABBREVIATIONS

CIVIL

DWG NO.	TITLE
C-1	OVERALL SITE PLAN
C-2	PLAN VIEW
C-3	CROSS SECTIONS STA 1+00 THRU STA 3+50
C-4	CROSS SECTIONS STA 3+75 THRU STA 5+75



VICINITY MAP





PROJECT LOCATION MAP

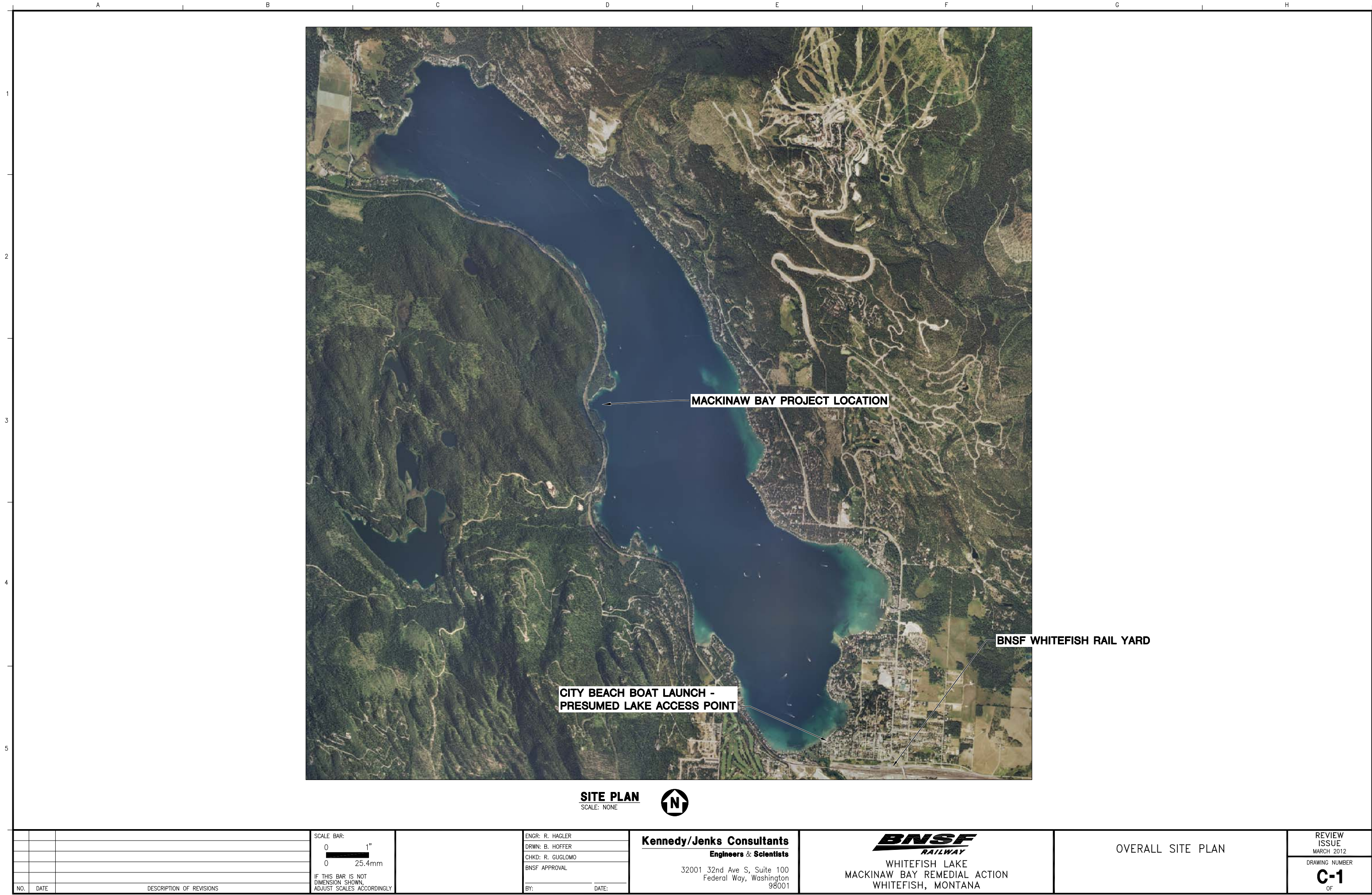
			SCALE BAR: 0 1" 0 25.4mm IF THIS BAR IS NOT DIMENSION SHOWN, ADJUST SCALES ACCORDINGLY			ENGR: R. HAGLER DRWN: B. HOFFER CHKD: R. GUGLOMO BNSF APPROVAL BY: _____ DATE: _____	Kennedy/Jenks Consultants Engineers & Scientists 32001 32nd Ave S, Suite 100 Federal Way, Washington 98001	 WHITEFISH LAKE MACKINAW BAY REMEDIAL ACTION WHITEFISH, MONTANA	TITLE SHEET	REVIEW ISSUE MARCH 2012
NO.	DATE	DESCRIPTION OF REVISIONS								DRAWING NUMBER <b>G-1</b> OF

## **ABBREVIATIONS**

AND	DISSOLVED AIR FLOTATION UNIT	IRRIGATION	P	PUMP	U/G	UNDERGROUND
@	DRY BULB	I	PA	PLANT AIR	UBC	UNIFORM BUILDING CODE
BY	DBL BLK & BLD	ID	PC	POINT OF CURVATURE	UH	UNIT HEATER
CENTERLINE	DOUBLE BLOCK AND BLEED	IE, IN EL	PCW	PROCESS WATER	UL	UNDERWRITER'S LABORATORY
CHANNEL	DOUBLE CONTAINED	IH	PD	PRESSURE DROP	UO	USED OIL
DEGREES FAHRENHEIT	DEMOLISH	IN	PE	PLAIN END OR POLYETHYLENE	UON	UNLESS OTHERWISE NOTED
DIAMETER	DFO	INCH	PERIM	PERIMETER		
FEET	DH	INVERT	PI	PRESSURE INDICATOR	V	VENT, VENT ABOVE ELEVATION, VENTILATING
INCHES	DI	IPS	PIW	PUMPED INDUSTRIAL WASTEWATER	VD	VOLUME DAMPER
NUMBER, POUND	DIA	IW	PIP	PLASTIC IRRIGATION PIPE	VERT	VERTICAL
PROPERTY LINE	DIM	IWS	PL	PLATE	VSD	VARIABLE SPEED DRIVE (VFD)
SQUARE	DIP	IWW	PLC	PROGRAMMABLE LOGIC CONTROLLER	VTR	VENT THRU ROOF
STRUCTURAL ANGLE	DN	IWWTF, IWTf,IWTP	POTW	POINT OF CONNECTION	VVT	VARIABLE VOLUME/TEMPERATURE
	DR		PP	PUBLICLY OWNED TREATMENT WORKS		
	DWG		PRESS	PRESSURE	W	WEST
	DWV		PROP	PROPELLER	W/O	WITHOUT
	(E), EXIST	KW	PRV	PRESSURE RELIEF VALVE, PRESSURE REDUCING VALVE	WB	WET BULB
	E		PS	PUMP STATION	WER	WALL EXHAUST OR RETURN
	e.g.	L	PSF	POUNDS PER SQUARE FOOT	WG	WATER GAUGE
	EA	LB	PSI	POUNDS PER SQUARE INCH	WM	WATER METER
	EAG	LBS	PSIG	POUNDS PER SQUARE INCH GAUGE	WS	WASTE SLUDGE, WATER SURFACE
	ECC	LF	PSS	PRESSURIZED SANITARY SEWER	WSD	WALL SUPPLY DIFFUSER
	EER	LG	PT	POINT. POINT OF TANGENCY	WTP	WATER TREATMENT PLANT
AMCA	EES	LO	PTW	PUMP-TO-WASTE	WW	WASTEWATER
ANCH	EF	LP	PVC	POLYVINYL CHLORIDE		
ANSI	EFF	LT	PVMT	PAVEMENT	XJ	EXPANSION JOINT
APPROX	EL, ELEV	LT.WT.	PW	POTABLE WATER	YD	YARD
ARV	ELECT	LWM	PWW	PUMPED WASTEWATER		
AS	ENCL	LWT				
ASTM	EP, EOP					
ATS	EQ	M				
AVR	EQUIP	MACH	R	RADIUS		
	ES	MFR	R/W	RIGHT OF WAY		
	ESP	MANUF	RCP	REINFORCED CONCRETE PIPE		
	EW/EF	MAT'L	RD	ROAD		
	EW	MAX	RE	RIM ELEVATION		
	EWS	MB	RECIRC	RECIRCULATION		
	EWT	MBH	RED	REDUCER		
	EXP	MCC	REF	REFERENCE		
	EXT	MD	REG	REGULATOR		
		MECH	REINF	REINFORCING, REINFORCED		
		MEOH	REQ'D	REQUIRED		
		MFR	RF	RAISED FACE, RETURN AIR		
		MH	RJ	RESTRAINED JOINT		
		MIN	RO	ROUGH OPENING		
		MISC	RPM	REVOLUTIONS PER MINUTE		
		MJ	RW	RAW WATER, RECOVERY WELL		
		MNPT	RWL	RAIN WATER LEADER		
		MON				
		MPH	S	SOUTH, SLOPE		
		MUX	SA	SAMPLE		
		MX	SAN	SANITARY SEWER		
		(N)	SCHED	SCHEDULE		
		N	SDR	STANDARD DIMENSION RATIO		
		NIC	SE	SOUTHEAST		
		N/A	SEC	SECOND		
		N/C	SEER	SEASONAL ENERGY EFFICIENCY RATIO		
		NE	SeqT	STORM EQUALIZATION TANK		
		NG	SEW	SEWER		
		NGVD	SF	SQUARE FEET		
		NO	SHT	SHEET		
		NO.	SIM	SIMILAR		
		NOM	SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION		
		NPT	SMH	SANITARY SEWER MANHOLE		
		NPW	SP	STATIC PRESSURE OR SURFACE PREPARATION, SUMP PUMP, SET POINT		
		NPWH	SPA	SPACES		
		NRS	SPEC	SPECIFICATIONS		
		NST	SO	SQUARE		
		NTS	SO FT	SQUARE FEET		
			SS	STAINLESS STEEL, SANITARY SEWER		
			SSPC	STRUCTURAL STEEL PAINTING COUNCIL		
			STA	STATION		
			STD	STANDARD		
			STL	STEEL		
			STORM, SD	STORM DRAIN		
			STR	STRENGTH		
			STRUCT	STRUCTURAL		
			SW	STORMWATER, SOUTHWEST		
			T	THERMOSTAT		
			T&B	TOP AND BOTTOM		
			TBM	TEMPORARY BENCH MARK		
			TCE	TRICHLOROETHYLENE		
			TEL	TELEPHONE		
			TGE	TOP OF GRATING ELEVATION		
			TOC	TOP OF CONCRETE		
			TOS	TOP OF SLAB, TOP OF STEEL		
			TOW	TOP OF WALL		
			TT	TANK TRUCK		
			TURB	TURBIDITY		
			TYP	TYPICAL		

			SCALE BAR: 		ENGR: R. HAGLER DRWN: B. HOFFER CHKD: R. GUGLIMO BNSF APPROVAL		<b>Kennedy/Jenks Consultants</b> <b>Engineers &amp; Scientists</b> 32001 32nd Ave S, Suite 100 Federal Way, Washington 98001		 WHITEFISH LAKE MACKINAW BAY REMEDIAL ACTION WHITEFISH, MONTANA		REVIEW ISSUE MARCH 2012	
			IF THIS BAR IS NOT DIMENSION SHOWN, ADJUST SCALES ACCORDINGLY		BY: _____ DATE: _____				ABBREVIATIONS		DRAWING NUMBER <b>G-2</b> OF	
NO.	DATE	DESCRIPTION OF REVISIONS										





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**CONSTRUCTION NOTES:**

- 1 REMOVE IMPACTED SEDIMENT. REFER TO CROSS SECTIONS FOR NOMINAL DEPTHS.

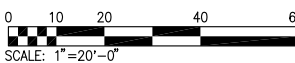
**GENERAL NOTES:**

1. REMOVE ALL LOGS, DEBRIS, AND OTHER OBSTRUCTIONS AS NEEDED TO ALLOW FOR DREDGE OPERATIONS.

**LEGEND**

- 12" = 12" DIAMETER LOG  
36" = 36" DIAMETER BOULDER

**SITE PLAN**  
SCALE: 1"=20'



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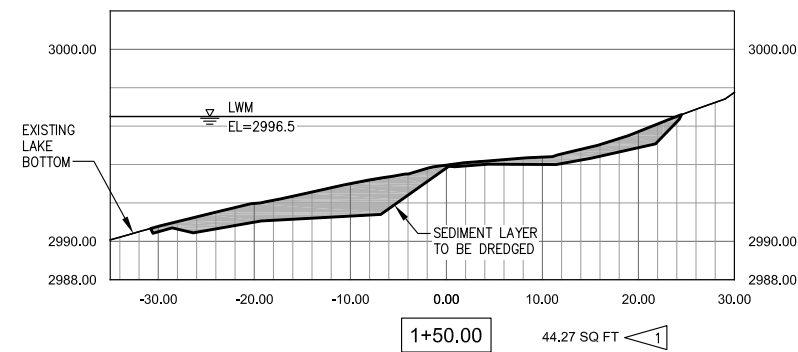
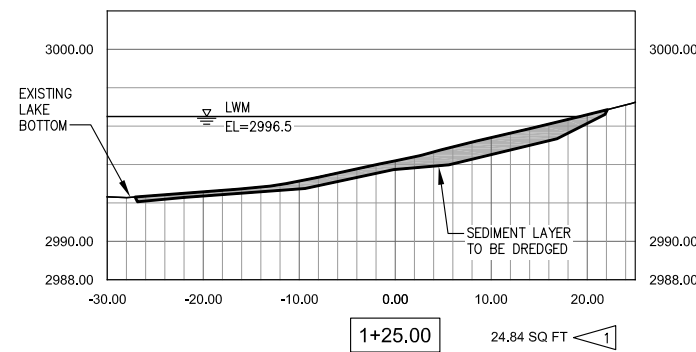
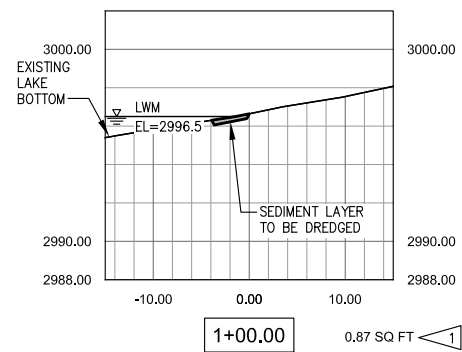
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**BNSF RAILWAY**  
WHITEFISH LAKE  
MACKINAW BAY REMEDIAL ACTION  
WHITEFISH, MONTANA

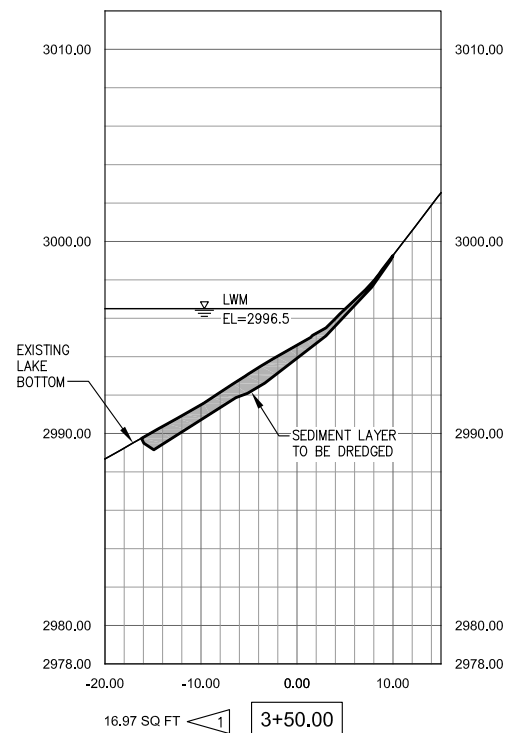
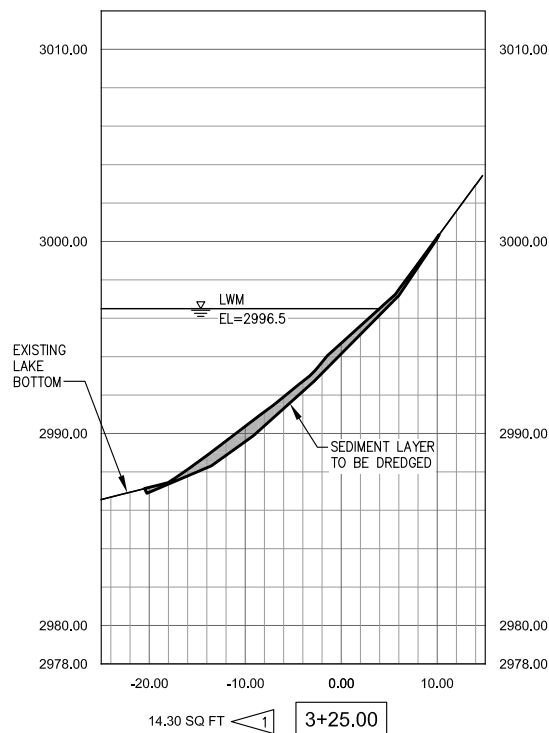
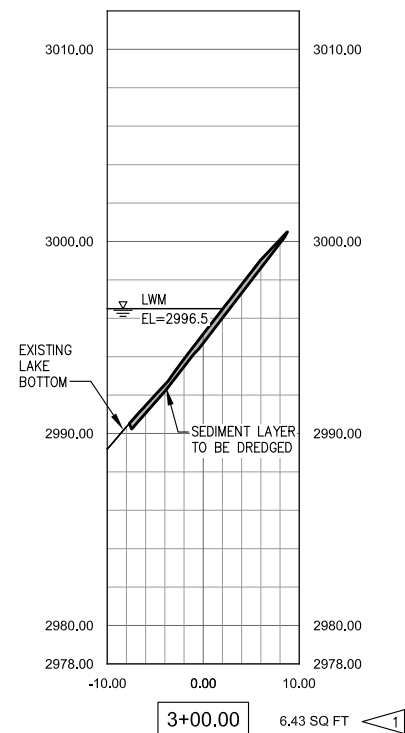
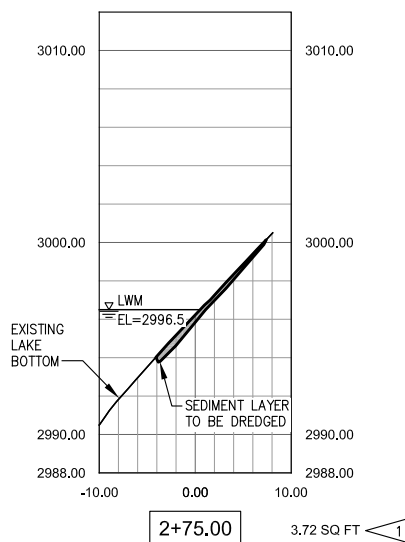
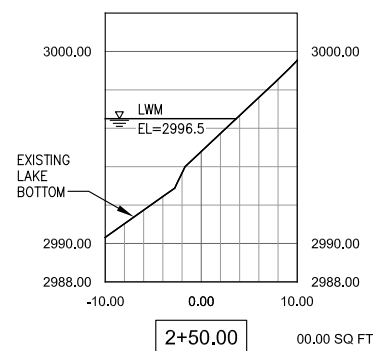
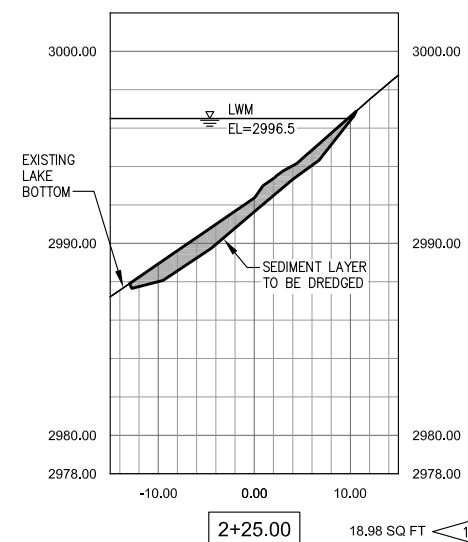
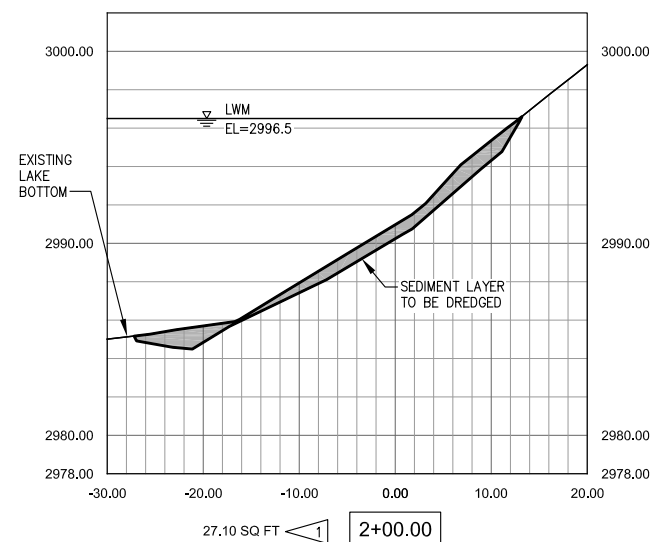
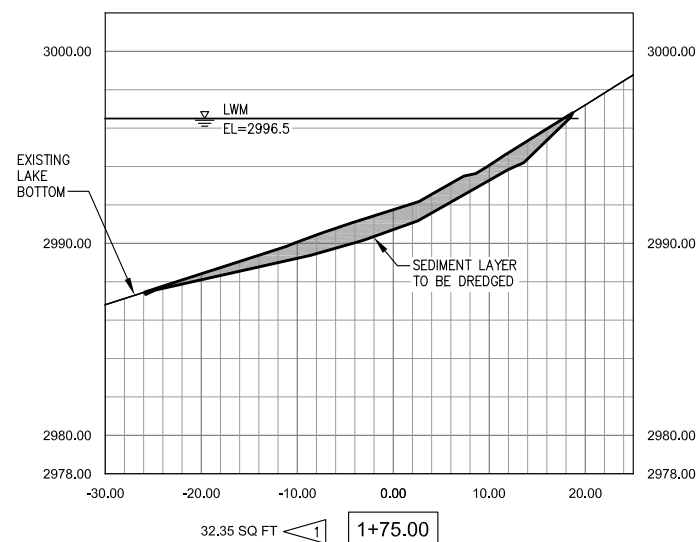
PLAN VIEW

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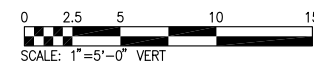
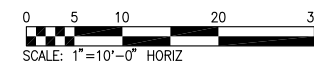
NO ACCOMMODATIONS MADE FOR OVERDREDGE.



## CROSS SECTIONS

SCALE: 1"=10' HORIZ 1"=5' VERT

NOTE:  
SECTIONS CUT LOOKING  
AHEAD ON STATIONING.

[illegible]

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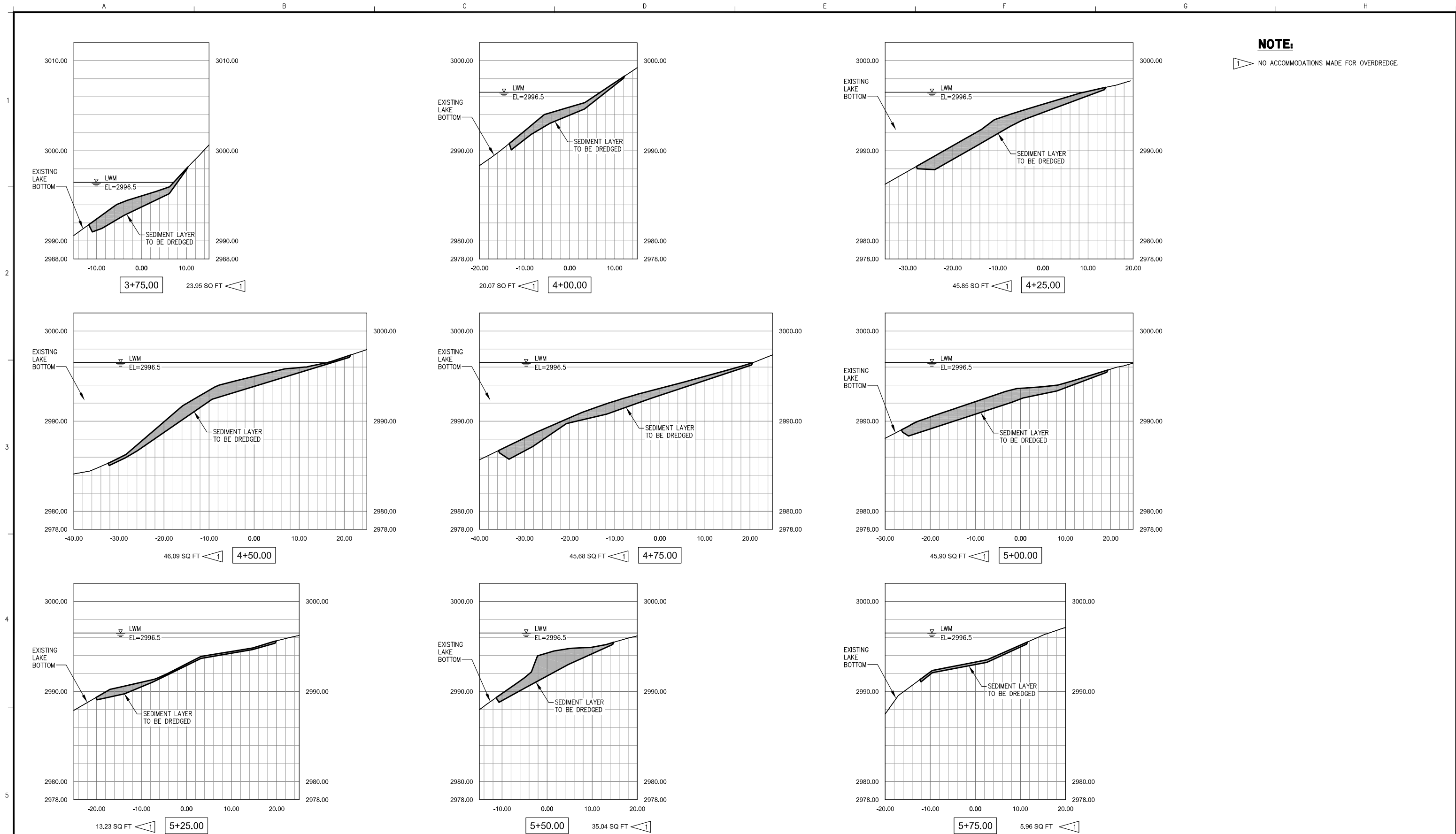
WHITEFISH LAKE  
MACKINAW BAY REMEDIAL ACTION  
WHITEFISH, MONTANA

CROSS SECTIONS  
STA 1+00 THRU STA 3+50

REVIEW  
ISSUE  
MARCH 2012

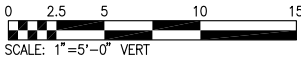
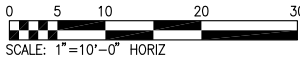
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CROSS SECTIONS  
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NOTE:  
SECTIONS CUT LOOKING  
AHEAD ON STATIONING.



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RAILWAY  
WHITEFISH LAKE  
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CROSS SECTIONS  
STA 3+75 THRU STA 5+75

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OF