Purchasing Division

Invitation for Bid

IFB-4648-19-DH
LAS COLONIAS PARK - RIVER RECREATION FEATURE

Responses Due:

June 14, 2019, prior to 3:30 pm

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 Jr., 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 to construct the Las Colonias Park – River Recreation Feature. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

IFB Questions:
Duane Hoff Jr., 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 pre-bid meeting on May 28th at 10:00 am.** Meeting location shall be in the City Hall Auditorium, located at 250 North 5th Street, Grand Junction, CO. The purpose of this visit will be 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 Engineer of all conflicts, errors, ambiguities or discrepancies in or among the *Contract Documents*

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 response time.

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. 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.

1.18. 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.

1.19. Public Disclosure Record: If the bidder has knowledge of their employee(s) or sub-contractors having an immediate family relationship with a City/County 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/County.

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/County, shall constitute a contract equally binding between the City/County 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 in not less than triplicate by the Owner (City/County) and Contractor. City/County 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/County are, and shall remain, City/County 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 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 Substantial Completion of the work or designated portions thereof is the date certified by the Owner when construction is sufficiently complete, 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 Contact 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 I 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 singed 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: 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 readvertise, 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: 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 **$500.00** 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 substantially complete. In addition to the Work being substantially 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 Substantial or 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.

2.34. 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.

2.35. 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.

2.36. 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.

2.37. 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.

2.38. Conflict of Interest: No public official and/or City/County employee shall have interest in any contract resulting from this IFB.

2.39. 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.

2.40. Employment Discrimination: During the performance of any services per agreement with the Owner, the Contractor, by submitting a Bid, agrees to the following conditions:

2.40.1. 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.

2.40.2. 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.

2.40.3. 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.

2.41. 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.

2.42. 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).

2.43. 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.

2.44. 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.

2.45. 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.

2.46. 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.

2.47. 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.

2.48. 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.

2.49. 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.

2.50. 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.

2.51. Ownership: All plans, prints, designs, concepts, etc., shall become the property of the Owner.

2.52. 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.

2.53. 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.

2.54. Remedies: The Contractor and Owner agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.

2.55. 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.

2.56. Expenses: Expenses incurred in preparation, submission and presentation of this IFB are the responsibility of the company and cannot be charged to the Owner.

2.57. 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.

2.58. 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.

2.59. 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.

2.60. 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).

2.60.1. "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 to grade a new inlet to the recently installed Colorado River Slough, and an extension of the existing slough with recreational elements, including revegetation, interpretative signage, and all other work associated with the Las Colonias Park – River Recreation Feature. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

NOTE: The descriptions 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 project generally consists of the installation of a new 475 lineal foot inlet channel, and approximately 850 lineal foot extension of the existing slough, creating a secondary channel with step-pool channel morphology, in-stream habitat structures and boulders, native riparian plantings, and bioengineered bank stabilization with recreational elements and interpretative signage.

The enhanced slough will be constructed to allow flowing water for a greater period of the year, to control flow distribution to function appropriately in the existing river system, and to avoid adverse impacts to existing aquatic habitat in the main channel of the Colorado River or any secondary channels. Upon completion, the excavated channel extension will have continuous water flow when the Colorado River flows are above 810 cubic feet per second. This excavation will add 1.77 acres of open water, increasing the area of aquatic habitat at the site while enhancing recreation in the park as well as the natural aesthetics of the area.

3.3. SPECIAL CONDITIONS:

3.3.1 Mandatory Pre-Bid Meeting: **Prospective bidders are required to attend a mandatory pre-bid meeting on May 28, 2019 at 10:00 am**. Meeting location shall be in the City Hall Auditorium, located at 250 North 5th Street, Grand Junction, CO. The purpose of this visit will be to inspect and to clarify the contents of this Invitation for Bids (IFB).

3.3.2 QUESTIONS REGUARDING SOLICIATION PROCESS/SCOPE OF WORK:

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

3.3.3 Project Manager: The Project Manager for the Project is Brendan Hines, Project Manager, who can be reached at (970) 256-4038. 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: Brendan Hines, Project Manager
333 West Avenue, BLDG C
Grand Junction, CO 81501

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

3.3.5 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, 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.

3.3.6 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.

3.3.7 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.

3.3.8 Time of Completion: The scheduled time of Completion for the Project is 120 Calendar Days from the starting date specified in the Notice to Proceed.

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.

3.3.9 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 with the following exception:
All work shall be performed between the hours of 7:00 AM to 5:00 PM.

3.3.10 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.

3.3.11 Permits: The following permits are required for the Project and will be obtained by the City at no cost to the Contractor. Permit will be joint between the contractor and the City through the duration of the project.

- CDPHE Construction Storm Water Permit.

The following permits are 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:

- 521 Drainage Authority Construction Storm Water Permit

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

- AutoCAD drawings for survey stakeout.

3.3.13 Project Newsletters: A newsletter for the Project will be prepared and distributed by the City. It will include general information about the Project including interruptions in utility services, street closures, parking restrictions, project schedule, and the names and telephone numbers of the contacts for the City and Contractor. The newsletter will be mailed approximately one week before the Contractor commences work.

The Contractor will be responsible for notifying all businesses and / or residents located adjacent to the work. Door hanger notifications shall be distributed at least two (2) working days prior to the day the work is scheduled to begin.

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

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

3.3.16 Stockpiling Materials and Equipment: All stockpiling/storage shall be in accordance with General Contract Conditions; Article VI: Contractor's Responsibilities – General; Section 51.

3.3.17 Traffic Control: The Contractor shall provide and maintain traffic control in accordance with the approved Traffic Control Plan and the Manual on Uniform Traffic Control Devices. A Traffic Control Plan shall be prepared by the Contractor and reviewed by the City two days prior to the pre-construction meeting.

3.3.18 Clean-Up: The Contractor is responsible for cleaning up all loose materials that have been deposited or swept into gutters, and onto sidewalks and driveways as a result of sidewalk operations. The costs for all clean-up work shall be considered incidental and will not be paid for separately.

3.3.19 Quality Control Testing: Supplier shall perform quality control testing on concrete. The City will perform all other necessary QA/QC.

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

- See appendix A.

3.3.21 Uranium Mill Tailings: Radioactive mill tailings are not anticipated to be encountered on this Project but in accordance with deed restrictions and the history of the site the Contractor shall adhere to the Uranium Mill Tailings Management Plan throughout all phases of construction supplied in Appendix D.

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

3.3.23 Excess Material: All excess materials shall be disposed in accordance with General Contract Conditions; Article VI: Contractor's Responsibilities – General; Section 50, unless otherwise stated in this document.

3.3.24 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 Conditions; Article VI: Contractor's Responsibilities – General; Section 37.

3.3.25 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.

3.3.26 Survey: The Contractor shall give the City survey crew a minimum of 72 hours' notice for all requested survey.

3.3.27 Work to be Performed by the City (Prior to Construction):

- N/A

3.3.28 Existing Concrete Sidewalks, Pans, Fillets, Curbs and Gutters: There are no existing concrete sidewalks, pans, fillets, curbs or gutters within the project limits.

3.3.29 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.

3.4. SCOPE OF WORK: (Refer to Plan Set)

Each bidder shall acknowledge the Bid Alternate Item shown at the end of the Bid Schedule, regarding the excess fill material.

The Base Bid requires the Contractor to excavate and stockpile <u>suitable,</u> excess material (Approx. 24,000 cubic yards) on-site, for which the City will haul off-site at a later date.

The Bid Alternate requires that the Contractor excavate <u>and</u> haul the excess <u>suitable</u> material off-site, to a location selected by the City, approximately 2-miles from the project site. Each bidder shall provide pricing for the Base Bid, the Bid Alternate, as well as the Base Bid plus the Bid Alternate, in order for the Project Bid Submittal to be accepted. The City shall determine if the Bid Alternate will be included within the Project scope.

3.5. Attachments:

Appendix A: Project Submittal Form
Appendix B: Project Special Provisions
Appendix C: Landscaping and Irrigation Specifications
Appendix D: Uranium Mill Tailings Management Plan
Appendix E: Construction Drawings

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:

Invitation For Bids available	May 14, 2019
Mandatory Pre-Bid Meeting	May 28, 2019
Inquiry deadline, no questions after this date	June 4, 2019
Addendum Posted	June 10, 2019
Submittal deadline for proposals	June 14, 2019
City Council Approval	July 1, 2019
Notice of Award & Contract execution	July 2, 2019
Bonding & Insurance Cert due	July 10, 2019
Preconstruction meeting	TBD
Work begins no later than	TBD
Final Completion	120 Calendar Days From Notice to Proceed
Holidays:	Sept. 2, 2019 (Labor Day) Nov. 11, 2019 (Veterans Day) Nov. 28, 2019 (Thanksgiving) Nov. 29, 2019 (Black Friday)

4. Contractor's Bid Form

Bid Date: _____

Project: IFB-4648-19-DH "Las Colonias Park - River Recreation Feature"

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: _____

Bid Schedule: 2019 Las Colonias Park - River Recreation Feature

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	***General***	***Project Items***				
2		Mobilization	1.	LS	$ _____	$ _____
3		Stabilized Construction Entrance (Install / Remove)	750.	SY	$ _____	$ _____
4		Granite Fines Trail (8-FT Wide)	4,800.	LF	$ _____	$ _____
5						
6	***Upstream***	***Channel Extension***				
7		Inlet Control: Blocky Stone Placement	30.	CY	$ _____	$ _____
8		Subgrade (3" to 8" Crushed Rock (or suitable on-site washed/screened))	3.	CY	$ _____	$ _____
9		Earthwork (Excavation and Fill) (Stockpile Excess Suitable Material on-site for later haul)	10,000.	CY	$ _____	$ _____
10		Modify Storm Outfall Apron/Demo and Remove Pipe	1.	LS	$ _____	$ _____
11		Blocky Stone Placement	250.	CY	$ _____	$ _____
12		Misc. Equipment Hours	10.	HR	$ _____	$ _____
13						
14	***Channel***	***Enhancements***				
15		Stone Placement (Deflectors)	40.	CY	$ _____	$ _____
16		Stone Placement (Terracing)	230.	CY	$ _____	$ _____
17		Flagstone Access Steps	12.	CY	$ _____	$ _____
18		Subgrade (3" to 8" Crushed Rock (or suitable on-site washed/screened))	20.	CY	$ _____	$ _____
19		Riprap Placement (Type H)	100.	CY	$ _____	$ _____
20		Earthwork (Excavation and Fill)	1,000.	CY	$ _____	$ _____
21		Large Random Boulder Placement	12.	EA	$ _____	$ _____
22		Misc. Equipment Hours	20.	HR	$ _____	$ _____
23						
24	***Downstream***	***Channel Extension***				
25		Structure #1: 3FT Grouted Blocky Stone Placement	360.	CY	$ _____	$ _____
26		Structure #1: Structural Conc Slab Chute	25.	CY	$ _____	$ _____
27		Subgrade (3" to 8" Crushed Rock (or suitable on-site washed/screened))	5.	CY	$ _____	$ _____
28		Pool Armoring STR1 - Type H Riprap Placement	50.	CY	$ _____	$ _____
29		Structure #2: 3FT Grouted Blocky Stone Placement	360.	CY	$ _____	$ _____
30		Structure #2: Structural Conc Slab Chute	25.	CY	$ _____	$ _____
31		Subgrade (3" to 8" Crushed Rock (or suitable on-site washed/screened))	5.	CY	$ _____	$ _____

Bid Schedule: 2019 Las Colonias Park - River Recreation Feature

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
32		Pool Armoring STR2 - Type H Riprap Placement	50.	CY	$ _____	$ _____
33		Earthwork (Excavation and Fill)	12,600.	CY	$ _____	$ _____
34		Stone Placement (Terracing)	700.	CY	$ _____	$ _____
35		Subgrade (3" to 8" Crushed Rock (or suitable on-site washed/screened))	50.	CY	$ _____	$ _____
36		Flagstone Access Steps	15.	CY	$ _____	$ _____
37		Large Random Boulder Placement	12.	EA	$ _____	$ _____
38		Misc. Equipment Hours	20.	HR	$ _____	$ _____
39						
40	***Landscapin***					
41		Irrigation System	1.	LS	$ _____	$ _____
42		Soil Testing	6.	EA	$ _____	$ _____
43		Soil Preparation (Upland)	11.92	ACRE	$ _____	$ _____
44		Soil Preparation (Riparian)	2.05	ACRE	$ _____	$ _____
45		Pre-Revegetation Weed Control	13.97	ACRE	$ _____	$ _____
46		Seeding (Upland)	11.92	ACRE	$ _____	$ _____
47		Seeding (Riparian)	2.05	ACRE	$ _____	$ _____
48		Hydromulch (2500 lbs per Acre)	11.92	ACRE	$ _____	$ _____
49		Erosion Control Blanket (Biodegradable Straw/Coconut)(8" Staples)	9,922.	SY	$ _____	$ _____
50		Deciduous Tree (2")(Deep Plant)	15.	EA	$ _____	$ _____
51		Deciduous Tree (2")	44.	EA	$ _____	$ _____
52		Deciduous Tree (6')	8.	EA	$ _____	$ _____
53		Shrubs (#5)	169.	EA	$ _____	$ _____
54		Willow Stakes	1,850.	EA	$ _____	$ _____
55		Maintenance (Mow 2x)(Spot Herbicide Treatments 6x)	1.	YEAR	$ _____	$ _____
MCR		Minor Contract Revisions	- - -	- - -	- - -	$ 60,000.00

Base Bid Amount: **$** _____

Base Bid Amount:

_____ **dollars**

Bid Schedule: 2019 Las Colonias Park - River Recreation Feature

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
BA1	BID ALT	Haul *Suitable* Excess Excavated Material to Off-Site City-Approved Location (approx. 2-miles away) (Assumes 24,000 CY)	24,000.	CY	$ _____	$ _____

Alternate Bid Amount: **$** _____

Alternate Bid Amount:

_____ **dollars**

Base Bid + Alternate Bid Amount: **$** _____

Base Bid + Alternate Bid Amount:

_____ **dollars**

Contractor Name:
Contractor Address:
Contractor Phone #:

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

Name & address of Sub-Contractor	Description of work to be performed	% of Contract

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.

Appendix A

Project Submittal Form

PROJECT SUBMITTAL FORM

PROJECT: **Las Colonias Park – River Recreation Feature**

CONTRACTOR: _____

PROJECT MANAGER: Brendan Hines

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
GENERAL PROJECT ITEMS				
Stabilized Construction Entrance				
Granite Fines Trail (8-FT Wide)				
UPSTREAM CHANNEL EXTENSION				
Inlet Control: Blocky Stone Placement				
Subgrade (3/8” Crushed Rock)				
Earthwork (Excavation and Fill) (Stockpile Excess Suitable Material On-site for later haul)				
Remove Pipe				
Blocky Stone Placement				
CHANNEL ENHANCEMENTS				
Stone Placement (Deflectors)				
Stone Placement (Terracing)				
Flagstone Access Steps				
Subgrade (3/8” Crushed Rock)				
Riprap Placement (Type H)				
Earthwork (Excavation and Fill)				
Large Random Boulder Placement				

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
DOWNSTREAM CHANNEL EXTENSION				
Structure #1: 3FT Grouted Blocky Stone Placement				
Structure #1: Structural Concrete Slab Chute				
Subgrade (3/8” Crushed Rock)				
Pool Armoring STR#1 – Type H Riprap Placement				
Structure #2: 3FT Grouted Blocky Stone Placement				
Structure #2: Structural Concrete Slab Chute				
Subgrade (3/8” Crushed Rock)				
Pool Armoring STR#2 – Type H Riprap Placement				
Earthwork (Excavation and Fill)				
Stone Placement (Terracing)				
Subgrade (3/8” Crushed Rock)				
Flagstone Access Steps				
Large Random Boulders				
LANDSCAPING				
Irrigation System				
Soil Testing				
Soil Preparation (Upland)				
Soil Preparation (Riparian)				
Pre-Revegetation Weed Control				
Seeding (Upland)				
Seeding (Riparian)				
Hydro-mulch (2500 lbs per Acre)				
Erosion Control Blanket (Biodegradable Straw/Coconut) (8” Staples)				

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
Deciduous Tree (2”) (Deep Plant)				
Deciduous Tree (2”)				
Deciduous Tree (6”)				
Shrubs (#5)				
Willow Stakes				
Maintenance (Mow 2x) (Spot Herbicide Treatments 6x)				

EROSION CONTROL / STORMWATER MANAGEMENT

5-2-1 Storm Water Permit				
CDPHE Construction Stormwater Permit				

Appendix B

Project Special Provisions & Specifications

SPECIAL PROVISIONS

GENERAL:

The descriptions of the pay items listed in the 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 Bid Schedule.

STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION:

The ***City of Grand Junction Standard Specifications for Road and Bridge Construction*** are hereby modified or supplemented for this Project by the following modifications to ***The Standard Specifications for Road and Bridge Construction***, State Department of Highways, Division of Highways, State of Colorado:

SP-1 SECTION 202- REMOVAL OF STRUCTURES AND OBSTRUCTIONS:

Section 202 of the Standard Specifications for Road and Bridge Construction is hereby revised for this Project as follows:

Subsection 202.07, shall include the following:

Excess Material. Excavated material generated on site shall remain on site and is to be stockpiled in designated area(s). Materials may only leave the site when directed by the City of Grand Junction. Prior from being removed from the site, materials must first undergo testing for radioactivity. Any/all materials over or under radioactivity limits that are directed to be removed from the site shall be delivered to a licensed disposal facility or to the interim storage facility to be defined by the City of Grand Junction and as described in the **Uranium Mill Tailings Management Plan (UMTMP) provided in Appendix D**. A log of these actions must be kept.

The current Uranium Mill Tailings Management Plan shall be adhered to during all construction activities. The most current version can be found at the State of Colorado's website https://www.colorado.gov/pacific/sites/default/files/HM_umilltail-mgt-plan.pdf. All contractors and trades working on this project shall become familiar with this and related documents.

SP-2 BOULDER PLACEMENT:

A. The measurement for payment for this item will be the actual number of cubic yards of un-grouted or grouted rock or each large random boulder placed in accordance with the Drawings and Specifications or as otherwise directed by the Engineer. Measurement does not include the thickness of the bedding. The unit price will include all of the Contractor's costs. Contractor to provide field coordination with Engineer for placement and construction of boulders for drop structures. This Bid

item includes, but is not limited to:

1) Furnishing, transporting, and placing all rock.
2) Excavating, backfilling, subgrade preparation, channel and pool shaping as directed by the Engineer.
3) Removing and disposing excavated material and debris.
4) Disposing of rejected boulders
5) Provide field coordination with Engineer for placement and construction of boulders.
6) Providing all other related and necessary labor, equipment, and materials to complete the Work.

B. Payment will be based on units completed and accepted:

Bid Item	Pay Unit
Large Random Boulders	EA
Stone Placement (Terracing)	CY
Stone Placement (Deflectors)	CY
Stone Placement (Stone Seating)	CY
Reset Existing Stone	CY
Stone Placement (Grade Control Structures)	CY
Stone Placement (Grouted)	CY
Riprap Placement (Type VH)	CY

SP-3 FLAGSTONE ACCESS STEPS:

A. The measurement for payment for this item will be the actual number of cubic yards of flagstone placed in accordance with the Drawings and Specifications or as otherwise directed by the Engineer. Measurement does not include the thickness of the bedding. The unit price will include all of the Contractor's costs. Contractor to provide field coordination with ENGINEER for placement and construction of boulders for drop structures. This Bid item includes, but is not limited to:

1) Furnishing, transporting, and placing all flagstone and bedding.
2) Excavating, backfilling, subgrade preparation, and general shaping as directed by the ENGINEER.
3) Removing and disposing excavated material and debris.
4) Disposing of rejected flagstone.
5) Provide field coordination with ENGINEER for placement and construction of flagstone.
6) Providing all other related and necessary labor, equipment, and materials to complete the Work.

B. Payment will be based on units completed and accepted:

Bid Item	Pay Unit
Flagstone Access Steps	CY

SP-4 GRANITE FINES TRAIL:

A. The measurement for payment for this item will be the actual number of linear feet of granite fines trail placed in accordance with the Drawings and Specifications or as otherwise directed by the Engineer. The unit price will include all of the Contractor's costs. Contractor to provide field coordination with ENGINEER for placement and construction of the trail. This Bid item includes, but is not limited to:

1) Furnishing, transporting, placing and compacting all granite fines.
2) Excavating, backfilling, subgrade preparation, and general shaping as required.
3) Removing and disposing excavated material and debris.
4) Provide field coordination with ENGINEER for trail alignment and construction.
5) Providing all other related and necessary labor, equipment, and materials to complete the Work.

B. Payment will be based on units completed and accepted:

Bid Item	Pay Unit
Granite Fines Trail	LF

SP-5 MISCELLANEOUS EQUIPMENT HOURS:

A. The measurement for payment for this item will be the actual number of hydraulic excavator (Caterpillar 225 or similar) hours spent ONLY AS APPROVED by the ENGINEER. The unit price will include all of the CONTRACTOR'S costs. This BID item will be only at the direction of the ENGINEER. This BID item includes, but is not limited to:

1) Extra excavating, channel shaping, bankwork, and riffle modifications.
2) Placement and handling of rock as directed by the Engineer.
3) Providing all other related and necessary labor, equipment, and materials to complete the Work.

B. Payment will be based on units completed and accepted.

Bid Item	Pay Unit
Miscellaneous Heavy Equipment Hours	Hours

Appendix C

Landscaping and Irrigation Specifications

LANDSCAPE PLANTINGS:

A. The measurement for payment for these items will be the actual number of landscape plantings installed, complete in place, measured. The unit price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

1) Harvesting on site plants or providing plants.
2) Layout for inspection.
3) Installing, excavating and backfilling.
4) Importing and placing amended topsoil in planting pits.
5) Preparing soil and adding soil amendments per plans.
6) Replacing dead or diseased plants.
7) Staking and guying.
8) Watering and maintaining plants until acceptance and turnover.
9) Providing all other related and necessary labor, equipment, and materials to complete the work.

B. Payment will be based on units completed and accepted

1) Deep Plant Deciduous Tree 2” Cal. - Each
2) Deciduous Tree 2” Cal. - Each
3) Deciduous Tree 6’- Each
4) Shrubs #5 - Each
5) Willow Stakes - Each

IRRIGATION SYSTEMS:

A. The measurement for payment for this item will be the lump sum price for the complete and functioning irrigation system. The lump sum price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

1) Confirming and reporting available pressure and flow
2) Point of connection assembly
3) Electrical connection for automated irrigation controller
4) Trenching, backfill and trench rolling
5) Furnishing and installing irrigation equipment per irrigation plan
6) Adjusting heads
7) Protection of equipment
8) Controller scheduling
9) Irrigation as-builts
10) Providing all other related and necessary labor, equipment, and materials to complete the work

B. Payment will be based on units completed and accepted

1) Irrigation Drip System – Lump Sum

SOIL PREPARATION:

A. The measurement for payment for this item will be the actual number of acres completed in place, inspected and measured. The unit price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

    1) Soil ripping and tillage
    2) Rock picking
    3) Seed bed preparation
    4) Hydraulic amendment placement per plans
    5) Proving water for all hydraulic applications
    6) Inspection walk

B. Payment will be based on units completed and accepted

    1) Soil Preparation - Acre

PRE-REVEGETATION WEED CONTROL:

A. The measurement for payment for this item will be the actual number of acres completed in place and measured. The unit price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

    1) Pre-Revegetation herbicide treatment
    2) Proper licensing and reporting

B. Payment will be based on units completed and accepted

    1) Pre-Revegetation Weed Control - Acre

NATIVE SEEDING:

A. The measurement for payment for this item will be the actual number of acres completed in place and measured. The unit price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

    1) Furnishing, transporting, and uniform placement of seed mix in hydraulic slurry according to plans
    2) Double drill rate for broadcast seeding
    3) Providing water for hydraulic applications
    4) Coordination and sequencing for project access
    5) Hydraulic application of amendments with seed mix per plan

B. Payment will be based on units completed and accepted

    1) Native Seeding Upland – Acre
    2) Native Seeding Riparian - Acre

HYDROMULCHING:

A. The measurement for payment for this item will be the actual number of acres completed in place and measured. The unit price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

    1) Furnishing, transporting, and uniform placement of hydromulch per plan
    2) Proving water for all hydraulic applications
    3) Coordination and sequencing for project access

B. Payment will be based on units completed and accepted

    1) Hydromulch – Acre

EROSION CONTROL BLANKET:

A. The measurement for payment for this item will be the actual number of square yards completed in place, inspected and measured. The unit price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

    1) Furnishing, transporting, placing and anchoring erosion control blanket per the manufacturer’s specification

B. Payment will be based on units completed and accepted

    1) Erosion Control Blanket – SY

LANDSCAPE MAINTENANCE:

A. The measurement for payment for this item will be the lump sum price for plant and native seed maintenance as outlined in the plans. The lump sum price will include all of the Contractor's costs. This Bid item includes, but is not limited to:

    1) Touch up seeding
    2) Inspection and adjustment of drip irrigation system
    3) Proper monthly reporting to the City of Grand Junction
    4) Mechanical and chemical weed control

B. Payment will be based on units completed and accepted

    1) Landscape Maintenance – Lump Sum

Appendix D

Uranium Mill Tailings Management Plan

URANIUM MILL TAILINGS MANAGEMENT PLAN

FOR MANAGING TITLE I URANIUM MILL TAILINGS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES IN WESTERN COLORADO

UPDATED May 2015

Colorado Department
of Public Health
and Environment

URANIUM MILL TAILINGS MANAGEMENT PLAN

FOR MANAGING TITLE I URANIUM MILL TAILINGS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES IN WESTERN COLORADO

UPDATED MAY 2015

Colorado Department of Public Health and Environment

For Information or Assistance Contact:

Colorado Department of Public Health and Environment
222 South 6th Street, Room 232
Grand Junction, Colorado 81501

Michael Cosby
(970) 248-7171

Kate Elsberry
(970) 248-7164

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INTRODUCTION

PURPOSE

In 1978 the U.S. Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA Public Law 95-604) which tasked the U.S. Department of Energy with stabilizing, disposing, and controlling uranium mill tailings and other contaminated material at 24 inactive uranium processing (mill) sites located in ten different states, where uranium was processed for sale to a federal agency. Nine of the inactive uranium processing sites are located in Colorado. These Title I sites (referred to as "Title I" because the sites were listed in Title I of the law) were located in Grand Junction, Gunnison, Rifle (2), Durango, Maybell, Naturita and Slick Rock (2). While the active cleanup required by UMTRCA has been completed, residual uranium mill tailings remain in the nine affected communities. These residual tailings deposits are referred to as "UMTRA Title I uranium mill tailings" throughout this plan, in order to clearly delineate that this plan pertains only to radioactive materials that originated from UMTRA Title I mill sites.

The Colorado Department of Public Health and Environment is authorized by Colorado Revised Statutes (C.R.S. 25-11-301 et. seq.) to assist local governments in the identification and management of uranium mill tailings remaining in western Colorado communities. Because tailings deposits are often associated with utility rights-of-ways and private property, this plan is also designed to assist utilities and private parties in the identification, proper handling and disposal of uranium mill tailings.

The purpose of this plan is to describe responsibilities and procedures for managing UMTRA Title I uranium mill tailings encountered or disturbed during construction activities in the nine UMTRA communities in western Colorado. All work procedures are designed to minimize worker contact with radioactive materials and comply with the ALARA principle, keeping radiation exposures As Low As Reasonably Achievable. All work will be performed in accordance with *Colorado Rules and Regulations Pertaining to Radiation Control,* (Regulations) 6CCR-100-7, current version.

HISTORY

Beginning around the turn of the century, exploration for ore deposits bearing radioactive elements began in the United States. Western Colorado and adjoining states in the Four Corners area, being rich in these deposits, were heavily prospected. Radium was the primary radioactive element of interest produced by the early mines and mills, followed by exploration for, and production of vanadium, which occurs in the same geologic ores. Then, in the 1940s, the demand for uranium rapidly grew as research progressed for development of atomic weapons and energy. After World War II, the continued research,

nuclear reactor use and the arms race accelerated the demand for uranium, which produced a uranium boom lasting through the 1950s and into the 1960s.

Many hundreds of mines were explored and often developed for ores. Many mill pilot plants, and later operating mill sites, were built to crush ore and separate uranium compounds from the waste materials. The mills produced a uranium product called "yellowcake" and waste tailings sands. These tailings contained most of the original natural radioactivity of the ore, since only one of the radioactive constituents was recovered in the milling process.

The waste tailings were piled at the mills, but erosion from wind and water invariably spread the tailings to adjacent areas. In addition, tailings from many of the mills were transported off site and used for construction or as fill materials. As the mills fell into disuse and obsolescence, and as the uranium boom faded, more of the tailings were eroded away or removed for construction.

The Public Health Service and the Colorado Department of Health conducted studies that demonstrated the magnitude of the health-related issues caused by the presence of uranium mill tailings in residential areas. Health effects result from exposure to gamma radiation, inhalation of radioactive particles and from radon gas, produced by natural radioactive breakdown of radium contained in the tailings. In places where uranium mill tailings were used for construction, radon can seep into buildings (homes**,** offices, schools) and can build up to high concentrations. Many research studies have demonstrated that people breathing air containing elevated levels of radon are at greater risk of lung cancer.

The Public Health Service documented the association between elevated radon and lung cancer during uranium mine studies conducted in the 1950s. In the 1960s, the Colorado Department of Health and the Public Health Service expanded the studies to include areas around mill sites. The studies concluded that excessive radiation exposure could result from indiscriminate use of tailings and that persons were at increased risk due to the presence of the uranium mill tailings. By this time, thousands of tons of tailings from the uranium mills had been used in residential areas for construction. In Grand Junction, Colorado, mill tailings from the former Climax Mill Site, which had been spread throughout the community, were identified as a health risk and the Colorado Department of Health soon issued an order to cease the use of tailings in construction.

Because of the availability and many possible uses of the sandy uranium mill tailings as a building material, the dispersal and misuse was widespread. Some examples of uranium mill tailings use were: soil attenuation, concrete mix, bedding for concrete and utilities, stucco, and brick production.

Experience has shown that as construction and demolition activities occur, new uranium mill tailings deposits will be discovered and disturbance of known deposits will occur. New construction close to such deposits increases potential public exposure to gamma radiation and radon.

GRAND JUNCTION REMEDIAL ACTION PROGRAM

Concerns about health risks and property values grew as the extent of the uranium mill tailings misuse became public. Nationwide publicity announced and often exaggerated the problem. Congressional hearings were conducted, and in 1972, Public Law 92-314 created the Grand Junction Remedial Action Program to reduce radiation exposures inside structures affected by uranium tailings in the Grand Junction community. The U.S. Surgeon General published cleanup guidelines for the voluntary project. During the 15-year program, 594 structures in Mesa County underwent remedial action, where the radioactive material was removed by government contractors.

URANIUM MILL TAILINGS REMEDIAL ACTION PROGRAM

From the late 1960s, it was known that the misuse of uranium tailings was not unique to the Grand Junction, Mesa County area. In 1978, the U.S. Congress passed Public Law 95-604, the Uranium Mill Tailings Radiation Control Act (UMTRCA). This law enabled the creation of the Uranium Mill Tailings Remedial Action Project and required the U.S. Environmental Protection Agency to develop cleanup standards. The U.S. Department of Energy was responsible for stabilizing, disposing, and controlling uranium mill tailings and other contaminated material in cooperation with States and Tribes. The project extended the assessment and cleanup of uranium tailings nationwide for both structure interiors and exterior deposits. By the conclusion of the Uranium Mill Tailings Remedial Action Program in 1998, approximately 5,000 properties and nine uranium mill sites had been cleaned up in Colorado. In Colorado alone, approximately 15 million cubic yards of uranium tailings were removed to controlled disposal sites.

Nine uranium mill sites in western Colorado qualified for remedial action under Title I of the Uranium Mill Tailings Remedial Action Program. These Title I sites were located in Grand Junction, Gunnison, Rifle (2), Durango, Maybell, Naturita and Slick Rock (2). These were inactive or abandoned sites, which had sold uranium to the U.S. Atomic Energy Commission exclusively. The Department of Energy performed site assessments and environmental impact studies and developed options for permanent, environmentally safe disposal of the radioactively contaminated materials.

Disposal cells were designed and constructed to comply with strict criteria regarding ground water protection, seismology, erosion protection, settlement and infiltration. The cells were designed to last for 200 to1,000 years. Therefore, erosion resistant, natural materials were used in the construction of the cells. The typical cell was excavated into low permeability bedrock and filled with compacted uranium mill tailings. A very low permeability layer was added on top of the uranium mill tailings as a cover to contain the radon gas and limit the entry of water. An erosion resistant rock layer capped the cells.

All of the Colorado Title I disposal cells, except for the Maybell site in Moffat County, were located away from the mill sites to situate the tailings out of floodplains and away from shallow ground water. The Maybell tailings pile was reengineered and reworked to provide compaction and erosion protection and capped in place. All of the disposal cells will be monitored and maintained under the Long Term Surveillance and Maintenance Program managed by the Department of Energy.

The Title I disposal cell for Mesa County, known as the Grand Junction Disposal Facility (GJDF) at 4800 Hwy 50 Whitewater, CO will remain open to receive tailings from all UMTRA Title I communities until at least 2023. (The GJDF was formerly known as the Cheney Disposal Site or Cell.) Recognizing the need for long term management and storage of the remaining uncontrolled tailings, Congress revised the Uranium Mill Tailings Radiation Control Act in 1996 to allow for continued use of the GJDF. The Department of Energy will continue to maintain, operate and fund the GJDF cell. The GJDF cell is the only Uranium Mill Tailings Remedial Action Program site remaining open and available to receive uranium tailings.

MANAGEMENT OF UNCONTROLLED TITLE I URANIUM MILL TAILINGS

UNCONTROLLED TITLE I URANIUM MILL TAILINGS

Despite widespread publicity, two cleanup programs extending over 25 years, and thousands of property investigations, Title I uranium mill tailings remain in several western Colorado communities. It is suspected that up to half a million cubic yards of tailings remain outside of the controlled disposal cells.

Over 70,000 properties have been surveyed in Colorado for uranium mill tailings. Because of the voluntary nature of the project and difficulty in finding hidden, shielded deposits such as those beneath soils or under foundations, not all properties were investigated and not all deposits were found. Also, in some circumstances an owner refused to participate in the cleanup project after tailings were found on their property.

In addition to tailings that were never detected, or those where the owner refused cleanup, there were several other situations where tailings were left in place, including 1) Tailings excluded from exterior removals; 2) Tailings excluded from interior removals and 3) Supplemental Standards areas. All of these situations, explained in detail below, represent potential instances where tailings may be uncovered and require safe management in the future.

TAILINGS EXCLUDED FROM EXTERIOR REMOVALS

The Environmental Protection Agency standards for exteriors allowed measurements of radiation exposure to be averaged over 100 square meters. Thus, a small area of elevated contamination was often averaged with uncontaminated areas, resulting in small quantities of uranium mill tailings being left in place. The Colorado Department of Public Health and Environment now advises/recommends that all areas of elevated concentrations (also known as “hot spots”) be removed from the construction footprint plus a ten-foot buffer area, in order to minimize future exposure to the hot spot and/or further spreading of the tailings material during future construction activities.

TAILINGS EXCLUDED FROM INTERIOR REMOVALS

The Environmental Protection Agency standards for interiors addressed the interior average gamma exposure rate and the annual average radon levels. Contaminated structural materials, such as foundations or tailings under slabs, were often left in place if the interior radiation levels were below the standards. The State advises removal of all tailings from under slabs or structures.

SUPPLEMENTAL STANDARDS

The Environmental Protection Agency cleanup standards allowed for a variance from meeting standards in certain situations. This variance was called "supplemental standards." The most common use of supplemental standards was in situations where the cost of tailings removal was greater than the health risks associated with leaving the tailings deposit in place. The use of supplemental standards resulted in tailings being left in place. Approval of supplemental standards by the Colorado Department of Public Health and Environment and the Nuclear Regulatory Commission required that the deposit was in such an area that current and future land use would result in minimal radiation exposures to the public. Often, when Supplemental Standards were used, some partial removal would take place to remove surface contamination, but leave uranium mill tailings at depth. Records of Supplemental Standards applications are available from the Colorado Department of Public Health and Environment.

Examples of areas containing uranium mill tailings left in place through the application of supplemental standards include railroad tracks, city streets and curb/gutter, steep slopes, river islands, basements, patios, currently uninhabited structures, and utility lines. Grand Junction, Colorado, has the greatest number of supplemental standards areas, but supplemental standards deposits also exist in the Maybell, Durango, Rifle, Gunnison, Naturita and Slick Rock communities.

TAILINGS MANAGEMENT PLAN

The laws and regulations pertaining to UMTRA Title I materials did not anticipate the impacts on new construction projects or changes in land use when residual tailings were left in place after the remediation projects were completed. Thus, there is a need for a long-term management plan to help guide persons who may contact residual Title I tailings materials. This management plan is designed to be relatively simple and easy to use. The main elements of the management plan include:

1) the availability of an interim storage facility, useable by local governments, utilities and private parties on short notice,
2) the assignment of responsibilities,
3) health and safety concerns, including procedures to limit radiation exposure
4) training requirements and responsibilities,
5) procedures for excavation and transportation, and
6) the availability of a long-term disposal site.

These elements are addressed in the following sections.

The general process related to uncontrolled tailings is outlined as follows, and discussed in greater detail in the following sections. A property owner, owner's representative or realtor requests information about a property from the Colorado Department of Public Health and Environment, either for a property transaction or a building permit application. Available records are provided to the property owner at that time. If no records exist, or if there is a question about whether or not tailings may be present, the Colorado Department

of Public Health and Environment may send an inspector to the property to conduct a gamma radiation survey. If tailings are present on the property, the Colorado Department of Public Health and Environment will provide a recommendation and information regarding the procedures for removing the material, following this plan. The removal of the material may be conducted by the property owner (referred to later in this plan as "private citizen") or through the use a contractor. Local governments may also conduct tailings removals. The tailings are removed from the property, following the procedures outlined in this plan, and hauled to the Interim Storage Facility. Once the materials are safely stored and the vehicle and personnel have been decontaminated and released by the Colorado Department of Public Health and Environment, the materials are stored until the Grand Junction Disposal Facility is opened to accept material. The material is then hauled to the Disposal Facility by the City of Grand Junction. The Department of Energy requires compliance with the Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version).

INTERIM STORAGE FACILITY

THE FACILITY

The Interim Storage Facility (ISF) is a temporary holding area for uranium mill tailings. The facility is owned by the City of Grand Junction and operated in coordination with the Colorado Department of Public Health and Environment. The facility is located at 333 West Avenue, Grand Junction, Colorado.

The ISF provides a temporary, secure, and safe storage for uranium mill tailings excavated during construction activities in Colorado communities. Access to the ISF is facilitated through the Colorado Department of Public Health and Environment or the City of Grand Junction. The tailings will ultimately be transported to the Grand Junction Disposal Facility (GJSF) south of Grand Junction, Colorado. This transfer is normally scheduled on an annual basis.

The interim storage facility consists of an abandoned sewage treatment plant clarifier that is 75 feet in diameter and surrounded by concrete walls approximately 10 feet high. The bottom is a concrete slab, sloping to the center for drainage. A slot has been cut through the walls wide enough to admit a dump truck. A concrete ramp provides access to the entrance. A lockable gate protects the entrance. All holes in the bottom were sealed to make a water-tight storage area.

The facility also includes a shed for storage of records regarding materials brought to the ISF. The City provides a water line extension for decontamination spray or dust control upon request.

The Colorado Department of Public Health and Environment is responsible for access control, decontamination, and maintenance of records regarding materials brought to the

ISF. If Department personnel are not available, such as during an emergency water main break, the City of Grand Junction may assume these duties. Prior to accessing the ISF, the Colorado Department of Public Health and Environment will arrange for someone to meet the truck and provide a radiation meter for frisking and decontamination. Supervision of unloading, decontamination of vehicles and personnel after Colorado Department of Public Health and Environment working hours is the responsibility of the City of Grand Junction, which is the only entity authorized to access the facility after hours.

UNLOADING

The hauling truck will back into the facility to place the load as close as possible to the back wall or near already placed material. The driver should prevent tires from coming in contact with contaminated materials in order to reduce the need for decontamination. Material brought to the interim storage facility must be sized as small as possible to allow for compaction at the Grand Junction Disposal Facility site. No debris may exceed 3 feet cubed or 10 feet in any dimension. Waste brought to the ISF should be in compliance with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version). No uncovered loads may be brought to the ISF unless all transported contamination is in a solid form; such as bound in concrete (see Hauling).

DECONTAMINATION

The truck bed will be inspected for visible uranium mill tailings contamination, soil and debris remaining after dumping. Material that did not dislodge will be pushed out with shovels or brooms. The truck will then proceed to the entrance for inspection of tires and undercarriage. All visible or measureable contamination will be removed from the tires and undercarriage.

Any use of the interim storage facility will be recorded. . The logbook will be kept in the facility shed. Logbook records will be transferred to the Colorado Department of Public Health and Environment office quarterly for permanent storage. The following information is required for every load brought to the ISF:

Date
Origin of contamination (street address)
Estimated cubic yardage
Name of driver/Company
Truck identification (license number)
Inspection for hazardous wastes
High gamma meter reading of the material
Time in and out of the facility
Decontamination status/notes/information

The truck tires and tailgate will undergo frisking according to the frisking procedure in Appendix B. If the tailgate or tires will not pass the frisking limits, the water hose will be

used to further decontaminate the vehicle. If material cannot be dislodged from the bed, it can also be sprayed out at this point. After washing, the tires and tailgate will again be frisked. All water or dislodged material will drain into the interim storage facility. No uranium mill tailings contamination shall be allowed to escape containment within the facility walls.

Individuals that have had physical contact with the uranium mill tailings will have all visible contamination removed by sweeping. The individual will undergo a full body frisk with the frisking meter. If the frisking limits are exceeded, further sweeping or washing will occur, followed by another frisking. If clothing will not decontaminate visibly or pass the frisking survey, the clothing will be changed out in the storage shed. Contaminated clothing will be left at the ISF for disposal.

Once decontamination is deemed complete by the Colorado Department of Public Health and Environment, and the logbook has been filled out, the truck and users may leave the interim storage facility access area. All materials used in decontamination will be returned to the shed. The gate and shed will be locked. The final determination that all procedures, including decontamination, have been completed according to the protocols is the responsibility of the Colorado Department of Public Health and Environment.

RESPONSIBILITIES

Colorado Department of Public Health and Environment

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

The Colorado Department of Public Health and Environment is responsible for the overall oversight of the Title I Uranium Mill Tailings Management Plan. The Department has more than 30 years experience in the management of uranium mill tailings, including expertise in radiation protection, clean up programs, record keeping, public information and health physics.

Colorado Department of Public Health and Environment's responsibilities include:

1) Maintaining, updating and sharing records and documentation
2) Conducting inspections
3) Conducting excavation control
4) Providing technical expertise
5) Overseeing use of the ISF
6) Providing instrumentation

PUBLIC RECORDS AND DOCUMENTATION

The Uranium Mill Tailings Management Plan will be used for technical information and field guidance. The Colorado Department of Public Health and Environment is responsible for the maintenance, distribution and revision of this plan.

The Colorado Department of Public Health and Environment will maintain and update uranium mill tailings records available to the general public and local government agencies. The Colorado Department of Public Health and Environment will produce or update property records as the conditions change due to excavation of the uranium mill tailings. The Colorado Department of Public Health and Environment will provide personnel to interpret records and give health risk information to the public regarding the presence of uranium mill tailings on properties.

The Colorado Department of Public Health and Environment will keep records of Title I uranium mill tailings excavated, received at the interim storage facility, and transported to Grand Junction Disposal Facility. The Colorado Department of Public Health and Environment will maintain records for decontamination of personnel and equipment.

For the UMTRA Title I communities outside of Grand Junction/Mesa County, the Colorado Department of Public Health and Environment will provide general information about uranium mill tailings to the public and local governments.

INSPECTIONS

The Colorado Department of Public Health and Environment will provide inspections of new building areas and demolition sites and inform the appropriate City and County Planning agencies for all pertinent building permits in Mesa County. All properties in Mesa County are to be monitored for the presence of mill tailings by the Colorado Department of Public Health and Environment, and if any are detected they are to be removed from all building sites before new construction commences.

For the UMTRA Title I communities outside of Grand Junction/Mesa County, the Colorado Department of Public Health and Environment will keep available Title I uranium mill tailings records and coordinate inspections of new construction in other communities as time permits and as requested.

EXCAVATION CONTROL

The Colorado Department of Public Health and Environment will provide excavation control for uranium mill tailings removals by private parties, contactors and government agencies by request.

Tailings co-mingled with other wastes cannot be hauled to the ISF or to the GJDF, as these materials are not in compliance with the Department of Energy's Waste Acceptance

Criteria for the Grand Junction Disposal Site. The Colorado Department of Public Health and Environment will conduct inspections prior to tailings removal for the presence of hazardous wastes that could be commingled with uranium mill tailings. The Colorado Department of Public Health and Environment will provide expertise on segregation, testing and storage of commingled waste. The Colorado Department of Public Health and Environment will provide documentation to the Department of Energy that materials transported to the Grand Junction Disposal Facility do not contain commingled waste.

TECHNICAL EXPERTISE

The Colorado Department of Public Health and Environment will provide technical expertise to communities, local governments or private parties in identifying, handling and management of Title I uranium mill tailings.

INTERIM STORAGE FACILITY

The Colorado Department of Public Health and Environment will routinely manage operations and record keeping at the interim storage facility. The Colorado Department of Public Health and Environment will conduct radiological surveys of the interim storage facility to insure its proper operation and containment of material. Spot checks will occur during heavy use, high winds or rain.

RADIOLOGICAL SURVEY INSTRUMENTS

The Colorado Department of Public Health and Environment will provide radiological survey instruments on loan to local governments and private parties on an as-needed basis. The Colorado Department of Public Health and Environment will maintain and calibrate the instruments annually as budgets allow and provide training in the use of the instruments**.**

TRAINING

The Colorado Department of Public Health and Environment will provide training to workers excavating tailings and will provide on-site safety briefings as needed. The Colorado Department of Public Health and Environment will be available to explain technical problems, options, radiation health risks or any part of the Uranium Mill Tailings Management Plan. The "Training" section of this plan describes the safety training in more detail.

LOCAL GOVERNMENTS AND PUBLIC UTILITIES

The local governments and public utilities are responsible for following the procedures in this plan, designed to locate residual uranium mill tailings in construction areas, and to excavate and transport contaminated material while minimizing impact and radiation exposure. The local governments and utilities recognize that cooperation and coordination between the Colorado Department of Public Health and Environment, the Department of Energy, utilities, and local governments is paramount. All parties recognize and understand that some inconvenience and costs are involved in the proper handling and disposal of residual uranium mill tailings.

TRAINING

Local governments and utilities will require and assign radiation training as required under this plan for workers potentially exposed to ionizing radiation from uranium mill tailings. Training requirements are described later in this document.

COSTS

The costs of excavation, handling and transporting of uranium mill tailings by local governments and public utilities will be borne by these entities. Local governments may apply for grants to cover these costs in accordance with HB 97-1248, through the Colorado Department of Local Affairs and the Associated Governments of Northwest Colorado.

ENFORCEMENT OF PROCEDURES

Local governments and public utilities will be responsible for monitoring and enforcing the procedures for workers under their direct control. Supervisors will observe operations and enforce the written procedures of the Uranium Mill Tailings Management Plan, and the Colorado Rules and Regulations Pertaining to Radiation Control.

POINT OF CONTACT

Local governments and public utilities will identify personnel responsible for contact and coordination with Colorado Department of Public Health and Environment.

INSTRUMENTS

Local governments and public utilities will maintain the radiological detection instruments provided on loan by the Colorado Department of Public Health and Environment in good working order. The instruments are expensive and require proper care and usage. The instruments will be kept on hand for ease of checking potentially contaminated areas. The

instruments will be returned to the Colorado Department of Public Health and Environment annually for an operations check.

Surveys must be performed in accordance with Appendix D and Colorado Department of Public Health and Environment training.

HAZARDOUS WASTE

Local governments and public utilities will notify the Colorado Department of Public Health and Environment of unusual coloration, smells, or materials such as car batteries or transformers discovered in excavations. Coordination with the Colorado Department of Public Health and Environment shall be made prior to the removal of such materials or soils, as they may contain hazardous wastes substances like asbestos which require special storage, handling or treatment if excavated. A certified asbestos inspector should be used to determine the presence or absence of asbestos contamination if it is suspected. If hazardous material is suspected it should be analyzed by a qualified inspector. Hazardous material may not be taken to the interim storage facility. If hazardous material is taken to the interim storage facility by any local government or public utility, that entity will be responsible for removing the hazardous waste and associated tailings within 30 days of being so notified and manage the material in accordance with all federal, state and local requirements. The Hazardous Materials and Waste Management Division technical assistance line (303) 692-3320 is available to provide instructions on how to manage the waste. All materials brought to the ISF must comply with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version.)

RECORDS CHECK

Local governments and public utilities are responsible for checking available records or maps prior to a planned excavation activity. Up-front knowledge of tailings locations will enable subcontractors to more accurately bid projects. The Colorado Department of Public Health and Environment has copies of the supplemental standards database to assist in locating tailings deposits. The Colorado Department of Public Health and Environment also will retain the records of several thousand properties assessed or cleaned up in Uranium Mill Tailings Remedial Action Program communities.

PERMITS

Construction activities in public right-of-ways are controlled by local governments through the issuance of permits. Work permitted in an area of known tailings involvement will have the statement "tailings procedures in effect" written on the work order and will include a requirement for coordination with the Colorado Department of Public Health and Environment.

EXCAVATION CONTROL

The local governments and public utilities supervising excavations into deposits of uranium mill tailings will minimize over-excavation. Over-excavation is the removal of uncontaminated materials or mixing of uncontaminated materials with uranium tailings for transport to the interim storage facility. Over-excavation is controlled by radiological surveys and segregation of contaminated and uncontaminated material. In most cases, tailings deposits are small and localized. For such situations, a small excavator is the appropriate equipment for this type of removal. In general, the size and capacity of the excavator should match the size of the job. The excavation tool should fit the job to prevent over excavation.

INTERIM STORAGE FACILITY

The City of Grand Junction will be responsible for providing and maintaining the infrastructure necessary for operation of the interim storage facility (ISF), including an operating water line. The City will provide a gate and lock for security of the ISF and equipment shed. The City will also consolidate stockpiles within the ISF as requested by the Colorado Department of Public Health and Environment. No material will enter the ISF without proper documentation completed and stored in the ISF shed. All non-city generated material will be cleared through the Grand Junction UMTRA CDPHE office prior to placement in the ISF.

TRANSPORT TO THE GRAND JUNCTION DISPOSAL FACILITY

The City of Grand Junction will be responsible for transport of the uranium mill tailings to the Department of Energy disposal site from the interim storage facility. All training and procedures required by the Department of Energy for entering the Grand Junction Disposal Facility site (GJDF) will be adhered to. In cases of large quantities, the Colorado Department of Public Health and Environment may arrange for direct transport of the material from the excavation to the GJDF cell. In these cases, the property owner is responsible for transportation. Transportation must meet the requirements of the Colorado Rules and Regulations Pertaining to Radiation Control Part 17 and Colorado Department of Transportation requirements. In addition, all material hauled to the GJDF must be cleared by the CDPHE and meet the Waste Acceptance Criteria for the Grand Junction Disposal Site, as established by the Department of Energy.

UNITED STATES DEPARTMENT OF ENERGY

OPERATION OF THE GRAND JUNCTION DISPOSAL FACILITY

The Department of Energy is responsible for providing resources and coordination necessary to receive uranium mill tailings at the GJDF disposal cell periodically from the

stockpile at the interim storage facility. Currently, it is projected that materials will be trucked from the interim storage facility to the GJDF at least once a year for a two-to-three-week period. This frequency will vary as needed.

The Department of Energy is responsible for providing resources and coordination necessary to receive uranium mill tailings at the GJDF during large planned construction projects, such as sewer line replacement in a supplemental standards area. Planned disturbance of large quantities of uranium mill tailings may be trucked directly to the GJDF without using the interim storage facility, if approved by the Department of Energy.

The Department of Energy is also responsible for developing and maintaining the Waste Acceptance Criteria for the Grand Junction Disposal Site and for assuring that any changes to the criteria are communicated to the Colorado Department of Public Health and Environment.

LONG TERM SURVEILLANCE AND MAINTENANCE

The Department of Energy is responsible for the long-term surveillance and maintenance of the Grand Junction Disposal Facility disposal cell. All costs associated with the operation and maintenance of Grand Junction Disposal Facility is at Department of Energy expense.

CONTACT PERSON

The Department of Energy shall provide a point of contact for coordinating and planning between local governments, utilities and the Colorado Department of Public Health and Environment. The point of contact will receive any reports that the Department of Energy requires.

MAPS

The Department of Energy will provide maps delineating supplemental standards areas to the Colorado Department of Public Health and Environment and local governments.

PRIVATE PROPERTY OWNERS

In Mesa County, private parties or their contractors will notify the Colorado Department of Public Health and Environment of a request for a building or demolition permit through the Mesa County Planning Department. The owners or contractors will follow the recommendations issued to the Planning Department by the Colorado Department of Public Health and Environment through the Building Permit Survey Program.

In Title I uranium mill tailings impacted communities, property owners bear the costs of excavating, stockpiling, and transporting of uranium mill tailings contaminated materials to the interim storage facility, a licensed disposal facility, or to the GJDF. Prior to moving material to the facility, the owner must coordinate with the Colorado Department of Public Health and Environment

The private parties or their contractors will follow the ALARA principle throughout all work with uranium mill tailings. See the ALARA section.

HEALTH AND SAFETY

IONIZING RADIATION EXPOSURE CONCERNS

Uranium mill tailings consist of sand-like wastes generated from the milling of uranium ores to extract "yellowcake," a uranium oxide compound. These tailings contain most of the original radioactivity found in the unprocessed ores. Radioactive radium, thorium, lead and other elements in tailings are unstable and decay by ejecting alpha and beta particles from the nucleus and by releasing excess energy as radiation. The radiation from the decaying tailings atoms has the potential to cause cancer in living tissues.

The main radiation exposures from uranium mill tailings are from direct exposure to gamma radiation, inhalation of radon, and inhalation of airborne radioactive particles.

Based on a human health risk assessment conducted by the Department of Energy (DOE, 1989) gamma radiation exposure to the public from residual uranium mill tailings is expected to be below the 100 millirem per year exposure limit for the general public.

Radon is formed when the radium in the tailings decays. Radon decays by ejecting alpha and beta particles and forms a series of short-lived radioactive products. The particles ejected by radon and its products cannot travel very far in air and cannot penetrate skin, thus are not an external hazard. However, if inhaled, these particles can cause damage to the lungs that could eventually result in lung cancer. Radon is found naturally in air in small amounts. Exposure to radon becomes a health hazard when it accumulates in buildings or mines to higher levels and is inhaled for extended periods. .

A third potential source of radiation exposure is radioactive particles (dust) associated with the tailings that can become airborne. Once airborne, these particles can be inhaled, with subsequent exposure to the respiratory tract. Airborne particulate contamination is routinely controlled to negligible concentrations by the application of water mists or sprays to equipment or tailings releasing dust. Dust masks can also be worn to control this exposure for workers.

The radiation exposures to utility workers excavating uranium mill tailings are greatest in trenches. Radon is heavier than air, and before dispersal occurs, will be at higher levels at the bottom of the trench. The radon levels would probably be greatest when the trench is opened up and lessen somewhat later due to mixing with air. Gamma radiation exposure is also more likely in a contaminated trench. There may be pure tailings in the bedding of the utility line and tailings mixed with the soils in the walls of the trench. The result is radiation exposure to workers from the sides as well as the bottom of the trench.

RADIATION RISK ANALYSIS

The limit for radiation exposure from uranium mill tailings for non-radiation workers is 100 millirem per year in the Regulations, Part 4.14.1, Radiation Dose Limits for Individual Members of the Public. This is a "total dose limit" which includes both internal and external exposure, rather than only external exposure to gamma radiation. The Environmental Protection Agency is currently considering lowering this limit to 15 millirem per year, while the Nuclear Regulatory Commission believes that 25 millirem per year should be used (as applied in the decommissioning of facilities). The allowable exposure for radiation workers is 5,000 millirem per year. Radiation workers are carefully and continuously scrutinized in a radiation workers health monitoring program.

The Department of Energy prepared a health risk analysis in 1989 for utility workers entering trenches that contain uranium mill tailings. The analysis calculated potential worst-case exposures to workers in trenches and compared them to the regulatory limit, (100 millirem per year above background for non-radiation workers, required by the Code of Federal Regulations (CFR), Title I0, Part 20). In the Colorado, background radiation varies from 350 to 650 millirems per year.

The analysis was based on a series of hypothetical projects to remove uranium mill tailings surrounding buried utilities. Water line repairs were estimated to last 39 hours. It was assumed that an individual worker would be in the trench only 25 percent of the time due to scheduling rotations. Thus, 10 hours per year of exposure was allotted to water line repairs.

Approximately eight hours of exposure was allotted to sewer line work with an individual spending only 10 percent of the time in a contaminated trench. Extra exposures were added to account for potential manhole repair. Therefore, two hours of exposure was used in the calculation for sewer line work.

Twelve total hours (10 for water lines and 2 for sewer lines) of yearly potential exposure at the highest, worst-case radiation levels detected in trenches gives an estimated exposure of 9.6 millirem to a utility worker, or 1/10 of the 100 millirem limit.

No exposure limit or regulation exists for radon in outside air, except for uranium and thorium mill tailings disposal cells. The radon limit for miners is four working level months per year. The Environmental Protection Agency has set a voluntary suggested indoor action level at 0.02 Working Levels (WL). This equates to about one working level month per year. The highest radon levels encountered in trenches during the analysis were 0.058 WL. The potential annual working level months-per-year after exposure to 0.058 working levels for 12 hours is 0.004 working level months-per-year, which is below the Environmental Protection Agency indoor action level.

The conclusion of the Department of Energy health risk analysis is that based upon these presumptions, "there is no clear present or future health risk to utility workers in Mesa

County due to potential gamma or radon exposure, even based upon the worst-case scenarios."

AS LOW AS REASONABLY ACHIEVABLE (ALARA)

Even though the Department of Energy's risk assessment demonstrated that risk to utility workers in trenches containing uranium mill tailings is expected to remain below regulatory limits, the Tailings Management Plan supports adherence to the ALARA philosophy, as stated in Part 4.5 of the Regulations, to limit exposure to levels less than the regulatory requirement.

ALARA is an approach to radiation protection to manage and control exposures (both individual and collective to the work force and the general public) and release of radioactive materials to the environment at levels as low as is practical below the regulatory requirement, taking into account social, technical, economic, practical and public policy considerations. As used in this context, ALARA is not a dose limit but a process, which has the objective of attaining doses as far below the applicable controlling limits as is reasonably achievable.

The ALARA principle will be the primary philosophy and tool used for controlling radiation exposures during all activities of managing uranium mill tailings. The ALARA principle will be implemented by use of the following requirements to control exposure:

- The upper limit of gamma exposure allowed will be 15 millirem per year. Supervisors of local government and utility workers should maintain records regarding the number of hours of exposure for their employees who work near uranium mill tailings. If badges are not used to track actual exposures, the exposures can be roughly estimated. Using the average tailings activity, approximately 300 hours of trench work is allowable per year under this exposure limit. The local government or public utility and the Colorado Department of Public Health and Environment may consider additional rotations out of trench work when any individual worker has accumulated 100 hours of work in contaminated trenches in any given year, in order to ensure worker protection.

- When possible, the local government or public utility should consider establishing a control area around exposed tailings. Only trained personnel should be allowed into the controlled area. Individuals entering the controlled area will limit the amount of time spent within the controlled area. Individuals will position their work as far from the contaminated areas as possible. Only necessary equipment or tools will be allowed into the controlled area. Uranium mill tailings contaminated areas will be fenced off from the public during non work hours. No unauthorized entry into the controlled areas is allowed by the public.

- No visible dust is allowed to leave the controlled area. Dust will be controlled through the use of water sprays. However, spraying should be limited to the

amount necessary to keep the excavation dust-free, but should not create runoff from the excavation.

- No eating, drinking, chewing, or smoking is allowed in the controlled area.

- All equipment and personnel in contact with tailings will be surveyed with a radiation meter. If contamination is present, they must undergo decontamination. Haul trucks and contaminated personnel will be frisked with a radiation meter to verify decontamination. Surface meter readings should be under 18 μ R/hr (microRem [Rem = roentgen equivalent man] per hour) or equivalent.

- Haul trucks will be covered with a tarp to prevent windblown transportation. . If the tailings are wet or have the potential of leaking out, a plastic sheet should be positioned in the tailgate to contain tailings.

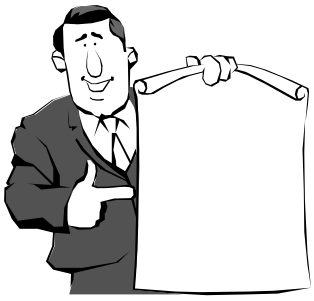
- If a spill occurs, the spill procedures must be followed (see "Transport of Tailings").

- Tailings deposits excavated from the top three feet of an excavation should not be replaced into the excavation. These tailings should be removed and transported to a controlled onsite stockpile or to the interim storage facility. Clean fill should replace tailings deposits for up to three feet from the ground surface. If this is not readily performable, a cap of 6 inches in non traffic areas and 18 inches in high traffic areas should be placed over the tailings at a minimum. This should be placed over stockpiled material as well and a tactifyer such as magnesium chloride should be applied to minimize weathering. This tactifyer should be applied to all temporary stockpiled tailings if stored over 30 days or if weather conditions indicate that tailings may be spread from the stockpile.

TRAINING

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

The Colorado Department of Public Health and Environment employees responsible for implementing the Uranium Mill Tailings Management Plan, and employees who may receive radiological exposures in the work place, will be provided with training and be proficient in the following areas:



40 Hour Hazardous Waste Training
8-hr Refresher Training

Radiological Worker Training
Radiological Refresher Training

The Department will develop and update the curriculum for training of local government and public utilities workers or private owners and agents. The curriculum will include:

Basic Health Physics
Radiation Exposure Limits and Monitoring
Excavation and Transport Procedures
Survey Meter Operation
The ALARA Principle
Decontamination Procedures

LOCAL GOVERNMENTS AND PUBLIC UTILITIES

It is recommended that local governments and public utilities workers who may potentially be exposed to uranium mill tailings will receive training in the following areas:

Radiological Worker Training
Radiological Refresher Training

The workers for these agencies will attend on-site briefings to review uranium mill tailings management procedures before beginning work in an area known to contain uranium mill tailings. The Colorado Department of Public Health and Environment or the local government/public utility supervisors will conduct the briefings.

EXCAVATION PROCEDURES

RADIATION SURVEY

A gamma radiation survey instrument will be accessible to excavation crews working in areas known to be contaminated with uranium mill tailings. The instrument will be provided on loan by the Colorado Department of Public Health and Environment and will be capable of detecting uranium mill tailings in the range of 0-1000 micro Roentgen per hour (μR/h).

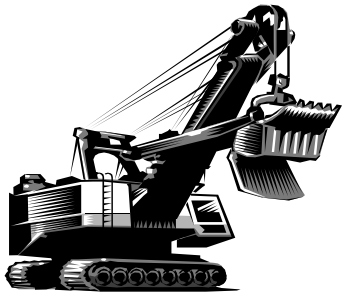
A field operations check on the instrument will be performed before surveying for uranium tailings contamination.

Refer to Appendix D – Generic Survey Procedures for more detailed procedures.

IDENTIFYING CONTAMINATED MATERIAL

For purposes of this plan, residual uranium mill tailings will be identified based on a reading of 30 percent above the normal background gamma radiation. A reading of fourteen μR/h is generally considered the average for western Colorado soils. As such, the background gamma plus 30 percent results in a value of 18 μR/h. Any reading of 18 μR/hr will be considered contaminated with uranium tailings. In non-habitable areas (and non-habitable in the future), a reading of 20 μR/h is allowable. Every area with contamination is to be evaluated and handled individually based on consultation with the Colorado Department of Public Health and Environment. For purposes of this Uranium Mill Tailings Management Plan, and in adherence to the ALARA principle, hot spots will be removed and area averaging is not allowed.

Uranium mill tailings contamination may be in surface deposits or buried, especially in utility trenches. Where applicable, the Department of Energy supplemental standards maps may be used to generally indicate potential areas of contamination. Prior to surface penetration, a check shall be made with a scintillometer. After a trench is excavated, the meter shall be lowered for spot checks along the length of the excavation. Any suspicious gray or purple sands should be particularly checked.
Tailings are often mixed with soils are indistinguishable and appear to be normal dirt.



EXCAVATION

CONTROLLED AREAS

If tailings are identified, a controlled area shall be established, extending 10 feet from the edge of the deposit. Once tailings are identified,

tailings excavation procedures and ALARA principles immediately become effective. The supervisor/property owner is responsible for enforcement of the procedures.

HAZARDOUS WASTES

Uranium mill tailings contaminated areas shall be inspected for asbestos, visible discoloration, odd smells, or for materials such as car batteries or transformers. Mixing of hazardous wastes with the tailings will probably cause the deposit to be considered a commingled waste. Commingled wastes, if above regulatory limits, and untreated, cannot be hauled to the Grand Junction Disposal Facility disposal site. Material hauled to the Grand Junction Disposal Facility must meet the Department of Energy's Waste Acceptance Criteria.

Co-mingled wastes are regulated with specific handling and storage requirements. The Colorado Department of Public Health and Environment shall be notified immediately upon suspicion of such wastes. These deposits shall not be excavated unless necessary and then shall be segregated and stored separately from the other non-comingled tailings and clean soils. The local government or public utility will be responsible for managing commingled wastes in accordance with applicable hazardous waste regulations.

AVOIDING OVER EXCAVATION

If uranium mill tailings need to be excavated, the amount of material disturbed or removed should be minimized. Over excavation causes extra handling costs and fills the limited permanent storage room available in the Grand Junction Disposal Facility disposal cell. Appropriately sized equipment should be used based on the size of the deposit to be excavated. If the tailings cannot be directly loaded onto transportation, stockpiled tailings should be placed onto concrete or plastic sheeting to delineate and separate from the clean soil below it.

Uncontaminated overburden shall be removed and segregated from uranium mill tailings below. Only uranium mill tailings contaminated materials shall be transported to the interim storage facility or Grand Junction Disposal Facility. Care shall be taken to avoid mixing contaminated soils with uncontaminated soils. The radiation meter shall be used to identify soils in question.

The uranium mill tailings contaminated areas considered for removal will be visibly marked for the machine operator. This is to segregate the contaminated material and avoid mixing. Spray paint, colored flags or fencing are appropriate to delineate the uranium mill tailings contaminated areas.

No trash, wood, tires or other non-contaminated solid waste shall be shipped to the interim storage facility or GJDF. Such materials may be decontaminated and disposed of as solid waste. Care shall be taken to segregate uncontaminated concrete from contaminated concrete (It has been our experience that uncontaminated concrete is the material that most

often is improperly brought to the interim storage facility). Contaminated concrete or asphalt shall be sized properly to allow compaction at Grand Junction Disposal Facility. No debris shall be larger than 3 feet in any dimension. No pipe shall be longer than 10 feet in length. All materials shall be sized in accordance with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site.

Proper disposal of tailings is always the best means of dealing with tailings. It is the ultimate final termination of the contamination. However, in some cases, particularly in Title I communities outside of the Grand Junction area, transportation to the ISF or GJDF is just not feasible. In these situations, uranium mill tailings can be re-buried on site provided that the following conditions are met:

1) A discussion with CDPHE about disposal options prior to any excavation activities must be conducted.
2) Tailings may be returned to the original excavation, in a last out-first in order.
3) The tailings should be re-buried under a minimum of 6 inches of clean soil in low exposure/traffic areas and 18 inches in high exposure/traffic areas and no deeper than a foot above the vadose (ground-water capillary) zone. 18 inches of clean cover should be used in areas with high erosion potential.
4) Contaminated surface deposits must be re-buried beneath clean fill material as listed in 2).
5) A written record that indicates the approximate volume of material that was re-buried, the meter reading for the material, the approximate depth of burial and the burial location, shall be submitted to CDPHE. These records shall also be maintained in perpetuity by the property owner, provided to any subsequent owner and to any contractors performing work on the property.

STOCKPILING

Stockpiling of uranium mill tailings contaminated material should be avoided whenever possible. Stockpiling may cause concerns to property owners, and may present an exposure hazard. Stockpiling on the same property that the tailings came from is allowable, but not advisable. Tailings may not be removed from the original property except to be taken to a licensed disposal facility, the interim disposal facility at the City of Grand Junction's yard, or the Grand Junction Disposal Facility in Whitewater, CO. Stockpiled material should be fenced from public access, and must be covered or a tacktifyer applied to prevent wind and water erosion. Stockpiles should not be left in place longer than 60 days. If it is necessary to leave them longer than that, or if inclimate weather is emanate, they must be properly covered or sealed.

ASPHALT

When working with asphalt placed over uranium mill tailings contaminated soils, care shall be taken to not penetrate into the tailings and/or mix the tailings with the asphalt. If tailings are mixed with the asphalt, the asphalt should be inspected with a meter. If the

mixture shows a meter reading of 30 percent above the radiological background (a reading of 18 uR/hr or greater), it is considered contaminated.

Asphalt removed in chunks over uranium mill tailings contaminated soils should be inspected on the underside with the survey meter. If excavation into the bedding material is necessary, care must be taken to segregate contaminated and uncontaminated materials.

WATER MAIN BREAKS

If uranium mill tailings are washing away due to a water line break, sediment dams shall be established to halt the spread of contamination. Following repair of the break, a meter survey should be conducted downstream to insure that any contaminated materials spread by the break are identified and are cleaned up. Any material exceeding 30 percent above background (18 μR/hr) should be returned to the excavation or taken to the interim storage facility.

DECONTAMINATION

All equipment used for excavation or hauling of tailings shall be inspected and decontaminated. Visible tailings shall be swept or sprayed away and placed in the ISF.

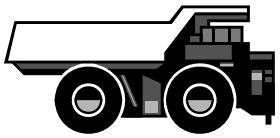
Workers in contact with tailings shall be decontaminated. Visible tailings shall be swept or washed away. These workers shall be frisked with the beta-gamma meter for verification of decontamination (See Appendix B). If clothing will not pass the frisk, the workers shall change into clean clothing. Contaminated clothing and contaminated decontamination materials shall be taken to the interim storage facility for further decontamination and frisking or disposal. The Colorado Department of Public Health and Environment will be available to assist in these operations.

CEASE WORK

Work shall cease when the project supervisor or the Colorado Department of Public Health and Environment determines that the procedures have not or cannot be followed. Examples include: high winds making it impossible to control dust, a truck that leaks tailings or non-cooperation of workers. Work may be resumed when the supervisor and the CDPHE determines that the procedures issue has been resolved and it is safe to resume work.

TRANSPORT OF TAILINGS

REGULATIONS



Transportation of radioactive material over public roads in Colorado is regulated under the Code of Federal Regulations (CFR) Title 49, Parts 171-178 and 390-397, and Part 17 of the Colorado Regulations, which mirror 49 CFR. Generally, uranium decay series material is low specific activity as defined by the International Atomic Energy Agency and U.S. Department of Transportation.

The Department of Transportation defines a concentration of radioactivity above which material like uranium mill tailings is considered radioactive for purposes of the transportation regulations. At present, the Department of Transportation defines any material with radioactivity greater than 70 Becquerel per gram (B/g) as radioactive for transport purposes. For uranium mill tailings, 70 B/gm total activity is calculated to be less than approximately 174 pCi/g radium-226. Therefore, if a truckload of tailings material averages overall below less than 174 pCi/g radium-226, it is not considered radioactive material for purposes of transportation under 49 CFR and Part 17 of the Regulations. From our experience in the Uranium Mill Tailings Remedial Action Program, tailings excavated from streets or other properties are usually mixed with clean soil and do not exceed 174 pCi/g radium-226.

HAULING

The ALARA principle will be followed during transportation of tailings. This will be insured by covering and not overfilling loads to prevent dust or spillage. If very wet or fine-grained material is to be loaded, a plastic sheet diaper will be placed in the rear of the truck bed in a manner to exclude leaking out the tailgate. Loads should not be piled any higher than the sidewall of the truck. The most direct route possible with no off-road stops will be used to transport tailings to the interim storage facility. All loads will be covered to ensure that no tailings are blown out during transport.

SPILL PROCEDURE

When transporting mill tailings, if a spill from the haul truck occurs, the supervisor and the Colorado Department of Public Health and Environment will be notified as soon as possible. The spill will be isolated and protected from further dispersal. Traffic cones and flagmen will be used as necessary for traffic safety. The truck should pull off the road if possible. If there has been an accident, the driver should call the state patrol or 911 as necessary. Drivers should also call their supervisor and the Colorado Department of Public Health and Environment in responding to the spill. Traffic safety has priority over isolating or recovering the spill

The spill will be swept up and put into a closed container appropriate to its volume and transported to the interim storage facility for disposal. The area is considered clean if no contamination is seen or detected. If the spill was onto a dirt road, the radiation survey meter will be used to verify the spill cleanup. If no readings above 18 μR/h are noted on the gamma survey meter, the area is considered clean.

APPENDIX A

DEFINITIONS

Access Control: A designated entrance/exit point to a controlled area.

ALARA: Acronym for "As Low as Reasonably Achievable," a basic concept of radiation protection that specifies that radioactive discharges from nuclear plants and radiation exposures to personnel be kept as far below regulatory limits as feasible.

Alpha Particle: A positively charged particle ejected spontaneously from the nucleus of some radioactive elements. It is identical to a helium nucleus and has a mass number of 4 and an electrostatic charge of +2. It has low penetrating power and short range. The most energetic alpha particle will generally fail to penetrate the skin. Alphas are hazardous when an alpha-emitting isotope is introduced into the body.

Beta Particle: A charged particle emitted from a nucleus during radioactive decay. A negatively charged beta is identical to an electron. A positively charged beta particle is called a positron. Large amounts of beta radiation may cause skin burns. Beta emitters are harmful if they enter the body. A thin sheet of metal or plastic easily stops beta particles.

Grand Junction Disposal Facility (GJDF): The Uranium Mill Tailings Remedial Action Program disposal cell, operated by Department of Energy, located about 15 miles south of Grand Junction on U.S. Highway 50, will remain open until the year 2023 or until filled. This will be the only permanent (program) disposal cell available to uranium mill tailings disturbed by construction activities after 1998. This cell was previously known as the Cheney Disposal Cell and was renamed in 2012.

Contamination: Unwanted radioactive materials (uranium mill tailings) that are present on/in a particular object or area. It can also refer to other contaminants such as asbestos.

Controlled Area: Any area to which access is managed in order to protect individuals from exposure to radiation and/or radioactive material. Individuals who enter a controlled area are not expected to receive a total effective dose equivalent of more than 100 millirem in one year**.**

Decontamination: The reduction or removal of contaminating radioactive material from a structure, area, object or person**.**

Frisk: A radiological survey of personnel or equipment utilizing a portable radiation detector.

Gamma Ray: High-energy, short wavelength electromagnetic radiation (a packet of energy) emitted from the nucleus of an unstable atom. It is very penetrating and is best stopped by dense materials such as lead. They are similar to x-rays but are usually more energetic.

Interim Storage Facility: The facility located in Grand Junction available for temporary storage of uranium mill tailings disturbed during construction activities. The interim storage facility is located on the City of Grand Junction property at 333 West Avenue, Grand Junction, Co. and managed by the Colorado Department of Public Health and Environment**.**

Radiation: Particles (alpha, beta or neutrons), or photons (gamma) emitted from the nucleus of an unstable (radioactive) atom as a result of radioactive decay.

Radioactive: Exhibiting radioactivity or pertaining to radioactivity.

Radioactivity: The spontaneous emission of radiation, generally alpha or beta particles often accompanied by gamma rays, from the nucleus of an unstable atom.

Uranium Mill Tailings: Radioactive residues from the processing of uranium ore into yellowcake in a mill. Although the milling process recovers about 93 percent of the uranium, the residues, or tailings, contain several radioactive elements, including uranium, thorium, radium and polonium.

Yellowcake: A product of uranium milling process, yellowcake is a solid uranium oxide compound (U3O8) that takes its name from its color and texture. Yellowcake is the feed material for fuel enrichment and fuel pellet fabrication.

APPENDIX B

FRISKING AND DECONTAMINATION PROCEDURE

FRISKING

PURPOSE

This procedure establishes the requirements for decontamination frisking prior to exiting the controlled area of the interim storage facility. Frisking for contamination will limit exposure of the workers and the general public to radioactive material and prevent the spread of contamination beyond controlled areas.

APPLICABILITY

This procedure applies to all people entering and exiting the controlled area of the interim storage facility.

PRECAUTIONS

All personnel who enter a controlled area (the interim storage facility or an excavation into tailings) are expected to keep their exposures to radiation and radioactive materials as low as reasonably achievable (ALARA).

Personnel or equipment may not leave the interim storage facility with any detectable radioactive contamination**.**

FRISKING SURVEY METER

A portable monitor, such as the Ludlum Model 44-9, pancake GM beta-gamma detector, or equivalent, shall be used for frisking. The frisking instrument shall have a valid calibration and be functionally checked before using this procedure.

EQUIPMENT FOR FRISKING AND DECONTAMINATION

Frisking Meter	Broom
Sturdy Brush	Wash Tub
Mild Soap	Laundry Soap
Garden Hose	Frisking Log

FRISKING PROCEDURE

Personnel shall frisk using the techniques defined. Personal items such as flashlights, notebooks or hats shall be subject to the same frisking requirements as the person carrying them.

Verify the instrument is in service, set to the proper scale, and the audio output can be heard during frisking.

Hold the probe less than half an inch from the surface being surveyed.

Move the probe slowly over the surface, approximately two inches per second.

If the count rate increases during frisking, pause for 5 to 10 seconds over the area to provide adequate time for instrument response.

If the count rate increases beyond background, the area shall be decontaminated and frisked again.

PERSONNEL FRISKING ORDER

Frisk the hands before picking up the probe.

Frisk in the following order:

Head (pause at the mouth and nose for five seconds)
Neck
Arms (pause at the elbows)
Chest and abdomen
Back, hips and seat of pants
Legs (pause at the knees and cuffs)
Shoes
Shoe bottoms
Personal items (hat, gloves)

DECONTAMINATION

PERSONNEL DECONTAMINATION

Skin contamination may be removed by washing with lukewarm water and mild soap. Personnel may flush ears/eyes with cool, clear water to decontaminate those areas. If flushing is not successful, qualified medical personnel shall direct additional decontamination efforts.

Clothing and shoes may be brushed clean. If clothing will not decontaminate with brushing, it shall be removed and exchanged with the supplied coveralls in the access shed. Contaminated shoes may be brushed and washed without removing and re-frisked.

EQUIPMENT AND TRUCK DECONTAMINATION

Prior to frisking a truck, the vehicle engine will be shut off, placed in 1st gear and have the wheels chocked. No person shall physically go beneath a piece of equipment to perform inspections or decontamination.

All visible contamination shall be swept or washed into the interim storage facility. Tailgate areas and tires will be frisked with the probe at two inches per second and with the probe half inch from the surface. If the instrument rate count registers above background, further brushing and washing will be performed until it is deemed acceptable.

EXITING THE INTERIM STORAGE FACILITY

Return the frisk probe to its holder. The probe shall be placed face up to allow the next person to monitor his/her hands before holding the probe.

After decontamination of equipment and personnel and successful frisking, personnel may leave the controlled area, sign out on the access/frisking log, secure the gate and shed and exit the area.

APPENDIX C

BUILDING PERMIT SURVEYS

BUILDING PERMIT SURVEY HISTORY

In 1971, the Colorado Department of Public Health and Environment, formerly the Colorado Department of Health, began a cooperative program with the Mesa County Planning Department to conduct radiation surveys at new construction sites. The radiation surveys were integrated into the building permit process, and it was therefore called the Building Permit Survey Program.

As discussed in the History section of the Uranium Mill Tailings Management Plan, radioactive tailings were used in Mesa County and other uranium mill towns for building materials and fill dirt. Many structures were modified or built over tailings. Therefore, potential health risks were being created due to the increased gamma radiation and radon exposure.

Surveys are performed by the Colorado Department of Public Health and Environment before a building permit is issued. The surveys include the footprint of the proposed building, plus 10 feet extra around the perimeter. After the survey, an inspection form is filled out indicating that no radioactive materials were found or with recommendations for removal, or other options, if tailings are found. The form is given to the owner (or contractor) with a copy entered into the Colorado Department of Public Health and Environment database. If tailings are found, a map is drawn indicating the areas of concern.

When tailings are removed from a building site, another form and map is filled out declaring the removal of the contamination, which allows the issuance of the building permit. Copies of the information are entered into the Colorado Department of Public Health and Environment database for reference and documentation.

The survey is considered valid for six months, after which another survey may be necessary if the structure hasn't been constructed. This is because, within six months, the site could have been re-contaminated.

The surveys include all structures that could possibly be converted into living spaces. During the oil shale boom, people were known to live in sheds or any space available. Thus, sheds and garages, as well as business sites and houses, are inspected. Areas such as patios, carports and porches are also inspected as these are often enclosed later as part of the living space.

Currently, the Colorado Department of Public Health and Environment surveys demolition

sites and building sites in Mesa County. Procedures now concentrate the surveys on properties or areas with a known history of tailings. Much of the construction activity currently in Mesa County is new subdivisions in former fields, where tailings are unlikely to be encountered.

PROCEDURES FOR THE REQUIREMENT OF A BUILDING PERMIT SURVEY

Upon receiving a request for a building permit survey, a record review will be performed by the Colorado Department of Public Health and Environment to ascertain the need for a field survey. The review will include the CDPHE gamma table, and, if necessary, the Department of Energy microfiche records for the location.

The following criteria will result in the execution of a field survey:

1. Records indicate the presence of historic tailings or ore. . Historic tailings properties will always be surveyed, even if remedial action took place. Remedial actions did not always find or completely remove tailings.

2. Tailings have been found on an adjacent property. Adjacent properties will be surveyed if it is in an area where extensive tailings were used.

3. For information: Information surveys are in areas where previous surveys were not performed. The inspector will perform surveys on several properties in the new area (subdivisions) and determine from visual observations which properties in the area may need surveys when they are requested, due to radiation readings, fill areas, geography, or previous structures.

If it is determined that a survey is not to be performed, the program assistant will fill out a Building Permit Records card, print out a form in duplicate, sign the form and give one copy to the requestor. The other copy is filed and entered into the database. The Building Permit Records form indicates, “No field survey is required based upon a record review of the vicinity of the building site. No tailings deposits were identified from available records that would affect the construction site.”

In communities outside of Mesa County, the Colorado Department of Public Health and Environment will provide assistance to monitor construction and demolition sites with a history of tailings involvement, if requested. The Colorado Department of Public Health and Environment data and files may be used to determine if a site needs a radiation survey. The Department may perform site visits to conduct the surveys if the data base information is inconclusive.

APPENDIX D

GAMMA RADIATION SURVEY PROCEDURES

GAMMA RADIATION SURVEYS

OBJECTIVES OF GAMMA SURVEYS

The objective of a gamma survey is to determine if radioactive materials, especially uranium mill tailings, are present on individual properties, to acquire sufficient data to evaluate the gamma levels and health risks, and to document the location and conditions of radioactive materials. Uranium mill tailings are the primary radioactive materials being surveyed, due to their radium content and potential to cause elevated radon gas in structures. The gamma surveys may locate natural soils, rocks or ores that have elevated gamma radiation and have the potential to increase indoor radon levels. The gamma survey may also locate and identify other radioactive sources such as ore or petrified wood, which may not have a potential to increase radon, but increases health risks through gamma exposure.

BACKGROUND GAMMA RADIATION

Background radiation is the natural radioactivity of an area. Background radiation varies due to the influence of natural mineral deposits, building materials and elevation. The most common outside background levels in Mesa County are 10 to 14 micro roentgens per hour (μR/h). Fourteen μR/h shall be considered background in Mesa County, Colorado. A meter reading 30 percent higher than the local background level (18 μR/h) is significant and requires investigation.

NON-TAILINGS GAMMA SOURCES

There are many different radioactive materials besides uranium mill tailings that may be encountered during a gamma survey. Luminous-dial compasses, clocks, aircraft instruments, propane tanks, petrified wood, dinosaur bones and ore samples may emit gamma radiation levels above 20 μR/h. Natural outcroppings of granite rocks may demonstrate elevated gamma radiation. These objects may act as point sources, as the gamma field drops off rapidly when the survey meter is moved away. Coal ash and shale may also cause meter readings above 20 μR/h, but seldom appear as point sources. Brick may cause readings of 22 μR/h due to the materials used in their manufacture. Some granite countertops exhibit meter readings far in excess of 20 μR/h as well.

INTERPRETATION OF READINGS

SHINE

Radiation detected that is from a source some distance away is called shine. Shine will make it more difficult to determine the levels of radiation from nearby objects. The meter readings are higher than if the shine radiation did not exist. An example of a shine source is a large pile of radioactive tailings or large radioactive ore pile. Shine fields are also created by strong local radioactive sources such as density gauges or metal weld x-ray devices.

To check for shine, the meter reading can be compared at ground level, waist level and overhead. If a shine field is present, the meter will detect about the same radiation levels at waist and surface levels.

Lead shielding can be used to help interpret meter readings in a shine field. A lead shield may be wrapped around the sides of the meter to block the shine.

A comparison of shielded meter readings and unshielded readings, called a differential, may help distinguish localized elevated gamma levels from shine. A sheet of lead is placed between the instrument and the suspected area, and a meter reading is taken. The shield is removed, and a second meter reading is taken. The difference between the shielded and unshielded reading is the differential. The differential should not be greater than six, which is about 30 percent, for background radiation areas around 14 μR/h. If the differential is greater than six, the area under the shielding may be contaminated with a radioactive source. This technique loses accuracy when higher gamma fields are encountered.

The Colorado Department of Public Health and Environment will provide assistance if a shine field is suspected and the meter readings are difficult to interpret.

GEOMETRY

A meter reading in a hole or trench may indicate higher radiation levels than a flat surface. The meter receives gamma radiation from many directions in a hole, while a surface reading mainly detects the area directly beneath it.

SHIELDING

Dense materials shield gamma radiation from detection. Examples are rock road base, asphalt, concrete and hard packed soils. The amount of shielding depends upon the thickness. Radiation surveys over asphalt or concrete need to be performed more slowly so that the technician can observe small fluctuations on the meter. While normal soils reading 14 μR/h usually indicate no contamination, this reading on asphalt or concrete may indicate a shielded radioactive deposit.

STANDARD GAMMA SURVEY PROCEDURE

SURVEY INSTRUMENTS

The survey instruments used by the Colorado Department of Public Health and Environment and loaned to local governments, public utilities, and private parties are adequate to locate uranium mill tailings situated close to the ground surface. If a deposit is heavily shielded, the meter may not indicate any change from background radiation. The meters are calibrated yearly and should be given an operations check before use. Many of the instruments have been calibrated and electronically modified to give a fast response time. Instruments with an audio device are the easiest to use as one can notice the faster change in the sound (clicking speed), which is an indication of a radioactive source. The instruments are designed to give a meter reading in micro roentgen per hour. If the surveyor's meter shows 18 μR/h on the scale, this is considered 30 percent above background of 14 μR/h and that tailings contamination is present.

PERMISSION TO SURVEY

Permission to access private property must be obtained before a survey is undertaken. The owner or owner representative may give a verbal or written permission to enter a property. The surveyor should identify himself to residents on the property and state the purpose of the survey.

HEALTH AND SAFETY

Performing a gamma radiation survey is not entirely risk free. The major hazards are potential physical injuries due to falling or being trapped in a confined space. The surveyor should comply with Occupational Safety and Health Administration (OSHA)-confined space entry requirements. Prior to entering any crawlspace, the surveyor should notify a coworker of the location and intent to survey. Some crawlspaces are too tight to enter safely. If such areas must be checked for a radiation source, an extension pole attached to a meter with audio capability would allow limited probing into the tight areas.

No hole or trench deeper than 4 feet or with sides steeper than a 45-degree angle should be entered unless the sidewall stability conforms to OSHA standards. These areas, as well as vertical cliffs, can be surveyed by lowering the meter on a rope and listening to the audio or observing the meter face with binoculars.

Head injuries can be avoided by not watching the meter while walking. Tree limbs, air conditioners, pipes and other extending objects are commonly at head level around houses. Using meters with the audio capability and watching the path of the survey will avoid injury.

Dogs are potentially a risk when surveying. Always ask the residents if there are dogs present and to place them indoors or tie them up in an area not needed to be surveyed. Personnel should always be watching for dogs when entering a property.

Exposure to gamma radiation is a potential health risk to the surveyor. During the many years that the Colorado Department of Public Health and Environment has conducted gamma surveys, it is rare that the monitoring badges worn by surveyors record any exposures above background. It would be possible to receive limited gamma exposure if uranium ore samples were carried around in a vehicle. If ore is transported, it should be placed as far away from occupants as possible and removed from the vehicle and properly disposed of as soon as possible.

If the surveyor detects a radiation source above 1,000 micro roentgen per hour (one mill roentgen), and the source is not obviously ore or uranium mill tailings, the surveyor should immediately leave the area and notify the Colorado Department Of Public Health And Environment, Radiation Control Program. Such sources could be radium sources or instruments, such as moisture density gauges.

The surveyor is expected to adhere to the ALARA principle and keep all radiation exposures As Low As Reasonably Achievable.

GENERIC SURVEY PROCEDURES

All gamma surveys will use generic procedures that address situations commonly encountered. These are centered on the readiness of the survey meter; interpretation of findings and investigating shielded radiation sources.

The survey meter must be checked for operation before use. The meter battery level and meter scales can be compared with historical levels by using known radioactive sources. If the instrument is in the field, and no radioactive check source is available, the meter can be placed on the ground and comparisons made between the different scales and background level.

Before surveying, the area background must be determined. Background is the normal radiation level in an uncontaminated area. Radiological contamination may be assumed if the meter registers 30 percent above background. However, holes or trenches may register 30 percent above background and not be contaminated due to the geometry. Interpretation of meter readings in trenches and holes is difficult and usually requires experience and a judgment call. It is not unusual for a water meter pit to read 20 μR/h on the survey meter and not be contaminated. If a water meter pit reads over 20 μR/h on the survey meter, one should be suspicious of possible uranium tailings.

The survey should be conducted at a slow walk, using an established grid pattern. Specific spots may be checked by hesitating, placing the meter on the ground and noting the reading. The meter should be carried no more than one to four inches from the surface

when walking with no wide arcing swings. The meter is placed in fast response mode on the lower scale with the audio switch on.

When surveying areas with tall vegetation (weeds), the meter will have to be alternately lifted and lowered rather than maintaining a constant one to four inches from the surface.

Shielding will hide radioactive sources from detection. The survey may detect borderline elevated readings. These areas should be explored by removing some of the shielding. Dirt or gravel may be kicked aside or shoveled away. Asphalt and concrete may be checked from the edge where an inspection hole can be dug. Woodpiles and debris may be moved to find a spot to lower the meter to the ground. Water meter pits and manholes can be inspected by removing the cover and lowering the meter. Large manhole covers are heavy and may need a shovel or crowbar to pry it off and therefore may not be accessible. At no time will the Colorado Department Of Public Health And Environment conduct a survey where personnel safety may be compromised.

SPECIFIC SURVEY PROCEDURES

BUILDING PERMIT SURVEY (NEW STRUCTURE)

In Mesa County, a cooperative program exists between the Colorado Department of Public Health and Environment and the City/County Planning Department to screen proposed building sites for uranium mill tailings. The generic survey procedures apply. Three-foot survey grids extending an extra 10 feet beyond the site footprint are adequate to screen for radioactive materials.

The Colorado Department of Public Health and Environment requires that the builder stake out the site footprint. If the site is not staked or marked at the time of the survey, the requester may mark it out and reschedule the survey. The property must be clear of hindrances or restrictions so that a valid survey can be completed. Dirt/gravel piles must be removed as well as any obstructions for a survey. Colorado Department Of Public Health And Environment requires any proposed building site be officially addressed by the City/County Planning Department before any field gamma screening are preformed or Building Permit Survey forms are issued.

If no unusual gamma radiation above background is detected, the Building Permit Survey form is completed, signed and given to the builder for inclusion with paperwork submitted to the Planning Department for a building permit.

If elevated gamma radiation is detected, the surveyor will explore the area to determine the source. The elevated gamma area may be checked by digging out shovel scoops. This method often determines that the source of elevated gamma is a small ore rock or that the source is not extensive.

If an extensive gamma source is discovered that cannot be removed by a few shovel scoops, the Building Permit Survey form is filled out to reflect the finding, a map is drawn to locate and document the area and the builder notified.

The Colorado Department of Public Health and Environment presents options to owners to mitigate radiation sources discovered on building sites. The main concern is mitigation of potential radon sources inside the structure. The secondary concern is mitigation of gamma radiation exposure through the floors of the structure. The optimum solution is the complete removal of the source of radiation.

BUILDING PERMIT SURVEY (DEMOLITION)

Structures being demolished in Mesa County are controlled through the permit system of the County Planning Department. Structures planned for destruction should be surveyed to locate any potential uranium mill tailings contamination in the building materials.

The lower levels and all floors made from concrete should be scanned using 5-foot grids. The inspection should also include closets, bathrooms and kitchens.

Areas to survey include the following:

Lower Level Floors	Cinder Blocks
Foundations	Stucco
Brick and Mortar	Sidewalks
Driveways	Rock Walls/Fences
Sandboxes	Rock Gardens
Planters	Patios
Garages	Carports

If radioactive sources are discovered, the survey form is filled out, and the owner or contractor is notified. Options are discussed to separate radioactive contaminated materials from other debris. The radioactive materials can be located by the survey meter and marked with paint. Contaminated materials should be segregated and stockpiled or taken to the interim storage facility. Items transported to the interim storage facility shall comply with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site.

These procedures are in addition to the State of Colorado Demolition permit processes.

GAMMA RADIATION SURVEY FOR INFORMATION

The Colorado Department of Public Health and Environment has a vast database documents the radiological conditions on thousands of properties in western Colorado. However, many properties were never surveyed, and no information is available. Thus, the

Department will occasionally conduct a gamma survey on a property for information purposes.

Surveys on an entire property present a problem because of the size of the area. The grids for survey must be appropriate to the area. If the area is no larger than two acres, 10-foot grids are used. . For very large areas, grids as large as 50 feet may be used.

The larger the grid size, the greater the chance of overlooking a radiation source. In the case of very large properties, the areas one inspects, like a potential building site may be more important than walking the entire site on grids. Disturbed areas, likely dump areas, roads and gates should be inspected. Any structures should be checked using the techniques for demolition sites. Lawns, gardens, and septic systems should be checked. All concrete, metal debris, hoses, and fiberglass panels should be inspected.

If a linear pattern of elevated gamma readings is detected, it may indicate a buried utility line packed in uranium mill tailings. The Colorado Department of Public Health and Environment may assist in conducting large-area surveys, but the responsibility for a complete (non-building permit) survey on any property is that of the owner. A survey meter may be checked out (borrowed) from the Colorado Department of Public Health and Environment, or a consulting company/contractor may be hired by the property owner. However, Colorado Department of Public Health and Environment will conduct complete surveys on building sites.

STREETS, ALLEYS, AND UTILITY LINE CONSTRUCTION

Prior to construction involving streets, alleys or utility lines, the contractors should consult Department of Energy maps delineating supplemental standard areas. City workers or their contractors using instruments on loan from the Colorado Department of Public Health and Environment can survey the areas. Identified uranium mill tailings contaminated areas can be marked with paint. As trenches and excavations are opened, the meter can be lowered down to better determine if the subsurface material is contaminated. If the contamination is to be removed, it must be segregated from other materials and transported to the interim storage facility.

Surveys over concrete or asphalt should be conducted at a slow walk to give the meter time to respond. The meter must be in the fast response mode. Concrete and asphalt shields radioactive materials below, and meter changes may be only slightly higher than background when measured through them.

PRIVATE REMOVALS

Private removals are remedial actions performed by property owners or their contractors to clear an area, or entire property, of radioactive uranium mill tailings. The material may have been identified by the Building Permit Survey, by an information survey or street/utility line construction.

For private parties, the Colorado Department of Public Health and Environment will identify and delineate uranium mill tailings for removal. The identified contamination will be excavated by the owner and segregated from clean material by stockpiling on site or removal from the property to the interim storage facility with Colorado Department of Public Health and Environment approval. A meter may be checked out by the private party.

For private parties, the removals of uranium mill tailings will be monitored by the Colorado Department of Public Health and Environment to guide and document the excavation. The Department will perform excavation control, provide health and safety guidance and operate the interim storage facility. The Department will document the results of the removal.

DOCUMENTATION MAPS

In Mesa County, maps are generally required for the documentation of radioactive contamination discovered or removed during a Building Permit Survey, information survey or private removal. The Colorado Department of Public Health and Environment will map and document any uranium tailings discovered, disturbed or removed from the communities in western Colorado that were not already mapped., as appropriate.

The map will include the following information in the upper right corner:

Location Number (assigned by the Department)
Street Address, Date, and Name of Surveyor

The map will include a legend with an arrow indicating north. Permanent and semi-permanent reference points, such as structures, streets, driveways, streets, power poles or irrigation ditches, will be drawn on the map.

Shading with cross marking or other appropriate indicators should show areas of radiation contamination. The meter readings for the contamination should be written in the contaminated area. If the area is too small to write in, the meter reading should be indicated by an arrow drawn to the contaminated area.

If a private removal of radioactive contamination occurs, the documentation may include a map showing the conditions of the area after excavation. If the area is large, a range of readings will be shown. The gamma reading and an arrow pointing to the spot will identify areas still demonstrating elevated gamma readings.

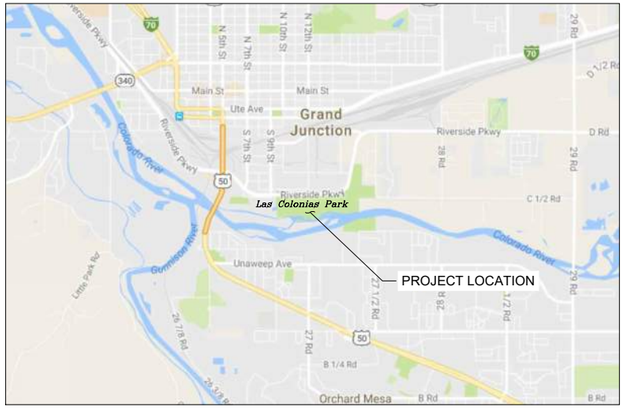
Appendix E

Construction Plans

CITY OF GRAND JUNCTION

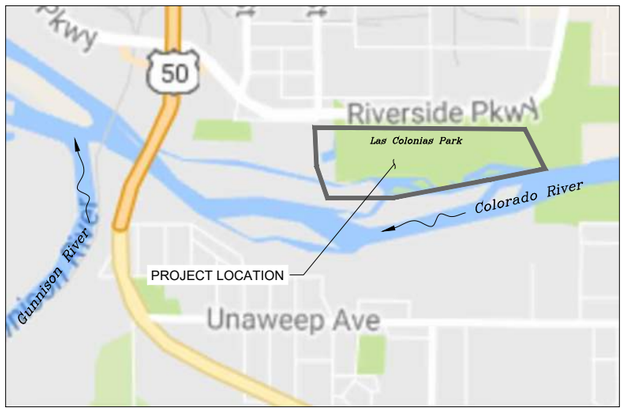
LAS COLONIAS RIVER PARK & SLOUGH IMPROVEMENTS PROJECT

MESA COUNTY
MAY, 2019
BID SET



VICINITY MAP

SCALE: 1"=3,000' (FOR 22X34" SHEETS)



SITE PLAN

SCALE: 1"=1000' (FOR 22X34" SHEETS)

PROJECT:

LAS COLONIAS SLOUGH IMPROVEMENTS PROJECT

NATURE AND ACTIVITY
PROPOSED SLOUGH ENHANCEMENTS AT LAS COLONIAS PARK INCLUDE A NEW INLET CHANNEL CONNECTING TO THE EXISTING SLOUGH, A SLOUGH EXTENSION CREATING ANOTHER SECONDARY CHANNEL WITH STEP-POOL CHANNEL MORPHOLOGY, IN-STREAM HABITAT STRUCTURES AND BOULDERS, NATIVE RIPARIAN PLANTINGS, AND BIOENGINEERED BANK STABILIZATION.

PURPOSE AND NEED
THE PURPOSE OF THE PROPOSED SLOUGH ENHANCEMENTS AT LAS COLONIAS PARK IS TO ENHANCE THE STREAM HYDROLOGY AND AQUATIC HABITAT ZONE IN THE EXISTING RECENTLY CONSTRUCTED SLOUGH, ADD ADDITIONAL AQUATIC HABITAT AREA BY SUPPORTING THE COLORADO RIVER'S MULTI-THREAD ANASTOMOSING CHANNEL PLANFORM, AND MAINTAIN EXISTING NAVIGATIONAL AND RECREATIONAL USE THROUGHOUT A LARGER PORTION OF THE YEAR.

CONTRACTOR SHALL COMPLY WITH ALL PERMIT CONDITIONS REFERENCED IN UNITED STATES ARMY CORPS OF ENGINEERS 404 PERMIT NUMBER: SPK-2016-0344

CONTRACTOR SHALL CONTACT AND FILE APPROPRIATE NOTIFICATION WITH COLORADO 811 PRIOR TO CONSTRUCTION.

PROJECT OWNER:

CITY OF GRAND JUNCTION
250 NORTH 5TH STREET
GRAND JUNCTION, CO
81501

SHEET INDEX:

PROJECT LOCATION:

LATITUDE 39° 03' 15.3" N
LONGITUDE 108° 33' 06.2" W

MESA COUNTY

SURVEY NOTES:

SURVEY BY: CITY OF GRAND JUNCTION
DATE: NOVEMBER 21, 2017
DATA BASED ON FIELD SURVEYS BY CITY OF GRAND JUNCTION. ADDITIONAL SURVEY DATA COLLECTED BY MIKE GRIZENKO 21 NOVEMBER 2017, USING TRIMBLE S5 TDS RANGER DATA COLLECTOR.
USGS 09106150 COLO RIVER BELOW GRAND VALLEY DIV NR PALISADE, CO ON 21 NOVEMBER 2017 AT 10:30AM READING 1,580 CFS.

VERTICAL DATUM: NAVD88
HORIZONTAL COORDINATE SYSTEM: MESA COUNTY LOCAL COORDINATE SYSTEM (MCLCS)

ABBREVIATIONS:

AVG	AVERAGE	N	NORTH
DTL	DETAIL	NTS	NOT TO SCALE
E	EAST	OC	ON CENTER
ELEV	ELEVATION	OHWM	ORDINARY HIGH WATER MARK
FT	FEET	SHT	SHEET
IN	INCHES	STA	STATION
MAX	MAXIMUM	STD	STANDARD
MIN	MINIMUM	TYP	TYPICAL

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COLORADO REGISTERED PROFESSIONAL ENGINEER
Cory Merrill Lach
20435

PROJECT OWNER:
CITY OF GRAND JUNCTION
---
250 N 5TH STREET
GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
COVER SHEET

REVISIONS:

NO.	DATE
	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.

G-01

SHEET G-01 OF 24

PROJECT NOTES

GENERAL SITE NOTES:

1. EXISTING TOPOGRAPHY SHOWN BASED ON DATA PROVIDED BY CITY OF GRAND JUNCTION. ADDITIONAL MAPPING HAS BEEN ADDED BY RIVERRESTORATION PO BOX 248, CARBONDALE, CO 81623. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND ADJUST WORK PLAN ACCORDINGLY PRIOR TO BEGINNING CONSTRUCTION.
2. EXISTING TOPOGRAPHY, STRUCTURES AND SITE FEATURES ARE SHOWN SCREENED AND/OR LIGHT LINED. NEW FINISH GRADE, STRUCTURES AND SITE FEATURES ARE SHOWN SOLID AND/OR HEAVY-LINED.
3. MAINTAIN, RELOCATE OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGIONAL MONUMENT(S) IN A TIMELY MANNER AT THE CONTRACTOR'S EXPENSE.
4. PROVIDE TEMPORARY FENCING AS NECESSARY TO MAINTAIN SECURITY. FENCING SHALL BE INCLUDED IN MOBILIZATION COSTS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION.
6. CONTRACTOR SHALL TAKE ALL OTHER MEASURES TO PRECLUDE EROSION MATERIALS FROM LEAVING THE SITE. CONTRACTOR TO SUBMIT EROSION CONTROL PLAN FOR APPROVAL PRIOR TO MOBILIZATION.
7. REMOVE TREES, SHRUBS OR OTHER PLANTINGS ONLY IF DIRECTED BY THE ENGINEER TO DO SO. IMPLEMENT TREE PROTECTION IF NEEDED AT LOCATIONS SPECIFIED.
8. DISPOSE OF ALL MATERIALS DESIGNATED FOR REMOVAL AT AN APPROVED DISPOSAL SITE UNLESS NOTED OTHERWISE.
9. CONTRACTOR SHALL PROTECT PUBLIC AND PRIVATE PROPERTY IN ACCORDANCE WITH SPECIFICATIONS AND REPLACE OR REPAIR DAMAGED PROPERTY AT CONTRACTOR EXPENSE.
10. AN REP REPRESENTATIVE SHALL BE PRESENT DURING CONSTRUCTION OF KEY PORTIONS OF THE PROJECT INCLUDING, DEFLECTOR, RANDOM BOULDER, AND RELATED BANK TERRACING. MINOR CHANGES MAY BE MADE BY AN REP REPRESENTATIVE. STRUCTURE ELEVATIONS WILL BE VERIFIED BY THE CONTRACTOR AND MAY BE CHECKED BY AN REP REPRESENTATIVE DURING CONSTRUCTION.

UTILITY DATA PROVIDED FOR REFERENCE ONLY.

CONTRACTOR SHALL LOCATE AND MARK ALL UTILITIES WITHIN THE PROJECT AREA PRIOR TO CONSTRUCTION AND SHALL NOT RELY SOLELY ON THESE CONSTRUCTION PLANS FOR UTILITY LOCATIONS. CONTRACTOR MUST COMPLETE ALL UTILITY LOCATES PRIOR TO CONSTRUCTION. DAMAGE TO ANY EXISTING UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

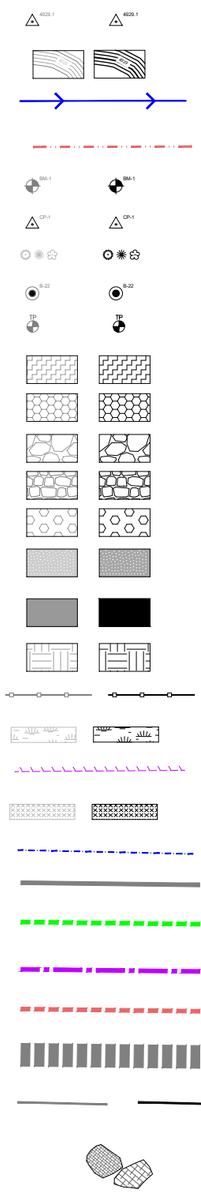
ROCK NOTES:

NO VOLCANIC ROCK PERMITTED FOR USE IN ANY STRUCTURES.

EXCEPTION MAY BE GRANTED FOR RIPRAP ONLY.

PROJECT LEGEND

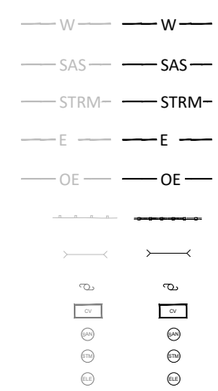
EXISTING PROPOSED



- SPOT ELEVATION
- CONTOUR LINE
- CHANNEL THALWEG
- STAGING OR LIMITS OF CONSTRUCTION
- BENCHMARK
- CONTROL POINT
- TREE
- BORING LOCATION
- TEST PIT LOCATION
- RIFFLE
- RIPRAP ARMORING
- BANK TERRACING
- BOULDER STRUCTURE
- ROUGHENED FISHWAY
- WATER SURFACE APPROXIMATION
- CONCRETE STRUCTURE
- NATIVE ALLUVIUM
- FENCELINE
- WETLANDS
- ORDINARY HIGH WATER MARK
- TOPSOIL SOIL
- 100-YR FLOODPLAIN
- PROPERTY BOUNDARIES
- SHEET PILE
- SILT FENCING
- CONSTRUCTION SECURITY FENCING
- TEMPORARTY COFFERDAM LOCATION
- EDGE OF TRAIL
- RANDOM BOULDERS

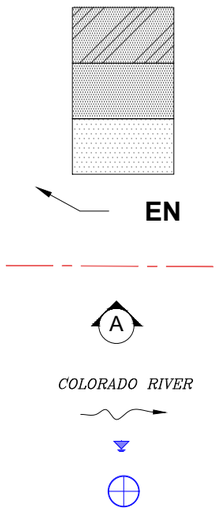
UTILITIES

EXISTING PROPOSED



- WATER LINE
- SEWER LINE
- STORMWATER LINE
- BURIED ELECTRIC
- OVERHEAD ELECTRIC
- GUARDRAIL
- CULVERT
- UTILITY POLE
- CONTROL VALVE BOX
- SEWER MANHOLE
- STORM MANHOLE
- ELECTRIC MANHOLE

FLOODPLAIN



- FEMA FLOODWAY
- FEMA ZONE AE BASE FLOOD ELEVATIONS
- FEMA ZONE X OTHER FLOOD AREAS
- FEMA CROSS SECTION
- HYDRAULIC CROSS SECTIONS
- STRUCTURE CROSS SECTIONS
- FLOW DIRECTION
- FREE WATER SURFACE
- MEASURED WATER SURFACE ELEVATION LOCATION

PROJECT MAY NOT CONTAIN ALL ELEMENTS REPRESENTED

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COLORADO REGISTERED ENGINEER Gary Lacy Martin 20435 PROFESSIONAL

PROJECT OWNER:
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---
250 N 5TH STREET
GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
PROJECT NOTES & LEGEND

REVISIONS:

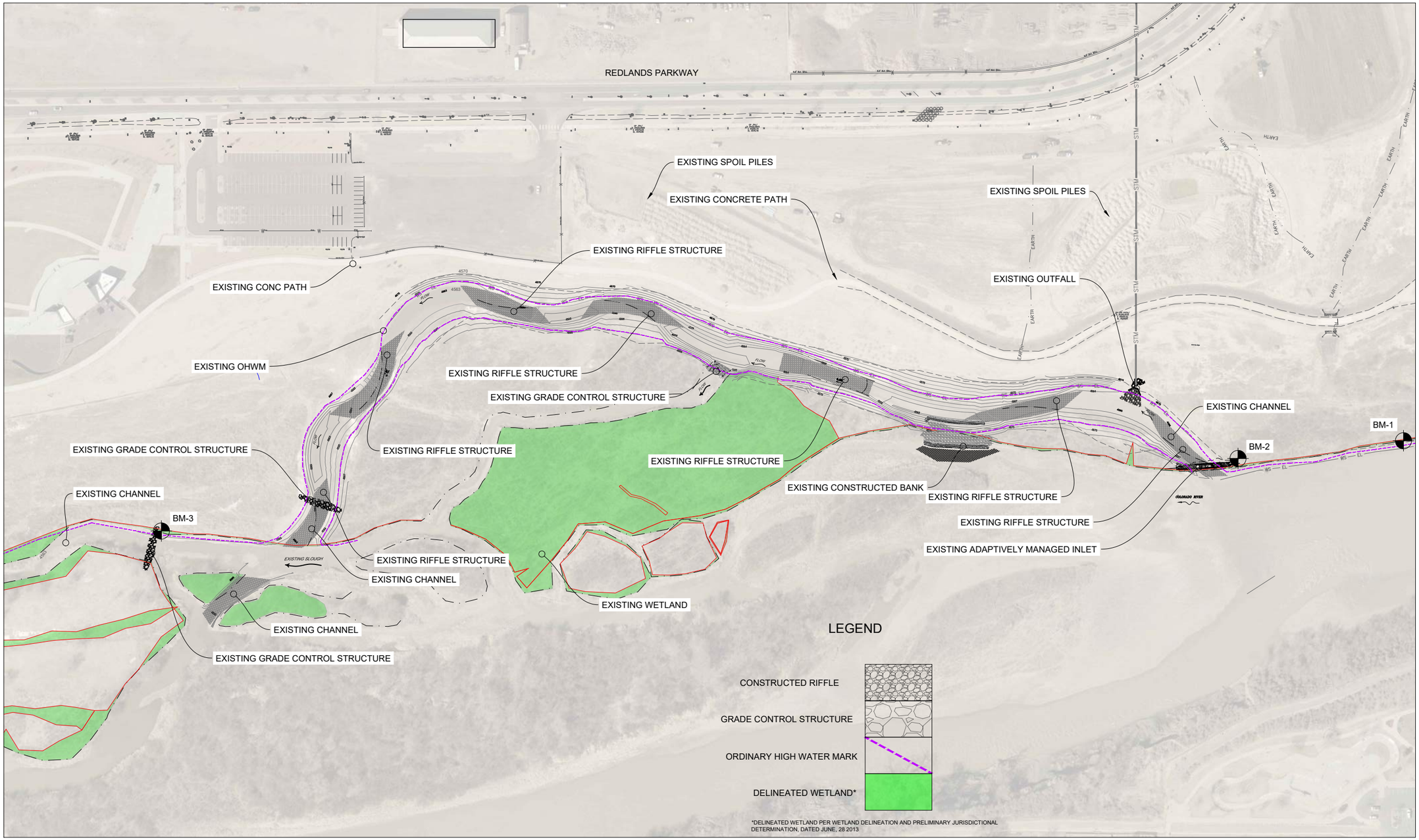
NO.	DATE
	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL | DRAFTED: RG
CHECKED: GL
PLOT DATE: 9/30/2019

DRAWING NO.

G-02

SHEET G-02 OF 24



SURVEY CONTROL TABLE

POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
71527	30815.1230	94023.2890	4569.43	BM
71541	30947.6060	96171.1910	4571.99	BM
71542	31005.1960	96605.2850	4571.70	BM

N

SCALE BAR 1"=100'

100 0 100

CONTOUR INTERVAL ONE FOOT

EXISTING CONDITIONS

NOTES:

1. EXISTING SLOUGH CHANNEL NO RIVER INFLOW AT 1600CFS
2. AREAS OF PROPOSED NEW CHANNELS HAVE FEW OR NO NATIVE VEGETATION
3. A URANIUM MILL WAS PREVIOUSLY LOCATED AT THE PROPOSED PROJECT SITE, AND CONTAMINATED SOILS WERE REMOVED FROM THE SITE AS PART OF THE CLEAN-UP EFFORT. CONTAMINATION AT THE SITE IS STILL A CONCERN AND FURTHER DILUTION OF CONTAMINANTS IS A GOAL OF THE PROPOSED PROJECT. THERE HAVE BEEN A NUMBER OF PROJECTS TO ENHANCE THE SIDE CHANNEL HABITAT AT LAS COLONIAS PARK. DREDGING AND EXPANSION OF ONE OF THE EXISTING SIDE CHANNELS OCCURRED SEVERAL TIMES. THE MOST RECENT PROJECT CONSISTED OF THE CONSTRUCTION OF A NEW SECONDARY CHANNEL ("SLOUGH"), DIVERGING FROM THE MAIN CHANNEL BEFORE REJOINING THE SYSTEM AT A NEW LOCATION DOWNSTREAM, CREATING NEW SIDE CHANNEL AQUATIC HABITAT.

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EXISTING CONDITIONS

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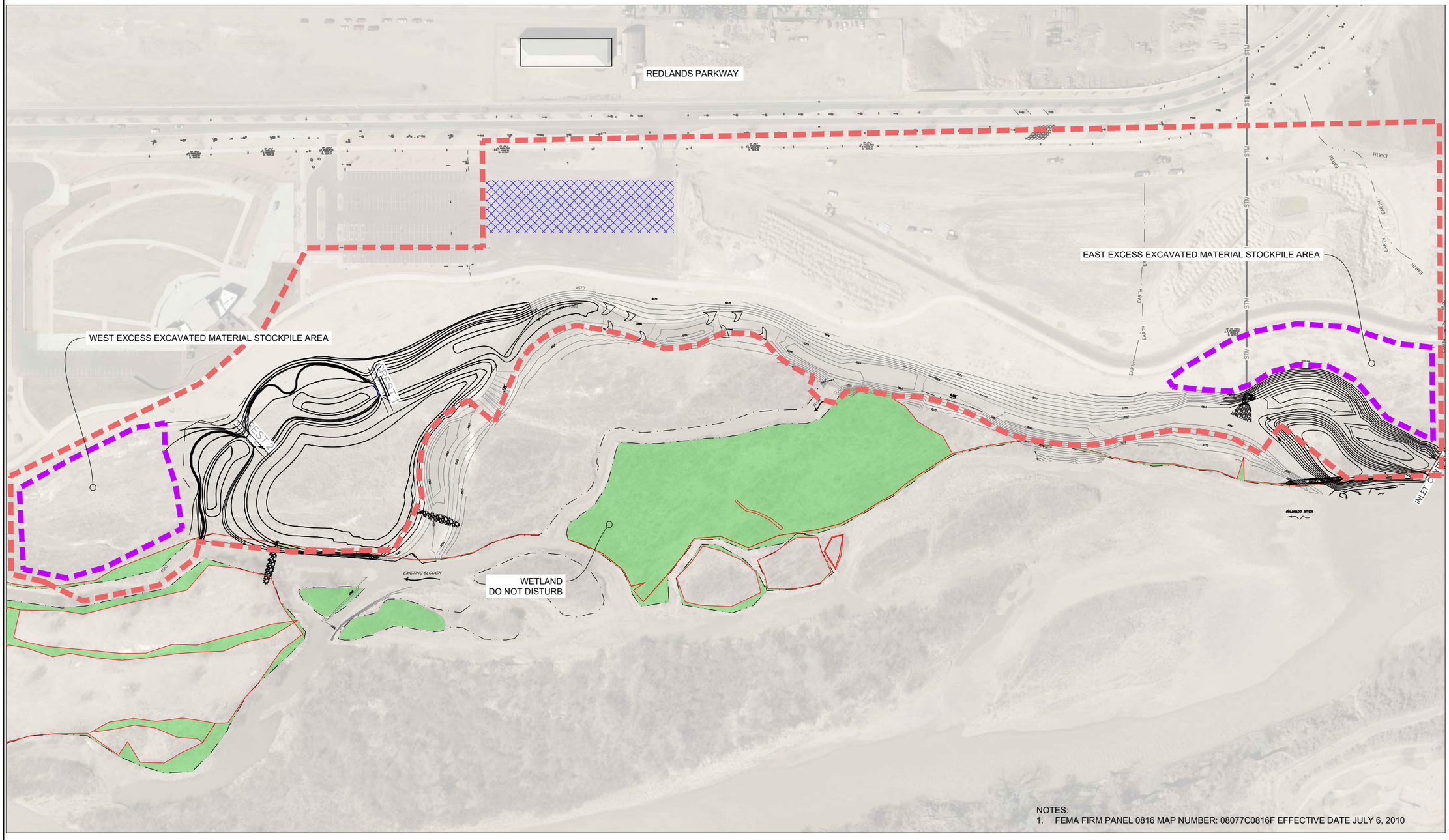
G-03

SHEET G-03 OF 24



NOTES:
1. FEMA FIRM PANEL 0816 MAP NUMBER: 08077C0816F EFFECTIVE DATE JULY 6, 2010

N

SCALE BAR 1"=100'

100 0 100

CONTOUR INTERVAL ONE FOOT

STAGING & ACCESS

LEGEND

STAGING AREA

STOCKPILE AREA

DELINEATED WETLAND*
DO NOT DISTURB

PROJECT LIMITS

NOTES:
1. CONTRACTOR SHALL NOT STORE EQUIPMENT BELOW THE ORDINARY HIGH WATER LINE, AND TAKES FULL RESPONSIBILITY FOR ANY MATERIALS VANDALIZED, DAMAGED, BROKEN, OR LOST AS A RESULT OF RIVER EVENTS.
2. ALL FUELING OPERATIONS, LUBRICATING, HYDRAULIC TOPPING OFF, FUEL TANK PURGING, AND EQUIPMENT MAINTENANCE/REPAIRS SHALL BE PERFORMED AT AN UPLAND SITE OUTSIDE OF THE BANKS OF ANY SITE WATERWAYS AT A LOCATION TO BE DETERMINED BY THE ENGINEER OR OWNER. THESE ACTIVITIES SHALL TAKE PLACE ON AN APPROVED PAD WITH SPILL CONTROL/ COLLECTION DEVICES IN PLACE.
3. ALL CONSTRUCTION EQUIPMENT SHALL BE INSPECTED DAILY FOR HYDRAULIC AND FUEL LEAKS. LEAKS SHALL BE REPAIRED PRIOR TO OPERATION WITHIN THE 100-YEAR FLOODPLAIN. WHEN NOT IN USE, FUEL AND HYDRAULIC FLUIDS SHALL BE STORED AT AN UPLAND SITE OUTSIDE OF THE 100-YEAR FLOODPLAIN. EMERGENCY SPILL RESPONSE DEVICES SHALL BE ON-SITE AT ALL TIMES DURING CONSTRUCTION IN WATERWAYS AND FLOODPLAINS AND SHALL BE READY TO DEPLOY IN THE EVENT OF A SPILL.
4. NO CHEMICALS, FUELS, LUBRICANTS, BRUSH, ETC. SHALL BE DISCHARGED OR DISPOSED OF INTO OR ALONGSIDE ANY STREAM, WATERCOURSE, OR FLOODPLAIN UNDER ANY CIRCUMSTANCES.

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GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO

BID SET

STAGING & ACCESS

REVISIONS:

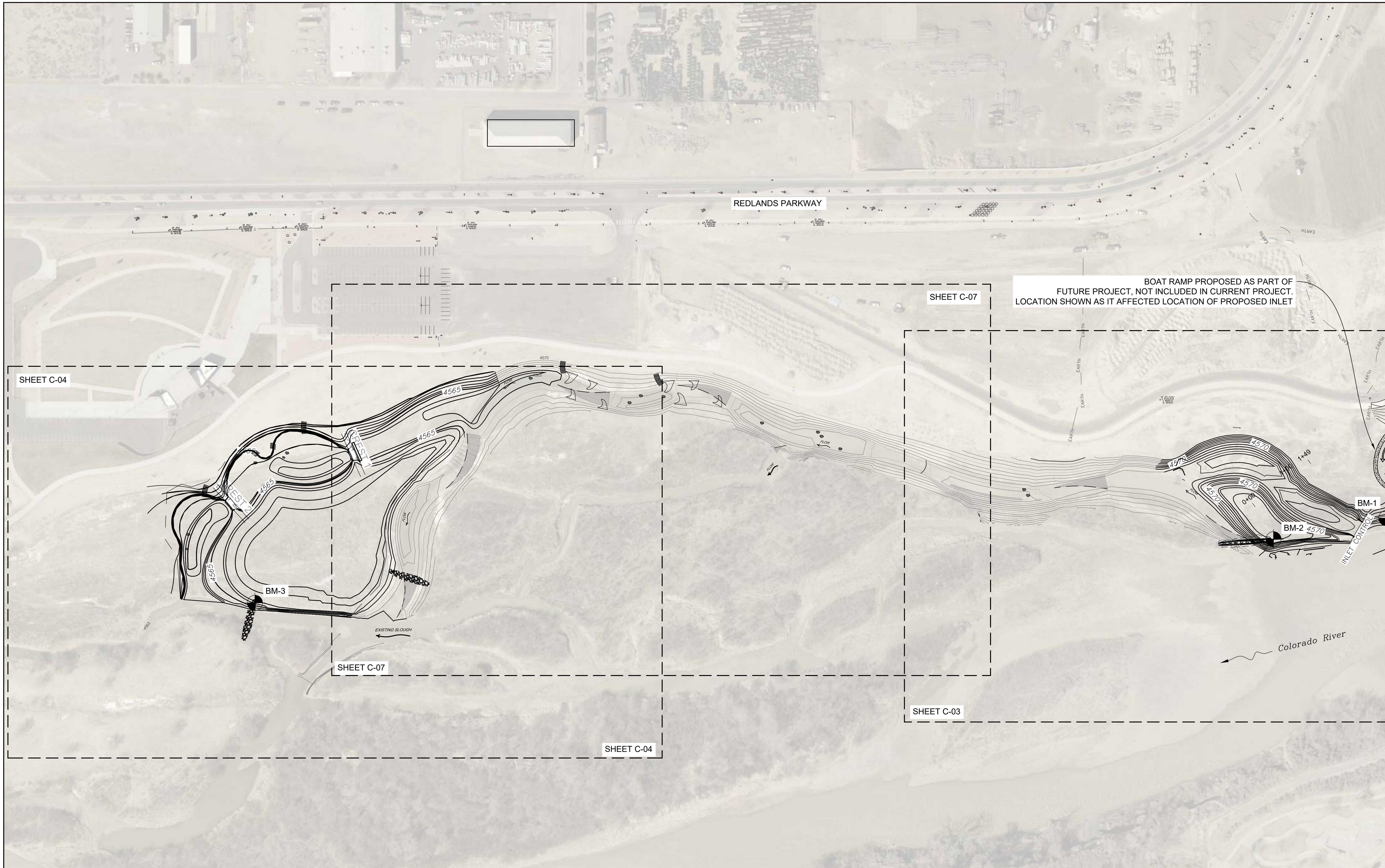
NO.	DATE
	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.

C-01

SHEET C-01 OF 24



SITE PLAN OVERALL & SHEET GUIDE

SCALE BAR 1"=100'
100 0 100
CONTOUR INTERVAL ONE FOOT

NOTES:
1. BENCHMARKS ESTABLISHED FOR SUBSEQUENT WATER SURFACE MEASUREMENT
2. MEASURED WATER SURFACE ELEVATIONS
   2.1. JUNE 12, 2017 - 4570.34 - COLO RVR - 13,800 CFS
   2.2. SEPTEMBER 11, 2017 - 4566.65 - COLO RIVER - 1,080 CFS
   2.3. NOVEMBER 21, 2017 - 4566.90 - COLO RIVER - 1,580 CFS

USGS 09106150 COLO RIVER BELOW GRAND VALLEY DIV NR PALISADE CO

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250 N 5TH STREET
GRAND JUNCTION, CO

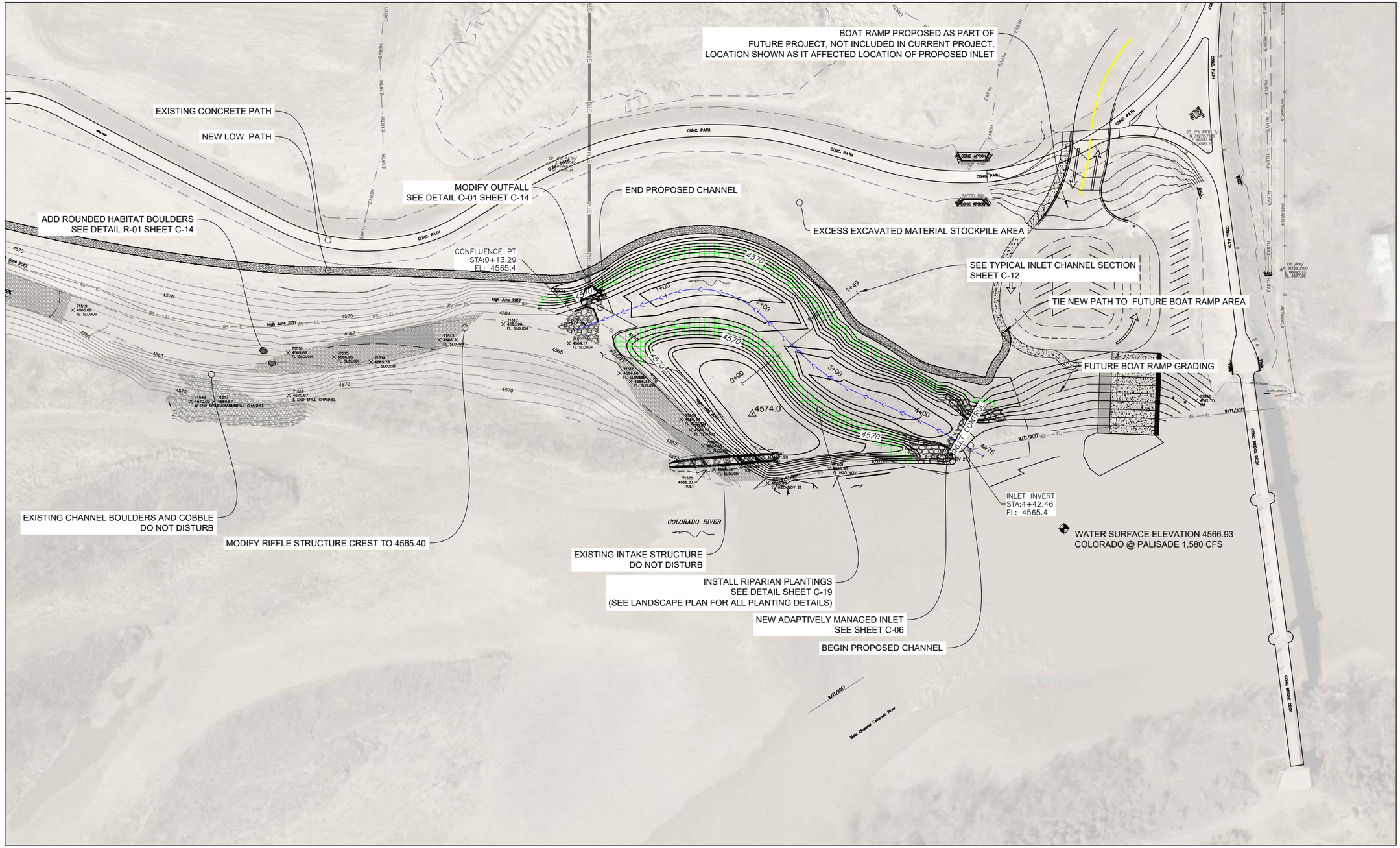
LAS COLONIAS RIVER PARK
COLORADO RIVER GRAND JUNCTION, COLORADO
BID SET
OVERALL SITE PLAN

REVISIONS:

NO.	DATE
	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.
C-02



EAST AREA GRADING

N

SCALE BAR 1"=50'

50 0 50

CONTOUR INTERVAL ONE FOOT

NEW RIPARIAN PLANTINGS ALONG NEW CHANNEL FOR RIPARIAN BUFFER

PROPOSED BOULDER STRUCTURE

LEGEND

LIMITS OF NEW CHANNEL GRADING

WETLAND

NOTES:

1. ADAPTIVELY MANAGED INLET TO AVOID IMPACTING LOW FLOW REQUIREMENTS IN THE MAIN CHANNEL OF THE COLORADO RIVER. DURING PERIODS WHEN THE MAIN CHANNEL OF THE RIVER IS AT OR BELOW 810 CFS THE PROPOSED CHANNEL WILL NOT DIVERT ANY WATER. LOW FLOW CONDITIONS ARE MOST LIKELY DURING LATE AUGUST AND EARLY SEPTEMBER. PROPOSED CHANNEL WILL CONTINUE TO MAINTAIN FLOW FOR FISH HABITAT AND UPSTREAM MIGRATION WITHIN MAIN CHANNEL AND OTHER CHANNEL BRAIDS IN THE REACH.
2. FLOWING POOLS SIMILAR TO THE EXISTING SLOUGH CHANNEL WILL MINIMIZE POOLS OF STANDING WATER AVOIDING INCREASING HABITAT FOR NON-NATIVE FISHES AND REDUCE POTENTIAL MOSQUITO BREEDING HABITAT.
3. PROPOSED CHANNEL IMPROVEMENTS WILL BE ADAPTIVELY MANAGED WITH ACCOMPANYING MONITORING AND MAINTENANCE PLANS TO ENSURE REQUIREMENTS ARE SUSTAINED.

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LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
EAST AREA GRADING

REVISIONS:

NO.	DATE
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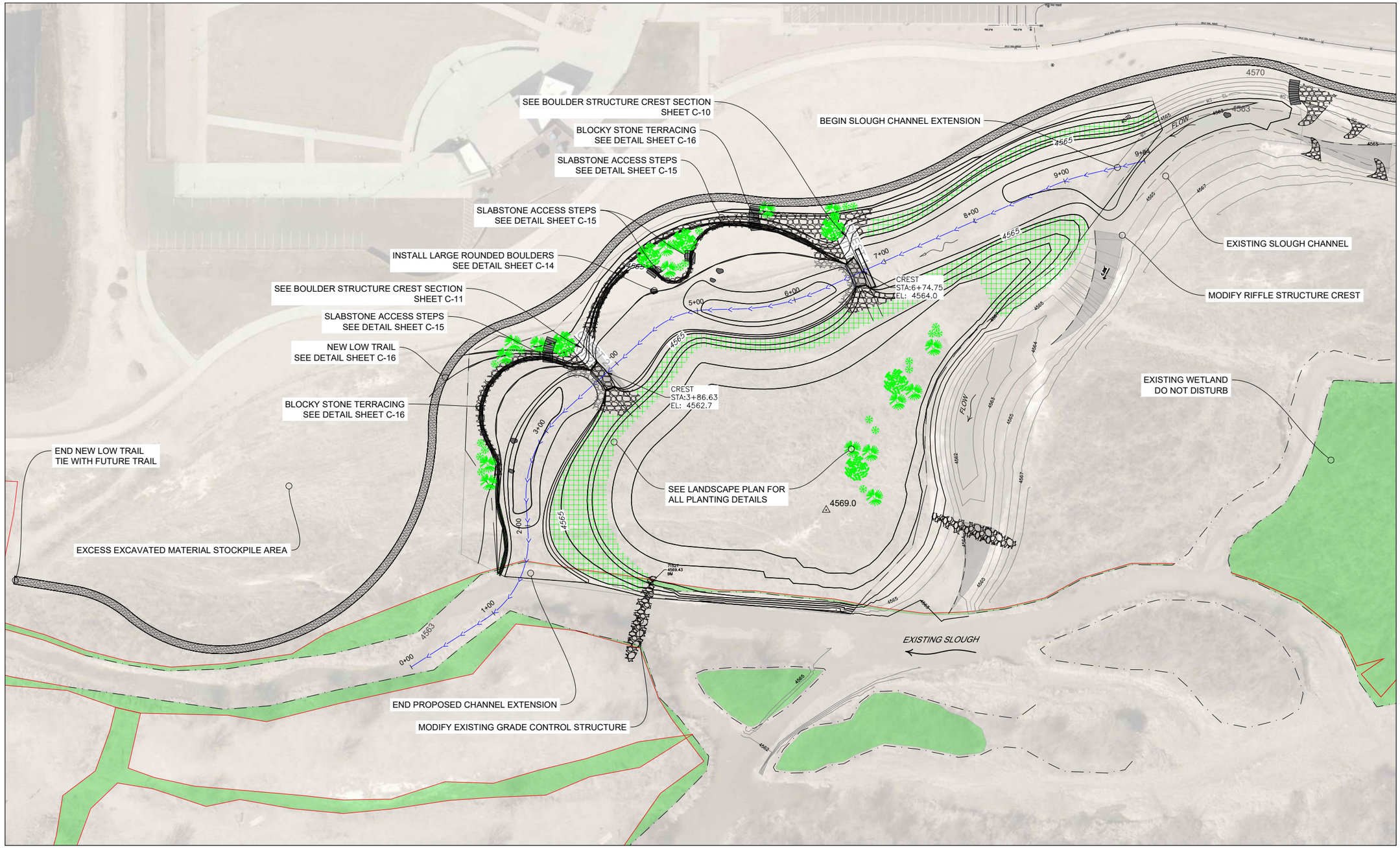
	07/30/2018
	04/25/2019

DESIGNED: GL | DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.

C-03

SHEET C-03 OF 24



WEST AREA GRADING

N

SCALE BAR 1"=50'

50 0 50

CONTOUR INTERVAL ONE FOOT

NEW RIPARIAN PLANTINGS ALONG NEW CHANNEL FOR RIPARIAN BUFFER

PROPOSED BOULDER STRUCTURE

LEGEND

LIMITS OF NEW CHANNEL GRADING

WETLAND

NOTES:

1. NEW SECONDARY CHANNEL, STEP-POOL CHANNEL MORPHOLOGY. NEW ADDITIONAL CHANNEL INCREASES AREA OF OPEN WATER AND AQUATIC HABITAT. BOULDERS PLACED TO ALLOW NATURAL SCOURING BELOW STEPS. FLOW COMPLEXITY CREATING HABITAT DIVERSITY. DEEP POOLS CREATE COVER, LOW VELOCITIES. HABITAT BOULDERS PLACED IN POOLS CREATES ADDITIONAL COVER AND HABITAT HETEROGENEITY
2. NATIVE VEGETATION PLANTINGS ALONG STREAMBANK FOR RIPARIAN BUFFER. EROSION CONTROL ALONG THE OUTSIDE OF MEANDER BENDS WILL BE ACCOMPLISHED WITH BIOTECHNICAL BANK STABILIZATION CONSISTING OF VEGETATED NATURAL BOULDER TERRACING.

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COLORADO REGISTERED PROFESSIONAL ENGINEER Gary Merritt Lacy 20435

PROJECT OWNER:
CITY OF GRAND JUNCTION
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250 N 5TH STREET
GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO

BID SET

WEST AREA GRADING

REVISIONS:

NO.	DATE
	01/02/2018
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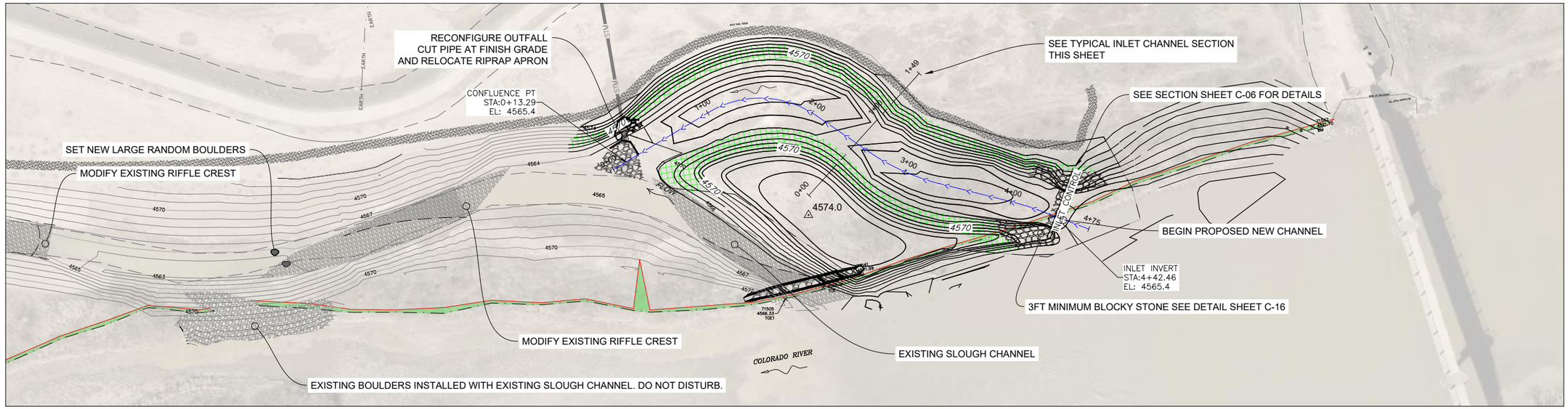
DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

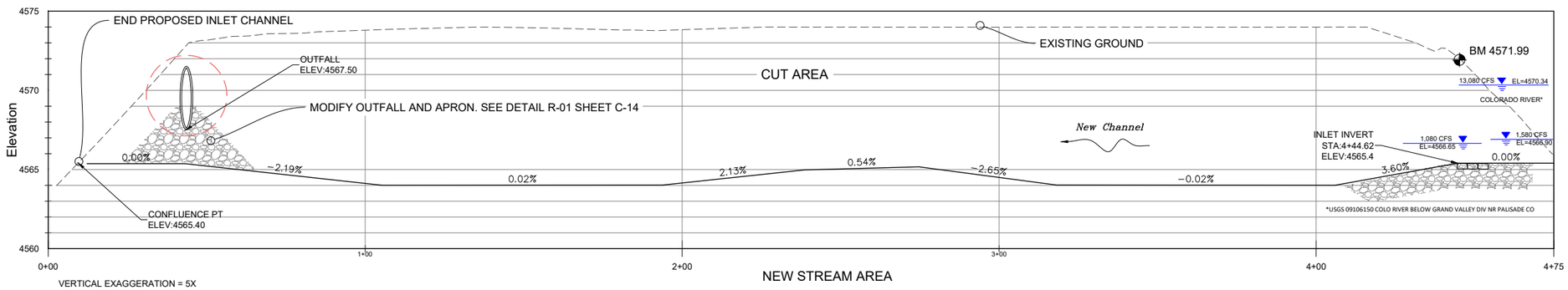
DRAWING NO.

C-04

SHEET C-04 OF 24



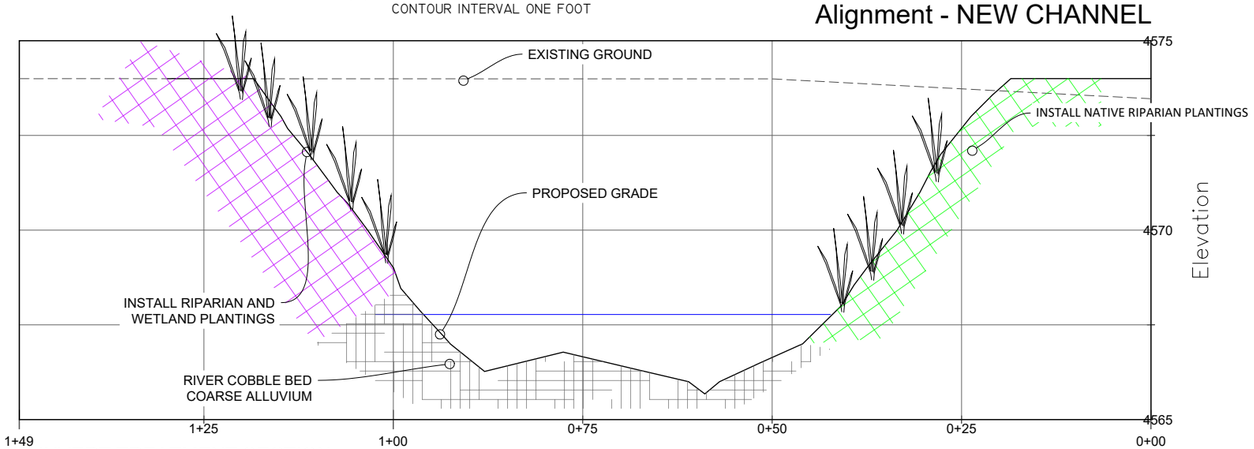
Thalweg Profile



NEW INLET CHANNEL PLAN & PROFILE

SCALE BAR 1"=50'
50 0 50
CONTOUR INTERVAL ONE FOOT

Alignment - NEW CHANNEL



INLET CHANNEL CUT SLOPE AND INVERT TREATMENT SECTION

SECTION EXAGGERATED BY 5X VERTICALLY

SECTION LOOKING DOWNSTREAM

NOTES:
1. NEW INLET CHANNEL - ANOTHER SECONDARY CHANNEL, INCREASING TOTAL AREA OF OPEN WATER AND AQUATIC HABITAT. INCREASE FUNCTION OF THE EXISTING SLOUGH. CURRENTLY NO FLOW INTO EXISTING SLOUGH AT 1600CFS, NO AQUATIC HABITAT
2. CURRENT DEFLECTORS - IN-STREAM HABITAT STRUCTURES TO CREATE FLOW HETEROGENEITY AND HABITAT COMPLEXITY BY ALLOWING NATURAL SCOUR, EDDY CURRENTS, VELOCITY REFUGES, COVER, ETC.
3. HABITAT BOULDERS PLACED AT OPTIMAL LOCATIONS THROUGHOUT SLOUGH TO ADD HABITAT COMPLEXITY AND COVER. HABITAT BOULDERS ARE KNOWN TO ALLOW NATURAL LOCAL SCOURING IN THE VICINITY, PROVIDE COVER, CREATE SECONDARY EDDY CURRENTS, VELOCITY SHELTERS.

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COLORADO REGISTERED PROFESSIONAL ENGINEER
Gary Martinez
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PROJECT OWNER:
CITY OF GRAND JUNCTION
---
250 N 5TH STREET
GRAND JUNCTION, CO

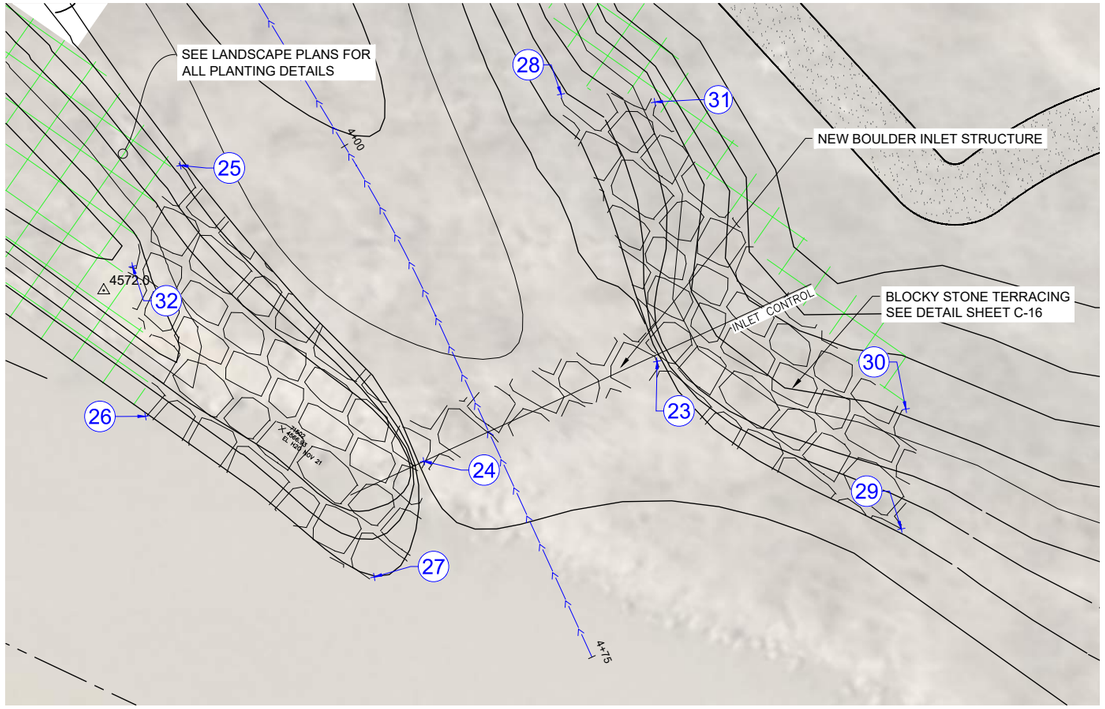
LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
NEW INLET CHANNEL PLAN & PROFILE

REVISIONS:

NO.	DATE
	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.
C-05



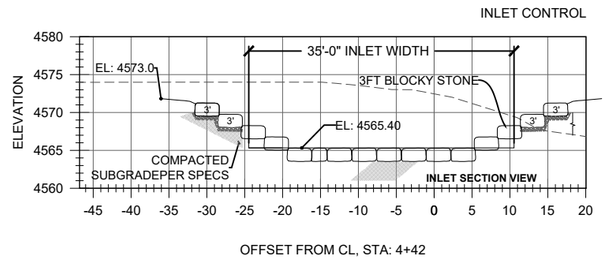
INLET PLAN, PROFILE & SECTIONS

SCALE BAR 1"=10'

10 0 10

POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
23	30985.6593	96373.3916	4565.40	INLET
24	30957.2265	96355.6768	4565.40	INLET
25	30970.8756	96306.9995	4564.50	INLET
26	30941.0807	96322.1513	4564.50	INLET
27	30940.9585	96359.0533	4564.50	INLET
28	31007.3205	96342.8330	4564.50	INLET
29	30985.9512	96412.4828	4564.50	INLET
30	30999.2612	96403.9293	4570.00	INLET
31	31013.5481	96353.5862	4570.00	INLET
32	30956.3516	96309.4392	4570.00	INLET

INLET STRUCTURE POINT TABLE



INLET STRUCTURE CREST SECTION

SCALE: H: 1"=5' V: 1"=5'

NOTES:
1. ENHANCE STREAM HYDROLOGY IN EXISTING CONSTRUCTED SIDE CHANNELS BY PROVIDING ADDITIONAL FLOW TO CHANNEL OVER GREATER PERIOD OF THE YEAR.
2. INCREASE AREA OF AQUATIC HABITAT IN THE COLORADO RIVER SYSTEM BY RESTORING CHANNEL PLANFORM TO MULTI-THREAD ANASTOMOSING CHANNEL
3. MAINTAIN EXISTING NAVIGATIONAL USE OF THE CHANNEL BY SMALL WATERCRAFT (CANOES) OVER A GREATER PERIOD OF THE YEAR.

Recreation Engineering & Planning
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COLORADO REGISTERED PROFESSIONAL ENGINEER
Gary Lacy Morrill
20435

PROJECT OWNER:
CITY OF GRAND JUNCTION
---
250 N 5TH STREET
GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
INLET PLAN, PROFILE & SECTIONS

REVISIONS:

NO.	DATE
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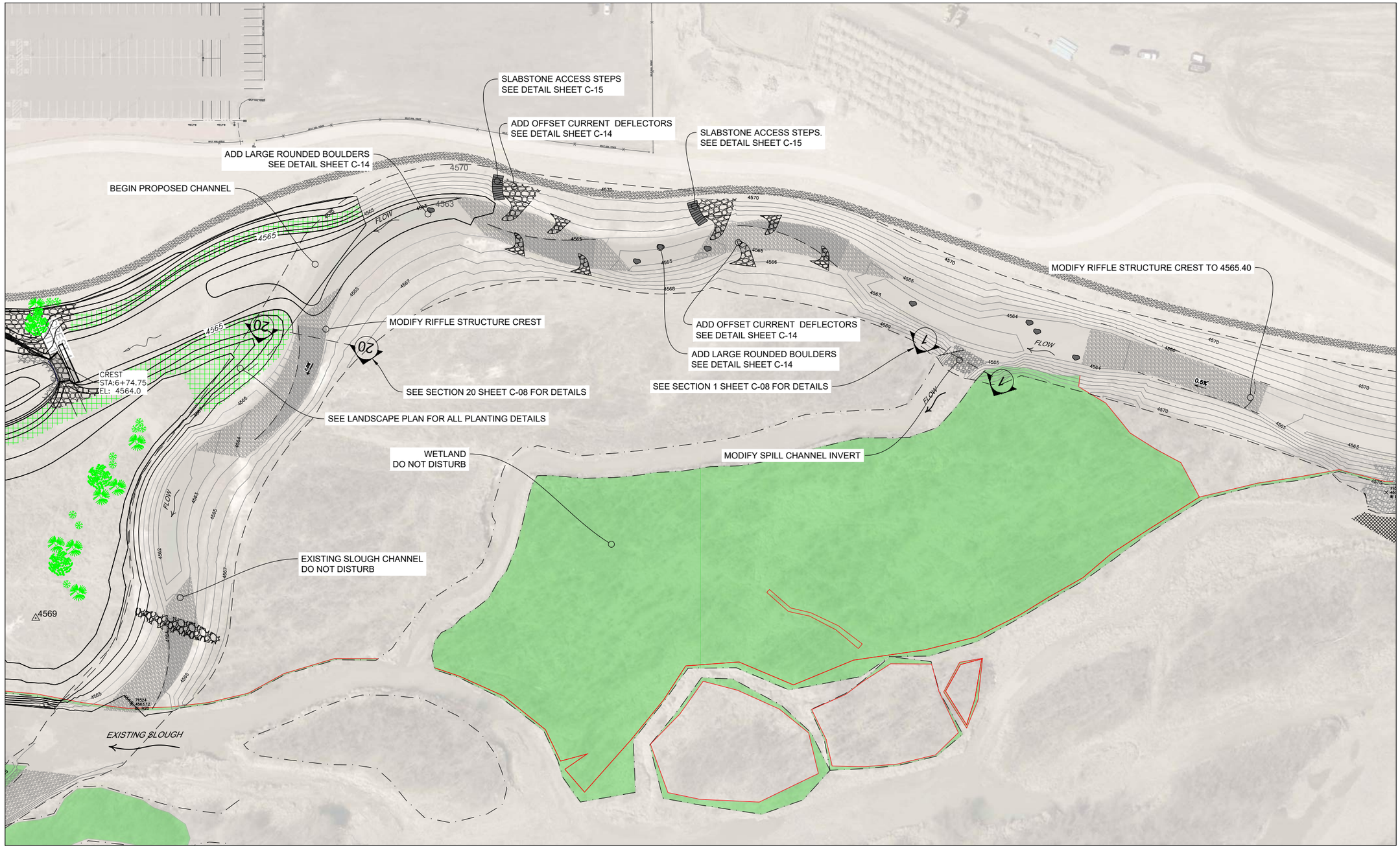
DESIGNED: GL | DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.
C-06
SHEET C-06 OF 24



SLOUGH ENHANCEMENTS

SCALE BAR 1"=50'

50 0 50

CONTOUR INTERVAL ONE FOOT

NOTES:

1. FLOWING POOLS WILL AVOID AND MINIMIZE STAGNANT POOLING, THUS LIMITING HABITAT FOR NON-NATIVE FISH, MAINTAIN CONTAMINANT DILUTION AND REDUCE MOSQUITO BREEDING AREAS.
2. BIOENGINEERED VEGETATION INCORPORATED TO INCREASE EROSIONAL STABILITY DURING HIGH FLOW EVENTS.
3. CURRENT DEFLECTORS - IN-STREAM HABITAT STRUCTURES TO CREATE FLOW HETEROGENEITY AND HABITAT COMPLEXITY BY ALLOWING NATURAL SCOUR, EDDY CURRENTS, VELOCITY REFUGES, COVER, ETC.
4. HABITAT BOULDERS PLACED AT OPTIMAL LOCATIONS THROUGHOUT SLOUGH TO ADD HABITAT COMPLEXITY AND COVER. HABITAT BOULDERS ARE KNOWN TO ALLOW NATURAL LOCAL SCOURING IN THE VICINITY, PROVIDE COVER, CREATE SECONDARY EDDY CURRENTS, VELOCITY SHELTERS.
5. NATIVE VEGETATION PLANTINGS ALONG STREAMBANK FOR RIPARIAN BUFFER. EROSION CONTROL ALONG THE OUTSIDE OF MEANDER BENDS WILL BE ACCOMPLISHED WITH BIOTECHNICAL BANK STABILIZATION CONSISTING OF VEGETATED NATURAL BOULDER TERRACING.

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LAS COLONIAS RIVER PARK
COLORADO RIVER
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SLOUGH ENHANCEMENTS

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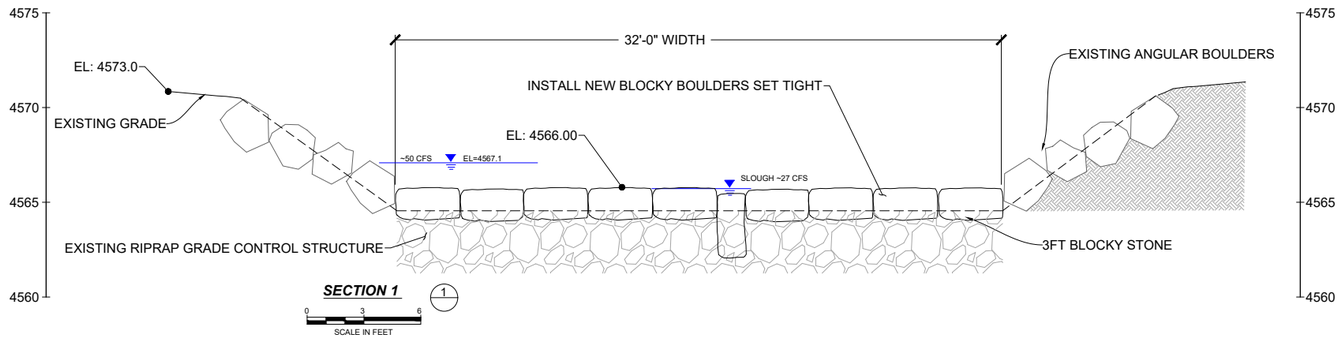
PLOT DATE: 5/13/2019

DRAWING NO.

C-07

SHEET C-07 OF 24

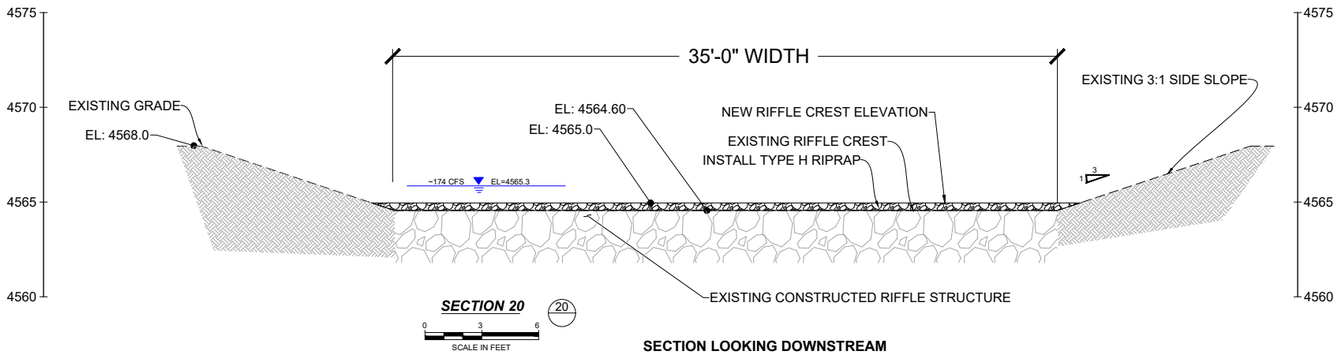
CHANNEL BRAID 1 SECTION VIEW



CHANNEL BRAID 1 SECTION MODIFICATION

SCALE: H: 1"=10' V: 1"=10'

SLOUGH RIFFLE 20+00 SECTION VIEW



SECTION LOOKING DOWNSTREAM

RIFFLE SECTION MODIFICATION

SCALE: H: 1"=10' V: 1"=10'

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LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
CHANNEL DETAIL SECTIONS

REVISIONS:

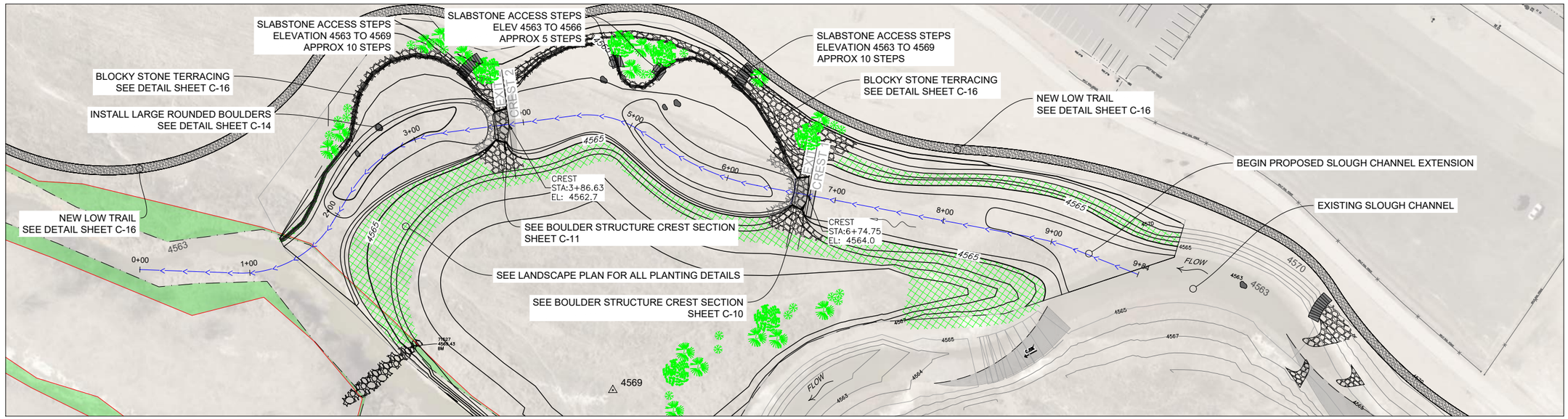
NO.	DATE
#	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

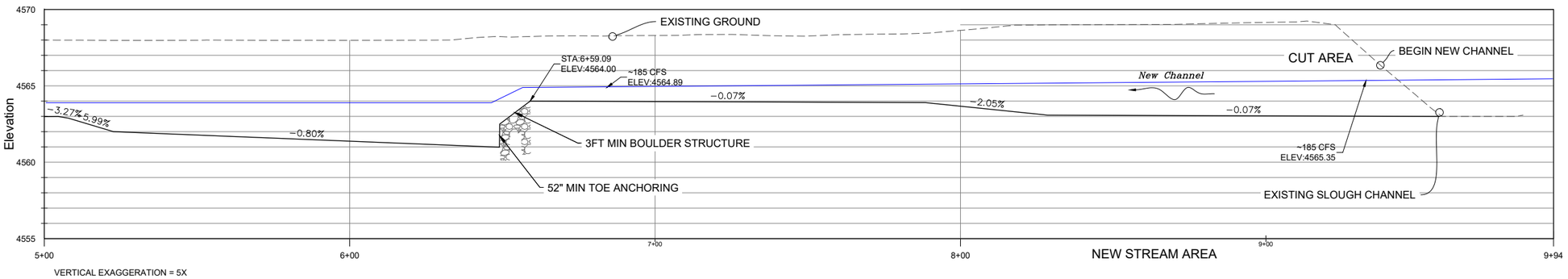
DRAWING NO.

C-08

SHEET C-08 OF 24



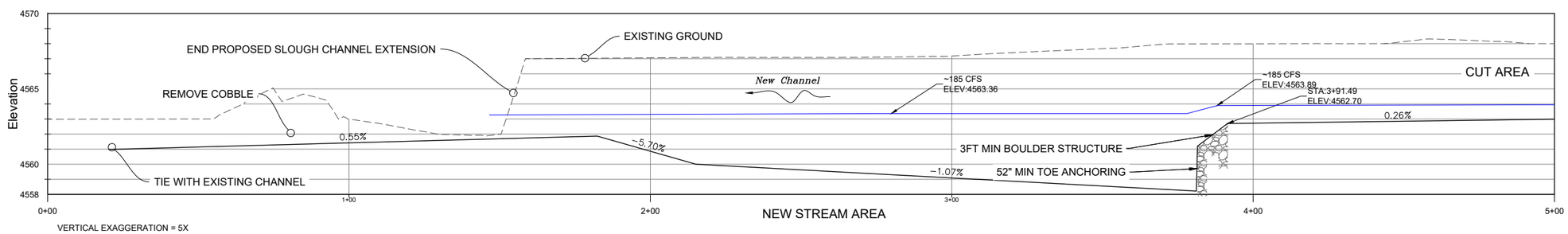
Thalweg Profile



VERTICAL EXAGGERATION = 5X

EXAGGERATED BY 5X VERTICALLY

Thalweg Profile



VERTICAL EXAGGERATION = 5X

NEW CHANNEL EXTENSION PLAN & PROFILE

SCALE BAR 1"=50'

50 0 50

CONTOUR INTERVAL ONE FOOT

NOTES:

1. ENHANCE STREAM HYDROLOGY IN EXISTING CONSTRUCTED SIDE CHANNELS BY PROVIDING ADDITIONAL FLOW TO CHANNEL OVER GREATER PERIOD OF THE YEAR.
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NEW CHANNEL EXTENSION PLAN & PROFILE

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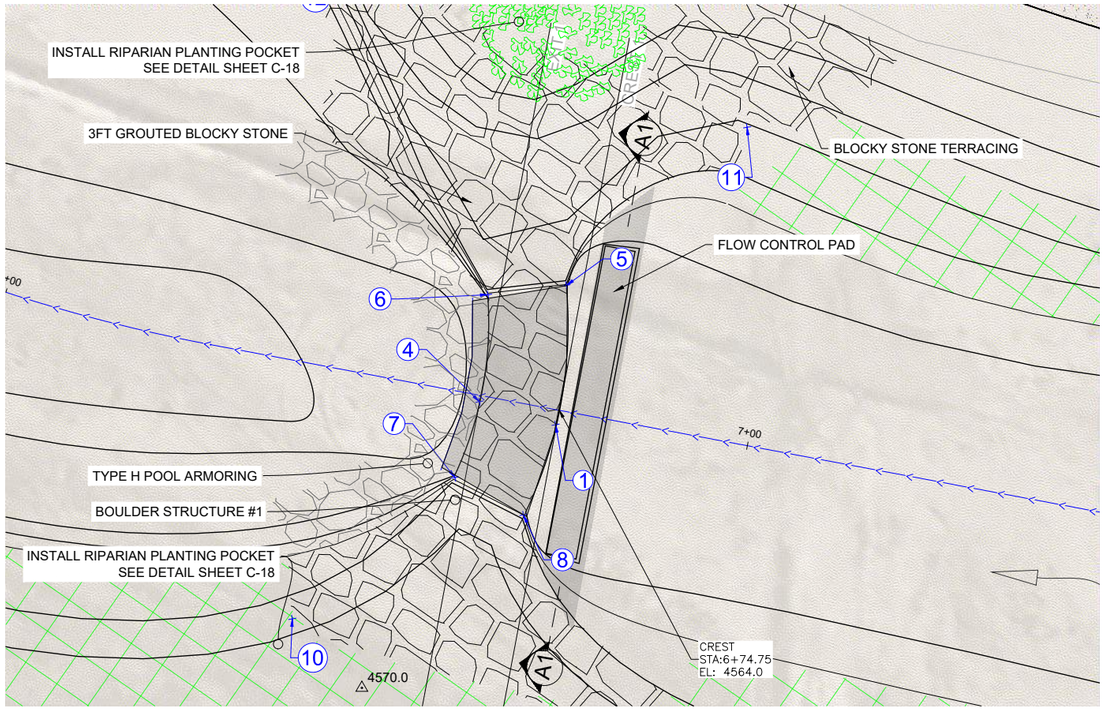
DRAWING NO.

C-09

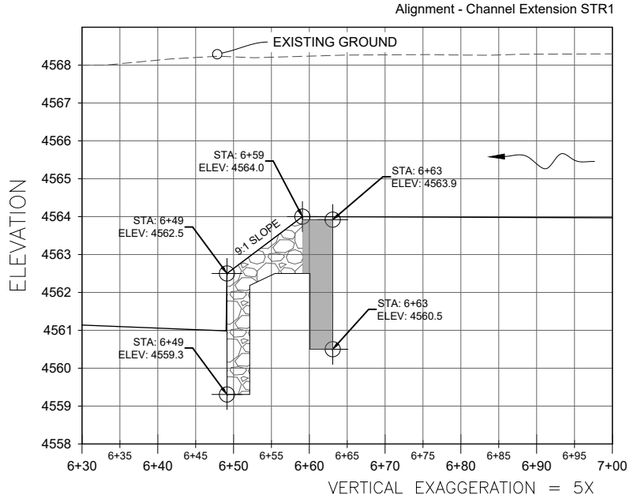
SHEET C-09 OF 24



STRUCTURE 1 PLAN

SCALE BAR 1"=10'

10 0 10



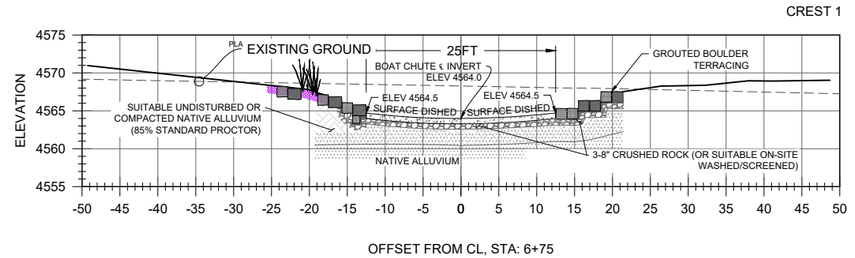
STRUCTURE 1 PROFILE

SCALE: H: 1"=10' V: 1"=2' EXAGGERATED BY 5X VERTICALLY

STRUCTURE 1 PLAN, PROFILE, & SECTIONS

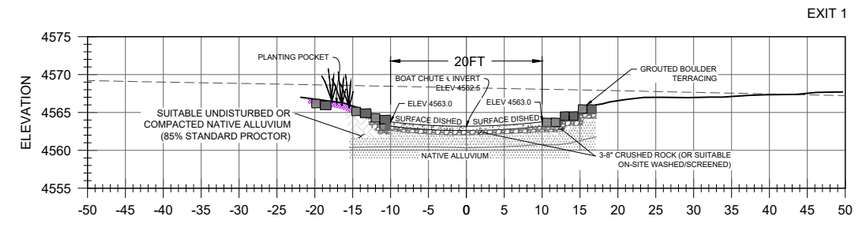
POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	31130.6922	94239.4255	4564.00	STR1
4	31127.4370	94229.4379	4562.50	STR1
5	31146.6005	94230.0867	4566.00	STR1
6	31139.6626	94222.2991	4565.00	STR1
7	31117.3817	94232.5142	4565.00	STR1
8	31118.5109	94242.7542	4566.00	STR1
9	31106.1195	94272.2316	4568.00	STR1
10	31089.8041	94225.5767	4568.00	STR1
11	31177.3487	94237.7127	4568.00	STR1
12	31163.1569	94186.9723	4566.00	STR1

STRUCTURE 1 POINT TABLE



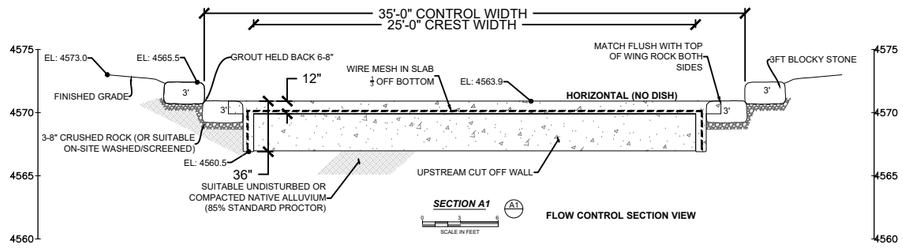
STRUCTURE 1 CREST SECTION

SCALE: H: 1"=5' V: 1"=5'



STRUCTURE 1 EXIT SECTION

SCALE: H: 1"=5' V: 1"=5'



STRUCTURE 1 FLOW CONTROL PAD SECTION

SCALE: H: 1"=5' V: 1"=5'

NOTES:

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4. EXCAVATED ALLUVIUM MAY BE USED FOR SUBBASE IF APPROVED BY ENGINEER, SEE SPECIFICATIONS
5. GROUTED BOULDER BANK TERRACING TO CURVE WITH CONTOURS

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Casey Martin Lach
20435

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250 N 5TH STREET
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LAS COLONIAS RIVER PARK
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GRAND JUNCTION, COLORADO

BID SET

STRUCTURE 1 PLAN, PROFILE, & SECTIONS

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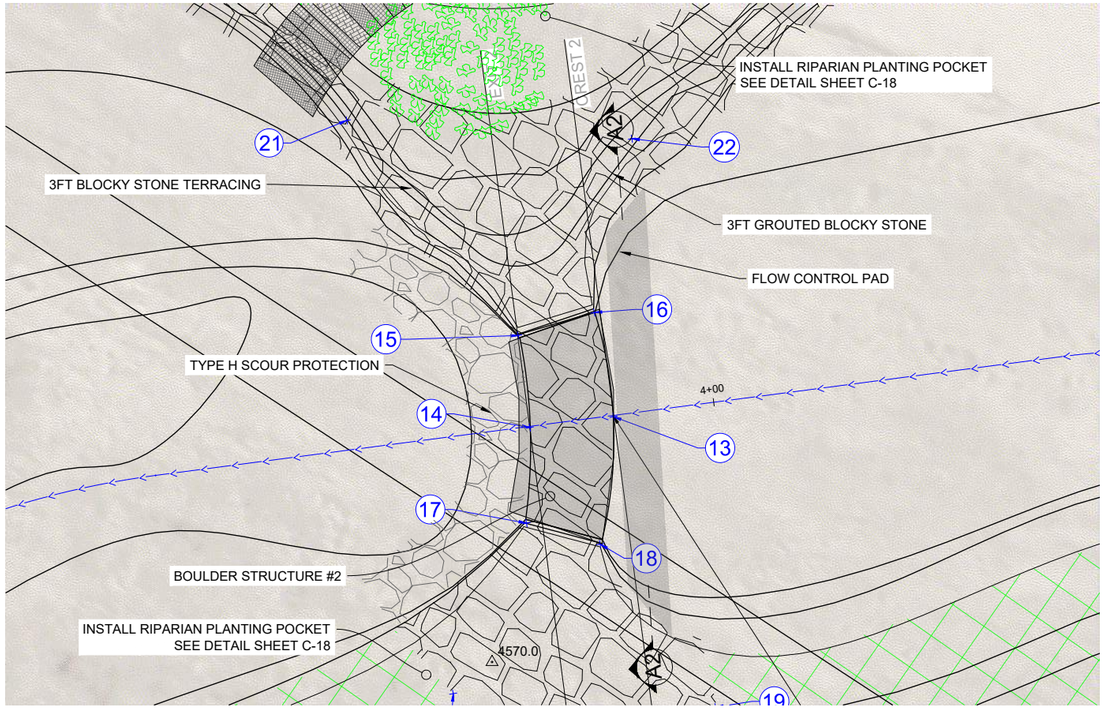
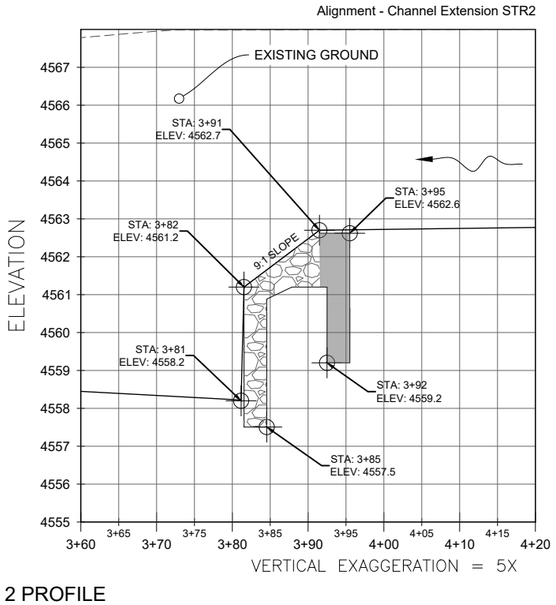
C-10

SHEET C-10 OF 24



STRUCTURE 2 PLAN



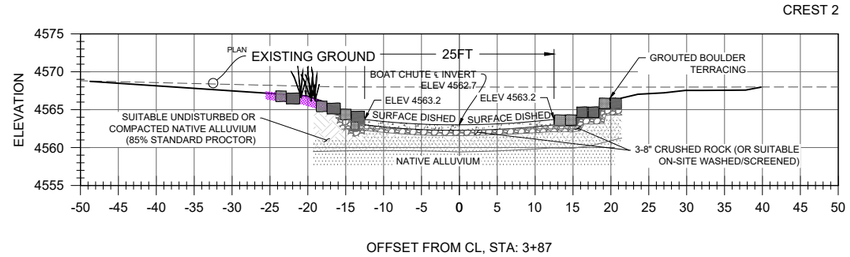
STRUCTURE 2 PROFILE

SCALE: H: 1"=10' V: 1"=2' EXAGGERATED BY 5X VERTICALLY

STRUCTURE 2 PLAN, PROFILE, & SECTIONS

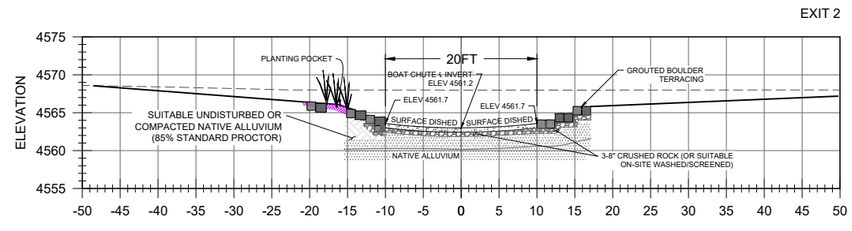
POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
13	31029.7282	93979.0857	4562.70	STR2
14	31022.2369	93970.8353	4561.20	STR2
15	31031.3152	93962.6191	4563.20	STR2
16	31039.5464	93969.1253	4564.70	STR2
17	31011.6337	93977.6885	4563.20	STR2
18	31014.9195	93987.2534	4564.70	STR2
19	31005.9825	94012.0569	4568.00	STR2
20	30987.6480	93982.6253	4568.00	STR2
21	31041.6660	93927.8471	4566.00	STR2
22	31061.2039	93960.0759	4567.00	STR2

STRUCTURE 2 POINT TABLE



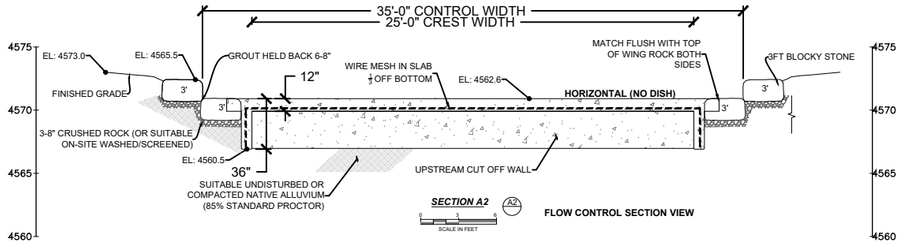
STRUCTURE 2 CREST SECTION

SCALE: H: 1"=5' V: 1"=5'



STRUCTURE 2 EXIT SECTION

SCALE: H: 1"=5' V: 1"=5'



STRUCTURE 2 FLOW CONTROL PAD SECTION

SCALE: H: 1"=5' V: 1"=5'

NOTES:
1. EXCAVATED ALLUVIUM MAY BE USED AS SUBBASE IF APPROVED BY ENGINEER, SEE SPECIFICATIONS
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COLORADO REGISTERED PROFESSIONAL ENGINEER
Gary Lacy Martinez
20435

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CITY OF GRAND JUNCTION
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250 N 5TH STREET
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LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO

BID SET

STRUCTURE 2 PLAN, PROFILE, & SECTIONS

REVISIONS:	
NO.	DATE
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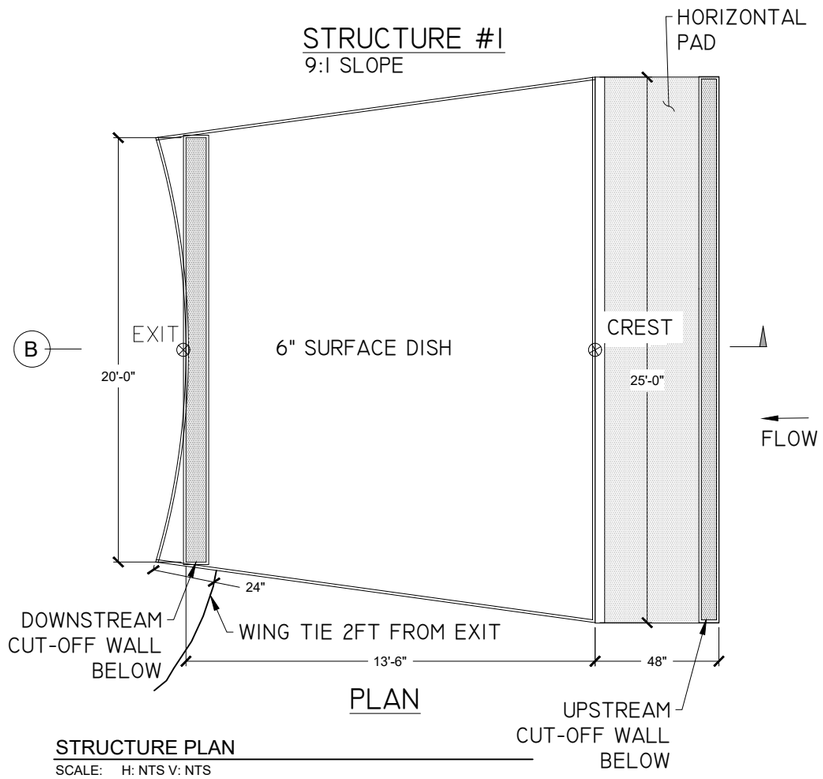
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

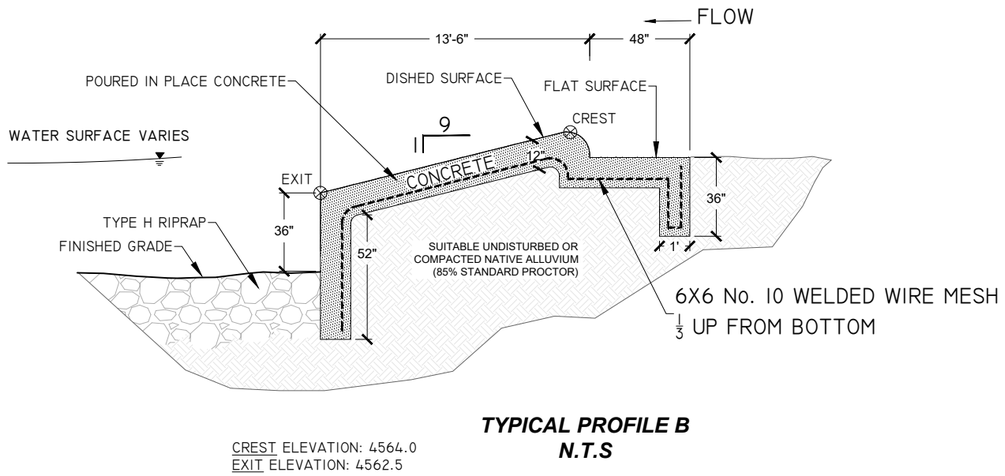
DRAWING NO.

C-11

SHEET C-11 OF 24



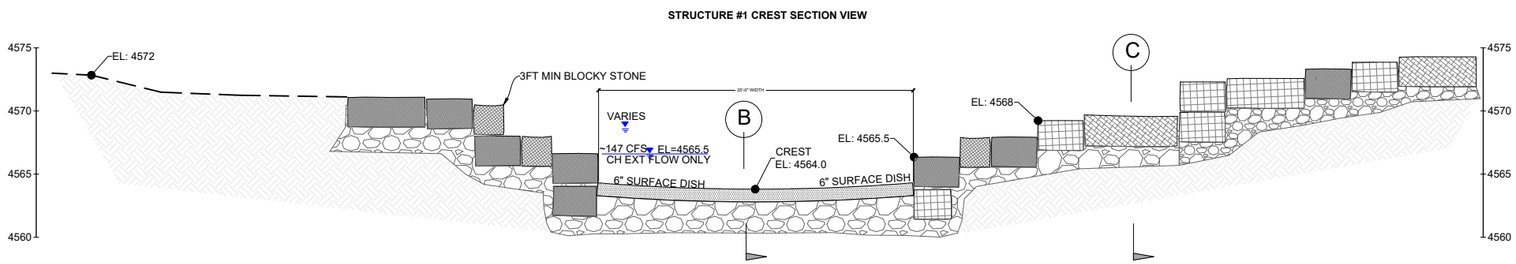
STRUCTURE PLAN
SCALE: H: NTS V: NTS



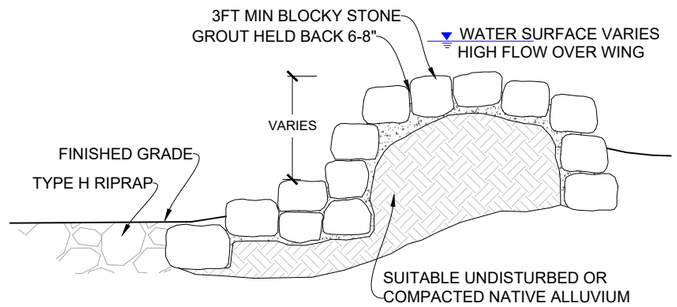
CREST ELEVATION: 4564.0
EXIT ELEVATION: 4562.5

TYPICAL PROFILE B
N.T.S

STRUCTURE PROFILE CENTERLINE B-B'
SCALE: H: NTS V: NTS



CREST SECTION
SCALE: H: NTS' V: NTS



TYPICAL PROFILE OF ROCK IN "WING"
PROFILE C

TYPICAL SECTION C-C'
SCALE: H: NTS' V: NTS

NOTES:
1. NO VOLCANIC ROCK PERMITTED FOR USE IN ANY STRUCTURES. EXCEPTION MAY BE GRANTED FOR RIPRAP ONLY.

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GRAND JUNCTION, COLORADO
BID SET
STRUCTURE #1 DETAIL

REVISIONS:

NO.	DATE
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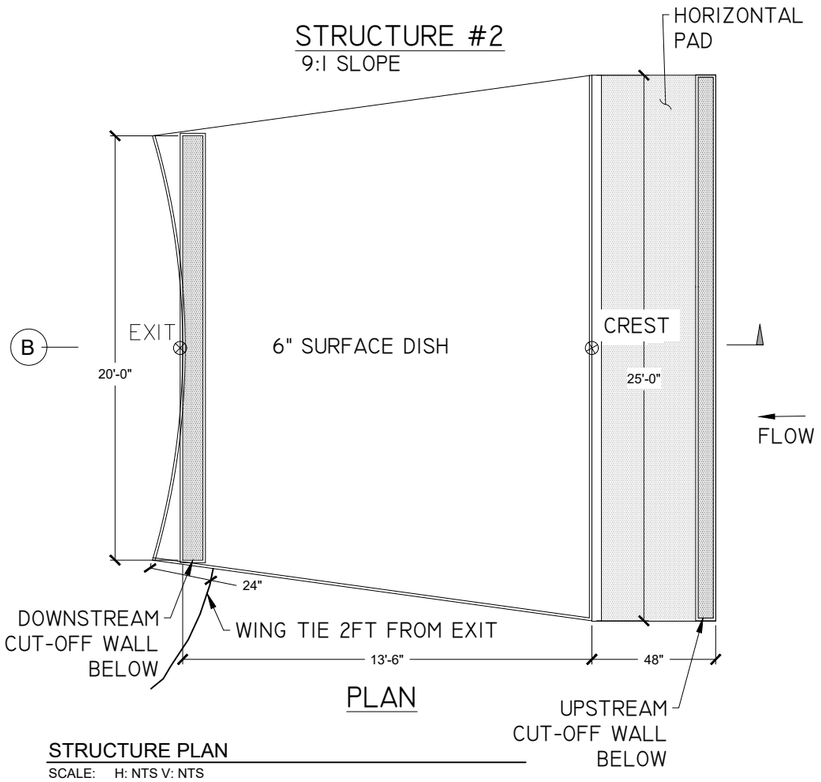
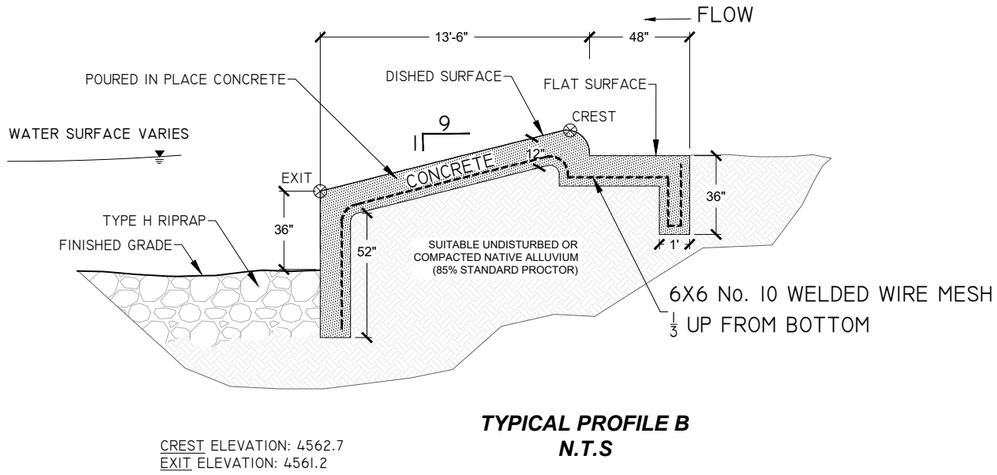
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.
C-12



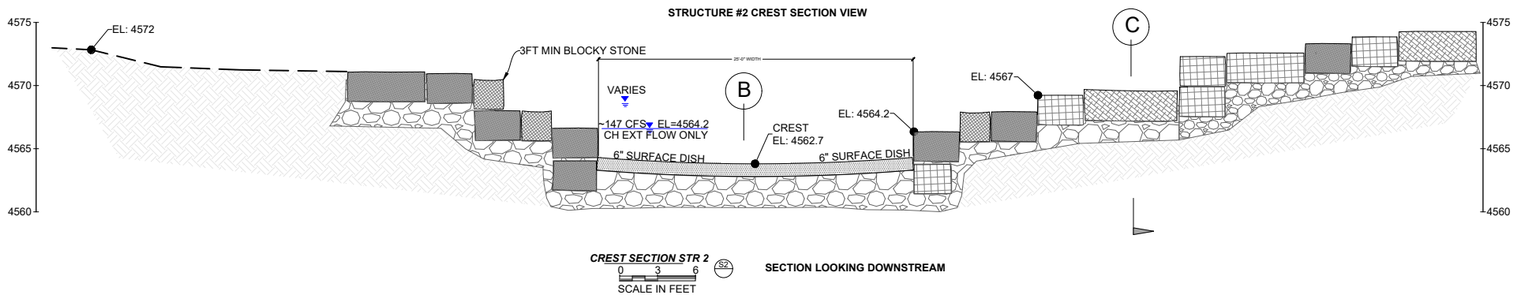
STRUCTURE PLAN
SCALE: H: NTS V: NTS



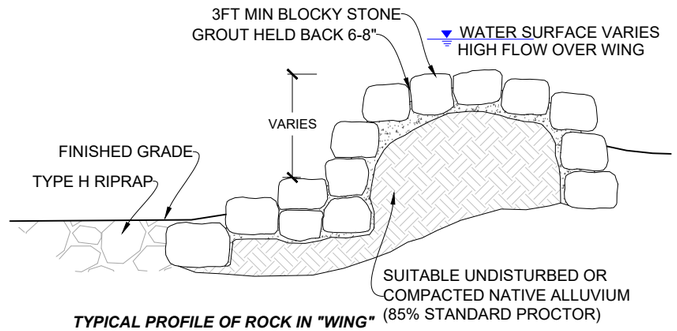
TYPICAL PROFILE B
N.T.S

CREST ELEVATION: 4562.7
EXIT ELEVATION: 4561.2

STRUCTURE PROFILE CENTERLINE B-B'
SCALE: H: NTS V: NTS



CREST SECTION
SCALE: H: NTS' V: NTS



TYPICAL PROFILE OF ROCK IN "WING"
PROFILE C

TYPICAL SECTION C-C'
SCALE: H: NTS' V: NTS

NOTES:
1. NO VOLCANIC ROCK PERMITTED FOR USE IN ANY STRUCTURES. EXCEPTION MAY BE GRANTED FOR RIPRAP ONLY.

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Gary Lacy Martinez
20435

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COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
STRUCTURE #2 DETAIL

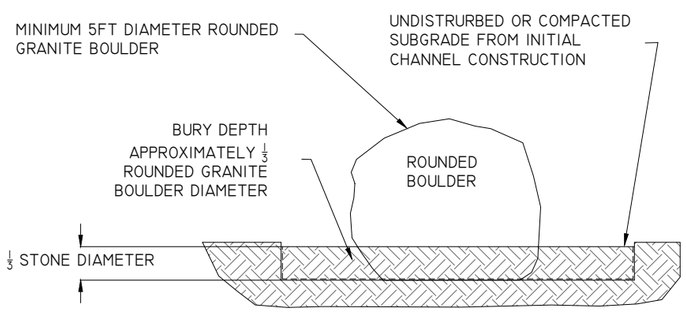
REVISIONS:

NO.	DATE
#	01/02/2018
	07/30/2018
	04/25/2019

DESIGNED: GL DRAFTED: RG
CHECKED: GL
PLOT DATE: 5/13/2019

DRAWING NO.
C-13

R-01



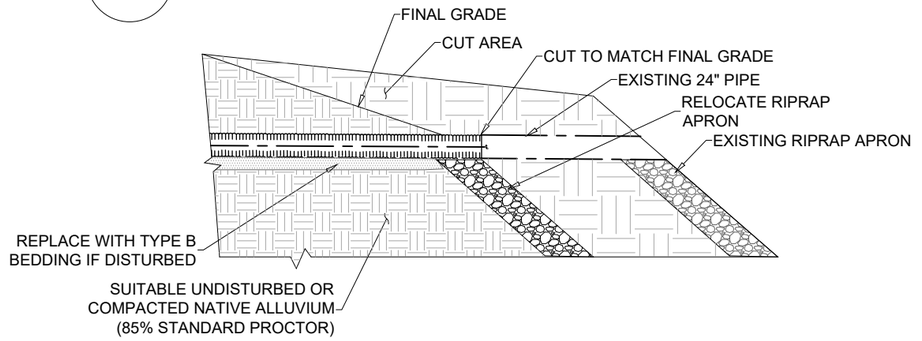
TYPICAL ROUNDED CHANNEL BOULDER

SCALE: H: 1"=8' V: 1"=8'

24" STRM OUTFALL DETAIL

NTS

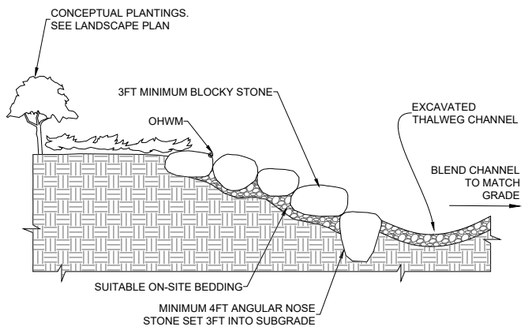
O-01



STORM OUTFALL ARPON RECONFIGURATION

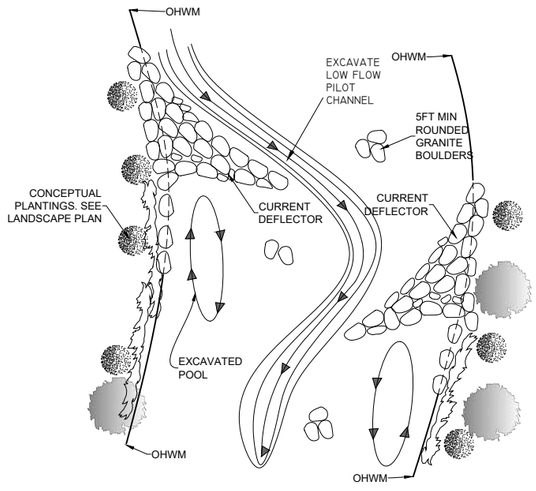
SCALE: NTS

NOTES:
1. EXCAVATED ALLUVIUM MAY BE USED AS SUBBASE APPROVED BY ENGINEER
2. ALL PLACED STONES MUST BE KEYED 6 INCHES MINIMUM IN THE HORIZONTAL AND VERTICAL DIRECTIONS
3. IF UNSUITABLE SUBGRADE IS ENCOUNTERED, CONTRACTOR MUST INCLUDE SUITABLE SUBGRADE MATERIAL SUCH AS ROAD BASE GRAVEL.



CURRENT DEFLECTOR CROSS SECTION VIEW

TYPICAL OFFSET CURRENT DEFLECTORS PLAN VIEW



TYPICAL RIFFLE RIBS

SCALE: N.T.S.

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COLORADO REGISTERED PROFESSIONAL ENGINEER
Gary Merrill Lach
20435

PROJECT OWNER:
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---
250 N 5TH STREET
GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
SLOUGH ENHANCEMENTS DETAILS

REVISIONS:

NO.	DATE
#	01/02/2018
	07/30/2018
	04/25/2019

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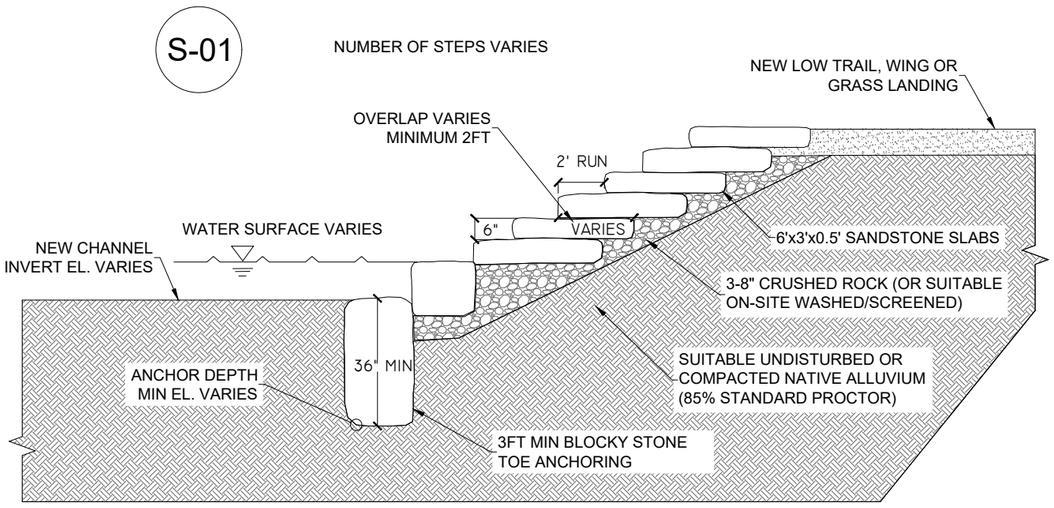
C-14

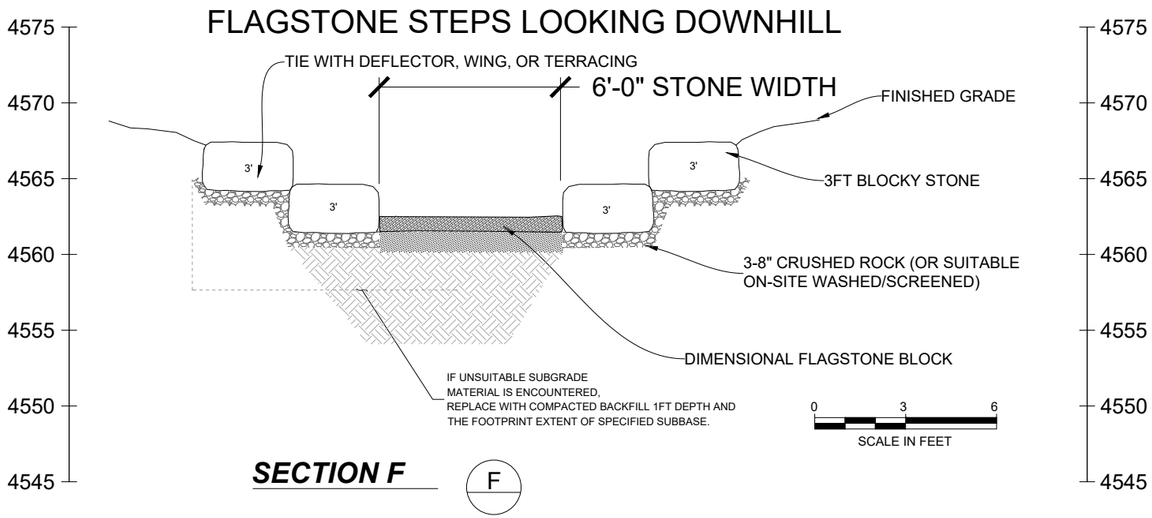


FLAGSTONE RIVER ACCESS STEPS DETAIL
N.T.S.

TYPICAL PROFILE SLABSTONE STEPS

SCALE: NTS

NOTE:
BACKFILL MATERIAL SHALL BE FREE OF ASHES, ROCK OR GRAVEL LARGER THAN 3" IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, BROKEN CONCRETE, ROOTS, BRUSH OR OTHER ORGANICS OR OTHER DELETERIOUS MATTER UNLESS DIRECTED OTHERWISE. COMPACTION SHALL BE 85% OF STANDARD PROCTOR.



SECTION F (F)

VALID FOR STATION 0+25.00

TYPICAL SECTION SLABSTONE STEPS

SCALE: H: 1"=8' V: 1"=8'

NOTES:
1. ALL PLACED STONES MUST BE KEYED 6 INCHES MINIMUM IN THE HORIZONTAL AND VERTICAL DIRECTIONS
2. IF UNSUITABLE SUBGRADE IS ENCOUNTERED, CONTRACTOR MUST INCLUDE SUITABLE SUBGRADE MATERIAL SUCH AS ROAD BASE GRAVEL.

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LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
SLABSTONE STEPS SECTIONS

REVISIONS:

NO.	DATE
#	01/02/2018
	07/30/2018
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PLOT DATE: 5/13/2019

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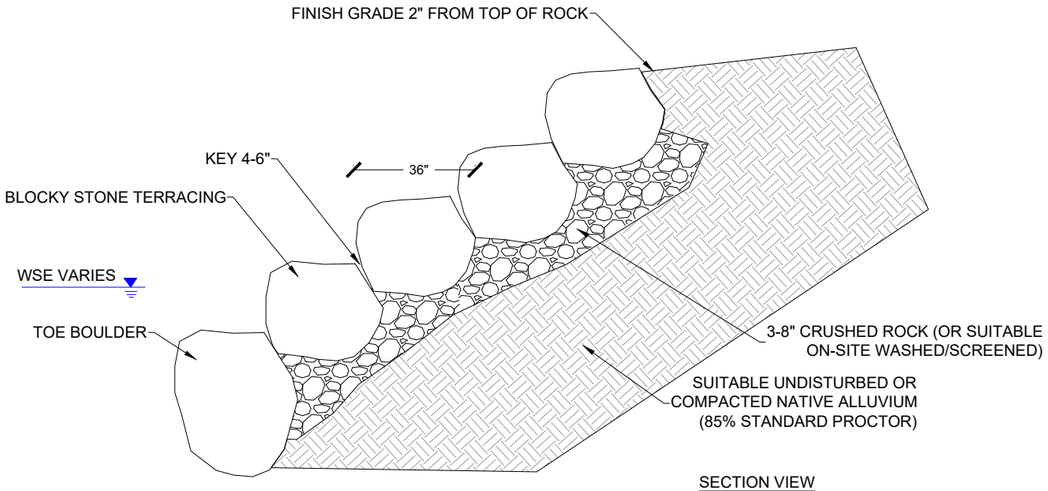
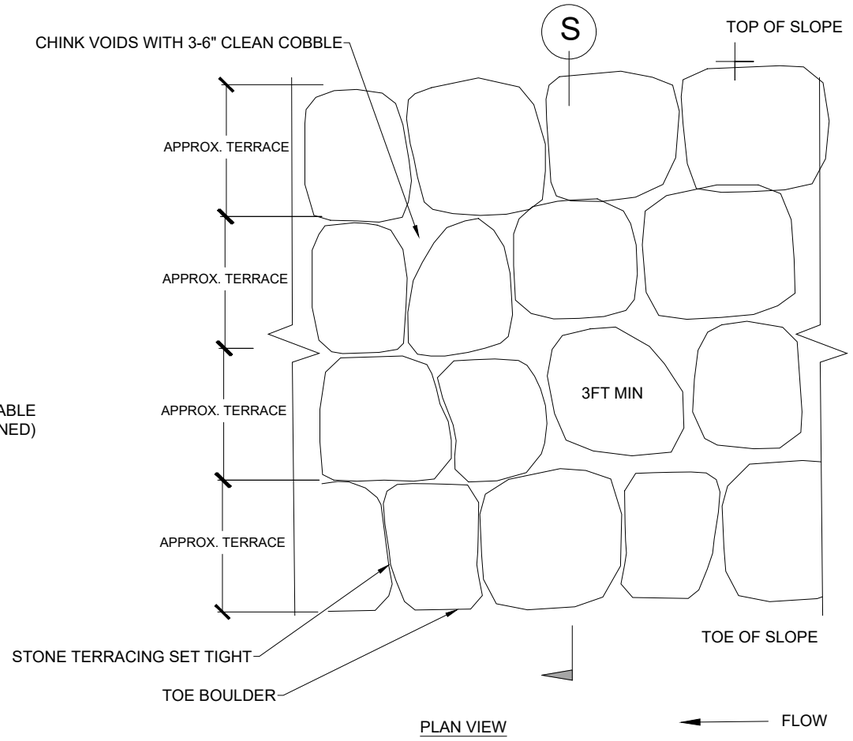
C-15

SHEET C-15 OF 24



STONE TERRACING

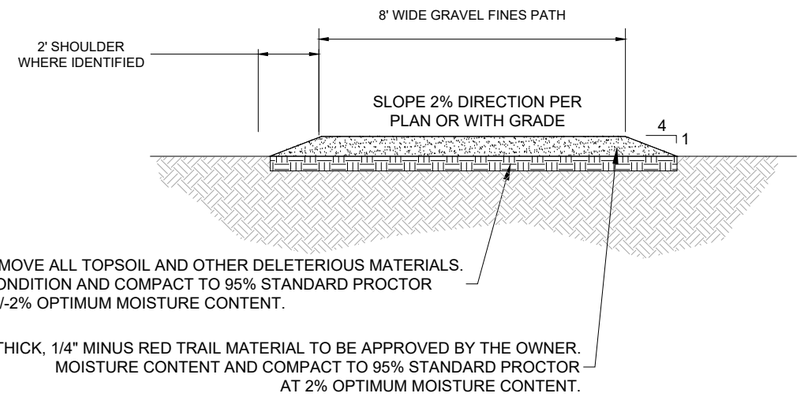


TYPICAL STONE BANK TERRACING

SCALE: H: 1"=8' V: 1"=8'

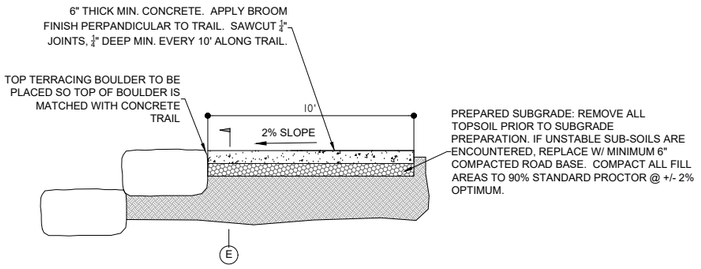
NOTES:

1. SAW CUT JOINTS 1 ½" DEEP (WITHIN 96 HOURS) MAX 6' CENTERS
2. EXPANSION JOINTS WHERE SIDEWALK RUN EXCEEDS 120'
3. TOOLED JOINTS ONLY ON RED COLORED CONCRETE SHOULDERS (WHERE SPECIFIED)

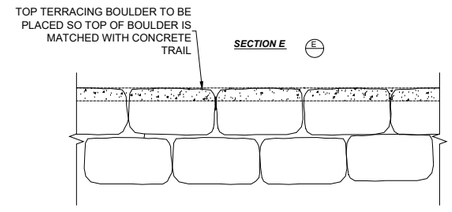


GRAVEL FINES TRAIL DETAILS

SCALE: H: 1"=8' V: 1"=8'



TYPICAL CONCRETE TRAIL WITH STONE SHOULDER SECTION



TYPICAL CONCRETE TRAIL WITH STONE SHOULDER PROFILE

CONCRETE TRAIL AT STONE SHOULDER DETAIL

SCALE: NTS
IF REQUIRED

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LAS COLONIAS RIVER PARK
COLORADO RIVER
GRAND JUNCTION, COLORADO
BID SET
BANK DETAILS

REVISIONS:

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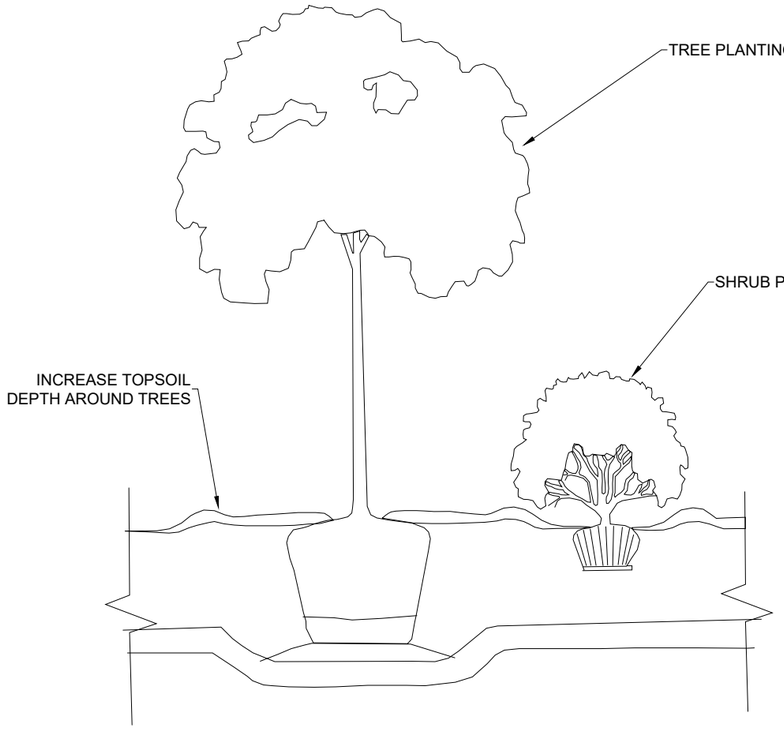
C-16



TREE AND SHRUB PLANTINGS

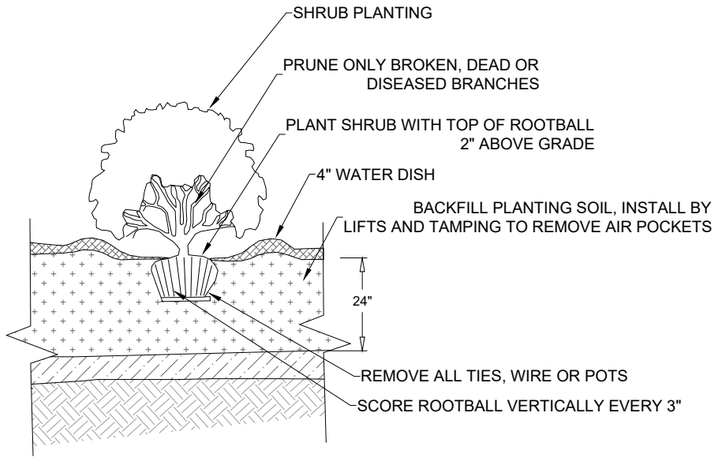
NATIVE RIPARIAN SPECIES IDENTIFIED FOR PLANTING:

TREES:
1. NARROWLEAF COTTONWOOD

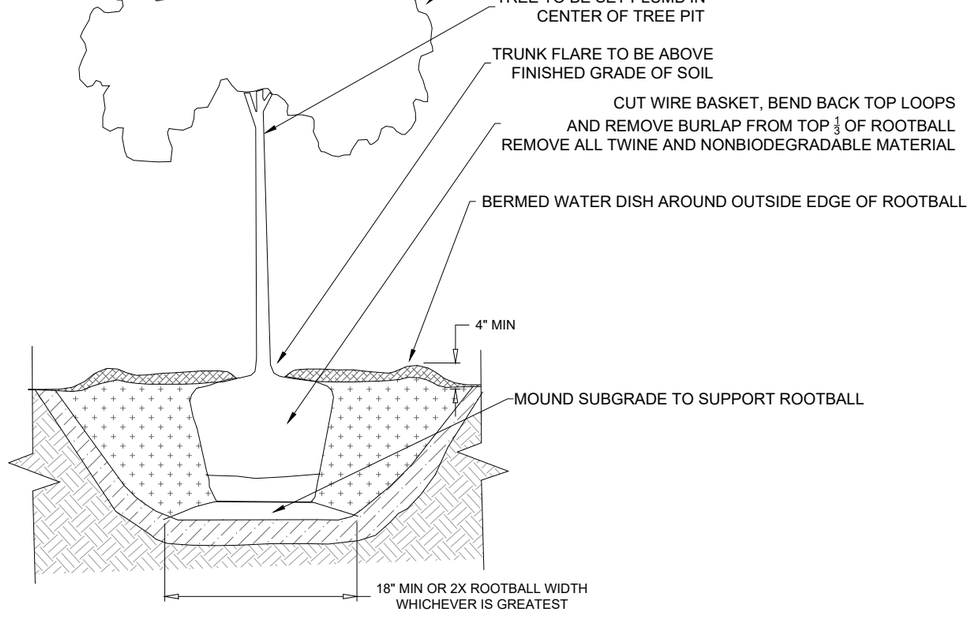
SHRUBS:
2. BOX ELDER
3. BLACK CHOKE CHERRY

LIVE STAKE:
4. MOUNTAIN WILLOW
5. PLANELEAF WILLOW

NOTES:
1) REMOVE ALL UNSUITABLE MATERIAL INGLUDING TRASH, RUBBLE, DEBRIS, GRAVEL, ETC. FROM PLATING PIT
2) WATER THOROUGHLY AFTER INSTALLATION
3) REMOVE TREE RINGS AND STAKES TWO YEARS AFTER INSTALLATION IF STAKING WAS REQUIRED
4) DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING
5) CROWN OF ROOTBALL TO BE PLACED 2" ABOVE FINISHED GRADE TO ALLOW FOR SETTLEMENT
6) DO NOT WRAP TRUNK



SHRUB PLANTING



TREE PLANTING

TREE AND SHRUB PLANTING DETAIL

SCALE: H: 1"=8' V: 1"=8'

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20435
PROFESSIONAL ENGINEER

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GRAND JUNCTION, CO

LAS COLONIAS RIVER PARK
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BID SET
TREE SHRUB DETAILS

REVISIONS:

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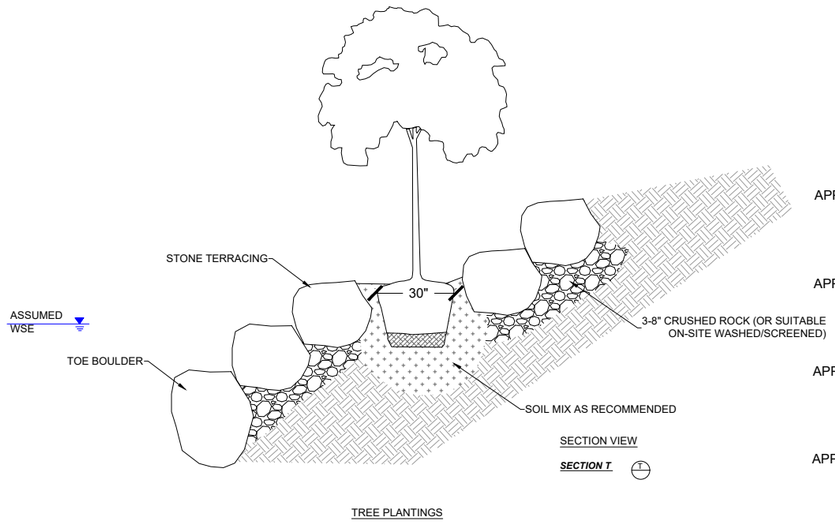
C-17

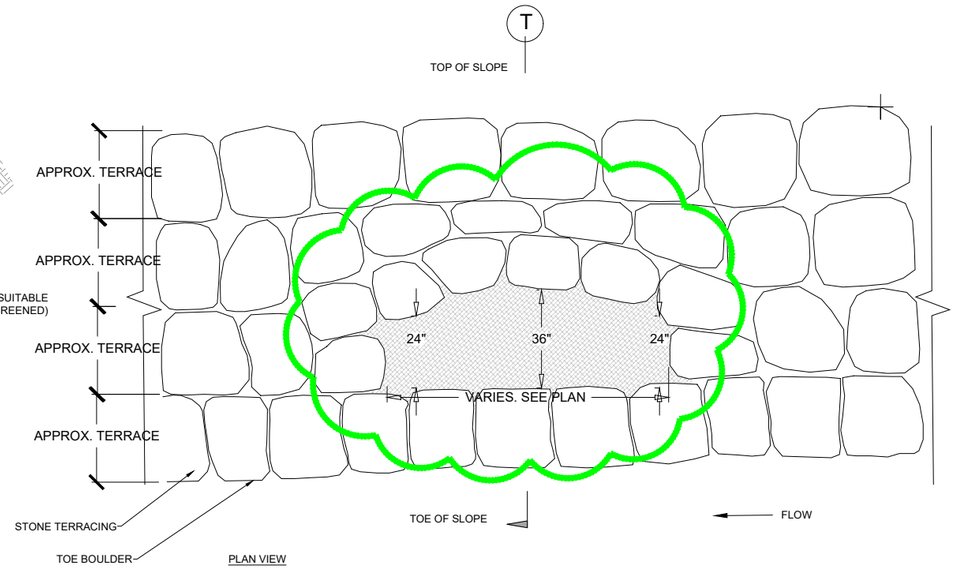
SHEET C-17 OF 24



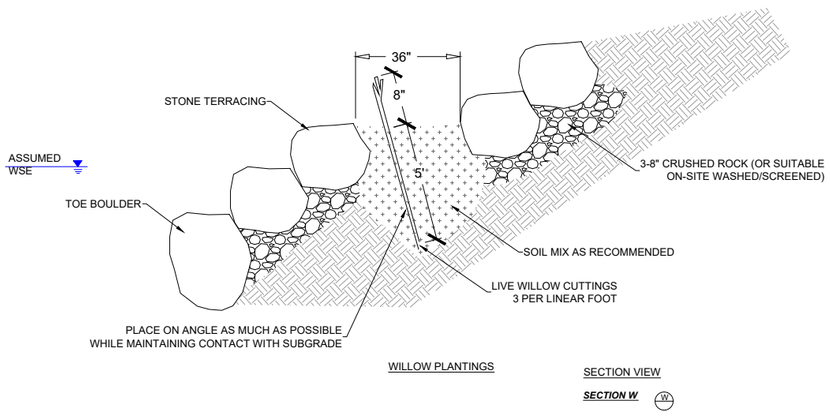
TREE PLANTINGS

TYPICAL RIPARIAN TREE PLANTINGS SECTION

SCALE: H: 1"=8' V: 1"=8'



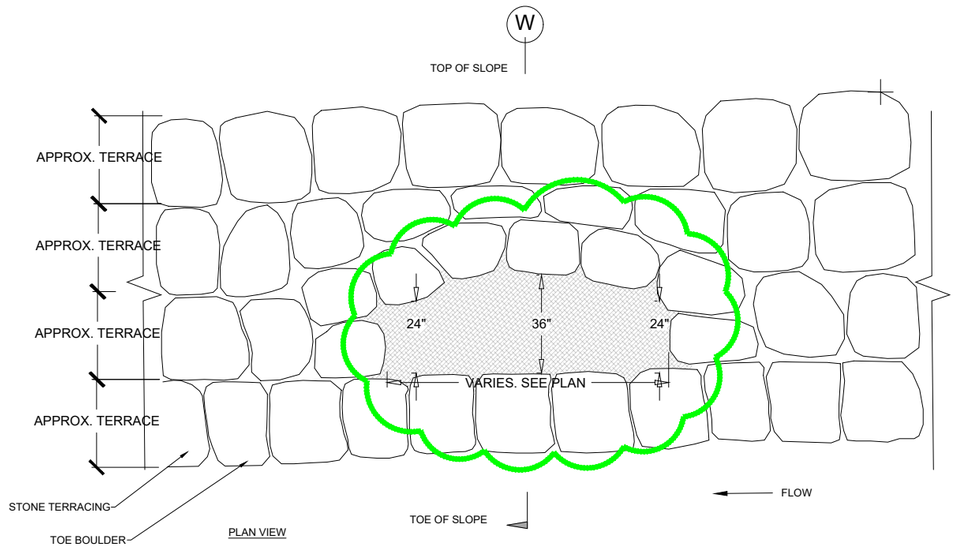
PLAN VIEW



WILLOW PLANTINGS

TYPICAL WILLOW STAKES PLANTINGS SECTION

SCALE: H: 1"=8' V: 1"=8'



PLAN VIEW

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PLANTING POCKET DETAIL

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C-18

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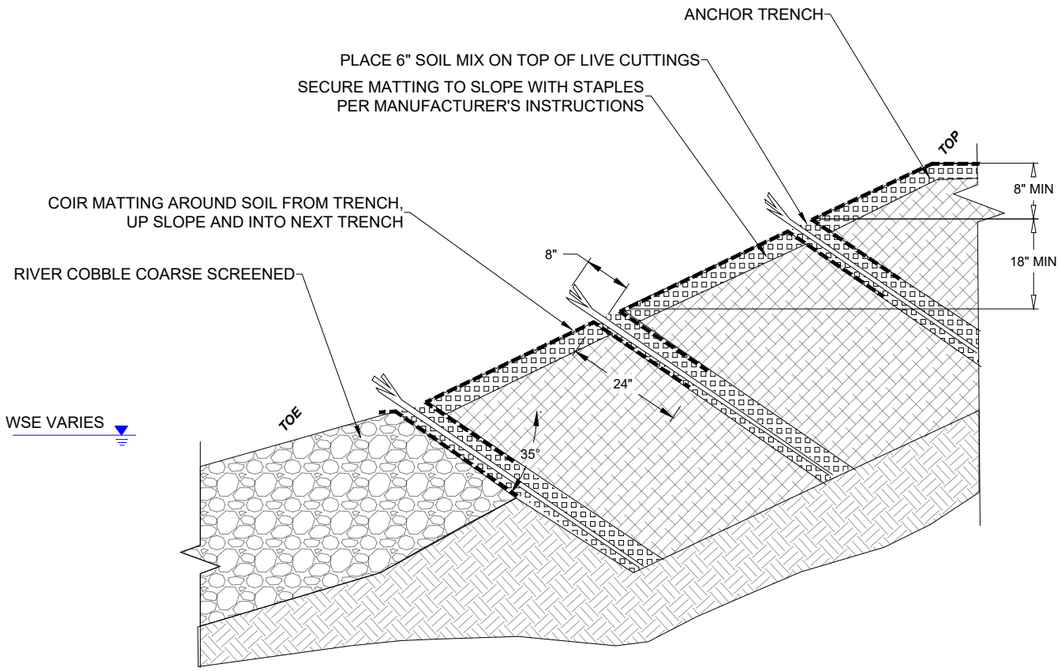
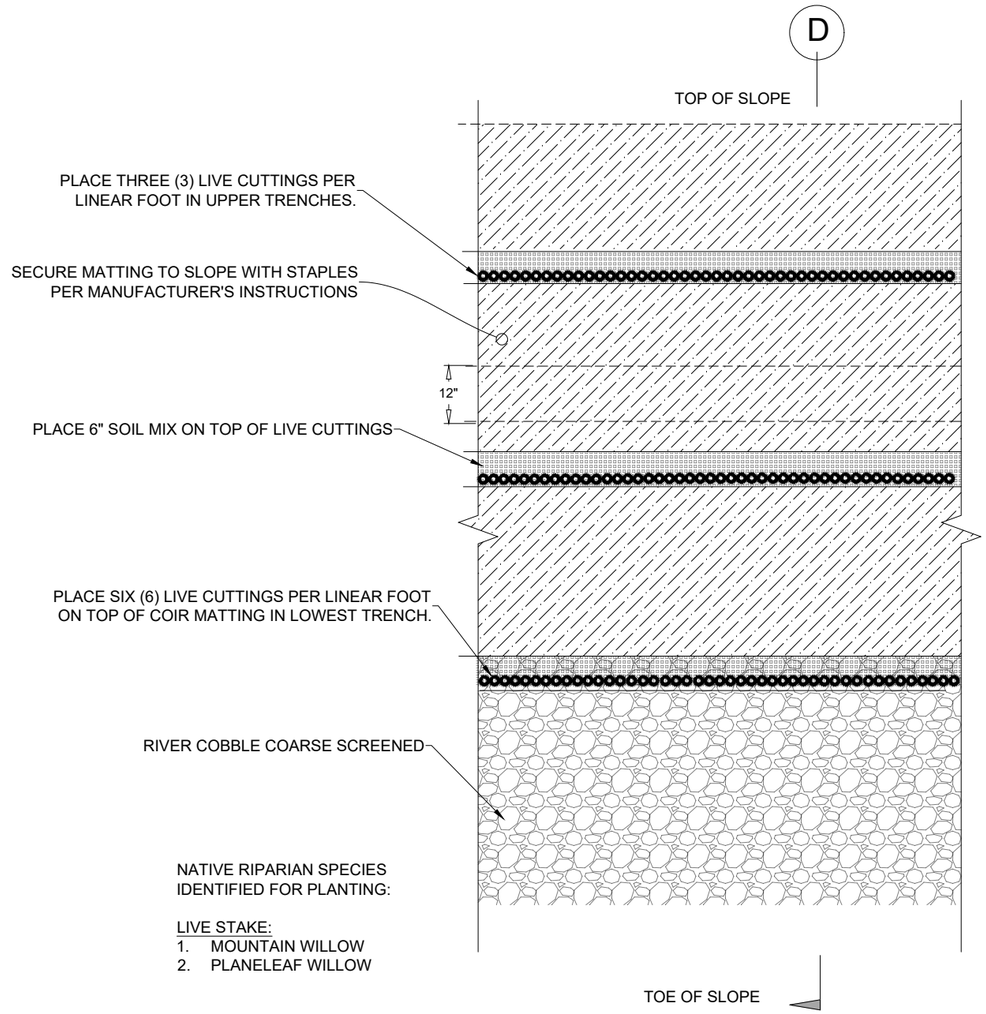


SECTION VIEW

SECTION D (D)

NOTES:
1) IF SLOPE IS TOO SHORT TO ACCOMMODATE 3 ROWS OF PLANTINGS, ELIMINATE 1 ROW OF POCKETS, BRUSH LATER TO REMAIN AT TOP.
2) PLACE SIX (6) LIVE CUTTINGS PER LINEAR FOOT ON TOP OF COIR MATTING IN LOWEST TRENCH. PLACE THREE (3) LIVE CUTTINGS PER LINEAR FOOT IN UPPER TRENCHES.



NATIVE RIPARIAN SPECIES IDENTIFIED FOR PLANTING:

LIVE STAKE:
1. MOUNTAIN WILLOW
2. PLANELEAF WILLOW

PLAN VIEW

TYPICAL WILLOW PLANTINGS SECTION

SCALE: H: 1"=8' V: 1"=8'

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WILLOW PLANTINGS DETAIL

REVISIONS:

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PLOT DATE: 5/13/2019

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C-19

SHEET C-19 OF 24

GENERAL NOTES:

ENGINEERS OVERSIGHT

1. THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY, AND IS NOT LIABLE FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY OR FOR PROBLEMS WHICH ARISE FROM OTHERS OR OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS.
2. ALL ELEVATIONS, DIMENSIONS, ALIGNMENTS AND ORIENTATION OF ALL ELEMENTS SHOWN IN THE PLANS MUST BE APPROVED BY THE REP ENGINEER OR REP ENGINEER'S REPRESENTATIVE (ENGINEER).
3. WORK SHALL NOT COMMENCE UNTIL AFTER THE DATE OF THE ON-SITE PRE-CONSTRUCTION MEETING WHICH WILL BE ATTENDED BY REPRESENTATIVES OF THE PROJECT OWNER, ENGINEER, CONTRACTOR AND ANY SUB-CONTRACTORS. IN THE EVENT THAT WORK DOES NOT BEGIN IMMEDIATELY FOLLOWING THE PRE-CONSTRUCTION MEETING, THE CONTRACTOR SHALL PROVIDE REPRESENTATIVES OF THE PROJECT OWNER, ENGINEER, ANY SUB-CONTRACTORS, AND RELEVANT AGENCIES NOTED IN THE PERMITS, TWO WEEKS NOTICE BEFORE CONSTRUCTION COMMENCES.
4. ALL CONSTRUCTION WORK SHALL CONFORM TO THE CITY OF GRAND JUNCTION DESIGN AND SPECIFICATIONS. UTILITY CONSTRUCTION SHALL CONFORM TO THE AMERICAN PUBLIC WORKS ASSOCIATION, PUBLIC WORKS CONSTRUCTION MANUAL, LATEST EDITION. STANDARD SPECIFICATIONS OF MATERIALS FOR AGGREGATES AND SOIL AGGREGATE SUB-BASE, BASE AND SURFACE COURSES SHALL BE GOVERNED BY AASHTO DESIGNATION M147-65 (1993) OR LATEST REVISION. ALL CONSTRUCTION SHALL CONFORM TO CITY AND COUNTY STANDARDS AND SPECIFICATIONS AS APPLICABLE.
5. WHENEVER THE INCLUDED DRAWINGS ARE FOUND TO BE INCONSISTENT WITH ANY OTHER RESOLUTION, ORDINANCE, CODE, REGULATION, OR OTHER STANDARDS REFERENCED, THE ENACTMENT IMPOSING THE MORE RESTRICTIVE STANDARDS OR REQUIREMENTS SHALL CONTROL.
6. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT CONSTRUCTION PLAN APPROVAL BY ALL RELEVANT AGENCIES. A COPY OF THE APPROVED PLANS SHALL BE AVAILABLE AT THE CONSTRUCTION SITE AT ALL TIMES DURING WORKING HOURS.
7. THE ENGINEER IS TO BE NOTIFIED PRIOR TO ANY PLAN CHANGES OR ON-SITE DESIGN MODIFICATIONS. ALL PLAN CHANGES MUST BE APPROVED BY THE ENGINEER. AN REP REPRESENTATIVE SHALL BE PRESENT DURING CONSTRUCTION OF KEY PORTIONS OF THE PROJECT (DROP STRUCTURES, DEFLECTORS, RANDOM BOULDER PLACEMENT, POOL SHAPING, CONSTRUCTED RIFFLES AND RELATED BANK TERRACING). CHANGES MAY BE MADE BY AN REP REPRESENTATIVE PRIOR TO AND DURING CONSTRUCTION.
8. ALL EXISTING TOPOGRAPHIC SURVEY DATA SHOWN ON THESE PLANS HAS BEEN OBTAINED AND CERTIFIED BY OTHERS. THE ENGINEER HAS UNDERTAKEN NO FIELD VERIFICATION OF THIS TOPOGRAPHIC INFORMATION, AND MAKES NO REPRESENTATION PERTAINING THERETO AND THEREFORE ASSUMES NO RESPONSIBILITY OR LIABILITY.
9. THE CONTRACTOR SHALL CONFINE HIS OPERATIONS TO THE CONSTRUCTION LIMITS OF THE PROJECT AND IN NO WAY SHALL ENCROACHMENT OCCUR ONTO ADJACENT PROPERTIES UNLESS LEGAL EASEMENTS ARE OBTAINED. ALL FILL AND CUT SLOPES SHALL BE SETBACK FROM THE PROPERTY LINE IN ACCORDANCE WITH PERTINENT BUILDING CODES. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY AGREEMENTS NECESSARY OR DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES TO PUBLIC OR PRIVATE PROPERTY, INCLUDING UTILITIES.

UTILITIES

1. THE CONTRACTOR SHALL LOCATE ALL UTILITIES WITHIN THE PROJECT AREA PRIOR TO CONSTRUCTION.
2. IF UTILITIES ARE IDENTIFIED WITHIN THE PROJECT AREA, A MINIMUM BUFFER OF NO DISTURBANCE, APPROVED BY THE ENGINEER OR OWNER, IS TO BE MAINTAINED ON ALL UTILITY CROSSINGS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF ALL EXISTING UTILITIES AND SHOULD NOT RELY SOLELY ON THESE CONSTRUCTION PLANS FOR UTILITY LOCATIONS. CONTRACTOR MUST COMPLETE ALL UTILITY LOCATES PRIOR TO CONSTRUCTION. DAMAGE TO ANY EXISTING UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

GENERAL ENVIRONMENTAL

1. WORK SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL AGENCIES' LAWS, RULES, REGULATIONS, AND PERMITS. ALL WORK SHALL BE SUBJECT TO INSPECTIONS AND SITE INVESTIGATION BY REGULATORY AGENCIES. FAILURE TO COMPLY WITH THESE REGULATIONS IS SUBJECT TO LEGAL ENFORCEMENT ACTION.
2. COPIES OF PERMITS OBTAINED BY THE OWNER WILL BE PROVIDED TO THE CONTRACTOR. CONTRACTOR SHALL MAINTAIN COPIES OF ALL PERMITS ON THE SITE AT ALL TIMES. THESE MAY INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: CLEAN WATER ACT SECTION 404 PERMIT FROM THE U.S, ARMY CORPS OF ENGINEERS, SECTION 401 WATER QUALITY CERTIFICATION, FLOODPLAIN DEVELOPMENT PERMIT, ANY APPROPRIATE LAND USE PERMITS, AND ANY RELEVANT CONSTRUCTION STORM WATER PERMITS.
3. A PRE-CONSTRUCTION MEETING WITH EQUIPMENT OPERATORS SHALL BE HELD TO DISCUSS THE PROJECT REQUIREMENTS AS THEY RELATE TO ENVIRONMENTAL PERMIT COMPLIANCE.
4. ON-SITE CONSTRUCTION REVIEWS SHALL BE CONDUCTED TO IDENTIFY MAINTENANCE NEEDS AND CHRONIC PROBLEMS THAT MAY BE OCCURRING. APPROPRIATE REMEDIAL ACTIONS SHALL BE IMPLEMENTED IN A TIMELY MANNER.
5. IF PREVIOUSLY UNKNOWN ARCHEOLOGICAL MATERIALS ARE DISCOVERED DURING CONSTRUCTION ACTIVITIES, WORK SHALL STOP IMMEDIATELY AND THE ENGINEER AND OWNER SHALL BE CONTACTED. THE STATE HISTORIC PRESERVATION OFFICE WILL THEN BE CONTACTED BY THE ENGINEER OR OWNER FOR CONSULTATION.

SEDIMENT AND POLLUTION CONTROL

1. ALL APPROPRIATE SEDIMENT AND POLLUTION CONTROL MEASURES, AND BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE IN PLACE TO MINIMIZE SEDIMENTATION AND RIVERBED IMPACTS PRIOR TO INITIATING IN-RIVER / RIVERBANK WORK. SEDIMENT AND EROSION CONTROLS SHALL BE INSTALLED IN ACCORDANCE WITH THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT GUIDELINES AND RELEVANT STORM WATER POLLUTION PREVENTION PLAN.
2. CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR THE DESIGN, IMPLEMENTATION, AND MAINTENANCE OF SEDIMENT AND EROSION CONTROLS IN CONFORMANCE WITH CONSTRUCTION STANDARDS AND THE REQUIREMENTS OF REGULATORY AGENCIES THROUGHOUT THE CONSTRUCTION PERIOD. THE ENGINEER WILL NOT BE ON-SITE TO APPROVE, REVIEW, OR MAINTAIN THE CONTROLS. STORMWATER MEASURES MAY BE REQUIRED TO BE INSTALLED AT ANY TIME DURING CONSTRUCTION AT THE DIRECTION OF THE ENGINEER OR OWNER.
3. IN ADDITION TO CONSTRUCTION BMP'S, TEMPORARY SEDIMENT AND EROSION CONTROLS (E.G., TEMPORARY SEEDING, MULCHING, SILT FENCE, STRAW WADDLE) SHALL BE IMPLEMENTED ON ALL DISTURBED AREAS WITHIN 2-DAYS IF DISTURBED AREAS ARE TO REMAIN DORMANT FOR MORE THAN 21-DAYS. PERMANENT SOIL STABILIZATION (E.G., PERMANENT SEEDING, EROSION CONTROL FABRIC) SHALL BE IMPLEMENTED ON DISTURBED AREAS WITHIN 2-DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE PROJECT AREA.
4. SPOIL PILES SHALL BE COVERED OR OTHERWISE MANAGED TO REDUCE SEDIMENTATION. ALL MATERIAL WHICH IS TO BE PLACED AT UPLAND SITE SHALL BE DISPOSED OF IN SUCH A WAY THAT SEDIMENT RUNOFF IS CONTROLLED AND MINIMIZED.
5. CONTRACTOR SHALL NOT STORE EQUIPMENT BELOW THE ORDINARY HIGH WATER LINE, AND TAKES FULL RESPONSIBILITY FOR ANY MATERIALS VANDALIZED, DAMAGED, BROKEN, OR LOST AS A RESULT OF RIVER EVENTS.
6. ALL FUELING OPERATIONS, LUBRICATING, HYDRAULIC TOPPING OFF, FUEL TANK PURGING, AND EQUIPMENT MAINTENANCE/REPAIRS SHALL BE PERFORMED AT AN UPLAND SITE OUTSIDE OF THE BANKS OF ANY SITE WATERWAYS AT A LOCATION TO BE DETERMINED BY THE ENGINEER OR OWNER. THESE ACTIVITIES SHALL TAKE PLACE ON AN APPROVED PAD WITH SPILL CONTROL/ COLLECTION DEVICES IN PLACE.
7. ALL CONSTRUCTION EQUIPMENT SHALL BE INSPECTED DAILY FOR HYDRAULIC AND FUEL LEAKS. LEAKS SHALL BE REPAIRED PRIOR TO OPERATION WITHIN THE 100-YEAR FLOODPLAIN. WHEN NOT IN USE, FUEL AND HYDRAULIC FLUIDS SHALL BE STORED AT AN UPLAND SITE OUTSIDE OF THE 100-YEAR FLOODPLAIN. EMERGENCY SPILL RESPONSE DEVICES SHALL BE ON-SITE AT ALL TIMES DURING CONSTRUCTION IN WATERWAYS AND FLOODPLAINS AND SHALL BE READY TO DEPLOY IN THE EVENT OF A SPILL.
8. NO CHEMICALS, FUELS, LUBRICANTS, BRUSH, ETC. SHALL BE DISCHARGED OR DISPOSED OF INTO OR ALONGSIDE ANY STREAM, WATERCOURSE, OR FLOODPLAIN UNDER ANY CIRCUMSTANCES.
9. LITTER AND CONSTRUCTION DEBRIS SHALL BE CONTAINED DAILY. ALL CONSTRUCTION DEBRIS AND LITTER SHALL BE COMPLETELY REMOVED OFFSITE AND DISPOSED OF PROPERLY UPON PROJECT COMPLETION.
10. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS NECESSARY TO PROVIDE ACCESS TO CONSTRUCTION AREAS FROM ALL EXISTING ROADWAYS AND PATHS TO MINIMIZE GROUND DISTURBANCE AND SEDIMENT TRACKING FROM VEHICLE TIRES. ADJACENT ROADWAYS AND PATHS SHALL BE VISUALLY INSPECTED DAILY TO ENSURE THAT SEDIMENT IS NOT BEING CARRIED OFF-SITE. IF SEDIMENT IS BEING CARRIED OFF-SITE, THE ADJACENT ROADWAYS AND PATHS SHALL BE SWEPT CLEAN DAILY.

BEST MANAGEMENT PRACTICES (BMP'S)

1. BMP'S SUCH AS DRAINAGE CHANNELS, PERIMETER FENCING, DETENTION BASINS, AND VEHICLE TRACKING CONTROLS MUST BE INSTALLED PRIOR TO CONSTRUCTION ACTIVITIES. EFFECTIVE EROSION CONTROL REQUIRES ADAPTATION AND CHANGES DURING CONSTRUCTION THAT CANNOT BE DESIGNED OR ANTICIPATED PRIOR TO CONSTRUCTION. A QUALIFIED SUPERVISOR SHOULD CHECK ALL BMP'S REGULARLY AND NOTIFY THE ENGINEER IF THERE ARE QUESTIONS OR CONCERNS. THE ENGINEER ACCEPTS NO LIABILITY FOR THE PLACEMENT, EFFECTIVENESS, MAINTENANCE, OR CHOICE OF BMP ON THE SITE IF THE ENGINEER AND/OR ENGINEER'S REPRESENTATIVE ARE NOT PRESENT.
2. THE CONTRACTOR SHALL IMPLEMENT THE NECESSARY SITE EROSION CONTROL MEASURES FOR INHIBITING DUST, WIND, AND AIR SEDIMENT MOVEMENT OFFSITE DURING ALL PHASES OR STAGES OF CONSTRUCTION.
3. THE CONTRACTOR SHALL PROVIDE AN AREA TO STORE CONSTRUCTION DEBRIS WHERE IT WILL NOT BE A NUISANCE TO THE SURROUNDING NEIGHBORHOOD. ALL DEBRIS SHALL BE CONTAINED IN SUCH A MANNER THAT WILL PREVENT SCATTERING. ALL DEBRIS, INCLUDING TREES AND UNDERGROWTH SHALL BE DISPOSED OF PROPERLY. ALL DEBRIS SHALL BE REMOVED FROM THE SITE PRIOR TO FINAL SITE INSPECTION.
4. CONTRACTOR SHALL LIMIT THE AREAS OF DISTURBANCE AND COMPLETE CONSTRUCTION WITH PHASES IN MIND.
5. CONTRACTOR SHALL LIMIT DIRECTLY CONNECTED IMPERVIOUS AREAS (DCIA).
6. BUFFER STRIPS SHOULD BE USED DURING CONSTRUCTION TO LIMIT THE DCIA'S. WHEN POSSIBLE, TRANSITIONING CHANGES IN SLOPE, TERRACING LONGER SLOPES, SURFACE ROUGHENING, AND CONTOUR FURROWS SHOULD BE USED TO MINIMIZE CONSOLIDATED FLOW.
7. ANY STAGED GRADING MUST BE DONE TO DIRECT STORMWATER TOWARDS THE APPROPRIATE BMP'S.
8. DURING CONSTRUCTION, STRAW WADDLES, COMPACTED SOIL BERMS, AGGREGATE BAGS, OR SIMILAR MUST BE USED ON ALL DISTURBED SLOPES OF 3:1 AND GREATER THAN 20 FEET IN LENGTH.
9. SILT FENCING LOCATED ON THE PERIMETER OF DISTURBED AREAS SHOULD BE CHECKED ON A DAILY BASIS, OR FOLLOWING SIGNIFICANT STORM EVENTS TO ENSURE IT IS WORKING PROPERLY.
10. INLET PROTECTION MUST BE INCLUDED AT ALL STORM, SEWER, AND CULVERT LINKS. APPROPRIATE BMP'S INCLUDE ROCK SOCKS, SEDIMENT CONTROL LOGS, OR SIMILAR.
11. SEDIMENT ENTRAINMENT FACILITIES SHOULD BE DESIGNED TO STORE THE APPROPRIATE VOLUME OF STORM WATER DISCHARGE, BUT CONTAIN MINIMAL ADDITIONAL CAPACITY. THEY MUST BE MAINTAINED TO THE CALCULATED VOLUME AND DREDGED AS NECESSARY.

WORK LIMITS AND LAYDOWN

1. WORK LIMITS, ACCESS, STAGING, LAYDOWN, AND STOCKPILE AREAS SHALL BE LOCATED AS APPROVED BY THE ENGINEER OR OWNER.
2. ALL CONSTRUCTION ACTIVITIES SHALL OCCUR WITHIN CURRENTLY DISTURBED AREAS TO THE EXTENT POSSIBLE.
3. DISTURBED/ EXPOSED RIVERBANKS AND STAGING AND PROJECT ACCESS AREAS SHALL BE PROPERLY STABILIZED (SEEDED, MULCHED, OR OTHERWISE) WITH NATIVE VEGETATION IMMEDIATELY AFTER GRADING TO PREVENT EROSION AND ESTABLISHMENT OF INVASIVE PLANT SPECIES.
4. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO VEGETATION OR PROPERTY OUTSIDE THE WORK LIMITS RESULTING FROM CONSTRUCTION OPERATIONS.
5. ALL AREAS TEMPORARILY DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION, SLOPES, AND ELEVATIONS, UNLESS OTHERWISE NOTED IN THE CONSTRUCTION DRAWINGS.

ROCK QUALITY

1. INDIVIDUAL STONE BOULDERS SHALL BE DENSE, SOUND AND FREE FROM CRACKS, SEAMS AND OTHER DEFECTS CONDUCIVE TO ACCELERATED WEATHERING.
2. AT A MINIMUM EXPOSED ROCK SHOULD HAVE AT LEAST ONE FLAT SURFACE AND MAY REQUIRE TWO ADJACENT FLAT SURFACES FOR STEPPED AND TERRACED AREAS.
3. THE ROCK SHALL HAVE THE FOLLOWING PROPERTIES:
   A. BULK SPECIFIC GRAVITY (SATURATED SURFACE-DRY BASIS) NOT LESS THAN 2.5.
   B. ABSORPTION NOT MORE THAN 2% BY WEIGHT.
   C. THE BULK SPECIFIC GRAVITY AND ABSORPTION SHALL BE DETERMINED BY ASTM METHOD C-127.
4. ROCK THAT FAILS TO MEET THESE REQUIREMENTS MAY BE ACCEPTED ONLY IF SIMILAR ROCK FROM THE SAME SOURCE HAS BEEN DEMONSTRATED TO BE SOUND AFTER FIVE YEARS OR MORE OF SERVICE UNDER CONDITIONS OF WEATHER, WETTING AND DRYING, AND EROSIVE FORCES SIMILAR TO THOSE ANTICIPATED. ALTERNATIVELY NATIVE OR IMPORTED STONE, ALREADY AT THE SITE AND MEETING THE STANDARDS OUTLINED ABOVE, MAY BE USED.
5. THE ENGINEER RETAINS RIGHT OF REFUSAL FOR ANY ROCK BROUGHT TO THE SITE WHICH IS NOT SUITABLE AND DOES NOT MEET THE ABOVE CRITERIA AND/OR SHOWS EXCESSIVE WEATHERING, CRACKING, DEFORMATION OR SHARP PROTRUSIONS THAT COULD CREATE A SAFETY HAZARD.
6. MINIMUM ROCK DIAMETER SHALL BE 3' FOR DROP STRUCTURES. MINIMUM ROCK DIMENSIONS FOR ALL POOL ARMORING AND CRIB FILL TO BE RIP RAP WITH A D50 OF 9-INCHES.
7. BOULDER SHALL HAVE ALL AXES NOT BE LESS THAN THE DIMENSION SPECIFIED FOR BOULDERS AS SHOWN ON THE DRAWINGS. THESE AXES FOR THE BOULDERS ARE DESCRIBED AS FOLLOWS:

L - LONGITUDINAL AXIS, REPRESENTS THE CENTERLINE (AXIS) CONNECTING THE MOST DISTANT POINTS OF THE BOULDER

B - REPRESENTS THE CENTERLINE WITHIN THE ROCK THAT INTERSECTS THE L-AXIS AT RIGHT ANGLES.

T - REPRESENTS THE CENTERLINE WITHIN THE ROCK THAT IS PERPENDICULAR TO THE L-B PLANES.

8. ALL RIP RAP TO MEET ASTM C-535-69, AASHTO TEST 103 AND HAVE A SPECIFIC GRAVITY OF 2.65. THE ENGINEER TAKES NO RESPONSIBILITY FOR MATERIAL USED NOT MEETING THESE SPECIFICATIONS OR NOT APPROVED ON-SITE BY THE ENGINEER OR OWNER.

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BID SET
GENERAL NOTES

REVISIONS:

NO.	DATE
#	01/02/2018
	07/30/2018
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CHECKED: GL
PLOT DATE: 5/13/2019

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GENERAL NOTES CONT.:

MISCELLANEOUS

1. THE CONTRACTOR SHALL PROTECT STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS AND OTHER FACILITIES FROM DAMAGE CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT AND OTHER HAZARDS CREATED BY EARTHWORK OPERATIONS. EQUIPMENT HAVING RUBBER RUNNERS OR TIRES SHALL BE UTILIZED EXCLUSIVELY ON PERMANENT PAVEMENT. TRACK-TYPE EXCAVATORS MAY BE EMPLOYED WHEN STREET MATS (AS APPROVED BY THE ENGINEER) ARE USED TO PROTECT THE PAVEMENT. HOWEVER, DIRT MAT PAVEMENT PROTECTION IS NOT TO BE USED.

THE CONTRACTOR SHALL EXCAVATE BY HAND IN AREAS WHERE DEEMED NECESSARY BY THE ENGINEER OR WHERE AVAILABLE SPACE IS TOO LIMITED TO PERMIT USE OF EQUIPMENT.

A. DAMAGE OF ANY KIND THAT IS OUTSIDE OF EITHER THE PERMANENT RIGHT-OF-WAY OR LIMIT OF EXCAVATION, WHICHEVER IS LESS, SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER OR ENGINEER.

B. ADEQUATE PROVISIONS SHALL BE MADE FOR THE FLOW OF SEWERS, DRAINS, CULVERTS, AND WATER COURSES ENCOUNTERED DURING CONSTRUCTION.

C. ALL SUCH STRUCTURES DISTURBED OR DAMAGED DURING THE WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.

2. THE CONTRACTOR SHALL PERFORM EARTHWORK OPERATIONS IN SUCH A MANNER AS TO KEEP THE JOB SITE FREE OF PONDED WATER AND THE SUBGRADE AT PROPER MOISTURE CONTENT REQUIRED FOR COMPACTION.
3. EXCAVATED MATERIAL SHALL BE DEPOSITED IN SUCH A MANNER AS TO INTERFERE AS LITTLE AS POSSIBLE WITH THE EXECUTION OF THE WORK, INCLUDING PREVENTING CAVE-INS OR MATERIAL FALLING OR SLIDING INTO DITCHES.
4. DITCHES SHALL BE KEPT FREE OF DEBRIS.
5. EARTHWORK OPERATIONS SHALL BE CONDUCTED SO AS TO MAINTAIN SAFE PEDESTRIAN AND VEHICULAR TRAFFIC UNLESS PROVISIONS FOR DETOURS OR DISRUPTION OF TRAFFIC ARE SET FORTH HEREIN OR ARE APPROVED BY THE ENGINEER PRIOR TO START OF CONSTRUCTION.
6. ACCESS TO ALL EXISTING VALVE PIT COVERS, VALVE BOXES, CURB STOP BOXES, FIRE AND POLICE CALL BOXES OR OTHER UTILITY CONTROLS SHALL BE MAINTAINED AT ALL TIMES.
7. ALL MATERIALS ENCOUNTERED, REGARDLESS OF TYPES OR HARDNESS AND INCLUDING EXISTING FOUNDATIONS AND OTHER UNDERGROUND INSTALLATIONS, SHALL BE REMOVED TO REQUIRED LINES AND DEPTHS.
8. NO CLAIMS FOR EXTRA COMPENSATION OR EXTENSION OF TIME DUE TO SUBSURFACE CONDITIONS ENCOUNTERED WILL BE CONSIDERED.
9. THE CONTRACTOR SHALL REMOVE ALL STREET AND SIDEWALK PAVEMENTS, CURBING, DRAINS, RIPRAP, BARRIERS, WALLS AND OTHER SUCH OBSTACLES AS REQUIRED FOR PROPER EXECUTION OF THE WORK AND SHALL STORE AND PROTECT ALL MATERIALS THAT CAN BE USED IN RESTORING THE SITE TO ITS ORIGINAL OR PROPOSED CONDITION.
10. EXCAVATE ALL ASHES, CINDERS, REFUSE, ORGANIC MATERIAL AND OTHER UNSATISFACTORY SUBGRADE MATERIALS THAT EXTEND BELOW REQUIRED ELEVATIONS TO ADDITIONAL DEPTH REQUIRED BY THE ENGINEER. REPLACE UNSUITABLE MATERIAL WITH APPROVED BACKFILL MATERIAL. COMPACT AND GRADE BACKFILL TO REQUIRED DENSITY AND TOLERANCE.
11. SUCH ADDITIONAL EXCAVATION AND BACKFILL SHALL BE CONSIDERED INCIDENTAL TO THE WORK OF THE PROJECT.
12. UNSUITABLE EXCAVATED MATERIAL SHALL BE REMOVED FROM SITE OF WORK AND WASTED IN APPROVED AREAS.
13. THE CONTRACTOR SHALL PROTECT THE BOTTOM OF ALL EXCAVATIONS FROM FREEZING.
14. PROVIDE AND PLACE ALL TIMBERWORK, SHEETING, SHORING, BRACING AND OTHER CLASSES OF TIMBERWORK TO ADEQUATELY PROTECT THE WORK FROM EARTH PRESSURE AS REQUIRED BY FEDERAL AND STATE LAWS AND MUNICIPAL ORDINANCES. ALL SHEETING, BRACING, SHORING OR OTHER SUPPORTS NOT ORDERED LEFT IN PLACE BY THE ENGINEER SHALL BE REMOVED AFTER EXCAVATION IS REFILLED IN SUCH A MANNER AS TO PREVENT CAVING IN. UPON REMOVAL, ALL VOIDS SHALL BE CAREFULLY BACKFILLED AND COMPACTED. WHERE SHEETING AND BRACING ARE REQUIRED, EXCAVATION WIDTH SHALL BE INCREASED ACCORDINGLY. TRENCH SHEETING SHALL REMAIN IN PLACE UNTIL THE NECESSARY ITEMS HAVE BEEN INSTALLED AND EARTH AROUND THE ITEM CONSTRUCTED IS COMPACTED TO A DEPTH OF TWO FEET OR AS SHOWN ON THE PLAN.
15. THE DECISION AS TO THE WEATHER OR NOT SHEETING AND SHORING ARE NECESSARY, AND THE DESIGN OF SUCH SHEETING AND SHORING, WILL BE MADE BY THE CONTRACTOR WHO SHALL ASSUME SOLE RESPONSIBILITY FOR THE SAFETY OF THE WORK AND ADJACENT STRUCTURES AND PROPERTIES DURING AND FOLLOWING THE EXCAVATION OPERATION.
16. REMOVAL OF MATERIALS BEYOND INDICATED SUBGRADE ELEVATIONS FOR DIMENSIONS WITHOUT SPECIFIC DIRECTIONS FROM THE ENGINEER IS PROHIBITED.
17. UNAUTHORIZED EXCAVATION BENEATH FOOTINGS, FOUNDATION BASES, OR CONCRETE ANCHORS SHALL BE CORRECTED BY EXTENDING INDICATED BOTTOM ELEVATION TO THE EXCAVATION BOTTOM WITHOUT ALTERING THE REQUIRED TOP ELEVATION.
18. ALL OTHER UNAUTHORIZED EXCAVATIONS SHALL BE BACKFILLED AND COMPACTED TO INDICATED GRADE AS SPECIFIED FOR AUTHORIZED EXCAVATIONS OF THE SAME TYPE.
19. NO CLAIMS OR EXTRA COMPENSATION DUE TO UNAUTHORIZED EXCAVATIONS WILL BE ALLOWED.
20. CONTRACTOR SHALL PROTECT EXCAVATION BOTTOMS AGAINST FREEZING WHEN ATMOSPHERIC TEMPERATURE IS LESS THAN 35°F.

COMPACTED BACKFILL, FILL AND SUBGRADE

1. CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, AND EQUIPMENT NECESSARY TO PERFORM ALL BACKFILL, FILL AND GRADING REQUIRED FOR CONSTRUCTION OF THE PROJECT. SUB-BASE MATERIAL BENEATH SLABS IS INCLUDED IN THIS SECTION.
2. COMPACTED BACKFILL SHALL BE USED FOR FILLING ALL EXCAVATED AREAS AROUND STRUCTURES WHEN INDICATED. COMPACTED BACKFILL SHALL ALSO BE USED FOR REPLACING UNSATISFACTORY FOUNDATION MATERIAL FOR STRUCTURES, FOR REPLACING CAVED-IN MATERIAL AND FOR REPLACING MATERIALS EXCAVATED BEYOND ESTABLISHED LIMITS. COMPACTED BACKFILL SHALL BE PLACED TO THE ORIGINAL GROUND SURFACE OR TO THE LINES AND GRADES SHOWN ON THE DRAWINGS, AS SPECIFIED HEREIN, OR AS DIRECTED BY THE ENGINEER.
3. FILL SHALL CONSIST OF THE PLACEMENT OF SUITABLE MATERIALS IN DESIGNATED AREAS IN ACCORDANCE WITH THESE SPECIFICATIONS AND TO THE LINES AND GRADES SHOWN ON THE DRAWINGS, INCLUDING ROADWAY EMBANKMENTS.
4. SUBGRADE SHALL CONSIST OF THE PREPARATION OF THE TOP SURFACE OF THE GROUND TO ACCOMMODATE THE PLACEMENT OF PAVEMENTS, SLABS, STRUCTURES, SHOULDERS, CURBS, GUTTERS, ETC. IN ACCORDANCE WITH THESE SPECIFICATIONS AND TO THE LINES AND GRADES AS SHOWN ON THE DRAWINGS.
5. NO FROZEN OR EXCESSIVELY WET MATERIAL SHALL BE USED AS BACKFILL.
6. NO SLAG, FLY ASH OR BOTTOM ASH MATERIALS SHALL BE USED FOR BEDDING, BACKFILL OR FILL MATERIALS.

MATERIALS

7. BACKFILL MATERIAL SHALL BE SECURED FROM REQUIRED EXCAVATIONS OR BORROW AREAS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. BACKFILL MATERIAL SHALL BE FREE OF ASHES, ROCK OR GRAVEL NOT LARGER THAN 3" IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, BROKEN CONCRETE, ROOTS, BRUSH OR OTHER ORGANICS OR OTHER DELETERIOUS MATTER UNLESS DIRECTED OTHERWISE.
8. IT SHALL BE REASONABLY WELL GRADED FROM COARSE TO FINE. UNLESS OTHERWISE SPECIFIED, THE MATERIAL SHALL BE GRANULAR AND PERVIOUS IN NATURE. IF OBTAINED FROM REQUIRED EXCAVATION, THE MATERIAL MAY REQUIRE SORTING TO REMOVE OBJECTIONABLE MATERIAL AND MAY ALSO REQUIRE STOCKPILING FOR LATER USE. NO SEPARATE PAYMENT WILL BE MADE FOR SORTING OR STOCKPILING.
9. IF THE ENGINEER DETERMINES EXCAVATED MATERIAL CANNOT BE USED FOR BACKFILL, THEN HE SHALL DIRECT THE CONTRACTOR TO USE BORROWED BACKFILL MATERIAL. NO ADDITIONAL PAYMENT WILL BE MADE TO THE CONTRACTOR FOR BORROWED BACKFILL.
10. SUB-BASE MATERIAL SHALL BE A NATURALLY OR ARTIFICIALLY GRADED MIXTURE OF NATURAL OR CRUSHED GRAVEL, CRUSHED STONE, NATURAL OR CRUSHED SAND MEETING THE FOLLOWING REQUIREMENTS:
11. UNDER TRAIL: WASHED MATERIAL 100% PASSING A 1-1/2" SIEVE, 90-100% PASSING A 1" SIEVE; 25-60% PASSING A ½ SIEVE; 0-10% PASSING A #4 SIEVE, AND 0-5% PASSING A #8 SIEVE.
12. SUB-BASE MATERIAL DEPTH SHALL BE 4" MINIMUM UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN.

DISPOSAL OF EXCESS AND WASTE MATERIALS

1. EXCESS EXCAVATED MATERIAL, SUITABLE FOR USE AS FILL, SHALL BE PLACED TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR TO THE LIMITS OF SUCH MATERIAL AVAILABLE.
2. EXCESS EXCAVATED MATERIAL, UNACCEPTABLE EXCAVATED MATERIAL, TRASH, DEBRIS AND WASTE MATERIALS SHALL BE REMOVED FROM OWNER'S PROPERTY AND DISPOSED OF.

SITE PREPARATION- STONES PLACED IN CHANNEL

1. NO ROCK PLACEMENT SHALL OCCUR IN CHANNEL UNTIL APPROPRIATE WATER CONTROL MEASURES ARE IN PLACE (IF REQUIRED). CONTRACTOR SHALL PREPARE A DEWATERING PLAN TO BE APPROVED BY THE ENGINEER OR OWNER PRIOR TO COMMENCEMENT OF ANY DEWATERING ACTIVITIES.
2. STEPS SHALL BE EMPLOYED THROUGHOUT THE COURSE OF THE PROJECT TO AVOID THE CREATION OF EXCESSIVE TURBIDITY WHICH MAY DEGRADE WATER QUALITY OR ADVERSELY AFFECT AQUATIC LIFE.
3. STONE SHALL BE PLACED AS SHOWN ON THE DRAWINGS WITHOUT ANY GAPS, SO THAT EACH BOULDER TOUCHES THE NEXT ONE.
4. EACH STONE SHALL BE PLACED TO THE FINAL POSITION BY SUITABLE EQUIPMENT FOR HANDLING MATERIAL AND, IF NECESSARY; THE STONE SHALL BE PICKED UP AND REPOSITIONED.
5. IT SHOULD BE ANTICIPATED THAT RE-HANDLING OF INDIVIDUAL STONES, AFTER INITIAL PLACEMENT WILL BE REQUIRED TO ACHIEVE REQUIRED SLOPES, GRADES, ELEVATIONS AND POSITION.
6. THE ENGINEER SHALL OBSERVE AND APPROVE CONTRACTOR'S METHOD FOR STONE PLACEMENT IN A REPRESENTATIVE AREA FOR EACH PROJECT COMPONENT.

SITE PREPARATION-ROCKS PLACED IN STONE TERRACING

1. ALL ROCKS PLACED AS STONE TERRACING MUST BE PLACED WITH FLAT SIDE FACING UP AND BE CLEAN OF ALL SHARP PROTRUSIONS THAT COULD CREATE A SAFETY HAZARD.
2. EACH STONE SHALL BE PLACED TO THE FINAL POSITION BY SUITABLE EQUIPMENT FOR HANDLING MATERIAL AND, IF NECESSARY; THE STONE SHALL BE PICKED UP AND REPOSITIONED.
3. IT SHOULD BE ANTICIPATED THAT RE-HANDLING OF INDIVIDUAL STONES, AFTER INITIAL PLACEMENT WILL BE REQUIRED TO ACHIEVE REQUIRED SLOPES, GRADES, ELEVATIONS AND POSITION.
4. ALL PLACED ROCKS MUST BE KEYED IN A MINIMUM OF 6-INCHES IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS.
5. ALL PLACED STONES SHALL BE PLACED ON SUITABLE SUBGRADE APPROVED BY ENGINEER. IF UNSUITABLE SUBGRADE IS EXPERIENCED, CONTRACTOR MUST INCLUDE SUITABLE SUBGRADE MATERIAL SUCH AS ROAD BASE GRAVEL OR WASHED COBBLE AND BACKFILL WITH CLEAN NATIVE FILL AFTER STONE PLACEMENT.

CONCRETE MATERIALS

1. CONCRETE SHALL CONSIST OF PORTLAND CEMENT, SAND, AND GRAVEL, THOROUGHLY MIXED WITH WATER TO PRODUCE A THICK, CREAMY CONSISTENCY. THE MINIMUM AMOUNT OF WATER SHOULD BE USED TO PREVENT EXCESS SHRINKAGE OF THE CONCRETE AFTER PLACEMENT.
2. THE AGGREGATE, FOR CONCRETE, SHALL CONSIST OF 70 PERCENT SAND AND 30 PERCENT 3/8-INCH ROCK. MAXIMUM AGGREGATE SHALL BE 3/8 INCH.
3. ALL CONCRETE SHALL BE PRODUCED FROM TYPE II PORTLAND CEMENT WITH LESS THAN 5% TRICALCIUM ALUMINATE. CONCRETE SHALL HAVE MINIMUM CEMENT CONTENT OF 7 GALLONS PER SACK.
4. STRENGTH OF THE CONCRETE SHALL BE 3,000 PSI IN 28 DAYS. THE WATER CEMENT RATIO SHALL NOT EXCEED 0.48. A STIFFER MIX SHALL BE USED FOR STEEPER APPLICATIONS. AIR ENTRAINMENT SHALL BE USED FOR STEEPER APPLICATIONS. AIR ENTRAINMENT SHALL BE 6% TO 9%, AND SLUMP SHALL BE 5-INCHES TO 9-INCHES, EXCEPT AS APPROVED OR DIRECTED. AIR ENTRAINING AGENTS SHALL CONFORM TO ASTM C260 AND WATER REDUCING AGENTS SHALL CONFORM TO ASTM C494.
5. SUBGRADE, BASE MATERIAL, AND SURFACE COURSE IS TO BE COMPACTED TO 95% STANDARD PROCTOR WITH A MOISTURE CONTENT WITHIN 2% OF OPTIMAL PER ASTM D1558 AND AASHTO T180.

COLD WEATHER PLACEMENT

6. CONTRACTOR MUST FOLLOW RECOMMENDATIONS SET IN THE AMERICAN CONCRETE INSTITUTE COMMITTEE 306 (ACI 306R-88). WHEN PLACING CONCRETE AFTER THE FIRST FROST OR WHEN THE MEAN DAILY TEMPERATURES ARE BELOW 40° F.
7. HEAT AGGREGATES AND WATER IN ORDER TO PLACE FLOW FILL AT TEMPERATURES BETWEEN 50° F AND 80° F.
8. PLACING OF CONCRETE MAY BEGIN IN MORNING, BUT SHALL BE DISCONTINUED AT 3:00 PM OF SAME DAY IF FREEZING WEATHER THREATENS.
9. AFTER CONCRETE IS PLACED, PROVIDE SUFFICIENT PROTECTION SUCH AS COVER, CANVAS, FRAMEWORK, HEATING APPARATUS, ETC., TO ENCLOSE AND PROTECT FLOW FILL AND MAINTAIN TEMPERATURE OF 70° F FOR 3 DAYS OR 50° F FOR 5 DAYS AFTER PLACING.
10. IF FLAKING OR SPAWLING IS FOUND, THAT PORTION OF THE CONCRETE DID NOT APPROPRIATELY CURE AND WILL BE RE-DONE AT THE EXPENSE OF THE CONTRACTOR.
11. IF IN THE OPINION OF OWNER'S REPRESENTATIVE PROTECTION IS NOT ADEQUATE, CEASE PLACEMENT UNTIL CONDITIONS OR PROCEDURES ARE SATISFACTORY TO OWNER'S REPRESENTATIVE.

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