APPENDIX A – PERMIT DOCUMENTS

CONTENTS

1. USACE Permit No. NWW-2019-00370 Priest Lake Outlet Dam
2. DEQ Section 401 Water Quality Certification
3. IDWR Permit No. S97-20058

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
COEUR D'ALENE REGULATORY OFFICE
1910 NORTHWEST BOULEVARD, SUITE 210
COEUR D'ALENE, IDAHO 83814-2676

October 29, 2019

Regulatory Division

SUBJECT: NWW-2019-00370, Priest Lake Outlet Dam

Mr. Rick Collingwood
Idaho Water Resource Board
PO Box 83720
Boise, Idaho 83720

Dear Mr. Collingwood:

We have determined that the Idaho Water Resource Board's proposed Priest Lake Outlet Dam project is authorized in accordance with Department of Army (DA) **Nationwide Permit (NWP) No. 03: Maintenance** This project is located within Section 6 of Township 59 North, Range 4 West, near latitude 48.490392º N and longitude -116.904053º W, in Bonner County, near Coolin, Idaho. Please refer to File Number NWW-2019-00370 in all future correspondence with our office regarding this project.

Project activities include the discharge of 2,965 cubic yards of rock and 390 cubic yards of concrete in Priest River, a Waters of the United States (U.S.), including wetlands, associated with replacing the existing scour apron at the Priest Lake Outfall Dam with a new 15 foot long concrete apron, with rock riprap armoring extending 30 foot downstream from the structure. Additionally, 3,440 cubic yards of gravel and 1,970 cubic yards of supersacks will be temporarily discharge associated with a temporary access road and cofferdams to facilitate construction activities. All work shall be done in accordance to the attached drawings, titled; *Idaho Water Resource Board, File No. NWW-2019-00370, Dam Maintenance, Sheets 1 through 6,* dated March 29, 2019.

AUTHORITY

DA permit authorization is necessary because your project would involve the discharge of dredged and/or fill material into Waters of the U.S., including wetlands. This authorization is outlined in Section 404 of the Clean Water Act (33 U.S.C. 1344).

PERMIT CONDITIONS

You must comply with all regional, general, and special conditions for this verification letter to remain valid and to avoid possible enforcement actions. The regional and general permit conditions for *NWP No. 03: Maintenance* are available online at

http://www.nww.usace.army.mil/Business-With-Us/Regulatory-Division/Nationwide-Permits/. If you are unable to access this website or would prefer a hard copy of the regional and general conditions please notify us and we will provide you a copy. In addition you must also comply with the special conditions listed below.

The following Special Conditions include:

a. This Corps permit does not authorize you to take an endangered species, in particular the bull trout. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA); e.g. an ESA Section 10 permit or Biological Opinion (BO) under ESA Section 7, with "incidental take" provisions with which you must comply.

   The U.S. Fish and Wildlife Service (USFWS) in their October 18, 2019 Letter of Concurrence agrees that the potential impacts of your project are not likely to adversely affect listed species or their designated critical habitat.

   Your authorization under this Corps permit is conditional upon your compliance with the special conditions in this permit and following the construction procedures described in your application and Biological Assessment (BA).

   Failure to comply with these conditions or variance of the construction procedures that result in a take of listed species under the ESA, would constitute an unauthorized take and non-compliance with your Corps permit. To ensure ESA compliance, any changes or deviation from your permit or the action as described in our BA may necessitate re-initiation of consultation with the USFWS.

b. The permittee is responsible for all work done by any contractor. Permittee shall ensure any contractor who performs the work is informed of and follows all the terms and conditions of this authorization, including any Special Conditions listed above. Permittee shall also ensure these terms and conditions are incorporated into engineering plans and contract specifications.

WATER QUALITY CERTIFICATION

You must also comply with the conditions detailed in the Section 401 Water Quality Certification (WQC) issued by the Idaho Department of Environmental Quality (IDEQ) on March 3, 2017. For your review, a copy of this 401 WQC is available on the IDEQ's website at: http://www.deq.idaho.gov/media/60179758/nationwide-permits-2017-401-certification-0317.pdf. If you have any questions regarding the conditions set forth in the Water Quality Certification, please contact IDEQ directly at 208-769-1422, Coeur d'Alene Regional Office.

COMPLIANCE CERTIFICATION

Further, Nationwide Permit General Condition 30 (*Compliance Certification*) requires that every permittee who has received NWP verification must submit a signed certification regarding the completed work and any required mitigation. The enclosed Compliance Certification form is enclosed for your convenience and must be completed and returned to us.

LIMITATIONS OF THIS VERIFICATION

This letter of authorization does not convey any property rights, or any exclusive privileges and does not authorize any injury to property or excuse you from compliance with other Federal, State, or local statutes, ordinances, regulations, or requirements which may affect this work.

EXPIRATION OF THIS VERIFICATION

This verification is valid until **March 18, 2022**, unless the NWP is modified, suspended or revoked. If your project, as permitted under this NWP verification is changed and/or modified, you must contact our office prior to commencing any work activities. In the event you have not completed construction of your project by March 18, 2022, please contact us at least 60-days prior to this date. A new application and verification may be required.

CUSTOMER SERVICE

We actively use feedback to improve our delivery and provide you with the best possible service. Please take our online customer service survey to tell us how we are doing. Follow this link to take the survey: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. If you have questions or if you would like a paper copy of the survey, call our office at 208-433-4464. For more information about the Walla Walla District Regulatory program, visit us online at http://www.nww.usace.army.mil/Business-With-Us/Regulatory-Division/.

If you have any questions or need additional information about this permit, you can contact me at 208-433-4474, by mail at the address in the letterhead, or email at shane.p.slate@usace.army.mil. For informational purposes, a copy of this letter will be sent to: the Idaho Department of Environmental Quality, the Idaho Department of Lands, and your authorized agent, Geo Engineers, Inc.

Sincerely,



Shane Slate
Project Manager
Regulatory Division

Enclosures

TRANSFER OF NATIONWIDE PERMIT

When the structures or work authorized by this Nationwide Permit, **NWW-2019-00370, Priest Lake Outlet Dam,** are still in existence at the time the property is transferred. The terms and conditions of this Nationwide Permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this Nationwide Permit, the associated liabilities and compliance with the terms and conditions the transferee must sign and date below.

Name of New Owner:

Street Address:

Mailing Address:

City, State, Zip:

Phone Number:

_____ _____

Signature of TRANSFEREE *DATE*

COMPLIANCE CERTIFICATION

US Army Corps of Engineers
Walla Walla District

Permit Number: NWW-2019-00370

Name of Permittee: Idaho Water Resource Board

Date of Issuance: October 29, 2019

Upon completion of the activity authorized by this permit and any mitigation required by the permit, please sign this certification and return it to the following address:

U.S. Army Corps of Engineers
Walla Walla District
Coeur d'Alene Regulatory Office
1910 Northwest Boulevard, Suite 210
Coeur d'Alene, Idaho 83814-2676

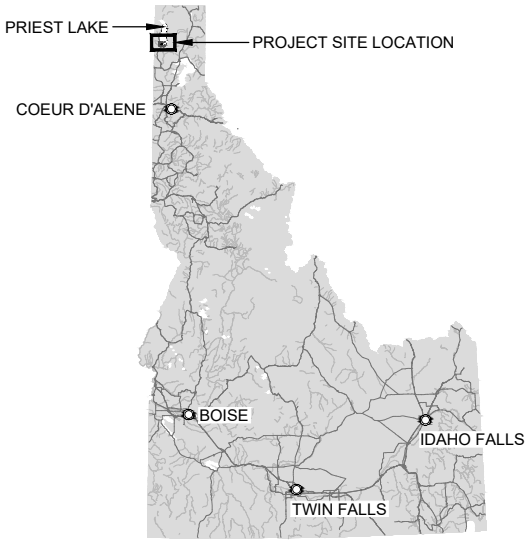
Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with all terms and conditions of this permit, the permit is subject to suspension, modification, or revocation and you are subject to an enforcement action by this office.

I hereby certify that the work authorized by the above-referenced permit has been completed in accordance with the terms and conditions of the said permit. The required mitigation was also completed in accordance with the permit conditions.

_____ _____

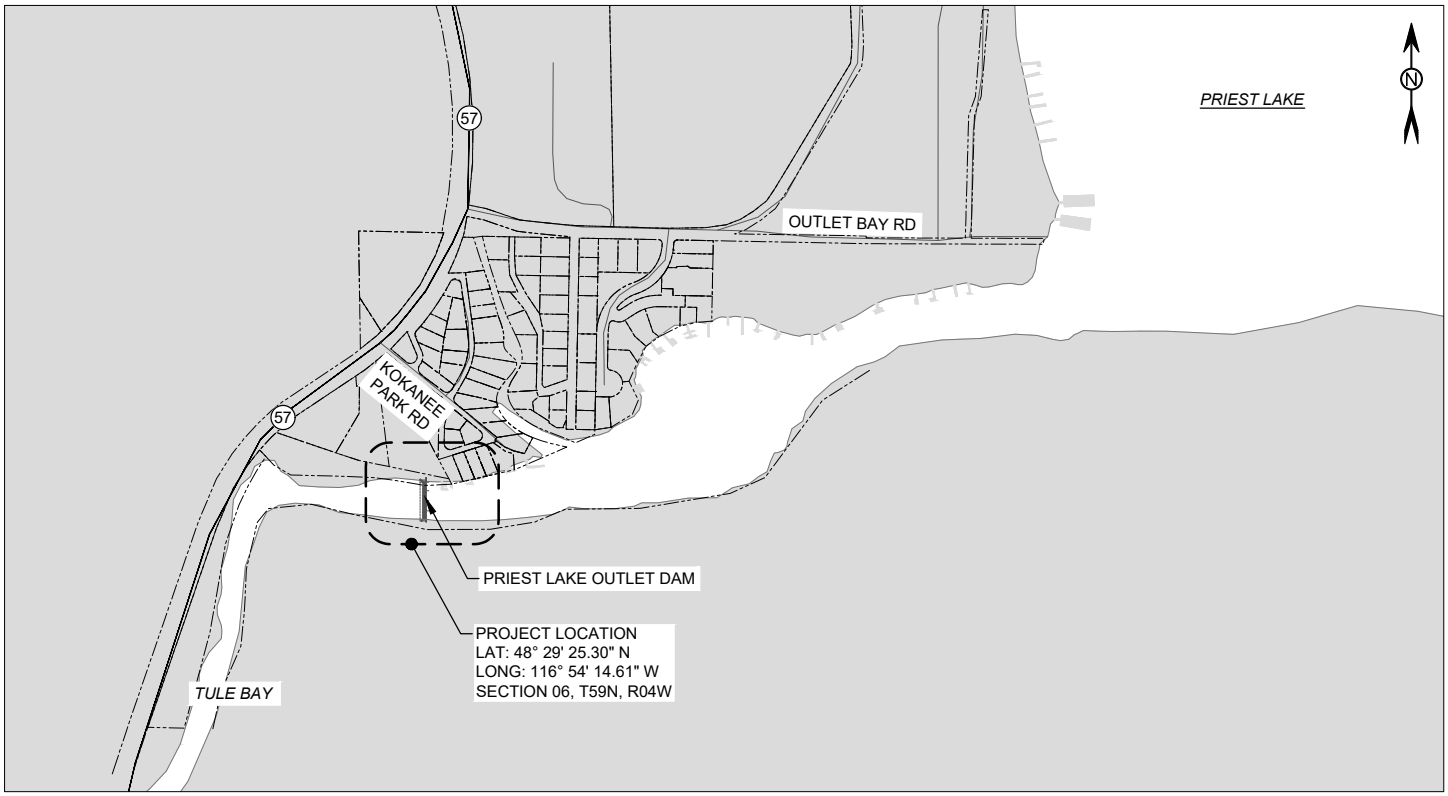
Signature of PERMITEE *DATE*

S06 T59N R04W



IDAHO KEY MAP

SHEET INDEX	
SHEET NO.	TITLE
1	COVER SHEET
2	EXISTING SITE PLAN
3	PROPOSED SITE PLAN
4	SECTION - EXISTING
5	SECTION - PROPOSED
6	TAINTER GATES - 1
7	TAINTER GATES - 2
8	ACCESS AND TEMPORARY STRUCTURES



LOCATION MAP

0 500 1,000

SCALE IN FEET

PURPOSE: GATE EXTENSION AND SCOUR PROTECTION

DATUM: NAVD88

ADJACENT PROPERTY OWNERS:

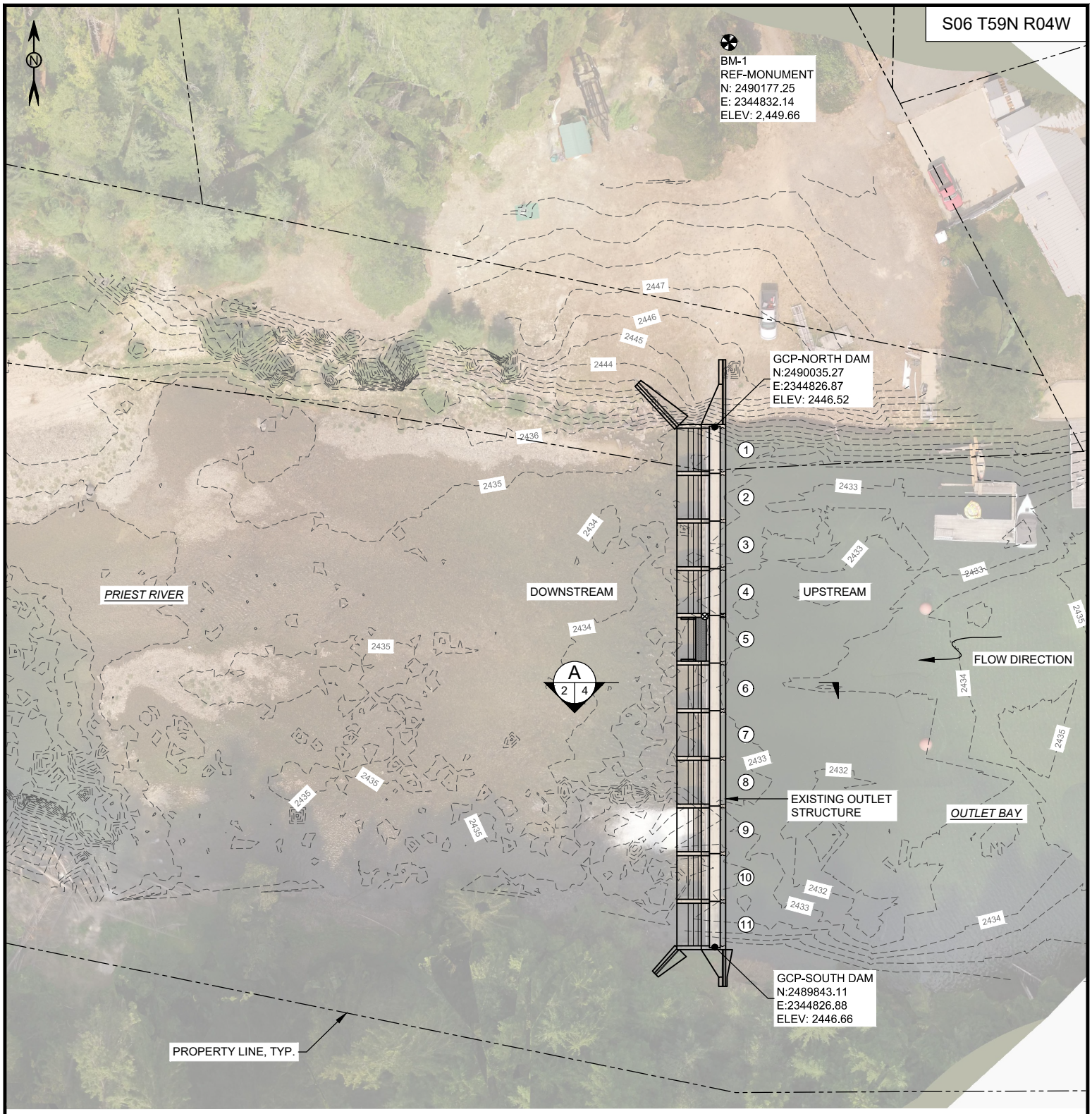
Priest Lake Water Management Project Outlet Dam Modifications

COVER SHEET

APPLICATION BY:
IDAHO DEPARTMENT OF WATER RESOURCES

Applicant: Idaho Water Resource Board
File No. : NWW-2019-00370
Waterway: Priest River
Proposed activity: Dam Maintenance
Sec 6, T-59N, R-4W
Lat.: 48.490392, Long.:-116.904053
Sheet 1 of 6 Date 3/29/2019

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NOTES

1. TOPOGRAPHIC AND BATHYMETRY SOURCE, MOTT MACDONALD DATA COLLECTION, AUGUST-SEPTEMBER 2018.
2. HORIZONTAL DATUM: NAD83, IDAHO STATE PLANE, WEST ZONE
3. VERTICAL DATUM: NAVD88
4. AERIAL SOURCE: DELPHIS, AUGUST 2018, UAV AERIAL PHOTOGRAMMETRY

EXISTING SITE PLAN

0 25 50

SCALE IN FEET

LEGEND

- BENCHMARK
- (#) BAY NUMBER
- PROPERTY LINES

PURPOSE: GATE EXTENSION AND SCOUR PROTECTION

DATUM: NAVD88

ADJACENT PROPERTY OWNERS:

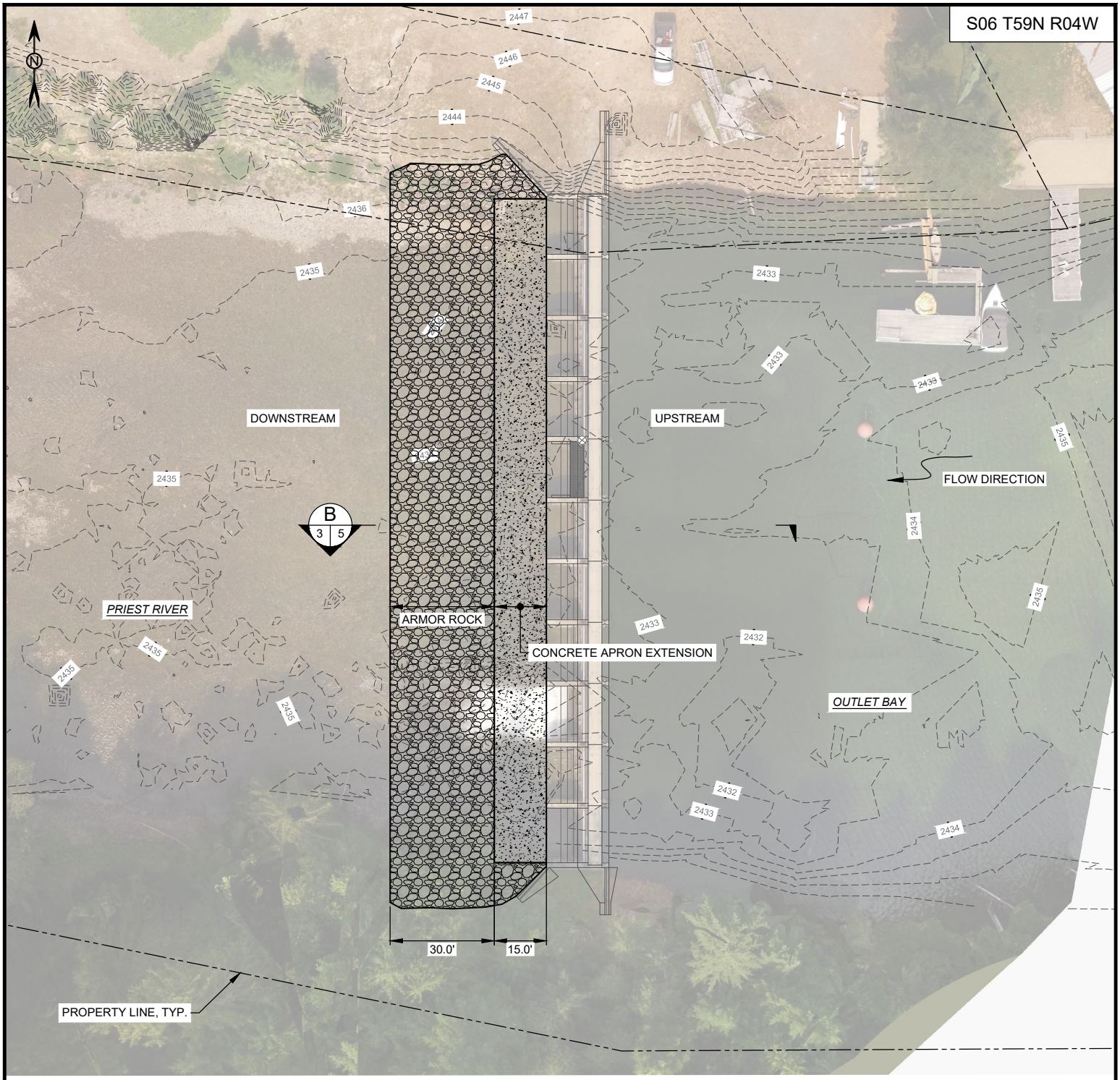
Priest Lake Water Management Project Outlet Dam Modifications

EXISTING SITE PLAN

APPLICATION BY:
IDAHO DEPARTMENT OF WATER RESOURCES

Applicant: Idaho Water Resource Board
File No. : NWW-2019-00370
Waterway: Priest River
Proposed activity: Dam Maintenance
Sec 6, T-59N, R-4W
Lat.: 48.490392, Long.:-116.904053
Sheet 2 of 6 Date 3/29/2019

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PROPOSED SITE PLAN

0 20 40

SCALE IN FEET

LEGEND

- ARMOR ROCK
- CONCRETE APRON
- PROPERTY LINES

PURPOSE: GATE EXTENSION AND SCOUR PROTECTION

DATUM: NAVD88

ADJACENT PROPERTY OWNERS:

Priest Lake Water Management Project Outlet Dam Modifications

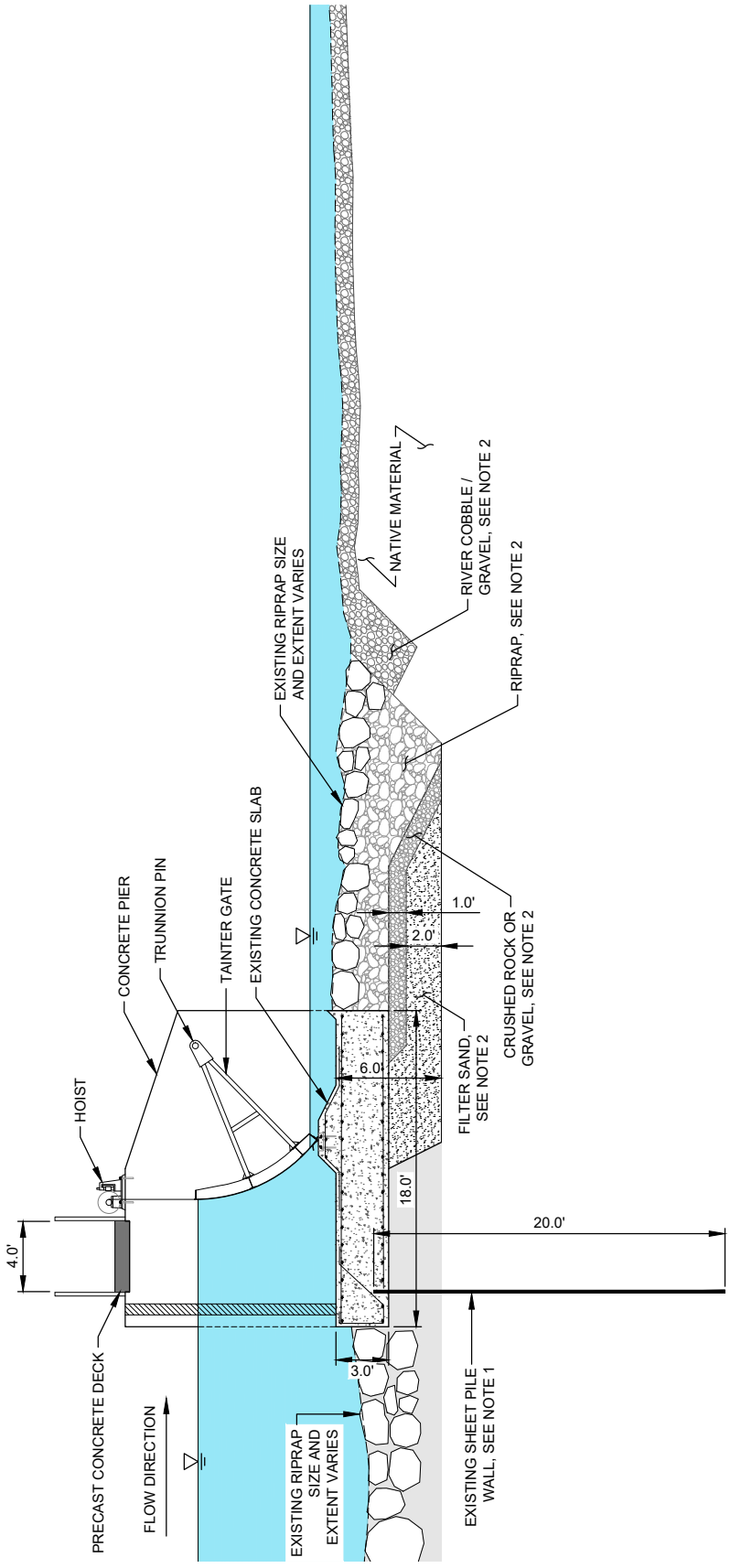
PROPOSED SITE PLAN

APPLICATION BY:
IDAHO DEPARTMENT OF WATER RESOURCES

Applicant: Idaho Water Resource Board
File No. : NWW-2019-00370
Waterway: Priest River
Proposed activity: Dam Maintenance
Sec 6, T-59N, R-4W
Lat.: 48.490392, Long.:-116.904053
Sheet 3 of 6 Date 3/29/2019

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S06 T59N R04W



A/2/4 TYPICAL SECTION
EXISTING

0 5 10
SCALE IN FEET

NOTES
1. SHEET PILE WALL IS SHOWN PER 1978 DESIGN DRAWINGS.
2. DOWNSTREAM RIPRAP AND ROCK UNDERLAYER LIMITS ARE SHOWN PER TECHNICAL SECTION DESIGN DRAWINGS.

PURPOSE: GATE EXTENSION AND SCOUR PROTECTION

DATUM: NAVD88

ADJACENT PROPERTY OWNERS:

Priest Lake Water Management Project Outlet Dam Modifications

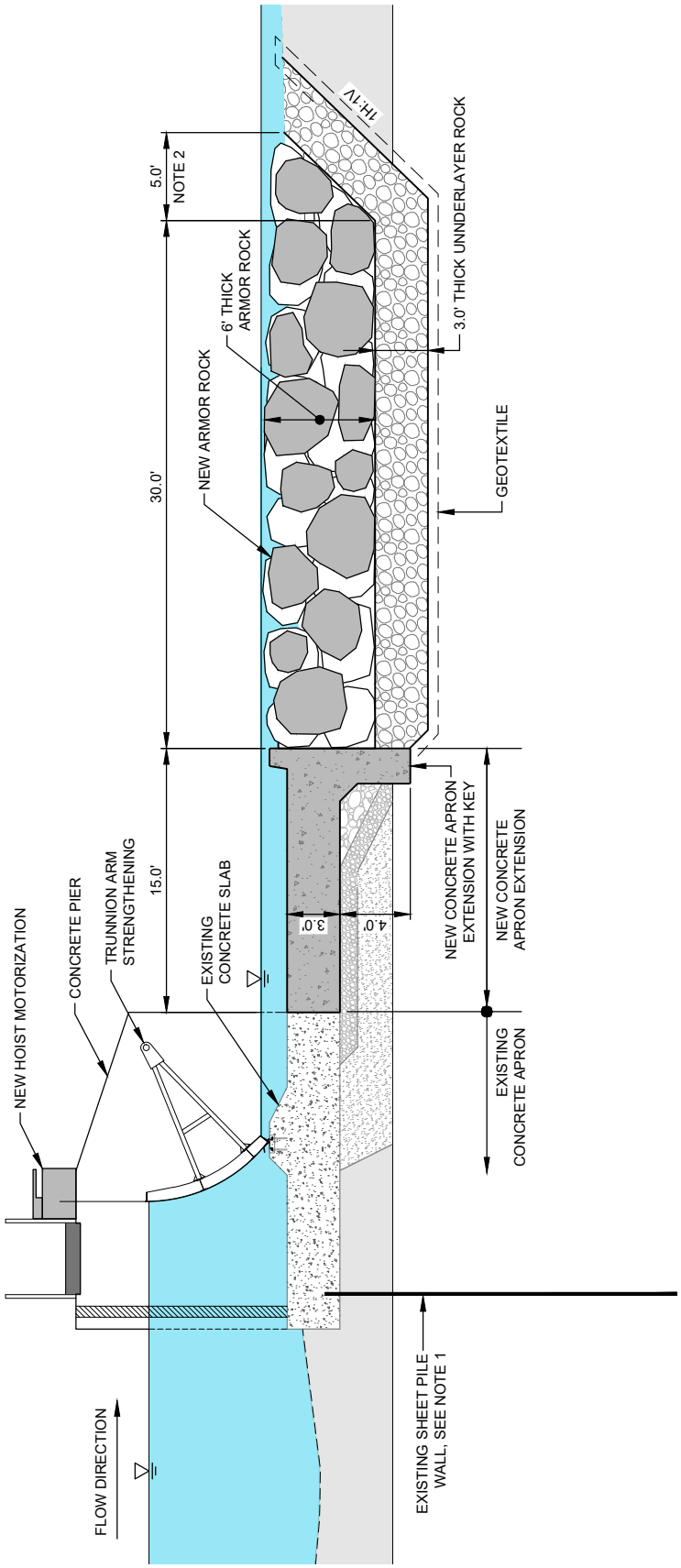
SECTION - EXISTING

APPLICATION BY:
IDAHO DEPARTMENT OF WATER RESOURCES

Applicant: Idaho Water Resource Board
File No. : NWW-2019-00370
Waterway: Priest River
Proposed activity: Dam Maintenance
Sec 6, T-59N, R-4W
Lat.: 48.490392, Long.:-116.904053
Sheet 4 of 6 Date 3/29/2019

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S06 T59N R04W



B 3 5 TYPICAL SECTION
PROPOSED MODIFICATIONS

0 5 10
SCALE IN FEET

NOTES
1. SHEET PILE WALL IS SHOWN PER 1978 DESIGN DRAWINGS.
2. SLOPE OF ARMOR ROCK SURFACE VARIES TO MEET EXISTING.

PURPOSE:GATE EXTENSION AND SCOUR PROTECTION

DATUM: NAVD88

ADJACENT PROPERTY OWNERS:

Priest Lake Water Management Project Outlet Dam Modifications

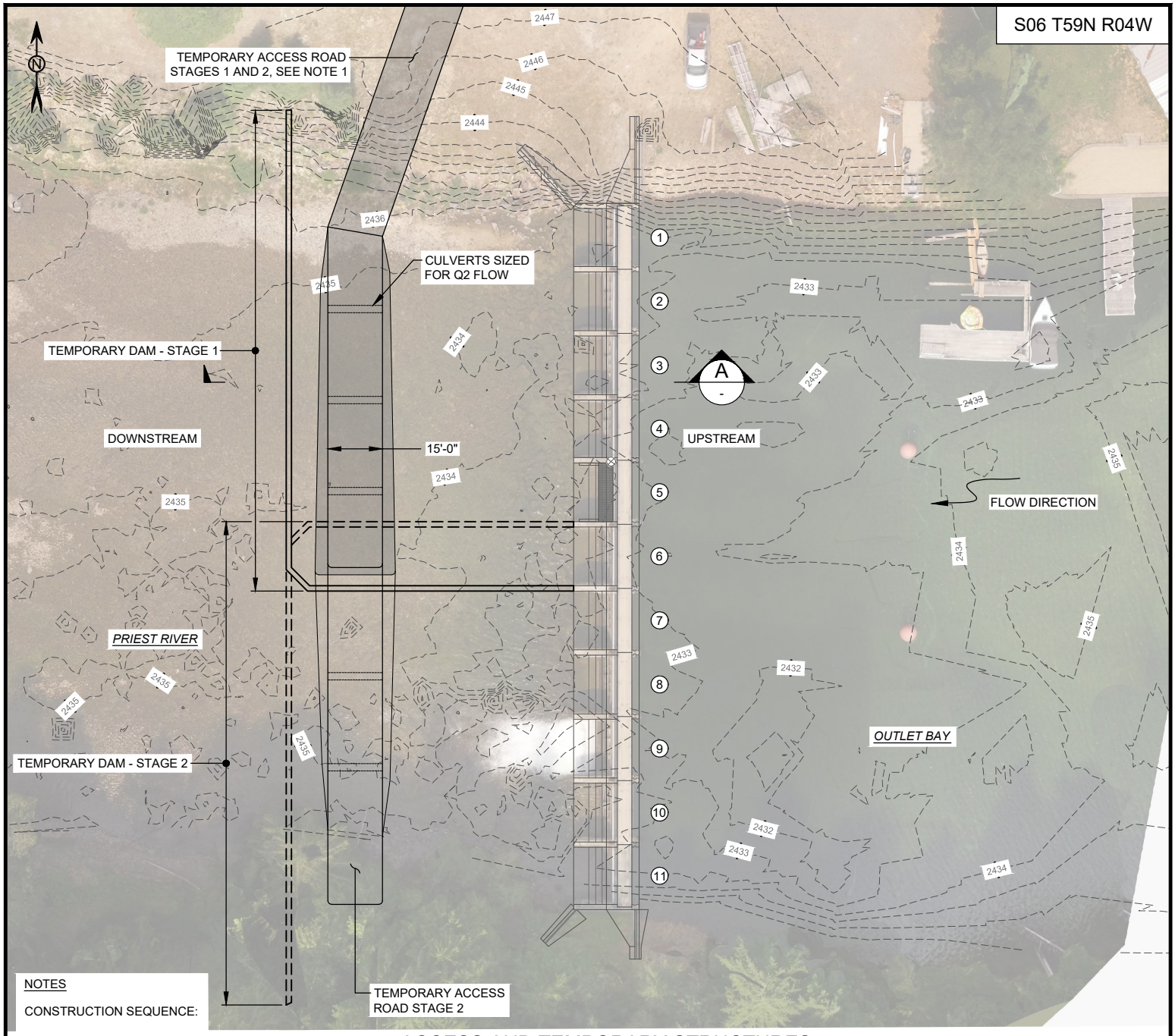
SECTION - PROPOSED

APPLICATION BY:
IDAHO DEPARTMENT OF WATER RESOURCES

Applicant: Idaho Water Resource Board
File No. : NWW-2019-00370
Waterway: Priest River
Proposed activity: Dam Maintenance
Sec 6, T-59N, R-4W
Lat.: 48.490392, Long.:-116.904053
Sheet 5 of 6 Date 3/29/2019

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S06 T59N R04W



NOTES

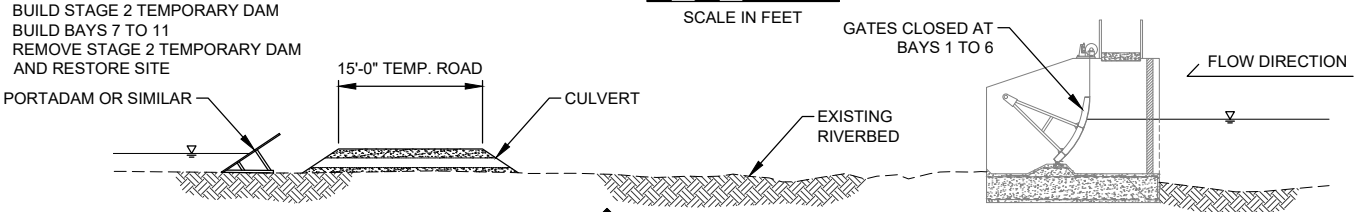
CONSTRUCTION SEQUENCE:

1. BUILD STAGE 1 TEMPORARY DAM
2. DEWATER
3. BUILD BAYS 1 TO 6
4. REMOVE STAGE 1 TEMPORARY DAM
5. BUILD STAGE 2 TEMPORARY DAM
6. BUILD BAYS 7 TO 11
7. REMOVE STAGE 2 TEMPORARY DAM AND RESTORE SITE

ACCESS AND TEMPORARY STRUCTURES

0 20 40

SCALE IN FEET



A - SECTION

STAGE 1 DEWATERING

0 10 20

SCALE: 1" = 10'

PURPOSE: GATE EXTENSION AND SCOUR PROTECTION

DATUM: NAVD88

ADJACENT PROPERTY OWNERS:

Priest Lake Water Management Project Outlet Dam Modifications

ACCESS AND TEMP STRUCTURES

APPLICATION BY:
IDAHO DEPARTMENT OF WATER RESOURCES

Applicant: Idaho Water Resource Board
File No. : NWW-2019-00370
Waterway: Priest River
Proposed activity: Dam Maintenance
Sec 6, T-59N, R-4W
Lat.: 48.490392, Long.:-116.904053
Sheet 6 of 6 Date 3/29/2019

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United States Department of the Interior
U.S. Fish and Wildlife Service
Idaho Fish and Wildlife Office - Spokane
11103 East Montgomery Drive
Spokane Valley, Washington 99206
Telephone (509) 891-6839
www.fws.gov/idaho

In Reply Refer To:
FWS/R1/ES/IFWO/2019-I-1843 October 18, 2019

Shane Slate, Regulatory Project Manager
U.S. Army Corps of Engineers
Walla Walla District
Coeur d'Alene Regulatory Office
1910 Northwest Blvd., Suite 210
Coeur d'Alene, Idaho 83814

Subject: Priest Lake Outlet Dam Modifications, Bonner County, Idaho - Concurrence

Dear Mr. Slate:

This responds to the U.S. Army Corps of Engineers' (Corps) request for the U.S. Fish and Wildlife Service's (Service) concurrence on effects of the subject action to species and habitats listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.; [Act]). The Corps' request, dated and received by the Service on August 19, 2019, included a biological assessment (Assessment) entitled *Revised Biological Assessment Priest Lake Outlet Dam Modifications, Priest Lake, Idaho* (Project). Information contained in the Assessment is incorporated here by reference.

The Corps determined, through the Assessment, the Project would have no effect to grizzly bear (*Ursus arctos horribilis*) and North American wolverine (*Gulo gulo*). The regulations implementing section 7 of the Act do not require the Service to review or concur with no effect determinations. Through the Assessment, the Corps determined that the Project may affect, but is not likely to adversely affect the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. The Service concurs with the Corps' determination for bull trout and its critical habitat, and presents our rationale below.

Proposed Action

The objectives of the Project are to meet statutory requirements to maintain water levels in Priest Lake between 3.0 and 3.5 feet at the outlet gauge during the summer recreation season, while simultaneously maintaining a minimum discharge of 60 cubic feet per second (cfs) from the Priest Lake outlet dam (dam). The goals of the Project are to improve the dam's structural stability and reduce scour and sedimentation risk that may result from increased pressures and water releases from storing additional surface water. The Project proposes to: 1) replace existing

rock armoring directly below the dam with a concrete scour apron; 2) install rock armoring below the scour apron to a depth of six feet; and 3) conduct improvements to mechanical components of the dam structure. The Project will be begin in September of 2020 and will be completed by early 2021 prior to the spring freshet, which typically occurs in mid-March. The Project area will be gradually dewatered immediately below the dam in two separate stages to allow work to be completed in the dry in one-half of the river channel while maintaining continuous flow in the other half. Cofferdams and block nets or bubble curtains will be utilized to isolate the Project area, and pumps will be utilized to divert upwelling water from within the dewatered area. A temporary 15-foot wide access road will be constructed across the stream channel with clean angular rock and sufficiently sized culverts to facilitate equipment access to the Project area from the sole access point on the north riverbank. The Project area will be restored to pre-Project conditions after construction work has been completed. The proposed action is fully described in the Assessment (pp. 2-8).

Species and Habitat Presence in the Action Area

The dam is a complete fish barrier, preventing any migration of bull trout between Priest Lake and the Priest River. The action area extends 1000 feet downstream from the dam in the Priest River, which is designated bull trout foraging, migrating, and overwintering (FMO) critical habitat, and bull trout may be present during Project implementation. Although bull trout primarily use the Priest River to migrate in the fall between spawning and rearing habitat in the East River drainage (approximately 21 miles downstream of the action area) and FMO habitat further downstream in the Pend Oreille River (Dupont et al. 2007, pp. 1271-1273; Stash 2019, *in litt*), they may use habitat in the action area for feeding or overwintering. However, habitat in the action area consists of low quality substrate, minimal hiding cover and elevated water temperatures, and is unlikely to be supportive of bull trout (IDEQ 2018, Appendix K, p. 14; Scott 2019, *in litt*).

Potential Impacts and Effects from the Proposed Action

Bull trout may be present but are not expected to be present in the Project area during Project implementation due to poor habitat conditions. Project effects may result from dewatering, construction-related noise, sediment and turbidity, and chemical contamination. Dewatering will be conducted gradually to encourage bull trout to move from the Project area into downstream habitat. Any bull trout remaining during the drawdown will be herded downstream from the Project area by a qualified fish biologist. As a result, effects of the dewatering process, including fish herding, are expected to be insignificant. Construction-related noise is not expected to exceed levels known to disturb bull trout (Assessment p. 8), and bull trout that may be present in the action area will be able to move downstream, resulting in insignificant effects. Potential sediment plumes that may occur during construction and re-watering will be short-term and minor, and bull trout will be able to avoid potential effects by moving downstream. Use of clean aggregate, filtering of pumped water, gradual re-watering of the dry channel, and use of best management practices (BMPs) (Assessment p. 10) to monitor and control sediment will result in insignificant effects from sedimentation and turbidity. Effects from chemical contaminants will be minimized by machinery operating in the dry and usage of BMPs (Assessment pp. 10-11), resulting in discountable effects.

The Project may also affect bull trout critical habitat by permanently altering the streambed and potentially reducing the food base. Installation of the concrete scour apron and adjoining rock scour protection will result in the alteration of approximately 10,870 square feet of existing rock armoring and native riverbed materials. However, existing habitat conditions in the Project area provide little to no complexity, pools or hiding cover, and alteration of this relatively small area of habitat will not appreciably affect the overall quality of FMO habitat in the Priest River. The concrete scour apron will replace approximately 2,870 square feet of existing rock armoring that currently provides limited macroinvertebrate habitat, but this will have a negligible effect on overall prey abundance in the Priest River. As a result, effects of the Project to bull trout critical habitat are expected to be insignificant.

Concurrence

Based on the Service's review of the Assessment, we concur with the Corps' determination that the action outlined in the Assessment and this letter may affect, but is not likely to adversely affect bull trout and its designated critical habitat. This concurrence is based on expected absence of bull trout in the Project area, conducting activities in the dry, use of BMPs, and minimal alteration of critical habitat that reduce impacts of the proposed action to bull trout and its critical habitat to insignificant or discountable levels.

This concludes informal consultation on the Project. Further consultation pursuant to section 7(a)(2) of the Act is not required. As provided in 50 CFR §402.16, re-initiation of consultation on this action may be necessary if new information reveals that effects of the action may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or if a new species is listed or critical habitat is designated that may be affected by this Project.

We value the dialogue between our offices that seeks to minimize impacts to listed species and aid their recovery. If you have any questions about this letter, or your responsibilities under the Act, please contact Sean Sweeney of my staff at sean_sweeney@fws.gov or phone (509) 893-8009.

Sincerely,

Patricia C. Johnson-Hughes

for Christopher Swanson
Acting Idaho State Supervisor

cc: IDFG (Horsmon)
GeoEngineers, Inc. (Scott)

References

Dupont, J.M., R.S. Brown, and D.R. Geist. 2007. Unique allacustrine migration patterns of a bull trout population in the Pend Oreille River drainage, Idaho. North American Journal of American Fisheries Management, 27(4):1268-1275.

Idaho Department of Environmental Quality (IDEQ). 2018. Idaho's 2016 Integrated Report – Final. Idaho Department of Environmental Quality, Boise, Idaho. 46 pp. https://www.deq.idaho.gov/media/60182296/idaho-integrated-report-2016.pdf

In Litteris

Scott, J. 2019, *in litt*. Email from Jason Scott, Associate Fisheries Scientist (GeoEngineers, Inc., Spokane, Washington) to Sean Sweeney, Biologist (U.S. Fish and Wildlife Service, Spokane, Washington) thru Shane Slate, Project Manager (U.S. Army Corps of Engineers, Coeur d'Alene, Idaho). Subject: Priest Lake Dam BA questions. August 5, 2019.

Stash, S. 2019, *in litt*. Email from Sean Stash, Fisheries Biologist (U.S. Forest Service, Sandpoint, Idaho) to Sean Sweeney, Biologist (U.S. Fish and Wildlife Service, Spokane, Washington). Subject: Priest River bull trout. September 3, 2019.

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2110 Ironwood Parkway • Coeur d'Alene, ID 83814 • (208) 769-1422
www.deq.idaho.gov

Brad Little, Governor
John H. Tippets, Director

October 16, 2019

Steve Klatt
Bonner County
1500 Hwy.2, Suite 101
Sandpoint, ID 83864

RE: Final §401 Water Quality Certification for the Priest Lake Thorofare Project, NWW-2018-00499

Dear Mr. Klatt,

Enclosed is the final water quality certification for the above referenced individual Army Corps of Engineers project, (NWW-2018-00499). No comments were received during the 21-day period that the document was available on our website for public comment. Please make sure that your staff and contracted individuals read the document and are familiar with conditions of the certification (pages 4-8).

If you have questions or concerns, please contact Thomas Herron at (208) 666-4631 or via email at Thomas.herron@deq.idaho.gov.

Sincerely,

Daniel Redline
Regional Administrator
Coeur d'Alene Regional Office

Enclosure

c: Shane Slate, Army Corps of Engineers – Coeur d'Alene Field Office

Idaho Department of Environmental Quality

Final §401 Water Quality Certification

October 16, 2019

404 Permit Application Number: NWW-2018-00499, Bonner County – Priest Lake Thorofare

Applicant: Bonner County

Project Location: Latitude 48°44'23.21" N, Longitude -116°50'51.19" W – Lionhead boat ramp at Priest Lake Park in Bonner County in Sandpoint, ID

Receiving Water Body: Priest Lake

Pursuant to the provisions of Section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended; 33 U.S.C. Section 1341(a)(1); and Idaho Code §§ 39-101 et seq. and 39-3601 et seq., the Idaho Department of Environmental Quality (DEQ) has authority to review activities receiving Section 404 dredge and fill permits and issue water quality certification decisions.

Based upon its review of the joint application for permit, received on August 21, 2019, DEQ certifies that if the permittee complies with the terms and conditions imposed by the permit along with the conditions set forth in this water quality certification, then there is reasonable assurance the activity will comply with the applicable requirements of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, the Idaho Water Quality Standards (WQS) (IDAPA 58.01.02), and other appropriate water quality requirements of state law.

This certification does not constitute authorization of the permitted activities by any other state or federal agency or private person or entity. This certification does not excuse the permit holder from the obligation to obtain any other necessary approvals, authorizations, or permits.

Project Description

This project is designed to improve and expand navigable access between the Upper and Lower Priest lakes by dredging accumulated lakebed material from the Priest Lake Thorofare. The project will deepen the channel by five feet, dredging approximately 12,200 cubic yards of sediment, which will result in improved fish migration passage. Additionally, this project will replace the existing, dilapidated breakwater and will also extend the structure by 225 feet. This project requires the removal of 5,725 cubic yards of sediment for the breakwater footprint and will mitigate for erosion risk from wave action and bank erosion during high flows. The breakwater will be filled with approximately 10,374 cubic yards of stone, gravel and cobble. Construction of a temporary haul road may be required to ford the Thorofare at low water.

Antidegradation Review

The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).

- Tier I Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier I review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).
- Tier II Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
- Tier III Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use, unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

Pollutants of Concern

The primary pollutant of concern for this project is sediment. As part of the Section 401 water quality certification, DEQ is requiring the applicant comply with various conditions to protect water quality and to meet Idaho WQS, including the water quality criteria applicable to sediment.

Receiving Water Body Level of Protection

This project is located on Priest Lake within the Priest Subbasin assessment unit (AU) ID17010215PN014_04 (Priest Lake Thorofare – Upper Priest Lake to Priest Lake). This AU has designated for cold water aquatic life, salmonid spawning, primary contact recreation, and domestic water supply beneficial uses. In addition to these uses, all waters of the state are protected for agricultural and industrial water supply, wildlife habitat, and aesthetics (IDAPA 58.01.02.100).

This AU is included in Category 3 (Unassessed Waters) of DEQ's 2016 Integrated Report. Therefore, DEQ must provide an appropriate level of protection on a case-by-case basis using information available at this time (IDAPA 58.01.02.052.05.b). Upstream segments of the Hughes Fork River and the Upper Priest River that feed into Upper Priest Lake are both water bodies that fully support aquatic life and contact recreation beneficial uses. Additionally, Caribou Creek,

which feeds directly into the Priest Lake Thorofare above lower Priest Lake is also a fully supporting water body. DEQ expects that lower segments of the assessment unit will retain similar high water quality. As such, DEQ will provide Tier II protection (IDAPA 58.01.02.051.02), in addition to Tier I (IDAPA 58.01.02.052.01), for the cold water aquatic life, salmonid spawning and contact recreation beneficial uses of this AU.

The only pollutant of concern associated with this project is sediment. However, sediment is not relevant to recreational uses since sediment will not degrade water quality necessary to support recreation uses, and it is therefore unnecessary for DEQ to conduct a Tier II analysis.

Protection and Maintenance of Existing Uses (Tier I Protection)

A Tier I review is performed for all new or reissued permits or licenses, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires demonstration that existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. The numeric and narrative criteria in the WQS are set at levels that ensure protection of existing and designated beneficial uses.

Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited, and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment. Once a TMDL is developed, discharges of causative pollutants shall be consistent with the allocations in the TMDL (IDAPA 58.01.02.055.05). Prior to the development of the TMDL, the WQS require the application of the antidegradation policy and implementation provisions to maintain and protect uses (IDAPA 58.01.02.055.04). The project will be consistent with the *Addendum – Priest River Subbasin Assessment and Total Maximum Daily Load* (DEQ 2003), which is designed to improve conditions (from sediment contributions) inside the Lower Priest River drainage.

During the construction phase, the applicant will implement, install, maintain, monitor, and adaptively manage best management practices (BMPs) directed toward reducing erosion and minimizing turbidity levels in receiving water bodies downstream of the project. In addition, permanent erosion and sediment controls will be implemented, which will minimize or prevent future sediment contributions from the project area. As long as the project is conducted in accordance with the provisions of the project plans, Section 404 permit, and conditions of this certification, then there is reasonable assurance the project will comply with the state's numeric and narrative criteria. These criteria are set at levels that protect and maintain existing and designated beneficial uses.

This project originally entertained three project alternatives, settling on a rubblemound structure for the Thorofare improvements. This alternative provides for habitat enhancement and does not utilize pile driving (disruptive to fish) while contributing a smaller footprint in the lake. The applicant will utilize the following BMPs to reduce sediment mobilization and further erosion on-site to protect water quality in the receiving waters. A temporary sand berm will be constructed to isolate work areas and divert the channel upstream from the breakwater so that construction and dredging will be conducted in dry conditions. Fish block nets or bubble curtains will be utilized around work areas. The project also allows for continued fish migration during construction. The contractor will be responsible for an approved Spill Prevention, Control and Countermeasure Plan as well as a Dredging and Dredge Material Hauling Plan.

There is no available information indicating the presence of any existing beneficial uses aside from those that are already designated and discussed above; therefore, the permit ensures that the level of water quality necessary to protect both existing and designated uses is maintained and protected in compliance with the Tier I provisions of Idaho's WQS (IDAPA 58.01.02.051.01 and 58.01.02.052.07).

Conditions Necessary to Ensure Compliance with Water Quality Standards or Other Appropriate Water Quality Requirements of State Law

General Conditions

1. This certification is conditioned upon the requirement that any modification (e.g., change in BMPs, work windows, etc.) of the permitted activity shall first be provided to DEQ for review to determine compliance with Idaho WQS and to provide additional certification pursuant to Section 401. Such modifications may not be implemented until DEQ has determined whether additional certification is necessary.
2. DEQ reserves the right to modify, amend, or revoke this certification if DEQ determines that, due to changes in relevant circumstances—including without limitation, changes in project activities, the characteristics of the receiving water bodies, or state WQS—there is no longer reasonable assurance of compliance with WQS or other appropriate requirements of state law.
3. If ownership of the project changes, the certification holder shall notify DEQ, in writing, upon transferring this ownership or responsibility for compliance with these conditions to another person or party. The new owner/operator shall request, in writing, the transfer of this water quality certification to his/her name.
4. A copy of this certification must be kept on the job site and readily available for review by any contractor working on the project and any federal, state, or local government personnel.
5. Project areas shall be clearly identified in the field prior to initiating land-disturbing activities to ensure avoidance of impacts to waters of the state beyond project footprints.
6. The applicant shall provide access to the project site and all mitigation sites upon request by DEQ personnel for site inspections, monitoring, and/or to ensure that conditions of this certification are being met.
7. The applicant is responsible for all work done by contractors and must ensure the contractors are informed of and follow all the conditions described in this certification and the Section 404 permit.
8. If this project disturbs more than 1 acre and there is potential for discharge of stormwater to waters of the state, coverage under the EPA Stormwater Construction General Permit *must* be obtained. More information can be found at https://www.epa.gov/npdes-permits/stormwater-discharges-construction-activities-region-10.

Erosion and Sediment Control

9. BMPs for sediment and erosion control suitable to prevent exceedances of state WQS shall be selected and installed before starting construction at the site. One resource that may be used in evaluating appropriate BMPs is DEQ's *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties*, available online at http://www.deq.idaho.gov/media/494058-entire.pdf. Other resources may also be used for selecting appropriate BMPs.
10. One of the first construction activities shall be placing permanent and/or temporary erosion and sediment control measures around the perimeter of the project or initial work areas to protect the project water resources.
11. Permanent erosion and sediment control measures shall be installed in a manner that will provide long-term sediment and erosion control to prevent excess sediment from entering waters of the state.
12. Permanent erosion and sediment control measures shall be installed at the earliest practicable time consistent with good construction practices and shall be maintained as necessary throughout project operation.
13. Top elevations of bank stabilization shall be such that adequate freeboard is provided to protect from erosion at 100-year design flood elevation.
14. Structural fill or bank protection shall consist of materials that are placed and maintained to withstand predictable high flows in the waters of the state.
15. A BMP inspection and maintenance plan must be developed and implemented. At a minimum, BMPs must be inspected and maintained daily during project implementation.
16. BMP effectiveness shall be monitored during project implementation. BMPs shall be replaced or augmented if they are not effective.
17. All construction debris shall be properly disposed of so it cannot enter waters of the state or cause water quality degradation.
18. Disturbed areas suitable for vegetation shall be seeded or revegetated to prevent subsequent soil erosion.
19. Maximum fill slopes shall be such that material is structurally stable once placed and does not slough into the stream channel during construction, during periods prior to revegetation, or after vegetation is established.
20. To the extent reasonable and cost-effective, the activity submitted for certification shall be designed to minimize subsequent maintenance.
21. Sediment from disturbed areas or able to be tracked by vehicles onto pavement must not be allowed to leave the site in amounts that would reasonably be expected to enter waters of the state. Placement of clean aggregate at all construction entrances or exits and other BMPs such as truck or wheel washes, if needed, must be used when earth-moving equipment will be leaving the site and traveling on paved surfaces.

Turbidity

22. Sediment resulting from this activity must be mitigated to prevent violations of the turbidity standard as stipulated under the Idaho WQS (IDAPA 58.01.02). *Any violation of this standard must be reported to the DEQ regional office immediately.*
23. All practical BMPs on disturbed banks and within the waters of the state must be implemented to minimize turbidity. Visual observation is acceptable to determine whether BMPs are functioning properly. If a plume is observed, the project may be causing an exceedance of WQS and the permittee must inspect the condition of the projects BMPs. If the BMPs appear to be functioning to their fullest capability, then the permittee must modify the activity or implement additional BMPs (this may also include modifying existing BMPs).
24. Containment measures such as silt curtains, geotextile fabrics, and silt fences must be implemented and properly maintained to minimize instream sediment suspension and resulting turbidity.
25. Monitoring must occur each day during project implementation when project activities may result in turbidity increases above background levels. *A properly and regularly calibrated turbidimeter is required.*

Turbidity Monitoring and Compliance Requirements

To ensure compliance with Idaho's WQS, required monitoring steps shall include the following:

A. Choose and identify the following locations for each crossing:
   1. Background location: A relatively undisturbed location unaffected by the construction activity, up-current from the permitted activity; and,
   2. Compliance location: A location downcurrent from the permitted activity, within any visible plume, at the distance that corresponds to the size of the waterbody where work is taking place as listed on the table below:

Wetted Stream Width	Compliance Distance
Up to 30 feet	50 feet
>30 feet to 100 feet	100 feet
>100 feet to 200 feet	200 feet
>200 feet	300 feet

B. Conduct Compliance Monitoring with a Turbidimeter
   1. Measure turbidity at both background and compliance locations at the frequency directed in the tables below and record the date, time, location, and turbidity measurements in the daily log. The permittee must also record all controls and practices implemented at the start of the work.
   2. Turbidity measurements must be representative of stream turbidity when the activity is being conducted. *Measurements cannot be taken during a cessation of activity.*
   3. If the project causes turbidity levels to increase above 50 NTU over background, the permittee must implement additional controls and practices, resume work, and

monitor both points again. A description of the additional controls and the date, time, and location where they are implemented must be recorded in the daily log.

Compliance Monitoring With a Turbidimeter

Allowable Exceedance in Turbidity	Action Required at 1st Monitoring Interval	Action Required at 2nd Monitoring Interval
0 to 24 NTU above background	Continue to monitor every 2 hours	Continue to monitor every 2 hours
25 to 49 NTU above background	Continue to monitor every 2 hours	STOP work after 8 hours/24-hour period
25 NTU above background for 10 or more consecutive days	STOP work and follow instructions in B.3. above	
50 NTU or more above background (first occurrence)	STOP work and follow instructions in B.3. above	
50 NTU or more above background (second occurrence)	STOP work and follow instructions in B.3. above and notify DEQ Regional Office	

C. Reporting—Copies of daily logs for turbidity monitoring must be made available to DEQ and other local, state and federal regulatory agencies upon request. The log must include:
   1. Background NTUs, compliance point NTUs, comparison of the points in NTUs, and location, time, and date for each reading.
   2. A narrative discussing all exceedances, controls applied and their effectiveness, subsequent monitoring, work stoppages, and any other actions taken.

In-water Work

26. Work in open water is to be kept at a minimum and only when necessary. Equipment shall work from an upland site to minimize disturbance of waters of the state. If this is not practicable, appropriate measures must be taken to ensure disturbance to the waters of the state is minimized.
27. Construction affecting the bed or banks shall take place only during periods of low flow.
28. Heavy equipment working in wetlands shall be placed on mats or suitably designed pads to prevent damage to the wetlands.
29. Activities in spawning areas must be avoided to the maximum extent practicable.
30. Work in waters of the state shall be restricted to areas specified in the application.

Management of Hazardous or Deleterious Materials

31. Petroleum products and hazardous, toxic, and/or deleterious materials shall not be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of waters of the state. Adequate measures and controls must be in place to ensure that those materials will not enter waters of the state as a result of high water, precipitation runoff, wind, storage facility failure, accidents in operation, or unauthorized third-party activities.
32. Vegetable-based hydraulic fluid should be used on equipment operating in or directly adjacent to the channel if this fluid is available.

33. Daily inspections of all fluid systems on equipment to be used in or near waters of the state shall be done to ensure no leaks or potential leaks exist prior to equipment use. A log book of these inspections shall be kept on site and provided to DEQ upon request.
34. Equipment and machinery must be removed from the vicinity of the waters of the state prior to refueling, repair, and/or maintenance.
35. Equipment and machinery shall be steam cleaned of oils and grease in an upland location or staging area with appropriate wastewater controls and treatment prior to entering a water of the state. Any wastewater or wash water must not be allowed to enter a water of the state.
36. Emergency spill procedures shall be in place and may include a spill response kit (e.g., oil absorbent booms or other equipment).
37. In accordance with IDAPA 58.01.02.850, in the event of an unauthorized release of hazardous material to state waters or to land such that there is a likelihood that it will enter state waters, the responsible persons in charge must
    a. Make every reasonable effort to abate and stop a continuing spill.
    b. Make every reasonable effort to contain spilled material in such a manner that it will not reach surface or ground waters of the state.
    c. Call 911 if immediate assistance is required to control, contain, or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office during normal working hours or Idaho State Communications Center after normal working hours (1-800-632-8000). If the spilled volume is above federal reportable quantities, contact the National Response Center (1-800-424-8802).
        - Coeur d'Alene Regional Office: 208-769-1422 / 877-370-0017
    d. Collect, remove, and dispose of the spilled material in a manner approved by DEQ.

Right to Appeal Final Certification

The final Section 401 Water Quality Certification may be appealed by submitting a petition to initiate a contested case, pursuant to Idaho Code § 39-107(5) and the "Rules of Administrative Procedure before the Board of Environmental Quality" (IDAPA 58.01.23), within 35 days of the date of the final certification.

Questions or comments regarding the actions taken in this certification should be directed to Tom Herron at (208) 666-4631 or at Thomas.herron@deq.idaho.gov.

Daniel Redline
Regional Administrator
Coeur d'Alene Regional Office

State of Idaho
DEPARTMENT OF WATER RESOURCES
Northern Region • 7600 N. Mineral Drive, Suite 100 • Coeur d'Alene, Idaho 83815-7763
Phone: (208) 762-2800 • Fax: (208) 762-2819 • Website: www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

August 27, 2019

IDAHO WATER RESOURCE BOARD
P O BOX 83720
BOISE, ID 83720

RE: Joint Application for Permit No. S97-20058
PREIST LAKE/PRIEST RIVER

Dear Mr. Collingwood:

The Idaho Department of Water Resources (IDWR) has reviewed your above referenced application for a permit to alter Priest Lake/Priest River and has prepared a decision as provided for in Section 42-3805, Idaho Code. The conditions set forth in this permit are intended to prevent degradation of water quality, protect fish and wildlife habitat, and protect the long-term stability of the stream channel. If you cannot meet the conditions set forth in the permit, please contact this office for further consideration.

Your project has been determined to meet the Stream Channel Alteration Rules, IDAPA 37.03.07 Minimum Standards (Rule 55). You may consider this letter a permit to construct your project according to your attached application, dated June 11, 2019 including diagrams. Project activities include a scour apron extension, , downstream rock armoring, and tainter gate extensions and strengthening. The project location is within Section 6, Township 59 North, Range 4 West, Boise Meridian, Bonner County, Idaho.

Failure to adhere to the conditions as set forth herein can result in legal action as provided for in Section 42-3809, Idaho Code. This project is subject to the following Minimum Standards, Special and General Conditions.

MINIMUM STANDARDS:

These standards are established in the Administrative Rules of the Idaho Water Resources Board; Stream Channel Alteration Rules, IDAPA 37.03.07 dated July 1, 1993 and are enclosed with this permit.

Rule 56 - Construction Procedures
Rule 57 – Riprap
Rule 62 – Culverts & Bridges
Rule 63 – Removal of Sand & Gravel Deposits

SPECIAL CONDITIONS:

[1] All construction shall be completed in accordance with the descriptions and methods on the attached application and diagrams. This office must approve any changes prior to construction.

[2] All construction activities shall be conducted in such a manner as to minimize turbidity and comply with Idaho water quality standards. Construction shall take place during low flow and in the dry to minimize turbidity and protect water quality.

[3] Permittee shall conduct work from the top of the bank. Equipment shall not enter the channel.

[4] Woody stream bank vegetation shall be protected to the extent practical during construction.

[5] Silt fencing or other erosion/sedimentation control measures shall be installed between any area of earth disturbance and the water. Erosion and sediment control measures shall be installed according to the manufacturer's specifications, during construction, and must be maintained until construction is completed and the disturbed ground is revegetated and stable.

[6] All temporary structures, excess excavated material, vegetative or construction debris shall be disposed of out of the stream channel where it cannot reenter the channel. All construction debris shall be removed from the site and disposed of properly.

[7] All fuel, oil and other hazardous materials shall be stored and equipment refueled away from the stream channel to ensure that a spill will not enter the waterway. Equipment must be free of fuel and lubricant leaks.

[8] Permittee is responsible for all work done by any contractor or sub-contractor and shall ensure any contractor who performs the work is informed of and follows all the terms and conditions of this authorization.

[9] IDWR Stream Channel Protection Specialist shall be contacted no less than 3 business days before construction begins by email northerninfo@idwr.idaho.gov or phone (208) 762-2800. Failure to do so may result in annulment of above referenced permit.

[10] This permit shall expire December 30, 2022.

GENERAL CONDITIONS:

1. **This permit does not constitute any of the following:**
   a) An easement or right-of-way to trespass or work upon property belonging to others.
   b) Other approval that may be required by Local, State or Federal Government, unless specifically stated in the special conditions above.
   c) Responsibility of the IDWR for damage to any properties due to work done.
   d) Compliance with the Federal Flood Insurance Program, FEMA regulations or approval of the local Planning and Zoning authority.

2. In accordance with Sections 55-2201 - 55-2210, Idaho Code, the applicant and/or contractors must contact Digline statewide phone number 1-800-342-1585 not less than three working days prior to the start of any excavation for this project.

3. The permit holder or operator must have a copy of this permit at the alteration site, available for inspection at all times.

4. The IDWR may cancel this permit at any time that it determines such action is necessary to minimize adverse impact on the stream channel.

Conditions and construction procedures approved under this permit may not coincide with the proposal as submitted. Failure to adhere to conditions as set forth herein can result in legal action as provided for in Section 42-3809, Idaho Code.

If you object to the decision issuing this permit with the above conditions, you have 15 days in which to notify this office in writing that you request a formal hearing on the matter. If an objection has not been received within 15 days, the decision will be final under the provisions of IDAPA 37.03.07 (Rule 70).

Please contact the Northern Region Office At (208) 762-2800 or northerninfo@idwr.idaho.gov if you have any questions regarding this matter.

Sincerely,

Douglas Jones
Northern Regional Manager

cc: Shane Slate, U.S Army Corps of Engineers, CDA Regulatory Office
Tom Herron, Idaho Department of Environmental Quality, CDA
Merritt Horsmon, Idaho Department of Fish and Game, CDA
Mike Ahmer, Idaho Department of Lands, CDA

056. CONSTRUCTION PROCEDURES (RULE 56).

01. Conformance to Procedures. Construction shall be done in accordance with the following procedures unless specific approval of other procedures has been given by the Director. When an applicant desires to proceed in a manner different from the following, such procedures should be described on the application. (7-1-93)

02. Operation of Construction Equipment. No construction equipment shall be operated below the existing water surface without specific approval from the Director except as follows: Fording the stream at one (1) location only will be permitted unless otherwise specified; however, vehicles and equipment will not be permitted to push or pull material along the streambed below the existing water level. Work below the water which is essential for preparation of culvert bedding or approved footing installations shall be permitted to the extent that it does not create unnecessary turbidity or stream channel disturbance. Frequent fording will not be permitted in areas where extensive turbidity will be created. (7-1-93)

03. Temporary Structures. Any temporary crossings, bridge supports, cofferdams, or other structures that will be needed during the period of construction shall be designed to handle high flows that could be anticipated during the construction period. All structures shall be completely removed from the stream channel at the conclusion of construction and the area shall be restored to a natural appearance. (7-1-93)

04. Minimizing Disturbance of Area. Care shall be taken to cause only the minimum necessary disturbance to the natural appearance of the area. Streambank vegetation shall be protected except where its removal is absolutely necessary for completion of the work adjacent to the stream channel. (7-1-93)

05. Disposal of Removed Materials. Any vegetation, debris, or other material removed during construction shall be disposed of at some location out of the stream channel where it cannot reenter the channel during high stream flows. (7-1-93)

06. New Cut of Fill Slopes. All new cut or fill slopes that will not be protected with some form of riprap shall be seeded with grass and planted with native vegetation to prevent erosion (7-1-93)

07. Fill Material. All fill material shall be placed and compacted in horizontal lifts except as provided for in Rule Subsection 060.05 for uncompacted dike and levee construction. Areas to be filled shall be cleared of all vegetation, debris and other materials that would be objectionable in the fill. (7-1-93)

08. Limitations on Construction Period. The Director may limit the period of construction as needed to minimize conflicts with fish migration and spawning, recreation use, and other uses. (7-1-93)

057. DUMPED ROCK RIPRAP (RULE 57).

01. Placement of Riprap. Riprap shall be placed on a granular bedding material or a compact and stable embankment. (7-1-93)

02. Sideslopes of Riprap. Sideslopes of riprap shall not be steeper than 2:1 (2' horizontal to 1' vertical) except at ends of culverts and at bridge approaches where a 1 1/2:1 sideslope is standard. (7-1-93)

03. Minimum Thickness of Riprap. The minimum thickness of the riprap layer shall equal the dimension of the largest size riprap rock used or be eighteen (18) inches, whichever is greater. When riprap will be placed below high water level, the thickness of the layer shall be fifty percent (50%) greater than specified below. (7-1-93)

04. Riprap Protection. Riprap protection must extend at least one (1) foot above the anticipated high water surface elevation in the stream. (7-1-93)

05. Rock Used for Riprap. Rock for riprap shall consist of sound, dense, durable, angular rock fragments, resistant to weathering and free from large quantities of soil, shale, and organic matter. The length of a rock shall not be more than three (3) times its width or thickness. Rounded cobbles, boulders, and streambed gravels are not acceptable as dumped riprap. (7-1-93)

06. Size and Gradation of Riprap. Riprap size and gradation are commonly determined in terms of the weight of riprap rock. The average size of riprap rock shall be at least as large as the maximum size rock that the stream is capable of moving. The maximum size of riprap rock used shall be two (2) to five (5) times larger than the average size. (7-1-93)

07. Methods Used for Determining Gradation of Riprap. There are many methods used for determining the gradation of riprap rock. One of these many acceptable methods is shown in Table 1 below the Far West States (FWS) method shown in APPENDIX A - Table 1A at the end of this chapter. (7-1-93)

GRADATION OF RIPRAP IN POUNDS		
Max. Weight of Stone required (lbs)	Min. and Max. Range in weight of Stones (lbs)	Weight Range 75 percent of Stones (lbs)
150	25 - 150	50 - 150
200	25 - 200	50 - 200
250	25 - 250	50 - 250
400	25 - 400	100 - 400

GRADATION OF RIPRAP IN POUNDS		
Max. Weight of Stone required (lbs)	Min. and Max. Range in weight of Stones (lbs)	Weight Range 75 percent of Stones (lbs)
600	25 - 600	150 - 600
800	25 - 800	200 - 800
1000	50 - 1000	250 - 1000
1300	50 - 1300	325 - 1300
1600	50 - 1600	400 - 1600
2000	75 - 2000	600 - 2000
2700	100 - 2700	800 - 2700

08. Use of Filter Material. A blanket of granular filter material or filter fabric shall be placed between the riprap layer and the bank in all cases where the bank is composed of erodible material that may be washed out from between the riprap rock. Filter material shall consist of a layer of well-graded gravel and coarse sand at least six (6) inches thick. (7-1-93)

09. Toe Protection. Some suitable form of toe protection shall be provided for riprap located on erodible streambed material. (7-1-93)

a. Various acceptable methods of providing toe protection are shown in APPENDIX B at the end of this chapter. (7-1-93)

b. In addition to the approved methods of providing toe protection as shown in APPENDIX B at the end of this chapter, any other reasonable method will be considered by the Director during review of a proposed project. (7-1-93)

10. Extension of Riprap Area. Riprap shall extend far enough upstream and downstream to reach stable areas, unless protected against undermining at ends by the method shown in APPENDIX C, Figure 3 at the end of this chapter. On extremely long riprap sections, it is recommended that similar cutoff sections be used at several intermediate points to reduce the hazard that would be created if failure of the riprap occurred at any one (1) location. (7-1-93)

11. Finished Surface. Placement shall result in a smooth, even finished surface. Compaction is not necessary. (7-1-93)

12. Placement of Riprap. The full course thickness of the riprap shall be placed in one (1) operation. Dumping riprap long distances down the bank or pushing it over the top of the bank with a dozer shall be avoided if possible. Material should be placed with a backhoe, loader, or dragline. Dumping material near its final position on the slope or dumping rock at the toe and bulldozing it up the slope is a very satisfactory method of placement, if approval is obtained for the use of equipment in the channel. (7-1-93)

13. Design Procedure. Design procedure using the Far West States (FWS) method. (7-1-93)

a. The FWS method uses a single equation to deal with variables for riprap. (7-1-93)

D75 = 3.5/CK WDS for Channel Banks

where: D75 = Size of the rock at seventy five percent (75%) is finer in gradation, in inches.

W	=	Specific weight of water, usually 62.4 lbs./cu.ft.
D	=	Depth of flow in stream, in feet in flood stage
S	=	Channel slope or gradient, in ft/ft.
C	=	A coefficient relating to curvature in the stream
K	=	A coefficient relating to steepness of bank slopes

b. The coefficient, C, is based on the ratio of the radius of curvature of the stream, (CR), to the water surface width, (WSW), so it is necessary for the user to make field determination of these values. The coefficient varies from 0.6 for a curve ratio of 4 to 6, up to 1.0 for a straight channel. If the computed ratio for a particular project is less than 4, the designer should consider some modification less than 4. (7-1-93)

(7-1-93)

CR/WSW	C
4 - 6	0.60
6 - 9	0.75
9 - 12	0.90
Straight Channel	1.00

c. The coefficient, K, ranges from 0.5 for a 1.5:1 sideslope to 0.87 for 3:1 sideslope. No values are given for steeper or flatter slopes. Slopes steeper than 1.5:1 are not recommended. If slopes flatter than 3:1 are desired, it would be conservative to use the K-value for 3:1 slopes. (7-1-93)

Bankslope	K
1.5:1	0.50
1.75:1	0.63
2.0:1	0.72
2.5:1	0.80
3.0:1	0.87

Table 1A in APPENDIX A, located at the end of this chapter.

062. CULVERTS AND BRIDGES (RULE 62).

01. Culverts and Bridges. Culverts and bridges shall be capable of carrying streamflows and shall not significantly alter conditions upstream or downstream by causing flooding, turbidity, or other problems. The appearance of such installations shall not detract from the natural surroundings of the area. (7-1-93)

02. Location of Culverts and Bridges. Culverts and bridges should be located so that a direct line of approach exists at both the entrance and exit. Abrupt bends at the entrance or exit shall not exist unless suitable erosion protection is provided. (7-1-93)

03. Ideal Gradient. The ideal gradient (bottom slope) is one which is steep enough to prevent silting but flat enough to prevent scouring due to high velocity flows. It is often advisable to make the gradient of a culvert coincide with the average streambed gradient. (7-1-93)

a. Where a culvert is installed on a slope steeper than twenty percent (20%), provisions to anchor the culvert in position will be required. Such provisions shall be included in the application and may involve the use of collars, headwall structures, etc. Smooth concrete pipe having no protruding bell joints or other irregularities shall have such anchoring provisions if the gradient exceeds ten percent (10%). (7-1-93)

04. Size of Culvert or Bridge Opening. The size of the culvert or bridge opening shall be such that it is capable of passing design flows without overtopping the streambank or causing flooding or other damage. (7-1-93)

a. Design flows shall be based upon the following minimum criteria: (7-1-93)

Drainage Area	Design Flow Frequency
Less than 50 sq. mi.	25 Years
Over 50 sq. mi. or more	50 years or greatest flow of record, whichever is more

b. For culverts and bridges located on U.S. Forest Service or other federal lands, the sizing should comply with the Forest Practices Act as adopted by the federal agencies or the Department of Lands. (7-1-93)

c. For culverts or bridges located in a community qualifying for the national flood issuance program, the minimum size culvert shall accommodate the one hundred (100) year design flow frequency. (7-1-93)

d. If the culvert or bridge design is impractical for the site, the crossing may be designed with additional flow capacity outside the actual crossing structure, provided there is no increase in the Base Flood Elevation. (NOTE: When flow data on a particular stream is unavailable, it is almost always safe to maintain the existing gradient and cross-section area present in the existing stream channel. Comparing the proposed crossing size with others upstream or downstream is also a valuable means of obtaining information regarding the size needed for a proposed crossing.) (7-1-93)

e. Minimum clearance shall be at least one (1) foot at all bridges. This may need to be increased substantially in the areas where ice passage or debris may be a problem. Minimum culvert sizes required for stream crossings: (7-1-93)

i. Eighteen (18) inch diameter for culverts up to seventy (70) feet long; (7-1-93)

ii. Twenty-four (24) inch diameter for all culverts over seventy (70) feet long. (7-1-93)

f. In streams where fish passage is of concern as determined by the director, an applicant shall comply with the following provisions and/or other approved criteria to ensure that passage will not be prevented by a proposed crossing. (7-1-93)

g. Minimum water depth shall be approximately eight (8) inches for salmon and steelhead and at least three (3) inches in all other cases. (7-1-93)

h. Maximum flow velocities for streams shall not exceed those shown in Figure 17 in APPENDIX N, located at the end of this chapter, for more than a forty-eight (48) hour period. The curve used will depend on the type of fish to be passed. (7-1-93)

i. Where it is not feasible to adjust the size or slope to obtain permissible velocities, the following precautions may be utilized to achieve the desired situation. (7-1-93)

j. Baffles downstream or inside the culvert may be utilized to increase depth and reduce velocity. Design criteria may be obtained from the Idaho Fish and Game Department. (7-1-93)

k. Where multiple openings for flow are provided, baffles or other measures used in one (1) opening only shall be adequate provided that the opening is designed to carry the main flow during low-flow periods. (7-1-93)

05. Construction of Crossings. When crossings are constructed in erodible material, upstream and downstream ends shall be protected from erosive damage through the use of such methods as dumped rock riprap, headwall structures, etc., and such protection shall extend below the erodible streambed and into the banks at least two (2) feet unless some other provisions are made to prevent undermining. (7-1-93)

a. Where fish passage must be provided, upstream drops at the entrance to a culvert will not be permitted and a maximum drop of one (1) foot will be permitted at the downstream end if an adequate jumping pool is maintained below the drop. (7-1-93)

b. Downstream control structures such as are shown in Figure 18 in APPENDIX O, located at the end of this chapter, can be used to reduce downstream erosion and improve fish passage. They may be constructed with gabions, pilings and rock drop structures. (7-1-93)

06. Multiple Openings. Where a multiple opening will consist of two (2) or more separate culvert structures, they shall be spaced far enough apart to allow proper compaction of the fill between the individual structures. The minimum spacing in all situations shall be one (1) foot. In areas where fish passage must be provided, only one (1) opening shall be constructed to carry all low flows. Low flow baffles may be required to facilitate fish passage. (7-1-93)

07. Areas to be Filled. All areas to be filled shall be cleared of vegetation, topsoil, and other unsuitable material prior to placing fill. Material cleared from the site shall be disposed of above the high water line of the stream. Fill material shall be reasonably well-graded and compacted and shall not contain large quantities of silt, sand, organic matter, or debris. In locations where silty or sandy material must be utilized for fill material, it will be necessary to construct impervious sections both upstream and downstream to prevent the erodible sand or silt from being carried away (see Figure 19, APPENDIX P, located at the end of this chapter), Sideslopes for fills shall not exceed one and one half to one (1.5:1). Minimum cover over all culvert pipes and arches shall be one (1) foot. (7-1-93)

08. Installation of Pipe and Arch Culvert. All pipe and arch culverts shall be installed in accordance with manufacturer's recommendations. (7-1-93)

a. The culvert shall be designed so that headwaters will not rise above the top of the culvert entrance unless a headworks is provided. (7-1-93)

063. REMOVAL OF SAND AND GRAVEL DEPOSITS (RULE 63).

01. Removal of Sand and Gravel. This work consists of removal of sand and gravel deposits from within a stream channel. The following conditions shall be adhered to unless other methods have been specified in detail on the application and approved by the Director. (7-1-93)

02. Removal Below Water Surface. Sand and gravel must not be removed below the water surface existing at the time of the work. Where work involves clearing a new channel for flow, removal of material below water level will be permitted to allow this flow to occur; however, this must not be done until all other work in the new channel has been completed. (7-1-93)

03. Buffer Zone. A buffer zone of undisturbed streambed material at least five (5) feet in width or as otherwise specified by the Director shall be maintained between the work area and the existing stream. The applicant shall exercise reasonable precautions to ensure that turbidity is kept to a minimum and does not exceed state water quality standards. (7-1-93)

04. Movement of Equipment. Equipment may cross the existing stream in one (1) location only, but shall not push or pull material along the streambed while crossing the existing stream. (7-1-93)

05. Disturbing Natural Appearance of Area. Work must be done in a manner that will least disturb the natural appearance of the area. Sand and gravel shall be removed in a manner that will not leave unsightly pits or other completely unnatural features at the conclusion of the project. (7-1-93)

APPENDIX B – GEOTECHNICAL REPORT

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1. Outlet Dam Geotechnical Report

Geotechnical Data Report

Priest Lake Outlet Dam
Bonner County, Idaho

for
Mott MacDonald

May 7, 2020

GeoEngineers
Earth Science + Technology

Geotechnical Data Report

Priest Lake Outlet Dam
Bonner County, Idaho

for
Mott MacDonald

May 7, 2020

GeoEngineers

523 East Second Avenue
Spokane, Washington
509.363.3125

Geotechnical Data Report

Priest Lake Outlet Dam
Bonner County, Idaho

File No. 22593-001-02

May 7, 2020

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5/7/2020

SST:LJS:tt

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1.0 INTRODUCTION

This data report presents the subsurface information used in design of the Priest Lake Outlet Dam project in Bonner County, Idaho. The results of our geotechnical analysis and design recommendations are provided in a 90-percent (April 27, 2020). The Outlet Dam is located at the south end of Priest Lake in Bonner County, Idaho as shown in the Vicinity Map, Figure 1.

The existing dam was built around 1978 and consists of an approximate 225-foot-long, cast-in-place concrete gravity structure at the outlet of the lake. Lake levels and downstream flows are managed via a series of tainter gates that can be operated independently to adjust lake levels and outlet flows. A sheet pile cut-off wall was installed along the upstream toe of the dam, extending about 20 feet below the dam. The south abutment of the dam is located adjacent to a steep undisturbed slope. The north abutment is located along a relatively flat bench. Several residential properties are located to the north and east of the north abutment. The approximate location of the Outlet Dam relative to existing site features is shown in the Site Plan, Figure 2.

2.0 SITE CONDITIONS

2.1. Geologic Setting

Priest Lake is situated within the Priest River crystalline complex, which consists of mountainous terrain west of the Purcell Trench of north Idaho and east of the Okanogan Highlands of north-central Washington. The north-south trending mountain valley that contains Priest Lake is drained by the Priest River, which generally flows south to its confluence with the Pend Oreille River near Priest River, Idaho.

Priest Lake roughly trends north to south and is approximately 23 miles in length. It consists of upper and lower lake portions connected by a narrow waterway known as the Thorofare. Priest Lake is about 2,442 +/- feet in elevation (relative to the North American Vertical Datum [NAVD] 1988 datum). Note that all elevations in this report are referenced to the NAVD 1988 datum unless stated otherwise. Elevation increases sharply to both the east and west of Priest Lake, rising to more than 6,000 feet in elevation along adjacent ridges and mountain crests.

The Priest River crystalline complex forms the outermost portion of North American basement rock, and therefore sits slightly east of the pre-Permian (older than about 299 million years ago [MA]) edge of the North American craton and east of a zone of exotic terrains that accreted to the North American margin during a period of convergence in the Jurassic (about 145 to 201 MA), Triassic (about 201 to 252 MA) and Permian (about 252 to 299 MA) periods (Rehrig et al. 1987). The period of compression (and associated thrust faulting) was followed by a period of regional east-west extension during the Cretaceous (about 66 to 145 MA) and early Tertiary (about 2.5 to 66 MA) periods. Crustal extension was accompanied by low-angle detachment faulting that resulted in the formation of the Priest River crystalline complex (Rehrig et al. 1987), as well as the Okanogan and Kettle Metamorphic Core Complexes to the west. Priest Lake is situated between two of these detachment faults, the Newport Fault to the west and the Purcell Trench fault system to the east (Rehrig et al. 1987; Doughty and Price 1999).

Basement rocks near Priest Lake largely consist of uplifted Precambrian (greater than about 570 MA) metamorphic rocks of the Prichard Formation of the lower Belt Supergroup. These rocks primarily consist

of argillite, siltite, and quartzite and were intruded by granitic rocks during the Cenozoic (less than about 65 MA and Cretaceous (about 65 to 146 MA).

The topography of the area was modified by Pleistocene (about 11,700 years to 2.5 MA) glacial and interglacial processes, which scoured the basin that formed Priest Lake and resulted in the deposition of abundant sedimentary deposits in lowland areas surrounding Priest Lake. During the height of the most recent glaciation (about 15,000 years ago) much of the Pend Oreille River valley and Purcell Trench was covered by the Pend Oreille lobe and Purcell Trench Lobe, respectively, of the Cordilleran ice sheet (Kahle et al. 2003). Associated deposits frequently consist of till (unsorted, unstratified mixtures of clay, silt, sand and gravel deposited at the glacier base), glaciolacustrine sediment (clay and silt deposited within glacial lake environments), and outwash deposits (stratified sand and gravel deposited by glacial meltwater). Where overridden by alpine or continental glaciers, these sediments can be dense to very dense.

Recent alluvial deposits generally are associated with channel and overbank deposits from the modern Priest River and its tributaries. These sediments generally consist of stratified silt, sand and gravel, with minor clay.

2.2. Surface Conditions

The Outlet Dam is located entirely within the channel of the Priest River as it exits Priest Lake. The channel is about 200 feet wide and flows to the west. Plans of the structure are presented in Appendix B. The north abutment of the Outlet Dam connects to a relatively flat area that, based on surface topography, appears to be an alluvial plain. The south abutment of the Outlet Dam connects to an existing relatively steep slope along the riverbank. About 800 feet downstream from the dam, the high canyon walls narrow as Priest River turns and flows south.

There is evidence of recent sloughs on the slope near the south abutment. During a site visit in August 2018, we observed a larger slough downstream of the dam. This slough appeared to be shallow. Debris consisted of weathered glacial soil and organic matter. The soil exposed by the slough consisted of relatively firm and intact fine-grained glacial till. We understand that a smaller slough also occurred just upstream of the south dam abutment. This slough was repaired with smaller (6-inch minus) angular rock. Some minor sloughing was also observed upstream of the north abutment. This sloughing was limited and appeared to be related to foot traffic from the bank down to the river.

We noted that material exposed within the river channel consisted of gravel and cobbles at the surface with some sand in isolated bars. There are some larger rocks placed at the toe of the dam for scour protection. There are also larger angular non-native rocks within the channel downstream of the dam. We understand that these rocks were riprap placed at the downstream toe of the dam as part of the dam construction; and were dislodged and deposited in their current location during a scour event that occurred in 1979, shortly after the dam was first put into operation. The scour hole that was created by this event appears to be filled, or partially filled, with large riprap.

2.3. Subsurface Conditions

2.3.1. Exploration Summary

Our understanding of the subsurface conditions is based on our review of data from previous geotechnical studies, as well as one recently completed boring for the current project. More detail about our exploration

program is provided in Appendix A. The approximate locations of our explorations are shown on the Site Plan, Figure 2.

2.3.1.1. Previous Explorations

Subsurface explorations at the site were originally completed around 1977 as part of design of the current dam. Three borings drill hole No. 1 (DH No. 1), drill hole No. 2 (DH No. 2), and drill hole No. 4 (DH No. 4), were advanced to depths of about 50 feet below ground surface (bgs). No drill hole No. 3 was reported. The approximate locations of the borings are presented on Sheet No. 97-2020-1. DH No. 1 was drilled near the north dam abutment, DH No. 2 was drilled near the south dam abutment, and DH No. 4 was drilled in the middle of the river channel about 130 feet downstream from the dam. Details regarding the drilling method were not available. Results of laboratory testing of soil samples (if conducted) also were not available. Logs of the borings are presented on Sheet No. 97-2020-3 of the 1978 plan set for the existing dam. The approximate locations of the previous borings are shown in Figure 2. Copies of the relevant plan sheets are included in Appendix B.

2.3.1.2. Recent Explorations

Subsurface conditions were also explored by GeoEngineers on September 25, 2018 by drilling one boring (B-1) to a depth of about 101½ feet bgs near the north dam abutment. The approximate location of boring B-1 relative to existing site features is shown in Figure 2.

Representative soil samples from boring B-1 were returned to our laboratory for examination and testing. Detailed descriptions of our site exploration and laboratory testing programs for the site along with the exploration log and laboratory test results are presented in Appendix A.

2.3.1.3. Exploration Elevations

Based on the topographic details included in plan sheet 97-2020-3, the approximate elevations of the previous borings are presented in Table 1. Recent boring B-1 was surveyed in the field and the ground surface elevation at the boring location also is presented in Table 1.

TABLE 1. BORING AND DAM ELEVATION SUMMARY

Location	Estimated Elevation (ft) (Local Datum/Gauge Height)	Estimated Elevation (ft) (NGVD 1929 datum)	Estimated Elevation (ft) (NAVD 1988 datum)
B-1	7.7	2,442.3[1]	2,446.3
DH No. 1	-3	2,432[2]	2,436
DH No. 2	-3	2,432[2]	2,436
DH No. 4	0	2,435[2]	2,439
Top of Dam (walkway)	7.90	2,442.54[1]	2446.51
Current Summer Lake Level	3.0	2,437.64	2,441.61
Proposed Summer Lake Level	3.5	2,438.14	2,442.11
Current Top of Gate	3.15	2,437.79[2]	2441.76

Location	Estimated Elevation (ft) (Local Datum/Gauge Height)	Estimated Elevation (ft) (NGVD 1929 datum)	Estimated Elevation (ft) (NAVD 1988 datum)
Proposed Top of Gate	3.65	2,438.29	2,442.26
Bottom of Dam	-7.85	2,426.79[2]	2430.76

Notes:

[1] Based on survey of boring location referenced to site brass benchmark (see Appendix A for details).

[2] Based on the assumption that local ground surface elevations presented in the 1978 plans are referenced to the gauge datum at the dam of 2,434.64 (NGVD 1929) = 0.0 (Lake Datum). Approximate ground surface elevations were rounded to the nearest foot.

2.3.2. Observed and Reported Soil Conditions

The 1978 boring logs indicate that subsurface conditions near the dam consist of interbedded layers of soft to medium stiff clay and silt, and loose silty sand. Specifically, the log for boring DH No. 2 indicates an approximate 10-foot-thick layer of silty fine sand from a depth of about 7 to 17 feet bgs (about Elevation 2,429 to 2,419). A lower layer of silty sand also was identified in each of the previous borings between depths of about 30 to 45 feet bgs (approximate Elevation 2,406 to 2,391), ranging in thickness from about 5 feet in DH No. 1 to about 10 feet in DH No. 2 and DH No. 4.

The results of our recent boring indicate that below an approximate 4½-foot-thick layer of surficial gravel fill, subsurface conditions at the location of boring B-1 consist predominantly of soft to very stiff non-plastic silt with variable sand content. Zones of lean clay were encountered between a depth of about 20 to 24 feet bgs, 60 to 73 feet bgs and 84 to 94 feet bgs.

We did not encounter any interbedded layers of sand as were reported in the previous explorations. However, using visual-manual methods in the field, some of the silt samples were initially characterized as silty sand, as some individual silt particles were distinguishable by the naked eye. Based on these observations of the soil samples, it could be possible that some of these samples were mischaracterized as containing more sand than they actually do. It is unclear from our review of the available historic information if laboratory analysis was used to verify the soil classifications presented on the previous logs. Therefore, it is also unclear if the apparent difference in observed and reported soil conditions is based on an actual difference in the soil conditions or from differences in observation and sampling methods.

Alluvium is often variable and can contain interbedded layers of different materials including relatively thin or thick layers of fine-grained soil (silts and clays) interbedded with sand layers. Although not observed or reported in the subsurface explorations, alluvium can also contain layers of gravel or coarse sands.

Glacial soil was not observed or reported in the explorations. Our geologic reconnaissance of surface geology indicates that the hillside near the south abutment likely consists of dense glacial soils. We anticipate that glacial soils are present at depth below the alluvium near the south abutment although the depth and full extent are unknown.

2.3.3. Groundwater Conditions

We encountered groundwater in boring B-1 at a depth of about 15½ feet bgs at the time of drilling (about Elevation 2,430.8 feet). Groundwater elevations observed at the time of drilling might not reflect static groundwater conditions due to soil disturbance caused by the drilling process, and the time required to establish static conditions in fine-grained soil. We surveyed the lake level at the time of drilling at about Elevation 2,441.9, and the river level just downstream of the dam at Elevation 2,435.7.

Groundwater levels are expected to fluctuate as a result of season, precipitation, and water levels within Priest Lake. During the recreational season (late June through September) the lake level is maintained at a gauge elevation of about 3 feet (approximately Elevation 2441.6 +/-). Seasonal lake levels typically fluctuate between a gauge height of less than 1 foot between November and February; increasing to about 3 to 5 feet during spring runoff, before maintaining relatively constant recreation season levels.

3.0 LIMITATIONS

We have prepared this report for the exclusive use of Mott MacDonald, Inc. Mott MacDonald may distribute copies of this report to Idaho Water Resources Board (IWRB), IWRB's authorized staff, and regulatory agencies, as may be required for the project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty or other conditions, express or implied, should be understood.

Please refer to Appendix C titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

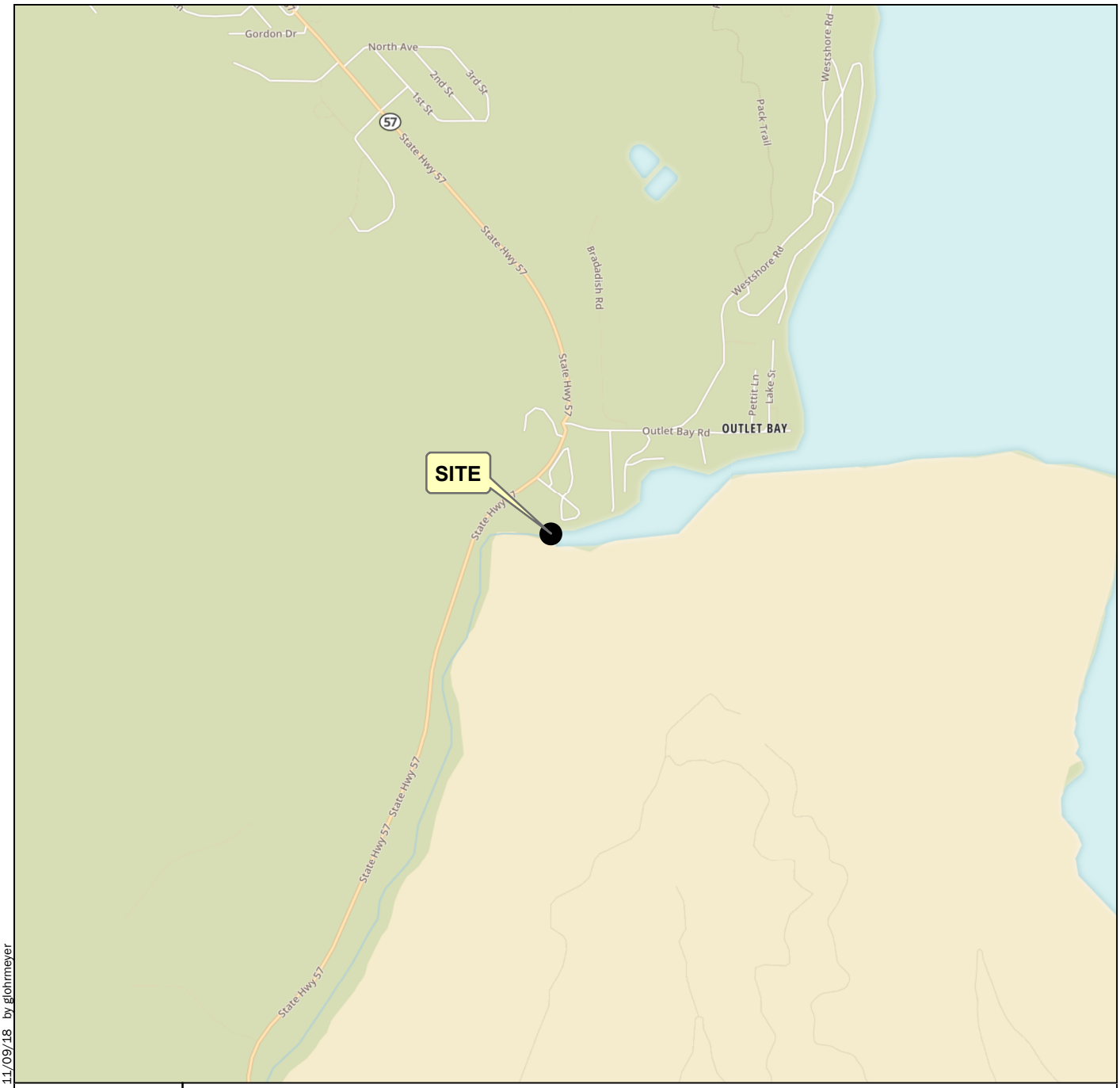
4.0 REFERENCES

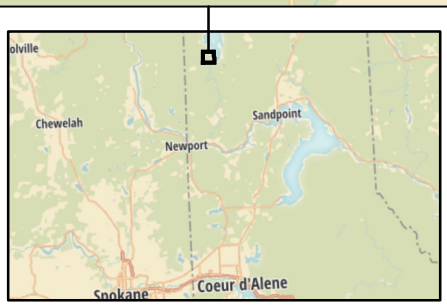
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Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 11N

Vicinity Map

Priest Lake Outlet Dam
Bonner County, Idaho

GeoEngineers

Figure 1

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Legend

Boring Number and Approximate Location (GeoEngineers 2018)

Boring Number and Approximate Location (IDWR 1977)

50 0 50

Feet

N
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Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 UTM Zone 11N

Site Plan

Priest Lake Outlet Dam
Bonner County, Idaho

GeoEngineers

Figure 2

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APPENDIX A
Field Explorations and Laboratory Testing

APPENDIX A
FIELD EXPLORATIONS AND LABORATORY TESTING

Field Explorations

Soil and groundwater conditions at the Priest Lake Dam were explored on September 25, 2018, by drilling one boring (B-1) at the approximate locations shown on the Site Plan, Figure 2. The boring was advanced to depth of about 101½ feet below ground surface (bgs) using a truck-mounted, CME-75 drill rig under subcontract to GeoEngineers. The boring was initially advanced to a depth of about 20 feet bgs using hollow-stem auger drilling methods. After advancing the boring below the groundwater table, the auger casing was left in place and the boring was advanced to its final depth using mud rotary drilling methods.

Samples of soil encountered in the boring were obtained at approximate 5-foot-depth intervals using a 2-inch, outside-diameter, standard split-spoon sampler. The sampler was driven into the soil using a 140-pound automatic hammer, falling 30 inches on each blow. The rated hammer efficiency as provided by the driller was 74 percent. The number of blows required to drive the sampler each of three, 6-inch increments of penetration were recorded in the field. The blow counts for the standard split-spoon sampler represent the ASTM International (ASTM) D 1586-08A Standard Penetration Test (SPT) N-value.

The boring was continuously monitored by our field engineer who examined and classified the soil encountered, maintained a detailed log of the exploration showing stratigraphic changes and other pertinent information, obtained representative soil samples, and observed groundwater conditions. Soil encountered in the explorations was classified in the field in general accordance with ASTM D 2488, the Standard Practice for the Classification of Soils (Visual-Manual Procedure), which is described in Key to Exploration Logs, Figure A-1. A log of the boring is presented in Log of Boring, Figure A-2. The log is based on interpretation of the field and laboratory data, and indicates the depth at which subsurface materials or their characteristics change, although these changes might actually be gradual.

The exploration location was selected based on coordination with Mott MacDonald. The boring location was subsequently measured in the field by taping from existing site features. The boring location also was recorded in the field using a hand-held global positioning system (GPS) device. The ground surface elevation was measured in the field by GeoEngineers field engineer using an optical level. An existing site benchmark was used as the elevation reference. The benchmark was labeled “IDWR 1979” and had an elevation of “2449.66 FT M.S.L” stamped on it. We assume the elevation is referenced to the NGVD 1929 vertical datum. Exploration locations and elevations should be considered accurate to the degree implied by the method used.

Laboratory Testing

Soil samples obtained from the boring were returned to our laboratory for further examination and testing. Representative soil samples were selected for laboratory tests to evaluate geotechnical engineering characteristics of the site soil and to confirm or revise our field classification. The laboratory testing program was completed in general accordance with applicable ASTM standards and is summarized in Table A-1, Summary of Laboratory Testing.

TABLE A-1. SUMMARY OF LABORATORY TESTING

Standard Test Method for:	Test Method Designation	Total Tests Performed	Results Location
Laboratory Determination of Water (Moisture) Content of Soil	ASTM D 2216	11	Presented on the boring log "Moisture Content, %" column at respective sample depths.
Laboratory grain-size analysis	ASTM D 422	2	Presented in Figure A-3. Moisture content and percent passing the No. 200 sieve also presented on the boring log "Fines Content" column at respective sample depths.
Percent Passing the U.S. No. 200 Sieve	ASTM D 1140	7	Presented on the boring log "Fines Content" column at respective sample depths.
Atterberg Limits Determinations	ASTM D 4318	8	Presented in Figures A-4 and A-5. Liquid limit and plasticity index also presented on the log "Remarks" column at respective sample depths.
Ductile Iron Pipe Research Association (DIPRA) 10 Point Soil Evaluation Procedure	ANSI/ANSW C105/A21.5	5	Presented in Figure A-6.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blow count is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

GeoEngineers

Figure A-1

Rev 06/2017

Drilled Start 9/25/2018 End 9/25/2018	Total Depth (ft) 101.5	Logged By JJB Checked By DRL	Driller Haztech	Drilling Method Hollow-stem Auger/Mud Rotary	
Surface Elevation (ft) 2442.3 Vertical Datum NGVD29	Hammer Data Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment Truck Mounted CME-75			
Easting (X) 2344840 Northing (Y) 249055	System Datum ID State Plane West NAD83	See "Remarks" section for groundwater observed			

Notes: Lat = 48.4907°, Long = -116.904° (WGS84). Hammer efficiency = 74%

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
2440	0	8	23		1		TS	Approximately 4 inches of brown silty fine to medium sand with organic matter (roots) and occasional cobbles (medium dense, moist) (topsoil)			Started boring using hollow-stem auger drilling method
							GM	Brown fine to coarse gravel with silt, sand and cobbles (medium dense, moist) (fill)			
2435	5	6	4		2		ML	Gray sandy silt with gravel and occasional cobbles (soft to medium stiff, moist) (fill?)			
2430	10	4	7		3						
		8	5		4		ML	Gray silt (soft to medium stiff, wet)			
2425	15	16	4		5 AL; %F				44.6	95	Non-plastic Groundwater at 15½ feet below ground surface during drilling
		0			6						
2420	20	14	5		7 AL, SA		CL	Gray lean clay (medium stiff, wet)	34.6	97	LL = 32; PI = 9 Switched to mud rotary drilling at 20 feet below ground surface
							ML	Gray silt with sand (soft, wet)			
2415	25	18	2		8 AL; %F				38.6	79	Non-plastic
		24			9						
2410	30	2	6 *		10		ML	Gray silt (soft, wet)			* Sampler on gravel, blowcount overstated
		18	2		11 AL; %F				38.9	99	Non-plastic
	35										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

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Log of Boring B-1

GeoEngineers

Project: Priest Lake Dam and Thorofare Modifications
Project Location: Bonner County, Idaho
Project Number: 22593-001-01

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	35	18	6		12 %F			Becomes medium stiff to stiff	38.1	100	
2405											
	40	16	9		13 AL, SA				38.6	97	Non-plastic
2400							ML	Gray silt with sand (very stiff, wet)			
	45	12	20		14 %F				34.1	72	
2395							ML	Gray sandy silt (stiff to very stiff, wet)			
	50	15	18		15 AL; %F				33.4	63	Non-plastic
2390											
	55	16	11		16						
2385											
	60	14	21		17		ML/CL	Gray silt with clay lenses (very stiff, wet)			
2380											
	65	15	14		18						
2375							CL	Gray lean clay (stiff, wet)			
	70	18	10		19 AL				58.7		LL = 36; PI = 22
2370							ML	Gray silt (very stiff, wet)			
	75	17	20		20 %F				37.5	88	

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Log of Boring B-1 (continued)

GeoEngineers

Project: Priest Lake Dam and Thorofare Modifications
Project Location: Bonner County, Idaho
Project Number: 22593-001-01

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
2365										
	80	19	8	21						
2360						ML/CL	Gray silt with clay lenses (very stiff, wet)			
	85	16	27	22						
2355						CL	Gray lean clay (stiff, wet)			
	90	22	9	23 / AL				42.5		LL = 42; PI = 19
2350						ML	Gray silt (very stiff, wet)			
	95	17	23	24						
2345						ML	Gray silt with sand (very stiff, wet)			
	100	12	32	25						

Date:11/13/18 Path:\\GEOENGINEERS.COM\WAN\PROJECTS\22\22593001\GINT\225930010 1.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEIB_GEOTECH_STANDARD_%F_NO_GW

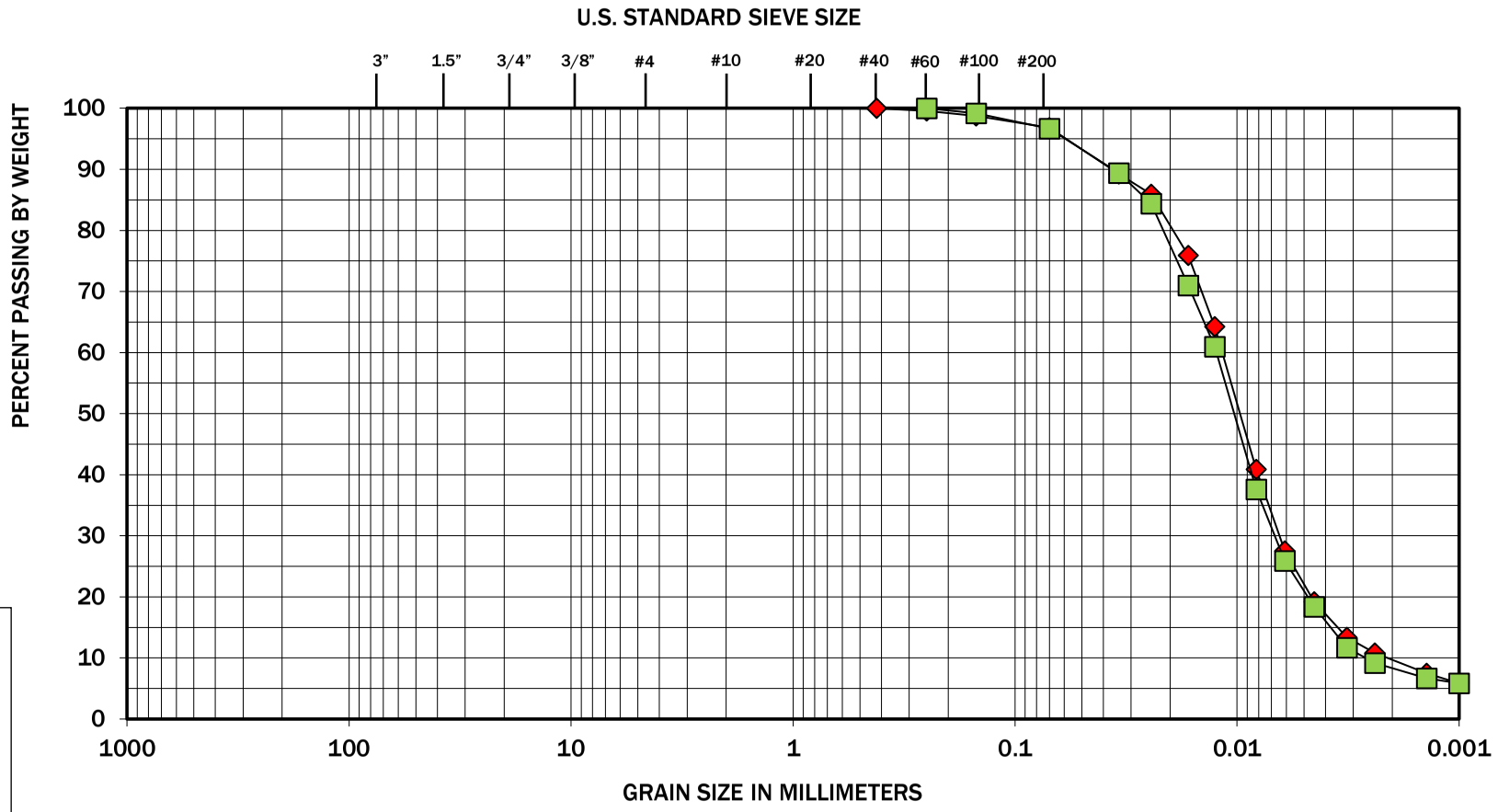
Log of Boring B-1 (continued)

GeoEngineers

Project: Priest Lake Dam and Thorofare Modifications
Project Location: Bonner County, Idaho
Project Number: 22593-001-01

Figure A-2
Sheet 3 of 3

File No. 22593-001-01 Date Exported: 10/09/2018



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	B-1	20	35	Silt
■	B-1	40	39	Silt

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The grain size analysis results were obtained in general accordance with ASTM D 6913.

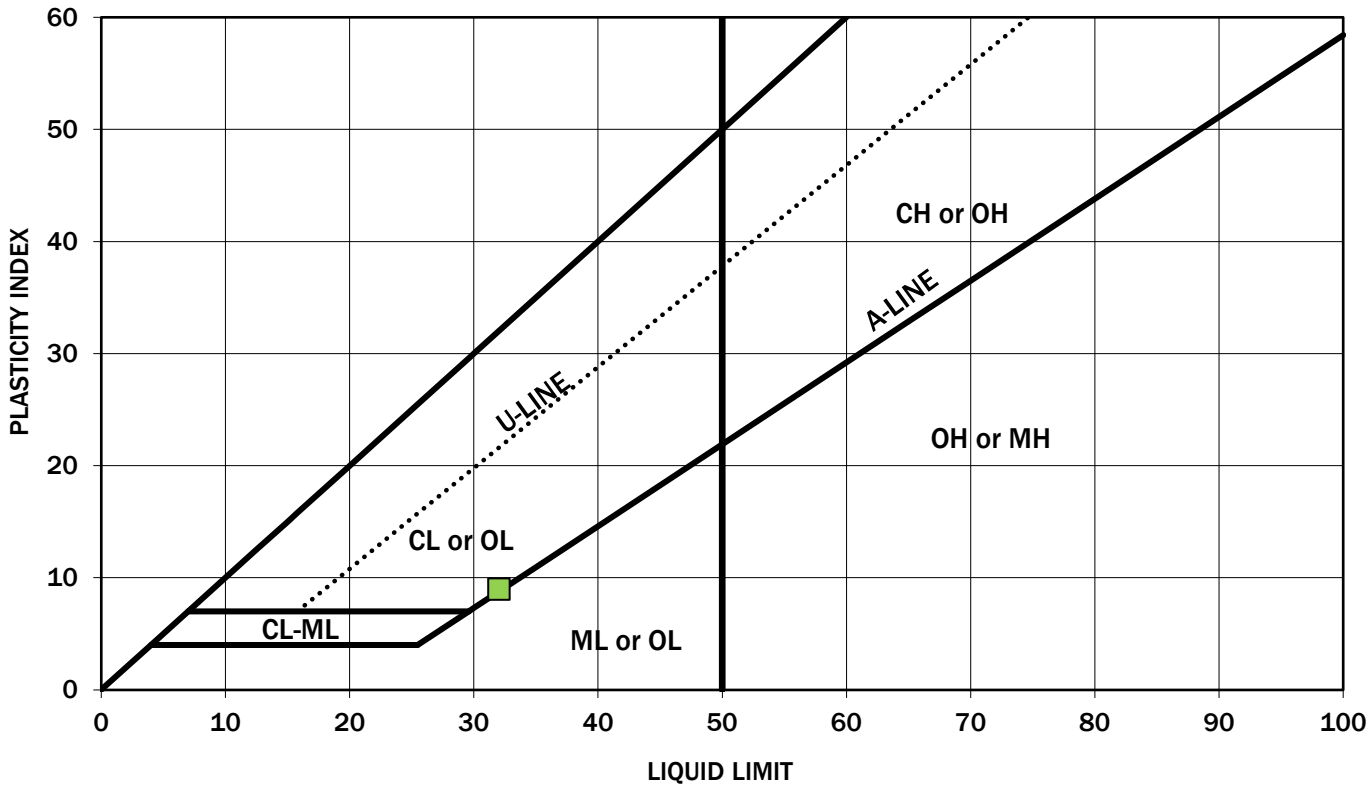
GeoEngineers

Figure A-3

Priest Lake Dam and Thorofare Modifications
Bonner County, Idaho

Sieve Analysis Results

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆	B-1	15	45	n/a	n/a	Nonplastic (NP)
■	B-1	20	35	32	9	Lean Clay (CL)
▲	B-1	25	39	n/a	n/a	Nonplastic (NP)
●	B-1	32	39	n/a	n/a	Nonplastic (NP)

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The liquid limit and plasticity index were obtained in general accordance with ASTM D 4318.

Atterberg Limits Test Results

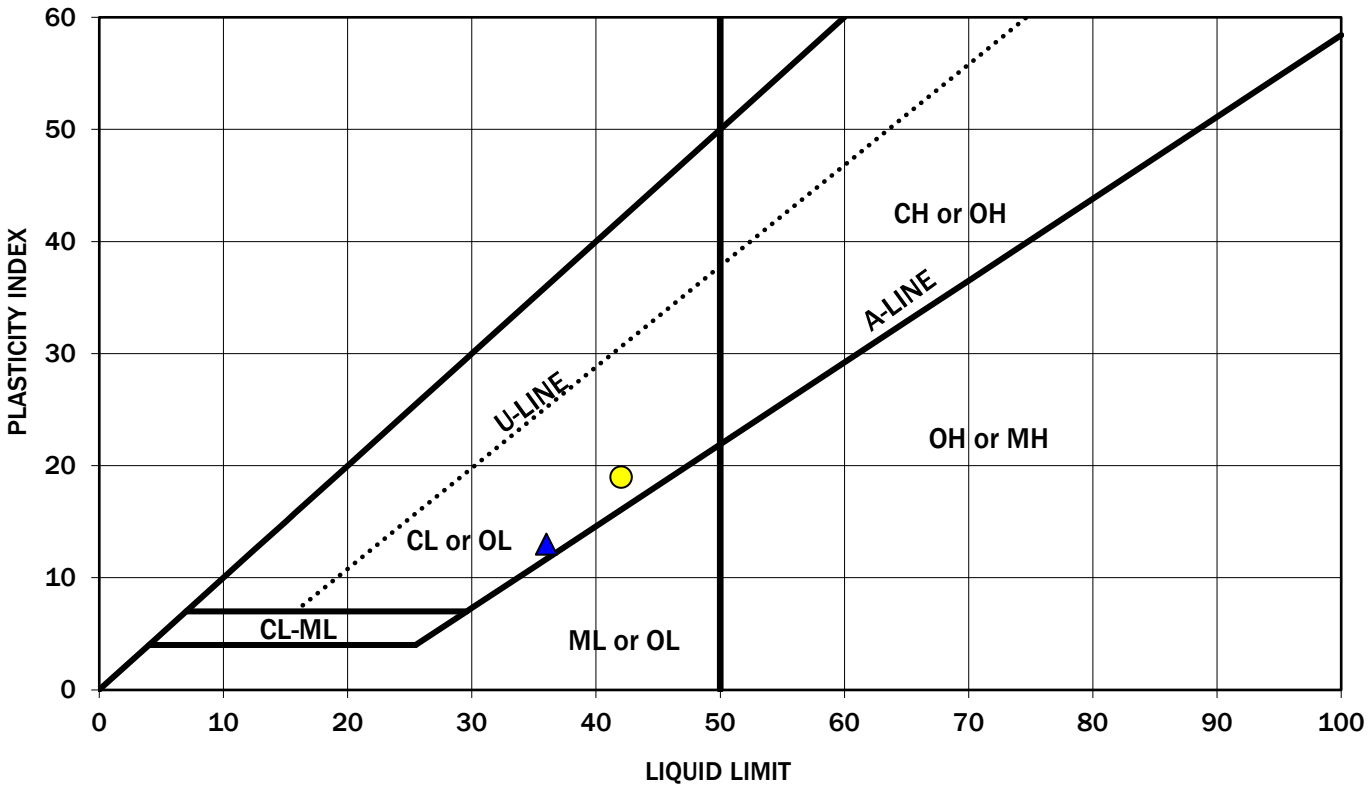
Priest Lake Dam and Thorofare Modifications
Bonner County, Idaho

GeoEngineers

Figure A-4

File No. 22593-001-01 Date Exported: 10/09/2018

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆	B-1	40	39	n/a	n/a	Nonplastic (NP)
■	B-1	50	33	n/a	n/a	Nonplastic (NP)
▲	B-1	70	59	36	13	Lean clay (CL)
●	B-1	90	43	42	19	Lean clay (CL)

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The liquid limit and plasticity index were obtained in general accordance with ASTM D 4318.

Atterberg Limits Test Results

Priest Lake Dam and Thorofare Modifications
Bonner County, Idaho

GeoEngineers

Figure A-5

File No. 22593-001-01 Date Exported: 10/08/2018

Job Name:	**Priest Lake Dam**	Job #:	**22593-001-01**	
Date:	**1/4/19**	Tested by:	MLC	
Boring #:	B-1			DIPRA Pts.
Sample #:	5	Resistivity :	4800	0
Depth:	15-16.5	pH :	8.9	3
Soil Description:	Silt (ML)	Redox Potential :	163.9	0
		Sulfides :	Negative	0
		Moisture :	Poor	2
		Total DIPRA Points:		**5**
Boring #:	B-1			DIPRA Pts.
Sample #:	7	Resistivity :	5100	0
Depth:	20-21.5	pH :	8.4	0
Soil Description:	Silt (ML)	Redox Potential :	234.3	0
		Sulfides :	Negative	0
		Moisture :	Poor	2
		Total DIPRA Points:		**2**
Boring #:	B-1			DIPRA Pts.
Sample #:	8	Resistivity :	5400	0
Depth:	25-26.5	pH :	8.2	0
Soil Description:	Silt (ML)	Redox Potential :	237.6	0
		Sulfides :	Negative	0
		Moisture :	Poor	2
		Total DIPRA Points:		**2**
Boring #:	B-1			DIPRA Pts.
Sample #:	11	Resistivity :	5200	0
Depth:	31.5-33	pH :	8.1	0
Soil Description:	Silt (ML)	Redox Potential :	261.8	0
		Sulfides :	Negative	0
		Moisture :	Poor	2
		Total DIPRA Points:		**2**
Boring #:	B-1			DIPRA Pts.
Sample #:	12	Resistivity :	6000	0
Depth:	35-36.5	pH :	8.1	0
Soil Description:	Silt (ML)	Redox Potential :	288.2	0
		Sulfides :	Negative	0
		Moisture :	Poor	2
		Total DIPRA Points:		**2**
Boring #:				DIPRA Pts.
Sample #:		Resistivity :		
Depth:		pH :		
Soil Description:		Redox Potential :		
		Sulfides :		
		Moisture :		
		Total DIPRA Points:		

DIPRA Test Results

Priest Lake Dam and Thorofare Modifications
Bonner County, Idaho

GeoEngineers

Figure A-6

22593-001-01 Date Exported: 01/29/19

APPENDIX B
1978 Plans for Existing Dam

IDAHO DEPARTMENT OF WATER RESOURCES

BOISE, IDAHO

1978

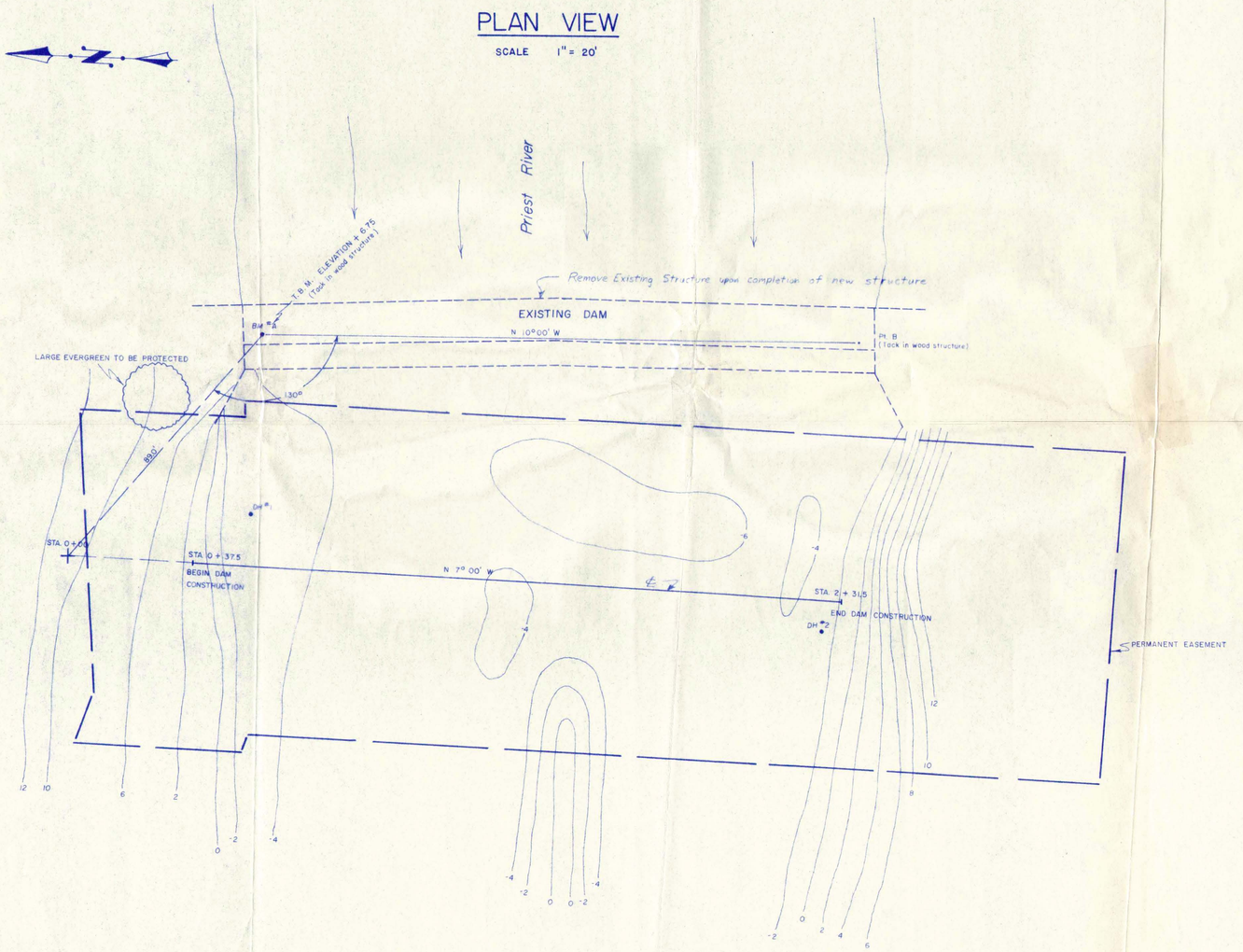
PLANS FOR REPLACEMENT OF CONTROL STRUCTURE

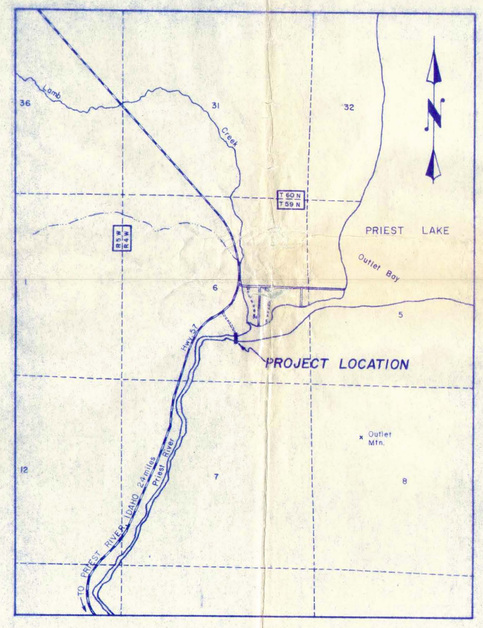
PRIEST LAKE OUTLET

BONNER COUNTY, IDAHO

PLAN VIEW

SCALE 1" = 20'





PROJECT LOCATION MAP

SCALE 1" = 2000'

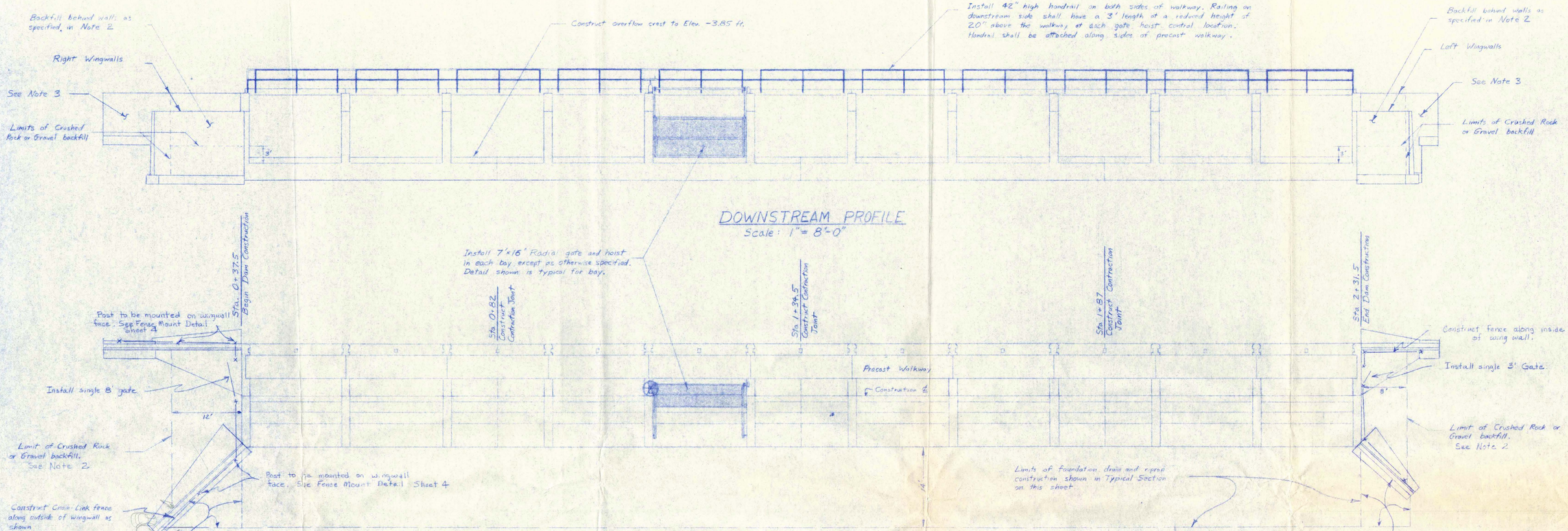
RECEIVED
JUL 23 1991
Water Appropriation
Boise, Idaho

3/20/78

11-3-78
William R. Gratton

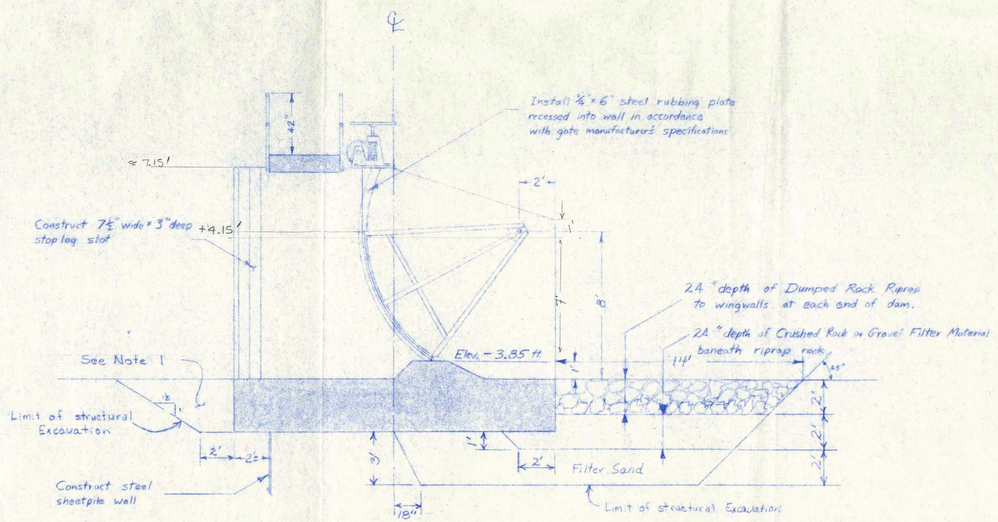
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DATE: May 1978		REVISED
PRIEST LAKE OUTLET — TITLE PAGE		
97-2020		DRAWING NUMBER 97-2020-1

24X36 PRINTED ON NO. 1000H CLEARPRINT



DOWNSTREAM PROFILE
Scale: 1" = 8'-0"

PLAN VIEW
Scale: 1" = 8'-0"



TYPICAL SECTION
Scale: 1" = 4'-0"

NOTES

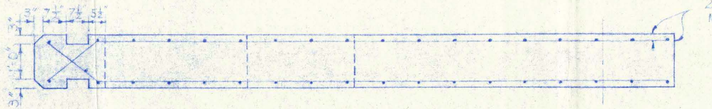
1. Place compacted backfill, Class II compaction.
2. Place compacted backfill with no more than 5% passing a No. 200 sieve above level of crushed rock or gravel to top of wingwalls. Class I compaction. Limits of fill extend vertically from crushed rock or gravel as shown
3. Place Class I compacted impervious backfill behind walls near abutment and along water side of upstream walls.

APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/20/78
DATE ADMINISTRATOR, RESOURCES ADMIN. DIVISION

REGISTERED PROFESSIONAL ENGINEER
17-3-78
William R. Gravatt
STATE OF IDAHO

IDAHO DEPARTMENT OF WATER RESOURCES		
SCALE: as shown	APPROVED BY: W. Gravatt	DRAWN BY WG JB
DATE: 17 Mar 1978		REVISED
PRIEST LAKE OUTLET —— PLAN & PROFILE		
		DRAWING NUMBER 97-2020-2

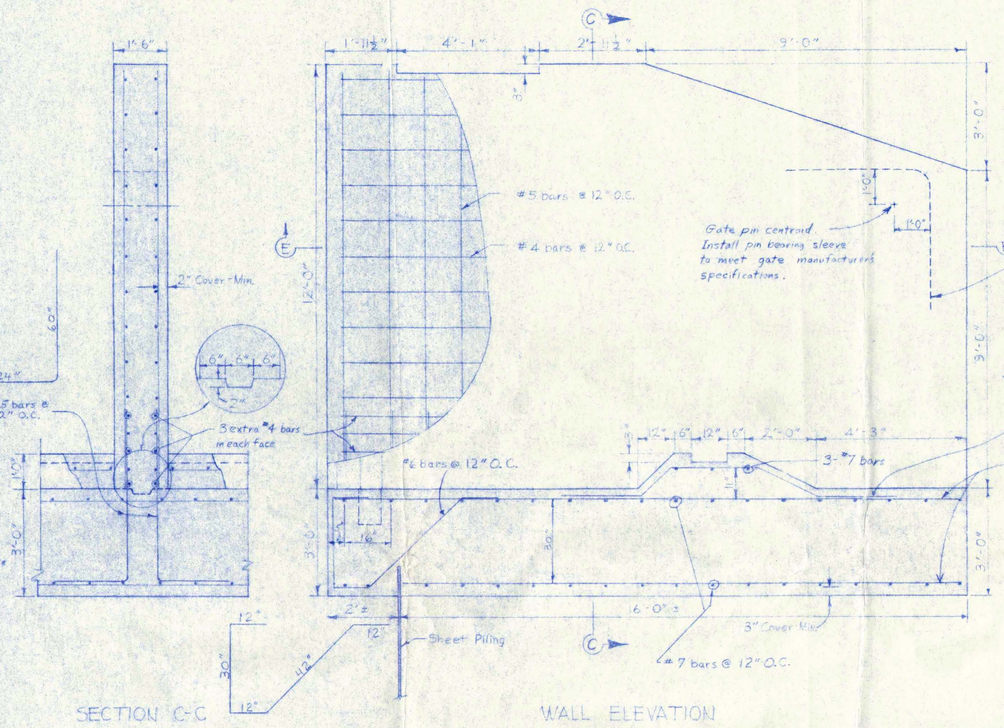
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SECTION E-E



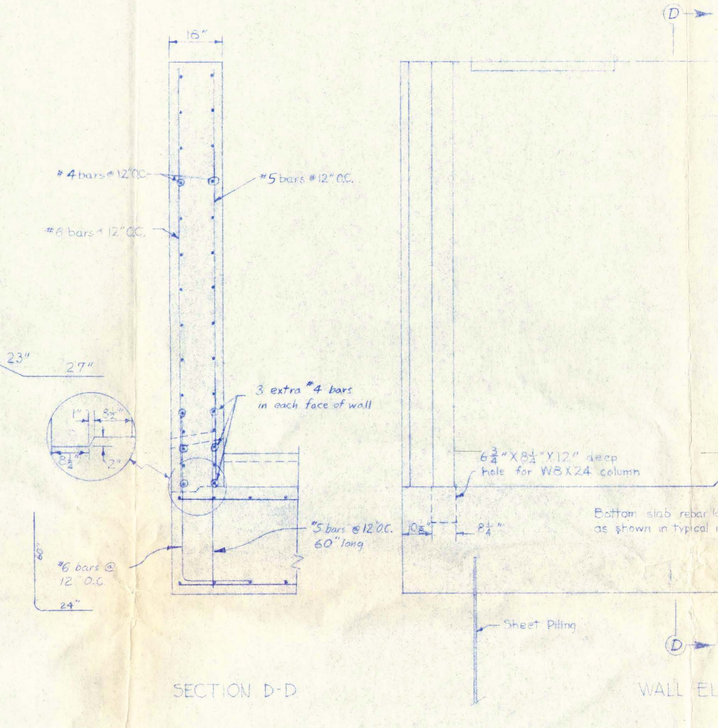
PLAN



SECTION C-C WALL ELEVATION

TYPICAL INTERIOR WALL DETAIL

SCALE: 1"=2'



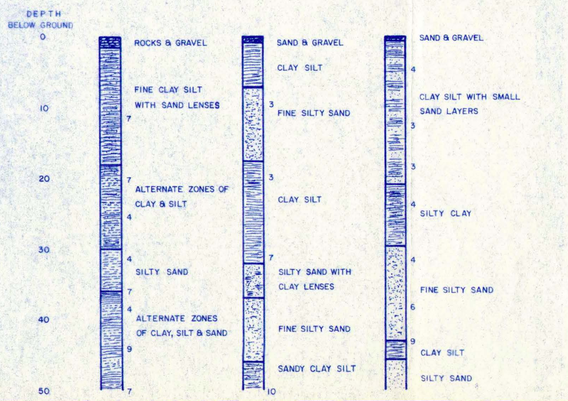
SECTION D-D WALL ELEVATION

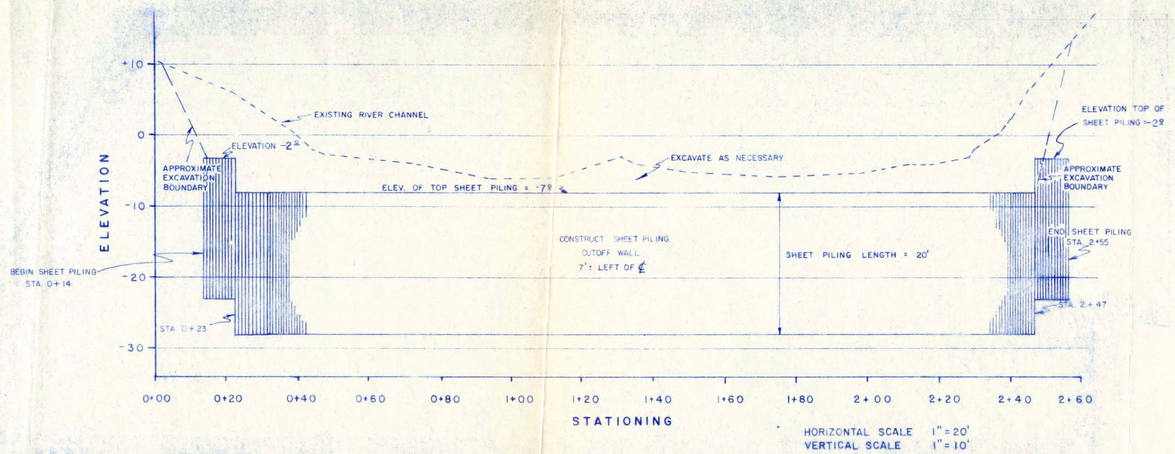
TYPICAL END WALL DETAIL

SCALE: 1"=2'

DRILL LOGS - PRIEST LAKE DAM

DESCRIPTION OF MATERIAL & SPLIT SPOON BLOW COUNT PER 6". ADDITIONAL INFORMATION AVAILABLE FROM DEPT OF WATER RESOURCES.





SHEET PILE WALL PROFILE

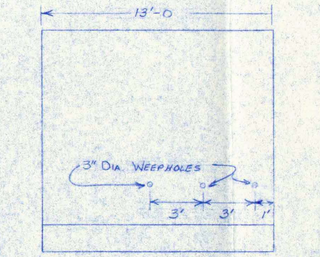
17 S. 78

William R. Hoovett

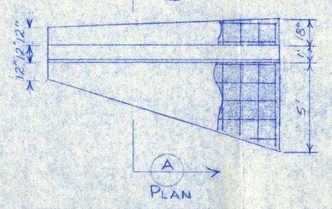
APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/20/78

IDAHO DEPARTMENT OF WATER RESOURCES		
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DATE: MAR. 1978		REVISED
PRIEST LAKE OUTLET - STRUCTURAL DETAIL		
		DRAWING NUMBER 97-2020-3

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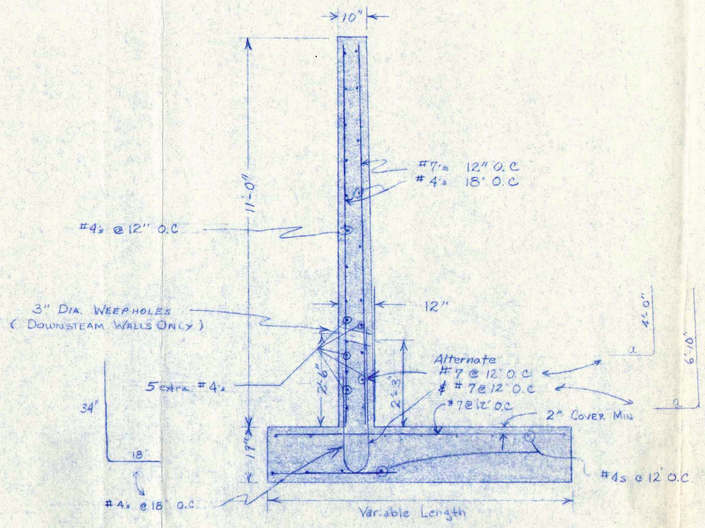


ELEVATION

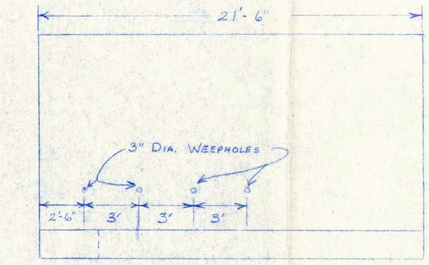


PLAN

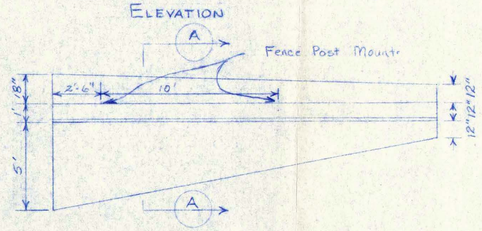
LEFT WING WALL - DOWNSTREAM
SCALE 1" = 4'-0"



SECTION A-A
TYP. DOWNSTREAM WING WALLS
SCALE 1" = 2'-0"

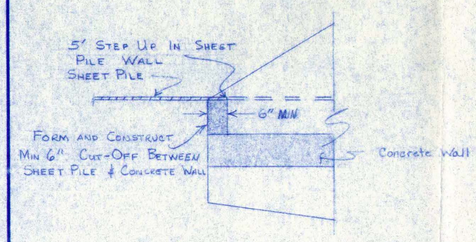


ELEVATION

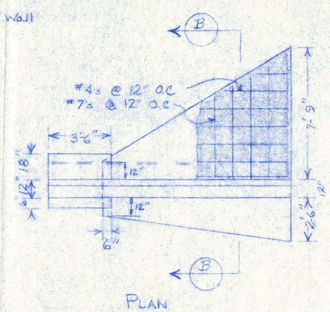


PLAN
RIGHT WING WALL - DOWNSTREAM
SCALE 1" = 4'-0"

ELEVATION

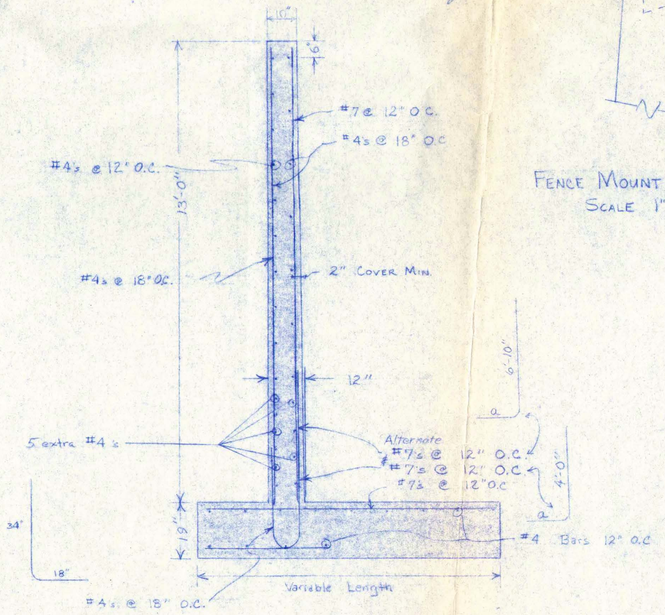


SECTION C-C
SCALE 1" = 2'-0"

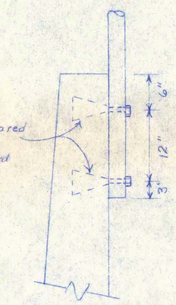


PLAN
LEFT WING WALL - UPSTREAM
SCALE 1" = 4'-0"

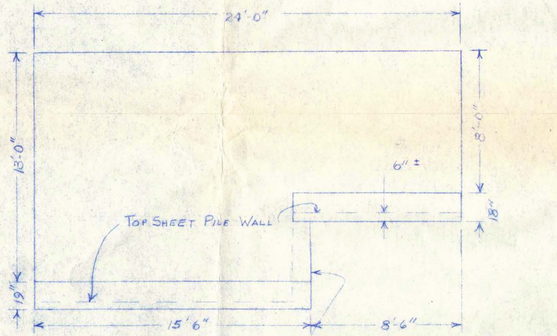
NOTE:
DIMENSION "a" VARIES WITH LENGTH OF WING WALL BASE



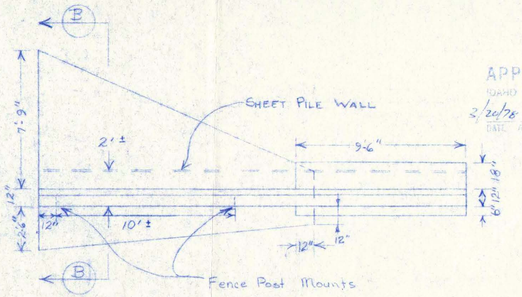
SECTION B-B
SCALE 1" = 2'-0"



FENCE MOUNT DETAIL
SCALE 1"=1'



ELEVATION



PLAN
RIGHT WING WALL - UPSTREAM
SCALE 1" = 4'-0"

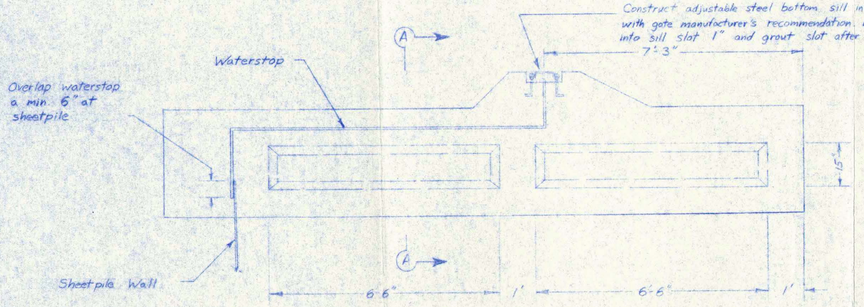
APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/26/78
DATE ADMINISTRATOR, RESOURCES ADMIN. DIVISION

CERTIFIED PROFESSIONAL ENGINEER
17-3-78
WILLIAM R. GOSS

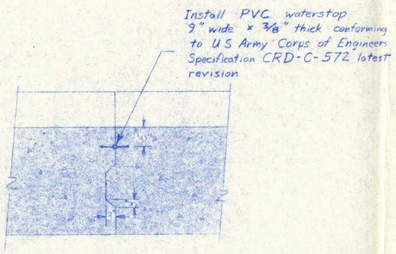
NOTE:
Construct Expansion Joint at each contact between wingwalls and dam and wall. See Typical Detail on Sheet 5.

IDAHO DEPARTMENT OF WATER RESOURCES	
PRIEST LAKE OUTLET — WINGWALLS	
DRAWN BY JB	APPROVED W.Stuart
SCALE AS SHOWN	SHEET NO. 97-2020 4
DATE 17 Mar. 78	

IDAHO BLUEPRINT & SUPPLY CO., INC., BOISE, IDAHO

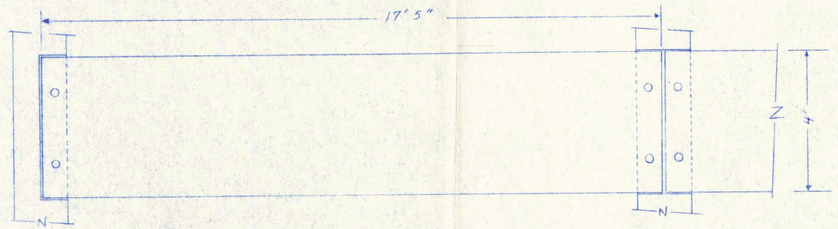


CONTRACTION JOINT DETAIL
Scale: 1" = 2'-0"



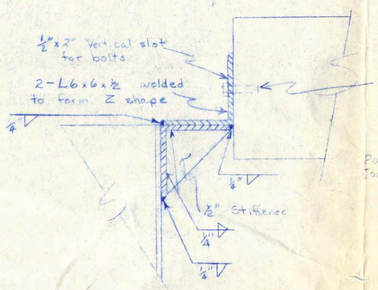
SECTION A-A

NOTE:
Concrete walkway to be designed for a live load of 100 lbs/ft² plus dead load.

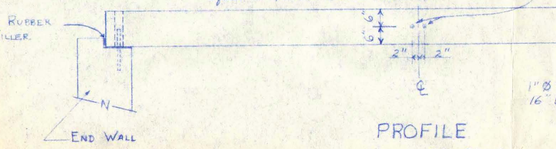


PLAN
Scale 1" = 2'-0"

BOLT INSERTS OR WELD PLATES SHALL BE INSTALLED ALONG BOTH SIDES TO ACCOMODATE HANDRAILING. HANDRAIL DESIGN SHALL BE APPROVED BY OWNER PRIOR TO CONSTRUCTION.



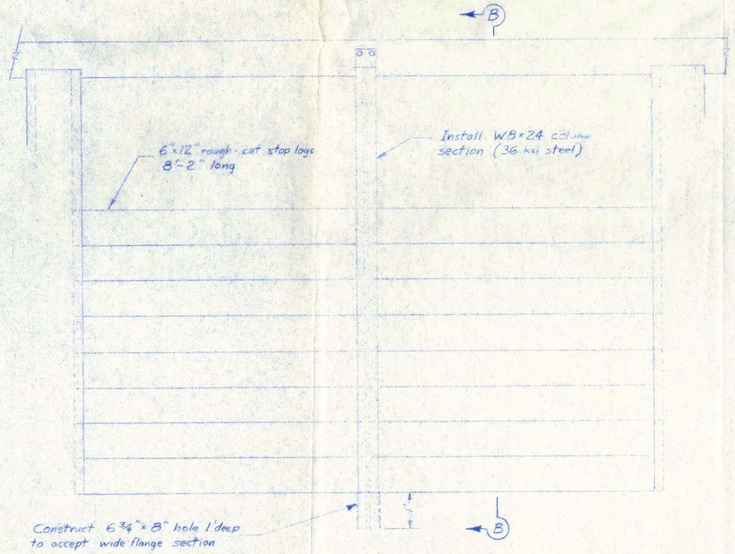
BRACKET DETAIL
Scale 1" = 1'



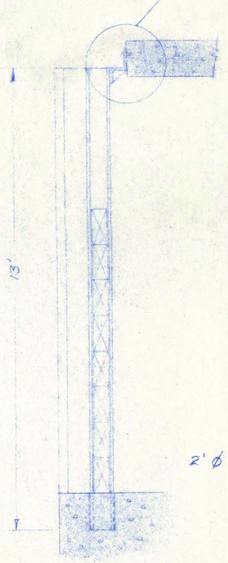
PROFILE
Scale 1" = 2'-0"



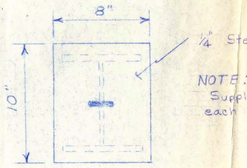
PLAN



PROFILE

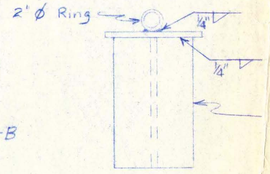


SECTION B-B



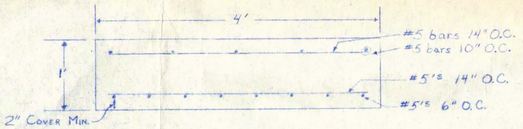
NOTE:
Supply one plug for each gate bay.

TOP VIEW



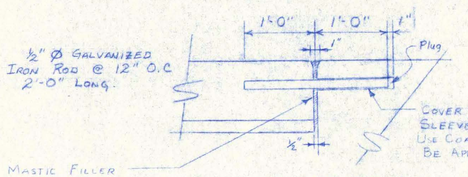
ELEVATION

Plug Detail
Scale 1" = 1'



SECTION C-C
Scale 1" = 1'-0"

PRECAST CONCRETE WALKWAY



NOTE:
ALIGN DOWELS PARALLEL TO WING WALLS

TYP. EXPANSION JOINT
No Scale

APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/29/78
DATE — DIRECTOR, WATER RESOURCE REGIONAL DIVISION

17-3-78
William R. Goodell

IDAHO DEPARTMENT OF WATER RESOURCES	
PRIEST LAKE OUTLET — MISC. DETAILS	
DRAWN BY: W.G., K.H. APPROVED: W. Goodell	
SCALE: AS SHOWN	SHEET NO. 97-2020 5
DATE: 17 MAY 1978	

IDAHO BLUEPRINT & SUPPLY CO., INC., BOISE, IDAHO

APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for Mott MacDonald, Inc. and for the Project specifically identified in the report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our Agreement with Mott MacDonald dated August 1, 2018 and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is based on a Unique Set of Project-Specific Factors

This report has been prepared for Mott MacDonald for the Priest Lake Outlet Dam project located in Bonner County, Idaho. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;

1 Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Environmental Concerns are Not Covered

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

We have developed the following recommendations based on data gathered from subsurface investigation(s). These investigations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to conduct additional study to obtain the specific types of information they need or prefer.

Contractors are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as

they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

Information Provided by Others

GeoEngineers has relied upon certain data or information provided or compiled by others in the performance of our services. Although we use sources that we reasonably believe to be trustworthy, GeoEngineers cannot warrant or guarantee the accuracy or completeness of information provided or compiled by others.

APPENDIX C – STOCKPILING AREAS

CONTENTS

1. Jackpine Gravel Pit Stockpiling Area
2. Coolin IDL Stockpiling Area



JACKPINE GRAVEL PIT STOCKPILING AREA



COOLIN IDL OFFICE STOCKPILING AREA

APPENDIX D – EXISTING UTILITY DRAWINGS

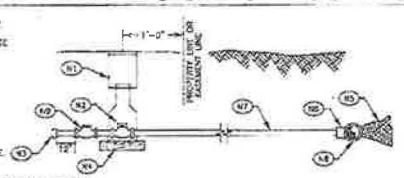
CONTENTS

1. Old Utility Drawings

FINAL CONSTRUCTION PLAN FOR "LAMB CREEK ESTATES"

SECTION 6, TWP. 59N., RNG. 4W., B.M. BONNER COUNTY, IDAHO

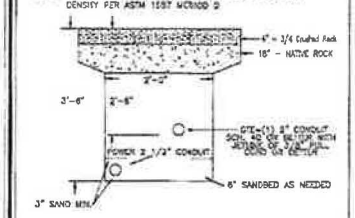
NOTES FOR SEWER SERVICE DETAIL
1. ADJUSTABLE CURB BOX MARKED "SEWER"
2. 1-1/2" TEFLON COATED BALL OR BRONZE GATE VALVE.
3. 1-1/2" PVC PIPE CAP
4. 8"X 8"X 2" CONCRETE BLOCK.
5. THRUST BLOCK AS REQUIRED.
6. 2" PVC TEE W/ 1-1/2" REDUCER
7. 1-1/2" SCH. 40 PVC PIPE.
8. 2" SCH. 40 PRESSURE SEWER MAIN LINE.
9. 1-1/2" PVC BALL CHECK VALVE



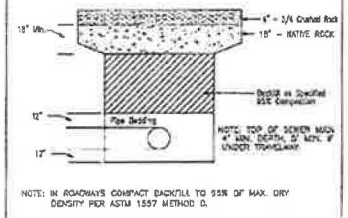
1.1 TYPICAL SEWER SERVICE CONNECTION N.T.S.

NOTE: SEWER CONNECTION SHALL BE LOCATED APPROXIMATELY 5' FROM THE SIDE LOT LINE UNLESS INDICATED OTHERWISE ON THE GENERAL LAYOUT

COORDINATE QTE SWEEP LOCATIONS WITH GARY POKATH @ 263-7301
NOTE: IN ROADWAYS COMPACT BACKFILL TO 95% OF MAX. DRY DENSITY PER ASTM 1557 METHOD D



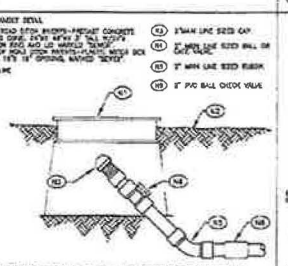
2.1 UTILITY TRENCH DETAIL N.T.S.



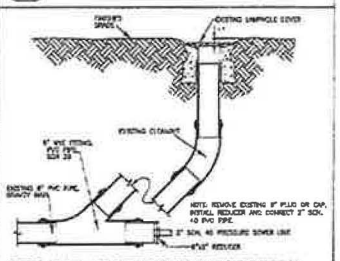
NOTE: IN ROADWAYS COMPACT BACKFILL TO 95% OF MAX. DRY DENSITY PER ASTM 1557 METHOD D.

2.2 PIPE TRENCH DETAIL N.T.S.

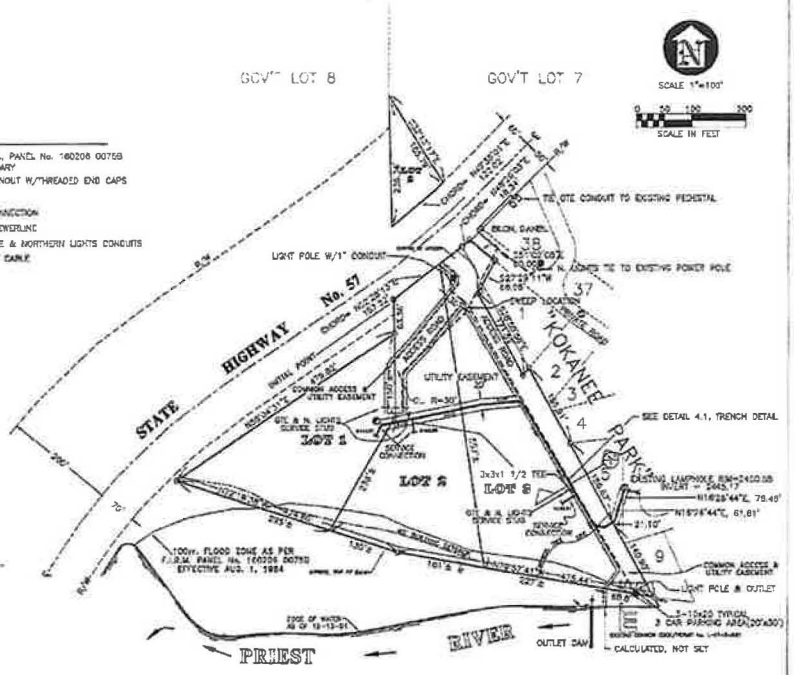
NOTES FOR CLEANOUT DETAIL
1. ESTABLISH ROAD GRADE WITH PRECAST CONCRETE REDUCING RING, 24"X8" 48"X 8" ALL ROUND CAST IRON ROD AND LID MARKED "SEWER" OUTSIDE OF ROAD USE PARTIAL PLASTIC MESH BOX MINIMUM SIZE 18" DIAMETER MARKED "SEWER"
2. GROUND LINE
3. 6"MAIN LINE SIZED CAP
4. 6" MAIN LINE SIZED WYE OR EQUIV.
5. 3" MIN LINE SIZED RISER
6. 3" PVC BALL CHECK VALVE



3.1 PRESSURE SEWER CLEANOUT DETAIL N.T.S.



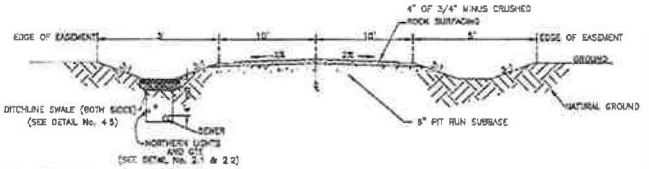
3.2 SEWER INTERCONNECTION DETAIL N.T.S.



DEVELOPER
DELL & TISH WILLIAMS
PO BOX 898
MOSS BEACH, CA.
94038

3.3 GENERAL SITE PLAN SCALE 1"=100'

PRIVATE DRIVEWAY



4.1 TYPICAL ROAD SECTION N.T.S.

SANITARY SEWER CONSTRUCTION SPECIFICATIONS

GENERAL - SEWER SYSTEM CONSTRUCTION SHALL CONFORM TO THE STATE OF IDAHO DIVISION OF ENVIRONMENTAL QUALITY (DEQ) REGULATIONS FOR COMMUNITY SEWER SYSTEMS, AND TO THE IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION (ISPWC), ACCORDINGLY, STORM SEWER CONSTRUCTION SHALL CONFORM TO THE PROVISIONS OF BEST MANAGEMENT PRACTICES FOR STORMWATER MANAGEMENT AND EROSION AND SEDIMENTATION CONTROL. IN THE EVENT OF STATE CONFLICT, THE MORE RESTRICTIVE CODE SHALL APPLY.

PIPE - PRESSURE SEWER PIPE AND FITTINGS SHALL CONFORM TO THE REQUIREMENTS OF SCHEDULE 40 PVC. PVC JOINTS SHALL UTILIZE SOLVENT WELD CONNECTIONS.

INSTALLATION - SEWER INSTALLATION SHALL CONFORM TO THE MANUFACTURER'S RECOMMENDED STANDARDS AND TO SECTION 600 OF THE ISPWC, AS THE DEPTH SHOWN ON THE DRAWINGS. TRENCH SHALL BE SUFFICIENTLY DEWATERED PRIOR TO PIPELINE INSTALLATION.

PIPE BEDDING - PIPE BEDDING SHALL CONFORM TO ISPWC STANDARD SPECIFICATION 302.02, TYPE I, OR 302.03, TYPE F.

TRENCH PROTECTION - TRENCH PROTECTION SHALL CONFORM TO ISPWC STANDARD SPECIFICATION 306, WHEN GROUND OR FROZEN MATERIAL, BOULDERS, SOFT OR UNSTABLE MATERIAL WHICH WILL NOT UNIFORMLY SUPPORT THE PIPE, IS ENCOUNTERED, SUCH MATERIAL SHALL BE EXCAVATED TO AN ADDITIONAL DEPTH AS DIRECTED BY THE ENGINEER AND BACKFILLED WITH TYPE II BEDDING MATERIAL.

TRENCH BACKFILL - TRENCH BACKFILL SHALL COMPLY WITH ISPWC STANDARD SPECIFICATION 306. BACKFILL IN ROADWAYS SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY, AND 90% OF MAXIMUM DENSITY ELSEWHERE, IN MAXIMUM 8" LOOSE LIFTS. MAXIMUM DENSITY SHALL BE DETERMINED BY ASTM D1557, METHOD D.

TESTING - AFTER INSTALLATION, THE PRESSURE PIPELINE SHALL BE PRESSURE TESTED TO A PRESSURE OF 50 PSI. IF THERE ARE NO VISIBLE LEAKS AND THERE IS NO PRESSURE DROP OVER 2 HOURS, THE PIPELINE WILL BE ACCEPTED AS A SUCCESSFUL INSTALLATION. (DONE)

4.3 SPECIFICATIONS

REGISTERED PROFESSIONAL ENGINEER 3998 STATE OF IDAHO

ENGINEER'S STAMP

No.	DATE	REVISIONS	DRAWN	CHECKED
1	10-7-97	AS BUILT REVISIONS, SEWER DETAIL 4.1 & SITE UTILITY LAYOUT	DRW	DWS/KFH
2	12-30-97	AS BUILT REVISIONS	DRW	DWS/KFH

James A. Sewell and Associates
CONSULTING ENGINEERS
NEWPORT, WASHINGTON, 99156
(509) 447-3626

SHEET TITLE: FINAL CONSTRUCTION PLAN "LAMB CREEK ESTATES" BONNER COUNTY, IDAHO
PROJECT:
DATE: 5-5-97
SCALE: AS SHOWN
DRAWN BY: DRW
CHECKED BY: DWS/KFH
FILE NO.: 97LP572
SHEET 1 OF 1

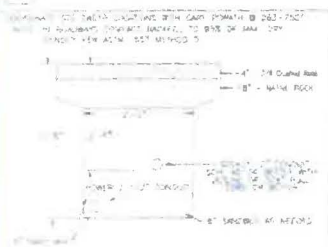
11 Lamb Creek Estates - Final Construction Plan

FINAL CONSTRUCTION PLAN FOR "LAMB CREEK ESTATES"

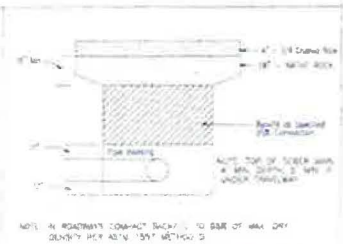
SECTION 6, TWP. 59N., RNG. 4W., B.M. BONNER COUNTY, IDAHO



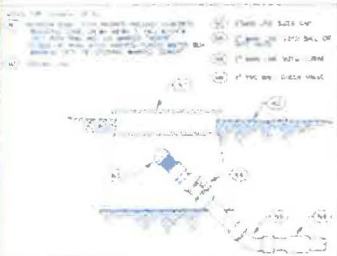
4.1 TYPICAL SEWER SERVICE CONNECTION



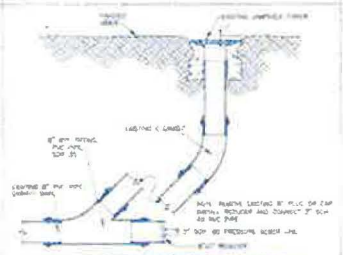
2.1 UTILITY TRENCH DETAIL



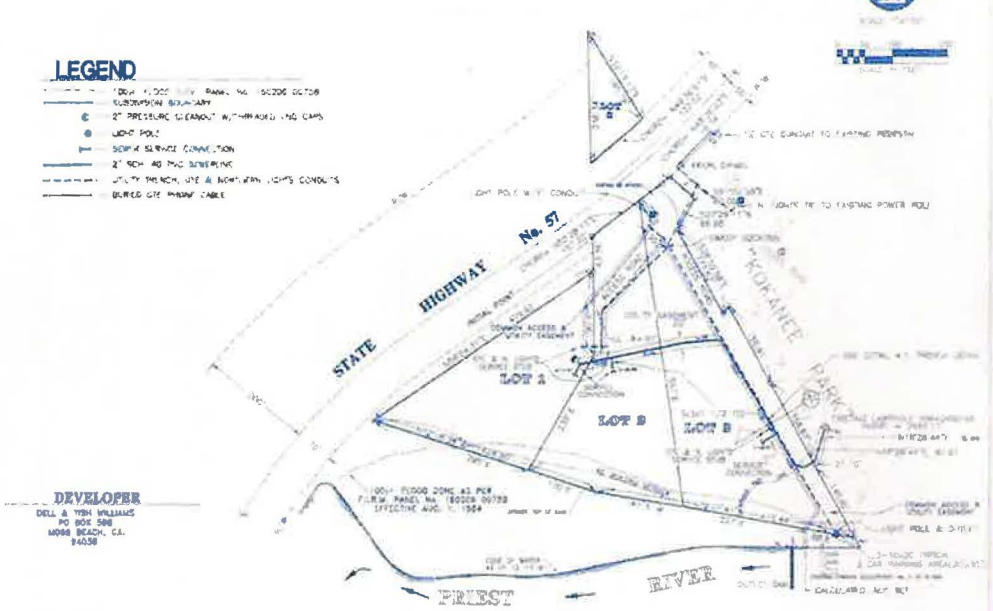
2.2 PIPE TRENCH DETAIL



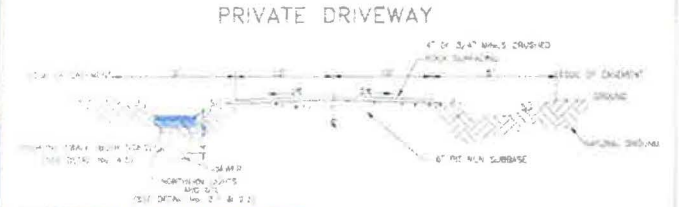
3.1 PRESSURE SEWER CLEANOUT DETAIL



3.2 SEWER INTERCONNECTION DETAIL



3.3 GENERAL SITE PLAN



4.1 TYPICAL ROAD SECTION

SANITARY SEWER CONSTRUCTION SPECIFICATIONS

4.3 SPECIFICATIONS

James A. Sewell and Associates
CONSULTING ENGINEERS
NEWPORT, WASHINGTON, 99156
(509) 447-3626

FINAL CONSTRUCTION PLAN
"LAMB CREEK ESTATES"
BONNER COUNTY, IDAHO

0-16 Outlet Bay Sewer Dist. — Lamb Ck. Estates, Sewer Ext.

APPENDIX E – WATER LEVEL & FLOW DATA

CONTENTS

1. Water Level & Flow Data

MOTT MACDONALD

Project:	Priest Lake Water Management Project Outlet Dam Improvements		
Subject:	Appendix E Flow & WL Data	**Date:**	May 20, 2020

1 Available Data

The US Geologic Survey (USGS) collects discharge and water level data at various gages in the Priest River Basin, including the lake and river downstream of the Outlet Dam. The types of data and length of data records for each gage are summarized in the figure below.

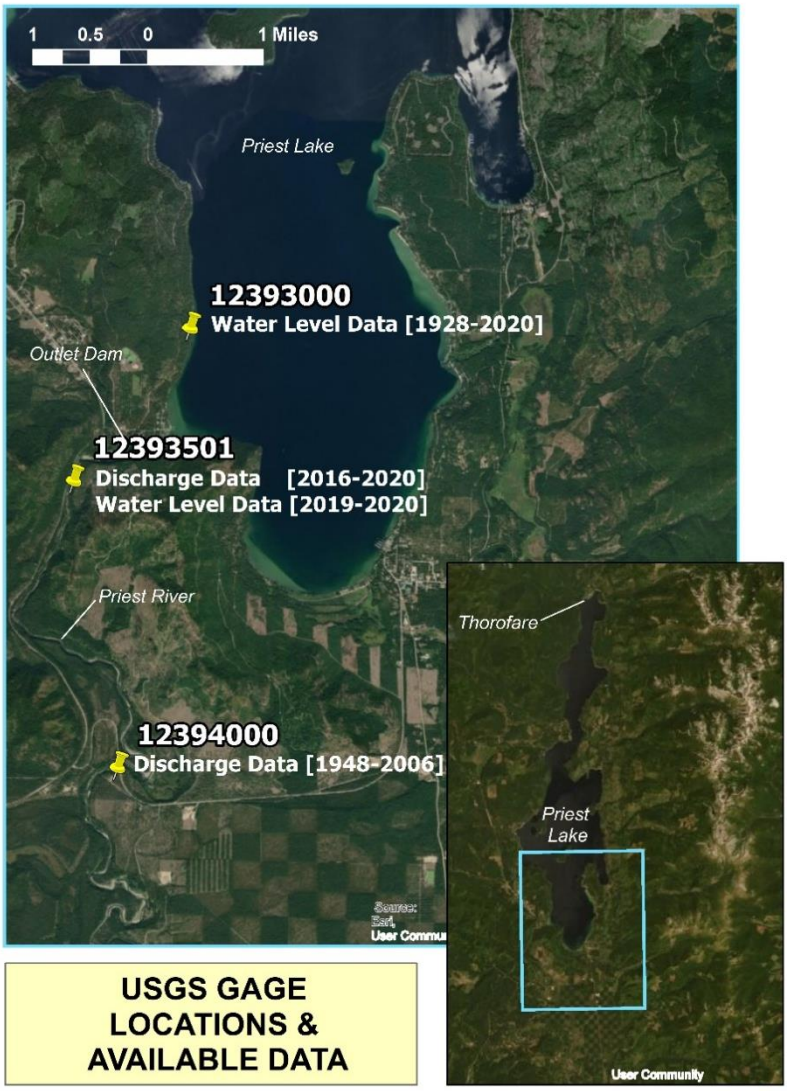


Figure 1. USGS Gages and Data Availability

2 Water Levels

USGS gage #12393000 provides a continuous data record of lake levels in Priest Lake relative to Lake Datum. The figure below summarizes daily statistics for water levels in Priest Lake for the post-dam construction time period (1978-2020). The figure below shows the minimum, average, and maximum observed water levels for each day of the year during this time period.

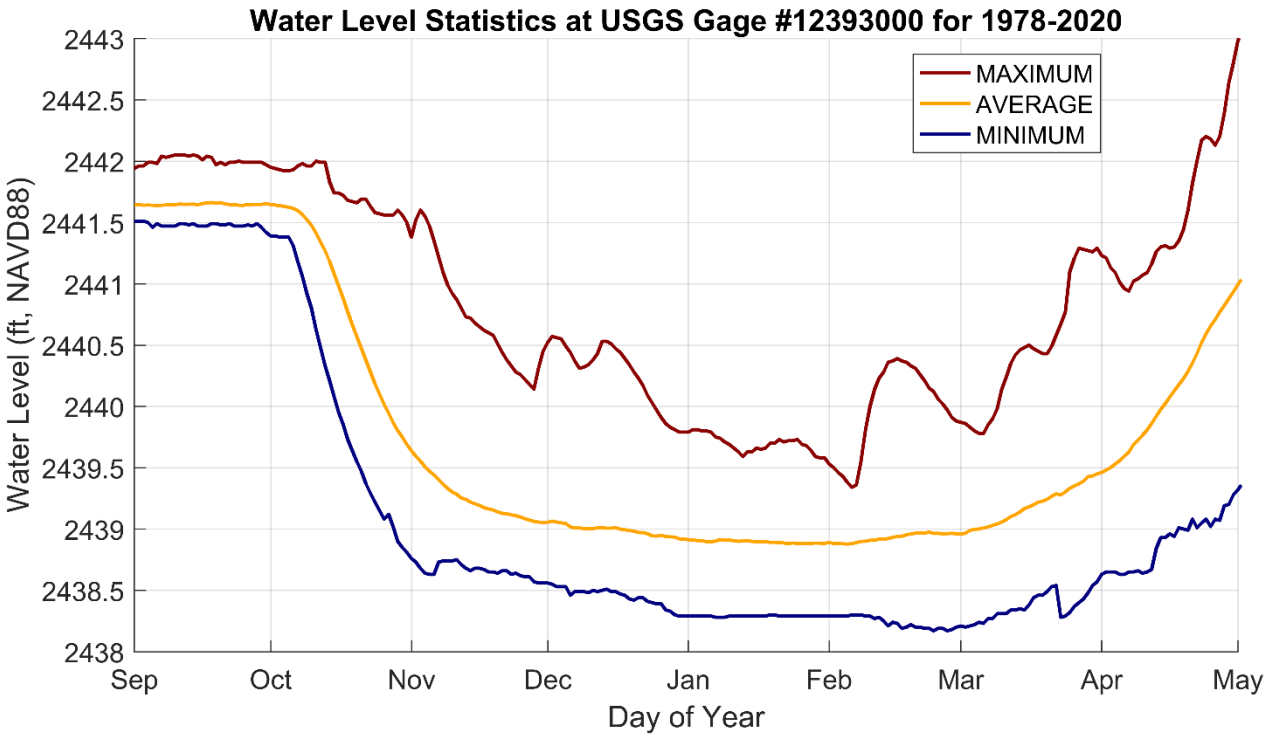


Figure 2. Daily Priest Lake water level statistics (Lake Datum = 2438.61ft NAVD88).

Table 1. Monthly Priest Lake water level statistics from USGS Gage #12393000.

	MONTHLY LAKE WL STATISTICS FOR PERIOD 1978-2020 DATA FROM USGS GAGE #12393000 (FT, NAVD88)						
	Nov.	Dec.	Jan.	Feb.	Mar.	Nov. - March	
Min. WL	2438.6	2438.3	2438.3	2438.2	2438.2	Min observed:	2438.2
Avg. WL	2439.3	2439.0	2438.9	2438.9	2439.2	Avg observed:	2439.1
Max. WL	2441.6	2440.6	2439.8	2440.4	2441.3	Max observed:	2441.6

3 Priest River Discharge

- There is a longstanding data record at USGS Gage #12394000, about 2.6 miles south of the Priest Lake Outlet Dam (approximately 4 miles downstream, along Priest River). The figure shows the minimum, average, and maximum observed discharge rates for each day of the year during this time period.

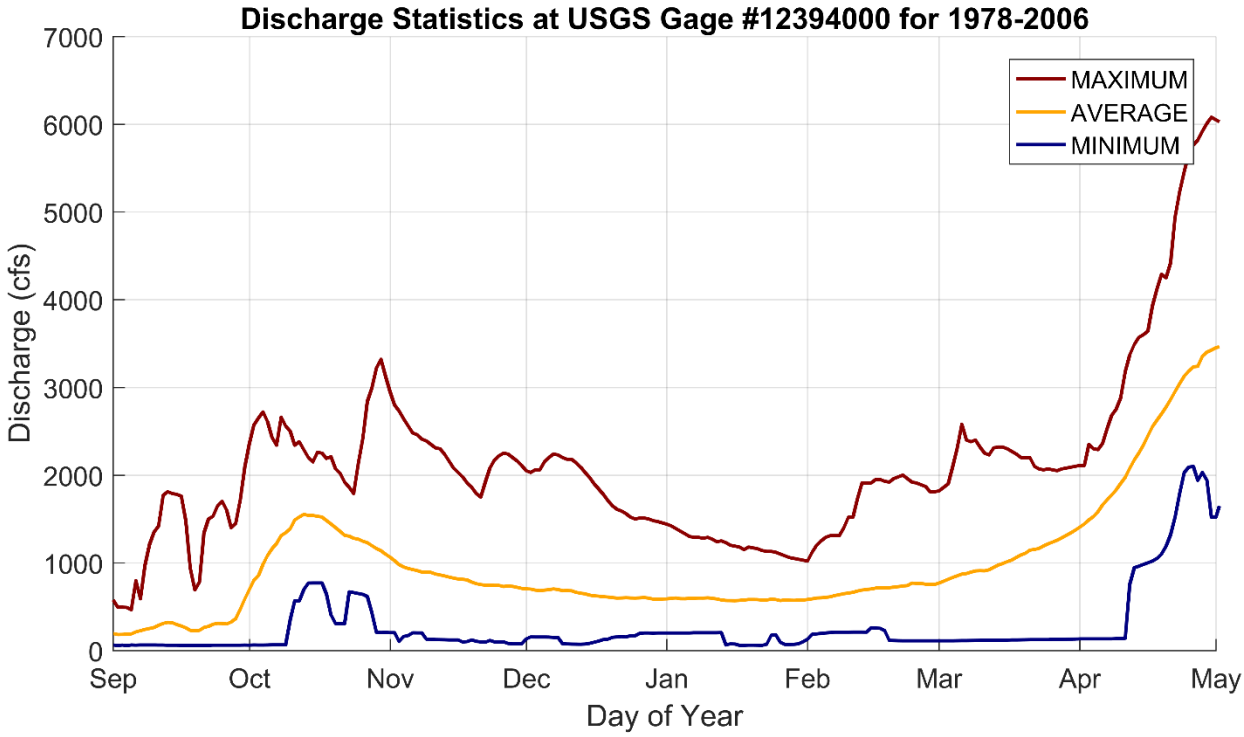


Figure 3. Daily Priest River water level statistics based on daily averaged values.

- In 2016, a new gage was installed just downstream of the Outlet Dam which is more representative of flows at the structure. Data from 2017-2020 is shown in Figure 4, below.

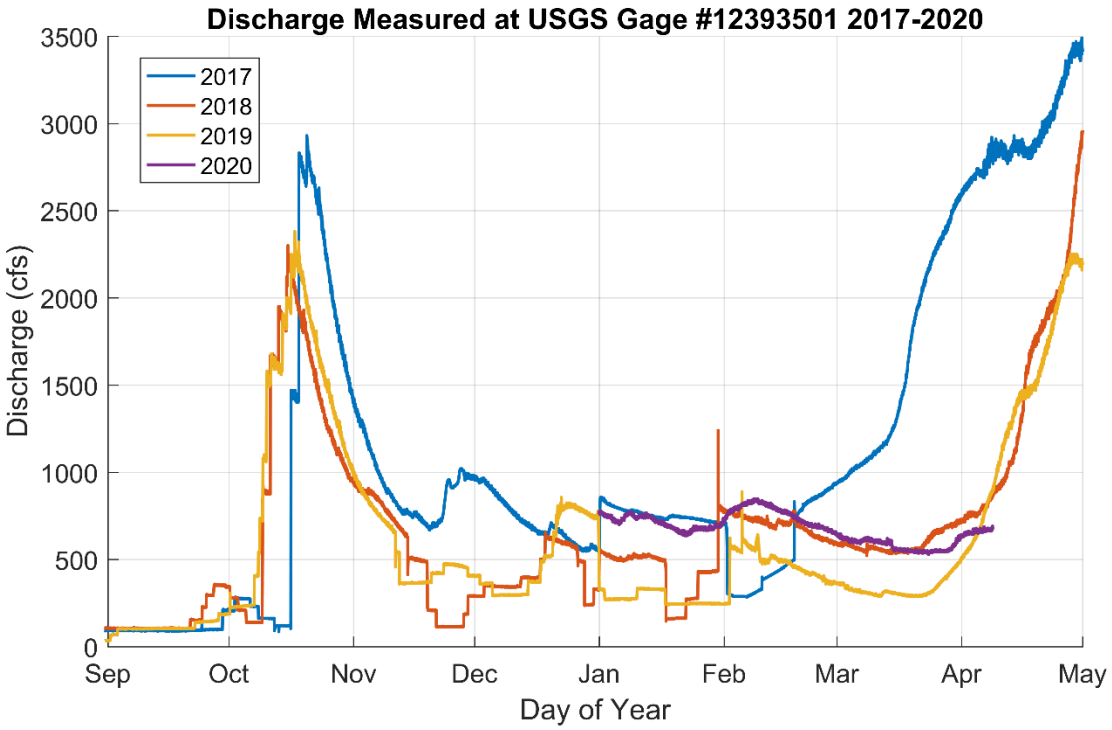


Figure 4. Daily Priest Lake discharge measurements, just downstream of the Outlet Dam. Only a few years of recent data is available at this Gage.

4 Design Flow Rates During Construction

- The Lake drawdown period is typically started during the first week in October. The duration of lake drawdown varies from year to year; but, historically, flow discharge through the Outlet Dam and lake water levels are regulated through the month of October and typically drawdown is completed by the first to second week in November.
- Based on the USGS data at Gage #12394000 on Priest River, an exceedance curve was developed to estimate the 2-year, 5-year, and 10-year peak flow event at Gage #12394000 (see Figure 5).
- The estimated 2-year, 5-year, and 10-year peak flow events were estimated for two periods of the Construction Window:
    - November 1st – December 14th – this period is characterized by higher discharge rates due to remnant effects of lake drawdown.
    - December 15th – March 15th – this period is characterized by lower discharge rates.

Estimated Outlet Dam Peak Flow Rates

	2-YEAR	5-YEAR	10-YEAR
NOVEMBER 1 TO DECEMBER 14:	1,535 CFS	2,049 CFS	2,412 CFS
DECEMBER 15 TO MARCH 15:	1,080 CFS	1,393 CFS	2,214 CFS

- **Results of hydraulic modeling indicate that the water surface elevation 30ft downstream of the dam centerline corresponding to the 2-year event for November 1st to December 14th (1,535 CFS) is 2438.3 NAVD88, with all gates open and unimpeded flow.**
- Based on the USGS data at Gage #12393501, an exceedance curve was developed for flow just downstream of the dam during the Construction Window (see Figure 5). The 2-year peak flow at this gage is between the range of values estimated using data from Gage #12394000.
- Note: For construction of the project, IWRB will operate the dam to fully complete the lake drawdown and complete gate regulated flow by October 31, resulting in a “run of the river” flow condition for the Priest Lake system starting on November 1.

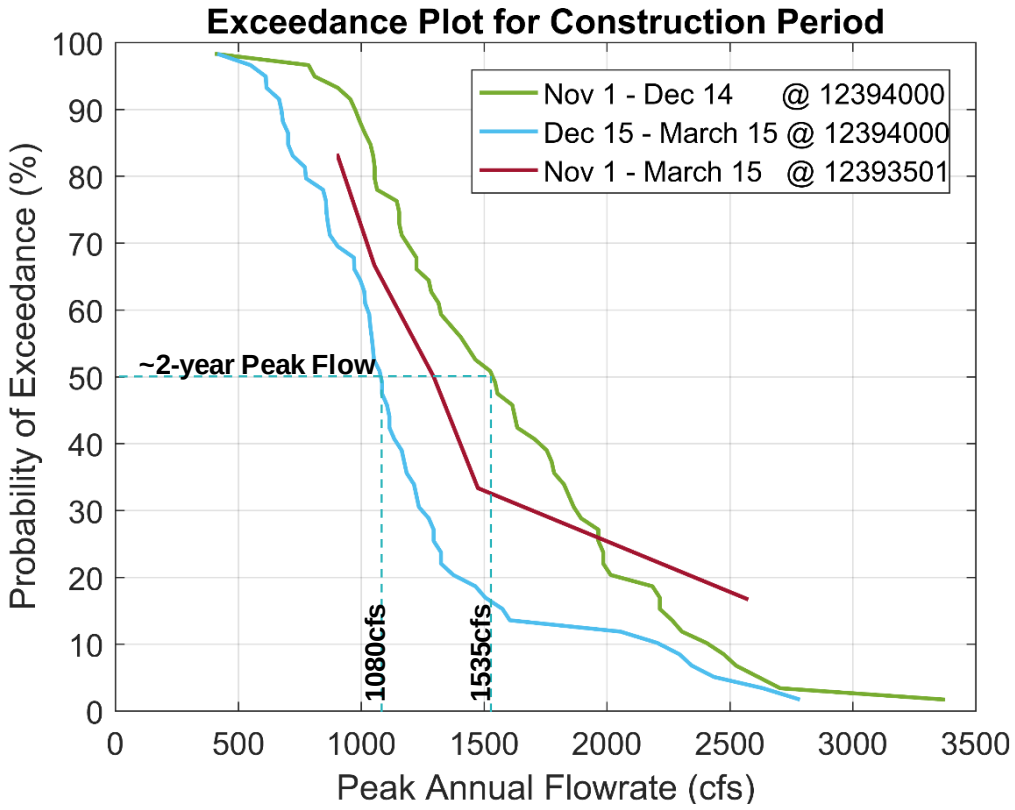


Figure 5. Exceedance Plots for: (a) USGS Gage #12394000[1] discharge measurements for the earlier part of the Construction Window (Nov 1st – Dec 14th) and the later part of the Construction Window (Dec 15th – March 15th); and (b) USGS Gage #12393501 discharge measurements for the entire Construction Window.

[1] Note: values shown from #12394000 have been adjusted to account for daily variation in flow rates (e.g. the possibility that the maximum flow rate may exceed the daily averaged value).

APPENDIX F - ORIGINAL CONSTRUCTION PLANS

CONTENTS

1. Original Dam Construction Plans (1978)

IDAHO DEPARTMENT OF WATER RESOURCES

BOISE, IDAHO

1978

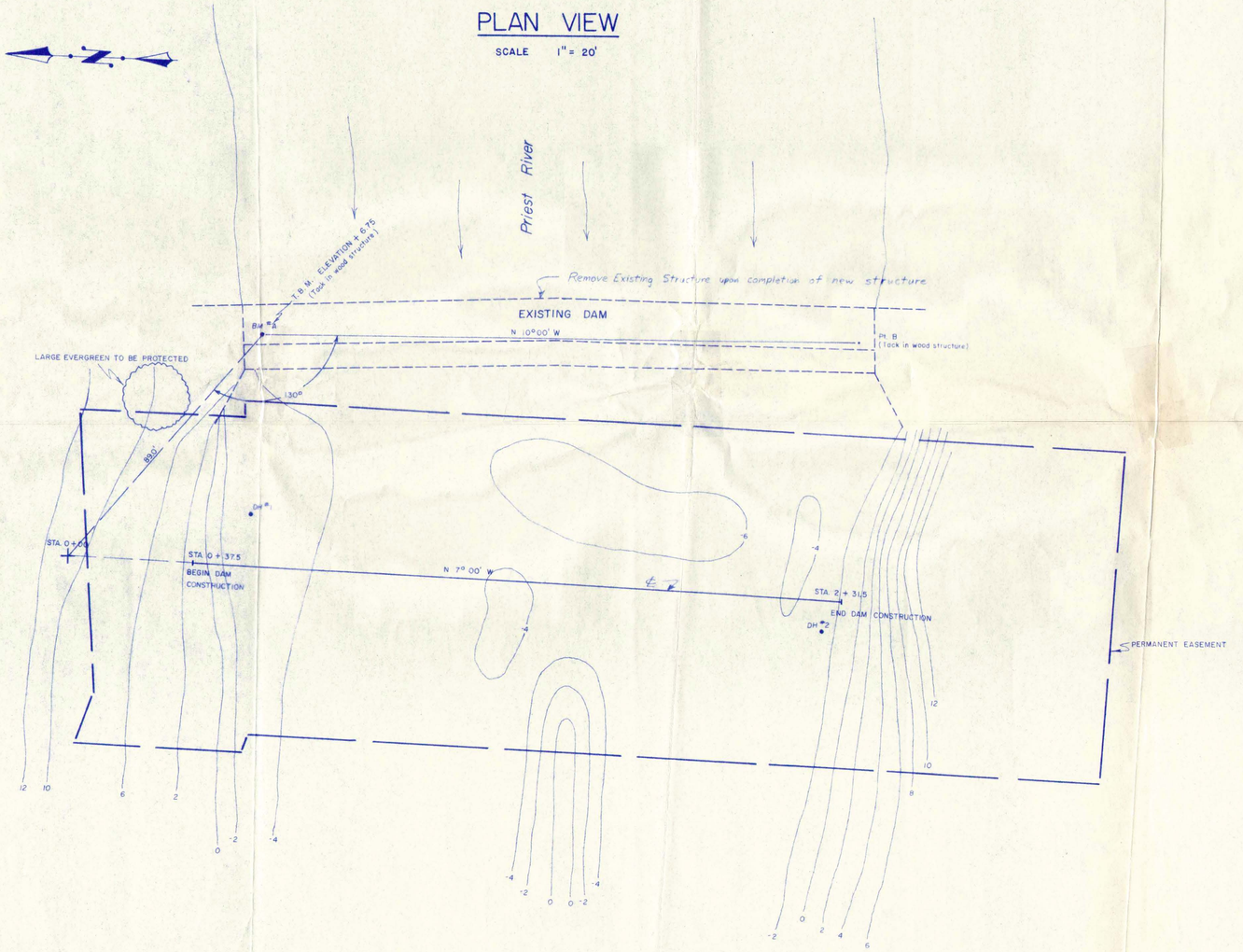
PLANS FOR REPLACEMENT OF CONTROL STRUCTURE

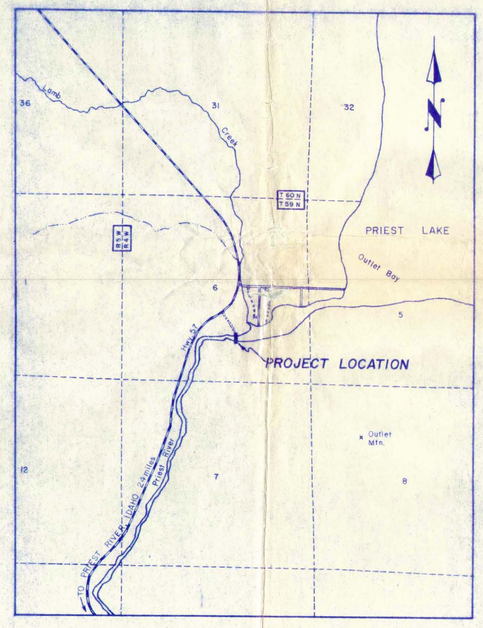
PRIEST LAKE OUTLET

BONNER COUNTY, IDAHO

PLAN VIEW

SCALE 1" = 20'





PROJECT LOCATION MAP

SCALE 1" = 2000'

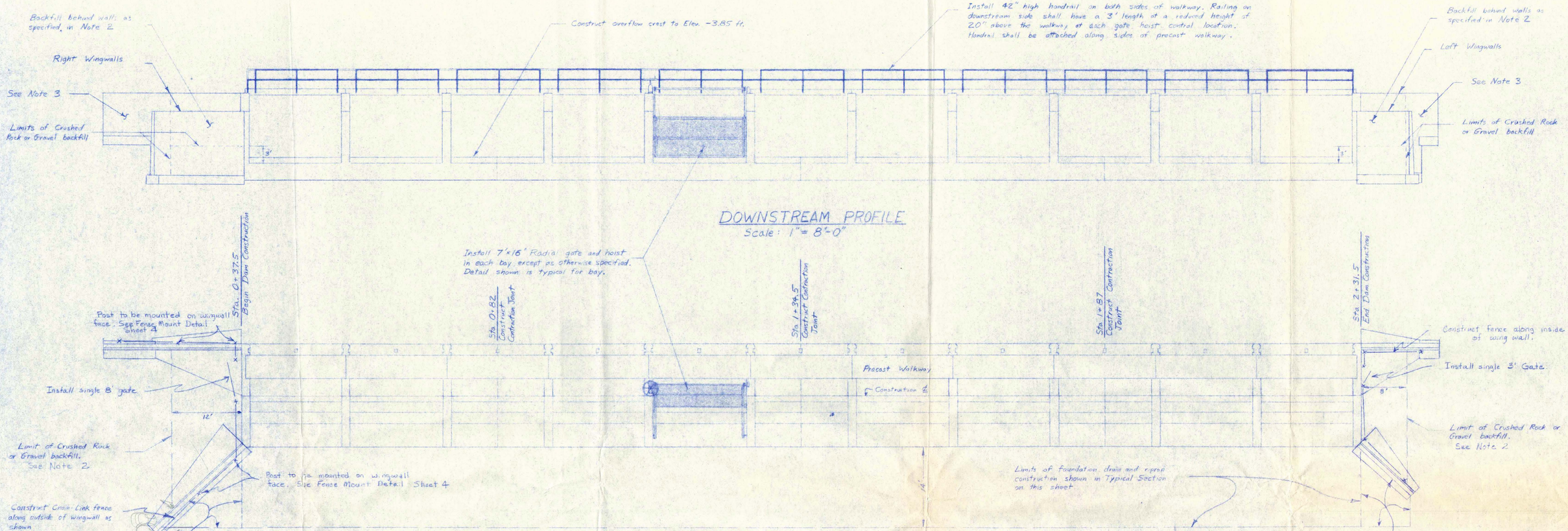
RECEIVED
JUL 23 1991
Water Appropriation
Boise, Idaho

3/20/78

11-3-78
William R. Gratton

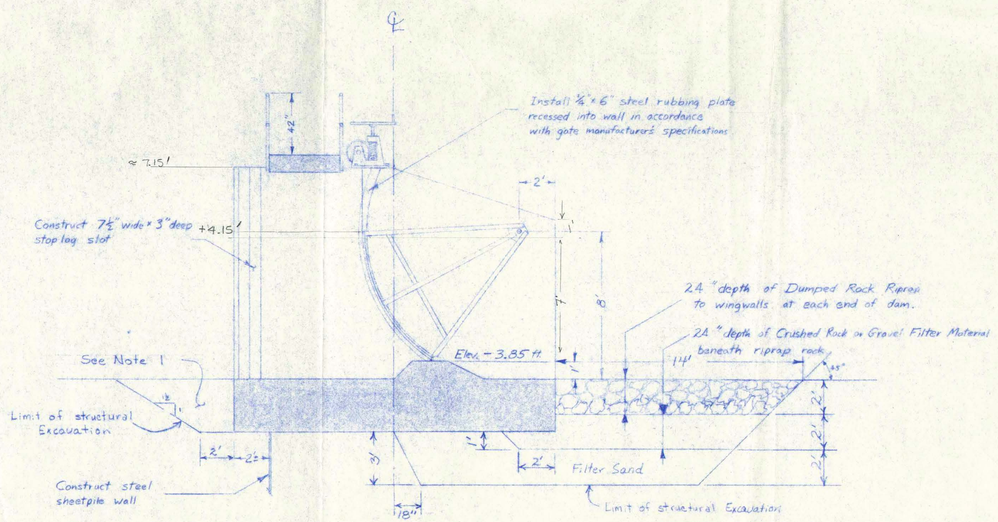
IDAHO DEPARTMENT OF WATER RESOURCES		
SCALE: as shown	APPROVED BY: William Gratton	DRAWN BY RC PB
DATE: May 1978		REVISED
PRIEST LAKE OUTLET — TITLE PAGE		
97-2020		DRAWING NUMBER 97-2020-1

24X36 PRINTED ON NO. 1000H CLEARPRINT



DOWNSTREAM PROFILE
Scale: 1" = 8'-0"

PLAN VIEW
Scale: 1" = 8'-0"



TYPICAL SECTION
Scale: 1" = 4'-0"

NOTES

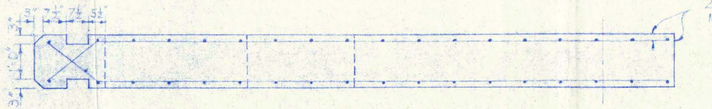
1. Place compacted backfill, Class II compaction.
2. Place compacted backfill with no more than 5% passing a No. 200 sieve above level of crushed rock or gravel to top of wingwalls. Class I compaction. Limits of fill extend vertically from crushed rock or gravel as shown
3. Place Class I compacted impervious backfill behind walls near abutment and along water side of upstream walls.

APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/20/78
DATE ADMINISTRATOR, RESOURCES ADMIN. DIVISION

REGISTERED PROFESSIONAL ENGINEER
17-3-78
William R. Gravatt
STATE OF IDAHO

IDAHO DEPARTMENT OF WATER RESOURCES		
SCALE: as shown	APPROVED BY: W. Gravatt	DRAWN BY WG JB
DATE: 17 Mar 1978		REVISED
PRIEST LAKE OUTLET —— PLAN & PROFILE		
		DRAWING NUMBER 97-2020-2

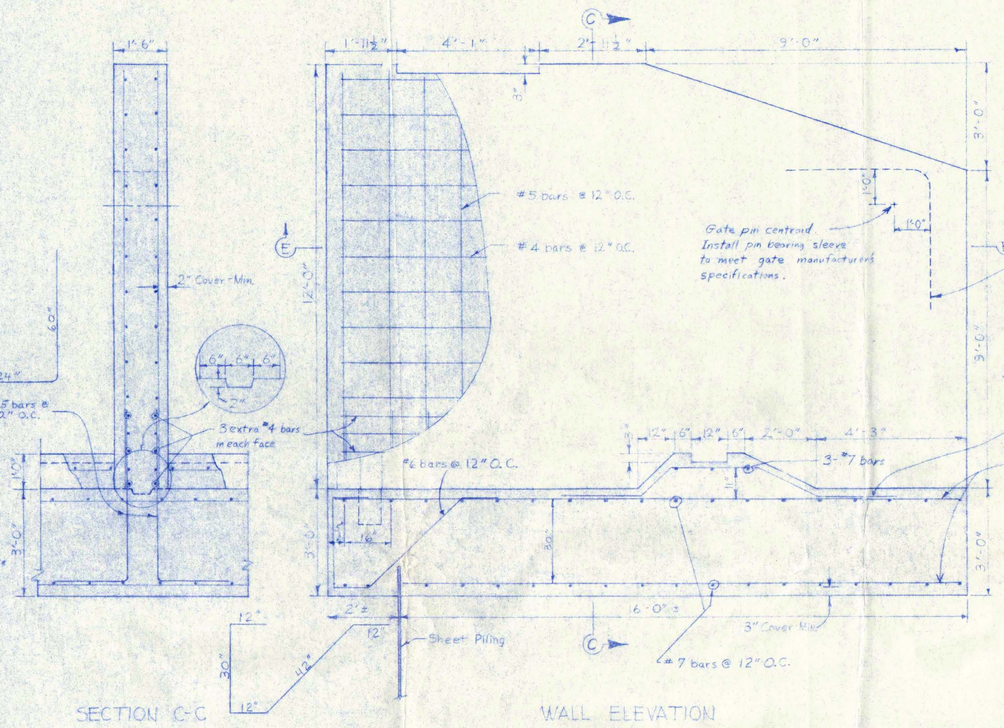
24336 — PRINTED ON NO. 1000H CLEARPRINT



SECTION E-E



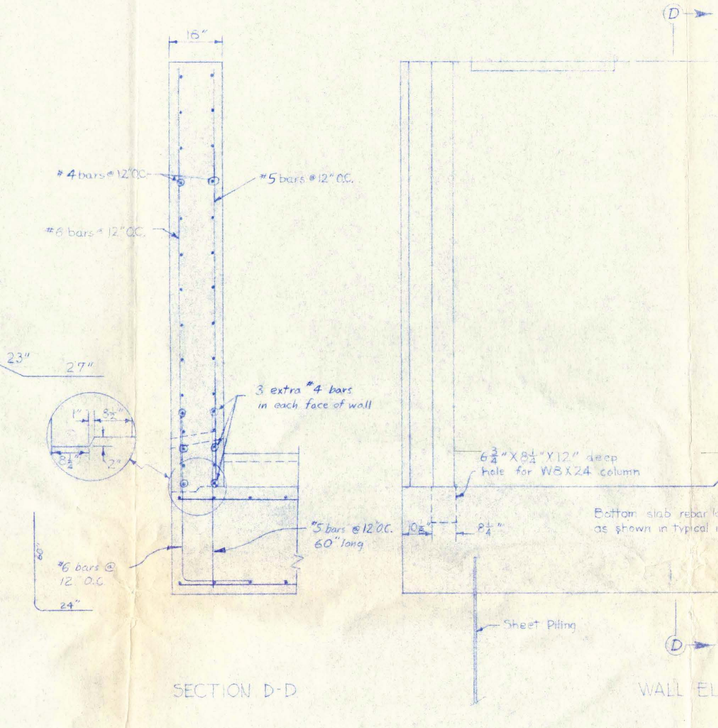
PLAN



SECTION C-C WALL ELEVATION

TYPICAL INTERIOR WALL DETAIL

SCALE: 1"=2'



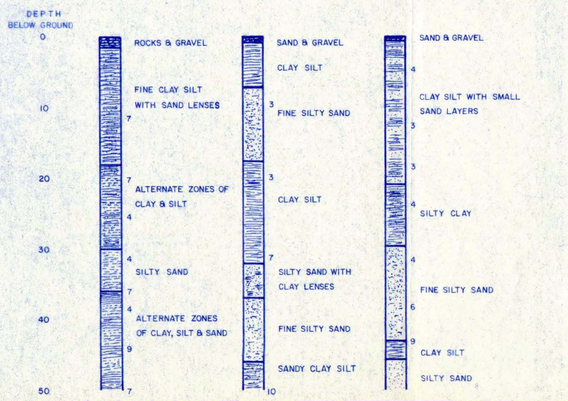
SECTION D-D WALL ELEVATION

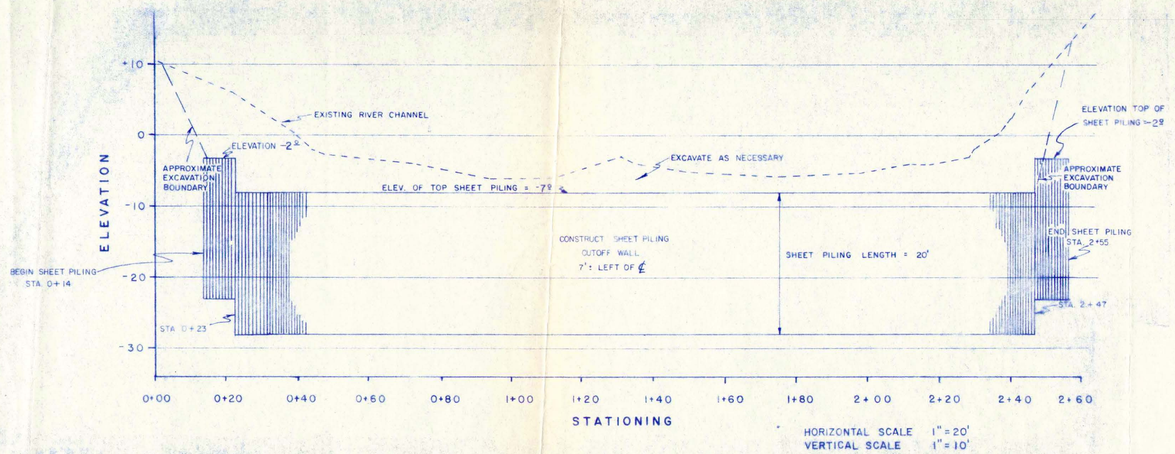
TYPICAL END WALL DETAIL

SCALE: 1"=2'

DRILL LOGS - PRIEST LAKE DAM

DESCRIPTION OF MATERIAL & SPLIT SPOON BLOW COUNT PER 6". ADDITIONAL INFORMATION AVAILABLE FROM DEPT OF WATER RESOURCES.





SHEET PILE WALL PROFILE

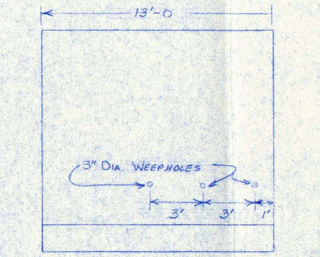
17 S. 78

William R. Hoovett

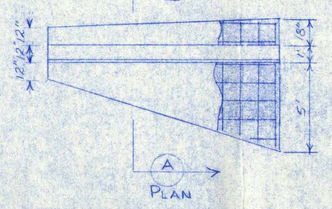
APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/20/78

IDAHO DEPARTMENT OF WATER RESOURCES		
SCALE: AS SHOWN	APPROVED BY:	DRAWN BY: FF / CA
DATE: MAR. 1978		REVISED
PRIEST LAKE OUTLET - STRUCTURAL DETAIL		
		DRAWING NUMBER 97-2020-3

24X36 PRINTED ON NO. 1080H CLEARPRINT

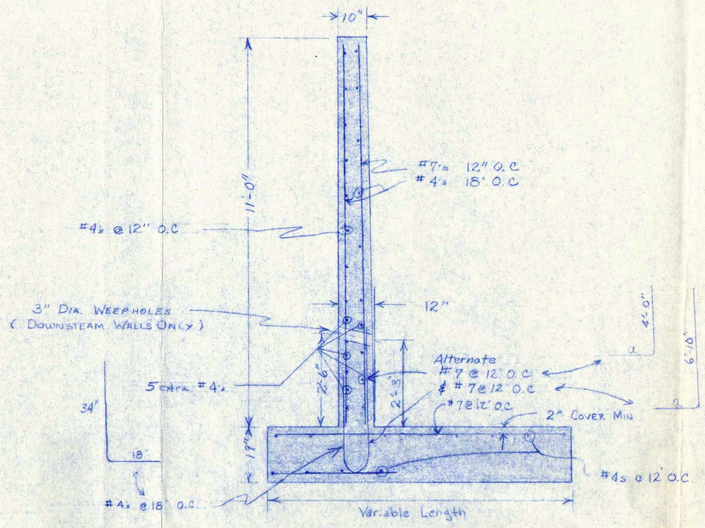


ELEVATION

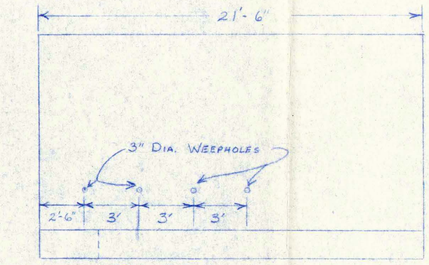


PLAN

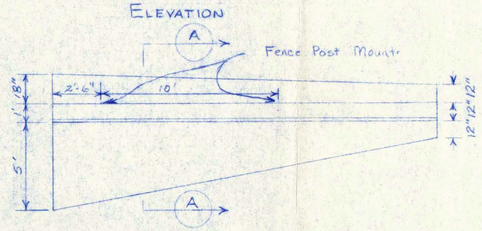
LEFT WING WALL - DOWNSTREAM
SCALE 1" = 4'-0"



SECTION A-A
TYP. DOWNSTREAM WING WALLS
SCALE 1" = 2'-0"

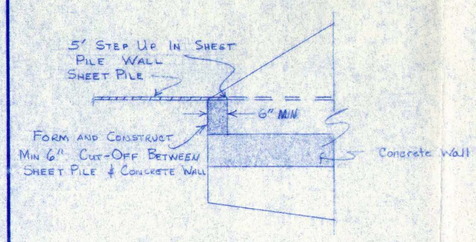


ELEVATION

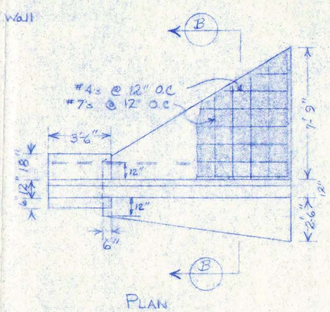


PLAN
RIGHT WING WALL - DOWNSTREAM
SCALE 1" = 4'-0"

ELEVATION

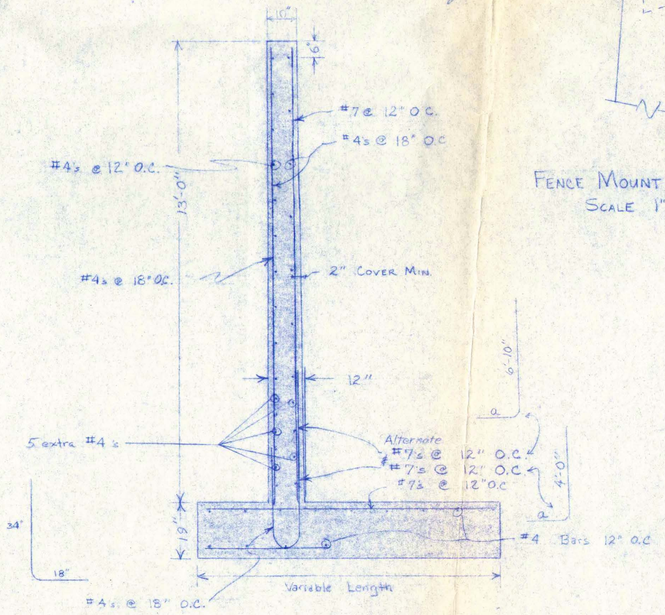


SECTION C-C
SCALE 1" = 2'-0"

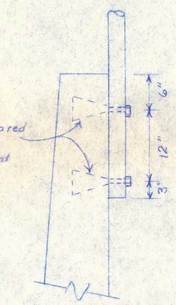


PLAN
LEFT WING WALL - UPSTREAM
SCALE 1" = 4'-0"

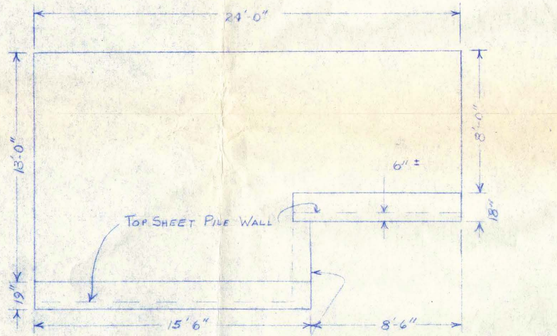
NOTE:
DIMENSION "a" VARIES WITH LENGTH OF WING WALL BASE



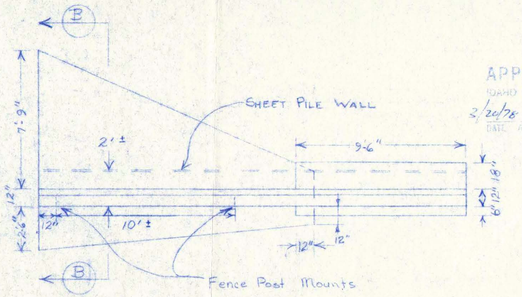
SECTION B-B
SCALE 1" = 2'-0"



FENCE MOUNT DETAIL
SCALE 1"=1'



ELEVATION



PLAN
RIGHT WING WALL - UPSTREAM
SCALE 1" = 4'-0"

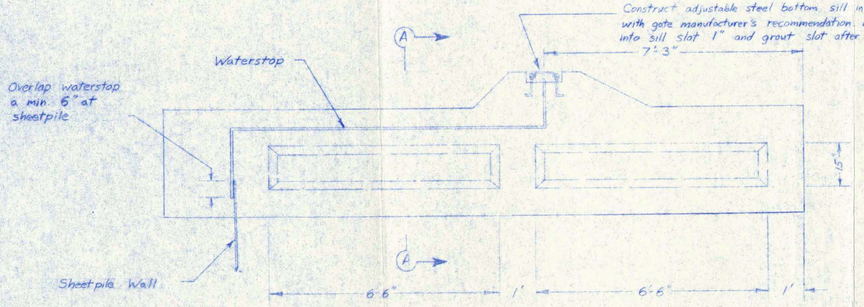
APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/26/78
DATE ADMINISTRATOR, RESOURCES ADMIN. DIVISION

CERTIFIED PROFESSIONAL ENGINEER
17-3-78
WILLIAM R. GOSS

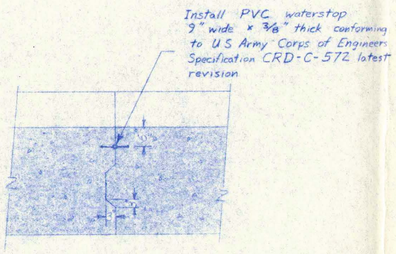
NOTE:
Construct Expansion Joint at each contact between wingwalls and dam and wall. See Typical Detail on Sheet 5.

IDAHO DEPARTMENT OF WATER RESOURCES	
PRIEST LAKE OUTLET — WINGWALLS	
DRAWN BY JB	APPROVED W.Stuart
SCALE AS SHOWN	SHEET NO. 97-2020 4
DATE 17 Mar. 78	

IDAHO BLUEPRINT & SUPPLY CO., INC., BOISE, IDAHO

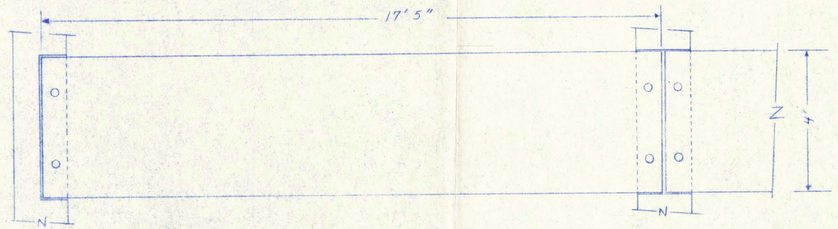


CONTRACTION JOINT DETAIL
Scale: 1" = 2'-0"



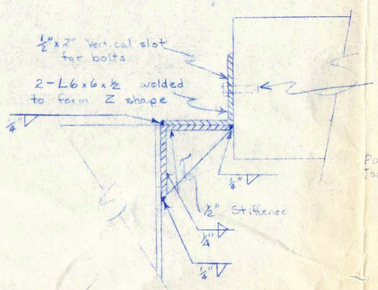
SECTION A-A

NOTE:
Concrete walkway to be designed for a live load of 100 lbs/ft² plus dead load.

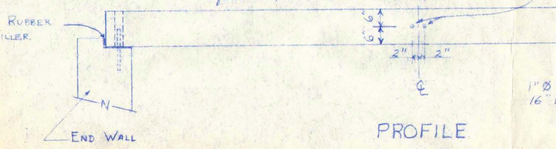


PLAN
Scale 1" = 2'-0"

BOLT INSERTS OR WELD PLATES SHALL BE INSTALLED ALONG BOTH SIDES TO ACCOMODATE HANDRAILING. HANDRAIL DESIGN SHALL BE APPROVED BY OWNER PRIOR TO CONSTRUCTION.



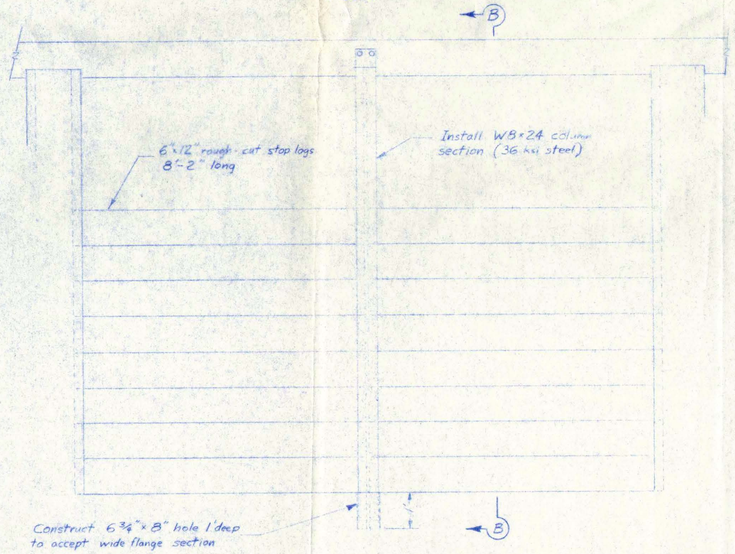
BRACKET DETAIL
Scale 1" = 1'



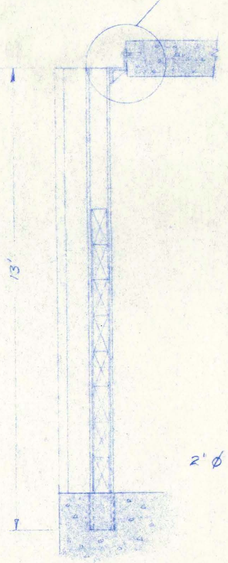
PROFILE
Scale 1" = 2'-0"



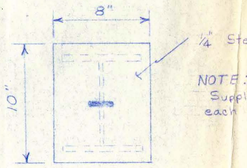
PLAN



PROFILE

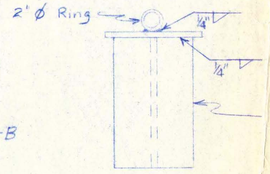


SECTION B-B



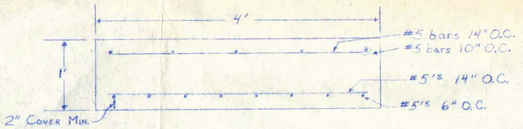
NOTE:
Supply one plug for each gate bay.

TOP VIEW



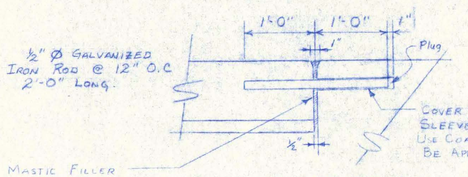
ELEVATION

Plug Detail
Scale 1" = 1'



SECTION C-C
Scale 1" = 1'-0"

PRECAST CONCRETE WALKWAY



NOTE:
ALIGN DOWELS PARALLEL TO WING WALLS

TYP. EXPANSION JOINT
No Scale

APPROVED
IDAHO DEPARTMENT OF WATER RESOURCES
3/29/78
DATE — DIRECTOR, WATER RESOURCE REGIONAL DIVISION

17-3-78
William R. Goodell

IDAHO DEPARTMENT OF WATER RESOURCES	
PRIEST LAKE OUTLET — MISC. DETAILS	
DRAWN BY: W.G., K.H. APPROVED: W. Goodell	
SCALE: AS SHOWN	SHEET NO. 97-2020 5
DATE: 17 MAY 1978	

IDAHO BLUEPRINT & SUPPLY CO., INC., BOISE, IDAHO

APPENDIX G – STANDARD TRAFFIC CONTROL PLANS

CONTENTS

1. Idaho Standard Traffic Control Plans