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May 21, 2021

Montana Fish, Wildlife & Parks
2300 Lake Elmo Drive
Billings, MT 59105

Michelle McGree
Montana Fish, Wildlife & Parks Future Fisheries Coordinator
P.O. Box 200701
Helena, MT 59620-0701

Dear Ms. McGree and Future Fisheries committee,

Included are materials for the June 2021 Future Fisheries grant cycle. Since the last grant cycle in June of 2020 and February of 2021, an environmental assessment written by staff from the Fisheries, Parks, and Information & Education departments of Montana Fish, Wildlife & Parks (FWP)'s Region 5 office was released for public review. Comments gathered from both the environmental assessment and a public scoping session in April 2020 indicate that the community is very supportive of the Lake Elmo State Park Enhancement project. As such, FWP is moving forward and are actively planning and seeking additional funds. The overall fisheries budget if all funds are finalized including this request will be $500,000. In this application, we hope to secure $33,700 towards cattail transplant efforts, brush bundles, catfish spawning structures, rock reefs with and with and without large woody material to be placed strategically in the reservoir. Previous funds helped secure the design contract with additional funds designated to pay for rock and gravel materials associated with the jetty's, fishing nodes, and the east bank restoration and shaping of the reservoir basin as part of cut and fill operations. The structures are intended to increase habitat complexity in Lake Elmo to support self-sustaining, wild populations of native fish such as Lake Chub, Fathead Minnow, and Channel Catfish, Largemouth Bass as well as sport fish (e.g., crappie, Bluegill, Yellow Perch).

This is a rare opportunity to renovate an ageing but heavily used public reservoir in a state park. The project anticipates it will be funded in part by local angling groups such as Pike Masters and Walleyes Unlimited, and other organizations (e.g., American Fishing Tackle Company). Funds from BASS Nation, and FWP's Future Fisheries and Community Ponds grants have already been accepted and allocated. An additional DJ grant is currently be developed to secure an additional $345,000 to complete the funding of this phase of Lake Elmo improvements. Please let us know if there are additional questions or more information is needed. Again, thank you for your time and attention in reviewing this application.

Sincerely

Shannon Blackburn and Mike Ruggles

# FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

*All sections must be addressed, or the application will be considered invalid*

## I. APPLICANT INFORMATION

A. Applicant Name: Mike Ruggles

Mailing Address: 2300 Lake Elmo Drive

City: Billings State: MT Zip: 59105

Telephone: 247-2961 E-mail: mikeruggles@mt.gov

B. Contact Person (if different than applicant): Shannon Blackburn

Address: 2300 Lake Elmo Drive

City: Billings State: MT Zip: 59105

Telephone: 247-2963 E-mail: shannon.blackburn@mt.gov

C. Landowner and/or Lessee Name (if different than applicant): Montana Fish Wildlife and Parks, Parks Division

Mailing Address: 1420 East 6th Ave

City: Helena State: MT Zip: 59620

Telephone: E-mail:

## II. PROJECT INFORMATION

A. Project Name: Lake Elmo Fish Habitat Enhancement

River, stream, or lake: Lake

Location: Township: 1 North Range: 26 East Section: 15

Latitude: 45.84068 Longitude: -108.48006 *within project (decimal degrees)*

County: Yellowstone

B. Purpose of Project:

The purpose of this project is to improve habitat that will enhance wild fish populations and angler opportunities at Lake Elmo State Park while eradicating invasive Golden Clams. We are seeking additional funds to purchase materials and supplies to create fish habitat (e.g, rock, gravel, woody debris and artificial structures). This grant will complete funding of the in-reservoir habitat planned in the project.

C. Brief Project Description (attach additional information to end of application):

Lake Elmo State Park in Billings, Montana is a reservoir originally built to store and transport irrigation water but also supports a very popular urban fishery. Prior to the construction of the irrigation canal system in the early 20th century, what is now Lake Elmo was likely an intermittent wetland. The 64-acre reservoir was acquired by the Montana State Park system in 1983 as a result of local grass-roots efforts to keep the water and surrounding land open to the public. Although updates to the park have been made over the last 37 years, efforts have been limited. For instance, major park improvements were last implemented in 1993, and in 1994 the only fishing pier (Rogers Fishing Pier) was built using a grant from the Sport Fish Restoration Program. Despite a lack of good fish habitat Lake Elmo provides a decent and fairly diverse fishery for anglers including Yellow Perch, bass, crappie, and sunfish. Additionally, Rainbow Trout stocking occurs annually with supplements from other trout species, such as Yellowstone Cutthroat Trout and Brown Trout. Native Channel Catfish are also sporadically stocked in the lake, but generally do not reproduce as there is little environment to support reproduction and rearing in addition to predation by other species.

The urban location of the lake coupled with its fishery helps make Lake Elmo State Park one of the most visited parks in Montana (see supplemental information) and improvements to the fishery are needed to better support high levels of fishing pressure. An unfortunate discovery of invasive Golden (or Asian) Clams at Lake Elmo in 2019 may have a silver lining as plans to eradicate the clams will provide ideal conditions to effectively implement aquatic habitat improvements. In an effort to freeze and desiccate clams typically found in shallow water, a partial draw-down of Lake Elmo was implemented this fall. The partial draw-down was maintained over the winter and the lake recently filled. A subsequent draw-down and complete drain will start in September 2021 with a final refill in the spring of 2022. During the full draw-down all sections of the lake would be accessible allowing for significant habitat improvements and in turn, a more robust and wild fishery.

Habitat improvement for a diverse and wild fishery is multifaceted. For instance, creating spawning beds requires importing gravel and distributing it in different ways throughout the lake. Sunfish do well with simple gravel beds, whereas independent rock and gravel substrate associated with rock jetties are needed to support self-sustaining bass and crappie populations. In addition, structurally-sound catfish condos and rock piles are proposed to be installed on rock jetties and larger rock reefs to improve spawning cavities and cover for native Channel Catfish. Artificial reefs made from brush and trees will be installed to improve perch spawning and cover with large woody material to be incorporated in project elements for cover and spawning substrates for minnows. Ideally, some of the smaller native fishes, such as Fathead Minnow and Lake Chub, would also benefit from several fish habitat elements which will provide more cover and spawning areas. Plans to alter the bed of Lake Elmo to promote areas of cattails along with importation of cattails and other submerged vegetation would benefit young and small fish as well.

Lake Elmo was not designed to support wild fish or intended to be a highly used urban fishery. Draining the reservoir provides a rare opportunity to incorporate proven fish habitat features that will improve fish populations and angling efforts. Furthermore, efforts to enhance Lake Elmo could serve as an example worth repeating in other aging reservoirs and ponds across the state that now serve as urban fisheries. We are excited to build on public support and partnerships to invigorate Lake Elmo's fishery that has been part of recruiting hundreds, if not thousands, of anglers over the past 90 years. If allowed, funds from this round of Future Fisheries grants will be used to complete the budget for in-reservoir habitat features. Funds from this grant cycle will also be used in conjunction with prior Future Fisheries awards ($46,298.84) to purchase materials and supplies for jetties, shoreline alterations, and various artificial and natural habitat structures. The proposed habitat improvements are part of the larger Lake Elmo State Park Enhancement plan with additional projects (derived through other funding sources) that include picnic nodes with rocky outcroppings, excavation to enlarge deep-water areas, constructing additional fishing piers, and other non-habitat related activities. As you have seen the EA and Scoping information we will not send at this time unless requested.

D. Length of stream or size of lake that will be treated (project extent): 64 Acres

Length/size of impact, if larger than project extent (e.g. stream miles opened): NA

E. Project Budget:

**Grant Request (Dollars): $ 33,700**

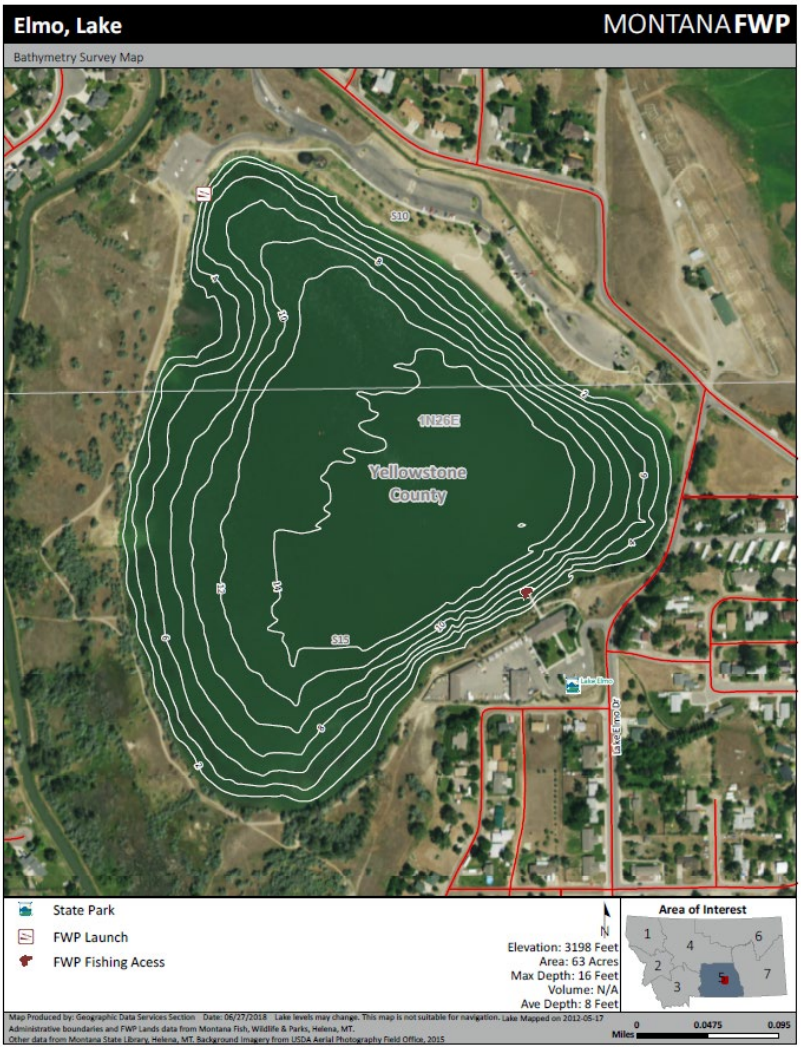
| | | |
|---|---|---|
| Matching Dollars: | $ | **Funds from non-profits use in overall match 345,000** |
| Matching In-Kind Services:* | $ | |

**salaries of government employees are not considered matching contributions*

| | | |
|---|---|---|
| Other Contributions (not part of this app) | $ | **114,988.16** |
| **Total Project Cost:** | $ | **495,506.41** |

F. **Attach** itemized (line item) budget – *see budget template*

G. **Insert** or **attach** a project location map showing the project area in relation to a major landmark or town. Please indicate if the project location is on public or private property.




**Public land within city of Billings.**

H. **Attach** specific project plans (e.g. detailed sketches, plan views [showing location and type of channel modifications], example photographs), current condition photographs, and maps. **If project involves water leasing or water salvage complete and attach a supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).*

*See attached. Within the budget and scope artificial habitat structures may be substituted for some Georgia Cubes. At this time the Georgia Cubes will function as artificial brush piles. Other state fisheries staff recommended this structure over many others. However, depending on available materials some substitutions shown in the attached information may be used*

I. **Attach** letters or statements of support. This includes landowner consent, community or public support, and fish biologist support. Support from local groups has resulted in $45,000 of donations to help the project gather additional funding. It was supported in the scoping and EA processes. With continued calls of support and offering to help.

J The project agreement includes a 20-year maintenance commitment. Please indicate (yes or no) that you will ensure project protection for 20 years. Discuss your ability to meet this commitment.

Yes [x] No [ ]

Yes this project is next to the FWP Region 5 office and is a State Park.

K. **Describe** or **attach** land management & maintenance plans, including changing to grazing regimes, that will ensure protection of the restored area.

**Managed as a state park.**

**III. PROJECT BENEFITS** (attach additional information to end of application):

A. What species of fish will benefit from this project?

Stocking to re-start fishery will be required after the final refill in the spring of 2022. Intend to replace perch, crappie, sunfish (i.e., Pumpkinseed, Bluegill), Largemouth and Smallmouth bass, Channel Catfish, Lake Chub, and Fathead Minnows as part of a wild fishery that will rely on habitat improvements. Additional fish species will benefit from the cover and improved habitat complexity such as stocked trout. The habitat improvements may also provide adequate spawning and cover as native non-game fish species (such as White Suckers) reestablish. Other native species that may befit include spiny softshell turtle, Osprey, and Giant Floater mussels.

B. How will the project protect or enhance wild fish habitat?

Wild fish habitat will be enhanced with spawning substrate (rock and gravel, PVC pipes) and reefs (brush, trees, cobble, boulders) placed in locations that can provide shoreline erosion protection and create space between the reef and the bank that may support aquatic vegetation. Aquatic vegetation (e.g., cattails) will provide hiding, cover, and spawning areas for perch and Fathead Minnows. Independent spawning beds for sunfish and bass are planned as well asrock piles) as fish habitat by improving cavity rock areas and adding artificial spawning structures (i.e., catfish condos).

C. Will the project improve fish populations and/or fishing? To what extent?

The proposed project will increase the complexity and total available habitat for fish including spawning, rearing, and adult habitat. Currently, there is little habitat diversity as the lake is a bowl-shaped basin lacking tree recruitment, and rock and gravel substrates. Additionally, a long-term goal of this project is to reduce the demand for stocked fish as the habitat improvements will likely create self-sustaining wild populations of bass, Channel Catfish, Yellow Perch, and sunfish. Fishing jetties will provide habitat for fish and expand access for shoreline anglers to access deeper water for angling.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?

It will improve an existing fishery that will first be removed, but then restored after extensive habitat enhancements. Post-project, anglers will experience an improved fishing experience with anticipated increases in desirable fish abundances. In turn, Lake Elmo will likely see an increase in fishing pressure. Other funds and actions are planned to increase the number of year-round lake access points, create better access to allow shore anglers to fish deeper water, and improve handicapped amenities.

E. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

Golden Clams cause habitat degradation by decreasing water quality (e.g., increased bacteria growth and algae blooms) and disrupting trophic webs. Draining Lake Elmo will control or eradicate the population of Golden Clams while providing a rare opportunity to enhance fish habitat and improve angler experience. A drained, dry lake bed makes habitat improvements easier and more cost-effective. Although the lake was created for irrigation with little to no natural habitat for fish, this project will allow MTFWP to mindfully create adequate habitat complexity and import appropriate materials to improve conditions. We will be implementing components that have been successful in many prairie reservoir restorations throughout the mid-west.

F. What public benefits will be realized from this project?

Public benefits include improved angling experience (e.g., more fish!), increased shoreline access and removal of an invasive species.

G. Will the project interfere with water or property rights of adjacent landowners? (explain):

The project will not interfere with property rights of adjacent landowners. We have been working closely with the Billings Bench Water Association to ensure the proposed draw-down and construction do not interfere with any irrigator's needs. The irrigation district is managing the draw down and refill of the reservoir. Geotech and well studies indicate it is unlikely major changes in groundwater will occur.

H. Will the project result in the development of commercial recreational use on the site? (explain):

No. The state park manages this site for the benefit of the public.

I. Is this project associated with the reclamation of past mining activity?

No

**Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.**

## IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____ Date: 5/21/21

Sponsor (if applicable): _____

Submittal: **Applications must be *signed and received before* December 1 and June 1 of each year to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

| | | | |
|---|---|---|---|
| Mail to: | FWP Future Fisheries<br>Fish Habitat Bureau<br>PO Box 200701<br>Helena, MT 59620-0701 | Email: | Future Fisheries Coordinator<br>FWPFFIP@mt.gov<br>(electronic submissions must be signed)<br>For files over 10MB, use https://transfer.mt.gov |

*Applications may be rejected if this form is modified.*

Both tables must be completed or the application will be returned

| PROJECT COSTS | | | | | CONTRIBUTIONS | | | |
|---|---|---|---|---|---|---|---|---|
| **WORK ITEMS (Itemize by Category)** | **NUMBER OF UNITS** | **UNIT DESCRIPTION*** | **COST/UNIT** | **TOTAL COST** | **FUTURE FISHERIES REQUEST** | **MATCH (Cash or Services)**** | **OTHER (Not part of this application)** | **TOTAL** |
| **Personnel***** | | | | | | | | |
| Survey | 1 | LS | $1,500.00 | $ 1,500.00 | | | 1,500.00 | $ 1,500.00 |
| Design | 1 | LS | $49,995.00 | $ 49,995.00 | | 36,000.00 | 13,995.00 | $ 49,995.00 |
| Engineering | 1 | | $6,000.00 | $ 6,000.00 | | | 6,000.00 | $ 6,000.00 |
| Permitting | 1 | | $6,100.00 | $ 6,100.00 | | | 6,100.00 | $ 6,100.00 |
| Oversight | | | | $ - | | | | $ - |
| | | | | $ - | | | | $ - |
| | | | Sub-Total | $ 63,595.00 | $ - | $ 36,000.00 | $ 27,595.00 | $ 63,595.00 |
| **Travel** | | | | | | | | |
| | | | Sub-Total | $ - | $ - | $ - | $ - | $ - |
| **Project Components** | | | | | | | | |
| West Fishing Jetty (ADA) | 1 | Each | $49,938.28 | $ 49,938.28 | | 37,688.28 | 12,250.00 | $ 49,938.28 |
| Northeast Fishing Nodes | 1 | Each | $102,176.06 | $ 102,176.06 | | 50,313.56 | 51,862.50 | $ 102,176.06 |
| East Bank Shoreline Improvement | 1 | Each | $154,619.49 | $ 154,619.49 | | 133,032.48 | 21,587.01 | $ 154,619.49 |
| In-Lake Habitat | 1 | Each | $38,795.30 | $38,795.30 | 33,700.00 | 1,583.40 | $1,693.65 | $ 36,977.05 |
| Overall Construction contingency | 1 | Each | $86,584.81 | $ 86,382.28 | | 86,382.28 | | $ 86,382.28 |
| | | | | $ - | - | | | $ - |
| **See Attachment for Project Component Breakdowns | | | | $ - | | | | $ - |
| | | | | $ - | - | | | $ - |
| | | | | | - | | | $ - |
| | | | Sub-Total | $ 431,911.41 | $ 33,700.00 | $ 309,000.00 | $ 87,393.16 | $ 430,093.16 |
| | | | **TOTALS** | $ 495,506.41 | $ 33,700.00 | $ 345,000.00 | $ 114,988.16 | $ 493,688.16 |

**OTHER REQUIREMENTS:**

**All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid.** Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used). Do not use government salaries as match. Describe here or in text.

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a justification or minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Additional details:

## APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

| CONTRIBUTOR | IN-KIND | CASH | TOTAL | Secured? (Y/N) |
|---|---|---|---|---|
| **USFWS DJ (Application will be submitted in Summer 2021)** | | $ 345,000.00 | $ 345,000.00 | No |
| | | | $ - | |
| | | | $ - | |
| | | | $ - | |
| | | | $ - | |
| | | | $ - | |
| | | | $ - | |
| | | | $ - | |
| **TOTALS** | $ - | $ 345,000.00 | $ 345,000.00 | |

## OTHER CONTRIBUTIONS

(contributions not associated with the application)

| CONTRIBUTOR | IN-KIND | CASH | TOTAL | Secured? (Y/N) |
|---|---|---|---|---|
| **Bass AFTCO Grant (-3% FWP OH)** | $ - | $ 4,854.37 | $ 4,854.37 | Yes |
| **PikeMasters (-3% FWP OH)** | | $ 9,708.74 | $ 9,708.74 | Yes |
| **Walleyes Unlimited (-3% FWP OH)** | $ - | $ 29,126.21 | $ 29,126.21 | Yes |
| **Future Fisheries** | $ - | $ 46,298.84 | $ 46,298.84 | Yes |
| **Community Ponds** | | $ 25,000.00 | $ 25,000.00 | Yes |
| | | | | |
| | | | $ - | |
| **TOTALS** | $ - | $ 114,988.16 | $ 114,988.16 | |

**Lake Elmo Fisheries Restoration Budget**

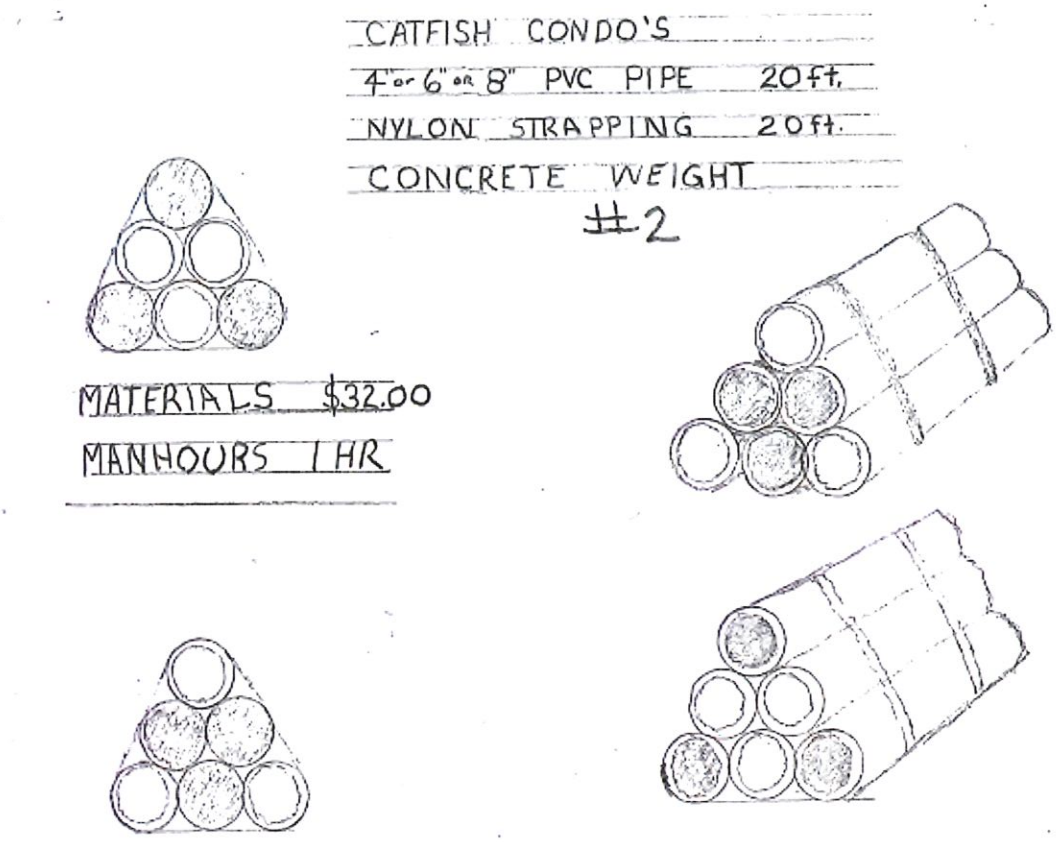
| | | | | | | | 33,700.00 | 345,000.00 | 46,298.84 |
|---|---|---|---|---|---|---|---|---|---|
| **Project Components** | **Item** | **Description** | **# of Units** | **Unit Description** | **Cost/Unit** | **Total Cost** | **This Future Fisheries Application** | **DJ Request (match)** | **Previous Future Fisheries Request** |
| Planning | Planning | Land Design | 1 | ea | 49,995.00 | 49,995.00 | | 35,000.00 | 10,000.00 |
| Planning | Planning | Geotechnical* | 1 | ea | 6,000.00 | 6,000.00 | | | 6,000.00 |
| Planning | Planning | Survey | 1 | ea | 1,500.00 | 1,500.00 | | | 1,500.00 |
| Planning | Planning | Cultural and Historic Survey | 1 | ea | 5,100.00 | 5,100.00 | | | 5,100.00 |
| Planning | Planning | bid package, permit advertising | 1 | ea | 1,000.00 | 1,000.00 | | 1,000.00 | |
| **Planning** | **Subtotal** | | | | | **63,595.00** | **-** | **36,000.00** | **22,600.00** |
| West Jetty | Jetty Development | Onsite fill | 986 | CY | 12.75 | 12,571.50 | | 12,571.50 | |
| West Jetty | Basin Earthwork Contingency | % of earth work | 20% | % | | 2,514.30 | | 2,514.30 | |
| West Jetty | Top Soil-import | 4" depth all areas | 15.30 | CY | 49.00 | 749.70 | | 749.70 | |
| West Jetty | Spread Top Soil | new work | 1,651 | SF | 0.14 | 231.14 | | 231.14 | |
| West Jetty | Fine Grading | new work | 1,651 | SF | 0.07 | 115.57 | | 115.57 | |
| West Jetty | Native Seeding | hydroseeding | 1,651 | SF | 0.17 | 280.67 | | 280.67 | |
| West Jetty | Riprap structure total | block rock 6-24" to 24" depth | 280 | | | | | | |
| West Jetty | Riprap not fish value | % of Rock for base | 140 | CY | 87.50 | 12,250.00 | | 12,250.00 | |
| West Jetty | Riprap Exposed fishery value | % of Rock exposed for fish use | 140 | CY | 87.50 | 12,250.00 | | | 12,250.00 |
| West Jetty | Concrete Pavement-Path | 4" standard grey | 1,197 | SF | 6.20 | 7,421.40 | | 7,421.40 | |
| West Jetty | Gravel Base for Path concrete | 6" crushed gravel | 22.20 | CY | 70.00 | 1,554.00 | | 1,554.00 | |
| West Jetty | Subtotal | | | | | 49,938.28 | - | 37,688.28 | 12,250.00 |
| NE Fishing Nodes | Earthwork-cut | Along Lake Edge | 2,700 | CY | 6.50 | 17,550.00 | | 17,550.00 | |
| NE Fishing Nodes | Earthwork-fill | Along Lake Edge | 2,700 | CY | 6.25 | 16,875.00 | | 16,875.00 | |
| NE Fishing Nodes | Basin Earthwork Contingency | % of earth work | 20% | % | | 6,885.00 | | 6,885.00 | |
| NE Fishing Nodes | Top Soil-import | 4" depth all areas | 97.20 | CY | 49.00 | 4,762.80 | | 4,762.80 | |
| NE Fishing Nodes | Spread Top Soil | new work | 10,502 | SF | 0.14 | 1,470.28 | | 1,470.28 | |
| NE Fishing Nodes | Fine Grading | new work | 10,502 | SF | 0.07 | 735.14 | | 735.14 | |
| NE Fishing Nodes | Block Rock Boulders | 32" stone blocks | 143 | Ton | 287.50 | 41,112.50 | | | |
| NE Fishing Nodes | Granite Boulders | Allowance Moss Covered | 20 | Ton | 287.50 | 5,750.00 | | | |
| NE Fishing Nodes | Riprap structure total | block rock 6-24" to 24" depth | 60 | | | | | | |
| NE Fishing Nodes | Riprap not fish value | % of Rock for base | 30 | CY | 87.50 | 2,625.00 | | 250.00 | |
| NE Fishing Nodes | Riprap Exposed fishery value | % of Rock exposed for fish use | 30 | CY | 87.50 | 2,625.00 | | | |
| NE Fishing Nodes | lawn seeding | Hydroseeding | 10,502 | SF | 0.17 | 1,785.34 | | 1,785.34 | |
| NE Fishing Nodes | Subtotal | | | | | 102,176.06 | - | 50,313.56 | - |
| East Bank improvement | Earthwork-cut | Along Lake Edge | 5838 | CY | 6.50 | 37,947.00 | | 37,947.00 | |
| East Bank improvement | Earthwork-fill | Along Lake Edge | 5838 | CY | 6.25 | 36,487.50 | | 36,487.50 | |
| East Bank improvement | Basin Earthwork Contingency | % of earth work | 20% | % | 74,434.50 | 14,886.90 | | 14,886.90 | |
| East Bank improvement | Top Soil-import | 4" depth all areas | 239 | CY | 49.00 | 11,711.00 | | 11,711.00 | |
| East Bank improvement | Spread Top Soil | new work | 5722 | SF | 0.14 | 801.09 | | 801.09 | |
| East Bank improvement | Fine Grading | new work | 25775 | SF | 0.07 | 1,804.25 | | 1,804.25 | |
| East Bank improvement | Slab Rock | Bank Features angler perch | 35 | Ton | 425.00 | 14,875.00 | | 9,336.83 | |
| East Bank improvement | Granite Boulders | Allowance Moss Covered | 16 | Ton | 287.50 | 4,600.00 | | | |
| East Bank improvement | Riprap structure total | block rock 6-24" to 24" depth | 310 | CY | - | | | | |
| East Bank improvement | Riprap not fish value | % of Rock for base | 155 | CY | 87.50 | 13,562.50 | | 13,562.50 | |
| East Bank improvement | Riprap Exposed fishery value | % of Rock exposed for fish use | 155 | CY | 87.50 | 13,562.50 | | 2,113.66 | 11,448.84 |
| East Bank improvement | Native Seeding | Hydroseeding | 25775 | SF | 0.17 | 4,381.75 | | 4,381.75 | |
| East Bank improvement | Subtotal | | | | | 154,619.49 | - | 133,032.48 | 11,448.84 |
| Habitat Gravel Beds | Gravel Beds Land Design Contract includes fabric | 15x300' 6" deep 3/8" gravel 3 total | 168 | CY | 9.08 | 1,524.60 | | 1,524.60 | |
| Habitat Gravel Beds | Gravel Beds placement FWP Fuel for Skidsteer | Fuel | 16.8 | gallons | 3.50 | 58.80 | | 58.80 | |
| In Lake Habitat | Materials subtotal | | | | | 1,583.40 | | 1,583.40 | |
| Rock Reef w/o trees | Rock Reef Rip Rap (Average length 8 feet) | 9-10 CY per feature | 136 | CY | 87.50 | 11,900.00 | 11,900.00 | | |
| Rock Reef w/o trees | Rock Reef Rip Rap placement FWP fuel for Skidsteer | fuel | 13.6 | gallons | 3.50 | 47.60 | 47.60 | | |
| In Lake Habitat | Materials subtotal | | | | | 11,947.60 | 11,947.60 | | |
| Rock Reef with trees | Rock and Tree Riprap | 9-10 CY per feature | 100 | CY | 87.50 | 8,750.00 | 8,750.00 | | |
| Rock Reef with trees | Rock Reef Rip Rap placement FWP fuel for Skidsteer | fuel | 10 | gallons | 3.50 | 35.00 | 35.00 | | |

**Lake Elmo Fisheries Restoration Budget**

| | | | | | | | 33,700.00 | 345,000.00 | 46,298.84 |
|---|---|---|---|---|---|---|---|---|---|
| **Project Components** | **Item** | **Description** | **# of Units** | **Unit Description** | **Cost/Unit** | **Total Cost** | **This Future Fisheries Application** | **DJ Request (match)** | **Previous Future Fisheries Request** |
| Rock Reef with trees | Cottonwood or other large trees with root wads 10 to 20 feet long-from area projects | 2 to 3 trees per reef | 25 | trees | - | - | - | | |
| Rock Reef with trees | Loading trees fuel for skidsteer | fuel | 28.5 | gallons | 3.54 | 100.90 | 100.90 | | |
| Rock Reef with trees | vehicle mileage assuming 50 mile radius for trips | mileage | 1250 | miles | 0.55 | 687.50 | 687.50 | | |
| In Lake Habitat | Materials subtotal | | | | | 9,573.40 | 9,573.40 | | |
| Brush Bundles | Brush Bundles 8' long x 3-4' wide by 2' to 6' high Russian Olive or similar bush | 3 stems per bundle =1.5 trees | 90 | bundles | - | - | - | | |
| Brush Bundles | Cable 250'@$115 20' per bundle 3/16" galvanized | cable | 2700 | feet | 0.46 | 1,242.00 | 1,242.00 | | |
| Brush Bundles | Cinder Blocks 9 per bundle | blocks | 810 | unit | 3.00 | 2,430.00 | 2,430.00 | | |
| Brush Bundles | Cable clamps 24/pack@$20/pack 4 per bundle | clamps | 400 | unit | 1.20 | 480.00 | 480.00 | | |
| Brush Bundles | Drill bits 5/16" 18" long | bits | 10 | unit | 20.00 | 200.00 | 200.00 | | |
| Brush Bundles | Mileage to haul trees 40 miles average round trip | mileage | 900 | miles | 0.55 | 495.00 | 495.00 | | |
| In Lake Habitat | Materials subtotal | | | | | 4,847.00 | 4,847.00 | | |
| Georgia cubes | Georgia cubes 3.3' cubes with plastic mesh bottom PVC 1.5" pipe@10'/pipe | pipe pvc 1.5" 10' | 120 | sticks | 8.00 | 960.00 | | | |
| Georgia cubes | 50' of 4" flexible drain pipe | flexible pipe 50' rolls | 30 | roll | 33.25 | 997.50 | | | |
| Georgia cubes | pea gravel to fill pipe half bag per cube | bags | 15 | bag | 4.00 | 60.00 | | | |
| Georgia cubes | glue primer 0.1 per cube | set of primer and glue | 3 | bottles | 8.00 | 24.00 | | | |
| Georgia cubes | fencing for orange base 100 feet roll need 5' per cuble | orange fencing | 2 | rolls | 55.00 | 110.00 | | | |
| Georgia cubes | hole saw 1.5" | drill bit | 10 | bits | 11.00 | 110.00 | | | |
| Georgia cubes | Zip Tie 11" UV resistant to secure fencing | 11" zip tie | 720 | ties | 0.07 | 50.40 | | | |
| Georgia cubes | 1.5" schedule 40 pvc side outlet elbow | connection fittings | 240 | fittings | 5.00 | 1,200.00 | | | |
| In Lake Habitat | Materials subtotal | | | | | 3,511.90 | | | |
| Catfish Condos | HDPE Culvert 20' long 15" Corruglated 1/condo | culvert | 15 | pipes | 290.00 | 4,350.00 | 4,350.00 | | |
| Catfish Condos | Plumbers tape 100' strapping 50' per condo | plumbers tabe | 7.5 | rolls | 15.00 | 112.50 | 112.50 | | |
| Catfish Condos | Cinder Blocks 2/condo | cement block | 30 | blocks | 3.00 | 90.00 | 90.00 | | |
| Catfish Condos | bolts for straps 4 per condo | bolts for straps | 60 | bolts | 1.20 | 72.00 | 72.00 | | |
| Catfish Condos | Quickrete 3 bags per unit | caps for tubes | 45 | bags | 5.50 | 247.50 | 247.50 | | |
| In Lake Habitat | Materials subtotal | | | | | 4,872.00 | 4,872.00 | | |
| Cattail transplant | cattails 80 sqare feet per load | loads=square feet | 3200 | 40 | - | - | - | | |
| Cattail transplant | Fuel for loader | fuel | 200 | gallons | 3.50 | 700.00 | 700.00 | | |
| Cattail transplant | mileage for FWP vehicle per trip 80 miles average round trip | miles | 3200 | miles | 0.55 | 1,760.00 | 1,760.00 | | |
| In Lake Habitat | Materials subtotal | | | | | 2,460.00 | 2,460.00 | | |
| In Lake Habitat | In Lake Habitat Subtotal | | | | | 38,795.30 | 33,700.00 | 1,583.40 | - |
| | Project overall Construction for Jetty, Nodes, Bank and Materials | | | | | 345,529.13 | | | |
| | Contingency for construction and materials | 25% | | | | 86,382.28 | | 86,382.28 | |
| Totoal Construction | Construction direct cost with contingency total | | | | | 431,911.41 | - | 86,382.28 | - |
| | | | | | | | | | |
| Total Project Cost | Total Project Cost (Includes Planning) | | | | | 495,506.41 | 33,700.00 | 345,000.00 | 46,298.84 |

**Lake Elmo State Park Fish Enhancement Project supplemental information**

*Photos, schematics, and examples of the proposed habitat structures (correlate with budgeted items)*

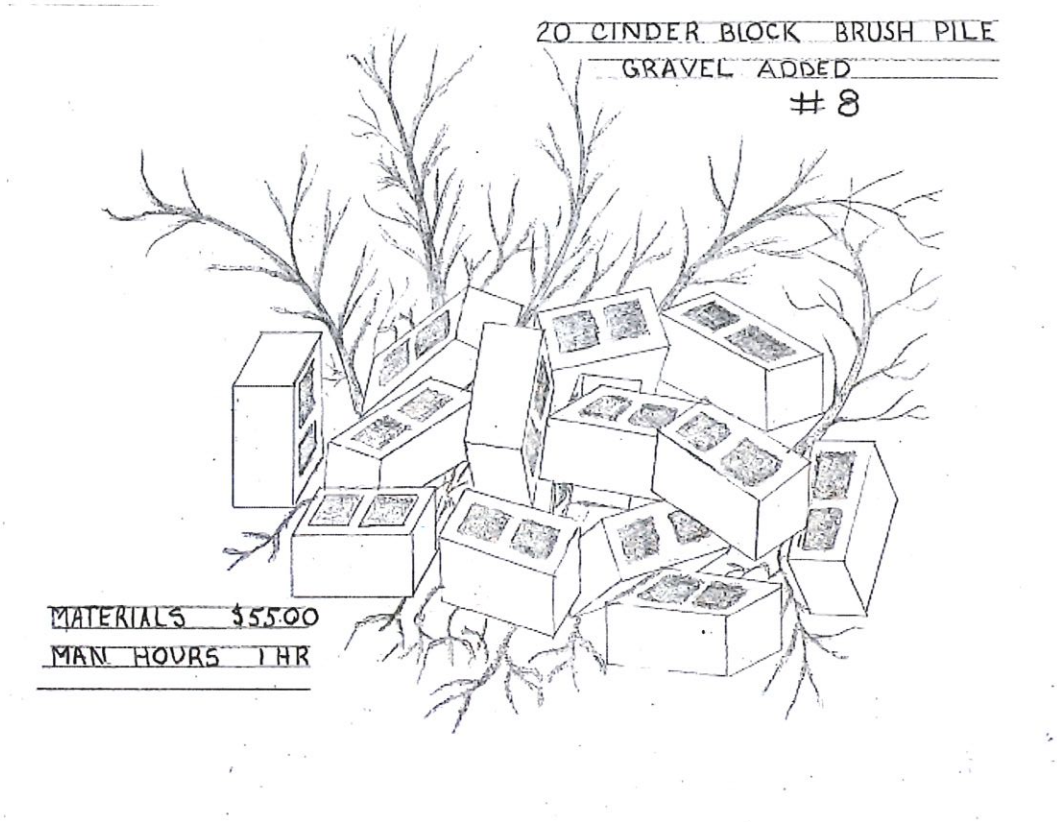



Catfish Condo Example the planned design may use larger pipe or use various sizes to make large and small spawning cavities. This is an example of the style proposed in the application.

Examples of catfish condos using other materials. Substitutions may be made within the budget.

Figure 2. Examples of rock jetties; $104.50 per foot (~$15,675 for rock in one jetty)

Figure 3. Perch (left) and bass (right) spawning substrate; sand and gravel




Brush bundle-planned design would be to have fewer blocks with stems cabled together.

Georgia Cube with fenced base

Basic Georgia Cube example

Examples of activities by video:

Videos:

http://magazine.outdoornebraska.gov/2018/06/aquatic-habitat-program/

https://www.youtube.com/watch?v=IRiiUlk7Rdo

https://www.youtube.com/watch?v=2MaMI5IL6Xc

Small Impoundment Management in North America (American Fisheries Society book).

# LAKE ELMO STATE PARK

CONCEPTUAL PHASE ONE MASTER PLAN | MAY 20, 2021

LAND DESIGN

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L1.2 **PRELIMINARY: NOT FOR CONSTRUCTION**

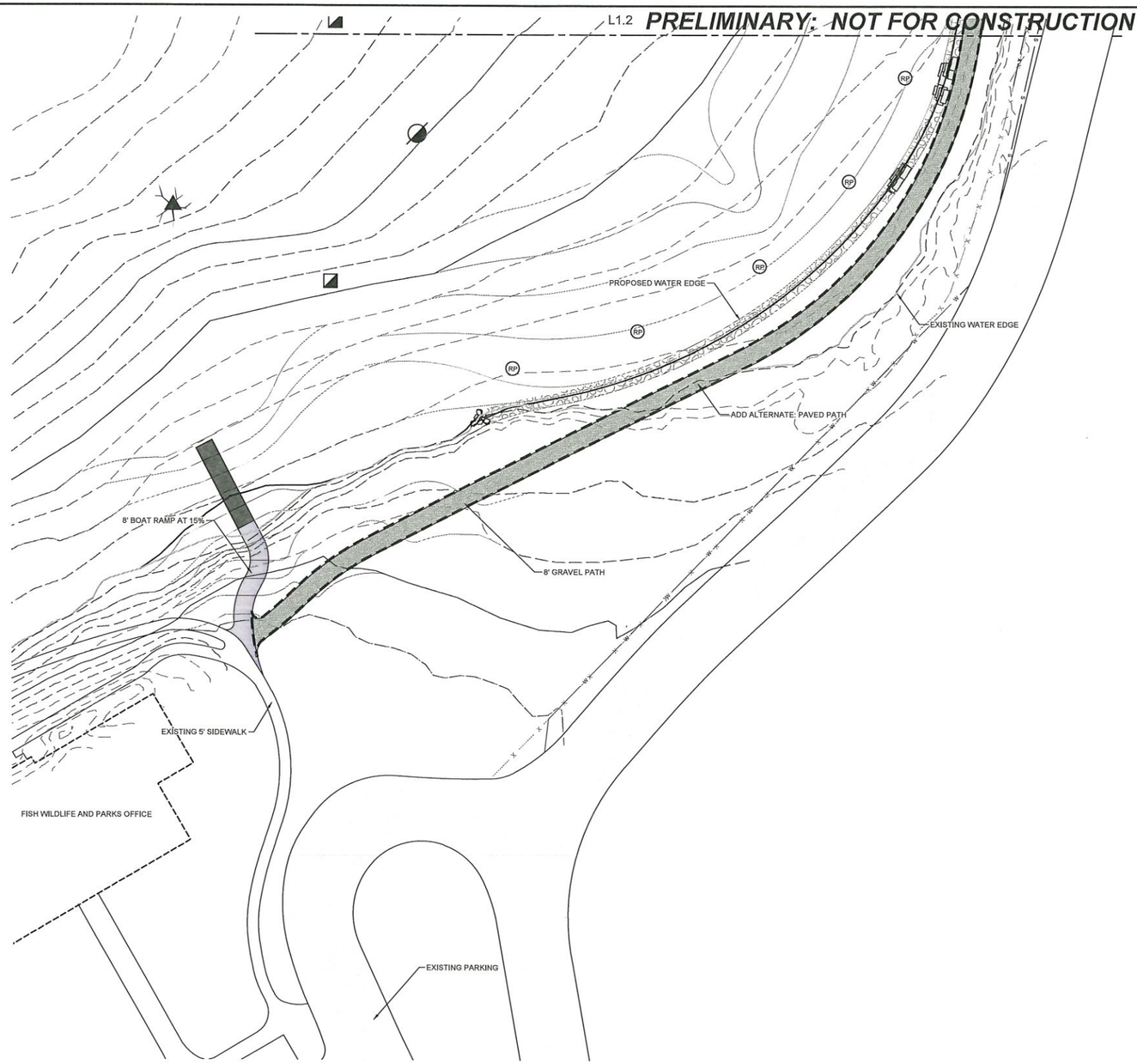
REFERENCE NOTES SCHEDULE EAST BANK

| SYMBOL | DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | BRUSH BUNDLE | 3 | |
| | ROCK & TREE REEF | 3 | |
| | GEORGIA CUBE | 4 | |

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | GRANITE BOULDERS 3' | 14 | |
| | SANDSTONE SLAB - 4' | 14 | |
| | SANDSTONE SLAB - 6' | 31 | |
| RP | FISH ROCK PILES | 11 | |

| SYMBOL | CONCRETE DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | CONCRETE PATH | 489 SF | |
| | GRAVEL PATH | 6,370 SF | |
| | BOAT RAMP | 319 SF | |

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | RIP RAP | 147.44 CY | |




N

0 20 40 60 80 feet
1" = 20'

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HARDSCAPE PLAN SOUTHEAST BANK

**FWP#21-21 LAKE ELMO PROJECT**

C. FLUMINEA ERADICATION, FISHERIES & PARKS - BILLINGS, MT

Issue Date: 4/30/2021

| Revision | Date |
|---|---|
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Checked By: MV
Job Code: FWP#21-21

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**L1.1**

HARDSCAPE PLAN SOUTHEAST BANK

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PRELIMINARY: NOT FOR CONSTRUCTION

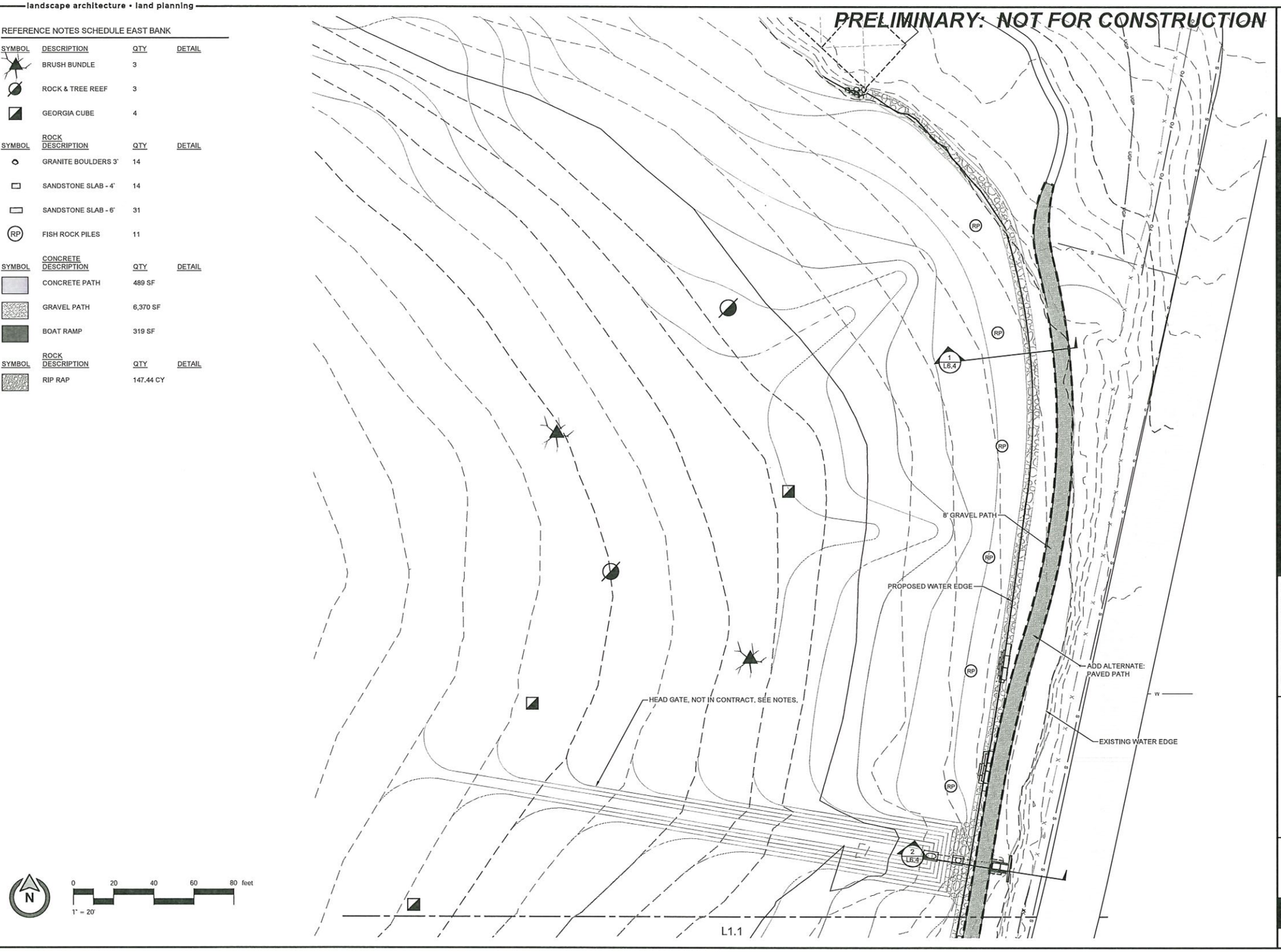
REFERENCE NOTES SCHEDULE EAST BANK

| SYMBOL | DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | BRUSH BUNDLE | 3 | |
| | ROCK & TREE REEF | 3 | |
| | GEORGIA CUBE | 4 | |

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | GRANITE BOULDERS 3' | 14 | |
| | SANDSTONE SLAB - 4' | 14 | |
| | SANDSTONE SLAB - 6' | 31 | |
| RP | FISH ROCK PILES | 11 | |

| SYMBOL | CONCRETE DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | CONCRETE PATH | 489 SF | |
| | GRAVEL PATH | 6,370 SF | |
| | BOAT RAMP | 319 SF | |

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | RIP RAP | 147.44 CY | |

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HARDSCAPE PLAN EAST BANK

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**L1.2**

HARDSCAPE PLAN EAST BANK

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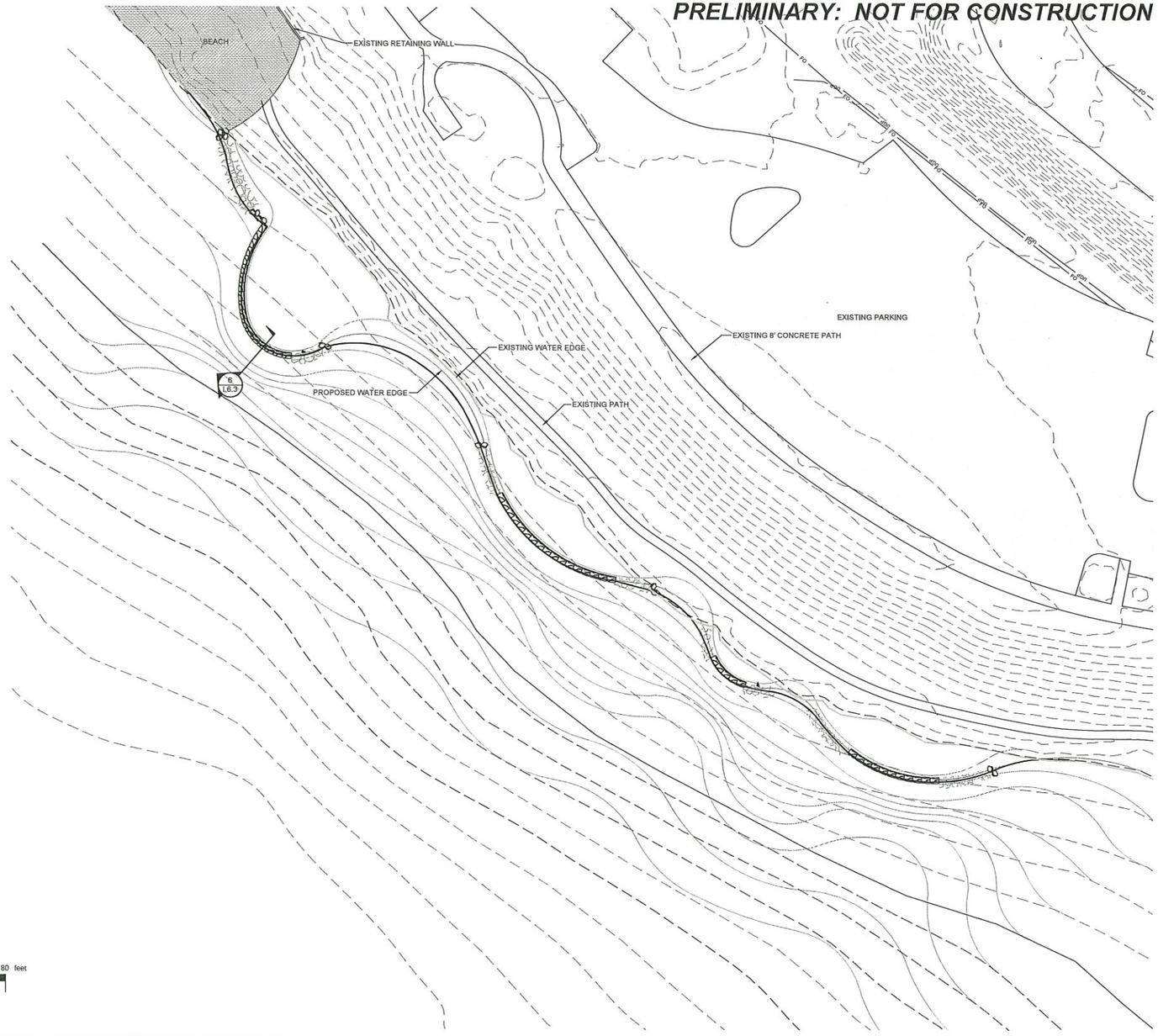
REFERENCE NOTES SCHEDULE NORTHEAST

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | GRANITE BOULDERS 3' | 17 | |
| | BLOCKROCK - 32" | 52 | |

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | RIP RAP | 34.01 CY | |

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HARDSCAPE PLAN NORTHEAST BANK

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**L1.3**

HARDSCAPE PLAN
NORTHEAST BANK

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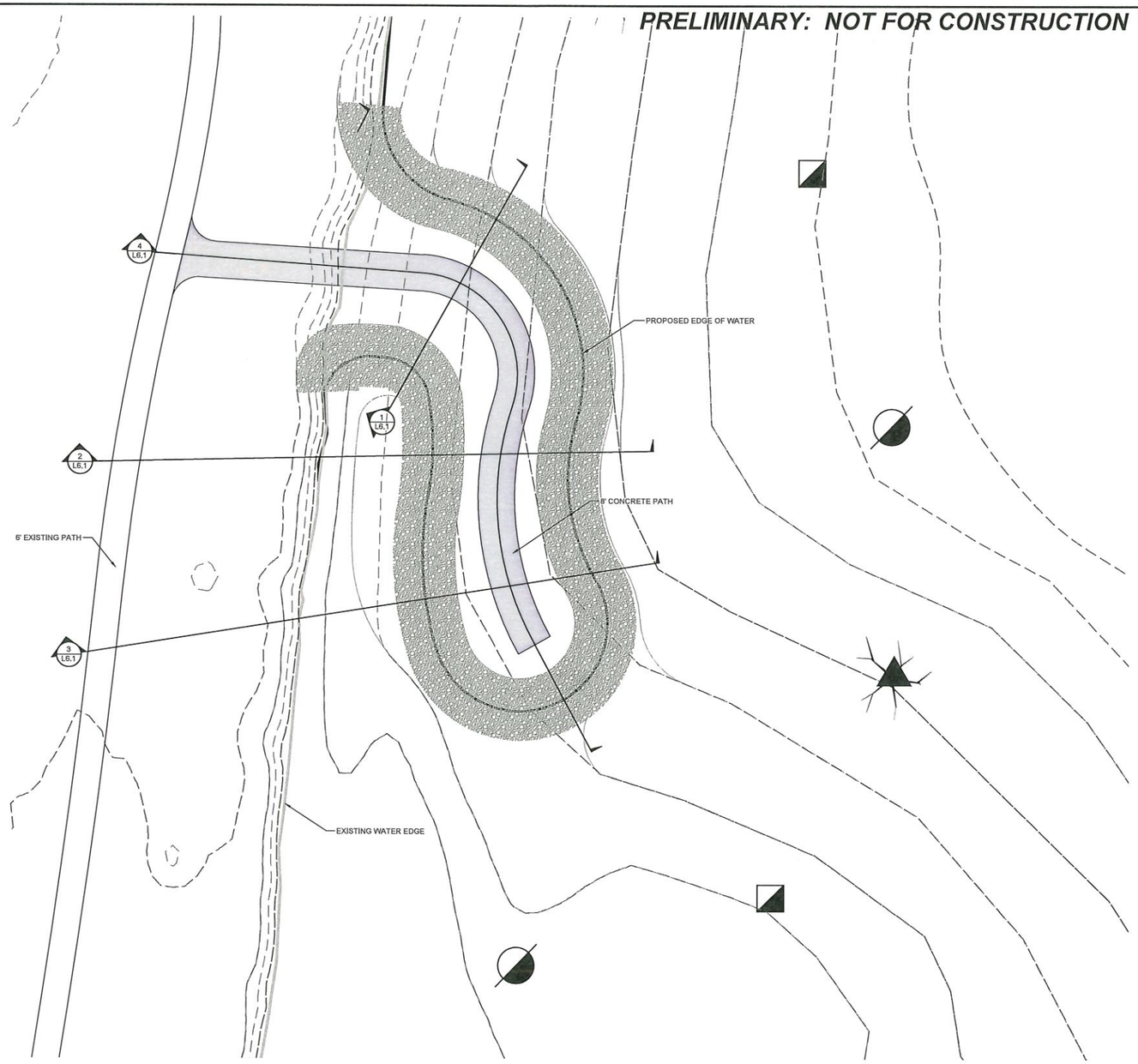
REFERENCE NOTES SCHEDULE WEST JETTY

| SYMBOL | DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | BRUSH BUNDLE | 1 | |
| | ROCK & TREE REEF | 2 | |
| | GEORGIA CUBE | 2 | |

| SYMBOL | CONCRETE DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | CONCRETE PATH | 1,197 SF | |

| SYMBOL | ROCK DESCRIPTION | QTY | DETAIL |
|---|---|---|---|
| | RIP RAP | 140.22 CY | |

PRELIMINARY: NOT FOR CONSTRUCTION




N

0 10 20 30 40 feet

1" = 10'

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HARDSCAPE PLAN NORTHWEST BANK

FWP#21-21 LAKE ELMO PROJECT

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Issue Date: 4/30/2021

| Revision | Date |
|---|---|
| 50% CD | - |
| - | - |
| - | - |
| - | - |
| - | - |

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L1.5

HARDSCAPE PLAN
NORTHWEST BANK

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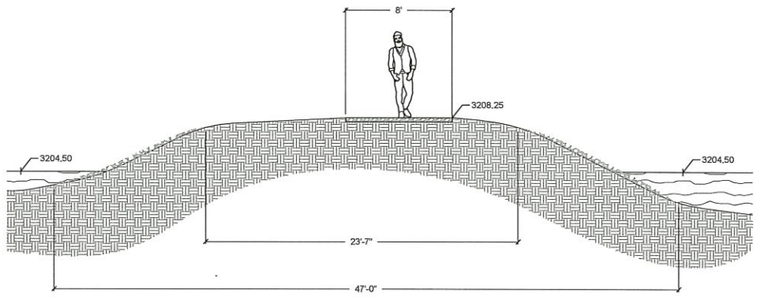
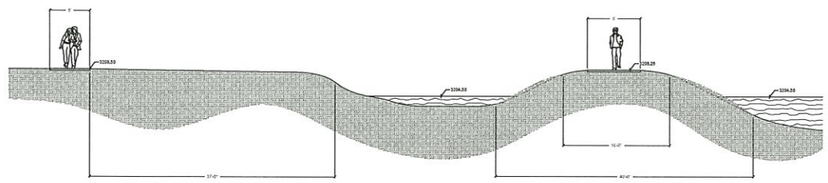
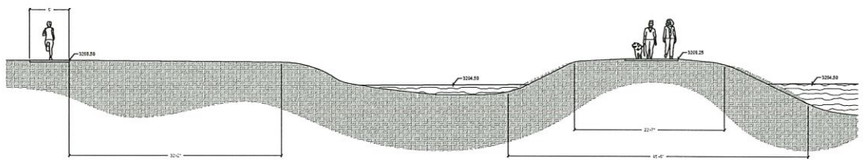
***PRELIMINARY: NOT FOR CONSTRUCTION***



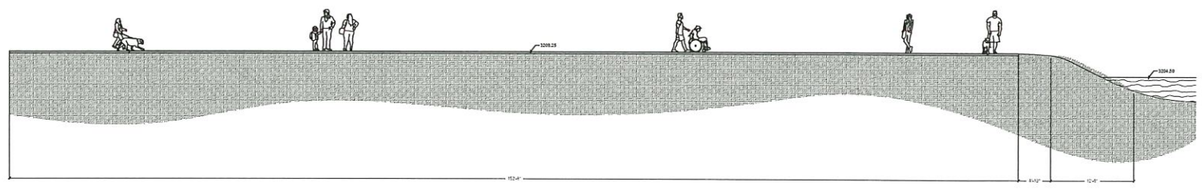

1 WEST JETTY - SECTION 1
3" = 1'-0"



2 WEST JETTY - SECTION 2
1 1/2" = 1'-0"



3 WEST JETTY - SECTION 3
1 1/2" = 1'-0"



4 WEST JETTY - SECTION 4
1 1/2" = 1'-0"

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SECTIONS

**FWP#21-21 LAKE ELMO PROJECT**

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**L6.1**

SECTIONS

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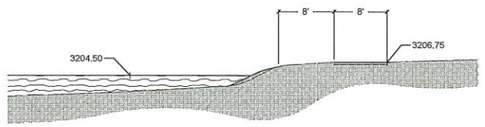
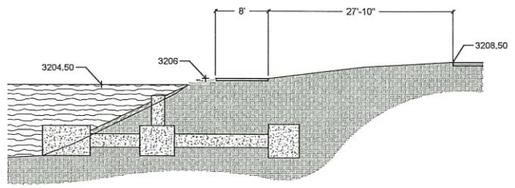
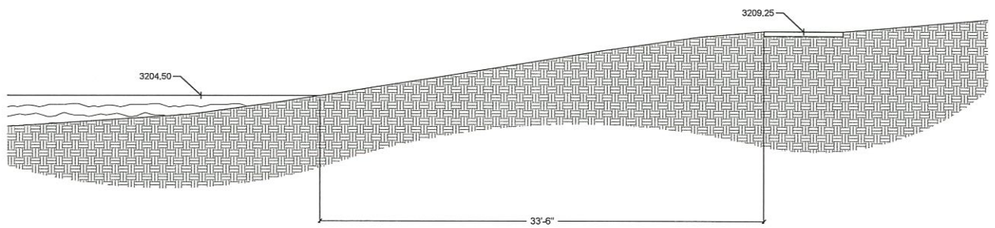
**PRELIMINARY: NOT FOR CONSTRUCTION**




1 EAST BANK - SECTION 1
1/8" = 1'-0"




2 EAST BANK - SECTION 2
1/8" = 1'-0"




3 NORTH BANK SECTION
1/4" = 1'-0"

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SECTIONS

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**L6.4**

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