PROJECT PLAN

PROJECT NO. 2013-02
FOUNTAIN LAKE RESTORATION PROJECT
HYDRAULIC DREDGING

NRT Project No. 2248

Prepared For:
SHELL ROCK RIVER WATERSHED DISTRICT
214 West Main Street
Albert Lea, Minnesota 56007

Prepared By:
Natural Resource Technology, Inc.
234 W. Florida Street, Fifth Floor
Milwaukee, Wisconsin 53204

September 12, 2016
September 12, 2016
(NRT Project No. 2248)

RE: Project No. 2013-02 Fountain Lake Restoration Project – Hydraulic Dredging

To Whom It May Concern,

On behalf of the Shell Rock River Watershed District (SRRWD), Natural Resource Technology, Inc., (NRT) is providing notice, pursuant to Minnesota Statute 103D, of SRRWD’s intent to establish a construction project within the Watershed District.

As described in SRRWD’s approved Watershed Management Plan, “2014 Second Generation Water Management Plan,” one of the identified priority issues is the removal of nutrient rich sediments from lakes with impaired water quality. SRRWD has identified that Fountain Lake is now ready for sediment removal through hydraulic dredging. Upstream projects have been completed to reduce external nutrient loading to Fountain Lake, and now sediment will be removed to reduce internal nutrient loading.

The attached Basis of Design Report and draft dredging plan serve as the Project Plan. A separate Environmental Assessment Worksheet was prepared and publically published and distributed to regulatory agencies for environmental review of the project.

If you have any questions or concerns regarding this Hydraulic Dredging Project Plan, please contact Mr. Andy Henschel of the SRRWD at (507) 377-5785.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

Andrew M. Millspaugh, PE
Environmental Engineer

Attachments: Attachment 1: Hydraulic Dredging Basis of Design Report
Attachment 2: Draft Dredging Plan
ATTACHMENT 1
HYDRAULIC DREDGING BASIS OF DESIGN REPORT
BASIS OF DESIGN REPORT

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<tr>
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<td>Basis of Design Report</td>
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<td>BMP</td>
<td>best management practice</td>
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<td>BWSR</td>
<td>Board of Water and Soil Resources</td>
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<td>CDF</td>
<td>confined disposal facility</td>
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<td>Shell Rock River Watershed District</td>
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<tr>
<td>TMDL</td>
<td>total maximum daily load</td>
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<td>TSS</td>
<td>total suspended solids</td>
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1 INTRODUCTION

1.1 Description of Project and Purpose

Fountain Lake, located in Albert Lea, Freeborn County, MN, (Figure 1) covers approximately 521 acres, and is central to the City’s identity and tourism as a popular destination for boating, swimming, waterskiing, fishing, canoeing, and kayaking. In 2008, Fountain Lake was added to Minnesota’s list of impaired waters for an “aquatic recreation” impairment due to nutrient loading (specifically phosphorus) and eutrophication. The Shell Rock River Watershed District (SRRWD) was established on June 25, 2003 with the mission of improving water quality in area waterbodies, and implementing reasonable and necessary improvements to water-related and other natural resources within its limits. Since its creation, SRRWD has pursued a comprehensive watershed approach to reduce sedimentation and improve water quality throughout the watershed through implementation of the Shell Rock River Watershed District 10-year Water Management Plan.

In 2012, SRRWD worked in cooperation with the Minnesota Pollution Control Agency (MPCA) to perform a Total Maximum Daily Load (TMDL) Study to determine pollution reduction strategies for Fountain Lake. The TMDL Study indicated that approximately 65 percent of the annual phosphorus loading to Fountain Lake is from internal sources (e.g., phosphorus release from lake bottom sediment). This accumulated phosphorus in sediment can be released into the water column through wind, wave, and rough fish action, decreasing water quality. The remaining 35 percent of the phosphorus load is from external sources (e.g., urban stormwater, tributary inflows, wet and dry deposition). Therefore, external load reductions alone will not lead to compliance with state water quality standards; rather, internal loading must be reduced to meet the TMDL load allocation requirement.

In 2013, SRRWD developed a TMDL Implementation Plan that provided a comprehensive list of Best Management Practices (BMP) to reduce external phosphorus loads to Fountain Lake. Implemented watershed protection initiatives include tributary creek stabilization, septic system improvements, and rough fish management, including common carp. With the substantial completion of upstream management practices, SRRWD seeks to further improve lake water quality by removing phosphorus-laden sediment through dredging, which will lead to reductions in average and maximum summer total phosphorus concentrations, reduction in the magnitude of phytoplankton concentrations, reduction in average chlorophyll-a concentrations, and increased average and maximum summer water clarity. Beneficiaries to the project include all lake users and residents who recreate, fish, or use Fountain Lake in any manner. Improving conditions in Fountain Lake will also improve downstream conditions.
Fountain Lake has been historically dredged twice before: once from 1940 to 1944 when the dredge “Captain George” removed approximately 1,800,000 cubic yards of sediment, muck, and debris from Fountain Lake; and a second time from 1962 to 1967 when the dredge “Foun-Da-Lea” removed approximately 1,823,310 cubic yards of sediment.

Dredging is currently targeted to commence in 2017 and span approximately 5 years to achieve the targeted volume of sediment removal. Existing lake conditions are shown in Figure 2.

1.2 Roles and Responsibilities

Several entities are involved in the dredging design; these entities and their roles include the following:

- **Shell Rock River Watershed District**: SRRWD is the project owner and holds, or will hold, contracts and permits with various entities for the design and execution of this project.

- **Natural Resource Technology, Inc. (NRT)**: NRT is contracted to SRRWD to perform the dredging design as described in this Basis of Design Report (BODR) and prepare permit applications, construction plans, and technical specifications for inclusion in project bid documents. NRT will maintain a project schedule for the design, permitting, and contractor procurement.

- **Barr Engineering Co. (Barr)**: Barr is contracted to SRRWD and performed sediment characterization activities for Fountain Lake. Barr may be used as a reference for questions related to past lake characterization activities.

- **Dredging Contractor**: A dredging contractor will be selected from qualified bids and will be contracted to SRRWD for hydraulic dredging.
2 DESIGN OBJECTIVES

The sediment dredging design will proceed to achieve the following objectives:

1. **Sediment Removal:**
   Dredge between 1,200,000 and 1,700,000 cubic yards of accumulated sediment to reduce phosphorus in Fountain Lake.

2. **Enhance Aquatic Habitat:**
   Dredge isolated areas for increased water depth to provide wintering holes and summer refuge areas for fish.

3. **Improve Recreational Opportunities:**
   Dredge accumulated sediment to increase average water depths in areas for improved boating.

4. **Develop Sediment Removal Phasing Plan:**
   Develop contract phasing for sediment removal areas to correspond with anticipated CDF construction.

NRT will coordinate with SRRWD staff during the design of sediment removal areas to balance the identified goals with available funds and the estimated maximum sediment removal volume.
3 DREDGING DESIGN & CONSTRUCTION SCHEDULE

The dredging schedule is controlled by weather and the availability of upland sediment management areas to place dredged sediment. Currently, three upland CDF cells have been designed with a combined estimated sediment storage capacity of 1,275,000 cubic yards. Dredging is planned to begin as soon as the first cell is constructed with an estimated sediment storage capacity of 690,000 cubic yards. SRRWD has an option agreement for additional land for future construction of one or more CDF cells to provide additional sediment storage capacity.

Sediment dredging is anticipated to be administered through multiple construction contracts corresponding to CDF cell construction. The first dredging contract will be limited to the storage capacity of CDF Cell 1 (Approximately 690,000 cubic yards). The second dredging contract will be for the combined storage capacity of CDF cells 2 and 3 (Approximately 585,000 cubic yards). Additional dredging contracts may be developed based on construction of additional sediment storage beyond CDF Cells 1, 2, and 3. Anticipated dredge contract phasing is shown in the project schedules included in Appendix A. Sediment storage beyond CDF Cell 3 has not yet been designed. The design tasks and the dredging schedule include the following critical elements:

- **Dredging Design**: This task includes the technical design and permit applications consisting of the following elements:
  - BODR review with SRRWD and concurrence on design approach. Following concurrence on the BODR approach, further review and input by SRRWD will occur during weekly progress conference calls.
  - Designation of dredge areas and depths for a total sediment removal volume of up to 1,700,000 cubic yards. Dredge areas will be subsequently grouped corresponding to dredge contracts.
    1. Dredge contract 1: Corresponding to CDF Cell 1 capacity estimated at 690,000 cubic yards and forecast to occur in 2017 and 2018.
    2. Dredge contract 2: Corresponding to CDF Cell 2 and 3 combined capacities estimated at 585,000 cubic yards and forecast to occur in 2019.
    3. Future dredge contracts: Corresponding to the remaining dredge volume estimated at 425,000 cubic yards to achieve total sediment removal of 1,700,000 cubic yards and forecast to occur in 2020. Future dredge contracts first require the design of additional CDF storage capacity beyond CDF Cell 3.
  - Prepare dredging technical plans and specifications to support construction bid documents for the first dredging contract. The plan set is anticipated to include the following sheets:
1. Title Sheet
2. Existing Site Conditions
3. Dredge Plan Overview
4. Dredge Areas
5. Dredge Area Volume and Sequence Table
6. CDF Site Plan
7. CDF Cell 1 Layout
8. CDF Outlet Weir Structure Detail
9. Details

- **Permitting:** This task requires elements from the dredging design task to complete permit applications for submittal. Permit applications (See Section 5) will be submitted at the direction of SRRWD as soon as required design information is completed and reviewed. Permitting agency personnel will be contacted prior to submittal to facilitate permit application preparation to potentially streamline agency review. Permit review is anticipated to take at least 45 days for most permits. This duration could be extended if a longer review period is needed or if revisions and resubmittal is required.

- **Project Approval:** Following BODR acceptance by SRRWD, and concurrent with design and permitting, NRT will prepare a Project Plan as described in Section 5.6 for SRRWD to submit to the Minnesota Board of Water and Soil Resource (BWSR) and the Department of Natural Resources (MNDNR), as required by Minnesota Statute 103D. Agency review of the dredging Project Plan is anticipated to take up to 30 days. Following receipt and review of any agency comments, SRRWD will hold a public hearing and then consider approval of the letting of bids for the dredging project through a SRRWD Board of Managers resolution.

- **Bidding & Contracting:** This task requires completion of the dredging design task and SRRWD board approval to release bid documents. NRT will work in coordination with SRRWD to prepare a unified bid package, which may include multiple bid options for bid solicitation. NRT will prepare general conditions, construction plans, and technical specifications. SRRWD will prepare supplementary conditions and other contract documents that they require (e.g., insurance, bonding). The bid solicitation is anticipated to be publically released in October 2016, and the bid period (anticipated to be 8 weeks) will be administered by NRT. Thereafter, NRT will deliver to SRRWD a bid tabulation summary and engineer’s recommendation for awarding the bid to the lowest qualified bidder. SRRWD shall have 3 to 6 weeks to review bids and award a contract or contracts.

- **Site Access:** This task requires the identification of staging areas, pipeline routes to the CDF site, and lake access points for launching construction equipment to each of the lake bays. Staging areas, dredge pipe routes, and access points may need access agreements with existing landowners or local agencies having jurisdiction. Potential access areas are identified in this BODR.

- **Dredging Construction:** This task includes the physical dredging of Fountain Lake. The design is based on dredging and operation of the CDF in above freezing conditions, generally anticipated to be between the months of April and November. Dredging will be phased over multiple years, or dredge seasons, to coordinate with CDF storage capacity and future CDF cell development and construction. The project schedules in Appendix A outline three dredging contracts to accomplish the target project sediment removal volume. The construction duration in the project schedule will be revised following receipt of contractor bids.
4 DESIGN CONSTRAINTS

The dredging design will incorporate the following constraints:

- Sediment and water storage capacity at the CDF.
- Required offsets from physical and administrative features
- Permits
- Contractor access locations
- Coordination with lake users and riparians.
- Use of SRRWD-owned dredging equipment, if any.

4.1 CDF Storage Capacity

The current CDF site plan includes up to three cells (Figures 1 and 4) for a combined storage capacity of approximately 1,275,000 cubic yards. Cell 1 will be constructed first and has an estimated storage capacity of 690,000 cubic yards. Cell 1 construction is currently planned to be complete by July 2017. Construction of Cells 2 and 3 will occur in ensuing years for an added storage capacity of approximately 585,000 cubic yards. SRRWD has an option agreement for additional land to construct additional storage capacity in one or more cells in the future. Due to the planned phased development and construction of CDF cells, dredging will also be phased to coordinate with available constructed storage capacity. The anticipated necessary project sediment storage capacity is approximately 1,700,000 cubic yards.

4.2 Dredging Offsets

Dredging will be offset from the existing shoreline, from submerged utilities, and from fixed structures such as bridges and the outlet dam.

- **From Shoreline:** to be protective of existing near shore aquatic habitat and shoreline slope stability, dredging will be offset a minimum of 30 feet. The general shoreline offset distance may be increased or decreased based on isolated site conditions and to achieve the target sediment removal volume.

- **From Utilities:** Two submerged utilities are known to exist within Fountain Lake (Figure 2). There is a submerged CenturyLink telecommunications utility in Fountain Lake's Main Bay, and a submerged City of Albert Lea sanitary sewer in Dane’s Bay. The CenturyLink utility crosses Main Bay from Lake Shore Drive to Grace Street, but the exact alignment and depth are unknown. The sanitary sewer crosses Dane’s Bay from Blackmer Avenue to Abbott Street. Dredging will be offset a minimum of 100 feet on both sides of submerged utilities in the absence of more specific information on the utility locations and approvals from their...
THE CONSTRUCTED DREDGING OFFSET MAY BE DECREASED THROUGH COORDINATION WITH THE UTILITY OWNERS AND DETERMINATION OF THE EXACT UTILITY LOCATIONS.

- **From Fixed Structures**: Dredging will be offset a minimum of 30 feet from fixed structures (e.g., bridges, outlet dam, permanent docks/piers). The offset may be increased or decreased based on isolated site conditions and to achieve the target sediment removal volume.

- **From Native Material**: Dredging will target deposited soft sediment, not native material that was in place at the time of dam construction. If the bottom of deposited soft sediment is encountered above the designed dredge elevations, the dredge elevations may be revised following review by the Engineer.

### 4.3 Permits

Several permits from various regulatory agencies are required prior to beginning lake dredging as described in Section 5. The Public Waters Work Permit from MNDNR is expected to include coordination with the MNDNR Area Fisheries Manager for dredging within the Work Exclusion Dates of March 1st through June 15th to allow for fish migration and spawning. Work within public waters is allowed within the Work Exclusion Dates provided the project can demonstrate there will be minimal impacts to fish habitat and written approval is obtained from MNDNR. The dredging design assumes that there are areas within Fountain Lake that can be dredged during the Work Exclusion Dates. Based on the project schedule in Appendix A, the first dredge season in 2017 is not anticipated to begin until after June 15th, after the 2017 work exclusion window has ended.

As dredging progresses, sediment will be deposited in the CDF cell(s) and clarified lake water will be separated from sediment and removed from the CDF over a weir outlet structure. Water discharge will be regulated though a US Army Corps of Engineers (USACE) and Minnesota Pollution Control Agency (MPCA) Clean Water Act Section 401/404 Joint Permit. The joint permit will establish effluent monitoring and compliance parameters to allow water discharge to occur.

### 4.4 Contractor Access

The selected dredging contractor will need short-term access locations for mobilizing equipment into Fountain Lake, and long-term access locations for material staging, dredge pipeline routing, and daily construction operations.

- **Mobilization**: Short-term access will be necessary to mobilize dredging equipment into each of Fountain Lake’s bays. Overhead clearance for bridges separating the bays is anticipated to be too low to allow for in-water movement of dredging equipment between bays. Therefore, separate access locations are needed for each bay where a portable crane can set up and lift equipment into the lake. Proposed access locations are shown on Figures 4 and 6; however, the dredging contractor may propose alternate access arrangements. Edgewater Bay can be accessed from the North Edgewater Bay boat landing. Main Bay can be accessed from the Brookside boat landing. Dane’s Bay can be accessed from Blackmer Avenue. Bancroft Bay can be accessed from West Richway Drive. During mobilization, a portable crane will set up at the identified access locations.
All of the crane lift locations will occur on existing ground or pavement around the lake and not on bridges. Engineering analysis or investigation of the sites for stability is not part of the NRT design and if needed will be the responsibility of the dredging contractor based on the weight and type of equipment provided. Semi-trucks will deliver equipment that will be lifted from the trucks directly into the lake. SRRWD will coordinate with the City of Albert Lea to verify use of these areas and obtain necessary approvals.

- **Material Staging:** During active mobilization or dredging construction, the contractor will need areas to store and stage materials and supplies. Identified potential staging areas are shown on Figure 4 and 5. The primary contractor staging area is a vacant city-owned parcel directly north of Edgewater Drive. Additional contractor staging areas, if needed, are at the city landfill and adjacent to the municipal airport at the dead end of West Plaza Street. SRRWD will coordinate with the City of Albert Lea to verify use of these areas and obtain necessary approvals.

- **Dredge Pipeline Routing:** During active dredging construction, a temporary pipeline will be routed from the dredge equipment to the CDF. Two temporary pipeline routes are proposed: one to access Edgewater Bay, and the other to access remaining bays of Fountain Lake. The proposed routes are shown on Figures 4 and 5. For work in Bancroft Bay, Main Bay, and Dane’s Bay, the pipeline route will primarily be submerged or floating within Fountain Lake until Bancroft Creek. From Bancroft Creek, the pipeline route will be overland adjacent to the Albert Lea Municipal Airport until Interstate 90 where the pipeline will cross through an existing culvert and then along the existing unnamed drainage ditch to the CDF site.

For work in Edgewater Bay, the pipeline will be primarily overland through vacant grassland. Road crossings will be coordinated at Edgewater Drive, Itasca Road, and Richway Drive (County Highway 20) through installation of new culverts or directional boring. Land use along the proposed pipeline routes is primarily open water and grassland. The routes will require access agreements with landowners, the City of Albert Lea, Freeborn County, and the Minnesota Department of Transportation (MNDOT). SRRWD will coordinate necessary approvals with landowners, Freeborn County, and the City of Albert Lea. NRT will coordinate necessary approvals with MNDOT.

Along the pipeline routes, dredge booster pumps may be placed at regular intervals as determined by the dredge contractor. Pumps may be located on land or floating in Fountain Lake at locations that can be readily accessed by the dredging contractor. Proposed pump locations will be reviewed before construction to minimize public impact.

- **Construction Access:** During active dredging construction, the contractor will need an area directly adjacent to the lake for construction personnel access and material delivery. This area is anticipated to include a parking area for personnel vehicles, a project construction trailer, and a temporary dock for workboats. Personnel will use the construction access to travel to dredge equipment within Fountain Lake. The construction access area will also be used for project deliveries such as fuel trucks. Most of the perimeter shoreline of Fountain Lake is owned by the City of Albert Lea; therefore, coordination will be required to identify a suitable location for use. One identified location is Edgewater Park indicated on Figures 3 and 4. Use of this area is anticipated to be possible while allowing for continued public use of the park. SRRWD will coordinate with the City of Albert Lea to verify use of this area and obtain necessary approvals.
4.5 Coordination with Lake Users and Riparians

Sediment dredging will occur during months when the lake is not frozen, anticipated from April through November. Recreational users are expected to be on and around Fountain Lake concurrent with sediment dredging operations. Project specifications will be prepared to require adequate coordination between the dredging contractor and lake users. This is expected to include requirements for public notice of active dredging areas and placement of buoys and signage to clearly indicate active work areas. Markings, including nighttime lights, will be in accordance with US Coast Guard requirements.

Coordination with riparian owners is expected to be minimal due to the dredging offset from the shoreline. Coordination will be required for contractor lake access during mobilization and active construction. SRRWD will coordinate with riparian landowners or agencies having jurisdiction to obtain necessary access.

4.6 Use of SRRWD-Owned Equipment

NRT has viewed SRRWD-owned dredging equipment, including one IMS-7012 horizontal auger dredge and three booster pumps. NRT has not viewed SRRWD-owned dredge pipeline sections. Additionally, NRT contacted the manufacturer of the SRRWD-owned dredge, IMS Dredge, to obtain a capability assessment and production rate estimate for use of the SRRWD-owned dredge for the project. Assumptions used by the dredge manufacturer include the following:

- Estimated total elevation gain of dredge pipeline = 38 ft
- Estimated pipe size = 12.86-inch inside diameter (HDPE SDR26)
- Average sediment particle size ($D_{50}$) = 50 µm
- 85% smaller sediment particle size ($D_{85}$) = 100 µm
- Dredge Slurry Concentration = 20% solids by volume (39.9% solids by weight)
- Absolute Specific Gravity = 2.65
- Dredge Slurry Specific Gravity = 1.33

Based on the stated assumptions, IMS Dredge estimated that the SRRWD-owned equipment could pump sediment at 4,000-4,400 gallons per minute for a pipeline length of 20,000 feet, which is approximately the longest anticipated project pipeline length. This equates to a production rate between 177 and 196 cubic yards per hour assuming a 75% efficiency factor. These are estimates based on basic data and assumptions, and may not be representative of actual production rates for SRRWD-owned equipment, if used. Additionally, the functioning state of the SRRWD-owned equipment is unknown as it has been in storage and not used for several years.
The dredging bid documents will be prepared to identify the SRRWD-owned equipment to bidding contractors as available for use on the project. The dredging bid form will be prepared to indicate the price impact of using or taking permanent ownership of SRRWD-owned equipment, anticipated to be in the form of a reduced unit price or a price credit. Bidders will be allowed to inspect the SRRWD-owned equipment during an on-site pre-bid meeting. Use or terms of transfer of SRRWD-owned equipment will be proposed by the bidding contractors.
5 PERMITS & PLANS

Several permits from various regulatory agencies are required prior to beginning lake dredging. Permit coordination and acquisition will be conducted by NRT on behalf of SRRWD as set forth in the Agreement. Permit fees will be paid and expensed by NRT or provided by SRRWD to accompany prepared applications.

5.1 Environmental Assessment Worksheet

An Environmental Assessment Worksheet (EAW) is required due to the mandatory project category under Minnesota Rule 4410.4300 Subpart 27A, Wetlands and Public Waters. An EAW was prepared and submitted to the Minnesota Environmental Quality Board (EQB) on August 1, 2016 for publication in the EQB Monitor on August 8, 2016. Public comments will be received for 30 days, ending September 7, 2016. Following the public comment period, SRRWD will respond to all received comments and make a determination if additional environmental review is necessary or if the review is complete.

5.2 MNDNR Public Waters Work Permit

A Public Waters Work permit is required from MNDNR for dredging within Fountain Lake. This permit is applied for through MNDNR’s online Permitting and Reporting System (MPARS) and requires the designed dredge areas. NRT will prepare and submit this permit application when dredge areas have been designed.

5.3 MNDNR Water Appropriations Permit

A Water Appropriations Permit is required from MNDNR for withdrawal of more than 10,000 gallons of water per day or one million gallons per year. Hydraulic dredging is anticipated to exceed these withdrawal thresholds; however, water removed from Fountain Lake will be returned following separation from sediment at the CDF. No net decrease in water is expected from Fountain Lake. This permit is applied for through MNDNR’s online MPARS site. NRT will prepare and submit this application.

5.4 MPCA Notice to Manage Dredge Material without a Permit

The Fountain Lake Restoration Project is being designed in accordance with the MPCA guidance document, “Managing Dredge Materials in the State of Minnesota.” The guidance document indicates that a State Disposal Permit is not required for dredging projects in the location of Fountain Lake. Rather, MPCA has a voluntary form, “Notice to Manage Dredge Material without a Permit,” that is recommended.
for submittal to MPCA, but is not required. If submitted, MPCA will perform a review and provide response comments only if there are concerns. This process was confirmed through email correspondence with MPCA personnel on July 21, 2016. NRT will prepare a Notice to Manage Dredge Material without a Permit for submittal to MPCA. Available sediment laboratory data are assumed adequate for characterization purposes. Additional sampling is not included in the design.

5.5 USACE/MPCA Section 404/401

Operation of the constructed CDF will discharge clarified lake water separated from the dredge slurry to the adjacent unnamed ditch and ultimately back to Fountain Lake via Bancroft Creek. The USACE classifies CDF effluent as the discharge of dredged material, which is regulated under Section 404 of the Clean Water Act. MPCA certifies discharge compliance with water quality standard under Section 401 of the Clean Water Act, which may include permit conditions for discharge sampling and monitoring. This permit is obtained through submittal of a joint application form to USACE and MPCA. NRT will prepare this permit application on behalf of SRRWD. Available laboratory data for sediment and lake water samples are assumed adequate for characterization and permitting purposes. Additional sampling is not included in the design.

5.6 Dredging Project Plan

SRRWD is required to submit a copy of a dredging design report (the “Project Plan”) to the Board of Water and Soil Resources (BWSR) and the director of the MDNR Division of Waters (“Director”), as required by Minn. Stat. section 103D.605. NRT, in coordination with SRRWD, will prepare a final document to be designated as the Project Plan. BWSR and the Director are required to review and report on the Project Plan back to the SRRWD. After receiving these reports, SRRWD is required to hold a public hearing on the Project Plan and thereafter approve the letting of bids for the dredging project.

5.7 Minnesota Department of Transportation

MNDOT requires a permit for the installation of temporary dredge slurry pipeline under the I-90 highway bridge/culvert crossing. NRT has previously made MNDOT aware of the planned crossing and understand the crossing can be made without additional culvert modifications or analysis. The dredging specifications will specify pipe anchoring to mitigate potential high flow conditions through the culvert. NRT will prepare this permit application on behalf of SRRWD.
5.8 Local Permits

Miscellaneous local permits may be needed to support dredging for reasons such as securing contractor staging and access areas. As identified, these permits will either be obtained by NRT and/or SRRWD or delegated to the selected dredging contractor.
6  DREDGE DESIGN ASSUMPTIONS

6.1  Existing Conditions

Existing lake conditions are shown in Figure 2 with bathymetry contours from a survey performed in 2009. The lake water elevation is assumed to be approximately equal to the crest elevation of the outlet dam at 1,214.3 feet NGVD29. Based on the 2009 survey in comparison to the outlet dam crest elevation, general water depths within Fountain Lake are estimated as the following:

<table>
<thead>
<tr>
<th>Lake Area</th>
<th>Estimated 2009 Water Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edgewater (West) Bay</td>
<td>6 ft – 7 ft</td>
</tr>
<tr>
<td>Fountain Lake (Main) Bay</td>
<td>6 ft – 9 ft</td>
</tr>
<tr>
<td>Dane’s Bay</td>
<td>2 ft – 4 ft</td>
</tr>
<tr>
<td>Channel</td>
<td>4 ft – 6 ft</td>
</tr>
<tr>
<td>Bancroft Bay</td>
<td>1 ft – 3 ft</td>
</tr>
</tbody>
</table>

Dredging constraints are also shown on Figure 2, including submerged utilities, bridges, and the outlet dam. It is assumed that the existing lake bathymetry data are sufficient for performing the dredging design. The technical specifications will require a current preconstruction survey be performed by the selected contractor and submitted to NRT to identify potential conflicts in the design documents.

6.1.1  Sediment Conditions

Existing sediment conditions are assumed to be represented by previously collected data summarized in the Draft Preliminary Engineering Report (Barr 2014), the Draft Fountain Lake Sediment and Dredging Assessment (Barr 2009), and the Fountain Lake Geotechnical Data Transmittal (Barr 2015). No additional sediment sampling is proposed as part of the design. Reports and corresponding sediment data will be made available to bidders in the dredging bid documents.

6.2  Dredging Plan

Dredge scenarios targeting approximately 1,200,000 to 2,100,000 cubic yards were previously prepared by Barr and provided to SRRWD. An intermediate scenario targeting approximately 1,700,000 cubic yards of sediment removal has been selected by SRRWD. Additionally, SRRWD staff has provided direction to refine the conceptual dredging plan considering lake use. SRRWD objectives include deeper sediment traps at creek inlets to Fountain Lake, and development of several deep fish habitat holes.
throughout the lake. NRT coordinated with SRRWD staff to develop a final conceptual dredging plan (Figure 3).

Two temporary dredge pipeline routes are assumed depending on which portion of Fountain Lake is being dredged as shown on Figures 4 and 5. The pipeline is assumed to be single wall HDPE or steel and will be inspected by the dredging contractor along its entire alignment from the dredge equipment to the CDF on each day of use. Within Fountain Lake, the pipeline may be floating or weighted to the lake bottom. The dredging contractor will be required to manage the dredge pipeline to minimize impacts on recreational lake users.
7 DREDGING OPERATION ASSUMPTIONS

The dredging design will proceed with the following assumptions:

- **Hours of Operation**: Dredging is assumed to take place six days per week between 7 AM and 10 PM during non-freezing weather, generally from April to November.

- **Noise**: Dredging equipment and booster pumps will be specified to comply with applicable noise ordinances (e.g., City of Albert Lea Noise Ordinance). Compliance with identified requirements may require equipment modification and implementation of noise controls.

- **Debris**: The dredging contractor will be required to remove debris encountered in Fountain Lake during dredging. Removed debris will be properly managed and disposed of in accordance with applicable laws. Debris will not be stockpiled at the CDF site or placed within CDF cells. Use of the City of Albert Lea demolition landfill and transfer station will be evaluated for debris disposal.

- **Sediment Removal**: Dredging is anticipated to occur over multiple years, and one dredge season is assumed to remove approximately 300,000 to 500,000 cubic yards of sediment. The dredging tolerance will be +/- 3 inches from the target dredge elevation, and will be determined through bathymetric surveys. Bathymetric surveys for payment quantities will be observed by the Engineer, Owner, or a designated representative. Payment will be based on surveyed in-place cubic yards of sediment removed, following review of survey data by the Engineer.

- **Construction Quality Control**: The following elements will be incorporated into the dredging technical specifications:
  - Construction documentation will be performed through periodic bathymetric surveys. The minimum frequency of survey events will be at the beginning of each dredge season and to support each payment application. The selected dredging contractor will be required to provide a construction quality control plan outlining how they will control and monitor their work.
  - GPS and electronic dredge head positioning may be installed by the contractor, but use will not be required in the technical specifications.
  - Weekly progress meetings/conference calls will be held among SRRWD, NRT, and the dredging contractor.
  - Periodic inspections will be performed by the Engineer, or a designated representative, during active dredging and CDF operation. Inspections are estimated to be at least biweekly.

- **Contractor Inspections**: The contractor will be required to make daily inspections of dredge equipment and the dredge pipeline.
  - Dredge equipment (e.g., dredge and booster pumps) will be inspected daily to ensure necessary maintenance is performed.
  - The dredge pipeline(s) will be inspected along its entire alignment from the dredge to the CDF at least once during each day of active dredging.
8 CDF OPERATION ASSUMPTIONS

During active sediment removal, the dredging contractor will be responsible for CDF operation. Between dredging seasons, anticipated to be November through March, necessary operation and maintenance will be performed by SRRWD. CDF operation requirements will be included in an operation and maintenance plan, and are assumed to include the following:

- **Contractor Inspections:** The CDF will be inspected at least once during each day of active dredging, or as required by the MNDNR Dam Safety Permit. Inspections at the CDF will include the dredge pipeline inlet location, the weir outlet structure, the perimeter berms, and the weir discharge pipe outlet. Inspections will be documented in written reports.

- **Effluent Sampling:** Water from the weir discharge pipe will be sampled and tested in accordance with applicable permit requirements. Sampling will be performed by the Owner/Engineer or by the dredging contractor with oversight by the Owner/Engineer.

- **CDF Water Level:** During active dredging, slurry of sediment and lake water will be pumped into the CDF. To allow gravity settling of sediment to occur, a minimum water level of 2 ft will be required above the CDF bottom surface, measured at the weir discharge structure. The ponded water level will be controlled by adding weir boards to the outlet structure to increase the water overflow elevation. The dredging contractor will be required to monitor the ponded water level during active dredging. It is anticipated that slurry may be initially pumped into the CDF for several days or weeks without discharging water when large storage capacity is available.

- **CDF Water Treatment:** Passive gravity settling within the CDF is assumed to be sufficient to adequately clarify lake water for discharge. Permit requirements for monitoring and testing are not yet known; however, prior communication with MPCA on August 3, 2015 described a narrative standard in Minnesota Rules 7050.0210 Subp. 2 and Subp. 13, which states that the effluent shall not have excessive suspended solids. Depending on actual discharge permit requirements and CDF settling performance, supplemental water treatment may be necessary. The CDF discharge pipe has been designed to allow for connection to a supplemental water treatment system, if needed.

The selected dredging contractor will be required to submit a dredge material management plan describing how they will comply with and execute the requirements in the technical specifications.
9 PHASED OPERATIONS

Dredging will be a phased operation in coordination with development of CDF cells as shown in the attached project schedule. Currently, three separate dredging contracts are anticipated to achieve the target sediment removal volume of 1,700,000 cubic yards. The dredging program, inclusive of all contracts, is estimated to span approximately 4 to 6 years.

- **Dredge Contract 1**: The first dredge contract will be for a sediment volume corresponding to the estimated CDF Cell 1 storage capacity of 690,000. Dredge Contract 1 is estimated to span two seasons ending in the fall of 2018. The actual removal volume of Dredge Contract 1 will be the actual total storage capacity of CDF Cell 1.

- **Dredge Contract 2**: The second dredge contract will be for a sediment volume corresponding to the estimated combined storage capacity for CDF Cells 2 and 3 of 585,000 cubic yards. Construction of CDF Cells 2 and 3 is assumed to occur in 2018 such that dredging for Dredge Contract 2 can commence in spring 2019. Dredge Contract 2 is estimated to span one season ending in the fall of 2019. The actual removal volume of Dredge Contract 2 will be the actual total storage capacity of CDF Cells 2 and 3.

- **Dredge Contract 3**: The third dredge contract will be for the remaining sediment volume to achieve the target project removal volume of 1,700,000 cubic yards. Based on designed storage capacities of CDF Cells 1, 2, and 3, Dredge Contract 3 is estimated to be for a volume of 425,000 cubic yards. The project schedule assumes that one or more additional CDF cells are design and constructed by the end of 2019 such that Dredge Contract 3 commences in spring 2020. Dredge Contract 3 is estimated to span one season ending in the fall of 2020. The actual removal volume of Dredge Contract 3 will be the actual total storage capacity of additional constructed CDF cells.
10 REFERENCES

Barr Engineering, April 17, 2015, “Fountain Lake Geotechnical Data Transmittal.”


MPCA, July 21, 2016, “RE: 401 Water Quality Certification Question,” Email Correspondence, Emily Schnick (MPCA) to Andrew Millsbaugh.


MPCA, August 4, 2015, “RE: 401 Water Quality Certification Question,” Email Correspondence, Jim Brist (MPCA) to Andrew Millsbaugh.

MPCA, April 2014, “Managing Dredge Materials in the State of Minnesota.”

SITE LOCATION MAP

FOUNTAIN LAKE RESTORATION PROJECT
DREDGING BASIS OF DESIGN REPORT
SHELL ROCK RIVER WATERSHED DISTRICT
ALBERT LEA, MINNESOTA

PROJECT NO: 2248/5.0
FIGURE NO: 1

Y:\Mapping\Projects\22\2248\MXD\Dredging_BODR\Figure 1_Site Location Map.mxd   Author: sstolz;  Date/Time: 8/29/2016, 9:39:49 AM
Service Layer Credits Copyright © 2013 National Geographic Society, i-cubed

DRAWN BY/DATE: SDS 8/8/16
REVIEWED BY/DATE: AMM 8/8/16
APPROVED BY/DATE: AMM 8/26/16
PRELIMINARY SEDIMENT REMOVAL AREAS

PROJECT NO: 2248/5.0
FIGURE NO: 3

FOUNTAIN LAKE RESTORATION PROJECT
SHELL ROCK RIVER WATERSHED DISTRICT
ALBERT LEA, MINNESOTA

DRAWN BY/DATE: SDS 8/8/16
REVIEWED BY/DATE: AMM 8/8/16
APPROVED BY/DATE: AMM 8/26/16

FOR ALL AREAS: 30 FT MIN OFFSET FROM SHORE

DREDGING CONTRACT NO. 1

TYPICAL 5-ACRE FISH HABITAT HOLES. 14 FT DEEP. LOCATIONS TBD

DREDGING CONTRACT(S)

FUTURE DREDGING CONTRACT(S)

CONTRACTOR CONSTRUCTION LAKE ACCESS

SUBMERGED CITY SANITARY SEWER

SUBMERGED CENTURYLINK TELECOMMUNICATIONS UTILITY

PROPOSED DREDGE PIPELINE ROUTE
SUBMERGED UTILITY
TYPICAL 5-ACRE FISH HABITAT HOLES. 14 FT DEEP. LOCATIONS TBD
DREDGING CONTRACT NO. 1
FUTURE DREDGING CONTRACT(S)

SERVICE LAYER CREDITS: Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation © 2010 NAVTEQ ©
PROPOSED DREDGE PIPELINE ROUTES AND LAKE ACCESS LOCATIONS

FOUNTAIN LAKE RESTORATION PROJECT
DREDGING BASIS OF DESIGN REPORT

SHELL ROCK RIVER WATERSHED DISTRICT
ALBERT LEA, MINNESOTA

DRAWN BY/DATE: SDS 8/8/16
REVIEWED BY/DATE: AMM 8/8/16
APPROVED BY/DATE: AMM 8/26/16

Site_Features_Dredge

PROPOSED DREDGE PIPELINE ROUTE
SEDIMENT MANAGEMENT AREAS
SEE FIGURES 5 & 6 FOR AREA DETAILS
OPEN WATER
PROPOSED DREDGE PIPELINE ROUTE DETAILS

FOUNTAIN LAKE RESTORATION PROJECT
DREDGING BASIS OF DESIGN REPORT
SHELL ROCK RIVER WATERSHED DISTRICT
ALBERT LEA, MINNESOTA

ROAD CROSSING OPTION A
ROAD CROSSING OPTION B
W PLAZA ST

A
CONTRACTOR STAGING AREA

B
CONTRACTOR STAGING AREA

C
CONTRACTOR STAGING AREA

D
CONTRACTOR STAGING AREA
APPENDIX A

PROJECT SCHEDULE
<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
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<tbody>
<tr>
<td>1</td>
<td>CDF Site Development / Due Diligence</td>
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<td>Mon 3/14/16</td>
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<tr>
<td>4</td>
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<td>34</td>
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<td>75 days</td>
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<td>78</td>
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<td>Dredging Contract 3 - CDF Cell (425K CY)</td>
<td>8 mons</td>
<td>Fri 4/10/20</td>
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**Project Summary**

<table>
<thead>
<tr>
<th>Task</th>
<th>Project Summary</th>
<th>Critical</th>
<th>Baseline Summary</th>
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<td>Critical Split</td>
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<td>Milestone</td>
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<td>critical</td>
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<td>Summary</td>
<td>Manual Summary</td>
<td>Baseline Milestone</td>
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# Schedule Estimate - DRAFT

## Through Dredge Contract 1

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<th>ID</th>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>1</td>
<td>CDF Site Development / Due Diligence</td>
<td>60 days</td>
<td>Mon 3/14/16</td>
<td>Fri 3/18/16</td>
<td>CDF Site Development / Due Diligence</td>
<td>CDF Site Development / Due Diligence</td>
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<tr>
<td>2</td>
<td>Final Design of CDF / Plans &amp; Specs</td>
<td>132 days</td>
<td>Mon 4/11/16</td>
<td>Tue 10/25/16</td>
<td>Final Design of CDF / Plans &amp; Specs</td>
<td>Final Design of CDF / Plans &amp; Specs</td>
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<tr>
<td>3</td>
<td>Final Design &amp; Specifications</td>
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<td>6</td>
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<td>Env. Assessment Worksheet</td>
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<td>60 days</td>
<td>Wed 8/16/16</td>
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<td>9</td>
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<td>Public Hearing to Review Project Plan</td>
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<tr>
<td>38</td>
<td>SRWDR Board Action - Establish Project</td>
<td>1 day</td>
<td>Tue 10/18/16</td>
<td>Tue 10/18/16</td>
<td>SRWDR Board Action - Establish Project</td>
<td>SRWDR Board Action - Establish Project</td>
</tr>
<tr>
<td>39</td>
<td>Advertise for Bids</td>
<td>1 day</td>
<td>Wed 10/19/16</td>
<td>Wed 10/19/16</td>
<td>Advertise for Bids</td>
<td>Advertise for Bids</td>
</tr>
<tr>
<td>40</td>
<td>On Site pre-Bid meeting</td>
<td>1 day</td>
<td>Thu 11/2/16</td>
<td>Thu 11/2/16</td>
<td>On Site pre-Bid meeting</td>
<td>On Site pre-Bid meeting</td>
</tr>
<tr>
<td>41</td>
<td>Bid Submittals</td>
<td>30 days</td>
<td>Fri 11/11/16</td>
<td>Thu 12/22/16</td>
<td>Bid Submittals</td>
<td>Bid Submittals</td>
</tr>
<tr>
<td>42</td>
<td>Bid Tabulation &amp; Engineer Recommendation</td>
<td>10 days</td>
<td>Fri 11/11/16</td>
<td>Thu 11/17/16</td>
<td>Bid Tabulation &amp; Engineer Recommendation</td>
<td>Bid Tabulation &amp; Engineer Recommendation</td>
</tr>
<tr>
<td>43</td>
<td>SRWDR Board Action - Award Bid</td>
<td>1 day</td>
<td>Fri 1/20/17</td>
<td>Fri 1/20/17</td>
<td>SRWDR Board Action - Award Bid</td>
<td>SRWDR Board Action - Award Bid</td>
</tr>
<tr>
<td>44</td>
<td>Dredge Contract 1 - Cell 1 600K CY - Season 1</td>
<td>1/4 seasons</td>
<td>Thu 1/31/17</td>
<td>Sat 11/27/17</td>
<td>Dredge Contract 1 - Cell 1 600K CY - Season 1</td>
<td>Dredge Contract 1 - Cell 1 600K CY - Season 1</td>
</tr>
<tr>
<td>45</td>
<td>Dredge Contract 1 - Cell 1 600K CY - Season 2</td>
<td>1/4 seasons</td>
<td>Fri 4/20/18</td>
<td>Sun 9/28/18</td>
<td>Dredge Contract 1 - Cell 1 600K CY - Season 2</td>
<td>Dredge Contract 1 - Cell 1 600K CY - Season 2</td>
</tr>
</tbody>
</table>
ATTACHMENT 2
DRAFT DREDGING PLAN