



Purchasing Division

Invitation for Bid

IFB-4839-21-DH

Hogchute (aka Carson) Reservoir Dam Modifications Project

Responses Due:

Responses will be due in March/April, 2021 (TBD)
(Exact date to be determined)

Accepting Electronic Responses Only

Responses Only Submitted Through the Rocky Mountain E-Purchasing System (RMEPS)

<https://www.rockymountainbidsystem.com/default.asp>

(Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. 800-835-4603)

Purchasing Representative:

Duane Hoff, Senior Buyer

duaneh@gjcity.org

970-244-1545

This document has been developed specifically to solicit competitive responses for this solicitation, and may not be the same as previous City of Grand Junction solicitations. All vendors are urged to thoroughly review this solicitation prior to responding. Submittal by **FAX, EMAIL or HARD COPY IS NOT ACCEPTABLE** for this solicitation.

Invitation for Bids

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1. Instructions to Bidders

- 1.1. **Purpose:** The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required for the **Carson Reservoir Dam Modifications Project**. The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

IFB Questions:

Duane Hoff, Senior Buyer
duaneh@gjcity.org

The City would like to remind all Contractors, Sub-Contractors, Vendors, Suppliers, Manufacturers, Service Providers, etc. that (with the exception of Pre-Bid or Site Visit Meetings) all questions, inquiries, comments, or communication pertaining to any formal solicitation (whether process, specifications, scope, etc.) must be directed (in writing) to the Purchasing Agent assigned to the project, or Purchasing Division. Direct communication with the City assigned Project Managers/Engineers is not appropriate for public procurement, and may result in disqualification.

- 1.2. **Mandatory Pre-Bid Meeting:** **Prospective bidders are required to attend a mandatory on-site pre-bid meeting on October 22, 2020 at 10:30 am.** Meeting location shall be at Carson Reservoir on the Grand Mesa on Forest Service Road 108. From US Hwy 50, go east on Kannah Creek Road for 3 miles, veer left onto Land's End Road (Forest Service Road 100) and continue 26 miles to Forest Service Road 108 on the Right. From I-70, take Exit 49 onto CO Hwy 65 and continue approximately 30 miles. Turn Right onto Forest Service Road 100, and after 3 miles Forest Service Road 108 will be on the left. The purpose of this visit will for Bidders to become familiar with the proposed project site before the snow comes and access to Carson Reservoir is closed, and to inspect and to clarify the contents of this Invitation for Bids (IFB).
- 1.3. **The Owner:** The Owner is the City of Grand Junction, Colorado and is referred to throughout this Solicitation. The term Owner means the Owner or his authorized representative.
- 1.4. **Submission:** **Each bid shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (<https://www.rockymountainbidsystem.com/default.asp>).** *This site offers both "free" and "paying" registration options that allow for full access of the Owner's documents and for electronic submission of proposals. (Note: "free" registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our "**Electronic Vendor Registration Guide**" at <http://www.gjcity.org/business-and-economic-development/bids/> for details. (Purchasing Representative does not have access or control of the vendor side of

RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. **800-835-4603**)

- 1.5. **Modification and Withdrawal of Bids Before Opening.** Bids may be modified or withdrawn by an appropriate document stating such, duly executed and submitted to the place where Bids are to be submitted at any time prior to Bid Opening.
- 1.6. **Printed Form for Price Bid:** All Price Bids must be made upon the Price Bid Schedule attached, and should give the amounts both in words and in figures, and must be signed and acknowledged by the bidder.

The Offeror shall specify a unit price in figures for each pay item for which a quantity is given and shall provide the products (in numbers) of the respective unit prices and quantities in the Extended Amount column. The total Bid price shall be equal to the sum of all extended amount prices. When an item in the Price Bid Schedule provides a choice to be made by the Offeror, Offeror's choice shall be indicated in accordance with the specifications for that particular item and thereafter no further choice shall be permitted.

Where the unit of a pay item is lump sum, the lump sum amount shall be shown in the "extended amount" column and included in the summation of the total Bid.

All blank spaces in the Price Bid Schedule must be properly filled out.

Bids by corporations must be executed in the corporate name by the president or vice president or other corporate office accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown below the signature.

Bids by partnerships must be executed in the partnership name and signed by a partner whose title must appear under the signature and the official address of the partnership must be shown below the signature.

All names must be typed or printed below the signature.

The Offeror's Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Contractor's Bid Form.

The contact information to which communications regarding the Bid are to be directed must be shown.

- 1.7. **Exclusions:** No oral, telephonic, emailed, or facsimile bid will be considered
- 1.8. **Contract Documents:** The complete IFB and bidder's response compose the Contract Documents. Copies of bid documents can be obtained from the City Purchasing website, <http://www.gjcity.org/business-and-economic-development/bids/> .
- 1.9. **Additional Documents:** The July 2010 edition of the "City Standard Contract Documents for Capital Improvements Construction", Plans, Specifications and other Bid Documents are available for review or download on the Public Works &

Planning/Engineering page at www.gjcity.org. Electronic copies may be obtained on a CD format at the Department of Public Works and Planning at City Hall.

1.10. Definitions and Terms: See Article I, Section 3 of the General Contract Conditions in the *Standard Contract Documents for Capital Improvements Construction*.

1.11. Examination of Specifications: Bidders shall thoroughly examine and be familiar with the project Statement of Work. The failure or omission of any Offeror to receive or examine any form, addendum, or other document shall in no way relieve any Offeror from any obligation with respect to his bid. The submission of a bid shall be taken as evidence of compliance with this section. Prior to submitting a bid, each Offeror shall, at a minimum:

- a. Examine the *Contract Documents* thoroughly;
- b. Visit the site to familiarize themselves with local conditions that may in any manner affect cost, progress, or performance of the Work;
- c. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the Work;
- d. Study and carefully correlate Bidder's observations with the *Contract Documents*, and;
- e. Notify the Purchasing Agent of all conflicts, errors, ambiguities or discrepancies in or among the *Contract Documents* within the designated inquiry period.

On request, the Owner will provide each Offeror access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of a Bid. It shall be the Offeror's responsibility to make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (including without limitation, surface, subsurface and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress or performance of the work and which the Offeror deems necessary to determine its Bid for performing the work in accordance with the time, price and other terms and conditions of the *Contract Documents*. Location of any excavation or boring made by Offeror shall be subject to prior approval of Owner and applicable agencies. Offeror shall fill all holes, restore all pavements to match the existing structural section and shall clean up and restore the site to its former condition upon completion of such exploration. The Owner reserves the right to require the Offeror to execute an access agreement with the Owner prior to accessing the site.

The lands upon which the Work is to be performed, rights of way, and access thereto, and other lands designated for use by Contractor in performing the Work, are identified on the Drawings.

Information and data reflected in the *Contract Documents* with respect to underground utilities at or contiguous to the site are based upon information and data furnished to

the Owner and the Engineer by the owners of such underground utilities or others, and the Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the *Contract Documents*.

By submission of a Bid, the Offeror shall be conclusively presumed to represent that the Offeror has complied with every requirement of these Instructions to Bidders, that the *Contract Documents* are not ambiguous and are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

- 1.12. **Questions Regarding Statement of Work:** Any information relative to interpretation of Scope of Work or specifications shall be requested of the Purchasing Representative, in writing, in ample time, prior to the inquiry deadline.
- 1.13. **Addenda & Interpretations:** If it becomes necessary to revise any part of this solicitation, a written addendum will be posted electronically on the City's website at <http://www.gjcity.org/business-and-economic-development/bids/>. The Owner is not bound by any oral representations, clarifications, or changes made in the written specifications by Owner, unless such clarification or change is provided in written addendum form from the City Purchasing Representative.
- 1.14. **Taxes:** The Owner is exempt from State retail and Federal tax. The bid price must be net, exclusive of taxes.
- 1.15. **Sales and Use Taxes:** The Contractor and all Subcontractors are required to obtain exemption certificates from the Colorado Department of Revenue for sales and use taxes in accordance with the provisions of the General Contract Conditions. Bids shall reflect this method of accounting for sales and use taxes on materials, fixtures and equipment.
- 1.16. **Offers Binding 60 Days:** Unless additional time is required by the Owner, or otherwise specified, all formal offers submitted shall be binding for sixty (60) calendar days following opening date, unless the Bidder, upon request of the Purchasing Representative, agrees to an extension.
- 1.17. **Exceptions and Substitutions:** Bidders taking exception to the specifications and/or scope of work shall do so at their own risk. The Owner reserves the right to accept or reject any or all substitutions or alternatives. When offering substitutions and/or alternatives, Bidder must state these exceptions in the section pertaining to that area. Exception/substitution, if accepted, must meet or exceed the stated intent and/or specifications and/or scope of work. The absence of such a list shall indicate that the Bidder has not taken exceptions, and if awarded a contract, shall hold the Bidder responsible to perform in strict accordance with the specifications and/or scope of work contained herein.
- 1.18. **Collusion Clause:** Each bidder by submitting a bid certifies that it is not party to any collusive action or any action that may be in violation of the Sherman Antitrust Act. Any and all bids shall be rejected if there is evidence or reason for believing that collusion exists among bidders. The Owner may, or may not, accept future bids for the same services or commodities from participants in such collusion.

- 1.19. Disqualification of Bidders:** A Bid will not be accepted from, nor shall a Contract be awarded to, any person, firm, or corporation that is in arrears to the Owner, upon debt or contract, or that has defaulted, as surety or otherwise, upon any obligation to the Owner, or that is deemed irresponsible or unreliable.

Bidders may be required to submit satisfactory evidence that they are responsible, have a practical knowledge of the project bid upon and that they have the necessary financial and other resources to complete the proposed Work.

Either of the following reasons, without limitation, shall be considered sufficient to disqualify a Bidder and Bid:

- a. More than one Bid is submitted for the same Work from an individual, firm, or corporation under the same or different name; and
- b. Evidence of collusion among Bidders. Any participant in such collusion shall not receive recognition as a Bidder for any future work of the Owner until such participant has been reinstated as a qualified bidder.

- 1.20. Public Disclosure Record:** If the bidder has knowledge of their employee(s) or sub-contractors having an immediate family relationship with a City employee or elected official, the bidder must provide the Purchasing Representative with the name(s) of these individuals. These individuals are required to file an acceptable "Public Disclosure Record", a statement of financial interest, before conducting business with the City.

2. General Contract Conditions for Construction Projects

- 2.1. The Contract:** This Invitation for Bid, submitted documents, and any negotiations, when properly accepted by the City, shall constitute a contract equally binding between the City and Contractor. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The contract may be amended or modified with Change Orders, Field Orders, or Addendums.
- 2.2. The Work:** The term Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.
- 2.3. Execution, Correlation, Intent, and Interpretations:** The Contract Documents shall be signed by the Owner (City) and Contractor. City will provide the contract. By executing the contract, the Contractor represents that he/she has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents. The Contract Documents are complementary, and what is required by any one, shall be as binding as if required by all. The intention of the documents is to include all labor, materials, equipment and other items necessary for the proper execution and completion of the scope of work as defined in the technical specifications and drawings contained

herein. All drawings, specifications and copies furnished by the City are, and shall remain, City property. They are not to be used on any other project, and with the exception of one contract set for each party to the contract, are to be returned to the owner on request at the completion of the work.

- 2.4. The Owner:** The Owner is the City of Grand Junction, Colorado and is referred to throughout the Contract Documents. The term Owner means the Owner or his authorized representative. The Owner shall, at all times, have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access. The Owner will make periodic visits to the site to familiarize himself generally with the progress and quality of work and to determine, in general, if the work is proceeding in accordance with the contract documents. Based on such observations and the Contractor's Application for Payment, the Owner will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in the contract. The Owner will have authority to reject work which does not conform to the Contract documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, he will have authority to require the Contractor to stop the work or any portion, or to require special inspection or testing of the work, whether or not such work can be then be fabricated, installed, or completed. The Owner will not be responsible for the acts or omissions of the Contractor, and sub-Contractor, or any of their agents or employees, or any other persons performing any of the work.
- 2.5. Contractor:** The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents. The term Contractor means the Contractor or his authorized representative. The Contractor shall carefully study and compare the General Contract Conditions of the Contract, Specification and Drawings, Scope of Work, Addenda and Modifications and shall at once report to the Owner any error, inconsistency or omission he may discover. Contractor shall not be liable to the Owner for any damage resulting from such errors, inconsistencies or omissions. The Contractor shall not commence work without clarifying Drawings, Specifications, or Interpretations.
- 2.6. Sub-Contractors:** A sub-contractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term sub-contractor is referred to throughout the contract documents and means a sub-contractor or his authorized representative.
- 2.7. Award of Sub-Contractors & Other Contracts for Portions of the Work:** Contractor shall submit with their bid response to the Owner, in writing for acceptance, a list of the names of the sub-contractors or other persons or organizations proposed for such portions of the work as may be designated in the proposal requirements, or, if none is so designated, the names of the sub-contractors proposed for the principal portions of the work. Prior to the award of the contract, the Owner shall notify the successful Contractor in writing if, after due investigation, has reasonable objection to any person or organization on such list. If, prior to the award of the contract, the Owner has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful Contractor may, prior to the award, withdraw their proposal without forfeiture of proposal security. If the

successful Contractor submits an acceptable substitute with an increase in the proposed price to cover the difference in cost occasioned by the substitution, the Owner may, at their discretion, accept the increased proposal or may disqualify the Contractor. If, after the award, the Owner refuses to accept any person or organization on such list, the Contractor shall submit an acceptable substitute and the contract sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued. However, no increase in the contract sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.

- 2.8. Quantities of Work and Unit Price:** Materials or quantities stated as unit price items in the Bid are supplied only to give an indication of the general scope of the Work, and are as such, estimates only. The Owner does not expressly or by implication agree that the actual amount of Work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit item of the Work without a change in the unit price except as set forth in Article VIII, Section 70 of the *General Contract Conditions*. The City also reserves the right to make changes in the Work (including the right to delete any bid item in its entirety or add additional bid items) as set forth in Article VIII, Sections 69 through 71 of the *General Contract Conditions*.
- 2.9. Substitutions:** The materials, products and equipment described in the *Solicitation Documents* shall be regarded as establishing a standard of required performance, function, dimension, appearance, or quality to be met by any proposed substitution. No substitution will be considered prior to receipt of Bids unless the Offeror submits a written request for approval to the City Purchasing Division at least ten (10) days prior to the date for receipt of Bids. Such requests for approval shall include the name of the material or equipment for which substitution is sought and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for evaluation, including samples if requested. The Offeror shall set forth changes in other materials, equipment, or other portions of the Work including changes of the work of other contracts, which incorporation of the proposed substitution would require to be included. The Owner's decision of approval or disapproval of a proposed substitution shall be final. If the Owner approves a proposed substitution before receipt of Bids, such approval will be set forth in an Addendum. Offerors shall not rely upon approvals made in any other manner.
- 2.10. Supervision and Construction Procedures:** The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.
- 2.11. Warranty:** The Contractor warrants to the Owner that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective. If required by Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If within ten (10) days after written notice to the Contractor requesting such repairs or replacement, the Contractor should neglect to make or undertake with due diligence to the same, the City may make such repairs or

replacements. All indirect and direct costs of such correction or removal or replacement shall be at the Contractor's expense. The Contractor will also bear the expenses of making good all work of others destroyed or damaged by the correction, removal or replacement of his defective work.

- 2.12. Permits, Fees, & Notices:** The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the work. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted by approximate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility and shall bear all costs attributable.
- 2.13. Responsibility for Those Performing the Work:** The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all sub-contractors, their agents and employees, and all other persons performing any of the work under a contract with the Contractor.
- 2.14. Use of the Site:** The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.
- 2.15. Cleanup:** The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of work he shall remove all his waste materials and rubbish from and about the project, as well as all his tools, construction equipment, machinery and surplus materials.
- 2.16. Insurance:** The Contractor shall secure and maintain such insurance policies as will provide the coverage and contain other provisions specified in the General Contract Conditions, or as modified in the Special Contract Conditions.

The Contractor shall file a copy of the policies or Certificates of Insurance acceptable to the City with the Engineer within ten (10) Calendar Days after issuance of the Notice of Award. These Certificates of Insurance shall contain a provision that coverage afforded under the policies shall not be canceled unless at least thirty (30) Calendar Days prior written notice has been given to the City.

- 2.17. Indemnification:** The Contractor shall defend, indemnify and save harmless the Owner, and all its officers, employees, insurers, and self-insurance pool, from and against all liability, suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the Contractor, or of any Contractor's agent, employee, sub-contractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Contractor shall pay any judgment with cost which may be obtained against the Owner growing out of such injury or damages.

- 2.18. Miscellaneous Conditions: Material Availability:** Contractors must accept responsibility for verification of material availability, production schedules, and other pertinent data prior to submission of bid. It is the responsibility of the bidder to notify the Owner immediately if materials specified are discontinued, replaced, or not available for an extended period of time. **OSHA Standards:** All bidders agree and warrant that services performed in response to this invitation shall conform to the standards declared by the US Department of Labor under the Occupational Safety and Health Act of 1970 (OSHA). In the event the services do not conform to OSHA standards, the Owner may require the services to be redone at no additional expense to the Owner.
- 2.19. Time:** Time is of the essence with respect to the time of completion of the Project and any other milestones or deadline which are part of the Contract. It will be necessary for each Bidder to satisfy the City of its ability to complete the Work within the Contract Time set forth in the Contract Documents. The Contract Time is the period of time allotted in the Contract Documents for completion of the work. The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein, or as established as entered on the Bid Form. The Date of Final Completion of the work is the date certified by the Owner when all construction, and all other work associated to include, but not be limited to: testing, QA/QC, receipt of required reports and/or forms, grant requirements (if applicable), punch list items, clean-up, receipt of drawings and/or as-builts, etc., is fully complete, and in accordance with the Contract Documents.
- 2.20. Progress & Completion:** The Contractor shall begin work on the date of commencement as defined in the Contract, and shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.
- 2.21. Payment & Completion:** The Contract Sum is stated in the Contract and is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents. Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of application for payment, the Owner's Project Manager will promptly make such inspection and, when he finds the work acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents.
- 2.22. Bid Bond:** Each Bid shall as a guaranty of good faith on the part of the Bidder be accompanied by a Bid Guaranty consisting of: a certified or cashier's check drawn on an approved national bank or trust company in the state of Colorado, and made payable without condition to the City; or a **Bid Bond** written by an approved corporate surety in favor of the City. The amount of the Bid Guaranty shall not be less than 5% of the total Bid amount. Once a Bid is accepted and a Contract is awarded, the apparent successful bidder has ten calendar days to enter into a contractor in the form prescribed and to furnish the bonds with a legally responsible and approved surety. Failure to do so will result in forfeiture of the Bid Guaranty to the City as Liquidated Damages.

Each bidder shall guaranty its total bid price for a period of sixty (60) Calendar Days from the date of the bid opening.

- 2.23. Performance & Payment Bonds:** Contractor shall furnish a Performance and a Payment Bond, each in an amount at least equal to that specified for the contract amount as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These bonds shall remain in effect for the duration of the Warranty Period (as specified in the Special Conditions). Contractor shall also furnish other bonds that may be required by the Special Conditions. All bonds shall be in the forms prescribed by the Contract Documents and be executed by such sureties as (1) are licensed to conduct business in the State of Colorado and (2) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Accounts, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of the Authority Act. If the surety on any bond furnished by the Contractor is declared bankrupt, or becomes insolvent, or its rights to do business in Colorado are terminated, or it ceases to meet the requirements of clauses (1) and (2) of this section, Contractor shall within five (5) days thereafter substitute another bond and surety, both of which shall be acceptable to the City.
- 2.24. Retention:** The Owner will deduct money from the partial payments in amounts considered necessary to protect the interest of the Owner and will retain this money until after completion of the entire contract. The amount to be retained from partial payments will be five (5) percent of the value of the completed work, and not greater than five (5) percent of the amount of the Contract. When the retainage has reached five (5) percent of the amount of the Contract no further retainage will be made and this amount will be retained until such time as final payment is made.
- 2.25. Liquidated Damages for Failure to Enter Into Contract: CITY ONLY** Should the Successful Bidder fail or refuse to enter into the Contract within ten Calendar Days from the issuance of the Notice of Award, the City shall be entitled to collect the amount of such Bidder's Bid Guaranty as Liquidated Damages, not as a penalty but in consideration of the mutual release by the City and the Successful Bidder of all claims arising from the City's issuance of the Notice of Award and the Successful Bidder's failure to enter into the Contract and the costs to award the Contract to any other Bidder, to re-advertise, or otherwise dispose of the Work as the City may determine best serves its interest.
- 2.26. Liquidated Damages for Failure to Meet Project Completion Schedule: CITY ONLY** If the Contractor does not achieve Final Completion by the required date, whether by neglect, refusal or any other reason, the parties agree and stipulate that the Contractor shall pay liquidated damages to the City for each such day that final completion is late. As provided elsewhere, this provision does not apply for delays caused by the City. The date for Final Completion may be extended in writing by the Owner.

The Contractor agrees that as a part of the consideration for the City's awarding of this Contract liquidated damages in the daily amount of **\$1,200.00** is reasonable and necessary to pay for the actual damages resulting from such delay. The parties agree that the real costs and injury to the City for such delay include hard to quantify items such as: additional engineering, inspection and oversight by the City and its agents; additional contract administration; inability to apply the efforts of those employees to the other work of the City; perceived inefficiency of the City; citizens having to deal with the

construction and the Work, rather than having the benefit of a completed Work, on time; inconvenience to the public; loss of reputation and community standing for the City during times when such things are very important and very difficult to maintain.

The Contractor must complete the Work and achieve final completion included under the Bid Schedule in the number of consecutive calendar days after the City gives is written Notice to Proceed. When the Contractor considers the entire Work ready for its intended use, Contractor shall certify in writing that the Work is fully complete. Final Completion date is the date by which the Contractor shall have fully completed all clean-up, and all items that were identified by the City in the inspection for final completion. Unless otherwise stated in the Special Conditions, for purposes of this liquidated damages clause, the Work shall not be finished and the Contract time shall continue to accrue until the City gives its written Final Acceptance.

If the Contractor shall fail to pay said liquidated damages promptly upon demand thereof after having failed to achieve Final Completion on time, the City shall first look to any retainage or other funds from which to pay said liquidated damages; if retainage or other liquid funds are not available to pay said liquidated damages amounts, the Surety on the Contractor's Performance Bond and Payment Bond shall pay such liquidated damages. In addition, the City may withhold all, or any part of, such liquidated damages from any payment otherwise due the Contractor.

Liquidated damages as provided do not include any sums to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the Contractor agrees to pay these costs that the City incurs because of the Contractor's delay, and these payments are separate from and in addition to any liquidated damages.

The Contractor agrees that the City may use its own forces or hire other parties to obtain Final Completion of the work if the time of completion has elapsed and the Contractor is not diligently pursuing completion. In addition to the Liquidated Damages provided for, the Contractor agrees to reimburse the City for all expenses thus incurred.

2.27. Contingency/Force Account: Contingency/Force Account work will be authorized by the Owner's Project Manager and is defined as minor expenses to cover miscellaneous or unforeseen expenses related to the project. The expenses are not included in the Drawings, Specifications, or Scope of Work and are necessary to accomplish the scope of this contract. Contingency/Force Account Authorization will be directed by the Owner through an approved form. Contingency/Force Account funds are the property of the Owner and any Contingency/Force Account funds, not required for project completion, shall remain the property of the Owner. Contractor is not entitled to any Contingency/Force Account funds, that are not authorized by Owner or Owner's Project Manager.

2.28. Protection of Persons & Property: The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing safeguards for safety and

protection, and all reasonable precautions, including posting danger signs or other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities. 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 by the Contractor in the execution of the work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an acceptable manner.

- 2.29. Changes in the Work:** The Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum and the contract time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be executed under the applicable conditions of the contract documents. A Change Order is a written order to the Contractor signed by the Owner issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by Change Order.
- 2.30. Claims for Additional Cost or Time:** If the Contractor wishes to make a claim for an increase in the contract sum or an extension in the contract time, he shall give the Owner written notice thereof within a reasonable time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall precede in accordance with the regulations on safety. No such claim shall be valid unless so made. Any change in the contract sum or contract time resulting from such claim shall be authorized by Change Order.
- 2.31. Minor Changes in the Work:** The Owner shall have authority to order minor changes in the work not involving an adjustment in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents.
- 2.32. Field Orders:** The Owner may issue written Field Orders which interpret the Contract Documents in accordance with the specifications, or which order minor changes in the work in accordance with the agreement, without change in the contract sum or time. The Contractor shall carry out such Field Orders promptly.
- 2.33. Uncovering & Correction of Work:** The Contractor shall promptly correct all work rejected by the Owner as defective or as failing to conform to the contract documents whether observed before or after substantial completion and whether or not fabricated installed or competed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Owner's additional services thereby made necessary. If within one (1) year after the date of completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the contract documents, any of the work found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming work under

the above paragraphs shall be removed from the site where necessary and the work shall be corrected to comply with the contract documents without cost to the Owner. The Contractor shall bear the cost of making good all work of separate Contractors destroyed or damaged by such removal or correction. If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the payment or contract sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.

- 2.30. Amendment:** No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract shall be made in writing by the Owner.
- 2.31. Assignment:** The Contractor shall not sell, assign, transfer or convey any contract resulting from this IFB, in whole or in part, without the prior written approval from the Owner.
- 2.32. Compliance with Laws:** Bids must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements.
- 2.33. Confidentiality:** All information disclosed by the Owner to the Contractor for the purpose of the work to be done or information that comes to the attention of the Contractor during the course of performing such work is to be kept strictly confidential.
- 2.34. Conflict of Interest:** No public official and/or City/County employee shall have interest in any contract resulting from this IFB.
- 2.35. Contract Termination:** This contract shall remain in effect until any of the following occurs: (1) contract expires; (2) completion of services; (3) acceptance of services or, (4) for convenience terminated by either party with a written *Notice of Cancellation* stating therein the reasons for such cancellation and the effective date of cancellation.
- 2.36. Employment Discrimination:** During the performance of any services per agreement with the Owner, the Contractor, by submitting a Bid, agrees to the following conditions:
 - 2.36.1.** The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, handicap, or national origin except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Contractor. The Contractor agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 - 2.36.2.** The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, shall state that such Contractor is an Equal Opportunity Employer.

- 2.36.3.** Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
- 2.37. Affirmative Action:** In executing a Contract with the City, the Contractor agrees to comply with Affirmative Action and Equal Employment Opportunity regulations presented in the General Contract Conditions.
- 2.38. Immigration Reform and Control Act of 1986 and Immigration Compliance:** The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986 and/or the immigration compliance requirements of State of Colorado C.R.S. § 8-17.5-101, *et.seq.* (House Bill 06-1343).
- 2.39. Ethics:** The Contractor shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official, or agent of the Owner.
- 2.40. Failure to Deliver:** In the event of failure of the Contractor to deliver services in accordance with the contract terms and conditions, the Owner, after due oral or written notice, may procure the services from other sources and hold the Contractor responsible for any costs resulting in additional purchase and administrative services. This remedy shall be in addition to any other remedies that the Owner may have.
- 2.41. Failure to Enforce:** Failure by the Owner at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the Owner to enforce any provision at any time in accordance with its terms.
- 2.42. Force Majeure:** The Contractor shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Contractor, unless otherwise specified in the contract.
- 2.43. Independent Contractor:** The Contractor shall be legally considered an Independent Contractor and neither the Contractor nor its employees shall, under any circumstances, be considered servants or agents of the Owner. The Owner shall be at no time legally responsible for any negligence or other wrongdoing by the Contractor, its servants, or agents. The Owner shall not withhold from the contract payments to the Contractor any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Contractor. Further, the Owner shall not provide to the Contractor any insurance coverage or other benefits, including Workers' Compensation, normally provided by the Owner for its employees.
- 2.44. Nonconforming Terms and Conditions:** A bid that includes terms and conditions that do not conform to the terms and conditions of this Invitation for Bid is subject to rejection as non-responsive. The Owner reserves the right to permit the Contractor to withdraw nonconforming terms and conditions from its bid prior to a determination by the Owner of non-responsiveness based on the submission of nonconforming terms and conditions.

Items for non-responsiveness may include, but not be limited to:

- a. Submission of the Bid on forms other than those supplied by the City;
- b. Alteration, interlineation, erasure, or partial detachment of any part of the forms which are supplied herein;
- c. Inclusion of unauthorized additions conditional or alternate Bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite, or ambiguous as to its meaning;
- d. Failure to acknowledge receipt of any or all issued Addenda;
- e. Failure to provide a unit price or a lump sum price, as appropriate, for each pay item listed except in the case of authorized alternative pay items;
- f. Failure to list the names of Subcontractors used in the Bid preparation as may be required in the Solicitation Documents;
- g. Submission of a Bid that, in the opinion of the Owner, is unbalanced so that each item does not reasonably carry its own proportion of cost or which contains inadequate or unreasonable prices for any item;
- h. Tying of the Bid with any other bid or contract; and
- i. Failure to calculate Bid prices as described herein.

2.45. Evaluation of Bids and Offerors: The Owner reserves the right to:

- reject any and all Bids,
- waive any and all informalities,
- negotiate final terms with the Successful Bidder, and
- disregard any and all nonconforming, nonresponsive or conditional Bids.

Discrepancies between words and figures will be resolved in favor of words. Discrepancies between Unit Prices and Extended Prices will be resolved in favor of the Unit Prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. The corrected extensions and totals will be shown in the tabulation of Bids.

The Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of Subcontractors and other persons and organizations must be submitted. Operating costs, maintenance considerations performance data, and guarantees of materials and equipment may also be considered by the Owner.

The Owner will conduct such investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Offeror, proposed Subcontractors and other persons and organizations to do the Work in accordance with the *Contract Documents* to the City's satisfaction within the Contract Time.

The Offeror shall furnish the Owner all information and data requested by the Owner to determine the ability of the Offeror to perform the Work. The Owner reserves the right to reject the Bid if the evidence submitted by, or investigation of such Offeror fails to satisfy the Owner that such Offeror is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

By submitting a Bid, each Offeror authorizes the Owner to perform such investigation of the Offeror as the Owner deems necessary to establish the responsibility, qualifications and financial ability of the Offeror and, by its signature thereon, authorizes the Owner to obtain reference information concerning the Offeror and releases the party providing such information and the Owner from any and all liability to the Offeror as a result of such reference information so provided.

The Owner reserves the right to reject the Bid of any Offeror who does not pass any evaluation to the Owner's satisfaction.

If the Contract is to be awarded, it will be awarded to the Offeror who, by evaluation, the Owner determines will best meet the Owner's interests.

The Owner reserves the right to accept or reject the Work contained in any of the Price Bid Schedules or alternates, either in whole or in part.

2.46. Award of Contract: Unless otherwise indicated, a single award will be made for all the bid items in an individual bid schedule. In the event that the Work is contained in more than one Bid Schedule, the City may award Schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative Schedules will be awarded. Within forty-five (45) Calendar Days of Bid Opening, the City will issue a Notice of Award to the Successful Bidder which will be accompanied by four (4) unsigned copies of the Contract and the Performance and Payment Bond forms. Within ten (10) Calendar Days thereafter, the Successful Bidder shall sign and deliver four (4) copies of the Contract, Performance Bond, Payment Bond and Certificates of Insurance to the City. Within ten (10) Calendar Days thereafter, the City will deliver two (2) fully executed counterparts of the Contract to the Contractor. No contract shall exist between the Successful Bidder and the City and the Successful Bidder shall have no rights at law or in equity until the Contract has been duly executed by the City.

The Successful Bidder's failure to sign and submit a Contract and other documents set forth in this Paragraph within the prescribed time shall be just cause of annulment of the award, and forfeiture of the Bid Guaranty. The award of Contract may then be made to the next qualified Bidder in the same manner as previously prescribed.

- 2.47. Ownership:** All plans, prints, designs, concepts, etc., shall become the property of the Owner.
- 2.48. Oral Statements:** No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in this document and/or resulting agreement. All modifications to this request and any agreement must be made in writing by the Owner.
- 2.49. Patents/Copyrights:** The Contractor agrees to protect the Owner from any claims involving infringements of patents and/or copyrights. In no event shall the Owner be liable to the Contractor for any/all suits arising on the grounds of patent(s)/copyright(s) infringement. Patent/copyright infringement shall null and void any agreement resulting from response to this IFB.
- 2.50. Remedies:** The Contractor and Owner agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.
- 2.51. Venue:** Any agreement as a result of responding to this IFB shall be deemed to have been made in, and shall be construed and interpreted in accordance with, the laws of the City of Grand Junction, Mesa County, Colorado.
- 2.52. Expenses:** Expenses incurred in preparation, submission and presentation of this IFB are the responsibility of the company and cannot be charged to the Owner.
- 2.53. Sovereign Immunity:** The Owner specifically reserves its right to sovereign immunity pursuant to Colorado State Law as a defense to any action arising in conjunction to this agreement.
- 2.54. Non-Appropriation of Funds:** The contractual obligation of the Owner under this contract is contingent upon the availability of appropriated funds from this fiscal year budget as approved by the City Council or Board of County Commissioners from this fiscal year only. State of Colorado Statutes prohibit obligation of public funds beyond the fiscal year for which the budget was approved. Anticipated expenditures/obligations beyond the end of the current Owner's fiscal year budget shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.
- 2.55. Cooperative Purchasing:** Purchases as a result of this solicitation are primarily for the City/County. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Bid. The quantities furnished in this bid document are for only the City/County. It does not include quantities for any other jurisdiction. The City or County will be responsible only for the award for its jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The City/County accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by

participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.

2.56. Keep Jobs in Colorado Act: Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a). If Contractor claims it is entitled to a waiver pursuant to C.R.S. §8-17-101(1), Contractor shall state that there is insufficient Colorado labor to perform the work such that compliance with Article 17 would create an undue burden that would substantially prevent a project from proceeding to completion, and shall include evidence demonstrating the insufficiency and undue burden in its response.

Unless expressly granted a waiver by the Owner pursuant to C.R.S. §8-17-101(1), Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a).

2.56.1. "Public project" is defined as:

- (a) any construction, alteration, repair, demolition, or improvement of any land, building, structure, facility, road, highway, bridge, or other public improvement suitable for and intended for use in the promotion of the public health, welfare, or safety and any maintenance programs for the upkeep of such projects
- (b) for which appropriate or expenditure of moneys may be reasonably expected to be \$500,000.00 or more in the aggregate for any fiscal year
- (c) except any project that receives federal moneys.

3. Statement of Work

3.1. GENERAL: The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required for the **Carson Reservoir Dam Modifications Project**. The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

NOTE: The description of the pay items listed in the Price Bid Schedule for this Project may not agree with those listed in the Standard Specifications. Payment for all Work performed, as required in the Contract Documents, will be in accordance with the items and units listed in the Price Bid Schedule.

The performance of the Work for this Project shall conform to the General Contract Conditions presented in the City of Grand Junction's Standard Contract Documents for Capital Improvements Construction, revised July 2010, except as specifically modified or supplemented herein or on the Construction Drawings.

3.2. PROJECT DESCRIPTION: The City of Grand Junction owns and operates Hogchute (aka Carson) Reservoir. Carson Reservoir is located in Mesa County, Colorado within the Grand Mesa National Forest on Kannah Creek. The reservoir was approved for construction in May of 1947 by the State Engineer with construction of the dam being completed in November 1947.

The elevation of the reservoir site is approximately 9,800 feet AMSL. The structural height of the earthen-embankment dam is 56 feet. The normal storage capacity of the reservoir is 520 acre-feet. Carson Reservoir is an in-line reservoir within the natural drainage path of Kannah Creek. The reservoir provides water storage for domestic use, downstream irrigation use, and for fishing recreation.

Carson Reservoir is typically filled from runoff in the Kannah Creek drainage, and natural spring inflows. The volume of Carson Reservoir can be maintained with several other minor reservoirs upstream on the Grand Mesa. The reservoir is usually drained to about 300 – 400 ac-ft during the winter months to accommodate the inflows from Kannah Creek, snow melt, and the natural spring inflows.

The Carson Reservoir Dam is classified as a high hazard jurisdictional dam as defined by Colorado Dam Safety Program of the Division of Water Resources, Department of Natural Resources. The rating is based on the impacts to downstream residents and infrastructure as determined by the City of Grand Junction through dam failure computer simulations and inundation mapping. The Dam Safety Department of the SEO identified key deficiencies of the Carson Dam in their February 2018 Comprehensive Dam Safety Report. These deficiencies are being addressed through this project to maintain dam safety and to avoid the need reduce the reservoir storage capacity as a safety precaution.

The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction and channel improvements, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure.

Construction is anticipated during Summer/Fall 2021 after spring runoff. See Section 3.7 for detail on schedule.

3.3. SPECIAL CONDITIONS & PROVISIONS:

3.3.1 Mandatory Pre-Bid Meeting: Prospective bidders are required to attend a mandatory on-site pre-bid meeting on October 22, 2020 at 10:30 am. Meeting location shall be at Carson Reservoir on the Grand Mesa on Forest Service Road

108. From US Hwy 50, go east on Kannah Creek Road for 3 miles, veer left onto Land's End Road (Forest Service Road 100) and continue 26 miles to Forest Service Road 108 on the Right. From I-70, take Exit 49 onto CO Hwy 65 and continue approximately 30 miles. Turn Right onto Forest Service Road 100, and after 3 miles Forest Service Road 108 will be on the left. The purpose of this visit will for Bidders to become familiar with the proposed project site before the snow comes and access to Carson Reservoir is closed, and to inspect and to clarify the contents of this Invitation for Bids (IFB).

3.3.2 QUESTIONS REGARDING SOLICIATION PROCESS/SCOPE OF WORK:

Duane Hoff, Senior Buyer
City of Grand Junction
duaneh@gjcity.org

3.3.2 Project Manager: The Project Manager for the Project is John Eklund, Project Engineer, who can be reached at 970-244-1558. During Construction, all notices, letters, submittals, and other communications directed to the City shall be addressed and mailed or delivered to:

City of Grand Junction
Department of Public Works
Attn: John Eklund Project Engineer
333 West Ave., Building C
Grand Junction, CO 81501

3.3.3 Affirmative Action: The Contractor is not required to submit a written Affirmative Action Program for the Project.

3.3.4 Pricing: Pricing shall be all inclusive to include but not be limited to: all labor, equipment, supplies, materials, freight (F.O.B. Destination – Freight Pre-paid and Allowed to each site), travel, mobilization costs, fuel, set-up and take down costs, quality control testing and full-time inspection costs, and all other costs related to the successful completion of the project.

The Owner shall not pay nor be liable for any other additional costs including but not limited to: taxes, shipping charges, insurance, interest, penalties, termination payments, attorney fees, liquidated damages, etc.

3.3.5 Freight/Shipping: All freight/shipping shall be F.O.B. Destination – Freight Pre-Paid and Allowed to the project site(s), Grand Junction, CO.

Contractor must meet all federal, state, and local rules, regulations, and requirements for providing such services.

3.3.6 Contract: A binding contract shall consist of: (1) the IFB and any amendments thereto, (2) the bidder's response (bid) to the IFB, (3) clarification of the bid, if any, and (4) the City's Purchasing Department's acceptance of the bid by "Notice of Award" or by "Purchase Order". All Exhibits and Attachments included In the IFB shall be incorporated into the contract by reference.

A. The contract expresses the complete agreement of the parties and, performance shall be governed solely by the specifications and requirements contained therein.

B. Any change to the contract, whether by modification and/or supplementation, must be accomplished by a formal contract amendment signed and approved by and between the duly authorized representative of the bidder and the City Purchasing Division or by a modified Purchase Order prior to the effective date of such modification. The bidder expressly and explicitly understands and agrees that no other method and/or no other document, including acts and oral communications by or from any person, shall be used or construed as an amendment or modification to the contract.

3.3.7 Time of Completion: The scheduled time of Completion for the Project is *(To Be Provided in Addendum at a later date)*.

Completion is achieved when site cleanup and all punch list items (resulting from the final inspection) have been completed. Completion shall have the meaning set forth in Article I, Section 3 (Definitions and Terms) of the General Contract Conditions.

3.3.8 Working Days and Hours: The working days and hours shall be as stated in the General Contract Conditions or as mutually agreed upon in the preconstruction Meeting.

3.3.9 Licenses and Permits: Contractor is responsible for obtaining all necessary licenses and permits required for Construction, at Contractors expense. See Section 2.12. Contractor shall supply to Owner all copies of finalized permits.

3.3.10 Permits: The following permits are required for the Project and will be obtained by the City at no cost to the Contractor:

- *State of Colorado Division of water Resources Office of the State Engineer Dam Safety Branch Approval for the Alteration, Modification, or Repair of a Dam and Reservoir – Pending*
- *USACE Clean Water Act Sections 401 and 404 Nationwide Permits – Pending*
- *USFS Special Use Permit – Pending*
-

The following permits **may be** required for the Project and shall be obtained and paid for by the Contractor, with the costs included in the total bid price for the Project:

- *Mesa County building or electrical permit*
- *Stormwater Permits (CDPS and Mesa County)*
- *Dewatering permits (CDPS)*

3.3.11 City Furnished Materials: The City will furnish the following materials for the Project:

- PDF and Paper copies of Construction Drawings and Project Documents
- The City may provide Electronic AutoCAD Drawing Files for survey stake-out

Electronic File Disclaimer

The City of Grand Junction delivers these electronic copies of certain documents or data ("Electronic Files") to its client or contractor, the original recipient hereof ("Client"), in addition to printed copies ("Hard Copies") for the convenience of Client. Client and its consultants, contractors and subcontractors may only rely on Hard Copies furnished by The City of Grand Junction to Client. If there is any discrepancy between Electronic Files and the corresponding Hard Copies, the Hard Copies control. Client acknowledges that Electronic Files can be altered, modified or corrupted Without The City of Grand Junction's authorization and that errors can occur in the transmission of such Electronic Files. The City of Grand Junction does not warrant or represent that Electronic Files will be compatible with or useable or readable by systems used by Client or its consultants, contractors and subcontractors. The City of Grand Junction is not responsible for any problems in the interaction of Electronic Files with other software used by Client or its consultants, contractors and subcontractors.

3.3.12 Project Newsletters: Project newsletters, if required, will be the responsibility of the City.

3.3.13 Project Sign: Project signs, if any, will be furnished and installed by the City.

3.3.14 Authorized Representatives of the City: Those authorized to represent the City shall include Purchasing Agent, Engineers, and Inspectors employed by the City, only.

3.3.15 Stockpiling Materials and Equipment: All stockpiling/storage shall be in accordance with General Contract Condition Section 51.

3.3.16 Traffic Control: The traffic control requirements for this Project will be determined during the design phase.

3.3.17 Clean-Up: The Contractor shall clear the construction site of all trash and on-site waste daily, including scrap from construction materials.

3.3.18 Quality Control Testing: To be determined to design phase.

3.3.19 Schedule of Submittals: Contractor shall deliver these submittals at least two days prior to the pre-construction meeting:

- Traffic Control Plans
- Project Schedule

3.3.20 Uranium Mill Tailings: It is anticipated that radioactive mill tailings will not be encountered on this Project.

3.3.21 Fugitive Petroleum or Other Contamination: It is anticipated that soil contamination from fugitive petroleum or other contaminants will not be encountered with the Project.

3.3.22 Excess Material: All excess materials shall be disposed in accordance with General Contract Condition Section 50.

3.3.23 Existing Utilities and Structures: Utilities were not potholed during design of this project. The location of existing utilities and structures shown on the Plans is approximate with the information gathered during design. It is the responsibility of the Contractor to pothole/locate and protect all structures and utilities in accordance with General Contract Condition Section 37.

3.3.24 Incidental Items: Any item of work not specifically identified or paid for directly, but which is necessary for the satisfactory completion of any paid items of work, will be considered as incidental to those items, and will be included in the cost of those items.

3.3.25 Existing U.S. Forest Service Parking Lot at Carson Reservoir: The plan is for the existing parking lot at Carson Reservoir to be used as a Construction Staging Area for the Project. The USFS pit toilets at the parking lot will be **off limits** to the Contractor and its subcontractors. The contractor shall provide temporary portable toilets for use by its staff and subcontractors for the duration of the Project.

3.3.26 ACI Concrete and Flatwork Finisher and Technician: Hand finishing concrete will be permitted only when performed under the direct supervision of a craftsman holding the following certificate: ACI Concrete Flatwork Finisher and Technician (ACICFFT) or other Flatwork Finisher certification program approved by the City Engineering Manager.

3.3.27 Weekly Progress Meetings: The Contractor and Engineer will schedule and hold regular progress meetings at least weekly. The purpose of the meetings will be to review the progress of the work, maintain coordination efforts, discuss the schedule, and resolve issues that may develop.

3.4. SCOPE OF WORK: The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure.

3.5. Attachments:

Appendix A: **TBD**

Appendix B: **TBD**

Appendix C: **TBD**

Appendix D: **TBD**

3.6. Contractor Bid Documents: For Contractor's convenience, the following is a list of forms/items to be submitted with the Contractor's bid response. However, should a

form/item not be listed in this section, but required in the solicitation documents, it is the Contractor's responsibility to ensure all forms/items are submitted.

- Contractor's Bid Form
- Price Bid Schedule
- References

3.7. IFB TENTATIVE TIME SCHEDULE:

The City of Grand Junction and their design Consultant, Ayres Associates, are currently working on the construction plans, specifications, and permitting for the construction of the Carson Reservoir Dam Modifications Project. The City is having the Pre-Bid meeting early to allow potential bidders the opportunity to see Carson Reservoir before the snow arrives and access would be closed as the bidding process for the Project will be finished in Spring of 2021. The City is planning to construct these dam improvements in the summer/fall season in 2021. The City currently anticipates construction starting after spring runoff in late June or early July 2021, or as soon as access to open to Carson Reservoir is possible.

City of Grand Junction has lowered the water level in Carson Reservoir for the Pre-Bid meeting. The reservoir will be partly or completely filled for the duration of the winter 2020-2021. The City will start draining Carson Reservoir in March/April 2021 and leave the outlet valves fully open during the spring runoff season so the reservoir is empty before construction starts in June/July 2021.

The City and Ayres Associates plan to provide Bidders attending the Pre-Bid meeting with either 30% construction plans, or a list of items that will describe what work is going to be required as part of the dam modifications project. **We would ask that Contractors hold their questions until such time that the 100% construction plans are released with the Addendum 1.**

In March or April 2021, the City will issue Addendum 1 for this Project that will include the 100% complete construction plans and specifications that the Bidders will use for determining their bid. Addendum 1 will also provide specific dates such as: Inquiry Deadline, Bid Opening, City Council Approval, etc. The City will provide at least 2-3 weeks for the Bidders to review the plans before the inquiry deadline. **Further addenda for inquiry responses, or issuance of other information will be posted as required during the Advertisement Period.**

Invitation for Bids available:	October 7, 2020
Mandatory Pre-Bid Meeting:	October 22, 2020
Inquiry deadline, no questions after this date:	TBD with Addendum
Addendum Posted:	March/April 2020 (TBD)
Submittal deadline for proposals (Bid Opening):	TBD with Addendum
City Council Approval:	TBD with Addendum
Notice of Award & Contract Execution:	TBD with Addendum
Bonding & Insurance Cert due	TBD with Addendum
Preconstruction meeting	TBD with Addendum
Work begins no later than	TBD with Addendum
Final Completion	TBD with Addendum
Holidays:	TBD with Addendum

4. Contractor's Bid Form

Bid Date: _____

Project: IFB-4839-21-DH "Hogchute (aka Carson) Reservoir Dam Modifications Project"

Bidding Company: _____

Name of Authorized Agent: _____

Email _____

Telephone _____ **Address** _____

City _____ **State** _____ **Zip** _____

The undersigned Bidder, in compliance with the Invitation for Bids, having examined the Instruction to Bidders, General Contract Conditions, Statement of Work, Specifications, and any and all Addenda thereto, having investigated the location of, and conditions affecting the proposed work, hereby proposes to furnish all labor, materials and supplies, and to perform all work for the Project in accordance with Contract Documents, within the time set forth and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this Contractor's Bid Form is a part.

The undersigned Contractor does hereby declare and stipulate that this offer is made in good faith without collusion or connection to any person(s) providing an offer for the same work, and that it is made in pursuance of, and subject to, all terms and conditions of the Instructions to Bidders, the Specifications, and all other Solicitation Documents, all of which have been examined by the undersigned.

The Contractor also agrees that if awarded the Contract, to provide insurance certificates within ten (10) working days of the date of Notification of Award. Submittal of this offer will be taken by the Owner as a binding covenant that the Contractor will be prepared to complete the project in its entirety.

The Owner reserves the right to make the award on the basis of the offer deemed most favorable, to waive any formalities or technicalities and to reject any or all offers. It is further agreed that this offer may not be withdrawn for a period of sixty (60) calendar days after closing time. Submission of clarifications and revised offers automatically establish a new thirty day (30) period.

Prices in the bid proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this bid proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a bid proposal for the purpose of restricting competition.
- The individual signing this bid proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of _____ percent of the net dollar will be offered to the Owner if the invoice is paid within _____ days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents.

State number of Addenda received: _____.

It is the responsibility of the Bidder to ensure all Addenda have been received and acknowledged.

By signing below, the Undersigned agree to comply with all terms and conditions contained herein.

Company: _____

Authorized Signature: _____

Title: _____

The undersigned Bidder proposes to subcontract the following portion of Work:

<u>Name & address of Sub-Contractor</u>	<u>Description of work to be performed</u>	<u>% of Contract</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The undersigned Bidder acknowledges the right of the City to reject any and all Bids submitted and to waive informalities and irregularities therein in the City's sole discretion.

By submission of the Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to his own organization, that this Bid has been arrived at independently, without collusion, consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.

BID FORM

PROJECT: Hogchute Dam Repairs
DAMID 420127
Mesa County, CO

BID DEADLINE: TBD
TBD

To: City of Grand Junction _____

We _____ (Name of Bidder) acknowledge that we have received the Contract Documents, prepared by Ayres and dated _____, that are listed in the Project Manual Table of Contents and Drawing Sheet Index. We hereby agree to provide all labor, materials, equipment, and services required to complete the work in strict accordance with the Contract Documents for the following stated amount(s).

BID SCHEDULE

Item No.	Description	Unit	Approx. Quantity	Unit Price	Total Price
1-1	Mobilization	L.S.	1	_____	_____
1-2	Erosion Control	L.S.	1	_____	_____
1-3	Construction Dewatering	L.S.	1	_____	_____
1-4	Demolition	L.S.	1	_____	_____
1-5	Concrete Overflow Spillway	L.S.	1	_____	_____
1-6	Rock Shell Removal	L.S.	1	_____	_____
1-7	Type 1 Filter Material	C.Y.		_____	_____
1-8	Filter Drain Pipe	L.F.		_____	_____
1-9	Filter Embankment Cap	C.Y.		_____	_____
1-10	Rock Shell Replacement	L.S.	1	_____	_____
1-11	Hydraulic Sluice Gate	L.S.	1	_____	_____
1-12	Intake Structure	L.S.	1	_____	_____
1-13	Auxiliary Spillway Grading	L.S.	1	_____	_____
1-14	Auxiliary Spillway Rock Berms	S.Y.		_____	_____
1-15	Pipe Filter Diaphragm	C.Y.		_____	_____
1-16	Outfall Pipe	L.F.		_____	_____
1-17	CIPP Pipe Lining	L.F.		_____	_____
1-18	Site Restoration	L.S.	1	_____	_____

Total Bid Amount, Items 1-1 thru 1-18, shall be _____

_____ Dollars (\$ _____)

BID SECURITY

Accompanying this bid is bid security payable to Owner in the form stipulated in the Instructions to Bidders, which is at least 5% of the maximum bid amount, and will be retained by Owner as liquidated damages if the undersigned fails to execute agreements and furnish bonds (if specified) within 10 days after Notice of Award.

WITHDRAWAL OF BID

It is agreed that this bid and any required bid security may not be withdrawn for a period of 45 days after the Bid Deadline.

TIME OF COMPLETION

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within _____ calendar days thereafter.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work after "Notice to Proceed" and to substantially complete the work on or before _____.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within _____ calendar days thereafter. The successful Contractor will be allowed to select the Notice to Proceed date provided the calculated substantial completion date is no later than _____.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within _____ calendar days after the contract time commences; and to have all work completed and ready for final payment within _____ calendar days after the contract time commences.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion. Failure to have the work completed and ready for final payment within the stated time will result in liquidated damages of _____ per calendar day thereafter until the work is completed and ready for final payment.

The undersigned agrees, if awarded the contract, to start work after "Notice to Proceed" and to substantially complete the work on or before _____; and to have all work completed and ready for final payment on or before _____.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion. Failure to have the work completed and ready for final payment within the stated time will result in liquidated damages of _____ per calendar day thereafter until the work is completed and ready for final payment.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete _____ within _____ calendar days after the contract time commences; and to substantially complete all remaining work within _____ calendar days after the contract time commences.

Failure to substantially complete the work of either deadline within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion of the applicable work.

BIDDER'S WARRANTY

By the act of submitting a bid for the proposed work, the bidder warrants that:

1. Bidder and its subcontractors have carefully and thoroughly reviewed the Contract Documents and have found them complete, free of ambiguities, and sufficient for the purpose intended; further that,
2. Bidder and all workers, employees, and subcontractors are skilled and experienced in the type of work represented by the Contract Documents; further that,
3. Bid is based solely upon the Contract Documents and properly issued written addenda and not upon any other representation; further that,
4. Bidder has carefully examined the site of the work and from its investigations is satisfied as to the nature and location of work, the character, quality, quantities of materials, and difficulties to be encountered, the kind and extent of equipment and other facilities needed for performance of the work, the general and local conditions, and other items which may, in any way, affect the work or its performance; and further that,
5. Neither the bidder nor its employees, agents, prospective suppliers, or subcontractors have relied upon any verbal representations allegedly authorized or unauthorized from the Owner, its employees or agents, including architects, engineers, and consultants, in assembling the bid.

LIST OF SUBCONTRACTORS

The following is a list of subcontractors whose bids were used in this bid. It is agreed that after submission of this list, no change may be made in subcontractors as listed without submitting change for Owner review in accordance with the conditions of the contract. If there are no subcontractors, state "None."

Subcontract:

Subcontractor:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

ADDENDA

The undersigned acknowledges receipt of addenda _____ to _____ inclusive.

ORGANIZATION AND AUTHORITY

The undersigned hereby certifies that the bidder is organized as indicated below and that all statements herein are made on behalf of such bidder.

Business Name _____

Business Address _____

Telephone Number _____

Fax Number _____

E-Mail Address _____

State Contractor Registration/License No. (if applicable) _____

(Complete applicable paragraph 1, 2, 3, or 4.)

1. Corporation. Bidder is a corporation organized under the laws of the state of _____. Its corporate president is _____ and its corporate secretary is _____. The _____ is authorized to submit bids and sign construction contracts for the bidder by action of the board of directors.
2. Limited Liability Corporation. Bidder is a limited liability corporation organized under the laws of the state of _____. Its members are _____. The _____ is authorized to submit bids and sign construction contracts for the bidder.
3. Partnership. Bidder is a partnership consisting of partners _____ and _____.
4. Sole Trader. Bidder is an individual doing business as _____.

SWORN STATEMENT

I, being duly sworn, hereby certify that I have examined and carefully prepared this bid from the Contract Documents and have checked the same in detail before submitting this bid; that I have full authority to make such statements and submit this bid on behalf of the above bidder; and that said statements are true and correct.

Signature _____

Name and Title _____

(Seal, if bid is by a corporation)

Subscribed and sworn to before me this _____
 day of _____, 20_____
 _____ Notary Public
 _____ County, _____
 My Commission expires _____

SECTION 01 01 00

GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 PROJECT DESCRIPTION

- A. In general, the project consists of:
 - 1. Mobilization.
 - 2. Drawdown, diversion, and dewatering.
 - 3. Erosion and sediment controls.
 - 4. Clearing and grubbing.
 - 5. Stripping and stockpiling.
 - 6. Developing borrow area.
 - 7. Construction of new auxiliary spillway weir and improved spillway chute.
 - 8. Excavation of embankment.
 - 9. Demolition of existing outlet works intake structure.
 - 10. Construction of new outlet works intake structure.
 - 11. Replacement and rehabilitation of existing outlet works conduit.
 - 12. Construction of embankment filter, filter diaphragm around conduit, and toe drain.
 - 13. Backfill and site restoration.

1.02 WORK BY OTHERS

- A. Owner will draw down the reservoir and bypass flows prior to and during construction.

1.03 WORK SEQUENCE

- A. The work shall be performed in accordance with general sequence or phasing included on the Drawings.

1.04 PROJECT MEETINGS

- A. A preconstruction conference will be scheduled after award of contract and prior to beginning work. This meeting shall be attended by A/E, Owner, and an authorized representative of Contractor.
- B. Periodic progress meetings will be held at project site at times designated by Owner or A/E. A responsible representative of Contractor who can bind Contractor to decisions shall attend.

1.05 WORK HOURS

- A. Work shall be conducted between the hours of 7:00 a.m. to 6:00 p.m. on normal work days, unless approved for unusual circumstances.
- B. Give written notice to A/E whenever it is desired to perform work at night, or on a Saturday, Sunday, or holiday, or to vary period of hours during which work is carried on each day. If approved, such work shall be subject to requirements furnished in writing by A/E, and no extra compensation will be allowed.

1.06 SUBMITTAL PROCEDURES

- A. See Section 01 33 00.

1.07 PERMITS AND CODES

- A. Owner will obtain permits, licenses, and approvals, which may include the following:

1. State of Colorado Division of Water Resources Office of the State Engineer Dam Safety Branch Approval for the Alteration, Modification, or Repair of a Dam and Reservoir.
 2. US Army Corps of Engineers (USACE) Clean Water Act Section 404 Nationwide Permit and Clean Water Act Section 401 Water Quality Certification Authorization.
 3. Colorado State Historic Preservation Office (SHPO) Section 106 review.
 4. US Forest Service (USFS) Special Use Permit.
 5. Colorado Discharge Permit System (CDPS) General Permit for Stormwater Discharges Associated with Construction Activities, COR400000.
- B. Contractor shall comply with the requirements of the above permits, licenses, and approvals. If a copy of a permit, license, or approval is not available for review prior to the Bid Deadline, and if it contains a requirement not covered by the Contract Documents, such a requirement will be considered extra work if Contractor makes a claim under the terms of the General Conditions. Work shall not begin on items applicable to the above until the required permit, license, or approval is received.
- C. Contractor shall provide all other necessary permits and licenses and pay all fees, taxes, and royalties, unless otherwise indicated.
- D. Comply with local and municipal ordinances and applicable state and national codes.

1.08 TEMPORARY UTILITIES

- A. Contractor shall be responsible for providing temporary electric power as required for construction purposes. Provide portable power supply or make arrangements with local utility company.
- B. Contractor shall be responsible for obtaining water for its needs. Pay cost of water used and meter rental, if applicable.
- C. Contractor shall provide temporary outside toilets sufficient for construction workers. Toilets shall be self-contained chemical type and shall comply with applicable Codes. Maintain sanitary facilities in a clean and sanitary condition; supply toilet paper until completion of project.

1.09 PROTECTION

- A. Furnish and maintain proper barricades, fences, signal lights, warning signs, and personnel as required to properly protect and safeguard the work, persons, animals, and property against injury.

1.10 ENVIRONMENTAL CONTROLS

- A. See Section 01 57 19.

1.11 TRAFFIC CONTROL

- A. Conduct operations to ensure minimum interference with streets, walks, and adjacent facilities not part of construction project.
- B. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.12 PRODUCT REQUIREMENTS

- A. General: Provide new products manufactured and conditioned for the particular application as recommended by manufacturer, unless otherwise noted. Transport, handle, store, and protect products as specified and in accordance with manufacturer's recommendations.

- B. Acceptable Manufacturers: Products, materials, and equipment identified by reference to a manufacturer's name, catalog number, or model are identified for the purpose of establishing a standard of type, function, appearance, and quality. Unless otherwise noted, any other product, material, or equipment which will perform adequately the duties imposed by the general design will be considered for substitution in accordance with the provisions below.
- C. Bid Phase Substitutions: Substitutions and "or equal" items proposed prior to the Bid Deadline shall be submitted in accordance with the Instructions to Bidders.
- D. Construction Phase Substitutions: Substitutions and "or equal" items proposed after Contract has been awarded shall be submitted for approval prior to their use. Consideration will be given only to proposed substitutions and "or equal" items where:
 - 1. The products named in the Contract Documents are no longer available or cannot be provided within the Contract Time.
 - 2. The manufacturers' standard products are no longer in conformance with the specified requirements.
 - 3. Owner's interests may be adversely affected.
- E. Substitution Procedures: Requests for substitution of alternate products or use of "or equal" items shall be submitted with complete references to manufacturer's product identification and product data indicating composition, guarantee, availability, applicable standards or agency approvals met or exceeded, restrictions imposed on product, and manufacturer's recommended method of application or installation. A substitution or an "or equal" item will be considered acceptable if the product will perform adequately the duties imposed by the general design and, in opinion of A/E, is of equal substance, quality, appearance, and function, unless the named item is necessary for interchangeability or if the named product has been demonstrated to be most cost-effective.

1.13 SURVEYS, STAKING, LINE AND GRADE

- A. Owner will provide baseline reference points and benchmarks as indicated on Drawings. Contractor shall provide all other survey staking and layout as required to complete the Work.

1.14 FIELD MEASUREMENTS AND INSPECTION OF SURFACES

- A. Contractor shall layout its Work based on reference points furnished by Owner and shall be solely responsible for the accuracy of its measurements. Verify grades, lines, levels, locations, and dimensions as shown on Drawings, and inspect surfaces that are to receive work before proceeding with fabricating, assembling, fitting, or erecting. Notify A/E in writing in case of unsuitable conditions, defective substrates, or discrepancies in Contract Documents. Starting of work shall imply acceptance of conditions.
- B. Correct any errors or defects due to faulty measurements, improper layout, or failure to report discrepancies.

1.15 CUTTING AND PATCHING

- A. Cut new openings in existing construction as required. Employ skilled workers.
- B. Restore surfaces to match adjacent finish. Waterproof and insulate holes in exterior walls. Backfill and properly compact earthwork needed to perform cutting and patching.

1.16 CONSTRUCTION CLEANING

- A. Keep work area free of accumulations of surplus materials, rubbish, and debris.

1.17 PUNCH LIST

- A. A "punch list" will be prepared and distributed to Contractor at Substantial Completion. Items on punch list shall be completed within 30 days. Required submittals (see below) shall be completed prior to or when requesting final payment.

1.18 CLOSEOUT SUBMITTALS

- A. Submit the following items to A/E prior to or with final Application for Payment:
 - 1. Project record drawings marked to show all changes made during construction. Dimension underground and concealed work and utilities from permanent reference points; record vertical distances. Make and record measurements to the nearest 0.5 ft on a clean drawing set.
 - 2. Evidence of continuing insurance coverage complying with insurance requirements (see Conditions of the Contract).
 - 3. Contractor's affidavit, along with final releases and waivers of liens as required by Owner, indicating that all debts and claims against project (less amounts withheld by Owner) have been paid in full or otherwise satisfied.
 - 4. Consent of surety company to final payment.

1.19 DEFINITIONS

- A. Dimensions on drawings and details are subject to field measurements.
- B. The term "working days" shall exclude weekends (Saturday and Sunday) and holidays.
- C. References to "Division 00" shall mean the Bidding Requirements and Contracting Requirements.
- D. References to "DSB" shall mean State of Colorado Division of Water Resources Office of the State Engineer Dam Safety Branch.
- E. References to "USACE" shall mean US Army Corps of Engineers.
- F. References to "Colorado DOT Std. Spec." shall mean Colorado Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.
- G. References to "USFS" shall mean US Forest Service.
- H. References to "CDPS" shall mean Colorado Discharge Permit System.
- I. References to "A/E", "Architect", or "Engineer" shall mean Ayres.
- J. References to "Owner" shall mean City of Grand Junction.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

SECTION 01 22 50

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. Payment for all work done in compliance with the Contract Documents, including all labor, equipment, materials, and performance of operations relative to construction of this project, will be made under the Bid Items listed below. Work required by the Contract Documents for which there is not a Bid Item will be considered incidental to the Contract and no additional compensation will be allowed.
- B. Owner reserves the right to alter Drawings, modify incidental work as may be necessary, and increase or decrease quantities of work to be performed, including deduction or cancellation of any one or more Bid Items. Changes in the Work shall not be considered as a waiver of any conditions of the Contract nor invalidate any provisions thereof. When changes result in revised quantities of work to be performed, Contractor shall accept payment according to contract unit prices appearing in the original Contract. A supplemental agreement between Contractor and Owner may be requested by either party when cumulative changes involve a net increase or decrease of more than 20 percent in total contract amount.
- C. Final measured quantities determined in field by A/E at time of construction shall govern over approximate quantities shown on the Bid Schedule, unless otherwise noted. Contractor shall take no advantage of any apparent error or omission in Drawings or Specifications, and A/E shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.

PART 2 (NOT USED)

PART 3 EXECUTION

3.01 MOBILIZATION

- A. This work consists of work and operations necessary for movement of personnel, equipment, supplies, and incidentals to project site and for establishment of Contractor's offices and other temporary facilities necessary for work on project; and of all other work and operations which must be performed, or for which costs must be incurred before beginning work on various items on project site; and demobilization at completion of work.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for MOBILIZATION, payable to Contractor in accordance with the following schedule:
 - 1. When 5 percent or more of original contract amount is earned, 40 percent of amount bid for mobilization will be paid.
 - 2. When 25 percent or more of original contract amount is earned, 80 percent of amount bid for mobilization will be paid.
 - 3. When 90 percent or more of original contract amount is earned, 100 percent of amount bid for mobilization will be paid.

3.02 EROSION CONTROL

- A. This work consists of furnishing, installing, and maintaining erosion and other environmental control measures in accordance with Section 01 57 19.

- B. Measurement for payment will be as a complete unit of work acceptably completed.
- C. Payment will be made at the contract lump sum price for EROSION CONTROL, payable to Contractor in accordance with the following schedule:
 - 1. When erosion control measures are installed, 75 percent of amount bid for erosion control will be paid.
 - 2. When erosion control measures have been removed, 100 percent of amount bid for erosion control will be paid.

3.03 CONSTRUCTION DEWATERING

- A. This work consists of diverting surface water, constructing cofferdams, and dewatering construction site in accordance with Section 01 57 60 as required to complete the work.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for CONSTRUCTION DEWATERING, payable to Contractor in accordance with the following schedule:
 - 1. When site is dewatered for construction, 75 percent of amount bid for dewatering will be paid.
 - 2. When all dewatering measures are removed, 100 percent of amount bid for dewatering will be paid.

3.04 DEMOLITION

- A. This work consists of removing intake structure and controls, Outfall structure and piping as shown on drawings, and grouted riprap and concrete outfall structure accordance with Section 02 41 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for DEMOLITION.

3.05 CONCRETE OVERFLOW SPILLWAY

- A. This work consists of constructing the Concrete Overflow Spillway as designated in the Drawings and in accordance with Section 03 30 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for CONCRRETE OVERFLOW SPILLWAY.

3.06 ROCK SHELL REMOVAL

- A. This work consists of excavating and stockpiling the downstream rock shell defined in Section 31 24 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract unit price per cubic yard for Rock SHELL REMOVAL.

3.07 TYPE I FILTER MATERIAL

- A. This work consists of furnishing and placing Type I filter material in accordance with Sections 31 24 00 and 33 46 72 and as shown on the Drawings.

- B. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits.
 - 1. Type I Filter Material required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
 - 2. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface. Quantities will be based upon project plan drawings.
- C. Payment will be made at the contract unit price per cubic yard for TYPE I FILTER MATERIAL.

3.08 FILTER DRAIN PIPE

- A. This work consists of furnishing and installing drainage pipe including granular filter blanket in accordance with Section 33 46 72.
- B. Measurement for payment will be the number of linear feet of drainage pipe in place and the number of cubic yards of granular filter blanket materials, not to exceed limits shown on Drawings.
- C. Payment for drainage pipe will be made at the contract unit price per linear foot for DRAINAGE PIPE.
- D. Payment for granular filter blanket will be made at the contract unit price per cubic yard for FILTER DRAIN PIPE.

3.09 FILTER EMBANKMENT CAP

- A. This work consists of excavating materials from embankment, stockpiling, placing, and compacting materials as specified, restoring stockpile areas, and other items necessary and incidental for construction of embankments in accordance with Section 31 20 00.
- B. Measurement for payment will be the volume of earth fill within specified zones and pay limits measured and computed to nearest cubic yard by method of average cross-sectional end areas. Unless otherwise indicated, no deduction in volume will be made for embedded conduits and appurtenances.
- C. Earth fill required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
- D. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface.
- E. Payment for each type of earth fill will be made at the respective contract unit price per cubic yard for FILTER EMBANKMENT CAPEARTH.

3.10 ROCK SHELL REPLACEMENT

- A. This work consists of restoring downstream rock shell defined in Section 31 24 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract unit price per cubic yard for ROCK SHELL REPLACEMENT .

3.11 HYDRAULIC SLUICE GATE

- A. This work consists of furnishing and installing sluice gate, operators, hoses, casement pipes, portable operator, and anchorages in accordance with Section 35 20 40.
- B. Measurement for payment will be the number of units acceptably installed.
- C. Payment will be made at the contract unit price each for HYDRAULIC SLUICE GATE

3.12 INTAKE STRUCTURE

- A. This work consists of constructing the intake structure as designated in the Drawings and in accordance with Section 03 30 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for CONCRRETE OVERFLOW SPILLWAY.

3.13 AUXILIARY SPILLWAY GRADING

- A. This work consists of constructing the intake structure as designated in the Drawings and in accordance with Section 31 20 00.
- B. Measurement for payment for auxiliary spillway grading will be the square yards of spillway grading not to exceed limits shown on Drawings will be made at the contract unit price per square yard
- C. Payment for auxiliary spillway grading will be made at the contract unit price per square yard for AUXILIARY SPILLWAY GRADING.

3.14 AUXILIARY SPILLWAY ROCK BERMS

- A. This work consists of furnishing and placing riprap in accordance with Section 31 37 00.
- B. Measurement for payment will be the number of cubic yards of riprap in place.
- C. Payment for riprap will be made at the contract unit price per cubic yard for AUXILIARY SPILLWAY ROCK BERMS.

3.15 PIPE FILTER DIAPHRAGM

- A. This work consists of furnishing and placing Type I filter material for pipe diaphragm in accordance with Sections 31 24 00 and 33 46 72 and as shown on the Drawings.
- B. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits.
 - 1. Type I Filter Material required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
 - 2. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface. Quantities will be based upon project plan drawings
- C. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits

- D. Payment will be made at the contract unit price per cubic yard for PIPE FILTER DIAPHRAGM.

3.16 OUTFALL PIPE

- A. This work consists of constructing the outfall pipe as designated in the Drawings and in accordance with Section 32 42 15.
- B. Measurement for payment will be the linear feet of pipe placed.
- C. Payment will be made at the contract lump sum price for OUTFALL PIPE.

3.17 CIPP PIPE LINING

- A. This work consists of lining of the steel penstock pipe in accordance with Section 33 01 36 and as shown on the Drawings. Any special equipment, personnel, or materials required for this work shall be incidental to this item.
- B. Measurement for payment will be the number of linear feet of pipe acceptable lined.
- C. Payment for fence will be made at the contract unit price per linear foot for CIPP PIPE LINING FENCE.

3.18 SITE RESTORATION

- A. This work consists of placing topsoil, fertilizing, seeding, and mulching in accordance with Section 32 99 10.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for SITE RESTORATION.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Submit items to A/E for review as required by the various Contract Documents. Refer to individual specification sections, General Conditions, Supplementary Conditions, and sections of Division 01 - General Requirements for submittal requirements.

1.02 GENERAL PROCEDURES

- A. Follow the requirements for each submittal type as specified below.
- B. Submittals shall be identified with project name, numbered consecutively, and bear the stamp of approval of Contractor as evidence of accuracy, compatibility, and conformance with contract requirements. Submittals not so stamped will be returned without being examined.
- C. Give specific written notice of each variation that submittals may have from requirements of the Contract Documents.
- D. Partial submittals will not be considered. Submit each portion of work complete in one submittal.
- E. Products subject to submittal review shall not be used in the work until submittals have been reviewed and bear the stamp and signature of A/E. Submittals will only be reviewed for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor shall be responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and the means and methods of construction, coordinating its work with that of all other trades, and performing all work in a safe and satisfactory manner. Corrections or comments made on submittals shall not relieve Contractor from compliance with requirements of Drawings and Specifications and shall not be considered an order for extra work.
- F. If information on previously reviewed shop drawings is altered, submit changes for review.
- G. Maintain complete copies of all final submittals at the project site.

1.03 SHOP DRAWINGS

- A. Required shop drawings are designated in the various specification sections. Submit shop drawings for review prior to fabrication, delivery, or installation in one of the following formats:
 - 1. PDF electronic file. An annotated PDF electronic file will be returned to Contractor.
- B. Each brochure of shop drawings shall contain an index of contents and shall consist of layout details, schedules, setting instructions, manufacturer's literature, and other data specifically prepared for the work. Reproductions of contract drawings may not be used without prior approval.

1.04 PRODUCT DATA

- A. Required product data are designated in the various specification sections. Submit product data for review prior to delivery or installation in one of the following formats:
 - 1. PDF electronic file. An annotated PDF electronic file will be returned to Contractor.

- B. Product data shall consist of manufacturer's literature, illustrations, and brochures of catalog cuts; instructions for handling, storage, and installation; and specifications and design data. Where manufacturer's standard literature includes multiple products or options, identify the specific products and options as required for this project.

1.05 SAMPLES

- A. Prior to fabrication, delivery, or installation, submit samples as designated in the various specification sections. Allow reasonable time for review and testing.
 - 1. Submit samples in sufficient quantity and of adequate size to show quality, type, and extremes of color range, finish, and texture. Submit a minimum of two sets of appearance and color samples.
- B. Label each sample stating material, description, project name, and Contractor's name. Expedite submittal of appearance and color samples following Notice to Proceed.
- C. Submit samples with transmittal letter requesting review; prepay transportation charges. Samples shall become Owner's property, unless otherwise designated.
- D. Samples will be reviewed for acceptability or selection of color, pattern, and texture only. Compliance with specifications is the responsibility of Contractor.
- E. Order no materials subject to sample review until receipt of written notice of completion of review. Installed materials shall match reviewed samples. No review of samples shall be taken in itself to change contract requirements.

1.06 CERTIFICATES OF COMPLIANCE

- A. Submit certificates of compliance as designated in the various specification sections in one of the following formats:
 - 1. PDF electronic file.
- B. Certificates shall be furnished by manufacturer, producer, or supplier of material or product and shall indicate that material or product conforms to or exceeds specified requirements. Include supporting reference data as appropriate. Certificates may be recent or previous test results on material or product, but must be acceptable to A/E.

1.07 PERMITS AND APPROVALS

- A. Submit permits, code inspections, and agency approval documents as designated in the various specification sections in one of the following formats:
 - 1. PDF electronic file.

1.08 TEST REPORTS

- A. Submit test reports as designated in the various technical specifications in one of the following formats:
 - 1. PDF electronic file.

1.09 OPERATION AND MAINTENANCE (O/M) MANUALS

- A. Submit operation and maintenance manuals covering each item of equipment furnished or installed under the Contract. Submit individual preliminary O/M brochures in PDF electronic format within 30 days after completion of shop drawing or product data review. Submit final O/M manuals prior to substantial completion in the following formats:

1. PDF electronic file of entire manual, and
 2. Two bound paper sets (unless otherwise specified in the various specification sections).
- B. For each item of equipment, include the following information:
1. A/E-reviewed shop drawings and product data.
 2. Installation and operating instructions.
 3. Maintenance instructions and address of authorized service center.
 4. Wiring diagrams and parts lists.
 5. Test data and certifications.
 6. Manufacturer's warranty information.
- C. Designate correct model number where literature covers more than one model.
- D. Write and furnish duplicate operation and maintenance instructions for items fabricated or assembled by Contractor.
- E. Electronic Manual:
1. Submit manual in the form of a single PDF file for entire project.
 2. Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 3. Group data according to specification section and organize with bookmarks. Bookmark both specification sections and individual products so that resulting bookmarks reflect a readily navigated document tree.
 4. Include an overall table of contents of the O/M manuals furnished.
- F. Paper Manuals:
1. Furnish data in 8-1/2 in. x 11 in. or 11 in. x 17 in. size; photographically reduce information if required. Place data into D-style, 3-ring hard cover binders; fold 11 in. x 17 in. sheets as required. Group data according to specification section and organize with tabbed index dividers on which the product name is typed.
 2. Label binders as follows:

[Systems or Equipment Designation]
OPERATION AND MAINTENANCE MANUAL
[Project Name]
[Project Location]
 3. Integrate general, mechanical, and electrical construction into same binder(s) when practicable. Individual subcontract O/M manuals will be acceptable provided they are placed in binder(s) as specified above.
 4. Include an overall table of contents of the O/M manuals furnished.

1.10 PROJECT RECORD DOCUMENTS

- A. Keep a current set of paper documents at project site that are marked to show all changes made during construction. Dimension underground and concealed work and utilities from permanent reference points; record vertical distances. Make and record measurements to the nearest 0.1 ft. Submit project record documents upon completion of Work.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide temporary environmental controls as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 DEFINITIONS

- A. References to "Colorado DOT Std. Spec." shall mean Colorado Department of Transportation Standard Specifications for Road and Bridge Construction (available at <https://www.codot.gov/business/designsupport/cdot-construction-specifications/2019-construction-specifications/2019-specs-book/2019-standard-specifications>).

1.03 SUBMITTALS

- A. Submit in accordance with Section 01 33 00: Submittals.
- B. Inspection Reports: Submit one copy of weekly inspection reports for erosion and sediment controls.
- C. Technical product literature for all commercial products to be used for sedimentation and erosion control.
- D. Contractor's Sedimentation and Erosion Control Plan: A plan describing Best Management Practices (BMPs) in accordance with local, state, and federal regulations and permits and this Section and Drawings stamped and sealed by a professional engineer as required.

1.04 PERMITS

- A. Owner will:
 - 1. Submit a Colorado Discharge Permit System (CDPS) General Permit for Stormwater Discharges Associated with Construction Activities, COR400000 Permit Application at least 10 working days prior to the start of construction.
 - 2. Provide Contractor with a copy of the notice of General Permit coverage.
 - 3. File Notice of Termination after construction site has undergone final stabilization.
- B. Contractor shall:
 - 1. Comply with the requirements of the General Permit and the Sedimentation and Erosion Control Plan and keep a copy of these documents at project site during construction.
 - 2. Post a copy of the Certificate of Permit Coverage in a conspicuous place on the construction site.

PART 2 PRODUCTS

2.01 SILT FENCE

- A. Posts: 2-inch by 2-inch; 4 feet 6-inch long, wood stakes, suitably durable for driving without cracking, as approved by the A/E.

- B. Fabric: Woven, polypropylene, ultraviolet resistant material. Mirafi, Inc. Mirafi 100X, or approved equal.
- C. Prefabricated commercial silt fence, if substituted for built-in-field fence: Mirafi Inc. "Envirofence" or approved equal.

2.02 EROSION BALES

- A. Certified weed hay or straw certified under the North American Weed Free Forage Certification Program and the New Mexico State University Seed Certification (NMSUSC) Program. Each certified weed free erosion bale shall be identified with purple and yellow twine, and regional Forage Certification Program tag indicating the Regional Forage Certification Program Number unless otherwise specified by the program.
- B. Erosion bales shall be inspected for and Regionally Certified as weed free based on the Regionally Designated Noxious Weed and Undesirable Plant List. Do not unload certified weed free erosion bales or remove their identifying twine, wire or tags until the A/E has inspected and accepted them. Provide a certificate of compliance showing the transit certificate number or a copy of the transit certificate as supplied from the forage producer.

2.03 EROSION LOGS

- A. Curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log and a seamless casing comprised of a photodegradable tube netting. Fungus free, resin free and free of growth or germination inhibiting substances. Furnish logs with the minimum diameter and length shown on approved erosion and sediment control plans.

2.04 VEHICLE TRACKING PAD

- A. Constructed tracking pad complying with Colorado DOT Std. Spec.
- B. Use crushed natural aggregate with at least two fractured faces that meets the Colorado DOT Std. Spec. gradation requirements for vehicle tracking pads.
- C. Geotextile fabric for tracking pads shall be Colorado DOT Std. Spec., Subsection 712.08, Class 2 fabric.

2.05 PERMANENT SEED

- A. See Section 32 92 36 and Section 32 99 10.

PART 3 EXECUTION

3.01 EROSION CONTROL

- A. General: Maintain erosion control measures to protect the project site and prevent sediment pollution of adjacent water courses and properties. At a minimum, provide erosion control measures as indicated on the Drawings.
- B. Applicable Standards: Unless otherwise shown or specified, erosion control measures shall comply with:
 - 1. CDPS General Permit for Stormwater Discharges Associated with Construction Activities, COR400000.
 - 2. Colorado DOT Std. Spec.
- C. Time Period: Install erosion control measures prior to start of construction and maintain them until final completion of work. Unless otherwise instructed, remove temporary erosion control measures prior to final application for payment.

- D. Stripping: Strive to limit stripping of sod and vegetation to a period that will expose bare soil to the least possibility of erosion that construction requirements will allow.
- E. Diversions: Construct and maintain dams, channels, flumes, sumps, surface roughening, and other temporary diversion and protective works to divert streamflow and other surface water through or around construction site and away from work while construction is in progress. Unless otherwise specified, a diversion must discharge into the same natural drainageway in which its head waters are located.
- F. Sediment Barriers: Construct and maintain one or more sediment barriers to receive runoff leaving site.
 - 1. Affix silt fence to ground and maintain in suitable structural condition to last until vegetation establishes.
 - 2. Affix erosion logs to ground, either by wood stakes (recommended method) or by equivalent anchorage if frozen winter subgrade prevents driving stakes. Equivalent anchorages include using steel posts (removed after vegetation establishes) or erosion bales spaced at same intervals as planned stakes or other approved equivalent method.
- H. Trackout Control: Prevent tracking of soils and sediments onto public and private streets by constructing and maintaining stabilized work surfaces and trackout controls in accordance with Colorado DOT Std. Spec. Check dual tire vehicles for picked up tracking pad materials prior to leaving site. Refresh and loosen tracking pad as needed to allow stones to contact full tire tread (at least up to start of sidewall) of exiting vehicles. If a vehicle or tire washing station is established, water from washing shall drain into a suitable sediment trap or settling device. Remove at the end of each workday soils and sediment reaching public and private streets not part of the construction site.
- I. Re-establishment of Vegetation: Re-establish temporary or permanent vegetation on disturbed areas within the time limits allowed by applicable standards.
- J. Sediment Deposits: Remove and dispose of sediment deposits when deposits reach one-half the volume capacity of sediment barrier, unless otherwise indicated.

3.03 EROSION CONTROL MONITORING AND REPORTING

- A. Contractor shall conduct the following inspections:
 - 1. Weekly inspections of implemented erosion and sediment controls.
 - 2. Inspections of erosion and sediment controls within 24 hours after a precipitation event that produces 0.5 in. of rain or more during a 24 hour period.
- B. Contractor shall prepare weekly written reports of all inspections that include:
 - 1. Date, time, and exact place of inspection.
 - 2. Name of individual who performed inspection.
 - 3. An assessment of condition of erosion and sediment controls.
 - 4. A description of any erosion and sediment control implementation and maintenance performed.
 - 5. A description of the present phase of construction at site.

3.04 DUST CONTROL

- A. Minimize dispersion of dust from construction operations by application of water or other dust control materials. Controls shall confine dust and dirt within the immediate area of project. Masonry and debris shall be thoroughly soaked during demolition and loading operations.

3.05 NOISE CONTROL

- A. Provide noise control measures to limit the amount of noise and prevent nuisance. Properly equip all equipment with mufflers. Limit construction activities generating significant noise to normal working hours.

3.06 MATERIAL HANDLING AND SPILL PREVENTION

- A. Hazardous materials shall be handled and stored in accordance with the recommendations of the manufacturer and Material Safety Data Sheets (MSDS). Containers or equipment leaking any contaminants shall be repaired, removed from the site, or utilize drip pans for containment purposes.
- B. Spills of any contaminants shall be immediately reported to the Colorado Water Quality Control Division Hotline at 877.518.5608. Contractor shall maintain an emergency spill kit at the project site containing contaminant containment products and absorbent materials (inlet socks, dry absorbent materials, and similar products).

3.07 HAZARDOUS ENVIRONMENTAL CONDITIONS

- A. If underground petroleum storage tanks, petroleum contaminated soils, or other hazardous environmental conditions are encountered, and are not identified to be part of the work, Contractor shall immediately stop all work in connection with the hazardous condition and shall notify Owner and A/E. (See the General Conditions of the Contract for specific procedures that may apply.)

END OF SECTION

**60% DRAFT
PROJECT MANUAL
FOR**

**HOGCHUTE DAM REPAIRS
DAMID 420127
MESA COUNTY, CO
SEPTEMBER 24, 2020**

**AKA Carson Reservoir
Owned by City of Grand Junction, CO**



3433 Oakwood Hills Parkway
Eau Claire, WI 54701-7698
715.834.3161 • Fax: 715.831.7500
www.AyresAssociates.com

HOGCHUTE DAM REPAIRS
 DAMID 420127
 MESA COUNTY, CO

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Specifications

SECTION 01 01 00**GENERAL REQUIREMENTS****PART 1 GENERAL****1.01 PROJECT DESCRIPTION**

- A. In general, the project consists of:
1. Mobilization.
 2. Drawdown, diversion, and dewatering.
 3. Erosion and sediment controls.
 4. Clearing and grubbing.
 5. Stripping and stockpiling.
 6. Developing borrow area.
 7. Construction of new auxiliary spillway weir and improved spillway chute.
 8. Excavation of embankment.
 9. Demolition of existing outlet works intake structure.
 10. Construction of new outlet works intake structure.
 11. Replacement and rehabilitation of existing outlet works conduit.
 12. Construction of embankment filter, filter diaphragm around conduit, and toe drain.
 13. Backfill and site restoration.

1.02 WORK BY OTHERS

- A. Owner will draw down the reservoir and bypass flows prior to and during construction.

1.03 WORK SEQUENCE

- A. The work shall be performed in accordance with general sequence or phasing included on the Drawings.

1.04 PROJECT MEETINGS

- A. A preconstruction conference will be scheduled after award of contract and prior to beginning work. This meeting shall be attended by A/E, Owner, and an authorized representative of Contractor.
- B. Periodic progress meetings will be held at project site at times designated by Owner or A/E. A responsible representative of Contractor who can bind Contractor to decisions shall attend.

1.05 WORK HOURS

- A. Work shall be conducted between the hours of 7:00 a.m. to 6:00 p.m. on normal work days, unless approved for unusual circumstances.
- B. Give written notice to A/E whenever it is desired to perform work at night, or on a Saturday, Sunday, or holiday, or to vary period of hours during which work is carried on each day. If approved, such work shall be subject to requirements furnished in writing by A/E, and no extra compensation will be allowed.

1.06 SUBMITTAL PROCEDURES

- A. See Section 01 33 00.

1.07 PERMITS AND CODES

- A. Owner will obtain permits, licenses, and approvals, which may include the following:

1. State of Colorado Division of Water Resources Office of the State Engineer Dam Safety Branch Approval for the Alteration, Modification, or Repair of a Dam and Reservoir.
 2. US Army Corps of Engineers (USACE) Clean Water Act Section 404 Nationwide Permit and Clean Water Act Section 401 Water Quality Certification Authorization.
 3. Colorado State Historic Preservation Office (SHPO) Section 106 review.
 4. US Forest Service (USFS) Special Use Permit.
 5. Colorado Discharge Permit System (CDPS) General Permit for Stormwater Discharges Associated with Construction Activities, COR400000.
- B. Contractor shall comply with the requirements of the above permits, licenses, and approvals. If a copy of a permit, license, or approval is not available for review prior to the Bid Deadline, and if it contains a requirement not covered by the Contract Documents, such a requirement will be considered extra work if Contractor makes a claim under the terms of the General Conditions. Work shall not begin on items applicable to the above until the required permit, license, or approval is received.
- C. Contractor shall provide all other necessary permits and licenses and pay all fees, taxes, and royalties, unless otherwise indicated.
- D. Comply with local and municipal ordinances and applicable state and national codes.

1.08 TEMPORARY UTILITIES

- A. Contractor shall be responsible for providing temporary electric power as required for construction purposes. Provide portable power supply or make arrangements with local utility company.
- B. Contractor shall be responsible for obtaining water for its needs. Pay cost of water used and meter rental, if applicable.
- C. Contractor shall provide temporary outside toilets sufficient for construction workers. Toilets shall be self-contained chemical type and shall comply with applicable Codes. Maintain sanitary facilities in a clean and sanitary condition; supply toilet paper until completion of project.

1.09 PROTECTION

- A. Furnish and maintain proper barricades, fences, signal lights, warning signs, and personnel as required to properly protect and safeguard the work, persons, animals, and property against injury.

1.10 ENVIRONMENTAL CONTROLS

- A. See Section 01 57 19.

1.11 TRAFFIC CONTROL

- A. Conduct operations to ensure minimum interference with streets, walks, and adjacent facilities not part of construction project.
- B. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.12 PRODUCT REQUIREMENTS

- A. General: Provide new products manufactured and conditioned for the particular application as recommended by manufacturer, unless otherwise noted. Transport, handle, store, and protect products as specified and in accordance with manufacturer's recommendations.

- B. Acceptable Manufacturers: Products, materials, and equipment identified by reference to a manufacturer's name, catalog number, or model are identified for the purpose of establishing a standard of type, function, appearance, and quality. Unless otherwise noted, any other product, material, or equipment which will perform adequately the duties imposed by the general design will be considered for substitution in accordance with the provisions below.
- C. Bid Phase Substitutions: Substitutions and "or equal" items proposed prior to the Bid Deadline shall be submitted in accordance with the Instructions to Bidders.
- D. Construction Phase Substitutions: Substitutions and "or equal" items proposed after Contract has been awarded shall be submitted for approval prior to their use. Consideration will be given only to proposed substitutions and "or equal" items where:
 - 1. The products named in the Contract Documents are no longer available or cannot be provided within the Contract Time.
 - 2. The manufacturers' standard products are no longer in conformance with the specified requirements.
 - 3. Owner's interests may be adversely affected.
- E. Substitution Procedures: Requests for substitution of alternate products or use of "or equal" items shall be submitted with complete references to manufacturer's product identification and product data indicating composition, guarantee, availability, applicable standards or agency approvals met or exceeded, restrictions imposed on product, and manufacturer's recommended method of application or installation. A substitution or an "or equal" item will be considered acceptable if the product will perform adequately the duties imposed by the general design and, in opinion of A/E, is of equal substance, quality, appearance, and function, unless the named item is necessary for interchangeability or if the named product has been demonstrated to be most cost-effective.

1.13 SURVEYS, STAKING, LINE AND GRADE

- A. Owner will provide baseline reference points and benchmarks as indicated on Drawings. Contractor shall provide all other survey staking and layout as required to complete the Work.

1.14 FIELD MEASUREMENTS AND INSPECTION OF SURFACES

- A. Contractor shall layout its Work based on reference points furnished by Owner and shall be solely responsible for the accuracy of its measurements. Verify grades, lines, levels, locations, and dimensions as shown on Drawings, and inspect surfaces that are to receive work before proceeding with fabricating, assembling, fitting, or erecting. Notify A/E in writing in case of unsuitable conditions, defective substrates, or discrepancies in Contract Documents. Starting of work shall imply acceptance of conditions.
- B. Correct any errors or defects due to faulty measurements, improper layout, or failure to report discrepancies.

1.15 CUTTING AND PATCHING

- A. Cut new openings in existing construction as required. Employ skilled workers.
- B. Restore surfaces to match adjacent finish. Waterproof and insulate holes in exterior walls. Backfill and properly compact earthwork needed to perform cutting and patching.

1.16 CONSTRUCTION CLEANING

- A. Keep work area free of accumulations of surplus materials, rubbish, and debris.

1.17 PUNCH LIST

- A. A "punch list" will be prepared and distributed to Contractor at Substantial Completion. Items on punch list shall be completed within 30 days. Required submittals (see below) shall be completed prior to or when requesting final payment.

1.18 CLOSEOUT SUBMITTALS

- A. Submit the following items to A/E prior to or with final Application for Payment:
 - 1. Project record drawings marked to show all changes made during construction. Dimension underground and concealed work and utilities from permanent reference points; record vertical distances. Make and record measurements to the nearest 0.5 ft on a clean drawing set.
 - 2. Evidence of continuing insurance coverage complying with insurance requirements (see Conditions of the Contract).
 - 3. Contractor's affidavit, along with final releases and waivers of liens as required by Owner, indicating that all debts and claims against project (less amounts withheld by Owner) have been paid in full or otherwise satisfied.
 - 4. Consent of surety company to final payment.

1.19 DEFINITIONS

- A. Dimensions on drawings and details are subject to field measurements.
- B. The term "working days" shall exclude weekends (Saturday and Sunday) and holidays.
- C. References to "Division 00" shall mean the Bidding Requirements and Contracting Requirements.
- D. References to "DSB" shall mean State of Colorado Division of Water Resources Office of the State Engineer Dam Safety Branch.
- E. References to "USACE" shall mean US Army Corps of Engineers.
- F. References to "Colorado DOT Std. Spec." shall mean Colorado Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.
- G. References to "USFS" shall mean US Forest Service.
- H. References to "CDPS" shall mean Colorado Discharge Permit System.
- I. References to "A/E", "Architect", or "Engineer" shall mean Ayres.
- J. References to "Owner" shall mean City of Grand Junction.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

SECTION 01 22 50**MEASUREMENT AND PAYMENT****PART 1 GENERAL****1.01 GENERAL REQUIREMENTS**

- A. Payment for all work done in compliance with the Contract Documents, including all labor, equipment, materials, and performance of operations relative to construction of this project, will be made under the Bid Items listed below. Work required by the Contract Documents for which there is not a Bid Item will be considered incidental to the Contract and no additional compensation will be allowed.
- B. Owner reserves the right to alter Drawings, modify incidental work as may be necessary, and increase or decrease quantities of work to be performed, including deduction or cancellation of any one or more Bid Items. Changes in the Work shall not be considered as a waiver of any conditions of the Contract nor invalidate any provisions thereof. When changes result in revised quantities of work to be performed, Contractor shall accept payment according to contract unit prices appearing in the original Contract. A supplemental agreement between Contractor and Owner may be requested by either party when cumulative changes involve a net increase or decrease of more than 20 percent in total contract amount.
- C. Final measured quantities determined in field by A/E at time of construction shall govern over approximate quantities shown on the Bid Schedule, unless otherwise noted. Contractor shall take no advantage of any apparent error or omission in Drawings or Specifications, and A/E shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.

PART 2 (NOT USED)**PART 3 EXECUTION****3.01 MOBILIZATION**

- A. This work consists of work and operations necessary for movement of personnel, equipment, supplies, and incidentals to project site and for establishment of Contractor's offices and other temporary facilities necessary for work on project; and of all other work and operations which must be performed, or for which costs must be incurred before beginning work on various items on project site; and demobilization at completion of work.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for MOBILIZATION, payable to Contractor in accordance with the following schedule:
 - 1. When 5 percent or more of original contract amount is earned, 40 percent of amount bid for mobilization will be paid.
 - 2. When 25 percent or more of original contract amount is earned, 80 percent of amount bid for mobilization will be paid.
 - 3. When 90 percent or more of original contract amount is earned, 100 percent of amount bid for mobilization will be paid.

3.02 EROSION CONTROL

- A. This work consists of furnishing, installing, and maintaining erosion and other environmental control measures in accordance with Section 01 57 19.

- B. Measurement for payment will be as a complete unit of work acceptably completed.
- C. Payment will be made at the contract lump sum price for EROSION CONTROL, payable to Contractor in accordance with the following schedule:
 - 1. When erosion control measures are installed, 75 percent of amount bid for erosion control will be paid.
 - 2. When erosion control measures have been removed, 100 percent of amount bid for erosion control will be paid.

3.03 CONSTRUCTION DEWATERING

- A. This work consists of diverting surface water, constructing cofferdams, and dewatering construction site in accordance with Section 01 57 60 as required to complete the work.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for CONSTRUCTION DEWATERING, payable to Contractor in accordance with the following schedule:
 - 1. When site is dewatered for construction, 75 percent of amount bid for dewatering will be paid.
 - 2. When all dewatering measures are removed, 100 percent of amount bid for dewatering will be paid.

3.04 DEMOLITION

- A. This work consists of removing intake structure and controls, Outfall structure and piping as shown on drawings, and grouted riprap and concrete outfall structure accordance with Section 02 41 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for DEMOLITION.

3.05 CONCRETE OVERFLOW SPILLWAY

- A. This work consists of constructing the Concrete Overflow Spillway as designated in the Drawings and in accordance with Section 03 30 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for CONCRRETE OVERFLOW SPILLWAY.

3.06 ROCK SHELL REMOVAL

- A. This work consists of excavating and stockpiling the downstream rock shell defined in Section 31 24 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract unit price per cubic yard for Rock SHELL REMOVAL.

3.07 TYPE I FILTER MATERIAL

- A. This work consists of furnishing and placing Type I filter material in accordance with Sections 31 24 00 and 33 46 72 and as shown on the Drawings.

- B. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits.
 - 1. Type I Filter Material required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
 - 2. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface. Quantities will be based upon project plan drawings.
- C. Payment will be made at the contract unit price per cubic yard for TYPE I FILTER MATERIAL.

3.08 FILTER DRAIN PIPE

- A. This work consists of furnishing and installing drainage pipe including granular filter blanket in accordance with Section 33 46 72.
- B. Measurement for payment will be the number of linear feet of drainage pipe in place and the number of cubic yards of granular filter blanket materials, not to exceed limits shown on Drawings.
- C. Payment for drainage pipe will be made at the contract unit price per linear foot for DRAINAGE PIPE.
- D. Payment for granular filter blanket will be made at the contract unit price per cubic yard for FILTER DRAIN PIPE.

3.09 FILTER EMBANKMENT CAP

- A. This work consists of excavating materials from embankment, stockpiling, placing, and compacting materials as specified, restoring stockpile areas, and other items necessary and incidental for construction of embankments in accordance with Section 31 20 00.
- B. Measurement for payment will be the volume of earth fill within specified zones and pay limits measured and computed to nearest cubic yard by method of average cross-sectional end areas. Unless otherwise indicated, no deduction in volume will be made for embedded conduits and appurtenances.
- C. Earth fill required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
- D. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface.
- E. Payment for each type of earth fill will be made at the respective contract unit price per cubic yard for FILTER EMBANKMENT CAPEARTH.

3.10 ROCK SHELL REPLACEMENT

- A. This work consists of restoring downstream rock shell defined in Section 31 24 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract unit price per cubic yard for ROCK SHELL REPLACEMENT.

3.11 HYDRAULIC SLUICE GATE

- A. This work consists of furnishing and installing sluice gate, operators, hoses, casement pipes, portable operator, and anchorages in accordance with Section 35 20 40.
- B. Measurement for payment will be the number of units acceptably installed.
- C. Payment will be made at the contract unit price each for HYDRAULIC SLUICE GATE

3.12 INTAKE STRUCTURE

- A. This work consists of constructing the intake structure as designated in the Drawings and in accordance with Section 03 30 00.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for CONCRETE OVERFLOW SPILLWAY.

3.13 AUXILIARY SPILLWAY GRADING

- A. This work consists of constructing the intake structure as designated in the Drawings and in accordance with Section 31 20 00.
- B. Measurement for payment for auxiliary spillway grading will be the square yards of spillway grading not to exceed limits shown on Drawings will be made at the contract unit price per square yard
- C. Payment for auxiliary spillway grading will be made at the contract unit price per square yard for AUXILIARY SPILLWAY GRADING.

3.14 AUXILIARY SPILLWAY ROCK BERMS

- A. This work consists of furnishing and placing riprap in accordance with Section 31 37 00.
- B. Measurement for payment will be the number of cubic yards of riprap in place.
- C. Payment for riprap will be made at the contract unit price per cubic yard for AUXILIARY SPILLWAY ROCK BERMS.

3.15 PIPE FILTER DIAPHRAGM

- A. This work consists of furnishing and placing Type I filter material for pipe diaphragm in accordance with Sections 31 24 00 and 33 46 72 and as shown on the Drawings.
- B. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits.
 - 1. Type I Filter Material required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
 - 2. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface. Quantities will be based upon project plan drawings
- C. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits

- D. Payment will be made at the contract unit price per cubic yard for PIPE FILTER DIAPHRAGM.

3.16 OUTFALL PIPE

- A. This work consists of constructing the outfall pipe as designated in the Drawings and in accordance with Section 32 42 15.
- B. Measurement for payment will be the linear feet of pipe placed.
- C. Payment will be made at the contract lump sum price for OUTFALL PIPE.

3.17 CIPP PIPE LINING

- A. This work consists of lining of the steel penstock pipe in accordance with Section 33 01 36 and as shown on the Drawings. Any special equipment, personnel, or materials required for this work shall be incidental to this item.
- B. Measurement for payment will be the number of linear feet of pipe acceptable lined.
- C. Payment for fence will be made at the contract unit price per linear foot for CIPP PIPE LINING FENCE.

3.18 SITE RESTORATION

- A. This work consists of placing topsoil, fertilizing, seeding, and mulching in accordance with Section 32 99 10.
- B. Measurement for payment will be as a complete unit of work acceptably performed.
- C. Payment will be made at the contract lump sum price for SITE RESTORATION.

END OF SECTION

SECTION 01 33 00**SUBMITTAL PROCEDURES****PART 1 GENERAL****1.01 SUMMARY**

- A. Submit items to A/E for review as required by the various Contract Documents. Refer to individual specification sections, General Conditions, Supplementary Conditions, and sections of Division 01 - General Requirements for submittal requirements.

1.02 GENERAL PROCEDURES

- A. Follow the requirements for each submittal type as specified below.
- B. Submittals shall be identified with project name, numbered consecutively, and bear the stamp of approval of Contractor as evidence of accuracy, compatibility, and conformance with contract requirements. Submittals not so stamped will be returned without being examined.
- C. Give specific written notice of each variation that submittals may have from requirements of the Contract Documents.
- D. Partial submittals will not be considered. Submit each portion of work complete in one submittal.
- E. Products subject to submittal review shall not be used in the work until submittals have been reviewed and bear the stamp and signature of A/E. Submittals will only be reviewed for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor shall be responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and the means and methods of construction, coordinating its work with that of all other trades, and performing all work in a safe and satisfactory manner. Corrections or comments made on submittals shall not relieve Contractor from compliance with requirements of Drawings and Specifications and shall not be considered an order for extra work.
- F. If information on previously reviewed shop drawings is altered, submit changes for review.
- G. Maintain complete copies of all final submittals at the project site.

1.03 SHOP DRAWINGS

- A. Required shop drawings are designated in the various specification sections. Submit shop drawings for review prior to fabrication, delivery, or installation in one of the following formats:
 - 1. PDF electronic file. An annotated PDF electronic file will be returned to Contractor.
- B. Each brochure of shop drawings shall contain an index of contents and shall consist of layout details, schedules, setting instructions, manufacturer's literature, and other data specifically prepared for the work. Reproductions of contract drawings may not be used without prior approval.

1.04 PRODUCT DATA

- A. Required product data are designated in the various specification sections. Submit product data for review prior to delivery or installation in one of the following formats:
 - 1. PDF electronic file. An annotated PDF electronic file will be returned to Contractor.

- B. Product data shall consist of manufacturer's literature, illustrations, and brochures of catalog cuts; instructions for handling, storage, and installation; and specifications and design data. Where manufacturer's standard literature includes multiple products or options, identify the specific products and options as required for this project.

1.05 SAMPLES

- A. Prior to fabrication, delivery, or installation, submit samples as designated in the various specification sections. Allow reasonable time for review and testing.
 - 1. Submit samples in sufficient quantity and of adequate size to show quality, type, and extremes of color range, finish, and texture. Submit a minimum of two sets of appearance and color samples.
- B. Label each sample stating material, description, project name, and Contractor's name. Expedite submittal of appearance and color samples following Notice to Proceed.
- C. Submit samples with transmittal letter requesting review; prepay transportation charges. Samples shall become Owner's property, unless otherwise designated.
- D. Samples will be reviewed for acceptability or selection of color, pattern, and texture only. Compliance with specifications is the responsibility of Contractor.
- E. Order no materials subject to sample review until receipt of written notice of completion of review. Installed materials shall match reviewed samples. No review of samples shall be taken in itself to change contract requirements.

1.06 CERTIFICATES OF COMPLIANCE

- A. Submit certificates of compliance as designated in the various specification sections in one of the following formats:
 - 1. PDF electronic file.
- B. Certificates shall be furnished by manufacturer, producer, or supplier of material or product and shall indicate that material or product conforms to or exceeds specified requirements. Include supporting reference data as appropriate. Certificates may be recent or previous test results on material or product, but must be acceptable to A/E.

1.07 PERMITS AND APPROVALS

- A. Submit permits, code inspections, and agency approval documents as designated in the various specification sections in one of the following formats:
 - 1. PDF electronic file.

1.08 TEST REPORTS

- A. Submit test reports as designated in the various technical specifications in one of the following formats:
 - 1. PDF electronic file.

1.09 OPERATION AND MAINTENANCE (O/M) MANUALS

- A. Submit operation and maintenance manuals covering each item of equipment furnished or installed under the Contract. Submit individual preliminary O/M brochures in PDF electronic format within 30 days after completion of shop drawing or product data review. Submit final O/M manuals prior to substantial completion in the following formats:

1. PDF electronic file of entire manual, and
 2. Two bound paper sets (unless otherwise specified in the various specification sections).
- B. For each item of equipment, include the following information:
1. A/E-reviewed shop drawings and product data.
 2. Installation and operating instructions.
 3. Maintenance instructions and address of authorized service center.
 4. Wiring diagrams and parts lists.
 5. Test data and certifications.
 6. Manufacturer's warranty information.
- C. Designate correct model number where literature covers more than one model.
- D. Write and furnish duplicate operation and maintenance instructions for items fabricated or assembled by Contractor.
- E. Electronic Manual:
1. Submit manual in the form of a single PDF file for entire project.
 2. Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 3. Group data according to specification section and organize with bookmarks. Bookmark both specification sections and individual products so that resulting bookmarks reflect a readily navigated document tree.
 4. Include an overall table of contents of the O/M manuals furnished.
- F. Paper Manuals:
1. Furnish data in 8-1/2 in. x 11 in. or 11 in. x 17 in. size; photographically reduce information if required. Place data into D-style, 3-ring hard cover binders; fold 11 in. x 17 in. sheets as required. Group data according to specification section and organize with tabbed index dividers on which the product name is typed.
 2. Label binders as follows:

[Systems or Equipment Designation]
OPERATION AND MAINTENANCE MANUAL
[Project Name]
[Project Location]
 3. Integrate general, mechanical, and electrical construction into same binder(s) when practicable. Individual subcontract O/M manuals will be acceptable provided they are placed in binder(s) as specified above.
 4. Include an overall table of contents of the O/M manuals furnished.

1.10 PROJECT RECORD DOCUMENTS

- A. Keep a current set of paper documents at project site that are marked to show all changes made during construction. Dimension underground and concealed work and utilities from permanent reference points; record vertical distances. Make and record measurements to the nearest 0.1 ft. Submit project record documents upon completion of Work.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

SECTION 01 57 19**TEMPORARY ENVIRONMENTAL CONTROLS****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide temporary environmental controls as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 DEFINITIONS

- A. References to "Colorado DOT Std. Spec." shall mean Colorado Department of Transportation Standard Specifications for Road and Bridge Construction (available at <https://www.codot.gov/business/designsupport/cdot-construction-specifications/2019-construction-specifications/2019-specs-book/2019-standard-specifications>).

1.03 SUBMITTALS

- A. Submit in accordance with Section 01 33 00: Submittals.
- B. Inspection Reports: Submit one copy of weekly inspection reports for erosion and sediment controls.
- C. Technical product literature for all commercial products to be used for sedimentation and erosion control.
- D. Contractor's Sedimentation and Erosion Control Plan: A plan describing Best Management Practices (BMPs) in accordance with local, state, and federal regulations and permits and this Section and Drawings stamped and sealed by a professional engineer as required.

1.04 PERMITS

- A. Owner will:
 - 1. Submit a Colorado Discharge Permit System (CDPS) General Permit for Stormwater Discharges Associated with Construction Activities, COR400000 Permit Application at least 10 working days prior to the start of construction.
 - 2. Provide Contractor with a copy of the notice of General Permit coverage.
 - 3. File Notice of Termination after construction site has undergone final stabilization.
- B. Contractor shall:
 - 1. Comply with the requirements of the General Permit and the Sedimentation and Erosion Control Plan and keep a copy of these documents at project site during construction.
 - 2. Post a copy of the Certificate of Permit Coverage in a conspicuous place on the construction site.

PART 2 PRODUCTS**2.01 SILT FENCE**

- A. Posts: 2-inch by 2-inch; 4 feet 6-inch long, wood stakes, suitably durable for driving without cracking, as approved by the A/E.

- B. Fabric: Woven, polypropylene, ultraviolet resistant material. Mirafi, Inc. Mirafi 100X, or approved equal.
- C. Prefabricated commercial silt fence, if substituted for built-in-field fence: Mirafi Inc. "Envirofence" or approved equal.

2.02 EROSION BALES

- A. Certified weed hay or straw certified under the North American Weed Free Forage Certification Program and the New Mexico State University Seed Certification (NMSUSC) Program. Each certified weed free erosion bale shall be identified with purple and yellow twine, and regional Forage Certification Program tag indicating the Regional Forage Certification Program Number unless otherwise specified by the program.
- B. Erosion bales shall be inspected for and Regionally Certified as weed free based on the Regionally Designated Noxious Weed and Undesirable Plant List. Do not unload certified weed free erosion bales or remove their identifying twine, wire or tags until the A/E has inspected and accepted them. Provide a certificate of compliance showing the transit certificate number or a copy of the transit certificate as supplied from the forage producer.

2.03 EROSION LOGS

- A. Curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log and a seamless casing comprised of a photodegradable tube netting. Fungus free, resin free and free of growth or germination inhibiting substances. Furnish logs with the minimum diameter and length shown on approved erosion and sediment control plans.

2.04 VEHICLE TRACKING PAD

- A. Constructed tracking pad complying with Colorado DOT Std. Spec.
- B. Use crushed natural aggregate with at least two fractured faces that meets the Colorado DOT Std. Spec. gradation requirements for vehicle tracking pads.
- C. Geotextile fabric for tracking pads shall be Colorado DOT Std. Spec., Subsection 712.08, Class 2 fabric.

2.05 PERMANENT SEED

- A. See Section 32 92 36.

PART 3 EXECUTION

3.01 EROSION CONTROL

- A. General: Maintain erosion control measures to protect the project site and prevent sediment pollution of adjacent water courses and properties. At a minimum, provide erosion control measures as indicated on the Drawings.
- B. Applicable Standards: Unless otherwise shown or specified, erosion control measures shall comply with:
 - 1. CDPS General Permit for Stormwater Discharges Associated with Construction Activities, COR400000.
 - 2. Colorado DOT Std. Spec.
- C. Time Period: Install erosion control measures prior to start of construction and maintain them until final completion of work. Unless otherwise instructed, remove temporary erosion control measures prior to final application for payment.

- D. Stripping: Strive to limit stripping of sod and vegetation to a period that will expose bare soil to the least possibility of erosion that construction requirements will allow.
- E. Diversions: Construct and maintain dams, channels, flumes, sumps, surface roughening, and other temporary diversion and protective works to divert streamflow and other surface water through or around construction site and away from work while construction is in progress. Unless otherwise specified, a diversion must discharge into the same natural drainageway in which its head waters are located.
- F. Sediment Barriers: Construct and maintain one or more sediment barriers to receive runoff leaving site.
 - 1. Affix silt fence to ground and maintain in suitable structural condition to last until vegetation establishes.
 - 2. Affix erosion logs to ground, either by wood stakes (recommended method) or by equivalent anchorage if frozen winter subgrade prevents driving stakes. Equivalent anchorages include using steel posts (removed after vegetation establishes) or erosion bales spaced at same intervals as planned stakes or other approved equivalent method.
- G. Trackout Control: Prevent tracking of soils and sediments onto public and private streets by constructing and maintaining stabilized work surfaces and trackout controls in accordance with Colorado DOT Std. Spec. Check dual tire vehicles for picked up tracking pad materials prior to leaving site. Refresh and loosen tracking pad as needed to allow stones to contact full tire tread (at least up to start of sidewall) of exiting vehicles. If a vehicle or tire washing station is established, water from washing shall drain into a suitable sediment trap or settling device. Remove at the end of each workday soils and sediment reaching public and private streets not part of the construction site.
- H. Re-establishment of Vegetation: Re-establish temporary or permanent vegetation on disturbed areas within the time limits allowed by applicable standards.
- I. Sediment Deposits: Remove and dispose of sediment deposits when deposits reach one-half the volume capacity of sediment barrier, unless otherwise indicated.

3.02 EROSION CONTROL MONITORING AND REPORTING

- A. Contractor shall conduct the following inspections:
 - 1. Weekly inspections of implemented erosion and sediment controls.
 - 2. Inspections of erosion and sediment controls within 24 hours after a precipitation event that produces 0.5 in. of rain or more during a 24 hour period.
- B. Contractor shall prepare weekly written reports of all inspections that include:
 - 1. Date, time, and exact place of inspection.
 - 2. Name of individual who performed inspection.
 - 3. An assessment of condition of erosion and sediment controls.
 - 4. A description of any erosion and sediment control implementation and maintenance performed.
 - 5. A description of the present phase of construction at site.

3.03 DUST CONTROL

- A. Minimize dispersion of dust from construction operations by application of water or other dust control materials. Controls shall confine dust and dirt within the immediate area of project. Masonry and debris shall be thoroughly soaked during demolition and loading operations.

3.04 NOISE CONTROL

- A. Provide noise control measures to limit the amount of noise and prevent nuisance. Properly equip all equipment with mufflers. Limit construction activities generating significant noise to normal working hours.

3.05 MATERIAL HANDLING AND SPILL PREVENTION

- A. Hazardous materials shall be handled and stored in accordance with the recommendations of the manufacturer and Material Safety Data Sheets (MSDS). Containers or equipment leaking any contaminants shall be repaired, removed from the site, or utilize drip pans for containment purposes.
- B. Spills of any contaminants shall be immediately reported to the Colorado Water Quality Control Division Hotline at 877.518.5608. Contractor shall maintain an emergency spill kit at the project site containing contaminant containment products and absorbent materials (inlet socks, dry absorbent materials, and similar products).

3.06 HAZARDOUS ENVIRONMENTAL CONDITIONS

- A. If underground petroleum storage tanks, petroleum contaminated soils, or other hazardous environmental conditions are encountered, and are not identified to be part of the work, Contractor shall immediately stop all work in connection with the hazardous condition and shall notify Owner and A/E. (See the General Conditions of the Contract for specific procedures that may apply.)

END OF SECTION

SECTION 01 57 60

CONSTRUCTION DEWATERING

PART 1 GENERAL

1.01 SUMMARY

- A. Provide construction dewatering as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.
- B. Work under this Section shall consist of removal of surface water and ground water as necessary to perform required work, including:
 - 1. Building and maintaining temporary impounding works, channels, and diversions.
 - 2. Furnishing, installing, and operating pumps, piping, and other facilities and equipment.
 - 3. Removing temporary works and equipment when no longer required.
- C. Contractor shall be responsible for design of dewatering system as specified below.

1.02 SUBMITTALS

- A. Dewatering and Diversion Plan: TBD

1.03 PERMITS

- A. General: TBD.

1.04 SITE CONDITIONS

- A. Information on flood flows at the dam and discharge capacity (TBD) is presented on the Drawings.
- B. Owner will maintain control and operation of dam during construction. Owner will cooperate and coordinate with Contractor in maintaining reservoir levels, providing for reservoir drawdown, and controlling releases.

PART 2 PRODUCTS

2.01 DESIGN REQUIREMENTS

- A. Contractor shall be responsible for:
 - 1. Protection of work area and safely passing stream flow for duration of construction.
 - 2. Means and methods for dewatering work areas, including the actual dimensions, configurations, stability, and dewatering capacity of cofferdams and protective works.
 - 3. All safety precautions and programs related to the work.

2.02 MATERIALS

- A. Contractor shall furnish all materials for and shall construct and maintain, as it deems necessary, all cofferdams, channels, drains, sumps, and protective works for protection of work areas.
- B. Contractor may select whatever materials it wishes for use in cofferdam, subject to permit requirements and the following:

1. Sheet piling may not be used within 10 ft of any permanent structure due to potential vibration damage.

PART 3 EXECUTION

3.01 DIVERTING SURFACE WATER

- A. Owner shall draw down the reservoir prior to construction and shall operate the existing bypass channel to divert normal river flows around the lake during construction. The existing bypass channel can divert up to 100 cfs around the lake. River flows exceeding 100 cfs may flow into the lake and cause levels to rise.
- B. Construct, maintain, and operate cofferdams, channels, flumes, sumps, and other temporary diversion and protective works to divert streamflow and other surface water through or around construction site and away from work while construction is in progress. Unless otherwise specified, diversions must discharge into the same natural drainageway in which its headwaters are located.
- C. Surface water diversion procedures shall not create a condition where erosion or deposition of materials occurs in stream. Riprap or other means of protection shall be provided for erosion protection adjacent to all cofferdams where flows could occur.
- D. Diversion works which are moved out of position by any cause during installation shall be righted or enlarged so as to provide necessary clearance.
- E. As work area is dewatered, diversion works that are not watertight shall be plugged or sealed as much as practical to reduce infiltration of water into work area.
- F. No shoring will be permitted in diversion works which will induce stress, shock, or vibration in permanent structure.

3.02 DEWATERING EXCAVATIONS AND WORK AREAS

- A. Foundations, cutoff trenches, and other parts of construction site shall be dewatered and kept free of standing water or excessively muddy conditions for proper execution of construction work. Furnish, install, operate, and maintain wells, drains, sumps, pumps, and other equipment needed to perform dewatering as specified. Dewatering methods that cause loss of fines from foundation materials will not be permitted.
- B. Maintain pumping operations to keep work area dry until all materials, equipment, and debris have been removed and diversion works is to be removed.

3.03 DEWATERING BORROW AREAS

- A. Maintain borrow areas in drainable condition or otherwise provide for timely and effective removal of surface waters that accumulate, for any reason, within borrow areas.

3.04 REMOVAL OF TEMPORARY WORKS

- A. Remove temporary works when no longer required; level and grade earth as required to restore appearance and to prevent obstruction to flow or any other interference with operation of or access to permanent works.
- B. Unless otherwise noted, pipes and casings shall be removed from temporary wells and wells shall be filled to adjacent ground level with gravel or other approved material.
- C. Construction dewatering material shall be removed from site and properly disposed of.

- D. Contractor shall make its own arrangements for a disposal site and shall pay all costs involved.

3.05 REPAIR OF DAMAGES

- A. Contractor shall repair, at its expense, any damage to foundations, structures, or other improvements caused by failure of any part of cofferdams or protective works.

END OF SECTION

SECTION 02 41 00**DEMOLITION****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide demolition work as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 RELATED SECTIONS

31 05 10 Site Preparation.

1.03 PRE-DEMOLITION CONFERENCE

- A. Contractor shall schedule a pre-demolition conference prior to beginning demolition to be attended by authorized representatives of A/E, Owner, and Contractor and by interested agencies.
- B. Contractor shall give notice of conference to agencies listed under "Permits and Notification of Agencies" article, below.

1.04 SUBMITTALS

- A. Demolition Work Plan: Submit a demolition work plan for A/E's information at least one week prior to start of work. Work plan shall include:
 - 1. Work Sequence: Sequence of operation for demolition and removal work.
 - 2. Noise and Dust Control Plan: Planned measures to minimize noise levels and control dust emissions from demolition activities.
 - 3. Material Disposal Plan: Planned material disposal/recycling locations.
- B. Permits: Submit copy of each application to and permit received from agencies having jurisdiction.
- C. Disposal/Recycling Documentation: Submit copy of each disposal manifest or letter of acceptance for all disposed and recycled materials.
- D. Make submittals in accordance with Section 01 33 00.

1.05 PERMITS AND NOTIFICATION OF AGENCIES

- A. Demolition Permit: Obtain and pay for demolition permit from local jurisdiction.
- B. Colorado Department of Public Health and Environment Notification: Submit and pay for Form DNA08 "Demolition Notification Application Form" to the Permit Coordinator at least 10 working days prior to demolition.
- C. Utility and Agency Notifications: Make arrangements with the following utilities and agencies so that work may proceed with least disruption of traffic and services in area. Notify Owner, A/E, adjacent property owners, and each of the following agencies having jurisdiction three days prior to beginning work.
 - 1. Department of Public Works.
 - 2. US Forest Service.
 - 3. Police Department.
 - 4. Fire Department.

1.06 WORKER QUALIFICATIONS

- A. Contractor is responsible for health and safety of its personnel during all demolition and construction work, including hazardous materials training, if required, in accordance with applicable laws and regulations.

1.07 EXISTING CONDITIONS

- A. Prior to bidding, thoroughly inspect existing conditions.
- B. Conditions existing at time of inspection for bidding purposes will be maintained by Owner in so far as practicable. However, variations within facilities may occur by Owner's removal and salvage operations prior to start of demolition work.
- C. Structures to be demolished will be vacated and use discontinued prior to start of work. Owner assumes no responsibility for actual condition of structures to be demolished.
- D. The existing low-level intake structure and outlet conduit will be submerged/buried at the time of bidding. Thus, these structures will not be accessible for inspection during bidding.

1.08 EXPLOSIVES

- A. Use of explosives will not be permitted.

PART 2 PRODUCTS

2.01 FILL MATERIAL

- A. Comply with the requirements of Section 31 24 00.

PART 3 EXECUTION

3.01 PROTECTION OF EXISTING IMPROVEMENTS

- A. Comply with requirements of Section 01 01 00 / 31 05 10 and governing regulations.
- B. Conduct operations to prevent damage to adjacent facilities. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of adjacent facilities to remain and to prevent premature collapse of structures to be demolished. Maintain work and site in orderly condition to prevent accidents.
- C. Protect survey monuments, reference points, benchmarks, and monitoring wells. Notify owner of disturbance.

3.02 SALVAGE

- A. Items designated for salvage to Owner shall be removed in a workmanlike manner and neatly stored on-site. Items not designated for salvage to Owner shall become property of Contractor and shall be removed from site.
- B. Salvaged items capable of disassembly shall be dismantled into individual components or subsections.

3.03 DEMOLITION

- A. See Drawings for specific areas, depths, and limits of demolition, removal, salvage, and disposal. Restrict demolition activities to project limits.

- B. Minimize dispersion of dust from demolition operations and dust generated by equipment traffic by application of water or other dust control materials. Controls shall confine dust and dirt within immediate area of demolition. Thoroughly soak masonry and debris during demolition and loading operations.
- C. Crushing of concrete, brick, and other masonry materials will be allowed on site, provided the material is not contaminated with hazardous materials.

3.04 BELOW-GRADE STRUCTURES

- A. Demolish and remove all foundations, footings, concrete slabs-on-ground, and all other below-grade construction within construction limits.

3.05 FILLING EXCAVATIONS AND VOIDS

- A. Completely fill below-grade areas and voids resulting from demolition in accordance with the requirements of Section 31 24 00.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from site and legally dispose of all debris, rubbish, and other materials resulting from demolition operations. Storage or sale of removed materials will not be permitted on site.
- B. Keep all haul roads clean and free of debris. Take measures to avoid littering waste.

3.07 RESTORATION

- A. Repair adjacent improvements damaged by demolition operations. Clean adjacent areas of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.
- B. Topsoil, fertilize, seed, and mulch exposed soils in accordance with Section 32 99 10, except areas designated to receive new construction.

3.08 CLOSEOUT

- A. Deliver to Owner all designated salvage items; obtain receipts from Owner for materials delivered.

END OF SECTION

SECTION 03 30 00**CAST-IN-PLACE CONCRETE****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide cast-in-place concrete work as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315.
- B. Product Data: Submit product data for each product specified.
- C. Mix Designs: Submit proposed mix designs to A/E ten days prior to beginning concrete work. Do not begin concrete production until mixes have been reviewed.
- D. Delivery Tickets: Submit delivery ticket to A/E for each load of concrete delivered to project.
- E. Test Reports: Testing agency shall submit copy of field and laboratory reports to A/E.
- F. Make submittals in accordance with Section 01 33 00.

1.03 QUALITY ASSURANCE

- A. Give A/E two working days notification of all planned concrete pours so that appropriate construction observation can be present at the project site.
- B. Prior to placing concrete, request review of reinforcement steel by A/E.

1.04 CODES AND STANDARDS

- A. Comply with the following codes and standards, except as otherwise designated:
 - 1. ACI 301 Specifications for Structural Concrete.
 - 2. ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - 3. ACI SP-2 Manual of Concrete Inspection.

1.05 TESTING

- A. Contractor shall arrange and pay for services of a qualified testing agency acceptable to Owner and independent of Contractor.
- B. Testing agency shall test concrete to measure slump, entrained-air content, temperature, and compressive strength to determine compliance with specifications. Furnish test apparatus and cylinders, perform on-site sampling and testing, submit samples, and perform laboratory tests.
- C. On-site tests shall be performed under observation of A/E unless waived.
- D. Slump, Air Content, and Temperature Tests:
 - 1. Perform slump, air content, and temperature tests prior to concrete placement each day, whenever there is a change in consistency of concrete, and when concrete cylinders are prepared.

2. Test for slump in accordance with ASTM C143, air content in accordance with ASTM C231, and temperature in accordance with ASTM C1064.
 3. If measured slump, air content, or temperature falls outside specified limits, immediately check another portion of same batch. In event of a second failure, concrete shall be rejected.
- E. Compressive Strength Tests:
1. During progress of work, prepare one set of test cylinders per 50 cu yd or fraction thereof for each class of concrete placed each day.
 2. Obtain samples in accordance with ASTM C172. Cast, identify, transport, and cure cylinders in accordance with ASTM C31. Test strength of cylinders in accordance with ASTM C39.
 3. If 6x12 in. cylinders are used, a set shall consist of three cylinders for laboratory curing. Obtain one 7-day and two 28-day compressive strength tests.
 4. If 4x8 in. cylinders are used, a set shall consist of four cylinders for laboratory curing. Obtain one 7-day and three 28-day compressive strength tests.
 5. If the requirements specified in the "Cold Weather Placing" article below apply, in addition to the above laboratory cylinders, a set shall also include two extra 6x12 in. or three extra 4x8 in. cylinders for field curing and laboratory testing. Obtain 28-day compressive strength tests on field cured samples.
 6. If test results indicate deficiencies, A/E may require additional tests and may order remedial work.

PART 2 PRODUCTS

2.01 CEMENTITIOUS MATERIAL

- A. Cement: Portland cement, ASTM C150, Type I.
- B. Fly Ash: ASTM C618, Class C.

2.02 AGGREGATES

- A. Fine and coarse aggregates, ASTM C33, consisting of clean, hard, durable sand and crushed rock, crushed gravel, or gravel.
- B. Coarse aggregate shall meet grading requirements for size number 67, 57, or 467. Maximum coarse aggregate size for each class of concrete shall be as indicated in Part 4 Schedules. Ratio of coarse aggregate to fine aggregate shall not be less than 1:1 nor more than 2:1.

2.03 WATER

- A. Mixing water shall be potable, free of oil, acid, excessive alkalinity, organic matter, and salts.

2.04 ADMIXTURES

- A. Air-entrained admixture shall conform to ASTM C260.
- B. Water reducing admixture shall conform to ASTM C494, Class A.
- C. Other admixtures which do not adversely affect strength and durability of concrete may be used with permission of A/E, if used in strict accordance with manufacturer's instructions. Care shall be exercised to assure that the admixture does not increase or decrease air content outside of allowable limits. Do not use salt or chemical anti-freeze admixtures.

2.05 FORMWORK

- A. Forms for Exposed Finish Concrete: Construct forms for exposed concrete surfaces with water-resistant plywood, metal, metal-framed plywood-faced, or other acceptable panel type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system if shown. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection. Rust-stained steel forms are not acceptable.
- B. Forms for Unexposed Finish Concrete: Construct forms for concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber that is dressed on at least one side and two edges for tight fit.

2.06 REINFORCING STEEL

- A. ASTM A615, Grade 60, new billet steel bars.
- B. Provide metal chairs, stirrups, spacers, and hangers to support reinforcement and insure against displacement during placement of concrete. All supports shall be plastic protected (Concrete Reinforcing Steel Institute [CRSI], Class 1) or stainless steel protected (CRSI, Class 2).

2.07 WELDED WIRE FABRIC

- A. ASTM A1064, welded steel wire fabric.

2.08 REINFORCING ADHESIVE

- A. General: Diameter and embedment depth of adhesive anchors shall be as indicated on the Drawings. Embedment depth into sound concrete shall develop the yield strength of reinforcing bar.
- B. Epoxy Adhesive: Hilti "HIT-RE 500-V3", Powers Fasteners "Pure110+", Simpson "SET-XP", or approved equal.
- C. Acrylic Adhesive: Hilti "HIT-HY 200", Powers Fasteners "AC100+ Gold", Simpson "AT-XP", or approved equal.

2.09 EXPANSION JOINT FILLER

- A. Premolded joint filler, ASTM D1751, asphalt-saturated cellulosic fiber; 1/2 in. thickness by depth of concrete, unless otherwise shown.

2.10 WATERSTOP

- A. PVC Waterstop: PVC 6 in. x 1/4 in., split bulb, ribbed type, unless otherwise shown. Use poly (vinyl chloride) with no reclaimed material. Provide factory-fabricated corners, intersections, and directional changes.
- B. PVC Retrofit Waterstop: PVC retrofit waterstop; Sika "Greenstreak 609", or approved equal. Use poly (vinyl chloride) with no reclaimed material. Factory fabricate corners, intersections, and directional changes.
- C. Hydrophilic Waterstop: Coiled, rope-like, cold joint waterstop impregnated with sodium bentonite which swells upon contact with water; CETCO "Waterstop RX", Sika "Swellstop", W.R. Meadows "Waterstop EC Plus", or approved equal.

2.11 BENCHMARK MARKER

- A. Brass or aluminum, 3-1/4 in. diameter, standard monument marker for embedding in cast-in-place concrete.

2.12 MOISTURE-RETAINING COVER

- A. Waterproof paper, polyethylene film, or polyethylene-coated burlap complying with ASTM C171.

2.13 CURING COMPOUND

- A. White, waterborne, membrane-forming curing compound, ASTM C309, Type 2, Class B, dissipating.

2.14 CONCRETE MIXTURES

- A. Conform to minimum standards for class and usage in Part 4 Schedules.
- B. Prepare design mixes for each type of concrete on the basis of compressive strength by methods recommended in ACI 301. Use an independent materials laboratory for preparing and reporting proposed mix designs.
- C. Provide water-reducing admixture for all concrete work. Provide air entraining admixture as scheduled.

PART 3 EXECUTION

3.01 FORMWORK INSTALLATION

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.
- B. Form 3/4 in. chamfers at corners to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer strips at changes in direction. Unexposed corners may be formed either square or chamfered.
- C. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- B. Adhesive for reinforcing bars shall not be installed into concrete that is less than 21 days old.

3.03 SLAB SUBGRADE PREPARATION

- A. Sprinkle subgrade with water.

3.04 STEEL REINFORCEMENT INSTALLATION

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

- C. Position reinforcement steel to provide minimum concrete cover as indicated on the Drawings. Unless otherwise specified on Drawings, minimum reinforcement cover shall be 3 in.

3.05 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install construction joints so that strength and appearance of concrete is not impaired, at locations shown or as approved by A/E.
- C. Isolation and Expansion Joints: Provide expansion joint filler to isolate slabs-on-grade from old concrete, walls, and other vertical surfaces, and where shown.
- D. Contraction Joints in Slabs: Provide contraction (control) joints in slabs-on-grade to form panels of patterns as shown. If joint pattern is not shown, provide joints not exceeding 15 ft in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays).
 - 1. Form contraction joints by inserting 1/4 in. x 1/4 slab depth premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed slabs may be formed by 1/8 in. x 1/4 slab depth saw cuts. Saw joints prior to formation of shrinkage cracks; achieve an even crisp joint.
- E. Contraction Joints in Walls: Provide contraction (control) joints in walls as shown. If not shown, provide a contraction joint within 10 to 15 ft of wall corner and at a maximum spacing of 25 ft thereafter.
 - 1. Total depth of inside and outside contraction joints shall be 1/4 of wall thickness.

3.06 WATERSTOP INSTALLATION

- A. PVC Waterstop: Provide continuous waterstop where shown on the Drawings and anywhere non-horizontal concrete joints extend upstream to downstream. Splice PVC waterstops by heat sealing adjacent surfaces in accordance with manufacturer's recommendations. Do not expose waterstop to a direct flame which could cause charring. Lap splices are not permitted. Embed approximately half of the waterstop on each side of joint. Support and protect waterstop during construction and repair or replace damaged waterstop.
- B. Hydrophilic Waterstop: Provide hydrophilic waterstop where shown on the Drawings. Install waterstop in accordance with manufacturer's recommendations. Place joint material to water side of reinforcement; comply with minimum cover requirements.

3.07 MIXING CONCRETE

- A. "Ready-mix" concrete shall be produced, delivered and handled in accordance with ASTM C94. Concrete shall be deposited at job site within one hour after introduction of water in mix. Care shall be taken in transferring concrete from truck or mixer to avoid segregation of aggregates in mixture.

3.08 CONCRETE PLACEMENT, GENERAL

- A. Place concrete as specified and in accordance with ACI 301. Maintain reinforcing steel in proper position.
- B. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints. Deposit

concrete as near as practicable to final location to avoid segregation from rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.

- C. Screed concrete to proper level to avoid excessive skimming or grouting.
- D. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from project site.
- E. Concrete shall not be placed around castings, frames, joints, and other embedded items until they have been accurately adjusted and set to required alignment and grade. Prior to placing of concrete, castings, frames, and embedded metal fixtures shall be painted on their contact surface with a heavy coat of asphaltic mastic or separated with expansion joint filler.

3.09 PLACING CONCRETE INTO FORMS

- A. Deposit concrete in forms in horizontal layers not deeper than 18 in. and in a manner to avoid inclined construction joints.
- B. Remove temporary spreaders in forms when concrete placing reaches elevation of spreaders.
- C. Consolidate concrete in forms by mechanical vibrating equipment and supplement by hand-spading, rodding or tamping. Use vibrators designed to operate at a speed of not less than 6000 impulses per minute when submerged in concrete. Vibration of forms and reinforcing will not be permitted.
- D. Do not use vibrators to move concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visibly effective. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other items without segregation of mix.

3.10 PLACING CONCRETE SLABS

- A. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until panel or section is complete.
- B. Consolidate concrete during placing operations using mechanical vibrating equipment. Thoroughly work concrete around reinforcement and other embedded items and into corners. Consolidate concrete placed in beams and girders of supported slabs, and against bulkheads of slabs on ground, as specified for formed concrete structures. Consolidate concrete in remainder of slabs by vibrating bridge screeds, roller pipe screeds, or other acceptable methods. Limit time of vibrating consolidation to prevent bringing an excess of fine aggregate to surface.
- C. Bring slab surfaces to correct level with straight edge and strike off. Use bull floats or darbies to smooth surface, leaving it free of humps or hollows. Do not sprinkle water on concrete surface while in plastic state. Do not disturb slab surfaces prior to beginning finishing operations.

3.11 COLD WEATHER PLACING

- A. Protect concrete work from physical damage or reduced strength caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as specified below.
 - 1. When air temperature falls to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 60 deg F (50 deg F for sections thicker than 31 in.) and not more than 90 deg F at point of delivery.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost, snow and ice before placing concrete.
3. During seasons when atmospheric temperature may be expected to drop below 40 deg F, concrete shall be protected by covering with impermeable paper and insulated blankets. Retain covering for seven days.
4. During seasons when atmospheric temperature may be expected to drop below 40 deg F, prepare extra concrete cylinders for field curing in accordance with "Testing" article above. Store field-cured cylinders in a location specified by A/E and in accordance with ACI 318 Section 26.5.3.2.

3.12 HOT WEATHER PLACING

- A. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as specified below.
 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 80 deg F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated in total amount of mixing water.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Spray forms, reinforcing steel, and subgrade just before concrete is placed.
 4. Do not use set-control admixtures, unless approved by A/E.

3.13 FINISHING FORMED SURFACES

- A. Provide standard rough finish to formed surfaces to be concealed in finish work or by other construction, unless otherwise designated. Standard rough form finish shall be the concrete surface having texture imparted by form facing material, with defective areas repaired and patched and fins and other projections exceeding 1/4 in. in height rubbed down with wood blocks.
- B. Provide standard smooth finish for formed surfaces exposed-to-view or to receive a covering applied directly or bonded to concrete, such as waterproofing, dampproofing, or paint. Standard smooth finish shall be the as-cast concrete surface obtained with form facing material, with defective areas repaired and patched and fins and other projections on surface completely removed and smoothed.

3.14 FINISHING UNFORMED SURFACES

- A. Thoroughly float surface after concrete has been struck off. Check and level surface plane to a tolerance not exceeding 1/4 in. in 10 ft when tested with a 10 ft straightedge placed on surface at not less than two different angles.
- B. Exterior walks and ramps shall have a lightly broomed surface with grain perpendicular to direction of travel.
- C. Edges shall be neatly trimmed with 1/4 in. radius edging tool.

3.15 CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Cure formed and unformed concrete for seven days or until 75 percent of the required 28-day compressive strength is obtained, whichever is less, but no less than three days regardless of the compressive strength obtained from testing.

- B. **Moisture-Retaining Cover:** Apply moisture-retaining cover to wet cure flat surfaces not receiving curing compound and other surfaces where formwork is removed prior to end of curing period.
- C. **Curing Compound:** Apply white-pigmented membrane curing compound to exterior slabs, walks, and ramps, unless otherwise indicated.

3.16 REMOVAL OF FORMS

- A. Remove forms from cast-in-place concrete only after concrete has achieved sufficient strength to support itself and superimposed loads; but in no case in less time than stated below.
- B. Forms not supporting weight of concrete, such as sides of walls and similar parts of the work, may be removed 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided that curing and protection operations are maintained.
- C. Forms supporting weight of concrete, such as elevated slabs and other structural elements, may not be removed in less than 14 days, and not until concrete has attained design minimum 28-day compressive strength.

3.17 EXPANSION JOINT SEALING

- A. Sealing of expansion joints is not required, unless otherwise shown.

3.18 CONCRETE SURFACE REPAIRS

- A. **Formed Surfaces:** Request inspection of concrete surfaces immediately after removal of formwork. After inspection, repair and patch defective areas as soon as practicable.
 - 1. Remove bulges and projections by chipping or tooling. Rub or grind surface after removal.
 - 2. For patching, use dry-pack mortar consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve and only enough water as required for handling and placing. Cut out honeycomb, rock pockets, voids over 1/4 in. diameter, and holes left by tie rods and bolts. Remove defects down to solid concrete but, in no case, to a depth of less than 1 in. Make edges of cuts perpendicular to concrete surface or slightly undercut to provide a key at edge of cut. Thoroughly clean, dampen with water, and brush-coat area to be patched with bonding agent. Place patching mortar before bonding agent has dried. Compact mortar in place and strike off slightly higher than surrounding surface. For exposed-to-view surfaces, patch shall match color of surrounding concrete.
 - 3. For patching less than 1 in. in depth, Contractor may propose a proprietary patching product in lieu of removing concrete to minimum depth of 1 in. Submit proposed product to A/E for approval.
- B. **Unformed Surfaces:** Repair surfaces that do not meet specified requirements.
 - 1. Correct low and high areas. Submit proposed repair products to A/E for approval.
 - 2. Fill cracks with an approved epoxy mortar which will match slab finish in density and performance. Grind filler smooth and even with adjacent surface, free of bumps or depressions at joint.

PART 4 SCHEDULES

4.01 CLASSES OF CONCRETE

<u>Class</u>	<u>Min. Comp. Strength @ 28 days, p.s.i.</u>	<u>Max. Slump</u>	<u>Max. Agg. Size</u>	<u>Min. Cement, Bags/ C.Y.</u>	<u>Max. Water-Cement Ratio</u>	<u>Air Content, % By Volume</u>
AA	4500	4"	3/4"	6*	0.45	5-8%
CC	3000	4"	3/4"	5-1/5	0.51	3-5%

* Fly ash shall be used to constitute between 15 to 30% by weight of total cementitious material.

4.02 USAGE SCHEDULE

A. Use class scheduled below, unless otherwise shown.

<u>Usage/Application</u>	<u>Min. Class</u>
All work, except as noted below	AA
Fence and sign post bases.....	CC

END OF SECTION

SECTION 05 50 00**METAL FABRICATIONS****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide metal fabrications (except structural steel framing) as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 COORDINATION

- A. Furnish inserts and anchoring devices to be embedded in concrete or masonry for installation of miscellaneous metal work. Provide setting drawings, templates, and instructions for installation of anchorage devices. Coordinate delivery with related work to avoid delays.
- B. See concrete and masonry sections for installation of inserts and anchors.

1.03 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal assemblies. Include product data, load tables, layouts, elevations, details of sections, connections, anchorage and accessory items. Provide templates for anchors and bolts installed under other sections.
- B. Make submittals in accordance with Section 01 33 00.

1.04 FIELD MEASUREMENTS

- A. Take measurements prior to shop fabrication. Allow for trimming and fitting to make field adjustments. Correct defects resulting from failure to take proper measurements.

PART 2 PRODUCTS**2.01 STEEL**

- A. Wide Flange Shapes: ASTM A992, Grade 50.
- B. Other Shapes, Plates, and Bars: ASTM A36 or ASTM A572, Grade 50.
- C. Tubing: ASTM A500, Grade B, cold-formed steel tubing.
- D. Pipe: ASTM A53, standard weight (Sch. 40) unless otherwise indicated.

2.02 STAINLESS STEEL

- A. Sheet, Strip, and Plate: ASTM A240 or ASTM A666, Type 304 or Type 316.
- B. Bars and Shapes: ASTM A276, Type 304 or Type 316.
- C. Tubing: ASTM A554, Grade MT304 or Grade MT316.
- D. Pipe: ASTM A312, Grade TP304 or Grade TP316.

2.03 CAST-IN-PLACE ANCHORS

- A. Concrete inserts shall be threaded or wedge type, galvanized castings of malleable iron, ASTM A47, or cast steel, ASTM A27. Provide hot-dip galvanized bolts, washers and shims.

2.04 EXPANSION ANCHORS

- A. Description: Wedge type, torque-controlled expansion anchors with washers.
- B. Acceptable Manufacturers: Anchors shall be Hilti, ITW Ramset/Red Head, Powers Fasteners, Simpson Strong-Tie, Wej-it, or approved equal.
- C. Performance Requirements: Minimum pullout strength shall be 1500 lb and minimum shear strength shall be 1500 lb, unless otherwise indicated. Anchor shall meet strength requirements for cracked concrete and for the spacing and edge conditions indicated on the Drawings.
- D. Materials: Unless otherwise indicated, provide stainless steel anchors for exterior use and with all stainless steel fabrications and zinc-plated anchors for interior use.
 - 1. Stainless Steel Anchors: ASTM F593 stainless steel bolts and ASTM F594 stainless steel nuts, Alloy Group 1 or Alloy Group 2.
 - 2. Galvanized Anchors: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5.

2.05 EPOXY ADHESIVE ANCHORS

- A. Description: Epoxy adhesive anchors with threaded rods, nuts, and washers.
- B. Performance Requirements: Diameter and embedment depth of anchors shall be as indicated on the Drawings. Embedment depth into sound concrete shall develop the tensile strength of anchor.
- C. Adhesive: Adhesive shall be Hilti "HIT-RE 500-V3", Powers Fasteners "Pure110+", Simpson "SET-XP", or approved equal.
- D. Rods, Nuts, and Washers: Anchor rods shall be stainless steel, ASTM F593, Alloy Group 1 or Alloy Group 2, Condition CW, with a minimum tensile strength of 100 ksi. Anchor rods shall be furnished with chamfered ends so that either end will accept a nut and washer. Alternatively, anchor rods shall be furnished with a 45 degree chisel point on one end for hole insertion. Nuts shall conform to ASTM F594, Alloy Group 1 or Alloy Group 2. Washers shall stainless steel of the same composition as bolt and nut.

2.06 FASTENERS

- A. General: Unless otherwise indicated, provide stainless steel fasteners for exterior use and with all stainless steel fabrications, zinc-plated steel fasteners at exterior walls, and unfinished steel fasteners elsewhere.
- B. Unfinished Steel Fasteners: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. Zinc-Plated Steel Fasteners: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers; with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5.
- D. Stainless Steel Fasteners: Regular hexagon-head annealed stainless steel bolts, ASTM F593, with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1 or Alloy Group 2.

2.07 FABRICATION

- A. Use materials of designated type, size, and thickness or, if not shown, of required strength, stiffness, and durability. Work to field measurements and shop drawings, using proven details of fabrication and support. Miscellaneous framing and support members shall comply with AISC Specification.
- B. Where exposed to view, use materials that are smooth and free of surface blemishes such as pitting, seam marks, roller marks, rolled trade names, and roughness.
- C. Form work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 in. unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or other impairment. Shearings and punchings shall be clean and true.
- D. Weld corners and seams continuously; comply with AWS recommendations. Grind exposed welds smooth and flush; match and blend with adjoining surfaces. Weld discoloration of exposed surfaces is not acceptable.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flathead (countersunk) screws or bolts.
- F. Provide anchorage devices and fasteners for securing miscellaneous metal items to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required. Cut, reinforce, drill, and tap miscellaneous metal work as required to receive hardware and connections required by other trades.
- G. Preassemble and fit items to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly identify units for reassembly and installation.

2.08 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Provide dull satin finish No. 6, unless otherwise indicated.
- C. When finishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install anchorage devices and fasteners for adequate support.
 - 1. Expansion anchors shall not be installed into concrete that is less than 7 days old.
 - 2. Adhesive anchors shall not be installed into concrete that is less than 21 days old.
- B. Perform cutting, drilling, and fitting, as required. Set work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.
- C. Fit exposed connections to form tight hairline joints. Field weld connections which cannot be shop welded because of shipping size limitations. Comply with AWS Code for manual shielded metal-arc welding, appearance and quality of welds, and methods for correcting

welding work. Grind exposed joints smooth and touch-up with shop primer. Do not weld, cut, or abrade surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

END OF SECTION

SECTION 31 05 10**SITE PREPARATION****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide site preparation as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.
- B. Work includes, but is not limited to:
 - 1. Protecting improvements, plants, and utilities.
 - 2. Temporarily removing and replacing improvements.
 - 3. Locating utilities and coordinating with utility companies.
 - 4. Clearing and grubbing trees and vegetation.
 - 5. Salvaging topsoil.
 - 6. Performing site demolition and abandonments.

PART 2 (NOT USED)**PART 3 EXECUTION****3.01 PROTECTION**

- A. Protect improvements on site and on adjoining properties. Provide barricades, coverings, or other types of protection as necessary to prevent damage and to safeguard against injury. Restore to original condition improvements damaged by the work or improvements which required temporary removal during construction.
- B. Protect existing vegetation indicated to remain against unnecessary cutting, breaking, bruising, or smothering by stockpiling excavated materials or parking of vehicles within drip line. Provide temporary fences, tree wells, barricades, or guards; repair or replace trees and vegetation damaged by construction operations.
- C. Maintain survey monuments, reference points, and benchmarks; notify Owner of disturbance to markers.
- D. No extra payment or time will be allowed for protection work that could have been suspected or anticipated by site inspection and interpretation of bidding documents prior to execution of contract.

3.02 LOCATING EXISTING UTILITIES

- A. Location and description of underground utilities and structures shown on drawings are approximate and are based on records available to Owner or surface features indicating their existence. There may be other utilities within project area that are not shown.
- B. Notify all affected utility companies of construction operations at least three working days before beginning work near their facilities. Do not begin excavation work until underground utility locations have been marked.
- C. Use caution when excavating so that exact location of underground utilities, both known and unknown, may be determined. Provide adequate protection and support for utilities during construction operations.

- D. If uncharted or incorrectly charted utilities are encountered during excavation work, or if proposed construction conflicts with existing utilities, give prompt notice and submit proposed solution to A/E for approval. Cooperate with Owner and public and private utility companies to keep their services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

3.03 SITE CLEARING

- A. Remove trees, stumps, snags, shrubs, brush, heavy growths of grass, weeds and other vegetation, improvements, rubbish and debris, and obstructions that interfere with proposed construction; remove items only as necessary for completion of work.
- B. Cut brush and vegetation flush with ground. Grub out stumps, roots having a diameter of 2 in. or larger, and root clusters to a depth of at least 2 ft below subgrade elevation for pavements, structures, and embankments and 6 in. below ground surface in other areas.
- C. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Cut back roots a minimum of 1 ft from concrete work, paving, and structures and to a depth of not less than 2 ft below structures, foundations, and embankments.

3.04 TOPSOIL STRIPPING

- A. Topsoil shall include all friable, fertile, loam soil suitable for grass and plants, found at surface, reasonably free of subsoil, clay lumps, stones, objects over 2-in. diameter, weeds, large roots, root clusters, and other objectionable material.
- B. Strip topsoil from project area to whatever depths encountered; prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping topsoil.
- C. Where trees are indicated to remain, terminate stripping a sufficient distance from such trees to prevent damage to root system.
- D. Stockpile topsoil in storage piles in areas where designated. Construct storage piles to freely drain surface water. Cover or sprinkle water on storage piles to prevent windblown dust.

3.05 DEMOLITION

- A. Remove structures, pavements, utilities, and other improvements within construction limits as shown and as required for construction.
- B. If removing only a portion of pavement, curb, gutter, sidewalk, or similar surface improvements, remove the improvement to an existing joint or saw cut the improvement to provide a smooth straight joint.
- C. Owner shall have first right to retain all useful salvage. All items not retained by Owner and construction debris shall become property of Contractor.

3.06 DEBRIS DISPOSAL

- A. Remove debris and excess materials from site and legally dispose of it; do not burn debris.

END OF SECTION

SECTION 31 20 00**EARTH MOVING****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide earth moving as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 RELATED SECTIONS

- 31 05 10 Site Preparation.
- 31 23 33 Trenching and Backfilling.
- 31 24 00 Embankments.
- 33 41 66 Drain Fill.
- 33 42 15 Piping and Accessories.

1.03 CLASSIFICATION

- A. Excavation of materials encountered under this work will be unclassified without regard to type, difficulty to remove, or suitability for use in construction.

1.04 SUBMITTALS

- A. Test Reports: Submit reports for laboratory and field tests required under "Testing" article. Test reports for footing, slab, and pavement subgrades shall be submitted prior to placing concrete or paving materials. Make submittals in accordance with Section 01 33 00.

1.05 TESTING

- A. Contractor shall arrange and pay for soil sampling and testing of fill material by a qualified testing agency, acceptable to Owner and independent of Contractor.
- B. Laboratory Testing:
1. Perform at least two sets of laboratory tests for each 1,000 cu yd of compacted Embankment Fill collected from on-site embankment fill.
 2. Fill materials shall be tested for gradation in accordance with ASTM C136 and ASTM C117 for conformance with ASTM D2487 gradation limits, and for liquid limit and plasticity index in accordance with ASTM D4318. Optimum moisture-maximum density curve for fill material shall be determined in accordance with ASTM D1557.
 3. Results of laboratory tests shall be received prior to any material placement.
- C. Field Testing:
1. Perform a minimum of one density test for each vertical foot of fill for every 100 linear feet of Embankment Fill. Field density tests shall be in accordance with ASTM D2922 or ASTM D1556.
 2. Perform dynamic cone penetrometer testing (DPI) to confirm suitability of existing subgrade materials under the cast-in-place concrete weir and the cast-in-place concrete buttress low-level intake structure. Perform at least four (4) DPI tests on the weir subgrade and one (1) DPI test on the buttress subgrade. Perform tests prior to scarification in accordance with ASTM D6951 to verify that the subgrade has a DPI less than 30mm per blow. Record DPI values to refusal or 36 in. below original top of subgrade, whichever comes first. Notify A/E if any DPI are greater than 30mm per blow.

3. Where soil materials do not conform to type or density specified, soil shall be replaced or reworked to conform. Cost of extra tests for replaced or reworked areas shall be paid for by Contractor.
- D. If in opinion of A/E, based on reports of testing agency and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional cost to Owner.

1.06 PROTECTION

- A. Protect existing improvements, utilities, trees and shrubs, and reference marks in accordance with Section 31 05 10.

1.07 BLASTING

- A. Use of explosives is not permitted.

PART 2 PRODUCTS

2.01 SOIL MATERIALS, GENERAL

- A. Soil materials shall be free of organic matter, debris, frozen soils, ice, and other objectionable materials. Rock particles larger than maximum size specified shall be removed prior to placement of soil.
- B. Select existing material from required excavations may be used for fill or backfill if it meets the specified product requirements. If necessary, furnish additional approved material from suitable off-site sources.

2.02 EMBANKMENT FILL

- A. See Section 31 24 00 Embankments.

2.03 DRAIN FILL MATERIALS

- A. See Section 33 41 66 Drain Fill.

2.04 STRUCTURAL FILL

- A. Select soils complying with ASTM D2487 soil classification groups GW, GP, SW, or SP; or these groups in combination with groups GM, GC, SM, or SC (dual symbol soils). Aggregate shall pass a 1-1/2-in. sieve and not more than 35% shall be retained on a No. 10 sieve. Maximum 12% by weight shall pass a No. 200 sieve; plasticity index shall not exceed 5.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prepare site for work in accordance with Section 31 05 10.
- B. Layout and stake lines and grades as required to complete the work.

3.02 EXCAVATION FOR STRUCTURES

- A. Excavate to achieve necessary dimensions, lines, and grades. Conform to elevations and dimensions shown within a tolerance of plus or minus 1 in and extending a sufficient distance from footings and foundations as required for bracing and supports, concrete formwork, installation of services, other required construction, and for inspection.

- B. For footings and foundations, take care not to disturb bottom of excavation. Excavate to final grade just before concrete is placed. Trim bottoms to required lines and grades to leave solid, undisturbed base to receive Structural Fill, Embankment Fill, or concrete as shown.

3.03 EXCAVATION FOR BERMS

- A. Excavate trenches for berms to the cross-sections and grades as shown.

3.04 TRENCHING

- A. Excavate trenches so that pipe can be laid safely and accurately to required line and grade. Hand excavate for bells, fittings and projections to allow for proper jointing and to ensure that pipe rests evenly along barrel and is not resting on bell.
- B. Bed pipes in compacted Embankment Fill, as specified below.
- C. Trench widths in ordinary soil shall be limited at top of pipe to not less than a 6 in. clearance on either side of barrel to allow for installation of bedding material between pipe and trench wall. Maximum trench width at top of pipe shall be outside pipe diameter plus 24 in. (30 in. minimum). Trench above top of pipe may be sloped, stepped or vertical to comply with state and federal regulations regarding trenches.

3.05 UNAUTHORIZED EXCAVATION

- A. Unauthorized excavation consists of removal of materials beyond indicated elevations or side dimensions without specific direction of A/E. Unauthorized excavation, as well as remedial work, shall be at Contractor's expense. Notify A/E prior to backfilling if unauthorized excavations are made.
- B. Under footings, foundations, underpinning, equipment bases, and retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete or compacted fill may be used to bring elevations to proper position when approved by A/E.
- C. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed.

3.06 STABILITY OF EXCAVATIONS

- A. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Slope sides of excavations to angle of repose of material excavated; otherwise, shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Take precautions to prevent slides or cave-ins when excavations are made in locations adjacent to backfilled excavations, and when sides of excavations are subjected to vibrations from traffic, machinery, or any other source. Comply with applicable codes and ordinances.

3.07 SHORING AND BRACING

- A. Carry down shoring and bracing as required as excavation progresses. Maintain shoring and bracing while excavations are open.
- B. Provide and maintain shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Use timbers that are sound and free of large or loose knots.
- C. Provide permanent steel sheet piling or pressure treated timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops as required and leave permanently in place.

3.08 DEWATERING

- A. Perform earthwork in a manner to prevent surface water and ground water from flowing into excavations. Promptly remove water from excavations using pumps, sumps, and dewatering system components necessary to convey water away from excavations. If underground springs are encountered, notify A/E before proceeding.
- B. Convey water removed from excavations and rain water to collection or run-off areas. Provide and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use foundation or utility trench excavations as temporary drainage ditches.
- C. Provide filter material, trash screens, and other devices around pumps and intakes to avoid pumping or discharging sediment from construction site.

3.09 STOCKPILING

- A. Stockpile excavated materials meeting the requirements for fill and backfill where directed until required for the work. Place, grade, and shape stockpiles for proper drainage. Locate stockpiles a sufficient distance from edge of excavations, even though such excavations may be sheeted and braced, to prevent such material from falling or sliding into excavations and to prevent cave-ins.

3.10 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 deg F by covering with dry insulating materials of sufficient depth to prevent frost penetration.

3.11 SUBGRADE EXAMINATION AND PREPARATION

- A. Examine subgrade prior to placing fill. Remove organic materials and debris subject to rot or corrosion. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with subgrade.
- B. Inform A/E of unsuitable, unconsolidated subgrade soils.
- C. After subgrade soil is stable, scarify top 6 to 8 in., moisture condition, and compact surface to density specified in Part 4 Schedules.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by A/E, without additional compensation.

3.12 ADDITIONAL EXCAVATION (OVER EXCAVATION)

- A. If unsuitable bearing materials, such as poorly compacted fill, existing foundations, rubble, debris, or organic deposits, are encountered at required subgrade elevations, carry excavations deeper and replace excavated material with properly compacted Embankment Fill as directed by A/E.
- B. Where over excavation below footing subgrade is required, widen over excavation beyond footing edges at least 1 ft for each 1 ft of over excavation depth.
- C. Removal of unsuitable material and its replacement as directed will be paid for as extra work, unless a pay item is included in the Bid Schedule. Do not proceed with extra or unit price work until authorized.

3.13 FILLING AND BACKFILLING, GENERAL

- A. Do not place fill until required subgrade preparation has been examined and approved by testing agency.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance by A/E of construction below finish grade.
 - 2. Removal of concrete formwork.
 - 3. Removal of trash and debris.
 - 4. Removal of temporary shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities or leave in place if required.
- C. Place fill or backfill in approximately horizontal layers; do not exceed the maximum lift thickness specified in Part 4 Schedules before compaction. Spread piles and windrows uniformly.
- D. Adjacent to structures, place fill or backfill to prevent damage and allow structures to assume loads gradually and uniformly, at approximately the same rate on all sides of structure. Adjacent to earth-retaining structures, do not place fill or backfill until concrete has reached specified 28-day compressive strength (minimum 14 days). Do not travel heavy equipment over cast-in-place concrete work until it has reached specified 28-day compressive strength (minimum 14 days), unless otherwise approved.

3.14 SOIL FILL

- A. Place and compact fill materials in layers to required elevations as follows:
 - 1. Under turf and planted areas: Use Embankment Fill.
 - 2. Under rock and rubble embankment core: Use Embankment Fill.
 - 3. Under cast-in-place overflow weir: Use Embankment Fill.
 - 4. For backfill behind retaining walls: Use Embankment Fill.
 - 5. Under cast-in-place concrete low-level intake buttress: Use Structural Fill.
- B. Do not place soil fill on frozen subgrades.

3.15 TRENCH BEDDING AND BACKFILL

- A. Use undisturbed earth for bedding by shaping it to conform to pipe. If bedding in undisturbed earth is not possible, compact Embankment Fill according to Part 4 Schedules.
- B. Immediately after installation of pipe, provide tamped Embankment Fill up to a minimum depth of 1 ft above pipe. Take special care in placing and tamping initial backfill material so alignment and grade of pipe is not disturbed nor pipe damaged.
- C. Backfill more than 1 ft over pipe shall meet material requirements for area in which pipe is located.

3.16 GRADING

- A. Grade areas within project limits to achieve cross sections, lines, and elevations indicated. Slope grades to direct water away from structures and to prevent ponding. Finish surface to be reasonably smooth and free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.
- B. Finish subgrades to required elevations within the following tolerances:
 - 1. Turf and Unpaved Areas: Plus or minus 1 in.
 - 2. Structure Slabs: Tolerance of 0.5 in. when tested with 10 ft straightedge.

3.17 CONTROL OF MOISTURE CONTENT

- A. During placement and compaction, maintain moisture content of materials within optimum range.
- B. Apply water to fill materials by sprinkling materials at borrow site or after placement on fill if necessary. Obtain uniform moisture distribution by discing, blading or other approved methods prior to compaction of layer.
- C. If material is too wet when deposited on fill, remove or dry it to specified moisture content prior to compaction.
- D. If top surface of a preceding layer of compacted fill becomes too dry to permit suitable bond, scarify and moisten it by sprinkling to an acceptable moisture content prior to placement of next layer of fill.

3.18 COMPACTION

- A. Compact each layer of soil material to not less than the percentage of maximum density specified in Part 4 Schedules.
- B. Provide compaction equipment required to obtain specified compaction. Compaction by travel of grading equipment is not considered adequate for uniform compaction. Small vibratory compactors are required wherever fill is placed adjacent to foundation walls, footings, and piers. Pipe bedding and initial backfill shall be hand or mechanically tamped.

3.19 MAINTENANCE

- A. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
- B. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add fill or backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove excess excavated material and trash, debris, and other waste materials and legally dispose of them off-site.

PART 4 SCHEDULES

4.01 COMPACTION SCHEDULE

<u>Material Type</u>	<u>Usage</u>	<u>Lift Thickness ⁽¹⁾</u>	<u>Compaction ⁽²⁾</u>
Embankment Fill	All areas.	6"	95%
Structural Fill	All areas.	8"	95%

(1) Place manually compacted materials in maximum 4 in. layers.

(2) Percent of maximum density determined in accordance with ASTM D1557 (Modified Proctor test).

END OF SECTION

SECTION 31 24 00**EMBANKMENTS****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide earth embankments as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 RELATED SECTIONS

- 01 57 60 Construction Dewatering.
- 31 05 10 Site Preparation.
- 31 20 00 Earth Moving.
- 31 23 33 Trenching and Backfilling.
- 33 41 66 Drain Fill.

1.03 SUBMITTALS

- A. Submit the following information for embankment fill materials two weeks prior to start of construction:
1. Source of proposed materials.
 2. Grain size analysis in accordance with ASTM C136 and, if more than 15% passes the #200 sieve, use ASTM C117 to demonstrate acceptability of source.
 3. Optimum moisture-maximum density curve for fill materials in accordance with ASTM D1557.
 4. Direct shear tests performed at 95% Modified Proctor density, near optimum moisture in accordance with ASTM D3080.
- B. A/E will review submittals for conformance with the specified requirements and the design parameters. A/E will also confirm material compatibility with drain fill.
- C. During construction, submit test reports for field tests.
- D. Make submittals in accordance with Section 01 33 00.

1.04 TESTING

- A. General: Contractor shall arrange and pay for laboratory and field testing of fill material by a qualified testing agency, acceptable to Owner and independent of Contractor.
- B. Laboratory Testing:
1. Perform at least two sets of laboratory tests for each 1,000 cu yd of compacted material used from each source.
 2. Fill materials shall be tested for gradation in accordance with ASTM C136 and ASTM C117 for conformance with ASTM D2487 gradation limits, and for liquid limit and plasticity index in accordance with ASTM D4318. Optimum moisture-maximum density curve for fill material shall be determined in accordance with ASTM D1557.
 3. Results of laboratory tests shall be received prior to any material placement.
- C. Field Testing:
1. Perform a minimum of one density test for each vertical foot of fill for every 100 lin ft of embankment fill.
 2. Field density tests shall be in accordance with ASTM D6938 or ASTM D1556.

3. Where soil materials do not conform to type or density specified, soil shall be replaced or reworked to conform. Cost of extra tests for replaced or reworked areas shall be paid for by Contractor.

1.05 PROTECTION

- A. Protect existing improvements, utilities, trees and shrubs, and reference marks in accordance with Section 31 05 10.

PART 2 PRODUCTS

2.01 SOIL MATERIALS, GENERAL

- A. Soil materials shall be free of organic matter, debris, frozen soils, ice, and other objectionable materials. Rock particles larger than maximum size specified for each type of material shall be removed prior to placement of soil. If not otherwise specified, rock particles shall be no larger than 1/2 the specified lift (layer) thickness.
- B. Obtain fill materials from required excavations and grading within site limits, and from designated borrow areas.

2.02 EMBANKMENT FILL

- A. Select, natural, free draining soils complying with ASTM D2487 soil classification groups CL or SC, or combinations thereof, and suitable for compaction. Maximum aggregate size shall be 1.5 in. No greater than 20% of particles shall be retained on the No. 4 sieve and no greater than 50% of particles shall be retained on the No. 200 sieve.
- B. Material shall be plastic during plastic limit portion of Atterberg Limits test. Direct shear tests shall indicate that friction angle of material is 36 deg or greater.

PART 3 EXECUTION

3.01 FOUNDATION PREPARATION

- A. Foundations for embankment fill shall be stripped in accordance with Section 31 05 10 to remove vegetation and topsoil. If shown, or required to remove unsuitable materials, provide excavation work.
- B. Except as otherwise specified, grade earth foundation surfaces to remove surface irregularities and scarify parallel to axis of fill or otherwise acceptably score and loosen to a minimum depth of 2 in. Control moisture content of loosened material as specified for embankment fill, and compact and bond surface materials with first layer of fill as specified for subsequent layers of fill.
- C. Foundation and abutment surfaces shall be not steeper than 1 horizontal to 1 vertical, unless otherwise specified. Fill test pits and other cavities with material conforming to specifications for earth fill.
- D. Keep earth abutment surfaces free of loose, uncompacted earth in excess of 2 in. in depth normal to slope and at a moisture content that embankment fill can be compacted against them to affect a good bond between fill and abutments. Clear rock foundation of loose materials by hand or other effective means. Keep foundations and abutments free of standing water when fill is placed.
- E. Occasional rock outcrops in foundations for embankment fill, except in dams and other structures designed to restrain movement of water, shall not require special treatment if they

do not interfere with compaction of foundation and initial layers of fill or bond between foundation and fill.

3.02 PLACEMENT

- A. Do not place fill until required excavation and foundation preparation have been inspected and approved. Do not place fill upon frozen surface; no snow, ice, or frozen material shall be incorporated in fill.
- B. Place fill in approximately horizontal layers; do not exceed maximum loose layer thickness specified. Spread piles and windrows uniformly. Spreading and compacting equipment shall travel approximately parallel to centerline of embankment.
- C. Place fill to be hand compacted or compacted by manually directed power tampers in layers not to exceed maximum thickness specified for manually compacted fill.
- D. Adjacent to structures, place fill to prevent damage and allow structures to assume loads gradually and uniformly at approximately the same rate on all sides of structure. Do not travel heavy equipment over cast-in-place concrete work until cured a minimum of 14 days, unless otherwise approved.
- E. Earth fill in dams, levees, and embankments designed to retain water shall meet the following requirements:
 - 1. Distribute materials throughout each zone uniformly, free from lenses, pockets, or layers differing substantially in texture or gradation.
 - 2. Scarify layers too hard and smooth for proper bond with succeeding layer; scarify parallel to axis of fill to a depth of 2 in.
 - 3. Maintain top surfaces of fills approximately level during construction, except provide a crown or cross-slope of not less than 2 percent for drainage. If the work requires fill to be placed higher at parts of an embankment, maintain top surface of each part level as specified above.
 - 4. Place fill in continuous layers from abutment to abutment, except where openings to facilitate construction or to allow stream flow are authorized. Route equipment travel approximately parallel to embankment centerline.
 - 5. Construct embankments required to be built at different levels so slopes of bonding surfaces between adjacent levels of embankment are not steeper than 3 horizontal to 1 vertical. Strip bonding surface of loose material and scarify, moisten, and recompact at specified moisture content and density to insure good bond with new fill.

3.03 CONTROL OF MOISTURE CONTENT

- A. During placement and compaction of fill, maintain moisture content of materials being placed within the specified range.
- B. Apply water to fill materials by sprinkling at excavation site or during placement of fill if necessary. Obtain uniform moisture distribution by discing, blading, or other approved methods prior to compaction of layer. If material is too wet when deposited on fill remove or dry it to specified moisture content prior to compaction.
- C. If top surface of preceding layer of compacted fill or a foundation or abutment surface in zone of contact with fill becomes too dry to permit suitable bond, scarify and moisten it by sprinkling to an acceptable moisture content prior to placement of next layer of fill.

3.04 COMPACTION

- A. Compact each layer of fill to a mass density not less than the percent of maximum density specified in 4.01 Embankment Compaction Schedule.

- B. Manually compact fill adjacent to structures to density of surrounding fill by means of manually directed power tampers or plate vibrators. Do not operate heavy equipment within 2 ft of any structure; do not operate vibrating rollers within 5 ft of any structure. Compaction by means of drop weights will not be permitted.
- C. Do not pass compacting equipment over cast-in-place concrete until cured 14 days (7 days for precast concrete with a concrete cradle) or over conduits until backfill has been placed above structure to a height equal to one-half the clear span width of structure or pipe or 2 ft, whichever is greater.
- D. Compacting of fill adjacent to structures may be started when concrete has attained design strength, determined by test cylinders (ASTM C31). If concrete strength is not determined by tests, passage of heavy equipment and compaction of fill adjacent to structures may not be started until the following curing periods have elapsed:

Structure	Minimum Curing Period
Retaining walls, counterforts, and wing walls	14 days
Cast-in-place conduits and risers (forms removed)	14 days
Cast-in-place concrete conduits and risers (with inside forms in place)	7 days
Walls backfilled on both sides simultaneously	7 days
Footings	3 days
Precast conduits with concrete cradle	2 days
Precast conduits, bedded	1 day
Antiseep collars and cantilever outlet bents	3 days

3.05 REMOVAL AND REPLACEMENT OF DEFECTIVE FILL

- A. Fill placed at densities lower than the specified minimum density, or at moisture contents outside the specified acceptable range or otherwise not conforming to requirements shall be removed and replaced by acceptable fill. Replacement fill and foundation preparation shall conform to all requirements.

3.06 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove excess excavated material and trash, debris, and other waste materials and legally dispose of them off-site.

PART 4 SCHEDULES

4.01 EMBANKMENT COMPACTION SCHEDULE

<u>Zone</u>	<u>Material Type</u>	<u>Layer Thickness (Max)</u>		<u>Moisture Content</u>	<u>Compaction Density *</u>
		<u>Machine Compaction</u>	<u>Hand Compaction</u>		
Embankment	Fill	8"-10"	N/A	+/- 3% of optimum	95%

*ASTM D1557 (Modified Proctor density)

END OF SECTION

SECTION 31 37 00**RIPRAP****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide loose rock riprap, including geotextile filter fabric, as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Submit information on sources of riprap. Provide access to sources to enable A/E to inspect and obtain samples. Do not deliver riprap until reviewed by A/E.
 - 2. Submit fabric product data. Include material samples, certification of physical properties, and installation procedures.
- B. Make submittals in accordance with Section 01 33 00.

1.03 TESTING

- A. A/E may perform tests to verify that riprap and completed work meet specified requirements. However, these tests are not intended to provide Contractor with information it may need to assure that materials and workmanship meet requirements of specifications, and their performance will not relieve Contractor of responsibility of performing its own tests for that purpose.

PART 2 PRODUCTS**2.01 RIPRAP**

- A. Riprap shall consist of hard, dense, durable stone, angular in shape and resistant to weathering. Rounded stone or boulders shall not be used as riprap material. The stone shall have a specific gravity of at least 2.5. Each piece shall have its greatest dimension not greater than three times its least dimension.
- B. Riprap gradation shall comply with requirements of Colorado DOT Std. Spec., Section 506, Table 506-2.

2.02 RIPRAP BEDDING

- A. Material used for riprap bedding shall meet the requirements for Drain Gravel in Section 33 41 66 – Drain Fill.

PART 3 EXECUTION**3.01 SUBGRADE PREPARATION**

- A. Grade subgrade surfaces to lines and grades as shown with an allowance for riprap. Remove organic materials. Compact soft subgrade soils. When fill to achieve subgrade lines is required, provide granular materials.

3.02 PLACING DRAIN GRAVEL RIPRAP BEDDING

- A. Place riprap bedding at the locations, thicknesses, lines, and grades shown on the Drawings.
- B. General: Surfaces to receive bedding materials shall be smooth and firm, free from deleterious materials, and shall be brought to the lines and grades shown on the Drawings. Prepare the surfaces that are to receive bedding materials, by rolling and trimming as necessary to enable a uniform lift of bedding of the specified thickness to be placed thereon. Surface preparation will include, but not be limited to, bringing all low spots up to the lines and grades shown on the Drawings with compacted fill and removing all material projecting above lines and grades shown on the Drawings.
- C. Placement: Place the bedding materials in a manner that minimizes segregation and results in uniform lifts of bedding materials of the thicknesses shown on the Drawings. Place riprap bedding materials from the bottom of the slope working up the slope.
- D. Moisture condition the materials as necessary to control dust and to minimize segregation.
- E. Compaction is not required for the bedding materials; however, bedding materials shall be spread in such a manner as to form a smooth, uniform layer under the riprap.

3.03 EQUIPMENT-PLACED ROCK RIPRAP

- A. Place riprap at the locations, thicknesses, lines, and grades shown on the Drawings.
- B. Stones with typical stone dimensions that are equal to D50 and larger shall be placed at the top surface with faces and shapes matched to minimize voids and form as smooth a surface as practical. Dumping and backhoe placement alone is not sufficient to ensure a properly interlocked system. The material may be machine-placed and then arranged as necessary by use of an excavator with a multi-prong grappling device or by hand to interlock and form a substantial bond.
- C. Hand placement will be required where necessary to correct obvious irregularities and to prevent damage to adjacent improvements and wherever equipment placement methods are unsatisfactory.

3.04 HAND-PLACED RIPRAP

- A. Riprap shall be securely bedded with larger rocks firmly in contact one to another. Spaces between larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge.

END OF SECTION

SECTION 32 92 36**NATIVE SPECIES SEEDING****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide native species seeding as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.
- B. Types of work required include, but are not limited to, the following:
 - 1. Preparing, topsoiling, seeding, and mulching areas designated on Drawings to receive native species seeding.
 - 2. Maintaining native species seeding for a 1-year period.

1.02 RELATED SECTIONS

31 05 10 Site Preparation: For topsoil removal.

1.03 SUBMITTALS

- A. Product Data: Submit product labels for seed mixtures proposed for use on project.
- B. Make submittals in accordance with Section 01 33 00.

1.04 WORK SEASONS

- A. Conduct seeding during favorable weather conditions. Acceptable seeding times in the project area are from spring thaw to consistent ground freeze. "Spring thaw" shall be defined as the earliest date in a new calendar year in which seed can be buried 1/2" into the surface soil (topsoil) through normal drill seeding methods. "Consistent ground freeze" shall be defined as that time during the fall months in which the topsoil, due to freeze conditions, prevents burying the seed 1/2" into the topsoil through normal drill seeding operations. Comply with seed supplier's recommendations for planting conditions.

PART 2 PRODUCTS**2.01 TOPSOIL**

- A. Loam, sandy loam, silty clay loam, or clay loam humus-bearing surface soil; 100% passing the 2 in. sieve; neither excessively acid, nor excessively alkaline; reasonably free of subsoil, clay lumps, brush, and weeds; and free of extraneous matter harmful to plant growth.
- B. Reuse topsoil salvaged from within work area. If necessary, obtain topsoil to supplement insufficient quantities at site from naturally well-drained local sources; do not obtain from bogs or marshes.

2.02 NATIVE SEED

- A. General: Deliver in bags tagged and labeled to show percentage of purity and germination. Seed shall have been tested within 1-year prior to date of seeding and shall conform to latest State and Federal seed laws.
- B. All Areas: Seed mixture shall be High Altitude Native Grass Mix by Beauty Beyond Belief Wildflower Seed (Boulder, Colorado, 303.530.1222, www.bbbseed.com), or approved equal.

2.03 MULCH

- A. Field or marsh hay or straw of oats, barley, rye, or triticale.
- B. Mulch shall be inspected for and Regionally Certified as weed free based on the Regionally Designated Noxious Weed and Undesirable Plant List for Colorado, Wyoming, Montana, Nebraska, Utah, Idaho, Kansas, and South Dakota
- C. Mulch materials shall not contain excessive moisture which prevents uniform feeding through mulching machine.

2.04 FERTILIZER

- A. Fertilizer as recommended by seed provider.

PART 3 EXECUTION

3.01 FINISH GRADING

- A. Disturbed area shall be graded to be reasonably smooth; fill all washes and gullies to conform to required lines and grades.

3.02 TOPSOIL PLACEMENT

- A. After completion of finish grading, place minimum of 4 in. of topsoil over areas indicated to be seeded.
- B. Smooth grade topsoil to eliminate irregularities. Remove rocks and hard soil clods. Finished topsoil grade shall be 1 in. below adjoining grade of any surfaced area.

3.03 FERTILIZING

- A. Apply fertilizer to prepared topsoil according to seed provider's recommendations.

3.04 SEEDING

- A. Apply native seed mixture using a drop spreader or broadcast spreader using method and application rate recommended by seed provider.

3.05 MULCHING

- A. Apply straw mulch uniformly in all seeded areas at rate of 1-1/2 tons per acre to a loose depth of 1 to 2 in. Anchor mulch using non-asphalt-based tackifier or mulch nets installed and stapled according to manufacturer's recommendations.
- B. Mulch shall be applied within 4 hours after seeding. Areas not mulched within 4 hours after seeding or prior to precipitation or damaging winds on site shall be reseeded with the specified seed mix and re-mulched at the Contractor's expense.
- C. Avoid applying mulch in windy conditions.

3.06 HYDROMULCHING

- A. At Contractor's option, mulch may be applied by hydromulch method at a minimum rate of 1700 lb per acre.
- B. Mix components in water using equipment specifically designed for hydromulch application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application. Include nonasphaltic tackifying agent in mixture.

3.07 POST PLANTING MAINTENANCE

- A. Maintain seeded areas for 1-year following planting.
- B. Follow seed provider recommendations for maintenance and care during the 1-year period following planting.

3.08 ESTABLISHMENT AND REPLACEMENT

- A. Seeded areas which fail to become established during the 1-year maintenance period shall be reseeded and maintained to ensure healthy growth. Because native seed mixtures are difficult to assess the first year of growth, satisfactory establishment of the cover crop and general erosion control by vegetation shall constitute establishment.

END OF SECTION

SECTION 33 01 36**CURED-IN-PLACE PIPE LINING****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide cured-in-place lining as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.
- B. Existing 30-inch steel outlet pipe to be lined is deteriorating, but is generally believed to be intact with no obstructions. Pipe has not been televised by Owner.
- C. Cured-in-place lining shall be installed over the entire length of the 30-inch steel outlet pipe, both existing and newly installed, from the intake structure to the outfall structure.
- D. The pipe shall be televised before and after installation of the cured-in-place lining.

1.02 RELATED SECTIONS

33 42 15 Piping and Accessories.

1.03 SUBMITTALS

- A. Product Data: Submit product data for lining materials.
- B. Installer Qualifications: Submit documentation of installer qualifications as specified in "Quality Assurance" article below.
- C. Work Procedures: Submit proposed procedures for review at least 10 days prior to beginning lining operations.
- D. Inspection Report: Submit report of inspection performed following lining. Include pressure test results and video recording of inspection. Video shall be recorded on a standard definition DVD suitable for use in a computer DVD drive.
- E. Make submittals in accordance with Section 01 33 00.

1.04 QUALITY ASSURANCE

- A. Liner installer shall have a minimum of 20,000 linear feet of pipe lining experience with the specified product.

1.05 PATENTS

- A. Contractor shall warrant to Owner that the methods, materials and equipment used herein, where covered by patents, are furnished in accordance with applicable licenses and that the prices included on Bid Form include applicable royalties and fees in accordance with such license. Warranty shall include defense against claims from infringement of patent and shall save harmless Owner and his Representatives from loss on account thereof.

PART 2 PRODUCTS**2.01 LINING MATERIAL**

- A. General: Pipe lining system must be recommended by the manufacturer for the type of application shown on the Drawings. A/E approval of pipe lining system required.

- B. Size: Liner shall be properly sized to diameter and length as shown.
- C. Structural Capacity: Pipe lining system must be capable of supporting no less than 58 ft of overburden material with an estimated unit weight of 125 lb per cu ft (pcf). The pipe lining shall also be capable of supporting 200 lb per sq (psf) of surcharge load located above the overburden.

PART 3 EXECUTION

3.01 INSTALLATION OF LINER

- A. Install liner according to manufacturer's recommendations.
- B. Finished lining shall be continuous over entire length of an insertion run between the low-level intake structure (upstream) and the outfall structure (downstream) and shall be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. Lining shall be impervious and free of any leakage from pipe to surrounding ground or from ground to inside of lined pipe.
- C. Defects which will affect integrity or strength of lining in the foreseeable future or warranty period shall be repaired at Contractor's expense in a manner mutually agreed by Owner and Contractor.

3.02 INSPECTION

- A. Upon completion, televise pipe and prepare a written report of findings.

END OF SECTION

SECTION 33 41 66**DRAIN FILL****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide drain fill for drainage blankets as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 RELATED SECTIONS

- 01 57 60 - Construction Dewatering.
- 31 20 00 - Earth Moving.
- 31 24 00 - Embankments.

1.03 SUBMITTALS

- A. Drain Fill Source: At least two weeks prior to start of construction, submit source location for drain fill materials.
- B. Test Report: Submit grain size analysis of proposed drain fill to demonstrate acceptability of source.
- C. Make submittals in accordance with Section 01 33 00.

1.04 TESTING

- A. A/E will perform tests to verify drain fill in place. These tests are not intended to provide Contractor with information needed to assure proper execution of work and test performance will not relieve Contractor of responsibility of performing tests for that purpose.
- B. At least one grain size analysis will be performed for each type of drain fill for each 100 lin ft along the embankment where drain fill is placed. Contractor shall provide A/E free access to placed material for purpose of obtaining samples for testing. Samples will be obtained from in-place, compacted drain fill.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Drain fill aggregates shall be stored and handled by methods that prevent segregation of particle sizes or contamination by other materials.

PART 2 PRODUCTS**2.01 DRAIN FILL MATERIALS**

- A. Drain fill aggregates shall be sand, gravel, crushed stone or mixtures thereof, composed of clean, hard, durable mineral particles free from organic matter, clay balls, soft particles, excessive fine-grain soils, or other substances that would interfere with their free-draining properties.
 - 1. Not more than 15 percent, by weight, shall be flat, elongated particles.
 - 2. Not more than 5 percent of material finer than a No. 4 sieve shall be crushed limestone.
 - 3. Material passing the No. 200 shall be non-plastic.
- B. Drain fill shall comply with the following gradation by weight:

<u>Sieve Designation</u>	<u>Percent Passing</u>		<u>Drain Gravel</u>
	<u>Type 1⁽¹⁾</u>	<u>Type 2⁽²⁾</u>	
1"			
3/4"		100	
1/2"			100
3/8"	100	90-100	85-100
No. 4	95-100	20-55	10-30
No. 6			
No. 8	80-100	5-30	0-10
No. 16	50-85	0-10	0-5
No. 25			
No. 35			
No. 50	5-30	0-5	
No. 100	0-10		
No. 200	0-5		

(1) ASTM C33 Fine Aggregate

(2) ASTM D448 No. 89

(3) ASTM No. 8

PART 3 EXECUTION

3.01 PREPARATION

- A. Foundation surfaces and trenches shall be clean and free of organic matter, loose soil, foreign substances, and standing water when drain fill is placed. Earth surfaces upon or against which drain fill will be placed shall not be scarified.
- B. Contaminated drain fill near edge of each excavation section shall be removed prior to continuation of placement of drain fill.
- C. Do not prepare any more base than can be satisfactorily covered that same working day.

3.02 PLACEMENT

- A. Drain fill shall not be placed until subgrade has been inspected and approved by A/E. Drain fill shall not be placed over or around pipe or drain tile until installation of pipe or tile has been inspected and approved.
- B. Drain fill shall be placed uniformly in layers not more than 12 in. deep before compaction. When compaction is accomplished by manually controlled equipment, layers shall be not more than 8 in. deep. Material shall be placed in a manner to avoid segregation of particle sizes and to ensure continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed with or otherwise contaminate drain fill.
- C. Traffic shall not be allowed to cross over drains at random. Equipment crossovers shall be maintained, and number and location of such crossovers shall be established and approved prior to beginning of drain fill placement. Each crossover shall be cleaned of all contaminating materials and shall be inspected and approved by A/E before additional drain fill is placed.
- D. Damage to foundation surface or to sides or bottoms of trenches occurring during placement of drain fill shall be repaired before drain fill placement is continued.
- E. Upper surface of drain fill constructed concurrently with adjacent zones of earth fill shall be maintained at an elevation at least 1 ft above upper surface of adjacent fill.
- F. Drain fill over or around pipe or drain tile shall be placed in a manner to avoid displacement of pipe or tile in line or grade.

3.03 CONTROL OF MOISTURE

- A. Moisture content of drain fill materials shall be controlled. When addition of water is required, it shall be applied in such a way as to avoid excessive wetting of adjacent earth fill.

3.04 COMPACTION

- A. Type 1: Each lift of Type 1 drain material shall be compacted by a minimum of 3 passes over the entire surface with the track of a crawler-type tractor or tire of front-loader equipment weighting at least 30 tons.
- B. Type 2 and Drain Gravel: No compaction of Type 2 drain material and Drain Gravel will be required beyond that resulting from placing and spreading operations.

END OF SECTION

SECTION 33 42 15**PIPING AND ACCESSORIES****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide piping and accessories as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 RELATED SECTIONS

- 31 20 00 Earth Moving.
- 31 23 33 Trenching and Backfilling.
- 33 01 36 Cured-in-Place Pipe Lining.
- 33 41 66 Drain Fill.

1.03 SUBMITTALS

- A. Product Data: Submit product data for pipe, fittings, and other piping accessories.
- B. Test Reports: Submit report for leakage testing.
- C. Record Drawings: Accurately record locations of pipe and field changes on a set of Drawings. Prior to final application for payment, deliver record drawings to A/E.
- D. Make submittals in accordance with Section 01 33 00.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Carefully unload and store pipe to prevent chipping, cracking, or damage to surface coatings. Pipe shall not be skidded upon ground. Repair damaged coatings.

PART 2 PRODUCTS**2.01 REINFORCED CONCRETE PIPE**

- A. ASTM C76, Class III minimum, unless otherwise designated. Joints shall be bell and spigot or tongue and groove type with rubber ring gasket, ASTM C443.
- B. Tying of all joints of pipe is required. Tie bolt fasteners shall be hot-dip galvanized steel and shall comply with WisDOT Standard Detail Drawing 8F4.

2.02 CORRUGATED POLYETHYLENE (PE) PIPE

- A. AASHTO M252/294, Type SP, high density, dual-wall corrugated PE pipe with integrally formed smooth interior and Class 2 perforations. Joints shall consist of an integral bell and spigot and shall be water tight according to requirements of ASTM D3212 (10.8 psi pressure test).

2.03 STEEL PIPE

- A. Steel pipe conforming to AWWA C200 and having the following minimum wall thickness:

<u>Diameter</u>	<u>Minimum Wall Thickness</u>
30"	0.375"

- B. Joints shall be in accordance with AWWA C200. Joints may be welded or flanged. Pipe ends for field-welded joints shall be beveled in accordance with AWWA C206.
- C. Steel pipe shall have an interior lining of primer and coal-tar enamel (AWWA C203), cement mortar (AWWA C205), or near-white blast cleaned (SSPC SP-10) and painted with one 7-mil coat of coal-tar epoxy, unless otherwise noted.
- D. Exterior of all pipe shall receive two coats of coal tar epoxy, 7 mils dry thickness per coat, applied to commercial blast cleaned surface (SSPC SP-6).

2.04 PVC PLASTIC PIPE

- A. Poly (vinyl chloride) (PVC) plastic pipe, Sch. 40 or 80, type 1, grade 1, meeting requirements of ASTM D1785, unless otherwise designated. Joints shall be solvent cement type or threaded type (Sch. 80 only) using teflon tape.
- B. Provide Sch. 40 or 80, ASTM D2466 or D2467, socket-type fittings, in size and classification the same as connecting pipe, suitable for solvent cement joints, unless otherwise noted.
- C. Solvent cement shall be a compatible solution of type 1, grade 1, unplasticized PVC plastic compound in accordance with ASTM D2564, free-flowing and free of lumps, undissolved particles or foreign matter that will adversely affect ultimate joint strength or chemical resistance.

PART 3 EXECUTION

3.01 LINE AND GRADE

- A. Provide staking as required to install pipe and drainage structures to line and grade as shown on Drawings.

3.02 LAYING OF PIPE

- A. Where practicable, begin at lowest point of proposed pipe line; lay with bell end or receiving groove edge upstream in direction of laying.
- B. Cut in and connect to existing pipe and drainage structures as required. When connection to an existing pipe is required, contact A/E if adjustments to inverts are needed.
- C. Pipe shall be laid immediately following the trench preparation and bedding provisions of Section 31 20 00 / 31 23 33.
- D. Exercise care when handling pipe. Ropes, slings, or other devices must be used for lowering pipe into trench. Only pipe which is suitable for use is to remain on site. Damaged or broken pipe shall be immediately separated from acceptable pipe.
- E. Lay pipe uniformly to line and grade on a prepared bed providing even support along entire barrel. Excavate bell holes in bedding material so pipe will rest on barrel and not on bell. As work progresses, interior shall be cleared of dirt and debris. Do not lay pipe where water is above bedding material except where A/E determines that foundation is stable, pipe will not be displaced upward, and joint construction will not be affected by water.
- F. Each pipe shall be bedded by hand or by equally careful means to 12-in. cover before laying subsequent pipes. Fill space between pipe and trench wall in 6-in. layers and manually compact. Pipe sizes larger than 15-in. diameter may require mechanical compaction of bedding material.
- G. When work is not in progress, water may be allowed to flow into newly laid pipe if provisions are made to prevent dirt from washing into pipe.

3.03 JOINTING

- A. Joint materials and methods shall conform to manufacturer's recommendations.
- B. Pipe joints shall be clean before joints are made. No joints shall be made under water.

3.04 ALIGNMENT AND GRADE

- A. Contractor shall view the 8" corrugated PE drain pipe after installation and backfill using a televised inspection. If defects are found due to failure of installation or materials, Contractor shall promptly correct defects at no additional cost to Owner.

END OF SECTION

SECTION 35 22 28**STAINLESS STEEL SLIDE GATES****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide stainless steel slide gates as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 RELATED SECTIONS

- 03 30 00 – Cast-in-Place Concrete.
- 33 42 15 – Piping and Accessories.

1.03 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for slide gate and operator. Include hydraulic requirements for operator.
- B. Certification: Submit manufacturer's certification that slide gate and operator comply with the specified requirements.
- C. O/M Manuals: Submit operation and maintenance manuals for slide gate and operator.
- D. Make submittals in accordance with Section 01 33 00.

1.04 FIELD MEASUREMENTS

- A. Field verify dimensions prior to gate fabrication.

PART 2 PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. Subject to compliance with the specified requirements, provide products by one of the following manufacturers, or approved equal:
 - 1. Golden Harvest.
 - 2. Hydro-Gate.
 - 3. Rodney Hunt.
 - 4. WACO Products.
 - 5. Whipps.

2.02 DESIGN REQUIREMENTS

- A. Design gates to comply with AWWA C561 and the following conditions.
- B. Gates shall have self-adjusting seals. Gates that utilize adjustable wedges are not acceptable.
- C. To compensate for debris strikes, gate bottom edge shall be designed to resist a static load of 1,000 lb per lin ft that is applied 3 in. above gate bottom lip.
- D. Gates shall be operable at variable gate open positions in increments of 0.10 ft to regulate flow. Gate shall be able to remain in any closed, partially open, or fully open position for long periods of time without excessive vibrations.

- E. Gates shall not vibrate excessively during opening, closing, or static positioning.

2.03 SLIDE GATES AND ACCESSORIES

- A. Provide fabricated stainless steel slide gates complying with AWWA C561 and 4.01 Stainless Steel Slide Gate Schedule.
- B. Gates designated for flush-bottom closure shall have a seal mounted either on gate slide or on gate frame. Full length of contacting member shall be accurately machined to make an effective seal when gate is closed.

2.04 MANUAL OPERATORS

- A. A hand-operated hydraulic pump shall be provided as back up operator.

2.05 PORTABLE HYDRAULIC OPERATOR

- A. One underwater (fully submerged) hydraulic operating system shall be provided to operate the gate. The system shall be designed to operate the gate smoothly and uniformly and hold the gate in the desired position. The gate shall be operated manually with a provided portable, gasoline-powered hydraulic pump mounted to a hand cart.
- B. Connections to hydraulic lines will be accessible via a locked valve box located at the top of the dam embankment.
- C. The hydraulic power unit (HPU) shall be designed to operate using environmentally-friendly (confirm with Owner prior to constructing HPU) hydraulic fluid such as Mobil 224H.
- D. Gate assembly shall have indicator device at operator location (top of dam) indicating position of gate in 0.10 ft increments.

2.06 GROUT AND FRAME LEAKAGE SEAL

- A. Grout furnished for installation of embedded components shall be as recommended by gate manufacturer for the site conditions.
- B. Frame to concrete connection shall be free of leakage. Acceptable leakage seals include a layer of grout between frame and existing concrete, rubberized membranes, or injectable waterstops. Design and furnishing of leakage seal materials shall be responsibility of gate manufacturer.

2.07 FINISH

- A. Ferrous metal surfaces shall receive surface preparation and high-solids epoxy protective coating or equivalent suitable for outdoor exposure before shipment to site.
- B. Machined surfaces, tapped holes, and threads shall receive protective coat of grease.

PART 3 EXECUTION

3.01 GATE INSTALLATION

- A. Install gates in accordance with shop drawings and manufacturer's recommendations and in a manner that will prevent leakage around seats and binding of gates during operation.
- B. Surfaces of metal against which concrete will be placed shall be free from oil, grease, loose mill scale, loose paint, surface rust, and other debris or objectionable coatings.

- C. Anchor bolts, thimbles, and frames shall be secured in true position and in forms and held in alignment during placement of concrete. Mechanical anchors shall not be installed into concrete that is less than 7 days old. Adhesive anchors shall not be installed into concrete that is less than 21 days old.
- D. Concrete surfaces against which seals will bear or against which flat frames or plates are to be installed shall be smooth and uniform.
- E. Install frame and anchorages in a manner that prevents leakage between frame and concrete buttress and secures gate for all load conditions.
- F. When a gate is attached to a wall thimble, mastic or resilient gasket shall be applied between gate frame and thimble in accordance with recommendation of gate manufacturer.

3.02 LIFT INSTALLATION

- A. Gate stems, stem guides, and gate operators shall be carefully aligned so that stem is parallel to guide bars or angles on gate frame after installation.

3.03 OPERATIONAL TESTS

- A. Clean, lubricate, and otherwise service gates and operators in accordance with manufacturer's instructions. Operate each gate several times throughout its full range. Test functioning of each operator. Adjust as necessary to insure satisfactory operation of gate system.
- B. Should any gate vibrate excessively during opening, closing, or static positioning (see "Design Requirements" article above), manufacturer shall promptly attend a meeting onsite with A/E to discuss cause and solutions for vibrations.

3.04 LEAKAGE TEST

- A. Perform a leakage test on all slide gates. Maximum permissible leakage at normal pool shall be 0.10 gallons per minute per foot of seating perimeter in compliance with AWWA C561, 5.2.2. Gate shall not leak more than 2 gallons per minute along any one foot length of seal perimeter. Adjust gates to meet permissible leakage.

PART 4 SCHEDULES

4.01 STAINLESS STEEL SLIDE GATE SCHEDULE

Quantity	Size (in.)* w x h	Stem*	Type*	Frame Type	Max. Unbalanced Head (ft)		Wall Thimble	Operation
					Seating	Unseating		
1	36x36	HC	FB	Flange Frame	55	10	No	M and P

*Abbreviations:

Size: w - clear opening width, h - clear opening height

Stem: HC - hydraulic cylinder

Type: FB - flush bottom

Operation: M - manual P - portable hydraulic operator

END OF SECTION

CONSTRUCTION DRAWINGS FOR HOGCHUTE DAM REPAIRS

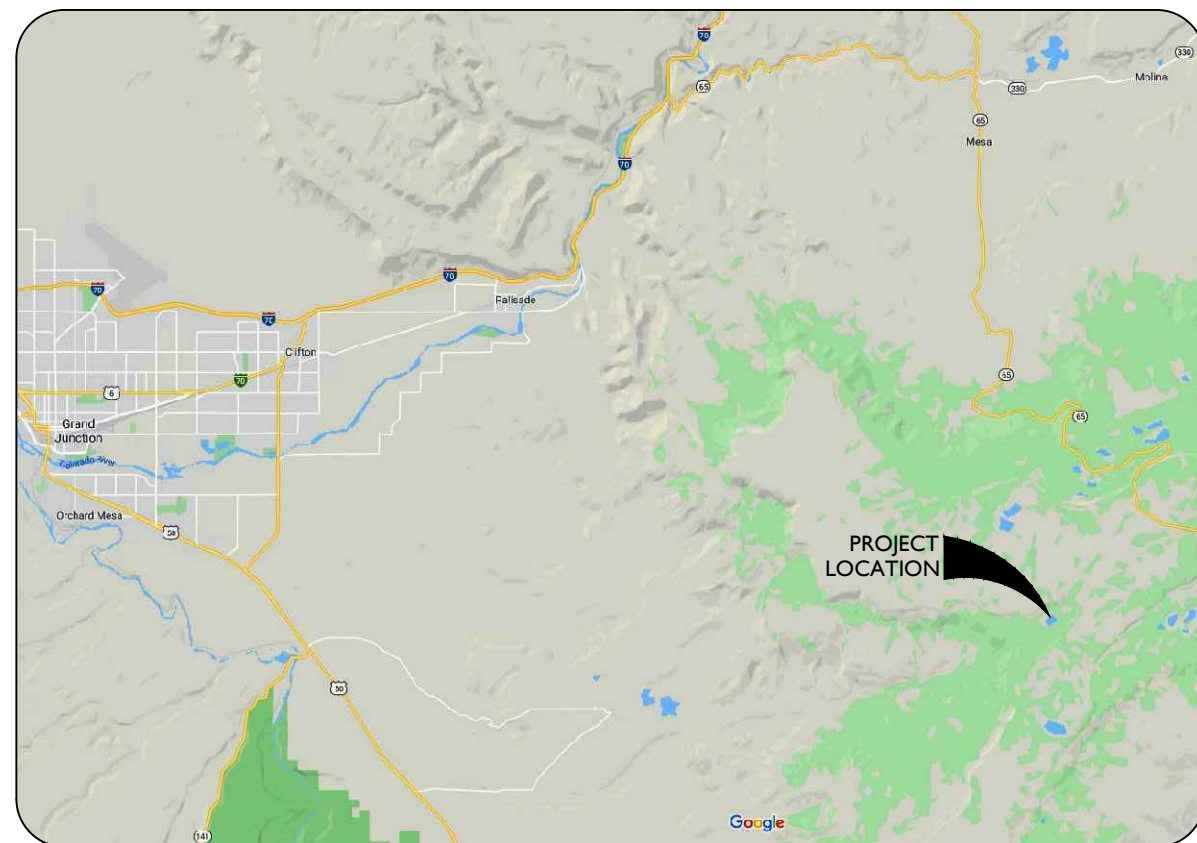
DAM ID NO. 420127 CONSTRUCTION NO. XXX

PREPARED FOR THE
CITY OF GRAND JUNCTION, MESA COUNTY, COLORADO
WATER DIVISION 4, WATER DISTRICT 42

SEPTEMBER 2020

VICINITY MAP

NOT TO SCALE



CONTACT INFORMATION



OWNER

City of Grand Junction
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333 West Avenue, Building C
Grand Junction, Colorado 81501
(970) 244-1558



CIVIL ENGINEER

Ayres Associates
Dale Mathison, P.E.
3665 JFK Parkway, Building 2, Suite 100
Fort Collins, Colorado 80525
(970) 223-5556



THESE PLANS HAVE BEEN PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

DALE MATHISON
COLORADO P.E. NO. 0050522

APPROVED ON THE _____ DAY OF _____ 2020

STATE ENGINEER

BILL McCORMICK, CHIEF, COLORADO DAM SAFETY
COLORADO P.E. NO. 0029127

THESE PLANS REPRESENT THE AS-CONSTRUCTED CONDITIONS OF HOGCHUTE DAM REPAIRS TO THE BEST OF MY KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY OTHERS, AS OF THE _____ DAY OF _____ 2020

DALE MATHISON
COLORADO P.E. NO. 0050522

**60% SUBMITTAL
NOT FOR CONSTRUCTION**
09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556



TITLE SHEET

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Date	Revisions

Project Mgr. CTG	Designed By: AUS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO.
26-1144.00
DRAWING NO.
G01
SHEET 1 OF 13

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 COVER.DWG Tuesday, September 29, 2020 5:12 PM By: RICKS, RONALD

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 GENERAL NOTES.DWG Tuesday, September 29, 2020 4:41 PM By: RICKS, RONALD

SHEET INDEX		
SHEET	DRAWING	DESCRIPTION
1	G01	TITLE SHEET
2	G02	INDEX TO DRAWINGS, SURVEY NOTES, AND GENERAL NOTES
3	G03	SITE ACCESS AND BORROW AREAS PLAN
4	G04	EXISTING SITE, STAGING, AND STOCKPILE AREAS PLAN
5	C01	DAM EXISTING CONDITIONS AND DEMOLITION PLAN
6	C02	DAM PLAN
7	C03	DAM PROFILE AND DETAIL
8	C04	DAM DETAILS
9	C05	DAM SECTIONS
10	C06	SPILLWAY PLAN 1 OF 2
11	C07	SPILLWAY PLAN 2 OF 2
12	C08	SPILLWAY DETAILS AND SECTIONS
13	C09	SPILLWAY OVERFLOW WIER PLAN AND DETAILS

GENERAL NOTES:

1. xxx

SURVEY NOTES:

BENCHMARK:

THE HORIZONTAL AND VERTICAL CONTROL SHOWN IS BASED ON UNADJUSTED GPS STATIC OBSERVATIONS TIED TO THE GRAND MESA AREA (GMA) GEOID ESTABLISHED BY MESA COUNTY. THE NORTHERLY CONTROL POINT (POINT 2) IS A PK NAIL AND WASHER EMBEDDED IN ROCK AND IS THE BENCHMARK FOR THIS PROJECT. THE SOUTH POINT (POINT 3) IS A ROUND HEAD BOLT EMBEDDED IN ROCK.

SURVEY CONTROL POINT TABLE				
POINT NUMBER	DESCRIPTION	ELEVATION	NORTHING	EASTING
1	CP /PK-W/	9902.462	15722.80	45752.48
2	CP /PK-W/	9903.882	16393.64	45673.48
3	CP /BOLT/	9905.415	15477.14	45781.19
10	CP /BOLT/	9901.937	16157.18	45763.76
11	CP /BOLT/	9902.010	15831.42	45734.61
12	CP /BOLT/	9902.091	15606.47	45772.61

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09/29/20

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SCALE ACCORDINGLY



INDEX TO DRAWINGS,
SURVEY NOTES, AND
GENERAL NOTES

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr. CTG	Designed By: AJS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO.
26-1144.00
DRAWING NO.
G02
SHEET 2 OF 13

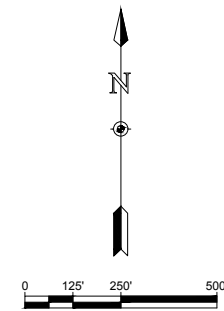
Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 SITE ACCESS.DWG Tuesday, September 29, 2020 4:41 PM By: RICKS, RONALD



INSET MAP
NOT TO SCALE



TO HIGHWAY 65. SEE
INSET MAP FOR ACCESS
TO PROJECT LOCATION



NOTES:

xx

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NOT FOR CONSTRUCTION**
09/29/20

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SCALE ACCORDINGLY

3665 JFK Parkway
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(970) 223-5556



SITE ACCESS AND
BORROW AREAS PLAN

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr. CTG	Designed By: AUS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO.

26-1144.00

DRAWING NO.

G03

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 STAGING AND BORROW AREAS.DWG Tuesday, September 29, 2020 4:41 PM By: RICKS, RONALD



NOTES:

XX

**60% SUBMITTAL
NOT FOR CONSTRUCTION**
09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

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AVRES

EXISTING SITE, STAGING,
AND STOCKPILE AREAS PLAN

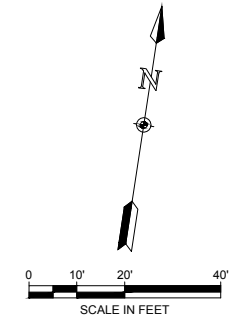
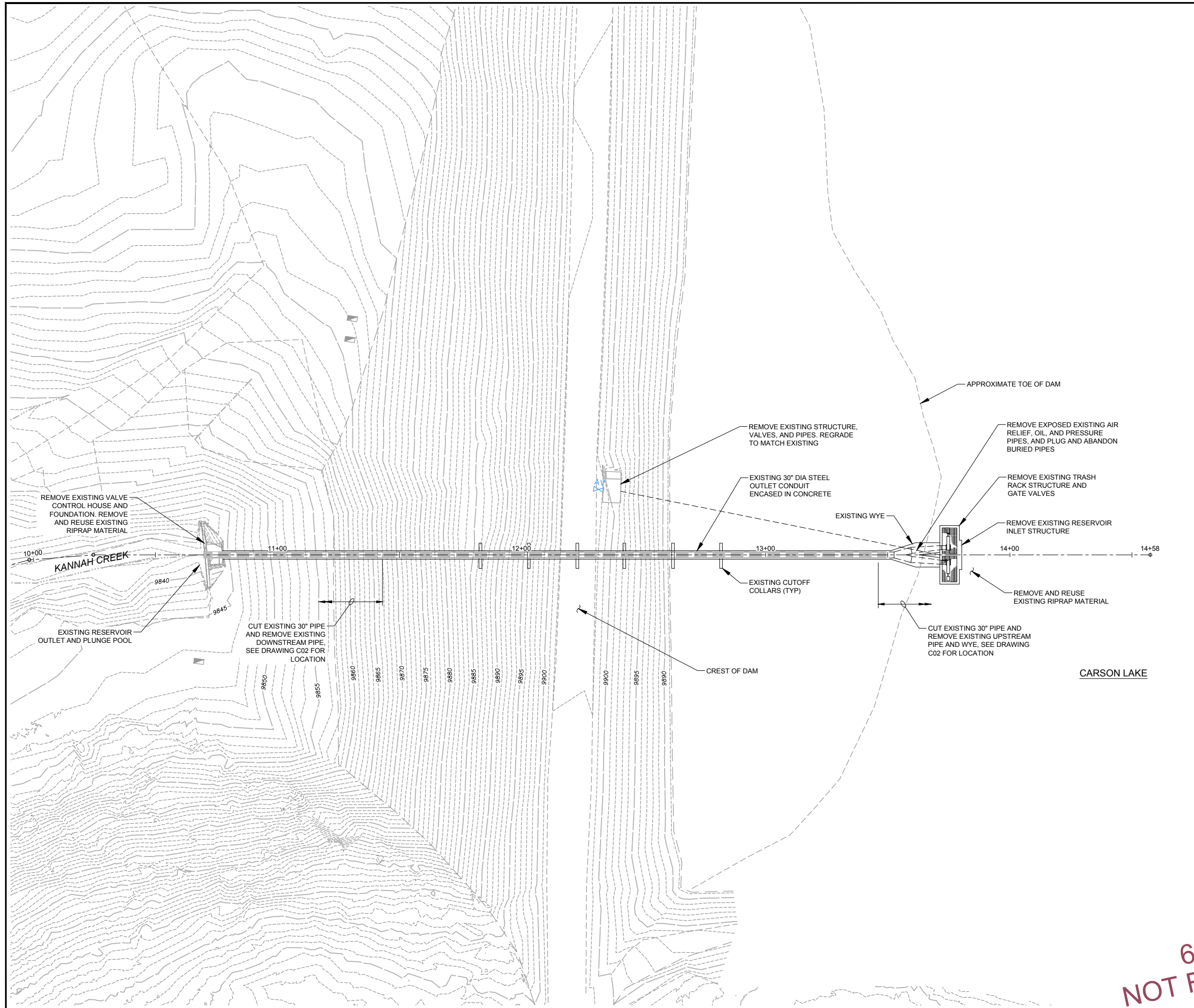
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Project Mgr.	CTG	Date

Project Mgr. CTG	Designed By: AUS	Date
Drawn By: RBR	Approved By: DAM	09/29/20

PROJECT NO. 26-1144.00
DRAWING NO. G04
SHEET 4 OF 13

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 EXISTING CONDITIONS.DWG Tuesday, September 29, 2020 4:41 PM By: RICKS, RONALD



NOTES:

xx

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DAM EXISTING CONDITIONS
AND DEMOLITION PLAN

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

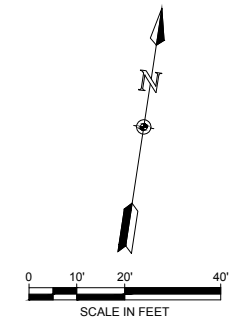
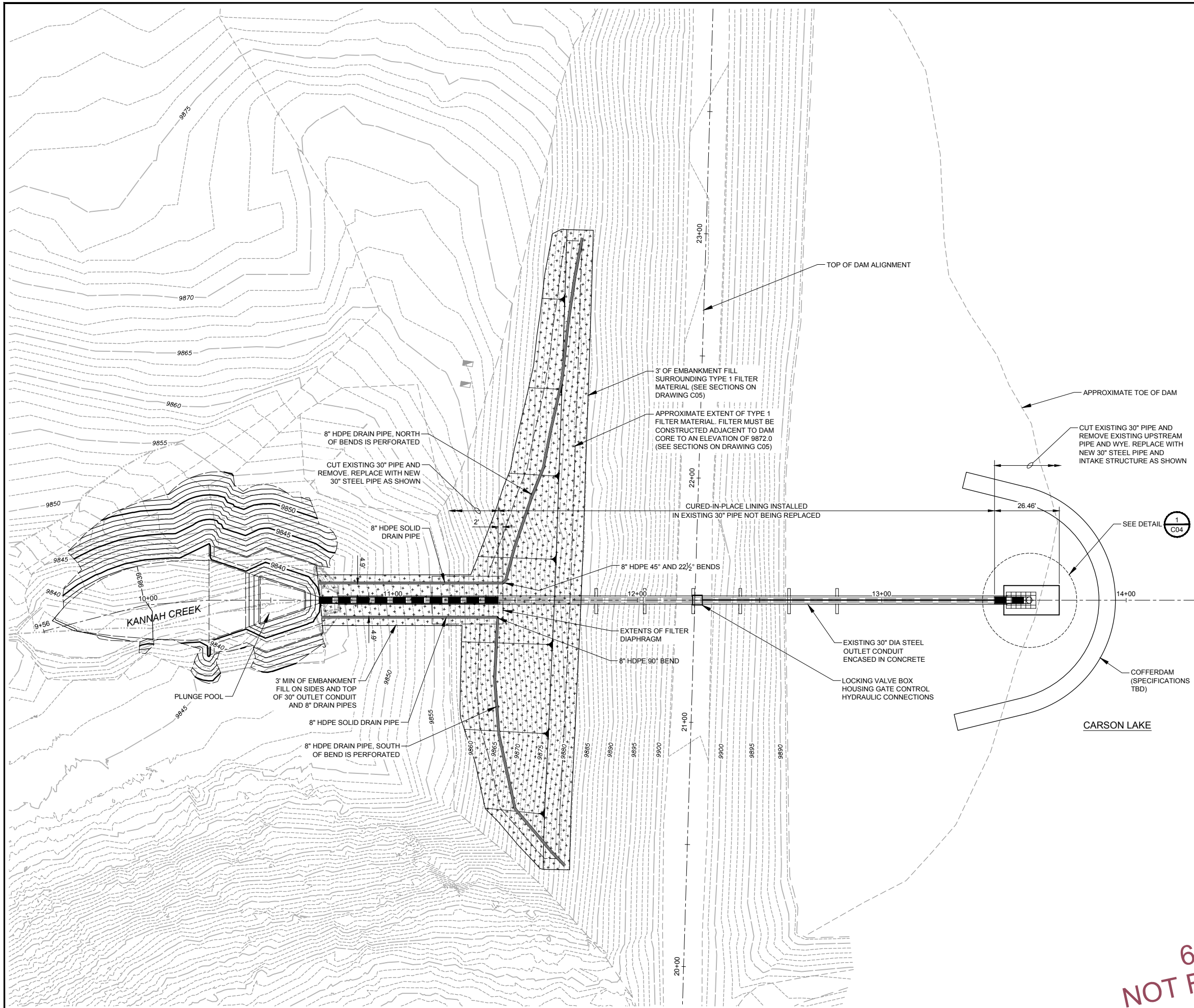
Project Mgr. CTG	Designed By: AJS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO.
26-1144.00
DRAWING NO.
C01

**60% SUBMITTAL
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09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 PLAN AND PROFILE.DWG Tuesday, September 29, 2020 5:29 PM By: RICKS, RONALD



NOTES:

XX

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DAM PLAN

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

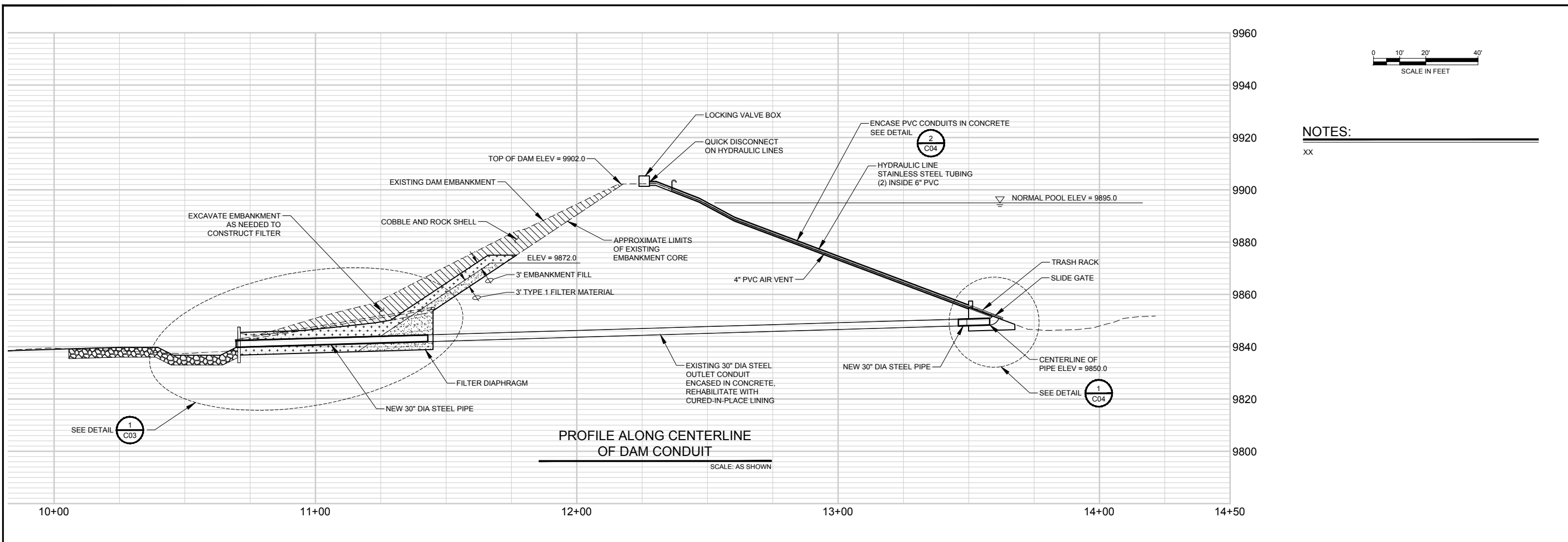
Project Mgr. CTG	Designed By: AJS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO. 26-1144.00
DRAWING NO. C02

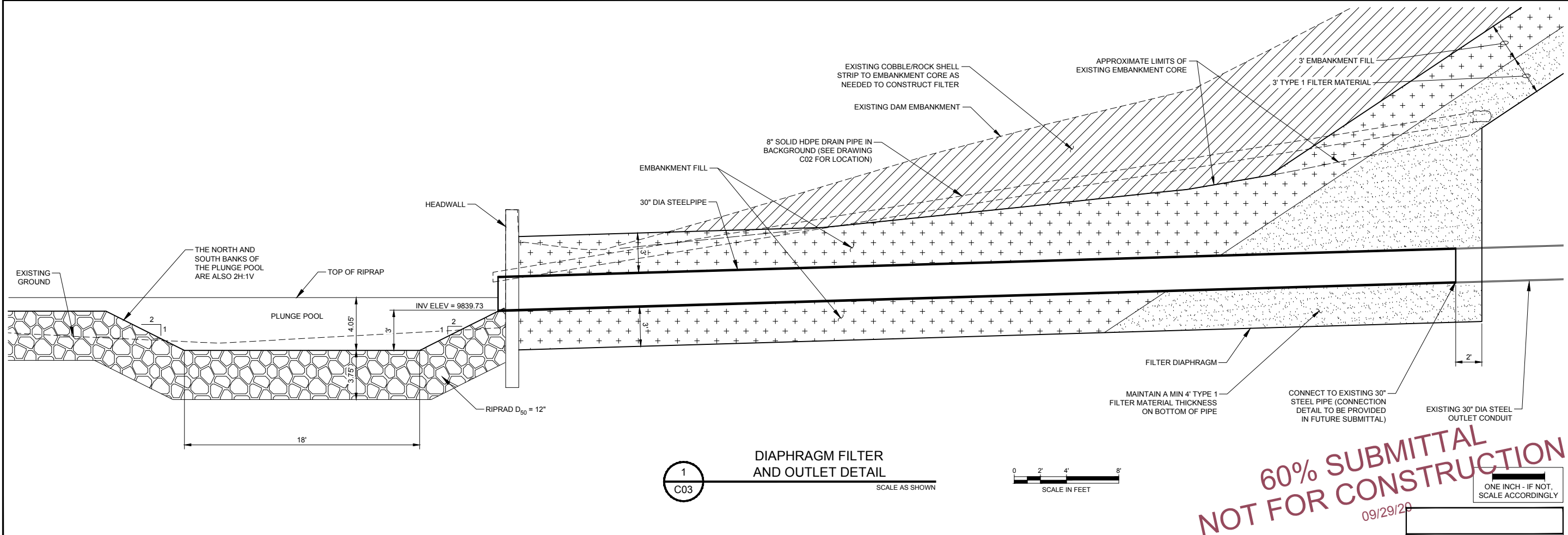
**60% SUBMITTAL
NOT FOR CONSTRUCTION**
09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 PLAN AND PROFILE.DWG Tuesday, September 29, 2020 5:29 PM By: RICKS, RONALD



NOTES:
XX



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DAM PROFILE AND DETAIL

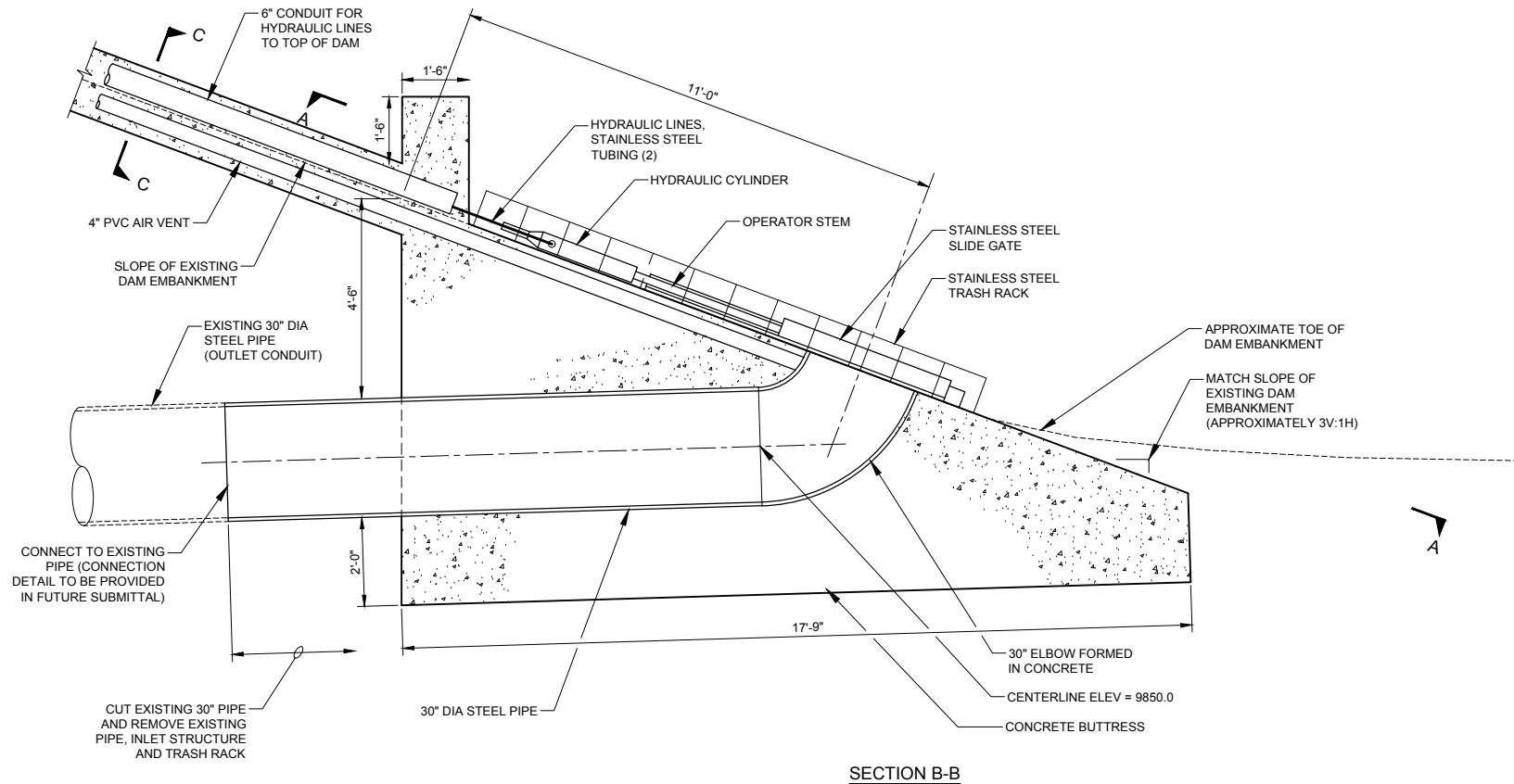
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Date	Revisions	Project Mgr.	CTG	Designed By:	AUS	Drawn By:	RBR	Approved By:	DAM	Date:	09/29/20

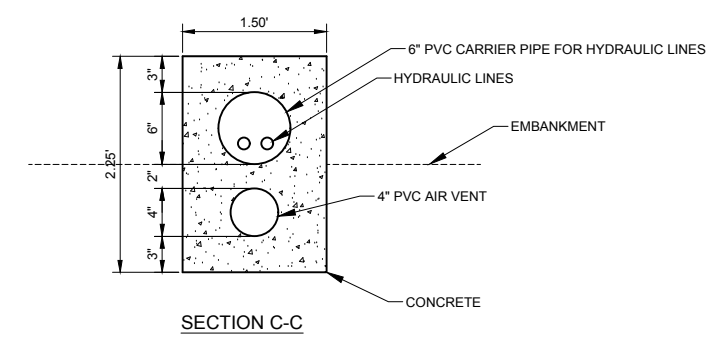
PROJECT NO. 26-1144.00
DRAWING NO. C03

SHEET 7 OF 13

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 DETAILS 1.DWG Tuesday, September 29, 2020 4:43 PM By: RICKS, RONALD

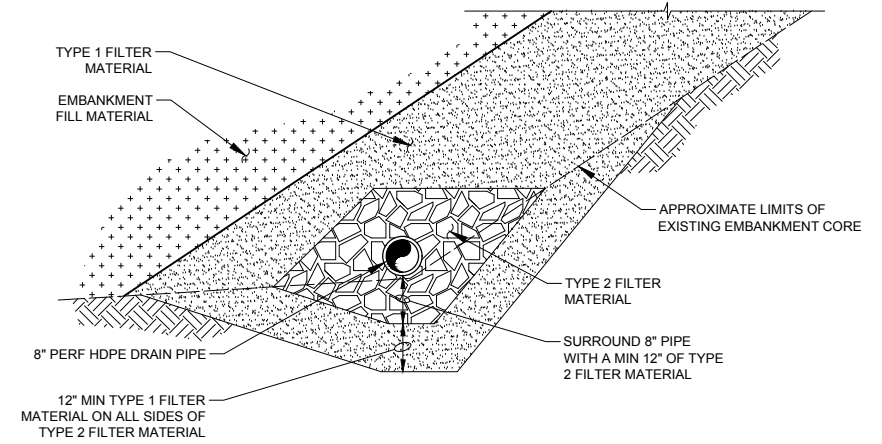


SECTION B-B



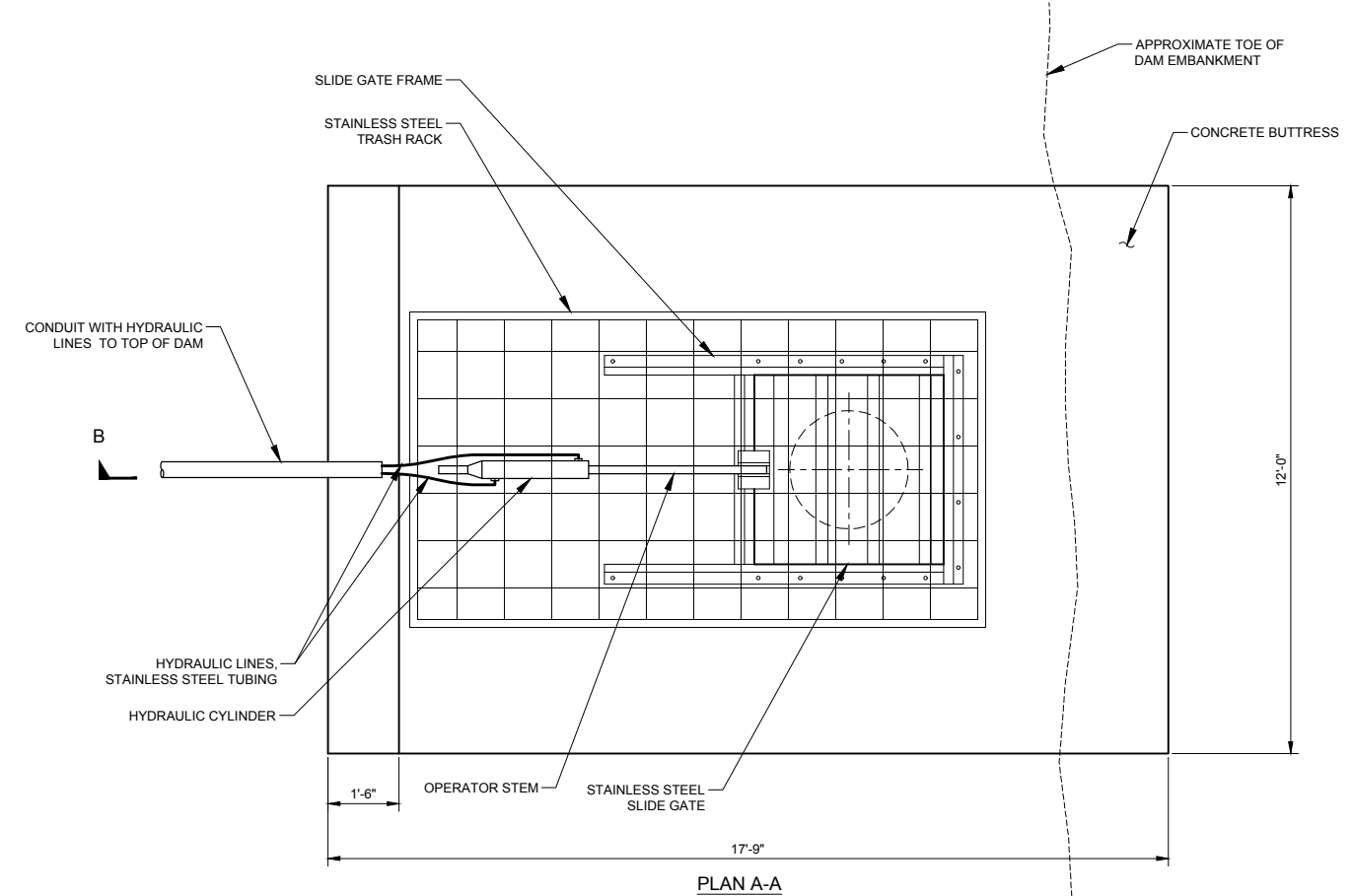
SECTION C-C

2 CONCRETE SECTION
C04 N.T.S.



PERFORATED DRAIN PIPE TRENCH DETAIL

3 CONCRETE SECTION
C04 SCALE: 1"=2'



PLAN A-A

*NOTE: CONCRETE REINFORCEMENT NOT SHOWN

1 CONCRETE BUTTRESS DETAIL
C04 SCALE: 1/2"=1'-0"

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09/29/20
ONE INCH - IF NOT,
SCALE ACCORDINGLY

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DAM DETAILS

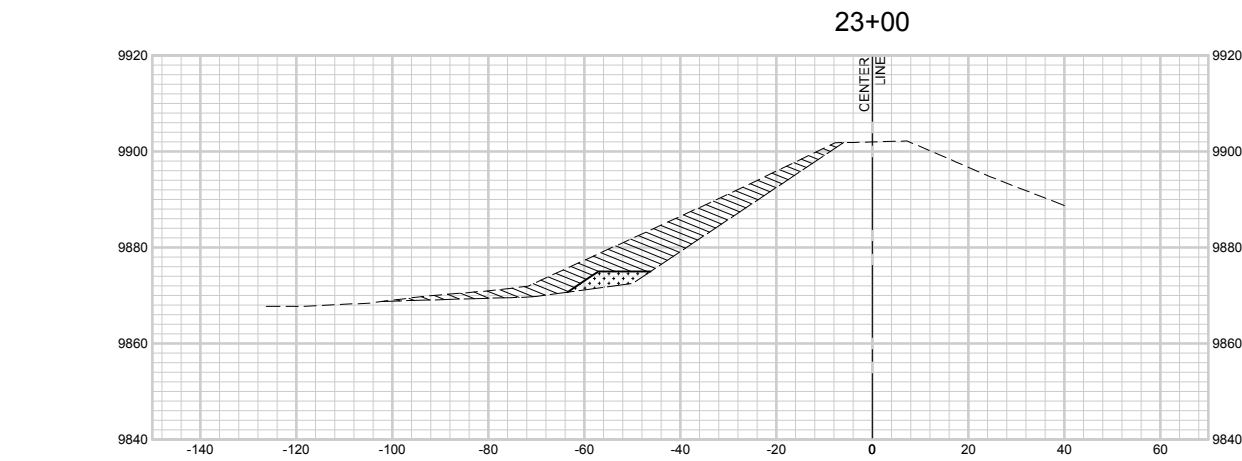
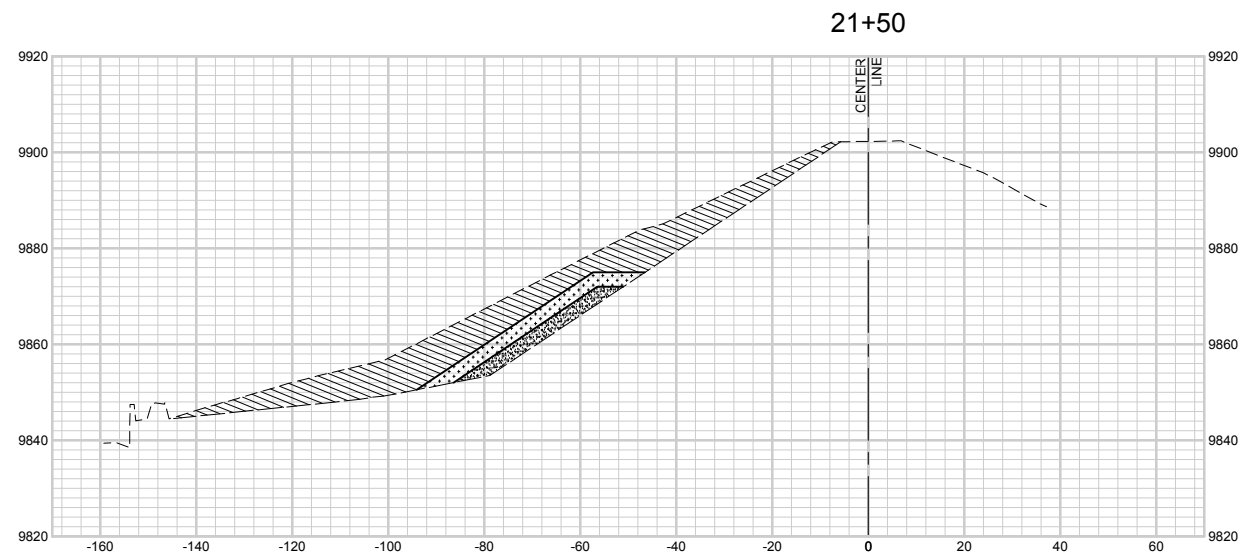
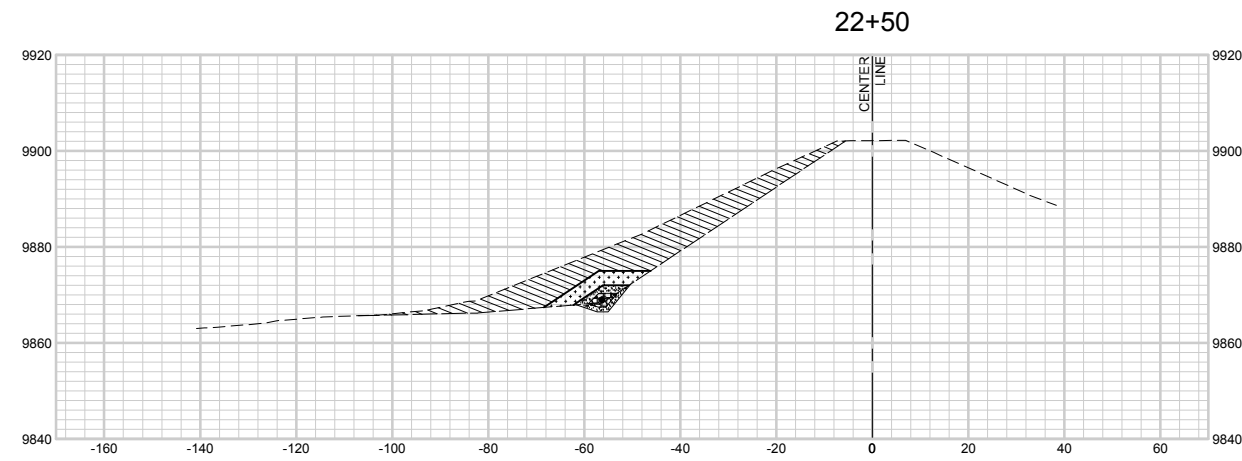
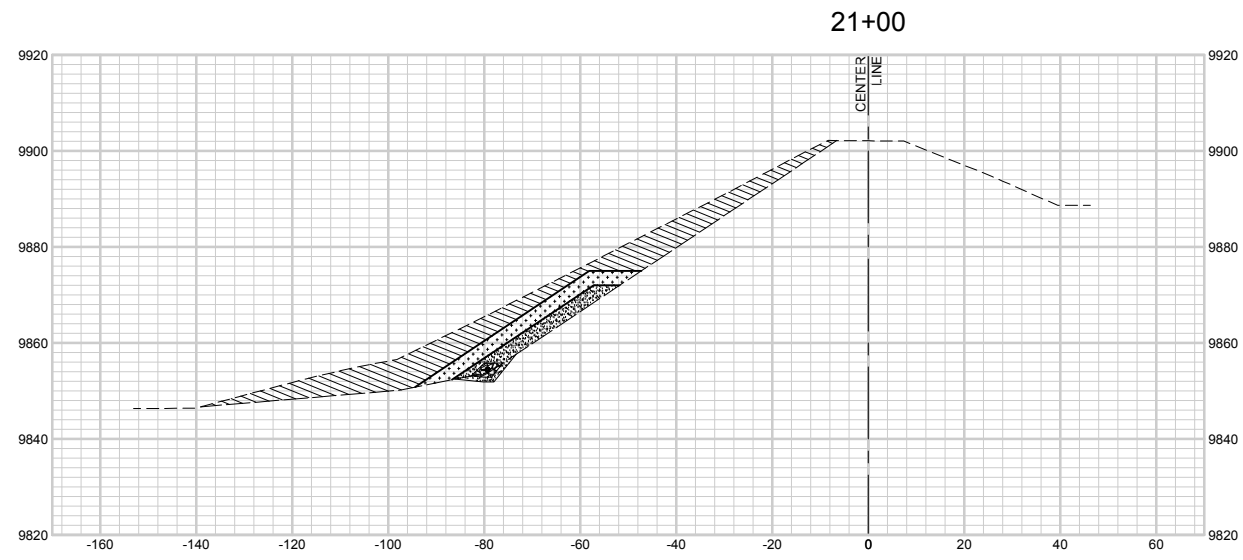
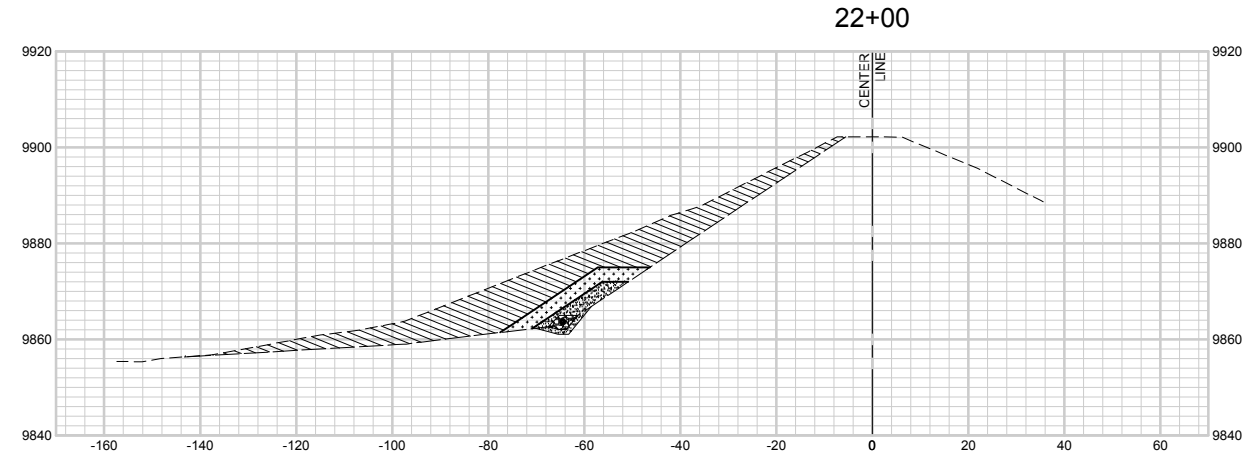
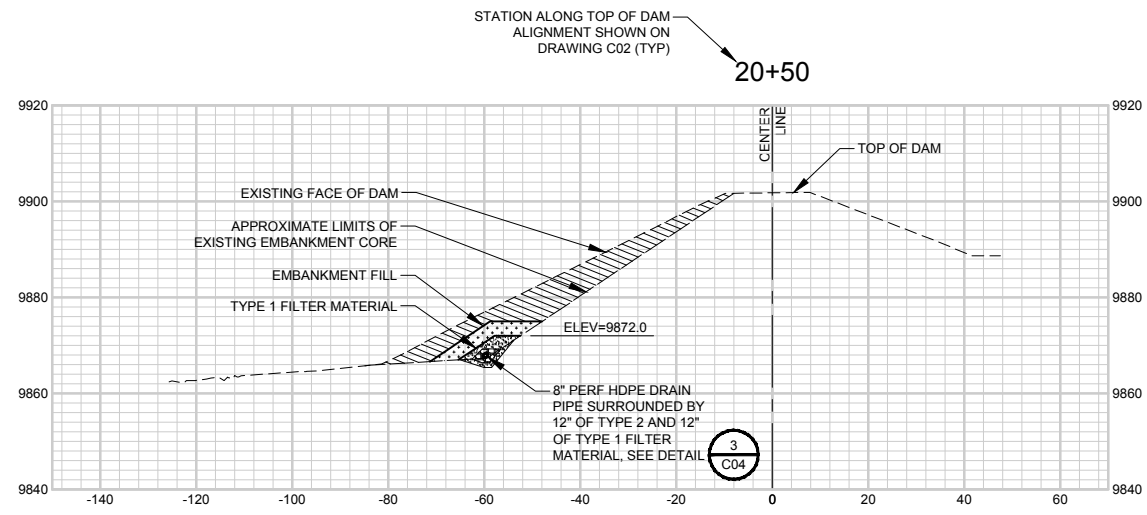
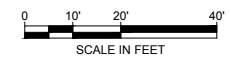
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr. CTG	Designed By: AUS
Drawn By: RBR	Approved By: DAM
Date: 09/29/20	

PROJECT NO. 26-1144.00
DRAWING NO. C04
SHEET 8 OF 13

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 DAM SECTIONS.DWG Tuesday, September 29, 2020 4:49 PM By: RICKS, RONALD



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09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

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DAM SECTIONS

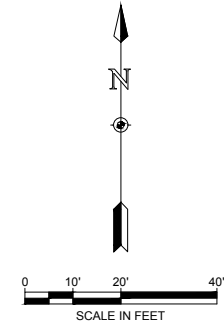
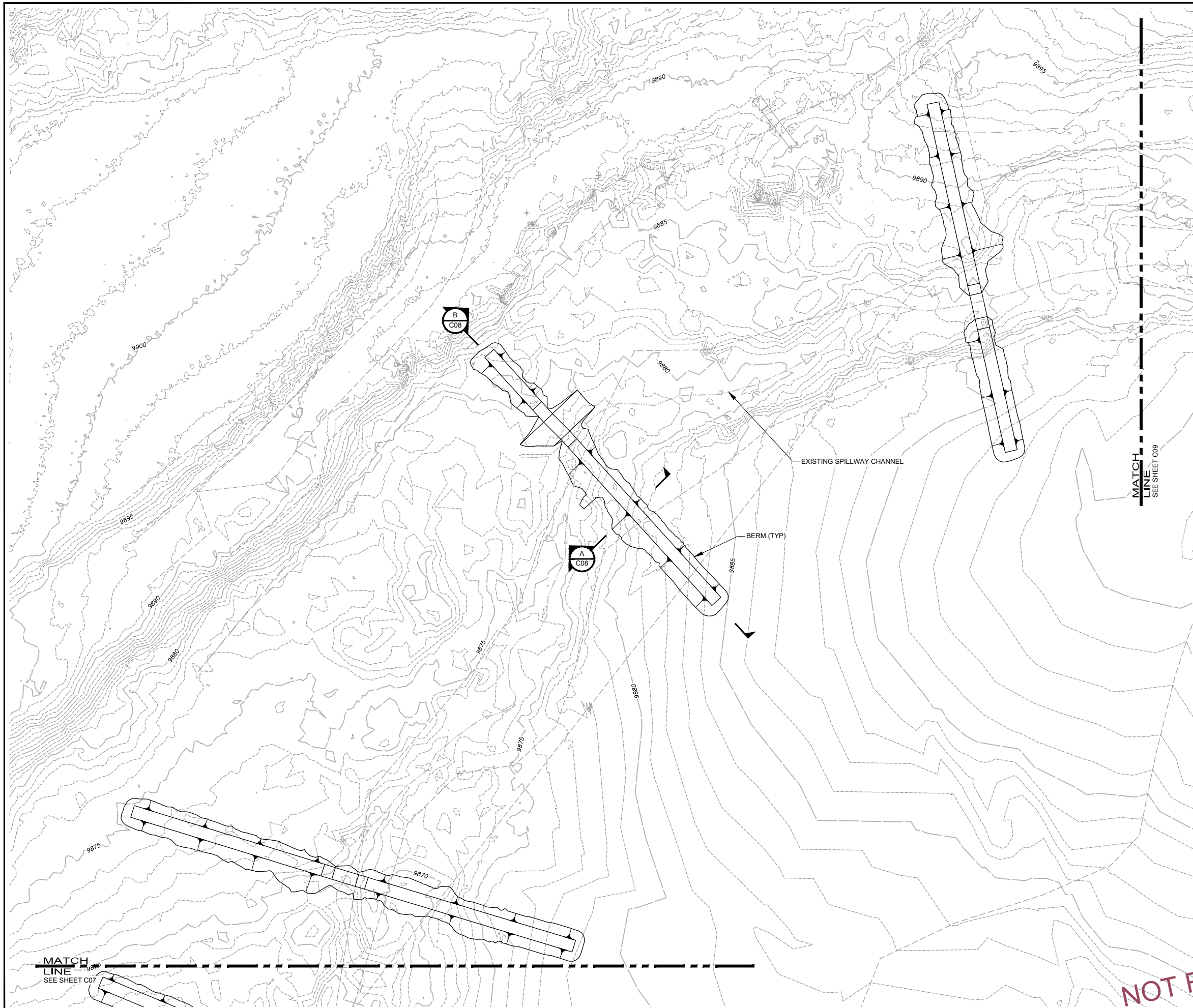
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr. CTG	Designed By: AUS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO.
26-1144.00
DRAWING NO.
C05
SHEET 9 OF 13

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\26-1144.00 SPILLWAY PLAN.DWG Tuesday, September 29, 2020 5:07 PM By: RICKS, RONALD



NOTES:

XX

NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

AVRES
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SPILLWAY PLAN 1 OF 2

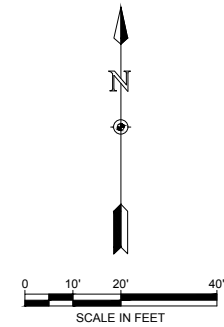
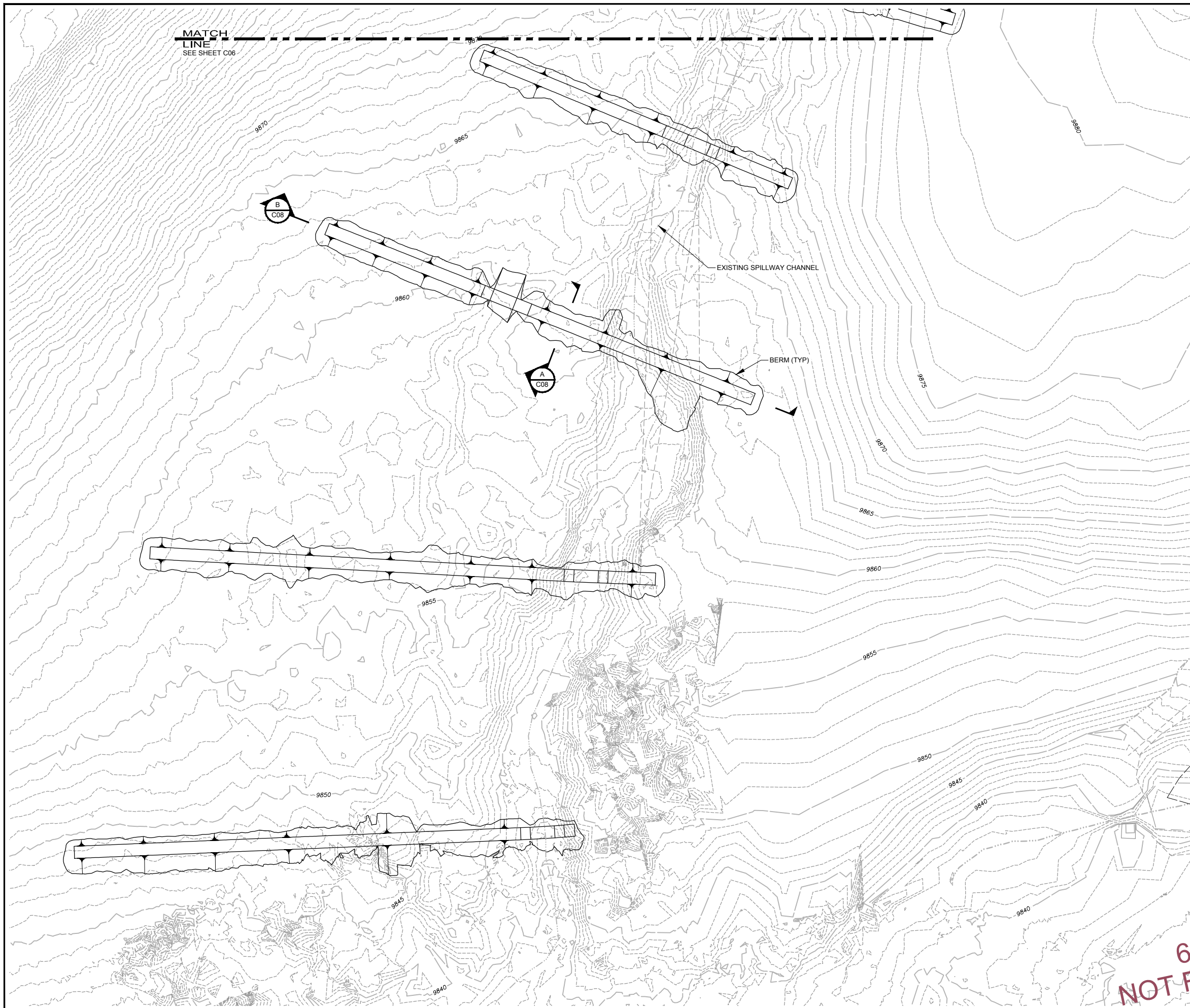
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr. CTG	Designed By: AJS
Drawn By: RBR	Approved By: DAM
Date: 09/29/20	

PROJECT NO.
26-1144.00
DRAWING NO.
C06

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 SPILLWAY PLAN.DWG Tuesday, September 29, 2020 5:07 PM By: RICKS, RONALD



NOTES:
XX

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09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

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SPILLWAY PLAN 2 OF 2

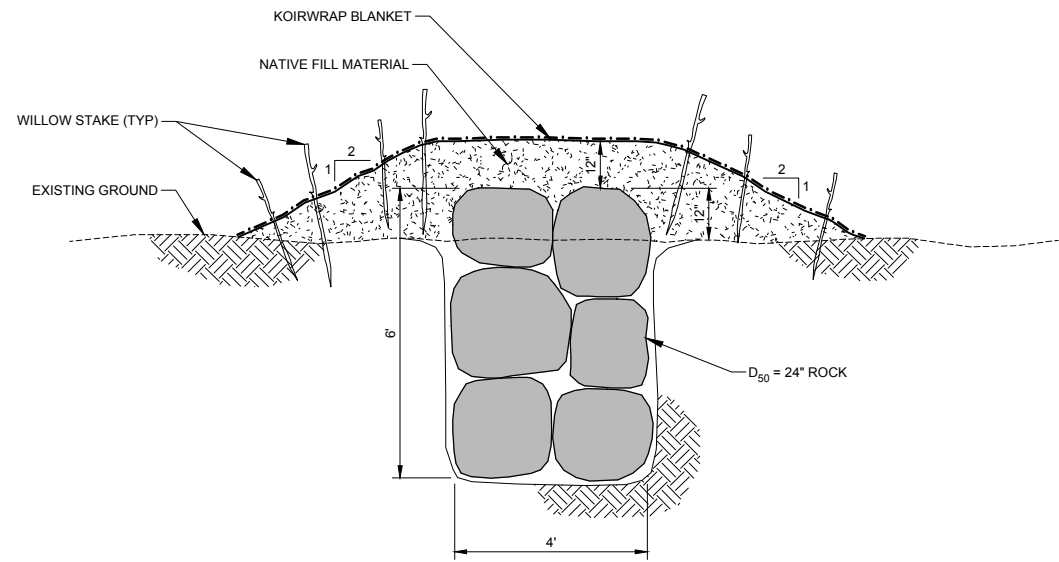
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

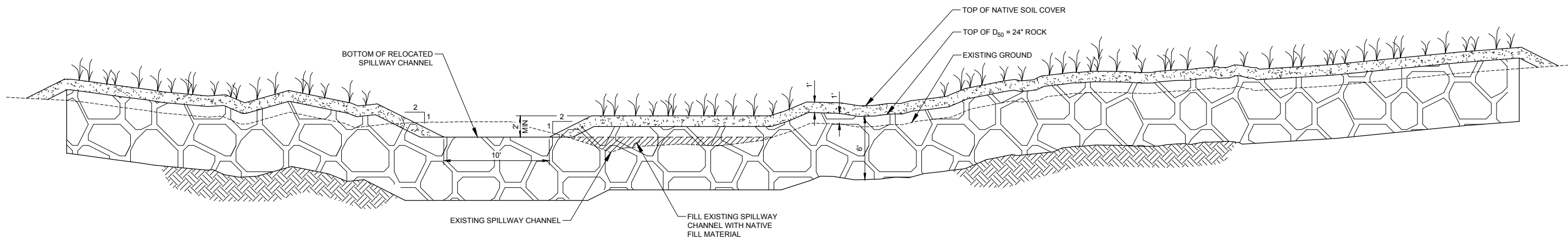
Project Mgr. CTG	Designed By: AUS
Drawn By: RBR	Approved By: DAM
Date: 09/29/20	

PROJECT NO.
26-1144.00
DRAWING NO.
C07

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\SHEETS\26-1144.00 SPILLWAY DETAILS.DWG Tuesday, September 29, 2020 4:42 PM By: RICKS, RONALD



A
TYPICAL BERM SECTION
C08 NOT TO SCALE



B
TYPICAL BERM PROFILE
C08 SCALE: 1"=5'

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NOT FOR CONSTRUCTION**
09/29/20

ONE INCH - IF NOT,
SCALE ACCORDINGLY

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AVRES
SPILLWAY DETAILS
AND SECTIONS

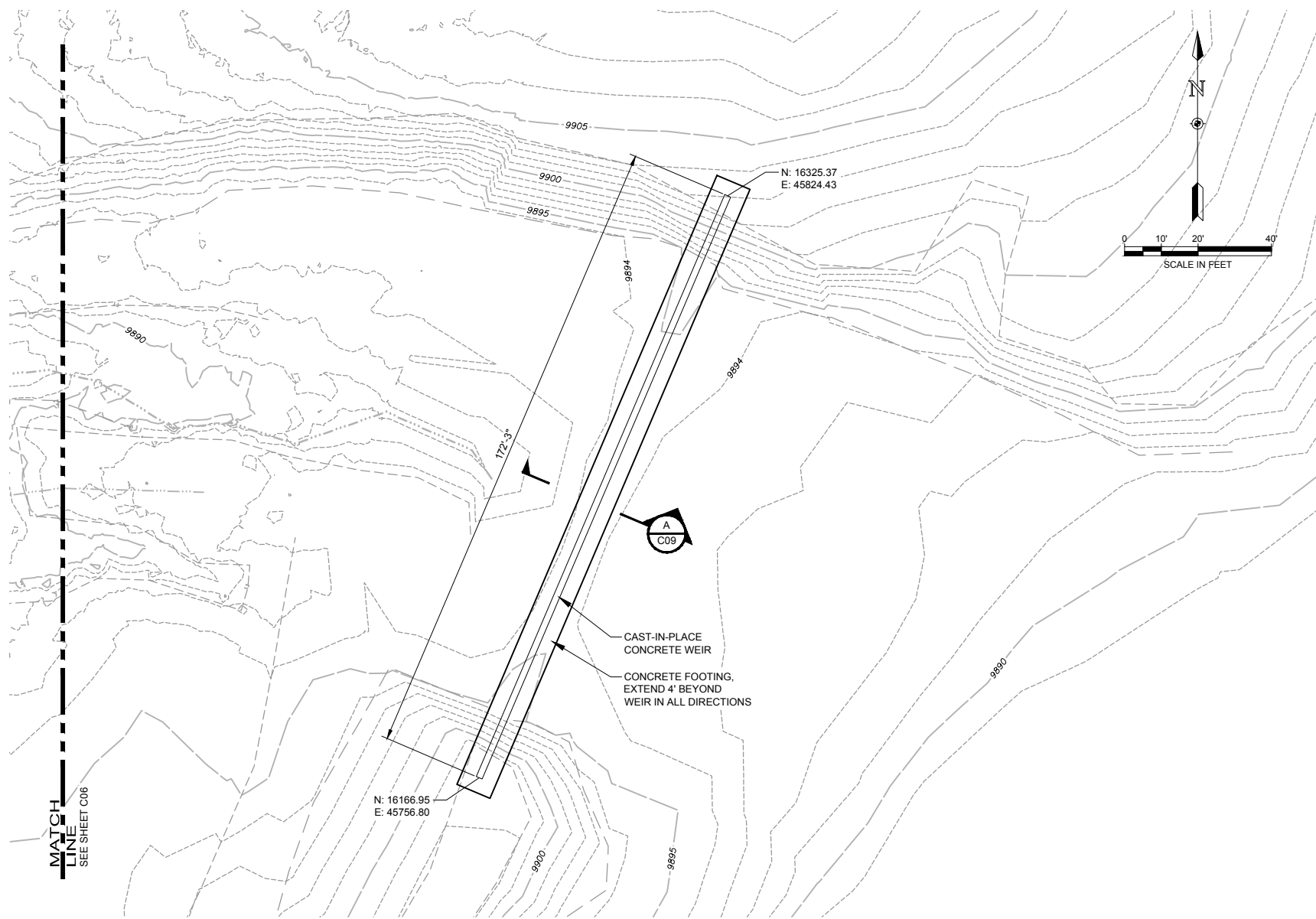
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

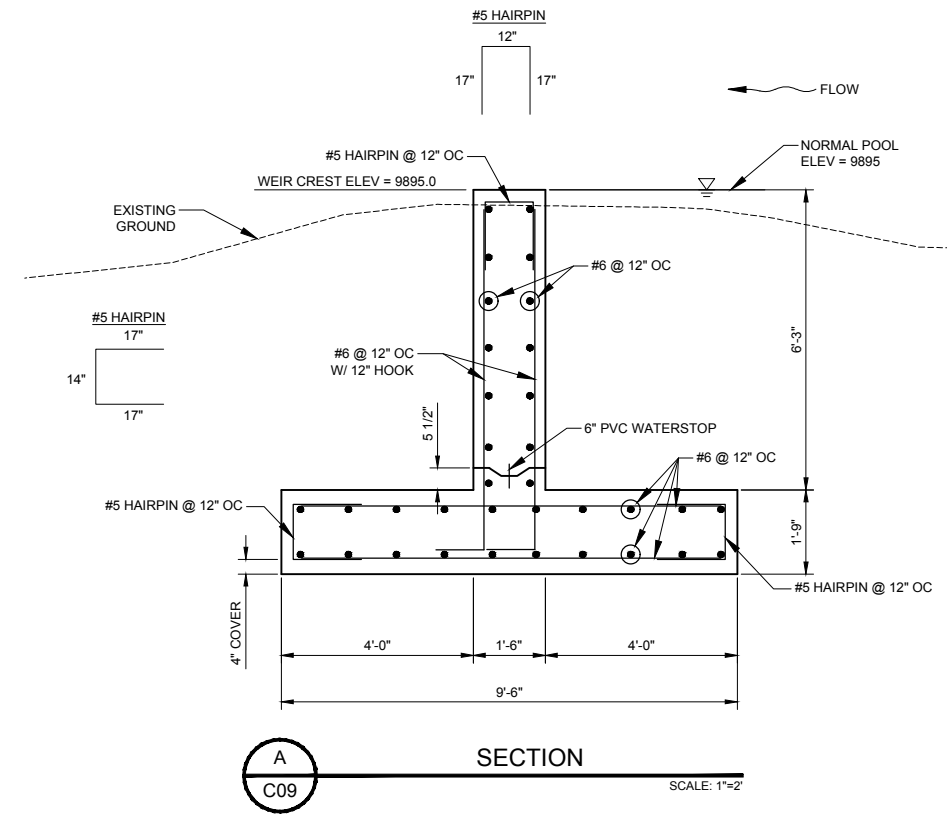
Project Mgr. CTG	Designed By: AUS	Drawn By: RBR	Approved By: DAM	Date: 09/29/20
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PROJECT NO. 26-1144.00
DRAWING NO. C08
SHEET 12 OF 13

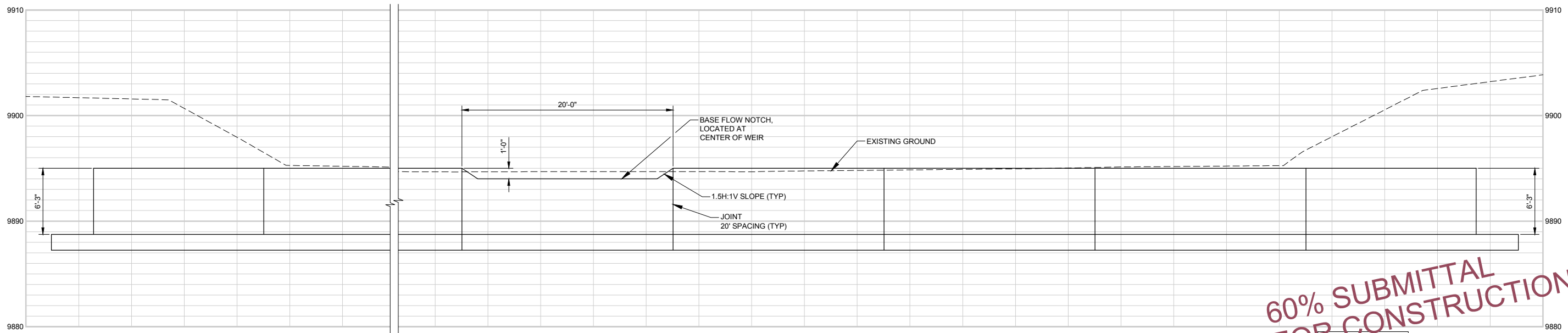
Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM MAINDWGS 2020\26-1144.00 OVERFLOW WIER.DWG Tuesday, September 29, 2020 4:42 PM By: RICKS, RONALD



OVERFLOW WEIR PLAN
SCALE: AS SHOWN



SECTION
SCALE: 1"=2'



FRONT ELEVATION
SCALE: 1"=5'

**60% SUBMITTAL
NOT FOR CONSTRUCTION**
09/29/20
ONE INCH = 5 FEET
SCALE ACCORDINGLY

Revisions	Date

Project Mgr. CTG	Designed By: AJS
Drawn By: RBR	Approved By: DAM
Date: 09/29/20	