

State of Idaho
Department of Water Resources
Permit to Appropriate Water
No. 63-35002

Priority: December 24, 2020

Maximum Diversion Rate: 30.0 CFS

This is to certify that

BOISE STATE UNIVERSITY OFFICE OF THE PRESIDENT
1910 UNIVERSITY DR BOISE ID 83725-0001

has applied for a permit to appropriate water from:

Source : BOISE RIVER

Tributary: SNAKE RIVER

and a permit is APPROVED for development of water as follows:

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>
AESTHETIC	01/01 to 12/31	30.0 CFS
WILDLIFE	01/01 to 12/31	30.0 CFS

Location of Point(s) of Diversion

BOISE RIVER L5 (SE¼ NE¼), Sec. 4, Twp 02N, Rge 03E, B.M. ADA County

Place of Use: AESTHETIC AND WILDLIFE

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
02N	03E	4	X L1			X L5													

Conditions of Approval

1. Proof of application of water to beneficial use shall be submitted on or before **September 01, 2026**.
2. Subject to all prior water rights.
3. Aesthetic and wildlife uses are for flow through water associated with the Diane Moore Nature Center.
4. Use of water under this right may be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 63.
5. Prior to diversion of water under this right, the right holder shall install and maintain a measuring device and lockable controlling works at the point of diversion and a measuring device at the point of return to the Boise River of a type and at a location acceptable to the Department as part of the diverting works. The point of return shall be located in or near Township 02N, Range 03E, Section 4, NENE.
6. To mitigate for the depletion of water resulting from the use of water under this right and to prevent injury to senior water right holders, the right holder shall cease diverting and using water as authorized by the following water rights for the purposes and amounts specified below. Moreover, the official record for the following water right will be changed to show that diversion and use of water is not authorized because the rights, or portion thereof, are being dedicated to mitigation by non-use. The mitigating right may also include a condition stating that the mitigation by non-use is for the benefit of this right.

State of Idaho
Department of Water Resources
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<u>Right No.</u>	<u>Use Changed to Mitigation by Non-Use</u>	<u>Mitigation Rate (cfs)</u>	<u>Mitigation Acres</u>
63-185B	Irrigation	0.08	4.0

The land that will no longer be irrigated under the mitigating rights is located within the service area of South Boise Water Company. Additionally, associated rights 63-148C, 63-150, 63-185A, 63-185B, 63-2392C and 63-2392D for the South Boise Water Company service area will be modified to reduce authorized irrigation acreage by 4.0 acres to prevent enlargement.

If the specified mitigation right, or portion thereof, is sold, transferred, leased, used on any place of use, or is not deliverable at a rate equal to or greater than 60% of the face value due to a shortage of water or a priority call, the right holder shall cease diversion, shall rent water from the Boise River Rental Pool, or shall otherwise mitigate for the depletion of water caused by this water use.

7. This right does not authorize the diversion or use of water released from Lucky Peak Reservoir for streamflow maintenance purposes pursuant to water right 63-3618. Pursuant to water right 63-3618, the quantity, duration, and timing of streamflow maintenance releases from Lucky Peak Reservoir are determined according to joint written instructions from the United States Bureau of Reclamation and the Idaho Department of Fish and Game to the Idaho Department of Water Resources.
8. Any obstruction in the Boise River channel for diversion of water under this right must provide for watercraft and fish passage. The right holder must bypass sufficient flows in the Boise River at the point of diversion to accommodate watercraft navigation and fisheries values in the Boise River downstream of the diversion. The quantity of the bypass flow may be established in the future by the filing of a petition with the Department to establish the bypass flows and subsequent proceedings as described in the Department's Rules of Procedure.
9. This right does not grant any right-of-way or easement across the land of another.
10. The diversion and use of water described in this right may be subject to additional conditions and limitations agreed to by the protestants and the right holder under a separate agreements, dated August 26, 2021, and dated August 19, 2021, respectively, to which the Department is not a party. Because the Department is not a party, the Department is not responsible for enforcement of any aspect of the agreements not specifically addressed in other conditions herein. Enforcement of those portions of the agreements not specifically addressed in other conditions shall be the responsibility of the protestant and the water right holder.
11. Diversions under this right into the side channel may occur only when flows in the existing main channel of Boise River exceed 600 cubic feet per second, as measured at the USGS Glenwood Bridge stream gage (Site No. 13206000).

This permit is issued pursuant to the provisions of Idaho Code § 42-204.

Signed this 7th day of September, 2021.



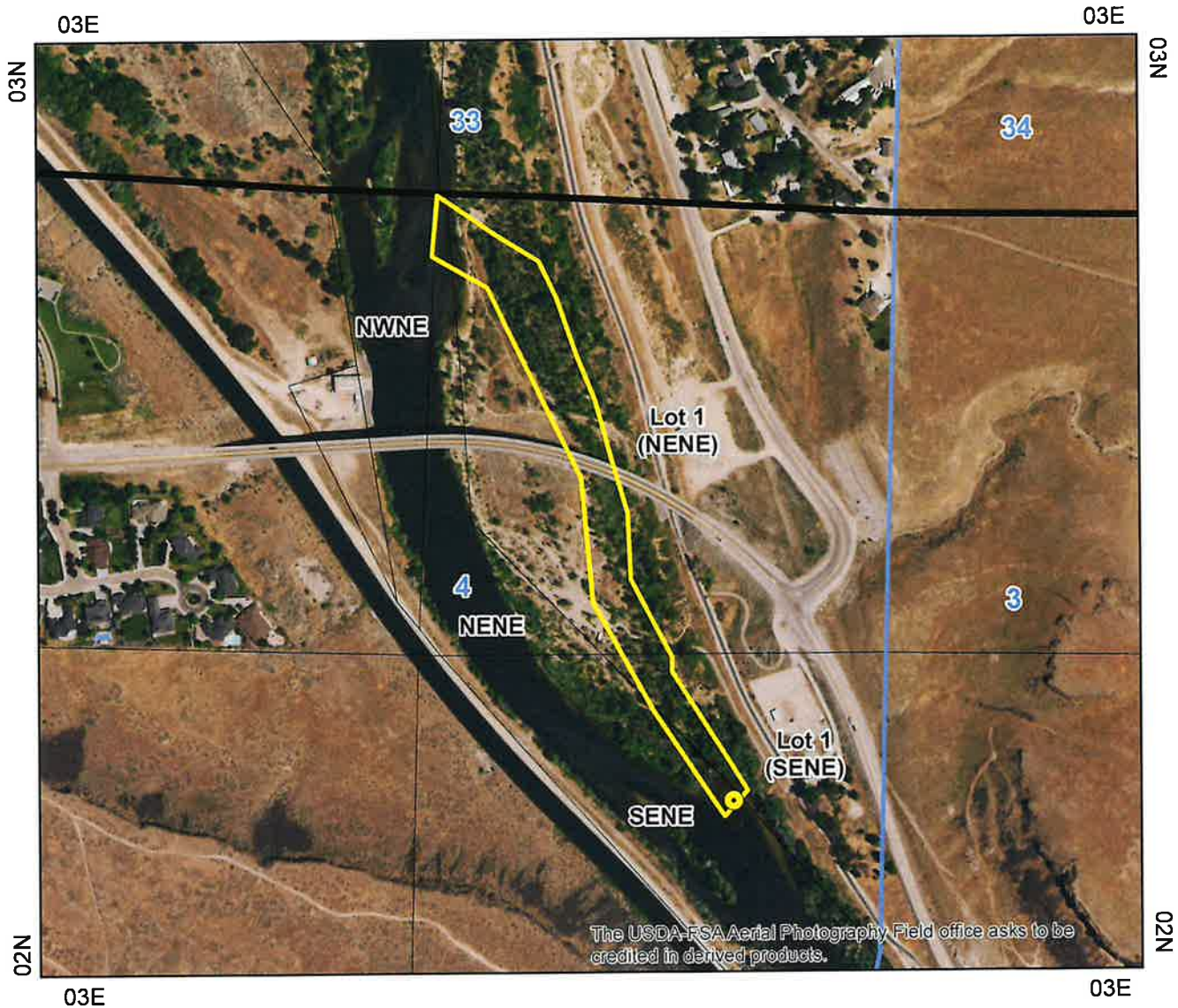
NICK MILLER
Western Regional Manager

State of Idaho
Department of Water Resources

Attachment to Permit to Appropriate Water

63-35002

This map depicts the AESTHETIC and WILDLIFE place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



-  Point of Diversion
-  Place Of Use Boundary
-  Townships
-  PLS Sections
-  Quarter Quarters

0 0.05 0.1 0.2 Miles





September 7, 2021

BOISE STATE UNIVERSITY
OFFICE OF THE PRESIDENT
1910 UNIVERSITY DR
BOISE ID 83725-0001

RE: Permit No: 63-35002

Permit Approval Notice

Dear Water Right Holder:

The Department of Water Resources (“Department”) has issued the enclosed permit authorizing you to establish a new water right. Please be sure to thoroughly review all the conditions of approval listed on your permit. The conditions include requirements that you must accomplish, such as timely submittal of proof of beneficial use or installation of a measuring device, as well as information about how your water use may be administered, such as regulation by a watermaster in a water district. Failure to comply with the conditions of approval may result in your permit lapsing or being canceled.

The permit is a PRELIMINARY ORDER issued pursuant to Rule 730 of the Department’s Rules of Procedure (IDAPA 37.01.01.730). It can and will become a final order without further action by the Department unless a party petitions for reconsideration, files exceptions, or requests a hearing as described in the enclosed information sheet.

The final step in the water right process is issuance of a water right license. To receive a water right license, you must divert and use water to the full extent intended and submit a *Statement of Completion for Submitting Proof of Beneficial Use* by the date shown in condition no. 1 of your permit. The Department will send you a *Proof Due Notice* approximately 60 days prior to the date listed in condition no. 1 of your permit.

You may also require approvals from other Department programs, such as Ground Water Protection, Safety of Dams, or Stream Channel Protection, to accomplish your proposed development. Please call or visit any Department office or see the Department’s website at idwr.idaho.gov for more information about these programs.

Please be advised that Idaho Code § 42-248, requires you or the owner of this water permit to maintain current ownership and address records on file with the Department. Forms to file an assignment of permit and/or a change in the address of the permit owner are available from any Department office or at the Department’s website at www.idwr.idaho.gov.

If you have any questions concerning the enclosed information, please contact me at (208) 334-2190.

Sincerely,


DENISE LAUERMAN

for Nick Miller
Western Regional Manager

Enclosures

CC:

SPF WATER ENGINEERING LLC C/O LORI GRAVES
BOISE CITY C/O MARY GRANT
SUEZ WATER C/O ROBERT NEWBRY
GIVENS PURSLEY LLP C/O CHARLIE S BASER & MICHAEL P LAWRENCE
SAWTOOTH LAW OFFICES PLLC C/O BRYCE FARRIS
WATER DISTRICT #63 C/O REX BARRIE

CERTIFICATE OF SERVICE

I hereby certify that on September 7, 2021, I served a true and correct copy of Permit to Appropriate Water No. 63-35002 by U.S. Mail, postage prepaid, to the following:

BOISE STATE UNIVERSITY (Current Owner)
OFFICE OF THE PRESIDENT
1910 UNIVERSITY DR
BOISE ID 83725-0001

SPF WATER ENGINEERING LLC (Representative)
C/O LORI GRAVES
300 E MALLARD DR STE 350
BOISE ID 83706-6660

CITY OF BOISE (Protestant)
C/O MARY GRANT
150 N. CAPITOL BLVD.
BOISE ID 83701

SUEZ WATER IDAHO INC (Protestant)
C/O GIVENS PURSLEY LLP
ATTN: CHARLIE S BASER & MICHAEL P LAWRENCE
601 BANNOCK STREET
BOISE ID 83702

SUEZ WATER IDAHO (Protestant)
C/O ROBERT NEWBRY
8248 W VICTORY RD
BOISE ID 83709

BRYCE FARRIS (Protestant)
SAWTOOTH LAW OFFICES PLLC
1101 W RIVER ST STE 110
PO BOX 7985
BOISE ID 83707

WATER DISTRICT #63
REX BARRIE (Watermaster)
PO BOX 767
STAR ID 83669-4500


Denise Lauerman
Administrative Assistant

EXPLANATORY INFORMATION TO ACCOMPANY A PRELIMINARY ORDER

(To be used in connection with actions when a hearing was **not** held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "**Preliminary Order**" issued by the department pursuant to section 67-5243, Idaho Code. **It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:**

PETITION FOR RECONSIDERATION

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. **Note: the petition must be received by the department within this fourteen (14) day period.** The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

EXCEPTIONS AND BRIEFS

Within fourteen (14) days after: (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

REQUEST FOR HEARING

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

ORAL ARGUMENT

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

CERTIFICATE OF SERVICE

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

FINAL ORDER

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

Unless a different date is stated in a final order, the order is effective fourteen (14) days after its service date if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:

- (a) The petition for reconsideration is disposed of; or
- (b) The petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

APPEAL OF FINAL ORDER TO DISTRICT COURT

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

- i. A hearing was held,
- ii. The final agency action was taken,
- iii. The party seeking review of the order resides, or
- iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.



SPF WATER
ENGINEERING

RECEIVED

MAY 17 2021

WATER RESOURCES
WESTERN REGION

May 14, 2021

Anna Kaiser
Water Resource Agent
Idaho Department of Water Resources
2735 Airport Way
Boise, ID 83705

Subject: Rule 40 Additional Information for Application for Permit 63-35002

Dear Anna:

On behalf of Boise State University (Applicant or BSU), SPF Water Engineering (SPF) has prepared this letter to provide additional information related to application for permit 63-35002. The referenced application for permit seeks to divert a total of 30 cfs of Boise River water for wildlife and aesthetic purposes through a river side channel. The following paragraphs provides background and additional information required under IDAPA 37.03.08 Rule 40.05.

BACKGROUND

Application for permit 63-35002 seeks authorization to divert up 30 cfs from the Boise River for wildlife and aesthetic purposes as part of the BSU Intermountain Bird Observatory side channel project at the Diane Moore Nature Center. Water will be diverted through an existing flood channel that flows beneath the Highway 21 bridge, with a point of diversion in the SE ¼ of the NE ¼ of Section 4, Township 2 North, Range 3 East. The water will return to the river approximately ½ mile downstream in the NENE of Section 4. The side channel will be modified to improve habitat for fish and wildlife. Water use will be non-consumptive, except for minor evaporation and transpiration losses that will be mitigated through non-diversion of a senior-priority irrigation water right held by South Boise Water Company.

RULE 40.05 INFORMATION

The following paragraphs provide the additional information required from the applicant under water appropriation rules 40.05c through 40.05g as requested by your letter dated February 23, 2021.

IDAPA 37.03.08, 40.05.c: Effect on Existing Water Rights

- I. *For applications appropriating springs or surface streams with five (5) or fewer existing users, either the identification number, or the name and address of the user, and the location of the point of diversion and nature of use for each existing water right shall be submitted.*

Not applicable. The Boise River has more than 5 existing users.

- II. *For applications appropriating groundwater, a plat shall be submitted locating the proposed well relative to all existing wells and springs and permitted wells within a one-half mile radius of the proposed well.*

Not applicable. The application proposes appropriating surface water.

- III. *Information shall be submitted concerning any design, construction, or operation techniques which will be employed to eliminate or reduce the impact on other water rights.*

The point of diversion for the project will be the entrance to an existing side channel on the Boise River. The side channel currently carries water only during high flow events. The channel will be modified to carry water when flows exceed 600 cfs at the Glenwood Bridge gage (Glenwood). River flows exceed 600 cfs at Glenwood during the irrigation season or during flood control releases. During the irrigation season when flows exceed 600 cfs at Glenwood, the flows at the proposed side channel point of diversion will generally range from 1100 cfs to 1600 cfs (i.e., flows in the main channel opposite the side channel will therefore range for 1070 cfs to 1570 cfs).

The Surprise Valley Pump Station is the only water right point of diversion located between the point of diversion and point of return proposed by this application. By limiting diversions to times when Boise River flows exceed 600 cfs at Glenwood, there will always be sufficient water supply at the pump station to allow diversion by the pump stations users (Micron, Suez, Surprise Valley HOA, and JR Simplot Company). The operators of the Surprise Valley Pump Station (Micron and Suez) are engaged with the applicant to ensure that the project does not impact the pump station. Appropriate conditions to protect the Surprise Valley Pump Station will be included in a stipulated agreement to resolve the Suez water right protest.

Limiting diversions under the proposed permit to such times when flows exceed 600 cfs at Glenwood also ensures that winter streamflow maintenance storage releases are not diverted through the side channel. Winter streamflow maintenance releases are typically less than 300 cfs.

Finally, the mitigation plan proposed with the application will offset the consumption from the project through non-diversion of 0.08 cfs authorized under South Boise Water Company water right 63-185B, thereby preventing injury of senior-priority water rights on the Boise River.

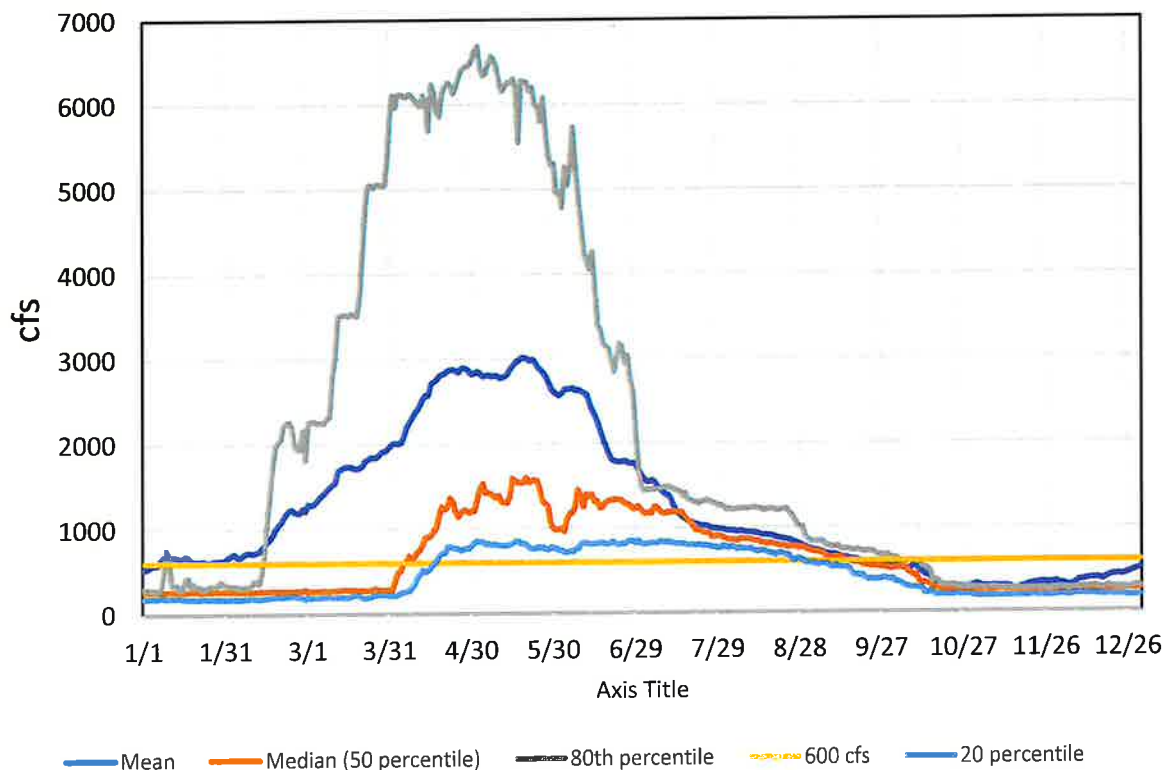
IDAPA 37.03.08, 40.05.d: Sufficiency of Water Supply

- I. *Information shall be submitted on the water requirements of the proposed project, including, but not limited to, the required diversion rate during the peak use period and the average use period, the volume to be diverted per year, the period of year that water is required, and the volume of water that will be consumptively used per year.*

The application seeks 30 cfs of water at times when flows exceed 600 cfs at the Glenwood gage. The full 30 cfs amount will be diverted at such times. Water availability varies from year to year, but the median (50 percentile) flows exceed 600 cfs for 164 days per year, from early April until mid-September. Assuming 164 days of operation at 30 cfs, total diversion volume will be 9,759 acre feet. In good water years, diversions through the side channel may begin during flood control releases prior to April and may extend with irrigation deliveries into October. In poor water years, diversion may begin in late April and stop before September 1. Figure 1 shows daily statistical flows for mean, 50 percentile (median), 20 percentile, and 80 percentile conditions. The median condition indicates water is available 164 days per season. Flows exceed 600 cfs for the 20 and 80 percentile conditions on 135 and 237 days, respectively.

Consumptive water use from the project has been estimated at 10.3 acre feet based on 2 acres of open water area and 2 acres of riparian edge (cottonwoods). Consumptive use is mitigated by non-diversion of 4 acres of South Boise Water Company irrigation water right 63-185B. A mitigation plan was included with the permit application.

Boise River Flows (cfs) at USGS Glenwood Gage (1981-2021)



- II. *Information shall be submitted on the quantity of water available from the source applied for, including, but not limited to, information concerning flow rates for surface water sources available during periods of peak and average project water demand, information concerning the properties of the aquifers that water is to be taken from for groundwater sources, and information on other sources of supply that may be used to supplement the applied for water source.*

The application seeks a diversion rate of 30 cfs, but diversion will occur only at times when Boise River flow exceed 600 cfs as measured at the Glenwood Bridge gage. Flows typically exceed 600 cfs at Glenwood from the first week of April until the mid-September (Figure 1), but may have longer or shorter durations depending on snowpack and runoff conditions.

IDAPA 37.03.08, 40.05.e: Good Faith, Delay, or Speculative Purposes

- I. *The applicant shall submit copies of deeds, leases, easements or applications for rights-of-way from federal or state agencies documenting a possessory interest in the lands necessary for all project facilities and the place of use or if such interest can be obtained by eminent domain proceedings the applicant must show that appropriate actions are being taken to obtain the interest. Applicants for hydropower uses shall also submit information required to demonstrate compliance with Sections 42-205 and 42-206, Idaho Code.*

The project is located on State lands controlled by the Idaho Department of Transportation (ITD). Applicant BSU currently utilizes the site under the terms of ITD Management Agreement number 8056. A copy of the Management Agreement is provided as Attachment A. BSU and ITD are currently negotiating an updated agreement for future management.

- II. *The applicant shall submit copies of applications for other needed permits, licenses and approvals, and must keep the department apprised of the status of the applications and any subsequent approvals or denials.*

The following permits and approvals have been identified and are being obtained, consulted, or negotiated as applicable.

- USACE 404 Nationwide Permit 27
- USFWS Section 7 ESA Consultation
- USFWS Fish & Wildlife Coordination Act
- Idaho Department of Lands Stream Alteration Permit
- Section 106 SHPO Project Review
- Idaho DEQ Section 401 Water Quality Certification

- Idaho DEQ 1200-C Stormwater NPDES General Permit
- ITD Access ROW MOU
- ITD Scour Evaluation MOU
- Ada County Floodplain No-rise
- City of Boise Floodplain No-rise
- City of Boise Commercial Grading
- City of Boise River System Tree Mitigation
- City of Boise Erosion and Sediment Control

Completed applications and permits are provided as Attachment B. IDWR can be provided with additional applications or approvals as they are completed.

IDAPA 37.03.08, 40.05.f: Financial Resources

- I. *The applicant shall submit a current financial statement certified to show the accuracy of the information contained therein, or a financial commitment letter along with the financial statement of the lender or other evidence to show that it is reasonably probable that financing will be available to appropriate the water and apply it to the beneficial use proposed.*

Attachment C is an agreement between Boise State University and Micron Technology for funding of the project. Micron is funding all design and construction.

- II. *The applicant shall submit plans and specifications along with estimated construction costs for the project works. The plans shall be definite enough to allow for determination of project impacts and implications.*

Attachment D is a 60%-level plan set for the project and a project design report. Current cost estimate for construction is approximately \$1.5M.

IDAPA 37.03.08, 40.05.g: Conflict with the Local Public Interest

The applicant shall seek comment and shall submit all letters of comment on the effects of the construction and operation of the proposed project from the governing body of the city and/or county and tribal reservation within which the point of diversion and place of use are located, the Idaho Department of Fish and Game, the Idaho Department of Environmental Quality, and any irrigation district or canal company within which the proposed project is located and from other entities as determined by the Director.

Attachment E includes requests for comment letters submitted to Ada County and City of Boise. A response from City of Boise is included. Requests for comment were previously sent out by Department of Water Resources staff to the Idaho Department of Fish and Game, Idaho Department of Environmental Quality, Water District 63, US Bureau of

Reclamation, Micron Technology, and South Boise Water Company. Copies of these previous requests for comment are included in Attachment E. The project is not located within the boundary of a canal company or irrigation district.

Please contact me with any questions.

Sincerely,

Terry M. Scanlan

Terry M. Scanlan, P.E., P.G.
Principal Engineer/Hydrogeologist

Cc: Matt McGee, BSU
Ann Dickey, Micron Technology Inc.

Attachments

- A – Management Agreement
- B – Permit Applications
 - B1 – Joint Application for Permit and Supporting Documents
 - B2 – BOR SF299 Utility ROW Application
 - B3 – Floodplain No-Rise
 - B4 – City of Boise River Systems Permit
- C – Funding Agreement
- D – Project Plans and Design Report
- E – Request for Comment Letters

SPF file number: 100.0460

Attachment A
Management Agreement

MANAGEMENT AGREEMENT

**Diversion Dam Bridge Mitigation Property
State Highway 21 at MP 3.4
Ada County, Idaho**

PARTIES

THIS AGREEMENT ("Agreement") is made and entered into this day of FEBRUARY 28, 2012, by and between the **IDAHO TRANSPORTATION DEPARTMENT**, hereafter called the **STATE**, and **BOISE STATE UNIVERSITY**, hereafter called the **BSU**.

PURPOSE and HISTORY

The Parties have agreed that it is in the public's interest to protect and conserve the natural values of said Property, to include the parking area, which property is more particularly described on Exhibit A, attached hereto and incorporated by reference herein (the "Property"), in a manner consistent with the mitigation commitments described below.

The Property was purchased by the STATE using federal dollars as part of the State Highway 21 Diversion Dam Bridge Project. The National Environmental Policy Act (NEPA) was applicable and an Environmental Assessment followed which defined impacts and mitigation for the project. Mitigation commitments were described in the NEPA document and Finding of No Significant Impact (FONSI). Mitigation for wetlands required the creation and/or enhancement of wetlands and that the wetlands are protected in perpetuity. A Section 404 permit of the Clean Water Act required that the wetland mitigation meet specific performance measures prior to releasing the STATE from its management obligation. The Property was monitored for performance until the performance measures were met. The U.S. Army Corps of Engineers has released the STATE from monitoring and liability. Additionally, Section 7 of the Endangered Species Act identified the project impacts on the wintering Bald Eagle and the STATE committed to manage the Property in accordance with the Biological Assessment performed for BSU's Groundwater Research and Education Project located on the Property. Currently, the Bald Eagle is no longer listed under the Endangered Species Act; however, the species has continued protection through the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The Property will be managed in perpetuity and consistent with the Clean Water Act, Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Where consistent with the above mitigation commitments, the Property will be managed in accordance with the Barber Pool Management Plan.

Since 1997, BSU has been developing and operating the Boise Hydrogeophysical Research Site (BHRS) for scientific research and educational activities at the Property. The BHRS is a field research and education site that is operated under permits with the ITD and the US Army Corps of Engineers that are consistent with ITD's Section 404 permit and that are consistent with the Barber Pool Management Plan.

Since 1999, BSU's Idaho Bird Observatory (IBO) has conducted environmental outreach and education activities in Barber Pool and at the Idaho Shakespeare Festival. BSU has interest in developing a year-round outdoor education and biological research program for local K-12 youth on the property consistent with the Barber Pool Management Plan.

Authority for this Agreement is established by Section 40-309 of the Idaho Code.

SECTION I. BSU will:

1. Allow ITD access to the Property as needed.
2. Manage the Property in accordance with the Barber Pool Management Plan where it is consistent with the above mitigation commitments.
3. Monitor the Property, as needed to minimize vandalism. BSU shall seek cooperation from the Ada County Sheriff's Department and/or Idaho Fish and Game, as needed.
4. Seek approval from ITD on all permanent structures prior to installation. Contact ITD District III Right of Way Specialist at 208-334-8300.
5. Provide management and maintenance of the Property, at no cost to ITD, including, but not limited to, amenities to the Property.
6. Prohibit employees, agents or invitees to the Property from contaminating the Property, including the lands, waters, or facilities thereon, or the disposing of any hazardous or toxic materials or chemicals within or upon the Property. Hazardous or toxic material means any substance now or hereafter identified by any government agency as requiring special handling, disposal or control unlike regular refuse. Pesticide

or herbicide applications on the Property shall be made in accordance with all federal, state and county and local laws.

SECTION II. The **STATE** will:

1. Allow BSU to manage the Property at will as long as the commitments in this Agreement are being met.
2. Provide BSU with initial signage along the greenbelt adjacent to the Property to inform the public of the sensitive nature of the area and legally enforceable consequences of disallowed and damaging activities.
3. Keep BSU informed in regards to any upcoming activities which may impact the Property.
4. Give BSU a free and unencumbered right of access to the Property for conservation, research, education, and maintenance purposes.
5. Allow BSU to store equipment, interpretive signs, and any other related equipment used for research and outreach activities on the Property.
6. Allow BSU to erect temporary structures as necessary for conservation, research, and education purposes.
7. Allow BSU to construct and maintain permanent structures as necessary for conservation, research, and education purposes, provided, however, that such construction shall be subject to the approval requirement of Section I(4) of this Agreement.

SECTION III. **BOTH** Parties will cooperatively work together to protect the values of the Property for which mitigation has been established.

SECTION IV: Effective Date and Termination of Agreement

This Agreement shall become effective on the date of signature by the authorized representatives of the parties as listed below, and shall remain in effect until the Parties mutually agree in writing to dissolve. Any Party may terminate their involvement in this Management Agreement by providing one hundred and eighty (180) days' prior written notice. In the event of a material breach of the commitments outlined in this Agreement, the non-breaching party may terminate this Agreement if such breach is not cured within thirty (30) days' prior written notice of breach to the breaching party.

NOTICES

Any notice under this Agreement shall be in writing and be delivered in person or by public or private courier service (including U.S. Postal Service Express Mail) or certified mail with return receipt requested or by facsimile. All notices shall be addressed to the parties at the following addresses or at such other addresses as the parties may from time to time direct in writing:

BSU: Boise State University
 Attn: Office of the General Counsel
 1910 University Drive
 Boise, Idaho 83725
 Fax: (208) 426-1345

STATE: Idaho Transportation Department
 Attn: Environmental Planner Senior
 P.O. Box 8028
 Boise, Idaho 83707

INDEMNITY:

BSU shall during the term of the lease, indemnify the State and hold it harmless and defend against all liability, claims, demands and judgments for loss of damage or injury to the property or person, resulting from or accruing by reason of BSU's negligent use or occupancy of the Property.

NEITHER PARTY SHALL BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR SPECIAL DAMAGES, EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Liability of both parties is at all times governed by the Idaho Tort Claims Act, Idaho Code §§ 6-901, et seq. Nothing herein shall be construed as a waiver of either party's sovereign immunity or any other protection afforded to either party as entities of the State of Idaho, including but not limited to the protections afforded both parties under the Idaho Tort Claims Act.

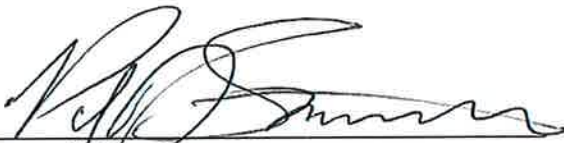
AGREEMENT NUMBER: 8056

EXECUTION

This Agreement is executed for the **STATE** by its **Chief Operations Officer**, and executed for **BSU** by the **Vice President of Finance and Administration**.

IDAHO TRANSPORTATION DEPARTMENT

APPROVED BY:


Chief Operations Officer

APPROVED AS TO FORM:


Deputy Attorney General

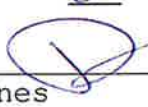
RECOMMENDED:


District Engineer

AGREEMENT NUMBER: 8056

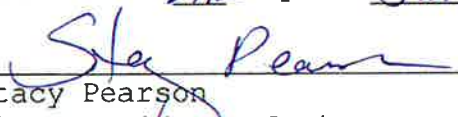
IN WITNESS WHEREOF, the Parties have set their hands and subscribed their names, the day, month and year in this agreement first above written.

Dated this 6th day of February, 2012.



Dave Jones
ITD District Administrator
Idaho Transportation Department

Dated this 27th day of January, 2012.



Stacy Pearson
Vice President of Finance and Administration
Boise State University

AGREEMENT NUMBER: 8056

EXHIBIT "A"
MANAGEMENT AGREEMENT

Diversion Dam Bridge Mitigation Property
State Highway 21 at MP 3.4
Ada County, Idaho

Attachment B
Permit Applications

Attachment B1
Joint Application for Permit and
Supporting Documents

JOINT APPLICATION FOR PERMITS

U.S. ARMY CORPS OF ENGINEERS - IDAHO DEPARTMENT OF WATER RESOURCES - IDAHO DEPARTMENT OF LANDS

Authorities: The Department of Army Corps of Engineers (Corps), Idaho Department of Water Resources (IDWR), and Idaho Department of Lands (IDL) established a joint process for activities impacting jurisdictional waterways that require review and/or approval of both the Corps and State of Idaho. Department of Army permits are required by Section 10 of the Rivers & Harbors Act of 1899 for any structure(s) or work in or affecting navigable waters of the United States and by Section 404 of the Clean Water Act for the discharge of dredged or fill materials into waters of the United States, including adjacent wetlands. State permits are required under the State of Idaho, Stream Protection Act (Title 42, Chapter 38, Idaho Code and Lake Protection Act (Section 58, Chapter 13 et seq., Idaho Code). In addition the information will be used to determine compliance with Section 401 of the Clean Water Act by the appropriate State, Tribal or Federal entity.

Joint Application: Information provided on this application will be used in evaluating the proposed activities. Disclosure of requested information is voluntary. Failure to supply the requested information may delay processing and issuance of the appropriate permit or authorization. **Applicant will need to send a completed application, along with one (1) set of legible, black and white (8½"x11"), reproducible drawings that illustrate the location and character of the proposed project / activities to both the Corps and the State of Idaho.**

See Instruction Guide for assistance with Application. Accurate submission of requested information can prevent delays in reviewing and permitting your application. Drawings including vicinity maps, plan-view and section-view drawings must be submitted on 8-1/2 x 11 papers.

Do not start work until you have received all required permits from both the Corps and the State of Idaho

FOR AGENCY USE ONLY

USACE NWW-	Date Received:	☐ Incomplete Application Returned	Date Returned:
Idaho Department of Water Resources No.	Date Received:	☐ Fee Received DATE:	Receipt No.:
Idaho Department of Lands No.	Date Received:	☐ Fee Received DATE:	Receipt No.:

INCOMPLETE APPLICANTS MAY NOT BE PROCESSED

1. CONTACT INFORMATION - APPLICANT Required:				2. CONTACT INFORMATION - AGENT:			
Name: Greg Kaltenecker				Name: Scott Wright, PE			
Company: Boise State University				Company: River Design Group, Inc.			
Mailing Address: 1910 University Drive				Mailing Address: 311 SW Jefferson Avenue			
City: Boise		State: ID	Zip Code: 83725	City: Corvallis		State: OR	Zip Code: 97333
Phone Number (include area code): (208) 426-4354		E-mail: gregorykaltenecker@boisestate.edu		Phone Number (include area code): (541)738-2920		E-mail: swright@riverdesigngroup.net	
3. PROJECT NAME or TITLE: Boise River Side Channel Restoration Project				4. PROJECT STREET ADDRESS: 7191 ID-21			
5. PROJECT COUNTY: Ada County		6. PROJECT CITY: Boise		7. PROJECT ZIP CODE: 83716		8. NEAREST WATERWAY/WATERBODY: Boise River	
9. TAX PARCEL ID#: S1604110200; S0933417700		10. LATITUDE: 43° 32' 37" North LONGITUDE: 116° 5' 50" West		11a. 1/4: NE 1/4	11b. 1/4: NE 1/4	11c. SECTION: 4	11d. TOWNSHIP: 2 North
						11e. RANGE: 3 East	
12a. ESTIMATED START DATE: 07/09/2021		12b. ESTIMATED END DATE: 03/23/2022		13a. IS PROJECT LOCATED WITHIN ESTABLISHED TRIBAL RESERVATION BOUNDARIES? ☒ NO ☐ YES Tribe:			
13b. IS PROJECT LOCATED IN LISTED ESA AREA? ☒ NO ☐ YES				13c. IS PROJECT LOCATED ON/NEAR HISTORICAL SITE? ☒ NO ☐ YES			
14. DIRECTIONS TO PROJECT SITE: Include vicinity map with legible crossroads, street numbers, names, landmarks. Project is located at the Intermountain Bird Observatory Diane Moore Nature Center: 7191 ID-21, Boise, ID 83716; Please see Block 10 Vicinity Map. From the intersection of E Warm Spring Ave. and State Highway 21, proceed west and south along the dirt road which terminates at the parking area for the Intermountain Bird Observatory Diane Moore Nature Center.							
15. PURPOSE and NEED: ☐ Commercial ☐ Industrial ☒ Public ☐ Private ☒ Other Environmental rehabilitation Describe the reason or purpose of your project; include a brief description of the overall project. Continue to Block 16 to detail each work activity and overall project. The purpose is to restore fish and wildlife habitat to the Boise River side channel. Currently, the historical side channel is only connected to the mainstem channel at infrequent high flows, and has been impacted by human activity; this project would establish a side channel through the project area that is active from March - July, and would feature native vegetation along the floodplain, providing improved habitat for migratory birds and other wildlife.							

16. DETAILED DESCRIPTION OF EACH ACTIVITY WITHIN OVERALL PROJECT. Specifically indicate portions that take place within waters of the United States, including wetlands: Include dimensions; equipment, construction, methods; erosion, sediment and turbidity controls; hydrological changes: general stream/surface water flows, estimated winter/summer flows; borrow sources, disposal locations etc.:

Please see Permit Drawing Sheet 2.1 for a full list of impacts to wetlands and waters of the United States resulting from restoration project construction. Channel excavation activity will result in 0.53 acres of permanent impact and 0.03 acres of temporary impact to wetlands and waters of the U.S. Total wetlands will be increased by 0.38 acres (from existing area of 2.11 acres to proposed area of 2.49 acres). Riverine waters of the U.S. will increase by 0.67 acres (from 1.36 acres to 2.03 acres). Overall, a net positive change of 1.05 acres to wetlands and waters of the U.S. is expected.

Project implementation consists of establishment of access routes and materials staging areas (Sheet 3.0); Establishment of wetland preservation areas (Sheet 3.1); Erosion and sediment turbidity controls (Sheets 3.2 - 3.5); Side channel excavation (Sheets 4.2 and 4.4); Installation of the inlet structure (Sheet 4.5), floodplain roughness treatment (Sheet 5.0), apex jam (Sheet 5.1), bank structures (Sheet 5.2), channel spanning structures (5.3), engineered riffles (5.4), wildlife snag pods (5.5), vegetated brush trench (5.6); and revegetation including planting, seeding, and wildlife browse exclusion fencing (Sheets 7.0-7.3). A site reclamation plan is detailed on Sheet 6.0. Dimensions of each project component, as well as written descriptions and illustrations, are detailed in the above-referenced Permit Drawing Planset Sheets.

Hydrological changes include the establishment of a surface water connection between the side channel and Boise River from March to July, which is the rainbow trout spawning and rearing window. Side channel flow would be activated at mainstem Boise River flow of 600 cfs at the Glenwood Gauge. Please refer to the enclosed Design Report Appendix C: No-Rise Report for Boise River Side Channel Restoration at Intermountain Bird Observatory for full details of pre- and post-project conditions hydraulic modeling.

17. DESCRIBE ALTERNATIVES CONSIDERED to AVOID or MEASURES TAKEN to MINIMIZE and/ or COMPENSATE for IMPACTS to WATERS of the UNITED STATES, INCLUDING WETLANDS: See Instruction Guide for specific details.

The restored Boise River side channel is in the historical side channel location, and no other alternative locations were considered outside this project area. However, multiple side channel alignments were considered, and the proposed alignment which was verified in the field was selected to minimize disturbance to existing wetlands as well as minimize the number of cottonwood trees that would need to be removed to excavate the side channel. A robust revegetation plan, including hydroseeding native grasses and forbs, and installation of a diverse assemblage of woody plants with a black cottonwood-dominated overstory composition, on excavated floodplain locations will ensure additional forested wetland area is created throughout the side channel floodplain environment. Throughout the revegetation plan design process, Greg Kaltenecker and his colleagues at Boise State University, and the Treasure Valley Native Plant Network, College of Western Idaho, Idaho Department of Fish and Game, and the Boise River Enhancement Network were consulted for the preferred species to be planted, taking into consideration the creation of high-quality bird and wetland habitat in the newly-constructed channel floodplain area.

Temporary access routes and materials staging areas will be located in uplands.

18. PROPOSED MITIGATION STATEMENT or PLAN: If you believe a mitigation plan is not needed, provide a statement and your reasoning why a mitigation plan is NOT required. Or, attach a copy of your proposed mitigation plan.

While the restoration work will result in permanent impacts to 0.53 acres of existing wetlands and waters of the U.S. within the side channel excavation footprint, the work will result in a net positive increase of 0.38 acres to wetlands, resulting from the establishment of forested wetlands on the newly-excavated side channel floodplain. The project will also result in a net positive increase of 0.67 acres to Riverine waters of the U.S., which is defined as the bankfull side channel environment. As the end result of the restoration project is a net positive change to wetlands and waters of the U.S. area, we reason that a mitigation plan is not required.

19. TYPE and QUANTITY of MATERIAL(S) to be discharged below the ordinary high water mark and/or wetlands:

Dirt or Topsoil:	_____	cubic yards
Dredged Material:	_____	cubic yards
Clean Sand:	_____	cubic yards
Clay:	_____	cubic yards
Gravel, Rock, or Stone:	67	cubic yards
Concrete:	_____	cubic yards
Other (describe): Wood	233	cubic yards
Other (describe): _____	_____	cubic yards
TOTAL:	300	cubic yards

20. TYPE and QUANTITY of impacts to waters of the United States, including wetlands:

Filling:	_____	acres	_____	sq ft.	_____	cubic yards
Backfill & Bedding:	_____	acres	_____	sq ft.	_____	cubic yards
Land Clearing:	_____	acres	_____	sq ft.	_____	cubic yards
Dredging:	_____	acres	_____	sq ft.	_____	cubic yards
Flooding:	_____	acres	_____	sq ft.	_____	cubic yards
Excavation:	0.53	acres	23,087	sq ft.	3,000	cubic yards
Draining:	_____	acres	_____	sq ft.	_____	cubic yards
Other:	_____	acres	_____	sq ft.	_____	cubic yards

TOTALS: 0.53 acres 23,087 sq ft. 3,000 cubic yards

21. HAVE ANY WORK ACTIVITIES STARTED ON THIS PROJECT? ☒ NO ☐ YES If yes, describe ALL work that has occurred including dates.				
22. LIST ALL PREVIOUSLY ISSUED PERMIT AUTHORIZATIONS: All permits pending approval: - Ada County floodplain development permit and No-rise certification - City of Boise river system, grading permit, floodplain permit - Idaho Section 401 water quality certification - Idaho Dept of Water Resources Permit #63-35002				
23. ☐ YES, Alteration(s) are located on Public Trust Lands, Administered by Idaho Department of Lands				
24. SIZE AND FLOW CAPACITY OF BRIDGE/CULVERT and DRAINAGE AREA SERVED: <u> N/A </u> Square Miles				
25. IS PROJECT LOCATED IN A MAPPED FLOODWAY? ☐ NO ☒ YES If yes, contact the floodplain administrator in the local government jurisdiction in which the project is located. A Floodplain Development permit and a No-rise Certification may be required.				
26a. WATER QUALITY CERTIFICATION: Pursuant to the Clean Water Act, anyone who wishes to discharge dredge or fill material into the waters of the United States, either on private or public property, must obtain a Section 401 Water Quality Certification (WQC) from the appropriate water quality certifying government entity. <u>See Instruction Guide for further clarification and all contact information.</u>				
The following information is requested by IDEQ and/or EPA concerning the proposed impacts to water quality and anti-degradation: ☐ NO ☒ YES Is applicant willing to assume that the affected waterbody is high quality? ☐ NO ☒ YES Does applicant have water quality data relevant to determining whether the affected waterbody is high quality or not? ☐ NO ☒ YES Is the applicant willing to collect the data needed to determine whether the affected waterbody is high quality or not?				
26b. BEST MANAGEMENT PRACTICES (BMP's): List the Best Management Practices and describe these practices that you will use to minimize impacts on water quality and anti-degradation of water quality. All feasible alternatives should be considered - treatment or otherwise. Select an alternative which will minimize degrading water quality Please refer to the enclosed Permit Drawings. Best Management Practices include: 1) Establishing site preservation areas and installing temporary construction fence around existing wetlands and vegetation not to be disturbed (Sheet 3.1); and 2) Following the erosion and sediment control plan as outlined on Sheet 3.2, including: - Installation of construction fence around staging area; - Silt fence crossing runoff flow path along outer edge of staging area; - Installation of turbidity curtain at inlet and outlet of the side channel; - Construction of cofferdams at inlet and outlet to achieve work area isolation; and - Dewatering into designated area with sediment control measures to allow water infiltration into ground. Notes on erosion and sediment control are provided on Sheet 3.3, and BMP details are included on Sheets 3.4 and 3.5.				
Through the 401 Certification process, water quality certification will stipulate minimum management practices needed to prevent degradation.				
27. LIST EACH IMPACT to stream, river, lake, reservoir, including shoreline: Attach site map with each impact location.				
Activity	Name of Water Body	Intermittent Perennial	Description of Impact and Dimensions	Impact Length Linear Feet
Excavation	Boise River	Perennial	Side channel inlet location which extends into Boise River	28
TOTAL STREAM IMPACTS (Linear Feet):				28
28. LIST EACH WETLAND IMPACT include mechanized clearing, fill excavation, flood, drainage, etc. Attach site map with each impact location.				
Activity	Wetland Type: Emergent, Forested, Scrub/Shrub	Distance to Water Body (linear ft)	Description of Impact Purpose: road crossing, compound, culvert, etc.	Impact Length (acres, square ft linear ft)
Excavation (permanent)	Forested Wetland	400 ft	side channel excavation	0.30 acres
Excavation (permanent)	Scrub/Shrub Wetland	300 - 400 ft	side channel excavation	0.18 acres
Drive over (temporary)	Forested Wetland	230 - 390 ft	temporary construction access route	0.03 acres
TOTAL WETLAND IMPACTS (Square Feet):				22,216

29. ADJACENT PROPERTY OWNERS NOTIFICATION REQUIREMENT: Provide contact information of ALL adjacent property owners below.

Name: State of Idaho (Board of Education) Mailing Address: 650 West State Street City: State: Zip Code: Boise ID 83702 Phone Number (include area code): E-mail: (208) 334-2270	Name: City of Boise (Boise Parks and Recreation) Mailing Address: 1104 W Royal Blvd. City: State: Zip Code: Boise ID 83706 Phone Number (include area code): E-mail: (208) 608-7600
Name: USA: Bureau of Land Management Mailing Address: 1387 S Vinnell Way City: State: Zip Code: Boise ID 83709 Phone Number (include area code): E-mail: (208) 373-4000	Name: Micron Technology Inc. Mailing Address: 8000 S. Federal Way City: State: Zip Code: Boise ID 83706 Phone Number (include area code): E-mail: (208) 368-4000
Name: Ada County Mailing Address: 200 W. Front St. City: State: Zip Code: Boise ID 83702 Phone Number (include area code): E-mail: (208) 287-7080	Name: SUEZ Mailing Address: 8248 West Victory Rd. City: State: Zip Code: Boise ID 83709 Phone Number (include area code): E-mail: (208) 362-7304
Name: Mailing Address: City: State: Zip Code: Phone Number (include area code): E-mail:	Name: Mailing Address: City: State: Zip Code: Phone Number (include area code): E-mail:

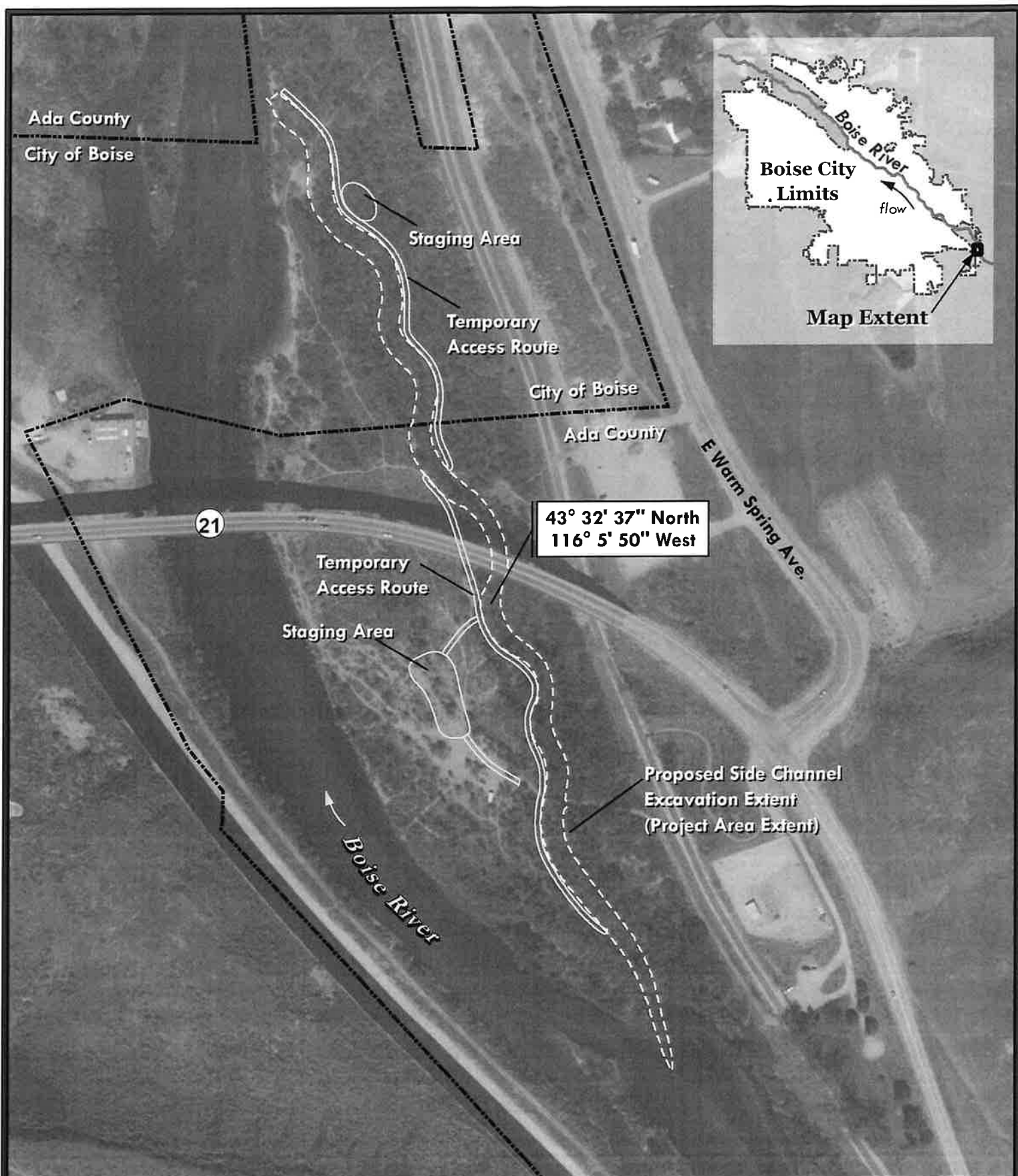
30. SIGNATURES: STATEMENT OF AUTHORIZATION / CERTIFICATION OF AGENT / ACCESS

Application is hereby made for permit, or permits, to authorize the work described in this application and all supporting documentation. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein; or am acting as the duly authorized agent of the applicant (Block 2). I hereby grant the agencies to which this application is made, the right to access/come upon the above-described location(s) to inspect the proposed and completed work/activities.

Signature of Applicant:  Date: 04/05/2021

Signature of Agent:  Date: 04/05/2021

This application must be signed by the person who desires to undertake the proposed activity AND signed by a duly authorized agent (see Block 1, 2, 30). Further, 18 USC Section 1001 provides that: "Whoever, in any manner within the jurisdiction of any department of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both".

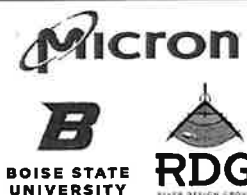


Block 10
Micron Boise River Side Channel Restoration Project Vicinity Map

0 200 400 600
Feet



03.15.2021. River Design Group, Inc.
Data: City of Boise, RDG. Imagery: Maxar Metro 2020.





IDAHO DEPARTMENT OF FISH AND GAME

SOUTHWEST REGION
3101 South Powerline Road
Nampa, Idaho 83686

C.L. "Butch" Otter / Governor
Virgil Moore / Director

August 25, 2017

Gregory S. Kaltenecker
Diane and Winston Moore Family Endowed Director
Intermountain Bird Observatory
Department of Biological Sciences
Boise State University
1910 University Drive
Boise, ID 83725

RE: BSU Funding Request-Boise City Open Space and Clean Water Partnership Program

Dear Gregory,

The Idaho Department of Fish and Game (Department) has reviewed your proposed project for construction of an interpretive trail system, access points from the Greenbelt, and boardwalks which would span wetland areas to help protect sensitive habitats. The project would be located within 20 acres of the Boise River floodplain along Warm Springs Avenue, at the upstream end of Barber Pool, just downstream from the Diversion Dam. The Department understands that Boise State University manages this parcel of land under an MOU with the Idaho Transportation Department. The existing use of this parcel is a series of unconsolidated trails and various access locations throughout the parcel. The proposed project would define a trail system to concentrate use and help maintain and enhance riparian wildlife habitat while still providing access to the Boise River. The vision of the property would be to create an environmental education area that could draw attention to the importance of the Boise River to local wildlife, and create a sense of community and stewardship among participants.

The Department is supportive of this proposal. The project would maintain and enhance intact floodplain habitat and the proposal would still allow access to the Boise River. Please continue to keep the Department informed as this project moves forward.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Bassista".

Tom Bassista
Environmental Staff Biologist

Keeping Idaho's Wildlife Heritage



DEPARTMENT OF THE ARMY

U.S. ARMY CORPS OF ENGINEERS

WALLA WALLA DISTRICT OFFICE

201 NORTH 3RD AVENUE

WALLA WALLA, WASHINGTON 99362-1876

August 21, 2017

SUBJECT: U.S. Army Corps of Engineers – Walla Walla District, Support for Boise State University application for “Open Space and Clean Water Partnership” Grant.

Gregory S. Kaltenecker
Boise State University
1910 University Drive
Boise, ID 83725

Dear Review Committee,

I am writing on behalf of the Army Corps of Engineers – Walla Walla District in support of the proposal from Boise State University regarding the Boise City “Open Space and Clean Water Partnership” funding opportunity. The University owns and/or manages (under a Memorandum of Understanding (MOU) with Idaho Transportation Department (ITD)) over 20 acres in the Boise River floodplain along Warm Springs Avenue. The University has submitted a project request, through the Section 1135 Continuing Authorities Program, to partner with the U.S. Army Corps of Engineers – Walla Walla District in order to accomplish the vision of Habitat Restoration, reduction of human impact, and Educational enhancement of the project area. The anticipated vision includes developing additional trout spawning habitat, constructing trails and boardwalks to isolate human traffic to specified area, and creation of a year-round environmental outreach program working closely with local schools and other partners. Specific plans include:

- 1) Habitat Restoration of both uplands and riparian habitats; including deepening and re-watering of a historic side channel, improvement of riparian habitat, restoration of shrubsteppe uplands, and creation of pollinator gardens.
- 2) Creation of controlled human access points and development of interpretive trails and boardwalks. The development of controlled access point and interpretive trails will help the public avoid critical habitat areas and maintain integrity of the site as high-quality wildlife habitat.
- 3) Development of year-round environmental education and outreach programs that highlight community partnerships, draw attention to the importance of the Boise River for local wildlife, and create a sense of community and stewardship among participants.

The University has initiated a partnership request under the Army Corps of Engineer's 1135 – Continuing Authorities Program for habitat improvement, specifically for deepening and re-watering of historic side channel. They are applying for funding from Boise City through their “Open Space and Clean Water Partnership” Program for various phases of this vision including development of interpretive trails system, boardwalks that will span and protect wetlands, and construction of human access points from the Greenbelt.

We are supportive of this overall integrated approach to improve and protect fish and wildlife habitat, improve water quality in the Boise River, provide controlled public access, conduct outreach and education, and maintain a property adjacent to a city park with complementary management goals.

Sincerely,

Tatton Suter
Plan Formulator / Project Manager / Outreach Coordinator
U.S. Army Corps of Engineers – Walla Walla District

Wetland Delineation Report

Micron Boise River Side Channel Restoration
Project at BSU Intermountain Bird Observatory

Submitted To:

U.S. Army Corps of Engineers

Walla Walla Regulatory Division, Boise Office
720 East Park Boulevard, Suite 245
Boise, Idaho 83712



**US Army Corps
of Engineers.**



RDG
RIVER DESIGN GROUP

April 2021

www.riverdesigngroup.com

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1 Introduction

1.1 Project Overview

River Design Group, Inc. (RDG) was retained by Warner Construction, Inc. (Warner) and Micron Technologies (Micron) to delineate wetlands in the Boise River Side Channel Restoration Project area (Figure 1-1). The objective of the wetland delineation is to provide the necessary pre-project existing wetlands survey data and results to permit agencies, including U.S. Army Corps of Engineers (USACE) for compliance with Section 404 of the Clean Water Act (CWA). Results will also be utilized for comparison with post-project conditions and demonstrating No Net Loss of wetlands following project implementation.

1.2 Geographic Jurisdiction

Discharge of dredged or fill material into Waters of the U.S. is regulated by Section 404 of the CWA. The USACE retains jurisdiction over Waters of the U.S. which includes Traditional Navigable Waters (TNW), their tributaries, and all other waters including wetlands that are adjacent to Waters of the U.S. The term 'adjacent' refers to wetlands that are bordering, contiguous, or neighboring a TNW, or a tributary to one.

Boise River originates in the mountains to the east of Boise, Idaho, and is a perennially flowing tributary of the Snake River. The Snake River is traditionally navigable between the Idaho/Washington border and river mile 45.5 (USACE 2017), which includes the confluence of the Boise River. Discharge of dredged or fill material into Boise River or wetlands adjacent to it, therefore, should fall under USACE jurisdiction under the CWA, however the USACE retains authority over all jurisdictional determinations.

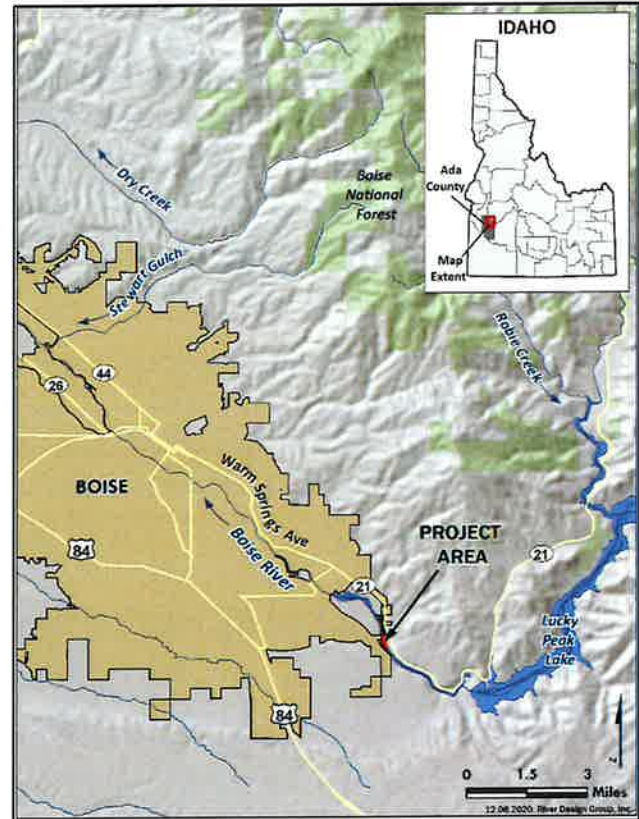


Figure 1-1. Boise River side channel restoration Project location map.

2 Methods

Wetland delineation field work was completed December 9, 2020 by RDG staff and Greg Kaltenecker (Boise State University). Field work complies with the USACE Wetland Delineation Manual (1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (2008). An area is determined a wetland only if it meets all three wetland criteria with at least one primary indicator or two secondary indicators in each (USACE 1987):

1. **Hydrophytic Vegetation:** “The sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.”
2. **Hydric Soil:** “A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.”
3. **Wetland Hydrology:** “All hydrologic characteristics of areas that are periodically inundated or have soils saturated to or near the surface during a portion of the growing season.”

Seven sampling plots were located throughout the wetland delineation project area, representing the range of conditions found throughout the project site (see Figure 4-3 on Page 7 of this report). A USACE Wetland Determination Data Form was completed for each plot (Appendix B), and a determination of wetland status was made based on the presence or absence of the three wetland criteria (hydrophytic vegetation, hydric

soil, wetland hydrology). Sampling plot photographs are included in Appendix A.

Soil pits were excavated to 16 inches below the surface where not restricted by an impermeable cobble layer. Soil color was characterized with the use of a Munsell soil-color chart, and texture was determined by hand. Presence of redox features was observed, and their color, percent, type, and location were recorded. Herbaceous vegetation was sampled utilizing a 5 x 5-foot square plot, and shrub and tree strata were sampled utilizing 30-foot radius circular plots.

Following the plot-scale wetland or upland classification, wetland boundaries were defined by walking the area between plots and adjusting boundaries based on observed vegetation, soil, and/or hydrology. Wetlands were mapped with a mapping-grade Trimble GPS as complete lines demarking the wetland/upland boundary, or points along the boundary which were then processed into boundary lines in GIS with the aid of high-resolution Light Detection and Ranging (LiDAR) elevation data. Classification of wetlands into types is based on dominant vegetation and habitat and follows the U.S. Fish and Wildlife Service (USFWS) classification system of Wetlands and Deepwater Habitats (USFWS 1979).

3 Site Description

3.1 Project Site Overview

The Micron Boise River Side Channel Restoration Project is located at the Boise State University (BSU) Intermountain Bird Observatory (IBO) River Research Station in Boise and Ada County, Idaho. It is in the NE ¼ of the NE ¼ of Section 4, Township 2 North, Range 3 East, Boise Meridian. The project area is in USDA Land Resource Region B: Columbia/Snake River Plateau.

3.2 Existing Data

3.2.1 NRCS Soils

One NRCS Soil Map Unit occurs at the project area (Appendix C). Care should be taken, however, when interpreting the NRCS Soil Unit Boundaries, as exact soil boundaries may not be valid when viewed at the detailed project scale (NRCS 2020).

Soil Map Unit 1001: Notus-LesBois Complex, covers the project area location. The Notus portion of the soil complex is approximately 45% of the Map Unit, occurs on floodplain steps and has parent material of sandy and gravelly alluvium. The typical profile includes fine gravelly loamy sand in the top 6 inches, and very gravelly sand from 6 inches to 60 inches beneath the soil surface. It is somewhat poorly drained, depth to water tables is 20 to 30 inches, and it does not have a hydric soil rating (NRCS 2020).

The LesBois portion of the soil complex is 35% of the Map Unit, has parent material of sandy alluvium, and includes alternating layers of loamy sand and fine sandy loam in the top 44 inches of the typical profile. It is somewhat poorly drained with depth to water table of 20 to 25 inches, and it does not have a hydric soil rating (NRCS 2020).

The minor soil components in the complex, both with 5% of the Map Unit, are Mollic endoaquents and Aeric fluvaquents. They occur on channels on floodplain steps or floodplain steps, and both have a hydric soil rating (NRCS 2020).

3.2.2 U.S. Fish and Wildlife Service National Wetlands Inventory

The USFWS National Wetlands Inventory (NWI) is designed to provide coarse-resolution baseline data for wetland types across the United States. In this region it is based primarily on 1:58,000 scale color-infrared imagery from the year 1981 (USFWS 2020).

NWI-defined wetlands within the wetland delineation boundary at the project site include Palustrine Forested/Shrub Wetlands and a Riverine Waters of the U.S. classification (Figure 3-1). The Forested/Shrub wetlands are classified with a Temporarily Flooded water regime, such that “surface water is present for brief periods during the growing season (from a few days to a few weeks), but the water table usually lies well below the ground surface for most of the season” (USFWS 2020).

A 20-ft wide path classified as Forested/Shrub wetlands defines the Boise River side channel restoration area, and all other area is shown as uplands on the NWI. A Riverine Waters of the U.S. classification is given for Boise River as well as a few excavated ditch/canal areas in the vicinity of the project area (USFWS 2020).

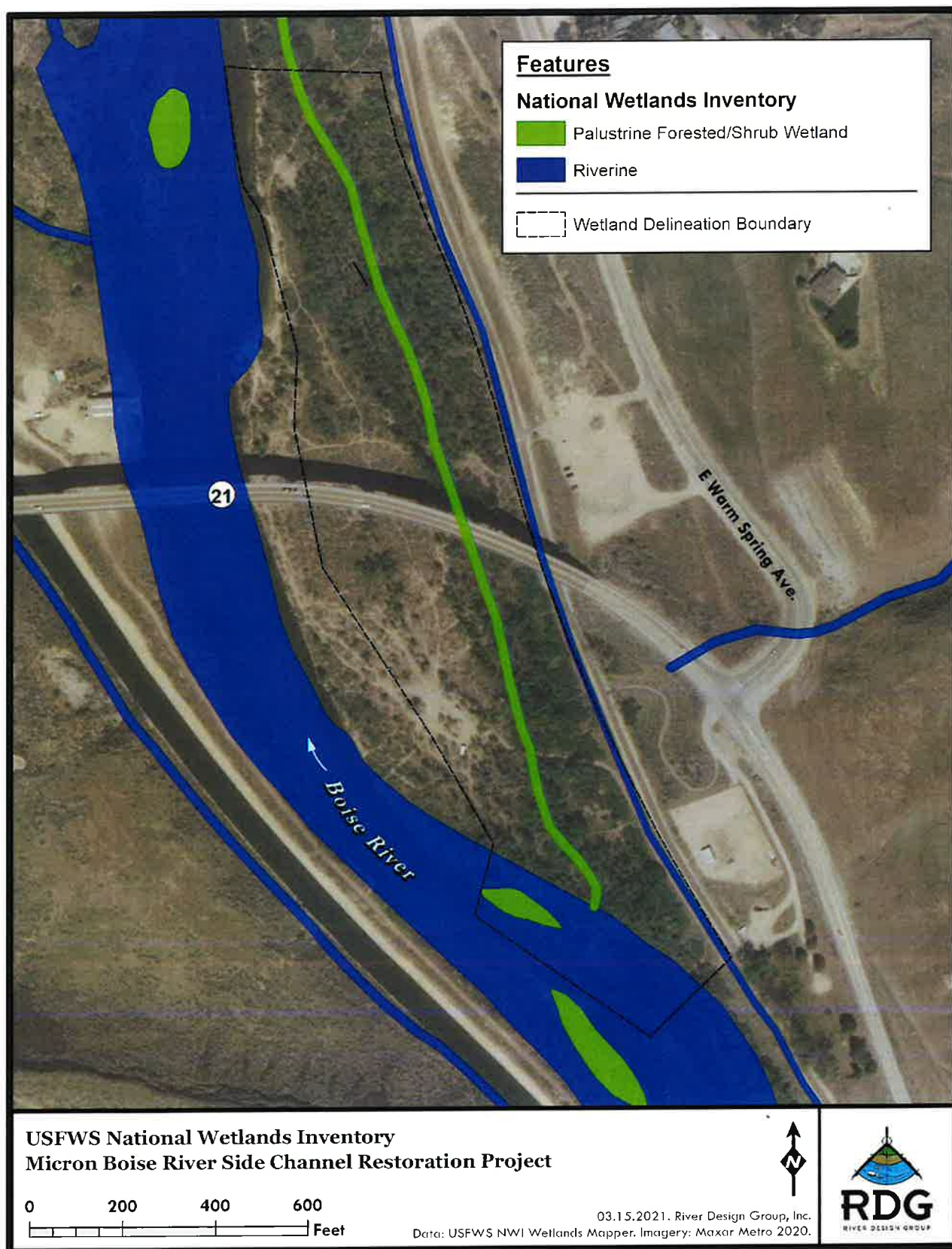


Figure 3-1. USFWS National Wetlands Inventory data in the Boise River Side Channel restoration project area.

4 Results

Wetlands present on the subject property as delineated by RDG include Palustrine Forested and Palustrine Scrub-Shrub Wetlands. Riverine Waters of the U.S. are also defined- and include the Boise River within its Ordinary High Water line (Table 4-1 and Figure 4-3).

Table 4-1. Wetland delineation results.

Wetland Type	Area (acres)
Palustrine Forested	1.67
Palustrine Scrub-Shrub	0.44
Total Wetlands	2.11
Riverine (Waters of the U.S.)	1.36
Total Wetlands and Waters of the U.S.	3.47

Of the 18.75 acres in the Wetland Delineation Boundary, 3.47 acres (19%) are delineated as wetlands or Waters of the U.S. Wetlands dominated by forested vegetation account for 79% of the delineated wetlands, and wetlands dominated by scrub-shrub vegetation account for 21% of the delineated wetlands. Forested wetlands were found in the interior of the Boise River side channel location, and scrub-shrub wetlands were found on the bank of the Boise River, as well as in the interior of the side channel project area under the Highway 21 overpass location (Figure 4-1).



Figure 4-1. Scrub-shrub wetland environment under Highway 21 bridge.

4.1 Hydrophytic Vegetation

Forested wetlands at the project area are dominated almost exclusively by black cottonwood (*Populus trichocarpa*) (Figure 4-2). While the structurally diverse cottonwood gallery is present on a majority of the riparian environment throughout the project area, a small fraction of the cottonwood gallery extent occurs on areas defined as wetlands. Black cottonwood has a Facultative rating in the Arid West on the USACE National Wetland Plant List, indicating that it occurs in wetlands with an estimated probability of 33% to 66%. It is in the willow family (*Salicaceae*), and while it has low drought tolerance and is dependent on a riparian environment especially in arid regions, it is usually not tolerant of prolonged flooding or stagnant water. Other tree species present in forested wetlands in the project area include water birch (*Betula occidentalis*) and black hawthorn (*Crataegus douglasii*).



Figure 4-2. Forested wetland downstream of the Highway 21 bridge.

Forested wetland habitat also includes shrubs in the understory of the black cottonwood gallery. Notably, western poison ivy (*Toxicodendron rydbergii*) is present in dominant cover throughout understory environments in the riparian area of the side channel, including in forested wetlands. Woods' rose (*Rosa woodsii*), dog rose (*Rosa canina*), coyote willow (*Salix exigua*), and yellow willow (*Salix lutea*) are also components of the understory of forested wetlands. In addition, the herbaceous vegetation layer includes Canada goldenrod (*Solidago canadensis*), along with mugwort (*Artemisia spp.*) and non-native prickly lettuce (*Lactuca serriola*). However, it is not uncommon to find 80-100% of bare ground in the herbaceous stratum, in response to a cobbly substrate and not much soil development at the surface. Sampling Plots 1 and 6 are characteristic of forested wetland environments throughout the project area (Figure 4-3).

Scrub-shrub wetlands are dominated almost exclusively by coyote willow. Yellow willow can be a minor component in the scrub-shrub wetland environment, and black hawthorn is

also present. The most prevalent overstory shrub at the project site is coyote willow, which can be found throughout the project area riparian environment in some percentage and is present in near monoculture on 0.37 acres under the Highway 21 overpass area. Here, the coyote willow community is associated with a groundwater upwelling or hillslope seep area and groundwater availability is higher than in adjacent areas. In the herbaceous understory, a dominance of sedge (*Carex spp.*) highlights the availability of wetland hydrology in the upper portion of the soil profile. Sampling Plot 4 is characteristic of this scrub-shrub wetland environment.

4.2 Hydric Soil

Soils at all Sampling Plots identified as occurring on wetlands exhibited clear indicators of hydric soil. Soil texture was usually coarse, with sand and loamy sand prevalent in forested wetlands. Cobbles were often present, and Sampling Plot 6 also contained loam in the upper 3 inches of the soil profile. The soil at Sampling Plot 4 at the scrub-shrub location included loam in the top 3 inches, underlain by sandy loam from 3-6 inches below the surface, and sandy loam with cobbles beneath 12 inches. In all sampling plots that occurred on wetlands, soil pit excavation was difficult especially beneath 12 inches due to the prevalence of cobble.

Hydric soil indicators used to document the presence of hydric soil at wetland locations included Redox Dark Surface (Indicator F6), and Sandy Redox (Indicator S5).

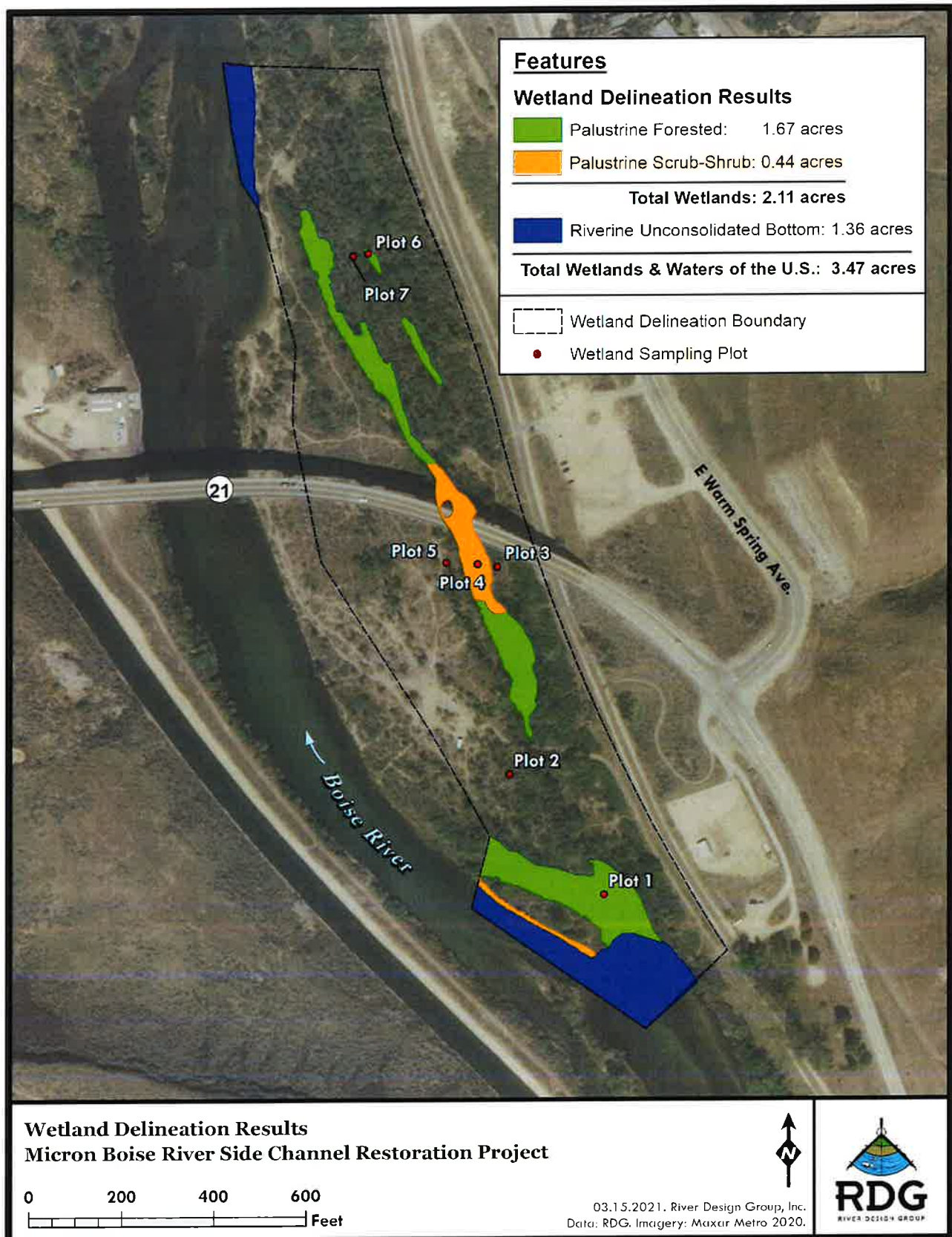


Figure 4-3. Wetland delineation results and sampling plot locations.

4.3 Wetland Hydrology

The sampling day of December 9, 2020 proved difficult for observations of primary indicators of wetland hydrology. Clear secondary indicators, however, were used to define the presence of wetland hydrology throughout wetland sampling plots. For Sampling Plot 1, these included Water Marks (Indicator B1), Sediment Deposits (Indicator B2), Drift Deposits (Indicator B3), and Drainage Patterns (Indicator B10). Sampling Plot 1 is at the inlet area of the side channel, and water marks on trees are apparent.

At Sampling Plot 4, the secondary indicator FAC-Neutral Test (Indicator D5) was used to determine the presence of wetland hydrology, along with personal communication with the local biologist who witnesses yearly water inundation throughout the area for long periods of time (the personal account of conditions was used as a proxy for Saturation Visible on Aerial Imagery (Indicator C9)). At the downstream of the project area, both the secondary indicators of Drainage Patterns and FAC-Neutral Test verified the presence of wetland hydrology at Sampling Plot 6.

4.4 Uplands

Uplands account for 15.28 acres, or 81% of the wetland delineation project area. Upland environments generally occurred on terrace features slightly above wetland side channel locations, or on bottomlands along the cottonwood gallery that do not receive enough hydrology for the soil to develop and exhibit hydric soil indicators in upper portions of soil profiles (Figure 4-4). Sampling Plots 2, 3, 5, and 7 were located in upland habitat at the project area.



Figure 4-4. Upland environment dominated by black cottonwood.

4.4.1 Upland Vegetation

In addition to a dominance of black cottonwood throughout much of the uplands, other tree species present in upland sampling plots included an ornamental cherry (*Prunus spp.*) and black hawthorn. A multitude of woody shrubs were also present, including dominant cover of dog rose, golden currant (*Ribes aureum*), grey rabbitbrush (*Ericameria nauseosa*), Wyoming big sagebrush (*Artemisia tridentata*), Western poison ivy, and coyote willow. Other woody species included antelope bitterbrush (*Purshia tridentata*) and yellow willow.

Species in the herbaceous understory of uplands often included invasive and weedy species such as cheatgrass (*Bromus tectorum*), medusahead (*Taeniatherum caput-medusae*), rush skeletonweed (*Chondrilla juncea*), tumbleweed mustard (*Sisymbrium altissimum*). The native showy milkweed (*Asclepias speciosa*) was also encountered, as was common yarrow (*Achillea millefolium*), mugwort, and Kentucky bluegrass.

(*Poa Pratensis*), a common non-native pasture grass.

4.4.2 Upland Soil and Hydrology

Soil throughout upland sampling plots did not exhibit any hydric soil indicators. Unlike in wetland sampling plots, soils in uplands were easy to excavate to at least 16 inches due to a predominance of sand. Sampling plot 5 contained sand with a few cobbles for the entire 16-inch profile excavation depth. Sampling Plots 2 and 3 included loamy sand and sandy loam, however no clear profile breaks were observed. The only loamy material found throughout the upland sampling plots was the top 4 inches of Sampling Plot 7, where the thin loam layer was underlain by sand. In addition, no primary or secondary indicators of wetland hydrology were observed in uplands.

5 References

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S.D.I. Fish and Wildlife Services. Washington, D.C.

Environmental Laboratory, 1987. US Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Environmental Laboratory. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). US Army Engineer Research and Development Center, Vicksburg, MS.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 Wetland Ratings*. Phytoneuron 2016-30: 1-17.

U.S. Army Corps of Engineers (USACE) Walla Walla District. 2017. Regulatory Pocket Guide. Online: <https://www.nww.usace.army.mil/Portals/28/docs/regulatory/2017RegulatoryPocketGuide.pdf>

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2020. Custom Soil Resource Report for Ada County, Idaho.

U.S. Fish and Wildlife Service (USFWS). 2020. National Wetlands Inventory Wetlands Mapper. URL: <https://www.fws.gov/wetlands/Data/Mapper.html>. Site accessed November 2020.

Appendix A

Sampling Plot Photographs

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Plot 1 soil and vegetation, wetland location.



Plot 2 soil, upland location.



Plot 3 soil and vegetation, upland location.





Plot 4 soil and vegetation, wetland location.



Plot 5 soil and vegetation, upland location.



Plot 6 soil and vegetation, wetland location.





Plot 7 soil and vegetation, upland location.

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Appendix B

Wetland Determination Data Forms

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Appendix C

USDA NRCS Soil Resource Report

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Attachment B2
BOR SF299 Utility ROW Application



BOISE STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES
Office of the Dean

3/29/2021

Bureau of Reclamation

Re.: Application for Transportation, Utility Systems, Communications, and Facilities on Federal Lands and Properties

To Whom it May Concern,

Boise State University is applying to temporarily use a gravel road and gravel parking lot administered by US Bureau of Reclamation, located within Ada County, Idaho, on Parcel # S1604142250 (Map Coordinates: 43.54183 - -116.09571; see attached maps and figures), for construction access to a project site near the Boise River at the future Diane Moore Nature Center. Located on the east side of the Boise River, downstream from Diversion Dam and upstream from the state Highway 21 bridge, the requested site provides the only vehicular access to the project site. The construction project is a riparian habitat improvement designed to reconnect a historic side channel of the Boise River to improve water quality and wildlife habitat and will involve use of heavy equipment and hauling of excavated material (approx.. 11,040 cu. Yards, 850 loads) across state Highway 21 to a nearby fill location.

Boise State University, Intermountain Bird Observatory, has partnered with Micron Technology, Inc., who has retained Warner Construction and River Deign Group to conduct design, permitting, and final construction of the project on behalf of the university.

We request authorization to occupy this site and temporarily exclude public access/use from July 15 2021 through 16 March 2022 due to safety concerns. During construction, the site will be used for parking by construction crews to stage materials and store equipment. An alternate parking area and Greenbelt access exists approximately 0.5 miles downstream that can be used by the public during construction.

Sincerely,

Greg Kaltenecker, Director
Intermountain Bird Observatory
Boise State University
1910 University Dr.
Boise, ID 83725
Ph: 208-866-6748
Email: gregorykaltenecker@boisestate.edu

APPLICATION FOR TRANSPORTATION, UTILITY SYSTEMS, TELECOMMUNICATIONS AND FACILITIES
ON FEDERAL LANDS AND PROPERTY

FOR AGENCY USE ONLY

NOTE: Before completing and filing the application for an authorization (easement, right-of-way, lease, license or permit), the applicant should completely review this package, including instructions, and schedule a pre-application meeting with representatives of the agency responsible for processing the application. Each agency may have specific and unique requirements to be met in preparing and processing the application. Many times, with the help of the agency representative, the application can be completed at the pre-application meeting.

Application Number

Date Filed

1. Name and address of applicant

Greg Kaltenecker
Boise State University
1910 University Dr.
Boise, ID 83725

2. Name and address of authorized agent if different from item 1

3. Applicant telephone number and email:

Authorized agent telephone number and email:

4. As applicant are you? (check one)

- a. ☐ Individual
b. ☐ Corporation*
c. ☐ Partnership/Association*
d. ☒ State Government/State Agency
e. ☐ Local Government
f. ☐ Federal Agency

* If checked, complete supplemental page

5. Specify what application is for: (check one)

- a. ☒ New authorization
b. ☐ Renewing existing authorization number
c. ☐ Amend existing authorization number
d. ☐ Assign existing authorization number
e. ☐ Existing use for which no authorization has been received *
f. ☐ Other*

* If checked, provide details under item 7

6. If an individual, or partnership, are you a citizen(s) of the United States? ☐ Yes ☐ No

7. Project description (describe in detail): (a) Type of use or occupancy, (e.g., canal, pipeline, road, telecommunications); (b) related structures and facilities; (c) physical specifications (Length, width, grading, etc.); (d) term of days/years needed; (e) time of year of use or operation; (f) Volume or amount of product to be transported; (g) duration and timing of construction; and (h) temporary work areas needed for activity/construction (Attach additional sheets, if additional space is needed.)

Boise State University is applying to temporarily use a gravel road and gravel parking lot administered by US Bureau of Reclamation, located within Ada County on Parcel # S1604142250 (Map Coordinates: 43.54183 -116.09571; see attached map and figures), for construction access to a project site near the Boise River at the future Diane Moore Nature Center. Located on the East side of the Boise River downstream from Diversion Dam and upstream from the state Highway 21 bridge, the site provides the only vehicular access to the project area. The construction project is a riparian habitat improvement designed to reconnect a historic side channel of the Boise River to improve water quality and wildlife habitat and will involve use of heavy equipment and hauling of excavated material (approx. 11,040 cu. yards, 850 loads) across state Highway 21 to a nearby fill location. We request authorization to occupy this site and temporarily exclude public access/use from 15 July 2021 through 16 March 2022 due to safety concerns. During construction the site will be used for parking by construction crews, to stage materials, and store equipment. An alternate parking area and Greenbelt access exists approximately 0.5 miles downstream that can be used by the public during construction.

8. Attach a map covering area and show location of project proposal.

9. State or Local government approval: ☐ Attached ☒ Applied for ☐ Not Required10. Nonrefundable application fee: ☒ Attached ☐ Not required ☐ To be determined by agency11. Does project cross international boundary or affect international waterways? ☐ Yes ☒ No (if "yes," indicate on map)

12. Give statement of your technical and financial capability to construct, operate, maintain, and terminate system for which authorization is being requested.

This is a Boise State University project and we have partnered with Micron Technology, Inc. who has provided financial backing for the project. Project design and construction are being managed by Micron Technology, Inc. and their design-build partners. Project design and necessary permitting and authorizations are being managed by River Design Group, Corvallis Or., and Warner Construction, Inc., Boise, Id. will manage construction. River Design Group specializes in ecosystem and river design and restoration. Warner Construction, a heavy civil contracting firm with over \$20 million of bonding capability, has been in business in Boise for over twenty years; their public works license # is 14850-AAA-1- unlimited. More information available upon request.

13a. Describe other alternative locations considered.

No other access points were identified to the parcel without the need for significant construction or alteration of native habitat including wetlands.

b. Why were these alternatives not selected?

N/A

c. Give explanation as to why it is necessary to use or occupy Federal assets (lands or buildings).

This parcel provides the only vehicular access to the project area. The site is needed to store construction equipment and temporarily stage materials during construction.

14. List authorizations and pending applications filed for similar projects which may provide information to the authorizing agency. (Specify number, date, code, or name)

N/A

15. Provide statement of need for project, including the economic feasibility and items such as: (a) cost of proposal (construction, operation, and maintenance); (b) estimated cost of next best alternative; and (c) expected public benefits.

This \$1.7M project is designed to improve water quality, restore natural function, and improve wildlife habitat along the Boise River. The future vision for the property is to create a nature center that will serve as an outdoor laboratory to conduct research and community education for local K-12 schools and the general public. No next best alternative exists.

16. Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles.

If granted, this application will temporarily limit public use of an area currently used by Greenbelt users, fishermen, and others wishing to access the Boise River in this area. This access will be restored after construction activities. An alternative public access is available in the immediate area.

17. Describe likely environmental effects that the proposed project will have on: (a) air quality; (b) visual impact; (c) surface and ground water quality and quantity; (d) the control or structural change on any stream or other body of water; (e) existing noise levels; and (f) the surface of the land, including vegetation, permafrost, soil, and soil stability; and, (g) historic or archaeological resources or properties.

This project should have no measurable effect on air quality, historical resources or properties, and no lasting visual impacts. The resulting side channel will have water quality benefits, is designed to tie into groundwater for multiple environmental benefits, and will operate at river flows above 600 cfs.

18. Describe the probable effects that the proposed project will have on (a) populations of fish, plant life, wildlife, and marine life, including threatened and endangered species; and (b) marine mammals, including hunting, capturing, collecting, or killing these animals.

The project is designed to improve wildlife habitat by providing a net increase in wetlands and improving existing wetlands by improving local hydrology. The project will create native fish spawning and brood-rearing habitat. A post-construction re-vegetation plan will rehabilitate stream banks with native plants that will further improve fish and wildlife habitat.

19. State whether any hazardous material, as defined in this paragraph, would be used, produced, transported or stored on or in a federal building or federal lands or would be used in connection with the proposed use or occupancy. "Hazardous material" shall mean (a) any hazardous substance under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any petroleum product or its derivative, including fuel oil, and waste oils; and (d) any hazardous substance, extremely hazardous substance, toxic substance, hazardous waste, ignitable, reactive or corrosive materials, pollutant, contaminant, element, compound, mixture, solution or substance that may pose a present or potential hazard to human health or the environment under any applicable environmental laws. The holder shall not store any hazardous materials at the site without prior written approval from the authorized officer. This approval shall not be unreasonably withheld. If the authorized officer provides approval, this permit shall include (or in the case of approval provided after this permit is issued, shall be amended to include) specific terms addressing the storage of hazardous materials, including the specific type of materials to be stored, the volume, the type of storage, and a spill plan. Such terms shall be proposed by the holder and are subject to approval by the authorized officer.

No hazardous materials will be brought to or stored on site. The equipment utilized for construction will use diesel fuel and as well as various grease products and hydraulic fluids. None of these materials will be stored on site in bulk. A Spill Prevention Countermeasures and Cleanup Plan (SPCC) has been developed for the project and is available for review; Contact Paul Warner pwarnar@warnerconstructioninc.com

20. Name all the Federal Department(s)/Agency(ies) where this application is being filed.

US Bureau of Reclamation

I HEREBY CERTIFY, That I am of legal age and authorized to do business in the State and that I have personally examined the information contained in the application and believe that the information submitted is correct to the best of my knowledge.

Signature of Applicant

Date

Marcy Warner, Business Manager

4-9-2021

Title 18, U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

GENERAL INFORMATION
ALASKA NATIONAL INTEREST LANDS

This application will be used when applying for a right-of-way, permit, license, lease, or certificate for the use of Federal lands which lie within conservation system units and National Recreation or Conservation Areas as defined in the Alaska National Interest Lands Conservation Act. Conservation system units include the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, and National Forest Monuments.

Transportation utility systems telecommunication installations facility uses for which the application may be used are:

1. Canals, ditches, flumes, laterals, pipes, pipelines, tunnels, and other systems for the transportation of water.
2. Pipelines and other systems for the transportation of liquids other than water, including oil, natural gas, synthetic liquid and gaseous fuels, and any refined product produced therefrom.
3. Pipelines, slurry and emulsion systems, and conveyor belts for transportation of solid materials.
4. Systems for the transmission and distribution of electric energy.
5. Wired and wireless systems for transmission or reception of radio, television, telephone, telegraph, and other electronic signals, and other means of communications.
6. Improved right-of-way for snow machines, air cushion vehicles, and all-terrain vehicles.
7. Roads, highways, railroads, tunnels, tramways, airports, landing strips, docks, and other systems of general transportation.

This application must be filed simultaneously with each Federal department or agency requiring authorization to establish and operate your proposal.

In Alaska, the following agencies will help the applicant file an application and identify the other agencies the applicant should contact and possibly file with:

Department of Agriculture
Regional Forester, Forest Service (USFS)
P.O. Box 21628
Juneau, Alaska 99802-1628
Telephone: (907) 586-7847
(or a local Forest Service Office)

Department of the Interior
Bureau of Indian Affairs (BIA)
Alaska Regional Office
709 West 9th Street
Juneau, Alaska 99802
Telephone: (907) 586-7177

Department of the Interior
Alaska State Office
Bureau of Land Management
222 West 7th Avenue #13
Anchorage, Alaska 99513
Public Room: 907-271-5960
FAX: 907-271-3684
(or a local BLM Office)

U.S. Fish & Wildlife Service (FWS)
Office of the Regional Director
1011 East Tudor Road
Anchorage, Alaska 99503
Telephone: (907) 786-3440

National Park Service (NPS)
Alaska Regional Office
240 West 5th Avenue
Anchorage, Alaska 99501
Telephone: (907) 644-3510

Note - Filings with any Interior agency may be filed with any office noted above or with the Office of the Secretary of the Interior, Regional Environmental Officer, P.O. Box 120, 1675 C Street, Anchorage, Alaska 99513.

Department of Transportation
Federal Aviation Administration
Alaska Region AAL-4, 222 West 7th Ave., Box 14
Anchorage, Alaska 99513-7587
Telephone: (907) 271-5285

NOTE - The Department of Transportation has established the above central filing point for agencies within that Department. Affected agencies are: Federal Aviation Administration (FAA), Coast Guard (USCG), Federal Highway Administration (FHWA), Federal Railroad Administration (FRA).

OTHER THAN ALASKA NATIONAL INTEREST LANDS

Use of this form is not limited to National Interest Conservation Lands of Alaska.

Individual department/agencies may authorize the use of this form by applicants for transportation, utility systems, telecommunication installations and facilities on other Federal lands outside those areas described above.

For proposals located outside of Alaska, applications will be filed at the local agency office or at a location specified by the responsible Federal agency.

SPECIFIC INSTRUCTIONS
(Items not listed are self-explanatory)

- 7 Attach preliminary site and facility construction plans. The responsible agency will provide instructions whenever specific plans are required.
- 8 Generally, the map must show the section(s), township(s), and range(s) within which the project is to be located. Show the proposed location of the project on the map as accurately as possible. Some agencies require detailed survey maps. The responsible agency will provide additional instructions.
- 9, 10, and 12 The responsible agency will provide additional instructions.
- 13 Providing information on alternate locations in as much detail as possible, discussing why certain locations were rejected and why it is necessary to use Federal assets will assist the agency(ies) in processing your application and reaching a final decision. Include only reasonable alternate locations as related to current technology and economics.
- 14 The responsible agency will provide instructions.
- 15 Generally, a simple statement of the purpose of the proposal will be sufficient. However, major proposals located in critical or sensitive areas may require a full analysis with additional specific information. The responsible agency will provide additional instructions.
- 16 through 19 Providing this information with as much detail as possible will assist the Federal agency(ies) in processing the application and reaching a decision. When completing these items, you should use a sound judgment in furnishing relevant information. For example, if the project is not near a stream or other body of water, do not address this subject. The responsible agency will provide additional instructions.

Application must be signed by the applicant or applicant's authorized representative.

EFFECT OF NOT PROVIDING INFORMATION

Disclosure of the information is voluntary. If all the information is not provided, the proposal or application may be rejected.

DATA COLLECTION STATEMENT

The Federal agencies collect this information from proponents and applicants requesting a right-of-way, permit, license, lease, or certification for use of Federal assets. The Federal agencies use this information to evaluate a proponent's or applicant's proposal to use Federal assets.

BURDEN STATEMENT

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0249. The time required to complete this information collection is estimated to average 8 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The authority to collect this information is derived from 47 U.S.C. 1455(c)(3) and 16 U.S.C. 3210.

USDA NONDISCRIMINATION STATEMENT

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

SUPPLEMENTAL

NOTE: The responsible agency(ies) will provide instructions	CHECK APPROPRIATE BLOCK	
	ATTACHED	FILED *
I - PRIVATE CORPORATIONS		
a. Articles of Incorporation	☐	☐
b. Corporation Bylaws	☐	☐
c. A certification from the State showing the corporation is in good standing and is entitled to operate within the State	☐	☐
d. Copy of resolution authorizing filing	☐	☐
e. The name and address of each shareholder owning 3 percent or more of the shares, together with the number and percentage of any class of voting shares of the entity which such shareholder is authorized to vote and the name and address of each affiliate of the entity together with, in the case of an affiliate controlled by the entity, the number of shares and the percentage of any class of voting stock of that affiliate owned, directly or indirectly, by that entity, and in the case of an affiliate which controls that entity, the number of shares and the percentage of any class of voting stock of that entity owned, directly or indirectly, by the affiliate.	☐	☐
f. If application is for an oil or gas pipeline, describe any related right-of-way or temporary use permit applications, and identify previous applications.	☐	☐
g. If application is for an oil and gas pipeline, identify all Federal lands by agency impacted by proposal.	☐	☐
II - PUBLIC CORPORATIONS		
a. Copy of law forming corporation	☐	☐
b. Proof of organization	☐	☐
c. Copy of Bylaws	☐	☐
d. Copy of resolution authorizing filing	☐	☐
e. If application is for an oil or gas pipeline, provide information required by item "I - f" and "I - g" above.	☐	☐
III - PARTNERSHIP OR OTHER UNINCORPORATED ENTITY		
a. Articles of association, if any	☐	☐
b. If one partner is authorized to sign, resolution authorizing action is	☐	☐
c. Name and address of each participant, partner, association, or other	☐	☐
d. If application is for an oil or gas pipeline, provide information required by item "I - f" and "I - g" above.	☐	☐

* If the required information is already filed with the agency processing this application and is current, check block entitled "Filed." Provide the file identification information (e.g., number, date, code, name). If not on file or current, attach the requested information.

Requirements for Crossing Reclamation Facilities

1. **Letter** explaining plans for crossing in/over/under the government's canal. Include any special needs or requests. Please include the name of the facility, legal description, name of the Grantee for the Agreement, contact name, address, phone number and title.
2. **SF-299 Form** (Application for Transportation and Utility Systems and Facilities on Federal Lands) or **Form 7-2540** (Use Authorization Application).
3. **Location Map** - photocopies of Farm Service/ASCS photos, USGS 7.5" topographic map sections or city/county maps with crossing location marked with an "x" will do fine as will internet maps such as <http://maps.google.com/>.
4. **Design drawing** as agreed to with the irrigation district. Provide equivalent drawings showing top, side and end views. Please use paper no larger than 11" x 17".
5. **Check for \$100.00 payable to "Bureau of Reclamation"** (Non-refundable application fee, as required under 43 CFR 429.17). Additional funds will be required for review and issuance of a permit if the proposed project is determined to be compatible with current operational plans and management objectives. The Irrigation District may also assess a fee to recover its processing costs.
6. **TAX IDENTIFICATION REQUEST FORM** Individual information or Business Tax Identification information must be filled out and enrollment form must be returned with the \$100 non-refundable application fee.

After your application has been reviewed and proposal has been determined to be appropriate for further processing, you will be notified in writing of the additional funds to be submitted in order to proceed processing your request and prepare an agreement. The agreement will be signed by the Irrigation District, you, and lastly by the Bureau's Deputy Area Manager. We'll then mail you an executed original.

Please contact us if you have any questions.

Reece Randall
Realty Specialist
Bureau of Reclamation
230 Collins Road
Boise, ID 83702-4520
Ph. 208-383-2228
Fax 208-383-2237
rcrandall@usbr.gov

Area Needed for Construction Access.



Project Area.

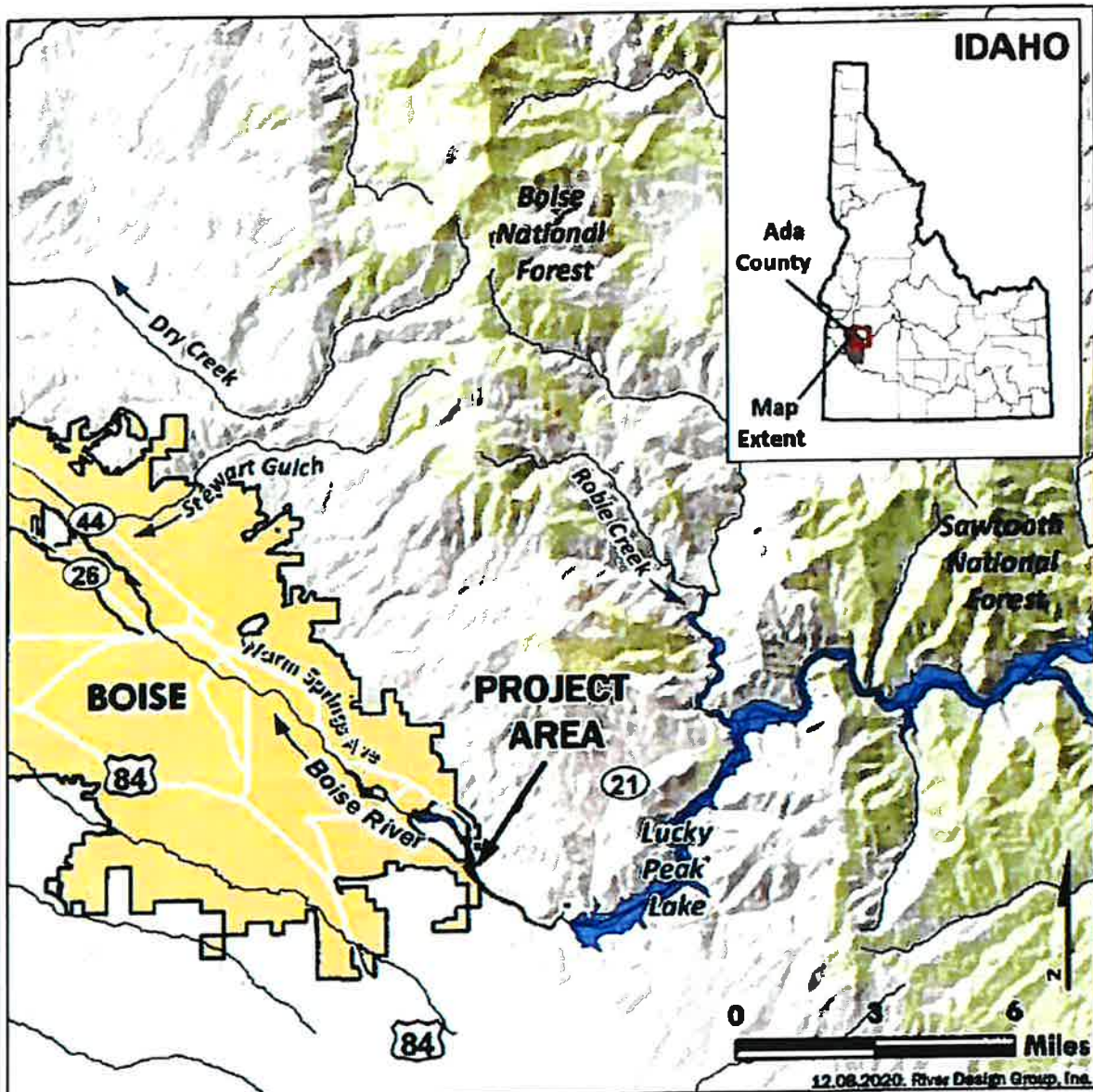


Figure 1-1. Site map showing location of Project on southeastern edge of Boise, Idaho.

Proposed project location and alignment.

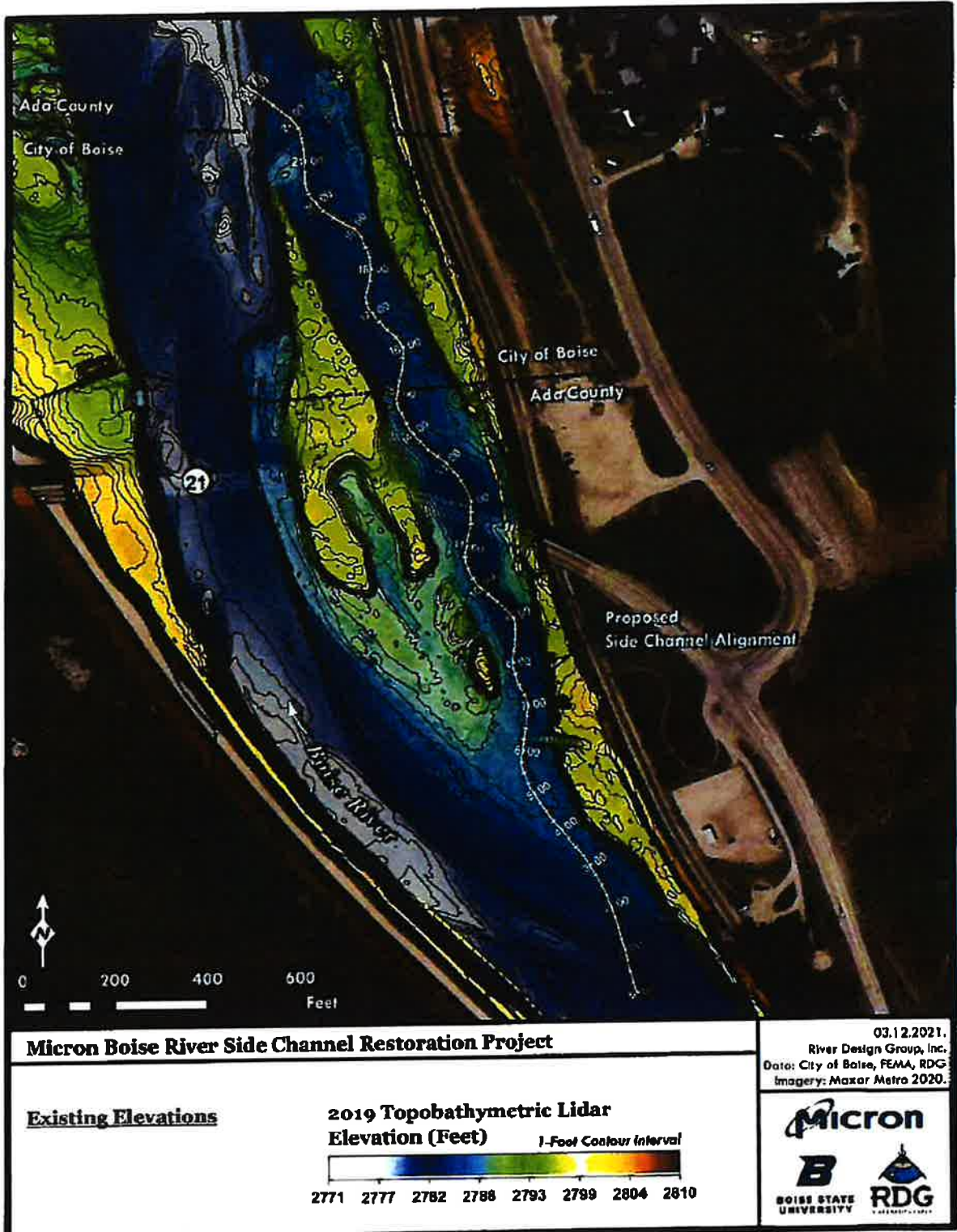


Figure 2-1. LiDAR map with elevations and proposed side channel alignment.

CUSTOMER PROFILE – LAND or WATER CONTRACTS

**For use of processing new customers, updating or correcting current customer profile and billing information.
Form must be completed in it's entirety.**

IN ACCORDANCE with the Debt Collection Improvement Act of 1996 (Pub.L.104-134), you are required to provide your tax identification number and in coordination with having a contract or agreement with the Federal Government. This number will be used to make corrections to your customer profile or for the purpose of collecting and reporting on any delinquent amounts which may arise out of your contracted relationship with the Federal Government.

Indicate your status as it states within your contract:

☐ **INDIVIDUAL** | Other

SOCIAL SECURITY NUMBER:

□ □ □ - □ □ - □ □ □ □

or

☒ **CORPORATION** ☒ **CITY/STATE GOVERNMENT**

☐ **PARTNERSHIP** ☐ **FEDERAL GOVERNMENT**
Other

BUSINESS TAX IDENTIFICATION NUMBER:

8 2 - 0 2 9 0 7 0 1

DUNS No. 072995848

PLEASE PRINT CLEARLY

FIRST NAME (or Business Name)		MIDDLE	LAST NAME	
Boise State University				
MAILING ADDRESS		CITY	ST	ZIP
1910 University Drive		Boise	ID	83725
TELEPHONE		EMAIL		
(208) 426-2031		marcyharmer@BoiseState.EDU		
SIGNATURE				
Marcy Harmer				

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(e)(3), enacted into law by Section 3 of the Privacy Act of 1974 (Pub.L.93-579), the following statement is furnished to individuals who supply information to the Bureau of Reclamation (BOR). This information is maintained in a system of records designated and described at 74 Federal Register 596 (January 6, 2009), or the most recent Federal Register publication.

- 1) **AUTHORITY:** 5 U.S.C. 552a; 5 U.S.C. 5514; 15 U.S.C. 1681; 26 U.S.C. 6103(m)(2); 31 U.S.C. 37, subchapters I and II; 31 U.S.C. 3701(a)(3); 31 U.S.C. 3711; 31 U.S.C. 3716; 31 U.S.C. 3717; 31 U.S.C. 3718; 31 U.S.C. 3720; 42 U.S.C. 2201; 42 U.S.C. 5841; Cash Management Improvement Act Amendments of 1992 (Pub.L.102-589); Debt Collection Improvement Act of 1996 (Pub.L.104-134); 31 CFR Chapter IX, Parts 900-904; 10 CFR Parts 15, 16, 170, 171; Executive Order (E.O.) 9397, as amended by E.O. 13478; E.O. 12101; and E.O. 12731.
- 2) **PRINCIPLE PURPOSE:** To obtain taxpayer identification number/social security number/individual taxpayer identification number to enable BOR to process payments and/or collect/report delinquent debts.
- 3) **ROUTINE USES:** Information from this form may be transmitted to: debt collection contractors and/or Federal agencies for collecting debts and/or collection action on such debts; Treasury on past due nontax debts for the purpose of locating the debtor and/or effecting offset under Treasury Offset Program. Information may be publically disseminated regarding the identity of delinquent nontax debtors and the existence of nontax debts under the provisions of the Debt Collections Improvement Act of 1996.
- 4) **MANDATORY DISCLOSURE:** It is mandatory that you furnish the requested information pursuant to the Debt Collection Improvement Act of 1996 (Pub.L.104-134). If you do not provide the requested information, Bureau of Reclamation may no longer conduct business with you, all contracts, license, permits or agreements will cease and be terminated.

Return Completed form to:

Address: 230 Collins Rd., Boise ID 83702

Fax: 208-383-2237

Attachment B3
Floodplain No-Rise



MASTER APPLICATION/PETITION

ADA COUNTY DEVELOPMENT SERVICES

Mailing: 200 W. Front Street, Boise, ID 83702 Website: adacounty.id.gov Phone: 208-287-7900 Fax: 208-287-7909

OFFICE USE ONLY:

PROJECT #

PLANNING/GIS FEES:

ENGINEERING FEES:

RECEIVED BY:

DATE:

DATE STAMPED: □

REQUIRED SUBMITTALS FOR ALL APPLICATIONS:

- ☒ DEED or evidence of proprietary interest
- ☒ APPLICATION SPECIFIC CHECKLIST(S)
- ☒ One (1) paper copy single-sided & One (1) electronic copy of all required application submittal documents.

ADMINISTRATIVE APPLICATIONS:

- | | |
|--|---|
| ☐ ACCESSORY USE | ☐ LIGHTING PLAN |
| ☐ DRAINAGE PLAN | ☐ MASTER SITE PLAN |
| ☐ EXPANSION NONCONFORMING USE | ☐ ONE-TIME DIVISION |
| ☐ FARM DEVELOPMENT RIGHT | ☐ PLANNED UNIT DEVELOPMENT (PUD) |
| ☒ FLOODPLAIN PERMIT | ☐ PRIVATE ROAD |
| ☐ HILLSIDE DEVELOPMENT | ☐ PROPERTY BOUNDARY ADJUSTMENT |
| ☐ HIDDEN SPRINGS ADMINISTRATIVE | ☐ SIGN PLAN |
| ☐ HIDDEN SPRINGS SPECIAL EVENT | ☐ TEMPORARY USE |
| ☐ LANDSCAPE PLAN | |

HEARING LEVEL APPLICATIONS:

- | | |
|---|--|
| ☐ CONDITIONAL USE | ☐ VACATION |
| ☐ DEVELOPMENT AGREEMENT | ☐ VARIANCE |
| ☐ PLANNED COMMUNITIES | ☐ ZONING MAP AMENDMENT |
| ☐ SUBDIVISION, PRELIMINARY | ☐ ZONING TEXT AMENDMENT |
| ☐ SUBDIVISION, SKETCH PLAT | |

HEARING LEVEL PETITION:

- ☐ COMPREHENSIVE PLAN MAP OR TEXT AMENDMENT PETITION CHECKLIST

ADDENDA ITEMS:

- | | |
|---|--|
| ☐ ADMINISTRATIVE MODIFICATION | ☐ FINAL PLAT |
| ☐ APPEAL | ☐ TIME EXTENSION (ADMINISTRATIVE) |
| ☐ DEVELOPMENT AGREEMENT MODIFICATION | ☐ TIME EXTENSION (HEARING) |

OVERLAY DISTRICTS: Some Overlays require a separate checklist. All require additional information:

- | | |
|--|---|
| ☐ BOISE AIR TERMINAL AIRPORT INFLUENCE AREAS (ACC 8-3A) | ☐ PLANNED UNIT DEVELOPMENT (ACC 8-3D) |
| ☒ BOISE RIVER GREENWAY (ACC 8-3G) | ☐ SOUTHWEST PLANNING AREA (ACC 8-3D) |
| ☐ FLOOD HAZARD (ACC 8-3F) | ☐ WILDLAND-URBAN FIRE INTERFACE (ACC 8-3B) |
| ☐ HILLSIDE DEVELOPMENT (ACC 8-3H) | |

SITE INFORMATION:

Section: 4 Township: 2N Range: 3E Total Acres: _____

Subdivision Name: N/A Lot: _____ Block: _____

Site Address: 6300 S Surprise Way City: Boise

Tax Parcel Number(s): _____

Existing Zoning: RP Proposed Zoning: RP Area of City Impact: _____

Overlay District(s): _____

PLEASE PRINT ALL INFORMATION CLEARLY & LEGIBLY!

APPLICANT/AGENT:	ADDITIONAL CONTACT, if applicable:
Company Name (if applicable): Boise State University	Company Name (if applicable):
Applicant Name: Greg Kaltenecker	Applicant Name:
Address: 1910 W University Dr	Address:
City: Boise State: ID Zip: 83725	City: State: Zip:
Telephone: 208-426-4354 Fax:	Telephone: Fax:
Email: gregorykaltenecker@boisestate.edu	Email:
I certify this information is correct to the best of my knowledge.	ENGINEER/SURVEYOR, if applicable:
 3/17/21	Company Name (if applicable): River Design Group, Inc.
Signature: (Applicant) Date:	Name: Scott Wright
	Address: 311 SW Jefferson Ave
	City: Corvallis State: OR Zip: 97333
	Telephone: 541-738-2920 Fax:
	Email: swright@riverdesigngroup.com

OWNER(S) OF RECORD:	OWNER(S) OF RECORD:
Company Name (if applicable): Boise State University	Company Name (if applicable):
Owner Name (or authorized representative/agent, see below*): Leslie Durham, Interim Dean, College of Arts and Sciences	Owner Name (or authorized representative/agent, see below*):
Address: 1910 University Drive	Address:
City: Boise State: ID Zip: 83725	City: State: Zip:
Telephone: 208-426-1414 Fax:	Telephone: Fax:
Email: ldurham@boisestate.edu	Email:
I consent to this application, I certify this information is correct, and allow Development Services staff to enter the property for related site inspections. I understand that as the property owner of record I will be required to enter into a Development Agreement with Ada County, either personally or on behalf of the entity owning the property, in the event this application includes a request for a Zoning Map Amendment. I agree to indemnify, defend and hold Ada County and its employees harmless from any claim or liability resulting from any dispute as to the statements contained in this application or as to the ownership of the property, which is the subject of the application.	I consent to this application, I certify this information is correct, and allow Development Services staff to enter the property for related site inspections. I understand that as the property owner of record I will be required to enter into a Development Agreement with Ada County, either personally or on behalf of the entity owning the property, in the event this application includes a request for a Zoning Map Amendment. I agree to indemnify, defend and hold Ada County and its employees harmless from any claim or liability resulting from any dispute as to the statements contained in this application or as to the ownership of the property, which is the subject of the application.
 3/11/21	
Signature: All Owner(s) of Record Date	Signature: All Owner(s) of Record Date

ALL OWNER(S) OF RECORD (ON THE CURRENT DEED) MUST SIGN
(Additional signature pages are Available Online, if needed)

*If the property owner(s) are a business entity, include business entity documents, including those that indicate the person(s) who are eligible to sign documents.

Appendix C: No-Rise Report for Boise River Side Channel Restoration at Intermountain Bird Observatory

Prepared for

Micron Technology, Inc.

Charles Dedeker



**Boise State University
Intermountain Bird Observatory**

Gregory Kaltenecker



Prepared by

River Design Group, Inc.

Contact: Scott Wright, PE, PMP and Chris Nelson, PE

236 Wisconsin Ave

Whitefish, MT 59937

Phone 406.862.4927

www.riverdesigngroup.com



March 2021

EXECUTIVE SUMMARY

River Design Group, Inc. (RDG) has assisted Micron Technologies (Micron), Boise State University (BSU) Intermountain Bird Observatory (IBO) and Warner Construction, Inc. (Warner) in designing the restoration of an existing side channel on the Boise River near Boise, Idaho. The project seeks to remove 11,000 cubic yards of material from the floodway to restore flow and function to the historic side channel. The project area falls within a FEMA Zone AE floodplain on FIRM panel 41017C0300E. Zone AE indicates an area that is likely to be inundated in the 100-year base flood, where base flood elevations have been determined. Portions of the project area are also designated as floodway.

This No-Rise Analysis describes changes in water elevations (WSEL) attributed to the project and provides the information required for submittal of a Letter of Map Amendment to FEMA following completion of the project. Hydraulic modeling results show that the proposed side channel restoration will result in lowering the 100-year flood elevation through the project site an average of 0.11 feet with changes in water surface elevation ranging from 0.00 feet to -0.28 feet.

In addition to modeling a net lowering of the floodplain WSEL, the model was used to evaluate potential changes in scour depth at the Highway 21 bridge piers. The scour analysis results suggest that the project will reduce scour depths for the 100-year flood event and will not significantly increase scour depths for the 500-year event.

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1 Introduction

River Design Group, Inc. (RDG) was retained by Micron Technologies (Micron), Boise State University (BSU) Intermountain Bird Observatory (IBO), and Warner Construction, Inc. (Warner) to develop plans, assist in the permit process, and provide construction oversight for restoration of an existing side channel. The project site is located on the Boise River near Boise, Idaho (**Figure 1-1**). As part of the permitting requirements for the project, a Letter of Map Revision (LOMR) for the floodplain is required. Improvements to the side channel are planned for completion in the fall of 2021. This report, accompanying appendices, and digital files, comprise the analysis performed for the LOMR and describe the 1%-annual-chance floodplain extent changes attributable to the project along the Boise River. A Post-project model summarizes the proposed impacts to the floodplain and provides the basis for the LOMR.

The effective Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for the Boise River in the vicinity of the project is FIS Number 16001CV001C (Ada County, Idaho and Incorporated Areas). The effective Flood Insurance Rate Map (FIRM) for the project area is 16001C0315J, which has an effective date of June 19, 2020. FEMA maintains and updates the FIS and associated FIRMs for communities that participate in FEMA's National Flood Insurance Program (NFIP). The maps depict land which has been determined to be subject to a 1% or greater chance of flooding in any given year, which is called the base flood. A flood event with a 1% chance of occurrence in any given year is referred to as a 1%-annual-chance flood, also commonly referred to as a 100-year flood. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

As stated in the FIS, the Boise River in the vicinity of the project was most recently analyzed using detailed methods. A hydraulic model of the river was completed by US Army Corps of Engineers (USACE, 2016). The effective model was provided by FEMA for use in the analysis of this project. A copy of the effective model, the 'duplicate effective model' was created and compared with output from the effective model to ensure that it reflected the FIS flood elevations accurately. This model was then updated using 2007 Lidar to create the 'corrected effective model'. The cross sections were resampled using 2019 Lidar to create the 'Pre-project' model which reflects the most recent pre-project floodplain elevation data available. The pre-project model was then updated to reflect changes to the floodplain resulting from the project. Results from the post-project model were compared with the pre-project model to ensure compliance with floodplain regulations. The post-project model provides the basis for results presented in this no-rise analysis.

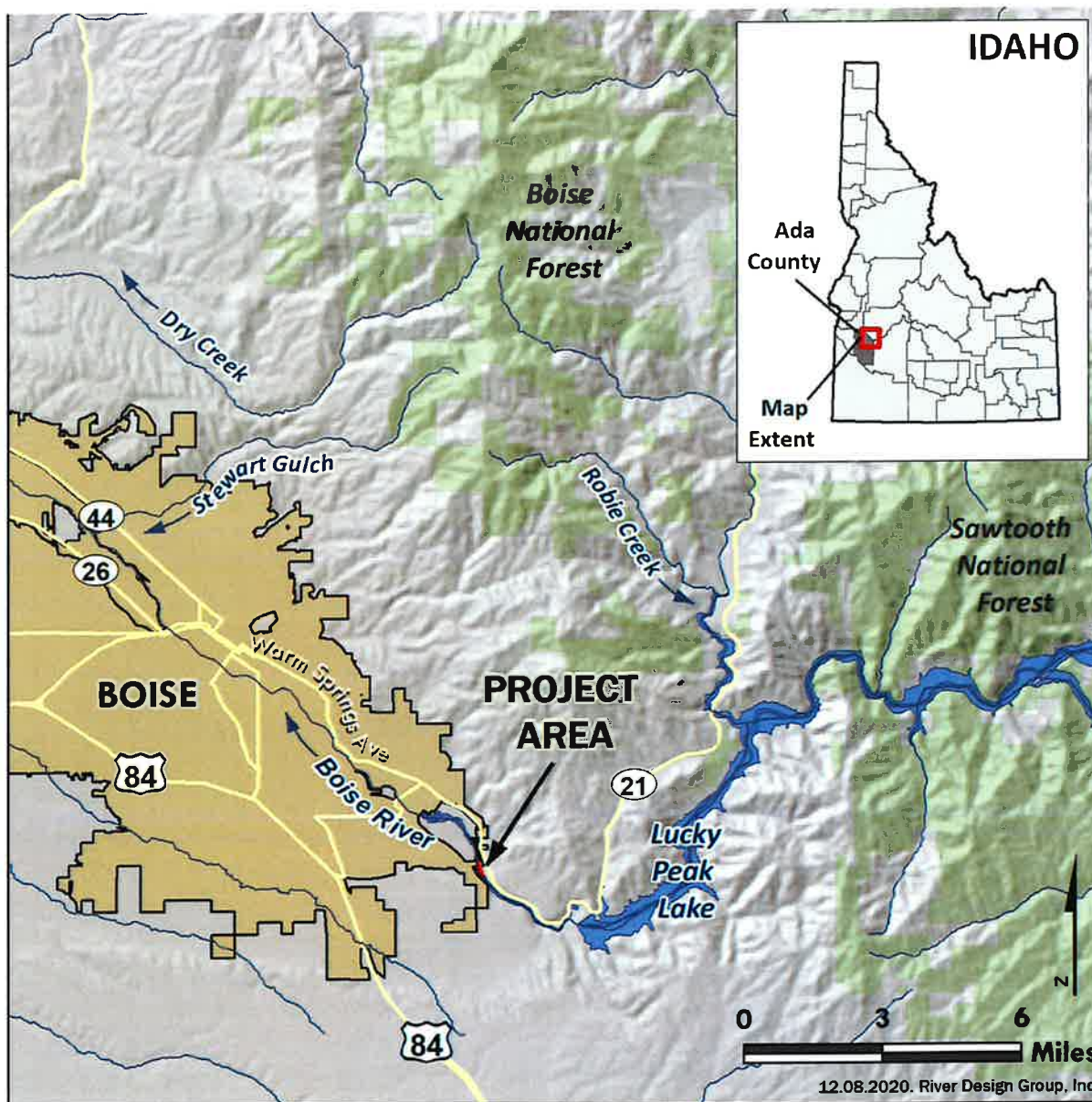


Figure 1-1. Project vicinity map showing location of the project in relation to the city of Boise, Idaho.

1.1 Standard of Practice

RDG works exclusively in the river environment and employs the most current and accepted practices available for planning and design of river restoration and channel enhancement projects. This no-rise analysis was developed in accordance with the City of Boise and Ada County floodplain management requirements, FEMA MT-2 Instructions (2018) and standard hydraulic engineering principles utilized for floodplain modeling. All work was performed or directed by a registered Professional Engineer (PE) with experience in no-rise and LOMR analyses.

2 Project Location and Background

The side channel restoration project is located a short distance downstream of Lucky Peak Dam. The project is located at river mile (RM) 64 on the Boise River as measured upstream from the confluence with the Snake River (43.65910337156601, -116.09330604613578). Portions of the project are located within the city limits of Boise and in Ada County, Idaho. The Boise River downstream of Lucky Peak Dam is mapped as FEMA zone AE (**Figure 2-1**). This mapping designation identifies areas with a one-percent chance of being inundated by the base flood, with mapping determined by detailed methods. The site is surrounded by high desert shrubland, and other than the Highway 21 bridge structure, there are no buildings within 1,000 feet of the side channel.

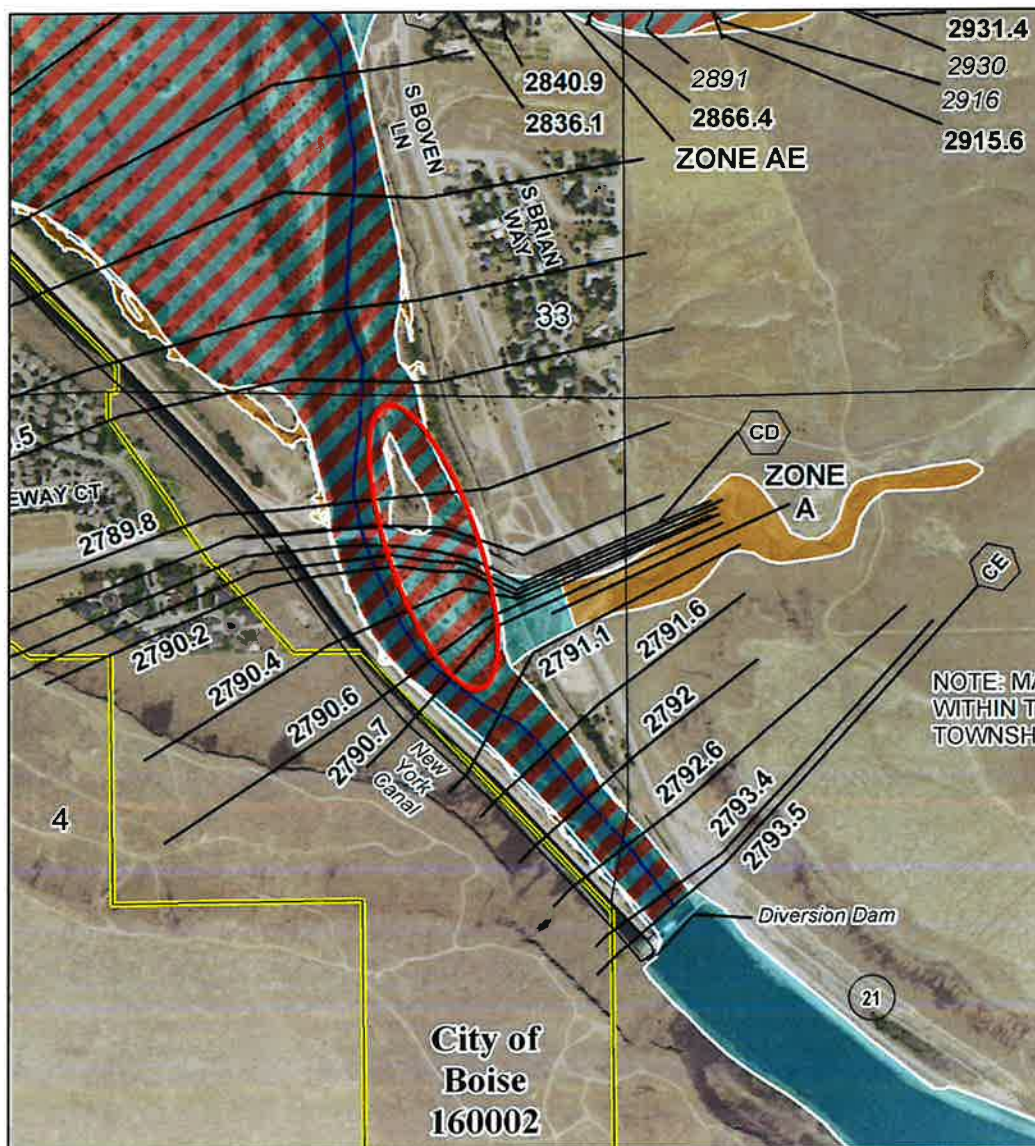


Figure 2-1. Portion of FEMA Flood Insurance Rate Map 16001C0315J showing location of project (red outline).

3 Methodology

The overall approach to modeling the study reach was to develop a model that accurately reflects Pre-project and Post-project conditions. All assumptions made in developing the hydraulic model are explained in the following sections.

3.1 Project Hydrology

Hydrology for the project was developed and compared with FEMA FIS flows. The hydrology for this reach of the Boise River in the Effective FIS (FEMA 2020) is presented in Section 10.6.f, Hydrologic Analyses. The following paragraph provides a brief description of the analysis completed. Flows from the Effective FIS for the study reach are listed in **Table 3-1**.

“For the Boise River, a flood frequency curve for the Lower Boise River basin, developed in 2012 by the USACE, Walla Walla District, was utilized in this restudy. Since 1955, when storage in Lucky Peak Lake began, the lower part of the frequency curve has been defined by regulated flood flows measured at the USGS gaging stations at Boise, Idaho. The upper part of the regulated frequency curve was developed by routing specific frequency hydrographs through the upstream reservoirs.”

Streamflow data from two USGS gages were analyzed for the comparison with the data from the Effective FIS. The Boise River near Boise gage (USGS # 12302000) was located immediately downstream of Lucky Peak Dam and has a drainage area of 2,686 square miles. Peak flow data are available for this gage from 1895 to 1916 and 1955 to 2019 (**Figure 3-1**). The Boise River at Glenwood Bridge gage (USGS #13206000) is located about 10 miles downstream of the project area with a drainage area of 2,773 square miles. The Glenwood Bridge gage is located downstream of the New York Canal diversion, and thus likely provides a better estimate of actual flows through the project area. It has a continuous record from 1982 to present and 3 historic peak flows pre-dating the installation of Lucky Peak Dam (**Figure 3-1**).

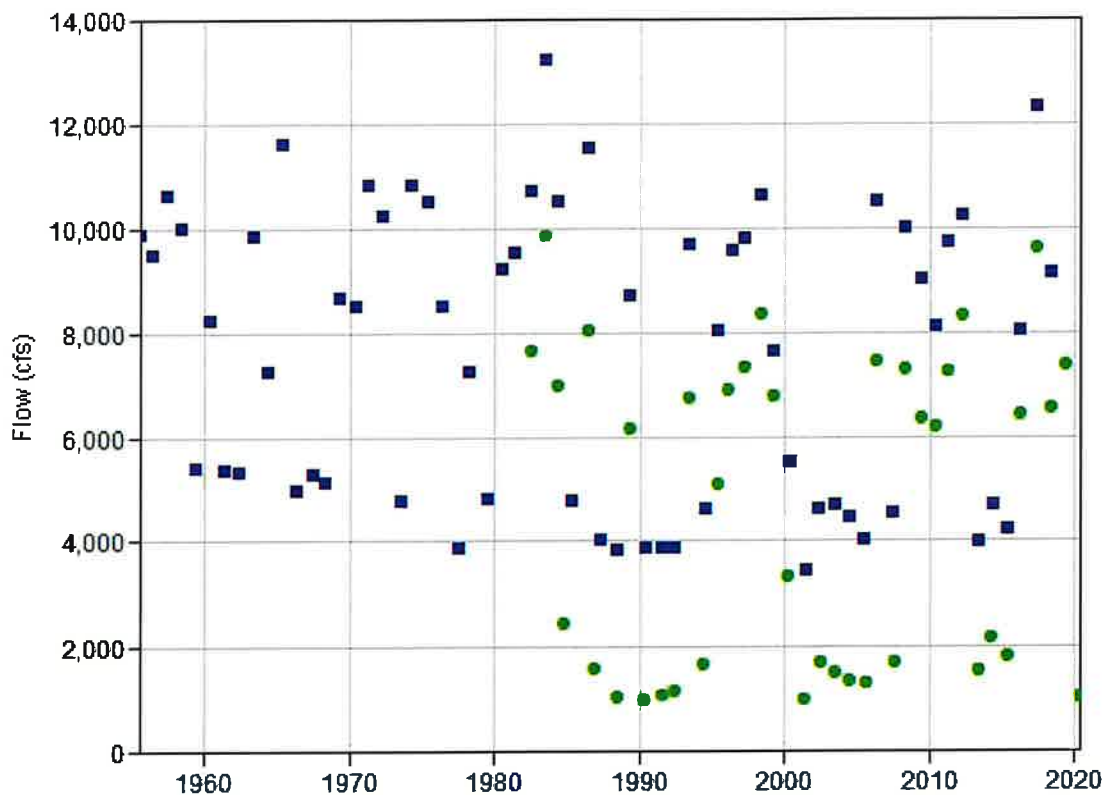


Figure 3-1. Post-dam peak flow data for Boise River near Boise gage (USGS #13202000) in blue and Boise River at Glenwood Bridge (USGS #13206000) in green.

Standard Bulletin 17b analyses were completed for both gages. Results of the analyses are presented in **Figure 3-2**. In addition, a best-fit curve was developed for the Glenwood Bridge gage. The best fit was found using three logarithmic regression lines. The results of the piecewise log regression are presented in **Figure 3-3**.

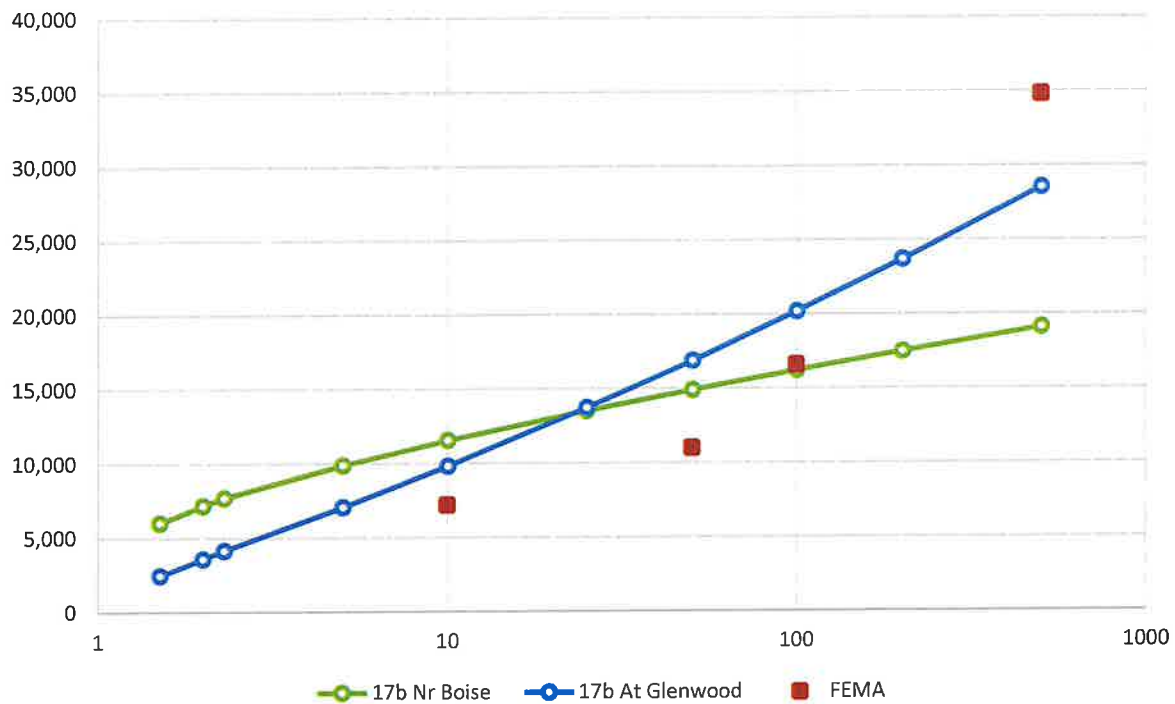


Figure 3-2. Bulletin 17b analysis results compared with FEMA FIS flows.

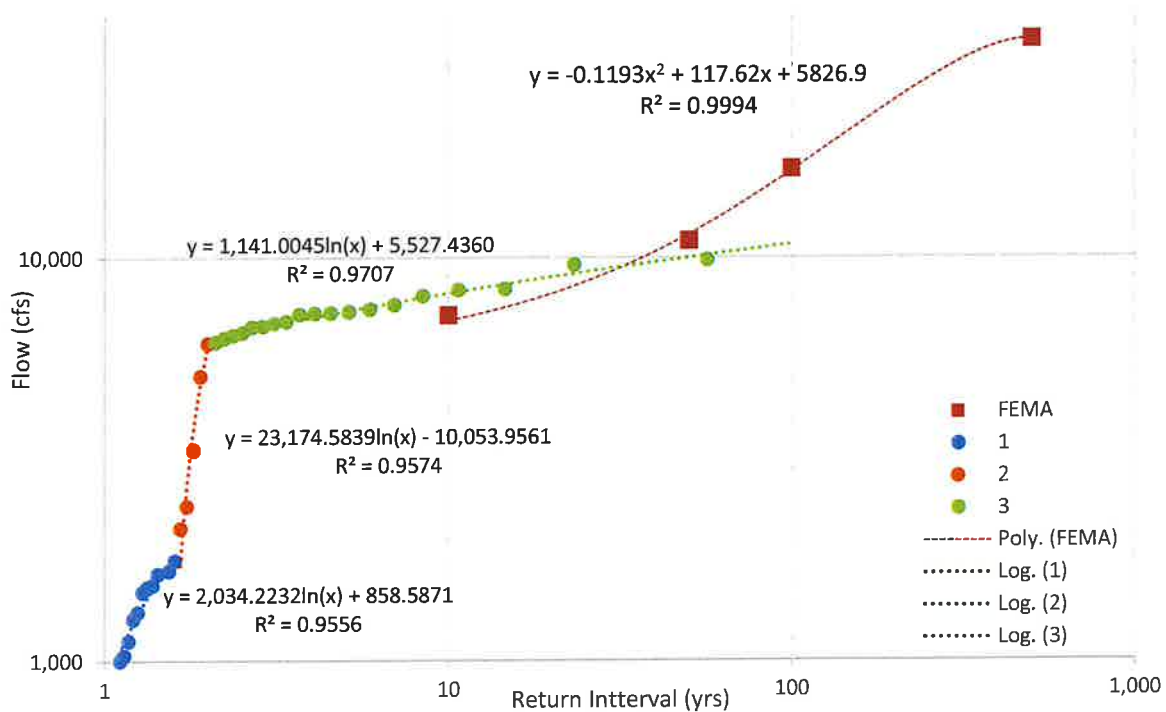


Figure 3-3. Piecewise log best-fit analysis for Boise River at Glenwood Bridge gage (USGS #13206000) compared with FEMA FIS flows.

The standard 17b analyses for both gages were found to provide a poor fit to the observed data. The 17b curves do not provide a reasonable approximation of the Log-Pearson 3 curve shape and are therefore not suitable for use in analysis of the regulated flow data in this system.

The piecewise fit shown in **Figure 3-3** was determined to provide a better approximation of the flood frequency. Design flows for events with return intervals up to and including 10 years were chosen from the piecewise log fit trendline analysis of the Boise River near Glenwood Bridge dataset. Design flows for events with return intervals greater than 10 years were chosen from the polynomial fit trendline developed from the FEMA FIS flows. The design flows are summarized in

Table 3-1. Comparison of peak flows.

Percent Chance of Exceedance	Return Interval (yrs)	Design Flow* (cfs)	FEMA* (cfs)
91	1.1	1,052	--
67	1.5	1,683	--
50	2.0	6,009	--
43	2.3	6,493	--
20	5.0	7,364	--
10	10	8,155	7,200
4	25	8,693	--
2	50	11,410	11,000
1	100	16,396	16,600
0.5	200	24,579	--
0.2	500	34,812	34,800

*q1.1 - q10 from piecewise log-fit of Glenwood gage data,

q25 - q500 from polynomial fit of FEMA FIS flows

FEMA FIS flows noted in **bold used for the no-rise analysis

3.2 Modeling and Mapping Datum and Naming Conventions

Survey data gathered for this project and the hydraulic model developed for the Boise River reference the North American Vertical Datum of 1988 (NAVD88). The horizontal datum for the project and model is NAD83, Idaho State Plane (West) with units of US feet.

3.3 Topography and Survey Data

Recently acquired LiDAR topographic data was used to investigate floodplain development that may have occurred since the effective FEMA flood study was conducted and to update river channel geometry within the vicinity of the dam to reflect channel changes. RDG integrated topographic, bathymetric, and LiDAR survey data into a seamless terrain model of terrestrial bare earth and submerged bathymetry. This integrated surface was used to model pre-project

conditions. Post-project conditions were modelled using the final design surface. This surface was developed by integrating CAD grading contours into the existing ground surface to produce a finished ground surface.

3.3.1 Pre-project Conditions

3.3.1.1 Remote Sensing

LiDAR (Light Detection and Ranging) data was available for the project area from aerial surveys conducted in 2007, 2017 and 2019. The 2007 data was used for development of the effective FIS HEC-RAS model. The survey was completed in March 2007 using the NASA Experimental Advanced Airborne Research LiDAR (EAARL) system. The data were processed by the Idaho Dept. of Water Resources (IDWR) using the Airborne LiDAR Processing System (ALPS), a multi-tiered processing system developed by a USGS/NASA collaborative project for the use of subaerial and submarine LiDAR. The output from this processing is 2-meter resolution raster data. RDG obtained the 2007 dataset from the Idaho Lidar Consortium for comparison with the effective model.

An updated green LiDAR survey was completed in November 2019 by Quantum Spatial, Inc. (QSI). This dataset was processed for use as pre-project terrain. Non-vegetated vertical accuracy relative to the bare earth DEM was 0.14 feet at the 95% confidence level (QSI 2020). Flows in the Boise River ranged from ~250 cfs to ~300 cfs at the Glenwood Bridge gage (USGS #13206000) during LiDAR acquisition. Comparison of 67 submerged bathymetric check points to the bare earth DEM resulted in a vertical accuracy of 0.41 feet, while assessment of 56 wetted edge check points resulted in a vertical accuracy of 0.60 feet at the 95% confidence level (QSI 2020).

3.3.1.2 Pre-Project Topographic Data

A field survey was performed in 2020 by Quadrant Consulting, Inc (QCI) to collect points for use in an independent check on the accuracy of the LiDAR data. The mean difference in elevation between the survey points and the 2019 Lidar TIN surface used for modeling was 0.03 ft, with a standard deviation of 0.3 ft. No adjustment of the LiDAR data was determined to be warranted based on the results of this assessment.

3.4 Hydraulic Analysis

The following section describes the hydraulic models developed to represent pre- and post-project floodplain conditions using methods outlined in the FEMA MT-2 Instructions (2018). A series of hydraulic models were developed to evaluate changes in the 1-percent annual chance water surface profile attributable to different river geometry files, including isolating potential effects of the proposed project. A brief description and purpose of each model is included below:

Current Effective Model - The Current Effective Model is the model used to develop the Effective FIS.

Duplicate Effective Model - The Duplicate Effective Model is a copy of the Current Effective Model.

Corrected Effective Model - The Corrected Effective Model corrects errors in the Current Effective Model and incorporates more detailed topographic information than that used in the Current Effective Model. The Corrected Effective Model does not reflect any manmade physical changes since the date of the effective model.

Pre-project Model - The Pre-project Model reflects physical changes in the floodplain prior to project implementation that are not included in the Corrected Effective Model.

Post-project Model - The Post-project Model evaluates specific effects of the project by replacing project geometry with post-project data while keeping other aspects of the model identical to isolate effects specific to the project.

3.4.1 Hydraulic Model Capabilities

HEC-RAS v5.0.7 (USACE, 2019) software was used for all modeling tasks. HEC-RAS is a 1-dimensional, steady-state, hydraulic model accepted for use in determining flood water surface profiles. The model solves the energy equation using an iterative technique for a given hydraulic condition. This technique results in a solution to all variables in the energy equation (i.e., velocity, hydraulic head, friction losses, etc.) at any given or interpolated cross-section. Inherent assumptions of the model are that the situation is steady-state, gradually varied, channel slopes are less than 1 on 10, and flow is 1-dimensional and uniform within a streamline. The model produces water surface profiles using step-backwater calculations and is currently accepted for use in the NFIP (FEMA, 2001).

3.4.2 Model Data Development

Model data was developed using a combination of legacy data and new data collected for this effort. At different stages in the evaluation, different combinations of data were used to evaluate specific changes between models. A description of model inputs, use, and development is provided below.

3.4.3 Geometric Data for Hydraulic Model

Cross section geometry for the duplicate effective model was taken from the 2007 Lidar DEM. Corrected effective and pre-project model cross section geometry was taken from the 2019 Lidar TIN. Post-project model cross section geometry was taken from the 2021 as-built TIN. Spatial data within the project area was sampled at each section and extracted as georeferenced cross-sectional data.

3.4.4 Flows

Flows used in the modeling effort were obtained from the effective FIS (**Table 3-1**). No revisions to FEMA flood flows were made for this analysis.

3.4.5 Channel Roughness

Roughness values for the duplicate effective, corrected effective, and pre-project models were copied from the current effective model for consistency. Horizontally varied roughness was used in the current effective model. Roughness values in the current effective model ranged from 0.020 to 0.075. Roughness values through the project area ranged from 0.030 to 0.070 with channel roughness values of 0.032. Overbank roughness in the side channel was generally 0.050.

3.5 Current Effective Model

The effective FEMA flood hazard information for the Boise River was most recently revised in 2020 and is described in the Flood Insurance Study of Ada County and Incorporated Areas (FEMA 2020). The effective model was provided by FEMA. Attempts to run the effective model produced an error message regarding the length of the Lateral Structure at RS 23.83, shown as **Figure 3-4**.

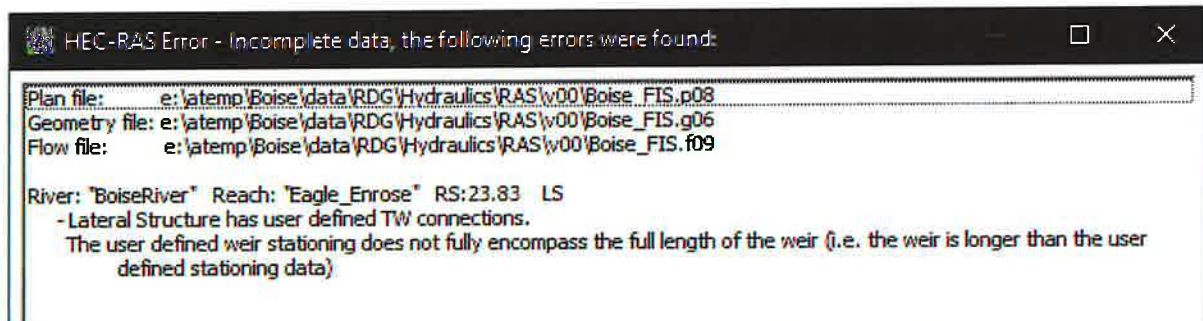


Figure 3-4. Error message regarding length of Lateral Structure at RS 23.83 in Effective Model.

3.6 Duplicate Effective Model

The Duplicate Effective Model is a copy of the Current Effective Model. The Current Effective Model was copied and truncated at RS 64.45566 to produce the Duplicate Effective Model. The downstream boundary conditions for the Duplicate Effective Model uses 'known' water surface elevations (WSELs) from the effective FIS as the starting WSELs (**Table 3-2**). This was required to work around the error in the Current Effective Model's geometry data referenced above.

Table 3-2. Starting WSELs.

Profile Name	Downstream WSEL
10pct	2785.5
2.0pct	2787.3
1.0pct	2789.0
0.2pct	2792.6

The Duplicate Effective Model extends about 1000 feet downstream of the project area and 2500 feet upstream to provide a continuous model of the revised reach. The Duplicate Effective Model ends at Effective FIS cross section CC downstream and CE upstream to ensure that the revised data will be integrated into the effective data. **Table 3-3** provides a comparison of WSEL's produced by the Duplicate Effective Model.

Table 3-3. Comparison of duplicate effective and current effective model WSELs.

RAS	Current Effective Model	Duplicate Effective Model	WSEL Difference
RS (letter)	(ft, NAVD88)	(ft, NAVD88)	(ft)
65.30499 (CE)	2793.53	2793.88	0.35
65.28944	2793.44	2793.79	0.35
65.22739	2792.63	2792.91	0.28
65.16534	2791.96	2791.85	-0.11
65.10329	2791.55	2791.47	-0.08
65.04122	2791.10	2791.15	0.05
64.97919	2790.69	2790.79	0.10
64.952	2790.60	2790.73	0.13
64.88996	2790.44	2790.57	0.13
64.8371	2790.15	2790.28	0.13
64.82432	2790.03	2790.16	0.13
64.81094 (CD)	2789.97	2790.13	0.16
64.79202	2789.89	2789.54	-0.35
64.76588	2789.75	2789.66	-0.09
64.6418	2789.46	2789.10	-0.36
64.565	2789.25	2788.89	-0.36
64.45566 (CC)	2788.95	2789.00	0.05

3.7 Corrected Effective Model

A Corrected Effective Model was developed that corrects errors in the Current Effective Model and incorporates more detailed topographic information than that used in the Current Effective Model. The Corrected Effective Model does not reflect any manmade physical changes since the date of the effective model. As described in the previous section on the Duplicate Effective Model, the Current Effective model was truncated at RS 64.45566 to work around the error in the CEM's geometry file. The most recent Lidar dataset (QSI 2020) was used to update channel and floodplain topography for all cross sections. The modeled WSELs are compared with the effective FIS WSELs in **Table 3-4**. The WSELs for the upstream and downstream most cross sections match the Effective FIS WSELs within the allowed 0.5 foot tolerance.

Table 3-4. Comparison of corrected effective and current effective model WSELs.

HEC-RAS RS (letter)	Current Effective Model (ft, NAVD88)	Corrected Effective Model (ft, NAVD88)	WSEL Difference (ft)
65.30499 (CE)	2793.53	2793.77	0.24
65.28944	2793.44	2793.57	0.13
65.22739	2792.63	2792.69	0.06
65.16534	2791.96	2791.64	-0.32
65.10329	2791.55	2791.41	-0.14
65.04122	2791.10	2791.07	-0.03
64.97919	2790.69	2790.83	0.14
64.952	2790.60	2790.78	0.18
64.88996	2790.44	2790.71	0.27
64.8371	2790.15	2790.43	0.28
64.82432	2790.03	2790.36	0.33
64.81094 (CD)	2789.97	2790.30	0.33
64.79202	2789.89	2790.24	0.35
64.76588	2789.75	2789.96	0.21
64.6418	2789.46	2789.60	0.14
64.565	2789.25	2789.30	0.05
64.45566 (CC)	2788.95	2789.00	0.05

3.8 Pre-project Model

A Pre-project Model was developed that adds additional cross sections to the Corrected Effective Model. No changes to the topographic data used for modeling were necessary as no physical changes occurred at the project site between the time that the 2019 Lidar used for the Corrected Effective Model was collected and the project was implemented. Two cross sections were added near the downstream end of the project area to facilitate comparison of pre- and post-project WSELs. Cross sections were orientated perpendicular to anticipated flow paths, sometimes requiring multiple inflection points. Pre-project model geometry is shown in **Figure 3-5**.

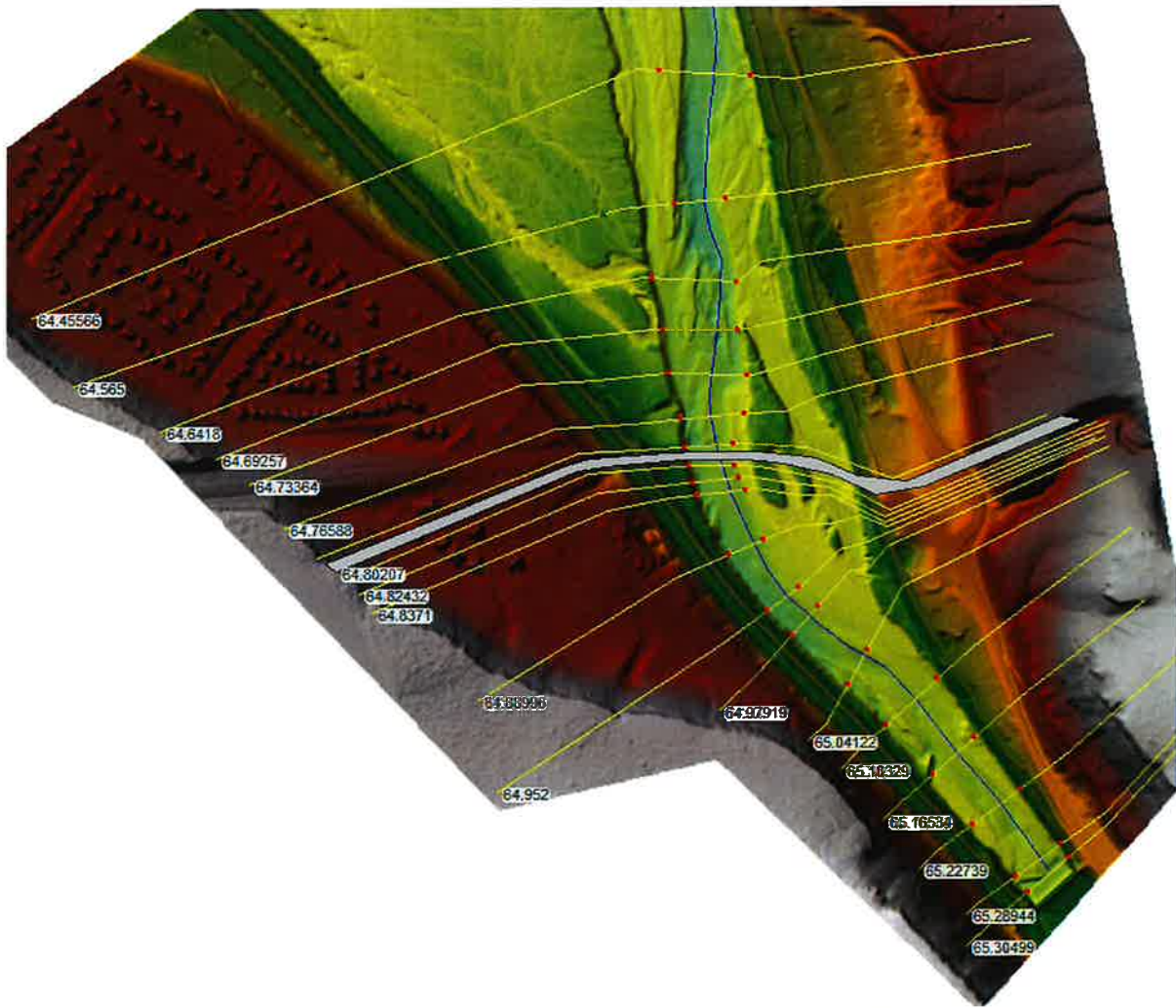


Figure 3-5. Plan view layout of pre-project hydraulic model showing cross-sections.

The modeled WSELs are compared with the effective FIS WSELs in **Table 3-5**. The WSELs for the upstream and downstream most cross sections match the Effective FIS WSELs within the allowed 0.5-foot tolerance.

Table 3-5. Comparison of current effective and pre-project model WSELs.

RAS RS (letter)	Current Effective Model (ft, NAVD88)	Pre-project Model (ft, NAVD88)	WSEL Difference (ft)
65.30499 (CE)	2793.53	2793.73	0.20
65.28944	2793.44	2793.53	0.09
65.22739	2792.63	2792.64	0.01
65.16534	2791.96	2791.55	-0.41
65.10329	2791.55	2791.31	-0.24
65.04122	2791.10	2790.96	-0.14
64.97919	2790.69	2790.67	-0.02
64.952	2790.60	2790.61	0.01
64.88996	2790.44	2790.55	0.11
64.8371	2790.15	2790.27	0.12
64.82432	2790.03	2790.21	0.18
64.81094 (CD)	2789.97	2790.14	0.17
64.79202	2789.89	2790.07	0.18
64.76588	2789.75	2789.73	-0.02
64.73364	--	2789.81	--
64.69257	--	2789.70	--
64.6418	2789.46	2789.62	0.16
64.565	2789.25	2789.32	0.07
64.45566 (CC)	2788.95	2789.00	0.05

3.9 Post-project Model

The Post-project model evaluates specific effects of the project by replacing project geometry with post-project data while keeping other aspects of the model identical to isolate effects specific to the project. Post-project model geometry was re-sampled to show changed bathymetry and topography attributable to the implementation of the project. Roughness values for the side channel in the Post-project Model were adjusted to reflect proposed conditions. Roughness values for the active channel portion of the side channel were set at 0.035. Overbank roughness in the side channel was set to 0.050. Large wood structures were included in the model as blocked obstructions. The post-project model geometry is shown in **Figure 3-6**.

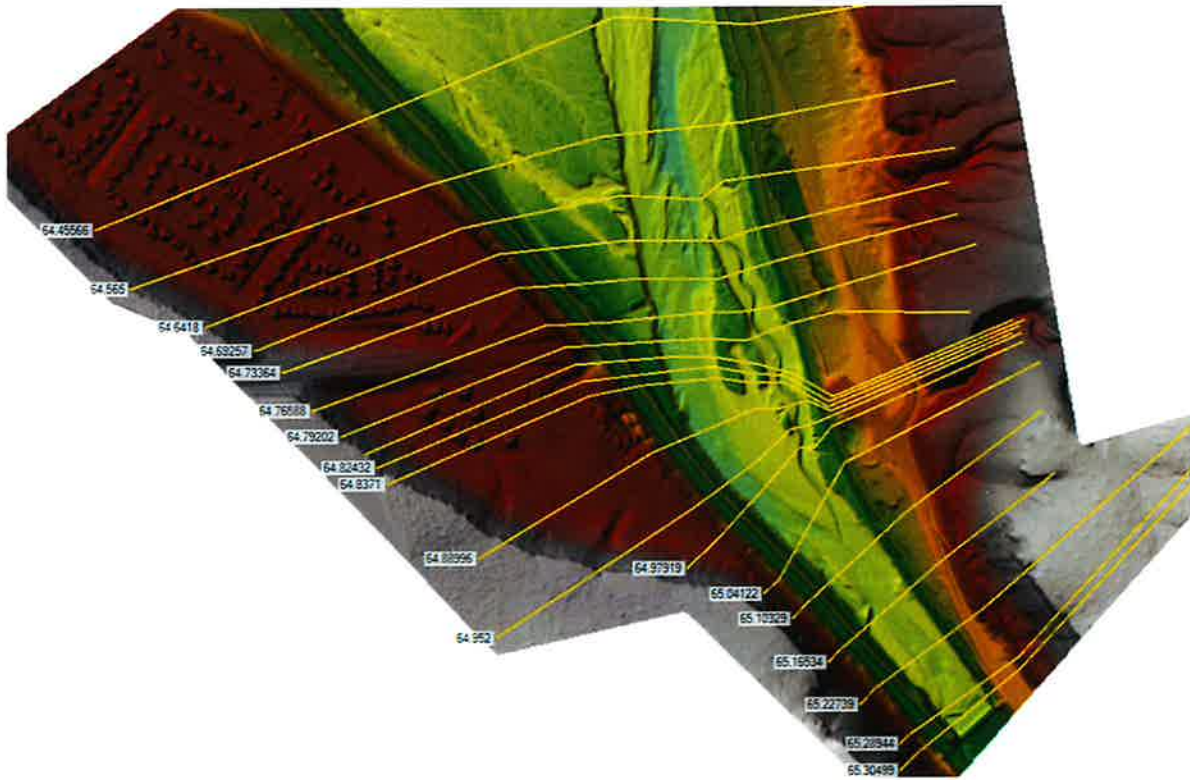


Figure 3-6. Plan view layout of post-project hydraulic model showing cross-sections.

4 RESULTS

4.1 Model Review

Standard checks on model parameters were made to ensure that results are reasonable. No errors were generated by HEC-RAS for any of the model runs. Check-RAS was not run due to updates to the HEC-RAS software that make it incompatible with Check-RAS.

4.2 WSEL Comparison

Water surface elevations for the 100-year event were compared to determine changes attributable to the project. *Post-project modeled WSELs show a reduction through the project area ranging from 0.28 feet to 0.04 feet with a median reduction of 0.12 feet.* The modeled WSELs converge at cross-section 65.289 showing a difference of less than 0.1 feet above that station (**Figure 4 1-and Table 4-1**). The downstream WSELs of the Post-project model match within 0.00 feet of the Pre-project model. The downstream WSELs of the Post-project model match within -0.04 feet of the Pre-project model. This meets the requirement to match within 0.5 feet at the upstream and downstream extents of the study reach per Subparagraph 65.6(a)(2) of the NFIP regulations (FEMA, 2021b).

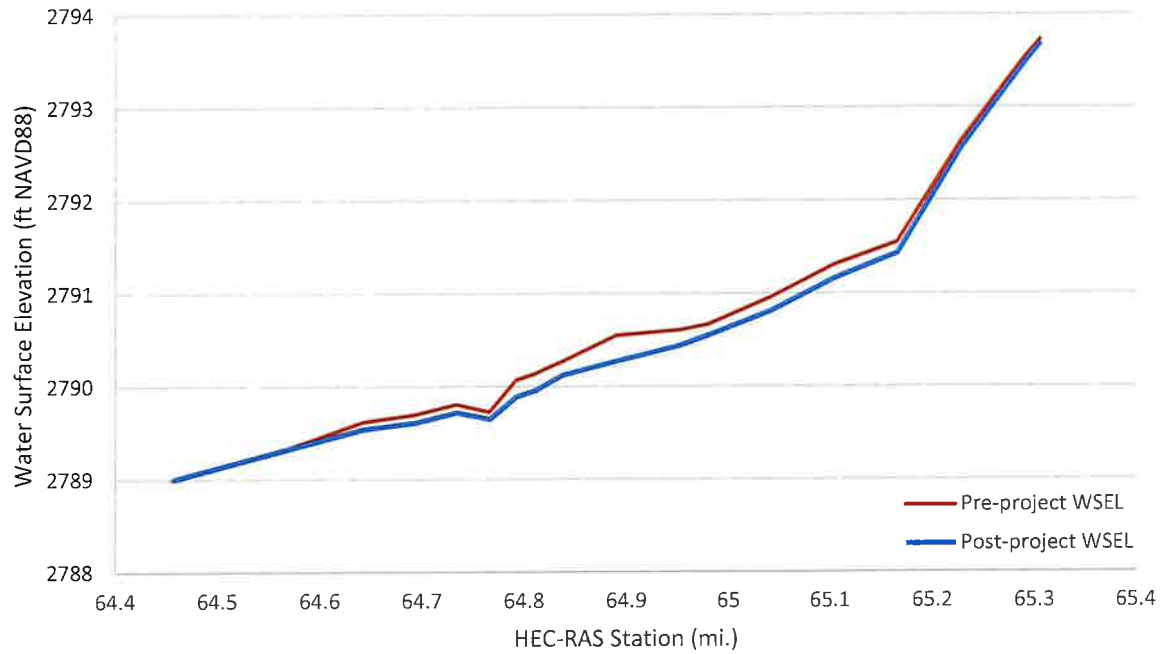


Figure 4-1. Comparison of Pre-project and Post-project water surface elevations for the 100-year event.

Table 4-1. Comparison of pre-project and post-project model WSELs.

HEC-RAS Station (mi.)	Current Effective Model (ft, NAVD88)	Pre-project Model (ft, NAVD88)	WSEL Difference (ft)
65.30499	2793.73	2793.69	-0.04
65.28944	2793.53	2793.48	-0.05
65.22739	2792.64	2792.57	-0.07
65.16534	2791.55	2791.43	-0.12
65.10329	2791.31	2791.16	-0.15
65.04122	2790.96	2790.81	-0.15
64.97919	2790.67	2790.55	-0.12
64.952	2790.61	2790.44	-0.17
64.88996	2790.55	2790.27	-0.28
64.8371	2790.27	2790.12	-0.15
64.82432	2790.21	2790.04	-0.17
64.81094	2790.14	2789.96	-0.18
64.79202	2790.07	2789.89	-0.18
64.76588	2789.73	2789.65	-0.08
64.73364	2789.81	2789.72	-0.09
64.69257	2789.70	2789.61	-0.09
64.6418	2789.62	2789.54	-0.08
64.565	2789.32	2789.32	0.00
64.45566	2789.00	2789.00	0.00

4.3 Sediment Transport

The following section provides data related to this conclusion as requested in the FEMA LOMR Riverine Structures Form (MT-2 RS). Sediment transport in the project reach was investigated during a geomorphic assessment conducted prior to implementation of the project. A sediment transport assessment using hydraulic modeling results shows that post-project channel hydraulics will maintain the ability to transport fine sediment through the project area.

Sediment sizes ranging from sand to coarse cobble are dominant in the main channel. The Boise River between the New York Canal Diversion Dam and Barber Dam historically had an alluvial bed with large cobble and gravel. The current condition is a cobble-gravel dominated bed transitioning to a sandy bed in lower section near Barber Dam. Dominant particle sizes in the reach range from 2.5 in. (d50) to 12 in. (d100) with a d85 of 5 in (BREN, 2015). Sediment sizes in the proposed side channel also range from sand to coarse cobble.

Velocity and shear stress signatures in the main channel are not expected to be significantly influenced by the restored side channel. No significant change in sediment transport through the main channel is expected to result from improvements to the side channel.

Side-channel velocities will increase slightly (**Figures 4-2 and 4-3**). It is unlikely that these changes will cause erosion of the side channel bed material. Side channel banks will be stabilized by vegetation and the improvements to the side channel are not expected to adversely affect them.

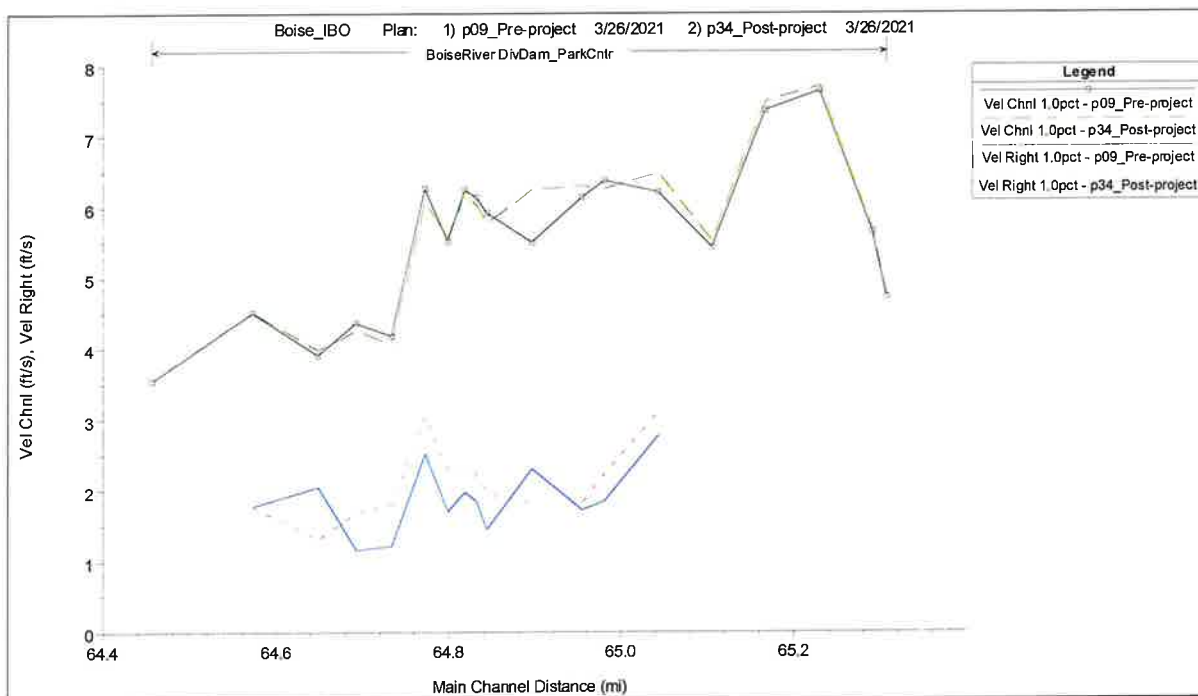


Figure 4-2. Average channel and right overbank velocity comparison from Pre-project and Post-project models.

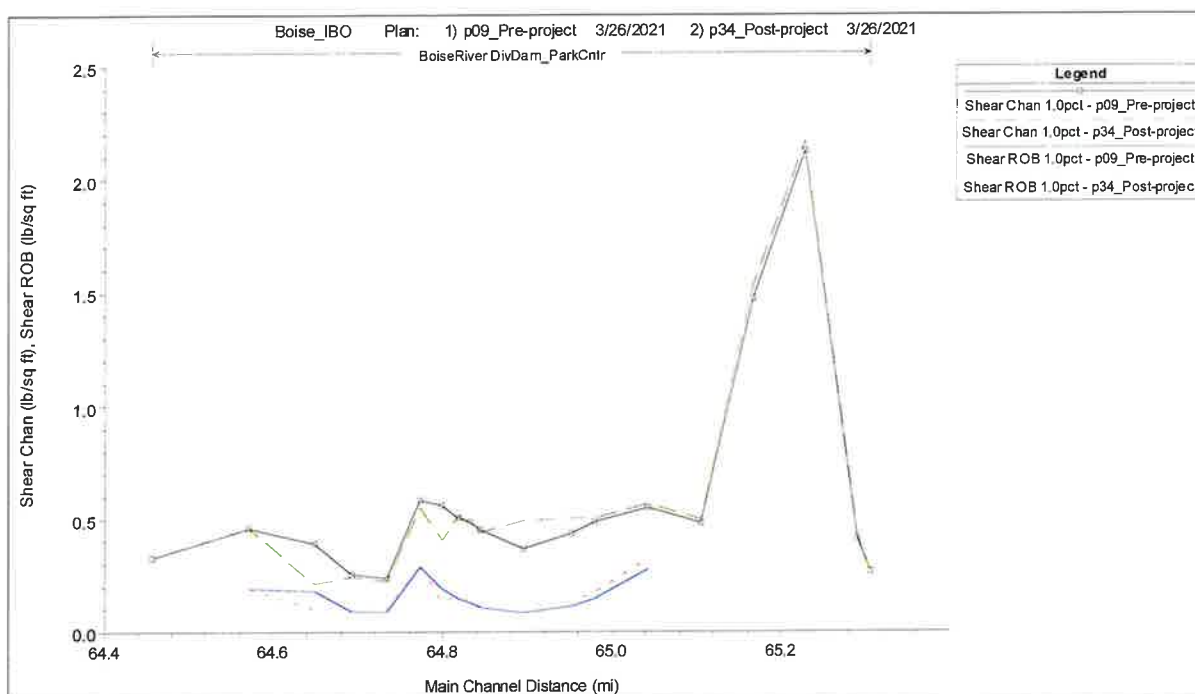


Figure 4-3. Average channel and right overbank shear comparison from Pre-project and Post-project models.

4.4 Bridge Scour

Potential for scour around the piers supporting the Highway 21 bridge was evaluated using the bridge scour hydraulic design function in HEC-RAS. The default methods for computing scour were used in the analysis. Potential for scour resulting from contraction was estimated as 0.0 feet for both pre- and post-project conditions. Potential for scour around piers in the active channel was reduced by 7.4 to 8.0 feet for the 100-year event in the post-project model. The change in potential for scour around piers in the active channel ranged from -1.6 feet to +0.6 feet for the 500-year event.

Table 4-1. Summary of scour at Highway 21 bridge piers (ft).

Location	100-yr			500-yr		
	Pre-project	Post-project	Difference	Pre-project	Post-project	Difference
Left Overbank	0.00	0.00	0.00	0.00	0.00	0.00
Channel	0.00	0.00	0.00	0.00	0.00	0.00
Right Overbank	0.00	0.00	0.00	0.00	0.00	0.00
Pier 1	0.00	0.00	0.00	0.00	0.00	0.00
Pier 2	0.00	0.00	0.00	0.00	0.00	0.00
Pier 3	0.00	0.00	0.00	0.00	0.00	0.00
Pier 4	19.20	11.85	-7.35	14.30	14.33	0.03
Pier 5	0.00	0.00	0.00	0.00	0.00	0.00
Pier 6	0.00	0.00	0.00	6.56	4.94	-1.62
Pier 7	14.40	6.40	-8.00	7.36	7.96	0.60
Pier 8	0.00	0.00	0.00	0.00	0.00	0.00

5 References

- Boise River Enhancement Network (BREN), 2015. Boise River Enhancement Plan. Boise, Idaho.
- FEMA (Federal Emergency Management Agency) 2018. MT-2 Instructions. Accessed online: https://www.fema.gov/sites/default/files/2020-07/MT-2_instructions_rev_8-20-18.pdf
- FEMA (Federal Emergency Management Agency) 2020. Flood Insurance Study Number 16001CV001C. Washington, D.C. Revised June 19, 2020.
- FEMA (Federal Emergency Management Agency) 2021a. Flood Map-Related Fees; Fee Exemptions For Map Change Request. Accessed online: <https://www.fema.gov/flood-maps/change-your-flood-zone/status/flood-map-related-fees>
- FEMA (Federal Emergency Management Agency) 2021b. NFIP regulations. Accessed online: https://www.fema.gov/pdf/floodplain/nfip_sg_appendix_e.pdf
- IDWR (Idaho Department of Water Resources) 2009. Boise River Green LiDAR.
- QCI (Quadrant Consulting, Inc.), 2020. Topographic Survey of Boise River. Boise, ID
- QSI (Quantum Spatial, Inc.) 2020. Boise River Flood Control District #10, Idaho, Topobathymetric Lidar Technical Data Report. March 20, 2020.
- Samuels, P.G. 1989. "Backwater lengths in rivers", Proceedings – Institution of Civil Engineers, Part 2, Research and Theory.
- USACE (U.S. Army Corps of Engineers) 2019. Hydrologic Engineering Center River Analysis System (HEC-RAS) version 5.0.7. March 2019
- USACE (U.S. Army Corps of Engineers) 2016. FLOOD INSURANCE STUDY HYDRAULICS SUMMARY FOR BOISE RIVER CANYON & ADA COUNTIES, IDAHO. Interagency Agreement No. HSFE10-09-X-00091 Project Number S110320Y. Prepared for FEMA Region X, 130 228th Street SW Bothell, WA 98021. Prepared by U.S. Army Corps of Engineers, Walla Walla District, 201 North 3rd Avenue Walla Walla, WA 99362. FEBRUARY 2016.

Attachment B4
City of Boise River Systems Permit



PLANNING AND DEVELOPMENT SERVICES

MAYOR: Lauren McLean | INTERIM DIRECTOR: Kelcey Stewart

May 6, 2021

Gregory Kaltenecker
Boise State University
1910 University Dr
Boise, ID 83725
gregorykaltenecker@boisestate.edu

Re: CFH21-00052 / 6300 S Surprise Way

Dear Applicant:

This letter is to inform you of the action taken by the Boise City Planning Department on your request for a Boise River System permit for the restoration of an existing side channel of the Boise River at the Intermountain Bird Observatory generally located in an A-1 (Open Lands) zone.

The Boise City Planning and Zoning Commission, at their hearing of **May 3, 2021**, **approved** your request, based on compliance with the attached Reason for the Decision and Conditions of Approval.

May we also take this opportunity to inform you of the following:

1. This approval will not take effect until after the appeal period has lapsed.
2. The decision of the Boise City Planning and Zoning Commission may be appealed to City Council within ten (10) calendar days from the hearing date. The appeal must be written, accompanied by the appropriate fee, and submitted to the Planning and Development Services Department prior to the deadline set forth herein. Appeal application forms are available in the Planning Department or online under Applications at: cityofboise.org/pds-appeal.
3. All appeals of this permit must be filed by **5:00 P.M., on May 13, 2021**.
4. If this Permit is not acted upon within 24 months, it will become null and void without further notification from this department.

Questions can be directed to me at (208) 608-7087 or dmoser@cityofboise.org.

Sincerely,

David Moser
Associate Planner, Current Planning and Subdivisions
Boise City Planning and Development Services
DM/mh

cc: Scott Wright / River Design Group / swright@riverdesigngroup.net
Fred Fritchman & Eric Berg / SENA / fritchman@msn.com; iceberg210@hotmail.com

REASON FOR THE DECISION

The proposed habitat enhancement project is in compliance with the applicable standards for Class A Lands and Waters (Section 11-05-06). With conditions of approval the development complies with all the policies and standards of the Boise Comprehensive Plan, Floodplain Ordinance, Boise River System Ordinance and all local, state, federal laws and regulations. Enhancing and protecting Eagle habitat along Boise River and side channels is encouraged by the Comprehensive Plan (*Policy ES 7.3(C)*). *Policy ES 7.1 (b)* places a priority on the protection of environmentally significant areas and waterways. As such, the habitat enhancement project satisfies these goals of the Comprehensive Plan. Finally, future phases of this project will include installation of public walking paths through this area. Providing parks and opens spaces that serve both the public and wildlife is an important objective of the Comprehensive Plan (*Policy BV-NC 1.1*). The natural resource functions of Class A Lands located on this property will be improved and enhanced by the project. It will enhance wildlife habitats onsite which includes improvements to the fish habitat along the side channel of Boise River. In addition, this project includes the planting of native vegetation to mitigate for the loss of trees and plant materials during construction phases of the project.

CONDITIONS OF APPROVAL

Site Specific

1. Compliance with plans and specifications submitted to and on file in the Planning and Development Services Department dated received **March 19, 2021**, except as expressly modified the following conditions:
2. Permits for this project may be required from the U.S. Army Corp of Engineers and the Idaho State Department of Water Resources. The project must comply with all jurisdictional requirements noted in the permits. These permits must be supplied to the City prior to issuance of any permits for construction.
3. Applicant shall submit and be approved for a LOMR after construction is performed. Engineering analysis will be required to show boundaries of new floodplain/floodway.
4. Applicant must obtain the applicable PDS Floodplain Permits, grading, building, and/or ESC permits from the City of Boise **prior to commencing any work onsite.**
5. Construction activities shall be restricted during the Bald Eagle wintering months between December 15 to March 15.
6. Native vegetation shall be used in the habitat enhancement project.
7. Fencing shall be installed where construction activities about a riparian area.



8. The applicant shall submit and obtain approval of a Floodplain Development Permit prior to the issuance of construction permits.
9. All disturbed areas caused by construction shall be stabilized and revegetated as soon as possible. Applicant shall submit a site restoration plan for approval by Public Works.
10. The applicant shall comply with all local, state, and federal laws and regulations.

Agency Requirements

11. Comply with the requirements of the Boise City Public Works Department as outlined in comments dated **April 8, 2021**. Contact Jason Taylor at 208-608-7171 for specific comments or questions.

Standard Conditions of Approval

12. This approval does not exempt the applicant from compliance with all local, state, and federal regulations where applicable by law or judicial decision.
13. Vision Triangles, as defined under Section 11-012-03 of the Boise City Code, shall remain clear of sight obstructions.
14. No change in the terms and conditions of this approval shall be valid unless in writing and signed by the applicant or an authorized representative and an authorized representative of Boise City. The burden shall be upon the applicant to obtain the written confirmation of any change and not upon Boise City.
15. Any change by the applicant in the planned use of the property, which is the subject of this application, shall require the applicant to comply with all rules, regulations, ordinances, plans, or other regulatory and legal restrictions in force at the time the applicant, or successors of interest, advise Boise City of intent to change the planned use of the property described herein, unless a variance in said requirements or other legal relief is granted pursuant to the law in effect at the time the change in use is sought.
16. Failure to abide by any condition of this approval shall be grounds for revocation by the Boise City Planning and Zoning Commission.
17. This permit shall be valid for a period not to exceed 24 months from the date of approval by the Planning and Zoning Commission. Within this period, the holder of the permit must acquire construction permits and commence placement of permanent footings and structures on or in the ground.
18. Prior to the expiration of this River System, the Commission may, upon written request by the holder, grant a two-year time extension. A maximum of two (2) extensions may be granted.





PLANNING AND DEVELOPMENT SERVICES

MAYOR: Lauren McLean | INTERIM DIRECTOR: Kelcey Stewart

April 7, 2021

Gregory Kaltenecker
Boise State University
1910 University Dr
Boise, ID 83725
gregorykaltenecker@boisestate.edu

Re: CFH21-00052 / 6300 S Surprise Way

Dear Applicant:

Your application has been scheduled to be heard before the Boise City Planning and Zoning Commission on **Monday, May 3, 2021 at 6:00 P.M.** This hearing will be conducted in Maryanne Jordan City Council Chambers, on the third floor of City Hall. However, you are encouraged to participate virtually through Zoom to allow for social distancing. Instructions on how to attend and participate can be found online at: www.cityofboise.org/virtual-meetings.

Agency comments on your application will be uploaded to [Permitting & Licensing Portal](#) as they become available and a project report will be ready for your review at [Permitting & Licensing Portal](#) five days prior to the hearing date.

You are responsible to post a public hearing notice on the project site no less than 15 days prior to scheduled public hearing. Proof of posting is required to be submitted no less than 10 days prior to the hearing or your item will be deferred. Site posting instructions are detailed online at: <https://www.cityofboise.org/sitepostings>.

The Ada County Highway District may also conduct public meetings regarding the traffic impacts from the proposed application. If you have questions, please contact the Ada County Highway District at (208) 387-6170.

Questions can be directed to the assigned planner, David Moser at (208) 608-7087 or dmoser@cityofboise.org.

Sincerely,

Céline Acord
Manager, Current Planning and Subdivisions
Boise City Planning and Development Services

CA/mh

cc: Scott Wright / River Design Group / swright@riverdesigngroup.net
Fred Fritchman & Eric Berg / South East Neighborhood Association / ffritchman@msn.com; iceberg210@hotmail.com

From: [Pozzanghera, Casey](#)
To: [Scott Wright](#)
Subject: RE: Boise River Side Channel at BSU Intermountain Bird Observatory
Date: Thursday, March 11, 2021 12:38:27 PM

Hi Scott,

I have finished reviewing your request for information related to the Boise River Side Channel Project at the Intermountain Bird Observatory site under Highway 21. IDFG understands that you are putting together information for a City of Boise River System Application, and request information on trout spawning and/or rearing waters in the project location. The Boise River is an economically important recreational resource for Treasure Valley citizens and visitors. It is among the most-fished waterbodies in the state, and provides a robust population of rainbow trout, brown trout, and mountain whitefish. IDFG performs fall surveys to document presence of trout fry in many sections of the Boise River. One such survey site is located immediately downstream of the proposed side channel project. This survey site has routinely documented the presence of fry, indicating that the mainstem of the Boise River adjacent to the project area provides important spawning and rearing habitat for trout. Rainbow trout, which spawn in the spring, are the more abundant species in this stretch of the Boise River and are not likely to be negatively impacted by the winter project construction timeline. Brown trout do spawn in the winter, however this species is much less abundant in this section of the Boise River, and project impacts are expected to be minimal. Trout spawning habitat consists of gravel substrates, and they are known to use side channel habitats extensively. Ultimately, the construction of this side channel should provide additional trout spawning habitat, resulting in a net benefit for the population. In addition to these benefits to fish populations, IDFG expects that the project will increase available riparian habitat for a variety of species common to the Boise River corridor. Please feel free to reach out to me if you have any additional questions or information needs. Thank you for considering the states fish and wildlife.

Best,

Casey

Casey Pozzanghera
Staff Biologist, Southwest Region
Idaho Department of Fish and Game
15950 N Gate Blvd
Nampa, ID 83687
(208) 854-8947



<https://idfg.idaho.gov>

From: Scott Wright <swright@riverdesigngroup.net>
Sent: Wednesday, March 10, 2021 12:57 PM

Attachment C

Funding Agreement

Side Channel Construction and Donation Agreement

This Side Channel Construction and Donation Agreement, dated as of ___ day of October, 2020 (this “**Agreement**”), is entered by and between Micron Technology, Inc., a Delaware corporation (“**Micron or Donor**”), and Boise State University, a higher education institution (the “**Recipient**,” unless otherwise stated).

RECITALS

WHEREAS, Donor, at its sole cost and expense as provided herein, wishes to make the real property improvements (“the **Side Channel Project**”) described in Alternative 1 to Exhibit A, upon a parcel of real property adjacent to the Boise River, which parcel is owned by the State Board of Education (the “**University Parcel**”); and

WHEREAS, the Side Channel Project will also be constructed upon a parcel of real property owned by the Idaho Transportation Department (“ITD”) and managed by Boise State University, pursuant to that Management Agreement (ITD agreement number 8056 – Diversion Dam Bridge Mitigation Property) dated February 28, 2012, as amended or supplemented from time to time (the “**ITD Parcel**,” and together with the University Parcel, the “**Property**”), and as such, Boise State University possesses the authority pursuant to the Management Agreement to manage and improve the Property in this manner; and

WHEREAS, Recipient wishes to authorize the real property improvements to be performed on the Property during the period of construction; and

WHEREAS, the Side Channel Project to be constructed on the Property, following completion and acceptance, will be donated to Boise State University, for the benefit of Boise State University and the Intermountain Bird Observatory; and

WHEREAS, the donation of the Side Channel Project to the Boise State University will not transfer ownership of the portion of the improved property located within the ITD Parcel; and

WHEREAS, the donation of the Side Channel Project to the Boise State University, and Boise State University’s ownership and management of the improved property is intended by the Parties to result in a flagship community outreach and educational destination, in the form of an open space benefitting the City of Boise, City residents and all Treasure Valley citizens for generations to come, providing environmentally sustainable improvements for the benefit of both Donor and Recipient; and in order to do so, wishes to make real property improvements on property owned by the State of Idaho; and

WHEREAS, the conceptual design for such improvements has been substantially developed with input from Boise State University and the final design will be approved by Boise State University before implementation; and

WHEREAS, upon completion of the Side Channel Project on the Property, Donor will convey and transfer all right and interest in and to the improvements related to the Side Channel Project to the University, for the University's benefit, and the University desire to accept the Side Channel Project on the Property upon successful completion.

NOW, THEREFORE, the Parties agree as follows:

1. Charitable Donation. To the greatest extent allowed by law, and at the Donor's election, the donation of the Side Channel Project to the University shall, under the terms of this Agreement, and for all purposes be treated as a charitable donation. The Parties intend that donation of the Side Channel Project be made in compliance with all applicable federal and state laws governing donations made to institutions of higher education. The Parties acknowledge that they may be required by law to report information about the donations provided under this Agreement and will do so to comply with legal obligations. The valuation of the Side Channel Project donation shall be determined by an independent appraiser to be selected by mutual agreement of the Parties within thirty (30) days of completion of the Side Channel Project. At a minimum, the independent appraisal shall take into account all design and construction costs associated with the Side Channel Project and all future environmental benefits.

2. Donation. Donor agrees to construct and donate the Side Channel Project to Recipient. Donor grants to the Recipient, irrevocable and unrestricted ownership, rights, title, and interest in the Side Channel Project as constructed upon the Property pursuant to the terms and conditions set forth in this Agreement and without monetary or other forms of payment to the Donor; provided, however, that this Agreement does not purport to convey title, ownership, or interests to real property or rights incident thereto not otherwise held by the Recipient. The transfer of ownership, rights, title, and interest to improved property within the ITD Parcel will occur in accordance with a Memorandum of Agreement between Boise State University and the Idaho Transportation Department (relating to ITD Agreement number 8056 – Diversion Dam Bridge Mitigation Property), which Memorandum Agreement shall be incorporated by reference herein. At the completion of the Side Channel Project, the Side Channel Project will be transferred to the Recipient free and clear of any and all liens, claims, or encumbrances. Boise State will determine and shall have responsibility to implement the disposition, management, maintenance, and use of the Side Channel Project. Disposition of the portion of the Side Channel Project located within the ITD Parcel will be subject to a Memorandum of Agreement between Boise State University and the Idaho Transportation Department (relating to ITD Agreement number 8056 – Diversion Dam Bridge Mitigation Property), which Memorandum Agreement shall be incorporated by reference herein. Subsequent to the transfer and donation of the Project, Micron shall have no obligation to maintain, repair, or manage the Project.

3. Quality of Construction, Permitting. Donor possesses all of the requisite resources, skill, experience, and qualifications to perform or contract for the performance of all of the construction anticipated under this Agreement and as described on Exhibit A, in a professional and workmanlike manner, in accordance with commercially reasonable industry standards for similar services. Donor has obtained, or will obtain, at its sole cost and expense, all licenses, authorizations, approvals, consents, or permits required by applicable laws (including the rules and regulations of all authorities having jurisdiction over the provision of the construction or other services); provided, however, that Recipient shall assist Donor in obtaining all licenses,

authorizations, Property access, approvals, consents, or permits to the extent necessary or required by law. To the extent the Donor and/or Recipient has a permit condition to mitigate wetlands, no commitment shall be made on the ITD Parcel or binding ITD to maintain mitigation on the ITD Parcel.

4. Property Access. From and after the date of this Agreement and for the term thereof, Recipient extends to Donor, its employees, contractors, and agents, the right to access and enter upon the Property for the purpose of completing the Side Channel Project, and agrees to ensure adequate site access for construction activities, including, without limitation, hauling excavated material offsite, and mobilizing and demobilizing heavy equipment to the site. Recipient and/or Donor are responsible for identifying and obtaining all necessary permits for Property access for construction activities for the Side Channel Project from the appropriate federal, state, and local jurisdictions. After completion of the Side Channel Project, Recipient and/or Donor are responsible for identifying and obtaining all necessary permits for permanent access to the Property from the appropriate federal, state, and local jurisdictions.

5. Schedule. Donor shall make its best efforts to deliver the Side Channel Project to Recipient in substantially complete form by March 31, 2022 (the “**Construction Completion Date**”), unless otherwise extended by mutual agreement of the Parties. The Construction Completion Date does not account for any disruptions or delays in the procurement or supply of labor and materials caused by or relating to the outbreak, spread, existence or any responses to Covid-19 or other force majeure event (as defined herein), all of which are acknowledged to be events not reasonably foreseeable at the time this Agreement was entered into and beyond the control of Donor. Any such disruption or delay shall extend the Construction Completion Date and shall not constitute a default under the Agreement; and furthermore, any disruption or delay caused by or related to a delay in obtaining required approvals, permits, or required authorizations shall extend the Construction Completion Date and shall not constitute a default under the Agreement. Donor shall not be responsible for any “delay damages”, consequential damages or similar in the event the Side Channel Project is not substantially complete by the Construction Completion Date.

6. Site Conditions. Donor has inspected the Property and is aware of apparent site conditions and constraints to the extent readily determinable upon visual inspection and review of documents in Exhibit A and listed in Exhibit C. As such, Donor commits to paying for the cost of engineering, design, and construction up to the maximum amount of \$1,700,000.00. In the event the cost of the Project exceeds, or is anticipated to exceed, \$1,700,000.00 (including but not limited to costs and expenses related to site conditions that are unforeseen, unknown, or undisclosed to Donor or any litigation or threat of litigation, for example), Donor or Recipient shall have the option to terminate this Agreement and Donor shall no longer have any obligations under this Agreement except as set forth in this paragraph; provided, however, that upon the exercise of such option to terminate, for any areas of earth disturbance, Recipient and Donor shall mutually negotiate any final Property conditions, including without limitation (i) limited project scope alternatives; (ii) conditions suitable for another Donor or Recipient to complete the Project; (iii) other mutually agreeable conditions meeting requirements for permit closure; (iv) grading and vegetatively stabilizing the disturbed portions of the Property such that it is returned to the general condition in which the Property existed prior to any construction activities; and/or (v) such other condition mutually acceptable to the Parties. In no event shall Donor be obligated

to donate more than \$1,700,000.00 in total including costs of the original Project and any final Property conditions; however, Donor, at its sole discretion, may determine to donate additional costs toward the Project, including under a cost sharing agreement. At the termination (on conditions as set forth above) or completion of the Project, Donor shall ensure that the Property is free and clear of any and all liens, claims, or encumbrances relating to construction activities undertaken in accordance with this Agreement. Notwithstanding anything to the contrary herein, including but not limited to the acquisition of insurance coverage for environmental conditions, in no case shall Donor be responsible for any environmental condition at the Property that existed prior to any construction activities undertaken in accordance with this Agreement. Donor shall have responsibility for any release of pollutants that it directly causes at the Property during the term of this Agreement.

7. Insurance. Micron shall require the contractor and/or its agents to procure and maintain insurance as stated in the attached Exhibit B, and ITD shall be named as an additional insured.

8. Inspection, Approval, Acceptance. During the term of this Agreement, representatives of Donor and Recipient, as well as a representative of the Idaho Transportation Department, shall participate in regular meetings concerning the progress of Side Channel Project planning and construction. Recipient will have the opportunity to review and approve the final design documents prior to the beginning of construction; provided, however, that Recipient's approval shall not be unreasonably withheld, nor impose substantial cost increases. Final design documents shall be deemed approved by Recipient unless Recipient objects, in writing, within seven (7) calendar days of Donor's submission to Recipient, subject to the terms and conditions of the Agreement. Furthermore, Donor may take into consideration any comments from Recipient based upon Recipient's review of the design documents and inspection of improvements during construction; provided, however, that Recipient shall not have the right to dictate means and methods of construction so long as Donor is performing the construction in conformance with applicable state, local and federal laws and regulations, this Agreement and the Recipient-approved design documents.

Recipient shall also approve, in writing, the commencement of construction after the receipt, review and award of construction bids. In the event any good faith dispute arises over the likelihood that the cost threshold set forth in Section 6 hereof may be exceeded, Recipient may condition such written approval on the waiver or amendment thereof.

Upon successful completion of the Side Channel Project and acceptance by Recipient, Recipient shall provide Donor with a written acceptance of the same, and all rights and responsibilities shall transfer to Recipient in accordance with Section 2 above. All of the following are conditions precedent to commencement of construction by Donor, the donation by Donor, and acceptance by the recipient: (i) written authorization by the Idaho Transportation Department in accordance with a Memorandum of Agreement between Boise State University and the Idaho Transportation Department (relating to ITD Agreement number 8056 – Diversion Dam Bridge Mitigation Property), which Memorandum Agreement shall be incorporated by reference herein, (ii) approval by the Public Building Fund Advisory Council and (iii) approval by the State Board of Education.

9. Warranty. Donor represents and warrants to Recipient that (a) the materials and equipment furnished shall be of good quality and new unless otherwise required or permitted by the construction documents; (b) the work performed will be free from defects not inherent in the quality required or permitted; and (c) the work performed conforms with the requirements of the construction documents. The sole warranties are those provided by the contractors sourced by Donor for the construction of the Side Channel Project. Donor shall not provide any extended warranties. Any warranty claims by Recipient shall be submitted directly to the contractors sourced by Donor.

10. Naming. Micron shall retain a first right of negotiation for naming the Side Channel Project, during the course of construction, and for a period of ninety (90) days following construction completion and acceptance of the Project by Recipient. Naming of the Side Channel Project shall be subject to any policies established by the Idaho State Board of Education and Boise State University.

11. Sustainability: Annual Data Reporting. Donor has certain sustainability goals, including improved water quality. In order to measure performance under these sustainability goals, Recipient shall:

11.1 Collaborate with Donor to establish temperature and turbidity sampling points and collect background data prior to commencement of construction.

11.2 Annually submit temperature and turbidity data from up to four sampling events (two samples per event) per year, beginning immediately upon delivery to and acceptance of the Project by Recipient. The schedule of sampling events will be determined by Donor following review of background data. Turbidity data must be analytical data using an EPA approved methodology.

11.3 Annually submit early and late season flow data. Donor to provide initial flow meter(s) during construction. Recipient shall maintain meter(s) in good working condition and repair/replace as necessary.

12. Term and Termination. The terms of this Agreement shall remain in effect during the design, permitting, and construction periods, from the effective date hereto, to delivery and acceptance of the Side Channel Project, unless extended in writing by the Parties, or unless terminated earlier by the Parties; provided, however, that the Recipient's ongoing data reporting obligations set forth in paragraph 11 shall survive such term. Either Party may terminate this Agreement by providing the other Party with sixty (60) days' advance written notification. Termination for cause may be undertaken by either Party in the event the other Party shall commit any material breach of or default in any terms or conditions of the Agreement, and also shall fail to remedy such default or breach within sixty (60) days after receipt of written notice thereof. In such event, the non-breaching party may, at its option and in addition to any other remedies which it may have at law or in equity, terminate this Agreement by sending notice of termination in writing to the other party to that effect. Termination shall be effective as of the day of receipt of such notice.

13. Public Announcements. Prior to final State Board of Education approval, the Parties may make public announcements and communicate with news media regarding this Agreement and the Side Channel Project with prior consent and notice to the other Party (which consent shall not be unreasonably withheld, conditioned, or delayed), and the Parties shall cooperate as to the timing and contents of any such announcement.

14. Notices. All notices, requests, consents, claims, demands, waivers, and other communications hereunder (each, a “Notice”) shall be in writing and addressed to the Parties at the addresses set forth below. All Notices shall be delivered by personal delivery, nationally recognized overnight courier with all fees pre-paid, email, or certified or registered mail (in each case, return receipt requested, postage pre-paid). Except as otherwise provided in this Agreement, a Notice is effective only (a) upon receipt by the receiving Party, and (b) if the Party giving the Notice has complied with the requirements of this Section.

If to Donor:

Micron Technology, Inc.
8000 S. Federal Way
PO Box 6
Boise, ID 83706
Attention: Environmental Compliance Manager

With a copy to:

Micron Technology, Inc.
8000 S. Federal Way
PO Box 6
Boise, ID 83706
Attention: General Counsel
Corporatenotices@micron.com

If to Recipient:

Gregory S. Kaltenecker
Diane and Winston Moore Family Endowed Director
Intermountain Bird Observatory
Department of Biological Sciences
Boise State University
1910 University Drive
Boise, ID 83725-1515

industrial disturbances; and (i) shortage of adequate power or transportation facilities. The Party suffering a Force Majeure Event shall give notice within fifteen (15) days of the Force Majeure Event to the other Party, stating the period of time the occurrence is expected to continue and shall use diligent efforts to end the failure or delay and ensure the effects of such Force Majeure Event are minimized.

20. Recitals and Exhibits. The recitals set forth above and the exhibits contained herein or hereafter are incorporated by reference.

21. Entire Agreement. This Agreement, along with all related exhibits and schedules, constitutes the sole and entire agreement of the Parties to this Agreement with respect to the subject matter contained herein, and therein, and supersedes all prior and contemporaneous understandings, agreements, representations, and warranties, both written and oral, with respect to such subject matter. In the event of any inconsistency between the statements in the body of this Agreement, and the related exhibits and schedules, the statements in the body of this Agreement shall control.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement as of the date set forth above.

Micron Technology, Inc.

By 

Name: Scott Gatzemeier

Title: Vice President of R&D operations

Boise State University

By 

Name: Mark Heil

Title: Vice President & CFO

Exhibit A

Design Documents

Exhibit B

Insurance Requirements

Micron will require the following insurance to be carried by the contractor (the “Contracting Party”) throughout the term of the Project:

INSURANCE REQUIREMENTS

- A. THE CONTRACTING PARTY, at its sole expense, shall procure and maintain in effect during the term of this Agreement, insurance written by an insurance company or companies acceptable to Micron and with an A.M. Best rating of at least A-, X. Insurers shall be lawfully authorized to do business in the jurisdiction(s) in which the Work is located. By requiring insurance herein, Micron does not represent that the coverage and limits will necessarily be adequate to protect THE CONTRACTING PARTY and such coverage and limits shall not be deemed as a limitation on THE CONTRACTING PARTY'S liability under the indemnities granted to Micron in this contract or those specified by law.
- B. Certificates of Insurance evidencing the coverages required herein shall be provided to Micron prior to the start date of the project. All certificates must be signed by an authorized representative of THE CONTRACTING PARTY'S insurance. The Contracting party must provide 30-days written notice prior to the cancellation of any referenced policies. Renewal certificates must be provided to Micron prior to the renewal date. THE CONTRACTING PARTY shall provide Micron a copy of the additional insured endorsement or such other policy language demonstrating that the insurance policy complies with the requirements of this attachment. Failure to provide insurance certificate(s) as required herein shall not alleviate THE CONTRACTING PARTY from their obligations had the certificate of insurance been provided to Micron.
- C. Certificates shall be mailed to the following address.

Insurance Certificate Administration
Risk Management Dept., Mail Stop 1-157
Micron Technology, Inc.
8000 South Federal Way
Boise, ID 83707-0006

Or scanned copies may be e-mailed to risk_mgmt@micron.com

D. Certificates must evidence the following minimum required insurance:

1. WORKERS COMPENSATION insurance meeting the statutory requirements of Idaho and/or any other State where work is planned. Except in jurisdictions where prohibited by law, any policy providing coverage required under this paragraph shall include an endorsement waiving subrogation against Micron.

2. EMPLOYERS LIABILITY insurance providing limits of liability in the following amounts:

Bodily Injury by Accident:	\$1,000,000	each accident
Bodily Injury by Disease:	\$1,000,000	policy limit
Bodily Injury by Disease:	\$1,000,000	each employee

The Employers Liability insurance policy shall be written on an "Occurrence Policy" form and include Micron and Idaho Transportation Department each as an additional insured.

3. COMMERCIAL GENERAL LIABILITY insurance and, if necessary, COMMERCIAL UMBRELLA LIABILITY insurance providing limits of liability in the following amounts, with aggregates applying separately on a "per project" basis:

General Aggregate Limit:	\$10,000,000
Per Occurrence Limit:	\$10,000,000
Products/Completed Operations Aggregate Limit:	\$10,000,000

The Commercial General Liability ("CGL") insurance policy shall be written on an "Occurrence Policy" form and shall include, but not be limited to cover liability arising from premises, operations, independent contractors, products/completed operations (with no number of years limitation upon which claims can be filed), bodily injury, property damage, personal and advertising injury, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract). Micron and Idaho Transportation Department each shall be included as an Additional Insured under the CGL and under the Commercial Umbrella insurance.

Additional Insured status shall include products/completed operations and no policy exclusion or limitation regarding products/completed operations, such as exclusions for aviation products, is acceptable under this contract.

4. BUSINESS AUTOMOBILE LIABILITY insurance and, if necessary, commercial umbrella liability insurance, providing bodily injury and property damage liability coverage for not less than \$1,000,000 each accident limit. Business Automobile Liability insurance shall be written on a standard ISO policy form, or an equivalent form, providing coverage for liability arising out of owned, hired, or non-owned vehicles in connection with this agreement. The Business Automobile Liability insurance policy shall be written on an "Occurrence Policy" form.

THE CONTRACTING PARTY hereby waives all rights against Micron and its agents, officers, directors and employees for the recovery of any and all damages to the extent such damages are covered by the Automobile Liability insurance required herein.

For all transporters of hazardous materials/waste, the Business Automobile Liability insurance policy must include a MCS-90 endorsement or equivalent coverages.

5. PROFESSIONAL LIABILITY INSURANCE or ERRORS AND OMISSIONS LIABILITY ("E&O") INSURANCE with limits of not less than \$2,000,000 per claim and \$2,000,000 aggregate. If the insurance required by this section is obtained through a "Claims Made" policy, this coverage or its replacement shall have a Retroactive Date of no later than the earliest of the beginning of performance of services by this CONTRACTOR or the inception of this contract. CONTRACTOR shall purchase run-off Professional Liability Insurance under the Claims Made policy.
6. POLLUTION LEGAL LIABILITY or equivalent insurance with limits of \$5,000,000 per occurrence and \$5,000,000 aggregate. The policy must also provide the following:
 - a. coverage for attorneys' fees and costs, defense and indemnity for liability, including, but not limited to, judgments, and/or settlements and/or governmental fines and penalties, which is assumed by THE CONTRACTING PARTY under the Agreement;

- b. coverage for Micron, Idaho Transportation Department, and Boise State University and their respective directors, officers, agents, employees, successors and assigns as Additional Insureds;
- c. coverage for any demands for environmental cleanup costs associated with THE CONTRACTING PARTY'S Services under this Agreement;
- d. coverage for the presence, discharge, dispersal, release or escape of pollutants ("Pollution Conditions") emanating from or affecting any location, whether or not owned, leased, occupied or otherwise controlled by Micron;
- e. coverage for sudden and gradual Pollution Conditions into or upon land, the atmosphere or any natural or artificial watercourse or body of water;
- f. coverage for loading and unloading activities.
- g. coverage for transporting activities

Upon request, a copy of the pollution legal liability policy, including all applicable endorsements, must be provided to and approved by Micron prior to THE CONTRACTING PARTY performing any Services under this Agreement.

- E. Any type of insurance coverage or limits of liability in addition to the coverages specified in this attachment that THE CONTRACTING PARTY, subcontractors or sub-subcontractors of any tier/level require for its or their own protection, or that is required by applicable laws or regulations, shall be THE CONTRACTING PARTYS responsibility and expense and shall not be billed to Micron or included in the project bid.
- F. Upon request, THE CONTRACTING PARTY shall make available their books, vouchers, contracts, documents, and records, of any and all kinds, to the auditors of Micron.
- G. THE CONTRACTING PARTY shall assist and cooperate in every manner possible in connection with the reporting, investigation and adjustment of all claims and demands which Micron's insurer(s) is/are called upon to adjust or defend against arising out of operations at the job site.

- H. THE CONTRACTING PARTY shall be responsible for safety on the project. THE CONTRACTING PARTY shall establish a safety program that, at a minimum, complies with all local, state and federal safety standards, and any safety standards established by Micron for the project, including OSHA Construction Safety Standards.
- I. THE CONTRACTING PARTY may request bid bonds of its subcontractors and sub-subcontractors, but may not require performance bonds of its subcontractors and sub-subcontracts without Micron's prior written agreement. Any performance bond expenses incurred without Micron's prior written agreement will be the sole responsibility of THE CONTRACTING PARTY.
- J. Insurance coverage equivalent to the above must be obtained by each Subcontractor, sub-subcontractor or supplier and certificates evidencing the same must be presented to Micron before such Subcontractors, sub-subcontractors or suppliers are permitted on the Project Site. THE CONTRACTING PARTY shall be responsible for ensuring that established coverages are maintained by all Subcontractors, sub-subcontractors or suppliers performing work under this Agreement. If THE CONTRACTING PARTY'S Subcontractors, sub-subcontractors or suppliers do not have the required insurance, then Contractor's policies must provide coverage for Subcontractors, sub-subcontractors or suppliers and their Work.
- K. The additional insured status required by this section shall be evidenced by THE CONTRACTING PARTY'S insurer using a form or endorsements providing the maximum coverage permitted for additional insured under the law and include a waiver of subrogation favorable to Micron. Regardless of the form or endorsement used, it shall require only the maximum scope of coverage allowed under the law. Such form or endorsement shall not exclude coverage for Products/Completed Operations. Additional insured status will apply independently of, and not coextensively with, THE CONTRACTING PARTY'S indemnity obligations as stated in the master agreement. The insurance required by this Attachment on behalf of the additional insured will apply to bodily injury and/or property damage claims arising from THE CONTRACTING PARTY'S operations regardless of the fault, negligence or proximate cause (or alleged fault, negligence, or proximate cause) of any additional insured and regardless of whether THE CONTRACTING PARTY is named or not named in the claim, lawsuit or complaint.
- L. THE CONTRACTING PARTY agrees that its failure to obtain or maintain and pay for the insurance required by this attachment or to provide a satisfactory certificate of insurance including additional insured endorsement shall be deemed to be a material breach of this agreement and shall entitle Micron to cancel this agreement and/or recover damages at its election.

- M. All insurance policies required herein shall apply as primary insurance and no other insurance effected by Micron will be called upon by THE CONTRACTING PARTY to contribute to a loss thereunder. Micron reserves the right to submit a claim to Micron's insurance in the event THE CONTRACTING PARTY'S insurance limits are exhausted or there is a loss due to a peril not covered by THE CONTRACTING PARTY'S insurance.
- N. THE CONTRACTING PARTY is responsible for all premiums, deductible and self insured retention expenses. Micron shall not be called up on to contribute to any premium, deductible and/or self insured retention expense.
- O. Equivalent insurance coverage to the above must be obtained by each of THE CONTRACTING PARTY'S subcontractors or suppliers and certificates evidencing the same must be presented to Micron before subcontractors or suppliers are permitted on the site of the project. If subcontractors do not have the required insurance, THE CONTRACTING PARTY'S policies must provide coverage for them and their Work. Certificates evidencing coverage under THE CONTRACTING PARTY'S policy must be provided to Micron before subcontractors or suppliers are permitted on the site of the project. THE CONTRACTING PARTY shall be responsible for ensuring that established coverages are maintained by all subcontractors performing work for THE CONTRACTING PARTY under this Agreement.

Exhibit C

Project Area Historical Environmental Documents

1. October, 1980. Idaho Transportation Department. Environmental Assessment. I-84 to Diversion Dam – State Highway 21 Project F-3291(22).
2. September, 1997. Bureau of Reclamation. Finding of No Significant Impact and Final Environmental Assessment, Sale of Storage in Anderson Ranch Reservoir for Municipal and Industrial Purposes and Related Acquisition of Lucky Peak Reservoir Storage for Salmon Flow Augmentation
3. Historical aerial photos from 1992 - present available on Google Earth. Accessed September 26, 2020.

Attachment D
Project Plans and Design Report

APR 26 2021

WATER RESOURCES
WESTERN REGION

PUBLIC WORKS DEPARTMENT

MAYOR: Lauren McLean | DIRECTOR: Stephan Burgos

April 21, 2021

Anna Kaiser
Idaho Department of Water Resources
Western Regional Office
2735 Airport Way
Boise, ID 83705-5082

RE: Application for Permit 63-35002—Boise State University

Dear Ms. Kaiser:

The City of Boise (City) appreciates the opportunity to provide comments on the subject application for Boise State University (BSU). The City is supportive of the BSU Intermountain Bird Observatory (IBO) side channel project at the Diane Moore Nature Center for several reasons. BSU has invested significant resources into the property and has fostered numerous community partnerships. The IBO has a history of commitment to wildlife preservation and environmental education. The project supports conservation criteria including critical open space, connectivity, clean water, habitat restoration and community engagement. It is important to note that this section of the Boise River is the last remaining open space connecting the foothills to the riparian corridor, which allows wildlife access to essential habitat. The City also has a vested interest in this project because it is exploring the possibility of future similar downstream projects for temperature mitigation and habitat improvement.

City Environmental Division staff have also been working with BSU to support the project with in-kind services including creation and implementation of a monitoring plan to include: flow and volumetric measurements when the side channel is in place; pre- and post-construction temperature measurements in the main channel of the river upstream and downstream from the project site; biological monitoring; and analytical support of biodiversity and temperature data. City in-kind services will evaluate the qualitative and quantitative benefits of the side channel restoration to water quality and habitat conditions.

While the City is supportive of the project, the following issues must be addressed to ensure the project is implemented consistent with existing City ordinances and water needs.

1. The City has concerns regarding the development associated with application 63-35002 and compliance with the Floodway and Waterways Overlay District Ordinances. We are aware BSU is currently working with the City's Planning and

Development Services (PDS) Department to address future development plans and the river system permit is scheduled to be heard by the Planning and Zoning Commission in May 2021. However, at this point the City is unclear how future development plans will be addressed.

- a. The City is aware the project is in the FEMA regulatory floodway and riparian area of the Boise River. Both are highly regulated through PDS and the Parks Commission. Per the City's Floodway Ordinance (BCC 11-08), no development may occur in the floodway without FEMA and City Council approval. The current side channel project is not a concern for the City with respect to the floodplain ordinance, however the City is aware of proposed future walkways and deck overlooks with shelters. To move forward with this proposal BSU will have to have prior approval from City Council and FEMA to comply with BCC 11-08.
 - b. The section of the Boise River identified by BSU for the side channel project is classified as Class A Lands and Waters making it subject to the City's Waterway Overlay District Ordinance (BCC 11-05-06). BCC 11-05-06.1.E prohibits new structures in an area with a Bald Eagle Perching, Feeding and Loafing setback. The side channel can be approved under the City's Floodway Ordinance as addressed above, but any future development of pathways, decks or overlooks are not allowed due to the Bald Eagle setback in the riparian area. For the project to remain in compliance the proposed walkway and viewpoint development needs to be addressed with the PDS Department.
2. BSU acknowledges the Boise River is fully appropriated on a nearly year-round basis during most years and intends to mitigate for any consumptive use that results from the side channel diversion. The City is a member of the South Boise Water Company Board of Directors and has supported the dedication of 40 mitigation shares to BSU water right application 63-35002 to offset the portion of the proposed diversion that is anticipated to be consumptive. The City appreciates BSU's foresight on the need for consumptive mitigation on application 63-35002. While the City is supportive of the project and acknowledges the intention to mitigate, we want to ensure that the water right permit is conditioned to include the proposed mitigation.
3. The BSU IBO side channel project will bypass a Boise River diversion supplying SUEZ Water Idaho Inc. (SUEZ) and Surprise Valley Homeowners' Association (HOA), Inc. The application proposes to divert water from the Boise River upstream of the SUEZ and Surprise Valley HOA diversion and return water to the river downstream of the diversion. SUEZ provides potable supply to the City's residents and the City leases water from the Surprise Valley HOA to provide irrigation supply to parks so the proposed permit must be conditioned to prevent impacts to this diversion. The City is aware that SUEZ has protested the



application and discussions may already be occurring among the impacted parties. The City requests information from the applicant demonstrating conditions will be added to the proposed permit and/or the proposed project operations have been modified to protect this diversion.

The City appreciates the consideration of our comments by the Idaho Department of Water Resources and Boise State University.

Sincerely,



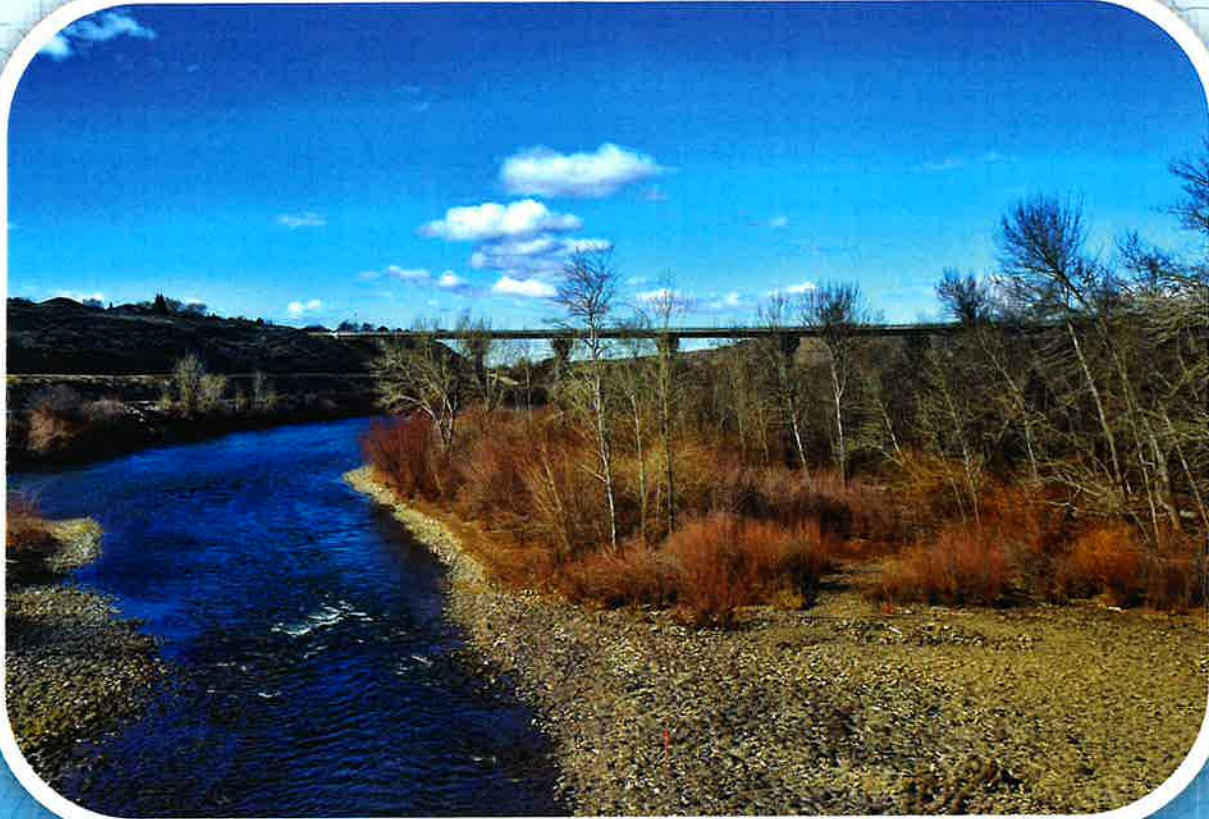
John Roldan, P.E.
Strategic Water Resources Manager

cc: Terry Scanlan, SPF Water Engineering
Steve Burgos, City of Boise
Jim Pardy, City of Boise
Haley Falconer, City of Boise
Cody Riddle, City of Boise
Jason Taylor, City of Boise
Mary Grant, City of Boise



Basis of Design Report (Permit Draft)

Boise River Side Channel Restoration at BSU Intermountain Bird Observatory



Prepared for
Charles Dedeker
Micron Technology, Inc.



Gregory Kaltenecker
Intermountain Bird Observatory



Prepared by



RDG
RIVER DESIGN GROUP

March 2021

www.riverdesigngroup.com

Micron Boise River Side Channel Restoration at Boise State University - Intermountain Bird Observatory

Basis of Design Report (Permit Draft)

Prepared for

Micron Technology, Inc.

Charles Dedeker



Boise State University

Intermountain Bird Observatory

Gregory Kaltenecker



Prepared by

River Design Group, Inc.

Contact: Scott Wright, PE, PMP

311 SW Jefferson Avenue

Corvallis, Oregon 97333

Phone 541.738.2920



March 2021

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Appendix A – Concept Design Technical Memorandum (Jacobs, 2019)

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1. Introduction

Micron Technology (Micron) retained Warner Construction (Warner) and River Design Group, Inc. (RDG) to develop engineering design and permitting for the Boise River Side Channel Restoration (Project) at the Boise State University (BSU) Intermountain Bird Observatory (IBO) site. The Project is located on the Boise River near the southeastern edge of Boise city limits as shown in **Figure 1-1**. The site is contained on property owned by the Idaho Transportation Department (ITD), US Bureau of Reclamation (BOR), and BSU.

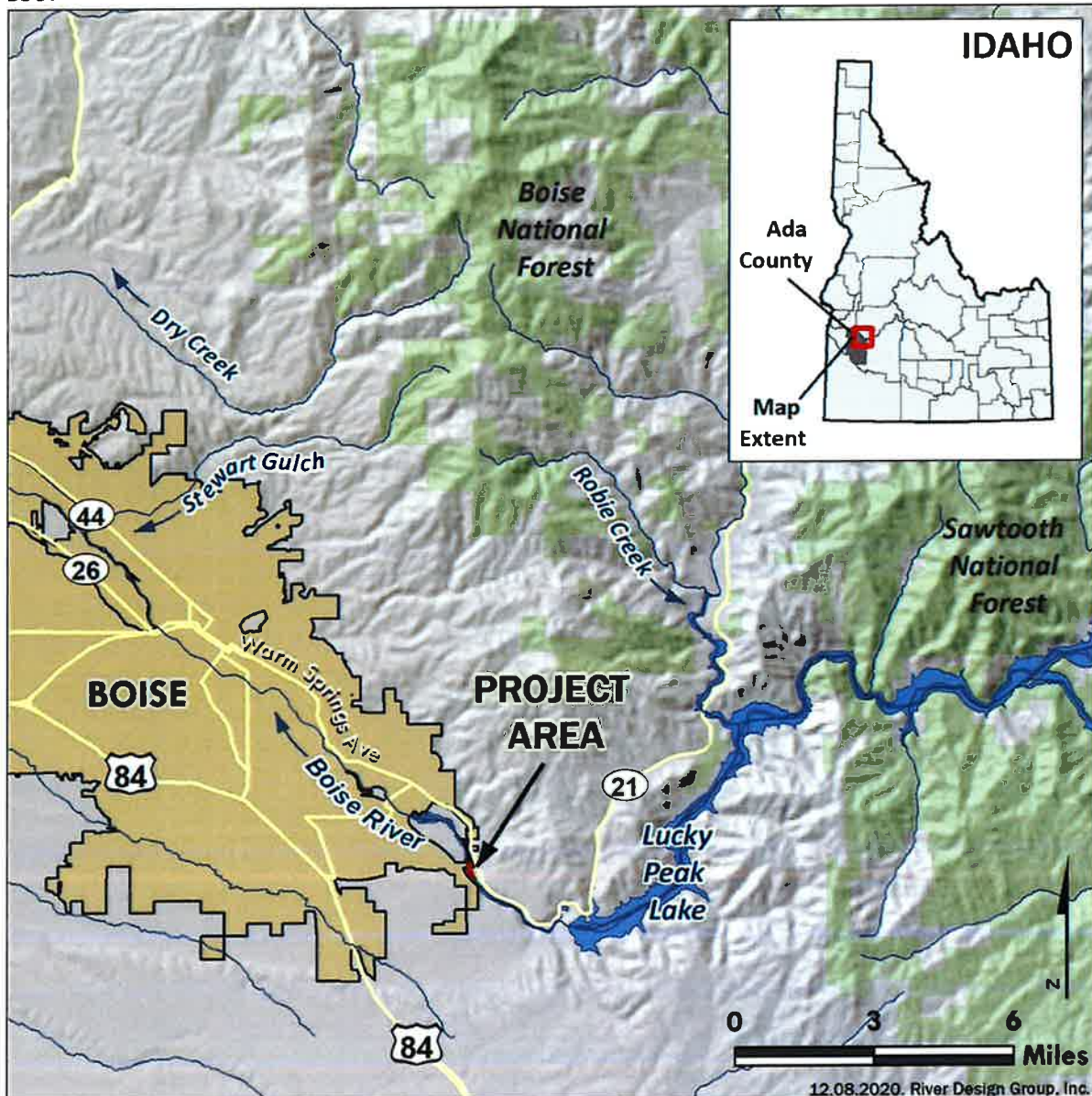


Figure 1-1. Site map showing location of Project on southeastern edge of Boise, Idaho.

1.1. Project Overview

A three-phased approach is being used to develop plans and restore the side channel for fish and wildlife as illustrated in **Figure 1-2**. Phase 1 consisted of an alternatives analysis that created two alternatives for

restoration that included input from a wide array of stakeholders, including community participation from public events. Phase 1 culminated in a Concept Design Technical Memorandum by Jacobs Engineering Group (Jacobs, 2019) that provided detailed information about the two alternatives. It was determined by Micron and IBO that Alternative 1 would be further pursued for final engineering design in Phase 2. This report focuses on Phase 2, Engineering Design, that includes development of construction drawings for restoration and permitting for implementation of the Project.



Figure 1-2. Overview of design process for Boise River Side Channel Project at IBO.

1.2. Goals and Objectives

The goals for the Project were established during Phase 1 of the Project and are reproduced here from the Jacobs report (Jacobs, 2019). IBO and its partners envision a self-sustaining side channel of the Boise River which is connected seasonally to surface water and continuously to groundwater, conveying low-velocity, deep, clear, cold water flowing over clean, coarse substrate that will benefit native fish and aquatic invertebrates, act to reduce water temperatures and improve water quality, and help to disperse flood flows. Periodic flows through the side channel will be large and frequent enough to flush fine sediment and to create bare, moist, alluvial substrate to recruit native riparian vegetation. The vision includes a side channel with associated healthy and vibrant native vegetation that benefit migratory birds and other wildlife including pollinating insects. The project site will become an outdoor laboratory around which community outreach and education programs are designed, and it will provide a model of best practices in ecological restoration within an urban setting.

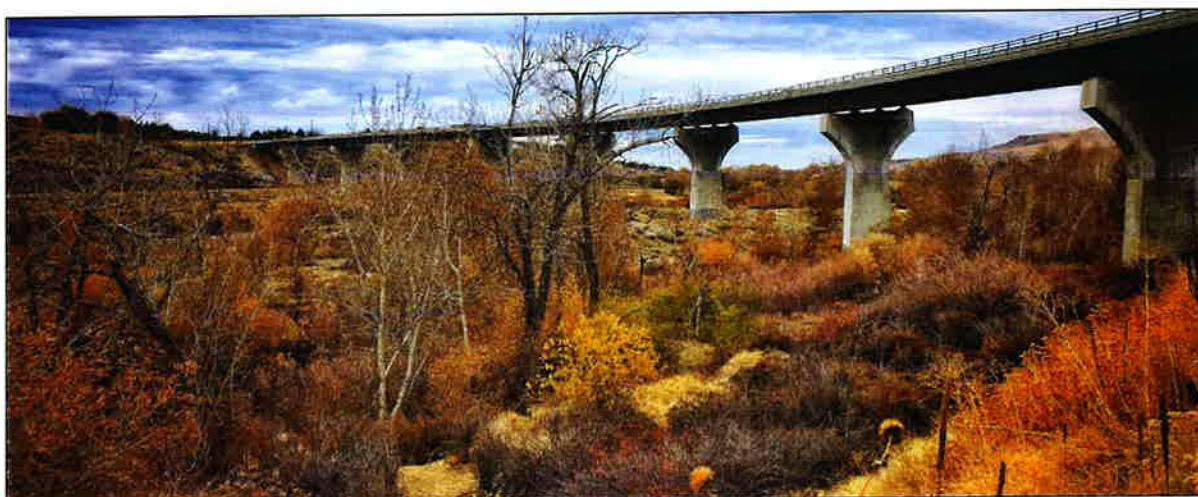


Figure 1-3. View of side channel from the Boise River Greenway path on November 6, 2020.

The primary goal is to create a self-sustaining side channel that increases the frequency and duration of connectivity between the side channel and mainstem relative to current conditions. Additional goals include the following:

- Protect and improve associated riparian habitats;
- Create long-term physical processes that increase hydraulic and geomorphic complexity with improved floodplain connectivity and riparian diversity;
- Support and enhance educational outreach;
- Support and maintain IBO research and monitoring programs; and,
- Protect culturally and historically significant areas.

1.3. Outreach and Community Stakeholder Engagement

The Boise River Side Channel Project at the Intermountain Bird Observatory has been an on-going community engagement effort since inception in 2014. From 2014 – 2021, IBO has engaged thousands of people in the Boise area to inform them about the Project and solicit input for design. With over 75 engagements, the following are notable highlights from the outreach and community engagement:

- 2015: IBO presented “Birds of the Boise River” at the Boise River Enhancement Network (BREN) Boise River Bash and presented the vision for side channel restoration to an audience of over 150 community members.
- 2016: IBO had over 500 visitors from school field trips where they presented the vision of a restored side channel and bird habitat.
- 2016: IBO presented to the Garden Clubs of Idaho with over 200 people present.
- 2017: IBO presents Project concept to Boise Bench Lions Club with 45 people present.
- 2017: IBO presents Project concept to Rotary Club with 40 people present.
- 2018: IBO presents Project at BREN River Boogie with approximately 200 people present.
- 2018: Project presented at Idaho Environmental Forum Panel with approximately 100 people present.
- 2018: Presentation of side channel Project to Barber Valley Neighborhood Association with approximately 20 people present.
- 2019: Radio presentation on Zamzow’s Radio Show.
- 2019: Side channel concept shared at MK Bird Celebration with approximately 400 people present.
- 2019: BREN float trip originating at Project site, 20 people participating.
- 2019: Second presentation of side channel Project to Barber Valley Neighborhood Association with 10 people present.

- 2020: IBO presents Project at Barber Pool Working Group showing vision of side channel restoration to approximately 30 people.
- 2020: IBO presents Project at Boise Metro Rotary Club, 15 people present.
- 2021: IBO presents Project on Zoom to over 200 community members and the presentation was publicly advertised to the greater Boise community. An on-site tour was provided after the Zoom presentation to everyone interested in attending.
- 2019-2021: IBO has advertised the Project on social media platforms to engage the community as much as possible.
- 2018-2021: Article about Project provided in Boise State University newsletter.

IBO has done an exhaustive amount of work to publicize the Project and solicit community involvement and input. Outreach was inclusive of all people and a diverse age range has been engaged to contribute meaningful input through on-site experiences and Project presentations. Furthermore, trails and site access were carefully developed from community input and protection of existing vegetation to further enhance the public's experience of the area by carefully integrating with the Boise River Greenbelt.

1.4. Standard of Practice

Side channel restoration design was performed or directed by a professional engineer licensed to practice civil engineering in the State of Idaho with over 25 years of experience with fish passage and river restoration. The standard of care used to develop this design meets those of the restoration community based on available budget constraints, existing field data, hydraulic modeling, and other relevant information publicly available for the Project.



Figure 1-4. Artist rendition of long-term vision for Project area on Boise River.

2. Existing Site Conditions

The Concept Design Technical Memorandum (Jacobs, 2019) developed by Jacobs Engineering Group provides a comprehensive overview of existing site conditions and background information for the Project. The following sections provide an overview of this information and additional detail where appropriate.

2.1. Topographic Survey

A combination of ground survey data and light detection and ranging (LiDAR) data were developed for the site. First, a site survey of the existing side channel, floodplain, and surrounding infrastructure was completed by Quadrant Consulting, Inc. in November 2018. Then, in November 2019, green LiDAR data was developed for the Project area by Quantum Spatial, Inc. (QSI). This dataset was processed for use as pre-project terrain. Non-vegetated vertical accuracy relative to the bare earth DEM was 0.14 feet at the 95% confidence level (QSI, 2020). Flows in the Boise River ranged from ~250 cubic feet per second (cfs) to ~300 cfs at the Glenwood Bridge gage (USGS #13206000) during LiDAR acquisition. Comparison of 67 submerged bathymetric check points to the bare earth digital elevation model (DEM) resulted in a vertical accuracy of 0.41 feet, while assessment of 56 wetted edge check points resulted in a vertical accuracy of 0.60 feet at the 95% confidence level (QSI, 2020). **Figure 2-1** shows an elevation map of the existing ground based on the validated LiDAR points and shows the location of the proposed side channel.

Ground survey points were used to perform an independent check on the accuracy of the LiDAR data. The mean difference in elevation between the survey points and the 2019 LiDAR surface used for modeling was 0.03 ft, with a standard deviation of 0.3 ft. No adjustment of the LiDAR data was determined to be warranted based on the results of this assessment. In February 2021, RDG acquired additional ground survey points to help locate trees and significant vegetation along the proposed side channel alignment. This topographic information was used to further validate existing surface models.

2.2. Subsurface Survey

Test pits were dug along the Project alignment by Jacobs (2019) as part of the Phase 1 services. Four test pits were excavated on November 19, 2018, using a John Deere C310 rubber-tired backhoe provided by the USFWS Deer Flat Refuge personnel. All four test pits were excavated north of the State Highway 21 bridge, near the alignment selected during the field visit. The general subsurface conditions observed were consistent across all four locations, with soils comprised of coarse-grained alluvium. The typical subsurface profile observed from the ground surface downward is summarized below:

- Up to 1.5 ft of silty sand/sandy silt, with organic matter (decomposed leaves) and roots (SM/ML)
- 2.5 to 3 ft of poorly graded sand (SP)
- Greater than 5 ft of sandy gravel with cobbles to the limits of excavation (SP/GP with COBBLES)
- No observed bedrock in any of the test pits

Based on grain size, angularity, and observations during the excavation of test pits, short-term slopes of 3:1 (H:V) are anticipated to be stable above the water table. Long-term slopes within the sand layer between 3:1 (H:V) and 4:1 (H:V) are anticipated to be stable for most conditions—these milder slopes would be expected to support vegetation and resist scour more effectively. Within the cobble layer, 2:1(H:V) slopes are anticipated to be stable for short- and long-term conditions.

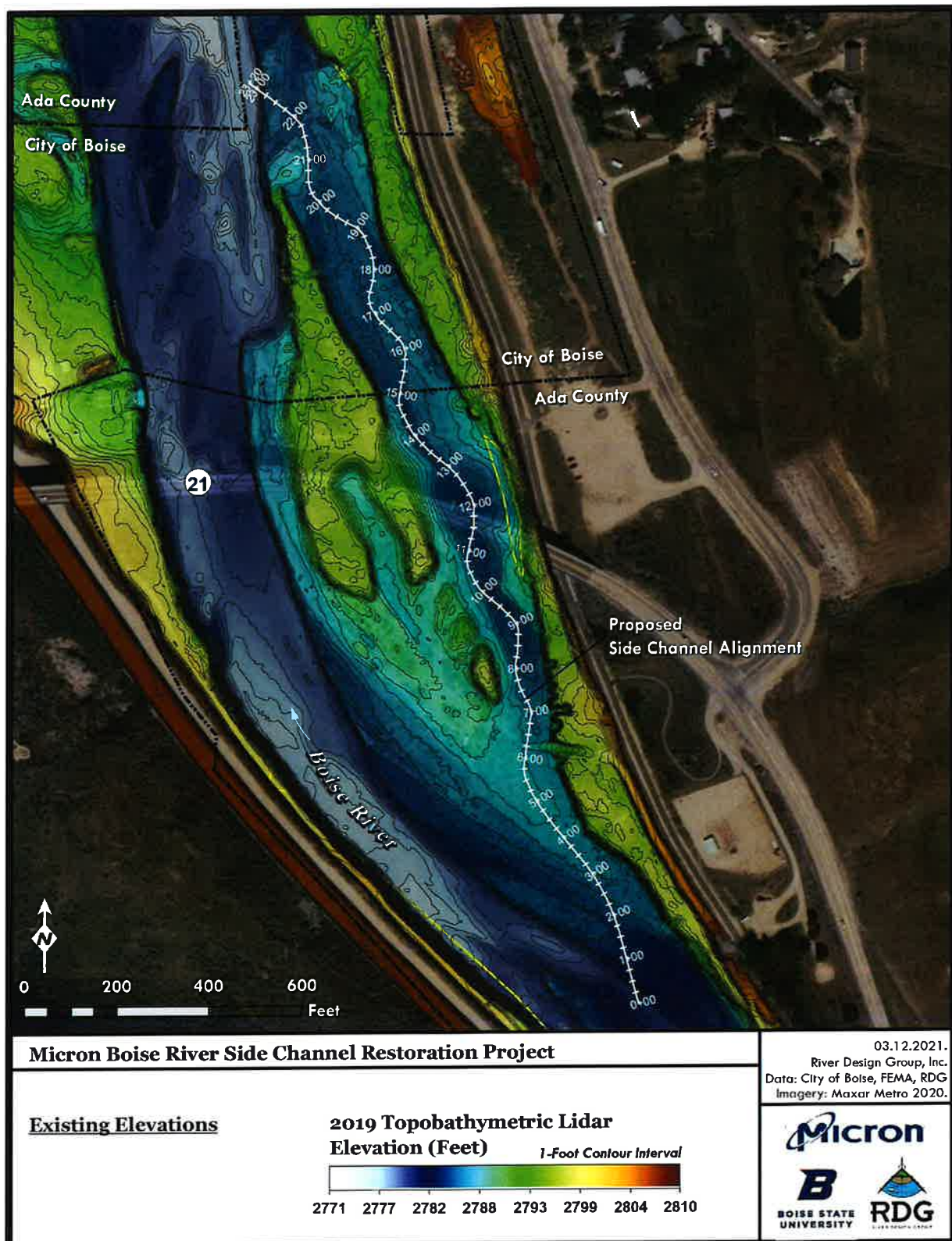


Figure 2-1. LiDAR map with elevations and proposed side channel alignment.

BSU's Geosciences Department has a wellfield located on the IBO site just upstream of the highway bridge. Available groundwater data include dates when the Boise River was either experiencing low winter flows (approximately 250-300 cfs) or high flows from additional dam releases (approximately 2,000- 7,000 cfs), and only two groundwater measurements have been recorded which are representative of the summer irrigation season. From these measurements, the approximate (interpolated) summer and winter groundwater profiles along the proposed side channel alignment were developed by Jacobs (2019). On average, the groundwater table along the alignment is approximately 1.7 feet lower in the winter than in the summer.

2.3. Cultural Resources Survey

In Phase 1, Jacobs (2019) performed a cultural resources background search for sites listed on the National Register of Historic Places (NRHP). As part of that effort, Jacobs connected with staff from the Idaho State Historical Society's State Historic Preservation Office (SHPO) to gain an initial understanding of cultural resource considerations for this Project. Although there have been no recent cultural resource studies conducted and no known archaeological sites identified on IBO's Project site, there are several historic resources in the Project vicinity. Most notably, the Boise Diversion Dam located upstream is a part of the NRHP-listed Diversion Dam and Deer Flat Embankments historic property, and the NRHP-eligible New York Canal and a NRHP-eligible Oregon Trail segment are located on the west side of the river. The Penitentiary Canal, upslope and east of IBO's Project area, was determined not eligible in 2017. Several pre-contact and historic archaeological sites are known to be located within ½-mile of the Project area.

2.4. Watershed Hydrology

River flows at the Project site are heavily influenced by Lucky Peak Dam, a storage reservoir that is 2.5 miles upstream, and Boise River Dam, an irrigation diversion less than 2,000 ft upstream of the site. Streamflow data at the USGS Boise River at Glenwood Bridge gage (USGS #13206000), located about 10 miles downstream of the Project area, with a drainage area of 2,773 square miles is used for Project area analysis. The Glenwood Bridge gage is located downstream of the New York Canal diversion, and thus provides a representative estimate of river flows through the Project area. It has a continuous record from 1982 to present. A USGS Bulletin 17B (USGS, 1982) analyses for the gage provides a poor fit to the observed data. For this highly regulated river environment, the 17B is not suitable for use in analysis so a different statistical analysis was used. **Figure 2-2** shows the results of a piecewise fit of past data that better approximates flood frequency. Design flows for events with return intervals up to and including 10 years were chosen from the piecewise log fit trendline analysis of the Boise River near Glenwood Bridge dataset. Design flows for events with return intervals greater than 10 years were chosen from the polynomial fit trendline developed from the FEMA FIS flows. The design flows are summarized in **Table 2-1**.

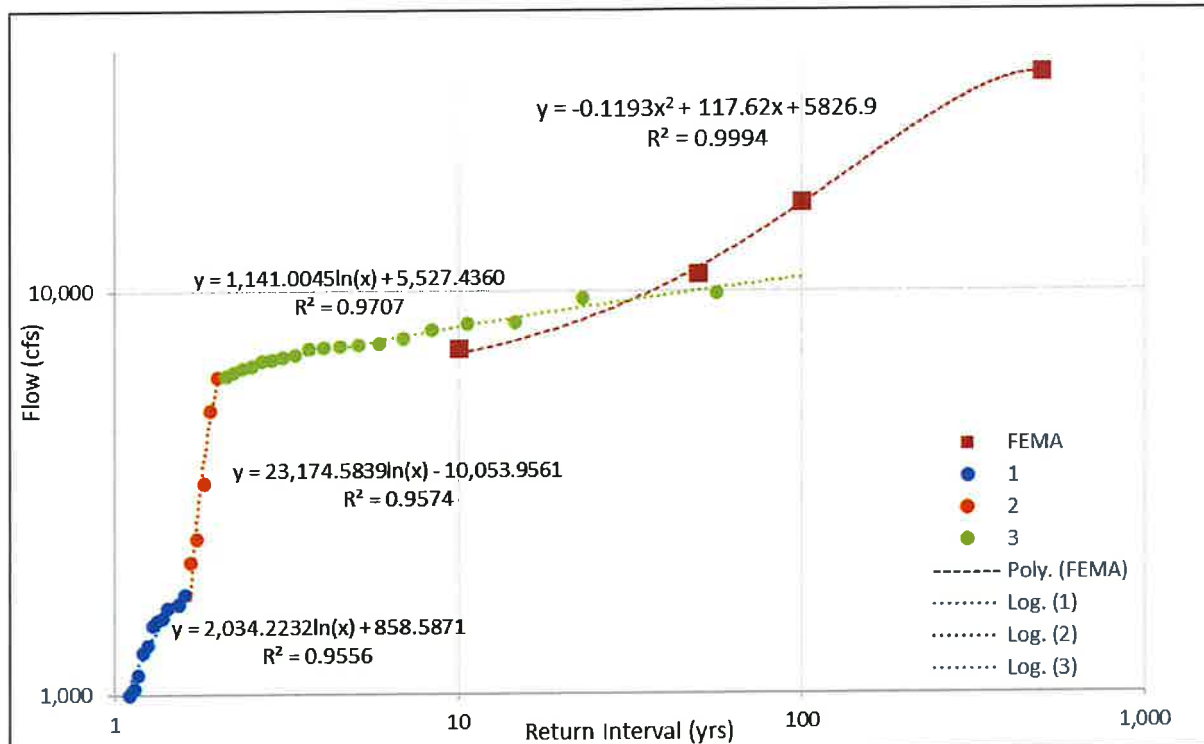


Figure 2-2. Piecewise log best-fit analysis for Boise River at Glenwood Bridge gage (USGS +13206000) and FEMA flood insurance study flows.

Table 2-1. Comparison of recurrence flows.

% Exceedance	Return Interval (years)	Design Flow (cfs)	FEMA
91	1.1	1,052	--
67	1.5	1,683	--
50	2	6,009	--
20	5	7,364	--
10	10	8,155	7,200
4	25	8,693	--
2	50	11,410	11,000
1	100	16,396	16,600
0.5	200	24,579	--
0.2	500	34,812	34,800

1. Design flows for q1.1 - q10 from piecewise log-fit of Glenwood gage data.

2. Design flows for q25 - q500 from polynomial fit of FEMA FIS flows.

3. FEMA FIS flows noted in **bold** were used for the LOMR analysis.

Jacobs (2019) performed an analysis of side channel connections for past flow records from 2003 to 2018. For Alternative 1, it was illustrated that the side channel would be connected throughout the Rainbow trout spawning period for all past records analyzed and the connection would be at least 141 days as summarized in Figure 2-3.

Year	Alternative 1 (600 cfs) Duration of Surface Connection [days]	Alternative 2 (1,000 cfs) Duration of Surface Connection [days]
2003	190	79
2004	182	70
2005	152	51
2006	239	214
2007	165	59
2008	166	92
2009	169	58
2010	141	68
2011	194	132
2012	203	100
2013	158	73
2014	159	51
2015	155	102
2016	169	102
2017	220	166
2018	179	91

Legend

Fully connected during rainbow trout spawning period

Partially connected during rainbow trout spawning period

Not connected during rainbow trout spawning period

Figure 2-3. Side channel surface water connection based on past flow data (Jacobs, 2019).

2.5. Climate Change

Over the next 100 years, climate change models for Idaho expect increases in temperature but predictions are not fully decisive on the amount of increase. For example, based on projections made by the Intergovernmental Panel on Climate Change and results from the United Kingdom Hadley Centre's climate model (HadCM2), by 2100, temperatures in Idaho could increase by 5°F (with a range of 2-9°F) in winter and summer and 4°F (with a range of 2-7°F) in spring and fall. Precipitation is estimated to change little in summer, to increase by 10% in spring and fall (with a range of 5-20%), and to increase by 20% in winter (with a range of 10-40%) (EPA, 1998). Trends from 1955 to 2015 show April snowpack declining by more than 20% in the Sawtooth Mountain Range (EPA, 2016) that drains to the Project site. Therefore, it is expected that the Project area will see warmer temperatures in the future with increased precipitation during fall, winter, and spring.

2.6. Geology and Geomorphology

The mainstem Boise River along the side channel Project area consists of a gravel-bed river that has reached a plane-bed state due to upstream flow regulation and sediment trapping. As part of the development of the 2015 Boise River Enhancement Plan (BREN, 2015), a Geomorphic Assessment of the Lower Boise River (Richardson and Guilinger, 2015) was developed that provides a good description of this reach and the overarching geologic controls in the Project area and the reader is referred to that document for more details.

2.7. Fisheries

The Boise River headwater streams originate from the north and east of the Project site in the Sawtooth Mountains. The North Fork Boise River, Middle Fork Boise River and South Fork Boise River all make their way into Arrowrock and Lucky Peak Reservoir just upstream from the Project. Below Lucky Peak Reservoir is considered the lower Boise River, which flows approximately 65 miles to the confluence with the Snake River. The lower Boise River fish communities have been impacted by flow alterations, habitat loss, and poor water quality with the predominant river flow pattern being opposite of pre-dam conditions with lower flows in winter and higher flows in summer (MacCoy, 2006). Altering the flow regime affects the fish community biodiversity, food availability, habitat complexity, life history patterns, and connectivity (Collier et al., 1996).

Idaho Department of Fish and Game (IDFG) states the fish species within the Project reach are dominated by cold-water fishes, especially Rainbow Trout, Brown Trout, and Mountain Whitefish. IDFG also stocks approximately 50,000 hatchery catchable trout in certain sections of the lower Boise River to provide additional angling opportunity in high-use areas of the river (<https://idfg.idaho.gov/blog/2020/05/lower-boise-river-idahos-urban-fishery>).

2.8. Wetlands and Vegetation Survey

Wetlands were surveyed on-site by RDG staff on December 8-9, 2020. Delineation of wetlands complied with the USACE Wetland Delineation Manual (1987) and the Arid West Regional Supplement (Version 2.0) (2008). Waters of the U.S. were also defined, and included the Boise River within the Ordinary High Water Mark of the river. As part of the wetland delineation effort, vegetation in the project area in both wetland and upland environments were surveyed by stratum, with 30-foot radius sampling plots for shrub and tree strata, and 5-foot x 5-foot rectangular plots for herbaceous strata. Sampling plots were established where a distinct break in vegetation community, elevation, hydrology, or soils occurred, resulting in paired upland and wetland sampling plots throughout the Project site.

A total of 0.44 acres of scrub-shrub wetlands and 1.67 acres of forested wetlands were delineated at the Project site. The Riverine Boise River channel occupies 1.36 acres, and wetlands and Waters of U.S. total 3.47 acres within the wetland delineation Project area. Uplands account for 15.28 acres, or 82% of the wetland delineation boundary. Scrub-shrub wetlands are dominated by coyote willow (*Salix exigua*), black cottonwood (*Populus trichocarpa*) saplings, Western poison ivy (*Toxicodendron rydbergii*), and dog rose (*Rosa canina*). Yellow willow (*Salix lutea*) can be a minor component in the scrub-shrub wetland environment along with Wood's rose (*Rosa woodsii*). The most prevalent overstory shrub at the Project site is coyote willow, which can be found throughout the riparian environment in some percentage, and is present in near monoculture on 0.37 acres under the Highway 21 overpass area. Here, the coyote willow community is associated with a groundwater upwelling or hillslope seep area and groundwater availability is higher than in adjacent areas.

Forested wetlands are dominated almost exclusively by black cottonwood. While the structurally diverse cottonwood gallery is present on a majority of the riparian environment throughout the project area, a small fraction of the cottonwood gallery extent occurs on areas defined as wetlands. Black cottonwood has a Facultative rating in the Arid West, indicating that it occurs in wetlands with an estimated probability of 33% to 66%. It is in the willow family (*Salicaceae*), and while it has low drought tolerance and is dependent on a riparian environment especially in arid regions, it is usually not tolerant of prolonged flooding or stagnant water. Other tree species present in forested wetlands include water birch (*Betula occidentalis*) and black hawthorn (*Crataegus douglasii*).

3. Side Channel Design

This section provides an overview of the design details pertaining to the side channel restoration actions included in the Project. A summary is provided for each of the major restoration design elements identified in the drawing set. The design summary includes a general overview of the feature, a description of the objectives addressed by the feature, and a discussion of the criteria considered during the design process. In addition, design dimensions and example photographs are provided.

3.1. Side Channel Restoration

The proposed side channel alignment restores 2,300 ft of channel and draws on recommendations from past Boise River studies and standard river restoration principles. The 2015 Boise River Enhancement Plan (BREN, 2015) recommends increasing channel complexity through active intervention in the Boise River to improve in-stream habitat as illustrated in **Figure 3-1**. Furthermore, the plan recommends forcing river processes by building engineered log jams at strategic points on bars to activate side channels.

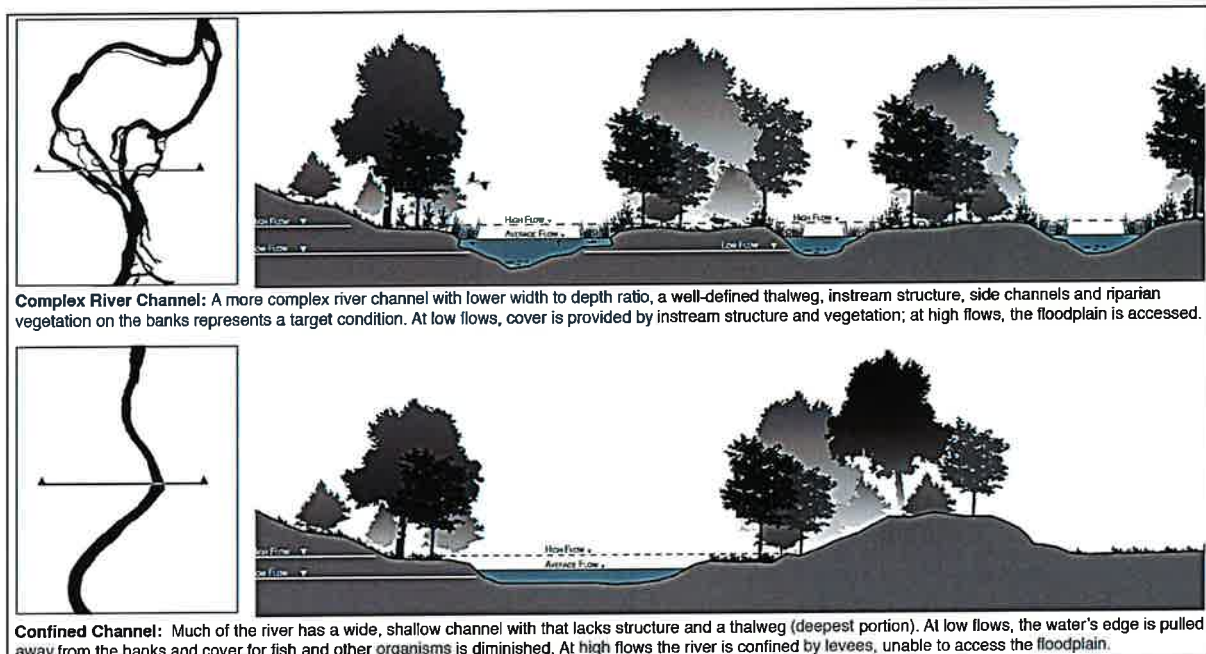


Figure 3-1. Graphic illustrating desirable channel complexity versus confined, single thread river (BREN, 2015).

The proposed Project aims to fulfill the recommendations of the 2015 plan. **Figure 3-2** Provides an overview of the proposed design for reconnecting the side channel on a more frequent basis to create diverse habitat and spawning opportunities for native trout. The design features an engineered apex log jam at the upstream side channel inlet that creates a minor bifurcation point to encourage flow down the side channel. Selective excavation (**Figure 3-3**) of the side channel alignment creates a more frequent flow connection to the Boise River and creates a preferential flow path. The alignment features pools and riffles for habitat complexity. All trees slated for removal along the 2,300-foot side channel alignment (152 total trees) will be repurposed and utilized as habitat features in the form of large wood structures along the side channel. An intensive revegetation plan for the Project area is proposed that incorporates native vegetation and variable life stages to ensure long-term success and natural site propagation of vegetation.

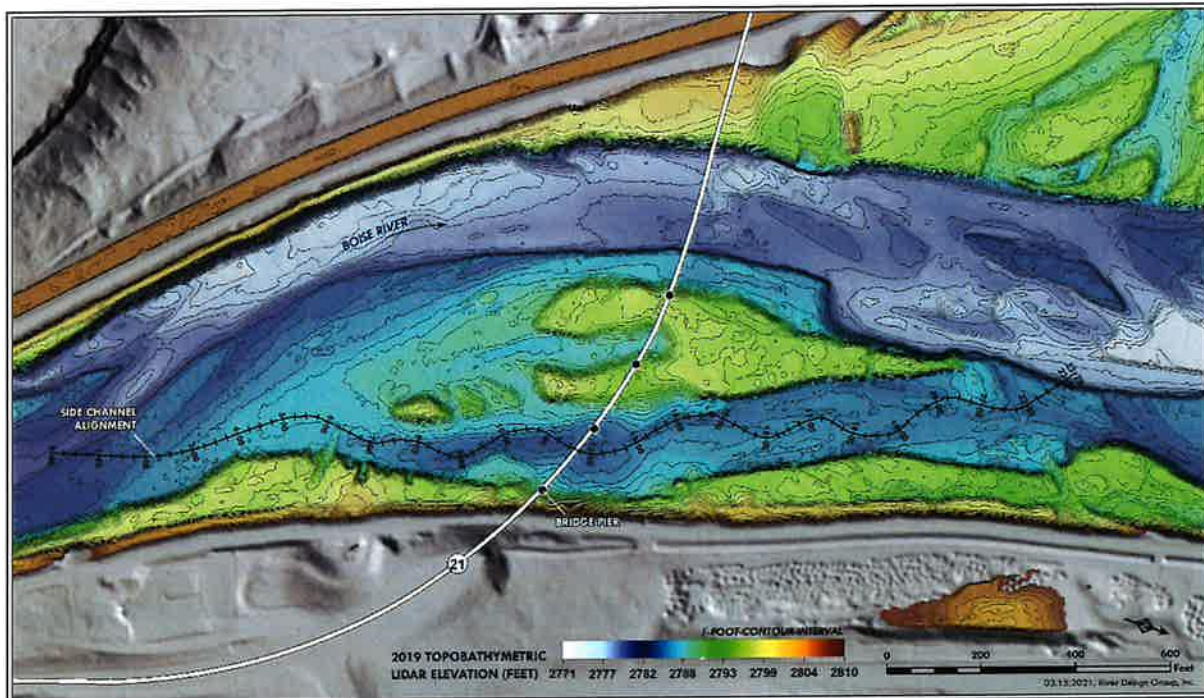


Figure 3-2. Overview of proposed side channel restoration on the Boise River.



Figure 3-3. Example of selective excavation and removal of soil while maintaining existing trees.

3.2. Design

Side channel design is based on recommendations from the 2019 concept plan (Jacobs, 2019) and further refined by RDG based on our restoration experience. A series of metrics were calculated to address geomorphic impairments and to enhance existing side channel habitat. A major project goal is to maintain a minimum of 25 cfs through the side channel for 178 days per year. A low flow channel was designed to convey the minimum flow rate which will occur when the Boise River flow is at 650 cfs. The design channel

cross-section is daylighted at a 3:1 slope to the surrounding surface to comprise the total active channel width. The complete side channel cross-section shown in the drawings will convey an approximate bankfull flow rate of 220 cfs when the Boise River flow rate is around 3,500 cfs. As flows increase, the side channel floodplain will activate further and fully inundate when the Boise River reaches 6,000 cfs.

The side channel design addresses channel geometry including planform (sinuosity and pattern), cross-section (width-depth ratio) and longitudinal profile (pool-riffle sequences). Modifying channel geometry adds hydraulic complexity and instream habitat diversity to existing simplified habitat conditions. The streambed will be graded and shaped per the design channel cross-section templates for riffles and pools included in the drawings. The streambed gradation of the riffles has been engineered to provide vertical stability essential for maintaining connection to the Boise River during predicted flows as well as floodplain connection. In addition, riffles were designed to be dynamic to support geomorphic processes and aquatic habitat objectives including trout spawning. Habitat structures are incorporated into the design along portions of the streambanks to provide lateral stability and vegetative cover. Structure types and placement criteria are described in more detail in the following sections.

A hydrologic analysis was completed to refine estimates of bankfull discharge and to estimate peak flow recurrence intervals. The design process also included subsequent field surveys for identifying locations for channel reconstruction with respect to IBO recommendations, existing vegetation, and floodplain elevations. In addition, LiDAR data and hydraulic models were used to refine the channel geometry and evaluate hydraulic performance. Table 3-1 summarizes geometric design criteria to construct the bottom of the side channel for base flow and Table 3-2 summarizes bankfull flow conditions.

Table 3-1. Geometric design criteria side channel at base flow.

Design Parameter	Minimum - Maximum (Average)
Discharge (cubic feet per second)	25
Active Period	>178 days/yr
Gradient (%)	0.1 – 0.15
Sinuosity	1.07
Riffle area (square feet)	15 - 20 (average 18)
Riffle width (feet)	12 - 14 (average 13)
Riffle mean depth (feet)	1.3 – 1.5 (average 1.4)
Riffle width-depth ratio	9 - 10 (average 10)
Riffle D ₅₀ (inches)	1 - 3 (average 2)
Riffle D ₈₄ (inches)	5 - 7 (average 6)
Pool maximum depth (feet)	4 - 6 (average 5)

Table 3-2. Geometric design criteria side channel at bankfull flow.

Design Parameter	Minimum - Maximum (Average)
Bankfull discharge (cubic feet per second)	220
Active Period (average)	34 days/yr
Gradient (%)	0.10 – 0.15
Sinuosity	1.07
Section area (square feet)	72 - 88 (average 80)
Top width (feet)	27 - 33 (average 30)
Channel maximum depth (feet)	5 - 7 (average 6)

3.3. Hydraulic Modeling

A 1-dimensional, steady-state, hydraulic model was developed for use in determining flood water surface profiles, velocities and shear stress for existing and proposed conditions. HEC-RAS v5.0.7 (USACE 2019) software was used for all modeling. A pre-project model was developed that reflects existing conditions using 2019 bathymetric Lidar data and calibrated with known water surface elevations and discharge measurements. This model was then modified to reflect post-project conditions by replacing existing geometry in the side channel with data sampled from the proposed design surface. Other aspects of the model including downstream boundary conditions and flows remained identical to isolate effects specific to the Project. For the target minimum flow of 25 cfs in the side channel (650 cfs total flow), velocities through the project reach range from 0.89 feet per second (fps) to 1.96 fps with an average of 1.44 fps. For the 25-year flow of 741 cfs in the side channel (8,700 cfs total flow), velocities range from 2.43 to 3.68 fps. Channel-average shear stress values through the project reach range from 0.02 pounds force (lbf) to 0.15 lbs with an average of 0.07 lbf for the target minimum flow of 25 cfs in the side channel. Shear stress values range from 0.07 to 0.18 lbf for the 25-year flow of 741 cfs in the side channel. Modeling results show that at the FEMA 100-year flow of 16,396 cfs, side channel conveyance increases from approximately 936 cfs under existing conditions to 1,841 cfs under proposed conditions. The proposed side channel grading water surface elevations through the side channel at the FEMA 100-year flow lowered by an average of -0.02 feet with a range of -0.05 feet to +0.01 feet. **Appendix C** provides a full report describing the hydraulic modeling effort for the proposed side channel design.

3.4. Side Channel Restoration Element: Floodplain Roughness

Floodplain roughness consists of microtopography grading and buried wood placement on newly exposed and constructed floodplain surfaces. Microtopography is grading that results in small furrows and ridges varying in elevation. This treatment creates complexity and microsites on newly constructed floodplain surfaces to trap and protect seed and other plant propagules, and to provide resistance to erosion by limiting rill formation. The woody material increases soil moisture retention, creates protective microsites for establishing seed and plants, and promotes soil development by introducing organic material. Floodplain roughness can discourage browse pressure by making access to planted material or naturally colonizing trees and shrubs more difficult.

Floodplain roughness will be incorporated into all constructed floodplain and slope surfaces, including floodplain swales and mounds, to provide temporary stability and to support revegetation efforts. Floodplain roughness is created using equipment to roughen the constructed surface with microtopography and partially bury woody debris in the soil. Microtopography creates variation in the constructed floodplain surface ranging from 0.5 feet above to 0.5 feet below the design floodplain surface. Wood placement for roughness includes small logs 6 to 12 inches in diameter and 8 to 12 feet long and brush up to 6 inches in diameter and 8 to 12 feet in length. Small logs will be placed at a rate of 50 pieces per acre and brush will be placed at a rate of 150 pieces per acre. Wood and brush will be partially buried and will extend above the surface up to two feet. **Figure 3-4** provides an example of floodplain roughness treatments on a restoration project on the Snake River near Boise, Idaho.



Figure 3-4. Photograph of floodplain roughness treatments one year after construction on Snake River near Boise.

3.5. Side Channel Restoration Element: Habitat Structures

Multiple types of structures will be installed along the channel margins to improve stability, habitat complexity and stream dynamics. Structures are described in the following sections.

3.5.1. Large Wood Bank Structures

Large wood bank structures will be installed in the project area at each meander apex in 11 locations to maintain pools, create hydraulic complexity, and protect banks from erosion. Large wood structures consist of multiple tiers of stacked large logs (key members) with attached rootwads. Smaller wood and brush is racked between the key members. Each structure contains approximately 11 logs plus brush. The structure is backfilled with soil or rock to counteract buoyancy and sliding forces. **Figure 3-5** displays a photograph of large wood structure constructed on a similar stream size as the project.



Figure 3-5. Large wood structure buried into bank for stability.

3.5.2. Large Wood Channel Spanning Structures

Large wood channel spanning structures will be installed along the side slopes of the side channel in approximately 13 locations. Large wood channel spanning structures will provide complexity and roughness to the side channel by emulating downed trees into the channel and providing habitat along the channel margins. Salvaged cottonwood trees from on-site shall be repurposed by interlocking with existing standing trees as shown. The exact location of each structure shall be directed by the on-site construction manager to minimize impacts to existing vegetation. **Figure 3-6** displays a photograph of large wood channel spanning structure constructed on a similar side channel project.



Figure 3-6. Large wood channel spanning logs interlocked into existing mature vegetation for stability.

3.6. Side Channel Restoration Element: Pool-Riffle Construction

Side channel restoration will utilize riffles to provide long-term vertical stability in the longitudinal profile. Riffles provide vertical stability and transitions between pools and/or meander bends. A well-graded mix of alluvial substrate will replicate natural bed materials and allow natural sorting processes to develop pavement and sub-pavement layers. Design criteria for the riffle gradation will be bed mobility for the D_{84} size classes at the 25-year flow. A matrix of larger material will be used to provide vertical bed stability and maintain interstitial spaces. Construction of a typical riffle with alluvium substrate composition is illustrated in **Figure 3-7**.



Figure 3-7. Construction of a riffle that transitions into a tailout and pool feature with a large wood bank structure.

3.7. Side Channel Restoration Element: Apex Log Jam

Historical side channel formation in the Boise River was instigated by large wood accumulating at the head of gravel bars and splitting mainstem flow. Since accumulations of mobile large wood are no longer prevalent in this reach of the Boise River, a constructed feature is required to instigate flow bifurcation. Apex log jams are common restoration elements used to encourage side channel flow and mimic natural river processes as illustrated in **Figure 3-8**. An apex jam will be installed at the entrance to the side channel to maintain a stable bifurcation of the Boise River. Due to the unstable nature of the Boise River banks at the downstream end of the side channel, an additional apex jam will be installed at the confluence to discourage erosion. This will minimize potential for the side channel outlet to migrate downstream.



Figure 3-8. Construction of an apex log jam to bifurcate flows into restored side channel.

3.8. Side Channel Restoration Element: Wildlife Snag

To enhance avian habitat within the grading extents, wildlife snags will be installed to replace standing trees that were removed and incorporated into restoration. Large trees with roots intact will be installed vertically with no lean to act as habitat while they decay over time. Wildlife snags can be installed to fill open areas and in groups as illustrated in **Figure 3-9**.



Figure 3-9. Example picture of wildlife snags installed on a floodplain similar to Boise River.

4. Revegetation Design

This section provides an overview of the site revegetation plan that further enhances the restoration area along the side channel and surrounding floodplain areas.

4.1. Preservation and Salvage

Existing native riparian and wetland vegetation communities in the Project area will be preserved to the greatest extent possible. Mature forested black cottonwood communities occur throughout the length of the side channel and these areas will not be disturbed. Floodplain grading extents may be field fit during construction to preserve additional areas of native vegetation. Where preservation of desired native species is not feasible within grading limits, this vegetation will attempt to be salvaged and directly transplanted into constructed streambank structures and/or floodplain swales. Plant material that may be suitable for transplant may include dense, native sedge/grass sod mats and young trees or shrubs such as cottonwoods (*Populus trichocarpa*), coyote willow (*Salix exigua*), red-osier dogwood (*Cornus sericea*), or water birch (*Betula occidentalis*). If suitable transplant locations are not available in coordination with the construction schedule or it is not possible to remove plants without damage, the vegetation may be used as coarse woody debris rather than live transplants.

4.2. Containerized Planting

Containerized plants will be used to establish riparian tree and shrub communities within the restored floodplain of the Boise River side channel. The desired vegetation community in the Project area includes a riparian black cottonwood forest and willow shrub community. Planting is planned within the grading extents, and floodplain roughness will be applied throughout the planting area which will increase natural seed recruitment and availability of fresh substrate and microsites for seed germination and natural colonization following flood events.

Table 4-1 summarizes the woody species planting effort. Plant material will consist of trees and shrubs grown in one-gallon, five-gallon, and twenty-gallon containers in a nursery environment. The variability in size will provide immediate height variability throughout the floodplain planting zone and increase structural diversity especially in the first five years of growth, before expression of the species' natural variability in size and structure. In addition, a diverse overstory and understory species assemblage is designed to maximize wildlife and bird habitat, while maintaining structural and functional diversity throughout the restored project area riparian habitat.

Table 4-1. Typical planting specifications for woody plants.

Species		Container Size (gallon)	Total Number
Black cottonwood	<i>Populus trichocarpa</i>	1, 5, 20	200
Water birch	<i>Betula occidentalis</i>	1, 5	20
Serviceberry	<i>Amelanchier alnifolia</i>	1	34
Chokecherry	<i>Prunus virginiana</i>	1	17
Blue elderberry	<i>Sambucus nigra ssp. caerulea</i>	1, 5	38
Black hawthorn	<i>Crataegus douglasii</i>	1	34
Golden Currant	<i>Ribes aureum</i>	1	121
Syringa	<i>Philadelphus lewisii</i>	1	121
Red-osier dogwood	<i>Cornus sericea</i>	5	182
Yellow willow	<i>Salix lutea</i>	1	30
Total containerized woody plants			796

4.3. Fencing and Browse Protection

Wildlife (elk, deer, and beaver) may preferentially browse the shoots of newly planted material and browse protection is needed to support the establishment of the plants and the development of a self-sustaining plant community. Wildlife browse will be managed through the use of small riparian browse enclosure fences and individual browse protectors. Discrete enclosure fencing units will be located along the channel to support vegetation establishment in key locations while facilitating movement of wildlife species through the Project area. Enclosure fences are designed as small ~10 ft x 20 ft units, which allows a short fence height of 5 feet to be utilized as deer and elk are unlikely to jump into a narrow fence, rather than the more imposing and aesthetically displeasing 7.5-ft. tall fence that is usually recommended to exclude deer and elk from an area. Individual browse protectors will be used in areas not protected by the small enclosure fence units, and will be 5 ft tall and approximately 30-inch diameter individual plant cages.

4.4. Willow Brush Trenches

Vegetated brush trenches will be constructed with the floodplain grading extents to supplement the microtopography treatment and woody species planting effort. Live willow cuttings and small wood will be integrated into the trenches, and may be curved or straight features that are generally oriented perpendicular to stream flow. The willow brush trenches will fill in much of the floodplain area in between containerized plantings and some may be located in wildlife browse enclosure units. Live willow cuttings will be harvested when dormant from existing willow stands along the Boise River in the vicinity of the Project area, or from donor stands in other drainages given they are similar in elevation and ecotype, and approved by the construction engineer.

4.5. Seeding and Reclamation

Restoration seeding will occur on all disturbed ground, including within the floodplain grading extents as well as reclaimed access routes and staging areas following construction. Seeding will utilize a hydroseed method, whereby a slurry of seed and mulch is applied to the bare ground surfaces. The hydroseeding method retains more initial moisture than traditional dry seed broadcast methods, and is particularly useful for erosion control on sloped ground.

Two restoration seed mixes will be utilized on bare ground surfaces (Table 4-2). The floodplain seed mix is provided for the side channel floodplain environment and includes a mixture of two rhizomatous grass species, two bunchgrass species, and three forbs to increase diversity, pollination, and aesthetics. Species in the floodplain seed mix have a higher moisture requirement than in the upland seed mix, which includes one rhizomatous grass species and four bunchgrasses, along with three forbs. All seed species are native to Idaho, and the two mixes are designed to provide short- and long-term erosion control and maximize ground cover to preclude invasive weed species establishment.

Table 4-2. Seeding specifications for floodplain and upland areas.

Location	Species		Total Pure Live Seed (lbs)
Floodplain 1.85 acres	Slender wheatgrass	<i>Elymus trachycaulus</i>	9.69
	Western wheatgrass	<i>Pascopyrum smithii</i>	17.22
	Bluejoint	<i>Calamagrostis canadensis</i>	1.08
	Meadow barley	<i>Hordeum brachyanterum</i>	15.14
	Prairie flax	<i>Linum lewisii</i>	1.08

Table 4-2. Seeding specifications for floodplain and upland areas.			
Location	Species		Total Pure Live Seed (lbs)
	Utah sweetvetch	<i>Hedysarum boreale</i>	0.27
	Showy milkweed	<i>Asclepias speciosa</i>	0.27
	Total		44.74
Upland 0.34 acres	Indian ricegrass	<i>Achnatherum hymenoides</i>	1.42
	Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	1.42
	Beardless wildrye	<i>Leymus triticoides</i>	3.94
	Basin wildrye	<i>Leymus cinereus</i>	1.19
	Sandberg bluegrass	<i>Poa secunda</i>	0.16
	Prairie flax	<i>Linum lewisii</i>	0.04
	Scarlet globemallow	<i>Sphaeralcea coccinea</i>	0.25
	Arrowleaf balsamroot	<i>Balsamorhiza sagittata</i>	0.09
	Total		8.50

5. Summary

For more than six years, IBO has been creating a vision for restoring a remnant side channel on the Boise River to enhance floodplain function, bird and wildlife habitat, and aquatic resources. Two alternatives for restoring flow to the side channel were developed and described in a Concept Design Technical Memorandum by Jacobs Engineering Group (Jacobs, 2019). Throughout development of the alternatives, IBO reached out to stakeholder groups, the greater Boise community, and resource agencies to solicit feedback and input into the process. The culmination of feedback and years of development created a preferred alternative that restores regular flow to the remnant side channel on the Boise River. This design report provides an overview of the engineering design for the 2,300 ft side channel restoration. The proposed side channel alignment seeks to minimize impacts to existing trees, wetlands, and vegetation while maximizing long-term opportunities for the site to provide improved function and habitat.

The proposed side channel will be connected at a Boise River flow of 600 cfs (as measured at Glenwood Bridge gage) and it is anticipated that 25 cfs will flow through the side channel when the Boise River is at 650 cfs. A comprehensive revegetation plan is designed for the side channel area that includes intensive coverage with native species and various age classes. The 152 trees that will be removed for the side channel grading will all be incorporated into the habitat features and 200 new trees are planned for installation. An extensive understory vegetation plan is designed to complement the tree plantings. Furthermore, there is a net gain in wetland areas due to the increased inundation along the side channel. Long-term maintenance of the area will be organized by IBO as stewards of the area.

6. References

- Boise River Enhancement Network (BREN), 2015. Boise River Enhancement Plan. Boise, Idaho.
- Collier, M., Webb, R.H., and Schmidt, J.C., 1996. Dams and Rivers: A Primer on the Downstream Effects of Dams: US Geological Survey Circular 1126, 94 p.
- Environmental Protection Agency (EPA), 1998. Climate Change and Idaho. Environmental Protection Agency (EPA). September 1998, EPA 236-F-98-007f.
- Environmental Protection Agency (EPA). 2016. What Climate Change Means for Idaho. Environmental Protection Agency (EPA). August 2016, EPA 430-F-16-014.
- Jacobs. 2019. Concept Design Technical Memorandum. Jacobs Engineering Group, Inc. 59 p.
- MacCoy, D. E., 2006. Fish Communities and Related Environmental Conditions of the Lower Boise River, Southwestern Idaho, 1974-2004. US Geological Survey Scientific Investigations Report 2006-5111, 36 p.
- Richardson, R., Guilinger, J. 2015. Geomorphic Assessment of the Lower Boise River, Idaho. Prepared for Boise River Enhancement Network. 57 p.
- U.S. Army Corps of Engineers (USACE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid west Region (Version 2.0), Environmental Laboratory Technical Report ERDC/EL TR-08-28. U.S. Army Engineer Research and Development Center, Vicksburg MS.
- U.S. Army Corps of Engineers (USACE). 2010. U.S. Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, MS.
- U.S. Army Corps of Engineers (USACE). 2019. Hydrologic Engineering Center River Analysis System Version 5.0.7.
- U.S. Bureau of Reclamation (USBR). 2008. The Effects of Climate Change on the Operation of Boise River Reservoirs, Initial Assessment Report. US Bureau of Reclamation (USBR). 67 p.
- U.S. Geological Survey (USGS). 1982. Guidelines for Determining Flood Flow Frequency. Bulletin 17B. Department of Interior, US Geological Survey (USGS). 194 p.

Appendix A

Concept Design Technical Memorandum

(Jacobs, 2019)

Appendix B

Wetlands Delineation Report River Design Group, Inc.

Appendix C

Hydraulic Modeling Report
River Design Group, Inc.



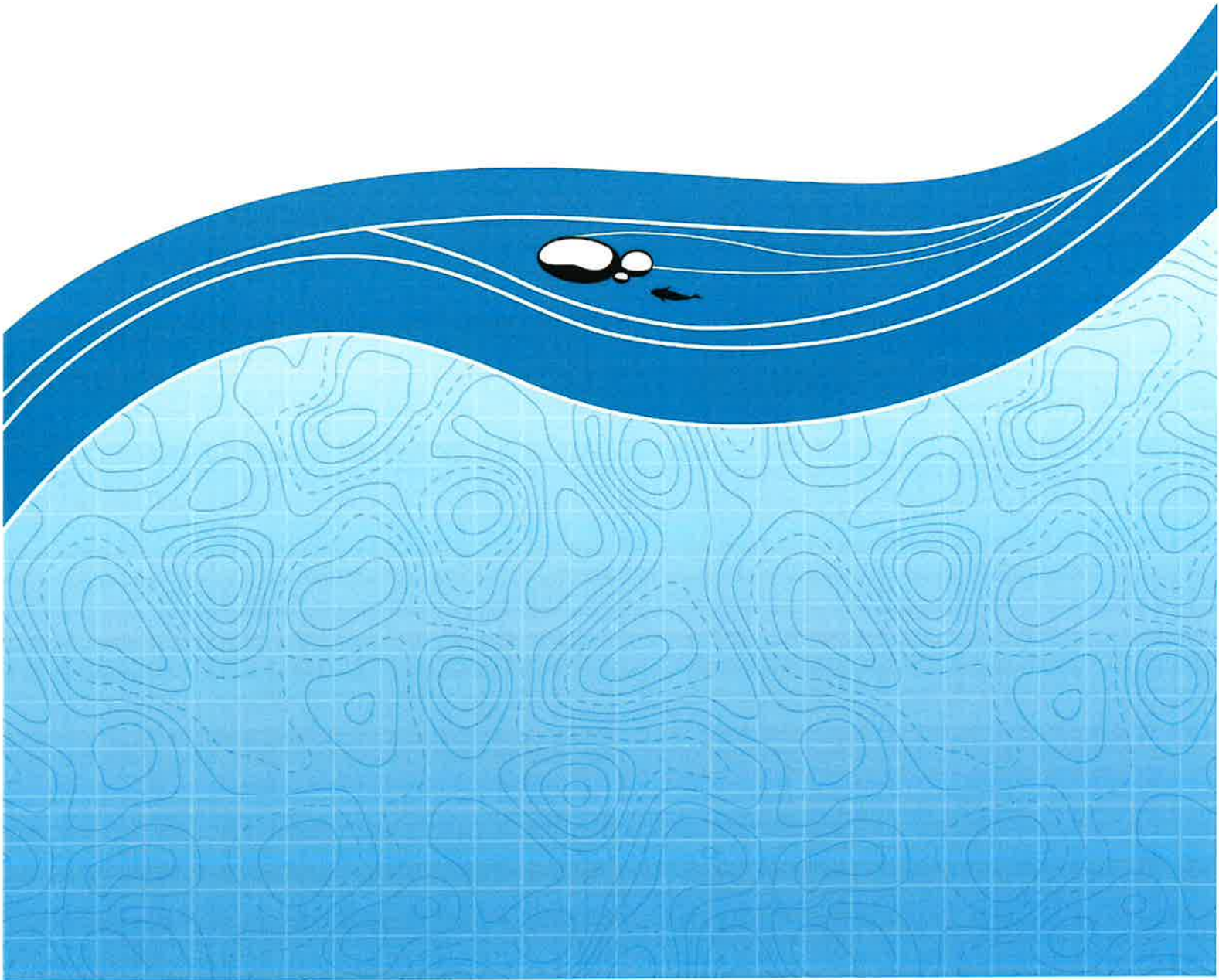
RDG
RIVER DESIGN GROUP

RIVER, STREAM & WETLAND RESTORATION EXPERTS

236 Wisconsin Avenue | Whitefish, Montana 59937 | 406.862.4927

311 SW Jefferson Avenue | Corvallis, Oregon 97333 | 541.738.2920

www.riverdesigngroup.com



Attachment E
Request for Comment Letters



SPF WATER
ENGINEERING

March 8, 2021

City of Boise, Public Works Department
Attn: John Roldan, Strategic Water Resources Manager
PO Box 500
Boise, ID 83701-0500

Re: Application for Permit No. 63-35002 – Boise State University

Dear John,

Boise State University (BSU) proposes to appropriate 30 cfs from the Boise River for wildlife and aesthetic purposes as part of the BSU Intermountain Bird Observatory side channel project at the Diane Moore Nature Center. Water will be diverted through an existing flood channel that flows beneath the Highway 21 bridge, with a point of diversion in the SE ¼ of the NE ¼ of Section 4, Township 2 North, Range 3 East. The water will return to the river approximately ½ mile downstream in the NENE of Section 4. The side channel will be modified to improve habitat for fish and wildlife. Water use will be non-consumptive, except for minor evaporation and transpiration losses that will be mitigated through non-diversion of a senior-priority irrigation water right held by South Boise Water Company.

Idaho Department of Water Resources Water Appropriation Rules (IDAPA 37.03.08, 40.05.g) require applicants to seek letters of comment on the effects of the construction and operation of projects proposed by certain water right applications. The project is located partially within the City of Boise and partially within Ada County. Please provide comments concerning the above referenced applications to:

Anna Kaiser
Idaho Department of Water Resources
Western Regional Office
2735 Airport Way
Boise, ID. 83705-5082

If you have any questions regarding this application, please do not hesitate to call me at 208-383-4140. SPF Water Engineering would appreciate a copy of your response be sent to us at the address listed in the footer below. Thank you for your consideration of this matter.

Sincerely,

Terry M. Scanlan

Terry M. Scanlan, P.E., P.G.
Principal Engineer/Hydrogeologist



PUBLIC WORKS DEPARTMENT

MAYOR: Lauren McLean | DIRECTOR: Stephan Burgos

April 21, 2021

Anna Kaiser
Idaho Department of Water Resources
Western Regional Office
2735 Airport Way
Boise, ID 83705-5082

RE: Application for Permit 63-35002—Boise State University

Dear Ms. Kaiser:

The City of Boise (City) appreciates the opportunity to provide comments on the subject application for Boise State University (BSU). The City is supportive of the BSU Intermountain Bird Observatory (IBO) side channel project at the Diane Moore Nature Center for several reasons. BSU has invested significant resources into the property and has fostered numerous community partnerships. The IBO has a history of commitment to wildlife preservation and environmental education. The project supports conservation criteria including critical open space, connectivity, clean water, habitat restoration and community engagement. It is important to note that this section of the Boise River is the last remaining open space connecting the foothills to the riparian corridor, which allows wildlife access to essential habitat. The City also has a vested interest in this project because it is exploring the possibility of future similar downstream projects for temperature mitigation and habitat improvement.

City Environmental Division staff have also been working with BSU to support the project with in-kind services including creation and implementation of a monitoring plan to include: flow and volumetric measurements when the side channel is in place; pre- and post-construction temperature measurements in the main channel of the river upstream and downstream from the project site; biological monitoring; and analytical support of biodiversity and temperature data. City in-kind services will evaluate the qualitative and quantitative benefits of the side channel restoration to water quality and habitat conditions.

While the City is supportive of the project, the following issues must be addressed to ensure the project is implemented consistent with existing City ordinances and water needs.

1. The City has concerns regarding the development associated with application 63-35002 and compliance with the Floodway and Waterways Overlay District Ordinances. We are aware BSU is currently working with the City's Planning and

Development Services (PDS) Department to address future development plans and the river system permit is scheduled to be heard by the Planning and Zoning Commission in May 2021. However, at this point the City is unclear how future development plans will be addressed.

- a. The City is aware the project is in the FEMA regulatory floodway and riparian area of the Boise River. Both are highly regulated through PDS and the Parks Commission. Per the City's Floodway Ordinance (BCC 11-08), no development may occur in the floodway without FEMA and City Council approval. The current side channel project is not a concern for the City with respect to the floodplain ordinance, however the City is aware of proposed future walkways and deck overlooks with shelters. To move forward with this proposal BSU will have to have prior approval from City Council and FEMA to comply with BCC 11-08.
 - b. The section of the Boise River identified by BSU for the side channel project is classified as Class A Lands and Waters making it subject to the City's Waterway Overlay District Ordinance (BCC 11-05-06). BCC 11-05-06.1.E prohibits new structures in an area with a Bald Eagle Perching, Feeding and Loafing setback. The side channel can be approved under the City's Floodway Ordinance as addressed above, but any future development of pathways, decks or overlooks are not allowed due to the Bald Eagle setback in the riparian area. For the project to remain in compliance the proposed walkway and viewpoint development needs to be addressed with the PDS Department.
2. BSU acknowledges the Boise River is fully appropriated on a nearly year-round basis during most years and intends to mitigate for any consumptive use that results from the side channel diversion. The City is a member of the South Boise Water Company Board of Directors and has supported the dedication of 40 mitigation shares to BSU water right application 63-35002 to offset the portion of the proposed diversion that is anticipated to be consumptive. The City appreciates BSU's foresight on the need for consumptive mitigation on application 63-35002. While the City is supportive of the project and acknowledges the intention to mitigate, we want to ensure that the water right permit is conditioned to include the proposed mitigation.
 3. The BSU IBO side channel project will bypass a Boise River diversion supplying SUEZ Water Idaho Inc. (SUEZ) and Surprise Valley Homeowners' Association (HOA), Inc. The application proposes to divert water from the Boise River upstream of the SUEZ and Surprise Valley HOA diversion and return water to the river downstream of the diversion. SUEZ provides potable supply to the City's residents and the City leases water from the Surprise Valley HOA to provide irrigation supply to parks so the proposed permit must be conditioned to prevent impacts to this diversion. The City is aware that SUEZ has protested the



application and discussions may already be occurring among the impacted parties. The City requests information from the applicant demonstrating conditions will be added to the proposed permit and/or the proposed project operations have been modified to protect this diversion.

The City appreciates the consideration of our comments by the Idaho Department of Water Resources and Boise State University.

Sincerely,



John Roldan, P.E.
Strategic Water Resources Manager

cc: Terry Scanlan, SPF Water Engineering
Steve Burgos, City of Boise
Jim Pardy, City of Boise
Haley Falconer, City of Boise
Cody Riddle, City of Boise
Jason Taylor, City of Boise
Mary Grant, City of Boise



Enclosure: Application for Permit No. 63-35002

cc: Anna Kaiser - IDWR

SPF Job No.: 100.0460



SPF WATER
ENGINEERING

March 8, 2021

Ada County Development Services
Attn: Zach Kirk, P.E., County Engineer
Ada County Courthouse
200 West Front Street
Boise, ID 83702

Re: Application for Permit No. 63-35002 – Boise State University

Dear Zach,

Boise State University (BSU) proposes to appropriate 30 cfs from the Boise River for wildlife and aesthetic purposes as part of the BSU Intermountain Bird Observatory side channel project at the Diane Moore Nature Center. Water will be diverted through an existing flood channel that flows beneath the Highway 21 bridge, with a point of diversion in the SE ¼ of the NE ¼ of Section 4, Township 2 North, Range 3 East. The water will return to the river approximately ½ mile downstream in the NENE of Section 4. The side channel will be modified to improve habitat for fish and wildlife. Water use will be non-consumptive, except for minor evaporation and transpiration losses that will be mitigated through non-diversion of a senior-priority irrigation water right held by South Boise Water Company.

Idaho Department of Water Resources Water Appropriation Rules (IDAPA 37.03.08, 40.05.g) require applicants to seek letters of comment on the effects of the construction and operation of projects proposed by certain water right applications. The project is located partially within the City of Boise and partially within Ada County. Please provide comments concerning the above referenced applications to:

Anna Kaiser
Idaho Department of Water Resources
Western Regional Office
2735 Airport Way
Boise, ID. 83705-5082

If you have any questions regarding this application, please do not hesitate to call me at 208-383-4140. SPF Water Engineering would appreciate a copy of your response be sent to us at the address listed in the footer below. Thank you for your consideration of this matter.

Sincerely,

Terry M. Scanlan

Terry M. Scanlan, P.E., P.G.
Principal Engineer/Hydrogeologist

Enclosure: Application for Permit No. 63-35002

Cc: Anna Kaiser – IDWR

SPF Job No.: 100.0460

Lauerman, Denise

From: Lauerman, Denise
Sent: Friday, February 26, 2021 11:59 AM
To: Sujata.Connell@deq.idaho.gov
Cc: 'lance.holloway@deq.idaho.gov'; 'danielle.merriman@deq.idaho.gov'
Subject: Application for Permit 63-35002, 77-14375, 77-14373
Attachments: Agency Recommendation Form 2021.docx

IDEQ:

The Idaho Department of Water Resources (IDWR) is seeking written comment and/or recommendations from you regarding the above referenced water right application. You can find a copy of the application at: <https://idwr.idaho.gov/apps/ExtSearch/WRAJSearch/WRADJSearch.aspx>. Please review the application, then complete the enclosed recommendation form and return it to this office by **03/22/2021**.

If the application is approved, IDWR will include appropriate standard conditions of approval for a water right located within a water district, such as regulation by the watermaster, lockable controlling works, and/or measuring devices. Any special conditions or other concerns you have related to this application should be specifically addressed in your recommendation.

IDWR can finish reviewing an unprotested application as soon as the protest period has past. Your prompt response to this request will ensure that your recommendation can be considered. If IDWR has not received your written recommendation by **03/22/2021**, IDWR will presume that you do not oppose approval of the application and that you have no comments for IDWR to consider.

Please contact this office if you have any questions regarding the application.

Thanks!
Denise

Denise Lauerman | *Administrative Assistant*
IDWR-Western Region
2735 W Airport Way, Boise ID 83705
(208).334.2190 | denise.lauerman@idwr.idaho.gov

Lauerman, Denise

From: Lauerman, Denise
Sent: Friday, February 26, 2021 11:59 AM
To: Casey Pozzanghera
Cc: Zachary Swearingen
Subject: Application for Permit 63-35002, 65-24014, 65-24015, 77-14373
Attachments: Agency Recommendation Form 2021.docx

Dear Mr. Pozzanghera:

The Idaho Department of Water Resources (IDWR) is seeking written comment and/or recommendations from you regarding the above referenced water right application. You can find a copy of the applications at: <https://idwr.idaho.gov/apps/ExtSearch/WRAJSearch/WRADJSearch.aspx>. Please review the applications, then complete the enclosed recommendation form and return it to this office by **03/22/2021**.

If the applications are approved, IDWR will include appropriate standard conditions of approval for a water right located within a water district, such as regulation by the watermaster, lockable controlling works, and/or measuring devices. Any special conditions or other concerns you have related to this application should be specifically addressed in your recommendation.

IDWR can finish reviewing an unprotested application as soon as the protest period has past. Your prompt response to this request will ensure that your recommendation can be considered. If IDWR has not received your written recommendation by **03/22/2021**, IDWR will presume that you do not oppose approval of the applications and that you have no comments for IDWR to consider.

Please contact this office if you have any questions regarding the application.

Thanks!

Denise

Denise Lauerman | *Administrative Assistant*
IDWR-Western Region
2735 W Airport Way, Boise ID 83705
(208).334.2190 | denise.lauerman@idwr.idaho.gov

Lauerman, Denise

From: Lauerman, Denise
Sent: Friday, February 26, 2021 11:59 AM
To: 'rex@wd63.org'; 'Mike Meyers'
Subject: Application for Transfer 84658, Permit 63-35002
Attachments: Watermaster Recommendation Form 2021.docx

Watermaster:

The Idaho Department of Water Resources (IDWR) is seeking written comment and/or recommendations from you regarding the above referenced water right applications. You can find a copy of the applications at: <https://idwr.idaho.gov/apps/ExtSearch/WRAJSearch/WRADJSearch.aspx>. Please review the applications, then complete the enclosed recommendation form and return it to this office by **03/22/2021**.

If the applications are approved, IDWR will include appropriate standard conditions of approval for a water right located within a water district, such as regulation by the watermaster, lockable controlling works, and/or measuring devices. Any special conditions or other concerns you have related to this application should be specifically addressed in your recommendation.

IDWR can finish reviewing an unprotested application as soon as the protest period has past. Your prompt response to this request will ensure that your recommendation can be considered. If IDWR has not received your written recommendation by **03/22/2021**, IDWR will presume that you do not oppose approval of the applications and that you have no comments for IDWR to consider.

Please contact this office if you have any questions regarding the application.

Thanks!
Denise

Denise Lauerman | *Administrative Assistant*
IDWR-Western Region
2735 W Airport Way, Boise ID 83705
(208).334.2190 | denise.lauerman@idwr.idaho.gov



State of Idaho

DEPARTMENT OF WATER RESOURCES

WESTERN Region • 2735 W AIRPORT WAY • BOISE, ID 83705-5082

Phone: (208)334-2190 • Fax: (208)334-2348 • Website: www.idwr.idaho.gov

Brad Little
Governor

Gary Spackman
Director

February 26, 2021

BUREAU OF RECLAMATION
203 N CAMAS RD
BOISE ID 83702-4520

RE: Application for Permit No. 63-35002

Dear Interested Party:

The Idaho Department of Water Resources (IDWR) is seeking written comment and/or recommendations from your organization regarding the above referenced water right application. You can find a copy of the application at:

<https://idwr.idaho.gov/apps/ExtSearch/WRAJSearch/WRADJSearch.aspx>.

Please review the application, complete the enclosed recommendation form, and return it to this office by 03/22/2021.

IDWR can finish reviewing an unprotested application as soon as the protest period has past. Therefore, your prompt response to this request is appreciated. If your organization desires to formally protest the approval of this application, you may do so after the notice is published by filing a written protest along with a \$25.00 filing fee within 10 days after final publication.

Please contact this office if you have any questions regarding the application.

Sincerely,

A handwritten signature in blue ink that reads "Denise Lauerman". The signature is fluid and cursive, with the first name "Denise" and last name "Lauerman" clearly distinguishable.

Denise Lauerman
Administrative Assistant 1

Enclosure(s)

State of Idaho
Department of Water Resources
RECOMMENDATION FORM

RE: Application for Permit No. 63-35002

New Appropriation Applicant's
Name:

OFFICE OF THE PRESIDENT
1910 UNIVERSITY DR
BOISE, ID 83725-0001

REP:
SPF WATER ENGINEERING LLC
C/O LORI GRAVES
300 E MALLARD DR STE 350
BOISE, ID 83706-6660

Recommendation:

- a) _____ I do not oppose approval of this application.
- b) _____ I do not oppose approval of this application if it is conditioned
as follows:
- c) _____ I oppose approval of this application for the following reasons:
- d) _____ Additional comments:

Dated this _____ day of _____.

Signature



State of Idaho

DEPARTMENT OF WATER RESOURCES

WESTERN Region • 2735 W AIRPORT WAY • BOISE, ID 83705-5082

Phone: (208)334-2190 • Fax: (208)334-2348 • Website: www.idwr.idaho.gov

Brad Little
Governor

Gary Spackman
Director

February 26, 2021

MICRON TECHNOLOGY INC
8000 S FEDERAL WAY
BOISE, ID 83707

RE: Application for Permit No. 63-35002

Dear Interested Party:

The Department of Water Resources (IDWR) is seeking written comment and/or recommendations from your organization regarding the above referenced water right application. You can find a copy of the application at:

<https://idwr.idaho.gov/apps/ExtSearch/WRAJSearch/WRADJSearch.aspx>.

IDWR can finish reviewing an unprotested application as soon as the protest period has past. Therefore, your prompt response to this request is appreciated. If your organization desires to formally protest the approval of this application, you may do so after the notice is published by filing a written protest along with a \$25.00 filing fee within 10 days of the final publication.

Please contact this office if you have any questions regarding the application.

Sincerely,

Denise Lauerman
Administrative Assistant 1

Enclosure(s)



State of Idaho

DEPARTMENT OF WATER RESOURCES

WESTERN Region • 2735 W AIRPORT WAY • BOISE, ID 83705-5082

Phone: (208)334-2190 • Fax: (208)334-2348 • Website: www.idwr.idaho.gov

Brad Little
Governor

Gary Spackman
Director

February 26, 2021

SOUTH BOISE WATER COMPANY
PO BOX 6005
BOISE, ID 83707

RE: Application for Permit No. 63-35002

Dear Interested Party:

The Department of Water Resources (IDWR) is seeking written comment and/or recommendations from your organization regarding the above referenced water right application. You can find a copy of the application at:

<https://idwr.idaho.gov/apps/ExtSearch/WRAJSearch/WRADJSearch.aspx>.

IDWR can finish reviewing an untested application as soon as the protest period has past. Therefore, your prompt response to this request is appreciated. If your organization desires to formally protest the approval of this application, you may do so after the notice is published by filing a written protest along with a \$25.00 filing fee within 10 days of the final publication.

Please contact this office if you have any questions regarding the application.

Sincerely,

Denise Lauerman
Administrative Assistant 1

Enclosure(s)

BOISE RIVER SIDE CHANNEL RESTORATION
INTERMOUNTAIN BIRD OBSERVATORY, BOISE, IDAHO
PERMIT DRAWINGS

PROJECT PARTNERS



MICRON TECHNOLOGY, INC.
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PROJECT DESCRIPTION

RIVER REGULATION, URBAN ENCROACHMENT, AND AGRICULTURAL DEVELOPMENT HAVE CUMULATIVELY IMPACTED RIPARIAN AND AQUATIC HABITAT THROUGHOUT THE LOWER BOISE RIVER AND AT THE INTERMOUNTAIN BIRD OBSERVATORY (IBO) SITE. IBO AND ITS PARTNERS ENVISION A SELF-SUSTAINING SIDE CHANNEL OF THE BOISE RIVER WHICH IS CONNECTED SEASONALLY TO SURFACE WATER AND CONTINUOUSLY TO GROUNDWATER. CURRENTLY, THE HISTORICAL SIDE CHANNEL AT THE PROJECT LOCATION IS ONLY CONNECTED TO THE MAINSTEM CHANNEL AT INFREQUENT HIGH FLOWS FOR RELATIVELY SHORT DURATIONS, AND THE OVERALL SITE HAS BEEN IMPACTED BY HUMAN ACTIVITIES. BASED ON MONITORING BY IBO, THE SITE IS IMPORTANT TO NEOTROPICAL MIGRANT SONGBIRDS FOR BOTH BREEDING AND AS MIGRATION STOPOVER HABITAT, AND IT SUPPORTS NUMEROUS WINTERING AND BREEDING WATERFOWL AND RAPTOR SPECIES. THE PROPOSED SIDE CHANNEL WOULD BE ACTIVATED AT A MAINSTEM RIVER FLOW (USGS 13206000 BOISE RIVER AT GLENWOOD BRIDGE) OF 600 CUBIC FEET PER SECOND (CFS) AND SUPPORT A SURFACE WATER CONNECTION FROM MARCH TO JULY (RAINBOW TROUT SPAWNING AND REARING WINDOW). THE SIDE CHANNEL RESTORATION WOULD FEATURE HEALTHY AND VIBRANT NATIVE VEGETATION THAT BENEFIT MIGRATORY BIRDS AND OTHER WILDLIFE INCLUDING POLLINATING INSECTS. THE PROJECT SITE WILL BECOME AN OUTDOOR LABORATORY AROUND WHICH COMMUNITY OUTREACH AND EDUCATION PROGRAMS ARE DESIGNED, AND IT WILL PROVIDE A MODEL OF BEST PRACTICES IN ECOLOGICAL RESTORATION WITHIN AN URBAN SETTING.

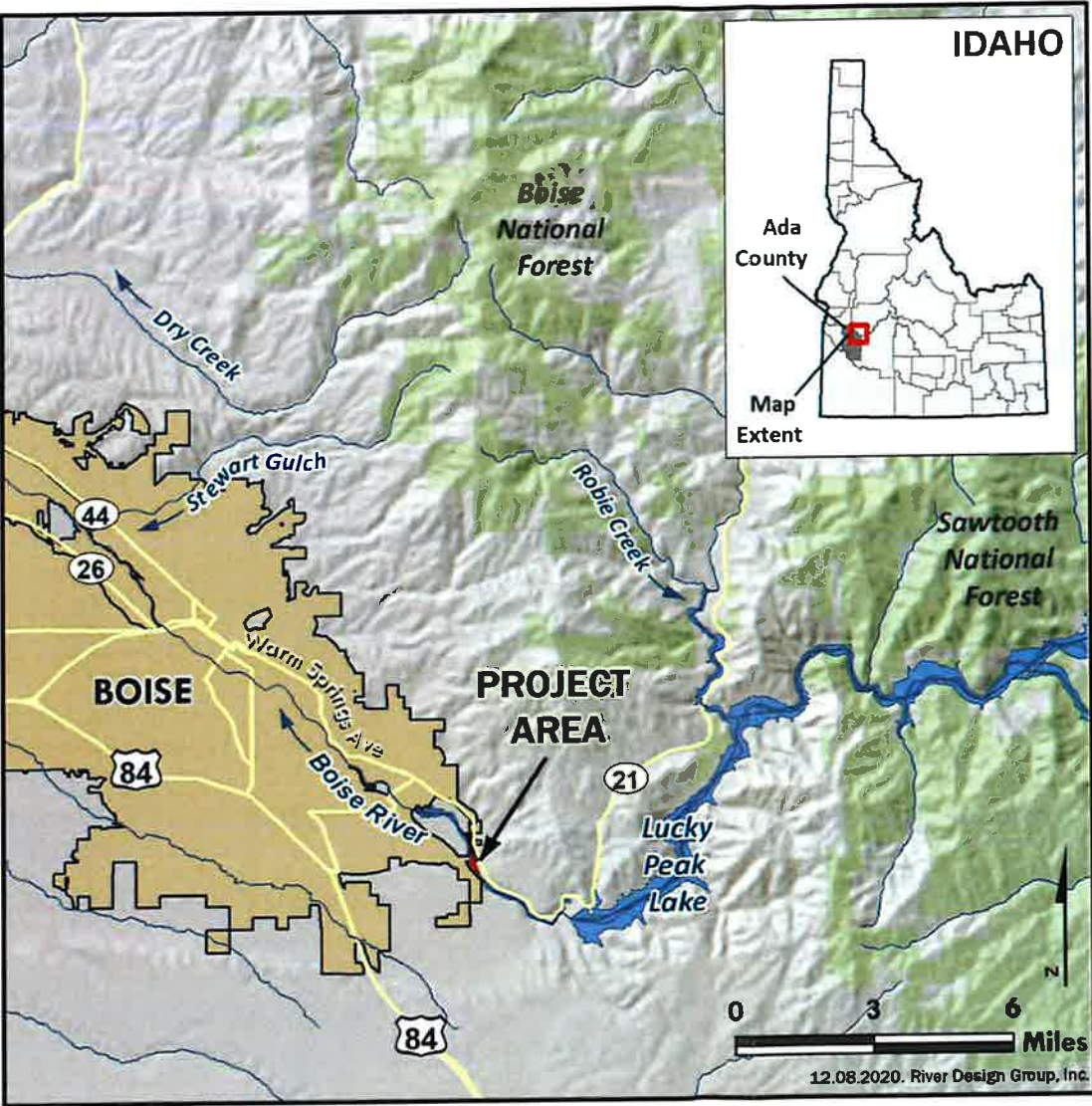
STANDARD OF PRACTICE

RDG WORKS EXCLUSIVELY IN THE RIVER ENVIRONMENT AND EMPLOYS THE MOST CURRENT AND ACCEPTED PRACTICES AVAILABLE FOR PLANNING AND DESIGN OF RESTORATION AND CHANNEL ENHANCEMENT PROJECTS. ANALYSIS AND DESIGN OF PROPOSED STREAM RESTORATION WORK RELIES ON THESE CURRENT BEST PRACTICES. ALL WORK IS SUPERVISED BY A REGISTERED PROFESSIONAL CIVIL ENGINEER IN THE STATE OF IDAHO WITH EXPERIENCE AND EXPERTISE IN THE RESTORATION WORK BEING PROPOSED FOR THIS PROJECT.

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PROJECT VICINITY MAP



NE 1/4 OF THE NE 1/4 OF SECTION 4, T.02N., R.03E., BOISE MERIDIAN
ADA COUNTY, IDAHO
USGS QUADRANGLE: BOISE, ID

REUSE OF DRAWINGS

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COVER PAGE AND NOTES

MICRON BOISE RIVER
BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
1	3/16/21	NW	PERMIT DRAWINGS	SW

PROJECT NUMBER
RDG-20-173

DRAWING NUMBER

1.0

Drawing 1 of 33

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GENERAL PROJECT NOTES

- 1. CONTRACTOR IS RESPONSIBLE FOR MEETING ALL STATE & COUNTY TRAFFIC SIGNAGE AND/OR FLAGGING REQUIREMENTS.
- 2. CONTRACTOR IS RESPONSIBLE FOR MEETING ALL PERMIT REQUIREMENTS. ANY FINES INCURRED DUE TO PERMIT VIOLATIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

SPATIAL REFERENCE NOTES

- 1. SURVEY CONTROL USED FOR THE PROJECT IS PROVIDED ON DRAWING 2.0 AND COORDINATES CORRESPOND TO THE TOP CENTER OF CONTROL MARKERS.

LIDAR, GPS RTK, AND TOTAL STATION:
HORIZONTAL PROJECTION: IDAHO STATE PLANE WEST
LIDAR COLLECTED: TOPOBATHYMETRIC LIDAR
NOVEMBER 2019

HORIZ DATUM: NAD83 (2011) UNITS: US SURVEY FEET
VERT DATUM: NAVD88 (GEOID12B) UNITS: US SURVEY FEET

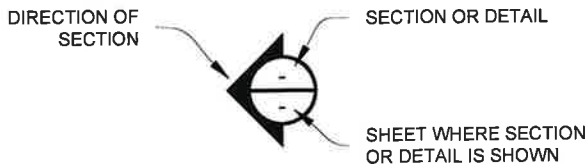
TOPOGRAPHIC SURFACE NOTES

- 1. SURVEY INFORMATION PROVIDED BY QUADRANT CONSULTING, INC. HORIZONTAL DATUM: IDAHO STATE PLANE WEST, NAD83, US. SURVEY FEET. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- 2. LIDAR CONTOUR DATA OBTAINED FROM QUANTUM SPATIAL. LIDAR DATA COLLECTED NOVEMBER, 2019.

PROJECT SITE ACCESS NOTES

- 1. CONTRACTOR SHALL UTILIZE GRAVEL ROAD FROM HIGHWAY 21 AS THE PRIMARY ROUTE TO ACCESS THE PROJECT SITE. REFER TO THE PROJECT SITE MAP ON PLAN SHEET 3.0 FOR SITE ACCESS OVERVIEW.
- 2. ACCESS TO THE PROJECT STAGING AREA SHALL BE FROM THE EXISTING GRAVEL ACCESS ROAD PER SHEET 3.0.
- 3. ACCESS ROUTES SHOULD BE LOCATED WITHIN LIMITS OF CONSTRUCTION AND IN ACCORDANCE WITH THE PROJECT EROSION AND SEDIMENT CONTROL PLANS.

CROSS-SECTION SHEET REFERENCE



SURFACE WATER AND UNWATERING NOTES

- 1. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL UNWATERING EFFORTS FOR CONSTRUCTION, FOR OBTAINING AND RENEWING ALL NECESSARY INFORMATION TO ENSURE UNWATERING EFFORTS ARE IN COMPLIANCE WITH REGULATIONS, AND TO ENSURE THE DESIGNED UNWATERING EFFORTS ARE ADEQUATE BASED ON SITE CONDITION.
- 2. THE PROJECT WILL BE IMPLEMENTED DURING THE IN-STREAM WORK WINDOW IDENTIFIED IN THE PERMITS DURING PERIOD TBD.
- 3. THE SIDE CHANNEL WORK WILL BE ISOLATED FROM FLOWING WATER USING A FLOATING SILT CURTAIN AND COFFERDAMS ON BOTH THE UPSTREAM AND DOWNSTREAM ENTRANCES. PUMPING WILL OCCUR ON THE DOWNSTREAM END AND FLOW WILL BE DISCHARGED INTO THE SEDIMENT CONTROL POND INDICATED ON SHEET 3.2. POND OUTFLOW WILL BE DISCHARGED INTO A DESIGNATED AREA THAT PROVIDES ADEQUATE INFILTRATION WITHOUT DISTURBING ADJACENT WETLANDS. ADDITIONAL PUMPING MAY BE REQUIRED TO MANAGE SEEPAGE AND CONSTRUCTION RUNOFF IN THE SIDE CHANNEL.
- 4. WORK AREA ISOLATION WILL EMPLOY MEASURES TO MINIMIZE STRANDING OF FISH. FISH SALVAGE OPERATIONS, IF REQUIRED, WILL BE CONDUCTED BY TBD. FISH SALVAGE OPERATIONS ARE NOT EXPECTED TO DELAY CONSTRUCTION.

FISH SALVAGE NOTES

- 1. CONTRACTOR RESPONSIBLE FOR COORDINATION AND COMPLETION OF FISH SALVAGE. CONTRACTOR SHALL PERFORM FISH AND FAUNA RECOVERY PER STATE AND FEDERAL REQUIREMENTS. UNWATERING IN CONJUNCTION WITH FISH SALVAGE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DONE USING PUMPS FITTED WITH APPROVED FISH SCREENS THAT PREVENT IMPINGEMENT OR ENTRAINMENT OF FISH. IF ISOLATED POCKETS OR POOLS OCCUR, THEY SHALL BE DEFISHED WITH DIP NETS AND PUMPING SHALL BE REDUCED ONCE MANAGEABLE WATER LEVELS ARE OBTAINED THAT CAN EASILY BE WADED AND DEFISHED. A QUALIFIED BIOLOGIST WILL DETERMINE THE METHODS FOR EACH AREA.

LEGEND

- APPROXIMATE TAX LOT LINE (ADA COUNTY GIS)
- BOISE CITY LIMIT
- PROPOSED CHANNEL BANKLINE
- EXISTING SURFACE PROFILE
- PROPOSED CHANNEL BED PROFILE
- EXISTING MINOR CONTOUR (LIDAR) 1.0'
- EXISTING MAJOR CONTOUR (LIDAR) 5.0'
- PROPOSED MINOR CONTOUR 1.0'
- PROPOSED MAJOR CONTOUR 5.0
- BSU WATER SURFACE PROFILE (SUMMER)
- BSU WATER SURFACE PROFILE (WINTER)
- ORDINARY HIGH WATER (OHW)
- TURBIDITY CURTAIN
- SEDIMENT FENCE
- CONSTRUCTION FENCE
- SHEET REFERENCE EXTENT
- EXISTING COTTONWOOD TREE
- WETLAND DELINEATION EXTENT LINE
- EXISTING FORESTED WETLAND
- EXISTING SCRUB-SHRUB WETLAND
- EXISTING RIVERINE WETLAND
- WETLAND CREATION
- PRESERVATION AREA
- COFFERDAM
- CONTROL POINT
- BSU MONITORING WELL
- FLOW DIRECTION
- GRADING EXTENT
- STAGING AREA
- TEMPORARY ACCESS ROAD
- SEDIMENT BASIN
- OVERPASS BRIDGE PIER
- RECLAMATION AREA
- PROPOSED TRAIL SYSTEM
- WILDLIFE EXCLOSURE FENCE
- INDIVIDUAL BROWSE PROTECTOR
- FLOODPLAIN PLANTING AREA
- WILLOW CLUMP SALVAGE AREA
- UPLAND SEEDING AREA
- FLOODPLAIN SEEDING AREA

PERMIT DRAWINGS



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GENERAL NOTES AND LEGEND

MICRON BOISE RIVER

BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
1	3/16/21	NW	PERMIT DRAWINGS	SW

PROJECT NUMBER
RDG-20-173

DRAWING NUMBER
1.1

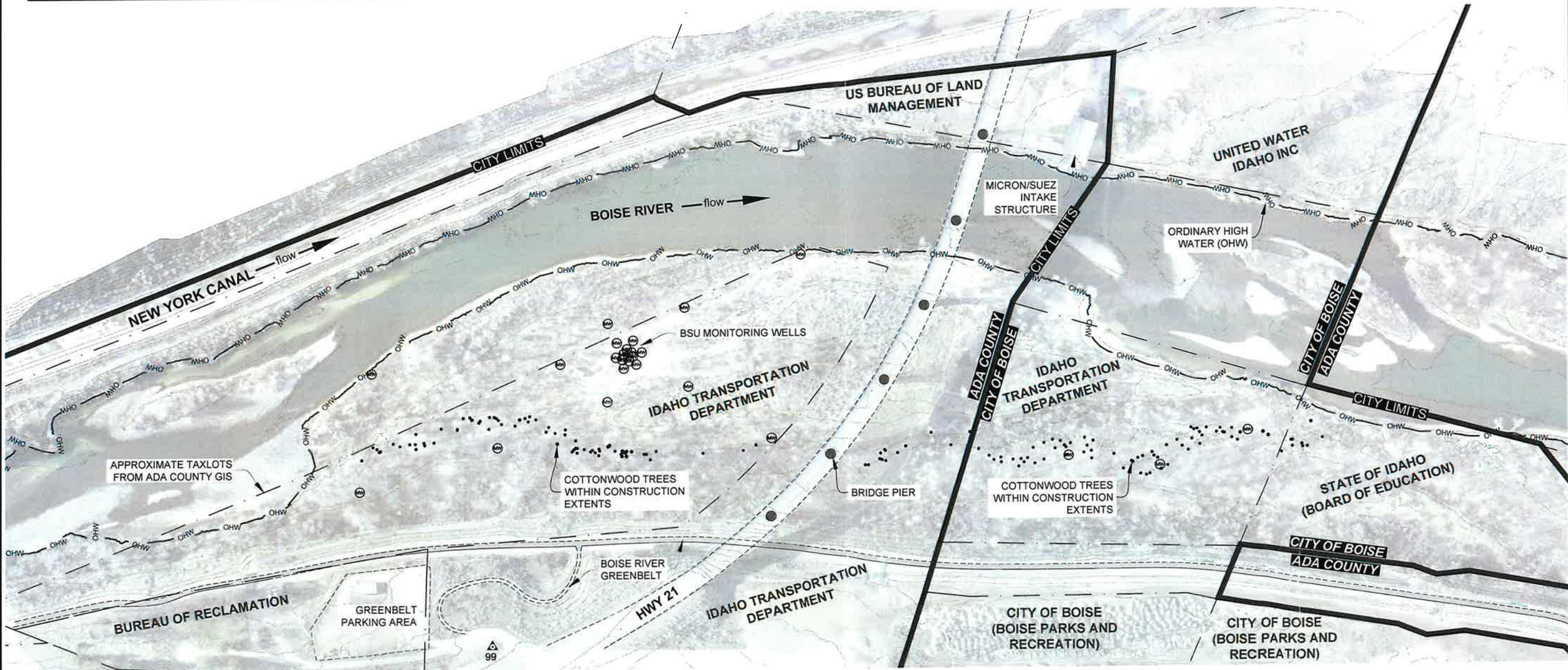
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BOISE RIVER CHARACTERISTICS

DRAINAGE AREA	±2,694 SQ. MILES
AVERAGE REACH SLOPE	0.0015 FT/FT
ACTIVE CHANNEL WIDTH	150 - 350 FT
1.5-YEAR FLOW	2,455 cfs
10-YEAR FLOW	9,830 cfs
25-YEAR FLOW	13,733 cfs
50-YEAR FLOW	16,882 cfs
100-YEAR FLOW	20,200 cfs
IN WATER WORK PERIOD	TO BE DETERMINED

CONTROL NETWORK

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
99	683708.64	2533081.46	2842.80	SET12*QCI



1 EXISTING SITE LAYOUT

1" = 200'



PERMIT DRAWINGS



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EXISTING SITE CONDITIONS
MICRON BOISE RIVER
BOISE, IDAHO

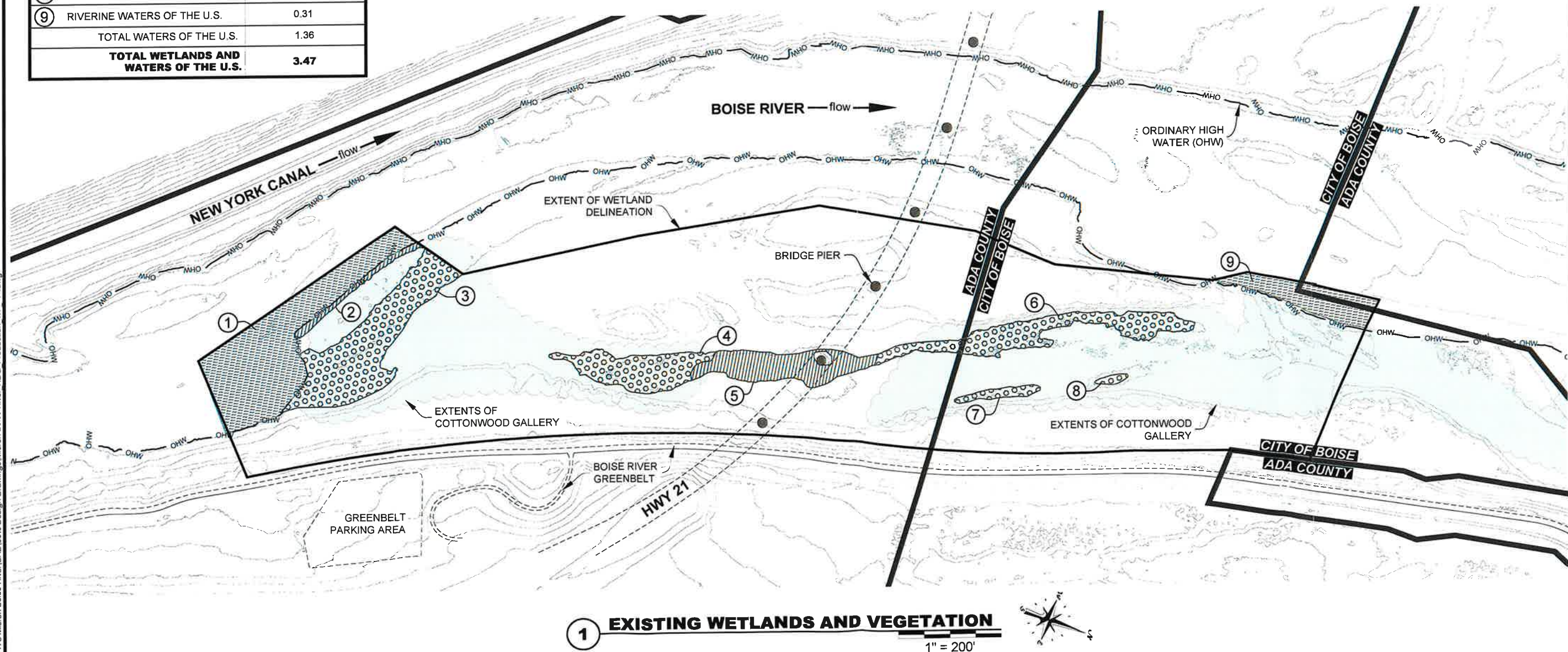
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EXISTING WETLANDS AND WATERS OF THE U.S.

TYPE	TOTAL AREA (AC)
② SCRUB-SHRUB WETLAND	0.07
③ FORESTED WETLAND	0.77
④ FORESTED WETLAND	0.35
⑤ SCRUB-SHRUB WETLAND	0.37
⑥ FORESTED WETLAND	0.47
⑦ FORESTED WETLAND	0.06
⑧ FORESTED WETLAND	0.02
TOTAL WETLANDS	2.11
① RIVERINE WATERS OF THE U.S.	1.05
⑨ RIVERINE WATERS OF THE U.S.	0.31
TOTAL WATERS OF THE U.S.	1.36
TOTAL WETLANDS AND WATERS OF THE U.S.	3.47



PERMIT DRAWINGS



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EXISTING WETLANDS AND VEGETATION

MICRON BOISE RIVER
BOISE, IDAHO

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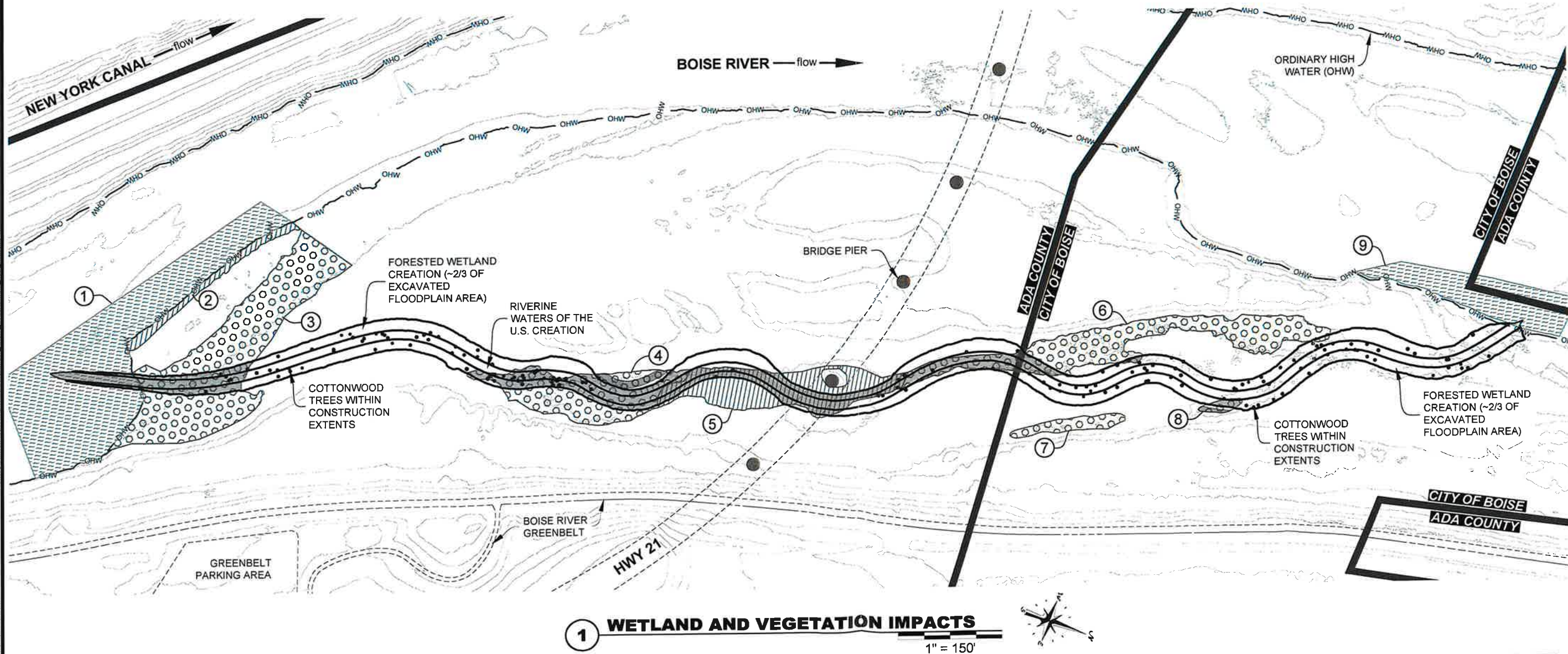
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WETLANDS AND WATERS OF THE U.S. IMPACTS			
TYPE	EXISTING AREA (AC)	TEMPORARY IMPACT (AC)	PERMANENT IMPACT (AC)
① RIVERINE	1.05	0	0.05
② SCRUB-SHRUB	0.07	0	0
③ FORESTED	0.77	0	0.01
④ FORESTED	0.35	0.02	0.17
⑤ SCRUB-SHRUB	0.37	0	0.18
⑥ FORESTED	0.47	0	0.11
⑦ FORESTED	0.06	0	0
⑧ FORESTED	0.02	0.01	0.01
⑨ RIVERINE	0.31	0	0
TOTAL	3.47	0.03	0.53

EXISTING AND PROPOSED WETLANDS AND WATERS OF THE U.S.			
TYPE	EXISTING AREA (AC)	PROPOSED AREA (AC)	NET CHANGE (AC) +/-
SCRUB-SHRUB WETLAND	0.44	0.26	-0.18
FORESTED WETLAND	1.67	2.23	+0.56
TOTAL WETLANDS	2.11	2.49	+0.38
RIVERINE WATERS OF THE U.S.	1.36	2.03	+0.67
TOTAL WETLANDS AND WATERS OF THE U.S.	3.47	4.52	+1.05



PERMIT DRAWINGS

SITE ACCESS AND STAGING NOTES

- 1

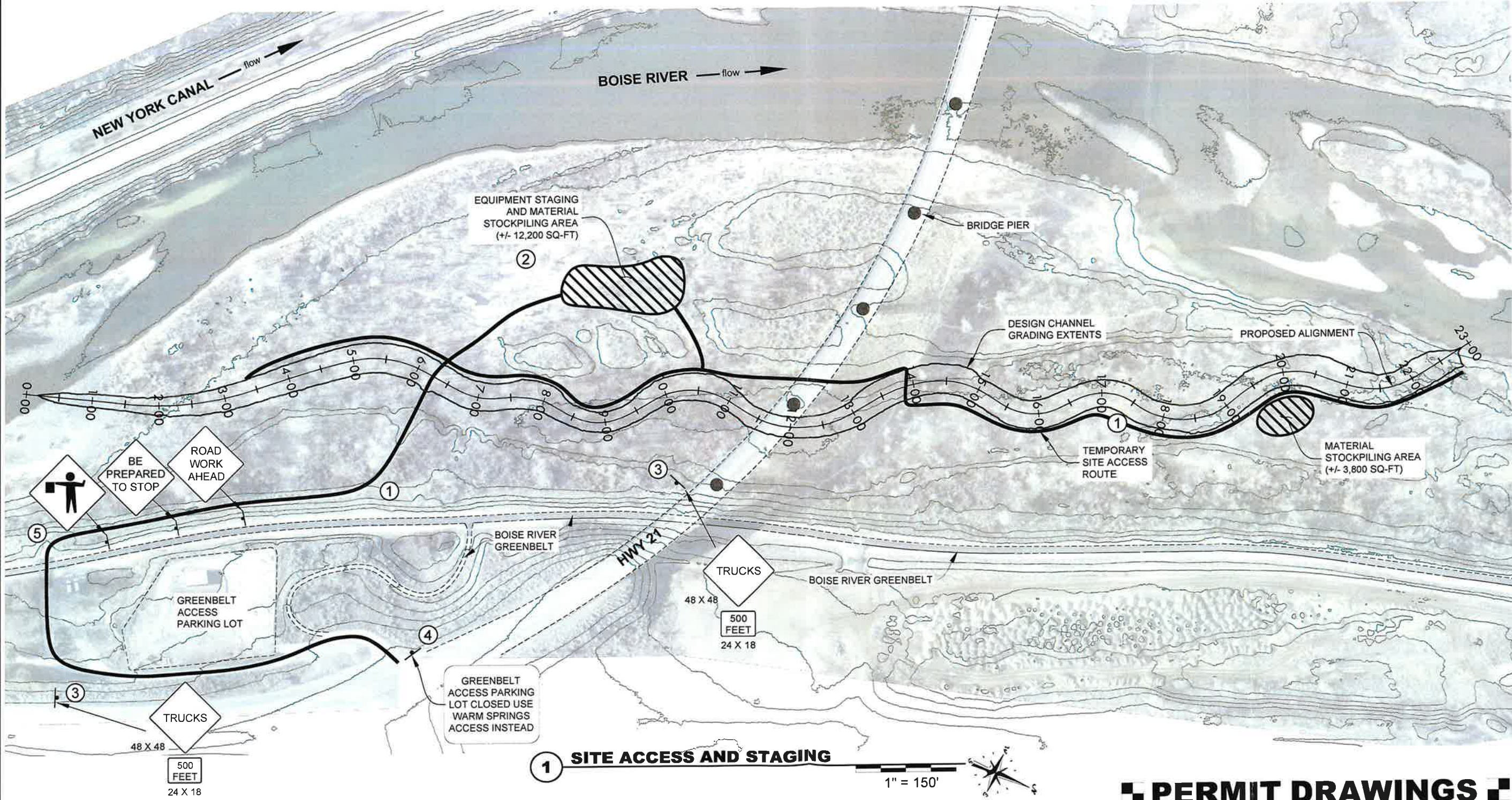
PRIMARY ACCESS IS FROM THE NORTHEAST (RIVER-RIGHT) SIDE OF THE BOISE RIVER FROM THE GREENBELT ACCESS PARKING LOT (LOCATED TO THE SOUTH OF HWY 21). UTILIZE THE DESIGNATED TEMPORARY ROUTE TO ACCESS THE STAGING AREA AND SITE.
- 2

UTILIZE THE DESIGNATED STAGING AREA TO THE EXTENT POSSIBLE FOR MATERIAL STOCKPILING AND EQUIPMENT STAGING.
- 3

INSTALL 48 INCH "TRUCKS" SIGN WITH 18 INCH "500 FEET" RIDER PER ITD AND MUTCD STANDARDS. CONTRACTOR SHALL REMOVE SIGN AT PROJECT COMPLETION. SIGN TO BE INSTALLED ON 4" X 6" WOOD POST PER TEMPORARY SIGN PLACEMENT AND WOOD POST SIGN SUPPORTS STANDARD DETAILS MOT-5-06 AND W16-2P.
- 4

INSTALL SIGN AT ENTRANCE TO GREENBELT ACCESS PARKING LOT. SIGN SHALL READ "GREENBELT ACCESS PARKING LOT CLOSED USE WARM SPRINGS ACCESS INSTEAD". CONTRACTOR SHALL REMOVE SIGN AT PROJECT COMPLETION.
- 5

FLAGGERS SHALL BE PRESENT ON EITHER SIDE OF THE GREENBELT CROSSING DURING CONSTRUCTION AND THREE SIGNS SHALL BE INSTALLED TO THE RIGHT AND LEFT TO SIGNAL APPROACHING PEDESTRIANS. SIGNS SHALL BE 100 FT APART. THE FIRST SIGN (100 FT FROM CROSSING) SHALL BE A FLAGGER WARNING SIGN PER STANDARD DETAIL W20-7A. THE SECOND SIGN (200 FT FROM CROSSING) SHALL READ "BE PREPARED TO STOP" PER STANDARD DETAIL W20-7B. THE THIRD SIGN (300 FT FROM CROSSING) SHALL READ "ROAD WORK AHEAD" PER STANDARD DETAIL W20-1.



1 SITE ACCESS AND STAGING

PERMIT DRAWINGS

SITE ACCESS AND STAGING
MICRON BOISE RIVER
BOISE, IDAHO

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PRESERVATION NOTES

ALL TREES, SHRUBS AND VEGETATION SHALL BE PROTECTED TO THE MAXIMUM EXTENT PRACTICABLE.

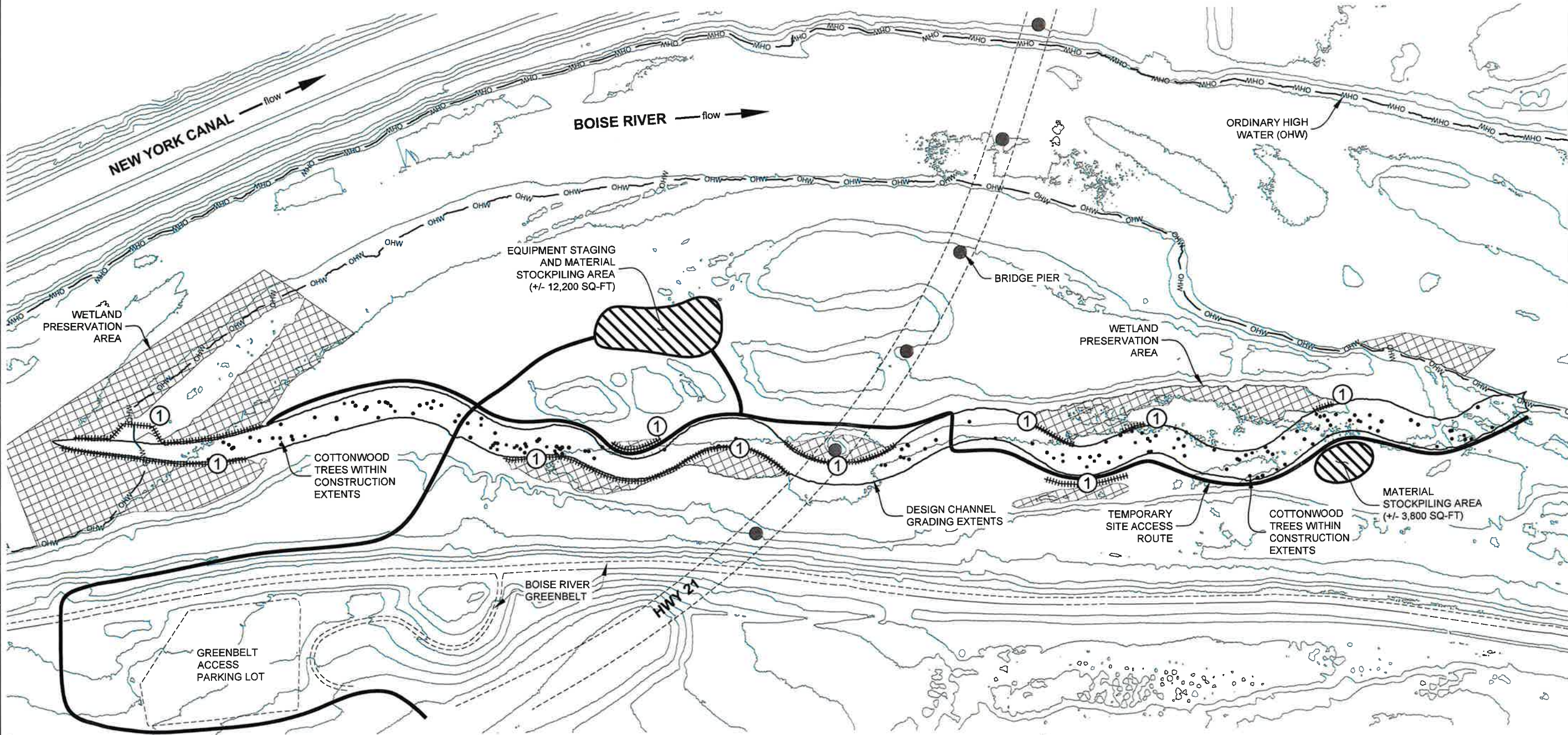
ALL TREES, SHRUBS, AND VEGETATION WITHIN SIDE CHANNEL ALIGNMENT AND GRADING EXTENTS SHALL BE REMOVED IN WHOLE TO THE FULLEST EXTENT POSSIBLE AND KEPT ON SITE FOR USE IN HABITAT FEATURES ON SIDE CHANNEL.

CONTRACTOR SHALL ONLY ACCESS SITE ON DESIGNATED TEMPORARY SITE ACCESS ROUTES AND WITHIN SIDE CHANNEL GRADING EXTENTS.

TEMPORARY SITE ACCESS ROUTES ARE NOT ANTICIPATED TO REQUIRE IMPROVEMENTS.

CONSTRUCTION NOTES

- 1 FENCE AND PRESERVE WETLANDS WITH CONSTRUCTION FENCE PER DETAIL 2, DRAWING 3.4



1 SITE PRESERVATION PLAN

1" = 150'

PERMIT DRAWINGS

SITE PRESERVATION PLAN

MICRON BOISE RIVER
BOISE, IDAHO

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RDG-20-173

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3.1

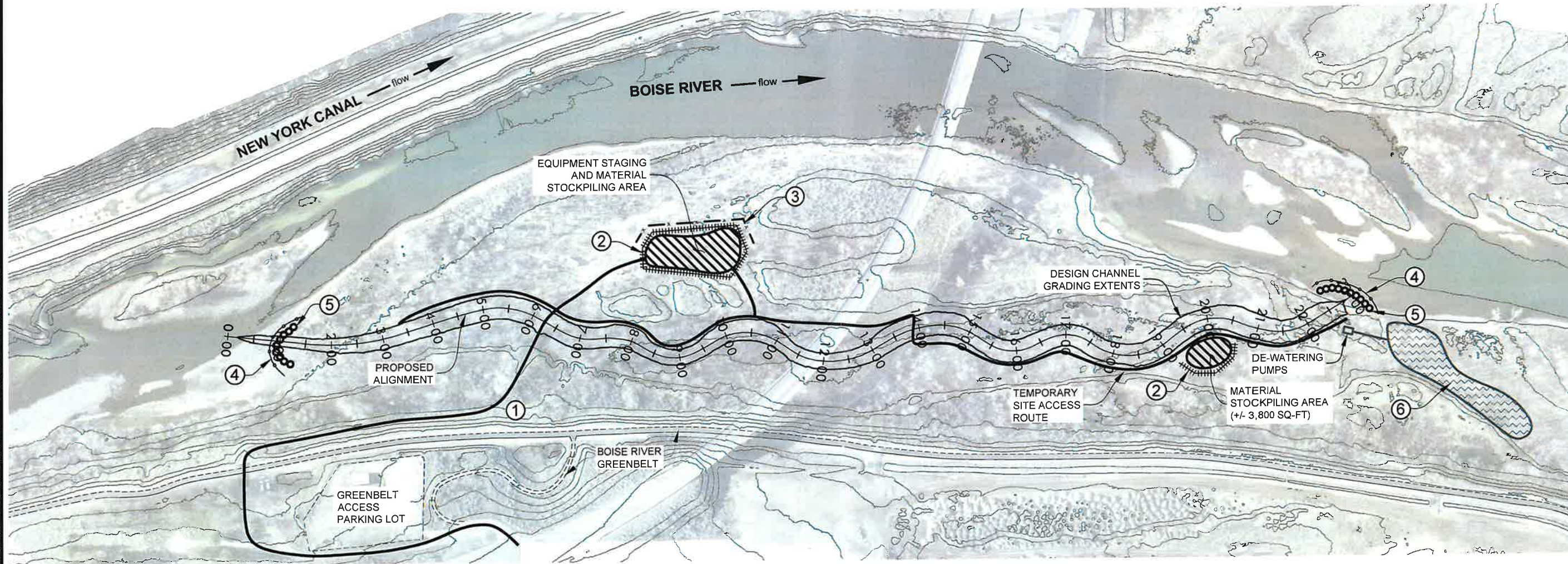
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1

EROSION AND SEDIMENT CONTROL

1" = 200'



EROSION AND SEDIMENT CONTROL NOTES

- 1 CONSTRUCT CONSTRUCTION ENTRANCE PER DETAIL 3, DRAWING 3.4.
- 2 INSTALL CONSTRUCTION FENCE PER DETAIL 2, DRAWING 3.4 AROUND STAGING AREA. CONTRACTOR TO DETERMINE AMOUNT OF SPACE TO USE IN DESIGNATED AREA.
- 3 INSTALL SILT FENCE PER DETAIL 1, DRAWING 3.4 CROSSING RUNOFF FLOW PATH ALONG OUTER EDGE OF STAGING AREA.
- 4 INSTALL TURBIDITY CURTAIN PER DETAIL 2, DRAWING 3.5 AT INLET AND OUTLET OF PROPOSED SIDE CHANNEL.
- 5 CONSTRUCT COFFERDAMS PER DETAIL 3, DRAWING 3.5 AT INLET AND OUTLET OF PROPOSED SIDE CHANNEL TO ACHIEVE WORK AREA ISOLATION.
- 6 DEWATER INTO DESIGNATED AREA WITH SEDIMENT CONTROL MEASURES TO ALLOW INFILTRATION OF WATER INTO GROUND.

EROSION AND SEDIMENT CONTROL PLAN

MICRON BOISE RIVER
BOISE, IDAHO

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RDG-20-173

DRAWING NUMBER

3.2

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EROSION AND SEDIMENT CONTROL PLAN NOTES (ESCP)

1. HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
2. ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 401 CERTIFICATION REQUIREMENTS.
3. INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 401 CERTIFICATION REQUIREMENTS.
4. RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR LOCAL MUNICIPALITY.
5. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.
6. IDENTIFY, MARK, AND PROTECT (BY CONSTRUCTION FENCING OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUTTER ZONES (100 FT WHEN POSSIBLE) BETWEEN THE SITE AND SENSITIVE AREAS (E.G. WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.
7. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED.
8. MAINTAIN AND DELINEATE ANY EXISTING NATURAL BUFFER WITHIN THE 50-FEET OF WATERS OF THE STATE.
9. INSTALL PERIMETER SEDIMENT CONTROL BARRIERS PRIOR TO LAND DISTURBANCE.
10. CONTROL BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION THROUGHOUT THE PROJECT SITE.
11. CONTROL SEDIMENT AS NEEDED ALONG THE SITE PERIMETERS AT ALL TIMES DURING CONSTRUCTION, BOTH INTERNALLY AND AT THE SITE BOUNDARY.
12. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK.
13. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES. TEMPORARY OR PERMANENT STABILIZATION MEASURES ARE NOT REQUIRED FOR AREAS THAT ARE INTENDED TO BE LEFT UNVEGETATED, SUCH AS DIRT ACCESS ROADS OR UTILITY POLE PADS.
14. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS.
15. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: CONSTRUCTION ENTRANCE, GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AND EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES.
16. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE.
17. CONTROL PROHIBITED DISCHARGES FROM LEAVING THE CONSTRUCTION SITE, I.E., CONCRETE WASH-OUT.
18. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING (MINIMUM 150 FT FROM WATER SOURCES), MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLE AND MACHINERY, AS WELL AS DEBRIS, FERTILIZER, PESTICIDES AND HERBICIDES, PAINTS, SOLVENTS, CURING COMPOUNDS AND ADHESIVES FROM CONSTRUCTION OPERATIONS.
19. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE; WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES.
20. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL.
21. TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR.
22. AS NEEDED BASED ON WEATHER CONDITIONS, AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS.
23. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND BARE GROUND ACTIVITIES DURING WET WEATHER.
24. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL.
25. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT AND BEFORE BMP REMOVAL.
26. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN-UP OF SEDIMENT SHALL BE PERFORMED ACCORDING THE IDAHO DIVISION OF STATE LANDS REQUIRED TIMEFRAME.
27. THE INTENTIONAL WASHING OF SEDIMENT INTO DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS.
28. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OF A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE.
29. PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE.
30. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, ALL TEMPORARY EROSION CONTROLS AND RETAINED SOILS MUST BE REMOVED AND DISPOSED OF PROPERLY, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS.

PROJECT SPECIFIC EROSION CONTROL NOTES

AT A MINIMUM, EROSION CONTROL MEASURES SHOWN ON EROSION AND SEDIMENT CONTROL PLAN SHALL BE IN PLACE PRIOR TO COMMENCING CONSTRUCTION.

DURING CONSTRUCTION, ALL EROSION CONTROLS SHALL BE INSPECTED BY THE CONTRACTOR DAILY TO ENSURE THEY ARE WORKING ADEQUATELY.
(1) IF INSPECTION SHOWS THAT THE EROSION CONTROLS ARE INEFFECTIVE, WORK CREWS WILL BE MOBILIZED IMMEDIATELY TO MAKE REPAIRS, INSTALL REPLACEMENTS, OR INSTALL ADDITIONAL CONTROLS AS NECESSARY.

CONTRACTOR SHALL PROVIDE MEASURES TO PREVENT MOVEMENT OF SOIL INTO WATERWAYS OR WETLANDS, E.G. FILTER BAGS, SEDIMENT TRAPS OR CATCH BASINS, VEGETATIVE STRIPS, BERMS, JERSEY BARRIERS, FIBER BLANKETS, BONDED FIBER MATRICES, GEOTEXTILES, MULCHES OR COMPOST, WATTLES AND SEDIMENT FENCES.

CONTRACTOR SHALL PROVIDE MEASURES TO PREVENT STOCKPILE EROSION DURING RAIN EVENTS OR WHEN THE STOCKPILE SITE IS NOT MOVED OR RESHAPED FOR MORE THAN 48 HOURS, BY SURROUNDING PILES WITH COMPOST BERMS, COVERING PILES WITH IMPERVIOUS MATERIALS OR OTHER EQUALLY EFFECTIVE METHODS.

CONTRACTOR SHALL INSTALL REMOVABLE PADS OR MATS TO PREVENT SOIL COMPACTION IN ALL TEMPORARY CONSTRUCTION ACCESS POINTS AND STAGING AREAS IN RIPARIAN OR WETLAND AREAS.

CONTRACTOR SHALL PREPARE AND HAVE ON-SITE A SPILL CONTAINMENT AND CONTROL PLAN WITH NOTIFICATION PROCEDURES, EQUIPMENT, SPECIFIC CLEANUP AND DISPOSAL INSTRUCTIONS FOR ALL PRODUCTS USED ON SITE.

CONTRACTOR SHALL HAVE AN EMERGENCY SUPPLY OF SEDIMENT CONTROL MATERIALS ON HAND (SILT FENCE, STRAW BALES, ETC.), AN OIL ADSORBING FLOATING BOOM, AND ABSORBENT PADS.

STATIONARY POWER EQUIPMENT, SUCH AS GENERATORS, WITHIN 150 FEET OF THE WATER SHALL BE DIAPERED TO PREVENT LEAKS.

ALL POWER EQUIPMENT WITHIN 150 FEET OF THE WATER SHALL BE INSPECTED DAILY FOR FLUID LEAKS AND REPAIRED. THE CONTRACTOR MUST KEEP DAILY INSPECTION REPORTS IN A DIARY.

ALL EQUIPMENT TO REMAIN WITHIN THE BOUNDS OF THE CONSTRUCTION STAGING AREA, ACCESS ROADS, OR PROJECT CONSTRUCTION AREA.

DUST CONTROL: ALL HEAVY USE AREAS ARE TO BE MAINTAINED IN A CONDITION THAT MINIMIZES DUST ON THE PROJECT SITE AND THE CONTRACTOR SHALL HAVE ACCESS TO A WATER TRUCK FOR DUST MANAGEMENT IF REQUIRED. THE CONTRACTING OFFICER WILL NOTIFY THE CONTRACTOR TO MOBILIZE DUST CONTROL ACTIVITIES (INCLUDING WATERING) IF CONDITIONS REQUIRE.

SITE CONDITION	MINIMUM INSPECTION FREQUENCY
1. ACTIVE PERIOD	DAILY WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOW MELT, IS OCCURRING, AND WITHIN 24 HOURS AFTER ANY STORM EVENT OF GREATER THAN 0.5 INCHES OF RAIN PER 24-HOUR PERIOD. AT LEAST ONCE EVERY 7 DAYS, REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING.
2. PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY	ONCE TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURE ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE.
3. INACTIVE PERIODS GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS	ONCE EVERY TWO (2) WEEKS.
4. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER	INSPECTIONS SHALL NOT BE REQUIRED. ADVERSE WEATHER SHALL BE RECORDED ON THE INSPECTION SHEET.
5. PERIODS DURING WHICH DISCHARGE IS UNLIKELY DUE TO FROZEN CONDITIONS	MONTHLY. RESUME MONITORING IMMEDIATELY UPON MELT, OR WHEN WEATHER CONDITIONS MAKE DISCHARGE LIKELY.

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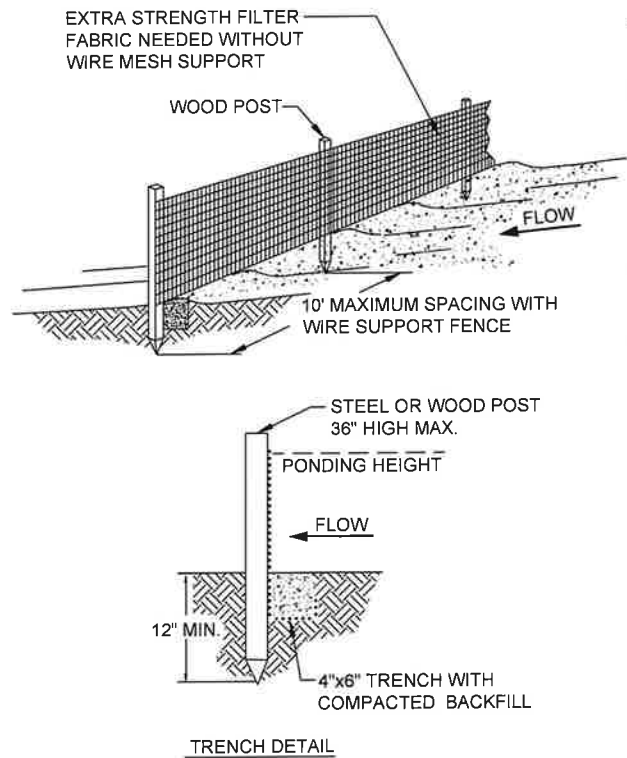
PROJECT NUMBER
RDG-20-173

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3.3

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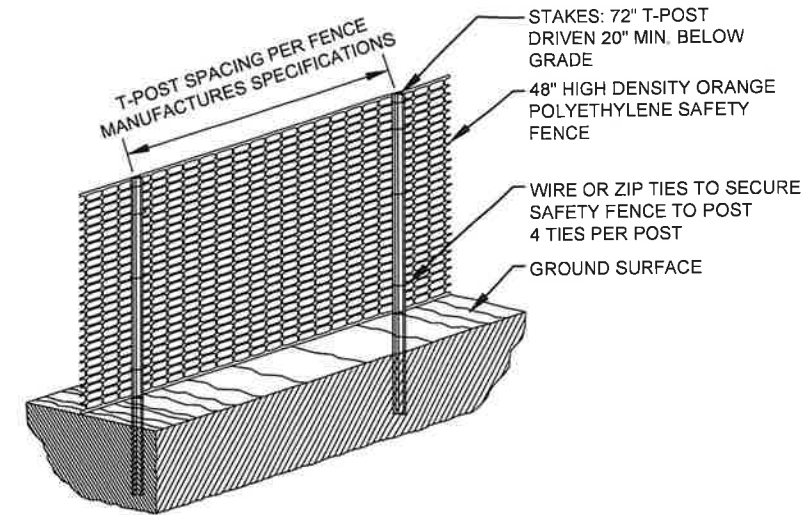
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1 TYPICAL SILT FENCE INSTALLATION

INSTALLATION NOTES

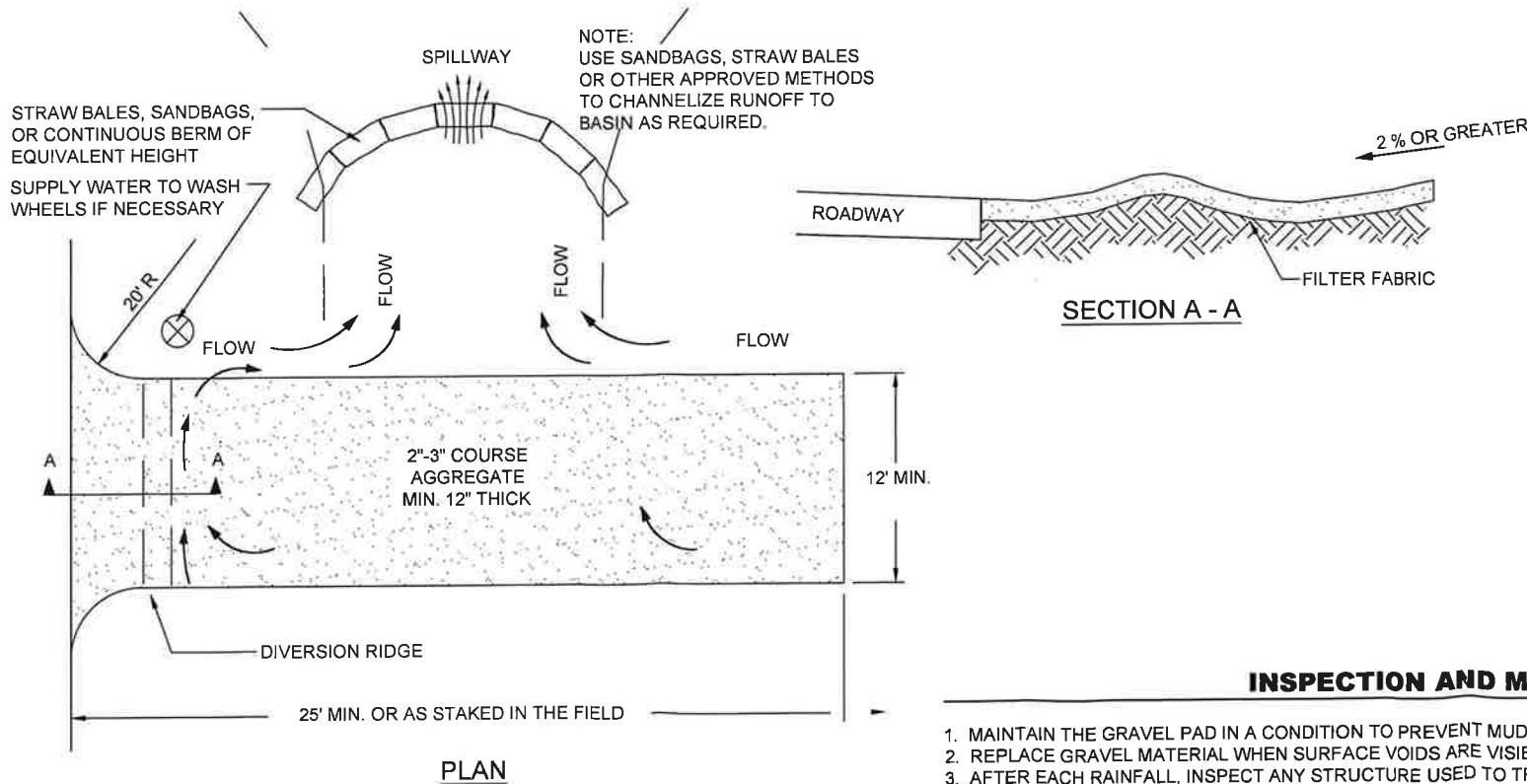
1. THE HEIGHT OF A SILT FENCE SHALL NOT EXCEED 36 INCHES. STORAGE HEIGHT AND PONDING HEIGHT SHALL NEVER EXCEED 18 INCHES.
2. THE FENCE LINE SHALL FOLLOW THE CONTOUR AS CLOSELY AS POSSIBLE.
3. IF POSSIBLE, THE FILTER FABRIC SHALL BE CUT FROM A CONTINUOUS ROLL TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED ONLY AT A SUPPORT POST, WITH A MINIMUM 6 INCH OVERLAP AND BOTH ENDS SECURELY FASTENED TO THE POST.
4. POSTS SHALL BE SPACED A MAXIMUM OF 10 FEET APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12 INCHES). WHEN EXTRA-STRENGTH FABRIC IS USED WITHOUT THE WIRE SUPPORT FENCE, POST SPACING SHALL NOT EXCEED 6 FEET.
5. TURN THE ENDS OF THE FENCE UPHILL.
6. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 6 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE BARRIER. THE STANDARD-STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 6 INCHES OF THE FABRIC SHALL EXTEND INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
8. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE TOE OF THE FILTER FABRIC.
9. SILT FENCES PLACED AT THE TOE OF A SLOPE SHALL BE SET AT LEAST 6 FEET FROM THE TOE IN ORDER TO INCREASE PONDING VOLUME.
10. CONTRACTOR SHALL REMOVE SILT FENCES WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED AND ANY SEDIMENT STORED BEHIND THE SILT FENCE HAS BEEN REMOVED.
11. SILT FENCES AND FILTER BARRIERS SHALL BE INSPECTED WEEKLY AFTER EACH SIGNIFICANT STORM (1 INCH IN 24 HOUR). ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
12. SEDIMENT SHOULD BE REMOVED WHEN IT REACHES 1/3 HEIGHT OF THE FENCE OR 9 INCHES MAXIMUM.
13. THE REMOVED SEDIMENT SHALL CONFORM WITH THE EXISTING GRADE AND BE VEGETATED OR OTHERWISE STABILIZED.



CONSTRUCTION SPECIFICATIONS

1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
2. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
3. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.
4. CONTRACTOR SHALL NOT CUT OR REMOVE NATIVE VEGETATION UNLESS APPROVED BY THE CONSTRUCTION MANAGER.

2 TEMPORARY CONSTRUCTION FENCE



3 GRAVEL CONSTRUCTION ENTRANCE

INSPECTION AND MAINTENANCE

1. MAINTAIN THE GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE CONSTRUCTION SITE.
2. REPLACE GRAVEL MATERIAL WHEN SURFACE VOIDS ARE VISIBLE.
3. AFTER EACH RAINFALL, INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT AND CLEAN IT OUT AS NECESSARY.
4. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS. REMOVE ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS WITHIN 24 HOURS.

CONSTRUCTION SPECIFICATIONS

1. THE AGGREGATE SIZE FOR CONSTRUCTION OF THE PAD SHALL BE 2-3 INCH STONE. PLACE THE GRAVEL TO THE SPECIFIC GRADE AND DIMENSIONS. PIT RUN AND RIVER RUN ROCK IS NOT ACCEPTABLE.
2. THE THICKNESS OF THE PAD SHALL NOT BE LESS THAN 6 INCHES. USE GEOTEXTILE FABRICS, IF NECESSARY, TO IMPROVE STABILITY OF THE FOUNDATION IN LOCATIONS SUBJECT TO SEEPAGE OR HIGH WATER TABLE.
3. THE WIDTH OF THE PAD SHALL NOT BE LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS AND IN ANY CASE SHALL NOT BE LESS THAN 12 FEET WIDE.
4. THE LENGTH OF THE PAD SHALL BE AS REQUIRED, BUT NOT LESS THAN 25 FEET.
5. LOCATE CONSTRUCTION ENTRANCES AND EXITS TO LIMIT SEDIMENT LEAVING THE SITE AND TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES. AVOID ENTRANCES WHICH HAVE STEEP GRADES AND ENTRANCES AT CURVES IN PUBLIC ROADS.
6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR MAINTENANCE OF ANY MEASURES USED TO TRAP SEDIMENT.
7. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY SHALL BE REMOVED IMMEDIATELY.
8. PROVIDE DRAINAGE TO CARRY WATER TO A SEDIMENT TRAP OR OTHER SUITABLE OUTLET.
9. WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
10. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE THROUGH USE OF SAND BAGS, GRAVEL, STRAW BALES, OR OTHER APPROVED METHODS.
11. REMOVE ACCESS IMPROVEMENTS AT PROJECT COMPLETION.
12. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
13. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
14. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

PERMIT DRAWINGS

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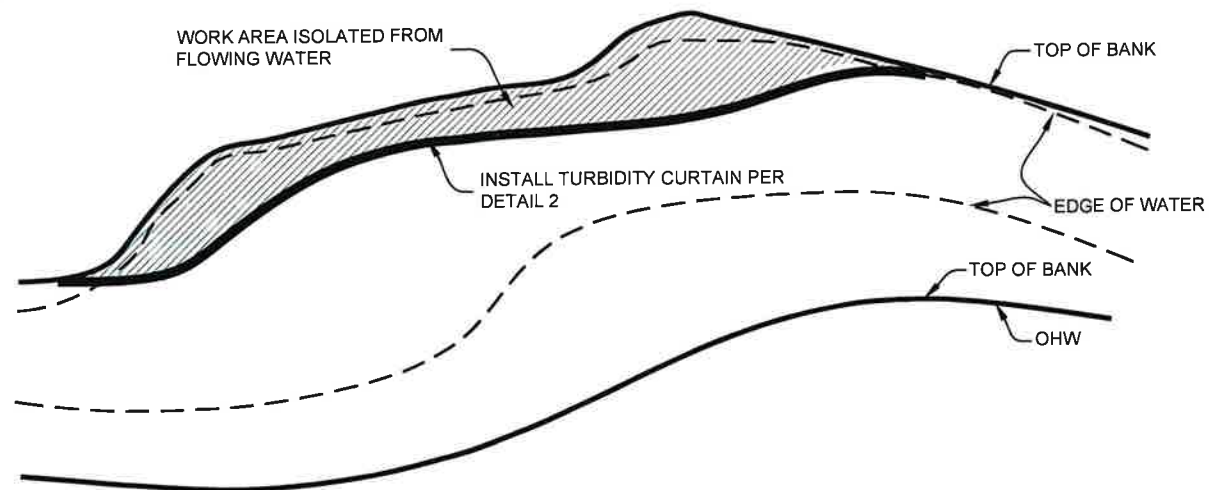
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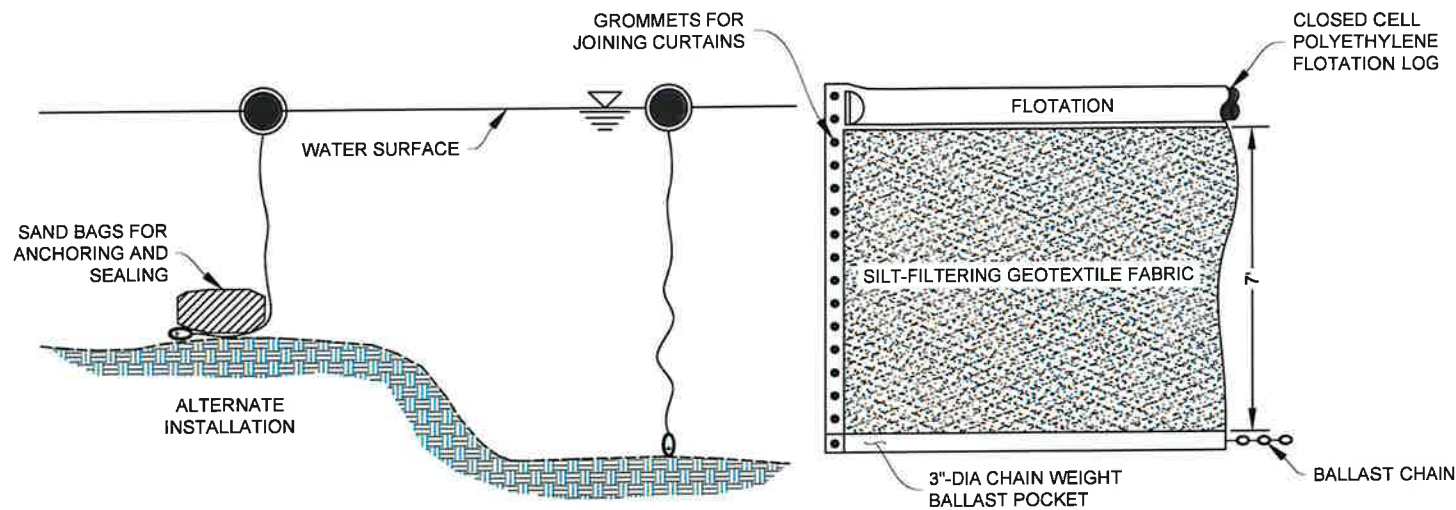
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1 WORK AREA ISOLATION - TYPICAL
NOT TO SCALE



TURBIDITY CURTAIN SHALL BE A "LAYFIELD FSC 13" OR APPROVED EQUAL. THE BODY OF THE TURBIDITY CURTAIN IS MADE FROM A STRONG, HIGH-FILTRATION FABRIC THAT RETAINS FINE SILTS AND SEDIMENTS ON-SITE. THE FLOAT AND BOTTOM SLEEVE ARE CONSTRUCTED FROM A UV-STABLE, HIGH-STRENGTH POLYETHYLENE (I.E. RIPSTOP-TYPE MATERIAL). THE TURBIDITY CURTAIN IS INCREASED IN LENGTH BY JOINING MALE AND FEMALE ENDS OF ADDITIONAL SECTIONS (HARDWARE INCLUDED WITH CURTAIN FROM MANUFACTURE) OF CURTAIN, WHICH TYPICALLY COME IN 50' LENGTHS.

2 TURBIDITY CURTAIN



EXAMPLE OF FLOATING SILT CURTAIN PLACEMENT

COFFERDAM NOTES

WORK AREA TO BE ISOLATED USING COFFERDAMS CONSTRUCTED WITH BULK BAGS, SAND BAGS, OR APPROVED ALTERNATIVE. BULK BAGS ARE ALSO CALLED FLEXIBLE INTERMEDIATE BULK CONTAINERS (FIBC) THAT CAN BE CUSTOM MADE FROM VARIOUS FABRIC. THE FOLLOWING REQUIREMENTS ARE NECESSARY FOR THE RIVER ENVIRONMENT:

LARGE BULK BAGS SHALL BE CONSTRUCTED OF 8 oz WOVEN FABRIC, 1200 HOUR UV RESISTANT WITH SEWN LIFTING LOOPS. WHEN FILLED WITH NATIVE RIVER SAND AND GRAVEL, THE BAGS ARE APPROXIMATELY 6' WIDE x 6' LONG x 4' HIGH.

SMALL BULK BAGS SHALL BE CONSTRUCTED OF 8 oz WOVEN FABRIC, 1200 HOUR UV RESISTANT WITH SEWN LIFTING LOOPS. WHEN FILLED WITH NATIVE RIVER SAND AND GRAVEL, THE BAGS ARE APPROXIMATELY 3' WIDE x 3' LONG x 2.5' HIGH.

BULK BAGS SHALL BE CAREFULLY PLACED TO ENSURE NO TEARING OR CUTTING OF THE BAGS OCCURS.

BULK BAGS SHALL BE PLACED USING A HYDRAULIC CRANE OR TRACKHOE USING LIFTING BARS AND STEEL CABLES TO EQUALIZE LOAD ON LIFTING LOOPS.



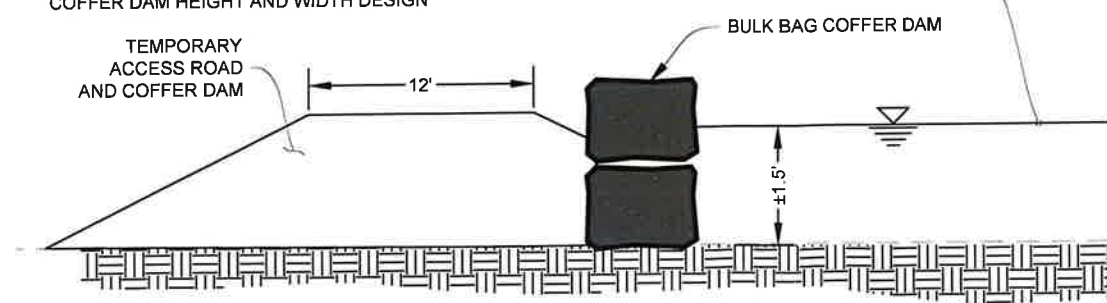
EXAMPLE OF BULK BAGS



EXAMPLE OF BULK BAG PLACEMENT

NOTE:
MINIMUM FREEBOARD 2 FEET
CONTRACTOR RESPONSIBLE FOR
COFFER DAM HEIGHT AND WIDTH DESIGN

EXPECTED WATER SURFACE AT BASE
FLOW DURATION EXCEEDANCE (600 CFS)



3 TYP. BULK BAG PLACEMENT

HORIZ 1" = 10'
VERT 1" = 10'

PERMIT DRAWINGS

NO.	DATE	BY	DESCRIPTION	CHK
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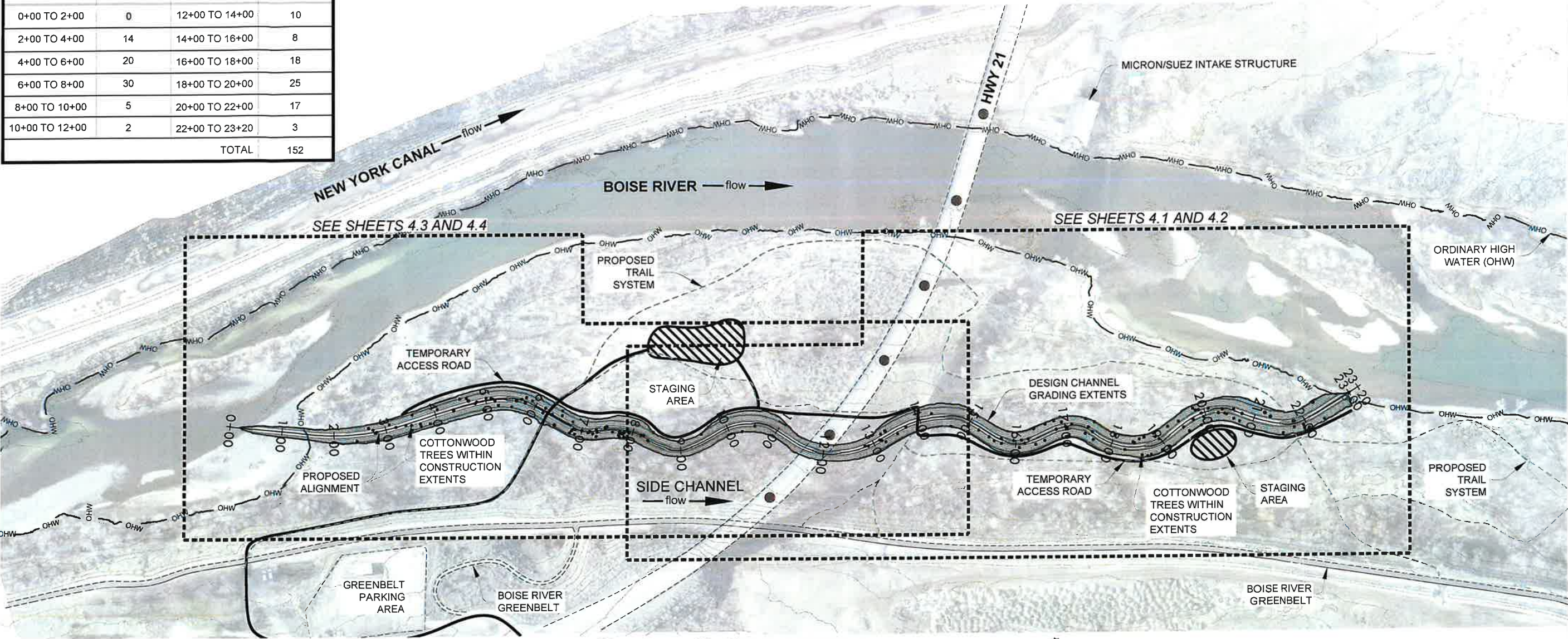
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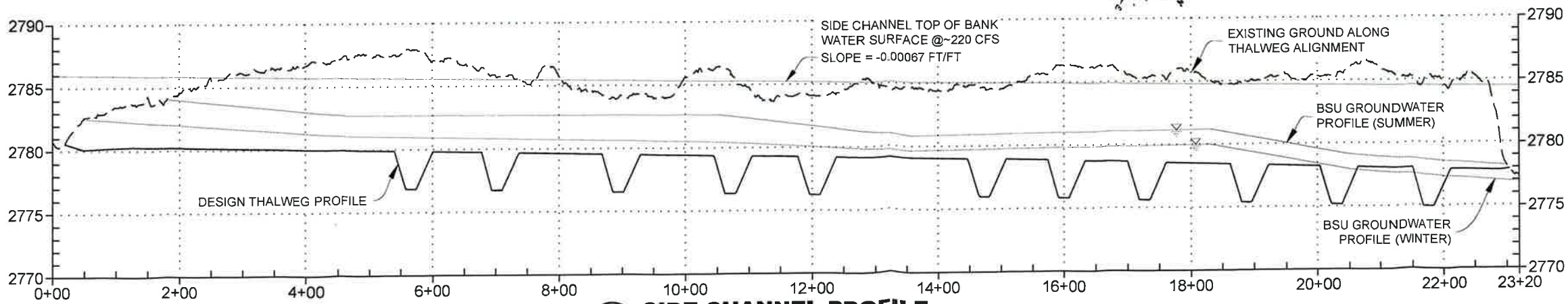
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IMPACTED TREES			
STATION	# OF TREES	STATION	# OF TREES
0+00 TO 2+00	0	12+00 TO 14+00	10
2+00 TO 4+00	14	14+00 TO 16+00	8
4+00 TO 6+00	20	16+00 TO 18+00	18
6+00 TO 8+00	30	18+00 TO 20+00	25
8+00 TO 10+00	5	20+00 TO 22+00	17
10+00 TO 12+00	2	22+00 TO 23+20	3
TOTAL			152



1 SIDE CHANNEL LAYOUT



2 SIDE CHANNEL PROFILE

PERMIT DRAWINGS

NO.	DATE	BY	DESCRIPTION	CHK
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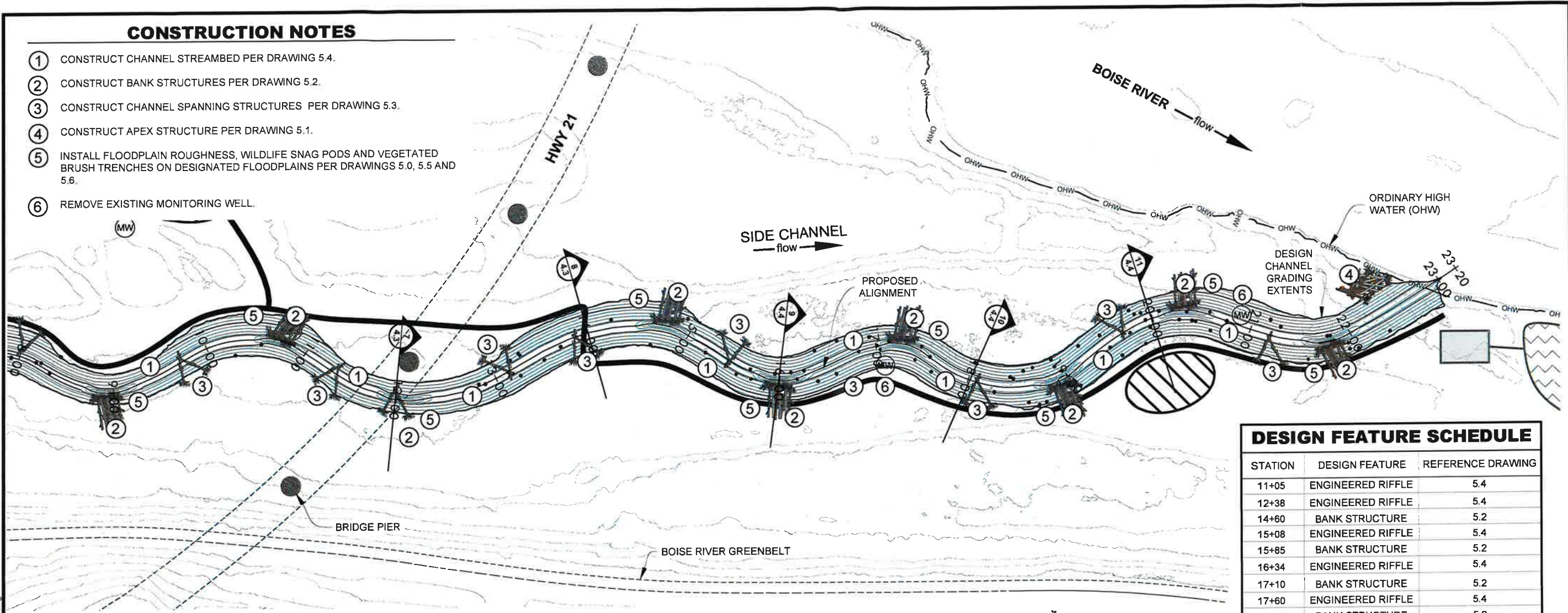
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SIDE CHANNEL SITE PLAN
MICRON BOISE RIVER
BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
1	3/16/21	NW	PERMIT DRAWINGS	SW

CONSTRUCTION NOTES

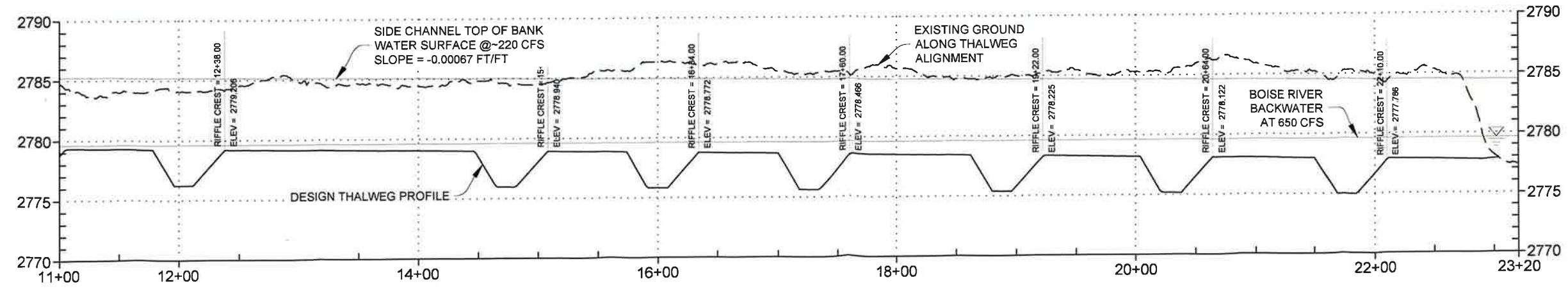
- 1 CONSTRUCT CHANNEL STREAMBED PER DRAWING 5.4.
- 2 CONSTRUCT BANK STRUCTURES PER DRAWING 5.2.
- 3 CONSTRUCT CHANNEL SPANNING STRUCTURES PER DRAWING 5.3.
- 4 CONSTRUCT APEX STRUCTURE PER DRAWING 5.1.
- 5 INSTALL FLOODPLAIN ROUGHNESS, WILDLIFE SNAG PODS AND VEGETATED BRUSH TRENCHES ON DESIGNATED FLOODPLAINS PER DRAWINGS 5.0, 5.5 AND 5.6.
- 6 REMOVE EXISTING MONITORING WELL.



1 SIDE CHANNEL LAYOUT
1" = 100'

DESIGN FEATURE SCHEDULE

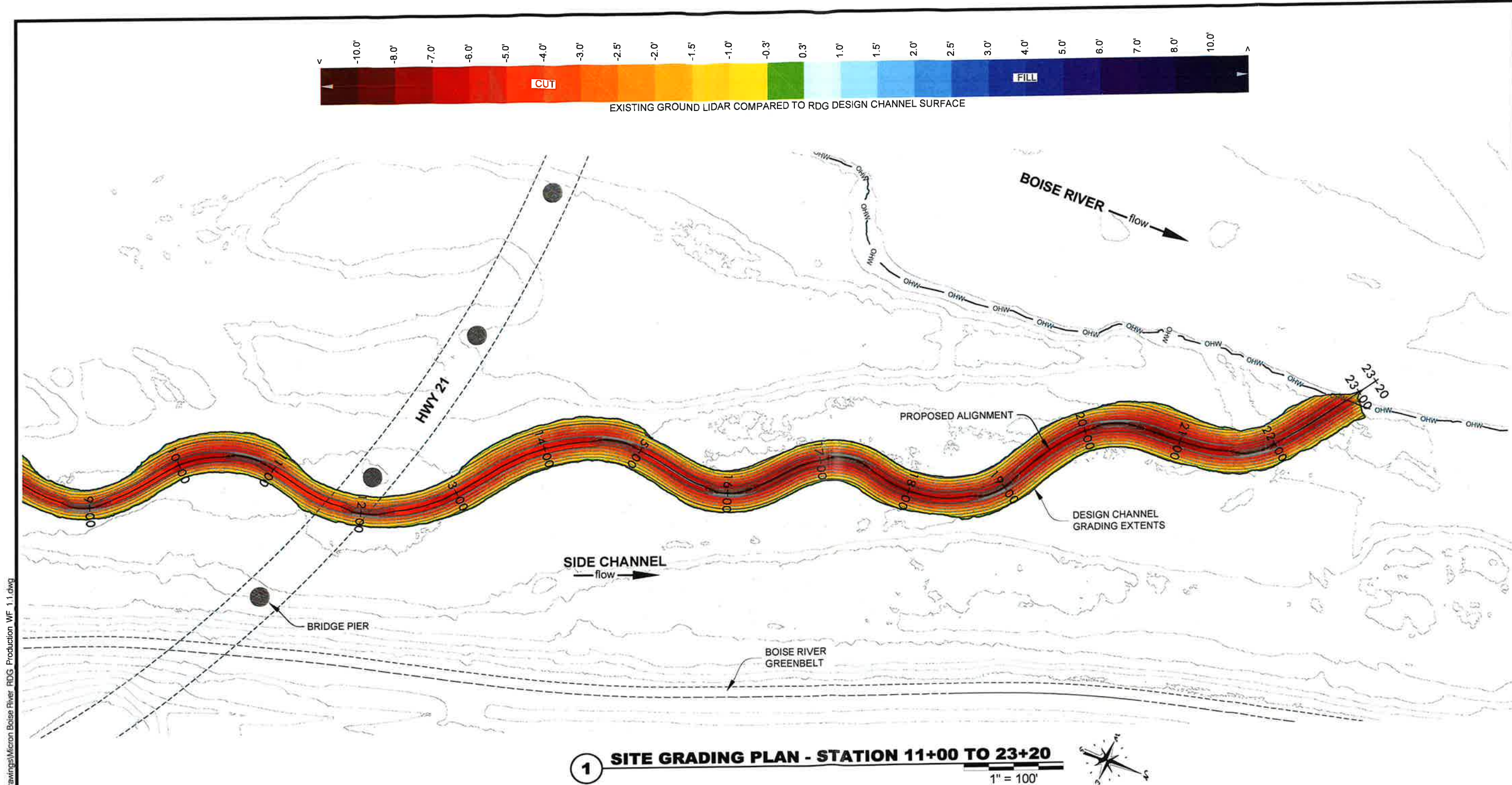
STATION	DESIGN FEATURE	REFERENCE DRAWING
11+05	ENGINEERED RIFFLE	5.4
12+38	ENGINEERED RIFFLE	5.4
14+60	BANK STRUCTURE	5.2
15+08	ENGINEERED RIFFLE	5.4
15+85	BANK STRUCTURE	5.2
16+34	ENGINEERED RIFFLE	5.4
17+10	BANK STRUCTURE	5.2
17+60	ENGINEERED RIFFLE	5.4
18+73	BANK STRUCTURE	5.2
19+22	ENGINEERED RIFFLE	5.4
20+17	BANK STRUCTURE	5.2
20+64	ENGINEERED RIFFLE	5.4
21+62	BANK STRUCTURE	5.2
22+10	ENGINEERED RIFFLE	5.4
22+20	APEX STRUCTURE	5.1



2 SIDE CHANNEL PROFILE
HORIZ 1" = 100'
VERT 1" = 10'

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ESTIMATED GRADING QUANTITIES (NEATLINE)	
CHANNEL STATION	CUT (CY)
11+00 TO 23+30	6,350

PERMIT DRAWINGS

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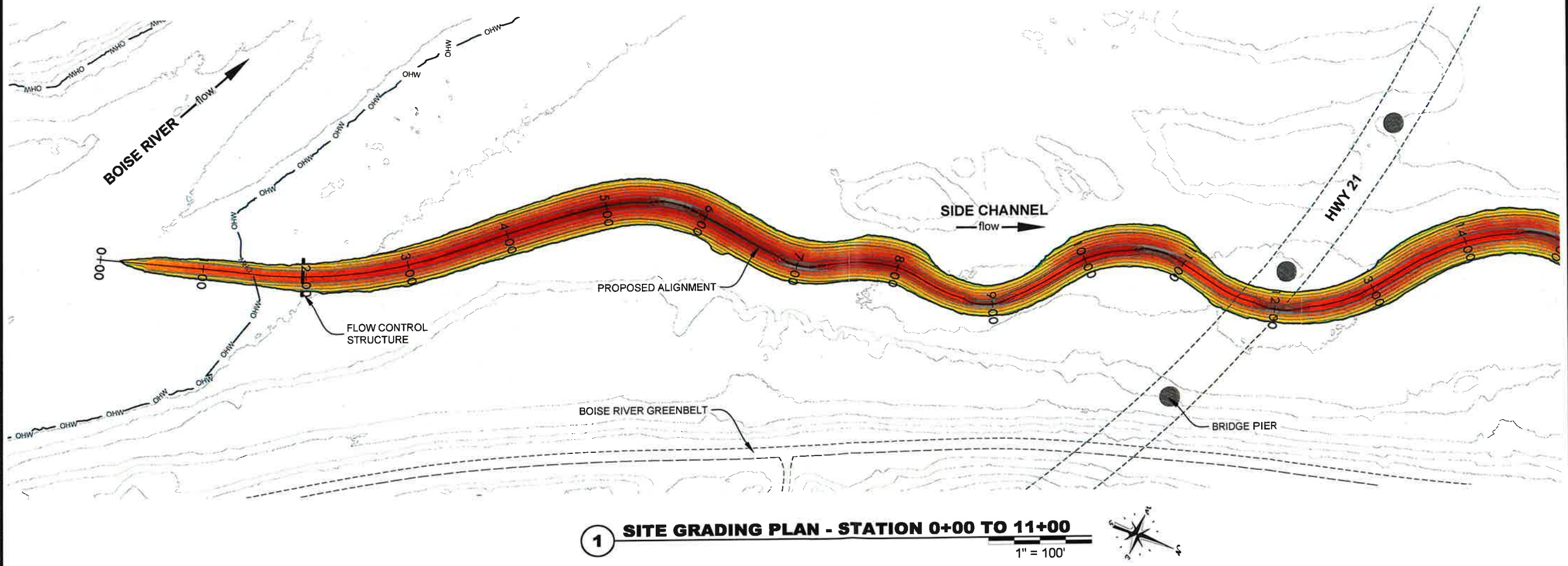
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DRAWING NUMBER

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ESTIMATED GRADING QUANTITIES (NEATLINE)	
CHANNEL STATION	CUT (CY)
0+00 TO 11+00	4,680

1 SITE GRADING PLAN - STATION 0+00 TO 11+00
1" = 100'

PERMIT DRAWINGS

RDG
RIVER DESIGN GROUP

236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920

GRADING PLAN

STATION 0+00 TO 11+00

MICRON BOISE RIVER

BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
*	3/16/21	NW	PERMIT DRAWINGS	SW

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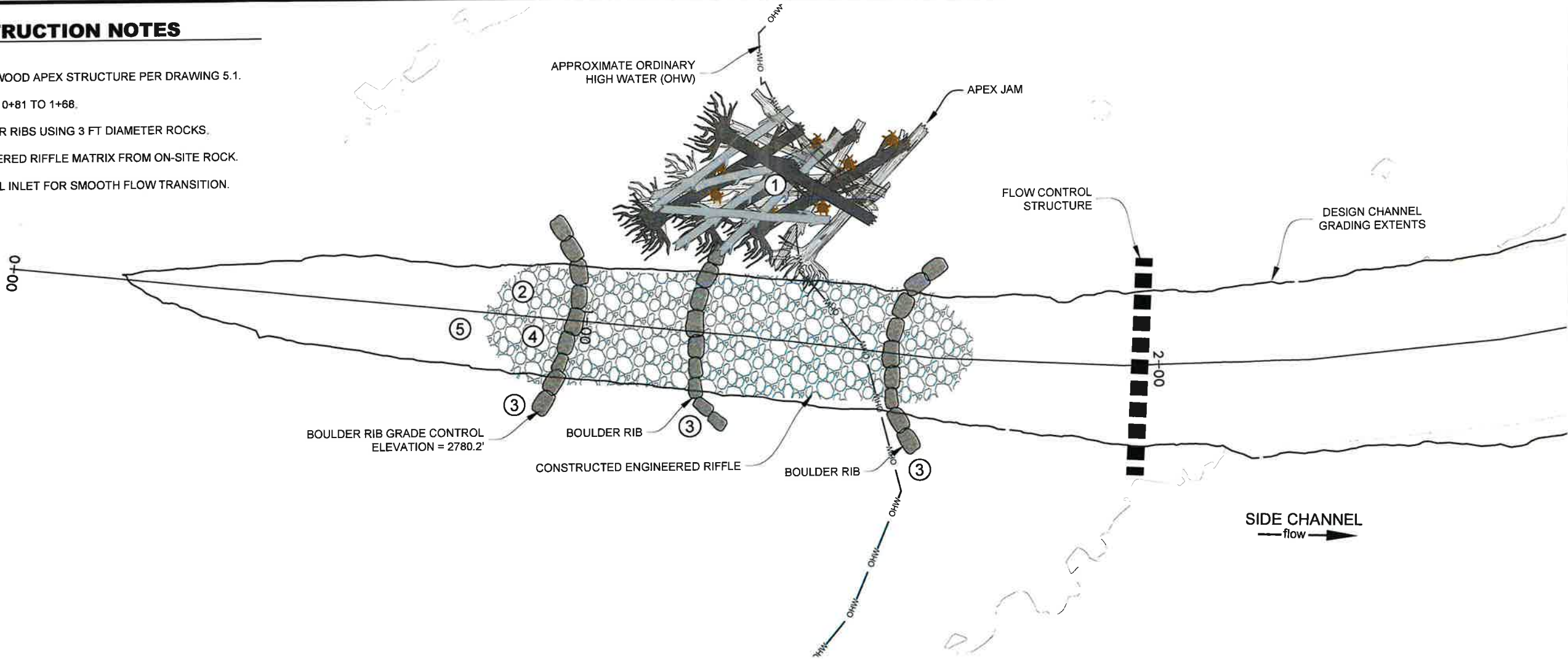
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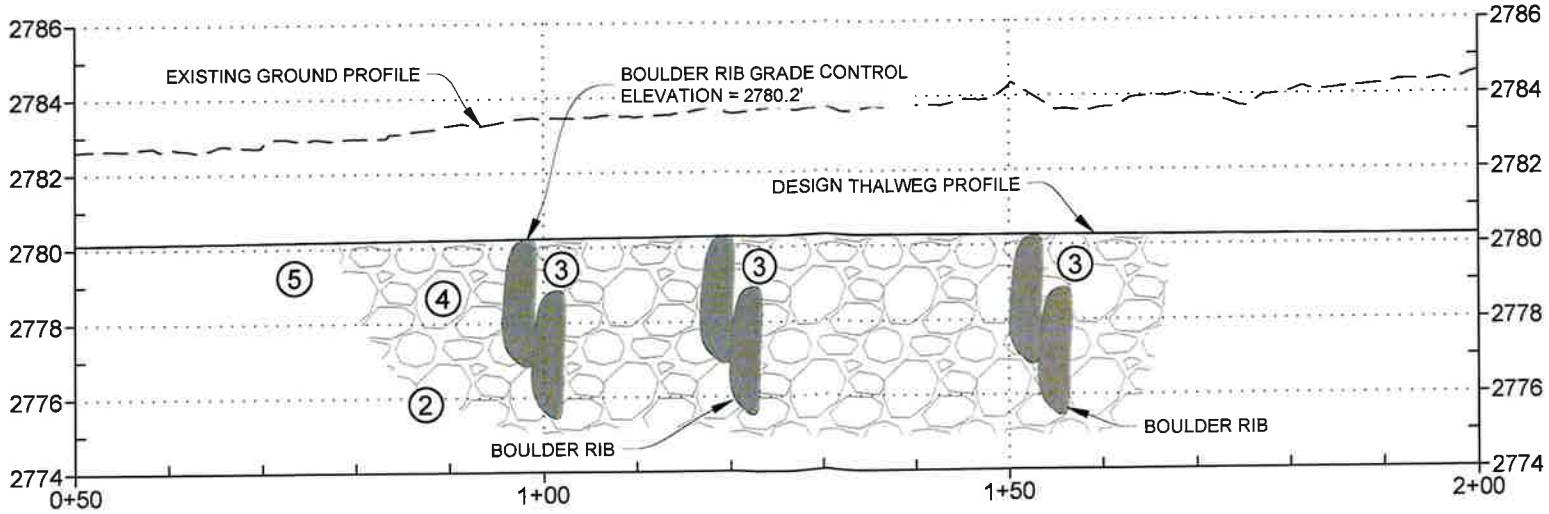
CONSTRUCTION NOTES

- 1 CONSTRUCT LARGE WOOD APEX STRUCTURE PER DRAWING 5.1.
- 2 OVER EXCAVATE STA 0+81 TO 1+68.
- 3 CONSTRUCT BOULDER RIBS USING 3 FT DIAMETER ROCKS.
- 4 CONSTRUCT ENGINEERED RIFFLE MATRIX FROM ON-SITE ROCK.
- 5 GRADE SIDE CHANNEL INLET FOR SMOOTH FLOW TRANSITION.



1 SIDE CHANNEL INLET LAYOUT

1" = 20'



2 SIDE CHANNEL INLET PROFILE

HORIZ 1" = 20'
VERT 1" = 5'

PERMIT DRAWINGS

SIDE CHANNEL INLET STRUCTURE

MICRON BOISE RIVER
BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
1	3/16/21	NW	PERMIT DRAWINGS	SW

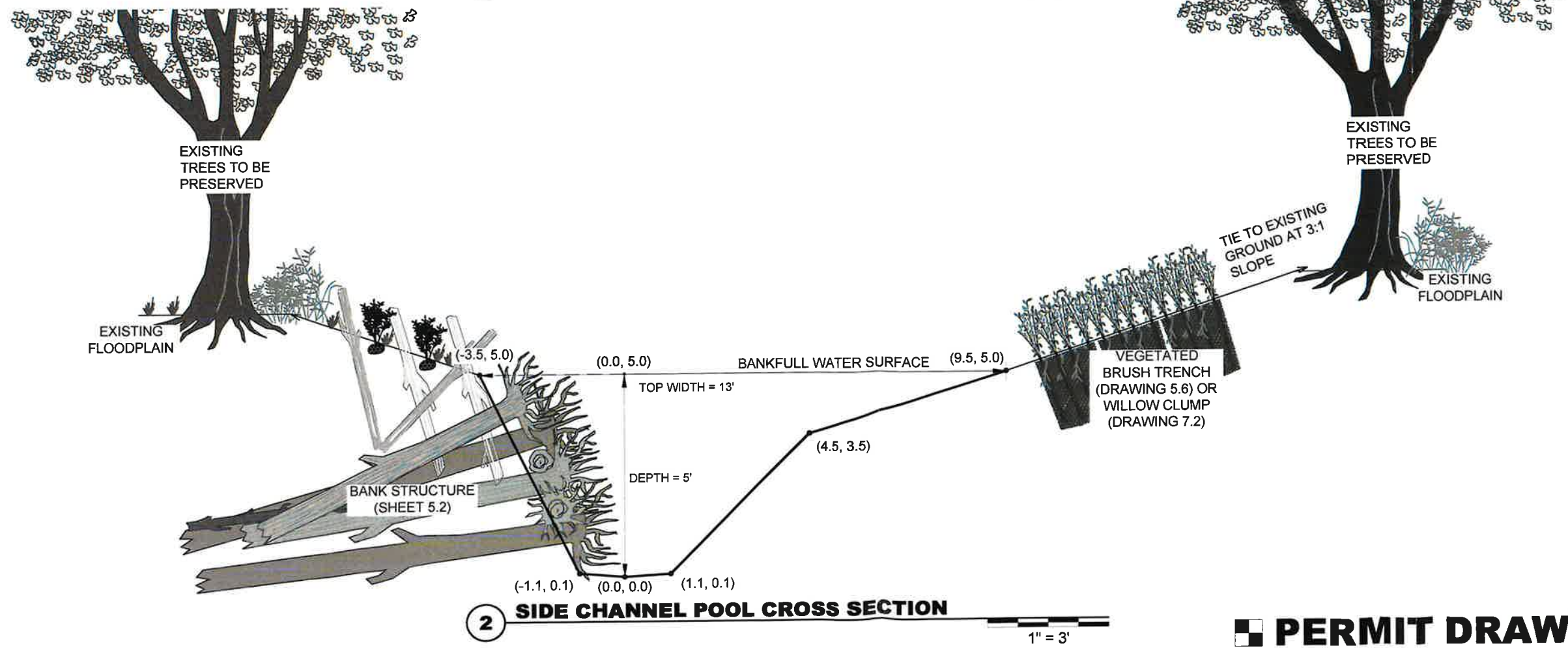
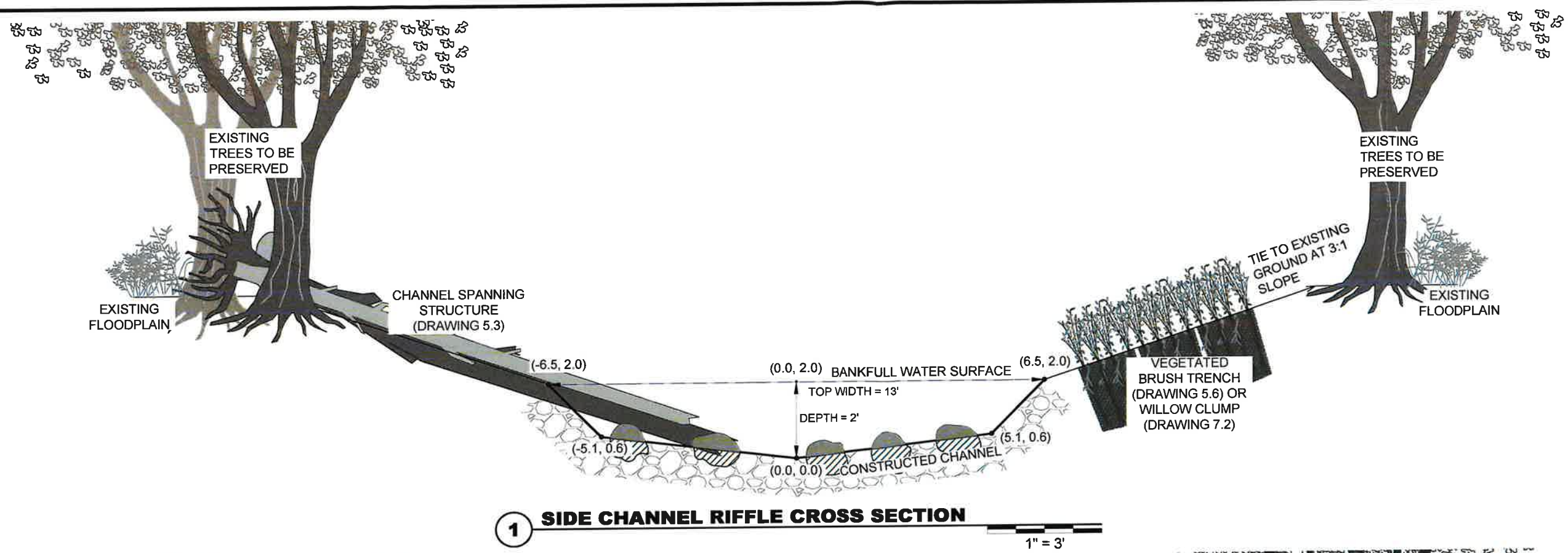
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RDG-20-173

DRAWING NUMBER

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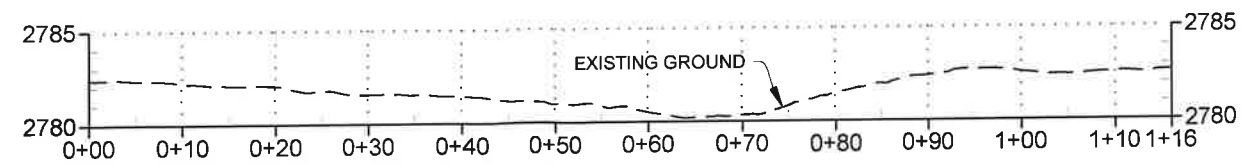


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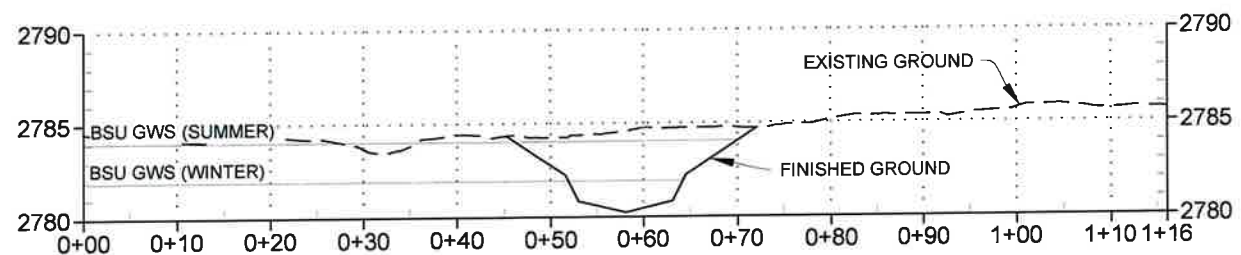
DESIGN CROSS SECTIONS
MICRON BOISE RIVER
BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
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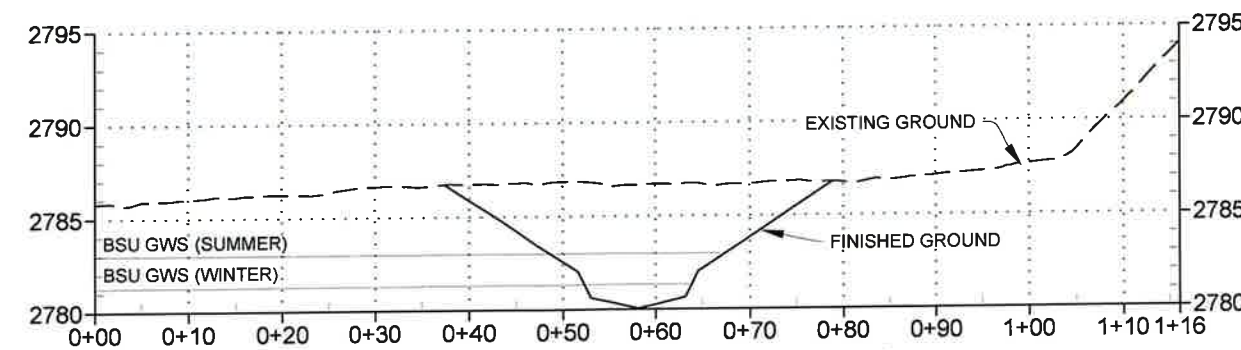
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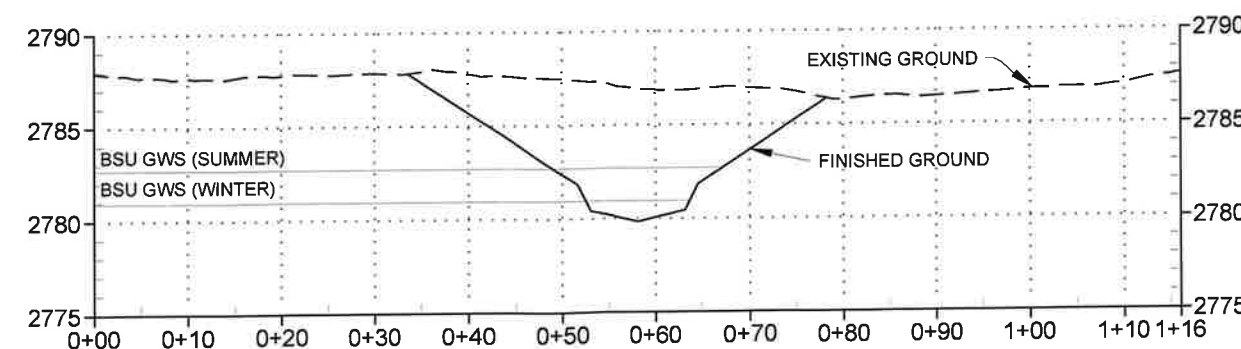
1 STATION 0+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



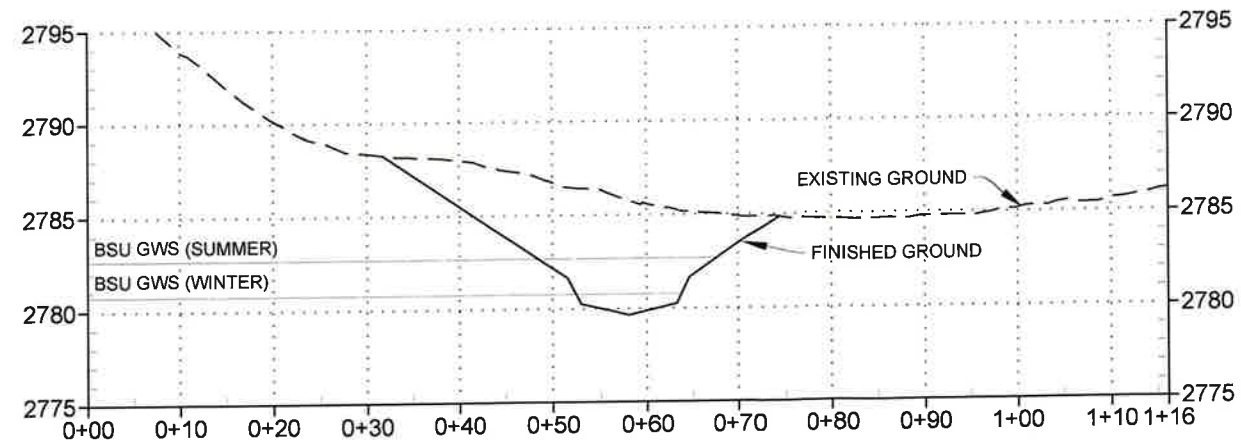
2 STATION 2+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



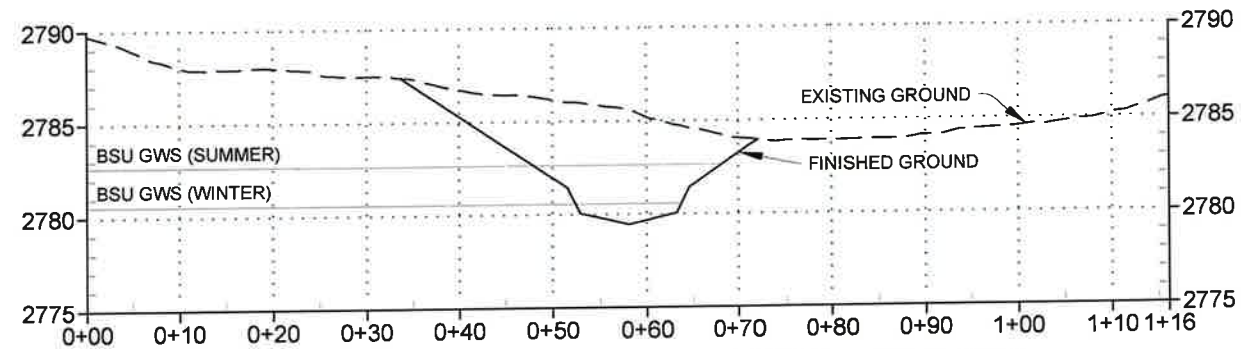
3 STATION 4+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



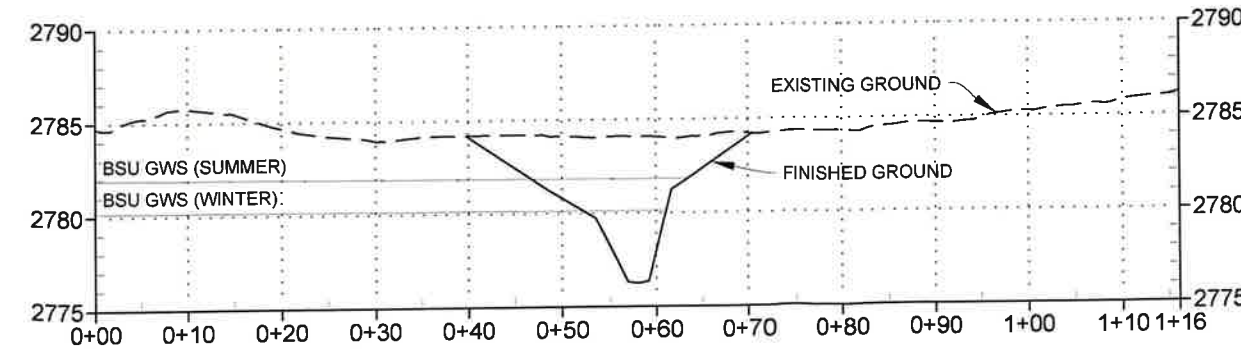
4 STATION 6+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



5 STATION 8+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



6 STATION 10+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



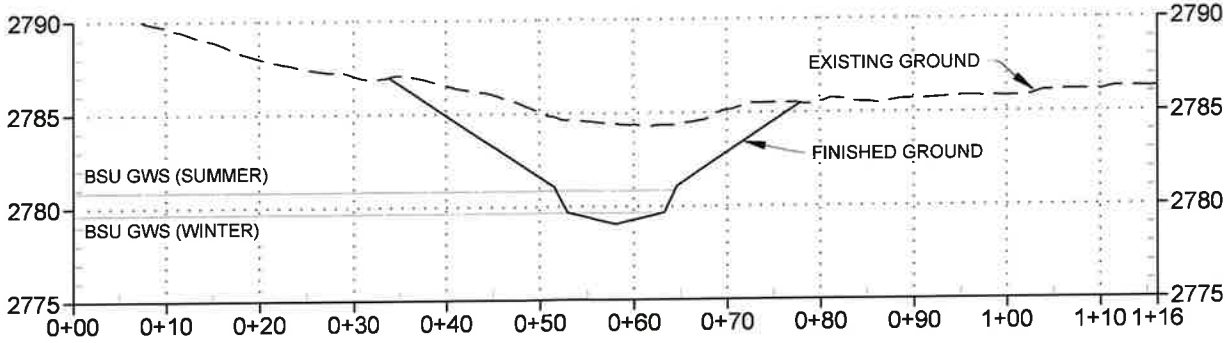
7 STATION 12+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'

PERMIT DRAWINGS

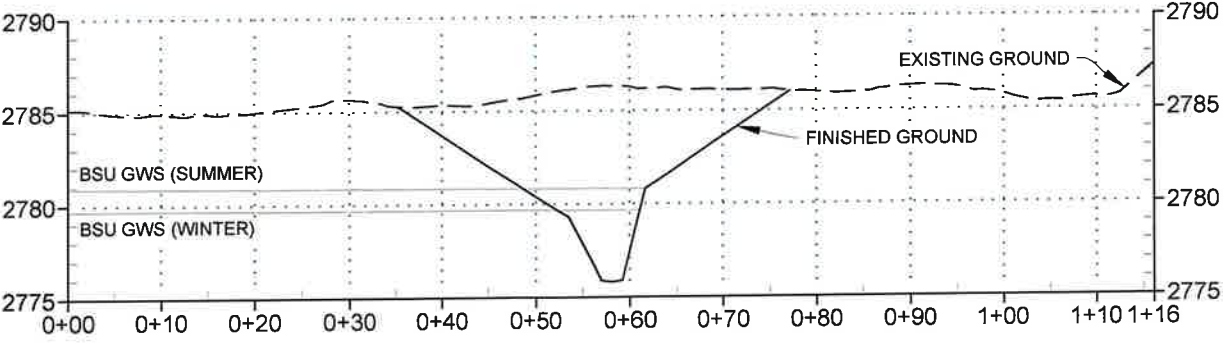


**CROSS SECTIONS
STATION 0+00 TO 12+00**
MICRON BOISE RIVER
BOISE, IDAHO

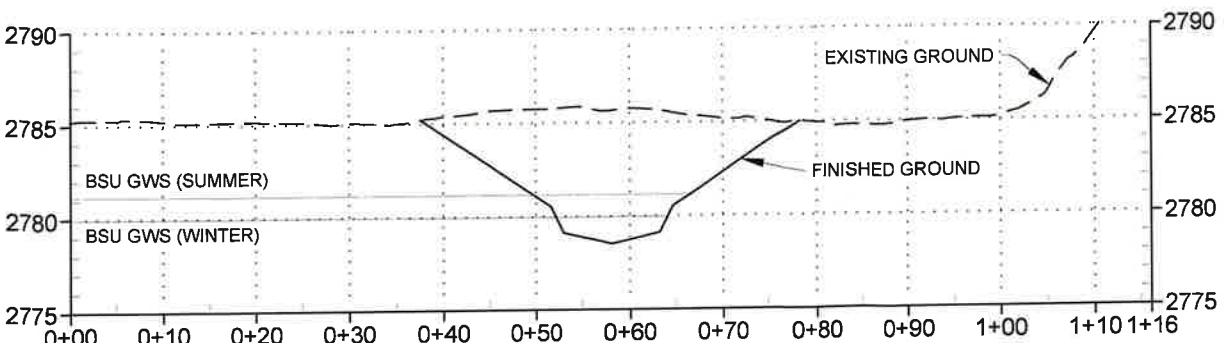
NO.	DATE	BY	DESCRIPTION	CHK
	3/16/21	NW	PERMIT DRAWINGS	SW
PROJECT NUMBER RDG-20-173				
DRAWING NUMBER 4.7				
Drawing 19 of 33				



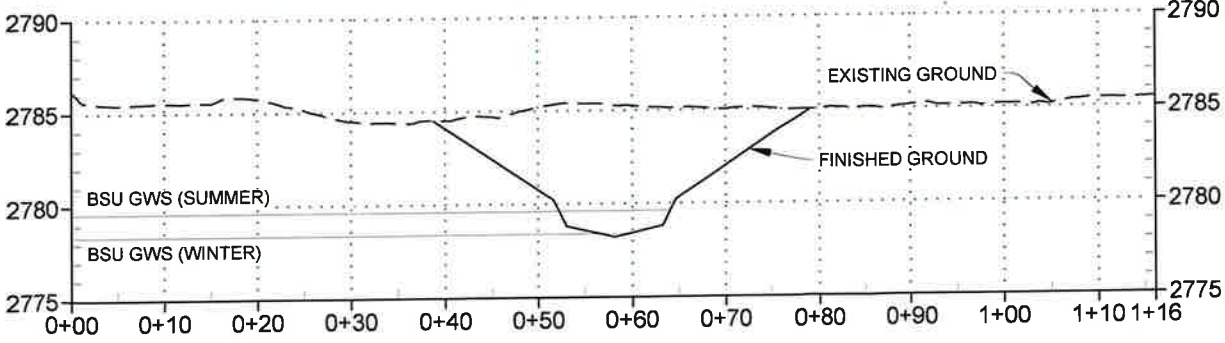
8 STATION 14+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



9 STATION 16+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



10 STATION 18+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'



11 STATION 20+00 GRADING SECTION
HORIZ 1" = 20'
VERT 1" = 10'

PERMIT DRAWINGS



RDG
RIVER DESIGN GROUP

236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4627

311 SW Jefferson Avenue
Corvallis, OR 97333
541.798.2820

CROSS SECTIONS

STATION 14+00 TO 20+00

MICRON BOISE RIVER

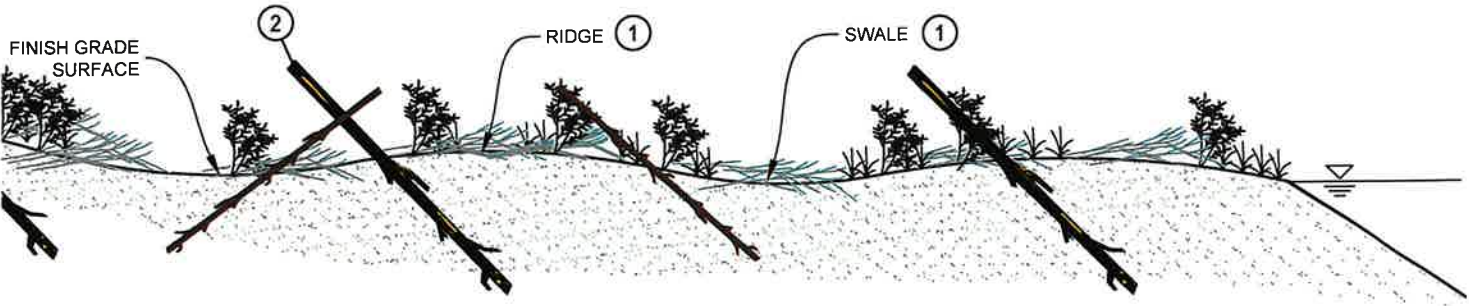
BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
•	3/16/21	NW	PERMIT DRAWINGS	SW
PROJECT NUMBER RDG-20-173				
DRAWING NUMBER 4.8				
Drawing 20 of 33				

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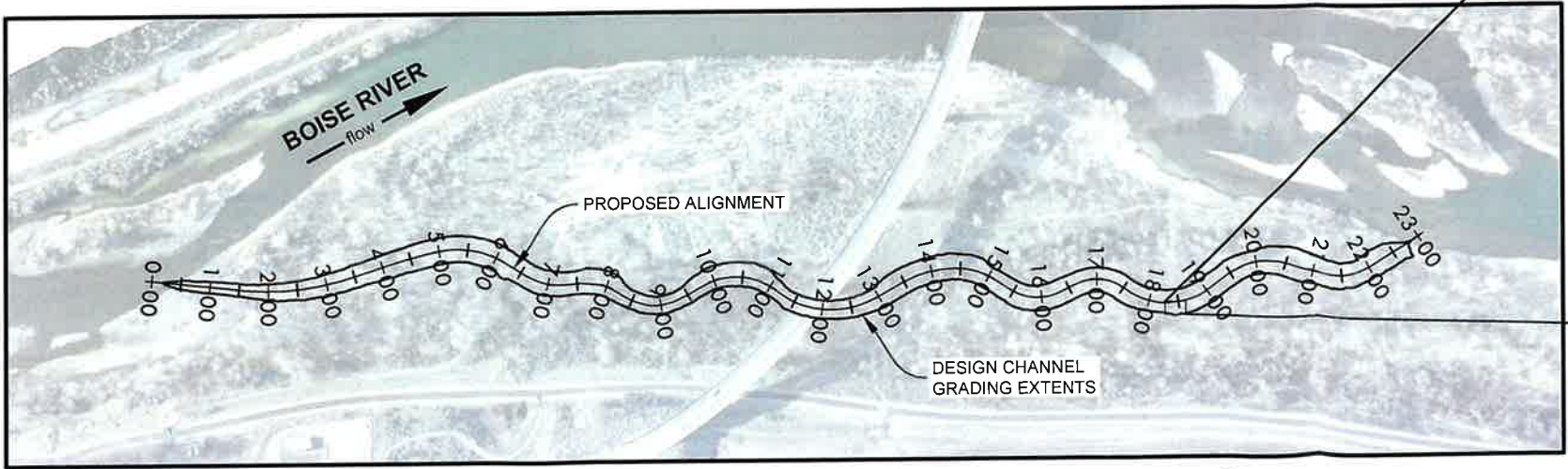


EXAMPLE OF CONSTRUCTED FLOODPLAIN ROUGHNESS ELEMENTS



2 FLOODPLAIN ROUGHNESS SECTION

HORZ 1" = 30'
VERT 1" = 30'



1 FLOODPLAIN ROUGHNESS LAYOUT

1" = 300'



GENERAL NOTES

1. DEVELOP FLOODPLAIN ROUGHNESS BY EXCAVATING RIDGES AND SWALES WITHIN DESIGNATED FLOODPLAIN SURFACES. BURY WOOD DEBRIS INTO THE FLOODPLAIN AT THE RATE AND SIZE PRESCRIBED BELOW.
2. SPECIAL ATTENTION SHALL BE TAKEN TO OPERATE EQUIPMENT IN A SAFE AND EFFICIENT MANNER WITH NO DISTURBANCE OUTSIDE OF GRADING LIMITS UNLESS OTHERWISE SPECIFIED.

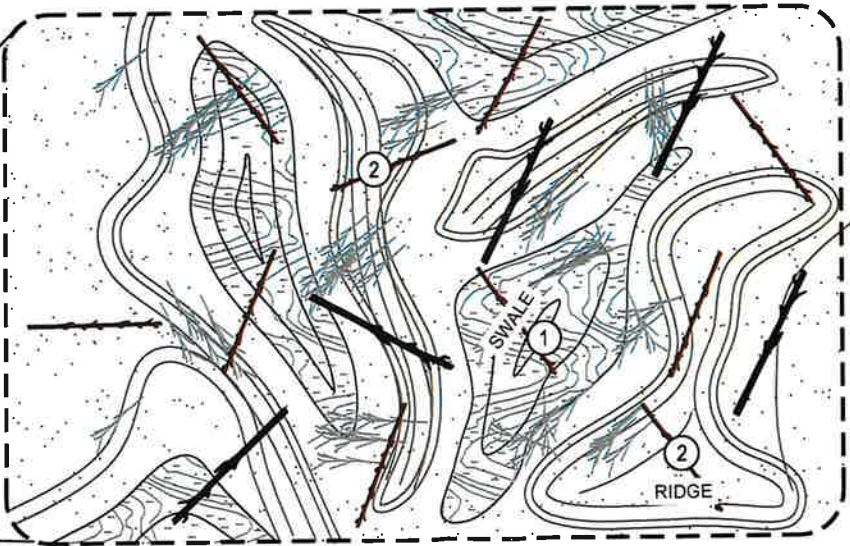
CONSTRUCTION NOTES

1. CONSTRUCT SWALES (5 FT LONG BY 3 FT WIDE, 0.5 FT BELOW FLOODPLAIN GRADE) AND RIDGES (5 FT LONG BY 3 FT WIDE, 0.5 FT ABOVE FLOODPLAIN GRADE) AS SHOWN ON THE DRAWINGS. APPROXIMATELY 20 PERCENT OF THE TOTAL SURFACE AREA OF EACH TREATMENT AREA SHALL CONSIST OF SWALES AND APPROXIMATELY 20 PERCENT SHALL CONSIST OF RIDGES.
2. PLACE SMALL LOGS AND BRUSH WITHIN THE ROUGHENED FLOODPLAIN TREATMENT AREA AS SHOWN ON THE DRAWINGS. SMALL LOGS AND BRUSH SHALL BE BURIED 50-70% OF STEM LENGTH AND SHALL NOT PROJECT MORE THAN 3 FT VERTICALLY FROM THE FLOODPLAIN SURFACE. PLACEMENT DENSITY SHALL BE AT A DISTANCE OF 30 FEET FOR SMALL LOGS AND 20 FEET FOR BRUSH OR AS DIRECTED BY THE ENGINEER.

PER ACRE FLOODPLAIN ROUGHNESS TREATMENT QUANTITIES

ITEM	QUANTITY (PER ACRE)	DIAMETER (IN)	LENGTH (FT)	ROOTWADS	LIMBS
BRUSH	±150	3 - 6	5 - 8	OPTIONAL	YES
SMALL WOOD	±50	6 - 12	10 - 15	OPTIONAL	YES

TOTAL TREATMENT AREA ± TBD ACRES



NOT TO SCALE
LOCATION OF TREATMENT PER
DRAWINGS 4.1 AND 4.3

PERMIT DRAWINGS



311 SW Jefferson Avenue
Corvallis, OR 97333
405.662.4927

FLOODPLAIN ROUGHNESS DETAIL

MICRON BOISE RIVER

BOISE, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
1	3/16/21	NW	PERMIT DRAWINGS	SW

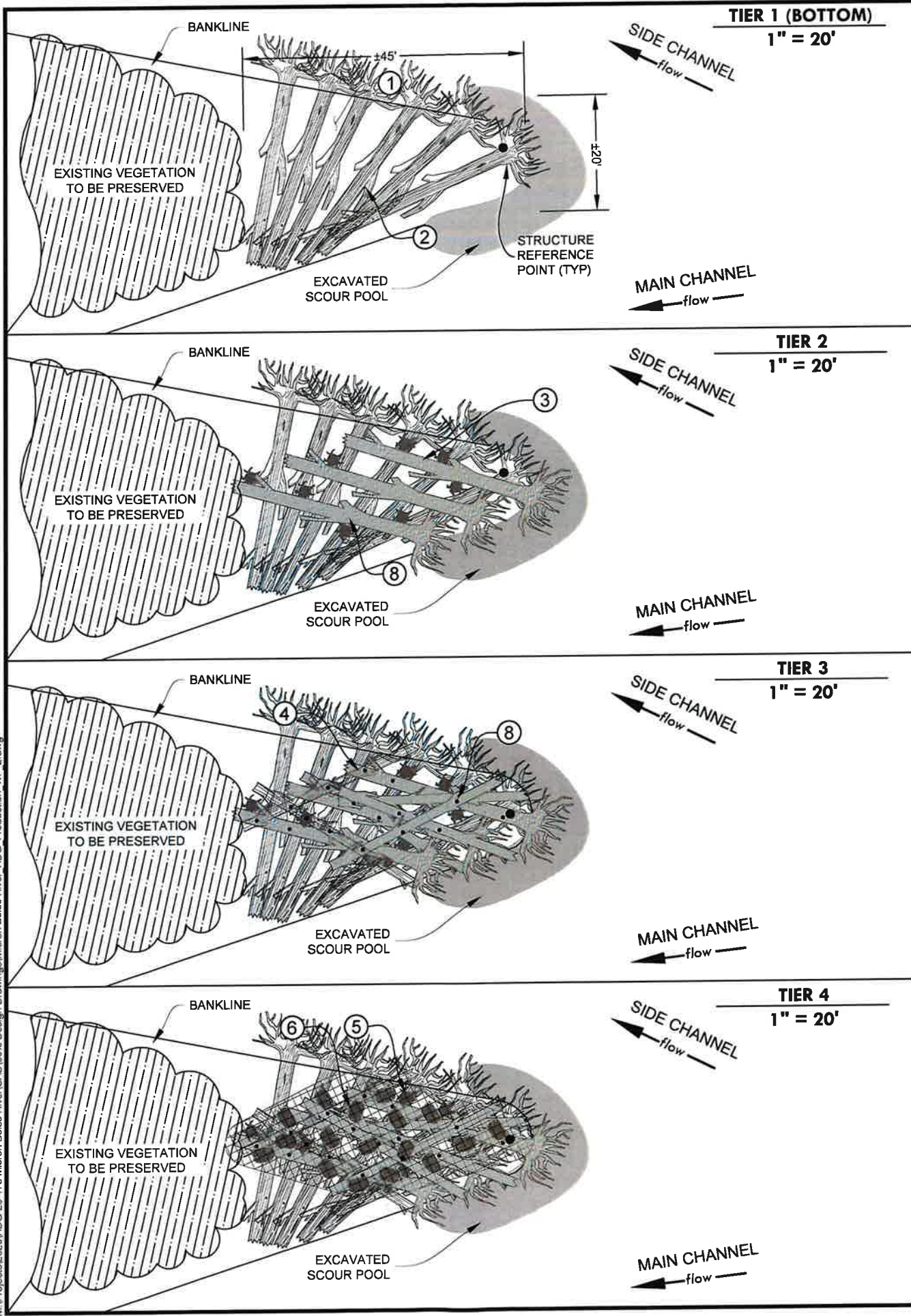
PROJECT NUMBER
RDG-20-173

DRAWING NUMBER

5.0

Drawing 21 of 33

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MATERIAL SCHEDULE

TIER	ITEM	QUANTITY	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)
TIER 1	BASE MEMBER	8	18+	25-30	YES - 4' DIA MIN
TIER 2	KEY MEMBER	6	18+	25-30	YES - 4' DIA MIN
TIER 3	LARGE WOOD	10	18+	25-30	NO
TIER 4	SMALL WOOD	MIN 15	6-10	12	NO
TIER 4	SLASH	±20 CY	± 2	5-10	
	BACKFILL GRAVEL	±120 CY	2" MIN		
	BALLAST BOULDERS	36	36		
	ALL-THREAD ROD	MIN 14	1	4	

GENERAL NOTES

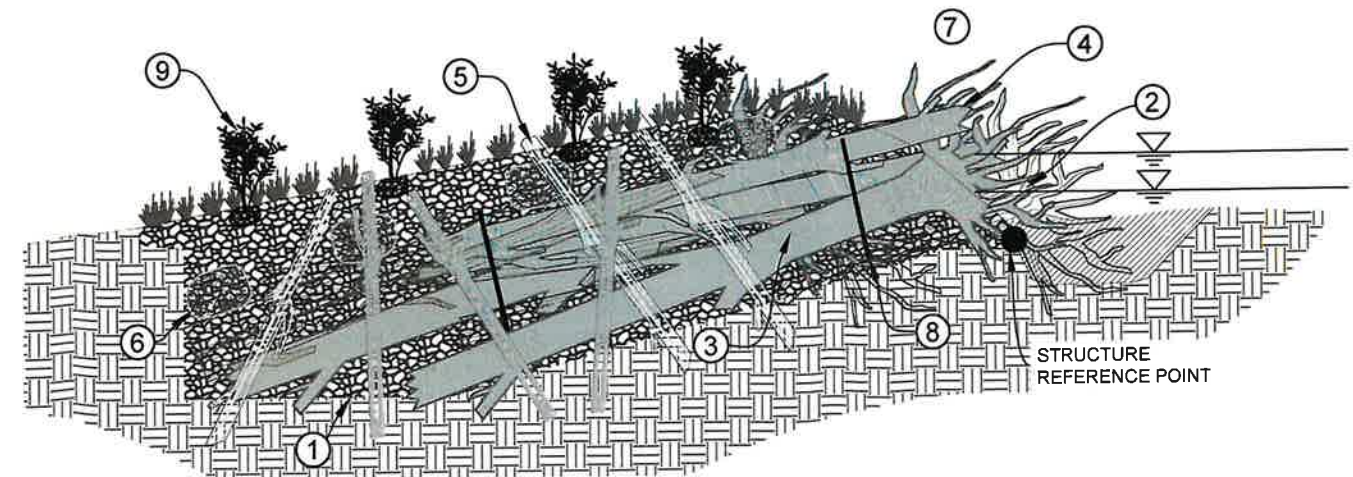
CONTRACTOR TO PLACE SLASH WITHIN ALL LARGE WOOD HABITAT STRUCTURES.

EXCAVATE SCOUR POOL ADJACENT TO EACH APEX STRUCTURE. POOLS TO BE ±40' x ±10', EXCAVATED TO A MAXIMUM DEPTH OF 2.0'. EXCAVATED GRAVELS TO BE USED AS STRUCTURE BACKFILL.

ALL WOOD MEMBERS WITHOUT ROOTWADS SHALL HAVE BROKEN ENDS PROJECTING INTO CHANNEL. BREAK OR ROUGHEN ENDS OF MEMBERS WITH EXCAVATOR PRIOR TO PLACEMENT.

CONSTRUCTION NOTES

- EXCAVATE LOG STRUCTURE FOOTPRINT TO SPECIFIED FOOTPRINT ELEVATION, OR AS NECESSARY BASED ON LOGS, ±100 CY. PRESERVE AND PROTECT EXISTING TREES/VEGETATION OUTSIDE OF FOOTPRINT TO THE FULLEST EXTENT POSSIBLE. STAGE EXCAVATED MATERIAL NEARBY AND OUTSIDE OF MOVING WATER. EXCAVATED MATERIAL WILL BE USED AS GROWING MEDIUM PLACED ON TOP OF GRAVEL BACKFILL.
- PLACE LARGE WOOD BASE MEMBERS (TIER 1) IN STRUCTURE FOUNDATION FOOTPRINT.
- PLACE KEY MEMBERS (TIER 2). ANCHOR KEY MEMBERS TO BASE MEMBERS PER CONSTRUCTION NOTE 8.
- PLACE LARGE WOOD MEMBERS (TIER 3) AND ANCHOR TO TIER 1 AND 2 MEMBERS WITH BALLAST BOULDERS AND ALL-THREAD ROD PER CONSTRUCTION NOTE 8.
- WEAVE SMALL WOOD (TIER 4) INTO STRUCTURE AT VARIABLE VERTICAL ANGLES AND EXTEND TO TOP OF LOG STRUCTURE. SMALL WOOD EXTEND A MINIMUM OF 75% OF LENGTH BELOW GROUND SURFACE. WOOD NOT TO EXTEND MORE THAN 3' ABOVE GROUND SURFACE.
- PLACE ADDITIONAL BALLAST BOULDERS WITHIN STRUCTURE CONSISTING OF 3 FT DIAMETER BOULDERS PER SCHEDULE. BACKFILL IN AND AROUND STRUCTURE WITH GRAVELS AND COBBLES EXCAVATED FROM THE STRUCTURE FOOTPRINT OR IMPORTED TO SITE. ALL GRAVEL BACKFILL SHALL BE GREATER THAN 2 INCHES IN SIZE. BACKFILL SHALL BE WASHED INTO THE LARGE WOOD OPENINGS TO ENSURE ADEQUATE BALLAST.
- WEAVE ±5 CY OF SLASH INTO THE LARGE WOOD STRUCTURE MATRIX WITHIN THE LATERAL LIMITS SLASH ZONE.
- ANCHOR LARGE WOOD MEMBERS TOGETHER USING 1" DIAMETER ALL-THREAD ROD AT A MINIMUM OF 2 LOCATIONS FOR EACH KEY AND LARGE WOOD MEMBER. UTILIZE 1" DIAMETER ASTM A449 TYPE 3 WITH 4" O.D. HEAVY PLATE WASHERS AND NUTS (A563B HEX HEAD NUT). ROD SHALL BE CUT FLUSH WITH NUT HEAD AFTER TIGHTENED AND EXPOSED END SHALL BE PAINTED WITH BROWN, RUST INHIBITING ALL WEATHER PAINT.
- A MINIMUM OF 10 NEARBY CLUMP PLANTINGS OF WILLOW AND/OR OTHER RIPARIAN PLANTS SHALL BE SECURED AND PLACED WITHIN THE BACKFILL AREA.



1 APEX STRUCTURE SECTION VIEW

HORIZ 1" = 10'
VERT 1" = 10'

PERMIT DRAWINGS

MATERIAL SCHEDULE PER STRUCTURE

ITEM	QUANTITY	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)
BASE MEMBER	4	18+	15-20	YES - 4' DIA MIN
KEY MEMBER	1	18+	15-20	YES - 4' DIA MIN
KEY MEMBER	3	18+	15-20	NO
LARGE WOOD	3	18+	15-20	YES - 4' DIA MIN
SMALL WOOD	MIN 10	6-10	12	NO
SLASH	±20 CY	3-6	10-20	
BACKFILL GRAVEL	±110 CY	2" MIN		
BALLAST BOULDERS	MIN 22	36		
ALL-THREAD ROD	MIN 14	1	VARIES	

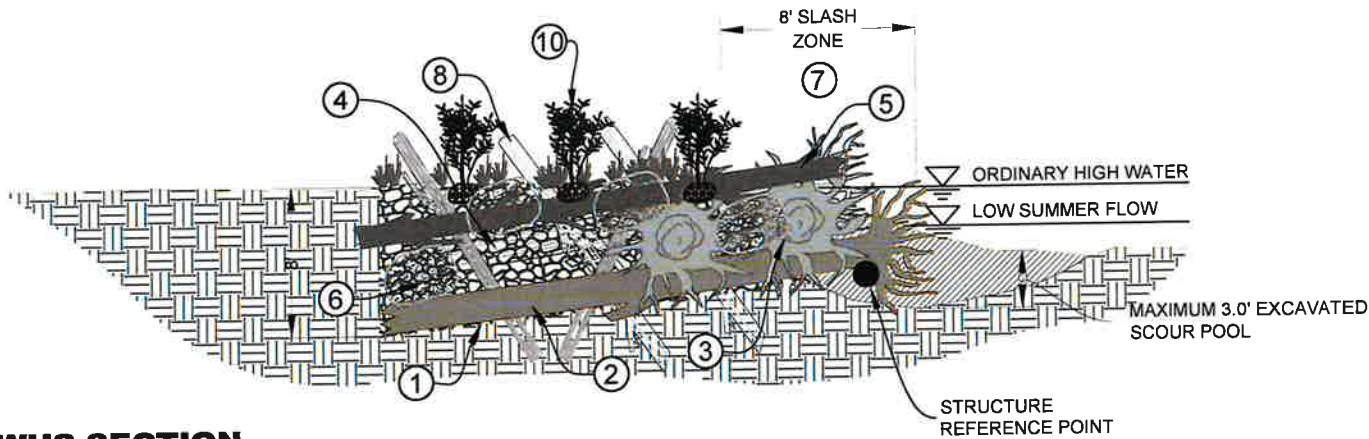
GENERAL NOTES

EXCAVATE SCOUR POOL ADJACENT TO EACH LARGE WOOD HABITAT STRUCTURE. POOLS TO BE ±15' BY ±8', EXCAVATED TO A DEPTH OF 3.0'. EXCAVATED GRAVELS TO BE USED AS STRUCTURE BACKFILL.

ALL WOOD MEMBERS WITHOUT ROOTWADS SHALL HAVE BROKEN ENDS PROJECTING INTO CHANNEL. BREAK OR ROUGHEN ENDS OF MEMBERS WITH EXCAVATOR PRIOR TO PLACEMENT.

CONSTRUCTION NOTES

- EXCAVATE STRUCTURE FOUNDATION AND SCOUR POOL, ±180 CY. STAGE EXCAVATED MATERIAL FOR STRUCTURE FILL. BANK-LINE FOUNDATION EXCAVATION TO CONFORM TO STRUCTURE DIMENSIONS. OVER EXCAVATION AND DISTURBANCE OF IN-SITU MATERIALS OUTSIDE OF STRUCTURE FOOTPRINT NOT ALLOWED.
- PLACE BASE MEMBERS WITHIN FOUNDATION EXCAVATION.
- PLACE KEY MEMBERS WITH AND WITHOUT ROOTWADS ACROSS BASE MEMBER. PLACE AT A SLIGHT VERTICAL SKEW AND TIE INTO EXISTING FLOODPLAIN TREES IF AVAILABLE. ANCHOR KEY MEMBERS TO BASE MEMBERS PER CONSTRUCTION NOTE 9.
- PLACE LARGE WOOD MEMBERS WITHIN BANKLINE FOUNDATION EXCAVATION. PLACE MEMBERS INTO PRECEDING KEY AND BASE MEMBERS TO DEVELOP A STABLE INTERLACED MATRIX. ANCHOR LARGE WOOD MEMBERS TO BASE AND KEY MEMBERS PER CONSTRUCTION NOTE 9.
- PLACE LARGE WOOD KEY MEMBERS WITHOUT ROOTWADS INTO PRECEDING TIERS TO DEVELOP A STABLE INTERLACED MATRIX.
- PLACE BALLAST BOULDERS WITHIN STRUCTURE CONSISTING OF 3 FT DIAMETER BOULDERS PER SCHEUDLE. BACKFILL IN AND AROUND STRUCTURE WITH GRAVELS AND COBBLES EXCAVATED FROM THE STRUCTURE FOOTPRINT OR IMPORTED TO SITE. ALL GRAVEL BACKFILL SHALL BE GREATER THAN 2 INCHES IN SIZE. BACKFILL SHALL BE WASHED INTO THE LARGE WOOD OPENING TO ENSURE ADEQUATE BALLAST.
- WEAVE ±20 CY (PACKED VOLUME) OF SLASH INTO THE LARGE WOOD STRUCTURE MATRIX WITHIN THE LATERAL LIMITS SLASH ZONE. SLASH SHALL CONSIST OF CONIFEROUS TREE TOPS WITH INTACT BRANCHES, GREEN ONLY.
- WEAVE SMALL WOOD INTO STRUCTURE AT VARIABLE VERTICAL ANGLES AND EXTEND TO TOP OF LOG STRUCTURE. SMALL WOOD EXTEND A MINIMUM OF 50% OF LENGTH BELOW GROUND SURFACE. WOOD NOT TO EXTEND MORE THAN 3' ABOVE GROUND SURFACE.
- ANCHOR LARGE WOOD MEMBERS TOGETHER USING 1" DIAMETER ALL-THREAD ROD AT A MINIMUM OF 2 LOCATIONS FOR EACH KEY AND LARGE WOOD MEMBER. UTILIZE 1" DIAMETER ASTM A449 TYPE 3 WITH 4" O.D. HEAVY PLATE WASHERS AND NUTS (A563B HEX HEAD NUT). ROD SHALL BE CUT FLUSH WITH NUT HEAD AFTER TIGHTENED AND EXPOSED END SHALL BE PAINTED WITH BROWN, RUST INHIBITING ALL WEATHER PAINT.
- NEARBY CLUMP PLANTINGS OF WILLOW AND OTHER RIPARIAN PLANTS SHALL BE SECURED AND PLACED WITHIN THE BACKFILL AREAS AT A MINIMUM OF 4 CLUMPS PER STRUCTURE.
- GRADE BANKLINE MARGINS AT UPSTREAM AND DOWNSTREAM ENDS OF STRUCTURE TO REDUCE POTENTIAL FOR TERMINUS SCOUR AND FLANKING AT DIRECTION OF PROJECT ENGINEER



1 LWHS SECTION

BASE MEMBERS (BOTTOM)
1" = 20'

KEY MEMBERS
1" = 20'

LARGE WOOD MEMBERS
1" = 20'

TREE TOPS
1" = 20'

BACKFILL (TOP)
1" = 20'

PERMIT DRAWINGS

CHK	DESCRIPTION	BY	DATE	NO.
SW	PERMIT DRAWINGS	NW	3/16/21	0

GENERAL NOTES

ALL WOOD MEMBERS SHALL HAVE BROKEN ENDS PROJECTING INTO CHANNEL. BREAK OR ROUGHEN ENDS OF MEMBERS WITH EXCAVATOR PRIOR TO PLACEMENT.

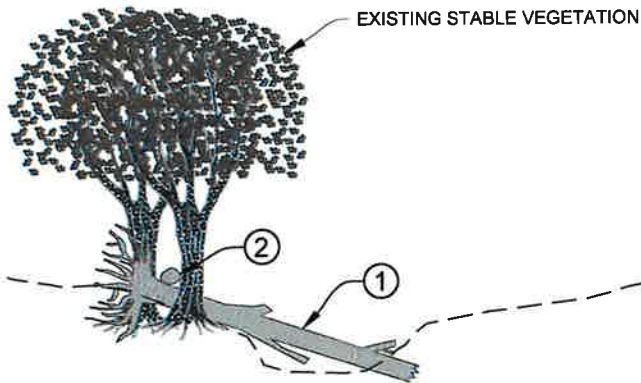
FINAL LOCATION/ORIENTATION OF LOGS AT THE DIRECTION OF PROJECT ENGINEER.

CONSTRUCTION NOTES

- 1 WEAVE LARGE WOOD MEMBER THROUGH SOLID STABLE VEGETATION AND PROJECT INTO CHANNEL.
- 2 PLACE LOCKING MEMBER ACROSS LARGE WOOD MEMBERS WITHIN STABLE VEGETATION TO CREATE INTERLOCKING STRUCTURE.

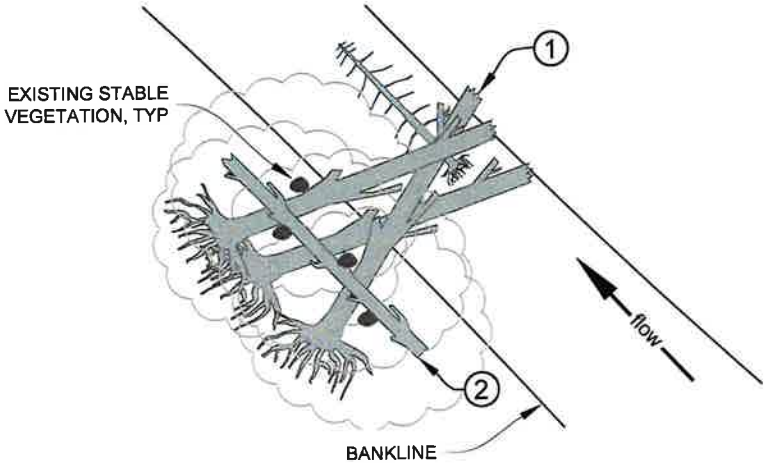
MATERIAL SCHEDULE PER STRUCTURE

ITEM	QUANTITY	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)
LARGE WOOD MEMBER	VARIES	18+	35+	YES - 4' DIA MIN
LOCKING MEMBER	1	18+	30	NO
WHOLE TREE	VARIES	±10	15-20	YES - 2' DIA MIN



1 LOG ANCHORING SECTION

HORIZ 1" = 20'
VERT 1" = 20'



2 LOG ANCHORING LAYOUT

HORIZ 1" = 20'

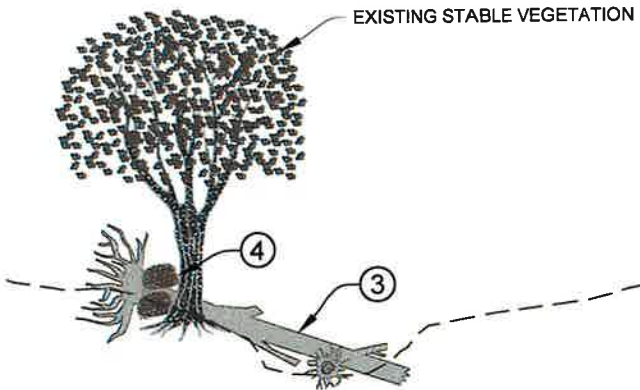
CONSTRUCTION NOTES

- 3 WEAVE LARGE WOOD MEMBERS THROUGH SOLID STABLE TREES AND PROJECT INTO CHANNEL.
- 4 PLACE BALLAST BOULDERS AT UPPER ENDS OF LARGE WOOD MEMBERS BETWEEN ROOTWADS AND SOLID STABLE TREES. COVER BOULDERS WITH NATIVE MATERIAL AND/OR WOODY DEBRIS TO MINIMIZE VISIBILITY.

MATERIAL SCHEDULE PER STRUCTURE

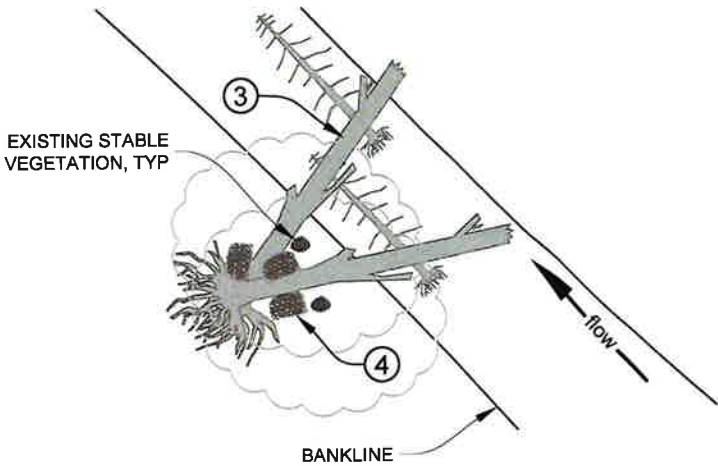
ITEM	QUANTITY	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)
LARGE WOOD MEMBER	VARIES	18+	35+	YES - 4' DIA MIN
BALLAST BOULDERS	2 *	36		
WHOLE TREE	VARIES	±10	15-20	YES - 2' DIA MIN

* PER LARGE WOOD MEMBER



3 ROCK ANCHORING SECTION

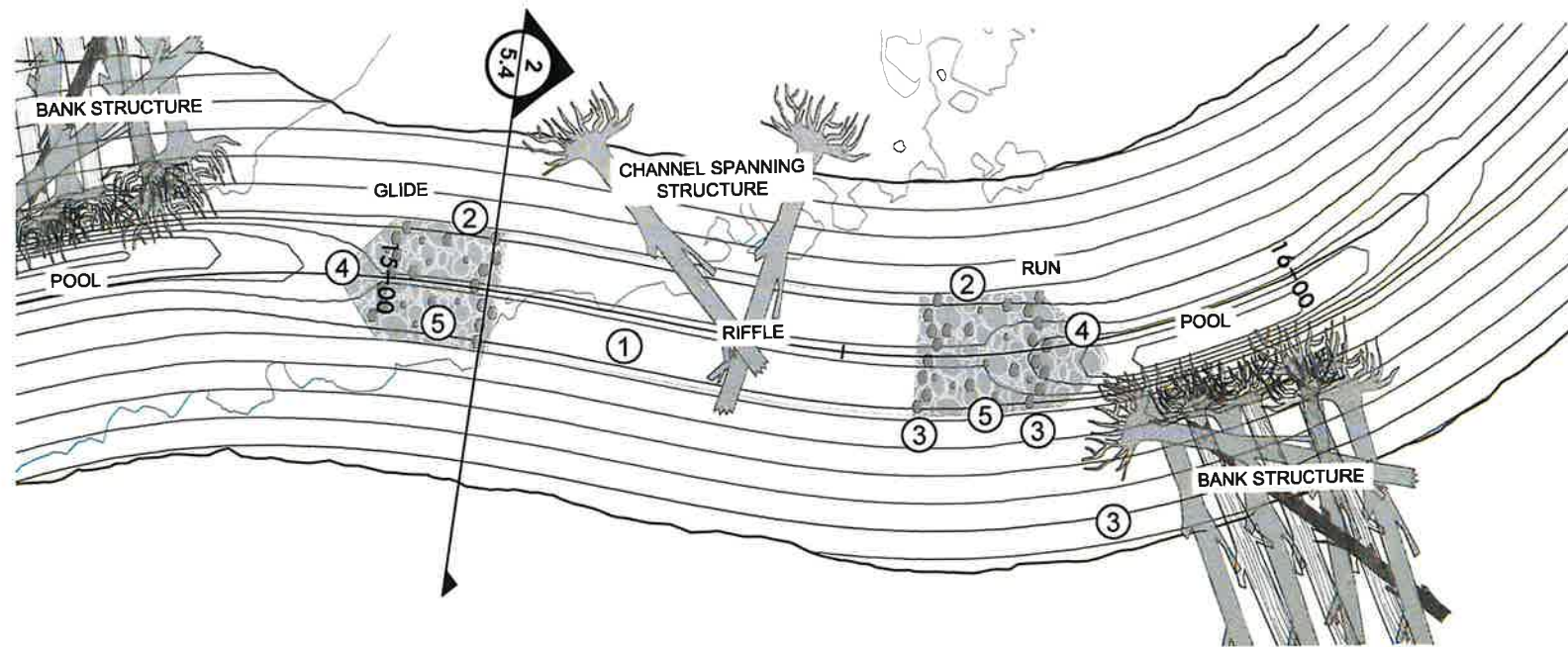
HORIZ 1" = 20'
VERT 1" = 20'



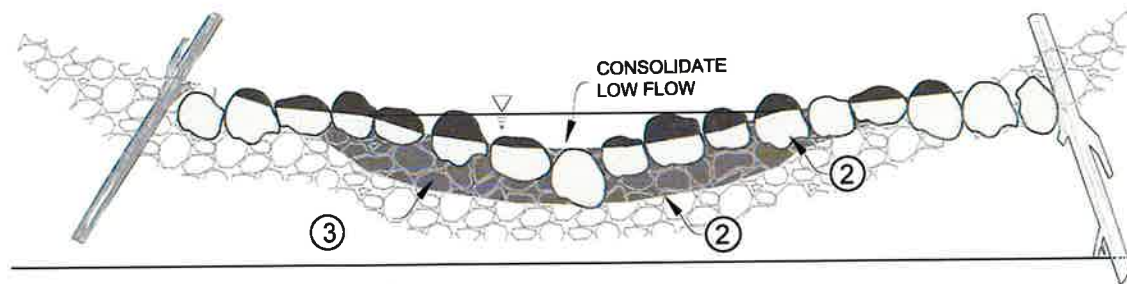
4 ROCK ANCHORING LAYOUT

HORIZ 1" = 20'

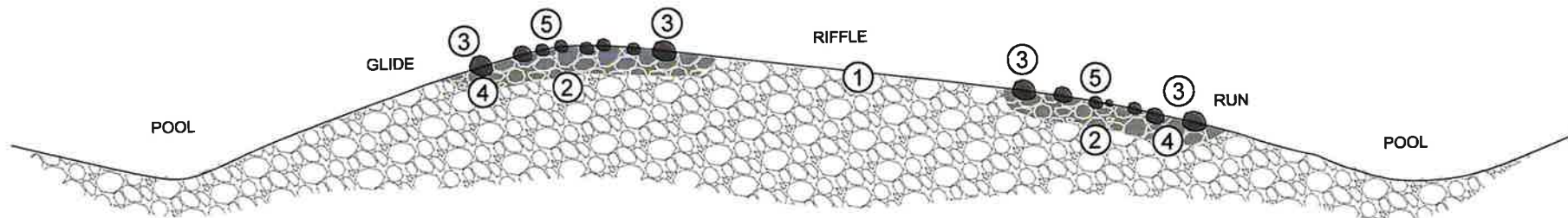
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1 ENGINEERED RIFFLE PLAN VIEW



2 TRANSVERSE RIB SECTION



3 ENGINEERED RIFFLE PROFILE

NOT TO SCALE

GENERAL NOTES

STRUCTURE LAYOUT TO BE PROVIDED BY PROJECT ENGINEER. THE CONSTRUCTION SITE SHALL BE DEWATERED AND KEPT FREE OF STANDING WATER OR EXCESSIVELY MUDDY CONDITIONS AS NEEDED FOR PROPER EXECUTION OF THE CONSTRUCTION WORK. SPECIAL ATTENTION SHALL BE TAKEN TO OPERATE EQUIPMENT IN A SAFE AND EFFICIENT MANNER WITH MINIMAL DISTURBANCE OUTSIDE OF GRADING LIMITS UNLESS OTHERWISE SPECIFIED. UTMOST CARE SHALL BE EMPLOYED TO ENSURE EXCAVATION AND CONSTRUCTION MATERIALS DO NOT ENTER STREAM OR INCREASE AMBIENT TURBIDITY LEVELS.

ROCK MATERIALS SHALL BE OF THE GRADATION SHOWN ON THE DRAWINGS. MATRIX ROCK SHALL BE SUBANGULAR TO ROUNDED IN SHAPE RIVER COBBLE WHERE INDIVIDUAL ROCK FRAGMENTS ARE FREE FROM SHARP ANGLES AND SMOOTHLY ROUNDED. ROCK SHALL BE FROM AN APPROVED SOURCE, AND SHALL BE SOUND, DENSE (SG=2.65) AND FREE FROM CRACKS, SEAMS OR OTHER DEFECTS CONDUCTIVE TO ACCELERATED WEATHERING. ROCK MATERIALS SHALL BE WASHED, "CLEAN", AND OTHERWISE FREE OF FINES PRIOR TO PLACEMENT SO THAT PLACEMENT ENSURES ROCK-TO-ROCK CONTACT.

MATRIX PACK MATERIAL IS A SAND/SILT MIXTURE PLACED INTO THE MATRIX ROCK SEPARATELY. THE PACK MATERIAL IS PLACED AFTER MATRIX ROCK PLACEMENT AND IS "WASHED-IN" USING WATER. MATRIX PACK MATERIAL GRADATION AND PLACEMENT METHOD ARE SPECIFIED ON THE DRAWINGS. MATRIX ROCK WILL ONLY BE PLACED WITHIN 20 FEET OF THE START OF THE FEATURE AND 20 FEET OF THE END.

COMPACTION SHALL BE PERFORMED BY SUCCESSIVE PASSES OF CONSTRUCTION EQUIPMENT TO A CONDITION WHERE DIFFERENTIAL SETTLEMENT OF THE LAYER IS MINIMIZED AND THE PLACED MATRIX MATERIAL IS CONSOLIDATED. MATRIX PACK MATERIAL SHALL BE SPREAD ACROSS AND WORKED INTO THE PLACED MATRIX. PRESSURE WASHING SHALL BE PERFORMED TO DRIVE MATRIX PACK MATERIAL INTO MATRIX VOIDS. SUCCESSFUL WASHING WILL BE DETERMINED BY MINIMIZATION OF VOIDS WITHIN PLACED MATRIX SUCH THAT PONDING OCCURS ON TOP OF LIFT WITH LITTLE TO NO PERCOLATION LOSSES OCCURRING THROUGH CONSTRUCTED STREAMBED. LAYER SHALL BE WORKED WITH EQUIPMENT TO ENSURE MINIMIZATION OF VOIDS AND TO PROVIDE COMPACTION.

BOULDER ELEMENT PLACEMENT SHALL BE PERFORMED AFTER MATRIX CONSTRUCTION IS COMPLETE.

CONSTRUCTION NOTES

- EXCAVATE THE STREAMBED TO FINISHED GROUND. THE NATIVE MATERIAL SHOULD BE COMPRISED OF ALLUVIUM.
- OVEREXCAVATE THE STREAMBED OVER A LENGTH OF 20 FEET ON THE UPSTREAM AND DOWNSTREAM EXTENTS OF THE RIFFLE FEATURE TO COMPENSATE FOR DESIGN BED MATRIX MATERIAL AS INDICATED ON THE DRAWINGS. EXCAVATED FOUNDATION TO BE CLEAR OF ORGANIC DEBRIS, DEWATERED AND UNIFORM TO FACILITATE MATRIX PLACEMENT.
- TRANSVERSE BOULDER PLACEMENTS ARE TO BE PLACED WITHIN THE STREAMBED AT SPECIFIED LOCATIONS AS INDICATED ON THE DRAWINGS AND AS DIRECTED BY THE PROJECT ENGINEER. RIBS ARE TO BE PLACED AT 20 FT INTERVALS. EMBEDMENT SHALL BE 50% - 75% OF EFFECTIVE BOULDER DIAMETER. GAPS BETWEEN ADJACENT BOULDERS SHALL BE MINIMIZED.
- THE STREAMBED SHALL BE CONSTRUCTED TO THE FULL COARSE THICKNESS IN ONE OPERATION AND IN A MANNER THAT PREVENTS DISPLACEMENT OF THE UNDERLYING MATERIALS. MATRIX ROCK SHALL BE PLACED IN A MANNER THAT WILL ENSURE THAT THE ROCK IS REASONABLY HOMOGENEOUS WITH LARGER ROCKS UNIFORMLY DISTRIBUTED AND FIRMLY IN CONTACT WITH ONE ANOTHER WITH GAPS LESS THAN TWO INCHES. SMALLER COBBLE (6"-MINUS) IN ADDITION TO THE STREAMBED MATRIX ROCK IS TO BE IMPORTED AND GRADED TO FILL THE VOIDS BETWEEN THE LARGER ROCKS. INDIVIDUAL LAYERS SHALL NOT BE MORE THAN 1 FOOT BEFORE COMPACTION. TAPER THE MATRIX ROCK HALFWAY INTO THE FEATURES DIRECTLY UPSTREAM AND DOWNSTREAM OF THE RIFFLE.
- HABITAT BOULDERS ARE TO BE PLACED IN RANDOM PATTERNS THAT REPLICATE NATURAL STREAM CONDITIONS AND AS DIRECTED BY THE PROJECT ENGINEER. EMBEDMENT SHALL BE A MINIMUM OF 50% OF EFFECTIVE BOULDER DIAMETER.

STREAMBED MATRIX ROUND ROCK GRADATION

PERCENT PASSING BY WEIGHT	AVERAGE PARTICLE SIZE (INCHES)
100	8
85	6
50	4
15	2

TRANSVERSE BOULDER SCHEDULE

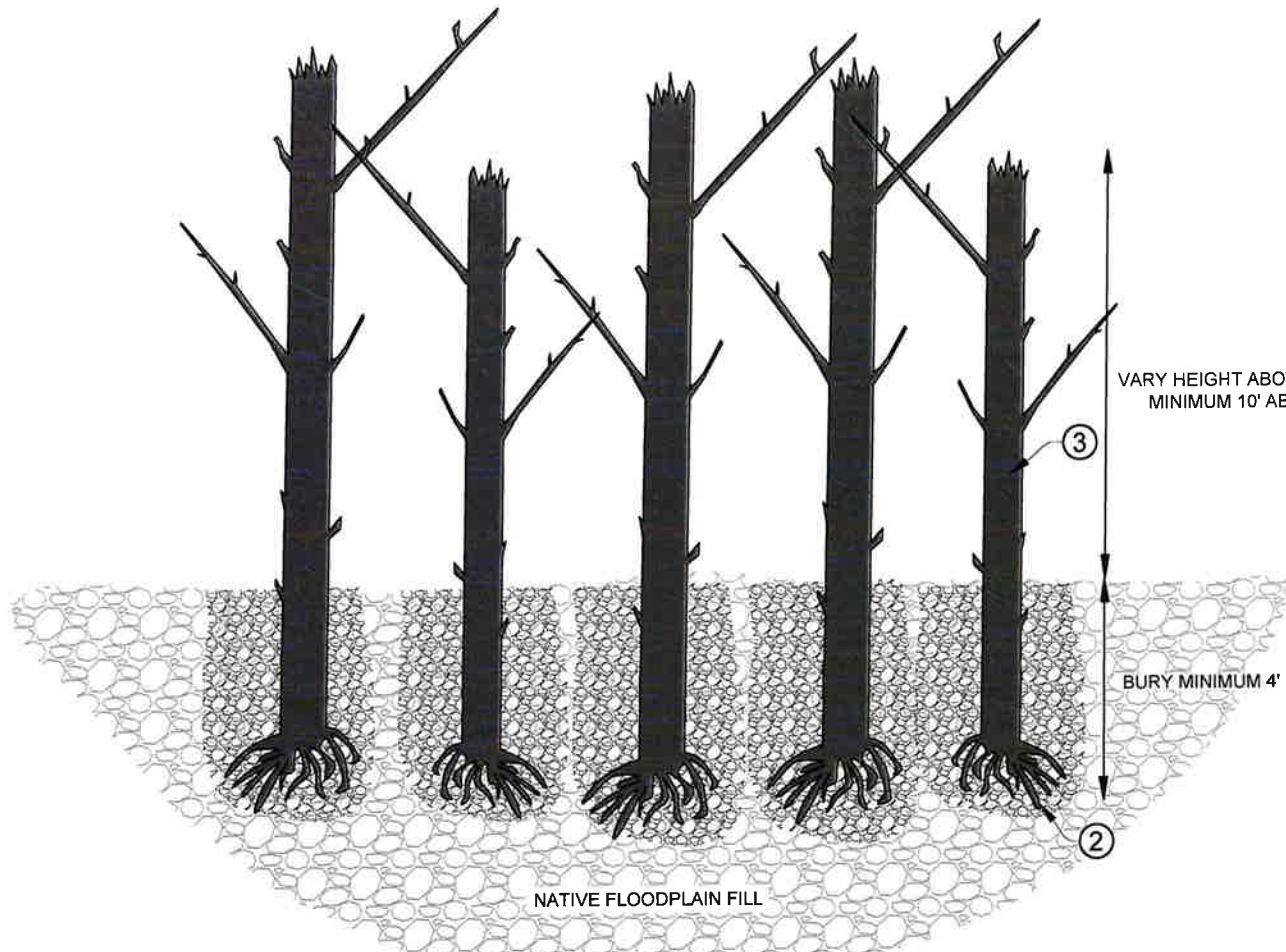
BOULDER ELEMENT SIZE (IN.)	MIN. COUNT
18-24"	X

HABITAT BOULDER SCHEDULE

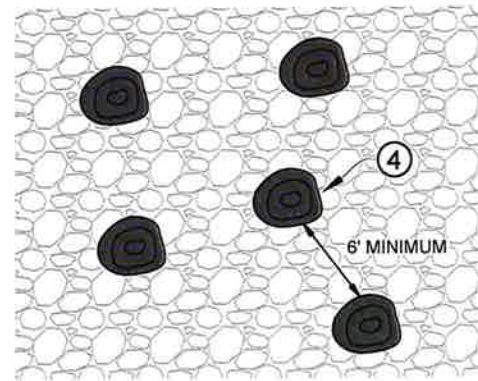
BOULDER ELEMENT SIZE (IN.)	MIN. COUNT
18-24"	X

PERMIT DRAWINGS

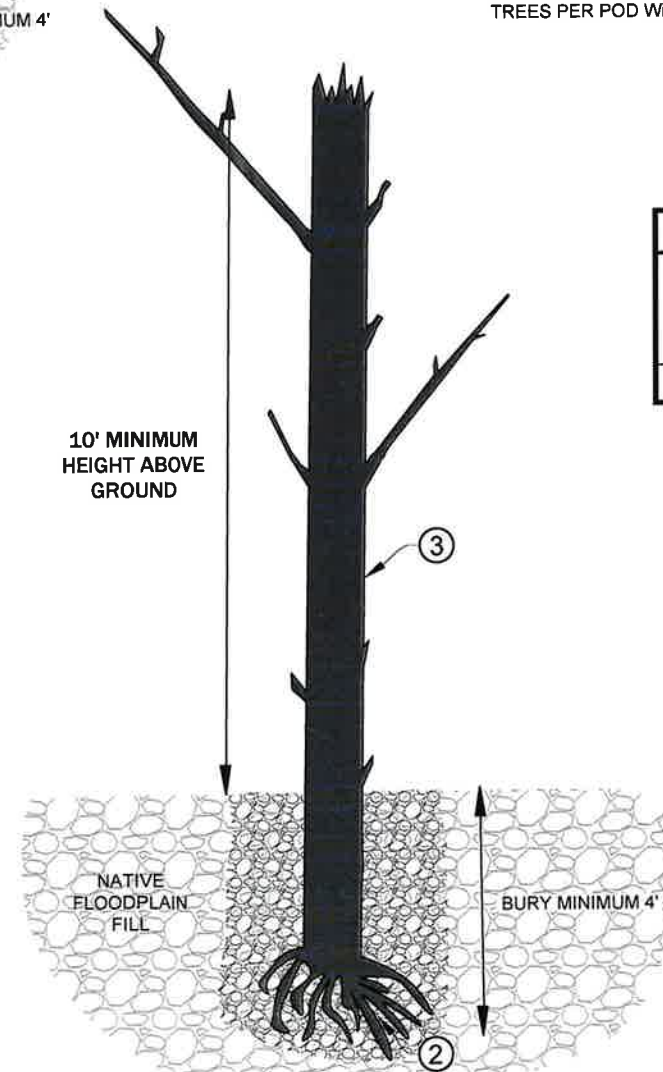
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1 **WILDLIFE SNAG POD PROFILE**



2 **WILDLIFE SNAG POD PLAN VIEW**



3 **WILDLIFE SNAG POD SECTION**

GENERAL NOTES

CONSTRUCTION OF THE WILDLIFE SNAGS WILL OCCUR AFTER THE SIDE CHANNEL AND FLOODPLAIN SUBGRADE BACKFILL IS PLACED AND THE CHANNEL STREAMBED IS CONSTRUCTED.

ANY CHANGES TO THE CONSTRUCTION SEQUENCE MUST BE APPROVED BY THE ENGINEER.

FIELD ENGINEER SHALL MARK THE GENERAL CONSTRUCTION LOCATION FOR EACH WILDLIFE SNAG PRIOR TO CONSTRUCTION.

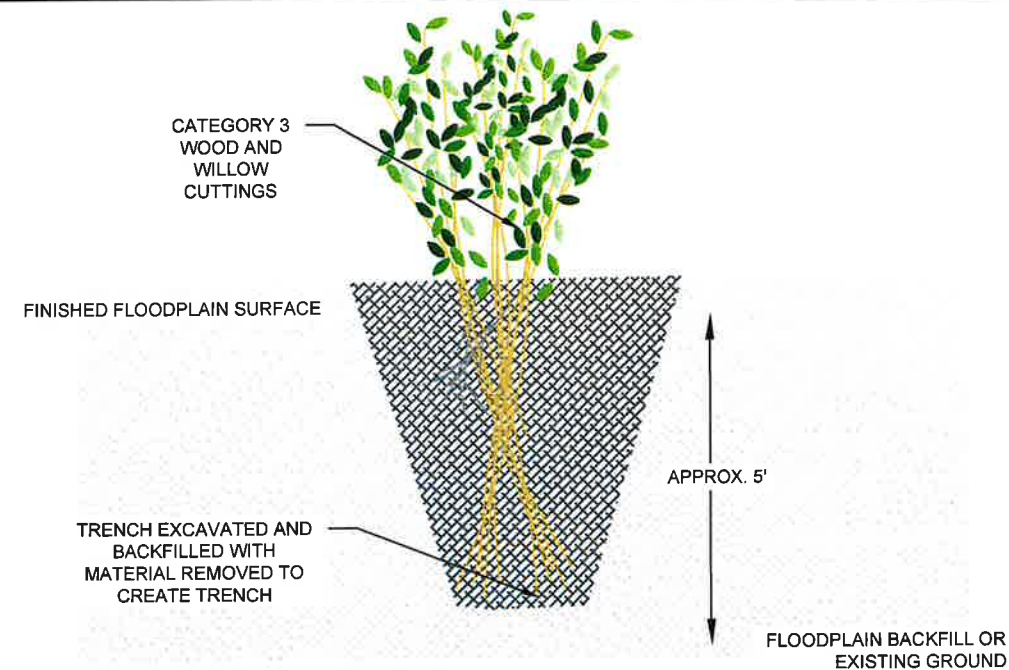
CONSTRUCTION NOTES

- 1 TRANSPORT SNAG TREES FROM DESIGNATED STOCKPILE AREAS TO THE TREATMENT SITES DESIGNATED BY CONSTRUCTION MANAGER.
- 2 INSTALL WILDLIFE SNAGS IN THE FLOODPLAIN SO THEY STAND VERTICALLY WITH NO LEAN AND WILL STAY STANDING AS THEY DECAY OVER TIME. DIG A HOLE A MINIMUM OF 4 FT DEEP AND LARGE ENOUGH FOR THE SNAG TO BE BACKFILLED WITH 6" PLUS COBBLE AND SOIL TO PROVIDE SUFFICIENT STABILITY. PLACE SNAG IN THE HOLE STANDING VERTICALLY AND BACKFILL UNTIL FLUSH WITH SURROUNDING FLOODPLAIN SURFACE
- 3 SNAGS SHALL STAND A MINIMUM OF 10 FT ABOVE GROUND AFTER INSTALLATION.
- 4 INDIVIDUAL AND PODS OF SNAGS WILL BE INSTALLED AND THE LOCATION OF EACH TYPE WILL BE DIRECTED BY THE CONSTRUCTION MANAGER IN THE FIELD. SNAG PODS SHALL CONSIST OF 4-6 TREES PER POD WITH A MINIMUM OF 6 FT BETWEEN TREES.

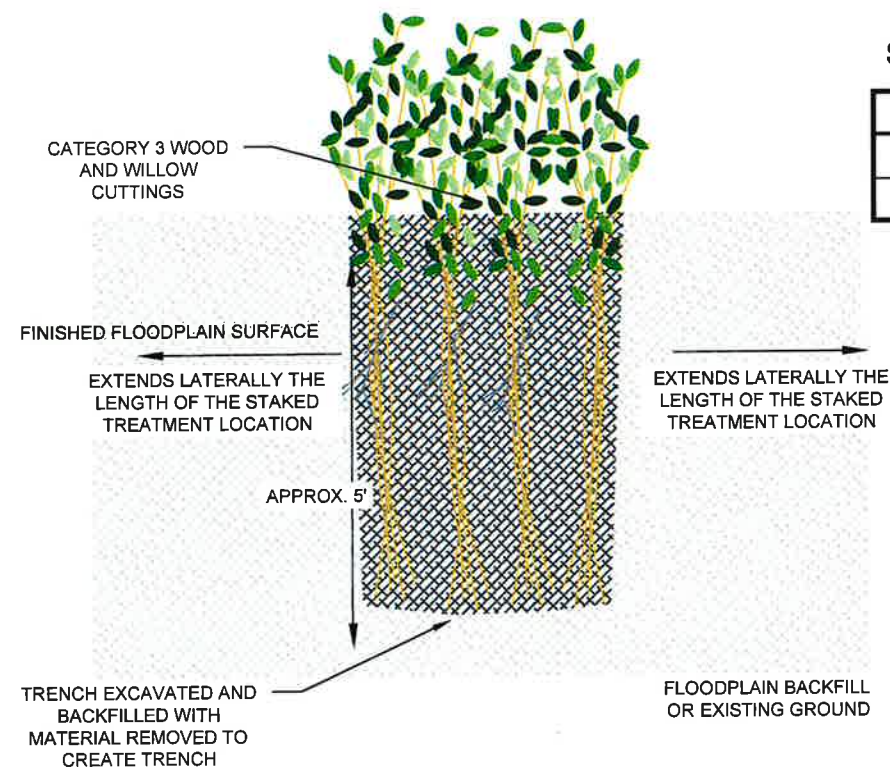
WILDLIFE SNAG MATERIAL SCHEDULE (PER LF)

ITEM	DIMENSIONS	QUANTITY
SNAG TREES	MIN. 12" DBH, MIN. 15' WITH ROOTWAD AND BRANCHES INTACT, MIX OF CONIFERS AND COTTONWOOD AS AVAILABLE	1 EA
ROCK BACKFILL	6" PLUS COBBLE	1.5 CY

NO.	DATE	BY	DESCRIPTION	CHK
0	3/16/21	NW	PERMIT DRAWINGS	SW



1 **VEGETATED BRUSH TRENCH PROFILE**

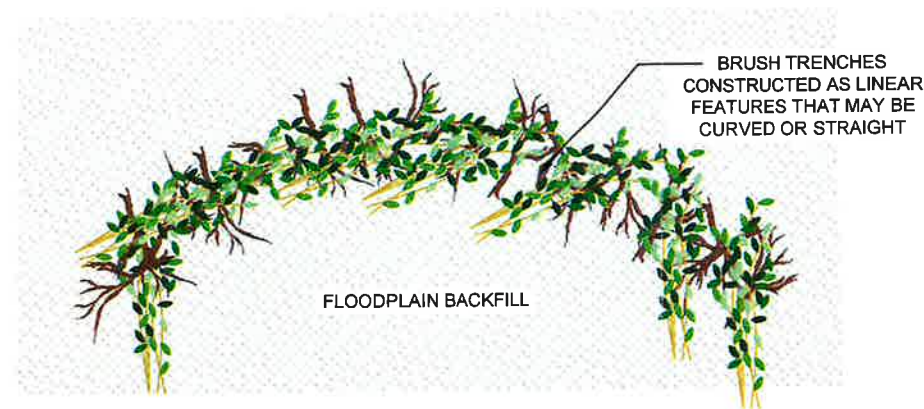


2 **VEGETATED BRUSH TRENCH SECTION**

BRUSH TRENCH MATERIAL SCHEDULE (PER LINEAR FOOT)		
ITEM	DIMENSIONS	QUALITY
WOOD	< 3"	3 EA
WILLOW CUTTINGS	0.25" - 1"	5 EA

- GENERAL NOTES**
1. VEGETATED BRUSH TRENCHES WILL BE CONSTRUCTED TO INCREASE FLOODPLAIN CONNECTIVITY, DISPERSE SURFACE FLOWS AND PROMOTE REVEGETATION. CONSTRUCTION OF VEGETATED BRUSH TRENCHES WILL OCCUR AFTER SEPTEMBER 15TH AND BEFORE THE END OF THE CONSTRUCTION SEASON.
 2. CONTRACTOR SHALL MARK AND ENGINEER SHALL APPROVE THE GENERAL CONSTRUCTION LOCATION FOR EACH VEGETATED BRUSH TRENCH PRIOR TO CONSTRUCTION.

- CONSTRUCTION NOTES**
1. VEGETATED BRUSH TRENCHES WILL BE CONSTRUCTED WITHIN THE FLOODPLAIN AT THE DIRECTION OF THE CONSTRUCTION MANAGER.
 2. A TRENCH WILL BE CONSTRUCTED APPROXIMATELY 5' DEEP AND EXTEND THE LENGTH OF THE STAKED TREATMENT LOCATION. LIVE WILLOW CUTTINGS AND CATEGORY 3 WOOD WILL BE PLACED IN THE TRENCH SUCH THAT THEY ARE INTERMIXED AND ORIENTED AT A NEAR VERTICAL ANGLE.
 3. THE TRENCH WILL THEN BE BACKFILLED WITH THE SAME MATERIAL REMOVED TO CREATE THE TRENCH AND SHOULD MATCH THE ELEVATION OF THE SURROUNDING FLOODPLAIN GRADE.



3 **VEGETATED BRUSH TRENCH PLAN VIEW**



EXAMPLE OF A VEGETATED BRUSH TRENCH INSTALLATION



EXAMPLE OF A CONSTRUCTED VEGETATED BRUSH TRENCH

PERMIT DRAWINGS

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RDG-20-173

DRAWING NUMBER

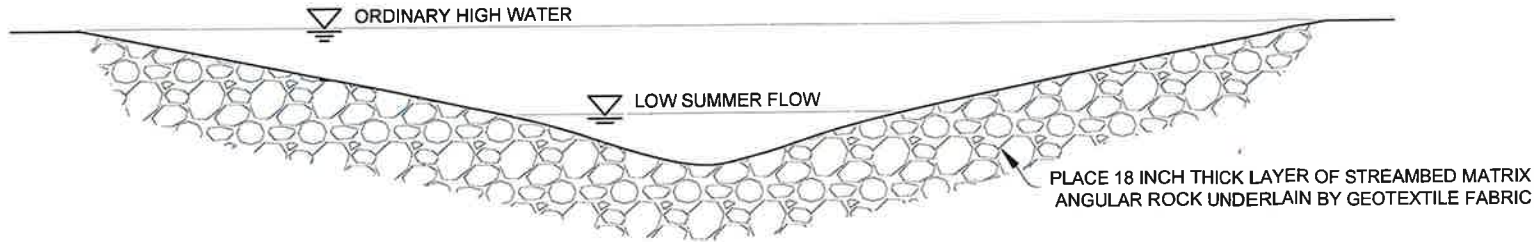
5.6

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1 LOW WATER CROSSING PLAN VIEW
1" = 10'



2 LOW WATER CROSSING CROSS SECTION
1" = 3'

GENERAL NOTES

THE ROCK SHALL BE PLACED BY EQUIPMENT TO THE DEPTHS AND ELEVATIONS SPECIFIED. THE STRUCTURE SHALL BE CONSTRUCTED TO THE FULL COARSE THICKNESS IN ONE OPERATION AND IN A MANNER THAT PREVENTS DISPLACEMENT OF THE UNDERLYING MATERIALS. THE ROCK SHALL BE PLACED IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH LARGER ROCKS UNIFORMLY DISTRIBUTED AND FIRMLY IN CONTACT WITH ONE ANOTHER WITH GAPS LESS THAN TWO INCHES. THE SMALLER ROCKS AND SPALLS FILL THE VOIDS BETWEEN THE LARGER ROCKS. END DUMPING OR DOZER PLACEMENT OF ROCK IS NOT PERMITTED.

THE FINAL ELEVATION OF THE SURFACING STONE IN THE BOTTOM OF THE SIDE CHANNEL CROSSING SHOULD BE NO HIGHER THAN THE ORIGINAL STREAM BOTTOM ON BOTH THE UPSTREAM AND DOWNSTREAM EDGES OF THE CROSSING OR ACCESS POINT.

ENTRANCE AND EXIT APPROACHES SHALL TRANSITION TO THE TERRACE ELEVATION. ENTRANCE AND EXIT APPROACHES TO THE CROSSING SHALL BLEND IN WITH THE EXISTING SITE CONDITIONS WHERE POSSIBLE, BUT SHOULD NOT BE STEEPER THAN 5:1. THE MINIMUM WIDTH APPROACHES SHOULD BE EQUAL TO THE WIDTH OF THE STRUCTURE.

ROCK SHOULD BE ANGULAR, WELL-GRADED MATERIAL AND SHALL BE OF THE GRADATION SHOWN ON THE DRAWINGS.

ACTUAL FILL HEIGHT (DEPTH) WILL BE DETERMINED BY THE SITE CONDITIONS.

STREAMBED MATRIX
ANGULAR ROCK GRADATION

PERCENT PASSING BY WEIGHT	AVERAGE PARTICLE SIZE (INCHES)
100	8
85	6
50	4
15	2

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DRAWING NUMBER

5.7

SITE REVEGETATION NOTES

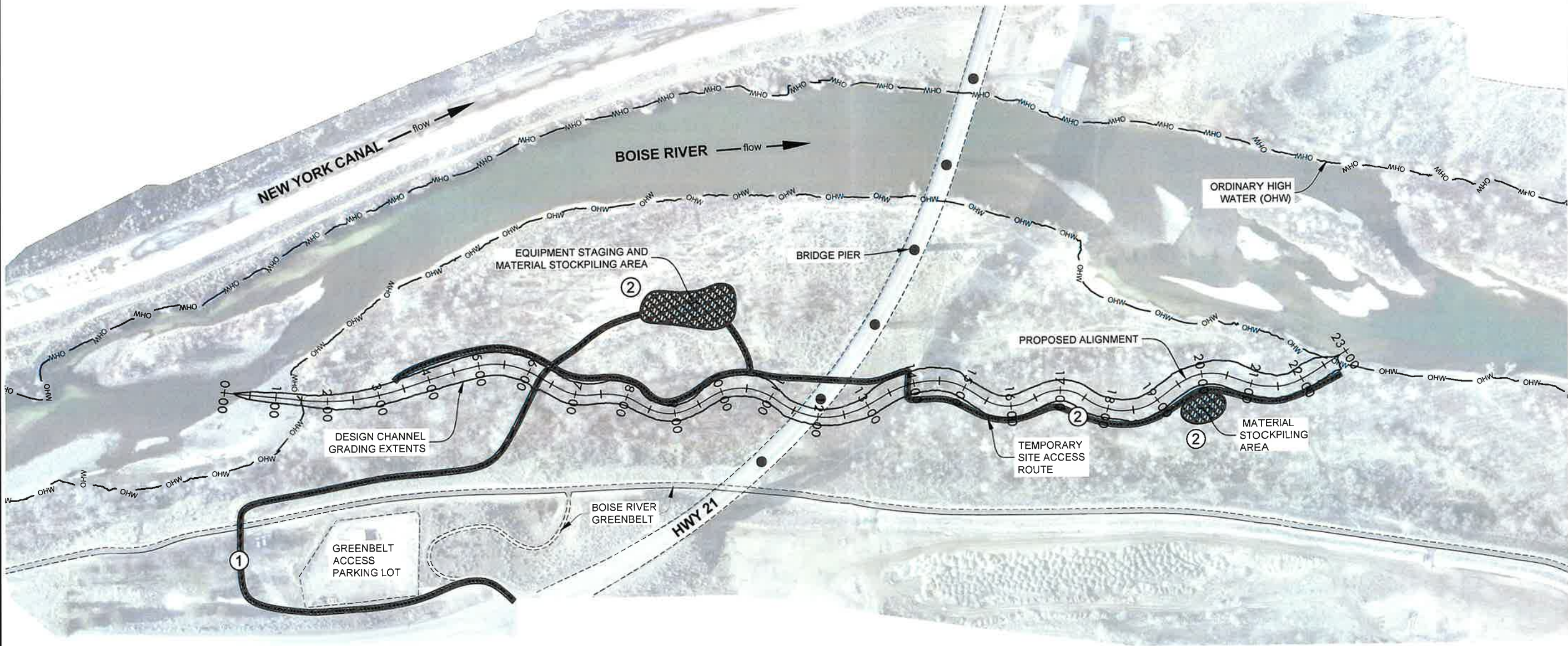
- 1. CONTRACTOR SHALL REMOVE ALL CONSTRUCTION MATERIALS, TEMPORARY FENCES AND FACILITIES, TRASH AND EQUIPMENT BROUGHT ON SITE TO COMPLETE THE PROJECT. AREAS WHERE CONSTRUCTION TRAFFIC ACCESSED AND MATERIALS WERE STAGED SHALL BE DECOMPACTED (SCARIFIED) FOR A DEPTH OF AT LEAST 6 INCHES, EXCEPT ROADS.
- 2. THE RECLAMATION SEEDING SHALL PERFORMED VIA HYDROSEED AND BE COMPRISED OF TWO DIFFERENT NATIVE SEED MIXES (FLOODPLAIN AND UPLAND) SPECIFIED IN THE SEEDING SCHEDULE ON DRAWING 7.1.

RECLAMATION SCHEDULE

RECLAMATION TREATMENT TYPE	TREATED PROJECT AREA (RECLAMATION PLAN)
STAGING AREA	0.37 ACRES
TEMPORARY ACCESS ROUTE	0.85 ACRES

SITE RECLAMATION NOTES

- 1. TEMPORARY ACCESS ROADS AND AREAS DISTURBED DURING CONSTRUCTION SHALL BE REHABILITATED TO SIMILAR OR BETTER THAN PRE-CONSTRUCTION CONDITIONS.
- 2. DESIGNATED DISTURBED AREAS SHALL BE BROADCAST SEEDED WITH SPECIFIED UPLAND OR FLOODPLAIN SEED MIXES. SEEDING AREAS AND MIXES ARE GIVEN ON DRAWING 7.1.



1 SITE RECLAMATION PLAN
1" = 200'

PERMIT DRAWINGS

SITE RECLAMATION PLAN
MICRON BOISE RIVER
BOISE, IDAHO

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PLANTING NOTES

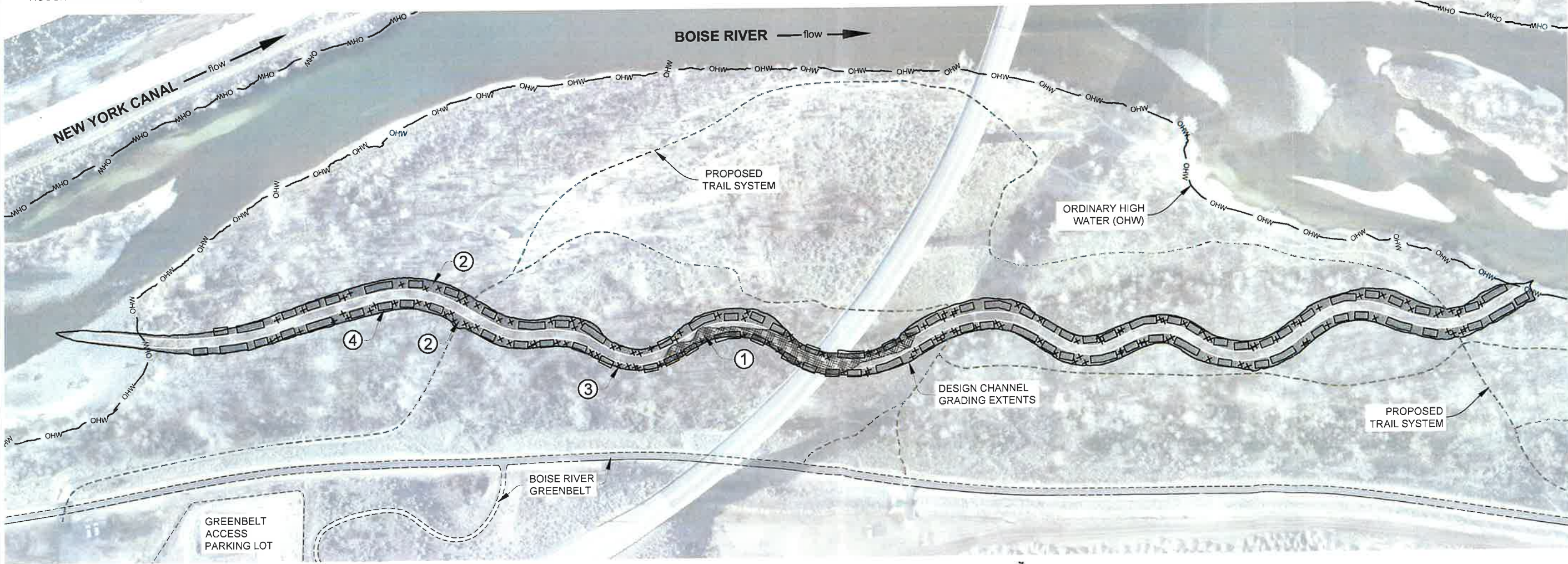
- 1. NO PESTICIDES, INCLUDING HERBICIDE, WILL BE ALLOWED WITHIN 150 FT OF THE WATER. MECHANICAL, HAND, OR OTHER METHODS MAY BE USED TO CONTROL WEEDS AND UNWANTED VEGETATION. FERTILIZER APPLICATION WITHIN 50 FT OF THE WATER IS NOT ALLOWED.
- 2. STOCKPILE ALL WOODY MATERIAL, NATIVE VEGETATION, TOPSOIL, AND NATURAL RIVER MATERIAL DISPLACED DURING CONSTRUCTION AND USE FOR SITE RESTORATION. THE STOCKPILED MATERIALS SHALL BE INCORPORATED INTO COVER OF DISTURBED AREAS TO RESTORE THE SITE TO NATURAL CONDITIONS WHILE MINIMIZING THE POTENTIAL FOR EROSION.
- 3. AFTER ALL TEMPORARY SITE SEEDING AND SITE STABILIZATION IS COMPLETE, LONG-TERM, PERMANENT REVEGETATION SHALL BE INSTALLED IN ACCORDANCE WITH REVEGETATION SCHEDULE INCORPORATED IN THIS DRAWING SET. WILLOW TRENCHES WILL BE FIELD FIT BETWEEN CONTAINERIZED PLANTINGS AND FINAL PLACEMENT WILL CONSIDER FLOODPLAIN ROUGHNESS AND FIELD CONDITIONS.
- 4. WILDLIFE BROWSE PROTECTION AROUND PLANTINGS WILL BE COMPRISED OF INDIVIDUAL BROWSE PROTECTORS AND WILDLIFE EXCLOSURE FENCING UNITS. EXCLOSURE FENCING UNITS CAN BE INSTALLED PRIOR TO PLANTING, WHILE INDIVIDUAL BROWSE PROTECTORS SHALL BE INSTALLED IMMEDIATELY AFTER PLANTING IS PERFORMED. FINAL PLACEMENT OF EXCLOSURE UNITS AND INDIVIDUAL BROWSE PROTECTOR CAGES WILL VARY BASED ON FLOODPLAIN ROUGHNESS AND FIELD CONDITIONS. TWO WILDLIFE EXCLOSURE UNITS CAN BE COMBINED WHERE FLOODPLAIN ROUGHNESS ALLOWS.

CONSTRUCTION NOTES

- 1 SALVAGE WILLOW CLUMPS FROM DESIGNATED AREA AND STORE UNTIL TRANSPLANTED.
- 2 INSTALL CONTAINERIZED PLANTINGS ON FLOODPLAIN IN SPECIFIED AREAS.
- 3 INSTALL INDIVIDUAL BROWSE PROTECTORS PER DRAWING 7.3 AROUND SPECIFIED VEGETATION.
- 4 INSTALL WILDLIFE EXCLOSURE FENCES PER DRAWING 7.3 AROUND SPECIFIED VEGETATION.

PLANTING SCHEDULE

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE (GALLON)	MINIMUM SPACING (FT)	NUMBER IN FENCING UNITS	NUMBER IN INDIVIDUAL CAGES	TOTAL NUMBER
BLACK COTTONWOOD	POPULUS TRICHOCARPA	1	10	140	20	160
		5	15	10	10	20
		20	15	-	20	20
WATER BIRCH	BETULA OCCIDENTALIS	1	15	10	-	10
		5	15	-	10	10
SERVICE BERRY	AMELANCHIER ALNIFOLIA	1	8	29	5	34
CHOKECHERRY	PRUNUS VIRGINIANA	1	8	17	-	17
BLUE ELDERBERRY	SAMBUCUS NIGRA SSP. CAERULEA	1	8	17	-	17
		5	8	-	20	20
BLACK HAWTHORN	CRATAEGUS DOUGLASII	1	8	29	5	34
GOLDEN CURRANT	RIBES AUREUM	1	6	111	10	121
SYRINGA	PHILADELPHUS LEWISII	1	6	111	10	121
RED-OSIER DOGWOOD	CORNUS SERICEA	1	6	152	30	182
YELLOW WILLOW	SALIX LUTEA	1	6	30	-	30
TOTAL				656	140	796



1 PLANTING LAYOUT

1" = 150'



PERMIT DRAWINGS

PLANTING LAYOUT
MICRON BOISE RIVER
BOISE, IDAHO

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RDG
RIVER DESIGN GROUP

236 Wisconsin Avenue
Whiterish, MT 59537
406.862.4927

311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920

SEEDING NOTES

1. SEEDING SHALL TAKE PLACE AFTER ACCESS AND STAGING AREAS ARE RECLAIMED.

CONSTRUCTION NOTES

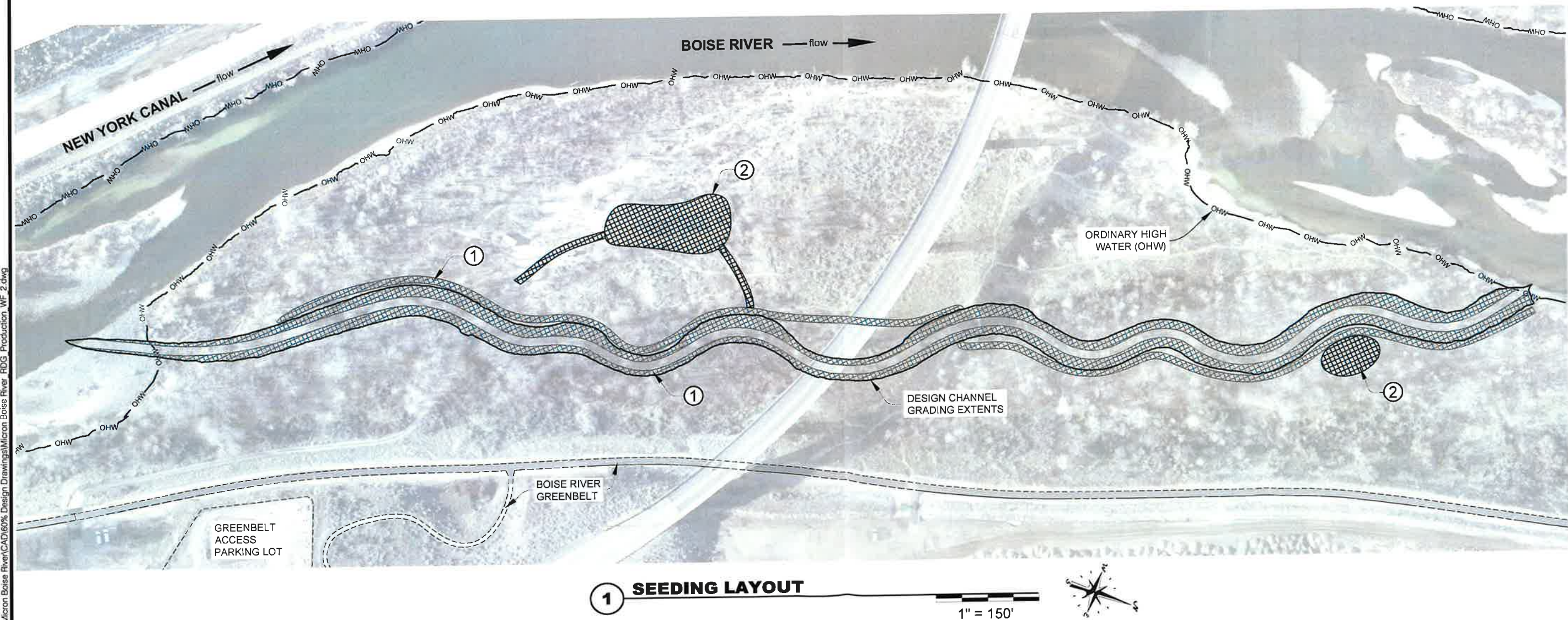
- 1 HYDROSEED DESIGNATED AREAS USING FLOODPLAIN SEED MIX (GIVEN BY SCHEDULE SPECIFIED IN DRAWING SET).
- 2 HYDROSEED DESIGNATED AREAS USING UPLAND SEED MIX (GIVEN BY SCHEDULE SPECIFIED IN DRAWING SET).

FLOODPLAIN SEEDING SCHEDULE

COMMON NAME	SCIENTIFIC NAME	LBS/ACRE (PLS)	TOTAL PLS LBS
SLENDER WHEATGRASS	ELYMUS TRACHYCAULUS	5.24	9.69
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	9.31	17.22
BLUEJOINT	CALAMAGROSTIS CANADENSIS	0.58	1.08
MEADOW BARLEY	HORDEUM BRACHYANTERUM	8.18	15.14
PRAIRIE FLAX	LINUM LEWISII	0.58	1.08
UTAH SWEETVETCH	HEDYSARUM BOREALE	0.15	0.27
SHOWY MILKWEED	ASCLEPIAS SPECIOSA	0.15	0.27
TOTAL			44.74

UPLAND SEEDING SCHEDULE

COMMON NAME	SCIENTIFIC NAME	LBS/ACRE (PLS)	TOTAL PLS LBS
INDIAN RICEGRASS	ACHNATHERUM HYMENOIDES	4.17	1.42
BLUEBUNCH WHEATGRASS	PSEUDOROEGNERIA SPICATA	4.17	1.42
BEARDLESS WILDRYE	LEYMUS TRITICOIDES	11.59	3.94
BASIN WILDRYE	LEYMUS CINEREUS	3.51	1.19
SANDBERG BLUEGRASS	POA SECUNDA	0.46	0.16
PRAIRIE FLAX	LINUM LEWISII	0.12	0.04
SCARLET GLOBEMALLOW	SPHAERALCEA COCCINEA	0.72	0.25
ARROWLEAF BALSAMROOT	BALSAMORHIZA SAGITTATA	0.26	0.09
TOTAL			8.50



1 SEEDING LAYOUT

1" = 150'



PERMIT DRAWINGS

SEEDING LAYOUT
MICRON BOISE RIVER
BOISE, IDAHO

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REVEGETATION NOTES

GENERAL NOTES

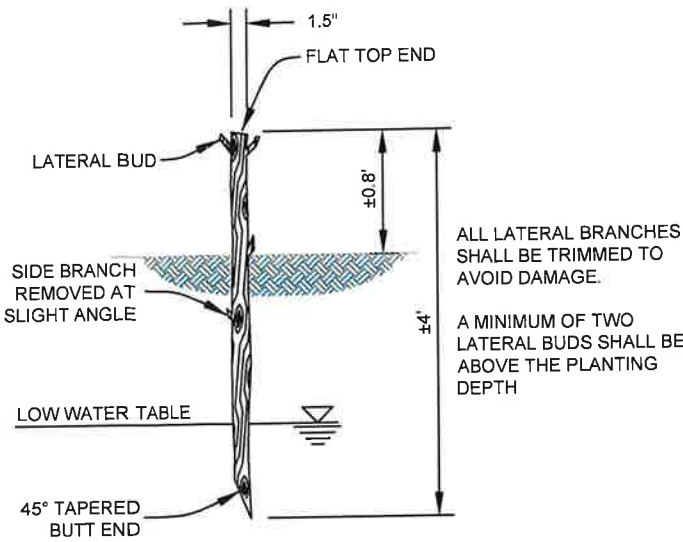
- 1. ALL PLANT MATERIAL MUST BE CLASSIFIED AS NATIVE FROM THIS REGION AND NON-CLONAL IN ORIGIN. ALL NATIVE PLANT MATERIAL TO BE USED IN PLANTING AREAS TO ORIGINATE FROM PARENT SOURCES WITHIN 50 MILES OF SITE. SEED SOURCE MUST BE AS LOCAL AS POSSIBLE.
- 2. INSTALL TREE AND SHRUB SPECIES IN RANDOM GROUPINGS, AVOIDING LINEAR ROWS OR AS DIRECTED IN FIELD, WITHIN CLOSE PROXIMITY OF EXISTING PLANTINGS OR NEWLY PLANTED MATERIAL. THE INTENT IS TO REPLICATE NATURAL PLANT COMMUNITIES BY PROVIDING A LAYERED UNDERSTORY CANOPY WITH A MIXTURE OF TREES IN THE OVERSTORY.
- 3. ALL PLANTED NURSERY-GROWN SHRUBS AND TREES SHALL BE PROTECTED FROM WILDLIFE BROWSE FOR A MINIMUM OF 5 YEARS WITH TEMPORARY FENCING, PER DRAWING 7.3.
- 4. THE PLANTING AND SEEDING AREA IS TO BE COVERED WITH TOPSOIL. IF THIS TOPSOIL IS DEEMED BY PROJECT ENGINEER TO BE INADEQUATE, IMPORTED MATERIAL SHALL BE USED TO POCKET PLANT THE PLANTS IN FLOODPLAIN LOCATIONS.
- 5. THOROUGHLY WATER ALL PLANTS IMMEDIATELY FOLLOWING INSTALLATION TO PROVIDE MAXIMUM SOIL CONTACT AND TO ELIMINATE AIR POCKETS. AFTER PLANTING EACH PLANT, PROVIDE A TWO (2) INCH LAYER OF MULCH AROUND DISTURBED AREA.

WILLOW STAKE PLANTING

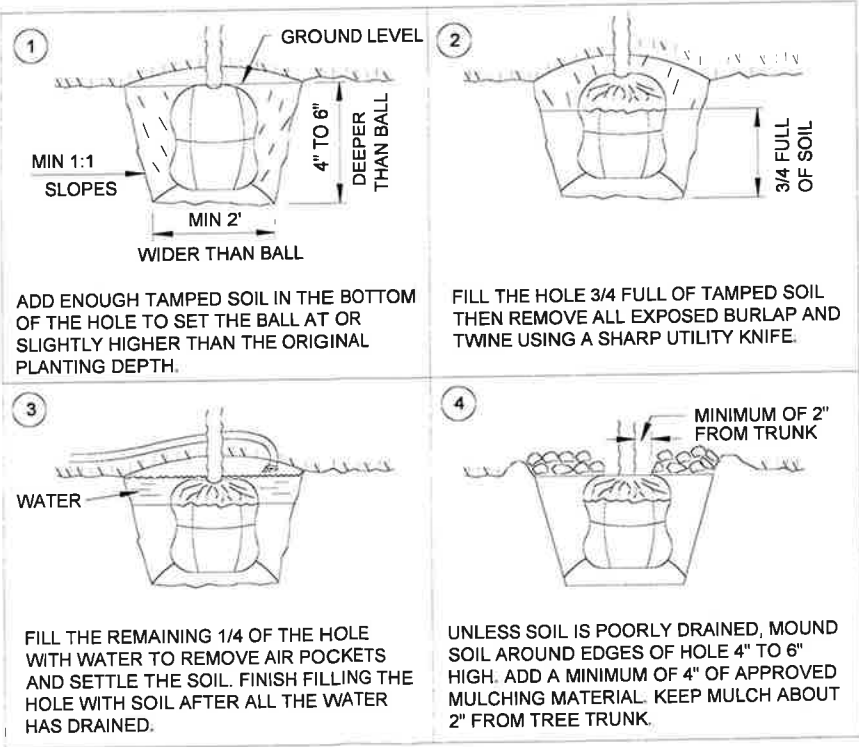
- 1. WILLOW STAKES SHALL HAVE MINIMUM DIAMETER OF 0.75" AND MINIMUM LENGTH 6'. THE STAKES SHALL BE CUT FROM NEARBY PLANTS TO ENSURE COMPATIBILITY IF POSSIBLE, OR LOCAL ECOTYPES. STAKES SHALL HAVE SIDE BRANCHES CLEANLY REMOVED WITH BARK INTACT, BASAL ENDS CUT AT AN ANGLE AND TOPS CUT SQUARE.
- 2. STAKES SHALL BE INSTALLED WHILE IN THE DORMANT STAGE, NOVEMBER 1 TO FEBRUARY 15 IN THE TREASURE VALLEY, UNLESS IRRIGATION IS PROVIDED. STAKES SHOULD BE DEEP ENOUGH TO CONTACT THE LOW SUMMER WATER LEVEL.
- 3. STAKES SHALL BE INSTALLED PER DETAIL 2 WITH 80% OF THE STAKE LENGTH INSTALLED INTO THE GROUND WITH FIRM SOIL IN CONTACT WITH THE WILLOW STAKE. A PIECE OF REBAR SHOULD BE USED AS A PILOT HOLE FOR THE STAKE.
- 4. TAMP STAKES INTO GROUND WITH A DEAD BLOW HAMMER (HAMMER HEAD FILLED WITH SHOT OR SAND).
- 5. WILLOW CLUMPS ARE PREFERRED TO LIVE STAKES ON THE LOWER HALF OF THE STREAMBANK. INSTALL PER NRCS PLANT MATERIALS TECHNICAL NOTE 42.
- 6. ALTERNATE INSTALLATION PROCEDURES MAY BE USED UPON CONSULTATION WITH PROJECT ENGINEER.

WILLOW CLUMP PLANTING

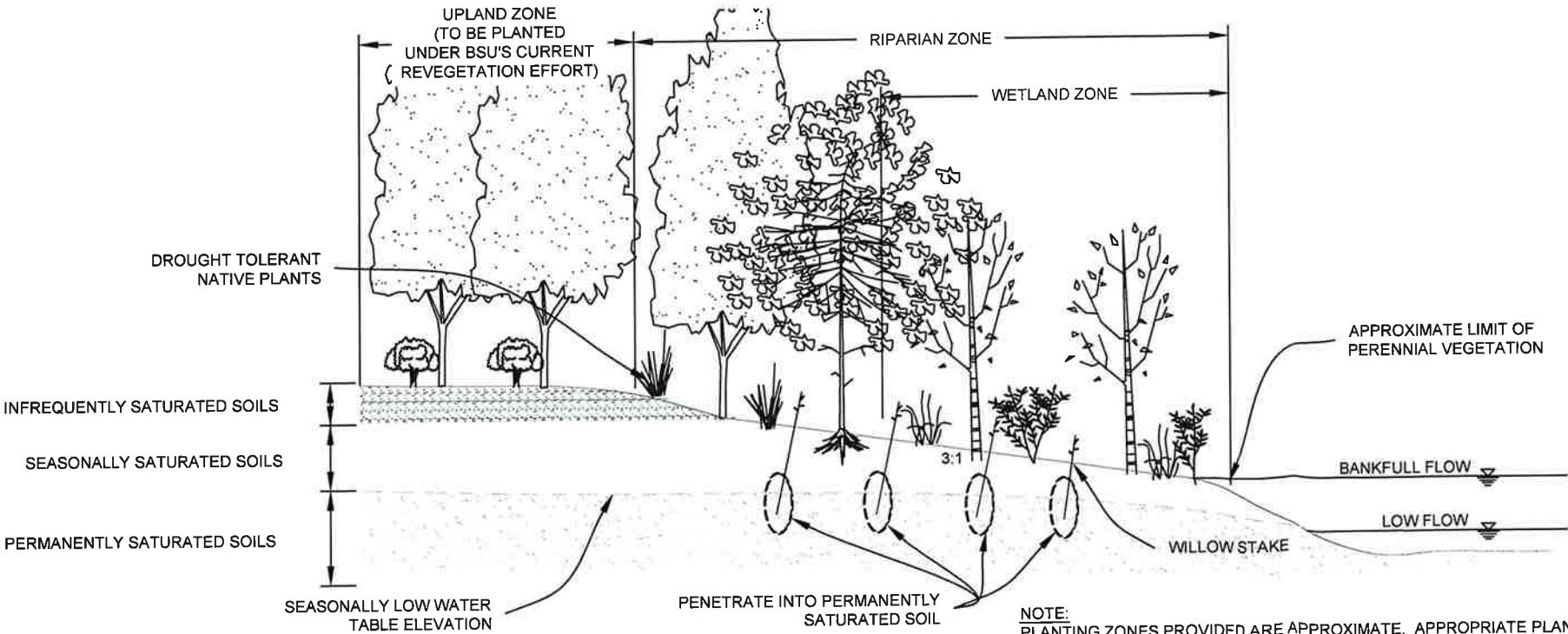
- 1. WILLOW CLUMPS SHALL BE SALVAGED FROM PROJECT AREA AS SHOWN ON SHEET 7.0, FROM WITHIN THE CONSTRUCTION EXTENTS. FILL IN ANY HOLES WHERE DONOR CLUMPS ARE EXTRACTED.
- 2. WILLOW CLUMP PLANTINGS SHALL FOLLOW THE NATURAL RESOURCE CONSERVATION SERVICE (NRCS) PLANT MATERIALS TECHNICAL NOTE 42 (2003).
- 3. LOCATE AND UTILIZE YOUNG AND VIGOROUS (8' - 20' TALL) WILLOW CLUMPS IN CONSULTATION WITH THE PROJECT ENGINEER. DIG THE WILLOW CLUMP UTILIZING A TRACKHOE BUCKET AND OBTAIN AT LEAST 75% OF THE ROOT MASS. DO NOT ALLOW CLUMPS TO SIT MORE THEN 1 HOUR OR DRY OUT. TRANSPORT CLUMPS TO PLANTING SITE.
- 4. DIG A HOLE UTILIZING THE TRACKHOE BUCKET TO THE SAME SIZE AND SHAPE OF THE CLUMP. HOLE SHALL BE TO A DEPTH JUST ABOVE THE STANDING WATER TABLE AND NOT INTO THE WATER TABLE. PACK THE SOIL FIRMLY IN THE EXCAVATED HOLE UPON INSTALLATION.
- 5. AFTER INSTALLATION, CUT OFF APPROXIMATELY 33%-50% OF THE WILLOW TOPS STRAIGHT ACROSS.



2 WILLOW STAKING DETAIL NOT TO SCALE



3 WILLOW CLUMP/SHRUB PLANTING DETAIL



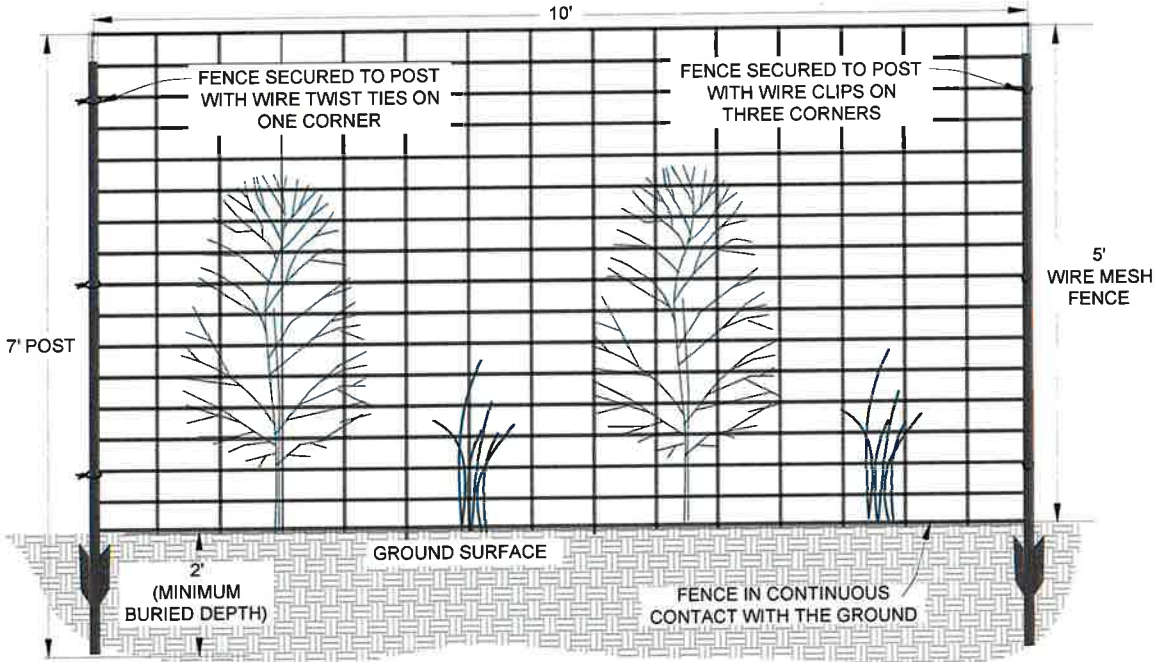
1 PLANTING ZONES NOT TO SCALE

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FENCING NOTES

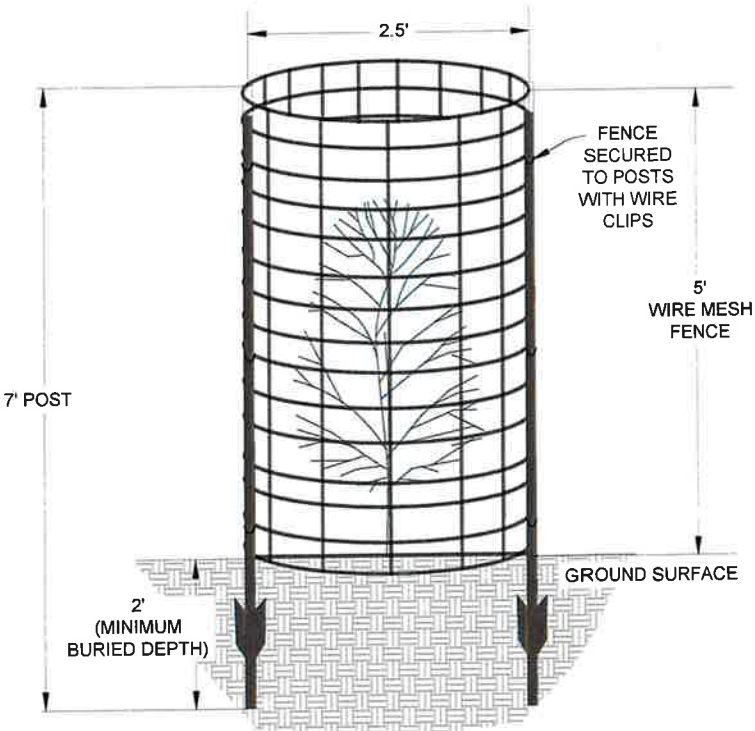
1. FENCING UNITS WILL BE COMPRISED OF INDIVIDUAL BROWSE PROTECTORS AND WILDLIFE EXCLOSURE FENCES AND SHALL BE INSTALLED AFTER REVEGETATION IS PERFORMED. FINAL PLACEMENT OF EXCLOSURE UNITS AND INDIVIDUAL BROWSE PROTECTOR CAGES WILL VARY BASED ON FLOODPLAIN ROUGHNESS AND FIELD CONDITIONS. FENCING UNITS SHALL BE INSTALLED IN AREAS DESIGNATED BY DRAWING 7.0.
2. WILDLIFE EXCLOSURE UNITS WILL BE 10 X 20 FT. TWO WILDLIFE EXCLOSURE UNITS WILL BE COMBINED WHERE FLOODPLAIN ROUGHNESS ALLOWS.



1 WILDLIFE EXCLOSURE PLAN VIEW
NOT TO SCALE

MATERIAL SCHEDULE

ITEM	QUANTITY	UNITS	DIMENSIONS
EXCLOSURE FENCING UNITS (10 X 20 FT, 108 TOTAL)			
WIRE MESH FENCE (WITH BLACK POLYPROPYLENE COATING)	6,480	LINEAR FEET	5' TALL
STEEL T-POSTS (4 PER UNIT)	432		7' TALL
WIRE CLIPS	972		
HEAVY DUTY SOFT WIRE TWIST TIES	324		0.16
INDIVIDUAL PLANT CAGES (2.5 FT DIAMETER, 140 TOTAL)			
WIRE MESH FENCE (WITH BLACK POLYPROPYLENE COATING)	1162	LINEAR FEET	5' TALL
STEEL T-POSTS (2 PER CAGE)	280	0.72	7' TALL
WIRE CLIPS	840	0.26	0.09



2 INDIVIDUAL BROWSE PROTECTOR PLAN VIEW
NOT TO SCALE

FENCING DETAILS
MICRON BOISE RIVER
BOISE, IDAHO

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