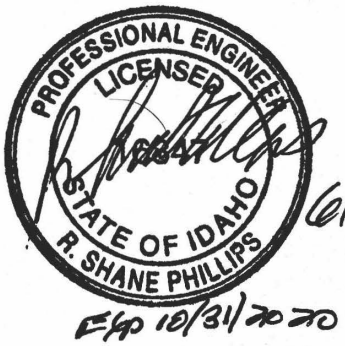
PRIEST LAKE WATER MANAGEMENT PROJECT
OUTLET DAM IMPROVEMENTS

TECHNICAL SPECIFICATIONS

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6/26/2020

Exp 10/31/2020

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PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The work includes improvements at Priest Lake Outlet Dam as described below:

1. Installation of new concrete and armor rock scour apron extension.
2. Extending height of existing tainter gates to accommodate higher pool levels.
3. Replacing trunnion pins.
4. Strengthening existing gate assembly.
5. Repairing existing concrete and expansion joints.
6. Repair of existing railing.

1.02 ACRONYMS

A. CFS = Cubic feet per second

B. DEQ = Department of Environmental Quality

C. IDAPA = Idaho Administrative Procedures Act

D. ITD = Idaho Transportation Department

E. OHW = Ordinary High Water, as shown on the Contract Drawings

F. USACE = United States Army Corps of Engineers

G. USFS = United States Forest Service

H. USFWS = United States Fish and Wildlife Service

1.03 SITE CONDITIONS

A. SITE INVESTIGATION AND REPRESENTATION

1. The Contractor acknowledges that they are satisfied as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this Contract.
2. The Contractor further acknowledges that they are satisfied as to the character, quality, and quantity of surface and subsurface materials to be encountered from their inspection of the site and from reviewing any available records of exploratory work furnished by the Owner or

included in these documents. Failure by the Contractor to acquaint themselves with the physical conditions of the site and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work.

3. The Contractor warrants that as a result of their examination and investigation of all the aforesaid data that they can perform the work in a good and workmanlike manner and to the satisfaction of the Owner. The Owner assumes no responsibility for any representations made by and of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner.

B. INFORMATION ON SITE CONDITIONS

1. Any information obtained by the Owner's Representative regarding site conditions, site access, subsurface information, groundwater and surface water elevations, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the Owner's Representative upon request. Such information is offered as supplementary information only. Neither the Owner's Representative nor the Owner assumes any responsibility for the completeness or interpretation of such supplementary information.

C. SUBSURFACE INVESTIGATION

1. Any information the Owner may have concerning subsurface conditions will be made available to the Contractor upon request.

2. The Contractor shall examine the site and may make arrangements with the Owner to conduct their own subsurface investigation.

D. UNDERGROUND UTILITIES

1. Known utilities and structures adjacent to or encountered in the work are shown on the Contract Drawings and referenced in the Appendices. The locations shown are taken from existing records and the best information available from existing utility plans; however, it is expected that there may be some discrepancies and omissions in the locations and quantities of utilities and structures shown. Those shown are for the convenience of the Contractor only, and no responsibility is assumed by either the Owner or the Owner's Representative for their accuracy or completeness.

E. CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

1. Where the Contractor's operations could cause damage or inconvenience to railway, telegraph, telephone, television, power, oil, gas, water, sewer, or irrigation systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor.

2. Notify all utility offices which are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

3. The Contractor shall be solely and directly responsible to the operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

4. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

5. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

6. In the event the Contractor encounters water service lines that interfere with trenching, they may, by obtaining prior approval of the property owner, Utility Manager, or Fire Department as applicable, and the Owner’s Representative, cut the service, dig through, and restore the service with similar and equal materials at the Contractor's expense.

7. The Contractor shall replace, at their own expense, any and all other existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents or ordered by the Owner’s Representative.

F. INTERFERING STRUCTURES

1. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Contract Drawings. While the information has been compiled from the best available sources, its completeness and accuracy cannot be

guaranteed, and it is presented simply as a guide to avoid known possible difficulties.

G. FIELD RELOCATION

1. During the progress of construction, it is expected that minor relocations of the work may be necessary. Such relocations shall be made only by direction of the Owner's Representative. If existing structures are encountered which prevent the construction, and which are not properly shown on the Contract Drawings, notify the Owner's Representative before continuing with the construction in order that the Owner's Representative may make such field revisions as necessary to avoid conflict with the existing structures. If the Contractor shall fail to so notify the Owner's Representative when an existing structure is encountered, and shall proceed with the construction despite this interference, they shall do so at their own risk.

H. EASEMENTS

1. Where portions of the work are located on public or private property, easements and permits will be obtained by the Owner. Easements will provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements and permits are available upon request to the Owner. It shall be the Contractor's responsibility to determine the adequacy of the easement obtained in every case and to abide by all requirements and provisions of the easement. The Contractor shall confine their construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owners or appropriate public agency for the additional area required. Any damage to property, either inside or outside the limits of the easements provided by the Owner, shall be the responsibility of the Contractor as specified herein. The Contractor shall remove, protect, and replace all fences or other items encountered on public or private property. Before final payment will be authorized by the Owner and Owner's Representative, the Contractor will be required to furnish the Owner, Owner's Representative, and Owner's Construction Manager with written releases from property owners or public agencies where side agreements or special easements have been made by the Contractor or where the Contractor's operations, for any reason, have not been kept within the construction right-of-way obtained by the Owner.

2. It is anticipated that the required easements and permits will be obtained before construction is started. However, should the procurement of any easement or permit be delayed, the Contractor

shall schedule and perform the work around these areas until such a time as the easement or permit has been secured.

I. LAND MONUMENTS

1. The Contractor shall notify the Owner's Representative of any existing Federal, State, City, County, and private land monuments encountered. Private monuments that are within 5 feet of the trench centerline shall be preserved or replaced by a licensed surveyor at the Owner's expense. When Government monuments are encountered, the Contractor shall notify the Owner's Representative at least 2 weeks in advance of the proposed construction in order that the Owner's Representative will have ample opportunity to notify the proper authority and reference these monuments for later replacement.

1.04 TIME FOR COMPLETION OF PROJECT

A. Substantially complete project in accordance with the Contract Drawings and Specifications within the timeframe outlined herein. Final Completion of the project, in accordance with Contract Documents shall occur within 30 calendar days from substantial completion date.

B. All in-water work shall be completed by March 15th, 2021. All other work shall be completed before the date set forth in the Contract Documents. The project shall be substantially completed by April 1st, 2020.

C. No time extensions or extra compensation will be granted for delays due to inclement weather conditions or due to a delayed start.

1.05 PROJECT START DATE

A. The Project Start Date shall be identified in the Notice to Proceed. No work is allowed within the project site limits or laydown and access area prior to Tuesday, September 15th, 2020. Work below OHW shall start on or around November 1st, 2020. No work below OHW is allowed prior to November 1st, 2020. Hauling and stockpiling of stone at the designated site(s) outlined in Appendix C – Stockpiling Areas, may start before the Project Start Date.

1.06 HOURS OF WORK

A. Except in the case of an emergency or unless otherwise approved by the Owner, the work hours shall be between 7 a.m. through 6 p.m. Monday through Saturday, excluding national holidays.

B. If the Contractor desires to perform Work on holidays or outside the work hours stated above, the Contractor shall apply in writing to the Owner for permission to Work such days or times.

1.07 PRE-CONSTRUCTION CONFERENCE

A. Following notification of award to Contractor, the date for an on-site pre-construction conference will be set at a minimum 45 days prior to project

start date. Do not commence work prior to conference or until written clearance has been obtained from the Owner.

B. Furnish Owner's Representative and Owner's Construction Manager with the following:

1. Complete list of sub-contractors, including business address, telephone numbers, items of Work, and registration numbers. List is to be updated during contract life.
2. Name of Contractor's superintendent who will be on job at all times.
3. A progress schedule in accordance with these Technical Specifications.
4. A detailed cost breakdown for lump sum bid items including equipment, labor, materials, and fees. Furnish a fair evaluation of actual cost of each items of Work listed. This will be used in processing Contractor's requests for partial payment and change orders. Submittal of breakdown does not affect the Contract terms.
5. Construction Sequence Work Plan and other Work Plans as required by the Contract Specifications and Contract Drawings.

1.08 CONSTRUCTION SEQUENCING

A. Phasing of flow diversion & dewatering, excavation, outlet dam improvements, and scour apron construction is critical to completing the project within the allotted work window. The Contractor shall submit a detailed Construction Sequence Work Plan as outlined in the Contract Drawings to the Owner's Representative and shall receive approval 45 days prior to start of construction. The approved Construction Sequence Work Plan shall be updated weekly during construction and submitted to the Owner's Representative and Owner's Construction Manager for review. See Contract Drawings and Specifications for additional requirements.

1.09 ENGINEERING REQUIREMENTS

A. The Contractor shall review the enclosed data (Appendix E – Water Level & Flow Data), publicly available USGS data, and site conditions to develop a work plan that will provide protection of the active work area from inundation of water for the range of flows anticipated during Construction.

B. Dewatering will be required to complete the Work. The Contractor is responsible for selection of their preferred river flow and water level conditions for the cofferdam and flow diversion design, in accordance with Section 02 20 00 Cofferdams and Dewatering.

1.10 PROGRESS CLEANING

A. Remove rubbish and debris from the project site limits daily. Storage of materials is not allowed on site unless specified by the Owner's Representative.

B. Maintain work area in a neat and orderly condition at all times.

C. All cleanup operations are incidental to the Contract and no extra compensation will be made.

1.11 PUBLIC SAFETY AND CONVENIENCE

A. ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

1. Authorized representatives of the Idaho Department of Health and Welfare, and other government officials shall at all times have safe access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

B. PROTECTION OF PROPERTY

1. Protect stored materials, cultivated trees and crops, and other items located adjacent to the proposed work. Notify property owners affected by the construction at least 48 hours in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding 8 hours, unless the Contractor has made special arrangements with the affected persons.

2. Provide for access at all times for livestock through farm areas, and no portion of farmlands in which livestock are pastured shall be cut off from ready access by the farm animals.

C. FIRE PREVENTION AND PROTECTION

1. The Contractor shall perform all work in a fire-safe manner. They shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable Federal, local, and State fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations, (NFPA No. 241) shall be followed.

D. ACCESS FOR POLICE, FIRE, AND POSTAL SERVICE

1. Notify the Fire department and Police Department before closing any street or portion thereof. No closing shall be made without the Owner's Representative's approval. Notify said departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead- end streets, in excess of 300 linear feet, without special written permission from the Fire Department. Conduct operations with the

least interference to fire equipment access, and at no time prevent such access.

2. The Contractor shall leave night emergency telephone number or numbers with the Police Department, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

3. Maintain postal service facilities in accordance with the requirements of the U. S. Post Office Department. Move mailboxes to temporary locations designated by the Post Office Department, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U. S. Post Office Department.

1.12 UNANTICIPATED DISCOVERY OF CULTURAL OR ARCHEOLOCIAL RESOURCES

A. No cultural or archaeological resource sites are known to exist within project site limits. However, there always exist the potential for unanticipated discoveries during excavation work.

B. Owner, Owner Representatives, Owner's Construction Manager, Contractors, and workers must be aware of clues that signify a potential discovery and what actions must be taken to protect discovery.

C. Clues that may signal the presence of cultural or archaeological resources are:

1. Artifacts: Artifacts may be found exposed in open trenches or back dirt piles. These may range from finished tools such as stone pestles, arrowheads or polished bone tools to small pieces of exotic stone such as chert, jasper or obsidian. Historic artifacts include: bottles, cans, bricks, window glass, square nails or other objects in excess of 50 years age. Do not remove items.

2. Buried features/midden: During excavation, exposed trench walls may contain buried features such as campfire hearths or shell middens. In cross-section, hearths look like evidence shallow lenses (saucer shaped) of rock, charcoal and blackened sediment. Middens are buried prehistoric ground surfaces. These are usually thin lenses of dark greasy sediments running horizontally for many feet in different directions. Near shorelines, these middens are characterized by accumulations of broken and burned shellfish remains. Occasionally they may also contain artifacts and/or broken bone fragments.

D. If resources of potential cultural or archeological resources are discovered the Contractor shall follow these steps:

1. The Contractor will immediately stop work in the vicinity of the find and notify the Owner's Representative.

1.13 AS-BUILT DRAWINGS

A. Keep a clean set of full-sized design drawings at job site and kept updated to identify all changes.

1.14 PROJECT CONDITIONS SITE SAFETY

A. The Contractor shall be solely responsible for job-site safety. Contractor shall adhere to requirements for safety established in state and federal regulations.

B. Federal, state, and local laws, rules, and regulations related to construction, safety and health standards are essential and must be followed by the Contractor. The Contractor will conduct their work in a safe and prudent manner at all times. The Contractor is prohibited from allowing or requiring workers to work in conditions that are unsanitary, hazardous, or dangerous to their health or safety.

C. Provide reasonable restroom facilities for personnel and adequate work time to use those facilities, including provision of portable facilities for moving operations.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 - GENERAL

1.01 SCOPE

A. The work included in this Contract is defined in the Contract Drawings and within these specifications under the following Division Numbers:

1. DIVISION 1 – GENERAL REQUIREMENTS
2. DIVISION 2 – EXISTING CONDITIONS
3. DIVISION 3 – CONCRETE
4. DIVISION 5 – METALS
5. DIVISION 31 – EARTHWORK
6. DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

B. The work under this contract is to provide, furnish and/or install all labor, materials and equipment, as may be required to complete the work, installed, tested, and ready for use, and as described in these documents.

C. The work includes facility improvements at Priest Lake Outlet Dam as described below:

1. Installation of new concrete and armor rock scour apron extension.
2. Extending height of existing tainter gates to accommodate higher pool levels.
3. Replacing trunnion pins.
4. Strengthening existing gate assembly.
5. Repairing existing concrete and expansion joints.
6. Repair of railing.

1.02 LOCATION

A. This project is located at Priest Lake Outlet Dam on Priest River, near the south end of Priest Lake in Bonner County, Idaho 83856. The outlet dam is located south of the intersection of Idaho State Route 57 and Kokanee Park Drive.

1.03 ACCESS TO SITE

A. Access to site will be primarily from the north river bank, via Lamb Creek Lane and through the upland construction access easements, as shown on the Contract Drawings.

1.04 COORDINATION

A. The Contractor shall coordinate its activity with the Owner's Representative, so interference with recreational activities will be minimized.

B. The Contractor shall also coordinate its work with adjacent properties throughout the life of this contract at no additional expense to the Owner.

1.05 MATERIALS TESTING

A. Necessary materials testing shall be performed by an independent testing laboratory and paid for in accordance with Section 01 40 00 - Quality Requirements. Access to the area necessary to perform the testing and/or to secure the material for testing, shall be provided by the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

PART 1 - GENERAL

1.01 MEASUREMENT METHOD – TRUCK MEASUREMENT

A. Measurement for payment will be at the unit price as stipulated in the bid form for the items listed below. Payment shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified.

B. Truck Measurement Method - Stone

1. Measurement for imported materials delivered by trucks shall be measured in accordance with these procedures and requirements. Imported materials include the following:
   a. Bedding Stone
   b. Armor Stone Type
   c. Crushed Rock Base Course
2. Scales: All material delivered by vehicle shall be weighed on public scales or scales provided by the Contractor and approved by the Owner's Representative and/or Owner's Construction Manager. The scales shall be of sufficient capacity to permit weighing the transporting vehicle, both empty and full. Documentation of scale certification shall be provided to ensure accuracy of the scale being used.
3. Each truck shall be weighed and bear a unique identification number. Each vehicle operator shall obtain a weigh or load ticket from the scale operator. The tickets shall, at a minimum contain the following information:
   a. Date of haul;
   b. Contract number;
   c. Contract unit Bid item;
   d. Unit of measurement;
   e. Identification number of hauling vehicle; and
   f. Weight delivered:
      (1) Net weight in the case of batch and hopper scales
      (2) Gross weight, tare and net weight in the case of platform scales (tare may be omitted if a tare beam is used).
      (3) Approximate load out weight in the case of belt conveyor scales.
   g. The vehicle operator shall deliver the ticket in legible condition to the material receiver at the material delivery point. The material delivery point is defined as the location where the material is incorporated into the permanent Work.
   h. When requested by the Owner's Representative and/or Owner's Construction Manager, the Contractor's representative shall collect the tickets throughout the day

and provide them to the designated receiver, not later than the end of shift, for reconciliation. Tickets for loads not verified as delivered will receive no pay.

i. Stone Products: Types of material shall not be mixed in any given load.

j. Over placement: In the event of over- or under-placement of material with respect to the lines and grades shown on the Contract Drawings, the following conversion for pay quantities shall be used:

(1) When the quantity of material is determined by weight and must be computed by the volume, the weight will be determined by calculating the in-place gross volume of material and multiplying that volume by the specific gravity of the material as measured in laboratory tests. The weight will then be reduced by 28 percent to account for voids in the gross volume for the Stone.

1.02 MEASUREMENT METHOD – VOLUME IN PLACE

Volume (excavation and fill) – Measured by the average-end-area method or by the finite element analysis method utilizing digital terrain modeling techniques, based on pre- and post- construction surveys and intermediate/progress surveys (as outlined in Technical Specification 01 71 23 Construction Surveying).

1.03 MEASUREMENT FOR PAYMENT:

A. Measurement for payment will be at the unit price as stipulated in the bid form for the items listed below. Payment shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified.

B. The bid items are for work as shown in the Contract Drawings.

1. Mobilization/Demobilization:

a. Measurement: Lump Sum.

b. Description: Work under this item shall include mobilization and demobilization of construction equipment and costs of preparatory work and operations performed by the Contractor that are not defined as a part of a payment item.

c. Payment:

1) 40% after completion of 5% of the total contract amount of other bid items have been earned.

2) 80% after completion of 20% of the total contract amount of other bid items have been earned.

3) 100% after completion of all work on the project has been completed, including cleanup and acceptance of the project by the Owner's Representative.

2. Environmental Protection, Site Prep, & Site Restoration:

   a. Measurement: No unit of measurement shall apply to the lump sum price for "Environmental Protection, Site Prep, & Site Restoration".

   b. Measurement: Lump Sum (LS).

   c. Description: Work under this item shall include all materials, supplies, equipment, and labor required for fabricating, constructing, installing, and maintaining and repairing environmental protection measures as needed for temporary erosion and sediment control (TESC), traffic control, water quality protection and compliance with permit conditions, and spill prevention as described in Sections 01 57 13 – Temporary Erosion and Sediment Control, 01 35 43 – Environmental Controls of these Technical Specifications and as shown in the Contract Drawings. Work elements for this item include, if required, but are not limited to:

      1) Water Quality Monitoring and Control Plan

      2) Water Quality Control

      3) Water Quality Monitoring

      4) Spill Prevention, Control and Countermeasure Plan

      5) TESC Plan and Compliance

      6) BMPs (silt fencing, construction fencing, debris boom, silt curtain, etc.) as needed for compliance with permits

      7) Noise and air pollution controls

   d. Payment: Lump Sum (LS).

3. Temporary Access Road/Structure and River Crossing

   a. Measurement: Lump Sum (LS).

   b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for designing, constructing, maintaining, and protecting temporary access roads and providing access to the outlet dam and apron as defined in the Technical Specifications and as shown on the Contract Drawings.

   c. Payment: Lump Sum (LS).

4. Construction Surveying:

a. Measurement: Lump Sum (LS).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for terrestrial and hydrographic surveying work required to construct the project components as defined in Technical Specification Section 01 71 23 – Construction Surveying. The construction survey work includes establishing control and performing staking, electronic templates, pre-construction survey, pre- and post-excavation surveys, intermediate/progress surveys, and post-construction survey, as described in these Technical Specifications and as shown in the Contract Drawings.

c. Payment: Lump Sum (LS).

5. Cofferdams and Dewatering

a. Measurement: Lump Sum (LS).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required to design, complete, maintain, and remove all cofferdam, stream diversion, and dewatering activities, as described in Technical Specification Section 02 20 00 – Cofferdams and Dewatering and as shown on the Contract Drawings. Work also includes development and refinement of a Construction Phasing & Dewatering plan to complete the work.

c. Payment: Lump Sum (LS).

6. Excavation & Disposal - Streambed

a. Measurement: Per cubic yard (CY); measurement will be calculated on an in-situ basis for cubic yards removed within the work area presented on the Plans using pre-construction and intermediate/progress surveys in accordance with Section 01 71 23 Construction Surveying. The quantity of material disposed of upland will be confirmed by truck measurement.

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required to complete the excavation and disposal of existing streambed material and riprap, in accordance with the Contract Documents. This item includes removing 2,010 CY of material from the stream channel and transporting the material to the Contractor-provided upland disposal site, in accordance with these Technical Specifications. The total excavated volume shall be determined by pre- and post-excavations surveying of in-place excavated areas. Payment for the work includes all work

incidental to excavation and upland disposal of excavated material as described in these Technical Specifications and as shown in the Contract Drawings. Work also includes development and refinement of a work plan to complete the excavation work. All excavation work conducted outside the lines and grades shown in the Contract Drawings will not be paid.

c. Payment: Per cubic yard (CY).

7. Concrete – Apron Scour

   a. Measurement: Per cubic yard (CY).

   b. Description: Work under this item shall include all materials, supplies, equipment, and labor required to place 10 CY of lean concrete underneath portions of the existing apron to fill existing scour holes or undermining resulting from excavation operations as described in these Technical Specifications and as indicated in the Contract Drawings.

   c. Payment: Per cubic yard (CY).

8. Reinforced Concrete – Apron Extension

   a. Measurement: Per cubic yard (CY).

   b. Work under this item shall include all materials, supplies, equipment, and labor required to construct 365 CY of the reinforced concrete apron extension, associated joints, and connections to the existing dam as described in these Technical Specifications and as indicated in the Contract Drawings.

   c. Payment: Per cubic yard (CY).

9. Concrete Repair – Pier 6 Spalled Areas

   a. Measurement: Per cubic foot (CF).

   b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for saw cutting/chipping; capture and disposal of all deteriorated concrete debris, abrasive grit, water from repair activities. Included shall be all labor, equipment, and materials required to prepare and install the 36 CF repair materials as described in these Technical Specifications and as indicated in the Contract Drawings.

   c. Payment: Per cubic foot (CF).

10. Miscellaneous Steel – Strengthen Tainter Gate Skin Plate

a. Measurement: Per bay (BAY).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required to field measure, fabricate, and install vertical skin plate stiffeners in all 11 bays. Work shall also include field drilling, repair coatings, angles, bolts, nuts, and washers as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Per bay (BAY).

11. Miscellaneous Steel –Tainter Gate Extension

a. Measurement: Per bay (BAY).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required to field measure, fabricate, and install tainter gate extension in all 11 bays. Work shall also include field drilling, repair coatings, angles, bolts, nuts, and washers as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Per bay (BAY).

12. Miscellaneous Steel – Replace Trunnion Pins

a. Measurement: Per bay (BAY).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required to field measure, fabricate, and install tainter gate replacement trunnion pins in all 11 bays. Work shall also include temporary support of existing gates, bolts, nuts, and washers as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Per bay (BAY).

13. Replace J-Seals

a. Measurement: Per bay (BAY).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for removal and disposal of existing J-Seals and fabricating, installing, and installation of new J-Seals in all 11 bays as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Per bay (BAY).

14. Repair Expansion Joints – N & S Abutment Wing Walls

a. Measurement: Measurement for "Repair Expansion Joints – N & S Abutment Wing Walls" will be per linear foot (LF).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for removal and disposal of existing joint seal and installation of new joint seal with backer rod for 100 LF as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: "Repair Expansion Joints – N & S Abutment Wing Walls" will be per linear foot (LF).

15. Railing – Repair Damaged Section

a. Measurement: Per linear foot (LF).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for removing 8 LF of damaged section of railing. Work shall also include all materials, supplies, equipment, and labor required to field measure, fabricate, install, and coat 8 LF of new railing, along with repairing the coating of existing railing as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Per linear foot (LF).

16. Replace Grease Fittings and Pump

a. Measurement: Per bay (BAY).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for the removal of existing grease lines, fabrication, and installation of new grease lines in all 11 bays as described in these Technical Specifications and as indicated in the Contract Drawings. Work shall also include (2) new 20 V grease pumps, fittings, bolts, and supplemental steel as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Per bay (BAY).

17. Install New Gauge on North Abutment and South Abutment

a. Measurement: Each (EA).

b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for the removal of the existing gauge, fabrication, and installation of 2 new gauges as described in these Technical Specifications and as indicated in the Contract Drawings.

c. Payment: Each (EA).

18. Vibrating Piezometer Array

    a. Measurement: Lump Sum (LS).

    b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for fabrication, installation, and testing the vibrating piezometer array and associated equipment as described in these Technical Specifications and as indicated in the Contract Drawings.

    c. Payment: Lump Sum (LS).

19. Armor Stone

    a. Measurement: Per ton (TON).; measured based on Truck Measurement Method described in Paragraph 1.01 above.

    b. Description: Work under this item shall include all testing, materials, supplies, equipment, and labor required for supplying, transporting, stockpiling, and installing 2,070 tons of Armor Stone Type I as described in Technical Specification Section 35 31 23 – Armor Stone and as indicated in the Contract Drawings

    c. Payment: Per ton (TON).

20. Bedding Stone

    a. Measurement: Per ton (TON).; measured based on Truck Measurement Method described in Paragraph 1.01 above.

    b. Description: Work under this item shall include all materials, supplies, equipment, and labor required for supplying, transporting, stockpiling, and installing 1,390 tons of Bedding Stone as described in Technical Specification Section 35 31 23 Armor Stone and as indicated in the Contract Drawings.

    c. Payment: Per ton (TON)..

21. Crushed Rock Base Course

    a. Measurement: Per ton (TON).; measured based on Truck Measurement Method described in Paragraph 1.01 above.

    b. Work under this item shall include all materials, supplies, equipment, and labor required for supplying, transporting, stockpiling, and installing of 37 tons of Crushed Rock Base Course as described in Technical Specification Section 35 31 23 – Armor Stone and as indicated in the Contract Drawings

    c. Payment: Per ton (TON).

22. Geotextile Fabric:

    a. Measurement: Per square yard (SY).

b. Description: Work under this item shall include the materials, supplies, equipment and labor required to fabricate and install 621 SY of geotextile fabric as described in Technical Specification Section 35 31 23 – Armor Stone and as indicated in the Contract Drawings. Measurement for payment of Geotextile Fabric will be conducted for the material placed within the lines and grades shown on the Contract Drawings. Measurement for payment for Geotextile Fabric shall include the neat lines shown on the plans without overlaps at seams and joints.

c. Payment: Per square yard (SY).

23. Approach Redevelopment - Base Course

a. Measurement: Per ton (TON).

b. Description: Work under this item shall include the materials, supplies, equipment and labor required to install ~~39~~ **230 TONS** of the crushed surfacing base course for the approach redevelopment as described and indicated in the Contract Drawings.

c. Payment: Per ton (TON).

24. Approach Redevelopment - Top Course

a. Measurement: Per ton (TON).

b. Description: Work under this item shall include the materials, supplies, equipment and labor required to install ~~20~~ **200 TONS** of the crushed surfacing top course for the approach redevelopment as described and indicated in the Contract Drawings.

c. Payment: Per ton (TON).

25. Approach Redevelopment - Hot Mix Asphalt Paving

a. Measurement: Per ton (TON). (2,000 lbs per ton)

b. Description: Work under this item shall include the materials, supplies, equipment and labor required to install 25 TON of the hot mix asphalt paving for the approach redevelopment as described and indicated in the Contract Drawings.

c. Payment: Per ton (TON).

26. Minor Changes:

a. Measurement: No unit of measurement shall apply to the lump sum price for “Minor Changes.”

b. For the purpose of providing a common Proposal for all Bidders, an amount for "Minor Changes" has been entered as part of the total bid by the Contractor. This item includes payments, credits, or changes amounting to $10,000 or less for equitable adjustments for differing site conditions. At the discretion of the Owner, all or part of this estimated amount may be used in lieu of a formal change order. All work and payment under this bid item must be authorized by the Owner.

c. Payment for "Minor Changes" will be only for the charges and amounts approved by the Owner. If no changes are authorized under this bid item, final payment for this bid item will be $0 (zero). If the parties are able to agree, the price will be determined using unit prices or other agreed upon prices. If the parties cannot agree, the price will be determined by the Owner's Representative using unit prices; or other means to establish costs.

END OF SECTION

PART 1 - GENERAL

1.01 PRE-CONSTRUCTION MEETING

A. NOTIFICATION

1. Following the award, the Owner's Representative will confirm the date and time of a pre-construction meeting with the selected bidder.

B. LOCATION

1. The pre-construction meeting will be held at the project site.

C. ATTENDANCE

1. The following are requested to attend:

a. IWRB Representatives:

(1) Owner's Representative/Project Engineer – Mott MacDonald

(2) Contract Administrator

(3) Owner's Construction Manager

b. Contractor's Representatives:

(1) Project Manager (Superintendent)

(2) Contract Administrator

(3) Major Subcontractors

(4) Major Suppliers

c. Community Representative

1.02 PROGRESS MEETINGS

A. The Owner's Representative will schedule and administer weekly progress meetings throughout progress of the work.

B. The Owner's Representative will arrange meetings, prepare standard agenda with copies for participants, preside at meetings, record minutes and distribute copies within ten working days to the Contractor, meeting participants, and others affected by decisions made. Progress meetings may take place in-person or via teleconference, at the Owner's Reprsentative's discretion.

C. The Contractor is responsible for providing a location with teleconference capabilities and connectivity, as described in Section 01 50 00 – Temporary Facilities and Controls.

D. Attendance is required for the Contractor's job superintendent, and major subcontractors, Owner's Construction Manager, Owner, and Owner's Representative as appropriate to the agenda topics for each meeting.

E. Standard Agenda

1. Safety moment.
2. Review minutes of previous meeting.
3. Review of work progress.
4. Field observations, problems, and decisions.
5. Identification of problems that impede planned progress.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Coordination of projected progress.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Demonstration that the project record drawings are up-to-date.
13. Other business relating to the work.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for submittals, including shop drawings, product data, samples, and other submittals.

1.02 RELATED SECTIONS:

A. All Sections of these Technical Specifications are related to this Section. Required submittals are identified in each of the individual Technical Specification sections.

1.03 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's Representative receipt of submittal. No extension of the Contract time will be authorized because of failure to transmit submittals enough in advance of the work to permit processing, including resubmittals.

B. Initial Review: Allow ten (10) working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The Owner's Representative will advise Contractor when a submittal being processed must be delayed for coordination. The Owner's Representative will determine if submittals are acceptable and inform the Contractor whether the submittal is accepted or if modifications and resubmittal are required.

C. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

D. Resubmittal Review: Allow five (5) working days for review of each resubmittal.

E. Submittals: Place a permanent label or title block on each submittal item for identification. The Owner's Representative will be tracking and logging the status of each submittal and resubmittal.

F. Indicate name of firm or entity that prepared each submittal on label or title block.

G. Include the following information for processing and recording action taken:

1. Project name.
2. Date.
3. Name of construction manager.
4. Name of Contractor.
5. Name of Subcontractor.

6. Name of supplier.
7. Name of manufacturer.
8. Submittal number or other unique identifier, including revision identifier.
9. Number and title of appropriate Technical Specification section.
10. Contract Drawing number and detail references, as appropriate.
11. Location(s) where product is to be installed, as appropriate.
12. Other necessary identification.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

I. Note date and content of previous submittal.

J. Note date and content of revision in label or title block and clearly indicate extent of revision.

K. Resubmit submittals until they are marked with approval notation from Owner's Representative.

L. Distribution: Furnish copies of final submittals to manufacturers, Subcontractors, suppliers, fabricators, installers, and others as necessary for performance of construction activities. Show distribution on transmittal forms. The Contractor is responsible for furnishing copies to agencies from which Contractor has secured permits.

M. Use for Construction: Retain complete copies of submittals on project site. Use only final submittals that are marked with approval notation from Owner's Representative.

N. All text shall be legible with a font size 8 points or larger when printed on 8.5x11-inch paper.

PART 2 – PRODUCTS

2.01 SUBMITTAL PROCEDURES

A. General submittal procedure requirements: Prepare and submit submittals required by individual Technical Specifications to the Owner's Representative. Types of submittals are indicated in individual Technical Specification sections

B. Product data: Collect information into a single submittal for each element of construction and type of product or equipment.

C. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as shop drawings, not as product data.

D. Mark each copy of each submittal to show which products and options are applicable.

E. Include the following information, as applicable:

1. Manufacturer's catalog cuts.
2. Manufacturer's product specifications.
3. Standard color charts.
4. Statement of compliance with specified referenced standards.
5. Testing by recognized testing agency.
6. Application of testing agency labels and seals.
7. Notation of coordination requirements.
8. Availability and delivery time information.
9. Submit product data before or concurrent with samples.

F. Shop Drawings: Prepare project-specific information, drawn accurately to scale. Do not base shop drawings on reproductions of the Contract Drawings or standard printed data.

G. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

1. Identification of products.
2. Schedules.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Relationship and attachment to adjoining construction clearly indicated.
7. Seal and signature of professional engineer if required.

H. Sheet Size (when hard copies required): Except for templates, patterns, and similar full-size drawings, submit shop drawings on sheets at least 8-1/2 by 11 inches, but no larger than 22 by 34 inches.

I. Samples: Submit samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

J. Transmit samples that contain multiple, related components such as accessories together in one submittal package.

K. Identification: Attach label on unexposed side of samples that includes the following:

1. Generic description of sample.
2. Product name and name of manufacturer.
3. Sample source.
4. Number and title of applicable Technical Specification section.
5. Technical Specification paragraph number and generic name of each item.

L. Disposition: Maintain sets of approved samples at project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

M. Samples that may be incorporated into the work are indicated in individual Technical Specification sections. Such samples must be in an undamaged condition at time of use.

N. Samples not incorporated into the work, or otherwise designated as Owner's property, are the property of the Contractor.

O. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available. Submit material sample for items such as aggregates, soil, and mulch.

P. Contractor's Construction Schedule: Comply with requirements specified in the Specific Requirements and Technical Specification Section 01 31 19 – Project Meetings.

Q. Test and inspection reports and schedule of tests and inspections submittals.

R. Pre-work Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

S. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

T. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Include a detailed description of the differing conditions, together with recommendations for correcting the differing conditions. All

Change Order requests must be submitted in accordance with the Contract Documents.

U. Closeout Submittals: Project Record Drawings, and maintenance material submittals.

V. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

W. Manufacturer, product, and material certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer, its products, and/or its materials comply with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

X. Material test reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents. Submit material test reports to the Owner's Representative for review and approval.

Y. Product test reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency. Submit product test reports to the Owner's Representative for review and approval.

2.02 COMPLIANCE

A. In the absence of an approved submittal that meets the requirements of this section, the Contractor shall furnish the exact materials specified or materials selected by the Owner's Representative based on the Contract Drawings.

2.03 WORKING DRAWINGS

A. The Owner's Representative will not accept Working Drawings that prohibit the Owner's Representative from making sepias or copies for its own use.

B. Quality: Working Drawings shall be prepared accurately to scale sufficiently large to indicate all pertinent features of the products and the method of fabrication, connection, erection, or assembly with respect to the work.

C. All Drawings submitted to the Owner's Representative for this approval shall be drawn on sheets in 11 X 17-inch format or sheets that are multiples of 8-1/2 X 11 inches. Upon the Owner's Representative's

specific request, the Contractor shall furnish copies of any drawing on sheets having the dimensions 22 X 34 inches long in overall dimensions. All text shall be legible with a font size 8 points or larger when printed on 11x17-inch paper.

D. Type of Prints Required:

1. Whenever possible, the Contractor shall transmit all submittals in Adobe portable document format (PDF).

2. If PDF format is not feasible, the Contractor shall submit six prints or copies of all Shop Drawings or supplemental Working Drawings in accordance with the General Conditions.

E. Distribution: The Owner's Representative and Owner's Construction Manager will review any Drawings provided by the Contractor, mark with appropriate notations, prepare the required number of prints for its use, and return marked copies to the Contractor. The Contractor may then order, at the Contractor's expense, as many additional copies as required for Contractor's work.

2.04 PRODUCT DATA

A. The Contractor shall submit product data in PDF format.

B. Catalog cuts or brochures shall show the type, size, ratings, style, color, manufacturer, and catalog number of each item and be complete enough to provide for positive and rapid identification in the field. General catalogs or partial lists will not be accepted.

2.05 SAMPLES

A. The sample submitted shall be the exact or precise article proposed to be furnished.

B. Samples, color chips, finish styles, etc., shall be submitted in sufficient number as to provide the Owner's Representative with alternate choices.

2.06 SUBSTITUTIONS

A. The Contract is based on the materials, equipment, and methods described in the Contract Documents.

B. The Owner's Representative will consider proposals for substitutions of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Owner's Representative to evaluate the proposed substitution.

C. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this work by the Owner's Representative.

D. Requests for substitutions may be made after award. Such requests shall be accompanied by all technical data and costs, and delivery information. When, in the opinion of the Owner's Representative, the product is equal, or better, in all respects to the product specified, it will be approved subject to Contract requirements and the Contractor's assumption of all responsibility thereof.

E. After written approval, this submission shall become a part of the Contract, and may not be deviated from except upon written approval of the Owner's Representative and Owner's Construction Manager.

F. Catalog and product data for equipment approved by the Owner's Representative does not in any case supersede the Contract Documents. The approval by the Owner's Representative shall not relieve the Contractor from responsibility for deviations from the Contract Drawings, unless Contractor has in writing called the Owner's Representative attention to such deviations at the time of the submission, nor shall it relieve Contractor from responsibility for errors of any sort in the items submitted. The Contractor shall check the work described by the product data with the Contract Documents for deviations and errors.

G. It shall be the responsibility of the Contractor to ensure that items to be furnished fit the space available. Contractor shall make necessary field measurements to ascertain space requirements, including those for connections and shall order such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the Contract Drawings and Specifications.

H. Where equipment requiring different arrangement of connections from those shown as approved is used, it shall be the responsibility of the Contractor to install the equipment to operate properly, and in harmony with the intent on the Plans, and to make all changes in the work required by the different arrangement of connections together with any cost of redesign necessitated thereby, all at Contractor's expense.

I. Where the phrase "or approved alternate" or "or equal" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved by the Owner's Representative unless the item has specifically been approved for this Work by the Owner's Representative.

PART 3 – EXECUTION

3.01 CONTRACTOR'S REVIEW

A. Submittals: Review each submittal and check for coordination with other work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with submittal stamp before submitting to Owner's Representative and Owner's Construction Manager.

B. Submittal Stamp: Contractor shall stamp the cover page of each submittal with a uniform, approval stamp. Include project name and location, submittal number, Technical Specification section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

C. All working drawings, brochures, and product data shall be submitted in Adobe Portable Document Format (PDF) generated by a PDF writer or scanned to PDF format.

D. Samples shall be submitted using electronic means following a system selected by the Owner's Representative and Owner's Construction Manager and discussed at the pre-construction conference.

3.02 OWNER'S ACTION

A. The Owner's Representative and Owner's Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. The Owner's Representative will forward each submittal to the Contractor.

B. Partial submittals prepared for a portion of the work will be reviewed when use of partial submittals has received prior approval from Owner's Representative.

C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

D. Submittals not required by the Contract Documents may be returned by the Owner's Representative without action.

E. Submittal Response: The Owner's Representative will note the submittal status when responding to a submittal as follows:

1. Under Review.

2. Approved: If the review indicates that the submittal appears to be in conformance with the Contract Documents, the submittal will be marked "APPROVED". The Contractor may begin implementing the work method or incorporating the material or equipment covered by the submittal.

3. Approved As Noted: If the review indicates that the submittal is insufficient or that limited corrections are required, the submittal will be marked "APPROVED AS NOTED". The Contractor may begin implementing the work method or incorporating the material or equipment covered by the submittal, in accordance with the noted corrections. Where submittal information will be incorporated in operation and maintenance plan, a corrected copy shall be

provided within 30 days, otherwise no further action will be required.

4. Resubmit: If the review reveals that the submittal is substantially insufficient or contains incorrect data to an extent that requires revision and re-review by the Owner's Representative prior to proceeding with the associated work, the submittal will be marked "RESUBMIT" and returned to the Contractor. This indicates that the Contractor should not proceed with the relevant portion of work, at-risk or otherwise, until a revised submittal has been submitted, reviewed, and accepted by the Owner's Representative as either "APPROVED", or "APPROVED AS NOTED."

5. Rejected. If the review reveals a proposed product which does not meet the specifications, the submittal will be marked "REJECTED" and returned to the Contractor. This indicates that the Contractor should not proceed with the relevant portion of work.

6. N/A: If the review reveals that the submittal is not required by the Contract Documents, at the Owner's Representative's discretion it may be returned by the Owner's Representative without action marked "N/A" This does not constitute review of the submittal, and is only communicating that Owner's Representative's review of this submittal is not required by the Contract Documents. It is the Contractor's responsibility to follow up with the Owner's Representative if the Contractor needs approval of information in a submittal that was marked "N/A."

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The work includes the requirements to maintain environmental controls by the Contractor in accordance with the specifications and the Owner provided permits. The work also includes compliance with all controls or ordinances with respect to safety, noise, dust, fire and police action, civil disobedience, security, or traffic.

1. IDWR Stream Channel Protection Specialist shall be contacted no less than 3 business days before construction begins by:

a. Email: northerninfo@idwr.idaho.gov, or

b. Phone: (208) 762-2800

Failure to do so may result in annulment of IDWR Permit No. S97-20058.

2. All work below the OHW must occur from November 1st 2020 to March 15th 2021.

B. Lubricants composed of biodegradable base oils such as vegetable oils, synthetic esters, and polyalkylene glycols are recommended for use in equipment operated in or near water.

C. This work item shall include the planning, installing, inspecting, maintaining, and removing Best Management Practices (BMPs) to prevent pollution of air, land, and water, and control, respond to, and dispose of existing structures during the contract.

D. The Contractor shall perform the following:

1. Install, maintain, and remove all BMPs during the life of the contract.

2. Perform other work shown on the Contract Drawings or as directed by Owner's Representative.

3. Educate all Contractor and all Subcontractor staff in environmental compliance issues at weekly meetings.

E. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

F. The Contractor is wholly responsible for meeting water quality standards during the duration of the work.

1.02 RELATED SECTIONS

A. Technical Specification Section 01 50 00 – Temporary Facilities and Controls

B. Technical Specification Section 01 57 13 – Temporary Erosion and Sediment Controls

C. Appendix A – Permit Documents

1.03 APPLICABLE PUBLICATIONS

A. The following permits, rules, requirements, and regulations provided in Appendix A – Permit Documents specified may apply to this work:

1. USACE Permit No. NWP-2019-00370
2. DEQ Section 401 Water Quality Certification
3. IDWR Stream Alteration Permit S97-20058

1.04 SITE MAINTENANCE:

A. The Contractor shall keep the work site and Contractor's facilities clean and free from rubbish and debris. Materials and equipment shall be removed from the site when they are no longer necessary. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance in conformance with the present condition of the site.

B. CLEAN-UP

1. Refer to specific site and permitting requirements in Appendix A – Permit Documents.

1.05 AIR POLLUTION CONTROL:

A. The Contractor shall not discharge smoke, dust, and other contaminants into the atmosphere that violate the regulations of any legally constituted authority. Internal combustion engines shall not be allowed to idle for prolonged periods of time. The Contractor shall maintain construction vehicles and equipment in good repair. Exhaust emissions that are determined to be excessive by the Owner's Representative shall be repaired or replaced at no cost to the Owner.

B. The Contractor shall minimize dust nuisance by cleaning, sweeping, vacuum sweeping, sprinkling with water, or other means. The use of water, in amounts which result in mud on public streets, is not acceptable as a substitute for sweeping or other methods. Equipment for this operation shall be on the job site or available at all times.

C. Visible dust generated from any Contractor activity shall not be allowed.

D. The Contractor shall sprinkle water as necessary to prevent visible dust at all times during earthwork operations.

1.06 NOISE CONTROL:

A. Refer to Specific Requirements in Appendix A – Permit Documents.

B. Construction involving noisy operations, including starting and warming up of equipment shall be in compliance with local noise ordinances. Noisy operations shall be scheduled to minimize their duration. Construction involving noisy operations shall be limited to work hours stated in Technical Specification 01 10 00 – General Requirements.

C. The Contractor shall comply with all local controls and noise level rules, regulations and ordinances which apply to any work performed pursuant to the Contract.

D. Each internal combustion engine, used for any purpose on the job or related to the job, shall be enclosed and be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler and enclosure.

E. Noise levels shall be in accordance with Idaho Code. Equipment that cannot meet these levels shall be quieted by use of improved exhaust mufflers, portable acoustical screens, or other means. Equipment not modified to meet these requirements shall be removed from the project.

1.07 WATER CONTROL:

A. The Contractor shall conform to the regulations and requirements of legally authorized surface water management agencies.

B. The Contractor shall be responsible for keeping upland (above OHW) excavations for the structures, trenches, and other areas free from water as required to permit continuous progress of, or to prevent damage to, its own work or the work of others. The Contractor's operations shall be conducted in such a manner as to prevent sediment or other contaminants from reaching the existing sewers, storm drains, creeks, or streams. Temporary erosion control and settling ponds shall be provided in the work area as required to trap runoff until the turbidity has settled and the water can be diverted into drainage courses.

C. The Contractor shall cover exposed excavated areas and spoil piles when runoff from rain is or would be likely to cause turbid waters to enter local waterways. The Contractor shall suspend work in the rain if such work cannot be performed without causing turbid runoff. If turbid water is discovered entering storm drainage structures, the Owner’s Representative may suspend the work immediately. All costs associated with suspension of the work shall be the responsibility of the Contractor. Work shall remain suspended until turbid runoff has been eliminated.

D. To avoid solids or turbid runoff from entering local waterways and storm drain systems, the Contractor shall cover, secure, and/or berm excavated areas and spoil piles and employ other methods as necessary such as hay bales around storm drains or around construction sites, use of cut and cover construction method, or use of sedimentation basins.

1.08 WATER QUALITY MEASURES:

A. Erosion control measures including silt fences, filter fabric, sedimentation ponds, placement of hay bales along the peripheries of construction sites, temporary detention ponds, and terraced slopes shall be employed as appropriate and shall be in place prior to any clearing or grading activity.

B. All site runoff shall be diverted into temporary erosion control facilities until solids settle before routing to Priest River or Outlet Bay.

C. The Contractor shall utilize industry standard erosion and sedimentation control Best Management Practices (BMPs) such as catch basin protective inserts, check dams, silt fences, sediment ponds, holding tanks, and drainage swales to prevent turbid runoff during the duration of the work.

D. No "track-out" of soils or other materials shall be allowed. The Contractor shall employ the use of built up construction entrances, wheel washes, and other means to prevent contamination of roads, streets, and other traveled surfaces in the vicinity of the project site. Should "track-out" occur, it shall be removed immediately.

1.09 WATER QUALITY CONTROL REQUIREMENTS:

A. All work shall be performed in a manner that does not adversely impact water quality or cause damage to critical habitat located outside the Project Site areas. The Contractor is prohibited from allowing equipment, boats, barges, or associated machinery to create petroleum product sheen on the water or otherwise create a release of petroleum or petroleum products due to petroleum products handling, use or storage. The Contractor shall have absorbent boom on-site and ready for placement to contain sheens in the event a spill occurs. The Owner’s Construction Manager and Owner’s Representative must be immediately notified if a material spill occurs or oil sheen is observed during any part of construction.

1.10 WATER QUALITY MONITORING AND CONTROL PLAN

A. The Contractor shall prepare and submit a Water Quality Monitoring and Control Plan prior to the start of construction for all work located below the ordinary high water mark (OHW). The Water Quality Control Plan shall include methods and procedures of demolition, and excavation and fill placement, that will be protective of lake and river water quality, and a description of contingency measures that will be implemented in the event water quality compliance criteria is exceeded during the performance of such activities.

1.11 WATER QUALITY MONITORING AND REPORTING CONDITIONS:

A. During and immediately after project construction, the Contractor shall visually monitor for turbidity discharges at the point of compliance in

accordance with DEQ's Section 401 Water Quality Certification in Appendix A – Permit Documents. The Contractor shall meet water quality criteria as defined in the Section 401 Water Quality Certification and applicable local, state, and federal standards. The Contractor shall have in place BMPs to prevent water quality exceedances and contingency measures to implement should water quality violations occur.

B. Turbidity monitoring work shall be conducted by a technician that is either an employee of Contractor or an independent company experienced in conducting water quality compliance monitoring work. The proposed technician shall have a minimum 5 years of documented experience with water quality and turbidity monitoring work. Technician shall have demonstrated proficiency in using the water quality monitoring equipment.

C. Monitoring Locations – The Contractor shall coordinate with Idaho DEQ to establish a background location (up-current) and point of compliance or mixing zone (down-current) location in accordance with DEQ's Section 401 Water Quality Certification (provided in Appendix A – Permit Documents) for turbidity monitoring.

D. Turbidity Monitoring Compliance – Turbidity monitoring must be conducted in accordance with DEQ's Section 401 Water Quality Certification in Appendix A – Permit Documents.

1. Turbidity shall not exceed background turbidity by more than 50 nephelometric turbidity units (NTU) instantaneously or more than 25 NTU for more than 10 consecutive days. Idaho DEQ requires that turbidity monitoring occur when project activities result in a discharge that causes a visible sediment plume.

2. A technician meeting the qualifications outlined in paragraph B above shall measure turbidity at the background location and point of compliance at the frequency indicated in the table below and record the date, time, location, and turbidity measurements in the daily log.

3. Turbidity measurements cannot be taken during a cessation of activity.

E. Reporting – Copies of daily logs for turbidity monitoring must be made available to Idaho DEQ and other local, state, and federal regulatory agencies upon request. The log must include:

1. Background NTUs, point of compliance NTUs, comparison of the points in NTUs, and location (latitude and longitude), time, and date for each reading.

2. A narrative discussing all exceedances, controls applied and their effectiveness, subsequent monitoring, work stoppage, and any other actions taken. Documentation of exceedances shall include:

a. A description of the nature and cause of the exceedance.

b. The period of non-compliance including exact dates, duration and times and/or the anticipated time when the Applicant will return to compliance.

c. The steps taken, or to be taken, to reduce eliminate, and prevent the recurrence of the non-compliance.

3. Any exceedance of the turbidity standard must be reported to the appropriate DEQ regional office (Coeur d'Alene) within 24 hours.

F. If water quality exceedances are observed outside of the point of compliance, work shall cease immediately and the Contractor shall assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further water quality turbidity exceedances.

G. If the results of the monitoring show that the water quality standards or project performance standards are not being met, additional monitoring and mitigation may be required.

H. Any changes to the monitoring requirements must be approved in writing by DEQ.

1.12 OIL SPILL PREVENTION AND CONTROL

A. The Contractor shall prepare a project specific spill prevention, control and countermeasures (SPCC) plan to be used for the duration of the project. The plan shall be submitted to the Owner's Representative prior to the commencement of any on-site construction activities. The Contractor shall maintain a copy of the plan at the Work site, including any necessary updates as the Work progresses. Adequate materials and procedures to respond to unanticipated weather conditions or accidental releases of materials (sediment, petroleum, hydrocarbons, etc.) shall be available on-site. The SPCC Plan also will ensure the proper management of oil, gasoline and solvents used in the operation and maintenance of construction equipment, that machinery remains free of external petroleum-based prior to entering the work area and during the work, and necessary repairs occur prior to returning the equipment to operation in the work area.

B. An emergency spill containment kit shall be located on-site with a pollution prevention plan detailing fueling procedures, materials storage and equipment storage.

C. Fueling areas shall be distinctly identified and established upland of OHW.

D. If hazardous materials are encountered during construction, the Contractor shall do everything possible to control and contain the material until appropriate measures can be taken. Hazardous material, as referred

to within this Specification, is defined in 40 CFR Part 261 Subpart A 261.3 "Definition of hazardous waste". Specific information required in the SPCC Plan is outlined in the Submittals section of the Technical Specification.

E. The Contractor shall be responsible for prevention, containment, and cleanup of spilling of oil, fuel and other petroleum products used in the Contractor's operations. All such prevention, containment and cleanup costs shall be borne by the Contractor and shall be conducted in accordance with IDAPA 58.01.02.800-58.01.02.852.

F. The Contractor is advised that discharge of oil from equipment or facilities into state waters or onto adjacent land is not permitted under state water quality regulations.

G. The Contractor shall, at a minimum, take the following measures regarding oil spill prevention, containment, and cleanup:

1. Fuel hoses, lubrication equipment, hydraulically operated equipment, oil drums, and other equipment and facilities shall be inspected regularly for drips, leaks, or signs of damage, and shall be maintained and stored properly to prevent spills. Proper security shall be maintained to discourage vandalism.

2. All land-based oil and products storage tanks shall be diked or located so as to prevent spills from escaping to the water. Diking and subsoils shall be lined with impervious material to prevent oil from seeping through the ground and dikes.

3. The Contractor shall not store oil or fuel on the river bank, or equipment that is not required for the daily construction activities. The Contractor shall specify where oil and fuels will be stored in the SPCC Plan. A metal pan or other impervious material with sides a minimum of four (4) inches high shall be placed under the equipment on the beach or adjacent area during refueling. The pan shall have a capacity equal to the capacity of the fuel cans used and catch any spills or leaks during the refueling activity. Fuel caught in the pan shall be contained and either transported off-site or used in the equipment. Under no condition shall the material be discharged on the Project Site. If the Contractor's fuel cells exceed the thresholds set forth in 40 CFR 112, the Contractor shall provide a spill plan and containment equipment accordingly.

4. Special measures shall be taken to prevent bilge pumpage or effluent, chemicals, fuels, oils, greases, bituminous materials, waste washing, herbicides and insecticides, and concrete drainage from entering the water.

5. All visible floating oils shall be immediately contained with booms, dikes, or other appropriate means and removed from the water prior to discharge into state waters. All visible oils on land shall be

immediately contained using dikes, straw bales, or other appropriate means and removed using sand, ground clay, sawdust, or other absorbent material, which shall be properly disposed of by the Contractor. Waste materials shall be temporarily stored in drums or other leakproof containers after cleanup and during transport to disposal. Waste materials shall be disposed off property at an approved site, submit approved sites to the Owner.

6. In the event of any oil or product discharges into public waters, or onto land with a potential for entry into public waters, the Contractor shall immediately notify the Owner's Representative and the following agencies at their listed 24-hour response numbers:

   a. DEQ, Coeur d'Alene Regional Office (normal working hours): (208) 769-1422

   b. Idaho State Communications Center (after hours): 1-360-407-6300

   c. EPA/NRC: 1-800-424-8802

H. Maintain on the job at each site the following materials (as a minimum):

1. Oil-Absorbent Booms: 8 each, 20 feet long.
2. Oil-absorbent pads or bulk material, adequate for coverage of 200 square feet of surface area.
3. Hay bales: 10
4. Plastic sheeting
5. Oil drywall, gloves and plastic bags.

1.13 CONTAMINATED/HAZARDOUS SOILS AND GROUNDWATER

A. Contractor's Responsibility

1. The Contractor shall monitor soils, groundwater and waste materials by instructing workers in observing and reporting questionable materials and odors, such as refuse, oily sheen or color on soils or water, and oily or chemical odors. If hazardous or contaminated materials are encountered, the Contractor shall stop all work in that area and notify the Owner's Representative and Owner's Construction Manager immediately.
2. The Contractor shall be responsible for all matters related to work safety and for detection of contaminated soils and groundwater encountered during the construction as they relate to worker safety. The Contractor shall ensure the protection of the safety and health of construction workers and other authorized persons at the work site from exposure to potential toxic materials.

B. Notification and Suspension

1. In the event the Contractor detects the presence of suspicious materials, the Contractor shall immediately notify the Owner, Owner's Representative, and Owner's Construction Manager. Following such notification by the Contractor, Owner shall in turn notify the various governmental and regulatory agencies concerned with the presence of potentially dangerous materials. Depending upon the type of problem identified, Owner may suspend the work in the vicinity of the material discovery.

2. Following completion of any further testing necessary to determine the nature of the materials involved, the Owner, Owner's Representative, and Owner's Construction Manager will determine how the material shall be handled and disposed of.

1.14 ADMINISTRATIVE REQUIREMENTS

A. Failure to install, maintain, and/or remove BMPs shown on the Contract Drawings and specified herein, or by order of Owner's Representative; or failure to comply, implement and maintain any provisions and requirements of this Technical Specification; or failure to conduct project operations in accordance with these Technical Specifications and Contract Drawings will result in the suspension of the Contractor's operations by Owner's Representative in accordance with the General Requirements.

B. Any damages, fines, levies, or judgments incurred as a result of Contractor, Subcontractor, or supplier negligence in complying with the requirements of this Technical Specification will be charged to the Contractor.

C. The Contractor shall be solely responsible for any schedule impacts from damages, fines, levies, judgments, or stop work orders incurred as a result of Contractor, subcontractor, or supplier negligence in complying with the requirements of this Technical Specification. The project schedule will not be changed to accommodate the time lost.

1.15 APPLICABLE REGULATIONS

A. Comply with applicable federal, state and local laws and regulations concerning environmental pollution control and abatement, and specific requirements elsewhere in these Specifications and Contract Drawings to prevent and provide for control of environmental pollution.

B. The Contractor is responsible for the appropriate preventative water quality protection systems to ensure compliance with Appendix A – Permit Documents and in accordance with ITD Standard Specification Section 212 – Erosion and Sediment Control. Water pollution control measures shall be utilized throughout the duration of the work in accordance with BMPs described in DEQ's *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties*. Other resources may also be used for selecting appropriate BMPs.

1.16 ENVIRONMENTAL PROTECTIONS

A. Protection of Land Resources:

1. Give special attention to the effect of Contractor's operations upon surroundings. Take special care to maintain natural surroundings undamaged and conduct Work in compliance with following requirements:

   a. When work is completed, remove storage and all other Contractor buildings and facilities, and sites restored to a neat and presentable condition appropriate to surrounding landscape, unless otherwise specified. Remove debris resulting from Contractor's operation.

   b. Store petroleum products, industrial chemicals and similar toxic or volatile materials in durable containers, approved by the authority having jurisdiction, located in areas where accidental spillage will not enter water. Store substantial quantities of materials in an area surrounded by containment dikes of sufficient capacity to contain an aggregate capacity of tanks.

B. Protection and Restoration of Property:

1. Preserve public property, prevention of damage to natural environment, etc., insofar as they may be endangered by Work.

2. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in execution of Work, or in consequence of non-execution of Work, the Contractor shall, restore, or have restored at Contractor's expense, such property to a condition similar and equal to that existing before such damage or injury was done. The Contractor shall do so by repairing, rebuilding, or otherwise restoring any damaged public or private property to pre-project condition or make good the damage or injury in some other manner acceptable to the Owner's Representative.

C. Protection of Water Resources:

1. Perform Work not to create conditions injurious to fish or to their habitat, or which would make water unsuitable for private, municipal, or industrial use.

2. Take special measures to prevent chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides, insecticides, lime, wet concrete, cement, silt or organic or other deleterious material from entering waterways.

3. Dispose at an offsite location, wastes, effluents, trash, garbage, oil, grease, chemicals, cement, bitumen, etc., petroleum, and chemical products or wastes containing such products, in a lawful manner conforming to applicable local, state and federal laws. Furnish the Owner, Owner's Representative, and Owner's Construction Manager with documentation showing compliance with this requirement.

4. Conform to applicable local, state and federal laws for disposal of effluents. Dispose of waters used to wash down equipment in a manner to prevent their entry into a waterway. If waste material is dumped in unauthorized areas, remove material and restore area to condition of adjacent, undisturbed area. If necessary, excavate contaminated ground and disposed of as directed by the Owner's Representative and replace with suitable compacted fill material with surface restored to original condition.

1.17 SUBMITTALS

A. The Contractor shall prepare and submit a Work Plan to the Owner, Owner's Representative, and Owner's Construction Manager for review and approval. For submission specifics including time frame requirements, see Section 01 33 00 – Submittals. The following items shall be submitted:

1. Water Quality Monitoring and Control Plan: The Contractor shall submit to the Owner, Owner's Representative, and Owner's Construction Manager a detailed Water Quality Monitoring and Control Plan for approval that is consistent with the project specification requirements presented herein and in paragraph WATER QUALITY MONITORING AND CONTROL PLAN of this Specification. At a minimum the plan shall include the following information:

a. Project Schedule: A schedule reflecting the expected timing and duration of the major activities associated with in-water construction. These shall include but are not limited to mobilization, demolition operations, anticipated schedule for performing in-water work, surveys, method of flow diversion and project access throughout construction period and demobilization.

b. Best Management Practices: The Contractor shall also include in the Water Quality Control Plan a description of BMPs that will be implemented during in-water lake and shoreline construction activities to satisfy permit requirements and meet the Owner's project goals.

1) BMP is to include a site-specific SPCC that provides a site plan and narrative describing demolition debris

and spill containment plan; and measures to reduce/recycle hazardous and non-hazardous wastes.

2) The spill containment control plan, per Section 1.12.A of this Specification.

3) Hazardous materials storage plan with narrative describing methods of storage, security, and containment methods.

4) BMPs that will be used to protect water quality must be approved by DEQ prior to commencement of the work.

2. Spill Prevention, Control and Countermeasures Plan: Develop a written description of their SPCC plan per section 1.12.A of this Specification. The SPCC plan shall additionally include the following information:

a. Site Information: Identify general site information useful in construction planning, recognizing potential sources of spills, and identifying personnel responsible for managing and implementing the plan.

b. Project Site Description: Identify staging, storage, maintenance, and refueling areas and their relationship to drainage pathways, waterways, and other sensitive areas, specifically address:

1) The Contractor's equipment maintenance, refueling, and cleaning activities.

2) The Contractor's on-site storage areas for hazardous materials.

c. Spill Prevention and Containment: For each of the locations identified in (b.) above, specifically address:

1) Spill prevention and containment measures to be used at each location.

2) The method of collecting and treating, or disposing of runoff from each location.

3) The method of diverting project runoff from each location.

d. Spill Response: Outline spill response procedures including assessment of the hazard, securing spill response and personal protective equipment, containing and eliminating the spill source, mitigation, removal and disposal of the material.

e. Standby, On-Site, Material and Equipment: The plan shall identify the equipment and materials the Contractor will maintain on site to carry out the preventive and responsive measures for the items listed.

f. Reporting: The plan shall list all federal, state and local agency telephone numbers the Contractor must notify in the event of a spill.

g. Program Management: Identify site security measures, inspection procedures and personnel training procedures as they relate to spill prevention, containment, response, management and cleanup.

h. Preexisting Contamination: If preexisting contamination in the project area is described elsewhere in the Plans or Specifications, the SPCC plan shall indicate measures the Contractor will take to conduct Work without allowing release or further spreading of the materials.

i. Work Below the Ordinary High Water Line: Identify equipment that will be used below the ordinary high water line. Outline daily inspection and cleanup procedures that ensure equipment is free of all external petroleum-based products. Identify refueling procedures for equipment that cannot be moved from below the ordinary high water line.

j. Attachments: Site plan showing the locations identified in (1. B. and 1. C.) noted previously.

k. Spill and Incident Report Forms, if any, that the Contractor will be using.

PART 2 – MATERIALS

2.01 GENERAL

A. Contractor shall not perform any demolishing activities after Contract Award until all BMP's are installed to the satisfaction of the Owner's Representative.

PART 3 – EXECUTIONS

3.01 WATER QUALITY CONTROL

A. The Contractor is responsible for allowing Water Quality monitoring on their construction site and for achieving Water Quality criteria throughout all in-water or near water construction activities as defined in the Section 401 Water Quality Permit, and applicable local, state and federal standards. The Contractor shall have in place a Water Quality Monitoring and Control Plan (see Part 1 of this specification) listing Best Management Practices (BMPs) that will be utilized during in-water lake and shoreline

construction to prevent adverse effects to water quality. The Water Quality Monitoring and Control Plan will include contingency measures that may be implemented should they become necessary.

B. Violations of any water quality requirement listed in Appendix A - Permit Documents may result in work stoppage by regulators. There shall be no additional compensation or time for shutdown, standby time, or delay associated with non-compliance.

C. The Contractor is responsible for taking the appropriate preventative erosion control measures and water quality protection systems to ensure compliance with the project regulatory permits and approvals and in accordance with ITD Standard Specification Section 212 Erosion and Sediment Control and Technical Specification Section 01 57 13 – Temporary Erosion and Sediment Control.

D. All work shall be conducted in accordance with the Owner provided permit conditions in Appendix A – Permit Documents. The Contractor is responsible for complying with all permit conditions when performing the work.

E. Materials for containment and cleanup shall be available on-site during all phases of the project.

F. Temporary Erosion and Stormwater Control (TESC) measures shall be utilized throughout the duration of the work in accordance with BMPs described in DEQ's *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties*. Other resources may also be used for selecting appropriate BMPs. Provide a TESC Plan in accordance with Technical Specification Section 01 57 13 – Temporary Erosion and Sediment Control.

G. All construction debris shall be properly disposed of on land so that it cannot enter a waterway or cause water quality degradation to state waters.

H. Wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall be contained for proper disposal, and shall not be discharged into state waters.

I. No wood, metal, or concrete preservatives, paints, sealers, glues, epoxies, chemicals, or other substances harmful or toxic to fish shall be applied to the new construction once it has been placed within or over the OHW of Priest River or Outlet Bay.

J. Clean Fill Criteria: The Contractor shall ensure that fill placed for the proposed project does not contain toxic materials in amounts exceeding the applicable environmental requirements.

1. If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop

(including equipment leaks or spills), immediate notification shall be made to USFWS, USACE, and the following:

a. National Response Center: 800-424-8802

b. DEQ Coeur d'Alene Regional Office: 208-769-1422.

3.02 EQUIPMENT

A. Vehicle staging, cleaning, maintenance, refueling, and fuel storage shall be located in accordance with DEQ requirements.

B. When heavy equipment is used, the equipment selected shall have the least adverse effects on the ground, e.g., minimally sized, low ground pressure.

C. Equipment used shall be free of external petroleum-based products while working around the water. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and the undercarriage of equipment prior to its working below the ordinary high water line. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities near the water.

D. Equipment used for this project operating with hydraulic fluid shall use only those fluids certified as non-toxic to aquatic organisms. Vegetable-based hydraulic fluid should be used on equipment operating in or directly adjacent to the channel if this fluid is available.

E. All stationary power equipment such as generators, cranes, or stationary drilling equipment, operated within 150 feet of any waterbody shall be diapered to prevent leaks unless suitable containment is provided to prevent potential spills for entering the water.

3.03 BMP – SILT FENCING

A. Silt fencing shall be installed along the river bank and Outlet Bay shoreline as shown on the Contract Drawings, to prevent turbid runoff from the upland work areas from entering the river system. Silt fencing should be installed downslope of any construction access work areas above OHW. Erosion and sediment control measures shall be installed according to the manufacturer's specifications, during construction, and must be maintained until construction is completed and the disturbed ground is stable.

B. The Contractor shall remove sediment from the upslope side of silt fences when accumulation has reached the effective height of the barrier.

3.04 BMP – SILT CURTAIN

A. During the construction and use of temporary access roads below OHW, the Contractor shall deploy a floating silt curtain to isolate suspended sediments and turbidity to the work area in order to meet the water quality

protection permit requirements, as shown on the Contract Drawings. The intent of the silt curtain is to reduce suspended sediments from dispersing out from the work area beyond the mixing zone boundary.

B. Contractor shall monitor the silt curtain during installation, operation, maintenance and removal to avoid injury or mortality to local fish life in accordance with Appendix A – Permit Documents.

3.05 EMERGENCY SPILL RESPONSE NOTIFICATION

A. Under state law, DEQ must be notified when any amount of regulated waste or hazardous material that poses an imminent threat to life, health, or the environment is released to the air, land, or water, or whenever oil is spilled on land or to waters of the state. The spiller is always responsible for reporting a spill. Failure to report a spill in a timely manner may result in enforcement actions. The Contractor should consult with DEQ's response team before attempting any type of response or cleanup and also notify the Owner's Representative.

B. If oil or hazardous materials are spilled to state waters, the spiller must notify both federal and state spill response agencies. The federal agencies contact is the NRC at 1-800-424-8802. Call 911 if immediate assistance is required to control, contain, or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office during normal working hours or Idaho State Communications Center after normal working hours (1-800-632-8000). The agency will then determine its response actions. Also notify Owner's Representative. Collect, remove, and dispose of the spilled material in a manner approved by DEQ.

1. DEQ Coeur d'Alene Regional Office: 208-769-1422

3.06 BMP REMOVAL

A. All temporary BMPs and debris boom shall be removed upon completion of the work, or as directed by the Owner's Representative.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality assurance and quality control requirements for individual construction activities are provided in the relevant specification sections. Requirements in those sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality assurance and control services required by the Owner or authorities having jurisdiction are not limited by provisions of this section.

4. Specific test and inspection requirements are not specified in this section.

1.02 RELATED SECTIONS

A. All Technical Specification sections relate to this section.

1.03 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by the Owner’s Representative.

C. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

F. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.04 QUALITY CONTROL

A. Contractor Responsibilities: Tests and inspections are the Contractor's responsibility. Perform additional quality control activities required to verify that the work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality control services.

a. The Contractor shall not employ same entity engaged by the Owner, unless agreed to in writing by the Owner's Representative.

3. Notify owners construction manager at least one business day (8 a.m. to 5 p.m.) or twenty-four (24) hours, whichever is greater in advance of time when work that requires testing or inspecting will be performed. Where quality control services are indicated as the Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.

4. Testing and inspecting requested by the Contractor and not required by the Contract Documents are the Contractor's responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

B. Retesting/Reinspecting: Regardless of whether original tests or inspections were the Contractor's responsibility, the Contractor shall provide quality control services, including retesting and reinspecting, for construction that replaced work which failed to comply with the Contract Documents.

C. Testing Agency Responsibilities: Cooperate with the Owner and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify the Owner's Representative, Owner's Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through the Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the work.
6. Do not perform any duties of the Contractor.

D. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.
2. Notify Owner's Representative and Owner's Construction Manager at least one business day (8 a.m. to 5 p.m.) or twenty-four (24) hours, whichever is greater, in advance of time when work that requires Owner's Representative and Owner's Construction Manager's presence will be performed.

1.05 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Owner's Representative for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner's Representative for a decision before proceeding.

1.06 QUANTITY SHEETS/WEIGHT TICKETS

A. For bulk items, supply quantity sheets (load receipts) to account for each load delivered to the jobsite. Deliver quantity sheets to Owner's Construction Manager (hired by the Owner) on job at delivery time. If the Inspector is not on the job, deliver quantity sheets on a daily basis to place designated by the Owner's Representative.

B. No payment shall be made for materials delivered for which quantity tickets have not been turned into Inspector or delivered to designated place at end of working day. Backdated tickets are not acceptable as a basis for payment, except at Owner's Representative's discretion.

C. If bid item for material to be delivered to jobsite is stated in TONS, only weight slips from approved scale are acceptable for payment purposes, unless approved in advance by the Owner's Representative.

D. No payment for materials will be made until proper accounting has been made. Final quantity records are approved by the Owner's Representative, with payment at the Owner's Representative's discretion.

1.07 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports to the Owner's Representative, as specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and re-inspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections and submit to the Owner's Representative. Include the following:

1. Name, address, and telephone number of the representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.

3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

4. Results of operational and other tests and a statement of whether observed performance complies with requirements.

5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.08 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of Authorities Having Jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: Testing agency shall be a Nationally Recognized Testing Laboratory (NRTL), an accredited laboratory through National Voluntary Laboratory Accreditation Program (NVLAP), or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329 and with additional qualifications specified in individual sections; and, where required by authorities having jurisdiction, that is acceptable to authorities. NRTL and NVLAP are further defined below.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.09 SUBMITTALS

A. Contractor’s Quality Control Plan

1. Quality Control Plan, General: Submit quality control plan within twenty-one (21) working days of Contract Award. Submit in format acceptable to the Owner, Owner’s Representative, and Owner’s Construction Manager. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality assurance and quality control responsibilities. Shall be coordinated with the Contractor's progress schedule.

2. Testing and Inspection: In quality control plan, include a comprehensive schedule of work requiring testing or inspection, schedule for conducting the testing or inspection, and similar quality control services. This including the following:

a. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

3. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents as a component of Contractor's quality control plan. Coordinate and submit concurrently with the Contractor's construction schedule. Update as the work progresses.

4. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work the Owner’s Representative has indicated as nonconforming or

defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of permits and building code requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Owner's Representative and Owner's Construction Manager.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain Log at Project Site. Post changes and revisions as they occur. Provide access to test and inspection log for the Owner's Construction Manager and Owner's Representative's reference during normal working hours.

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

C. Protect construction exposed by or for quality-control service activities.

D. Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section relates to the applicable regulatory requirements.

1.02 PERMITS, CODES AND REGULATIONS

A. The following permits have been applied for (or are on file) and incorporated into the contract:

1. USACE Permit No. NWW-2019-00390
2. DEQ Section 401 Water Quality Certification
3. IDWR Stream Alteration Permit No. S97-20058

B. Conform with the requirements of listed permits or other applicable permits, codes, and regulations as may govern Work.

C. Obtain and pay fees for licenses, permits, inspections, and approvals required by laws, ordinances, and rules of appropriate governing or approving agencies necessary for proper completion of Work (other than those listed under item 1.1A. above and Special Inspections called for by the International Building Code).

D. Conform with current applicable codes, regulations and standards, which is the minimum standard of quality for material and workmanship. Provide labor, materials, and equipment necessary for compliance with code requirements or interpretations, although not specifically detailed in the Contract Drawings or specifications. Be familiar with applicable codes and standards prior to bidding.

E. Process through the Owner's Representative, requests to extend, modify, revise, or renew any of the permits (listed in 1.02A above). Furnish requests in writing and include a narrative description and adequate Drawings to clearly describe and depict proposed action. Do not contact regulatory agency with requests for permit extensions, modifications, revisions, or renewals without the prior written consent of the Owner's Representative.

1.03 VARIATIONS WITH CODES, REGULATIONS AND STANDARDS

A. Nothing in the Contract Drawings and Specifications permits Work not conforming to codes, permits or regulations. Promptly submit written notice to the Owner's Representative of observed variations or discrepancies between the Contract documents and governing codes and regulations.

B. Appropriate modifications to the Contract documents will be made by Change Order to incorporate changes to Work resulting from code and/or regulatory requirements. The Contractor assumes responsibility for Work contrary to such requirements if Work proceeds without notice.

C. Contractor is not relieved from complying with requirements of Contract documents which may exceed, but not conflict with requirements of governing codes.

1.04 COORDINATION WITH REGULATORY AGENCIES

A. Coordinate Work with appropriate governing or regulating authorities and agencies.

B. Provide advance notification to proper officials of Project schedule and schedule revisions throughout Project duration, in order to allow proper scheduling of inspection visits at proper stages of Work completion.

C. Regulation coordination is in addition to inspections conducted by the Owner's Representative. Notify the Owner's Representative and Owner's Construction Manager of scheduled inspections involving outside regulating officials, to allow Owner's Representative and Owner's Construction Manager to be present for inspections.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section covers temporary facilities and miscellaneous site controls needed to complete the work, including the following:

1. Construction facilities;
2. Use of project site limits;
3. Owner access to project site limits;
4. Construction aids;
5. Snow Management;
6. Traffic and pedestrian control;
7. Temporary construction entrances;
8. Temporary access road/structure;
9. Construction access easements use and protection.
    a. Lamb Creek Lane

1.02 RELATED SECTIONS

A. Technical Specification Section 01 31 19 – Project Meetings

B. Technical Specification Section 01 35 43 – Environmental Controls

C. Appendix C – Stockpiling Areas

1.03 DEFINITIONS

A. Temporary Construction Entrances are locations along Lamb Creek Lane that will be temporarily modified by the Contractor to support the ingress/egress of equipment, machinery, and materials between Outlet Dam and Highway 57. All temporary use and modifications of Temporary Construction Entrances must be in accordance with the Construction Access Easements provided in Appendix C – Stockpiling Areas.

B. A Temporary Construction Access Agreement is in place to outline the terms and conditions related to the temporary use of private property along Lamb Creek Lane.

C. Existing Utilities refers to utilities servicing the Lamb Creek Estates Development, including but not limited to: sewer main line and laterals, water main line and laterals, and underground powerlines. The Existing Utilities must be protected during construction in accordance with the Temporary Construction Access Agreement. The location of Existing Utilities are provided in Appendix D – Existing Utility Drawings.

D. Temporary Access Road/Structure is access across the stream channel to the dewatered work area, designed by the Contractor.

1.04 SUBMITTALS

A. The following Submittals shall be in accordance to Section 01 33 00 – Submittals:

1. Site Plan: Show any proposed temporary facilities, existing utilities, sanitary accommodations, and parking areas for construction personnel. Site Plan shall be submitted to the Owner's Representative after notice of Contract Award to obtain the Owner's Representative's review and acceptance prior to initiation of construction.
2. Vehicle Traffic Control Plan
3. Pedestrian Traffic Control Plan
4. Construction Access Easement Work Plan
    a. Existing Utility Location Survey Results
    b. Easement use area work description
    c. Pre-construction Condition Survey
    d. Post-construction Condition Survey
    e. Utility Protection Plan
5. Temporary Access Road/Structure Design

PART 2 – PRODUCTS

2.01 UTILITIES

A. It shall be the Contractor's responsibility to provide adequate facilities for Contractor's operation, including:

1. Water: Drinking water for employees shall be provided in sanitary containers and maintained fresh each day.
2. Construction Electricity: The Contractor shall make all arrangements for the furnishing of electric power for construction purposes. The power meter shall be registered in the name of the Contractor and all charges for installation and electric energy shall be borne by the Contractor.
3. Toilet Room Facilities: The Contractor shall install and maintain necessary temporary sanitary toilet facilities during the term of this contract. Toilet facilities for employees shall be maintained in a sanitary condition. Toilets shall be of a chemical type; remove at completion of work and disinfect the premises.
4. Teleconference Capabilities: There is no/limited cell service at the project site. The Contractor is responsible for providing a location

with teleconference capabilities and connectivity to enable weekly progress meetings or other meetings conducted remotely.

2.02 USE AND OCCUPANCY

A. The Contractor will not be allowed space for the storage of materials under this Contract. Employee parking will be agreed upon with the Owner.

B. No camping or overnight stay at the project site is permitted.

2.03 SECURITY

A. The project site limits shall be closed to the public at all times.

B. The Contractor shall abide by special request of security personnel, and local police and fire departments.

2.04 FENCES & ENCLOSURES

A. Safety Fencing: Contractor shall furnish and install temporary safety fencing around the temporary construction entrances as indicated on the Contract Drawings.

B. Access Gate: Install a temporary chainlink fence and access gate to prevent public access at the temporary construction entrances during construction, as shown on the Contract Drawings.

C. Temporary fence installation shall be coordinated with the Owner's Representative and Owner's Construction Manager.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

A. Locate facilities where they will serve the project adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required by progress of the work.

B. Temporary stockpiling and staging is permitted within the designated laydown area shown on the Contract Drawings. The Contractor may coordinate with and seek approval from the Owner's Representative for use of an offsite laydown area within the proximity of the project site limits.

C. Temporary use of permanent roads: Contractor shall construct and maintain temporary roads adequate for construction operations. Extend temporary roads within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads with permanent roads.

2. Recondition temporary construction entrance base after temporary use, including removing contaminated material, regrading, compacting, and testing.

D. Parking: Parking needed for construction personnel shall be approved by the Owner's Representative. In all cases, the Contractor shall confine parking to areas acceptable to the Owner's Representative.

3.02 USE OF PROJECT SITE

A. See section 1.05 Hours of Work in 01 10 00 - General Requirements for work hour, work stoppage, and site restrictions.

B. Use of Sites: Limit use of project site to the limits of construction indicated on the Contract Drawings. Do not disturb portions of the site beyond areas in which the work is indicated. The Contractor shall keep access roads clear and available to the Owner and emergency vehicles at all times. Do not use access roads for parking or storage of materials. Schedule and coordinate deliveries to minimize space and time requirements for storage of materials and equipment within or adjacent to the project site limits.

C. General

1. Do not proceed with work on adjoining properties unless directed by the Owner or Owner's Representative.

2. Do not clear outside of the project site limits.

3. Do not close or obstruct roads or other facilities used by occupants of adjacent properties without written permission from the Owner's Representative and authorities having jurisdiction.

D. The Contractor will not have exclusive or unrestricted use of the project site limits for its operations. The Contractor shall recognize and take into account during its planning and execution of the work that the Owner's Representative, or Owner, may require access to and use of certain areas or spaces during certain periods.

E. The Contractor shall perform all work within the project site limits defined in the Contract Documents. If other areas are required for construction, the Contractor shall secure any necessary agreement or construction easement documentation with the private landowners at no additional expense to the Owner. The actual selected location shall be coordinated with and approved by the Owner.

F. The Owner assumes no responsibility for the condition or maintenance of any road or structure thereon that may be used by the Contractor in performing the work under the Contract Documents or in traveling to and from the project site. The Contractor is responsible for constructing, maintaining, and removing any additional temporary construction entrance and/or access that they deem necessary to access the project site limits.

No payment will be made to the Contractor by the Owner for any work done in improving, repairing, or maintaining any road or structure thereon for use in the performance of the work under the Contract Documents.

G. The Contractor shall be responsible for restoring the Contractor use areas, temporary construction entrances, project site, and other impacted areas to their original condition.

3.03 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. The Contractor shall comply with applicable laws, ordinances, rules, regulations and orders pertaining to personnel, construction machinery and equipment, hoists, cranes, staging, materials handling facilities, tools, appliances and other construction aids. The Contractor shall provide first aid facilities where required.

B. Protection of Existing Facilities, Residential Properties, and Utilities: Protect existing facilities, properties, utilities, and vegetation, and other improvements within the project site limits and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

D. Tree and Plant Protection: Comply with any state, county, or local Homeowners Association (HOA) requirements.

E. Site Security Fencing and Gates: The Contractor shall install temporary site security fencing and gates as indicated on the Contract Drawings, prior to beginning construction, to prevent people and animals from entering the construction zone. Locations shall include public rights-of-way and easements. The Contractor shall provide construction safety signage on the fencing and/or gates. The Contractor shall facilitate access to adjacent properties as shown on the Contract Drawings.

3.04 SNOW MANAGEMENT

A. Public snow removal occurs along Highway 57. The Contractor is responsible for snow removal and maintenance along Lamb Creek Lane to provide access to the project site for the duration of the project, until the project is complete as defined in Section 01 70 00 – Project Closeout.

B. The Contractor shall conduct all snow management work in accordance with the requirements within Section 01 57 13 – Temporary Erosion and Sediment Control.

3.05 TRAFFIC CONTROL PLAN

A. Traffic Controls: The Contractor shall be responsible for preparation of Traffic Control Plan(s) to conduct the Work. All required and necessary traffic control including signage, barriers, flagging, markings, and other devices shall be in accordance with ITD standard plans.

1. Protect existing site improvements to remain including curbs, gravel pavements, and existing utilities.

2. Maintain access for fire-fighting equipment and access to fire hydrants.

3. Provide temporary, directional signs for construction personnel and visitors.

4. Traffic Control shall be provided during all work hours at the locations indicated on the Contract Drawings.

5. Additional flaggers/spotters may be needed at other times during various stages of construction and shall be specified in the Contractor's Traffic Control Plan and as required and approved by the Owner's Representative.

3.06 CONTRACTOR OBTAINED PERMITS

A. The Contractor shall be responsible for obtaining public right-of-way (ROW) use permits and all other permits necessary for construction including hauling and transport of construction materials, equipment and waste material to and from the project site, and any other permits necessary to accomplish the work.

3.07 ACCESS TO PROJECT SITE AND WORK

A. The Owner will secure temporary construction access agreements for Lamb Creek Lane

B. In addition to those provided, if required, the Contractor is responsible for coordinating and obtaining all necessary agreements and easements for access to the project site limits and Contractor vessel moorage at no additional expense to the Owner. Access for construction equipment and adjacent work areas are the responsibility of the Contractor.

1. The Contractor will assume all responsibility of restoration of the surface of all access roads (haul routes) used by the Contractor, if damaged.

2. In the event the Contractor does not have labor or material immediately available to make necessary repairs, the Contractor shall so inform the Owner. The Owner will make the necessary repairs and the cost of such repairs shall be paid by the Contractor.

3. The Contractor is responsible for identifying and documenting any damage that is pre-existing or caused by others. Restoration of gravel roads (haul routes) shall be done in accordance with the requirements herein.

3.08 CONSTRUCTION ACCESS EASEMENT

A. The Contractor shall protect from damage all existing structures, equipment, improvements, utilities, and vegetation within or near the project site limits, and on adjacent property of a third party, the locations of which are identified within the Contract Drawings. The Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If the Contractor fails or refuses to repair the damage promptly, the Owner may have the necessary work performed and charge the cost to the Contractor.

B. All Work shall be accomplished so as to cause the least amount of disturbance and damage to easements, private properties, and existing utilities.

C. The Contractor shall submit an easement use area work description in the Construction Access Easement Work Plan that describes all labor, materials, tools, equipment, supervision and protection necessary for use of the construction access easement.

D. All existing infrastructure and private property shall be protected during the duration of construction and shall be replaced if damaged at no additional cost to the Owner and to the satisfaction of the Owner.

1. Existing Utility Locate Survey: The Contractor shall submit electronic survey results from the existing utility locate.

2. Pre-construction Condition Survey: The Contractor shall submit photos and a video recording of an initial walkthrough of the Construction Access Easement prior to construction. See Section 01 71 23 – Construction Surveying.

3. Post Condition Survey: The Contractor shall walk the site with the Owner's Representative and Owner's Construction Manager and submit photos of the Construction Access Easement after construction. See Section 01 71 23 – Construction Surveying.

E. The Contractor shall not proceed with any portion of the Work in areas where ROW, easements, or rights-of-entry have not been acquired until the Owner certifies to the Contractor that the ROW or easement is available or that the right-of-entry had been received.

F. Utility protection is required as outlined in the Contract Drawings.

G. Each property owner shall be given 48 hours' notice prior to entry by the Contactor. This includes entry onto easements and private property.

3.09 TEMPORARY ACCESS ROAD/STRUCTURE

A. Construct a temporary road/structure for construction access to dewatered work areas, as needed and design by the Contractor.

B. Submit a set of plans and design calculations, signed and sealed by a professional engineer licensed in the state of Idaho, to the Owner's Representative for review.

C. Any temporary fill for abutments or other support of the temporary access road/structure shall be constructed of clean, washed angular rock, and protected from scour.

D. The temporary access road structure shall be compatible with the cofferdam system and shall be designed to handle high flows that could be anticipated during the construction period. See Specification Section 02 20 00 – Cofferdams & Dewatering.

E. The temporary access road/structure or cofferdam shall not significantly alter conditions upstream or downstream by causing flooding, turbidity, or other problems.

F. Completely remove all temporary structures from the stream channel at the conclusion of construction and restore the disturbed areas to a natural appearance.

G. Refer to permits in the Appendix for additional requirements.

3.10 OPERATION OF DAM DURING CONSTRUCTON

Contractor is responsible for operation of the dam during construction in consultation with the Owner.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section covers work necessary for stabilization of soil to prevent erosion during and after construction and land disturbing activities. The work shall include the furnishing of all labor, materials, tools, and equipment to perform the work and services necessary as herein specified and as indicated on the Contract Drawings. This shall include installation, maintenance, and final removal of all temporary soil erosion and sediment control measures.

B. The minimum areas requiring soil erosion and sediment control measures are indicated on the Contract Drawings. The Owner's Representative reserves the right to modify the use, location, and quantities of soil erosion and sediment control measures based on activities of the Contractor and as the Owner's Representative and Owner's Construction Manager considers to be to the best interest of the Owner.

C. The Temporary Erosion and Sediment Control (TESC) facilities described in this section and shown on the Contract Drawings are the minimum requirements anticipated for site conditions expected during the construction period. As work progresses, it is the Contractor's responsibility to inspect the temporary erosion and sediment controls and make repairs and improvements as necessary.

D. In order to comply with the requirements of this Technical Specification, the Contractor shall develop and submit a Contractor's TESC Plan.

1.02 RELATED SECTIONS

A. Technical Specification Section 01 35 43 – Environmental Controls

B. Technical Specification Section 02 20 00 – Cofferdams and Dewatering

C. Technical Specification Section 31 00 00 – Excavation and Fill

1.03 APPLICABLE PUBLICATIONS

A. The following permits, rules, requirements, and regulations specified may apply to this work:

1. Concurrence Letter from NOAA's National Marine Fisheries Service (WCR-2016-4573)
2. UASCE Permit No. NWS-2016-26
3. Concurrence Letter from U.S. Fish and Wildlife Service
4. Disposal Authorization Memo issued by the USACE (CENWS-OD-TS-NR)
5. Hydraulic Project Approval (HPA)

6. Determination of Non-Significance (DNS)
7. Shoreline Substantial Development Permit Exemption and Critical Areas Review (SEPA)

B. Any conflicts between these Technical Specifications and the project permits will be brought to the attention of the Owner's Representative. Nothing whatsoever shall be deemed to authorize violation of the project permits.

1.04 GENERAL

A. See Conditions of the Contract and Division 1, General Requirements, which contain information and requirements that apply to the Work specified herein and are mandatory for this project.

B. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

C. Soil erosion stabilization and sedimentation control consist of the following elements:

1. Maintenance of existing permanent or temporary storm drainage piping and channel systems, as necessary.
2. Construction of new permanent and temporary storm drainage piping and channel systems, as necessary.
3. Install, maintain, and remove all erosion prevention, containment, and countermeasures BMPs during the life of the contract.

D. Failure to install, maintain, and/or remove BMPs shown on the Contract Drawings and specified herein, or by order of the Owner's Representative or Owner's Construction Manager; or failure to comply, implement and maintain any provisions and requirements of this Technical Specification; or failure to conduct project operations in accordance with these Technical Specifications and Contract Drawings will result in the suspension of the Contractor's operations by Owner's Representative in accordance with General Requirements.

E. Any damages, fines, levies, or judgments incurred as a result of Contractor, Subcontractor, or supplier negligence in complying with the requirements of this Technical Specification will be charged to the Contractor.

F. The Contractor shall be solely responsible for any schedule impacts from damages, fines, levies, judgments, or stop work orders incurred as a result of Contractor, Subcontractor, or supplier negligence in complying with the requirements of this Technical Specification. The project schedule will not be changed to accommodate the time lost.

G. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working and administrative areas for the Contractor's exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall be done in a manner to control all sediment transport away from the area.

H. The Contractor is wholly responsible for meeting water quality standards during excavation and excavation material rehandling and disposal. No discharge of water shall be allowed that increases the turbidity above permit levels, volume, velocity, or peak flow rate of the receiving water relative to ambient background conditions.

I. The Owner's Representative or Owner's Construction Manager may require additional temporary measures if it appears that pollution or erosion may result from weather, the nature of the materials, or progress of the work.

J. In the event that TESC measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled, or are ordered by Owner's Representative or Owner's Construction Manager, such work shall be performed by the Contractor at their own expense.

K. The Contractor shall maintain all elements of the Soil Erosion Stabilization and Sedimentation Control systems and facilities to be constructed during this Project for the duration of the Contractor's activities on this Project. Site inspections shall be conducted at least once every calendar week and within 24 hours of any discharge from the site. The inspection frequency for temporarily stabilized, inactive site may be reduced to once a month every calendar year.

L. The Contractor's inspector shall summarize the results of each inspection in an inspection report or checklist and be entered into, or attach to, the site logbook. The logbook should be available for review by the Owner or Idaho DEQ.

M. All sedimentation facilities shall be cleaned of collected sediment after every storm or as determined from the weekly inspections. Cleaning shall be done in a manner that will not direct the sediment into the storm drain piping system. Removed sediment shall be disposed of offsite.

N. Replacement or repair of failed or overloaded silt fences, check dams, or other temporary erosion control devices shall be accomplished by the Contractor within 2 days after receiving written notice from the Owner's Representative or Owner's Construction Manager.

O. If the Contractor has not complied with any of the above maintenance efforts to the satisfaction of the Owner's Representative or Owner's

Construction Manager within 2 working days after receiving written notification from the Owner's Representative or Owner's Construction Manager, the Owner shall have the prerogative of engaging others to perform any needed maintenance or cleanup, including removal of accumulated sediment at constructed erosion control facilities, and deduct from the Contractor's monthly partial payment the costs for such efforts.

1.05 CONTRACTOR EROSION AND SEDIMENT CONTROL PERSONNEL

A. The Contractor shall designate a sufficient number of qualified employees to be responsible representatives in charge of erosion and sedimentation control so that one representative is on-site at all times when any work activity is taking place. These employees' responsibility will be the oversight of all water and air quality issues. The Contractor shall designate one employee as the Temporary Erosion and Sediment Control Lead (TESCL) who shall be responsible for ensuring compliance with all requirements of this Technical Specification. Prior to the construction, the TESCL shall have for the life of the Contract, a TESCL certification card from a course approved by the Department of Environmental Quality.

B. The TESCL shall have authority to act on behalf of the Contractor. Duties and responsibilities of the TESCL shall include:

1. Preparing and submitting a TESC Plan for approval.
2. Maintaining a permit file on site at all times that includes the TESC Plan and any associated permits and drawings, as applicable.
3. Directing BMP installation, inspection, maintenance, modification, and removal.
4. Being available 24 hours per day, 7 days per week either in person or by telephone.
5. Updating all TESC drawings with changes made in the field
6. Keeping daily logs.
7. Identifying the points where stormwater runoff, if any, potentially leaves the site, is collected in a surface water conveyance system (i.e., road ditch or storm sewer), and enters receiving waters of the State.
8. If water sheet-flows from the site, identifying the point at which it becomes concentrated in a collection system.
9. Inspecting TESC Plan requirements including BMPs as required to ensure that they are adequate and functioning properly.
10. Facilitating, participating in, and taking corrective actions resulting from inspections performed by outside agencies and Owner's Representative.

1.06 SCHEDULE

A. The TESC Plan schedule shall include:

1. Schedules for accomplishment of temporary and permanent erosion and sediment control work, as applicable for offloading, dewatering, transloading, transporting, placement, and grading of dredged material
2. Proposed method of erosion and dust control on haul roads and a plan for disposal of waste materials.
3. Estimated removal date of all temporary BMPs.
4. Estimated date of final site stabilization.
5. Overall project schedule and weekly “look ahead” schedules.
6. Erosion control work activities consistent with the TESC Plan shall be included in the Contractor’s Construction Schedule.

1.07 SUBMITTALS

A. Submittals shall be made in accordance with Section 01 33 00 - Submittals.

B. Temporary Erosion and Sediment Control Plan: Within seven (7) calendar days after the Contract Award, the Contractor shall submit the Contractor TESC Plan. Failure to approve all or part of any such Plan shall not make the Owner liable to the Contractor for any work delays. The TESC Plan shall, at a minimum, include written descriptions addressing the following:

1. Site description
2. BMP installation & maintenance
3. Contractor erosion and sediment control personnel
4. Construction phasing & schedule
5. Site inspection & monitoring
6. Reporting & record keeping
7. BMP removal
8. Emergency response
9. Drainage systems
10. Haul routes
11. Construction dewatering

C. Shop Drawings

1. Location of the above items; additional dredging and excavation areas, natural and constructed drainage systems within the work area and staging areas.

2. Locations of BMPs during each phase of construction and each location of work activities.

D. TESCL Qualifications

1. The TESC Plan shall include the resume, name, telephone number, fax number, email address, and street address of the designated TESCL.

E. In addition, the Contractor shall provide the following specific information:

1. Certificates of inspection of seed by state or federal authorities and copies of delivery invoices or other proof of quantities of fertilizer.

2. Manufacturer's certificate of compliance attesting that the geotextile meets the requirements of these Specifications.

PART 2 – PRODUCTS

2.01 GENERAL

A. Contractor shall not clear, grub, grade, or perform any earth disturbing activities, dredged material, or dispose dredged material after Contract Award until all BMP's outlined in the Owner's Representative and Owner's Construction Manager approved TESC Plan are installed to the satisfaction of the Owner's Representative and Owner's Construction Manager.

B. Contractor shall have materials on hand, in quantities sufficient to cover all bare soil exposed to rainfall and surface water runoff, divert all flows, contain all sediments, and prevent turbid discharges from the site during all stages of construction in accordance with permit requirements. These materials include, but are not limited to, the following:

1. Reinforced plastic sheeting (minimum 6 mil thickness) so that all areas that are exposed at any given time to rainfall and site water runoff can be covered.

2. Straw.

3. Drain pipe

4. Sand bags. Sufficient quantity shall be provided to hold all installed reinforced plastic in place and to prevent wind blowing under the plastic sheeting or water draining under the plastic sheeting

5. Filter fabric

6. Hay bales
7. Floating debris boom
8. Silt/turbidity curtain
9. Silt fence

PART 3 – EXECUTION

3.01 GENERAL

A. The TESC Plan shall include installation instructions and details for each BMP used during the life of the project and shall include a description of the maintenance and inspection procedures to be used for the life of the project.

B. BMPs shall be maintained for the life of the project or until removed by order of the Owner's Representative. BMPs shall be maintained during all suspensions of work and all non-work periods. BMPs shall be maintained and repaired as needed to assure continued performance of their intended function and in accordance with the approved TESC Plan. Sediments removed during BMP maintenance shall be placed away from natural and construction stormwater conveyances and permanently stabilized.

C. At a minimum, the Contractor shall perform the following for all TESC BMPs:

1. Inspect daily and immediately after any measurable rain event (0.5 inches or greater).
2. Deficiencies identified during the inspection shall be corrected within 24 hours or as directed by the Owner's Representative and Owner's Construction Manager.
3. Inspect for runoff leaving the site during storms and checking for turbid water.
4. Inspect for dust during dry periods.
5. Note repairs or improvements needed, if any, and implement improvements.
6. Implement additional BMPs, if needed, to address site-specific erosion control.
7. Inspect streets and surrounding the site for dirt tracking.
8. Ensure no ponding of water due to formation of snow or ice dams during time periods of snowmelt or rain after snow events.
9. Report all discharges immediately to the Owner's Representative and Owner's Construction Manager.

D. Reports summarizing the scope of inspections, the personnel conducting the inspections, the dates of the inspections, major observations relating to the implementation of the TESC Plan, and actions taken as a result of these inspections shall be prepared and retained as a part of the TESC Plan.

E. All inspection reports shall be kept on-site during the life of the project and be available for review upon request of the Owner's Representative and Owner's Construction Manager.

3.02 TURBIDITY CURTAIN & DEBRIS BOOM

A. Refer to Section 01 35 43 - Environmental Controls for information on required turbidity curtains and debris booms.

3.03 CONSTRUCTION DEWATERING

A. The TESC Plan shall address how the Contractor will to manage clean and polluted water during the life of the project, including any water resulting from dewatering or concrete handling operations.

1. The Contractor shall dispose of offsite, haul, or pump and treat all water that does not meet Idaho DEQ Section 401 Water Quality Certification requirements. This includes water from any source that drains into project boundaries and becomes contaminated with sediment, chemicals, petroleum or other pollutants. Sources include but are not limited to: rainfall, surface water, roof drainage, groundwater, broken pipelines, irrigation and Contractor activities.

2. The Owner's Representative and Owner's Construction Manager shall be notified before any disposal, hauling, pumping, or treatment of water occurs. Notification shall include location of disposal and methods of treatment.

3. Groundwater shall be discharged as directed by the Owner's Representative.

4. Water shall not be pumped or allowed to drain into ditches, gutters, drainage conveyances, or catch basins.

5. Construction runoff may be pumped:

a. Into temporary holding tanks.

b. Into water trucks for disposal off-site at a Contractor's selected location.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Section includes administrative and procedural requirements for Project Closeout, including, but not limited to, the following:

1. Completion procedures.
2. Warranties.
3. Final cleaning.
4. Repair of the work.
5. Project Record Drawings.

1.02 RELATED SECTIONS

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and other sections of the General Requirements apply to this work as if specified in this section. Work related to this section is described throughout the specifications.

B. Prior to requesting final inspection, the Contractor shall assure itself that the project is complete in all aspects.

PART 2 – PRODUCTS

2.01 WARRANTY

A. The Contractor warrants the labor, materials and equipment delivered under the contract to be free from defects in design, material, or workmanship, and against damage caused prior to final inspection. Unless otherwise specified, this warranty extends for a period of one (1) year from the date of Substantial Completion.

B. The Contractor shall promptly repair or replace all defective or damaged items delivered under the contract. The Contractor may elect to have any replaced item returned to Contractor's plant at Contractor's expense.

C. In the event of equipment failure, during such time or in such a location those immediate repairs are mandatory, the Contractor shall respond promptly, irrespective of time. If the Contractor is not available, the Owner will effect repairs. The Contractor shall then reimburse the Owner for parts and labor necessary to correct deficiencies as defined within the warranty clause and time.

PART 3 – EXECUTION

3.01 FINAL DOCUMENTS

A. As-Built Drawings: After the completion of the work and before requesting substantial completion, the record drawings shall be completed and given to the Owner and Owner's Representative.

3.02 CLEAN-UP

A. Final clean-up and clean-up during the course of the work is defined in the paragraphs below:

1. At all times, and as may specifically be requested by the Owner, Owner's Construction Manager, or Owner's Representative, the Contractor shall clean up and remove all refuse resulting from the Work in order that the Project site remains free from an accumulation of construction debris. Upon failure to do so within 24 hours after request by the Owner's Representative, the Owner may do such clean up, and the cost thereof shall be charged to the Contractor and deducted from the Contract Sum.

2. Upon completion of the Work and before final inspection, the Contractor shall clean the entire Work premises occupied or used in connection with the Work of all rubbish, surplus and discarded materials, false work, temporary structures, equipment, and debris. The entire Work premises shall be left in a clean, neat, and presentable condition. The Contractor shall not remove warning, regulatory, or guide signs prior to Final Completion except as requested by the Owner's Representative.

B. Those paragraphs are supplemented to provide the following:

1. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.

2. Site: Unless otherwise specifically directed by the Owner's Representative or Owner's Construction Manager, sweep all paved areas on the site and all public sidewalks directly adjacent to the site. Completely remove all resultant debris.

3. Timing: Schedule final cleaning as approved by the Owner's Representative and Owner's Construction Manager to enable the Owner to occupy a completely clean project.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section outlines construction surveying work required to construct the components of the project in accordance with the Contract Drawings and Technical Specifications subject to the terms and conditions of the Contract.

B. The Contractor's work will include furnishing all materials, labor, and equipment necessary to perform construction staking and layout, establishing temporary benchmarks from primary control, pre-construction surveying, existing utility line locate surveying, progress/intermediate surveying for quality control, establishing on-site water level gages, construction staking and layout surveying for development of progress payments, and post-construction surveying.

C. Work covered by this Section includes, but is not limited, to the following elements of construction surveying work:

1. Temporary Construction Easement Locations and Entrances
2. Earthwork

1.02 RELATED SECTIONS

A. Section 01 33 00 - Submittals

B. Section 01 70 00 – Project Closeout

C. Section 31 00 00 – Excavation and Fill

D. Section 35 31 23 - Armor Stone

1.03 APPLICABLE PUBLICATIONS

A. USACE EM-1110-1-1005 – Topographic Surveying.

B. USACE EM-1110-2-1003 – Hydrographic Surveying.

1.04 DEFINITIONS

A. Terrestrial Surveys: Survey work conducted for any project work elements located above Ordinary High Water (OHW) and/or located below OHW where existing depths and environmental conditions (waves, currents, etc.) allow for the safe use of standard topographic survey equipment equipped as specified herein.

B. Hydrographic Surveys: Survey work conducted via boat equipped with positioning equipment as specified herein and utilizing single-beam transducer sounding techniques for measuring elevations in areas where water depths do not allow for the use of standard topographic survey equipment.

C. Hybrid Surveys: Any non-standard topographic and/or hydrographic survey work utilizing Unmanned Surface Vessels (USVs), Unmanned Aerial

Vehicles (UAVs), or other hybrid/alternative equipment. The use of hybrid or alternative survey equipment by the Contractor or Contractor's survey team must be approved in writing by the Owner's Representative prior to use. Accuracy of hybrid or alternative surveys shall meet or exceed the accuracy requirements listed herein for terrestrial and/or hydrographic surveys.

D. DGPS: Differential Global Positioning System (DGPS)

E. RTK-GPS: Real Time Kinematic (RTK) Global Positioning Systems

1.05 GENERAL CONSTRUCTION SURVEYING

A. Survey responsibility and sequence of survey work: The Contractor is responsible for all surveys necessary for controlling the work, including setting temporary benchmarks, staking and layout, intermediate/progress surveys, pre/post construction surveys. Construction survey assignments and activities are listed below. Survey tasks must be performed by an independent licensed surveyor, working as a sub-contractor for the Contractor, where indicated:

1. Establish primary survey control (Must be performed by a Contractor hired Independent Licensed Surveyor)
2. Existing utility locate survey (Contractor)
3. Establish water level gauge(s) (Contractor)
4. Pre-construction survey (Must be performed by a Contractor hired Independent Licensed Surveyor)
5. Pre-Excavation survey (Must be performed by a Contractor hired Independent Licensed Surveyor)
6. Intermediate/progress surveys for quality control (Contractor)
7. Post-Excavation Survey (Must be performed by a Contractor hired Independent Licensed Surveyor)
8. Final intermediate progress survey to confirm that design elevations have been achieved at all locations (Contractor hired Independent Licensed Surveyor)
9. Post-construction survey (Must be performed by a Contractor hired Independent Licensed Surveyor)

B. Construction surveying requirements

1. The surveys performed during construction including pre-construction survey, intermediate/progress surveys, construction staking, electronic template development and post construction surveys shall be done at no additional expense to the Owner.

2. The Contractor shall layout, install, and maintain construction stakes and marks needed to establish the lines, grades, slopes and cross-sections as necessary for completion of the work. Construction staking using wood lathing in above water areas and plastic pipe or other similar durable material shall be used in inundated areas to ensure waves and currents do not dislodge the staking during the construction period. The Contractor shall establish quality control for all work performed and all products supplied to assure compliance with the Technical Specifications. All construction surveys shall be conducted with electronic DGPS/RTK surveying equipment and shall achieve the survey accuracies stated herein.

3. The Contractor shall use electronic work templates in combination with installed on-board construction electronics equipment. Electronic templates shall utilize TIN or equivalent 3-dimensional surface models developed from the Contract Drawings and updated with pre-construction, progress/intermediate, and post-construction survey data throughout the duration of construction.

4. All surveys conducted within the project site limits shall use equipment equipped with electronic DGPS/RTK positioning capabilities and shall achieve the survey accuracies stated herein.

5. The Contractor shall perform all survey work to layout and set any construction stakes and marks which are needed to establish the lines, grade, slopes, and cross-sections. A baseline offset from the work area shall be established, utilizing benchmarks and monuments provided on the Contract Drawings, at a location that shall not be disturbed by construction activities and located close to the work so that it provides alignment and location reference. In addition, the Contractor shall perform intermediate/progress surveys during construction to ensure that the bedding stone and armor stone are being constructed to the lines and grades shown on the Contract Drawings within the tolerance specified. The Owner's Representative shall approve the field-staking and electronic templates for all work areas prior to the start of excavation or fill activities.

6. The electronic surveying method must be approved, in writing, by the Owner's Representative, prior to beginning placement of products on the Project.

7. Establish intermediate elevation benchmarks as needed to check work throughout the project.

8. The Owner's Representative may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

9. Surveys shall be of sufficient frequency and accuracy during construction so that the Owner's Representative can determine that the construction is within the tolerances of the Technical Specifications and Contract Drawings.

10. The Contractor shall be responsible for processing all survey data and providing the Owner and the Owner's Representative with electronic files containing topographic and/or bathymetry data (ASCII x-y-z format) for each survey.

11. The Contractor shall make consideration for providing sufficient notification time of any intermediate/progress survey work for the Owner's Representative to review, observe and check all progress survey results throughout the duration of the work. The Owner's Representative and Owner's Construction Manager shall be allowed the time and access to check and approve the work prior to Contractor backfilling or covering the survey work area.

12. The Contractor shall be responsible for setting, maintaining and resetting all alignment stakes, slope stakes, offsets to structures, and grades as necessary for the construction of all work shown in the Contract Drawings. Calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

13. The location of each cross-section surveyed shall be referenced to the stationing shown on the Contract Drawings. The Contractor shall plot the cross-sections and profiles on a scale agreeable to the Owner's Representative and submit to the Owner's Representative for approval.

C. Datums and Units: All surveys performed for this work shall be referenced to the following survey datums.

1. Horizontal Datum: Idaho State Plane West Zone, North American Datum 1983(91), (NAD83(91)), U.S. Feet.

2. Vertical Datum: Lake Datum, referenced to USGS Gage 12393000. Datum of USGS Gage is 2,434.64 feet above NGVD29, U.S. Feet.

D. Surveying tolerances

1. Terrestrial surveys shall be conducted utilizing surveying procedures, equipment, and methodology that meet or exceed accuracy tolerances of ±0.05 feet in vertical and ±0.1 feet in horizontal unless specified otherwise.

   Hydrographic survey work (if required) shall be conducted in accordance with USACE standards for Class 1 Hydrographic Survey for Navigation and Dredging support surveys in accordance with EM 1110-2-1003, Hydrographic Surveying. Vessels used for

hydrographic surveying works shall be equipped with survey grade single-beam depth transponders. Accuracy for measured depths/elevations shall be +/- 0.3 feet, and accuracy of horizontal position shall be +/- 3 feet at the 95 percent confidence interval.

Hybrid survey technologies shall meet or exceed the vertical and horizontal accuracy tolerances specified herein for terrestrial surveys.

2. Intermediate/Progress Surveying: Terrestrial and Hydrographic survey work for intermediate/progress surveys shall be conducted using electronic DGPS/RTK positioning equipment and survey grade single-beam depth sounders (Hydrographic Surveys) in accordance with the requirements herein. Other electronic survey equipment may be proposed for use by Contractor in lieu of that specified but shall be approved by Owner's Representative prior to start of construction. Accuracy for measured elevations and/or water depths for intermediate/progress surveys shall be in accordance with the Terrestrial and Hydrographic Survey requirements herein.

E. Survey equipment

1. General: The Contractor shall employ a suitable method to locate and control equipment, structure excavation work, and the placement of fill that may include: DGPS, RTK-GPS, and/or an Owner's Representative approved equivalent. Observation data will be recorded in standard surveying field book format or by other methods as approved by the Owner's Representative. Automated position determinations will be accomplished by standard trilateration procedures whereby lengths to two or more shore-based points are electronically measured by either time delay or phase comparison techniques.

2. Hydrographic Survey: Hydrographic surveys shall be conducted by the Contractor using DGPS and/or RTK-GPS positioning equipment and shall use single-beam transducer sounding techniques for measuring depths. Hydrographic surveying shall be conducted with appropriate correction for water levels at the time of the survey. The proposed survey equipment shall be capable of providing the necessary measurement accuracy and provide exportable data in electronic format.

3. Survey Data Point Collection: Elevation and horizontal data points shall be taken at intervals as required herein, with additional points taken as necessary to adequately locate critical site features including edges, intersections, limits, and changes in slope of excavation, fill, cofferdam placement, stone structures, concrete placement, and other items project components to be constructed as shown on the Contract Drawings.

1.06 CONSTRUCTION SURVEYING & STAKING

A. Survey for Layout of Work: An accurate method of horizontal control shall be established by the Contractor before construction begins. The Owner's Representative will review and approve the proposed method and maintenance of the horizontal control system. If, at any time, the method fails to provide accurate location for the construction, the Owner's Representative may require the Contractor to suspend its operations until the survey control is reestablished. The Contractor shall lay out its work from the site control monuments shown on the Contract Drawings and shall be responsible for all measurements taken from these points. The Contractor shall furnish at its own expense all stakes, electronic templates, platforms, equipment, buoys, range markers, transponder stations and labor as may be required to lay out the work from the work points shown on the Contract Drawings. If staked points are destroyed by the Contractor or disturbed through the Contactor's negligence prior to authorized removal, they shall be resurveyed and/or replaced by the Contractor at the Contractor's own expense.

B. Use of electronic work templates for on-equipment positioning systems during construction to locate and delineate excavation and stone placement area limits and elevations for the work are allowable but require detailed description in the survey plan. Provide equipment positioning plan and electronic templates from Hypak, Dredgepack, AutoCAD, or other comparable 3D software if onboard equipment positioning systems are utilized in lieu of field staking. Equipment positioning systems shall be field checked for accuracy utilizing survey grade instruments for horizontal and vertical. Intermediate surveys will also include equipment positioning system electronic bucket marks within the work area prisms as part of the interim survey submittals.

C. Contractor is responsible for conducting all construction staking and survey work required for construction.

D. To facilitate the establishment of lines and elevations, the Contractor hired Independent Licensed Surveyor will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control, and descriptions of two control points will be described by reference to the coordinate system and elevation datum utilized by the project.

E. The Contractor is responsible for verifying primary control information furnished by the Independent Licensed Surveyor prior to performing construction marking work. The Contractor shall notify the Owner's Representative promptly in writing of any discrepancies discovered.

F. When staking structure or other alignment and stationing, the Contractor shall perform independent checks from different secondary control to

ensure that the points staked are within the specified survey accuracy tolerances.

G. The Contractor shall calculate coordinates for the alignment. The Contractor shall submit these coordinates for Owner's Representative for review and approval in accordance with Technical Specification Section 01 33 00 – Submittals.

H. The use of Global Positioning System (GPS) positioning equipment on construction machinery is contingent upon the use of electronic construction templates, which shall be submitted by the Contractor and approved by the Owner's Representative prior to the start of Construction.

I. Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Owner's Representative. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

J. In addition to the development of electronic templates, the location of all work elements indicated on the Contract Drawings shall be field staked or marked and approved by the Owner's Representative prior to the start of construction.

K. Establish the centerlines of all alignments, by placing hubs, stakes, or marks on centerline or on offsets to centerline at all curve points (PCs, PTs, and PIs) and at points on the alignments spaced no further than 50 feet.

L. Establish clearing limits, placing stakes at all angle points and at intermediate points not more than 50 feet apart. The clearing and grubbing limits shall be 5 feet beyond the toe of a fill and 10 feet beyond the top of a cut unless otherwise shown in the Contract Drawings.

M. Establish grading limits, placing slope stakes at centerline increments not more than 25 feet apart. Establish offset reference to all slope stakes.

N. Establish the horizontal and vertical location of all drainage features, placing offset stakes to all drainage structures and to pipes at a horizontal interval not greater than 25 feet, as applicable.

O. For all other types of construction included in this project, provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

1.07 PRE-CONSTRUCTION SURVEYING

A. A pre-construction survey shall be conducted at least 45 days prior to the start of construction. The Contractor shall provide the pre-construction survey to the Owner's Representative and the Owner's Construction Manager at least 30 days prior to the start of construction for review.

B. The pre-construction survey shall include the following:

1. Pre-construction surveys shall meet the requirements outlined in paragraph 1.05 "General Construction Surveying" of this Section.
2. Terrestrial, hydrographic and/or hybrid/alternative survey data collection within the work areas indicated on the Contract Drawings and Specifications. Survey areas include areas within and outside of the project site limits.
3. Design Template Overlay: The Contractor shall develop drawings with overlays of design cross-section templates (from Contract Drawings) on cross-sections developed using pre-construction survey data.

1.08 INTERMEDIATE/PROGRESS SURVEYS

A. Intermediate/progress surveys shall be conducted in accordance with the requirements outlined in paragraph 1.05 "General Construction Surveying" of this Section.

B. The purpose of intermediate/progress surveys is for quality assurance and quality control to assure products are installed as specified. Owner's Representative and Owner's Construction Manager may use the results of intermediate/progress surveys to direct the Contractor to adjust its methods to assure compliance with the Contract Drawings and permit requirements, at no additional expense to the Owner.

C. Intermediate/progress surveys of the work may be submitted for partial payment upon prior approval from the Owner's Representative.

D. The Contractor shall perform intermediate/progress surveys for all work items where progress payments are requested and as specified below. Intermediate/progress terrestrial and hydrographic surveys (if required) shall, to the practical extent possible, be performed in a similar manner (areas of coverage and point density) as any pre-construction survey works. The Owner's Representative will use the survey data to confirm design elevations monitor construction progress and confirm partial payments.

E. Intermediate/Progress survey cross-sections shall be taken at the same cross-section locations as previously performed surveys for comparison of work element progress.

1.09 POST-CONSTRUCTION SURVEY

A. Upon completion of all work activities, the Contractor shall hire an Independent Licensed Surveyor to perform a post-construction survey within all work areas.

B. The purpose of the post-construction survey is to assure compliance with the Contract and to record the as-built condition of the work.

C. The post-construction survey shall include the following:

1. Post-construction surveys shall meet the requirements outlined in paragraph 1.05 - General Construction Surveying of this Section.
2. Terrestrial, hydrographic and/or hybrid/alternative survey data collection within the work areas indicated on the Contract Drawings and Specifications. Survey areas include areas within and outside of the project site limits.

D. The Contractor shall survey all existing utility lines and residential laterals located along State Highway 57 and Lamb Creek Lane. Any damage to the existing utility lines located along the haul road that are identified following the Owner's Representative and Owner's Construction Manager's review of the post-construction utility survey data shall be the responsibility of the Contractor and repaired in accordance with Section 01 50 00 – Temporary Facilities and Controls.

E. All Post-construction survey data shall be reviewed and verified by the Owner's Representative prior to Demobilization from the site.

1.10 SUBMITTALS

A. Action Submittals

1. Qualifications: Contractor shall submit a description of construction survey personnel qualifications to the Owner's Representative for review prior to start of survey work. Surveys shall be submitted in accordance with 01 33 00 – Submittals. Survey qualifications are as follows:

a. Licensed Surveying: Licensed surveying shall be performed under the direct supervision of an independent licensed State of Idaho Professional Land Surveyor that is not an employee of the Contractor. All primary control verification and secondary control establishment, pre-construction, pre-excavation, post-excavation, final intermediate/progress surveys, and post-construction survey work shall be conducted as a licensed survey. Licensed survey may require multiple survey methods and may be performed by different licensed surveyors, provided that they meet the following requirements:

(1) General: The surveyor shall be a licensed public land surveyor (PLS) in the State of Idaho and shall have a minimum 5 years of documented experience with construction field surveying for similar types of shoreline and nearshore upland improvement projects.

(2) Hydrographic Survey: The surveyor shall be a licensed public land surveyor (PLS) in the State of Idaho and shall have a minimum 5 years of documented

experience with hydrographic surveying works using the equipment proposed for use on this project.

b. Non-Licensed Surveying: Intermediate/progress surveys shall be performed by either an employee of the Contractor or and independent licensed surveyor meeting the following requirements

(1) General: The surveyor shall have a minimum of five (5) years of documented experience performing topographic surveying utilizing electronic surveying instruments (total station, GPS, etc.) and qualified in the use of the survey equipment proposed by the Contractor.

(2) Hydrographic Survey: The surveyor shall have a minimum of five (5) years of documented experience performing hydrographic surveying of similar works using the equipment proposed for use on this project.

2. Survey Plans: Contractor shall submit survey plans for all work and all phases to the Owner's Representative's for review in accordance with Technical Specification Section 01 33 00 – Submittals. All survey plans must be reviewed and approved by the Owner's Representative and Owner's Construction Manager prior to the start of surveys and construction activity by the Contractor. The plans shall include a description of the methods, procedures, and proposed survey equipment and model number to be used for pre-construction, intermediate/progress, and post-construction survey works. The following list includes, but is not limited to, the survey plans that shall be provided by the Contractor:

a. Pre-construction Survey Plan

b. Progress/Intermediate Survey Plan

c. Post-Construction Survey Plan

3. Survey Data and Drawings

a. Primary and Secondary control established by the Contractor

(1) Provide descriptions of primary and secondary control to the Owner's Representative and Owner's Construction Manager. The description shall include coordinates and elevations of all primary and secondary control points.

b. Utility locate surveys, potholing, etc.

c. Temporary Construction Easement and Access Surveys

d. Intermediate/Progress surveys

(1) The Contractor shall furnish the original field notes and data of the surveys to the Owner's Representative and Owner's Construction Manager within 24 hours following completion of the survey. Survey data shall be in PC compatible, ASCII format, in delimited files of easting, northing, and elevation (xyz), and description.

(2) Survey data file shall list the project name, surveyor's name, area surveyed, date of survey, and the horizontal and vertical datum.

(3) Topographic and/or bathymetric survey data shall include measured Outlet Dam and Priest Lake water levels to the nearest 0.1 foot in the project datum for the period of the survey.

(4) Cross-sections and plan views shall be plotted in AutoCAD 2014 (or newer format) and submitted in hard copy and electronic format to the Owner's Representative. Cross-sections and plan views shall follow within 3 business days after completion of the survey, or as approved by the Owner's Representative. Plotted survey submittals shall be drawings of sections on 11x17 inch sheets at a suitable scale.

(5) Data shall be submitted to the Owner's Representative and Owner's Construction Manager in electronic ASCII and PDF formats.

e. Pre/post construction and pre/post excavation drawings

(1) The processed data pre-construction and pre-excavation (ASCII format), one (1) foot contour map of the work areas, and cross-section drawings (in AutoCAD format) with overlays of design templates shall be submitted to Owner and the Owner's Representative at least 14 business days prior to the start of on-site construction activities.

(2) The Contractor shall furnish the original field notes of all construction surveys and data of the surveys to the Owner's Representative and Owner's Construction Manager within 24 hours following completion of the survey. Survey data shall be in PC compatible, ASCII format, in delimited files of easting, northing, and elevation (xyz), and description.

(3) Survey data file shall list the project name, surveyor's name, area surveyed, date of survey, and the horizontal and vertical datum.

(4) Topographic and/or bathymetric survey data shall include measured Thorofare and Priest Lake water levels to the nearest 0.1 foot in the project datum for the period of the survey.

(5) Cross-sections and plan views shall be plotted in AutoCAD 2014 (or newer format) and submitted in hard copy and electronic format to the Owner's Representative. Cross-sections and plan views shall follow within 7 business days after completion of survey, or as approved by the Owner's Representative. Plotted survey submittals shall be drawings of sections on 11x17 inch sheets at a suitable scale.

(6) Data shall be submitted to the Owner's Representative and Owner's Construction Manager in electronic ASCII and PDF formats.

f. Project Record Drawings

(1) Refer to Specific Requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SURVEY EQUIPMENT

A. Surveying equipment and methods used for pre-construction, intermediate/progress surveying and post-construction surveys shall be conducted in accordance with paragraph "General Construction Surveying" of this Section.

3.02 EXISTING UTILITY LOCATION SURVEY

A. Contractor shall clearly mark and stake the location of existing utilities located within the access road corridor shown on the Contract Drawings.

3.03 PRE-CONSTRUCTION SURVEY

A. Pre-construction survey areas shall include surveying for all within and outside of the project site limits. Pre-construction survey works also include utility line locate surveys and pre-construction condition assessments along Lamb Creek Lane. Pre-construction survey works also include all pre-construction condition assessment and surveying work associated with temporary construction easements and access areas.

B. Existing Utility Surveys

1. Pre-construction Utility Condition Survey: The Contractor shall submit photos and a video recording of an initial walkthrough of the Construction Access Easements prior to construction. Inspections of utility infrastructure, including CCTV, potholing, and other utility location works shall be documented and provided to the Owner's Representative and Owner's Construction Manager for review prior to initiating construction activities. The photos, video, and other documentation shall be used at the end of construction as a baseline for the Contractor to restore the site.

C. Pre-construction survey works within the project site limits shall consist of survey transects taken perpendicular to specified structure centerlines or along shoreline reference line and at no greater than 25 feet on center. Survey points along each transect shall be taken at all major breaks in grades, slope, and alignment to accurately depict topographic conditions. Surveying along transects shall extend at least 25 feet beyond the edge of excavation and fill limits (both landward and waterward directions).

D. The Contractor shall complete locate surveys for all existing utility lines and residential laterals located along Lamb Creek Lane. Existing utility information is indicated on the Contract Drawings and in Appendix D – Existing Utility Drawings.

E. All Pre-construction survey data shall be reviewed and verified by the Owner's Representative for approval prior to the start of construction.

3.04 INTERMEDIATE/PROGRESS SURVEYS

A. Intermediate/progress surveys for construction associated with excavation and fill and any other works located within the project site limits shall be performed using terrestrial and hydrographic (if required) survey equipment as specified below:

1. Progress surveys shall be conducted following the same procedures and locations as outlined in the Pre-construction survey section. Results of the intermediate/progress surveys will be transmitted to the Owner's Representative and Owner's Construction Manager within 24 hours of completion of each survey and may be used to direct the Contractor to adjust its method of fill placement and/or temporary stockpiling to assure compliance with the Contract Drawings and permit requirements, at no additional expense to the Owner.

B. Intermediate/progress surveys shall be conducted at the following stages of construction to ensure the lines and grades shown on the Contract Drawings and specified herein are being achieved:

1. Every 25 feet, relative to the centerline of the Outlet Dam, following excavation. Intermediate/progress surveys shall be conducted along the same transects surveyed during the pre-construction survey.

2. Every 25 feet, relative to the Outlet Dam Centerline, following placement of geotextile, fill/beneficial reuse, cofferdams, and stone materials. Intermediate/progress surveys shall be conducted along the same transects surveyed during the pre-construction survey.

C. Intermediate/Progress Survey Submission Requirements. The Contractor shall submit intermediate/progress survey data as specified herein for the Owner's Representative review and approval. The Owner's Representative reserves the right to increase or decrease the frequency of intermediate/progress surveys at no additional expense. The frequency of intermediate/progress surveys will depend on the Contractor's ability to progress the work and maintain quality assurance and quality control in accordance with the Contract Drawings and Specifications. The Owner's Construction Manager and Owner's Representative shall be present during the execution of the progress survey data collection effort, unless explicitly waived by the Owner's Representative.

D. Final payment for the excavation work will be based on volumes computed using the pre-excavation survey and Intermediate/Progress Surveys of excavated areas completed to the lines and grades shown in the Contract Drawings. The comparison of the pre-construction and intermediate/progress surveys will be used as the basis for determining final pay quantities and acceptance of the excavation and fill work. Final pay quantities will be calculated by the Owner's Representative computing volumes to the nearest cubic yard. Upon request, the Contractor will be provided with a copy of the quantity calculations.

3.05 POST-CONSTRUCTION SURVEYING

A. Post-construction survey areas shall include surveying for all Work within and outside of the project site limits. Post-construction survey works also include utility line surveys and post-construction condition assessments along Lamb Creek Lane. Post-construction survey works also include all pre-construction condition assessment and surveying work associated with temporary construction easements and access areas.

B. Existing Utility Surveys

1. The Contractor shall survey all existing utility lines and residential laterals located along Lamb Creek Lane. Any damage to the existing utility lines located along the haul road that are identified following Owner's Representative and Owner's Construction Manager's review of the post-construction utility survey data shall be the responsibility of the Contractor and repaired in accordance with Section 01 50 00 – Temporary Facilities and Controls.

C. The Contractor shall walk the site with the Owner's Representative and Owner's Construction Manager and submit photos of the Construction Access Easement after construction. The Contractor shall submit to the Owner's Representative inspections of the utility's infrastructure following construction activities. Any damage incurred during construction shall be considered the responsibility of and repaired by the Contractor.

D. All Post-construction survey data shall be reviewed and verified by the Owner's Representative prior to Demobilization from the site.

3.06 PROJECT RECORD DRAWINGS

A. Contractor shall utilize final progress and post-construction survey data to assemble project record drawings for submission to the Owner at the conclusion of the project.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. A cofferdam and dewatering will be required to complete the Outlet Dam Improvement work. The cofferdam and dewatering will include the following:

1. Flow Diversion and Dewatering Work Plan
2. Cofferdam Design
3. Dewatering System
4. Rewatering
5. Temporary Access Road/Structure
6. Monitoring of Outlet Dam flow conditions and lake levels
7. Dewatering System removal and site restoration

1.02 RELATED SECTIONS

A. All Technical Specification sections relate to this section.

1.03 DEFINITIONS

A. Cofferdam is a temporary structure within a waterway or body of water designed to provide a dry work area for temporary construction activities and to contain disturbed soil and/or suspended sediments.

B. Dewatering refers to the removal of water with the purpose of creating a dry work area for temporary construction activities.

C. Dewatering system defines the machinery, equipment, and appurtenances necessary for and related to the accomplishment of dewatering, and the collection and disposal of all surface water within the protected area.

D. Flooding of the excavation is defined as the uncontrolled process of filling the excavation with water to a specified elevation and at a specified rate.

E. In-water work area is work occurring at or below OHW.

F. In-water Construction Window is the time period from November 1st, 2020 through March 15th, 2021 during which the Contractor is permitted to conduct work below OHW. No work below OHW may be conducted outside the In-water Construction Window.

G. Isolated Work Area is the area contained within the temporary cofferdam during construction. The Isolated Work Area will change during various phases of construction.

H. Unwatering is defined as the process of removing all water within an excavation.

I. Rewatering is defined as the controlled process of placing water in the completed structure and/or excavation to its naturally occurring elevation at

a specified rate when the construction is completed and the dewatering system is no longer required.

J. Flow Diversion defines the temporary re-routing of river flows around work areas.

1.04 RIVER FLOWS

A. The requirements and specifications for the cofferdams and dewatering are set forth herein.

B. A map of available flow data for the Priest Lake/Priest River system is provided in Appendix E - Water Level & Flow Data.

C. Outlet Dam Discharge: Recently (2016), a gage was installed just downstream of the Outlet Dam to measure discharge through the dam (USGS Gage #12393501).

D. Additional discharge data: There is also a long data record of river flows further downstream of the Outlet Dam from USGS Gage #12394000. Small tributaries drain into Priest River between the Outlet Dam and Gage #12394000, so the flows measured at this gage are similar to, but not necessarily representative of flows through the Outlet Dam.

E. A summary of Priest River flow data from USGS Gage #12394000 and available Outlet Dam flow data (#12393501) data is provided in Appendix E – Water Level & Flow Data for design of the cofferdam and dewatering system. A summary of estimated peak flows at the Outlet Dam and daily statistics from USGS Gage #12394000 during the In-water Construction Window are provided.

F. The Contractor shall install a staff gage within or upstream of the project site limits to monitor water levels during Construction.

G. It is the Contractors responsibility to review the enclosed data, USGS data, and site conditions and develop a Cofferdam System design and work plan that will provide protection of the active work area from inundation of water for the range of flows anticipated during construction.

1.05 DESIGN

A. The Contractor is responsible for the design of the dewatering and flow diversion systems. The dewatering system shall be designed using accepted professional methods of engineering design consistent with the best current practice and standard guidance.

The dewatering system shall include a cofferdam to isolate the dry work area from river flow. The cofferdam shall meet all requirements contained in paragraph COFFERDAM REQUIREMENTS in Part 3 and be able to withstand the two-year peak river flow, at a minimum, without overtopping. The estimated 2-year, 5-year, and 10-year peak river flow at the Outlet Dam

is provided below for two time periods within the In-Water Construction Window:

Estimated Outlet Dam Peak Flow Rates

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

B. The Contractor shall secure the services of a professional engineer licensed to practice in the State of Idaho to design and stamp calculations for the Cofferdams and Dewatering Systems.

1. The stamped design and calculation shall be submitted to the Owner's Representative as described in Paragraph 1.09 of these Specifications.

1.06 MAINTENANCE AND SERVICES

A. The Contractor shall be responsible for the maintenance, servicing, and repairs of the entire dewatering system and appurtenances during the life of the contract.

1.07 DEWATERING REQUIREMENTS

A. The dewatering system shall be of a type and capacity to accomplish all requirements specified herein.

B. The dewatering system shall be designed, installed, and operated to isolate and dewater a section of the Outlet Dam and scour apron, as shown on the Contract Drawings. The Contractor is responsible for selecting the dewatering system design water level for the anticipated river water levels and flows. The dewatering system must also include standby pumping and power supply such that a continuously operable system is available during power outages, pump failures, etc.

C. The dewatering system shall provide a dry, stable bottom, and side slopes.

D. The dewatering system shall be maintained continuously as specified above so that construction operations can be performed without interruption due to wet conditions.

E. The system may consist of pumps, standby pumps, sumps, sump pumps, ditches, and necessary appurtenances capable, at all river flows less than or equal to the 2-year peak flow provided in paragraph DESIGN above, at a minimum. The system shall be operated as required as specified herein to prevent flooding of the dewatered work area; and shall be designed to control a rainfall intensity of two (2) inches per hour within the dewatered area. All pumping equipment included in the system shall be muffled or isolated to prevent noise exceeding 75 decibels at the limit of construction.

Protection of all slopes will be required to prevent erosion under normal surface runoff and construction conditions. Slope protection may include proper drainage, mulching, vegetation, geosynthetics, etc.

F. Rewatering of the area shall be accomplished by directing surface and ground water into the area. Protection of slopes and excavation surfaces shall be provided as necessary to prevent erosion during flooding operations.

G. Burying of headers will be allowed only in areas and to depths absolutely necessary for protection against damage at construction equipment crossings.

1.08 GENERAL CRITERIA

A. All permanent work under this contract except as otherwise specified shall be carried on in areas free of water. The Contractor shall design, furnish, install, operate, and maintain such facilities necessary to accomplish the following:

1. The Flow Diversion/Dewatering Work Plan and Cofferdam System developed by the Contractor must be in accordance with all environmental permits included in Appendix A – Permit Documents.

2. No fish stranding shall occur. A qualified biologist (possessing all necessary knowledge, training, and experience to ensure safe handling of fish and to ensure the safety of staff conducting the operations) shall assist with any fish relocation efforts, if encountered.

1.09 SUBMITTALS

A. The Contractor shall submit an original and four copies of its complete flow diversion/dewatering and work site dewatering system design with details of the proposed diversion dewatering facilities to the Owner's Representative and Owner's Construction Manager for review for general conformance with permit requirements. These details must be presented in the form of a description of the proposed system including procedure, schedule, products, and basis of design, calculations, and drawings, including details showing the type of system, planned layout and sizes, sumps and pumps; provisions for disposal of water from the dewatering and diversion system; and plan of operation including flooding and rewatering plans. This submittal shall be submitted no later than 15 days prior to installation of the system.

PART 2 – PRODUCTS

2.01 MATERIALS

A. The Contractor shall furnish all materials, tools, and equipment for the flow diversion and control of water system, including flow diversion and

dewatering. Materials for diversion and control of water shall be selected by the Contractor and shall be similar to the following systems:

1. Aqua Dam ®
2. Portadam ®
3. Concrete Ecology Blocks
4. Supersacks with plastic sheeting
5. Or other Engineer-approved equivalent dewatering system

PART 3 – EXECUTION

3.01 OPERATION

A. The Contractor shall perform dewatering and maintain the isolated work areas in a dry condition as long as is necessary for the work under this contract. Once an area is dewatered, it shall be maintained in a dewatered condition until all work in that area is completed, unless flooding is directed by the Owner. In the event that flooding is deemed necessary by the Owner, the protected area shall be flooded in accordance with the sequence of flooding proposed by the Contractor and approved by the Owner's Representative and Owner's Construction Manager. However, the Contractor shall not flood the protected areas without the approval of the Owner. If flooding occurs because of the Contractor's fault, negligence, or convenience, all costs resulting from such flooding shall be borne by the Contractor. Commencement of dewatering subsequent to flooding will be subject to prior approval of the Owner.

3.02 QUALITY CONTROL

A. The Contractor shall establish and maintain quality control for all dewatering operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including but not limited to the following:

1. Designing,
2. Fabrication and Workmanship,
3. Installation, Operation and Removal.

3.03 COFFERDAM REQUIREMENTS

A. The following requirements shall apply to the cofferdam(s) proposed by the Contractor:

1. The Contractor is responsible for protecting the Work, prior to final acceptance, for conditions up to a 10-year flow event (see paragraph 1.03 DESIGN above).

2. The cofferdam shall be high enough to allow for the conveyance of the 2-year peak flow with 1ft of freeboard (at a minimum) past the isolated work area without overtopping the cofferdam.

3. The cofferdam shall be constructed of non-erodible materials (steel sheets, aqua barriers, rip rap, and geotextile liner, etc.). Earthen cofferdams are not permissible.

4. The cofferdam must be constructed from the upland area and no equipment may enter flowing water at any time. If the installation of the cofferdam cannot be completed from shore and access is needed to reach the area to be coffered, other measures, such as the construction of a temporary access road, will be necessary to ensure that equipment does not enter the water. Temporary access roads must meet the requirements contained in Section 01 50 00 – Temporary Facilities and Controls. Once the cofferdam is in place and the isolated area is dewatered, equipment may enter the coffered area to perform the required work.

5. During dewatering of the isolated work area, all sediment-laden water must be filtered to remove sediment. Possible options for sediment removal include baffle systems, anionic polymers systems, dewatering bags, or other appropriate methods. Water shall have sediment removed prior to being re-introduced to the downstream waterway. A stabilized conveyance from the dewatering device to the waterway must be identified in the plan. Discharge water is considered clean if it does not result in a visually identifiable degradation of water clarity.

6. The areas from the toe to the top of the side slopes outside the dewatered area shall be temporarily stabilized during construction to reduce the potential for erosion. All areas disturbed due to construction activities shall be restored to proposed conditions and fully stabilized prior to accepting flows.

3.04 REMOVAL

A. The dewatering facilities required to maintain a dry condition within the protected area shall be maintained until completion of the work within the protected area, and then shall be completely removed. However, no dewatering facilities of any kind shall be removed without prior approval of the Owner's Representative. Pumps and appurtenances employed in the dewatering system and all materials other than earth shall remain the property of the Contractor and shall be removed from the site of the work. Any approvals of the implementation and/or removal plans by the Owner's Representative does not shift the responsibility for the removal of the system from the Contractor to the Owner. Nor does it relieve the Contractor of their responsibility to provide a removal plan, which comports with industry standards and prudent construction practices.

B. The Contractor shall restore all riverbed areas to pre-construction conditions and all imported materials removed within the areas of flow diversion work.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Technical Specification covers supply, placement, and testing for all cast-in-place concrete, including formwork, reinforcement, concrete materials, mix design, and finishes for construction of the concrete apron, keyway, upstand, apron walls, floating slab, and pier repair as shown in the Contract Drawings. Work included under this Technical Specification is to include all equipment, labor, and materials, including reinforcement, formwork, placement, curing, testing, and any other associated work required for the installation of cast-in-place concrete.

B. Testing will be required at numerous stages of construction. The Contractor shall be responsible for coordinating all testing activities, related to this work, with the Owner's Representative and/or Owner's Construction Manager. The Contractor shall be responsible for ensuring that the test results for each testing activity are obtained within the acceptable timeframes specified in subsequent items of this section and are stamped by a professional engineer with current license under Idaho Statues, Title 54, Chapter 12, or by other certifying individual, who is qualified to review and approve such results or perform such testing. All test results shall be accompanied with the following information:

1. Manufacturer's Certificate of Compliance by Professional Engineer or certified individual as may apply, listing the test standard(s) used and that the testing was in compliance with the Contract.
2. The name of the testing laboratory including the accrediting agency, date of accreditation, principal in charge of testing, name of personnel doing testing if different including qualifications, address, phone number, and email address.
3. The results of the test(s) presented in the format required by the designated recognized test standard unless the Contract specifies otherwise.
4. Where and how the sample was obtained, any care given to the sample, and any care given in preparing the sample not specified in the test standard, any deviations from the testing standard used in testing.

1.2 RELATED SECTIONS

A. Section 01 33 00 – Submittals

B. Section 01 40 00 – Quality Requirements

C. Section 01 71 23 – Construction Surveying

D. Section 05 12 00 – Structural Steel Framing

1.3 REFERENCE STANDARDS

A. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified:

ACI

66 ACI Detailing Manual

117 Tolerances for Concrete Construction and Materials

211.1 Selecting Proportions for Normal, Heavyweight and Mass Concrete

301 Structural Concrete

304 Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete

305 Recommended Practice for Hot Weather Concrete

306 Recommended Practice for Cold Weather Concrete

308 Guide to Concrete Curing

315 Manual of Standard Practice for Detailing Reinforced Concrete Structures

318 Building Code Requirements for Reinforced Concrete (2014)

347 Recommended Practice for Concrete Formwork

ASTM

A82 Steel Wire, Plain, for Concrete Reinforcement

A497 Steel Welded Wire Reinforcing

A 615 Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

C31 Making and Curing Concrete Test Specimens in the Field

C33 Concrete Aggregates

C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens

C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C94 Ready-Mixed Concrete

C150 Portland Cement

C172 Sampling Freshly Mixed Concrete

C 260 Air-Entraining Admixtures

C 309 Liquid Membrane-Forming Compounds for Curing Concrete

C 494 Chemical Admixtures for Concrete

C 618 Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

C 989 Slag Cement for Use in Concrete and Mortars

1.4 QUALITY ASSURANCE

A. General

1. All concrete shall be reinforced unless otherwise stated.

2. Workmanship: The workmanship must be equal to the best practice in modern construction. The Contractor shall exercise the greatest possible care to make a uniform dense concrete of required strength, true to the elevations and lines shown on the Contract Drawings.

3. All concrete work which does not conform to the specified requirements, including those for strength, tolerances, and finishes shall be corrected or removed and recast as directed by the Owner's Representative and/or Owner's Construction Manager at the Contractor's expense with no modification of project schedule requirements. The Contractor shall also be responsible for the cost of corrections to any other work affected by, or resulting from, corrections to the concrete work.

4. Special Inspection by an independent inspector will be required prior to placement of concrete to ensure all formwork has been adequately prepared and cleaned and all reinforcement has been adequately installed.

B. Installer Qualifications

1. An experienced installer and finisher who has completed concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance. Qualifications must include:

a. Has experience completing installation of five (5) or more projects with similar finish techniques and has been in business ten (10) years or more. Provide the following information:

1) Provide list of five (5) projects with the address of the installation, the date of the installation, point of contact for the project and phone number as a reference.

2) Provide two (2) photos of each project listed above representing the project/installation.

C. Manufacturer Qualifications

1. A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.

    a. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

D. Testing Agency Qualifications

1. An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

    a. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

E. Source Limitations

1. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.6 SUBMITTALS

A. Submittals shall be in accordance with Technical Specification Section 01 33 00 – Submittals.

B. Concrete Work Plan: The Contractor shall submit a work plan detailing scheduling and methods to be used for cast-in-place concrete construction activities. The Concrete Work Plan shall include the following:

1. Pour and Joint Plan: The Contractor shall submit a detailed dimensioned pour plan that includes reinforcing in the concrete, the construction and cold joint locations, and pour sequencing. This plan shall be approved by the Owner's Representative prior to ordering the materials for construction.

2. Repair Plan: Prior to commencement of any concrete work, the Contractor is to submit a repair plan for both structural and non-structural repairs addressing materials and methods.

3. Thermal Control Plan: If hot or cold weather concrete placement is anticipated as defined by ACI 301, the Contractor shall adhere to the manufacturer's recommendations and submit a thermal control plan

to the Owner's Representative for review and approval prior to commencement of any concrete work.

4. Reinforcing Steel Shop Drawings: Contractor shall submit shop drawings for all reinforcing steel. Shop drawings shall conform to ACI and CRSI standards. Reproductions of contract drawings are unacceptable. Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of the concrete reinforcement.

C. Concrete Mixes: The Contractor shall submit concrete mixture proportions and supporting data for review and approval by the Owner's Representative to prequalify their mix design. The mix design shall be approved prior to any concrete placement. The proportions of each ingredient used in all mixes, the compressive strengths at 7 and 28 days, and slump, air content, chloride-ion content, and other characteristics of all mixes shall be submitted for approval. This includes an initial test result for the proposed concrete mix shall be submitted and approved prior to the first pour. Note that all testing during construction for this project is at the point of placement not the point of discharge, and it is the Contractor's responsibility to ensure the mix design will provide the required properties at the point of placement. This submittal shall be accompanied by the test data showing the properties of each ingredient used in the mixes including cement and aggregates. The materials used in the work shall be the same as those in the submittal.

D. Test Results: Concrete cylinders taken during concrete construction shall be tested in accordance with these Technical Specifications and the results submitted to the Owner's Representative for approval. An initial test result for the proposed concrete mix shall be submitted and approved prior to the first pour.

E. Mill Certifications: The Contractor shall submit certified mill test reports for reinforcing steel.

F. Curing Compounds: The Contractor shall submit the manufacturer's literature for curing compounds to be used in the work if applicable.

G. Batch Tickets: The Contractor shall submit one original copy in accordance with ASTM C94, Section 15.

PART 2 – PRODUCTS

2.1 GENERAL

A. Unless otherwise specified, measure, batch, mix concrete materials, and deliver concrete in approved equipment in conformance with ASTM C94.

B. All cast-in-place concrete shall be normal-weight concrete made with normal-weight aggregate and shall meet the requirements for exposure class C2 per ACI 318 Tables 19.3.1.1 and 19.3.2.1. Lightweight aggregates shall not be used.

2.2 MIX COMPONENTS

A. Concrete Mix: Concrete mixtures shall be proportioned by the Contractor in accordance with ACI 211.1. Concrete mixtures shall conform to ACI 318, Chapter 4, and shall meet both the strength and durability criteria specified herein.

B. Consistency of mix shall be obtained with the minimum amount of water required to produce a concrete that will work properly into the corners, angles, and reinforcement without excessive puddling, or the need for spading or excessive vibrating and without permitting the materials to segregate or free water to collect on the surface.

C. Mix Proportions: The mixture proportions for concrete shall be developed by the Contractor to produce the design strength and to provide durability, workability, and mixture consistency to facilitate placement, compaction into the forms and around reinforcement without segregation or bleeding. The Contractor shall submit this mix design to the Owner's Representative for approval. The following durability requirement considerations shall be incorporated in the mixture proportions for concrete subjected to water immersion, splash, and debris abrasion:

   1. Maximum water/cement ratio: 0.40 by weight

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement (fly ash or other pozzolans, slag, or silica) in concrete as follows.

   1. Combined fly ash and pozzolan conforming to ASTM C 618: 25%

   2. Ground granulated blast-furnace slag conforming to ASTM C 989 Grade 100 or 120: 25%

   3. Combined fly ash or pozzolans and ground granulated blast-furnace slag: 25%

E. Portland Cement: Portland cement shall conform to ASTM C 150, Type II for all cast-in-place elements unless otherwise noted. Only cement of low alkali (less than 0.60 percent as Na2O) content shall be used with aggregates identified as potentially reactive. All cement used shall be from the same mill and manufacturer and shall have uniform color and shade.

F. Water soluble, chloride-ion content in hardened concrete is not to exceed 0.15% by weight of cement. The Contractor shall include test results showing compliance with this requirement with the submittal of their proposed mix design.

G. Water used in the mixing of concrete shall be potable in accordance with ASTM C1602 and shall be clean and free from oil, acid and injurious amounts of organic material, or alkalis and other salts.

H. Aggregates

1. Coarse aggregate shall be hard, durable, clean, uncoated particles conforming to the requirements for deleterious substances contained in ASTM C 33, Class Designation 4S. Coarse aggregate shall conform to ASTM C 33 No. 67 gradation requirements unless otherwise approved by the Owner's Representative. The aggregate shall contain no more than 8 percent by weight of flat or elongated pieces (ratio between maximum and minimum dimensions of a circumscribing rectangular prism exceeding 5:1) when tested in accordance with ASTM D 4791.
2. The Contractor shall propose an aggregate gradation for Owner's Representative's approval.
3. Fine aggregate shall be clean, hard, durable, uncoated grains of natural medium sand, free from silt, loam and clay, as available from established, approved local sources conforming to ASTM C 33, including grading requirements.

I. Admixtures: Use of admixtures as necessary, shall be approved by the Owner's Representative upon submittal of the Contractor's mix design.

1. No admixtures containing calcium chloride shall be used.
2. All admixtures shall be provided by the same supplier and shall be stated by the manufacturer as being compatible.
3. Air-Entraining Admixture: Air-entraining admixture shall be in strict accordance with agent manufacturer's printed instructions and shall conform to ASTM C 260. Percent air entrainment shall be in accordance with section 3.02.F of this specification.
4. Set-Retarding Admixture: Set-retarding admixture shall conform to ASTM C494, Type A or D. All concrete shall contain set retarding admixture, which shall be used at the rate, recommended by the manufacturer if the concrete cannot be placed within 1 hour of batching.
5. Water Reducing Agent(s) (Plasticizers): Water reducing agent shall conform to ASTM C494, Type B or D. All concrete shall contain water reducing agent, which shall be used at the rate recommended by the manufacturer if the concrete cannot be placed within 1 hour of batching.
6. Concrete Accelerator Admixtures may be used, if approved by the Owner's Representative.
7. Other Admixtures: Anti-freeze liquids, salts, or other similar materials shall not be used in concrete unless specifically authorized in writing by the Owner's Representative prior to construction.

8. Superplasticizer can be added to a concrete mix on-site to increase slump prior to placement, provided that the finished mix meets all specified requirements and the manufacturer's mix design parameters. Superplasticizer cannot be added to a partially-emptied batch of concrete. Superplasticizer additions can only be made to a load of concrete of known volume. Superplasticizer can only be added by the concrete manufacturer's representative.

2.3 REINFORCING STEEL AND MISCELLANEOUS

A. Reinforcing steel (deformed bars & undeformed rod) shall be in accordance with ASTM A 615, Grade 60.

B. Metal Accessories: Metal accessories including spacers, chairs, ties and other devices necessary for proper placement, spacing, supporting and fastening reinforcement in place shall conform to the Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.

2.4 FORMING AND CURING

A. Formwork: Materials for concrete formwork shall be suitable to achieve the finish requirements for formed surfaces specified and meet ACI 347 "Recommended Practice for Concrete Formwork." Unless specified or detailed otherwise, construct all formwork with new plywood or clean steel forms, to provide continuous straight, smooth, exposed surfaces. Vertical surfaces not over 12 inches high may be formed with new dimension lumber or stock steel forms. Provide form material with sufficient strength and rigidity to withstand pressure of newly placed concrete without bow or deflection. Include edges that prevent leakage of all cementitious materials from inside the forms into the water.

B. Form Coatings, Sealers and Release Agents: Form coating, sealers and release agents shall not bond with, stain, nor adversely affect concrete surfaces, and shall not impair subsequent treatments (painting, etc.) of concrete surfaces.

C. Curing compounds: Curing compounds can be used at the Contractor's option and if used shall be an approved paraffin-based substance conforming to ASTM C 309 Type 1 that shall not impair subsequent treatments (painting, etc.) of concrete surfaces. Liquid membrane-forming curing compounds shall not be used on surfaces to receive additional concrete or cementitious finishing materials, and shall be used only where approved by the Owner's Representative.

D. Owner's Representative Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

E. Watertight forms will be constructed to contain cast-in-place concrete and prevent leaching. Impervious materials and forms will be placed against and over any exposed wet concrete that could come into contact with waters of

the state. The impervious materials and forms must remain in place until the concrete is cured for at least 7 days. Any water that comes into contact with concrete before it is cured must be treated as required by project permit requirements.

2.5 CONCRETE REPAIR MATERIALS

A. Defect Repair Materials:

1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer for site conditions and repair thickness.

4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C109.

B. All repair materials and methods shall be submitted by the Contractor to the Owner's Representative for review and approval. The Contractor shall allow sufficient time for review and approval of all submittals taking into consideration that repair materials and/or methods may be rejected and may need to be resubmitted.

C. Materials defined for repair in this Technical Specification are not all inclusive and may not be applicable to the type of repair that is to be performed in the field. It is at the Owner's Representative's discretion to define the applicability of specific repair materials and whether or not the damaged item is repairable or not. If an item is deemed non-repairable the Contractor shall replace such item(s) at no additional cost to the Owner.

2.6 EPOXY REBAR BONDING MATERIAL FOR CONCRETE

A. Meet ASTM C881 with the classification (Type IV and Grade 3) of the system selected as specified. Use the following products or an approved equal to bond reinforcing steel in drilled holes:

1. Unitex®Pro-Poxy™300 from Dayton Superior.

2. Hilti HIT-RE 500®from Hilti, Inc.

3. Simpson Set Pac Epoxy from Simpson Strong-Tie Company, Inc.

B. Submit the manufacturer's certification verifying compliance to material specifications.

PART 3 – EXECUTION

3.1 GENERAL

A. Trucks or barges used for transportation of concrete shall have a water-gage for monitoring the water added to the concrete batch. The water-tank shall always arrive on-site full, and no other uses of this water shall be permitted until any on-site water additions have been made. On-site water additions shall be recorded on the batch receipt that becomes part of the project records.

B. Measuring, mixing, transporting and placing concrete shall adhere to the requirements and recommendations of ACI 304. Aggregate shall be handled in such a way as to avoid segregation prior to incorporation.

C. The work shall be protected from the elements, rain, flowing water, and defacement of any nature during construction.

D. Ends of reinforcement ties shall be bent inwards, away from the outside edges of the concrete pour.

3.2 INSPECTIONS

A. The Owner's Representative and/or Owner's Construction Manager shall be notified upon completion of installation of concrete reinforcement and formwork. The Owner's Representative and/or the Owner's Construction Manager will review and approve the work for conformance with the contract documents prior to placement of concrete.

B. All concrete testing is the responsibility of an independent testing firm hired by the Contractor.

C. Concrete Testing – General:

1. Testing will be required per Section 1.01 B per this specification.

2. An initial test result for the proposed concrete mix shall be submitted to the Owner's Representative and approved prior to the first pour.

3. All concrete test samples during construction are to be procured at the point of placement prior to consolidation to ensure the in-place product provides the required level of performance.

4. Materials and installed work will require testing by the Contractor's inspection laboratory and services in accordance with ASTM C172.

5. The Owner's Representative and/or Owner's Construction Manager may independently sample concrete and perform slump, temperature and air tests in accordance with ASTM C143. Concrete exceeding the maximum slump may be rejected by the Owner's Representative and/or Owner's Construction Manager. Concrete rejected for excessive slump shall be immediately removed from the Project Site.

D. Concrete Strength Testing

1. Unless otherwise shown on the Contract Drawings or otherwise approved the minimum 28-day cast-in-place concrete compressive strength shall be 5000 psi.

2. Concrete test specimens shall be collected in accordance with ASTM C172 at the point of placement, created in accordance with ASTM C31, and be tested in accordance with ASTM C39. Sample acquisition and testing shall proceed promptly so as not to impede progress of the work. Strengths of concrete shall be considered satisfactory if the average of any three consecutive strength tests of the laboratory cured specimens representing each specified strength of concrete is 15 percent greater than the specified strength, and if not more than 10 percent of the strength tests have values not more than 10 percent less than the specified strength.

   a. A minimum of four (4) 4-inch diameter by 8-inch tall cylinders shall be taken per mix per day or two (2) cylinders per twenty (20) yards of concrete, whichever is greater.

   b. One (1) cylinder shall be tested at seven (7) days, two (2) cylinders shall be tested at twenty-eight (28) days and one (1) cylinder shall be held in reserve. The twenty-eight (28) day compressive strength shall be evaluated in accordance with ASTM C39.

   c. Testing results shall be furnished to the Owner's Representative and/or Owner's Construction Manager as they are received.

   d. One test specimen of each set shall be tested at seven (7) days or prior to stripping of the form and three test specimens shall be tested at 28 days. The 28 day compressive strength shall be evaluated in accordance with ASTM C39.

3. Specimens will be collected by a testing laboratory/special inspector. The Contractor shall provide labor, and material as required, to assist testing laboratory in preparing specimens for testing, and job storage facilities for making and storage of specimens. The Contractor is responsible for protecting the specimens from damage while they are on the project site. Delivery and responsibility of the test specimens will be that of the testing laboratory/special inspector.

4. The Contractor is to keep an identification record of cylinders taken and concrete poured. Mark all cylinders from each set with the same number on one end and enter this number in the concrete testing records and include the date, time, and location.

5. If compressive strength test samples fail to meet the minimum strength requirements, the concrete represented by the failed tests shall be considered questionable and shall be subjected to further testing. In this case, the Owner's Representative and/or Owner's Construction Manager may require test cores of cured concrete to be taken by the testing laboratory in accordance with ASTM C42 and ASTM C39. If core specimen compressive strength test results do not meet the minimum strength requirements, the Contractor is to remove and replace the concrete in question at the Contractor's expense.

6. Compressive strength test results shall be submitted by the laboratory in writing to the Owner's Representative and/or Owner's Construction Manager, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in work, design compressive strength, concrete mix proportions and materials, compressive breaking strength, and type of break for all tests and shall be correlated to the corresponding on-site test results.

E. Concrete Slump Testing

1. Perform slump tests in accordance with ASTM C143 at the point of placement. Concrete failing the slump test cannot be placed as-is. Perform one test for each batch of each strength of concrete and at least one test per batch. Maximum slump of all concrete measured in accordance with ASTM C143 shall be as follows: 4-inch maximum and 1-inch minimum slump for all concrete structures. The maximum slump may be increased when approved chemical admixtures are used, provided that admixture concrete has the same or lower water-cement ratio and does not exhibit segregation potential or excessive bleeding.

F. Concrete Air Entrainment Testing

1. Perform air entrainment tests in accordance with ASTM C173 for each batch of concrete at the point of placement. Add air-entraining admixture in accordance with the approved mix design as required to achieve required percent air content at the point of placement in accordance with the table below, unless otherwise noted. The air content shall be within the range shown below – additional tolerances shall not be applied.

Maximum Aggregate Size [inches]	3/8	1/2	3/4	1	1 1/2

Corresponding Air Entrainment [%]	6.0% - 9.0%	5.5% - 8.5%	4.5% - 7.5%	4.5% - 7.5%	4.0% - 7.0%

G. Concrete Temperature Testing

1. Concrete Temperature: ASTM C1064; test hourly when the ambient air temperature is 40 degrees F (4.4 degrees C) or below and when the ambient air temperature is 80 degrees F (27 degrees C) or above, and whenever cylinders are taken. Concrete temperatures shall be in conformance with ACI 301.

H. Testing of concrete mix components

1. Limit water soluble, chloride-ion content in cured concrete to 0.15% by weight of cement. The Contractor shall submit test records indicating that their proposed mix design meets this requirement. The Contractor shall ensure that the test records represent samples made with materials from the same material suppliers as will be used for the work.

2. Aggregate shall have an L.A. abrasion loss of no more than 40%, tested in accordance with ASTM C131.

3. Aggregate from sources determined on the basis of petrographic analysis or tests to be susceptible to the alkali-carbonate form of alkali-aggregate reaction shall not be used. Evaluate and test aggregates to be used in concrete for alkali-aggregate reactivity per ASTM C1260.

a. Evaluate fine and coarse aggregates separately and in combination, which match fabricator's proposed mix design proportioning, using modified version of ASTM C1260.

1) Test results of combination shall have a measured expansion equal to or less than 0.08 percent at 16 calendar days after casting.

3.3 CONCRETE FORMWORK

A. Design, erect, support, brace and maintain formwork according to ACI 301 to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position, within tolerance limits of ACI 117.

B. Formwork shall be designed to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials and surfaces.

C. Forms shall be in compliance with ACI 347. Construct to sizes, shapes, lines and dimensions as necessary to produce the finished shapes shown in the

Contract Drawings. Obtain accurate alignment, location, grades, level and plumb work in the finished structures. Solidly butt joints of forms and provide back-up at joints to prevent leakage of water and/or cement paste. The Contractor shall immediately notify the Owner's Representative and/or Owner's Construction Manager if any wet concrete enters the water. Voids, honeycombing, sand pockets, fins, etc., may be cause for rejection.

D. Forms shall be constructed of wood or steel, straight, and of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be of adequate thickness, straight and free from warp, twist, loose knots, splits or other defects. Steel forms shall be channel formed sections with a flat top surface and with welded braces at each end at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning.

E. Fabricate forms for easy removal without hammering or prying against the concrete surfaces.

F. Form coatings, sealers and release agents shall be applied immediately before erecting forms where necessary to achieve the specified curing and finishes. Forms shall be protected from dust and dirt.

G. Cleaning and tightening: Before inspection of forms and reinforcing steel, thoroughly clean forms and adjacent surfaces to receive concrete. Remove wood chips, sawdust or other debris just before concrete is placed. Retighten forms after placement of concrete, and as required, eliminating any concrete or water leakage.

H. Removing and Reusing Forms: Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damages form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

1. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Owner's Representative and/or Owner's Construction Manager.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete so that strength and appearance of concrete are not impaired. Joints shall be in compliance with the approved concrete pour sequence and joint plan submittal. All necessary joint locations, spacing and offsets from adjacent structures shall be considered to reduce shrinkage cracking in concrete. A layout in plan view of all joint locations (construction, control, expansion) shall be included for approval.

B. Construction Joints: Install joints so that strength and appearance of concrete is not compromised, and shrinkage cracking is reduced.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.

2. Joints shall be roughened and not smooth formed and have a bonding agent at every location where fresh and existing concrete meet.

3. See Contract Drawings for additional restrictions and requirements for cold and construction joint locations.

3.5 PRIOR TO PLACEMENT

A. Notify the Owner's Representative and/or Owner's Construction Manager and Independent Inspector not less than twenty-four (24) hours before placing concrete.

B. Clean formwork thoroughly, removing all loose dirt, scrap lumber and other debris from forms prior to concrete placement.

C. Do not place concrete until the forms and reinforcement have been completed and all preparations for the pour have been made, and have been inspected and approved by the independent inspector.

3.6 PLACEMENT

A. Discharge and place concrete not later than one hour after the original addition of water to the mix. Mix concrete for a minimum of 10 minutes prior to placing, at least 3 minutes of which must be immediately prior to discharge at the site.

B. No additional water to be added on-site, unless on-site water additions are pre-authorized by the Owner's Representative. On-site water additions shall be recorded on the batch receipt that becomes part of the project records.

C. In no case shall concrete be placed on standing water, muddy, soft, or spongy areas.

D. Cold weather: Unless otherwise approved in writing by the Owner's Representative, concrete shall not be placed when the ambient temperature is below 40°F, or when the concrete is likely to be subject to freezing temperatures before expiration of the curing period. Where cold weather placement is approved, special procedures shall be adopted to heat the material and to protect the concrete from damage by freezing during mixing, placing, and curing. All such special procedures shall be subject to prior approval of the Owner's Representative. Cold weather concreting procedures contained in ACI 306 Cold Weather Concreting shall be utilized.

E. Hot Weather: Unless otherwise approved in writing by the Owner's Representative, the maximum allowable temperature of the concrete as it is placed, shall be 90°F. When the ambient air temperature approaches or

exceeds this maximum, special procedures shall be adopted to control the temperature of the materials and to protect the concrete from damage due to hot weather during mixing, placing and curing. All such special procedures shall be subject to the prior approval of the Owner's Representative. Hot weather concreting procedures contained in ACI 305 Hot Weather Concreting shall be utilized.

F. Concrete shall not be placed during rain, sleet or snow unless Owner's Representative approved protection is provided.

G. Pours of concrete, once started, shall be carried on as a continuous operation until the section of approved size and shape is completed. The Contractor shall determine pour sizes based on ability to provide finishes as specified in this Technical Specification. If the Contractor elects to pour more concrete than agreed upon by the Owner's Representative, any defects in finishing work shall be repaired, using a method approved by the Owner's Representative, at no additional cost to the Owner.

H. Depositing of concrete shall be continuous, or in layers, or bands, of such thickness that no concrete will be deposited on, or against, concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section.

I. Concrete shall be consolidated by use of approved immersion-type mechanical vibrators immediately upon placement. Concrete shall be vibrated sufficiently to remove entrapped air such that the concrete closes snugly against all surfaces to the maximum practicable density but not so much as to cause the coarse aggregate to settle or excessive accumulation of mortar at the surface. Vibrators shall not be held against embedded materials.

J. Concrete shall be deposited in or near its final position; segregation due to rehandling or flowing shall be avoided.

K. Depositing a large quantity at any point, or running or working the concrete along the forms will not be permitted.

L. Concrete shall be conveyed from mixer to place of final deposit by methods which will not cause separation or loss of material.

M. Concrete shall be placed in a manner that prevents it from dropping from a height greater than 4 feet.

N. Concrete which has developed initial set shall not be used. Concrete which has developed initial set shall not be re-tempered or remixed.

O. Concrete shall be thoroughly worked around reinforcement and embedded items, and into corners of forms by effective vibration. Top surfaces shall be generally level during placement.

P. Placing of concrete shall be regulated so that the pressure caused by the wet concrete shall not exceed that used in the design of the forms.

Q. Concrete shall not be cast underwater or used to displace water in the forms without written approval of the Owner's Representative.

3.7 FINISHES - GENERAL

A. Prepare pours for finishing by tamping concrete with special tools to force the coarse aggregate away from the surface and then screed to the required level.

B. All finishes are to be clearly designated on the Contractor's shop drawings.

C. All finishes shall be in accordance with ACI 301 unless otherwise noted.

D. Exterior edges of the cap shall be tooled with a 4-inch-wide edger for a smooth finish and a ½-inch chamfer.

E. Top Surface Broom Finish: All top surfaces of the concrete shall have a broomed finish as described herein. The broomed finish shall consist of a medium-to-coarse textured broomed surface preparation followed by final texturing with a wire comb tine device.

1. The surface preparation for the wire comb tine device shall be obtained by striating the float-finished concrete surface 1/16 inch to 1/8-inch-deep with a stiff-bristled broom in with the finish orientation shown in the Contract Drawings to create a moderately abrasive, uniform, non-skid surface.

3.8 CURING AND PROTECTION

A. Curing: Concrete is to be wet-cured for no less than seven days after placement for Type I and II cement concrete. During wet-curing the concrete is to remain wet by covering with burlap or cotton mats or rugs which are to be kept moist with a soaker hose or sprinkler. Plastic sheets or other moisture barrier shall not be an acceptable substitute for a soaker hose or sprinkler unless approved by the Owner's Representative. To simplify the wet curing process, concrete curing compounds can be used in accordance with the manufacturer's recommendations and in conformance with ASTM C 309.

B. Concrete shall be protected from damage during removal of formwork and from injury resulting from the storage or movement of materials during construction. Careful attention shall be given to the proper curing and protection of all concrete.

C. Curing shall start as soon as concrete has hardened sufficiently to prevent surface damage.

D. Changes in temperature. Curing temperature of all concrete shall be as uniform as possible. Changes shall not exceed 5 degrees F. in any one hour or 50 degrees F. in any 24-hour period. The Contractor is to monitor the

concrete temperature intermittently as required to ensure the change in temperature requirements are met.

E. Formwork shall not be disturbed until the concrete has hardened adequately. All forms shall be loosened and removed as soon as practicable, but in no case shall they be removed earlier than seven days after placement of cement concrete unless otherwise approved by the Owner's Representative. Concrete exposed by form removal prior to seven days after placement shall be moist-cured in accordance with this Technical Specification. Forms shall be removed carefully so as to prevent damage to the concrete. Any repairs needed or finish treatment required on surfaces shall be performed at once and shall be followed immediately by the specified curing.

F. If forms are removed prior to end of prescribed curing time, continue curing for the prescribed time as specified herein.

G. If voids and/or rock pockets are present when forms are removed, the contractor shall modify his placement procedure on future pours. Do not proceed until placement procedure has been corrected.

3.9 CONCRETE REPAIRS

A. All repairs are to be performed at the Contractor's expense. The Contractor shall not be granted schedule extensions due to time spent performing concrete repairs. Curing shall be interrupted for the shortest time and in the smallest area practicable to perform repair.

B. All tie holes shall be patched.

C. Every defect shall be reported to the Owner's Representative and/or Owner's Construction Manager by a means adequate to convey the size and extent of the defects. The Owner's Representative shall reply to the Contractor and direct them to consider the repair as either structural or non-structural. The Contractor can then proceed to make the repair in accordance with their approved repair plan. The Contractor is not permitted to repair a defect that the Owner's Representative has not been made aware of.

D. Defective Concrete: Repair and patch defective areas when repair designation (structural or non-structural) has been made by the Owner's Representative. Remove and replace concrete that cannot be repaired and patched as directed by the Owner's Representative and/or Owner's Construction Manager.

E. Non-structural Patching Mortar: Mix dry-pack patching mortar, consisting of one-part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.

F. Structural Repairs: Perform structural repairs of concrete, subject to the Owner's Representative's approval, using epoxy adhesive and patching

mortar in accordance with the manufacturer's recommendations and the Owner's Representative comments on the Contractor's submitted structural repair procedure.

G. EPOXY REBAR BONDING

1. Follow the manufacturer's written instructions regarding mixing, drill-hole diameter and depth, application, and curing temperatures and conditions. Size the holes to fully develop the deformed bar. Clean and clear the holes of debris before adhesive placement. If necessary, adjust the reinforcing steel embedment depth specified to meet development length requirements of the bonded bar. Ensure the pullout strength of the bonded reinforcing steel exceeds the yield strength of the deformed bar.

H. LEVELNESS CORRECTIONS

1. Correct low areas in unformed top of cap surfaces during, or immediately after completion of surface finishing operations by cutting out low areas to the nearest joint or edge on all sides and replacing with fresh concrete. Finish repaired areas to match adjacent concrete.

3.10 CLEAN-UP

A. Areas to be kept clean during progress of work and until completion. Dispose of all surplus, waste materials, and rubbish according to laws, regulations, and ordinances.

B. Provide certification from disposal site operator stating that disposal site complies with governmental regulations.

C. Clean up shall be in conformance with Section 01 35 43 – Environmental Controls.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this Work as if specified in this Section. Work related to this Section is described in:

1. Section 03 30 00 – Cast-in-Place Concrete

1.02 DESCRIPTION OF WORK

A. The Work includes furnishing all necessary labor (including manufacturer's representative(s)), materials, equipment, and accessories necessary for preparing the concrete surfaces and providing the required rehabilitation of existing concrete spalls, delaminations, joints and cracks as indicated on the Contract Drawings, using high performance cementitious (HPC) repair materials and polyurethane grout. Take all precautions necessary to protect workers and the environment during the course of the work and to meet all in-water work restrictions and regulatory requirements. The Owner will provide a Construction Manager to be present and observe preparation and placement of HPC materials.

1.03 REFERENCE STANDARDS

A. Publications from the following organizations form a part of this Section to the extent indicated by the references thereto, and these publications are referred to by basic designation only. Use the most current edition of each publication available at the time of bid unless otherwise indicated.

B. American Concrete Institute (ACI) Specifications, References, and Procedures

1. ACI 548.12 Specification for Bonding Hardened Concrete with an Epoxy Adhesive

C. American Society for Testing Materials (ASTM), Standard Specifications and Standard Test Methods

D. American Welding Society (AWS) D1.1, Structural Welding Code - Steel and D1.4, Structural Welding Code – Reinforcing Steel.

E. ICRI 310.2R International Concrete Repair Institute (ICRI) Guidelines

1.04 SUBMITTALS

A. Submit the following items to the Owner’s Representative for review and approval. Submit data sheets, letters, written plans, schedules, and procedures prior to start of work. Include signatures of the Contractor's personnel overseeing the work on all submittals. Include signature of the HPC repair material manufacturer's (RMM) representative on written procedures for surface preparation, HPC repair material placement, and HPC repair material curing.

B. Spill prevention, control, and countermeasures plan (SPCC). The Owner's Representative will review this submittal for consistency with the projects permit requirements including all best management practices (BMP's). The Contractor is responsible for developing and implementing the SPCC and the Owner's Representative's review does not constitute an approval.

C. Technical data sheets for the repair materials used, with the HPC RMM's written instructions for use of the materials.

D. Letter identifying the name, address, telephone number, and e-mail address of the HPC RMM representative(s).

E. Letter from the HPC RMM indicating the HPC RMM representatives have been directly involved in evaluation and placement of HPC repair materials on not less than five structures within the last five years and are not employees of the Contractor or any subcontractor.

F. Letter certifying that the HPC RMM representatives have reviewed procedures for surface preparation, placement, and curing of the HPC repair materials.

G. Letter identifying the name, address, telephone number, and e-mail address of any subcontractor(s) performing work.

H. Schedule for the field placement of the HPC repair materials and crack polyurethane grout injection.

I. Written procedures for surface preparation of areas to receive the HPC repair materials.

J. Written procedures for containment and disposal of debris generated during the course of the work. Include procedures that define how permit and regulatory requirements will be met.

K. Written procedures for placement of the HPC repair materials into the forms by the trowel (hand-applied method), form and pour method, and form and pump method, including formwork and venting to remove air.

L. Written procedures for curing the HPC repair materials including minimum cure times, minimum and maximum temperatures, and minimum time for formwork to remain in place.

M. Weld procedures and welder qualifications for welded reinforcing splices

1.05 TESTING

A. The Owner's representative and/or Construction Manager will retain the services of a testing laboratory certified in accordance with ASTM C 1077 to perform field tests as stipulated in this Section.

1.06 QUALITY ASSURANCE

A. Qualifications of personnel: submit evidence that personnel for this project (Contractor and subcontractor(s) if applicable) have a minimum of five years of experience preparing surfaces and applying Injection Grouting and HPC repair materials under similar conditions and methods of placement on other

projects and have successfully performed surface preparation, placement, curing, and finishing of HPC repair materials on a minimum of three separate structure repair projects within the past five years. List by individual and include the following for each project.

1. Name of individual and proposed position for this project
2. Position or responsibility on each previous project
3. Previous employer (if other than the Contractor for this project)
4. Name of each previous facility owner where project was performed
5. Mailing address and telephone number of each facility owner
6. Name of contact reference in previous facility owner's organization
7. Location, size, and description of structures in previous projects
8. Dates that previous work was performed
9. Description of work performed on structures in previous projects

B. Qualifications of the HPC RMM's representative: provide records of experience and training, including name, phone number and address; and a statement from the HPC RMM certifying the representative has successfully completed training for material storage, mixing, surface preparation, placement, curing, and testing.

C. Repair material instructions: submit HPC RMM's printed instructions, including detailed mixing and placement procedures, minimum and maximum placement temperatures, and curing procedures. Include material safety data sheets (MSDS) for all materials to be used at the job site.

1.07 DELIVERY, HANDLING, AND STORAGE

A. Ship, store, and handle HPC repair materials in accordance with the HPC RMM's recommendations. Maintain temperature in storage spaces in accordance with those recommendations. Inspect materials for damage prior to use and properly dispose of non-compliant materials.

B. Mix HPC repair materials and other materials only in such quantities as are required for immediate use, and use before initial set takes place. Do not use HPC repair material which has developed initial set. Do not remix or temper HPC repair material which has partially hardened.

1.08 MATERIAL HAZARDS

A. HPC repair materials may have potential health hazards if improperly handled. Follow the HPC RMM's written safety precautions throughout mixing, placement, and curing of the materials. During cleaning, cleanup, surface preparation, and placement phases, ensure that employees are protected from toxic and hazardous chemical agents. The existing debris released

during power tool cleaning and/or abrasive blasting may cause adverse health reactions.

1.09 DEFINITIONS

A. Spall - A location on a member where one or more concrete fragments have detached from the larger concrete mass by expansion within the mass.

B. Delamination - Splitting apart of a concrete mass.

C. Crack – a split or break in a concrete mass without a complete separation of parts.

PART 2 – PRODUCTS

2.01 HPC REPAIR MATERIALS

A. Use materials from one HPC RMM only for the project. Select HPC repair materials suitable for the methods of placement described in this Section. When used in combination, select materials that are compatible. Use prepackaged HPC repair materials with premeasured, properly proportioned components by the HPC RMM. Select HPC repair materials with the following properties:

1. Minimum pot life at 75 degrees F = 15 minutes
2. Minimum bond strength per ASTM C 1583, at 7 days = 150 psi. Testing per ACI 305R, Appendix A – Permit Documents, modified for cementitious materials may be allowed if approved by the Owner's Representative.
3. Minimum compressive strength per ASTM C109, modified for cementitious materials = 2,000 psi at 1 day and 4,500 psi at 7 days.
4. Maximum drying shrinkage at 28 days per ASTM C 157, modified per ICRI Guideline No. 320.2R = 0.09
5. Minimum splitting tensile strength per ASTM C 496 at 7 days = 450 psi
6. Rapid freeze/thaw durability per ASTM C 666, minimum relative durability factor at 300 cycles = 90
7. Maximum rapid chloride permeability per ASTM C 1202 = 1000 coulombs
8. Does not produce a vapor barrier
9. Do not use non-conductive repair materials such as epoxy, urethane, or magnesium phosphate. Do not use materials such as epoxy bonding agents unless approved by the Owner's Representative.

2.02 HPC Repair Material Manufacturers and Products

A. General: the following HPC RMM and HPC repair materials comply with this Section.

B. Hand-troweled

1. BASF Emaco S88 CI
2. SikaTop 123 plus

C. Form and pump method or form and pour method

1. BASF Emaco S66 CI
2. Sika Monotop 611

2.03 Concrete Bonding Agent

In lieu of conditioning the prepared concrete surface immediately before placement of HPC repair material, a bonding agent recommended by HPC RMM may be used. Mix and apply in accordance with the HPC RMM recommended procedure. Do not use an epoxy bonding agent unless specifically approved by the RMM and Owner's Representative. Bonding agent shall be an ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.04 Curing Compounds

Provide material recommended by the HPC RMM.

2.05 Reinforcement

A. Reinforcing steel: ASTM A 706, Grade 60, deformed.
B. Splices: Meet ACI 318 requirements for mechanical splices and develop 125 percent of the bar capacity. Meet AWS D1.4 requirements for welded splices, including weld procedures and welder qualifications.

2.06 Polyurethane for Injection Grouting
A. Grout shall be Low Viscosity Expanding Hydrophillic Polyurethane
B. General: the following Polyurethane grout materials comply with this Section.
1. Sika - SikaFix HH Hydropllic
2. Prime Resins - Prime Flex 900 XLV polyurethane grout
3. Euclid Chemical Company DURAL AQUA-FIL

PART 3 – EXECUTION

3.01 GENERAL

A. Repair all structures to the extent indicated on the Contract Drawings and in accordance with project permits and regulatory requirements. Perform the work in conformance with the selected HPC RMM's requirements. Wherever there is a discrepancy between those requirements and the requirements contained in this Section, notify the Owner's Representative for resolution prior to proceeding with the work.

B. Pre-Repair Conference: A minimum of 1 week prior to start of repairs in accordance with this Section, meet to review the detailed repair procedures included surface preparation, equipment and procedures; material mixing, placing, and curing; schedules; climatic conditions; etc.

The HPC RMM representative shall demonstrate the approved placement method(s) if requested by the Owner's Representative and/or Owner's Construction Manager. Required attendees are the superintendent and employees performing the repair work, HPC RMM representative, and the Owner's Representative and/or Owner's Construction Manager.

C. Prior to beginning any concrete repair with HPC, perform a pre- construction survey of the areas to be repaired. Include verification that the repair areas in this survey match the Contract Drawings. With the Owner's Representative and/or Owner's Construction Manager, jointly estimate the total material quantities for the areas to be repaired and jointly prioritize the areas to be repaired so that any quantity discrepancies are resolved prior to starting any work. Do not begin repairs until after this joint survey and prioritization are completed. The true limits of the defects will be defined during removal. Cracks may be present within the delaminated areas that do not continue into the substrate. Jointly verify all repairs with the Owner's Representative and/or Owner's Construction Manager during a post-construction survey. Provide all equipment and materials necessary to perform pre- construction and post-construction surveys for these repairs.

D. Inspection: Locate, mark, and measure the size and extent of all areas designated to be repaired on the Contract Drawings. Determine the actual perimeter of each repair by hammer sounding to determine if unforeseen subsurface delaminations exist in addition to visual spalls and areas of delamination.

E. Provide adequate quantities of materials to accomplish all work.

3.02 PREPARATION

A. Spalled and Delaminated Concrete

1. Remove loose, unsound, or delaminated concrete from each spalled or delaminated area by sawcutting the perimeter and then removing concrete using small chipping hammers or hydro-jetting tools. Use oil-free air in pneumatic tools. Remove all unsound concrete. Remove all organic matter, dirt, grease, paint, or other deleterious materials from concrete surrounding the repair area.

2. Inspect the cavity for remaining defective concrete by tapping with a hammer or steel rod and listening for dull or hollow sounds. In areas where tapping does not produce a solid tone, remove additional

concrete until tapping produces a solid tone. Make the entire cavity at least 1-inch deep except at and near the saw cut edges where the cavity depth shall be ½ inch deep.

3. Where reinforcing steel or structural steel is exposed, remove concrete around the bar to provide a 3/4-inch gap between the bar and the remaining concrete unless otherwise indicated on the Contract Drawings. Remove all corrosion by abrasive blasting or mechanical means to a near white metal condition and in accordance with the HPC RMM's recommendations.

4. Sawcut edges of cavity to a depth of 1½ inch around the area of unsound concrete unless otherwise indicated on the Contract Drawings. Make the sawcut in sound concrete. Do not cut reinforcing steel or structural steel. Determine the depth of all reinforcing steel in the cavity area prior to sawcutting. Reduce the depth of sawcut locally to avoid cutting reinforcing steel or structural steel. Chip concrete at these locations to provide sharp edges. Outline each repair area in a square or rectangular shape with straight edges dressed perpendicular to the member face. Prepare surfaces by abrasive blasting or mechanical scarification, as recommended by the HPC RMM, to remove all loose laitance.

5. When longitudinal reinforcing steel is corroded, remove additional concrete for a minimum of 6 inches beyond active corrosion each side.

6. Replace reinforcing steel damaged during sawing or concrete removal at no additional cost to the Owner.

7. Limit impact hammer size for concrete removal to 15 pounds and use pointed gads only.

8. Roughen all concrete surfaces to a ¼-inch amplitude.

B. Debris: Remove dust, dirt, and loosely bonded material resulting from cleaning. Collect, manage, and dispose of all debris and sandblast grit in accordance with all permits and all local, state, and federal government regulatory requirements. Do not allow debris, grit, water from surface preparation or other associated work, or other items to fall into the water.

C. Replacement of Deteriorated Reinforcement: follow ACI 301. Replace all existing bars with greater than 20 percent section loss (by cross-sectional area). Provide bars, wire ties, supports, and other devices necessary to install and secure reinforcement. For supports use non-corrodible chairs, spacers, or hangers. Do not install reinforcement with rust, scale, oil, grease, clay, or foreign substances that would reduce the bar to repair

material or concrete bond. Rusting of reinforcement is a basis of rejection if the effective cross-sectional area or the nominal weight per unit length has been reduced greater than 20 percent in cross-sectional area. Remove loose rust prior to placing steel. Do not tack weld.

D. Splicing of reinforcement: Splice as required. Use approved welded and mechanical splices only. Perform all welding in accordance with AWS D1.4 using certified welders and qualified joint welding procedures of the type required for the work. Consider all existing reinforcing steel to have a carbon equivalency rating greater than 0.75, as defined in AWS D1.4. Maintain minimum cover at welded and mechanical splices per paragraph 3.04B titled "HPC Repair Material Cover Over Reinforcement".

E. Coat the entire surface of all existing and replacement reinforcement and accessories (including mechanical splices) with a zinc-based corrosion inhibitor.

3.03 MIXING MATERIALS

Mix batches small enough to ensure placement before the HPC repair material begins to take any set. Mix materials in accordance with the HPC RMM recommendations.

3.04 PLACEMENT

A. General: Place HPC repair material and consolidate using methods prescribed by the HPC RMM. Place HPC repair material on vertical and overhead surfaces using the trowel method, form and pour method, or form and pump method, as approved. Level the final surface to match the adjoining surfaces. See paragraph 3.04B titled "HPC Repair Material Cover Over Reinforcement". Remove excess material from adjacent surfaces before it begins to harden. Do not feather out on to adjacent surfaces.

B. HPC Repair Material Cover Over Reinforcement: Provide 2-inch clear cover unless otherwise indicated on the Contract Drawings. Where the existing concrete cover was less than aforementioned minimum coverage, place HPC repair material to match the original concrete profile unless otherwise directed by the Owner's Representative and/or Owner's Construction Manager. Transition (reduce) repair thickness at repair locations where the coverage extends beyond the original concrete surface profile so that repair edges become flush with the original concrete profile beyond the repair area.

C. Do not allow wet or cured HPC repair material to enter the water. Construct forms in a manner to prevent leaching of wet material into the water. Place impervious materials over any exposed concrete not lined with forms that

will come in contact with the water. Keep forms and impervious materials in place until the HPC repair materials are cured.

D. Trowel (Hand-Applied) Method: Apply HPC repair material in accordance with the HPC RMM recommendations. Use on repair areas with up to two square feet or less of surface area or in locations where the prepared surface does not extend to a vertical edge. The trowel method may also be allowed in areas where the form and pour method or form and pump method may result in trapped air, if approved by the Owner's Representative and/or Owner's Construction Manager on a case by case basis. Pay special attention to consolidation of the material behind reinforcing steel, and to working the material into the concrete substrate at the interface of subsequent lifts to achieve a sound bond. Prepare cavity surfaces using a stiff bristle brush to apply a thin film ("scrub coat") of the HPC repair material unless otherwise directed by the HPC RMM recommendations. Use wood dowels to ram material tightly behind reinforcing steel. Finish the exposed surface to match adjacent surfaces.

E. Form and Pour Method or Form and Pump Method: Use on repair areas larger than two square feet. Properly secure forms and place material through ports located near the bottom the form, filling the form from the bottom up. Provide additional ports or other means of venting at the top of the form on overhead repairs to provide necessary venting during placement of the HPC repair material. Pre-dampen the entire cavity surface with clean, fresh potable water immediately prior to HPC repair material placement unless otherwise directed by the HPC RMM recommendations. Remove all freestanding water in the forms prior to repair material placement.

F. Timing of HPC Repair Material Placement: When reinforcement is exposed, apply material after completion of surface preparation and in accordance with this Section and the HPC RMM recommendations. Do not exceed 48 hours between time of surface preparation and repair material placement unless approved by the HPC RMM.

G. Forms: Anchor to surrounding concrete with drilled-in expansion anchors. Remove anchors after form removal and repair holes with a stiff consistency of the HPC repair material. Construct forms so that finish surface will be free of ridges, bulges or other irregularities.

3.05 CURING

Cure HPC repair materials in accordance with the HPC RMM recommendations.

3.06 REPAIRS

Repair any voids remaining in repairs after form removal at no additional cost to

the Owner. Use HPC repair material, prepare void and apply material in accordance with the HPC RMM recommendations.

3.07 FIELD QUALITY CONTROL

The following Inspections and Testing will be performed by the IWRB and coordinated with the Contractor, unless stated otherwise.

A. Sampling: Obtain and test one sample of the HPC repair material for each day's production for the first 5 days of production and one sample each week thereafter. Resume daily sampling if two successive test failures occur. Collect 12 test cubes for each test sample. Identify samples by designated name, HPC repair material batch number, project contract number, where used, and quantity involved.

B. Testing: Perform by an approved laboratory in accordance with ASTM C 109. Test 3 test cubes at 1 day and 3 at 7 days and hold 3 in reserve. If a sample fails to meet the HPC RMM's published physical properties after two tests, the Contractor shall replace HPC repair materials in the repaired area represented by the samples tested at no additional cost to the Owner and the Inspector will retest.

C. Bond Strength Pull-off Tests: Conduct in accordance with ASTM C 1583 at 7 days. Perform two bond strength tests on the substrate in the repair test described in the paragraph titled “TESTING OF SAMPLE PLACEMENTS” in a relatively smooth area after the surface preparation is complete and before HPC repair material is placed. Penetrate substrate 1/2 inch minimum to 1 inch maximum with the cores. If a substrate test core fails to meet 150 psi minimum bond strength, then perform additional surface preparation and retest before placing the HPC repair material. The Inspector may perform two additional substrate tests at its discretion during the work. Once the substrate meets bond strength criteria, the Contractor shall place HPC repair material in repair area in accordance with this Section and the Inspector will test bond strength of placed material. Bond strength result data will be provided within 48 hours of testing. Samples for bond strength tests will be taken once for each 200 square feet of repair area. For the entire Project, the Inspector will take no less than three sets of samples of material applied by each method and perform bond strength test on each. Each bond strength test result will be the average of the three samples. The Inspector will retest locations represented by erratic bond strengths. The Contractor shall remove HPC repair material not meeting bond strength criteria and provide new material and retest. The Contractor shall repair cored holes with HPC repair material at no additional cost to the Owner.

D. Inspection: The Contractor shall assist the Owner’s Representative and/or Owner’s Construction Manager to check each repaired area for cracks,

spalls, popouts and loss of bond between repaired area and surrounding concrete by making equipment and access available for use in performing the checks. Check each repaired area for voids by tapping with a hammer or steel rod and listening for dull or hollow sounds. The Contractor shall immediately repair all defects so sound, well-bonded repairs result at no additional cost to the Owner, regardless of level of inspection by the Owner's Representative and/or Owner's Construction Manager before, during, or after repair work.

E. HPC RMM Representative: Advise the Contractor on material handling, batching and mixing; surface preparation; curing, inspections, and testing of HPC repair materials.

F. Injection Grouting Installation
   1. Condition material overnight to manufacturers recommended temperatures.
   2. Keep lid tightly sealed when not in use and avoid splashing water into pails.
   3. Install in accordance with manufacturer's instructions.
      a. Expose the cracks or joint.
      b. Drill injection holes.
      c. Flush injection holes with water using a probe that reaches the back of the hole.
      d. Install injection ports and zerk fittings.
      e. Flush the crack with water.
      f. Inject resin and allow to cure.
      g. Remove injection ports and fill holes with either a cementitious epoxy-based patching material.
      h. Grind excess resin from face of concrete.
   4. Cured material is chemically inert and safe to dispose of in landfill. Cleanup any spilled liquid resin and place in a suitable sealed container. Dispose of in accordance to applicable environmental regulations.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The work includes the requirements to provide a galvanized coating to miscellaneous metals as specified with all handling, pre-finishing, cleaning, pickling, rinsing, dipping, cooling, draining, vibrating, centrifuging, inspection, and other processes or materials required. The work specified in this Technical Specification is incidental work and the cost shall be included in other associated bid items in the contract. All exposed steel shall be hot-dip galvanized. All other exposed metal shall have a coating system approved by the Owner's Representative. This section is applicable to:

1. All steel fabricated metal items.

2. Miscellaneous steel hardware.

1.02 RELATED SECTIONS

A. Section 01 33 00 – Submittals

B. Section 01 40 00 – Quality Requirements

C. Section 05 12 00 – Structural Steel Framing

1.03 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. Latest editions apply.

ASTM

ASTM A123/A123M	Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
ASTM A143	Practice for Safeguarding Against Embrittlement of Hot Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
ASTM A153/A153M	Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
ASTM A384	Practice for Safeguarding Against Warpage and Distortion During Hot Dip Galvanizing of Steel Assemblies.
ASTM A385	Practice for Providing High Quality Zinc Coatings (Hot Dip).
ASTM A653	Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.

ASTM A767	Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
ASTM A780	Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings.
ASTM B6	Standard Specification for Zinc.

AGA

Inspection of Products Hot Dip Galvanized After Fabrication

Quality Assurance Manual

1.04 GENERAL

A. Galvanizing metals material specification requirements shall apply to all galvanized items unless otherwise identified or noted on the Contract Drawings. It is the Contractor's responsibility to thoroughly review the design prior to commencement of work to prevent delays.

1.05 QUALIFICATIONS

A. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of the Quality Assurance Manual of the AGA.

1.06 INSPECTION AND TESTING

A. The Contractor shall provide and pay for the following testing of galvanized materials, which is to occur at their galvanizing facility:

B. Inspect and test hot dip galvanized fabricated items in accordance with ASTM A123/A153M and A153/A153M.

C. Visually inspect coating and test for thickness and adhesion of zinc coating for a minimum of three test samples from each lot in accordance with ASTM A123/A123M and A153/A153M.

D. Reject and retest nonconforming articles in accordance with ASTM A123/A123M and A153/A153M.

1.07 PRODUCT HANDLING

A. Handle and store hot-dip galvanized material in a manner that minimizes potential for warping and distortion of the material.

B. Replacements: Repair or replace damaged work, if any, as necessary for acceptance by the Owner's Representative and at no additional cost to the Owner.

1.08 ACTION SUBMITTALS

A. The following items shall be submitted to the Owner's Representative for review and approval in accordance with Technical Specification Section 01 33 00 – Submittals:

1. Certificate of compliance signed by galvanizer, with description of material to be galvanized and ASTM standard used for coating.

2. Reports from inspection and testing.

PART 2 – PRODUCTS

2.01 ZINC

A. Zinc for galvanizing shall conform to manufacturers' specifications, directions, and recommendations for best results in the use of each of their products for each condition. If results are at variance with these Technical Specifications, immediately report the discrepancy to the Owner's Representative and proceed with the related work only after receiving direction from the Owner's Representative in writing.

2.02 REPAIR PRODUCTS

A. Galvanizing repair shall be performed with zinc-based alloy solder rods.

PART 3 – EXECUTION

3.01 FABRICATION AND PREPARATION

A. Fabricated steel to be fabricated and galvanized in accordance with ASTM A143, ASTM A384, and ASTM A385. Avoid fabrication techniques that could cause distortion or embrittlement of the steel before, during, or after the galvanizing process.

B. All welds shall be continuous on assemblies to be welded prior to galvanizing. Abutting surfaces shall be at a minimum seal welded. All welds shall be shown on the shop drawings.

C. All flame-cut surfaces shall be ground smooth and plane to bright metal prior to galvanizing.

D. All edges and corners shall be ground to a 2mm radius prior to galvanizing.

E. Any drain or vent holes not indicated on the Contract Drawings which are required to produce a high quality galvanized coating with minimal warping and distortion shall be identified by the coating manufacturer, clearly shown on the shop drawings, and shall be subject to acceptance by the Owner's Representative. The fabricator shall detail the assembly in accordance with ASTM A384 recommendations. Any discrepancies between the shop drawings and the recommendations of ASTM A384 shall be indicated in the shop drawings to alert the Owner's Representative of potential warpage problems during hot-dip galvanizing.

F. The fabricator shall consult with the Owner's Representative and hot-dip galvanizer regarding potential concerns, including handling issues, during the galvanizing process that may require design modification before fabrication proceeds.

G. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.

H. Remove, by blast cleaning or other methods, surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.

3.02 GALVANIZING

A. Hot-dip galvanizing of steel members, fabrications, and assemblies shall occur after fabrication in accordance with ASTM A123/A123M.

B. Hot-dip galvanizing of bolts, nuts, washers, and hardware components shall be in accordance with ASTM A153 and ASTM A385. Provide oversize holes to allow for zinc alloy thickness. Test-fit nuts and bolts after galvanizing prior to shipment. Nut/bolt pairs are to be shipped in an assembled state.

C. Galvanize components of bolted assemblies separately before assembly.

D. Tapped holes to be cleaned with a wire brush immediately after galvanizing and test-threaded full-depth prior to shipment from the galvanizer. Threads may be cleaned with a tap if fastener cannot be fully finger-inserted for the full depth of the threaded hole.

E. Galvanizing for all steel bolts, washers, and nuts shall be performed in accordance with ASTM A385 and ASTM A153. Coating thickness shall be in accordance with the relevant ASTM requirements.

3.03 REPAIR OF GALVANIZED COATING

A. Repair all new and existing galvanized surfaces removed or damaged during welding, shipping, or erection in accordance with ASTM A780. Repair material shall be zinc-based alloy solder (zinc rod). Application shall be in accordance with ASTM A780 and rod manufacturer's recommendations. Minimum applied thickness shall be the minimum original galvanizing thickness required for the component in accordance with ASTM galvanizing requirements, or 4 mils, whichever is greater. After cooling, apply two coats of grey zinc rich paint. Any galvanizing repair conducted by the Contractor, Subcontractor, or supplier which occurs onsite will be subject to approval by the Owner's Representative. The Contractor shall notify the Owner's Representative and Owner's Construction Manager when any repair is being performed, and provide access to adequately review the repair area before and after the repair.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Section 01 33 00 – Submittals

B. Section 01 40 00 – Quality Requirements

C. Section 05 05 00 – Galvanizing

1.02 SUMMARY

A. Section Includes:

1. Structural steel extension and strengthening of the radial gates.

2. Radial Gate Trunnion Pins

3. Bolts, Nuts, and Washers

4. Hand Railing Repairs

1.03 DEFINITIONS

A. Structural Steel: Elements of the radial gate strengthening, modifications and other steel work as indicated on the Contract Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Survey of existing conditions.

C. Field quality-control and special inspection reports.

1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program, is designated an AISC-Certified Plant, Category HYD (Hydraulic QMS Certification), and has experience

completing installation of five (5) or more projects with similar finish techniques and has been in business ten (10) years or more.

1. Provide list of five (5) projects with the address of the installation, the date of the installation, point of contact for the project and phone number as a reference.
2. Provide two (2) photos of each project listed above representing the project/installation.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program, is designated an AISC-Certified Erector, and has experience completing installation of five (5) or more projects with similar finish techniques and has been in business ten (10) years or more.

1. Provide list of five (5) projects with the address of the installation, the date of the installation, point of contact for the project and phone number as a reference.
2. Provide two (2) photos of each project listed above representing the project/installation.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
4. ASME B46.1 2009 Edition, 2009 Surface Texture (Surface Roughness, Waviness, and Lay)
5. American Welding Society (AWS) D1.1 Structural Welding Code – Steel
6. AWS D19.0 Welding on Zinc-Coated Steels

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

PART 2 – PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

A. WT-Shapes: ASTM A 992 Grade 50

B. Angles: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A572 Grade 50

D. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND TRUNNION PINS

A. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM F3125 Type 1, Twist-off Style steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.

1. Bolt Assembly Finish: 50µm Hot-dip zinc coating as per ASTM F2329.

2. Alternately, Bolts shall be mechanically galvanized in accordance with ASTM B695 with a class 55 finish.

B. Trunnion Pins

1. ASTM A705, Type 630, Condition H 1150M Stainless Steel Forging, 75 KSI Minimum Yield Strength, Charpy-V Impact 30 Ft-Lb at 10 degrees Fahrenheit, and reduce temperature 15 degrees Fahrenheit for each 10 ksi above a tested yield stress of 85 ksi, or:

2. ASTM A564, Type 630, Condition H 1150M Stainless Steel Hot-Rolled, 75 KSI Yield Strength, Charpy-V Impact 30 Ft-Lb at 10 degrees Fahrenheit mi and reduce temperature 15 degrees F for each 10 ksi above a tested yield stress of 85 ksi.

2.03 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Mark and match-mark materials for field assembly.

2. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill**,** or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Trunnion Pins ASME B46.1 - 125 µin. Before trunnion pin fabrication, verify that a pin of the proposed diameter will fit into the existing bearing sleeve in the field.

E. Steel Fabrication Metal Galvanizing – Specification Section 05 05 00 – Galvanizing.

F. Trunnion Pins – Make every effort to protect the stainless-steel pins from being contaminated by mild/carbon steel particles throughout the entire fabrication and erection process. Coordinate fabrication of trunnion pins to match the existing pins and bearing sleeves.

G. Fabrication Marking

1. Marking the Weight. Mark the weight on sub-assemblies and individual members weighing over 200 pounds.

2. Marking Piece Marks and Directional Arrows. Mark piece marks and directional arrows on all members and sub-assemblies to be assembled at the job site. Use the piece marks assigned on the shop detail drawings or erection drawings.

3. Method of Marking. Make all markings plainly visible with waterproof paint after shop painting.

4. Marking Materials to be Galvanized. Stamp piece marks or match marks in material to be galvanized with metal dies so that the marks are clearly legible after galvanizing.

5. Fabrications. All fabrications shall be marked to correspond to the fabricators placing drawings.

2.04 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.05 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to all new structural steel pieces according to Technical Specification Section 05 05 00 – Galvanizing.

2.06 SOURCE QUALITY CONTROL

A. Testing Agency: Owner's representative and/or Construction Manager will engage a qualified testing agency to perform shop tests and inspections.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.

D. Prepare test and inspection reports.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify, with certified steel erector present, elevations of gate sealing and bearing surfaces and trunnion pins, locations of trunnion pins, sealing and bearing plates, and radial gate dimensions for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include gate sealing and bearings surfaces, trunnion pins, bearing plates, and other embedments showing dimensions, locations, angles, clearances and elevations. Verify trunnion pin outside diameters and sleeve inside diameters.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove existing radial gates and trunnion pins carefully to prevent damage or distortion.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.03 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

D. Install radial gates in such a way that the rubber J-seals are not damaged and proper sealing will occur when upstream water levels are restored.

E. Do not use thermal cutting during erection.

F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

G. Ensure that existing trunnion pin bearings are clean and lubricated before installation of the new trunnion pins

3.04 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

3.05 FIELD QUALITY CONTROL

A. Special Inspections: Owner’s representative and/or Construction Manager will engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

3.06 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M and the Technical Specification Section 05 05 00 – Galvanizing.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section includes specifications for excavation and fill work lakeward of the OHW line and within the project site limits. Excavation work, described herein, constitutes the work required to remove sediment to construct the concrete Apron Extension, Armor Stone Extension, grades and profiles shown on the Contract Drawings and described within the Specifications. It is assumed that land-based excavation will be performed as proposed by the Contractor.

B. The work described herein includes excavation, material handling, temporary stockpiling or staging, backfilling, compaction and finish grading activities as indicated on the Contract Drawings and Specifications.

C. Earthwork within the project site limits is subject to fluctuating water levels as well as erosion due to wind, wave, current, and ice action that may hinder earthwork activities. It is the Contractor's responsibility to select appropriate means and methods to achieve the work shown on the Contract Drawings while avoiding sedimentation of the work areas and erosion of subgrade soils that would preclude this work.

D. Excavation and Backfill Work Stoppage. All work below the OHW line shall be conducted within the timeframe allowed by the regulatory permit conditions and the substantial completion date designated within the Contract Documents.

1.02 RELATED DOCUMENTS

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this work as if specified in this section. Related Sections include the following:

1. Section 01 71 23 – Construction Surveying
2. Section 01 40 00 – Quality Requirements
3. Section 01 35 43 – Environmental Controls
4. Section 01 41 00 – Regulatory Requirements
5. Section 01 50 00 – Temporary Facilities and Controls
6. Section 01 57 13 – Temporary Erosion and Sediment Control
7. Section 35 31 23 – Armor Stone
8. Appendix A – Permit Documents

1.03 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

Occupational Safety and Health Administration (OSHA)

29 CFR 1910	Occupational Safety and Health Regulations.
29 CFR 1926	Safety and Health Regulations for Construction.

1.04 DEFINITIONS

A. Beneficial Reuse: The reuse of excavated materials from within the project site limits by the Contractor as fill for the various work elements shown on the Contract Drawings and as described within the Specifications.

B. Flow Diversions Systems: Temporary systems that may be required to facilitate the execution of various works within the project site limits. Flow diversion may include, but is not limited to, the temporary installation of products such as Super Sacks, Geobags, or other products installed for the purpose of redirecting Outlet Dam flow from active work areas below the OHW line. The design of Flow Diversion Systems is the responsibility of the Contractor in accordance with the Contract Drawings and Technical Specification Section 02 20 00 – Cofferdams and Dewatering.

1.05 SUBMITTALS

A. The following items shall be submitted to the Owner's Representative for review and approval in accordance with Section 01 33 00 – Submittals:

1. Prepare and submit for Owner's Representative approval an Excavation and Backfill Plan as a component Work Plan described in Section 01 33 00 – Submittals that includes details of Contractor's methods and equipment to accomplish the work herein, including equipment to be used, description of excavation and fill construction sequencing method, description of proposed work area isolation method, grading, sequencing of excavation/backfill activities, and schedule.

2. The Owner's Representative has completed environmental and geotechnical assessments in the vicinity of project site limits. General site environmental, geotechnical, and subsurface conditions are described in the Appendices.

3. The Contractor shall make its own interpretations, deductions, and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavations, and the difficulties of doing any other work affected by environmental, geotechnical subsurface, and groundwater conditions and shall accept full responsibility thereof.

4. Product specifications for imported fill materials if the Contractor elects to import fill rather than beneficially reuse excavated removed from within the project site limits.

5. All pertinent source and test records (imported fill material quality, testing results, gradation, chemical analyses results, and a description of previous uses within fluvial environments from the material source shall be submitted to the Owner's Representative for review and approval. Documentation shall include the following:

    a. Name and location of material source, name, and telephone number of supplier.

    b. Laboratory test results completed within the last 12 months for test procedures listed Part 2 of this Technical Specification.

6. Such test records will be evaluated to help determine if imported fill materials from that source can meet quality standards as hereinafter specified. Materials sourced for fill shall meet, to the extent possible, the gradation of the in-situ sediments within the project site limits unless otherwise approved by the Owner's Representative.

7. Weigh Scale Certification: Prior to the use of any scale under this contract, the contractor shall submit details on the location and construction of the scale and a copy of the certification of the scale's accuracy from the local weights and measures regulating agency.

8. Daily Activities Report: The Contractor shall provide a daily record of construction activities and shall include the following:

    a. Report shall document the percent of project completion, limits of excavation and/fill, and adverse weather conditions or other problems that cause problems for each day there are on-site work activities. The report shall be submitted to the Owner's Representative and Owner's Construction Manager at the end of each week.

9. Daily Shipment Log Sheets: On the workday following imported fill material shipment, the Contractor shall submit a copy of the log of all shipments from the material source(s). The log sheets shall include information regarding placement or stockpiling of the shipments, and what shipments were sampled. The Daily Log sheet and its format shall be approved by the Owner's Representative prior to the shipment of any materials.

10. Weigh Bills: Certified weigh bills shall be provided to the Owner's Representative and/or Owner's Construction Manager at the time the weighted material is delivered. Certified weigh bills for each load of imported fill materials delivered to the project site shall include

certification of weight, the time of weighing, time of delivery, and serial number and description of delivery truck.

11. Progress Survey Data: In accordance with Technical Specification Section 01 71 23 – Construction Surveying.

1.06 OFF-SITE TRANSPORTATION AND DISPOSAL

A. All excavated material that is not used for beneficial reuse as indicated on the Contract Drawings or Specifications herein shall be loaded into trucks for disposal at an approved location or landfill. Submit locations to the Owner.

B. The Contractor shall be responsible for coordinating truck scheduling. The Contractor shall coordinate truck traffic and loading locations on site with stockpile and excavation locations, including providing suitable on-site truck routes.

PART 2 – PRODUCTS

2.01 GENERAL IMPORTED MATERIAL QUALITY REQUIREMENTS

[NOTE: For clarity, it is likely that excavated and/or dredged material volumes are sufficient for all work elements requiring fill and/or beneficial reuse **however, for bidding purposes assume all excavated material is to be disposed of offsite at an approved location**. Import of any sand and/or aggregate materials to the site, not including the stone materials identified within Section 35 21 23 – Armor Stone, shall be submitted for approval to the Owner's Representative prior to use.]

A. Imported materials (if required) shall be tested and certified to be free of contaminants as approved by the Owner's Representative. See Paragraph 1.05 (6, 7) herein for the details of the required testing, submittals, and approval.

B. The Owner's Representative maintains the right to reject any materials that have been determined to be substandard for any reason. In the event of rejection, it shall be the responsibility of the Contractor to remove all rejected material form the site at its sole expense.

C. Visually inspect each load of imported material upon delivery. Material shall be inspected for presence of foreign, recycled, or reprocessed material. Owner's Representative and/or Owner's Construction Manager may at any time perform an independent inspection. Material may be rejected due to identification of any such material or as a result of substandard test results.

PART 3 – EXECUTION

3.01 GENERAL EXCAVATION AND GRADING

A. Excavating and grading that is part of this Contract, shall be completed within the tolerances established or within reasonably close conformity within the alignment grade and cross sections indicated on the Contract

Drawings or as established within these Speciation. Specific requirements for surveying are described in Technical Specification Section 01 71 23 – Construction Surveying.

B. All excavation activities will be performed 'in the dry' to the extent practicable or at least during low flows, low groundwater flows and/or low water levels, to minimize the amount of water in excavations. This will require special installation methods including controlling water, and/or timing activities to coincide with low flow conditions.

C. Excavation shall only include what is needed to complete the work elements shown on the Contract Drawings and Specifications. Any excess excavation not needed to construct the slopes shall be disposed of at a Contractor provided facility that meets the local, state and federal requirements. No payment will be made for excessive excavation.

D. Excavation material shall be moved with the use of mechanical equipment, such as shovels, loaders, bulldozers, hydraulic excavators, graders, rippers, etc., but shall not require drilling and blasting or drilling and line breaking. Excavation by sluicing methods will not be permitted unless specifically approved by the Owner's representative. In general excavation shall be remove in horizontal layers.

E. Conduct all required activities associated with excavation, stockpiling, and disposal of sediment in accordance with the requirements of the Contract Documents, regulatory permits, and as directed by the Owner or Owner's Representative to complete the work under this Contract. Coordinate the work with the Owner's Representative to limit adverse effects of the work on the activities of other adjacent public and privately-owned areas and/or the public.

F. Implement environmental protection measures, temporary erosion and sediment control, BMPS, site access and traffic control, utility protection, spill prevention and pollution control, noise control, and all other controls needed to protect environmental quality during the work. Refer to Specification Section 01 57 13 – Temporary Erosion and Sediment Control.

G. The Contractor may construct temporary stockpile areas located within the project site limits, unless alternative locations are pre-approved by the Owner's Representative. The Contractor shall not stockpile any material in areas subject to flowing water. Sediment placed in stockpiles shall be protected from the weather and environmental conditions (water level variation, waves, and currents). Contractor shall be responsible for proper handing and discharge of water collected within the stockpile areas as defined in Section 01 57 13 – Temporary Erosion and Sediment Control.

3.02 BACKFILLING

A. No backfilling shall occur until excavation elevations have been confirmed, based on Contractor provided intermediate/progress survey(s), by the Owner's Representative. See Section 01 71 23 – Construction Surveying.

B. Contractor shall backfill excavations back to existing grade unless noted otherwise on the Contract Drawings or Specifications herein.

C. Contractor shall be responsible to maintain excavation subgrades to excavated elevations and lateral extent during backfilling operations. The Contractor shall be responsible to remove displaced soil (loose fill) greater than 1 foot above base of excavation or subgrade that occurs during backfilling.

D. Backfill work shall not occur within areas subject to active river flow conditions.

3.03 GENERAL COMPACTION REQUIREMENTS

A. Compaction shall be performed for backfill of excavated materials. Compaction equipment suitable for the soil and the area being compacted shall be used. Each lift of material placed shall be uniformly compacted as indicated for the specific material and indicted in these Specifications. The compaction equipment may be of any type, provided it can compact each lift of the material as specified. The Owner's Representative may require that the use of particular compaction equipment be discontinued if it is not capable of compacting the material as indicated within a reasonable time, or if the equipment may damage underlying or adjacent soils and/or structures.

B. Contractor shall place fill in 1 to 2-foot maximum loose lift thickness, unless specified otherwise herein.

C. Adjustments to achieve compaction shall be at no additional cost to the Owner.

D. Lifts shall be uniform thickness, sloped to drain, and even across the entire width of the fill surface. Shape the surfaces to uniform cross sections and eliminate ruts and holes.

E. Specific compaction requirements for general fill and/or the beneficial reuse of dredged material are described in the following Paragraphs herein.

3.04 CLEARING AND GRUBBING

A. Remove shrubs, and other vegetation to permit the installation of new construction within the areas indicated on the Contract Drawings and as specified herein.

1. The clearing limits shown on the Contract Drawings represent the maximum area that may be cleared and grubbed. Within the clearing

limits, remove existing vegetation only where necessary to complete new construction. Preserve all other existing native vegetation.

B. Material generated from clearing and grubbing shall be disposed of by the Contractor at an approved offsite disposal location.

C. Contractor shall not burn material generated from clearing and grubbing activities.

3.05 TOLERANCES

A. Vertical:

Finished elevations shall be graded within a vertical tolerance of +/-0.25 feet relative to the pre-construction survey and/or the Contract Drawings and maintain positive site drainage unless noted otherwise.

3.06 SURVEY

A. The Contractor shall provide for all survey needs on this project as identified in these Specifications or as required to complete the work. See Section 01 71 23 – Construction Surveying for required control and as-built documentation.

3.07 STOCKPILING

A. The Contractor may elect to temporarily stockpile excavated material for dewatering/decant and/or temporary storage within the project site limits.

B. The Contractor shall not temporarily stockpile materials in areas subject to flowing water/currents, waves, or fluctuating water levels.

C. The Contractor shall locate stockpiles as necessary within the project site limits to compete the work. No stockpiles may be located in such a manner as to impair access to adjacent sites or facilities or be detrimental to work progress or the completed work in any way. Stockpile locations and configurations must be approved by the Owner's Representative or Owner's Construction Manager.

D. All stockpile areas shall be sized to accommodate anticipated volumes and rates of excavation and import.

E. The Contractor shall maintain a written log of stockpiles containing excavated/dredged materials from on-site.

F. The Contractor shall inspect all stockpile areas daily and after rain or high flow events and shall maintain a written inspection log. The inspection log shall be available at the request of the Owner, Owner's Representative, or Owner's Construction Manager and also submitted with the Contractor's Weekly Report. Inspection logs shall contain date and time of inspection, name of individual conducting the inspection, observations, problems noted, and corrective actions taken. For each stockpile, the log shall note the material present; dates that the stockpile was established or modified;

and daily volumes based on visual or other estimates. The log shall establish a sequential number system of each stockpile.

3.08 SITE CLEANUP

A. Contractor shall return stockpile areas to original conditions on completion of use. Original conditions will be determined based upon review of the pre-construction survey data by the Owner's Representative.

B. Contractor shall clean up soil tracked from the site onto roadways on a daily basis or more frequently, as directed by the Owner or Owner's Representative.

C. Periodically clean up wastes, debris, and leftover materials resulting from the earthwork activities. Clear the work areas of all debris and waste materials that may have accumulated during execution of the work and dispose of such materials in accordance with all applicable regulations.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section includes specifications installation of geotechnical monitoring equipment beneath the dam. The location and type of monitoring equipment is shown on the Contract Drawings.

B. The work described herein includes intent and description of the work to be accomplished. The sequencing, materials, and detailed methods have been left to the contractor.

C. The objective of the geotechnical instrumentation is to provide ability to monitor groundwater pressures beneath the dam periodically. Three instruments are to be installed in boreholes at a depth indicated on the Contract Drawings. The connecting wires are to be extended to the shoreline where a monitoring station can complete periodic readings.

D. Installation timing. All work below the ordinary high water line shall be conducted within the timeframe allowed by the regulatory permit conditions and the substantial completion date designated within the Contract Documents.

1.02 RELATED DOCUMENTS

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this work as if specified in this section. Related Sections include the following:

1. Section 01 71 23 – Construction Surveying
2. Section 01 40 00 – Quality Requirements
3. Section 01 35 43 – Environmental Controls
4. Section 01 41 00 – Regulatory Requirements
5. Section 01 50 00 – Temporary Facilities and Controls
6. Section 01 57 13 – Temporary Erosion and Sediment Control
7. Section 35 31 23 – Armor Stone
8. Appendix A – Permit Documents

1.03 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

Occupational Safety and Health Administration (OSHA)

29 CFR 1910	Occupational Safety and Health Regulations.

29 CFR 1926	Safety and Health Regulations for Construction.

1.04 DEFINITIONS

A. Vibrating Wire Piezometer (VWP): A device for measuring groundwater pressure comprising a tensioned wire that resonates at a measurable frequency. The vibrating wire is connected to a diaphragm exposed to the ambient pressure. The diaphragm is typically protected by a ceramic porous stone. As the pressure and tension change, the resonant frequency is altered and measured as an electrical signal. The wire is plucked through activation by an automated or manual readout device.

1.05 SUBMITTALS

A. The following items shall be submitted to the Owner's Representative for review and approval in accordance with Section 01 33 00 – Submittals:

1. Prepare and submit for Owner's Representative approval a Vibrating Wire Piezometer Installation Plan detailing the sequencing of drilling, installation of the piezometer, and backfill of the borehole. The plan shall include detail of the conduit placement and protection during construction activities. Sequencing of the boreholes shall be provided considering the cofferdam access to the installation locations. Protection of installed instruments during remaining construction activities shall be described.

2. Provide documentation for acquired VWP including manufacturers recommendation for borehole grout backfill mix, calibration factors, and calibration checks at least one week prior to installation. Notify Owner's Representative representative to anticipated drilling and installation schedule at least one week prior to mobilization of the drilling equipment.

3. The Contractor shall make its own interpretations, deductions, and conclusions as to the nature of the materials to be excavated or drilled, the difficulties of making and maintaining the required excavations or boreholes, and the difficulties of doing any other work affected by environmental, geotechnical subsurface, and groundwater conditions and shall accept full responsibility thereof.

4. Contractor shall provide as-built submittal for the VWPs indicating approximate location in plan (±1 foot) and approximate elevation (**±2 inches**) of the porous stone end of the VWP. Contractor shall provide an as-built indication of which cable represents which VWP as per Construction Drawings. Calibration certificates, cabling diagram, location information, and elevation information shall be included in an operations manual. Operation manual shall include photographic documentation of VWP installation, cabling, conduit, and enclosure.

1.06 OFF-SITE TRANSPORTATION AND DISPOSAL

A. All drilling cuttings that is not used for beneficial reuse as indicated on the Contract Drawings or Specifications herein shall be disposed at an approved location or landfill.

B. The Contractor shall be responsible for coordinating truck scheduling. The Contractor shall coordinate truck traffic and loading locations on site with stockpile and excavation locations, including providing suitable on-site truck routes.

PART 2 – PRODUCTS

2.01 VIBRATING WIRE PIEZOMETERS

A. Conduit to house and protect cabling to be provided by Contractor.

B. Weatherproof enclosure for cabling to be provided by Contractor. May consist of DGSI/Slope Indicator housing for 4-Channel V-Logger (without logging componentry) or Contractor-provided timber enclosure, at Contractor's discretion.

C. Vibrating Wire Data Recorder – DGSI Item Number 52613500 or equivalent, to match VWP componentry.

PART 3 – EXECUTION

3.01 VIBRATING WIRE PIEZOMETER INSTALLATION

A. VWPs shall be installed approximately 10-15 feet below the concrete apron in a grouted-in-place borehole at a known depth in quantity and locations identified on the Contract Drawings. The objective of the VWP installation is to provide an ongoing measurement capability for groundwater pressures beneath the Outlet Dam. VWPs shall be installed in a borehole that is constructed in accordance with local regulations. The Owner's Representative and Geotechnical Engineer shall be on-site for the drilling and installation of the VWP.

B. Borehole grout backfill shall conform to VWP manufacturer specifications for bentonite mix. Mud rotary drilling and tremie grout placement methods are recommended. VWP shall be mounted on a rigid frame for accurate placement within the borehole. Mounting on one-inch diameter sacrificial PVC pipe used as tremie pipe is recommended.

C. VWP porous stones shall be saturated by placing in filtered water for at least 24 hours prior to placement in the borehole, or as otherwise directed by the manufacturer recommendations. The VWP shall be tested for functionality immediately prior to placement in the borehole.

D. The cabling resulting from the installation shall be of sufficient length to pass through a conduit to the shoreline. The ends of the cabling shall be labeled so as to differentiate which VWP is represented. The free end of the cabling shall be left in a weatherproof but accessible enclosure for periodic measurements to be taken with the Vibrating Wire Data Recorder provided by the Contractor. At least three feet (3 ft) of cabling shall be coiled within the enclosure and the bare wiring ends stripped and soldered for long-term resilience.

E. The cabling conduit may be located within the apron subgrade or within the apron slab, at the contractor's discretion. If located within the slab, it shall not impede construction of the reinforced concrete. Conduit location must be approved by the Owner's Representative prior to installation. Filling or sealing the conduit against water seepage may be required.

3.02 TOLERANCES

A. Vertical:

Elevation of the porous stone shall be determined to within two inches (±2 inches). Porous stone shall be mounted facing upwards to maintain saturation.

B. Horizontal

Horizontal elevation of the porous stone shall be determined within one foot (±1 foot).

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section covers excavation, fill and stonework required to construct the armor stone apron. Stone shall be supplied to the site and installed as per the Contract Drawings and as specified herein. Geotextile fabric required for stonework is also included.

B. All arrangements must be made prior to construction for right-of-way, for adequate investigation and exploration, and for selection, development, and operation of the quarry to supply stones for this contract of the weights, sizes, and quality specified herein. Inspection for acceptance of individual stones will be at the construction site.

1.02 RELATED DOCUMENTS

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this work as if specified in this section. Related Sections include the following:

1. Section 01 40 00 – Quality Requirements
2. Section 01 35 43 – Environmental Controls
3. Section 01 71 23 – Construction Surveying
4. Section 31 00 00 – Excavation and Fill
5. Appendix A – Permit Documents

1.03 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

American Society for Testing and Materials (ASTM)

C88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
C127	Specific Gravity and Absorption of Coarse Aggregates.
C131	Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
C535	Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
D2938	Unconfined Compressive Strength of Intact Rock Core Specimens.
D4992	Evaluation of Rock to be used for Erosion Control.

U.S. Army Corps of Engineers Handbook for Concrete and Cement (CRD-C)

CRD-C 148-69 Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol.

CRD-C 144-92. Resistance of Rock to Freezing and Thawing.

1.04 DEFINITIONS

A. Armor Stone: Layer of stones used as an armor layer for apron as shown on the Contract Drawings.

B. Bedding Stone: Layer of small stones used for bedding/filter layer between the Armor Stone and the geotextile fabric as shown on the Contract Drawings.

C. Stoneworks: Installation of any stone materials including, Armor Stone Type and Bedding Stone, in accordance with the Contract Drawings and requirements specified herein.

D. Excavation: Includes only what is needed to install geotextile and construct the final stonework in accordance with the Contract Drawings and requirements specified herein.

E. Fill: Includes only what is needed to replace excavation for installation of geotextile and stonework in accordance with the Contract Drawings and requirements specified herein.

1.05 SUBMITTALS

A. The following items shall be submitted to the Owner's Representative for review and approval in accordance with Section 01 33 00 – Submittals:

1. Product specifications for geotextile, and other materials specified herein.

2. All pertinent source and test records (stone quality, testing results, gradation, chemical analyses results, and a description of previous use on coastal and/or fluvial structures) from the stone source shall be submitted to the Owner's Representative for review and approval. Documentation shall include the following:

   a. Name and location of material source, and name and telephone number of supplier.

   b. Laboratory test results completed within the last 12 months for test procedures listed Part 2 of this Technical Specification.

3. Such test records will be evaluated to help determine if stones from that source can meet quality standards as hereinafter specified.

4. Weigh Scale Certification: Prior to the use of any scale under this contract, the contractor shall submit details on the location and construction of the scale and a copy of the certification of the scale's accuracy from the local weights and measures regulating agency.

5. Daily Activities Report: The Contractor shall provide a daily record of construction activities and shall include the following:

    a. Report shall document the percent of project completion, limits of construction, and adverse weather conditions or other problems that cause problems for each day there are on-site work activities. The report shall be submitted to the Owner's Representative at the end of each week.

6. Daily Shipment Log Sheets: On the workday following stone shipment, the Contractor shall submit a copy of the log of all shipments from the stone source(s). The log sheets shall include information regarding placement or stockpiling of the shipments, and what shipments were sampled. The Daily Log sheet and its format shall be approved by the Owner's Representative prior to the shipment of any stone materials.

7. Weigh Bills: Certified weigh bills shall be provided to the Owner's Representative and/or Owner's Construction Manager at the time the weighted material is delivered. Certified weigh bills for each load of stone materials delivered to the project site shall include certification of weight, the time of weighing, time of delivery, and serial number and description of delivery truck or barge.

8. Stone Work Plan consisting of the following subsections:

    a. Description of stone construction sequencing method.

    b. Description of proposed work area isolation method.

    c. Intermediate/Progress Survey sequencing and review plan for the stone in accordance with Section 01 71 23 – Construction Surveying.

PART 2 – PRODUCTS

2.01 GEOTEXTILE FABRIC

A. Physical Properties: The geotextile shall be pervious, non-woven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. The material shall be a geotextile consisting only of long chain synthetic polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters and shall meet or exceed the requirements of AASHTO

M288-92. The material shall be free from defects or tears. Geotextile material shall be inert to chemicals commonly found in natural water, the soils conditions encountered at the site, and UV stabilized. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile. The geotextile fiber shall contain stabilizers or inhibitors added to the base material if necessary to make filaments resistant to deterioration due to ultraviolet and heat exposure. The geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation. Geotextile shall be sampled and tested in accordance with ASTM D4354. The geotextile fabric shall meet the following physical property requirements:

Table 1 – Physical Requirements for Geotextile

Fabric Property	ASTM Method	Property Value
Grab Tensile Strength, in machine and x-machine direction	D4632	160 lb. min.
Grad Failure Strain, in machine and x-machine direction	D4632	≥ 50%
Seam Breaking Strength	D4632	140 lb. min.
Puncture Resistance	D6241	310 lb. min.
Tear Strength, in machine and x-machine direction	D4533	50 lb. min.
Ultraviolet Radiation Stability	D4355	50% strength retained min.
Apparent Opening size AOS	D4751	No. 80 max.
Water Permittivity	D4491	0.3sec^{-1} min.
Weight	D5261	
Thickness	D5199	

2.02 STONE SOURCES

A. The Contractor is responsible for obtaining a source for the materials in accordance with these Specifications. The name and location of the material source the Contractor proposes for supply of the Products shall be submitted to the Owner's Representative after the notice of award. The Owner's Representative will evaluate these sources as potential suppliers and determine if they are qualified for consideration under these Specifications. Evaluation will be conducted based on a review of test results and review of source material at the proposed source location. If the primary source is determined to be unqualified, subsequent sources shall

also be evaluated at the Contractor's expense. The Contractor shall select stone materials from an existing commercial source for which all operating permits have been obtained prior to bid opening. Contractor shall assure himself of availability of an adequate and acceptable material source based on quantity, quality, production rate, and gradation standpoints prior to submitting his bid.

2.03 SAMPLING, STONE QUALITY TESTING, AND ACCEPTANCE OF STONES

A. General

1. The acceptability of stone materials from the proposed source will be determined by sampling and laboratory testing results, geologic examination, quarry field investigation by the Owner's Representative, and drop tests at the quarry. The Contractor shall submit existing quarry test results from a laboratory that has been validated by the Owner's Representative, in accordance with the tests specified herein and which are representative of the stone to be used on the project. The Contractor shall submit existing laboratory test documentation to the Owner's Representative within five (5) business days of receipt of Notice to Proceed. Existing test records shall have been completed during the previous 12 months from bid opening. When satisfactory test records are not available, the proposed stone shall be subjected to all such tests as are necessary to determine that the stones are durable and suitable for use in the work at the Contractors expense. Tests to which the stones may be subjected include unit weight or specific gravity, absorption, abrasion, accelerated expansion, and such other supplemental tests as may be necessary.

2.04 SAMPLING

A. Should the Contractor's documentation not include previous satisfactory laboratory test results for tests completed within the last 12 months or fail to satisfy the Owner's Representative, samples of all types of stone proposed for use in construction shall be selected in the presence of the Owner's Representative and delivered to the testing lab for testing at the Contractor's expense. These samples shall be delivered to the testing lab within five (5) business days after receipt of notification of insufficient or unsatisfactory lab tests. Samples of stone shall consist of 5 to 10 pieces with a total weight of not less than 200 pounds with an average weight of 25 pounds per piece for each stone type proposed for use as armor and bedding stone. No single piece shall weigh more than 100 pounds. The presence of the Owner's Representative during selection of samples of stones will not relieve the Contractor of the responsibility to secure representative samples from the quarry for testing.

2.05 STONE QUALITY

A. All stone used for any Product described hereinafter shall meet the following requirements:

1. Stone materials shall be clean, dense, hard, sound, rough, angular, close grained durable, naturally occurring stone, free from overburden material, and shall not slake or deteriorate on exposure to the action of water or atmosphere. The faces of individual stone shall be roughly angular, not rounded in shape.

2. Stone shall be free of cracks, joints, honeycomb, faults, flaws, seams or mineral in-fillings, or other defects that would tend to increase its deterioration from the weathering process or result in breakage during re-handling at offsite stockpile locations, normal handling, placing, or service in the armor stone pad.

3. Each stone shall have sufficiently uniform physical properties throughout so that all portions of the stone will meet the specified test requirements. All quarried Products shall be cured in the quarry and stockpiled for a minimum of 48 hours after blasting during which time the atmospheric temperature does not drop below 40º F prior to shipment to the site of the construction.

4. Stone materials shall be produced only from quarries in areas free of marine basalt flows, reefs, shale, or chert.

5. Each stone shall not have a longest dimension greater than three times its shortest dimension.

6. Any stone containing an inferior stone material portion that does not meet the specified test requirements will be rejected as unsatisfactory and shall be removed from the project area at the Contractor's expense.

7. Weak or inferior appearing portions of any non-uniform type stone such as igneous flow breccias, volcanic breccias, scoria, cataclastic metamorphics, or irregularly cemented sedimentaries shall be subjected to all testing to determine that the stone will not be susceptible to splitting or differential weathering.

2.06 STONE QUALITY TESTING

A. Separate tests shall be made for each different stone type. All costs of tests shall be borne by the Contractor and shall be incidental to placing materials. All tests shall be conducted by an independent laboratory acceptable to the Owner's Representative. In the event any stone type in the sample fails to pass the required tests, subsequent tests for that stone type shall also be conducted at the Contractor's expense. The Owner's Representative will be notified of the results of laboratory tests. Satisfactory Contractor documentation of laboratory test results on stone sample will not constitute

approval of all stone in the quarry and will not in any way change the Contractor's responsibility for obtaining, developing, and maintaining a satisfactory source of stones. Throughout the duration of this contract, the Owner's Representative may sample and test stones delivered to the construction site and proposed for use in the construction. No contract extension will be granted for specified submittal and testing time or because materials fail to meet the specification requirements.

B. The test results reported by the laboratory will be considered as exact results for unit weight, absorption, abrasion, accelerated expansion, or other necessary supplemental tests, regardless of any permissible variance that may be established by test procedures in determining the acceptability of stone furnished under this contract. Test procedures to be utilized and required values are as follows:

Armor Stone and Bedding Stone Testing Requirements

Test	Required Value	Test Method
Specific Gravity	>2.65	ASTM C127
Water Absorption	<2.7%	ASTM C127
Sodium Sulfate Soundness	<10% loss (after 5 cycles)	ASTM C88
L.A. Abrasion	<20% loss (after 500 revolutions)	ASTM C535
Unconfined Compressive Strength	>12,000 psi	ASTM D2938
Expansive Breakdown in Ethylene Glycol	<5% loss in 15 days	CRD C148*

* The proposed stone should be free of the presence of clay minerals in the stone fabric. If during the Owner's Representative review of the proposed stone source, clay is observed in the stone and laboratory tests (from past 12 months) are not available to validate conformance with the specification, the Contractor will be required to conduct a new test and ensure compliance with the specified value.

C. The Contractor shall perform a drop test on armor stone for each load delivered or as determined necessary by the Owner's Representative. The drop test shall be performed by dropping a stone specimen, selected by the Owner's Representative, from a height of half the average diameter of the stone onto a rigid surface or second stone. Stone fracturing as a result of the drop test constitutes test failure. Individual fractured stones will be rejected for use as armor stone. If a stone fractures as a result of the drop test, the Owner's Representative may elect to test other stones from the same load. If multiple stones from a single load fail the drop test, the

Owner's Representative may elect to reject the entire load for use as armor stone.

D. In the event any stone in the sample fails to pass the required tests, subsequent tests for that stone type shall also be conducted at the Contractor's expense. Samples shall be delivered to the testing lab within five (5) business days after receipt of notification of insufficient or unsatisfactory lab tests. No contract extension will be granted for specified submittal and testing time or because materials fail to meet the specification requirements.

E. Failure of Stones: Stones failing to meet the specified requirements or as determined by the Owner's Representative to be in non-conformance shall be removed from the project site. No materials or stones shall be placed until those materials or stones have been approved for use by the Owner's Representative. Individual stones failing to meet specified requirements, or loads containing more than 10 percent by weight of stones failing to meet specified requirements, will be rejected prior to placement, or shall be removed from the site if placed on the prepared site.

2.07 GRADATION

A. The stone shall conform to the following size gradation for the in-place condition. The percent smaller value shall not be less than that listed for each weight or size category for the materials described below.

1. Armor Stone

Approximate Size (in)	Percent Passing (Smaller)
42	100
36	80-95
30	50-80
22	15-50
14	15 max

2. Bedding Stone

Use aggregate consisting of naturally angular or manufactured crushed aggregate having strong, durable particles that are free of adherent coatings and deleterious materials such as organics or construction debris. The facture requirement shall be at least one fractured face and applies to the combined aggregate retained on the No. 4 sieve in accordance with AASHTO T 335.

Sieve Size	Percent Passing
8 inches	100
3 inches	95-100
2 inches	90-95
1.5 inches	85-92
3/8 inch	45-55
No. 4	25-35
No. 8	10-20
No. 16	3-10
No. 30	0-2

B. Gradation tests of the stone shall be accomplished at the quarry. Tests by weight shall be made by the Contractor in the presence of the Owner's Representative. The Contractor shall notify the Owner's Representative not less than three (3) working days in advance of each test. A minimum of one gradation test shall be performed for each 1,000 tons of stone.

C. Specified gradation is for the installed (in-place) condition. The Contractor shall consider breakage during material handling, delivery and installation in order to provide the specified in-place stone gradations.

PART 3 – EXECUTION

3.01 SITE PREPARATION

A. Preparatory works include general excavation, scour hole fill and compaction. Excavation and fill works shall be executed in accordance with the Contract Drawings and as specified within Section 31 00 00 – Excavation and Fill, as specified herein, and in accordance with any applicable requirements of related sections. Excavation shall only include what is needed to place geotextile and construct the bedding stone and armor stone as shown on the Contract Drawings.

B. Excavation. Immediately prior to placing stone, the area to receive the stone will be inspected by the Owner's Representative and/or Owner's Construction Manager, and no material shall be placed thereon until that area has been approved.

3.02 GEOTEXTILE INSTALLATION

A. The geotextile shall be installed on the prepared base as described below and within the limits shown on the Contract Drawings.

B. Geotextile shall be kept dry and wrapped such that it is protected from the elements during shipping and storage. At no time shall the geotextile be exposed to ultraviolet (sun) light for a period exceeding seven days. The geotextile shall be labeled as per ASTM D4873.

C. The area to receive the geotextile shall be cleared of any debris or obstructions which may damage the geotextile. The geotextile must be placed to cover the footprint shown on the Contract Drawings prior to placement of stone material.

D. The installed geotextile shall have no tears or punctures.

E. Should the geotextile be torn or punctured, the damaged area shall be repaired by the Contractor. The repair shall consist of a patch of the same type of geotextile which replaced the ruptured area. All geotextile within 2 feet of the ruptured area shall be removed from the geotextile by cutting the geotextile using a method which produces a smooth geotextile edge and does not cause geotextile ripping or tearing. The patch shall be sewn onto the geotextile using a double sewn "Flat" seam, one inch from the edge, Type Ssn-2, may be used for the repair. The stitch density shall be six stitches per inch. High strength polypropylene, polyester, or Kevlar thread shall be used.

F. All non-sewn geotextile fabric panel seams shall be overlapped at a minimum distance of 3 feet.

G. The geotextile fabric shall be unrolled and laid smooth without excessive wrinkles. The Contractor may elect to sew fabric seams. A double sewn "J" seam, Type Ssn-2, with parallel stitching spaced approximately 0.5 inches apart, shall be used for both factory and field sewn seams. The seams shall be sewn in such a manner that the Owner's Representative and/or Owner's Construction Manager can inspect the seam readily. High strength polypropylene, polyester, of Kevlar thread shall be used. If a patch of fabric is to be placed on damaged fabric for the purpose of repairing the fabric, then a double sewn "flat" or "prayer" seam, 1 inch from the edge of the fabric, Type Ssa-2, may be used for this repair. Stitch density shall be 6 stitches per inch.

H. Geotextile shall be placed with the machine direction perpendicular to the river flow with a minimum 1-foot of the upstream geotextile overlapping the downstream geotextile.

I. The geotextile shall be placed in the manner and at the locations shown on the Contract Drawings. The Contractor shall prepare the surface to receive the geotextile to ensure that the surface is relatively smooth and free of obstructions, depressions, debris, or stone that could damage the geotextile during placement. Geotextile placement areas shall be protected from inundation of currents and waves until the geotextile, bedding stone and armor stone are installed to a level above the native ground elevation.

J. Geotextile shall be temporarily anchored into its final position, using sandbags and other methods that will not rupture the geotextile, prior to the placement of bedding stone and/or armor stone on the geotextile.

K. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The geotextile shall be protected at all times during construction to ensure that the original chemical and physical properties of the geotextile are not changed.

L. All wrinkles and sags shall be stretched out immediately before stone is placed on the geotextile. The geotextile shall be protected from damage during placement of stone. This shall be accomplished by limiting the height of drop to less than 1 foot. In the event that this damages the geotextile, the stone shall be placed directly on the geotextile with zero height of drop. Before placement technique will not damage the geotextile. Any geotextile that is rejected or damaged shall be replaced by the Contractor at no additional cost to the Owner.

3.03 GENERAL STONE PLACING

A. Stone shall be delivered to the project site for installation by methods that will minimize multiple re-handling of the materials to minimize breakage. Acceptance of stone gradations will be provided by the Owner's Representative and/or Owner's Construction Manager based on in-place materials. If excessive breakage occurs so that in-place required gradations are not being provided, the installed stone may be rejected by the Owner's Representative and/or Owner's Construction Manager which require the Contractor to remove and replace the installed materials.

B. Armor and bedding stone shall be mechanically placed on secured geotextile fabric layer in such manner that will produce a well-keyed mass of stone (with maximum level of stone interlocking) to the lines, grades and thickness shown on the Contract Drawings. Stone shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing stone through chutes, dropping more than 2 feet (above or below water surface), and other methods which may segregate the various sizes or damage the armor stone or underlying material will not be permitted. The large stones shall be well distributed in the mass of stones.

C. Rearranging of individual armor stones will be required to the extent necessary to achieve the results specified herein. Any stonework which contains objectionable segregation of stone sizes shall be excavated, removed from the site of the work, and replaced with material conforming with these Specifications.

D. Placement of bedding stone and armor stone shall be suspended when adverse weather, and flow conditions do not allow for proper placement.

E. Stone shall be placed within the limits shown on the Contract Drawings. All stone shall be placed by excavation bucket with thumb, clamshell bucket, stone grab, or by some other method approved by the Owner's

Representative that will not drop or cast the stone, but will release the stone in such a manner that they will be properly interlocked with the underlying or adjacent stones to resist displacement by turbulent flow action and provide a uniform and compact section. Stones shall be firmly set and well supported by underlying or adjacent stones to resist displacement by turbulent flow action and provide a uniform and compact section.

F. The Contractor shall place the stone using methods, techniques, and equipment that will produce a tight-fitting mass of stone.

G. Armor Stone shall be installed using the "Selected Placement" method. This method requires the careful selection and mechanical placement of individual armor stones to achieve a high degree of interlocking and stability between adjacent stones. Individual stones shall be selected for placement on the structure and repositioned as necessary to produce a tight fitting and interlocked structure.

H. Stone shall be constructed, within the specified tolerance, to the lines and grades shown on the Contract Drawings. The Contractor will not be paid for stone placed outside the allowable tolerance. The Contractor shall relocate the unsatisfactorily placed stone within the specified limits for payment or the weight of the stone so misplaced will be estimated by the Owner's Representative and the payment deductions shall be determined from this estimate and the bid unit price of the stone.

I. The largest armor stones shall be well distributed and the entire mass of armor stones in their final position shall be graded to conform to the gradation specified in Part 2 above. The finished armor stone slopes shall be free from objectionable pockets of small stones and clusters of larger stones.

J. Placing stone by dumping it at the top of the slope and pushing it down the slope will not be permitted. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source, by controlled dumping of successive loads during final placing, or by other methods of placement that will produce the specified results.

K. Rearranging of individual armor stones by mechanical equipment will be required to the extent necessary to obtain a reasonably well-graded distribution of armor stone sizes as specified above.

L. The Contractor shall maintain the stone until accepted and any material displaced prior to acceptance and due to the Contractor's negligence shall be replaced at his own expense and to the lines and grades shown on the Contract Drawings.

M. Smaller armor stone shall be utilized to "chink" the voids of the pad.

N. Placing of armor stone shall ensure that the stones are firmly set and supported by underlying materials and adjacent stones. Stones shall be placed such that at least three sides of the placed stone are in contact with the adjacent in-place stones. Loose and unstable stones shall be reset by picking the stone up off the slope and twisting and rolling it back into its required position or be replaced with a different stone to ensure sufficient stability.

3.04 ARMOR STONE

A. The armor stone shall be constructed as specified herein and at the locations and geometrical configuration as shown on the Contract Drawings.

B. The armor stone layers of the pad shall be constructed to thickness at a minimum equal to 2 diameters of the median size of the respective stone type. Stones shall be placed in such a manner as to provide the 2-stone thickness at a minimum or as indicated on the Contract Drawings.

3.05 BEDDING STONE

A. The bedding stone layer shall be constructed to the thickness indicated on the Contract Drawings.

B. Place bedding stone on 12-inch lifts and compact prior to placing the next lift.

3.06 WORK SEQUENCE

A. It is the Contractor's responsibility to develop a work method to ensure all excavations are protected while the works are being constructed. The Contractor shall take permit requirements into consideration in developing their work approach and sequencing plan. See Contract Drawings for details and requirements on construction sequencing.

3.07 TOLERANCES

A. Vertical

1. A tolerance of plus 6 inches or minus 6 inches from the surface plane of the Armor Stone layer shown will be allowed for armor stone placement. A tolerance of plus 3 inches or minus 3 inches from the surface plane of the bedding stone layer shown will be allowed for bedding stone installation. Either extreme of such tolerance shall not be continuous over an area greater than 200 square feet. The tolerance limit will be determined on the basis of the average surface elevation within 10 square feet. The armor stone surface shall be shaped with plating equipment or bucketing in order to achieve a uniform surface with no stones protruding more than 6 inches from the average surface area.

B. Horizontal

1. The horizontal location tolerance of the extents of armor stone, as measured along the centerline, will be 1 foot laterally along the length of the outlet dam structure as indicated on the Contract Drawings.

3.08 PROTECTION OF EXCAVATION AND SHORELINE

A. Alteration or disturbance of existing shorelines shall be limited to that necessary to construct the project to the lines and grades shown on the Contract Drawings. Excavated slopes shall be protected from erosion during construction. The stone protection shall be maintained until accepted, and any material displaced shall be replaced to the lines and grades shown.

B. Excavated slopes, geotextile, bedding stone, and armor stone shall be protected from erosion and sand infilling by concurrently constructing geotextile, bedding stone and armor stone layers.

3.09 PROTECTION OF DISTURBED SURFACES

A. All upland disturbed areas shall be stabilized with environmental protection requirements in accordance with Technical Specification 01 57 13 – Temporary Erosion and Sediment Control.

3.10 INSPECTION

A. Slope lines, grades, and placement of stone shall be inspected and/or tested for gradation. The Owner's Representative and/or Owner's Construction Manager may perform inspection of the stone prior to placement. However, this inspection does not relieve the Contractor from performing the in-place inspection. The Owner's Representative will review the results of the Contractor's intermediate progress surveys specified in Section 01 71 23 – Construction Surveying. The Contractor shall provide sufficient notification and time for the Owner's Representative to check and inspect installed materials prior to placement of overlying material layers.

3.11 WORK AREA ISOLATION

A. So that construction operations progress successfully, the excavation areas shall be isolated and protected from adverse environmental conditions as to prevent sloughing of excavation slopes and deposition of suspended sediments. The Contractor shall use an isolation system capable of withstanding the hydrodynamic conditions at the project site during the construction to protect the excavation and installed materials. A description of the proposed work isolation method shall be submitted to the Owner's Representative.

3.12 TRUCK MEASUREMENT METHOD

A. Any trucks used to transport new material shall be measured in accordance with Specification Section 01 20 00 Measurement and Payment.

END OF SECTION