Purchasing Division

Invitation for Bid

IFB-4797-20-DH
Lunch Loop Trailhead Improvements

Responses Due:

May 28, 2020 prior to 3:30pm

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

Table of Contents

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 complete the project, which includes approximately 758 tons of hot mix asphalt underlain by 1,100 cubic yards of Class 6 aggregate base course for a left-turn lane in Monument Road, a new trailer parking area south of the existing parking lot, and other miscellaneous improvements at Lunch Loop Trailhead. This project also includes colored concrete sidewalk, curb and gutter, and ramps, a precast concrete block retaining wall, and a steel changing room enclosure to be constructed at the trailhead. All dimensions, scope of work, and schedule 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. **Recommended Site Visit Meeting:** **Prospective bidders are encouraged to attend a recommended site visit meeting on May 13, 2020 at 10:00am**. Meeting location shall be in the Lunch Loop Trail Head off of Monument Road, (South of Mariposa Drive) 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. **Procurement Process:** Procurement processes shall be governed by the most current version of the City of Grand Junction Purchasing Policy and Procedure Manual.

1.5. **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**)

1.6. **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.

1.7. **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.

1.8. **Exclusions:** No oral, telephonic, emailed, or facsimile bid will be considered

1.9. **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/ .

1.10. **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.

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

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

a. Examine the *Contract Documents* thoroughly;

b. Visit the site to familiarize themselves with local conditions that may in any manner affect cost, progress, or performance of the Work;

c. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the Work;

d. Study and carefully correlate Bidder's observations with the *Contract Documents*, and;

e. Notify the Purchasing Agent of all conflicts, errors, ambiguities or discrepancies in or among the *Contract Documents* within the designated inquiry period.

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

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

Information and data reflected in the *Contract Documents* with respect to underground utilities at or contiguous to the site are based upon information and data furnished to the Owner and the Engineer by the owners of such underground utilities or others, and the

Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the *Contract Documents*.

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

1.13. Questions Regarding Statement of Work: Any information relative to interpretation of Scope of Work or specifications shall be requested of the Purchasing Representative, in writing, in ample time, prior to the inquiry deadline.

1.14. 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.

1.15. Taxes: The Owner is exempt from State retail and Federal tax. The bid price must be net, exclusive of taxes.

1.16. 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.

1.17. 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.

1.18. Exceptions and Substitutions: Bidders taking exception to the specifications and/or scope of work shall do so at their own risk. The Owner reserves the right to accept or reject any or all substitutions or alternatives. When offering substitutions and/or alternatives, Bidder must state these exceptions in the section pertaining to that area. Exception/substitution, if accepted, must meet or exceed the stated intent and/or specifications and/or scope of work. The absence of such a list shall indicate that the Bidder has not taken exceptions, and if awarded a contract, shall hold the Bidder responsible to perform in strict accordance with the specifications and/or scope of work contained herein.

1.19. 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.

1.20. 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.

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

2. General Contract Conditions for Construction Projects

2.1. The Contract: This Invitation for Bid, submitted documents, and any negotiations, when properly accepted by the City, shall constitute a contract equally binding between the City and Contractor. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The contract may be amended or modified with Change Orders, Field Orders, or Addendums.

2.2. The Work: The term Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

2.3. Execution, Correlation, Intent, and Interpretations: The Contract Documents shall be signed by the Owner (City) and Contractor. City will provide the contract. By executing the contract, the Contractor represents that he/she has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents. The Contract Documents are complementary, and what is required by any one, shall be as binding as if required by all. The intention of the documents is to include all labor, materials, equipment and other items necessary for the proper execution and completion of the scope of work as defined in the

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

2.4. The Owner: The Owner is the City of Grand Junction, Colorado and is referred to throughout the Contract Documents. The term Owner means the Owner or his authorized representative. The Owner shall, at all times, have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access. The Owner will make periodic visits to the site to familiarize himself generally with the progress and quality of work and to determine, in general, if the work is proceeding in accordance with the contract documents. Based on such observations and the Contractor's Application for Payment, the Owner will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in the contract. The Owner will have authority to reject work which does not conform to the Contract documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, he will have authority to require the Contractor to stop the work or any portion, or to require special inspection or testing of the work, whether or not such work can be then be fabricated, installed, or completed. The Owner will not be responsible for the acts or omissions of the Contractor, and sub-Contractor, or any of their agents or employees, or any other persons performing any of the work.

2.5. Contractor: The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents. The term Contractor means the Contractor or his authorized representative. The Contractor shall carefully study and compare the General Contract Conditions of the Contract, Specification and Drawings, Scope of Work, Addenda and Modifications and shall at once report to the Owner any error, inconsistency or omission he may discover. Contractor shall not be liable to the Owner for any damage resulting from such errors, inconsistencies or omissions. The Contractor shall not commence work without clarifying Drawings, Specifications, or Interpretations.

2.6. Sub-Contractors: A sub-contractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term sub-contractor is referred to throughout the contract documents and means a sub-contractor or his authorized representative.

2.7. Award of Sub-Contractors & Other Contracts for Portions of the Work: Contractor shall submit with their bid response to the Owner, in writing for acceptance, a list of the names of the sub-contractors or other persons or organizations proposed for such portions of the work as may be designated in the proposal requirements, or, if none is so designated, the names of the sub-contractors proposed for the principal portions of the work. Prior to the award of the contract, the Owner shall notify the successful Contractor in writing if, after due investigation, has reasonable objection to any person or organization on such list. If, prior to the award of the contract, the Owner has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful Contractor may, prior to the award, withdraw their proposal without forfeiture of proposal security. If the successful Contractor submits an acceptable substitute with an

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

2.8. Quantities of Work and Unit Price: Materials or quantities stated as unit price items in the Bid are supplied only to give an indication of the general scope of the Work, and are as such, estimates only. The Owner does not expressly or by implication agree that the actual amount of Work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit item of the Work without a change in the unit price except as set forth in Article VIII, Section 70 of the *General Contract Conditions*. The City also reserves the right to make changes in the Work (including the right to delete any bid item in its entirety or add additional bid items) as set forth in Article VIII, Sections 69 through 71 of the *General Contract Conditions*.

2.9. Substitutions: The materials, products and equipment described in the *Solicitation Documents* shall be regarded as establishing a standard of required performance, function, dimension, appearance, or quality to be met by any proposed substitution. No substitution will be considered prior to receipt of Bids unless the Offeror submits a written request for approval to the City Purchasing Division at least ten (10) days prior to the date for receipt of Bids. Such requests for approval shall include the name of the material or equipment for which substitution is sought and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for evaluation, including samples if requested. The Offeror shall set forth changes in other materials, equipment, or other portions of the Work including changes of the work of other contracts, which incorporation of the proposed substitution would require to be included. The Owner's decision of approval or disapproval of a proposed substitution shall be final. If the Owner approves a proposed substitution before receipt of Bids, such approval will be set forth in an Addendum. Offerors shall not rely upon approvals made in any other manner.

2.10. Supervision and Construction Procedures: The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.

2.11. Warranty: The Contractor warrants to the Owner that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective. If required by Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If within ten (10) days after written notice to the Contractor requesting such repairs or replacement, the Contractor should neglect to make or undertake with due diligence to the same, the City may make such repairs or replacements. All indirect and direct costs of

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

2.12. Permits, Fees, & Notices: The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the work. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted by approximate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility and shall bear all costs attributable.

2.13. Responsibility for Those Performing the Work: The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all sub-contractors, their agents and employees, and all other persons performing any of the work under a contract with the Contractor.

2.14. Use of the Site: The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

2.15. Cleanup: The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of work he shall remove all his waste materials and rubbish from and about the project, as well as all his tools, construction equipment, machinery and surplus materials.

2.16. Insurance: The Contractor shall secure and maintain such insurance policies as will provide the coverage and contain other provisions specified in the General Contract Conditions, or as modified in the Special Contract Conditions.

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

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

2.18. Miscellaneous Conditions: Material Availability: Contractors must accept responsibility for verification of material availability, production schedules, and other pertinent data prior to submission of bid. It is the responsibility of the bidder to notify the Owner immediately if materials specified are discontinued, replaced, or not available for an extended period of time. **OSHA Standards:** All bidders agree and warrant that services performed in response to this invitation shall conform to the standards declared by the US Department of Labor under the Occupational Safety and Health Act of 1970 (OSHA). In the event the services do not conform to OSHA standards, the Owner may require the services to be redone at no additional expense to the Owner.

2.19. Time: Time is of the essence with respect to the time of completion of the Project and any other milestones or deadline which are part of the Contract. It will be necessary for each Bidder to satisfy the City of its ability to complete the Work within the Contract Time set forth in the Contract Documents. The Contract Time is the period of time allotted in the Contract Documents for completion of the work. The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein, or as established as entered on the Bid Form. The Date of Final Completion of the work is the date certified by the Owner when all construction, and all other work associated to include, but not be limited to: testing, QA/QC, receipt of required reports and/or forms, grant requirements (if applicable), punch list items, clean-up, receipt of drawings and/or as-builts, etc., is fully complete, and in accordance with the Contract Documents.

2.20. Progress & Completion: The Contractor shall begin work on the date of commencement as defined in the Contract, and shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.

2.21. Payment & Completion: The Contract Sum is stated in the Contract and is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents. Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of application for payment, the Owner's Project Manager will promptly make such inspection and, when he finds the work acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents.

2.22. Bid Bond: Each Bid shall as a guaranty of good faith on the part of the Bidder be accompanied by a Bid Guaranty consisting of: a certified or cashier's check drawn on an approved national bank or trust company in the state of Colorado, and made payable without condition to the City; or a **Bid Bond** written by an approved corporate surety in favor of the City. The amount of the Bid Guaranty shall not be less than 5% of the total Bid amount. Once a Bid is accepted and a 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 **$1000.00** is reasonable and necessary to pay for the actual damages resulting from such delay. The parties agree that the real costs and injury to the City for such delay include hard to quantify items such as: additional engineering, inspection and oversight by the City and its agents; additional contract

administration; inability to apply the efforts of those employees to the other work of the City; perceived inefficiency of the City; citizens having to deal with the construction and the Work, rather than having the benefit of a completed Work, on time; inconvenience to the public; loss of reputation and community standing for the City during times when such things are very important and very difficult to maintain.

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

If the Contractor shall fail to pay said liquidated damages promptly upon demand thereof after having failed to achieve Final Completion on time, the City shall first look to any retainage or other funds from which to pay said liquidated damages; if retainage or other liquid funds are not available to pay said liquidated damages amounts, the Surety on the Contractor's Performance Bond and Payment Bond shall pay such liquidated damages. In addition, the City may withhold all, or any part of, such liquidated damages from any payment otherwise due the Contractor.
Liquidated damages as provided do not include any sums to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the Contractor agrees to pay these costs that the City incurs because of the Contractor's delay, and these payments are separate from and in addition to any liquidated damages.

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

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

2.28. Protection of Persons & Property: The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing safeguards for safety and protection, and all reasonable precautions, including posting danger signs or other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct by the Contractor in the execution of the work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an acceptable manner.

2.29. Changes in the Work: The Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum and the contract time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be executed under the applicable conditions of the contract documents. A Change Order is a written order to the Contractor signed by the Owner issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by Change Order.

2.30. Claims for Additional Cost or Time: If the Contractor wishes to make a claim for an increase in the contract sum or an extension in the contract time, he shall give the Owner written notice thereof within a reasonable time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall precede in accordance with the regulations on safety. No such claim shall be valid unless so made. Any change in the contract sum or contract time resulting from such claim shall be authorized by Change Order.

2.31. Minor Changes in the Work: The Owner shall have authority to order minor changes in the work not involving an adjustment in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents.

2.32. Field Orders: The Owner may issue written Field Orders which interpret the Contract Documents in accordance with the specifications, or which order minor changes in the work in accordance with the agreement, without change in the contract sum or time. The Contractor shall carry out such Field Orders promptly.

2.33. Uncovering & Correction of Work: The Contractor shall promptly correct all work rejected by the Owner as defective or as failing to conform to the contract documents whether observed before or after substantial completion and whether or not fabricated installed or competed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Owner's additional services thereby made necessary. If within one (1) year after the date of completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the contract documents, any of the

work found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming work under the above paragraphs shall be removed from the site where necessary and the work shall be corrected to comply with the contract documents without cost to the Owner. The Contractor shall bear the cost of making good all work of separate Contractors destroyed or damaged by such removal or correction. If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the payment or contract sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.

2.30. Amendment: No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract shall be made in writing by the Owner.

2.31. Assignment: The Contractor shall not sell, assign, transfer or convey any contract resulting from this IFB, in whole or in part, without the prior written approval from the Owner.

2.32. Compliance with Laws: Bids must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements.

2.33. Confidentiality: All information disclosed by the Owner to the Contractor for the purpose of the work to be done or information that comes to the attention of the Contractor during the course of performing such work is to be kept strictly confidential.

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

2.35. Contract Termination: This contract shall remain in effect until any of the following occurs: (1) contract expires; (2) completion of services; (3) acceptance of services or, (4) for convenience terminated by either party with a written *Notice of Cancellation* stating therein the reasons for such cancellation and the effective date of cancellation.

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

2.36.1. The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, handicap, or national origin except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Contractor. The Contractor agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

2.36.2. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, shall state that such Contractor is an Equal Opportunity Employer.

2.36.3. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

2.37. Affirmative Action: In executing a Contract with the City, the Contractor agrees to comply with Affirmative Action and Equal Employment Opportunity regulations presented in the General Contract Conditions.

2.38. Immigration Reform and Control Act of 1986 and Immigration Compliance: The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986 and/or the immigration compliance requirements of State of Colorado C.R.S. § 8-17.5-101, *et.seq.* (House Bill 06-1343).

2.39. Ethics: The Contractor shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official, or agent of the Owner.

2.40. Failure to Deliver: In the event of failure of the Contractor to deliver services in accordance with the contract terms and conditions, the Owner, after due oral or written notice, may procure the services from other sources and hold the Contractor responsible for any costs resulting in additional purchase and administrative services. This remedy shall be in addition to any other remedies that the Owner may have.

2.41. Failure to Enforce: Failure by the Owner at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the Owner to enforce any provision at any time in accordance with its terms.

2.42. Force Majeure: The Contractor shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Contractor, unless otherwise specified in the contract.

2.43. Independent Contractor: The Contractor shall be legally considered an Independent Contractor and neither the Contractor nor its employees shall, under any circumstances, be considered servants or agents of the Owner. The Owner shall be at no time legally responsible for any negligence or other wrongdoing by the Contractor, its servants, or agents. The Owner shall not withhold from the contract payments to the Contractor any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Contractor. Further, the Owner shall not provide to the Contractor any insurance coverage or other benefits, including Workers' Compensation, normally provided by the Owner for its employees.

2.44. Nonconforming Terms and Conditions: A bid that includes terms and conditions that do not conform to the terms and conditions of this Invitation for Bid is subject to rejection as non-responsive. The Owner reserves the right to permit the Contractor to withdraw nonconforming terms and conditions from its bid prior to a determination by the Owner of non-responsiveness based on the submission of nonconforming terms and conditions.

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

a. Submission of the Bid on forms other than those supplied by the City;

b. Alteration, interlineation, erasure, or partial detachment of any part of the forms which are supplied herein;

c. Inclusion of unauthorized additions conditional or alternate Bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite, or ambiguous as to its meaning;

d. Failure to acknowledge receipt of any or all issued Addenda;

e. Failure to provide a unit price or a lump sum price, as appropriate, for each pay item listed except in the case of authorized alternative pay items;

f. Failure to list the names of Subcontractors used in the Bid preparation as may be required in the Solicitation Documents;

g. Submission of a Bid that, in the opinion of the Owner, is unbalanced so that each item does not reasonably carry its own proportion of cost or which contains inadequate or unreasonable prices for any item;

h. Tying of the Bid with any other bid or contract; and

i. Failure to calculate Bid prices as described herein.

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

- reject any and all Bids,
- waive any and all informalities,
- take into account any prompt payment discounts offered by Bidder,
- negotiate final terms with the Successful Bidder,
- take into consideration past performance of previous awards/contracts with the Owner of any Contractor, Vendor, Firm, Supplier, or Service Provider in determining final award. and
- disregard any and all nonconforming, nonresponsive or conditional Bids.

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

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

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

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

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

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

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

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

2.46. Award of Contract: Unless otherwise indicated, a single award will be made for all the bid items in an individual bid schedule. In the event that the Work is contained in more than one Bid Schedule, the City may award Schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative Schedules will be awarded. Within forty-five (45) Calendar Days of Bid Opening, the City will issue a Notice of Award to the Successful Bidder which will be accompanied by four (4) unsigned copies of the Contract and the Performance and Payment Bond forms. Within ten (10) Calendar Days

thereafter, the Successful Bidder shall sign and deliver four (4) copies of the Contract, Performance Bond, Payment Bond and Certificates of Insurance to the City. Within ten (10) Calendar Days thereafter, the City will deliver two (2) fully executed counterparts of the Contract to the Contractor. No contract shall exist between the Successful Bidder and the City and the Successful Bidder shall have no rights at law or in equity until the Contract has been duly executed by the City.

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

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

2.48. Oral Statements: No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in this document and/or resulting agreement. All modifications to this request and any agreement must be made in writing by the Owner.

2.49. Patents/Copyrights: The Contractor agrees to protect the Owner from any claims involving infringements of patents and/or copyrights. In no event shall the Owner be liable to the Contractor for any/all suits arising on the grounds of patent(s)/copyright(s) infringement. Patent/copyright infringement shall null and void any agreement resulting from response to this IFB.

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

2.51. Venue: Any agreement as a result of responding to this IFB shall be deemed to have been made in, and shall be construed and interpreted in accordance with, the laws of the City of Grand Junction, Mesa County, Colorado.

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

2.53. Sovereign Immunity: The Owner specifically reserves its right to sovereign immunity pursuant to Colorado State Law as a defense to any action arising in conjunction to this agreement.

2.54. Non-Appropriation of Funds: The contractual obligation of the Owner under this contract is contingent upon the availability of appropriated funds from this fiscal year budget as approved by the City Council or Board of County Commissioners from this fiscal year only. State of Colorado Statutes prohibit obligation of public funds beyond the fiscal year for which the budget was approved. Anticipated expenditures/obligations beyond the end of the current Owner's fiscal year budget shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.

2.55. Cooperative Purchasing: Purchases as a result of this solicitation are primarily for the City/County. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Bid. The quantities furnished in this bid document are for only the City/County. It does not include quantities for any other jurisdiction. The City or County will be responsible only for the award for its jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The City/County accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.

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

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

2.56.1. "Public project" is defined as:

(a) any construction, alteration, repair, demolition, or improvement of any land, building, structure, facility, road, highway, bridge, or other public improvement suitable for and intended for use in the promotion of the public health, welfare, or safety and any maintenance programs for the upkeep of such projects

(b) for which appropriate or expenditure of moneys may be reasonably expected to be $500,000.00 or more in the aggregate for any fiscal year

(c) except any project that receives federal moneys.

3. Statement of Work

3.1. GENERAL: The work request is for improvements to the Lunch Loop Trailhead for the City of Grand Junction. The improvements will include Aggregate Base Course, Colored Concrete Elements, Asphalt placement, and Striping.

3.2. PROJECT DESCRIPTION: The project includes approximately 758 tons of hot mix asphalt underlain by 1,100 cubic yards of Class 6 aggregate base course for a left-turn lane in

Monument Road, a new trailer parking area south of the existing parking lot, and other miscellaneous improvements at Lunch Loop Trailhead. This project also includes colored concrete sidewalk, curb and gutter, and ramps, a precast concrete block retaining wall, and a steel fence to be constructed at the trailhead. All dimensions, scope of work, and schedule should be verified by Contractors prior to submission of bids.

3.3. SPECIAL CONDITIONS & PROVISIONS:

3.3.1 Recommended Site Visit Meeting: **Prospective bidders are encouraged to attend a recommended site visit meeting on May 13, 2020 at 10:00am**. Meeting location shall be in the Lunch Loop Trail Head off of Monument Road, (South of Mariposa Drive) 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

3.3.2 Project Manager: The Project Manager for the Project is Kirsten Armbruster, Project Engineer, who can be reached at (970)244-1421. 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 - Engineering
Attn: Kirsten Armbruster, Project Manager
250 North Fifth Street
Grand Junction, CO 81501

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

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

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

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

Contractor must meet all federal, state, and local rules, regulations, and

requirements for providing such services.

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

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

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

3.3.7 Time of Completion: The scheduled time of Completion for the Project is **30 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.

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

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

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

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

None

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:

Mesa County Drainage Authority Construction Permit
CDPHE Construction Stormwater Permit
Work in the Right-of-Way Permit

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

- None

3.3.12 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.

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

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

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

3.3.16 Traffic Control: The 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.

3.3.17 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.

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

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

- Traffic Control Plans
- Project Schedule

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

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

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

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

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

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

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

- Sign removal

3.3.27 Existing Concrete Sidewalks, Pans, Fillets, Curbs and Gutters: The existing sidewalks, pans, fillets, curb and gutter are in good serviceable condition. In most instances the installation of new sidewalk and pavement will be adjacent to existing concrete. The Contractor will need to protect all concrete adjacent to construction. If the concrete is damaged during construction the Contractor will be responsible for its replacement at no cost to the City. The Contractor, the City Project Inspector, and/or the City Project Manager will walk and record any concrete that is deemed to be damaged before construction has started.

3.3.28 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:

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 601 – STRUCTURAL CONCRETE

Section 601 of the Standard Specifications is hereby revised for this project as follows:

Subsection 601.02, Classification:

CONCRETE SHALL MEET THE FOLLOWING REQUIREMENTS:

- 4,500 PSI Compressive at 28 Days
- 6% air ±1.5%
- Slump 4", Loads exceeding 4 ½" shall be rejected
- Maximum Water Cement Ratio no greater than 0.45.

Subsection 601.06, Batching:

This CDOT Specification has been added to this Project:

The Contractor shall furnish a batch ticket (delivery ticket) with each load for all concrete. Concrete delivered without a batch ticket containing complete information as specified shall be rejected. The Contractor shall collect and complete the batch ticket at the placement site and deliver all batch tickets to the Engineer or his representative at the end of each day. The Engineer or his representative shall have access to the batch tickets at any time during the placement. The following information shall be provided on each ticket:

1. Suppliers name and date
2. Truck number
3. Project name and location
4. Concrete class and designation number
5. Cubic yards batched
6. Type brand and amount of each admixture
7. Type, brand, and amount of cement and fly ash
8. Weights of fine and coarse aggregates
9. Moisture of fine and coarse aggregates
10. Gallons of batch water

The contractor shall add the following information to the batch ticket at time of placement:

1. Gallons of water added by the truck operator.
2. Number of revolutions of the drum for mixing
3. Discharge time

SP-2 SECTION 304 – AGGREGATE BASE COURSE

Section 304 of the Standard Specifications is hereby revised for this project as follows:

Subsection 304.01 shall include the following:

In areas of asphalt overlay where there is no curb and gutter and/or a drainage pan, the Contractor shall backfill the shoulder with Class-6 Aggregate Base Course immediately following the overlay. The shoulder shall have a slope of 12:1 or flatter and shall extend a maximum 4' from the edge of asphalt. The aggregate base course shall be brought level to the new pavement surface and compacted. An exception to this will be made in areas where shoulder material

would extend into existing yards or landscaping adjacent to the roadway. In these locations, it will be necessary to provide materials that match the existing landscape.

SP-3 SECTION 401 – PLANT MIX PAVEMENTS - GENERAL

REVISION OF SECTION 401
PLANT MIX PAVEMENTS

Section 401 if the Standard Specifications are hereby revised for this project as follows:

401.01 Description.

Add the following:

This work shall consist of providing a Hot Mix Asphalt (HMA) to be placed as shown on the plans, or as directed by the Owner. The Contractor shall be responsible for Process Control (PC) of the HMA; including the design, and control of the quality of the material incorporated into the project.

401.02 Composition of Mixtures.

Delete subparagraph (a) *Mix Design* and replace with the following:

A Job Mix Formula (JMF) design shall be submitted for each mixture required, at least 10 calendar days prior to placing any mix on the project, for acceptance by the Owner. JMF's previously approved by CDOT within the past six months may be utilized. The JMF design shall be determined using AASHTO T-312 or CP-L 5115 for the Method of Mixture Design. Grading ST, SX, and S shall be designed using 100mm molds. The job mix gradation shall be wholly within the Master Range Table in subsection 703.04 before the tolerances shown in Section 401 are applied.

Designs shall be developed and performed in a materials laboratory that meets the requirements set forth by AASHTO Materials Reference Laboratory (AMRL) for all testing procedures. The design shall be stamped and signed by a Professional Engineer licensed in the State of Colorado. In addition, the Contractor shall submit, as part of the mixture design, laboratory data documents to verify the following:

- Gradation, specific gravity, source and description of individual aggregate and properties, and the final blend.
- Aggregate physical properties.
- Source and Grade of the Performance Graded Binder.
- Proposed Design Job Mix: aggregate and additive blending, final gradation, optimum binder content.
- Mixing and compaction temperatures used.
- Mixture properties shall be determined with a minimum of four binder contents.

The JMF for each mixture shall establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to the aggregate, and a single temperature for the mixture at the discharge point of the plant.

The Owner reserves the right to verify the asphalt supplier's mix design for each JMF design utilizing materials produced and stockpiled. The asphalt supplier shall provide, at no cost, a sufficient quantity of each aggregate, mineral filler, Recycled Asphalt Pavement (RAP), and additive for the required laboratory tests, as well as all Certificates of Conformance/ Compliance at any time on any material used. The Asphalt Supplier shall provide copies of quality control testing results during the production of HMA used within one business day from the sampling date.

Mixture design of HMA shall meet the requirements of Table 403-1 and Table 403-2 in the Revision to Section 403. For mixes requiring a design gyration of 100 (ESALs greater than 3 million) the Project Special Conditions should be used. This gyration is not recommended for the majority of roads within Mesa County.

Delete subparagraph *(b) Mixtures Furnished to the Project* and replace with the following:

Production verification shall occur prior to, or during, the start of the project. Volumetric properties of the mix shall be verified by LabCAT Level C Certified Technicians. If the mix was produced for another project within the last 90 days, data from that project can be submitted for verification. All mixtures furnished for the project shall conform within the ranges of tolerance listed in Table 401.02A. The mix verification test reports shall be submitted to the Owner prior to mix placement.

TABLE 401.02A
Production Mix Tolerances

Property	Tolerance
Asphalt Cement Content	± 0.3%
VMA	± 1.2%
Air Voids	± 1.2%

Verification testing for binder content, gradation and physical properties shall be performed at the frequencies listed in Table 401.23-1.

There shall be no substitutions of materials allowed during production, unless approved in advance by the Owner. All substitutions will require checkpoint verification. If the checkpoint differs from the Job Mix Formula (JMF), a new mix design will be required. Upon request of the Owner, the binder grade may be changed by one available binder grade level without requiring a new mix design.

Should a change in the source of any material used in the production of HMA (aggregate, mineral filler, lime, or performance graded asphalt binder) occur, a one point verification test (at optimum binder content) of the mix must be performed to verify that the applicable criteria shown on Table 403-1 (HMA) and Table 403-2 (VMA) of Revision to Section 403 are still met. If this testing shows noncompliance, the Contractor shall establish a new job mix design and obtain approval by the Owner before the new HMA is used.

Add the following new subparagraphs:

(c) *Reclaimed Asphalt Pavement (RAP).* RAP shall be allowed in HMA up to a maximum binder replacement of 23 percent, unless otherwise specified in the contract, and provided that all the specifications for the HMA are met. Fine Aggregate Angularity requirements shall apply only to the virgin fraction of the fine aggregate. RAP shall be of uniform quality and gradation with a maximum size no greater than the nominal aggregate size of the mix. RAP shall not contain clay balls, vegetable matter, or other deleterious substances.

The Contractor shall have an approved mix design for the amount of RAP to be used. The AC content of the RAP utilized in the Contractor RAP mix design shall be the average AC content determined in accordance with 1B or 1C, below, or alternatively, a minimum of five samples of the Contractors RAP stockpile may be sampled and the average AC content of the RAP be determined using AASHTO T-164, Method A or B, or in accordance with 1C below. The Contractor shall determine the total binder replaced by the binder in the RAP pursuant to the following equation:

Total Binder Replaced = (A x B) x 100/E
Where:

A = RAP % Binder Content *
B = RAP % in Mix *
E = Total Effective Binder Content *
* in decimal format (i.e. 2% is 0.02)

The Total Binder Replaced by the binder in the RAP shall not exceed 23 percent of the effective binder content of either the mix design or the produced mix.
The Contractor shall have an approved Quality Control (QC) Plan that details how the RAP will be processed and controlled. The QC plan shall address the following:

1. RAP Processing Techniques. This requires a schematic diagram and narrative that explains the processing (crushing, screening, and rejecting) and stockpile operation for this specific project.

2. Control of RAP Asphalt Binder Content (AASHTO T-164, Method A or B). RAP Asphalt Binder Content may also be determined in accordance with CP-L 5120, provided an RAP AC content correction factor is determined through correlation testing with AASHTO T-164, Method A or B. The correction factor shall be determined by performing correlation testing on the first five samples of the RAP AC content, then at a frequency of one for every five AC content tests thereafter. The correction factor shall be determined by calculating the average difference in AC content between CP-L 5120 and AASHTO T-164, Method A or B, and applying the correction to the AC content determined in accordance with CP-L 5120 :
   Frequency: 1 per 1000 tons of processed RAP material (minimum five tests)

3. (Alternate) The Contractor may propose a RAP asphalt content correction factor to be used in conjunction with CP-L 5120. The proposed CP-L 5120 RAP asphalt content correction factor shall be used with all RAP asphalt contents tested for the mixture design and quality control sampling and testing. The methodology of the proposed CP-L 5120 RAP asphalt content correction factor shall be outlined in detail in the approved RAP QC Plan. At a minimum, the proposed CP-L 5120 correction factor shall identify the principal source locations of the RAP aggregate, gradation of the material tested, and specific ignition oven serial number used in all the RAP asphalt content testing. The RAP source locations, material gradation, and specific

equipment used shall substantiate the CP-L 5120 asphalt content correction factor used for the testing. The substantiation must be from data gathered from historical information or specific asphalt content correction data obtained from tests performed on similar virgin aggregate sources, virgin material gradations, and the specific equipment used.

4. Control of RAP Gradation (CP31 or AASHTO T-30):
   Frequency: 1 per1000 tons of processed RAP material (minimum three tests, sampling from belt feed and not stockpile).

5. Process Control Charts shall be maintained for binder content and each screen listed in Table 401.2C, during addition of any RAP material to the stockpile. The Contractor shall maintain separate control charts for each RAP stockpile. The control charts shall be displayed and shall be made available, along with RAP AC extraction testing laboratory reports to the Engineer upon request.

The processed RAP must be 100 percent passing the 31.5 mm (1¼ inch) sieve. The aggregate obtained from the processed RAP shall be 100 percent passing the 25.0 mm (1 inch) sieve. The aggregate and binder obtained from the processed RAP shall be uniform in all the measured parameters in accordance with the following:

Table 401.2C
RAP Binder & Aggregate Uniformity Tolerances

Element	StandardDeviation
Binder Content	0.5
% Passing ¾"	4.0
% Passing ½"	4.0
% Passing 3/8"	4.0
%Passing #4	4.0
% Passing #8	4.0
% Passing #30	3.0
% Passing #200	1.5

(d) *Warm Mix Asphalt (WMA) Technology.* The Contractor may choose to use a WMA Technology that is included on the CDOT approved products list (https://www.codot.gov/business/apl/asphalt-warm-mix.html).

WMA technologies (additive or foaming) used shall be identified on the mix design, indicating usage as a workability additive and/or anti-strip additive. WMA shall be submitted and approved by the Owner for use on a project.

The addition of WMA additives during production, including foaming, shall be controlled by a calibrated metering system interlocked with the plant's controls per the manufacturers' recommendation. Additives may be added at the asphalt terminal at the dosage rate recommended by the WMA technology provider. The foaming process mixes water and binder to create microscopic steam bubbles. Typical water injection rate is ≤ 2% of binder flow rate or per manufacturers' recommendation.

(e) *Anti-Strip Additives.* Anti-Strip shall be added into the HMA. Anti-Strip agents may be liquids (added to the binder), lime (added to the aggregates) or other products, and shall be submitted for approval by the Owner.

The minimum value for Tensile Strength Ratio (TSR) tested in accordance with Table 401.21-1 shall be 80% for the mix design and 70% during production.

There are various types of liquid Anti-Strips. Amine and Organo-silane type liquid Anti-Strip additives are physically mixed with the asphalt binder. Liquid Anti-Strip agents shall be added per the manufacture's recommendations. Typical product dosages are provided in Table 401.2E-1.

TABLE 401.2E-1
Liquid Anti-Strip Dosage Rates

Type	Typical Dosage Rate
Amine	0.4% to 0.8%
Organo-silane	0.05% to 0.15%

WMA chemical products which display Anti-Stripping characteristics will be classified, and identified on the mix design, as a liquid Anti-Strip additive.

When a liquid Anti-Strip additive is used, the Contractor shall include the following information with the mix design submission:

- Information on the type of liquid Anti-Strip additive to be supplied, including product name, product manufacturer/supplier
- Additive rate
- TSR values for the treated mixes
- The proposed method for incorporating the additive into the plant produced mix

401.03 Aggregates.

Add the following:

The percentage of fractured faces shall be as shown in Table 403.1 of the Revision to Section 403.

Grading ST (3/8" nominal) mixes may be used for leveling, maintenance, bike paths, sidewalks and thin lift overlays. Grading SX (1/2" nominal) mixes shall be used on top and bottom lifts and for patching. Grading S (3/4" nominal) mixes may be used for bottom lifts.

401.05 Hydrated Lime.

Add the following:

When used in the HMA, hydrated lime shall be added at the rate of 1% by dry weight of the aggregate and shall be included in the amount of material passing the No. 200 sieve.

401.06 Asphalt Cement.

Revise the second paragraph to read as follows:

The asphalt cement shall meet the applicable requirements of subsection 702.01.

Add the following:

The Contractor shall provide to the Owner acceptable 'Certifications of Compliance' of each applicable asphalt binder grade from the supplier. Should testing or certificate show nonconformance with the specifications, the asphalt binder may be rejected. When production begins, the Contractor shall, upon request, provide to the Owner a one quart can of each specified asphalt binder for analysis. Additionally, the Contractor shall provide the refinery test results that pertain to the asphalt binders used during production.

Based on climatic conditions and reliability, binder grades approved for use in Mesa County are as follows in Table 401.06A-1:

TABLE 401.06A-1
Recommended Performance Graded Binders

Condition	Non-modified Binder	Modified Binder
Free flowing traffic loads and 300,000 to 1 million 18K ESAL	PG 64-22	
Free flowing traffic loads and 300,000 to 1 million 18K ESAL, plus above 6000 elevation	PG 58-28	
Slow moving or standing trucks, major street intersections and/or 10,000,000 18K ESAL		PG 76-28 (top lift only)

Binder grades other than those shown above shall not be used unless the proposed binder and the mix design are approved in writing by the OWNER. The asphalt cement shall meet the requirements of subsection 702.01

401.07 Weather Limitations and Placement Temperatures.

Revise as follows:

Surface temperatures shall be used to determine placement of APM. APM produced with documented WMA will be allowed a reduction in minimum surface temperatures for placement as provided in Table 401.07A-1. Ambient temperatures and other weather conditions shall be considered prior to placement.

TABLE 401.07A-1
Minimum Surface Temperatures for placement of APM

Compacted Layer Thickness (in.)	Minimum Surface Temperature (ºF)			
	Top Layer		Layers Below the Top Layer	
Product	APM	with WMA	APM	with WMA
<1½	60	50	50	40
1½ - <3	50	45	40	35
3 or more	45	40	35	35

If the Contractor modifies the placement and compaction processes when ambient temperatures are below minimum surface temperatures in Table 401.07A-1, they shall demonstrate to the Owner the required in-place density has been achieved. APM cooling software such as PaveCool, or MultiCool can be used to determine placement and compaction times available.

401.08 Asphalt Mixing Plant.

Delete the last paragraph of the subsection.

401.09 Hauling Equipment.

Add the following:

The Owner may reject any HMA which demonstrates it has been contaminated from a petroleum distillate release agent. The Owner may reject any uncovered HMA which demonstrates it has been impacted by contamination and/or weather.

401.10 Asphalt Pavers.

Delete the twelve paragraph and replace with the following:

Contractor shall submit for and receive approval of the screed control devices to be utilized on the paver prior to use for placing HMA on the project.

Add the following:

A Material Transfer Vehicle (MTV) or Material Transfer Device (MTD) may be required for placement of the HMA when specified in the contract documents. The MTV shall be a self-propelled unit with on board storage of material. An MTD is a non-self-propelled unit. Both MTV and MTD are capable of receiving material from trucks or from the ground, transferring the material from the unit to a paver hopper insert via a conveyor system.

401.11 Tack Coat.

Delete and replace with the following:

A tack coat shall be applied between pavement course and to all existing concrete and asphalt surfaces per Section 407. Tack coat is considered incidental to the cost of the HMA.

401.15 Mixing.

Add the following:

If a WMA technology (additive or foaming) is used, the discharge temperatures may be lowered during production at the discretion of the Contractor provided all specifications are achieved. Mix design is to indicate revised allowable discharge temperatures with WMA usage.

401.16 Spreading and Finishing.

Revise as follows:

Joints in the top layer of new pavement shall be located on lane lines unless otherwise shown on the plans. Longitudinal joints shall be minimized with wide paving pulls. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. Tack coat material shall be applied to contact surfaces of all joints before additional mixture is placed against the previously compacted material.

401.17 Compaction.

Revise as follows:

Equipment used for compaction of the HMA will be at the discretion of the Contractor. The number, weight, and type of rollers furnished shall be sufficient to obtain the required density and surface texture.

All joints shall be compacted to 92% of maximum theoretical specific gravity (Rice), taken six inches offset from the joint. The allowable variance shall be ±2%. Joint density will be determined using nuclear density equipment.

Delete paragraphs six through eight, and paragraphs eleven to the end of the subsection and replace with the following:

Cores may be used to verify compaction results. The Contractor shall core the pavement, as required by the Owner**;** in accordance with AASHTO T 230, Method B, or for field calibration of nuclear density equipment in accordance with the ASTM D 2950. At a minimum, cores for nuclear density equipment correlation shall be taken at the beginning of placement of each project or change of mixture materials or gradation, unless otherwise approved by the Engineer. If the correlation cores were produced for another project within the last 90 days, data from that project can be submitted for verification, if no change in materials or gradation has occurred. When cores are used, the Contractor shall provide all labor and equipment for the coring and repair of the holes.

Along forms, curbs, headers, walls, and all other places not accessible to the rollers, the mixture shall meet all project compaction specifications. Any mixture that is defective, shall be corrected to meet the project specifications at the expense of the Contractor.

401.20 Surface Smoothness.

Delete and replace with the following:

The finish transverse and longitudinal surface elevation of the pavement shall be measured using a 10-foot straightedge. Surface smoothness shall be verified following the finish roller pass. Surface variation shall not exceed 3/16 inch in 10 feet for full lane width paving. For patching, the variation shall not exceed 3/8 inch in 10 feet. The final pavement surface shall not vary from the specified cross section by more than one inch at any point. Transverse measurements for variations shall exclude breaks in the crown sections. If the surface tolerance exceeds 3/16" across transverse joints, measured in at least three locations, the Contractor shall make corrections to the joint before proceeding. All corrections shall be made at the Contractor's expense.

The final surface pavement adjacent to curb and gutter shall be finished from 1/8-inch to 3/8- inches above the lip for catch curb and shall not extend above the lip for spill curb.

The Contractor shall adjust all manholes, valve boxes, and survey range boxes 1/8 to 1/4- inch below final grade and adjusted to match the slope of the roadway. Valve boxes and manholes are to be maintained fully accessible at all times for emergency and maintenance operations. The cost of adjusting valve boxes, manholes, and survey range boxes shall be included in the work, unless otherwise specified. The Contractor shall be responsible for any cost incurred by the Owner to provide access to the covered manholes or valve boxes. Final adjustment of all utility access points shall be completed within seven days of from the time the HMA was placed.

Add the following new subsections:

401.23 Testing and Inspection

The Contractor shall assume full responsibility for controlling all operations and processes to meet the Specifications. The Contractor shall perform all tests necessary for process control purposes on all elements at the frequency listed in Table 401.23-1. The Contractor shall maintain a log of all process control testing. Test results that have sampling or testing errors shall not be used. Process control testing shall be performed at the expense of the Contractor.

Laboratories shall be accredited by AASHTO Materials Reference Laboratory (AMRL) for the tests being performed. Technicians obtaining samples and conducting compaction tests must have a LabCAT Level A certification. Technicians conducting tests of asphalt content and gradation must have a LabCAT Level B certification. Technicians performing volumetric testing must have a LabCAT Level C certification. Equivalent NICET certification for all technicians is acceptable.

When requested by the Owner, the Contractor shall submit a quality control plan that addresses production, sampling, testing, and qualifications of testing personnel, timing, and methods for making adjustments to meet the specifications. The Contractor will provide a process or schedule for making corrections for material that was placed but does not meet specifications as well as obtain a follow up sample immediately after corrective actions are taken to assess the adequacy of the corrections. In the event the follow-up process control sample also fails to meet Specification requirements; the Contractor shall cease production of the asphalt mixture until the problem is adequately resolved to the satisfaction of the Owner.

TABLE 401.23-1
Minimum Materials Sampling and Testing for Process Control and Owners Acceptance

Test	Standard	Minimum Frequency
Sampling	AASHTO T168, ASTM D 979 and ASTM D3665, CP 41	1/1000 tons or fraction thereof (not less than one test per day)
In-Place Density	AASHTO T 166, T 238, T 230, CP 81 (nuclear), CP 44 (coring)	One test for each 250 lineal feet per lane and one test per 1,000 lineal feet of joint per lift
Thickness (Core) (when called for in Project specs.)	ASTM D3549	One test for each 1000 lineal feet per lane
Air Voids & VMA	CP-L 5115 A.I. SP-2	1/1000 tons or fraction thereof (not less than one test per day)
Gradation	AASHTO T 27/T 11, CP 31	1/1000 tons or fraction thereof (not less than one test per day)
Hveem/Marshall Stability As Applicable	CP-L 5016	One per project per mix used
Binder Content	CP-L 5120, AASHTO T 164 or other methods agreed upon between Owner and Contractor	1/1000 tons or fraction thereof (not less than one test per day)
Maximum Theoretical Specific Gravity (Rice)	AASHTO T 209 (Rice), CP-L 51	1/1000 tons or fraction thereof (not less than one test per day)
Lottman Stripping, TSR & Dry Density	CP-L 5109	One per project per mix used.

Field control testing of dense graded asphalt mixes for the above tests shall meet the requirements of Table 403-1 and Table 403-2 in the Revision to Section 403.

401.24 Acceptance

If any materials furnished, or work performed, fails to meet the specification requirements, such deficiencies shall be documented and reported to the Owner. Copies of all process control tests shall be delivered to the Owner within one business day. Test results that cannot be completed within one day shall be provided to the Owner no later than three days after the sample was obtained.

Owners Acceptance (OA) test results, if any, and/or Process Control (PC) test results will be evaluated to determine acceptability. If the Contractor does not meet the project specifications, but acceptable work has been produced, the Owner shall determine the extent of the work to be accepted. If the Owner determines

the work is not acceptable, the Contractor shall correct the work, as approved by the Owner, at the expense of the Contractor.

SP-4 SECTION 403 – HOT MIX ASPHALT

REVISION OF SECTION 403
HOT MIX ASPHALT

Section 403 of the Standard Specifications is hereby revised for this project as follows:

403.02 Materials

Delete and replace with the following:

The materials shall conform to the requirements of subsections 401.2 of the Revised Section 401 above.

The design mix for hot mix asphalt (HMA) shall conform to the following Table 403-1 and Table 403-2:

Table 403-1
Mixture Properties for Hot Mix Asphalt

Property	Test Method	Value
Air Voids, percent at: N (design)	AASHTO T-132, CPL 5115	3.0 – 4.0
Lab Compaction (Revolutions): N (design)	CPL 5115	75
Hveem Stability, (Grading ST, SX & S only)	CPL 5106	28 min.
Aggregate Retained on the 4.75 mm (No. 4) Sieve for S, SX and SG, and on the 2.36mm (No. 8) Sieve for ST and SF with at least 2 Mechanically Induced fractured faces	CP 45	60% min.
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman)(for S & SX mixes)	AASHTO T-283 Method B, CPL 5109 Method B	80 min.
Minimum Dry Split Tensile Strength, kPa (psi)	CPL 5109 Method B	205 (30) min.
Voids in the Mineral Aggregate (VMA) % minimum	CP 48, AI-SP2	See Table 403-2
Voids Filled with Asphalt (VFA)	AI MS-2	65-80%
Dust to Asphalt Ratio: Fine Gradation Coarse Gradation	CP 50	 0.6 – 1.2 0.8 – 1.6

Property	Test Method	Value
Note: AI MS-2 = Asphalt Institute Manual Series 2 Note: Mixes with gradations having less than 40% passing the 4.75 mm (No. 4) sieve shall be approached with caution because of constructability problems. Note: Gradations for mixes with a nominal maximum aggregate size of one-inch or larger are considered a coarse gradation if they pass below the maximum density line at the #4 screen. Gradations for mixes with a nominal maximum aggregate size of 3/4" to 3/8" are considered a coarse gradation if they pass below the maximum density line at the #8 screen. Gradations for mixes with a nominal maximum aggregate size of #4 or smaller are considered a coarse gradation if they pass below the maximum density line at the #16 screen.		

Table 403-2
Minimum Voids in Mineral Aggregate (VMA)

Nominal Maximum Size*, mm (inches)	3.5%	***Design Air Voids **	
		4.0%	4.5%
37.5 (1½)	11.6	11.7	11.8
25.0 (1)	12.6	12.7	12.8
19.0 (¾)	13.6	13.7	13.8
12.5 (½)	14.6	14.7	14.8
9.5 (⅜)	15.6	15.7	15.8
4.75 (No. 4)	16.6	16.7	16.8

* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%.
** Interpolate specified VMA values for design air voids between those listed.
*** Extrapolate specified VMA values for production air voids beyond those listed.

403.03 Construction Requirements

Delete the first paragraph and replace with the following:

The construction requirements shall be as prescribed in subsections 401.3 through 401.14 of the Revised Section 401 above.

403.04 Method of Measurement

Delete and replace with the following:

Hot Mix Asphalt will be measured by the ton or the square yard. Batch weights will not be permitted as a method of measurement when measured by the ton. The tonnage shall be the weight used in the accepted pavement.

403.05 Basis of Payment

Delete and replace with the following:

The accepted quantities of hot mix asphalt will be paid for in accordance with subsection 401.22, at the contract unit price per ton or square yard for the asphalt mixture.

Payment will be made under:

Pay Item	**Pay Unit**
Hot Mix Asphalt (Grading __)(PG___)	Ton
Hot Mix Asphalt (Grading __)(PG ___)	Square Yard
Hot Mix Asphalt (Patching)	Square Yard

Aggregate, asphalt cement, asphalt recycling agent, additives, hydrated lime, tack coat, and all other work necessary to complete each hot mix asphalt items will not be paid for separately but shall be included in the unit price bid.

Excavation, preparation, and tack coat of areas to be patched will not be measured and paid for separately, but shall be included in the work.

SP-5 SECTION 407 – PRIME COAT, TACK COAT, AND REJUVINATING AGENT

REVISIONS OF SECTION 407
PRIME COAT, TACK COAT, AND REJUVENATING AGENT

Section 407 of the Standard Specifications is hereby revised for this project as follows:

407.01 Description

Add the following:

Prior to placement of APM, a tack coat shall be applied to all existing concrete and asphalt surfaces.

407.02 Asphalt Material.

Add the following:

The tack coat shall meet the specification for emulsified asphalt, consisting of CSS-1h or SS-1h, and conform to AASHTO M208 or M140.

407.07 Application of Asphalt Material.

Add the following:

The tack coat shall be applied at the rates specified in Table 407-1. The surface receiving the tack coat shall be dry and clean, and dust, debris, and foreign matter shall be removed. Tack coat shall be applied uniformly. The Contractor shall allow the tack coat to cure (dehydrate) prior to the placement of APM. If the tack becomes contaminated during construction, it shall be cleaned, and if necessary, additional tack coat shall be reapplied and allowed to cure before paving resumes.

TABLE 407-1
Tack Coat Application Rates

Pavement Condition	Application Rate (gal/yd^2)		
	Residual	Undiluted	Diluted (1:1)
New asphalt	0.03 - 0.04	0.05 – 0.07	0.10 – 0.13
Oxidized asphalt	0.04 – 0.06	0.07 – 0.10	0.13 – 0.20
Milled Surface (asphalt)	0.06 – 0.08	0.10 – 0.13	0.20 – 0.30
Milled Surface (PCC)	0.06 – 0.08	0.10 – 0.13	0.20 – 0.30
Portland Cement Concrete	0.04 – 0.06	0.07 – 0.10	0.13 – 0.20

407.09 Method of Measurement and Basis of Payment.

Delete and replace the following:

Tack Coat will not be measured and paid separately but shall be considered included in the work for Section 401 – Asphalt Pavement Materials.

SP-6 SECTION 504 – CRIBBING

REVISIONS OF SECTION 504
CRIBBING

Section 504 of the Standard Specifications is hereby revised for this project as follows:

504.01 Description

Add the following:

The work shall consist of furnishing materials, labor, equipment and supervision for the construction of a precast modular block (PMB) retaining wall structure in accordance with the requirements of this section and in acceptable conformity with the lines, grades, design and dimensions shown in the project site plans.

504.02 Materials

Add the following:

The precast modular blocks shall be Redi-Rock units manufactured under license from Redi-Rock International, and meet the following requirements:

a) All units shall be wet-cast precast modular retaining wall units conforming to ASTM C1776.

b) All units for the project shall be obtained from the same manufacturer. The manufacturer shall be licensed and authorized to produce the retaining wall units by the precast modular block system patent holder/licensor and shall document compliance with the published quality control standards of the proprietary precast

modular block system licensor for the previous three (3) years, or the total time the manufacturer has been licensed, whichever is less.

c) Concrete used in the production of the precast modular block units shall be first-purpose, fresh concrete. It shall not consist of returned, reconstituted, surplus or waste concrete. It shall be an original production mix meeting the requirements of ASTM C94 and exhibit the properties as shown in the following table:

TABLE 504-1 Concrete Mix Properties

Freeze Thaw Exposure Class[1]	Minimum 28-Day Compressive Strength[2]	Maximum Water Cement Ratio	Nominal Maximum Aggregate Size	Aggregate Class Designation[3]	Air Content[4]
Moderate	4,000 psi (27.6 MPa)	0.45	1 inch (25 mm)	3M	4.5% +/- 1.5%
Severe	4,000 psi (27.6 MPa)	0.45	1 inch (25 mm)	3S	6.0% +/- 1.5%
Very Severe	4,500 psi (30.0 MPa)	0.40	1 inch (25 mm)	4S	6.0% +/- 1.5%
Maximum Water-Soluble Chloride Ion (Cl^-) Content in Concrete, Percent by Weight of Cement[5,6]					0.15
Maximum Chloride as Cl^- Concentration in Mixing Water, Parts Per Million					1000
Maximum Percentage of Total Cementitious Materials By Weight [7,9] (Very Severe Exposure Class Only):					
Fly Ash or Other Pozzolans Conforming to ASTM C618					25
Slag Conforming to ASTM C989					50
Silica Fume Conforming to ASTM C1240					10
Total of Fly Ash or Other Pozzolans, Slag, and Silica Fume[8]					50
Total of Fly Ash or Other Pozzolans and Silica Fume[8]					35
Alkali-Aggregate Reactivity Mitigation per ACI 201					
Slump (Conventional Concrete) per ASTM C143[10]			5 inches +/- 1½ inches (125 mm +/- 40 mm)		
Slump Flow (Self-Consolidating Concrete) per ASTM C1611			18 inches – 32 inches (450 mm – 800 mm)		

[1]Exposure class is as described in ACI 318. "Moderate" describes concrete that is exposed to freezing and thawing cycles and occasional exposure to moisture. "Severe" describes concrete that is exposed to freezing and thawing cycles and in continuous contact with moisture. "Very Severe" describes concrete that is exposed to freezing and thawing cycles and in continuous contact with moisture and exposed to deicing chemicals. Exposure class should be specified by owner/purchaser prior to order placement.

[2]Test method ASTM C39.

[3]Defined in ASTM C33 Table 3 *Limits for Deleterious Substances and Physical Property Requirements of Coarse Aggregates for Concrete*.

[4]Test method ASTM C231.

[5]Test method ASTM C1218 at age between 28 and 42 days.

[6]Where used in high sulfate environments or where alkali-silica reactivity is an issue, water soluble chloride shall be limited to no more than trace amounts (from impurities in concrete-making components, not intended constituents.)

[7]The total cementitious material also includes ASTM C150, C595, C845, C1157 cement. The maximum percentages shall include:

(a) Fly ash or other pozzolans in type IP, blended cement, ASTM C595, or ASTM C1157.
(b) Slag used in the manufacture of an IS blended cement, ASTM C595, or ASTM C1157.
(c) Silica fume, ASTM C1240, present in a blended cement.

[8]Fly ash or other pozzolans and silica fume shall constitute no more than 25 and 10 percent, respectively, of the total weight of the cementitious materials.

[9]Prescriptive limits shown may be waived for concrete mixes that demonstrate excellent freeze/thaw durability in a detailed and current testing program.

[10]Slump may be increased by a high-range water-reducing admixture.

d) Each concrete block shall be cast in a single continuous pour without cold joints. With the exception of half-block units, corner units and other special application units, the precast modular block units shall conform to the nominal dimensions listed in the table below and be produced to the dimensional tolerances shown.

TABLE 504-2 Block Tolerances

Block Type	Dimension	Nominal Value	Tolerance
28" (710 mm) Block	Height	18" (457 mm)	+/- 3/16" (5 mm)
	Length	46-1/8" (1172 mm)	+/- 1/2" (13 mm)
	Width*	28" (710 mm)	+/- 1/2" (13 mm)
41" (1030 mm) Block	Height	18" (457 mm)	+/- 3/16" (5 mm)
	Length	46-1/8" (1172 mm)	+/- 1/2" (13 mm)
	Width*	40-1/2" (1030 mm)	+/- 1/2" (13 mm)
60" (1520 mm) Block	Height	18" (457 mm)	+/- 3/16" (5 mm)
	Length	46-1/8" (1172 mm)	+/- 1/2" (13 mm)
	Width*	60" (1520 mm)	+/- 1/2" (13 mm)

* Block tolerance measurements shall exclude variable face texture

e) Individual block units shall have a nominal height of 18 inches (457 mm).

f) With the exception of half-block units, corner units and other special application units, the precast modular block units shall have two (2), circular dome shear knobs that are 10 inches (254 mm), 7.5 inches (190 mm), or 6.75 inches (171 mm) in diameter and 4 inches (102 mm) or 2 inches (51 mm) in height. The shear knobs shall fully index into a continuous semi-cylindrical shear channel in the bottom of the block course above. The peak interlock shear between any two (2) vertically stacked precast modular block units, with 10 inch (254 mm) diameter shear knobs, measured in accordance with ASTM D6916 shall exceed 6,500 lb/ft (95 kN/m) at a minimum normal load of 500 lb/ft (7kN/m). as well as an ultimate peak interface shear capacity in excess of 11,000 lb/ft (160 kN/m). The peak interlock shear between any two (2) vertically stacked precast modular block units, with 7.5 inch (190 mm) or 6.75 inch (171 mm) diameter shear knobs, measured in accordance with ASTM D6916 shall exceed 1,850 lb/ft (27 kN/m) at a minimum normal load of 500 lb/ft (7kN/m) as well as an ultimate peak interface shear capacity in excess of 10,000 lb/ft (146 kN/m).Test specimen blocks tested under ASTM D6916 shall be actual, full-scale production blocks of known compressive strength. The interface shear capacity reported shall be corrected for a 4,000 psi (27.6 MPa) concrete compressive strength. Regardless of precast modular block configuration, interface shear testing shall be completed without the inclusion of unit core infill aggregate.

g) The 28" (710 mm) and 41" (1030 mm) precast modular block units may be cast with a 13" (330 mm) wide, continuous vertical core slot completely through the block, or solid concrete.

h) Without field cutting or special modification, the precast modular block units shall be capable of achieving a minimum radius of 14 ft 6 in (4.42 m).

i) The precast modular block units shall be manufactured with an integrally cast shear knobs that establishes a standard horizontal set-back for subsequent block courses. The precast modular block system shall be available in the four (4) standard horizontal set-back facing batter options listed below:

Horizontal Set-Back/Blk. Course	Max. Facing Batter
3/8" (10 mm)	1.2˚
1-5/8" (41 mm)	5.2˚
9-3/8" (238 mm)	27.5˚
16-5/8" (422 mm)	42.7˚

The precast modular block units shall be furnished with the required shear knobs that provide the facing batter required in the construction shop drawings.

j) The precast modular block unit face texture shall be selected by the owner from the available range of textures available from the precast modular block manufacturer. Each textured block facing unit shall be a minimum of 5.76 square feet (0.54 square meters) with a unique texture pattern that repeats with a maximum frequency of once in any 15 square feet (1.4 square meters) of wallface.

k) The block color shall be selected by the owner from the available range of colors available from the precast modular block manufacturer.

l) All precast modular block units shall be sound and free of cracks or other defects that would interfere with the proper installation of the unit, impair the strength or performance of the constructed wall. PMB units to be used in exposed wall construction shall not exhibit chips or cracks in the exposed face or faces of the unit that are not otherwise permitted. Chips smaller than 1.5" (38 mm) in its largest dimension and cracks not wider than 0.012" (0.3 mm) and not longer than 25% of the nominal height of the PMB unit shall be permitted. PMB units with bug holes in the exposed architectural face smaller than 0.75" (19 mm) in its largest dimension shall be permitted. Bug holes, water marks, and color variation on non-architectural faces are acceptable. PMB units that exhibit cracks that are continuous through any solid element of the PMB unit shall not be incorporated in the work regardless of the width or length of the crack.

m) Preapproved Manufacturers.

Manufacturers of Redi-Rock Retaining Wall Systems as licensed by Redi-Rock International, LLC, 05481 US 31 South, Charlevoix, MI 49720 USA; telephone (866) 222-8400; website www.redi-rock.com.

n) Substitutions. Technical information demonstrating conformance with the requirements of this specification for an alternative precast modular block retaining wall system must be submitted for preapproval at least 14 calendar days prior to the bid date. Acceptable alternative PMB retaining wall systems, otherwise found to be in conformance with this specification, shall be approved in writing by the owner 7 days prior to the bid date. The Owner's Representative reserves the right to provide no response to submissions made out of the time requirements of this section or to submissions of block retaining wall systems that are determined to be unacceptable to theowner.

o) Value Engineering Alternatives. The owner may evaluate and accept systems that meet the requirements of this specification after the bid date that provide a minimum cost savings of 20% to the Owner. Construction expediency will not be considered as a contributing portion of the cost savings total.

The precast modular block units shall be placed on a leveling pad constructed from crushed stone or unreinforced concrete. The leveling pad shall be constructed to the dimensions and limits shown on the retaining wall design drawings prepared by the Retaining Wall Design Engineer.

a) Crushed stone used for construction of a granular leveling pad shall meet the requirements of the drainage aggregate and wall infill in section 206 or a preapproved alternate material.

b) Concrete used for construction of an unreinforced concrete leveling pad shall satisfy the criteria for AASHTO Class B. The concrete should be cured a minimum of 12 hours prior to placement of the precast modular block wall retaining units and exhibit a minimum 28-day compressive strength of 2,500 psi (17.2 MPa).

The Drainage collection pipe shall be a 4" (100 mm) diameter, 3-hole perforated, HDPE pipe with a minimum pipe stiffness of 22 psi (152 kPa) per ASTM D2412. The drainage pipe shall be manufactured in accordance with ASTM D1248 for HDPE pipeand fittings.

504.03 Construction Requirements

Add the following:

Prior to construction, the General Contractor, Grading Contractor, Retaining Wall Installation Contractor and Inspection Engineer shall examine the areas in which the retaining wall will be constructed to evaluate compliance with the requirements for installation tolerances, worker safety and any site conditions affecting performance of the completed structure. Installation shall proceed only after unsatisfactory conditions have been corrected.

A. PREPARATION

1) Fill Soil.
   a. The Inspection Engineer shall verify that retained backfill material placed within a horizontal distance of one (1.0) times the wall height behind the wall blocks satisfies the criteria of this section.
   b. The Inspection Engineer shall verify that any fill soil installed in the foundation and retained soil zones of the retaining wall satisfies the specification of the Retaining Wall Design Engineer as shown on the construction drawings.

2) Excavation.
   a. The Grading Contractor shall excavate to the lines and grades required for construction of the precast modular block retaining wall as shown on the construction drawings. The Grading Contractor shall minimize over-excavation. Excavation support, if required, shall be the responsibility of the Grading Contractor.
   b. Over-excavated soil shall be replaced with compacted fill in conformance with the specifications of the Retaining Wall Design Engineer and "Division 31, Section 31 20 00 – Earthmoving" of these project specifications.
   c. Embankment excavations shall be bench cut as directed by the project GeotechnicalEngineer and inspected by the Inspection Engineer for compliance.

3) Foundation Preparation.
   a. Prior to construction of the precast modular block retaining wall, the leveling pad area and undercut zone (if applicable) shall be cleared and grubbed. All topsoil, brush, frozen soil and organic material shall be removed. Additional foundation soils found to beunsatisfactory beyond the specified undercut limits shall be undercut and replaced with approved fill as directed by the project Geotechnical Engineer. The Inspection Engineer shall ensure that the undercut limits are consistent with the requirements of the project Geotechnical Engineer and that all soil fill material is properly compacted according project specifications. The Inspection Engineer shall document the volume of undercut and replacement.
   b. Following excavation for the leveling pad and undercut zone (if applicable), theInspection Engineer shall evaluate the in-situ soil in the foundation and retained soil zones.
      I. The Inspection Engineer shall verify that the shear strength of the in-situ soil assumed by

the Retaining Wall Design Engineer is appropriate. The Inspection Engineer shall immediately stop work and notify the Owner if the in-situ shear strength is found to be inconsistent with the retaining wall design assumptions.

II. The Inspection Engineer shall verify that the foundation soil exhibits sufficient ultimate bearing capacity to satisfy the requirements indicated on the retaining wall construction shop drawings per paragraph 1.06 I of this section.

4) Leveling Pad.
   a. The leveling pad shall be constructed to provide a level, hard surface on which to place the first course of precast modular block units. The leveling pad shall be placed in the dimensions shown on the retaining wall construction drawings and extend to the limits indicated.

   b. Crushed Stone Leveling Pad. Crushed stone shall be placed in uniform maximum lifts of 6" (150 mm). The crushed stone shall be compacted by a minimum of 3 passes of a vibratory compactor capable of exerting 2,000 lb (8.9 kN) of centrifugal force and to the satisfaction of the Inspection Engineer.

   c. Unreinforced Concrete Leveling Pad. The concrete shall be placed in the same dimensions as those required for the crushed stone leveling pad. The Retaining Wall Installation Contractor shall erect proper forms as required to ensure the accurate placement of the concrete leveling pad according to the retaining wall construction drawings.

B. PRECAST MODULAR BLOCK WALL SYSTEM INSTALLATION

1) The precast modular block structure shall be constructed in accordance with the construction drawings, these specifications and the recommendations of the retaining wall system component manufacturers. Where conflicts exist between the manufacturer's recommendations and these specifications, these specifications shall prevail.

2) Drainage components. Pipe, geotextile and drainage aggregate shall be installed as shown on the construction shop drawings.

3) Precast Modular Block Installation
   a. The first course of block units shall be placed with the front face edges tightly abutted together on adjacent blocks, on the prepared leveling pad at the locations and elevations shown on the construction drawings. The Retaining Wall Installation Contractor shall take special care to ensure that the bottom course of block units are in full contact with the leveling pad, are set level and true and are properly aligned according to the locations shown on the construction drawings.

   b. Backfill shall be placed in front of the bottom course of blocks prior to placement of subsequent block courses. Nonwoven geotextile fabric shall be placed in the V-shaped joints between adjacent blocks. Drainage aggregate shall be placed in the V-shaped joints between adjacent blocks, and extend to a minimum distance of 12" (300 mm) behind the block unit.

   c. Drainage aggregate shall be placed in 9 inch maximum lifts and compacted by a minimum of three (3) passes of a vibratory plate compactor capable exerting a minimum of 2,000 lb (8.9 kN) of centrifugal force.

   d. Unit core fill shall be placed in the precast modular block unit vertical core slot. The core fill shall completely fill the slot to the level of the top of the block unit. The top of the block unit shall be broom-cleaned prior to placement of subsequent block courses. No additional courses of precast modular blocks may be stacked before the unit core fill is installed in the blocks on the course below.

e. Base course blocks for gravity wall designs (without geosynthetic soil reinforcement) may be furnished without vertical core slots. If so, disregard item 4 above, for the base course blocks in this application.

f. Nonwoven geotextile fabric shall be placed between the drainage aggregate and theretained soil (gravity wall design) if required on the retaining wall construction drawings.

g. Subsequent courses of block units shall be installed with a running bond (half block horizontal course-to-course offset). With the exception of 90 degree corner units, the shear channel of the upper block shall be fully engaged with the shear knobs of the block course below. The upper block course shall be pushed forward to fully engage the interface shear key between the blocks and to ensure consistent face batter and wall alignment. Drainage aggregate, unit core fill, geotextile and properly compacted backfill shall be complete and in-place for each course of block units before the next course of blocks is stacked.

h. The elevation of retained soil fill shall not be less than 1 block course (18" (457 mm)) belowthe elevation of the retained backfill throughout the construction of the retaining wall.

i. If included as part of the precast modular block wall design, cap units shall be secured withan adhesive in accordance with the precast modular block manufacturer's recommendation.

4) Construction Tolerance. Allowable construction tolerance of the retaining wall shall be as follows:

a. Deviation from the design batter and horizontal alignment, when measured along a 10' (3m) straight wall section, shall not exceed 3/4" (19 mm).

b. Deviation from the overall design batter shall not exceed 1/2" (13 mm) per 10' (3 m)of wall height.

c. The maximum allowable offset (horizontal bulge) of the face in any precast modular block joint shall be 1/2" (13 mm).

d. The base of the precast modular block wall excavation shall be within 2" (50 mm) of the staked elevations, unless otherwise approved by the Inspection Engineer.

e. Differential vertical settlement of the face shall not exceed 1' (300 mm) along any 200' (61 m) of wall length.

f. The maximum allowable vertical displacement of the face in anyprecast modular block joint shall be 1/2" (13 mm).

g. The wall face shall be placed within 2" (50 mm) of the horizontal location staked.

C. WALL INFILL AND BACKFILL PLACEMENT

1) Backfill material placed immediately behind the drainage aggregate shall be compacted as follows:
   a. 98% of maximum dry density at ± 2% optimum moisture content per ASTM D698 standard proctor or 85% relative density per ASTM D4254.

2) Compactive effort within 3' (0.9 m) of the back of the precast modular blocks should be accomplished with walk-behind compactors. Compaction in this zone shall be within 95% of maximum dry density as measured in accordance with ASTM D698 standard proctor or 80% relative density per ASTM D 4254. Heavy equipment should not be operated within 3' (0.9 m) of the back of the precast modular blocks.

3) Backfill material shall be installed in lifts that do not exceed a compacted thickness of 9" (230 mm).

4) At the end of each work day, the Retaining Wall Installation Contractor shall grade the surface of the

last lift of the granular wall infill to a 3% ± 1% slope away from the precast modular block wall face and compact it.

5) The General Contractor shall direct the Grading Contractor to protect the precast modular block wall structure against surface water runoff at all times through the use of berms, diversion ditches, silt fence, temporary drains and/or any other necessary measures to prevent soil staining of the wall face, scour of the retaining wall foundation or erosion of the reinforced backfill or wall infill.

D. OBSTRUCTIONS IN THE INFILL ZONE

1) The Retaining Wall Installation Contractor shall make all required allowances for obstructions behind and through the wall face in accordance with the approved construction shopdrawings.

2) Should unplanned obstructions become apparent for which the approved construction shop drawings do not account, the affected portion of the wall shall not be constructed until the Retaining Wall Design Engineer can appropriately address the required procedures for construction of the wall section in question.

E. COMPLETION

1) For walls supporting unpaved areas, a minimum of 12” (300 mm) of compacted, low-permeability fill shall be placed over the granular wall infill zone of the precast modular block retaining wall structure. The adjacent retained soil shall be graded to prevent ponding of water behind the completed retaining wall.

2) For retaining walls with crest slopes of 5H:1V or steeper, silt fence shall be installed along the wall crest immediately following construction. The silt fence shall be located 3’ to 4’ (0.9 m to 1.2 m) behind the uppermost precast modular block unit. The crest slope above the wall shall be immediately seeded to establish vegetation. The General Contractor shall ensure that the seeded slope receives adequate irrigation and erosion protection to support germination and growth.

3) The General Contractor shall confirm that the as-built precast modular block wall geometries conform to the requirements of this section. The General Contractor shall notify the Owner of any deviations.

504.04 Method of Measurement

Add the following:

Precast concrete block walls will be measured by the number of square feet of facial area

504.05 Basis of Payment

Add the following:

Payment will be made under:

Pay Item	**Pay Unit**
Precast Concrete Block Retaining Wall System	Facial Square Foot

3.5. Attachments:

Appendix A: Project Submittal Form
Appendix B: Geotechnical Report
Appendix C: 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	April 28, 2020
Recommended Site Visit Meeting	May 13, 2020
Inquiry deadline, no questions after this date	May 20, 2020
Addendum Posted	May 21, 2020
Submittal deadline for proposals	May 28, 020
City Council Approval	June 17, 2020
Notice of Award & Contract execution	June 18, 2020
Bonding & Insurance Cert due	June 29, 2020
Preconstruction meeting	June 29, 2020
Work begins no later than	Upon Receipt of Notice to Proceed
Final Completion	30 Calendar Days from Notice to Proceed
Holidays:	July 3-4, 2020

4. Contractor's Bid Form

Bid Date: _____

Project: IFB-4797-20-DH "Lunch Loop Trailhead Improvements"

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. The Owner reserves the right to take into account any such discounts when determining the bid award.

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: Lunch Loop Trailhead Improvements

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	108.2	18" STORM DRAIN PIPE (RCP)	78.	LF	$ _____	$ _____
2	108.6	SINGLE STORM DRAIN INLET (VERTICAL CURB)	2.	EA	$ _____	$ _____
3	108.6	OUTLET STRUCTURE (COLORED CONCRETE SPILLWAY, 6" THICK, INCLUDES 6" OF CLASS 6 AGGREGATE BASE COURSE)	1.	EA	$ _____	$ _____
4	201	CLEARING AND GRUBBING	1.73	ACRE	$ _____	$ _____
5	202-00039	REMOVAL OF BOLLARDS	2.	EA	$ _____	$ _____
6	202-00200	REMOVAL OF CONCRETE WALK	10.	SY	$ _____	$ _____
7	202-00208	REMOVAL OF ASPHALT MILLINGS	410.	SY	$ _____	$ _____
8	202-00220	REMOVAL OF ASPHALT MAT	335.	SY	$ _____	$ _____
9	202-00250	REMOVAL OF STRIPING (GRINDING)	4,048.	LF	$ _____	$ _____
10	202-00810	REMOVAL OF SIGN	3.	EA	$ _____	$ _____
11	202-01000	REMOVAL OF CABLE FENCE	750.	LF	$ _____	$ _____
12	203-00060	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	1,121.	CY	$ _____	$ _____
13	208-00208	EROSION CONTROL (COMPLETE IN PLACE)	1.	LS	$ _____	$ _____
14	209-00000	DUST ABATEMENT	45.	DAY	$ _____	$ _____
15	210	RESET SERVICE GATE	1.	EA	$ _____	$ _____
16	210-00001	RESET BOULDERS	1.	LS	$ _____	$ _____
17	210-01001	RESET STRETCH SIGN AND FENCE	1.	EA	$ _____	$ _____
18	210-04000	ADJUST BACKFLOW PREVENTION DEVICE AND IRRIGATION STRUCTURE	1.	LS	$ _____	$ _____
19	212-00007	SEEDING (NATIVE) (HYDRAULIC)	0.51	ACRE	$ _____	$ _____
20	213-00067	INORGANIC MULCH (4" THICK IN CURBED ISLANDS)	138.	CY	$ _____	$ _____
21	304-06000	AGGREGATE BASE COURSE (CLASS 6) (6 INCH THICK PARKING AREAS, 18" THICK MONUMENT ROAD)	1,090.	CY	$ _____	$ _____

Bid Schedule: Lunch Loop Trailhead Improvements

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
22	403	HOT MIX ASPHALT (3 INCH THICK PARKING AREAS, 5 INCH THICK MONUMENT ROAD) (GRADING SX, 75, BINDER GRADE PG 64-22)	758.	TON	$ _____	$ _____
23	504	PRECAST CONCRETE BLOCK RETAINING WALL SYSTEM (INCLUDES ALL NECESSARY APPURTENANCES, WORK, ETC. TO COMPLETE).	300.	FSF	$ _____	$ _____
24	607	FENCE (METAL)	570.	LF	$ _____	$ _____
25	608	COLORED CONCRETE CURB AND GUTTER (2' WIDE) TO INCLUDE 6" OF CLASS 6 AGGREGATE BASE COURSE.	1,742.	LF	$ _____	$ _____
26	608	COLORED CONCRETE SIDEWALK (6" THICK) TO INCLUDE 6" OF CLASS 6 AGGREGATE BASE COURSE.	915.	SY	$ _____	$ _____
27	608	COLORED CONCRETE CURB RAMP (6" THICK) TO INCLUDE 6" OF CLASS 6 AGGREGATE BASE COURSE.	29.	SY	$ _____	$ _____
28	608	DETECTABLE WARNINGS (CAST IRON) WET SET (2' X 2')	15.	EA	$ _____	$ _____
29	620-00020	SANITARY FACILITY	1.	EA	$ _____	$ _____
30	625-00000	CONSTRUCTION SURVEYING	1.	LS	$ _____	$ _____
31	626-00000	MOBILIZATION	1.	LS	$ _____	$ _____
32	627	PREFORMED THERMOPLASTIC PAVEMENT MARKING (4" WHITE SOLID)	1,138.5	LF	$ _____	$ _____
33	627	PREFORMED THERMOPLASTIC PAVEMENT MARKING (HANDICAP SYMBOL)	2.	EA	$ _____	$ _____
34	627	PREFORMED THERMOPLASTIC PAVEMENT MARKING (LEFT TURN SYMBOL)	3.	EA	$ _____	$ _____
35	630	TRAFFIC CONTROL (COMPLETE IN PLACE) (INCLUDES TRAFFIC CONTROL PLAN)	1.	LS	$ _____	$ _____
MCR		MINOR CONTRACT REVISIONS	- - -	- - -	- - -	$ 45,000.00
				Bid Amount:		**$** _____

Bid Amount:

_____ **dollars**

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: **Lunch Loop Trailhead Improvement Project**

CONTRACTOR:

PROJECT ENGINEER: Kirsten Armbruster

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
CONCRETE CONSTRUCTION				
Precast Block Wall System				
Concrete Mix Design				
ASPHALT CONSTRUCTION				
Base course gradation, Proctor curves (ABC Cl 6)				
Asphalt Mix Designs				
18-inch RCP cut sheet				
EROSION CONTROL / STORMWATER MANAGEMENT				
Vehicle Tracking Pad				
Concrete Washout				
PERMITS, PLANS, OTHER				
Construction Schedule				
Erosion Control Plan				

APPENDIX B
Geotechnical Investigations

Huddleston-Berry
Engineering & Testing, LLC

GEOTECHNICAL AND GEOLOGIC HAZARDS INVESTIGATION
MONUMENT ROAD TRAIL
GRAND JUNCTION, COLORADO
PROJECT#00208-0087

CITY OF GRAND JUNCTION
333 WEST AVENUE, BUILDING E
GRAND JUNCTION, COLORADO 81501

OCTOBER 15, 2018

Huddleston-Berry Engineering and Testing, LLC
640 White Avenue,
Grand Junction, Colorado 81501

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

A geologic hazards and geotechnical investigation was conducted for the proposed Monument Road Trail project in Grand Junction, Colorado. The project location is shown on Figure 1 – Site Location Map. The purpose of the investigation was to evaluate the surface and subsurface conditions at the site with respect to geologic hazards, foundation design, pavement design, and earthwork for the proposed construction. This summary has been prepared to include the information required by civil engineers, structural engineers, and contractors involved in the project.

Subsurface Conditions (p. 2)

The subsurface investigation consisted of fourteen borings, drilled in August 2018. The borings generally encountered native sand and gravel soils. However, shallow bedrock was observed in the southern portion of the project area. Groundwater was only encountered in six of the borings at depths of between 2.0 and 14.0 feet at the time of the investigation. The native sand soils are non-plastic to slightly plastic and slightly collapsible. The claystone and bentonite bedrock materials were moderately to highly plastic and are anticipated to range from slightly to highly expansive.

Geologic Hazards and Constraints (p. 5)

No geologic hazards were identified which would preclude construction. However, construction should consider the risks of movement associated with the moisture sensitive soils and/or bedrock at the site. In addition, shallow groundwater and the potential for flooding could impact some portions of the trail.

Summary of Foundation Recommendations

Southern four Low-Flow Crossings (culverts)

- *Recommended Foundation Alternative* – Shallow Foundations. (p. 6)
- *Nominal Bearing Resistance at Strength Limit State* – q_{ult} = 1,450*Effective footing width + 10,000 psf. (p. 7)
- *Resistance Factor* – 0.45. (p. 7)
- *Nominal Bearing Resistance at Service Limit State* – See Appendix D.

Northern Low-Flow Crossing (culvert)

- *Recommended Foundation Alternative* – Shallow Foundations. (p. 7)
- *Nominal Bearing Resistance at Strength Limit State* – q_{ult} = 450*Effective footing width + 1,750 psf. (p. 7)
- *Resistance Factor* – 0.45. (p. 7)
- *Nominal Bearing Resistance at Service Limit State* – See Appendix D.

Pedestrian Bridge

H-Piles

- *Pile Type* – Minimum HP 10x57. (p. 8)
- *Nominal Axial Capacity* – 18 ksi times the pile bottom area for 36 ksi steel piles. 25 ksi times the pile bottom area for 50 ksi steel piles. (p. 8)
- *Resistance Factor* – 0.65 where PDA used to establish field driving criteria (p.8)

Micro Piles

- *Anticipated Length* – up to 40 feet. (p. 8)
- *Unit Side Resistance* – 5,250 psf. (p. 9)
- *Resistance Factor* – 0.5 (p. 9)

Shade Structures

- *Recommended Foundation Alternative* – Shallow Foundations. (p. 9)
- *Nominal Bearing Resistance at Strength Limit State* – q_{ult} = 450*Effective footing width + 1,750 psf. (p. 9)
- *Resistance Factor* – 0.45. (p. 9)
- *Nominal Bearing Resistance at Service Limit State* – See Appendix D.

Summary of Pavement Recommendations (p. 11)

It is recommended that the path consist a minimum of 4-inches of concrete. It is recommended that the path in areas where automobile traffic may use and/or cross the path consist of a minimum of 6-inches of concrete. All concrete should be constructed above a minimum of 6-inches of CDOT Class 6 base course.

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

As part of improvements to infrastructure in Western Colorado, the City of Grand Junction proposes to construct a new pedestrian path along Monument Road from D Road to the Lunch Loops parking lot. As part of the design development process, Huddleston-Berry Engineering and Testing, LLC (HBET) was retained by the City of Grand Junction to conduct a geologic hazards and geotechnical investigation at the site.

1.1 Scope

As discussed above, a geologic hazards and geotechnical investigation was conducted for the proposed Monument Road Trail in Grand Junction, Colorado. The scope of the investigation included the following components:

- Conducting a subsurface investigation to evaluate the subsurface conditions at the site.
- Collecting soil and bedrock samples and conducting laboratory testing to determine the engineering properties of the soils and bedrock at the site.
- Providing recommendations for bridge and culvert foundations.
- Providing recommendations for subgrade preparation.
- Providing recommendations for drainage, grading, and general earthwork.
- Providing recommendations for pavements.
- Evaluating potential geologic hazards at the site.

The investigation and report were completed by a Colorado registered professional engineer in accordance with generally accepted geotechnical and geological engineering practices. This report has been prepared for the exclusive use of the City of Grand Junction.

1.2 Site Location

The project is located on the southeast side of Monument Road between D Road and the Lunch Loops parking lot. The project location is shown on Figure 1 – Site Location Map.

1.3 Proposed Construction

The proposed construction is anticipated to consist of a new pedestrian path. The construction is also anticipated to include one bridge and five culverts. In addition, new shade structures are proposed at the Lunch Loops parking lot. Significant earthwork is also likely.

2.0 GEOLOGIC SETTING

2.1 Soils

Soils data was obtained from the USDA Natural Resource Conservation Service Web Soil Survey. The data indicates that the several soil types are present at the site. Soil survey data is included in Appendix A.

Path and trail construction in the site soils is indicated to range from somewhat limited to very limited due to sand content, large stones content, slope, dust, and/or water erosion. The site soils are indicated to have a low to moderate potential for frost action, moderate to high risk of corrosion of uncoated steel, and low to high risk of corrosion of concrete.

2.2 Geology

According to the *Geologic Map of the Grand Junction Quadrangle, Mesa County, Colorado* (2002), several geologic units are present along the trail alignment. The north end of the trail alignment is mapped as being underlain by young fan alluvium and debris flow deposits. The area of the northern bridge structure is mapped as being underlain by the Dakota formation, alluvium deposited by tributary streams, and/or local gravel deposits over terrace alluvium 30 of the Colorado River. The remainder of the trail area is mapped as being underlain by alluvium deposited by tributary streams and/or eolian sand and sheetwash deposits. A geologic map is included as Figure 2.

2.3 Groundwater

Groundwater was only encountered in Borings B-7 and B-10 through B-15 at depths of between 2.0 and 14.0 feet at the time of the investigation.

3.0 SUBSURFACE INVESTIGATION

The subsurface investigation was conducted between August 3rd and August 7th, 2018. Fifteen boring locations were proposed for the project area; however, only fourteen of the borings were drilled. The location of Boring B-12 was inaccessible to the track mounted drill rig. In addition to the borings, a hand sample was collected at the north end of the project area that was inaccessible to the drill rig. Another hand sample was collected at a proposed borrow area on the west side of Monument Road.

The borings were drilled to depths of between 5.5 and 30.5 feet below the existing ground surface. The locations of the borings and hand samples are shown on Figures 3 through 7. Typed boring logs are included in Appendix B. Samples of the native soils and bedrock were collected during Standard Penetration Testing (SPT) and using bulk sampling methods at the locations shown on the logs. In addition, a bulk sample was collected from the proposed borrow area. A second bulk sample was collected at the north end of the project that was inaccessible to the drilling equipment.

As shown on the logs, the subsurface conditions along the trail alignment were variable. Boring B-1, conducted near where the new trail will intersect the Lunch Loops parking lot, encountered red, moist, dense cobbles and boulders in a silty sand with gravel matrix from the ground surface to the bottom of the boring. Groundwater was not encountered in B-1 at the time of the investigation.

Boring B-2, conducted at the southernmost No Thoroughfare Canyon crossing, encountered 0.5 feet of red, moist, loose silty sand with gravel above white to green, soft, highly weathered bentonite to the bottom of the boring. Groundwater was not encountered in B-2 at the time of the investigation.

Borings B-3 and B-4, conducted along a trail section between creek crossings, encountered tan, moist, loose to medium dense silty sand with gravel soils at the ground surface. In B-3, the sand extended to a depth of 7.0 feet and was underlain by ran, moist, dense to very dense cobbles and boulders in a silty sand with gravel matrix to the bottom of the boring. In B-4, the sand extended to a depth of 6.0 feet where sandstone bedrock was encountered. Groundwater was not encountered in B-3 or B-4 at the time of the investigation.

Borings B-5 through B-7, conducted at the next three crossings of No Thoroughfare Canyon, encountered tan, moist to wet, medium dense to very dense silty sand with gravel or cobbles and boulders in a silty sand with gravel matrix from the ground surface to depths of between 3.5 and 5.5 feet. In B-5, the sand was underlain by tan, hard, moderately weathered sandstone bedrock to the bottom of the boring. In B-6, the sand was underlain by gray to green, medium hard, highly weathered bentonite to the bottom of the boring where sandstone bedrock was encountered. In B-7, the granular soils were underlain by red, medium hard, highly weathered claystone bedrock to the bottom of the boring. Groundwater was only encountered in B-7 at a depth of 2.0 feet at the time of the investigation.

Borings B-8 through B-10, conducted along a trail section north of the three crossings, encountered tan, moist to wet, very loose to medium dense silty sand soils from the ground surface to depths of between 5.0 and 7.5 feet. In B-8, the sand was underlain by gray to green, medium hard, highly weathered bentonite to the bottom of the boring. In B-9, the sand extended to the bottom of the boring where sandstone bedrock was encountered. In B-10, the sand was underlain by brown, wet, medium dense sandy gravel to the bottom of the boring where sandstone bedrock was encountered. Groundwater was only encountered in B-10 at a depth of 2.0 feet at the time of the investigation.

Boring B-11, conducted at the northernmost culvert crossing of No Thoroughfare Canyon, encountered 12.0 feet of tan, moist to wet, loose to medium dense silty sand with gravel above brown, wet, very dense sandy gravel to a depth of 17.0 feet. The gravel was underlain by brown, wet, loose silty sand with gravel to a depth of 22.0 feet. Below the sand, tan, hard, moderately weathered sandstone bedrock extended to the bottom of the boring. Groundwater was encountered in B-11 at a depth of 3.0 feet at the time of the investigation.

Boring B-13, conducted along a trail section south of the pedestrian bridge, encountered 7.0 feet of tan, moist to wet, very loose silty sand above tan, wet, medium dense to loose sandy gravel with trace cobbles to the bottom of the boring. Groundwater was encountered in B-13 at a depth of 3.5 feet at the time of the investigation.

Boring B-14, conducted at the south abutment of the pedestrian bridge, encountered brown, moist to wet, medium dense to dense sandy gravel soils from the ground surface to a depth of 29.0 feet where sandstone bedrock was encountered. Boring B-15, conducted at the north abutment of the pedestrian bridge, encountered 6.0 feet of dense fill materials above brown, moist to wet, dense to very dense silty clayey sand with trace cobbles and boulders to a depth of 15.5 feet. The sand was underlain by tan, wet, medium dense to dense sandy gravel to the bottom of the boring where sandstone bedrock was encountered. Groundwater was encountered in B-14 at a depth of 14.0 feet and in B-15 at a depth of 7.0 feet.

Bulk samples HS-1 and HS-2, collected from the proposed borrow area and north end of the project, respectively, encountered silty gravel with sand soils.

4.0 LABORATORY TESTING

Selected native soil and bedrock samples collected from the borings were tested in the Huddleston-Berry Engineering and Testing LLC geotechnical laboratory for natural moisture content and density determination, grain size analysis, Atterberg limits determination, maximum dry density and optimum moisture (Proctor) determination, swell/consolidation testing, and soluble sulfates content determination. The laboratory testing results are included in Appendix C.

The laboratory testing results indicate that the native sand soils are non-plastic to slightly plastic. In addition, the sand soils were shown to be slightly collapsible at their existing density with up to approximately 1.6% collapse measured in the laboratory. Water soluble sulfates were detected in the sand soils in a concentration of 0.04%.

The bentonite materials encountered in some of the borings were indicated to be highly plastic. Based upon the Atterberg limits of these materials and upon our experience with bentonite in the vicinity of the subject site, the bentonite is anticipated to be highly expansive.

The claystone bedrock was determined to be moderately plastic. Based upon the Atterberg limits of the material and upon our experience with claystone in the vicinity of the subject site, the claystone bedrock at this site is anticipated to be slightly to moderately expansive.

The native silty, clayey gravel with sand soils encountered at the bulk sampling locations were indicated to be slightly plastic.

5.0 GEOLOGIC INTERPRETATION

5.1 Geologic Hazards

The primary geologic hazard at the site is the potential for flooding of No Thoroughfare Canyon. However, moisture sensitive soils and bedrock were also encountered at the site.

5.2 Geologic Constraints

The primary geologic constraint to construction is the presence of moisture sensitive soils and bedrock. However, shallow groundwater may also impact construction in some areas of the site.

5.3 Water Resources

No water supply wells were observed in the project area. However, shallow groundwater was encountered in several of the borings. In addition, the site runs along No Thoroughfare Canyon. In general, with proper grading and stormwater management, the proposed construction at the site is not anticipated to adversely affect surface water or groundwater.

5.4 Mineral Resources

Potential mineral resources in Western Colorado generally include gravel, uranium ore, and commercial rock products such as flagstone. As discussed previously, sands and gravels were encountered in the subsurface along the trail alignment. However, based upon the location of the proposed trail along No Thoroughfare Canyon, HBET does not believe that the existing sands and gravels represent an economically recoverable resource.

6.0 CONCLUSIONS

Based upon the available data sources, field investigation, and nature of the proposed construction, HBET does not believe that there are any geologic conditions which should preclude construction of the new trail, culvert crossings, and bridges in the project area. However, the presence of shallow groundwater, moisture sensitive soils and bedrock, and/or potential for flooding may impact the design and/or construction.

7.0 RECOMMENDATIONS

7.1 Foundations

As discussed previously, five culvert crossings and one bridge crossing are proposed along the trail alignment. Also, as discussed previously, bedrock materials were encountered fairly shallow at the southern four culvert crossings (Borings B-2, 5, 6, 7). As a result, shallow foundation design will likely be appropriate for these culverts.

At the next culvert crossing (Boring B-11), at the elevation of the proposed culvert, silty sand soils were encountered. As discussed previously, the native sand soils are collapsible. However, the foundation loading is not anticipated to be large. As a result, shallow foundations are anticipated to be appropriate at this location.

At the pedestrian bridge (B-14 and B-15), sand and gravel soils were encountered above sandstone bedrock. Due to the variable density of the granular soils, deep foundations to competent bedrock should be considered. Driven piles may be appropriate; however, driven piles may have difficulties penetrating the dense clayey sand layer encountered in B-15. An alternative to driven piles is micro-piles.

As indicated previously, Boring B-1, conducted near the Lunch Loops parking lot encountered dense granular materials in the subsurface. In general, HBET anticipates similar soil conditions at the locations of the proposed shade structures. Therefore, HBET anticipates that shallow foundations will be appropriate for the shade structures.

7.1.1. Shallow Foundations for Southern Four Culverts (B-2, 5, 6, 7)

As discussed previously, expansive claystone and bentonite bedrock materials were encountered in borings at three of the crossings. However, claystone and bentonite are common to the geology in the area and even though they were not encountered in the fourth boring, it is likely that they are present in the bedrock below all of the crossings. Due to the high likelihood of moisture fluctuations in the subgrade at the culverts, volume changes in the claystone and/or bentonite are likely. Unfortunately, there is no cost effective way to limit the potential for movement of culverts. The only way to limit the potential for movement would be to construct micro-pile supported bridges at the crossings. However, this would likely be cost prohibitive. Therefore, HBET generally recommends that the culverts be constructed above competent bedrock materials or structural fill extending to bedrock.

Structural fill should consist of granular, non-free draining, non-expansive material such as ¼-inch minus crusher fines or CDOT Class 6 Base course. Controlled Low Strength Material (CLSM/Flowable Fill) is also acceptable below the culverts down to bedrock. However, unless it can be demonstrated that they are not free-draining, pit-run materials are not suitable for use as structural fill.

In accordance with LRFD design methodology, for culverts constructed/placed above competent weathered bedrock, a nominal bearing resistance for the strength limit state of q_{ult} = 1,450*Effective footing width + 10,000 psf may be used. A resistance factor of 0.45 is recommended. Nominal bearing resistance for the service limit state should be in accordance with the attached plot of Bearing Stress versus Effective Footing Width for a maximum total settlement of 1.0-inch included in Appendix D.

7.1.2. Shallow Foundations for Fifth Culvert (B-11)

As discussed previously, collapsible sand soils were encountered in the subsurface at the elevation of the proposed culvert base. Therefore, HBET recommends that the culvert(s) be constructed above a minimum of 24-inches of structural fill consisting of the proposed borrow materials or imported granular material such as crusher fines or CDOT Class 6 base course.

Prior to placement of structural fill, it is recommended that the bottom of the foundation excavation be scarified to a depth of 6 to 9 inches, moisture conditioned, and compacted to a minimum of 95% of the standard Proctor maximum dry density, within ± 2% of the optimum moisture content as determined in accordance with ASTM D698. However, soft, wet conditions may exist at the bottom of the foundation excavation and this may make compaction of the subgrade difficult. It may be necessary to utilize geotextile and/or geogrid in conjunction with up to 30-inches of granular fill to stabilize the subgrade. HBET should be contacted to provide specific recommendations for subgrade stabilization based upon the actual conditions in the bottom of the foundation excavation.

Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils and modified Proctor maximum dry density for coarse grained soils, within ± 2% of the optimum moisture content as determined in accordance with ASTM D698 and D1557, respectively. Structural fill should extend laterally beyond the edges of the culvert(s) a distance equal to the thickness of structural fill.

In accordance with LRFD design methodology, for foundation preparation as recommended, a nominal bearing resistance for the strength limit state of q_{ult} = 450*Effective footing width + 1,750 psf may be used. A resistance factor of 0.45 is recommended. Nominal bearing resistance for the service limit state should be in accordance with the attached plot of Bearing Stress versus Effective Footing Width for a maximum total settlement of 1.0-inch included in Appendix D. Foundations subject to frost should be at least 24-inches below the finished grade.

7.1.3. Driven Piles for Pedestrian Bridge

As discussed previously, driven steel H-piles may be appropriate for the pedestrian bridge. For driven piles, it is anticipated that most of the axial pile capacity will be developed in end bearing on sandstone bedrock. Based upon the anticipated working loads and pile driving conditions, piles should be a minimum of HP 10x57. However, if larger piles are proposed, it is important to ensure the pile driving contractor has a large enough hammer to achieve the design capacities.

The piles should penetrate the native sand and gravel soils and bear into the sandstone bedrock. The actual penetration of individual piles will be dependent upon driving conditions and size of pile used; however, it is anticipated that H-piles will reach refusal within 2 to 10 feet of the top of the bedrock. Therefore, pile lengths of up to approximately 39 feet may be possible (measured from existing grade). In order to protect the pile tip, pile tip reinforcement is recommended.

In accordance with LRFD design methodology, for Grade 36 steel H-piles, a nominal combined skin friction and end bearing capacity of 18 ksi times the cross sectional area of the pile is recommended. For Grade 50 steel H-piles, a nominal combined skin friction and end bearing capacity of 25 ksi times the cross sectional area of the pile is recommended. However, it is recommended that pile load testing be conducted to evaluate actual achievable capacities and pile lengths. In accordance with AASHTO LRFD bridge design specifications, where a pile driving analyzer is utilized to establish the field pile driving criteria, a resistance factor of 0.65 may be used.

To eliminate reductions in capacity from group effects, the minimum center-to-center spacing of piles should be 3 pile diameters. Group effects should be considered for piles grouped less than 3 diameters apart.

In general, for properly installed H-piles refused on bedrock, HBET anticipates that total settlements will be 1.0-inch or less. However, this should be verified during pile load testing. A reduction in capacity may be necessary where pile load tests indicate excessive deflection.

7.1.4. Micro Piles for Pedestrian Bridge

As discussed previously, micro-piles are an appropriate foundation alternative for the pedestrian bridge. In general, micro-piles should be designed as unbonded elements in the overburden sand and gravel soils with bearing capacity developing from side shear in the sandstone bedrock. Due to the granular nature of the overburden soils, conventional micro-piles will likely require casing to maintain an open hole. However, injection grouted piles may also be considered.

For a micro pile foundation, it is recommended that micro piles extend into competent bedrock a minimum of 10 feet. Therefore, pile lengths of up to approximately 40 feet are anticipated (as measured from existing grade).

Side resistance should be ignored along the portion of the piles in the overburden soils. Assuming a weighted load factor of 1.5, a unit side resistance (q_s) value of 5,250 psf may be used for the sandstone bedrock. The side resistance is applicable in both compression and uplift. A resistance factor of 0.5 is recommended. However, where a different load factor is used, the load factor should be divided by 3 to determine the corresponding resistance factor. To ensure friction capacity, pile load testing is strongly recommended. Grout used in the bond zone of the micro piles should have a minimum 28 day compressive strength of 3,000 psi.

In general, micro piles should be installed with a center-to-center spacing of greater than 3 feet. However, to the extent practical, smaller numbers of longer micro piles should be used in lieu of larger numbers of shorter piles. The longer the piles and larger the loads on the piles, the lower the risk of movement.

For properly installed micro-piles, HBET anticipates that total settlements will be 1.0-inch or less. However, this should be verified during pile load testing. A reduction in capacity may be necessary where pile load tests indicate excessive deflection.

7.1.5. Shallow Foundations for Shade Structures

As discussed previously, dense granular materials were encountered at the south end of the trail. It is anticipated that similar conditions will be present at the proposed shade structure locations. Therefore, spread footing type foundations are appropriate for these structures. However, to provide a uniform bearing stratum and limit the potential for excessive differential settlements, it is recommended that the shade structure foundations be constructed above a minimum of 18-inches of structural fill consisting of the proposed borrow materials or imported granular material such as crusher fines or CDOT Class 6 base course.

Prior to placement of structural fill, it is recommended that the bottom of the foundation excavation be scarified to a depth of 6 to 9 inches, moisture conditioned, and proofrolled to the Engineer's satisfaction. Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils and modified Proctor maximum dry density for coarse grained soils, within ± 2% of the optimum moisture content as determined in accordance with ASTM D698 and D1557, respectively. Structural fill should extend laterally beyond the edges of the foundations a distance equal to the thickness of structural fill.

In accordance with LRFD design methodology, for foundation preparation as recommended, a nominal bearing resistance for the strength limit state of q_{ult} = 450*Effective footing width + 1,750 psf may be used. A resistance factor of 0.45 is recommended. Nominal bearing resistance for the service limit state should be in accordance with the attached plot of Bearing Stress versus Effective Footing Width for a maximum total settlement of 1.0-inch included in Appendix D. Foundations subject to frost should be at least 24-inches below the finished grade

7.2 Lateral Pile Capacity

Based upon the results of the subsurface investigation, the following soil parameters are recommended for use in lateral capacity analyses utilizing the LPile software program:

Depth from Grade (in).	Above Water Table	Below Water Table
Soil Type	Sand	Sand
Density (pci)	0.0637	0.0275
Cohesion (psi)	0	0
Friction Angle (ϕ)	28	28
ε_{50} (in/in)	-	-
K_h (pci)	90	60

7.3 Corrosion of Steel and Concrete

The Soil Survey data suggest that the native soils have a moderate to high potential for corrosion of steel. The risk of corrosion may be increased where flooding or groundwater fluctuations result in periods of wetting and drying. Therefore, it is recommended that the structural engineer consider corrosion in the design of H-piles.

With regard to soil corrosivity to concrete, as discussed previously, water soluble sulfates were detected in the site soils in a concentration of 0.04%. This concentration of sulfates represents a negligible degree of sulfate attack on concrete exposed to the native soils. However, the Soil Survey data suggest that the native soils have lot to high potential for corrosion of concrete. Therefore, at a minimum, Type I-II sulfate resistant cement is recommended for construction at this site.

7.4 Borrow Materials

As indicated in the attached laboratory testing data, the proposed borrow materials consist of silty, clayey gravel with sand. In general, these materials are suitable for use as structural fill, embankment fill, etc.

7.5 Lateral Earth Pressures

The structures should be designed to resist lateral earth pressures. HBET recommends that the structures be designed using the following earth pressure coefficients:

<u>Native Sand Soils</u>

- $K_o = 0.53$
- $K_a = 0.36$
- $K_p = 2.77$

Native Gravels / Cobbles and Boulders and Gravel Borrow

- $K_o = 0.44$
- $K_a = 0.31$
- $K_p = 3.26$

The earth pressure coefficients above assume horizontal backslope and should be increased where the backslope is not level. Computed lateral earth pressures on the structures should consider surcharge loading from vehicular traffic on the trail, where applicable.

7.6 Seismic Site Classification

At the four southern culverts, shallow bedrock was present. As a result, Seismic Site Class C is recommended for these structures.

At the northern low-flow crossing, loose sand soils are present below the water table and some of these soils are potentially liquefiable. In general, HBET does not believe that there is a significant risk of structural damage, loss of life, etc. associated with a concrete culvert structure at this location. However, in accordance with the International Building Code (IBC), the northern crossing area technically classifies as Seismic Site Class F.

At the pedestrian bridge crossing, sand and gravel soils were present in the shallow subsurface. While some of these soils were below the water table, based upon the SPT blow counts of these materials, HBET does not believe that these soils are liquefiable. In addition, deep foundations are proposed for this structure. Therefore, HBET recommends that Seismic Site Class D be used for the pedestrian bridge.

7.7 Excavations

Excavations in the soils at the site may stand for short periods of time but should not be considered to be stable. The native sand soils generally classify as Type C soil with regard to OSHA's *Construction Standards for Excavations*. In general, for Type C soils, the maximum allowable slope in temporary cuts is 1.5H:1V.

In general, for bedrock excavation in the southern portion of the project area, HBET recommends that the materials be classified as Type A soil. For Type A soil, the maximum allowable slope in temporary cuts is 0.75H:1V. However, HBET should be contacted to further evaluate bedrock materials exposed during construction.

7.8 Path Pavements

The proposed construction is anticipated to include a new concrete path. The subgrade materials along the path will consist of native sand and gravel soils or gravel soils from the borrow area.

In general, the native sand soils will be critical for the pavement section design as any fills will consist of suitable controlled materials. Due to the collapse potential of the native sand soils, the recommended minimum Resilient Modulus of 3,000 psi was used for the pavement design.

In general, HBET recommends that the concrete path be a minimum of 4-inches in thickness in accordance with Mesa County standards. In addition, in areas where automobile traffic may use and/or cross the path, a minimum thickness of 6-inches of concrete is recommended. For all areas of the path, a minimum of 6-inches of CDOT Class 6 base course is recommended below the concrete.

Prior to new pavement placement, areas to be paved should be stripped of all topsoil, uncontrolled fill, or other unsuitable materials. It is recommended that the subgrade soils be scarified to a depth of 12-inches; moisture conditioned, and recompacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of optimum moisture content as determined by AASHTO T-99.

Aggregate base course should be placed in maximum 9-inch loose lifts, moisture conditioned, and compacted to a minimum of 95% of the maximum dry density, at -2% to +3% of optimum moisture content as determined by AASHTO T-180. In addition to density testing, base course should be proofrolled to verify subgrade stability.

The long-term performance of the pavements is dependent on positive drainage away from the pavements. Ditches, culverts, and inlet structures in the vicinity of paved areas must be maintained to prevent ponding of water on the pavement.

8.0 GENERAL

The recommendations included above are based upon the results of the subsurface investigation and on our local experience. These conclusions and recommendations are valid only for the proposed construction.

As discussed previously, the subsurface conditions at the site were variable. Although HBET believes that the investigation was sufficient to adequately characterize the range of subsurface conditions at the site, the precise nature and extent of subsurface variability may not become evident until construction. Therefore, it is recommended that a representative of HBET be retained to provide engineering oversight and construction materials testing services during the construction. This is to verify compliance with the recommendations included in this report or permit identification of significant variations in the subsurface conditions which may require modification of the recommendations.

It is important to note that moisture sensitive soils and bedrock were encountered at the site. In general, with proper design and construction, HBET believes that the risk of excessive differential movements is low. However, where significant changes in the subsurface moisture conditions occur either during or after construction, significant differential movements of the sidewalks are possible.

Huddleston-Berry Engineering and Testing, LLC is pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC

Michael A. Berry, P.E.
Vice President of Engineering

FIGURES

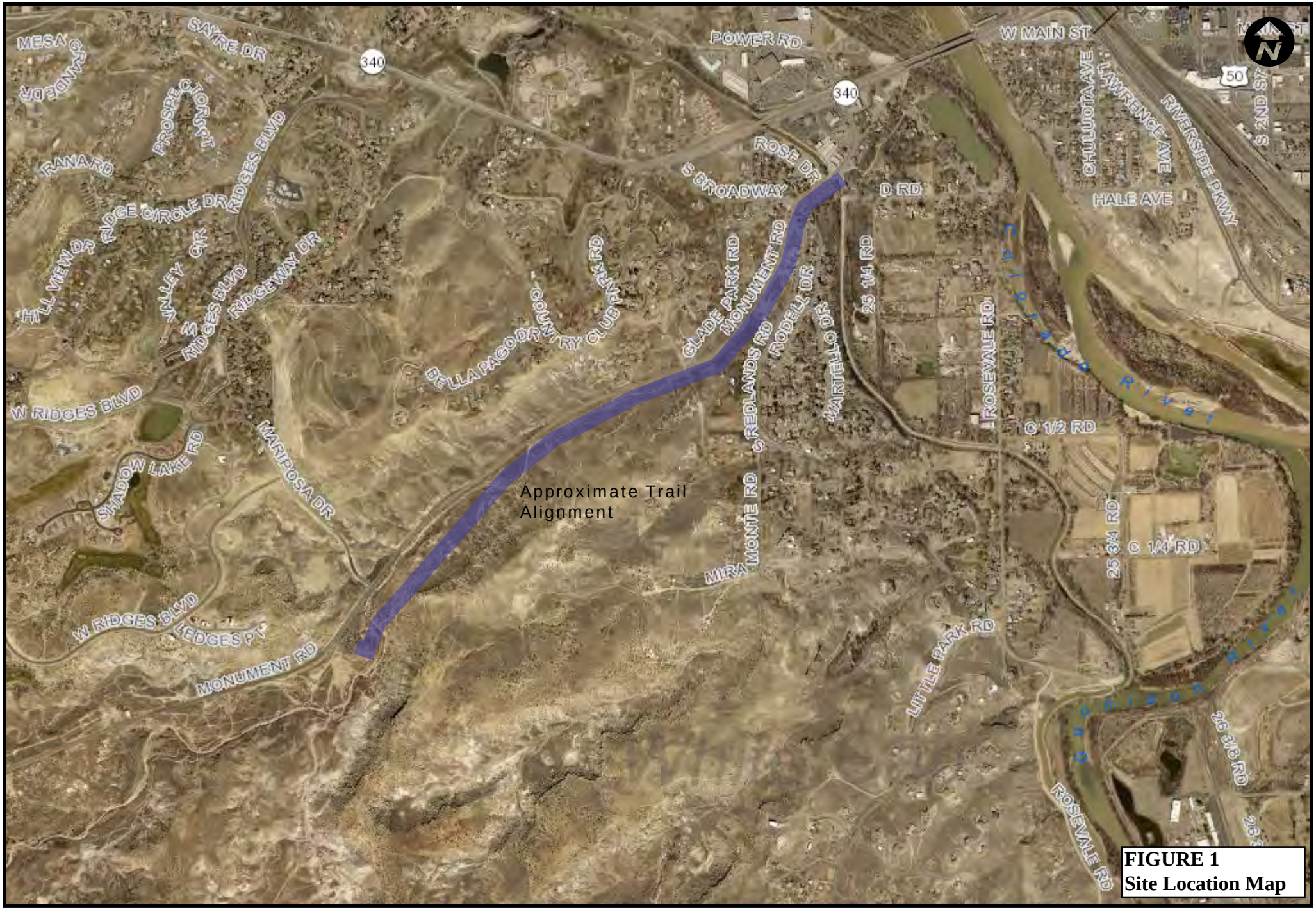


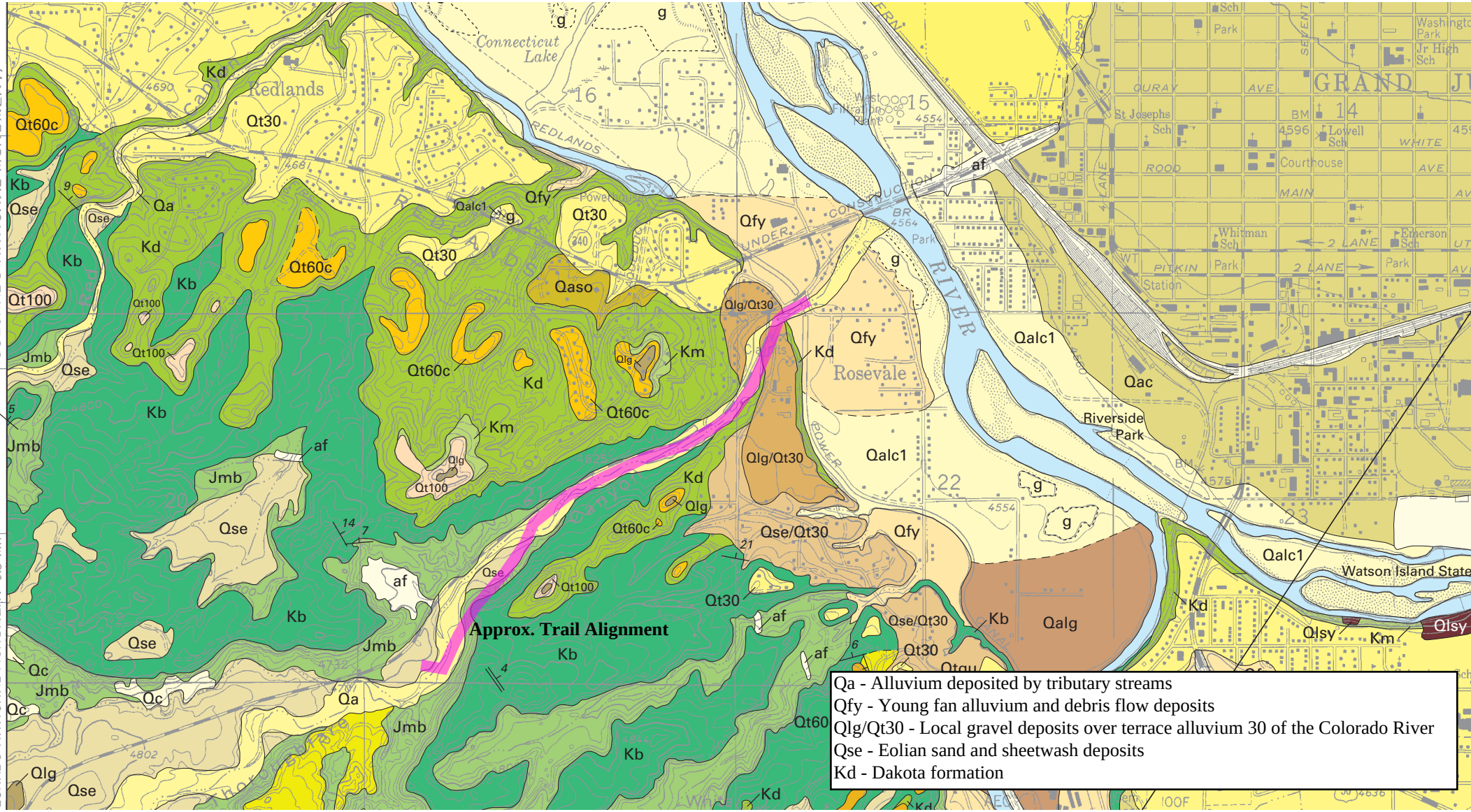
FIGURE 1
Site Location Map

Mesa County Map

0 0.125 0.25 0.5 mi
0 0.15 0.3 0.6 km

Print Date: October 15, 2018

Mesa County, Colorado
GIS/IT Department
gis.mesacounty.us



Printed portion of map titled G*eologic Map of the Grand Junction Quadrangle, Mesa County, Colorado* by Scott, Carrara, Hood, and Murray (2002)

FIGURE 2
Geologic Map

FIGURE 3
Site Plan

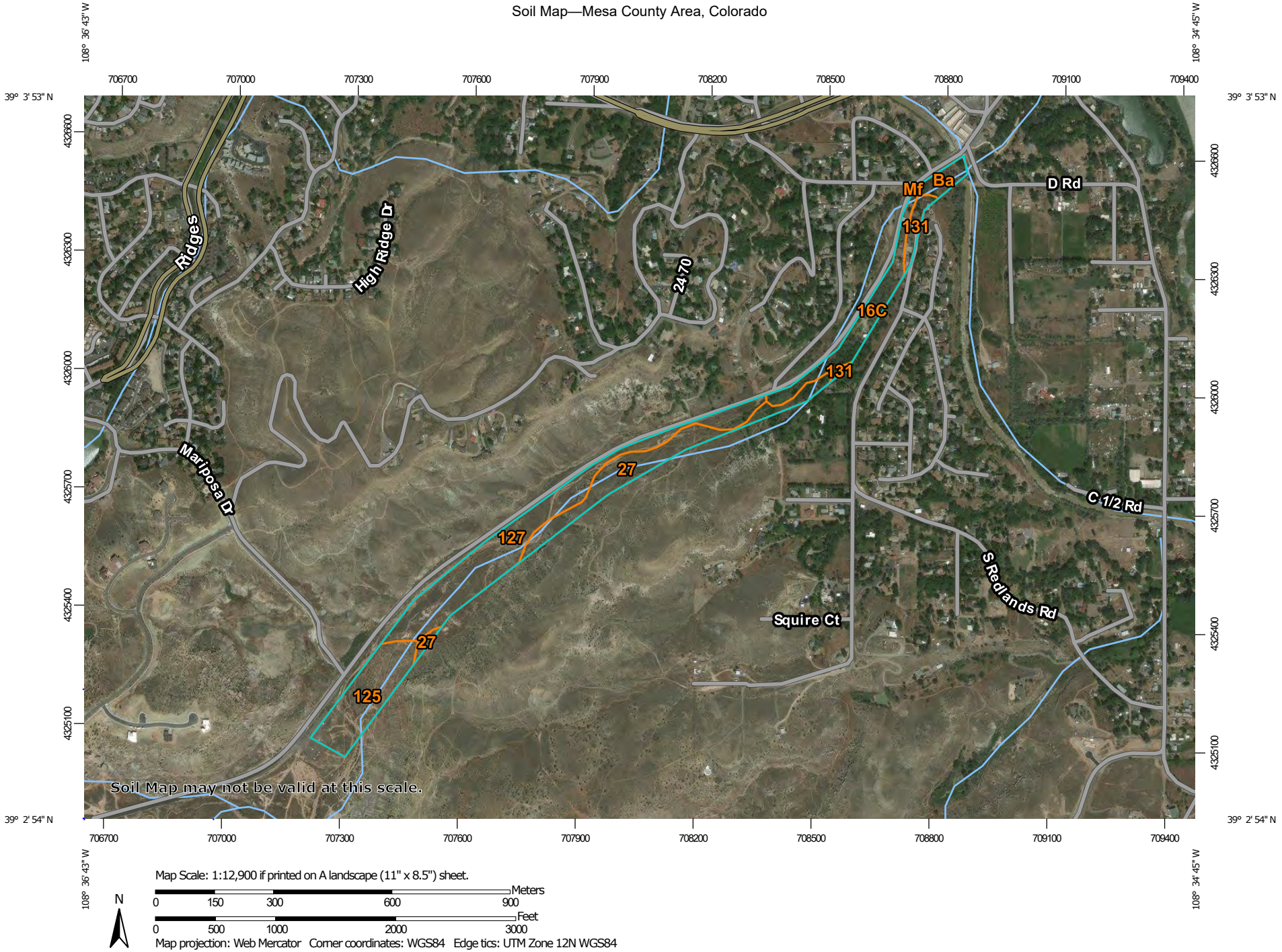
FIGURE 4
Site Plan

FIGURE 5
Site Plan

FIGURE 6
Site Plan

FIGURE 7
Site Plan

APPENDIX A
Soil Survey Data



Map Scale: 1:12,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 150 300 600 900

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 9, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Mar 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
16C	Luster loamy fine sand, 3 to 8 percent slopes	5.7	13.9%
27	Rock outcrop-Biedsaw complex, 25 to 65 percent slopes, extremely bouldery	8.8	21.5%
125	Moffat sandy loam, 2 to 6 percent slopes	8.0	19.4%
127	Rock outcrop-Persayo-Hostage complex, 25 to 65 percent slopes, extremely bouldery	15.1	37.0%
131	Mack-Gyprockmesa complex, 1 to 5 percent slopes	1.6	4.0%
Ba	Massadona silty clay loam, 0 to 2 percent slopes	1.6	4.0%
Mf	Gyprockmesa cobbly clay loam, 5 to 12 percent slopes	0.0	0.0%
Totals for Area of Interest		**40.9**	**100.0%**

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Mesa County Area, Colorado

16C—Luster loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: k06j
Elevation: 5,400 to 6,500 feet

Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 49 to 54 degrees F
Frost-free period: 120 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Luster and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Luster

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone

Typical profile

Ap1 - 0 to 3 inches: loamy fine sand
Ap2 - 3 to 8 inches: fine sandy loam
AB - 8 to 12 inches: fine sandy loam
Bk1 - 12 to 32 inches: loamy fine sand
Bk2 - 32 to 45 inches: loamy fine sand
Bk3 - 45 to 60 inches: loamy fine sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.13 to 7.09 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Sandy Foothills (R036XY310CO)
Hydric soil rating: No

27—Rock outcrop-Biedsaw complex, 25 to 65 percent slopes, extremely bouldery

Map Unit Setting

National map unit symbol: k08s
Elevation: 5,800 to 8,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 49 to 54 degrees F
Frost-free period: 120 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 55 percent
Biedsaw, extremely bouldery, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Biedsaw, Extremely Bouldery

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from sandstone and shale over residuum weathered from clayey shale

Typical profile

A - 0 to 16 inches: very cobbly clay loam
2C1 - 16 to 32 inches: silty clay
2C2 - 32 to 60 inches: silty clay

Properties and qualities

Slope: 25 to 65 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.07 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent

Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: Steep Shallow Clay Loam - (Pinyon-Utah Juniper) (R036XY111CO)
Hydric soil rating: No

125—Moffat sandy loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: k07l
Elevation: 4,400 to 5,000 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Moffat and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moffat

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone

Typical profile
Ap - 0 to 2 inches: sandy loam
Bw1 - 2 to 7 inches: fine sandy loam
Bw2 - 7 to 16 inches: fine sandy loam
Bk1 - 16 to 24 inches: sandy loam
Bk2 - 24 to 32 inches: sandy loam
Bk3 - 32 to 44 inches: loamy sand
Bk4 - 44 to 61 inches: sandy loam

Properties and qualities
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.71 to 2.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: Desert Sandy Loam (Indian Ricegrass) (R034BY115UT)
Hydric soil rating: No

127—Rock outcrop-Persayo-Hostage complex, 25 to 65 percent slopes, extremely bouldery

Map Unit Setting

National map unit symbol: k07k
Elevation: 4,700 to 5,400 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 35 percent
Persayo, extremely bouldery, and similar soils: 30 percent
Hostage, extremely bouldery, and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Persayo, Extremely Bouldery

Setting

Landform: Pediments
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Cretaceous source residuum weathered from clayey shale

Typical profile

A - 0 to 2 inches: very parachannery clay loam
C - 2 to 11 inches: very parachannery silty clay loam
Cr - 11 to 60 inches: bedrock

Properties and qualities

Slope: 25 to 65 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: D
Ecological site: Semidesert Very Steep Loam (Shadscale) (R034BY248UT)
Hydric soil rating: No

Description of Hostage, Extremely Bouldery

Setting

Landform: Pediments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from sandstone and shale over cretaceous source residuum weathered from clayey shale

Typical profile

A - 0 to 4 inches: clay loam
Bw - 4 to 25 inches: clay loam
C1 - 25 to 50 inches: silty clay loam
C2 - 50 to 55 inches: silty clay loam
Cr - 55 to 72 inches: bedrock

Properties and qualities

Slope: 25 to 50 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Semidesert Very Steep Loam (Shadscale) (R034BY248UT)
Hydric soil rating: No

131—Mack-Gyprockmesa complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: k0df
Elevation: 4,360 to 4,990 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mack and similar soils: 50 percent
Gyprockmesa and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mack

Setting

Landform: Fan remnants
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium over alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 6 inches: loam
Btk1 - 6 to 14 inches: clay loam
Btk2 - 14 to 20 inches: clay loam
Btk3 - 20 to 50 inches: gravelly clay loam
Bk - 50 to 80 inches: gravelly clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.21 to 0.71 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Gypsum, maximum in profile: 4 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Desert Loam (Shadscale) (R034BY106UT)
Hydric soil rating: No

Description of Gyprockmesa

Setting

Landform: Fan remnants
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy slope alluvium derived from shale over cobbly alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 5 inches: clay loam
Btk1 - 5 to 10 inches: clay loam
Btk2 - 10 to 15 inches: clay loam
Btk3 - 15 to 23 inches: cobbly clay loam
2Bky1 - 23 to 35 inches: very cobbly clay loam
2Bky2 - 35 to 44 inches: cobbly clay loam
2Bky3 - 44 to 70 inches: stony loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.21 to 0.71 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 35 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0

Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Desert Loam (Shadscale) (R034BY106UT)
Hydric soil rating: No

Ba—Massadona silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: k06n
Elevation: 4,490 to 4,920 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Massadona and similar soils: 70 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Massadona

Setting

Landform: Fan remnants
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Cretaceous source alluvium derived from clayey shale

Typical profile

A - 0 to 2 inches: silty clay loam
Bw - 2 to 12 inches: silty clay
Bkyz - 12 to 24 inches: silty clay
BCkyz1 - 24 to 48 inches: fine sandy loam
BCkyz2 - 48 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.07 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent

Salinity, maximum in profile: Moderately saline to strongly saline (10.0 to 30.0 mmhos/cm)
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification (irrigated): 7s
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Desert Clay (Castlevalley saltbush) (R034BY103UT)
Hydric soil rating: No

Mf—Gyprockmesa cobbly clay loam, 5 to 12 percent slopes

Map Unit Setting
National map unit symbol: k0ct
Elevation: 4,490 to 4,890 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Gyprockmesa and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gyprockmesa

Setting
Landform: Strath terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy slope alluvium derived from shale over cobbly alluvium derived from sandstone and shale

Typical profile
Ap - 0 to 5 inches: cobbly clay loam
Btk1 - 5 to 10 inches: clay loam
Btk2 - 10 to 15 inches: clay loam
Btk3 - 15 to 23 inches: cobbly clay loam
2Bky1 - 23 to 35 inches: very cobbly clay loam
2Bky2 - 35 to 44 inches: cobbly clay loam
2Bky3 - 44 to 70 inches: stony loam

Properties and qualities
Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.21 to 0.71 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 35 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Desert Loam (Shadscale) (R034BY106UT)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 9, Sep 10, 2018

Paths, Trails, and Golf Fairways

The soils of the survey area are rated in this table according to limitations that affect their suitability for paths, trails, and golf fairways. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Report—Paths, Trails, and Golf Fairways

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Paths, Trails, and Golf Fairways–Mesa County Area, Colorado							
Map symbol and soil name	**Pct. of map unit**	**Golf fairways**		**Off-road motorcycle trails**		**Paths and trails**	
		Rating class and limiting features	**Value**	**Rating class and limiting features**	**Value**	**Rating class and limiting features**	**Value**
16C—Luster loamy fine sand, 3 to 8 percent slopes							
Luster	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Low exchange capacity	0.75	Too sandy	0.92	Too sandy	0.92
27—Rock outcrop-Biedsaw complex, 25 to 65 percent slopes, extremely bouldery							
Rock outcrop	55	Not rated		Not rated		Not rated	
Biedsaw, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Large stones content	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00	Slope	1.00
		Dusty	0.42	Dusty	0.42	Dusty	0.42
		Gravel content	0.13				

Paths, Trails, and Golf Fairways–Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Golf fairways		Off-road motorcycle trails		Paths and trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
87—Persayo-Blackston complex, 6 to 45 percent slopes							
Persayo	65	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Water erosion	1.00	Slope	1.00
		Slope	1.00	Dusty	0.50	Water erosion	1.00
		Droughty	0.87	Slope	0.01	Dusty	0.50
		Dusty	0.50				
		Low exchange capacity	0.50				
Blackston	25	Very limited		Somewhat limited		Somewhat limited	
		Slope	1.00	Dusty	0.19	Dusty	0.19
		Droughty	0.75			Slope	0.02
		Gravel content	0.39				
		Dusty	0.19				
125—Moffat sandy loam, 2 to 6 percent slopes							
Moffat	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Low exchange capacity	0.50	Dusty	0.04	Dusty	0.04
		Dusty	0.04				
127—Rock outcrop-Persayo-Hostage complex, 25 to 65 percent slopes, extremely bouldery							
Rock outcrop	35	Not rated		Not rated		Not rated	
Persayo, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Large stones content	1.00	Large stones content	1.00
		Droughty	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Dusty	0.50	Dusty	0.50
		Dusty	0.50				
Hostage, extremely bouldery	25	Very limited		Very limited		Very limited	
		Slope	1.00	Large stones content	1.00	Large stones content	1.00
		Dusty	0.36	Slope	0.92	Slope	1.00
				Dusty	0.36	Dusty	0.36

Paths, Trails, and Golf Fairways–Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Golf fairways		Off-road motorcycle trails		Paths and trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
131—Mack-Gyprockmesa complex, 1 to 5 percent slopes							
Mack	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.38	Dusty	0.38	Dusty	0.38
Gyprockmesa	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.35	Dusty	0.35	Dusty	0.35
Ba—Massadona silty clay loam, 0 to 2 percent slopes							
Massadona	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.50	Dusty	0.50	Dusty	0.50
Mf—Gyprockmesa cobbly clay loam, 5 to 12 percent slopes							
Gyprockmesa	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Large stones content	0.99	Dusty	0.35	Dusty	0.35
		Dusty	0.35	Large stones content	0.01	Large stones content	0.01
		Slope	0.04				

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 9, Sep 10, 2018

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features–Mesa County Area, Colorado									
Map symbol and soil name	**Restrictive Layer**				**Subsidence**		**Potential for frost action**	**Risk of corrosion**	
	Kind	**Depth to top**	**Thickness**	**Hardness**	**Initial**	**Total**		**Uncoated steel**	**Concrete**
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
16C—Luster loamy fine sand, 3 to 8 percent slopes									
Luster		—	—		0	0	Low	Moderate	Low
27—Rock outcrop-Biedsaw complex, 25 to 65 percent slopes, extremely bouldery									
Rock outcrop		—	—		—	—			
Biedsaw, extremely bouldery		—	—		0	0	Low	High	Moderate
125—Moffat sandy loam, 2 to 6 percent slopes									
Moffat		—	—		0	0	Moderate	Moderate	Low

Soil Features–Mesa County Area, Colorado									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
127—Rock outcrop-Persayo-Hostage complex, 25 to 65 percent slopes, extremely bouldery									
Rock outcrop		—	—		—	—			
Persayo, extremely bouldery	Paralithic bedrock	10-11-20	—	Weakly cemented	0	0	Moderate	High	High
Hostage, extremely bouldery	Paralithic bedrock	40-55-60	—	Weakly cemented	0	0	Moderate	Moderate	Low
131—Mack-Gyprockmesa complex, 1 to 5 percent slopes									
Mack		—	—		0	0	Moderate	Moderate	Low
Gyprockmesa		—	—		0	0	Moderate	Moderate	High
Ba—Massadona silty clay loam, 0 to 2 percent slopes									
Massadona		—	—		0	0	Low	High	High
Mf—Gyprockmesa cobbly clay loam, 5 to 12 percent slopes									
Gyprockmesa		—	—		0	0	Moderate	Moderate	High

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 9, Sep 10, 2018

APPENDIX B
Typed Boring Logs

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-1

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		COBBLES and BOULDERS in a Silty SAND with Gravel Matrix (SM), red, moist, dense										
2.5		*** Lab Classified SS1	SS 1	83	25-17-24 (41)			2	NP	NP	NP	13
5.0												
7.5												
			SS 2	61	24-27							
10.0												
12.5			SS 3	83	52							
15.0		Bottom of hole at 15.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-2

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND with GRAVEL (sm), red, moist, loose										
		BENTONITE, white to green, soft, highly weathered										
2.5			SS 1	0	6-6-10 (16)			34	108	34	**74**	
5.0												
7.5			SS 2	100	6-7-12 (19)							
10.0		Bottom of hole at 10.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-3

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION _____ **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND with Gravel (sm), tan, moist, medium dense										
2.5			SS 1	78	6-7-8 (15)							
5.0												
7.5		COBBLES and BOULDERS in a Silty SAND with Gravel Matrix (sm), tan, moist, dense to very dense	SS 2	58	24-26							
10.0		Bottom of hole at 10.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-4

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION _____ **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND with Gravel (sm), tan, moist, loose										
2.5			SS 1	89 (39)	5-4							
5.0		*** Auger refusal on SANSTONE bedrock										
		Bottom of hole at 6.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-5

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND with Gravel (sm), tan, moist, medium dense										
			SS 1	78	14-11-12 (23)							
2.5		SANDSTONE, tan, hard, moderately weathered										
5.0		*** Auger refusal										
		Bottom of hole at 5.5 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-6

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION _____ **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND with Gravel (sm), tan, moist, medium dense										
2.5			SS 1	83	21-12-8 (20)							
		BENTONITE, grey to green, medium hard, highly weathered										
5.0												
7.5			SS 2	100	25-13							
		*** Auger refusal on SANDSTONE bedrock Bottom of hole at 9.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-7

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 2.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 2.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		COBBLES and BOULDERS in a Silty SAND Matrix (sm), tan, moist to wet, very dense										
2.5												
5.0		CLAYSTONE, red, medium hard, highly weathered	SS 1	67	17-36			23	34	21	13	
7.5												
10.0		Bottom of hole at 10.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-8

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION _____ **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), tan, moist, medium dense										
2.5			SS 1	78	8-8-6 (14)							
5.0												
7.5		BENTONITE, grey to green, medium hard, highly weathered	SS 2	100	50							
10.0		Bottom of hole at 10.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-9

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), tan, moist, medium dense										
2.5			MC 1	94	10-8-7 (15)		100	2				
5.0		*** Auger refusal on SANDSTONE bedrock										
		Bottom of hole at 6.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-10

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 2.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 2.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), tan, moist to wet, very loose										
2.5			MC 1	83	1-1-1 (2)		98	19				
5.0		Sandy GRAVEL (gws), brown, wet, medium dense										
7.5			SS 1	72	21-14-16 (30)							
10.0												
12.5												
		*** Auger refusal on SANDSTONE bedrock										
		Bottom of hole at 14.5 feet.										

GEOTECH BH COLUMNS 00208-0087MONUMENT ROAD TRAIL.GPJ GINT US LAB.GDT 10/5/18

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-11

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 3.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 3.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Gravel (sm), tan, moist, loose to medium dense										
			SS 1	67	5-3-2 (5)							
5			SS 2	94	4-8-7 (15)							
10		Sandy GRAVEL (gws), brown, wet, very dense	SS 3	42	19-39							
15		Silty SAND with Gravel (gws), brown, wet, loose	SS 4	72	2-4-3 (7)							
20		SANDSTONE, tan, hard, moderately weathered										
		*** Auger refusal										
		Bottom of hole at 23.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-13

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 3.5 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 3.5 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), tan, moist to wet, very loose										
2.5			SS 1	50	3-2-1 (3)							
5.0												
7.5		Sandy GRAVEL with tarec cobbles (gws), tan, wet, medium dense to loose	SS 2	89	4-13-15 (28)							
10.0												
12.5												
15.0			SS 3	72	5-3-5 (8)							
		Bottom of hole at 15.5 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-14

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 14.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 14.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Sandy GRAVEL (gws), brown, moist to wet, medium dense to dense										
			SS 1	44	10-7-16 (23)							
5												
			SS 2	89	5-6-9 (15)							
10												
			SS 3	89	8-4-4 (8)							
15												
			SS 4	67	10-16-13 (29)							
20												
25												
30		SANDSTONE tan, hard, highly weathered *** Auger refusal Bottom of hole at 30.5 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-15

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO
DATE STARTED 8/3/18 **COMPLETED** 8/7/18
GROUND ELEVATION ---- **HOLE SIZE** 4-inches
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 7.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 7.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with trace Cobbles and Boulders (FILL), brown, moist, dense	SS 1	100	50/3"							
5		Silty Clayey SAND with trace Cobbles and Boulders (sc), brown, moist to wet,	SS 2	67	6-25-17 (42)							
10			SS 3	0	50/1"							
15		Sandy GRAVEL (gws), tan, wet, medium dense	SS 4	67	5-8-12 (20)							
20												
25		*** Auger refusal on SANDSTONE bedrock Bottom of hole at 27.0 feet.										

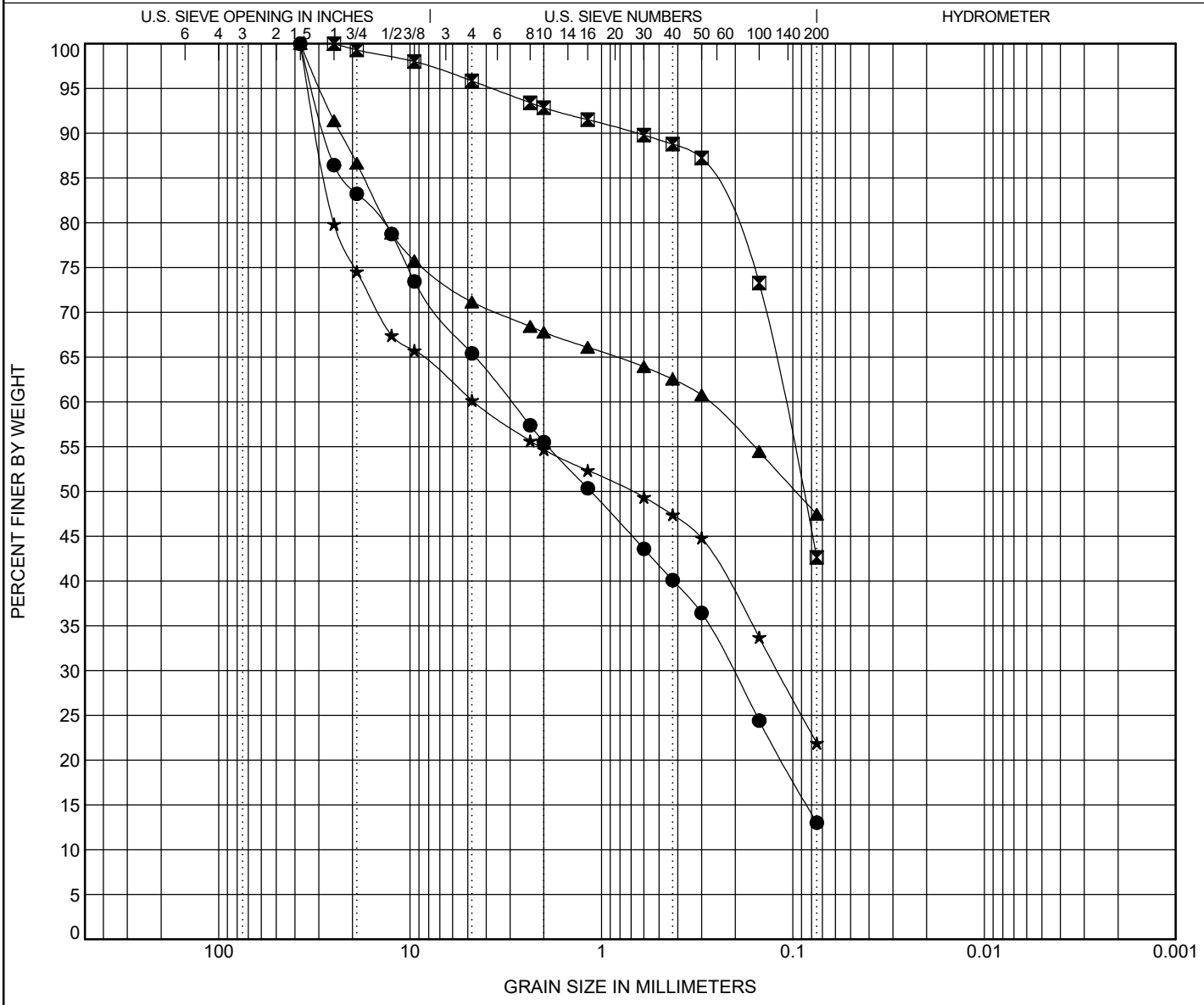
APPENDIX C
Laboratory Testing Results

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

GRAIN SIZE DISTRIBUTION

CLIENT City of Grand Junction **PROJECT NAME** Monument Road Trail

PROJECT NUMBER 00208-0087 **PROJECT LOCATION** Grand Junction, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	B-1, SS1	8/2018	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠	Composite	8/2018	SILTY SAND(SM)	22	21	1		
▲	HS-1, GB1	8/2018	SILTY, CLAYEY GRAVEL with SAND(GC-GM)	26	19	7		
★	HS-2, GB1	8/2018	SILTY, CLAYEY GRAVEL with SAND(GC-GM)	23	17	6		

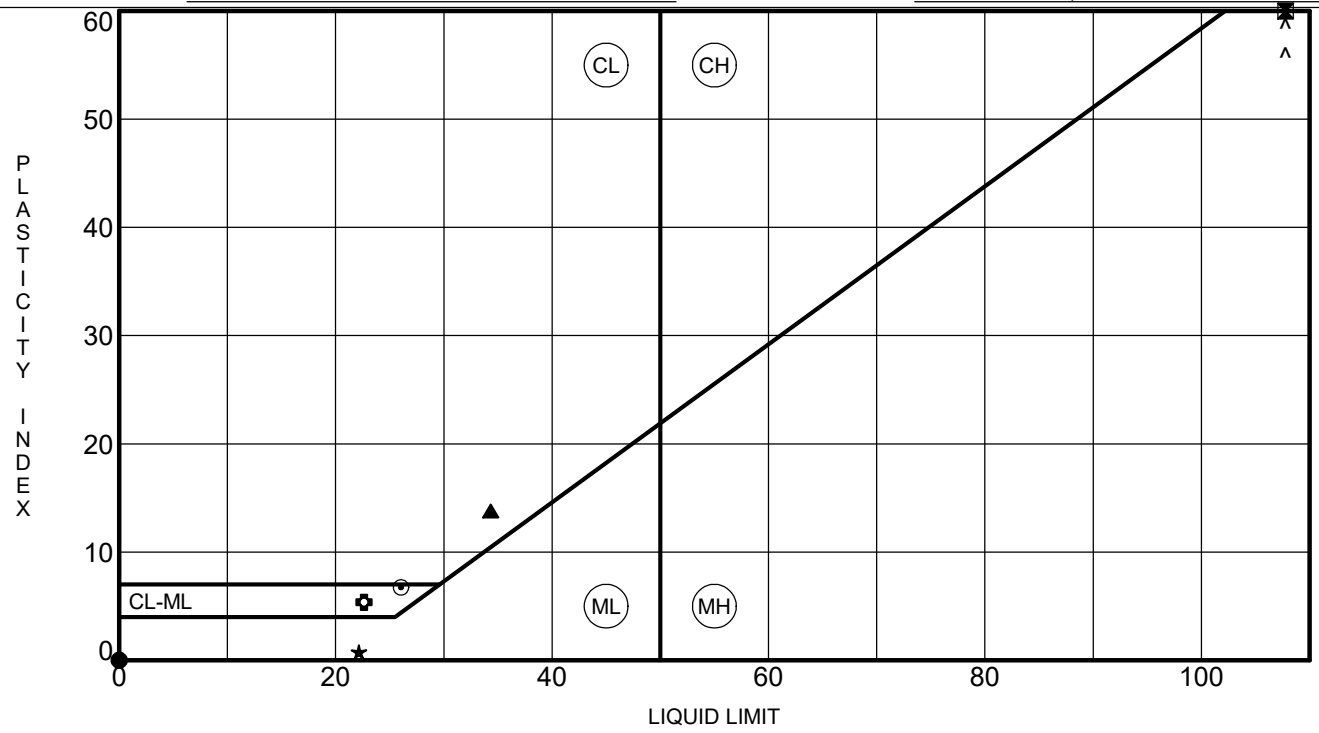
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1, SS1	8/2018	37.5	2.964	0.207		34.6	52.4	13.0	
⊠	Composite	8/2018	25	0.111			4.2	53.2	42.6	
▲	HS-1, GB1	8/2018	37.5	0.276			28.9	23.7	47.5	
★	HS-2, GB1	8/2018	37.5	4.629	0.121		39.8	38.3	21.9	

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

ATTERBERG LIMITS' RESULTS

CLIENT City of Grand Junction **PROJECT NAME** Monument Road Trail

PROJECT NUMBER 00208-0087 **PROJECT LOCATION** Grand Junction, CO



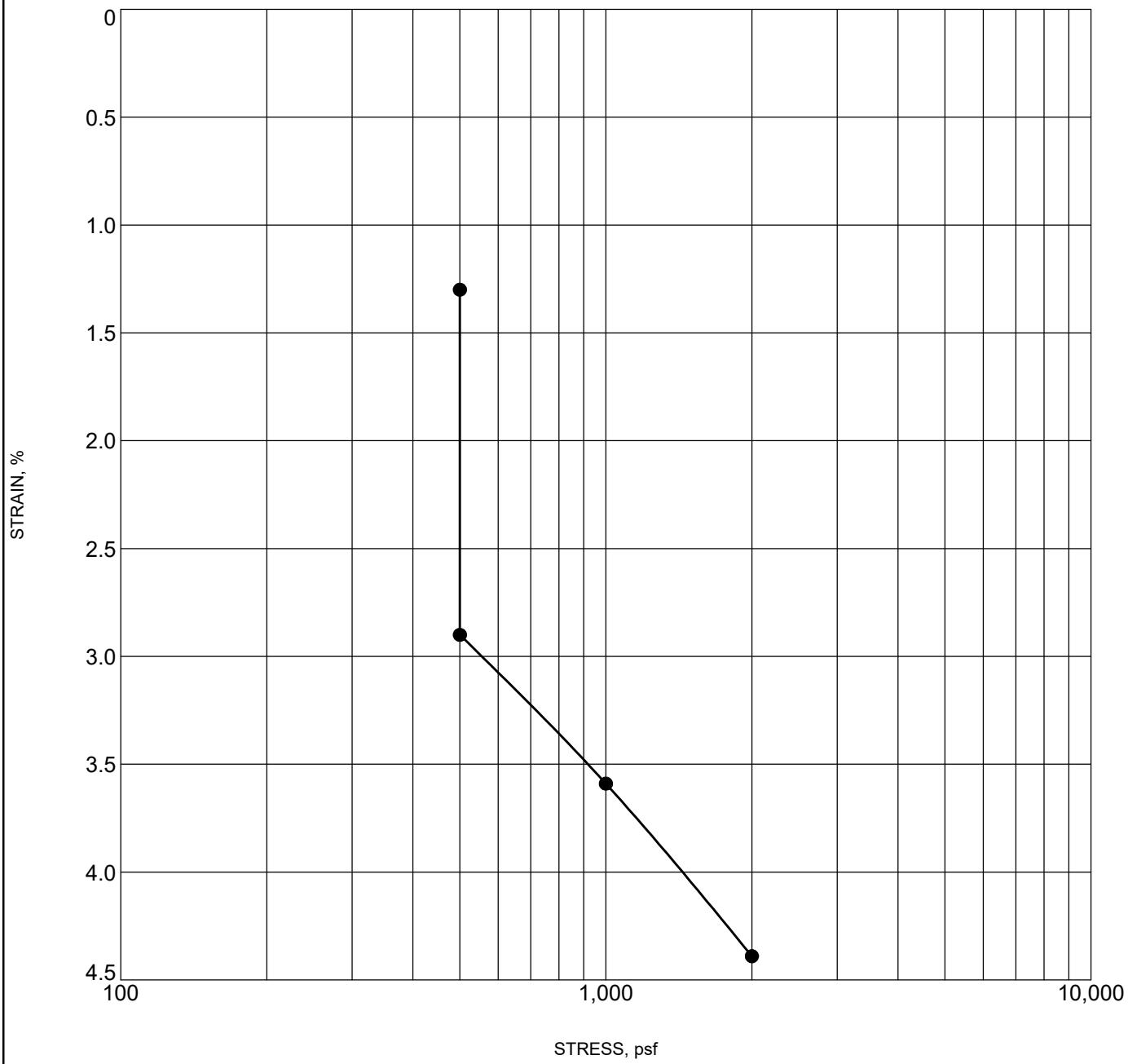
	Specimen Identification		LL	PL	PI	#200	Classification
●	**B-1, SS1**	**8/2018**	**NP**	**NP**	**NP**	**13**	**SILTY SAND with GRAVEL(SM)**
⧓	**B-2, SS2**	**8/2018**	**108**	**34**	**74**		
▲	**B-7, SS1**	**8/2018**	**34**	**21**	**13**		
★	**Composite**	**8/2018**	**22**	**21**	**1**	**43**	**SILTY SAND(SM)**
⊙	**HS-1, GB1**	**8/2018**	**26**	**19**	**7**	**47**	**SILTY, CLAYEY GRAVEL with SAND(GC-GM)**
✿	**HS-2, GB1**	**8/2018**	**23**	**17**	**6**	**22**	**SILTY, CLAYEY GRAVEL with SAND(GC-GM)**

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

CONSOLIDATION TEST

CLIENT City of Grand Junction **PROJECT NAME** Monument Road Trail

PROJECT NUMBER 00208-0087 **PROJECT LOCATION** Grand Junction, CO



Specimen Identification		Classification	γ_d	MC%
● **B-9**	**2.0**		**97**	**2**

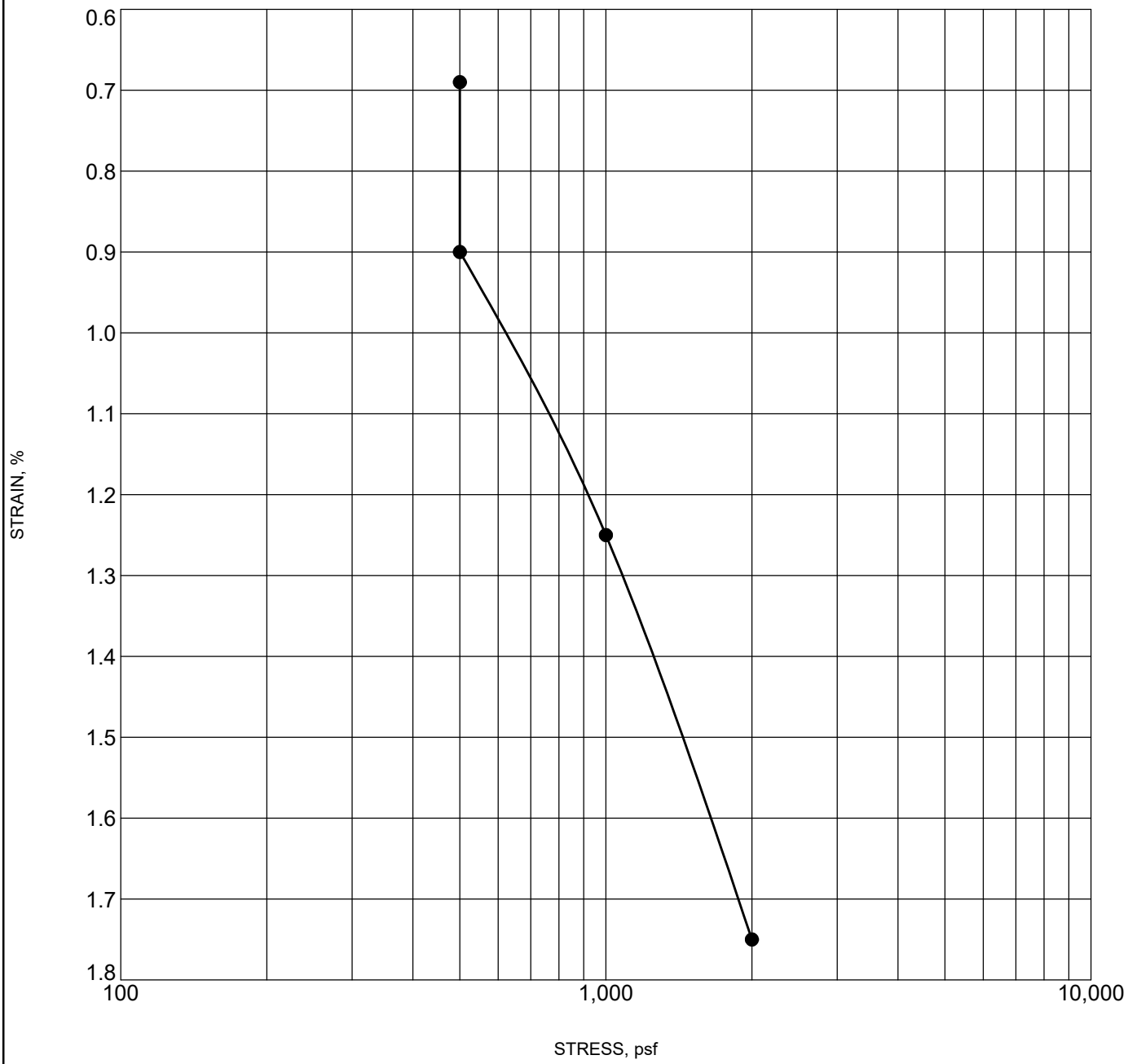
CONSOL STRAIN 00208-0087MONUMENT ROAD TRAIL.GPJ GINT US LAB.GDT 10/4/18

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

CONSOLIDATION TEST

CLIENT City of Grand Junction **PROJECT NAME** Monument Road Trail

PROJECT NUMBER 00208-0087 **PROJECT LOCATION** Grand Junction, CO



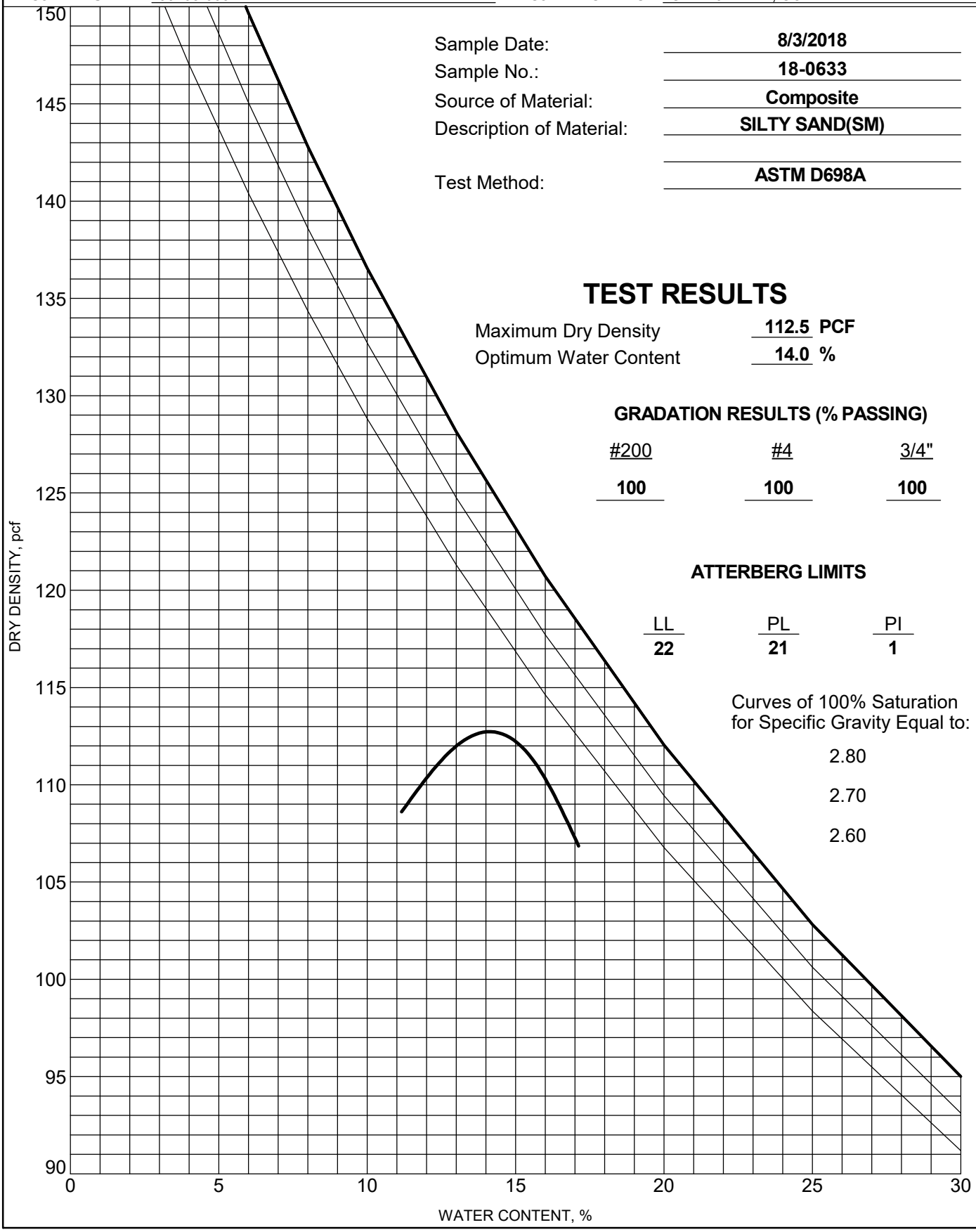
Specimen Identification		Classification	γ_d	MC%
● **B-10**	**2.0**		**98**	**19**

CONSOL STRAIN 00208-0087MONUMENT ROAD TRAIL.GPJ GINT US LAB.GDT 10/4/18

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction
PROJECT NAME Monument Road Trail
PROJECT NUMBER 00208-0087
PROJECT LOCATION Grand Junction, CO



Sample Date: **8/3/2018**
Sample No.: **18-0633**
Source of Material: **Composite**
Description of Material: **SILTY SAND(SM)**
Test Method: **ASTM D698A**

TEST RESULTS

Maximum Dry Density **112.5** PCF
Optimum Water Content **14.0** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
100	100	100

ATTERBERG LIMITS

LL	PL	PI
22	21	1

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

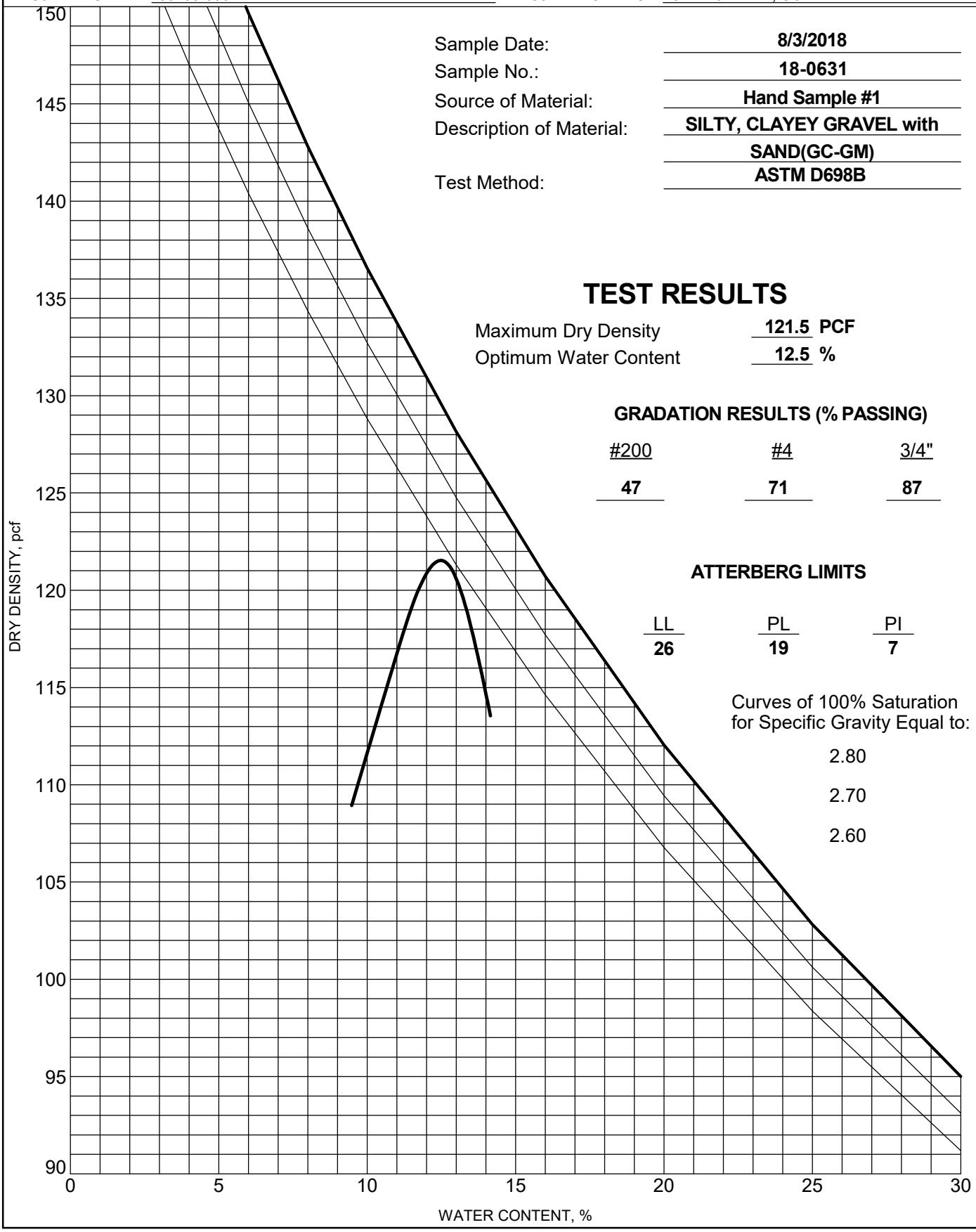
COMPACTION 00208-0087MONUMENT ROAD TRAIL.GPJ GINT US LAB.GDT 10/4/18

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction **PROJECT NAME** Monument Road Trail

PROJECT NUMBER 00208-0087 **PROJECT LOCATION** Grand Junction, CO



Sample Date: **8/3/2018**

Sample No.: **18-0631**

Source of Material: **Hand Sample #1**

Description of Material: **SILTY, CLAYEY GRAVEL with SAND(GC-GM)**

Test Method: **ASTM D698B**

TEST RESULTS

Maximum Dry Density **121.5** PCF

Optimum Water Content **12.5** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
47	71	87

ATTERBERG LIMITS

LL	PL	PI
26	19	7

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

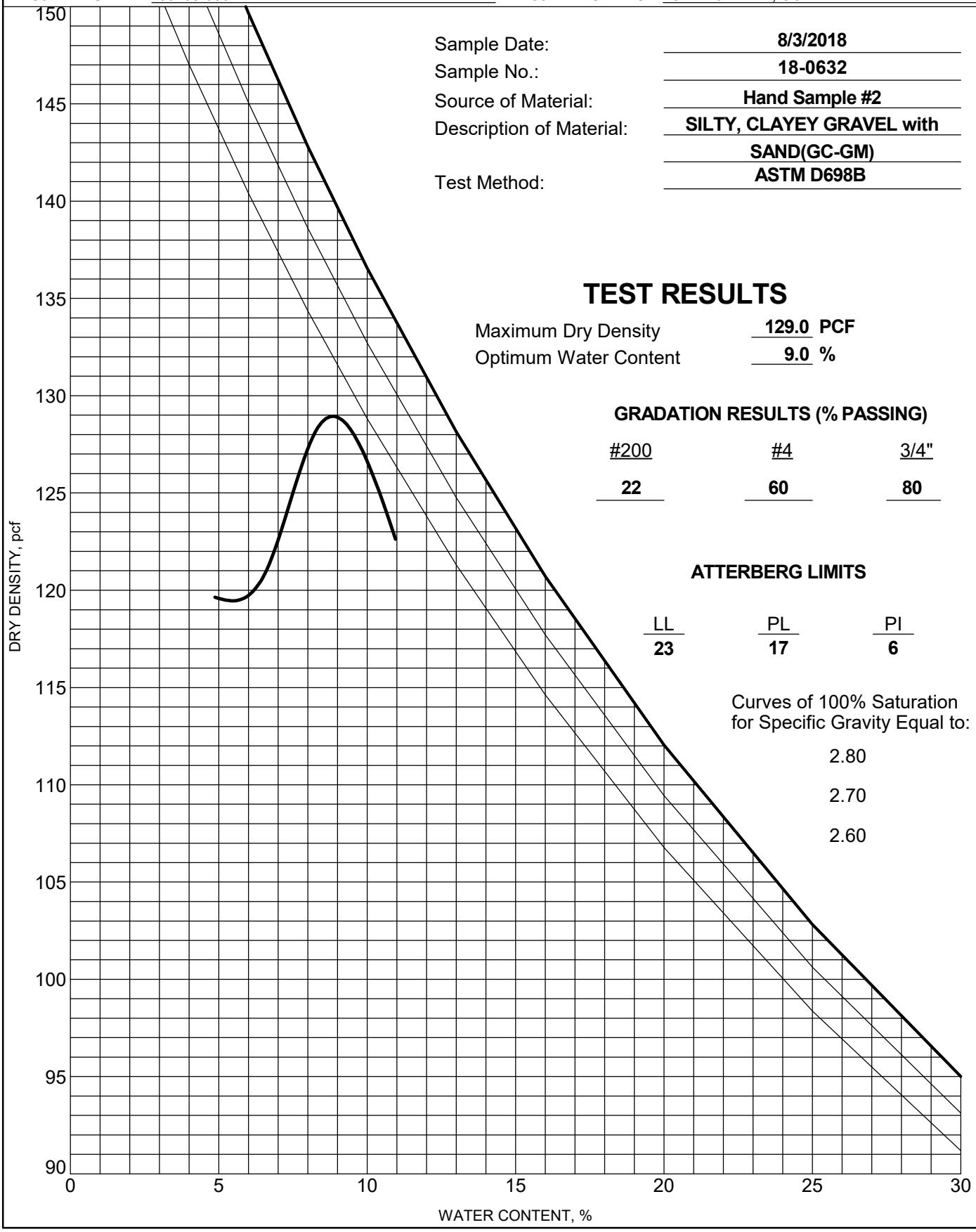
COMPACTION 00208-0087MONUMENT ROAD TRAIL.GPJ GINT US LAB.GDT 10/4/18

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction **PROJECT NAME** Monument Road Trail

PROJECT NUMBER 00208-0087 **PROJECT LOCATION** Grand Junction, CO



Sample Date: **8/3/2018**

Sample No.: **18-0632**

Source of Material: **Hand Sample #2**

Description of Material: **SILTY, CLAYEY GRAVEL with SAND(GC-GM)**

Test Method: **ASTM D698B**

TEST RESULTS

Maximum Dry Density **129.0** PCF

Optimum Water Content **9.0** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
22	60	80

ATTERBERG LIMITS

LL	PL	PI
23	17	6

Curves of 100% Saturation for Specific Gravity Equal to:

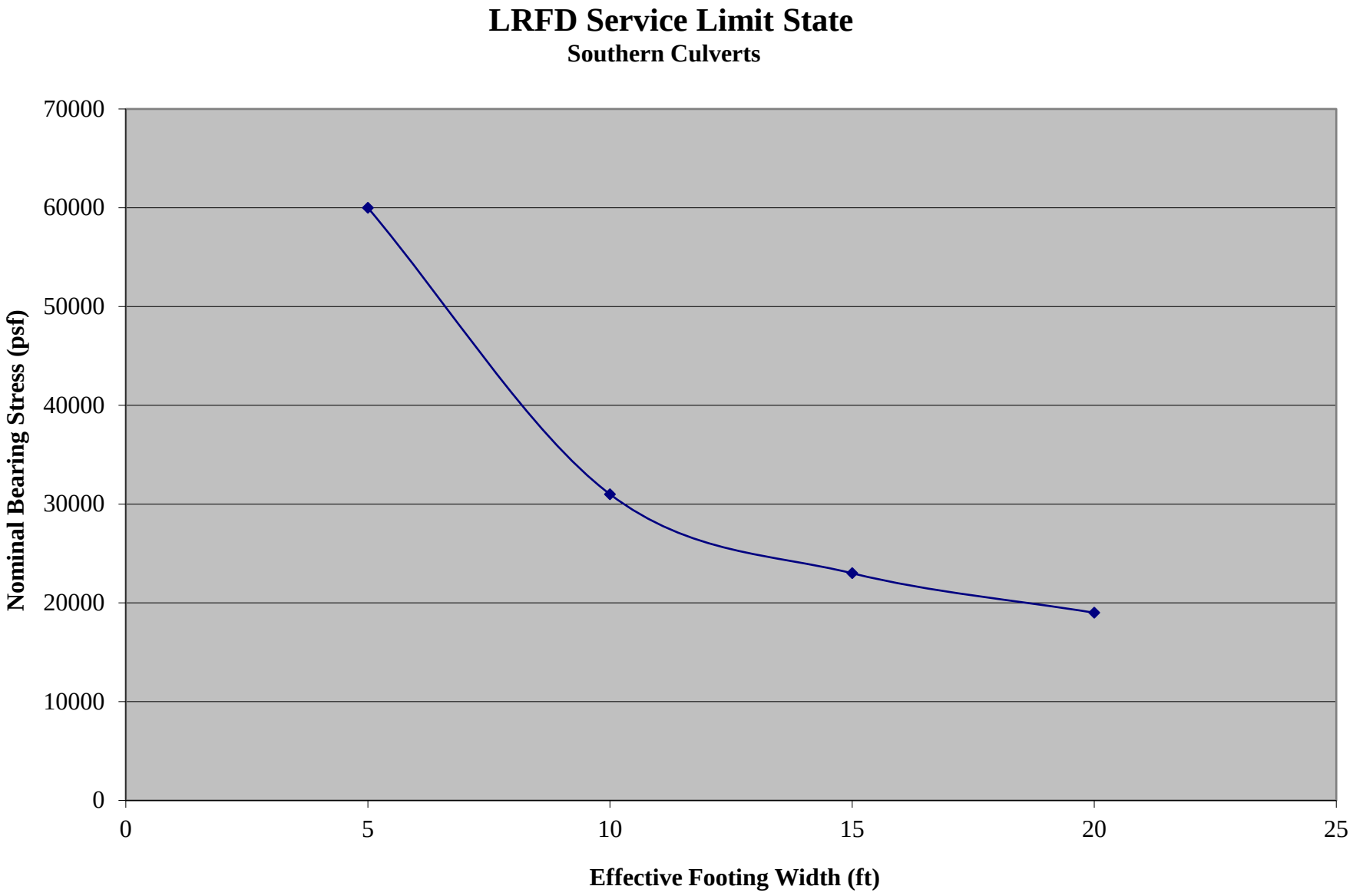
2.80

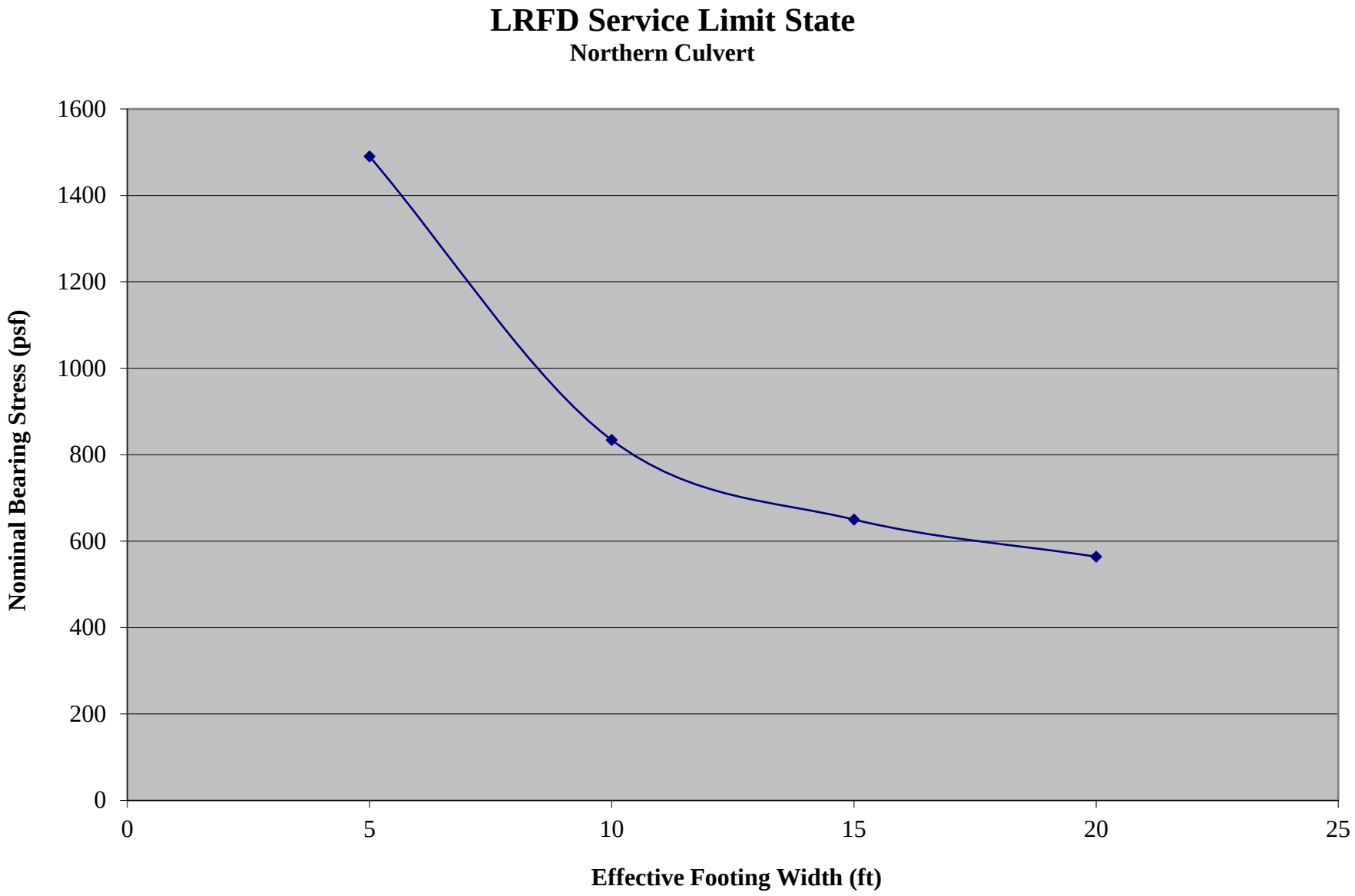
2.70

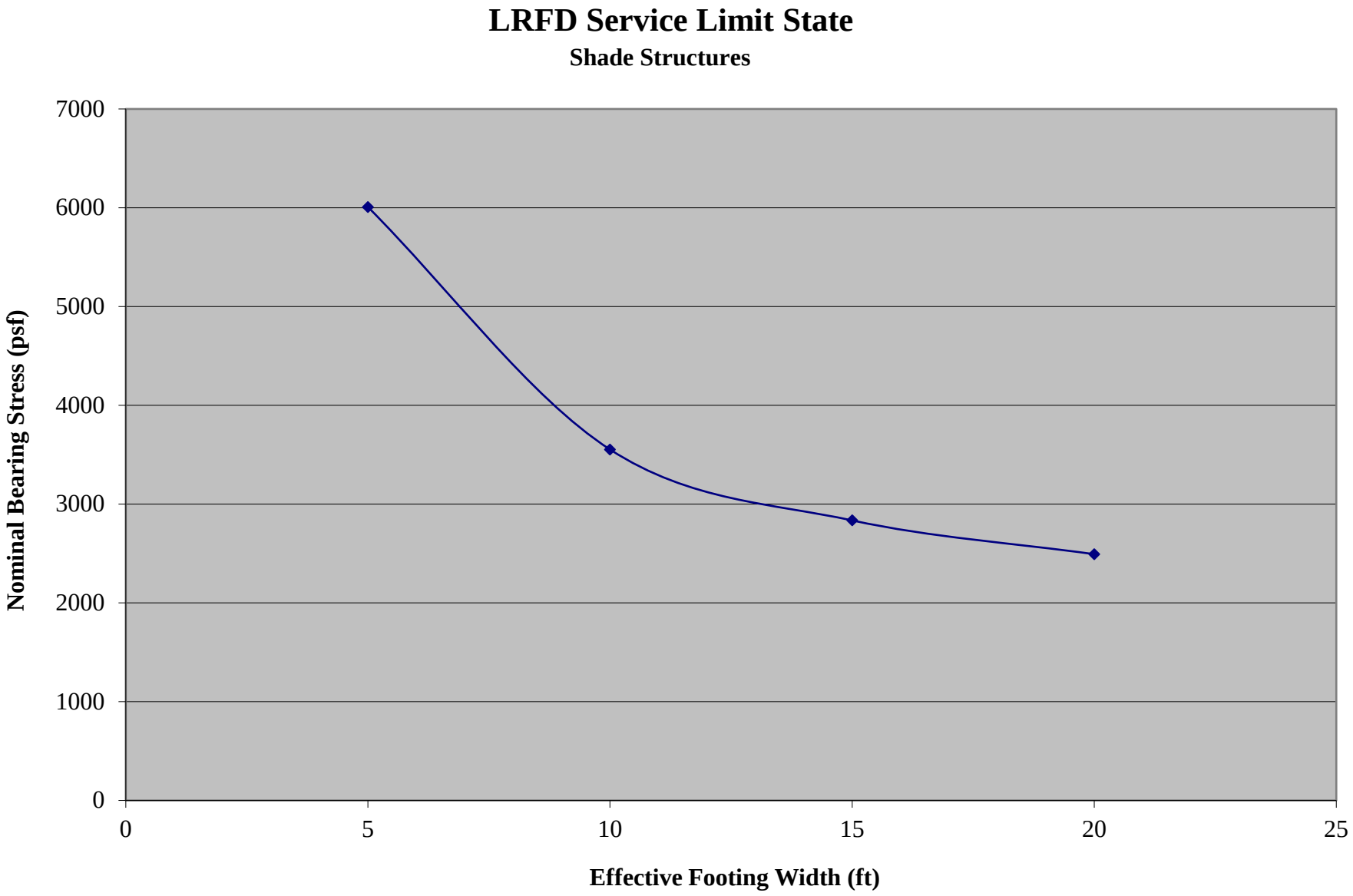
2.60

COMPACTION 00208-0087MONUMENT ROAD TRAIL.GPJ GINT US LAB.GDT 10/4/18

APPENDIX D
Bearing Resistance for Service Limit State

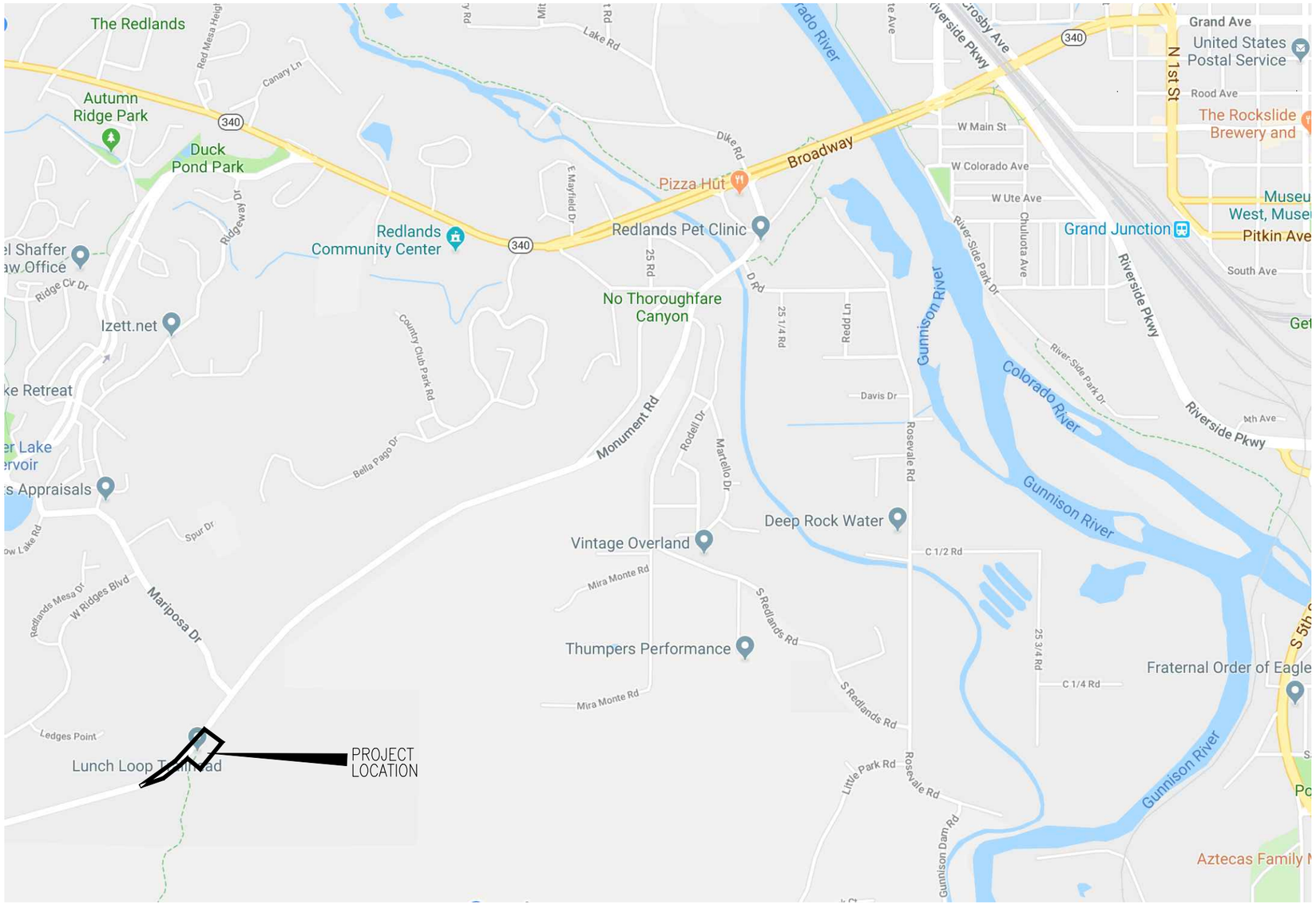

LRFD Service Limit State
Southern Culverts
70000
60000
50000
40000
30000
20000
10000
0
Nominal Bearing Stress (psf)
0
5
10
15
20
25
Effective Footing Width (ft)


LRFD Service Limit State
Northern Culvert
Nominal Bearing Stress (psf)
1600
1400
1200
1000
800
600
400
200
0
0
5
10
15
20
25
Effective Footing Width (ft)


LRFD Service Limit State
Shade Structures
Nominal Bearing Stress (psf)
7000
6000
5000
4000
3000
2000
1000
0
0
5
10
15
20
25
Effective Footing Width (ft)

APPENDIX C
Construction Drawings

LUNCH LOOP TRAILHEAD IMPROVEMENTS
MARCH 2020



1	Cover Sheet
CP-1	Control Plan
STM1	Storm Drain Plan and Profile
RM-1 – RM-3	Removal Plan
WP-1	Wall Plan and Profile
Si-1	Sheet Index for Improvement and Staking Plan
IM-1 – IM-15	Improvement Plan
ST-1 – ST-16	Staking Plans
XS-1 – XS-4	Cross Sections
SEQ-1	Summary of Earthwork Quantities
SWM1 – SWM4	Storm Water Management Plan
STR1 – STR2	Striping and Signage Plan

Know what's **below.** **Call** before you dig.

NOTE: NOTIFY AFFECTED UTILITY VENDOR 48 HOURS PRIOR TO EXCAVATIONS THAT WILL EXPOSE UTILITY LINES. THE UTILITY PLAN WILL HAVE A LISTING OF UTILITY VENDORS AND TELEPHONE NUMBERS.

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	TCP	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 NA NA NA
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

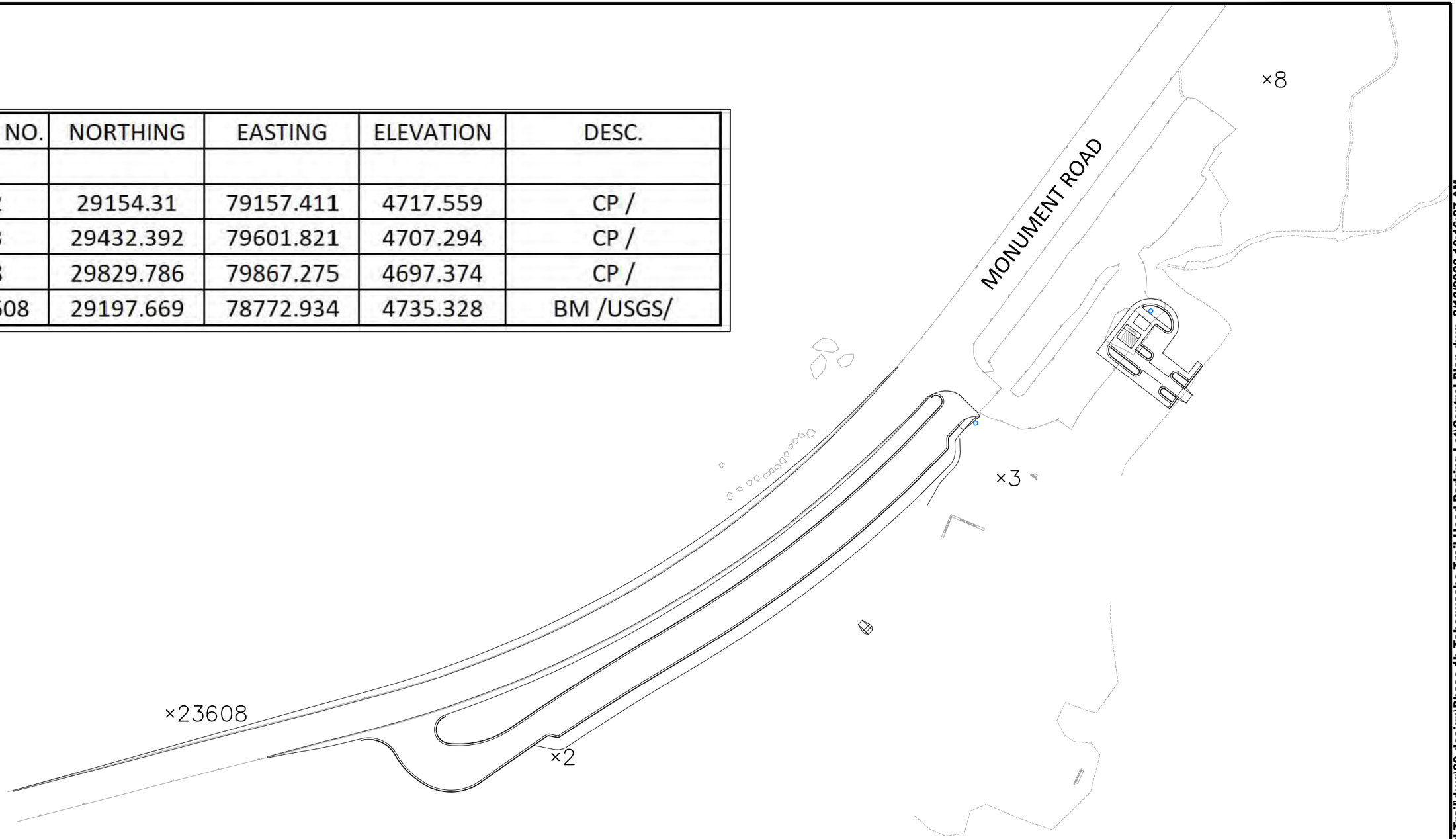
PUBLIC WORKS
ENGINEERING DIVISION

COVER SHEET

1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\COVER SHEET.dwg

PNT. NO.	NORTHING	EASTING	ELEVATION	DESC.
2	29154.31	79157.411	4717.559	CP /
3	29432.392	79601.821	4707.294	CP /
8	29829.786	79867.275	4697.374	CP /
23608	29197.669	78772.934	4735.328	BM /USGS/



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 25 50 100
VERTICAL 0 NA NA NA

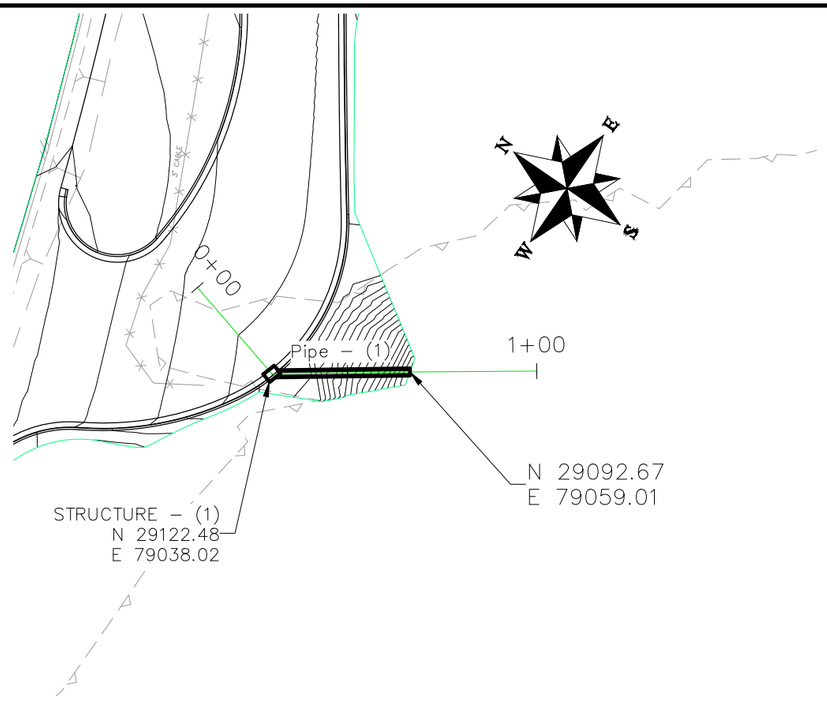
CITY OF Grand Junction COLORADO

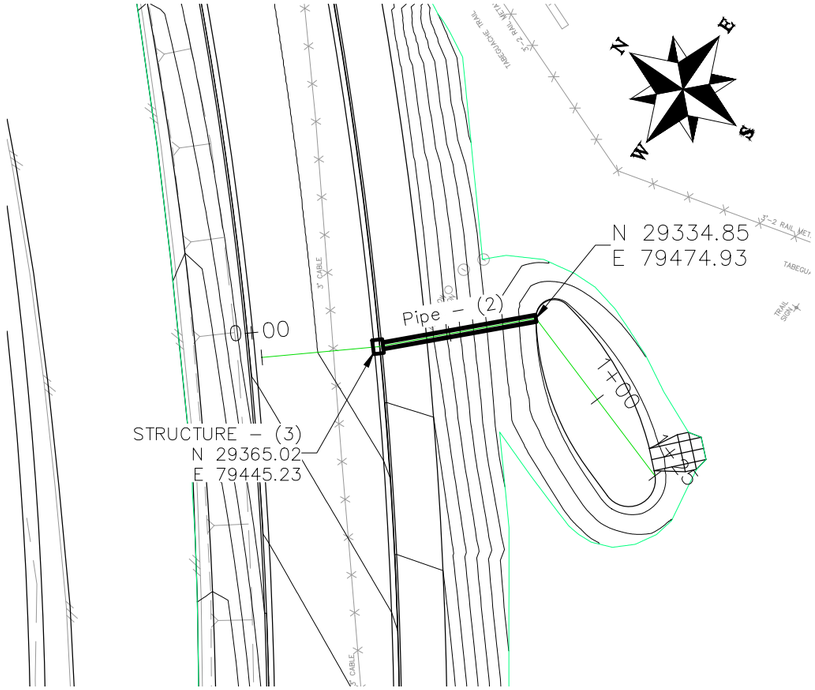
PUBLIC WORKS
ENGINEERING DIVISION

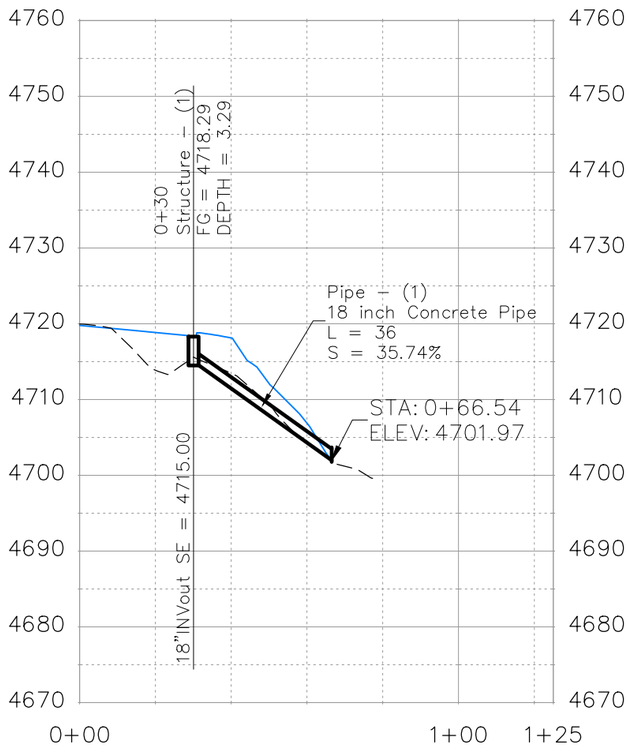
LUNCH LOOP TRAILHEAD
CONTROL PLAN

CP-1

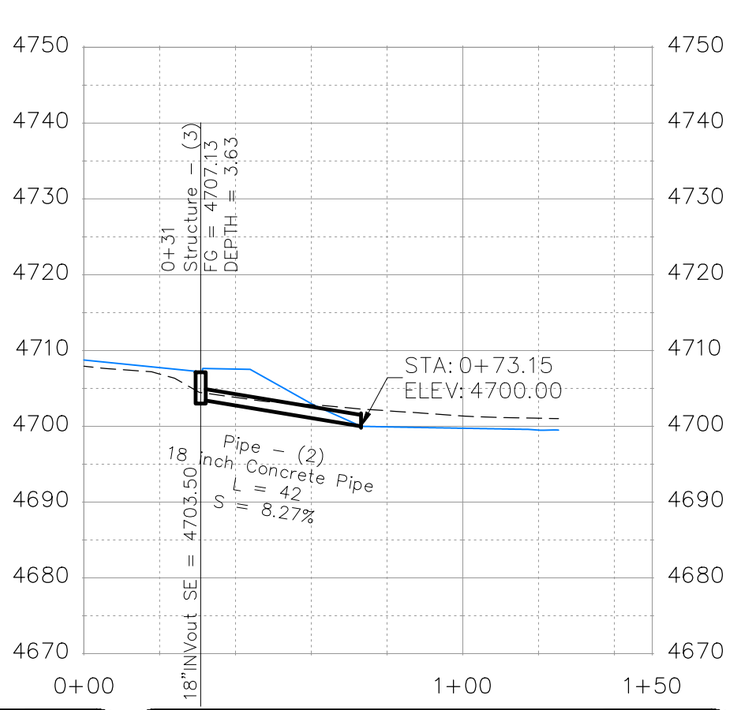
N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Control Plan.dwg, 2/18/2020 10:46:27 AM







BOTH STRUCTURES SHOWN SHALL BE SINGLE STORM DRAIN INLETS (VERTICAL CURB) (SEE CITY OF GRAND JUNCTION STANDARD DETAIL D-07).



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	BH	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 5 10 20

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
STORM DRAIN PLAN AND PROFILE

STM1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STORM DRAIN.dwg, 2/18/2020 10:51:16 AM

DAYLIGHT LINE

CLEAR AND GRUB

REMOVAL OF STRIPING BY GRINDING METHODS (WIDTH AS NEEDED TO COMPLETELY REMOVE LINE) (BOTH EDGE LINES, AND CENTER DOUBLE YELLOW TO LIMITS SHOWN)

REMOVAL OF ASPHALT MAT. CUT AND REMOVE ASPHALT AS SHOWN. (1'± STRIP BOTH SIDES OF ROAD) (INDICATED BY CROSS HATCH PATTERN)

19+50 | 20+00 | 20+50 | 21+00 | 21+50 | 22+00 | 22+50 | 23+00 | 23+50 | 24+00 | 24+50 | 25+00 | 25+50

MONUMENT RD

CLEAR AND GRUB

3" CABLE

3" CABLE

CP
N 29154.3100
E 79157.41
EL 4717.56

REMOVAL OF FENCE AS SHOWN. (HEIGHT AND MATERIAL AS SHOWN ON PLAN)

N

W E

S

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
REMOVAL PLAN

RM-1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\DEMOLITION PLAN.dwg, 2/18/2020 10:48:17 AM

REMOVAL OF STRIPING BY GRINDING METHODS (WIDTH AS NEEDED TO COMPLETELY REMOVE LINE) (BOTH EDGE LINES, AND CENTER DOUBLE YELLOW TO LIMITS SHOWN)

BOULDERS WILL REMAIN IN PLACE ON NORTH SIDE OF MONUMENT RD (TYPICAL)

RESET "ADOPT A ROAD" SIGN (BY CITY)

REMOVE BOULDERS AROUND TRAILHEAD SIGN AND KIOSK AND STOCKPILE PER PROJECT ENGINEER.

REMOVAL OF ASPHALT MAT. CUT AND REMOVE ASPHALT AS SHOWN. (1'± STRIP BOTH SIDES OF ROAD) (INDICATED BY CROSS HATCH PATTERN)

DAYLIGHT LINE

CLEAR AND GRUB

REMOVE AND SALVAGE "SIGN IN" SIGN

KIOSK REMOVED BY OTHERS.

REMOVAL OF GROUND SIGN. (SALVAGE TO CITY SHOPS)

PROTECT TRAILHEAD SIGN.

RESET SERVICE GATE (PEDESTRIAN GATE REMOVED BY OTHERS)

MONUMENT RD

25+50 26+00 26+50 27+00 27+50 28+00 28+50 29+00 29+50 30+00 30+50 31+00 31+50 2+00 1+50 1+00

RESET "STRETCH" SIGN. LOCATE PER PROJECT ENGINEER

REMOVAL OF FENCE AS SHOWN. (HEIGHT AND MATERIAL AS SHOWN ON PLAN)

RESET FENCE. (COORDINATE NEW LOCATION WITH PROJECT ENGINEER)

CLEAR AND GRUB

CP
N 29154.3100
E 79157.41
EL 4717.56

ADJUST BACKFLOW PREVENTION DEVICE AND IRRIGATION STRUCTURE TO GRADE.

DAYLIGHT LINE

REMOVAL OF FENCE AS SHOWN

CP
N 29432.3920
E 79601.82
EL 4707.29

N

W E

S

N:\Landproj\2019 Monument Road Traildwg\00 design\Phase 1b Tabeguache Trailhead Parking Lot\DEMOLITION PLAN.dwg

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

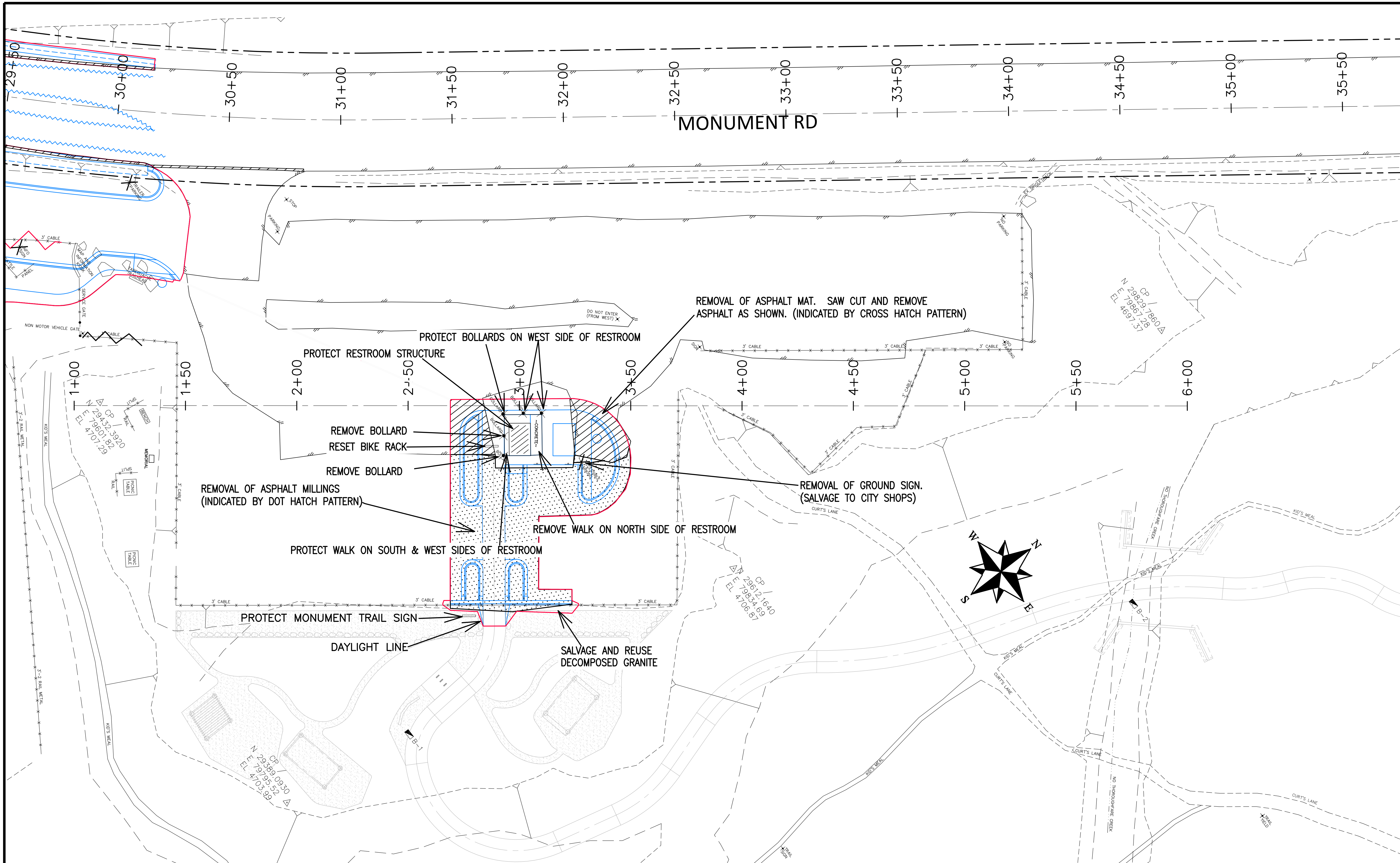
SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
REMOVAL PLAN

RM-2


MONUMENT RD
29+50
30+00
30+50
31+00
31+50
32+00
32+50
33+00
33+50
34+00
34+50
35+00
35+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
4+50
5+00
5+50
6+00
REMOVAL OF ASPHALT MAT. SAW CUT AND REMOVE
ASPHALT AS SHOWN. (INDICATED BY CROSS HATCH PATTERN)
PROTECT BOLLARDS ON WEST SIDE OF RESTROOM
PROTECT RESTROOM STRUCTURE
REMOVE BOLLARD
RESET BIKE RACK
REMOVE BOLLARD
REMOVAL OF ASPHALT MILLINGS
(INDICATED BY DOT HATCH PATTERN)
REMOVAL OF GROUND SIGN.
(SALVAGE TO CITY SHOPS)
REMOVE WALK ON NORTH SIDE OF RESTROOM
PROTECT WALK ON SOUTH & WEST SIDES OF RESTROOM
PROTECT MONUMENT TRAIL SIGN
DAYLIGHT LINE
SALVAGE AND REUSE
DECOMPOSED GRANITE
W
N
S
E

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\DEMOLITION PLAN.dwg

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

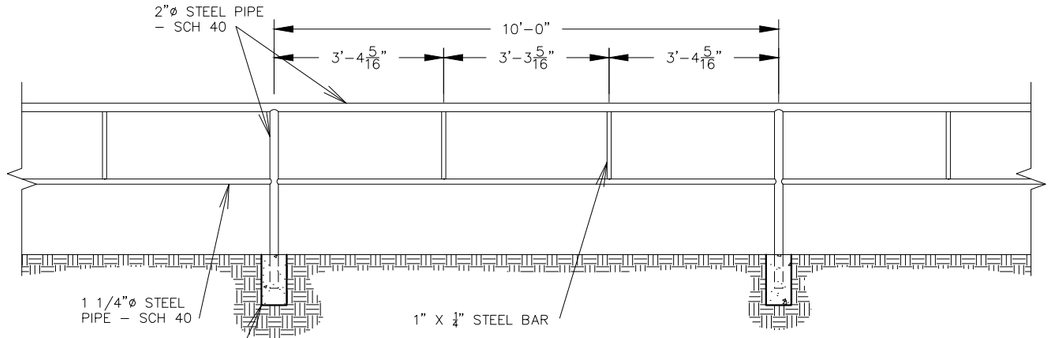
SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

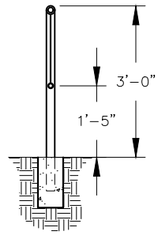
LUNCH LOOP TRAIL HEAD
REMOVAL PLAN

RM-3

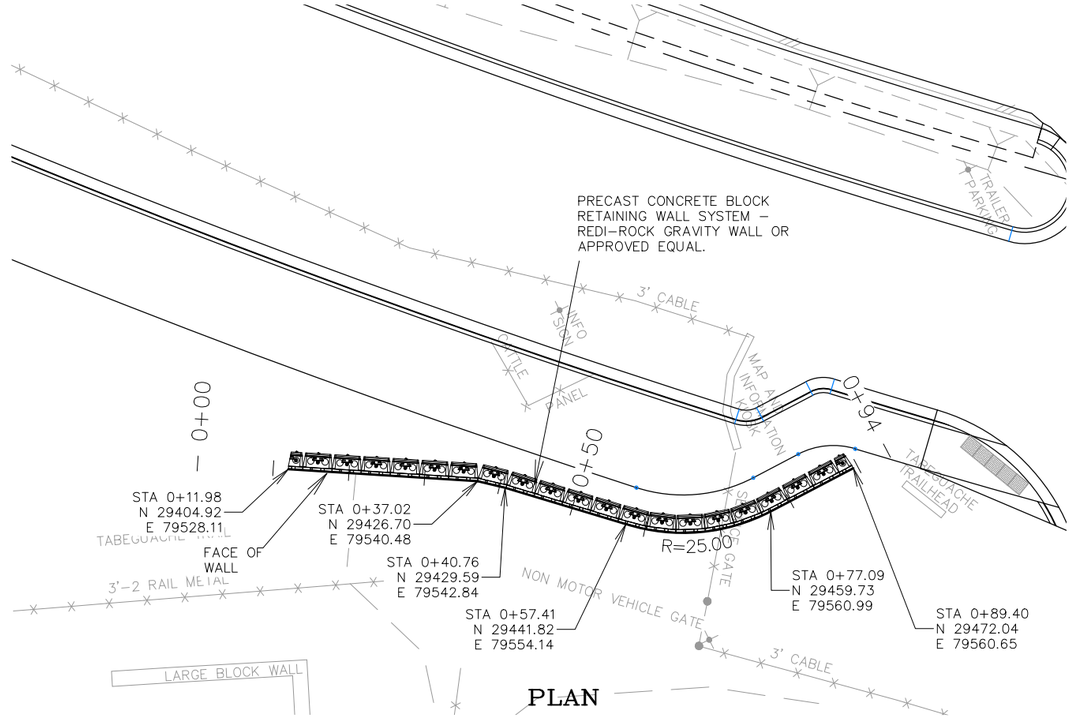


STEEL FENCE ELEVATION

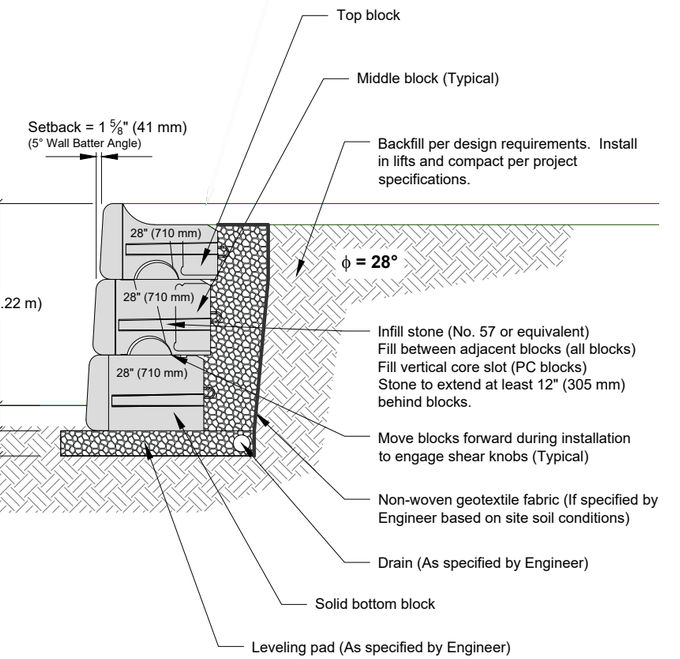
NOTE: ALL STEEL–TO–STEEL CONNECTIONS SHALL BE ALL–AROUND FILLET WELDS. STEEL FENCE SHALL BE SANDED TO REMOVE SHARP EDGES AND BURRS AND LEFT BARE TO RUST.



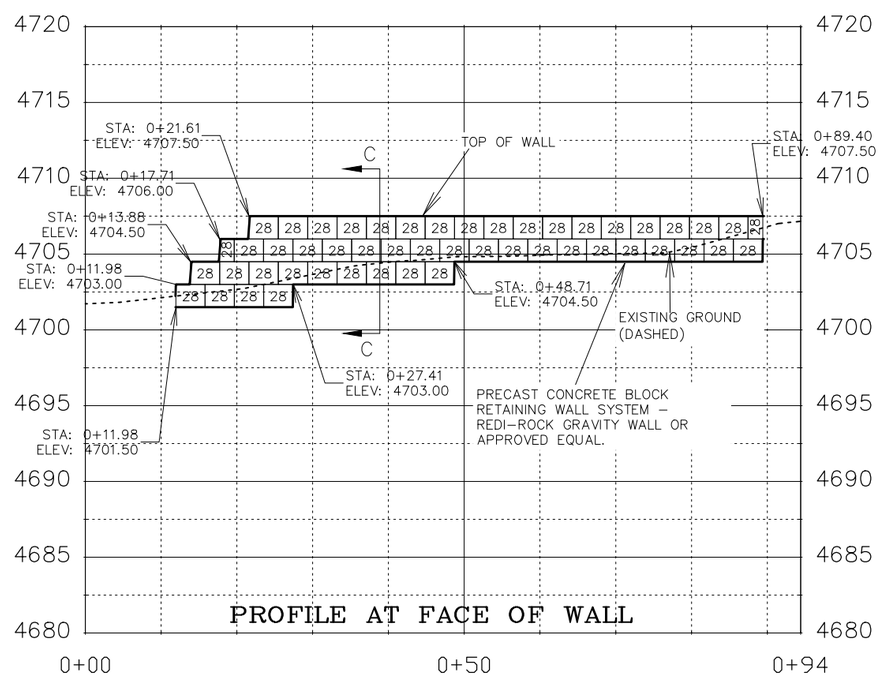
SECTION



PLAN



SECTION C–C



PROFILE AT FACE OF WALL

DESCRIPTION	DATE
REVISION 1 C.O.#2 (CIP WALL TO PRECAST)	5/24/2019
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES: PLAN & PROFILE
HORIZONTAL 0 5 10 20
VERTICAL 0 2.5 5 10

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
WALL PLAN AND PROFILE

WP-1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Wall Plan and Profile.dwg

NOTE:
IMPROVEMENT PLAN SHEET NO.S PREFACED WITH "IM-"
STAKING PLAN SHEET NO.S PREFACED WITH "ST-"

MONUMENT ROAD

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 25 50 100
VERTICAL 0 NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAILHEAD
IMPROVEMENT AND STAKING PLAN SHEET INDEX

Si-1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Sheet Index for Imp Pln and Stking Pln.dwg, 2/18/2020 10:56:36 AM

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING IMPROVEMENT PLAN

~INORGANIC MULCH (1"–2" RIVER COBBLE)
(4" THICK) (INCLUDES WEED BARRIER FABRIC)~

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(SPILL GUTTER) (INCLUDES 6" A.B.C.)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75,
BINDER GRADE PG 64–22) (TWO 1 $\frac{1}{2}$" LIFTS) OVER 6"
OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY
SOLID HATCH)

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(COLLECTOR GUTTER) (INCLUDES 6" A.B.C.)

SEE SHEET IM-2

N

W E

S

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–IMPROVEMENT PLAN

IM-1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING IMPROVEMENT PLAN

~INORGANIC MULCH (1"–2" RIVER COBBLE)
(4" THICK) (INCLUDES WEED BARRIER FABRIC)~

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(SPILL GUTTER) (INCLUDES 6" A.B.C.)

3' CABLE

3' CABLE

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75,
BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6"
OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY
SOLID HATCH)

SEE SHEET IM-1

SEE SHEET IM-3

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(COLLECTOR GUTTER) (INCLUDES 6" A.B.C.)

COLORED
CONCRETE SIDEWALK (6" THICK)
(INCLUDES 6" A.B.C.)

METAL FENCE

N 29154.3100
E 79157
EL

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–IMPROVEMENT PLAN

IM-2

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING IMPROVEMENT PLAN

~INORGANIC MULCH (1"–2" RIVER COBBLE)
(4" THICK) (INCLUDES WEED BARRIER FABRIC)~

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(SPILL GUTTER) (INCLUDES 6" A.B.C.)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75,
BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6"
OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY
SOLID HATCH)

3' CABLE

SEE SHEET IM-2

SEE SHEET IM-4

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(COLLECTOR GUTTER) (INCLUDES 6" A.B.C.)

METAL FENCE

COLORED
CONCRETE SIDEWALK (6" THICK)
(INCLUDES 6" A.B.C.)

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–IMPROVEMENT PLAN

IM-3

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING IMPROVEMENT PLAN

~INORGANIC MULCH (1"–2" RIVER COBBLE)
(4" THICK) (INCLUDES WEED BARRIER FABRIC)~

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(SPILL GUTTER) (INCLUDES 6" A.B.C.)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75,
BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6"
OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY
SOLID HATCH)

SEE SHEET IM-3

SEE SHEET IM-5

3' CABLE

3' CABLE

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(COLLECTOR GUTTER) (INCLUDES 6" A.B.C.)

COLORED
CONCRETE SIDEWALK (6" THICK)
(INCLUDES 6" A.B.C.)

METAL FENCE

BACKFLOW PREVENTION

SEE STAKING PLANS FOR
WATER QUALITY POND
AND CONCRETE SPILLWAY

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–IMPROVEMENT PLAN

IM-4

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING IMPROVEMENT PLAN

SEE SHEET IM-4

~INORGANIC MULCH (1"–2" RIVER COBBLE)
(4" THICK) (INCLUDES WEED BARRIER FABRIC)~

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(SPILL GUTTER) (INCLUDES 6" A.B.C.)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75,
BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6"
OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY
SOLID HATCH)

DETECTABLE WARNING PLATES
(WET SET)

COLORED
CONCRETE CURB RAMP (8" THICK)
(INCLUDES 6" A.B.C.)

3' CABLE

COLORED
CONCRETE CURB AND GUTTER (2' WIDE)
(COLLECTOR GUTTER) (INCLUDES 6" A.B.C.)

INFO SIGN

MAP AND INFORMATION KIOSK

TABEGUACHE TRAILHEAD

COLORED
CONCRETE SIDEWALK (6" THICK)
(INCLUDES 6" A.B.C.)

METAL FENCE

RESET SERVICE GATE

SEE WALL PLAN
AND PROFILE

NON MOTOR VEHICLE GATE

3' CABLE

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA 5 NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–IMPROVEMENT PLAN

IM-5

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

ALL BOLLARDS ON WEST SIDE OF RESTROOM SHALL REMAIN IN PLACE. BOLLARDS TO HAVE ½" EXPANSION JOINT MATERIAL PLACED AROUND THEM. IF BOLLARDS ARE DISTURBED DURING CONSTRUCTION THEY SHALL BE RESTORED TO PRECONSTRUCTION CONDITION AND PLUMBED BACK UP.

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

TRANSITION FROM 6" CURB HEIGHT TO 0" CURB HEIGHT (SEE STAKING PLANS FOR ADDITIONAL INFORMATION) (COST INCIDENTAL TO CONCRETE CURB AND GUTTER PAY ITEM)

2+50

3+00

3+50

REMOVE AND REPLACE CONCRETE SIDEWALK ON NORTHEAST SIDE OF BUILDING (SOUTH AND WEST WALKS REMAIN IN PLACE)

BOLLARD

BOLLARD

BOLLARD

TRANSITION FROM 6" CURB HEIGHT TO 0" CURB HEIGHT (SEE STAKING PLANS FOR ADDITIONAL INFORMATION) (COST INCIDENTAL TO CONCRETE CURB AND GUTTER PAY ITEM)

~CONCRETE~

~STEEL CHANGING ROOM (BY OTHERS)~

RESET BIKE RACK

INORGANIC MULCH (1"–2" RIVER COBBLE) (4" THICK) (INCLUDES WEED BARRIER FABRIC)

DETECTABLE WARNING PLATES (WET SET)

PROVIDE 4" PVC PIPE IN CONCRETE SLAB AT SIGN LOCATIONS

TRANSITION FROM 6" CURB HEIGHT TO 0" CURB HEIGHT (SEE STAKING PLANS FOR ADDITIONAL INFORMATION) (COST INCIDENTAL TO CONCRETE CURB AND GUTTER PAY ITEM)

3' CABLE

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

5' (TYPICAL)

COLORED CONCRETE CURB AND GUTTER (2' WIDE) (SPILL GUTTER) (INCLUDES 6" A.B.C.)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

SEE SHEET IM-7

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES: PLAN & PROFILE HORIZONTAL 0 2.5 5 10 VERTICAL 0 NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
PARKING LOT IMPROVEMENT PLAN

IM-6

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

DETECTABLE WARNING PLATES (WET SET)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

HOT MIX ASPHALT (3 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 1 ½" LIFTS) OVER 6" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

COLORED CONCRETE CURB AND GUTTER (2' WIDE) (COLLECTOR GUTTER) (INCLUDES 6" A.B.C.)

3' CABLE

3' CABLE

EXISTING MONUMENT SIGN, PROTECT IN PLACE

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

COLORED CONCRETE SIDEWALK (6" THICK) (INCLUDES 6" A.B.C.)

TRANSITION FROM 6" CURB HEIGHT TO 0" AT EDGE OF THROUGH GUTTER (SEE STAKING PLANS FOR ADDITIONAL INFORMATION) (COST INCIDENTAL TO CONCRETE CURB AND GUTTER PAY ITEM)

TRAIL HEAD IMPROVEMENTS COMPLETED NOV 2019

COLORED CONCRETE CURB RAMP (8" THICK) (INCLUDES 6" A.B.C.)

B-1

N

W

E

S

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
PARKING LOT IMPROVEMENT PLAN

IM-7

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

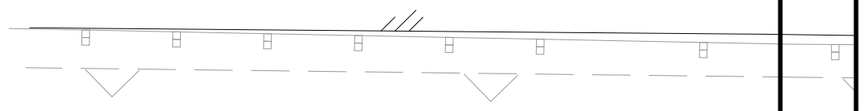
ROADSIDE SWALE (SEE STAKING PLANS)

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

"T" TOP REQUIRED AT SAWCUT LINE PER CITY STD DETAIL GU-03

19+00 | 19+50 | 20+00 | 20+50

SEE SHEET IM-9



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

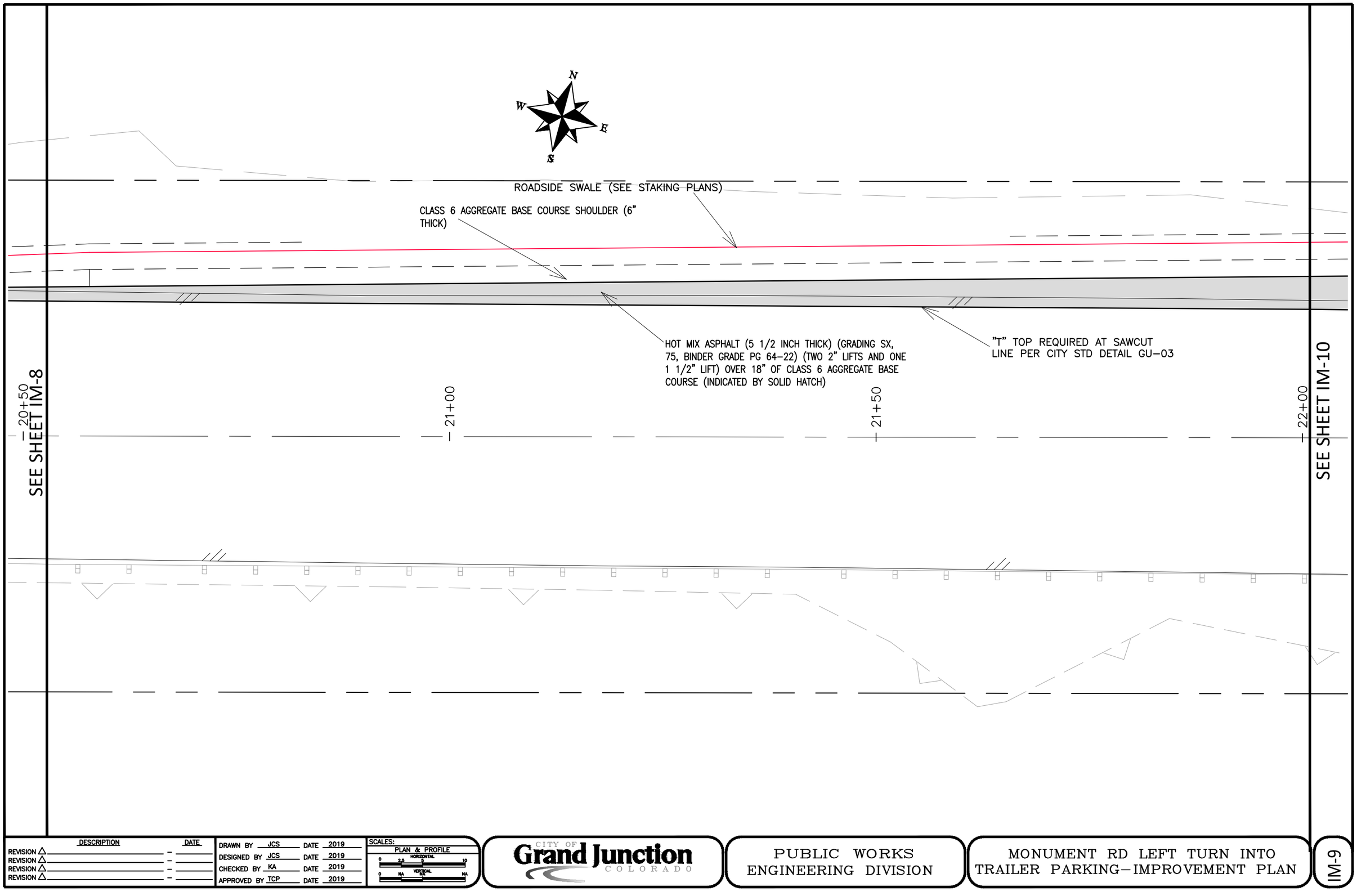
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING-IMPROVEMENT PLAN

IM-8

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING–IMPROVEMENT PLAN

IM-9

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

N

W E

S

ROADSIDE SWALE (SEE STAKING PLANS)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

22+00

22+50

23+00

23+50

SEE SHEET IM-9

SEE SHEET IM-11

"T" TOP REQUIRED AT SAWCUT LINE PER CITY STD DETAIL GU-03

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

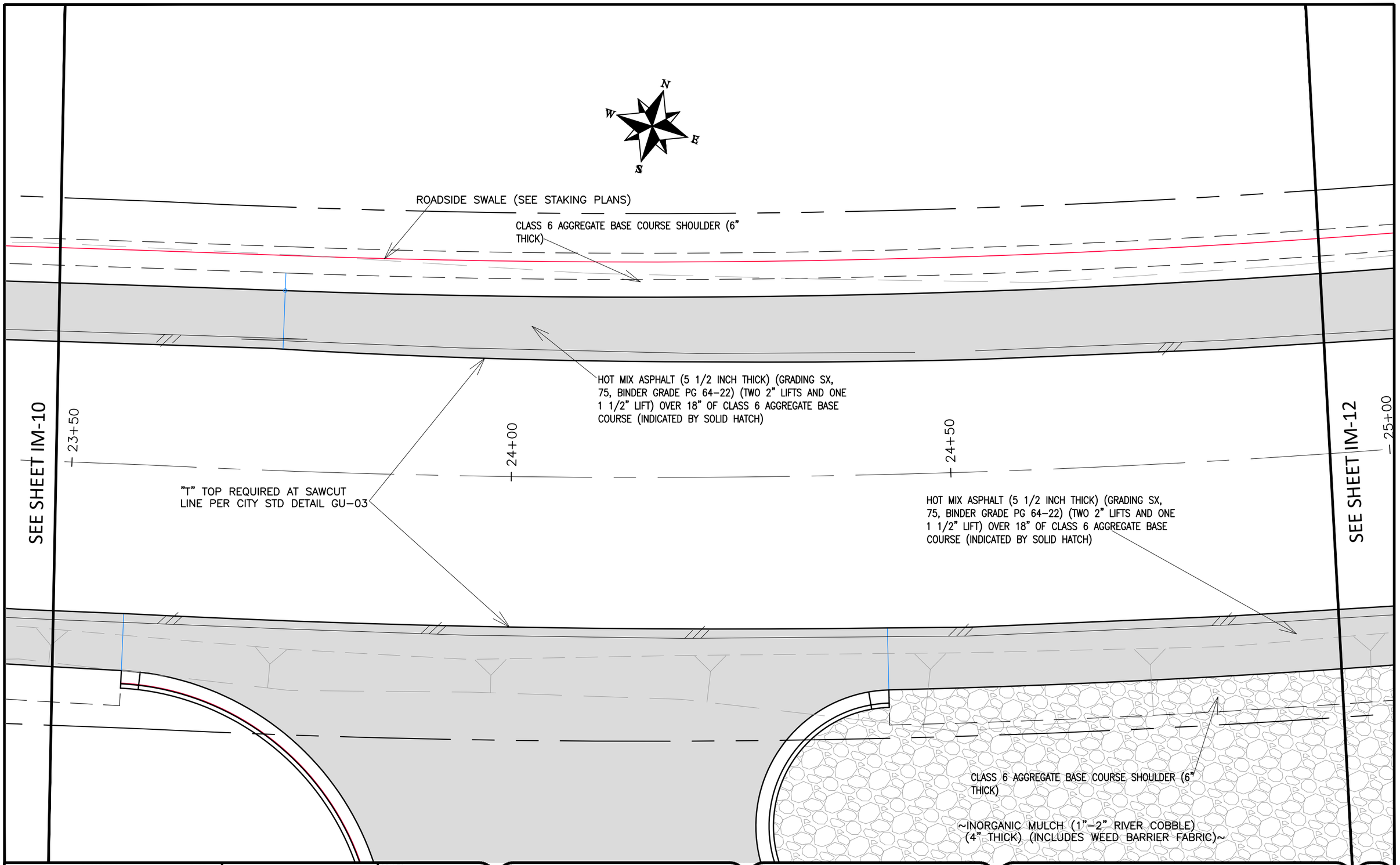
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING-IMPROVEMENT PLAN

IM-10

N:\Landproj\2019 Monument Road Traildwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg



DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING-IMPROVEMENT PLAN

IM-11

N:\Landproj\2019 Monument Road Traildwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

ROADSIDE SWALE (SEE STAKING PLANS)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

25+00

25+50

26+00

"T" TOP REQUIRED AT SAWCUT LINE PER CITY STD DETAIL GU-03

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

~INORGANIC MULCH (1"-2" RIVER COBBLE) (4" THICK) (INCLUDES WEED BARRIER FABRIC)~

SEE SHEET IM-11

SEE SHEET IM-13

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING-IMPROVEMENT PLAN

IM-12

ROADSIDE SWALE (SEE STAKING PLANS)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

26+50

27+00

"T" TOP REQUIRED AT SAWCUT LINE PER CITY STD DETAIL GU–03

27+50

SEE SHEET IM-12

SEE SHEET IM-14

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64–22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

~INORGANIC MULCH (1"–2" RIVER COBBLE) (4" THICK) (INCLUDES WEED BARRIER FABRIC)~

SEE TRAILER PARKING IMPROVEMENT PLAN

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

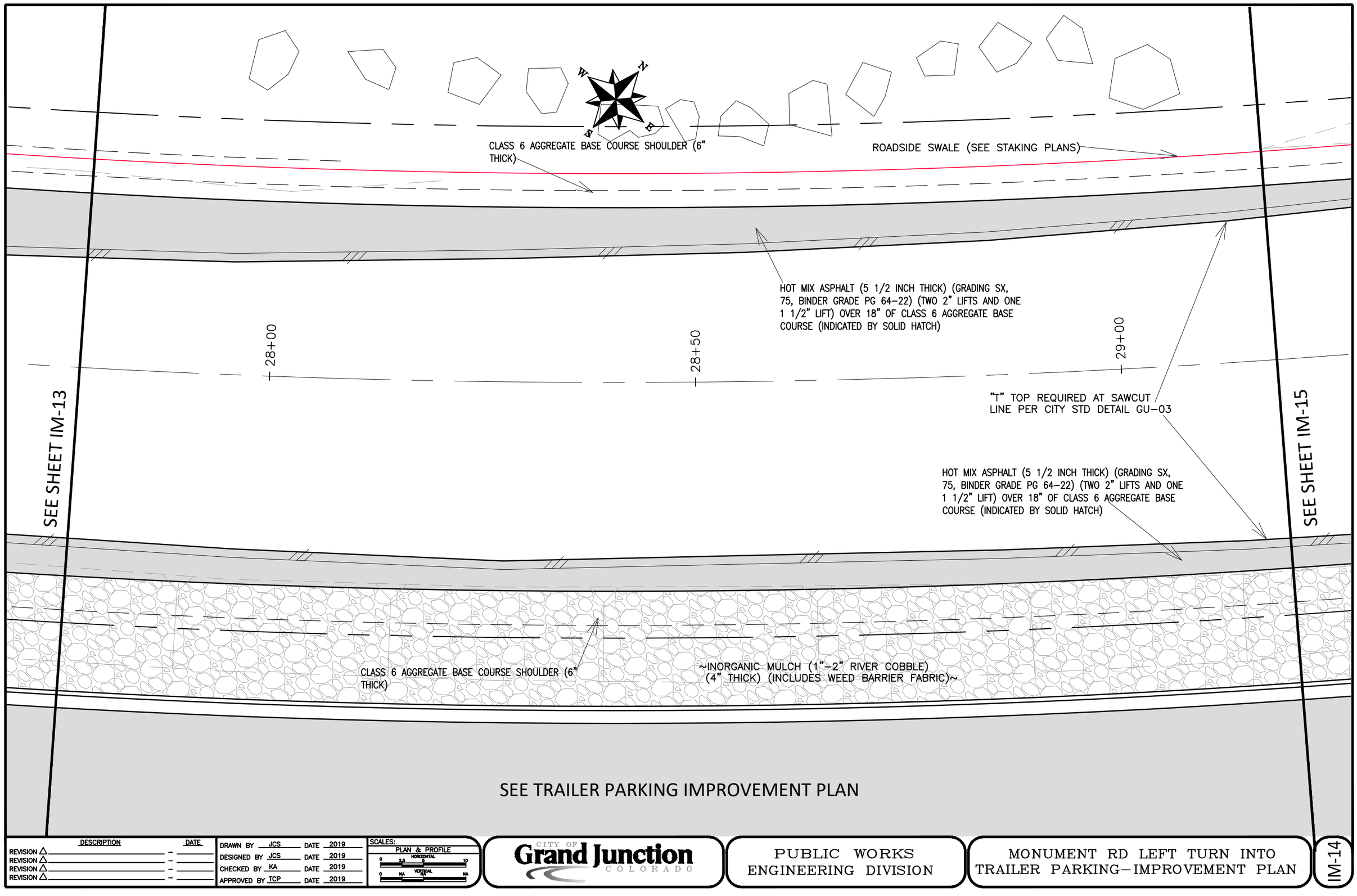
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING–IMPROVEMENT PLAN

IM-13

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg



DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING-IMPROVEMENT PLAN

IM-14

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

ROADSIDE SWALE (SEE STAKING PLANS)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

29+50

30+00

30+50

"T" TOP REQUIRED AT SAWCUT LINE PER CITY STD DETAIL GU-03

SEE SHEET IM-14

HOT MIX ASPHALT (5 1/2 INCH THICK) (GRADING SX, 75, BINDER GRADE PG 64-22) (TWO 2" LIFTS AND ONE 1 1/2" LIFT) OVER 18" OF CLASS 6 AGGREGATE BASE COURSE (INDICATED BY SOLID HATCH)

CLASS 6 AGGREGATE BASE COURSE SHOULDER (6" THICK)

~INORGANIC MULCH (1"-2" RIVER COBBLE) (4" THICK) (INCLUDES WEED BARRIER FABRIC)~

SEE TRAILER PARKING IMPROVEMENT PLAN

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING-IMPROVEMENT PLAN

IM-15

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\IMPROVEMENT PLAN.dwg

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING STAKING PLAN

22.94 22.82 22.71 22.63 22.49 22.34 22.17 22.02 21.73

N 29172.32
E 78963.14
EL 22.80

N 29175.70
E 78975.01
EL 22.70

N 29179.07
E 78986.88
EL 22.60

N 29182.44
E 78998.76
EL 22.50

N 29185.82
E 79010.63
EL 22.40

N 29189.19
E 79022.51
EL 22.30

N 29192.56
E 79034.38
EL 22.20

N 29196.18
E 79047.13
EL 22.09

N 29201.90
E 79063.60
EL 21.95

R1148.31 R1149.31 R1149.31

22.80 22.77 22.70 22.65 22.58 22.09 22.05 22.11 22.03 21.87 22.01

N 29170.39
E 78963.63
EL 22.67

N 29171.29
E 78969.91
EL 23.08

N 29194.29
E 79047.77
EL 22.01

N 29166.96
E 78964.57
EL 22.28

N 29170.82
E 78965.60
EL 23.15

CURB HT TRANSITION

CURB HT TRANSITION

R300.00

4722.0

21.85 21.91

N 29193.51
E 79045.93
EL 22.61

N 29185.42
E 79039.18
EL 22.41

R350.00

4721.0

N 29165.27
E 78982.12
EL 22.27

N 29156.28
E 78997.07
EL 21.44

21.06 20.94

4721.0

N 29153.71
E 78995.77
EL 21.93

N 29168.10
E 79050.52
EL 20.99

20.49 20.43

N 29167.68
E 79067.20
EL 20.72

N 29183.33
E 79112.07
EL 19.93

DAYLIGHT LINE

20.22 20.16

R90.00

4722.0

4721.0

N 29141.05
E 79001.82
EL 22.24

4720.0

R52.00

N 29137.92
E 79005.42
EL 21.66

SEE SHEET ST-2

18.92 18.80

4719.0

N 29126.16
E 79027.11
EL 19.30

N 29122.57
E 79032.27
EL 19.00

18.41 18.29

R2498.00

SEE INSET LEFT FOR FILL INTO DRAW

N 29121.51
E 79037.74
EL 18.79

18.62 18.50

N 29108.19
E 79039.40
EL 17.26

R52.00

N 29129.41
E 79086.84
EL 19.27

N 29128.99
E 79083.53
EL 19.00

N 29121.51
E 79037.74
EL 18.79

18.62 18.50

N 29108.19
E 79039.40
EL 17.26

R52.00

N 29091.77
E 79055.50
EL 2.40

N 29093.61
E 79062.55
EL 2.55

N W E S

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–STAKING PLAN

ST-1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:19:44 AM

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING STAKING PLAN

SEE SHEET ST-1

SEE SHEET ST-3

DAYLIGHT LINE

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–STAKING PLAN

ST-2

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:19:50 AM

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING STAKING PLAN

17.11

4718.0

R1149.31

N 29297.44
E 79266.91
EL 17.30

4717.0

4716.0

17.22

4715.0

R1149.31

4717.0

4716.0

4715.0

4714.0

4713.0

4716.0

N 29281.61
E 79266.67
EL 13.98

R2526.00

R1162.81

13.48

13.42

SEE SHEET ST-2

4714.0

4713.0

4712.0

4711.0

SEE SHEET ST-4

12.16

12.04

R2490.50

N 29250.98
E 79284.61
EL 12.54

R1198.31

4714.0

4713.0

4712.0

4711.0

4710.0

N 29240.63
E 79290.68
EL 12.42

R2478.50

R1210.31

4713.0

4712.0

4711.0

4710.0

4709.0

4708.0

4707.0

4706.0

4705.0

N
E
8.48

29197.15
79252.47

4709.0

N 29280.91
E 79383.31
EL 4.47

N 29227.49
E 79302.64
EL 6.47

N 29239.97
E 79323.25
EL 6.04

DAYLIGHT LINE

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–STAKING PLAN

ST-3

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:19:54 AM

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING STAKING PLAN

14.58
N 29352.28
E 79350.50
EL 14.67
14.59
13.03
N 29382.38
E 79390.42
EL 13.06
12.97
1.71
N 29430.70
E 79447.76
EL 11.74
1.66
R1149.31
R1149.31
R1162.81
R1162.81
8.89
8.83
N 29391.54
E 79423.16
EL 9.39
4715.0
4714.0
4713.0
4712.0
4713.0
4712.0
4711.0
4710.0
4710.0
4709.0
4708.0
SEE SHEET ST-3
SEE SHEET ST-5
7.25
7.13
R1198.31
R1198.31
N 29364.24
E 79445.88
EL 7.63
N 29355.02
E 79453.57
EL 7.51
R1210.31
R1210.31
4710.0
4709.0
4708.0
4707.0
4706.0
4705.0
4704.0
4703.0
4702.0
4701.0
5.0
280.91
383.31
4.47
N 29309.52
E 79425.27
EL 3.30
N 29325.80
E 79444.74
EL 2.72
DAYLIGHT LINE
N 29373.32
E 79501.27
EL 2.20
N 29355.22
E 79479.81
EL 2.81
SEE SHEET ST-16 FOR
WATER QUALITY POND
N 29350.93

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–STAKING PLAN

ST-4

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:19:58 AM

SEE MONUMENT RD LEFT TURN INTO TRAILER PARKING STAKING PLAN

SEE SHEET ST-4

CURB HT TRANSITION

EXISTING DRAIN FLOW

EXISTING TABEGUACHE TRAILHEAD SIGN

SEE WALL PLAN AND PROFILE

DAYLIGHT LINE

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

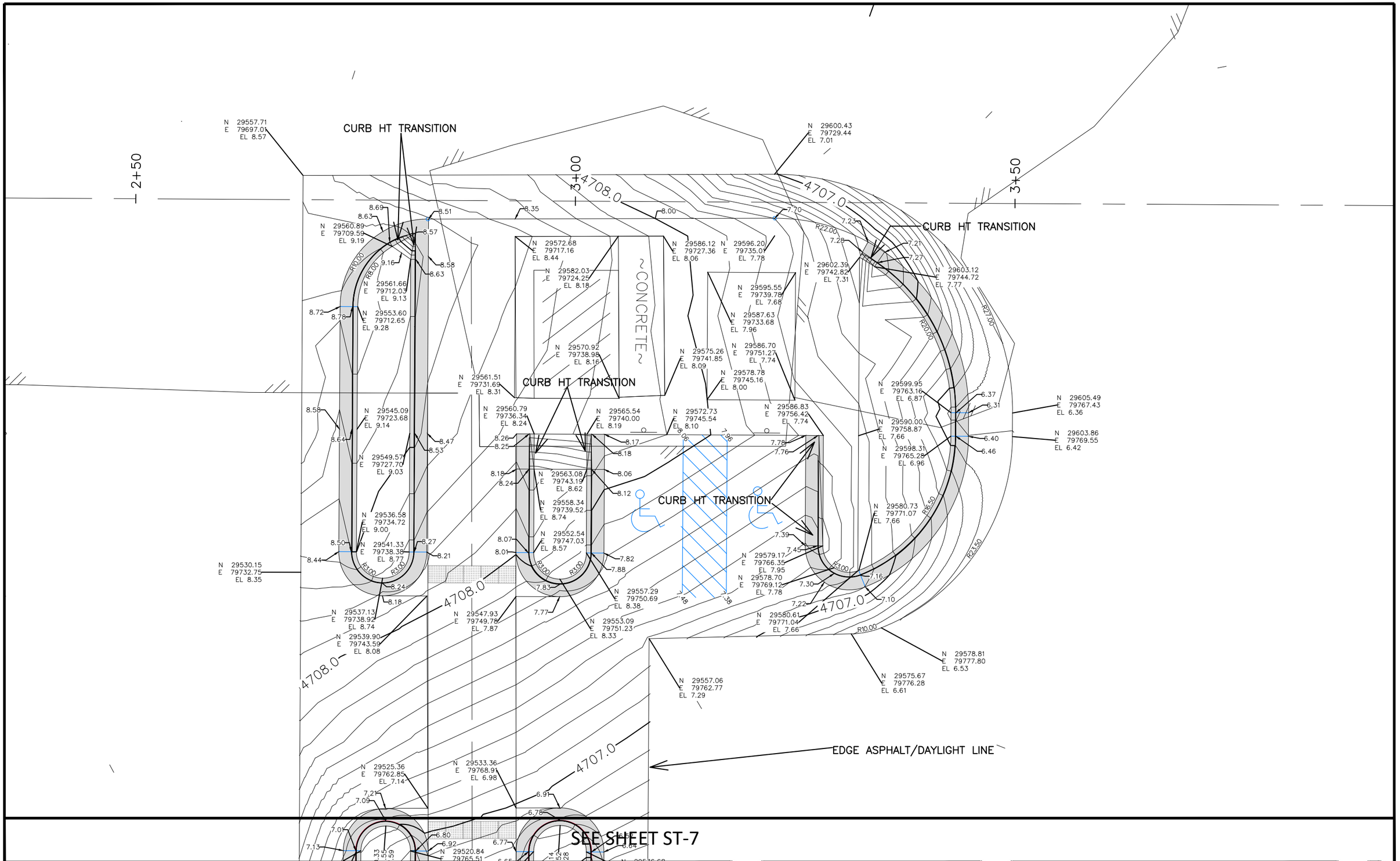
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–STAKING PLAN

ST-5

N:\Landproj\2019 Monument Road Traildwg\00 design\Phase 1b Tabeguache Trailhead Parking Lot\STAKING PLAN.dwg



N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA 5 NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD PARKING LOT STAKING PLAN

ST-6

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg

EDGE ASPHALT/DAYLIGHT LINE

CURB HT TRANSITION

CURB HT TRANSITION

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

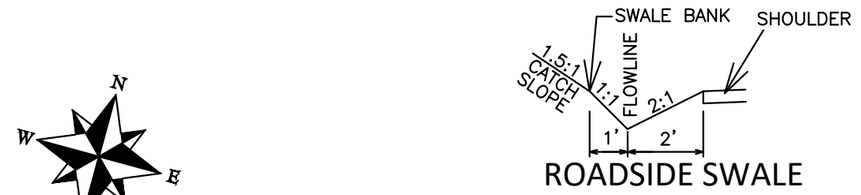
SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

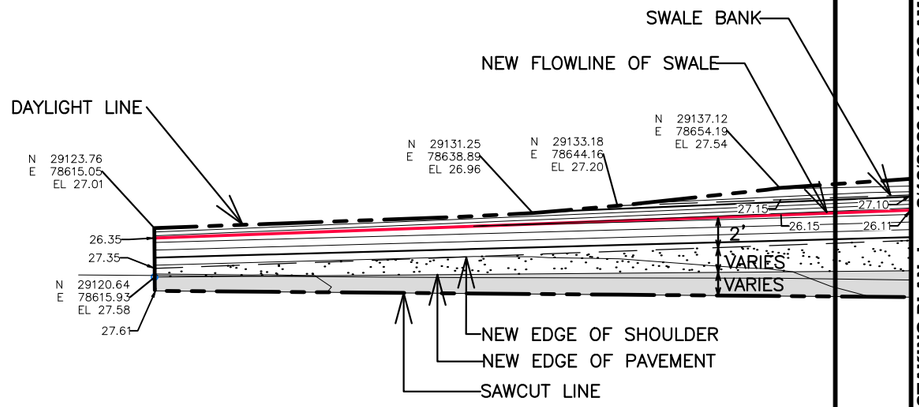
PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
PARKING LOT STAKING PLAN

ST-7



ROADSIDE SWALE



19+00 19+50 20+00 20+50

MONUMENT RD

SEE SHEET ST-9

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:20 AM

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

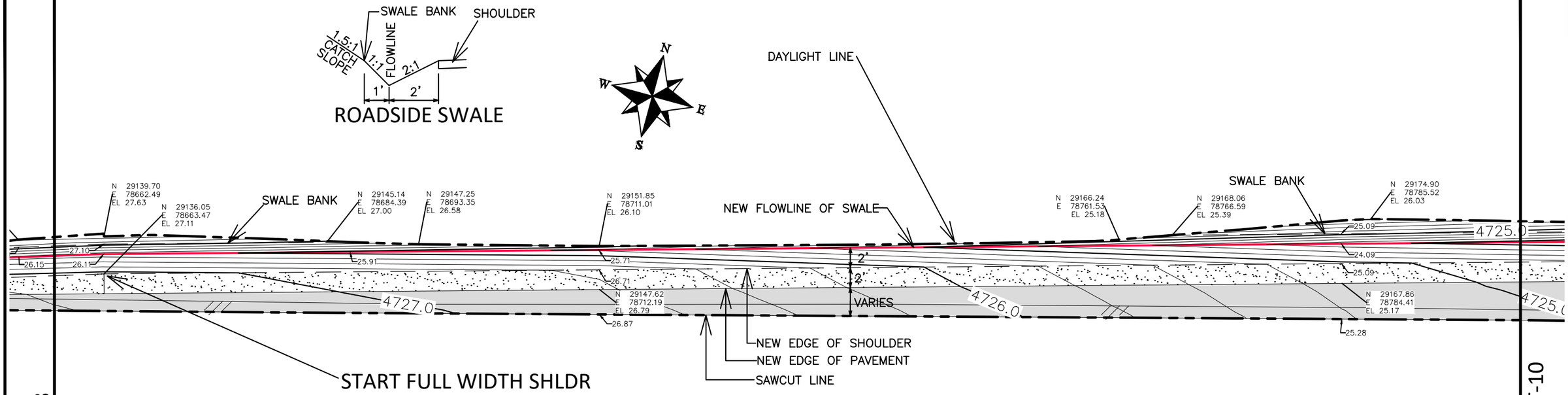
SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO
TRAILER PARKING–STAKING PLAN

ST-8



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

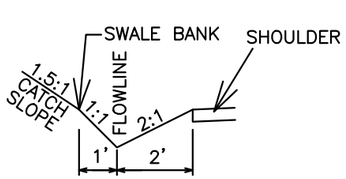
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

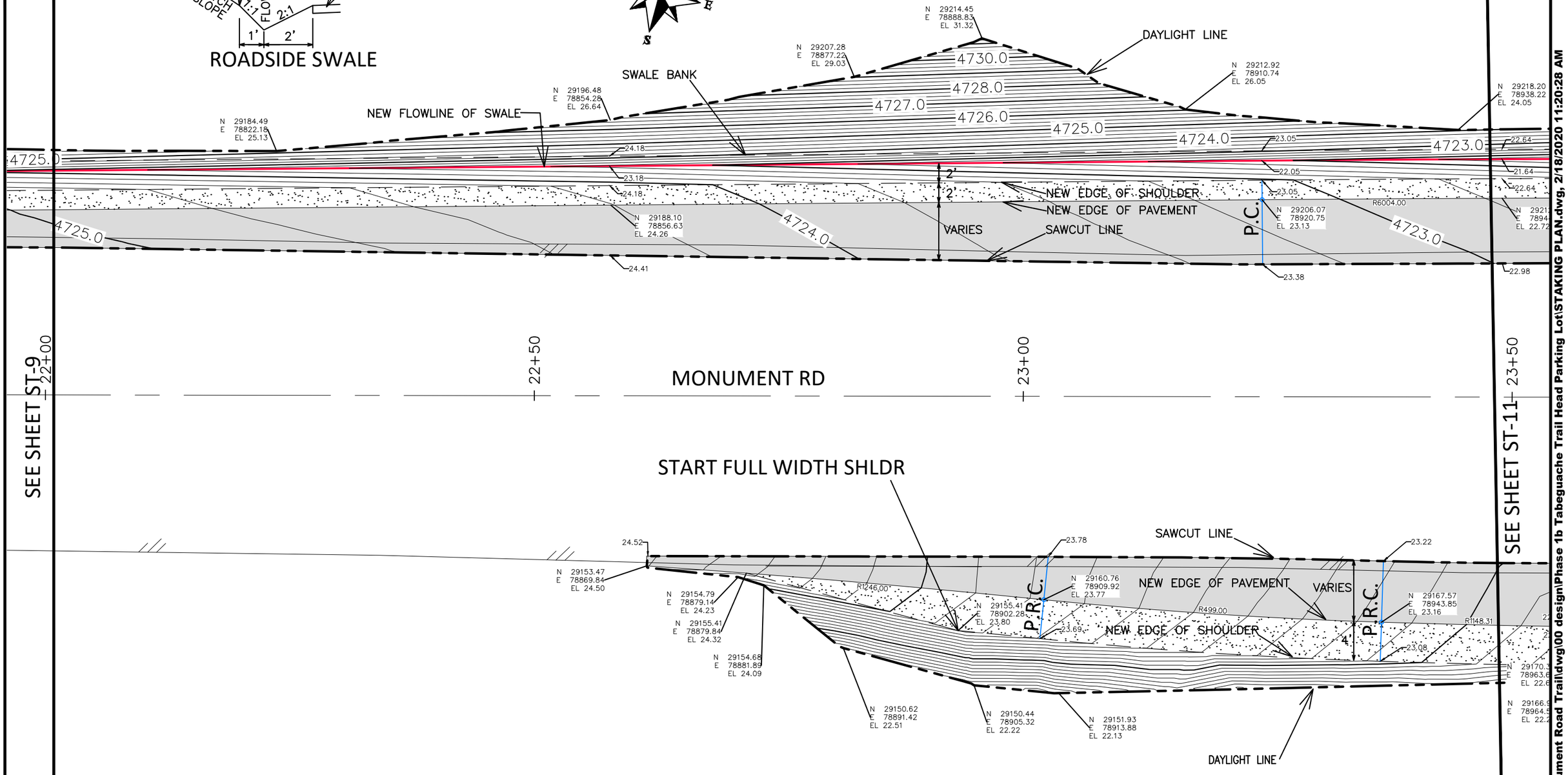
MONUMENT RD LEFT TURN INTO
TRAILER PARKING–STAKING PLAN

ST-9

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:24 AM



ROADSIDE SWALE



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

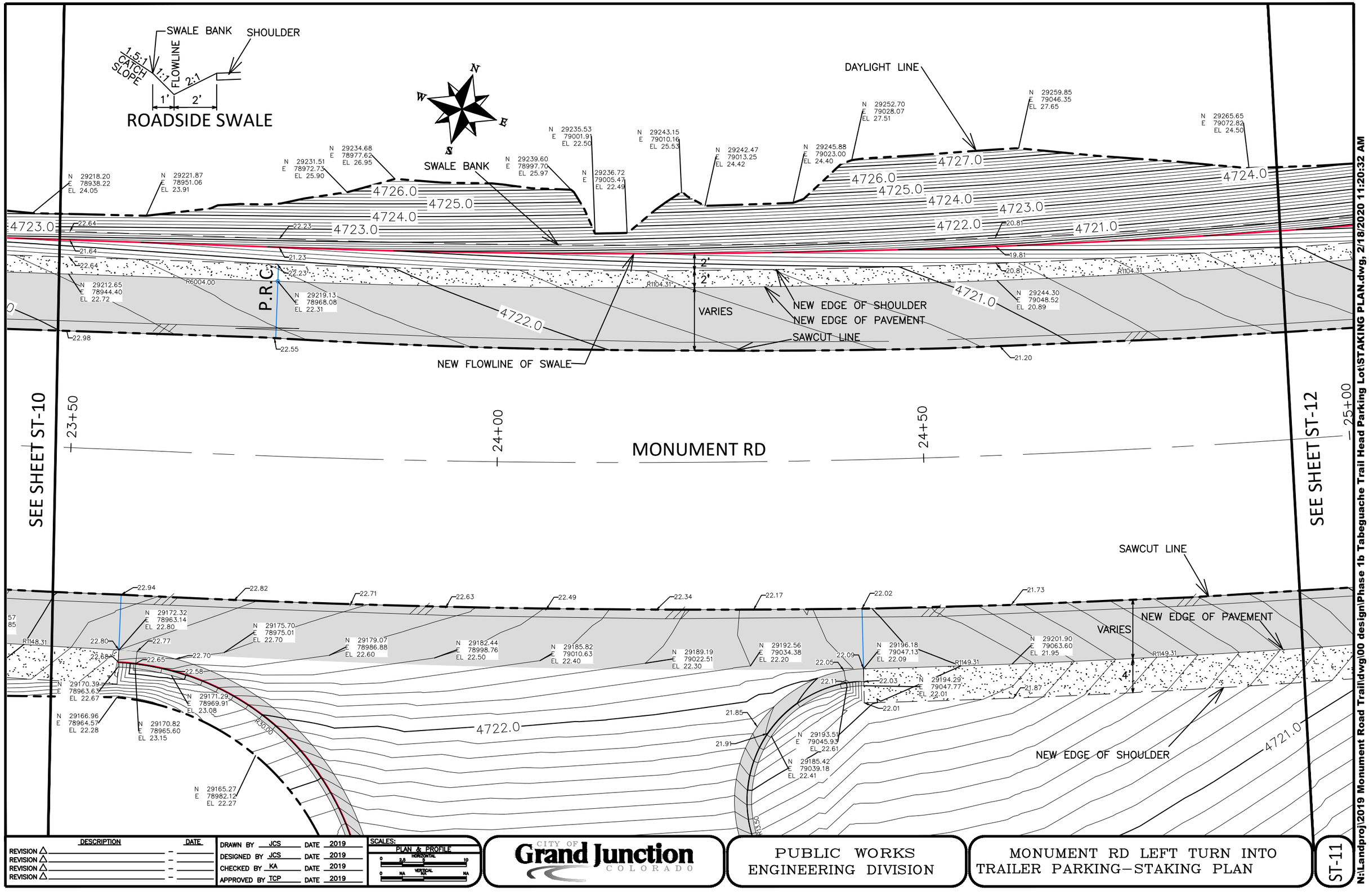
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING–STAKING PLAN

ST-10

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:28 AM



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

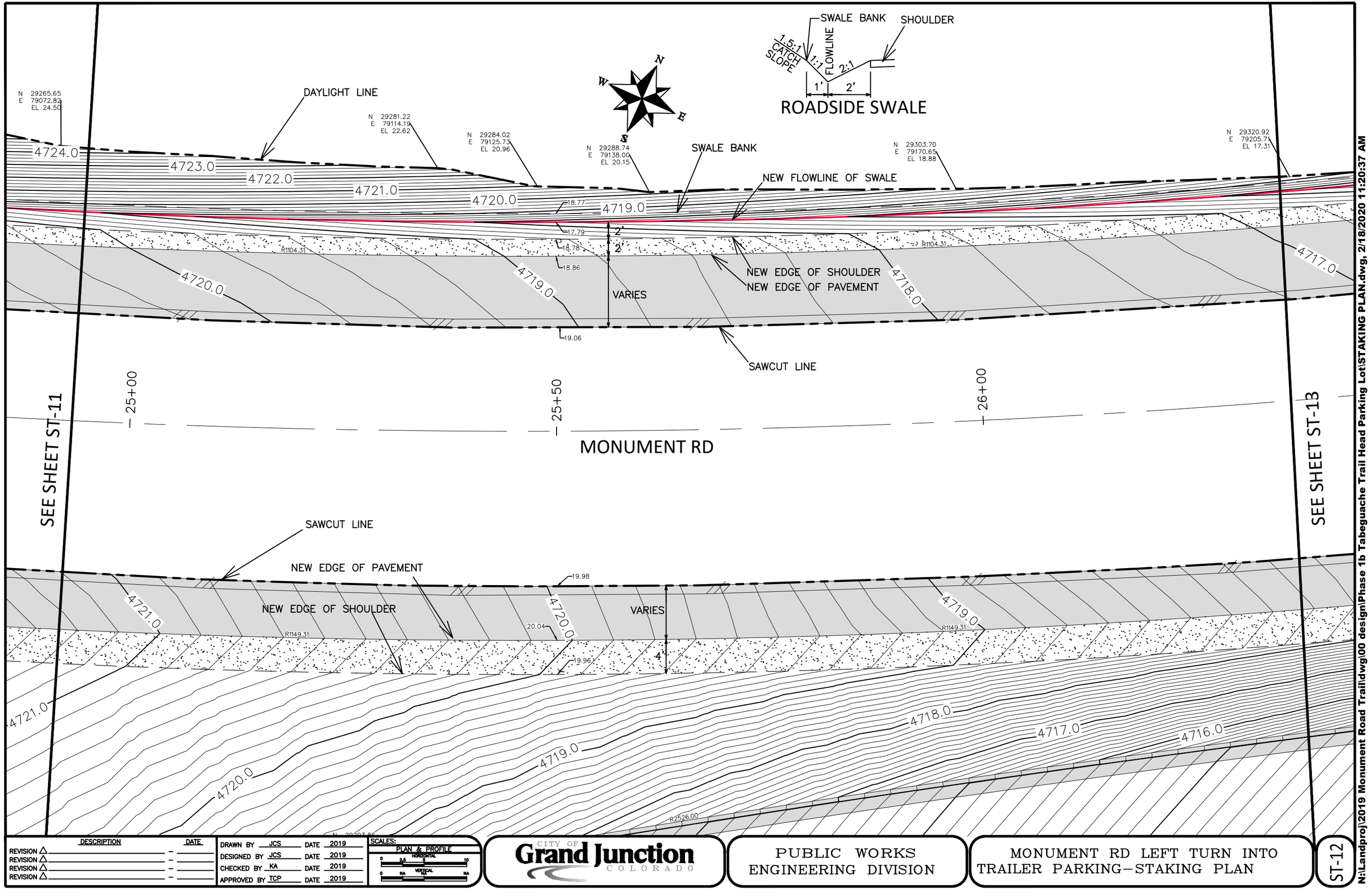
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING–STAKING PLAN

ST-11

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:32 AM



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

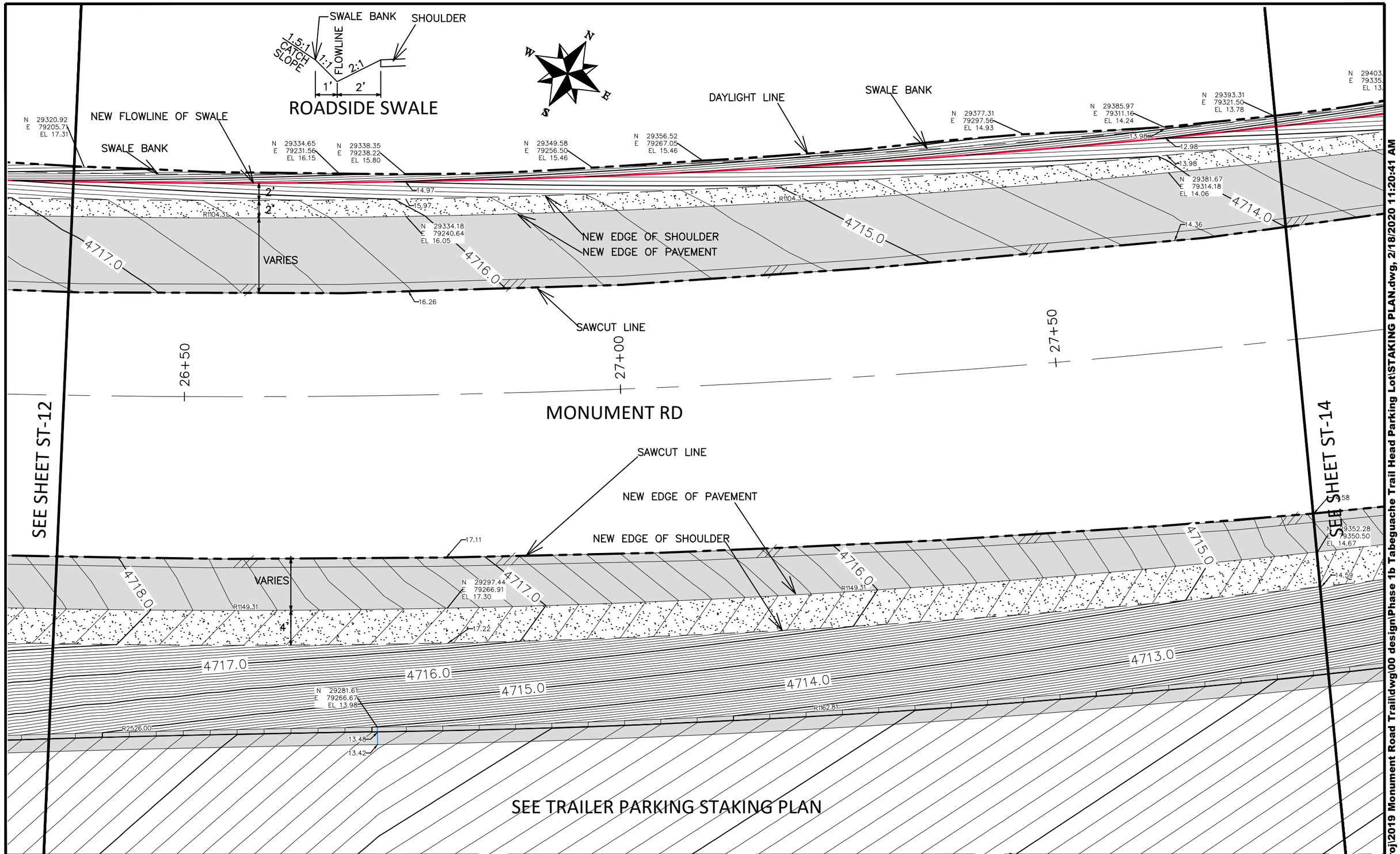
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO TRAILER PARKING–STAKING PLAN

ST-12

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:37 AM



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

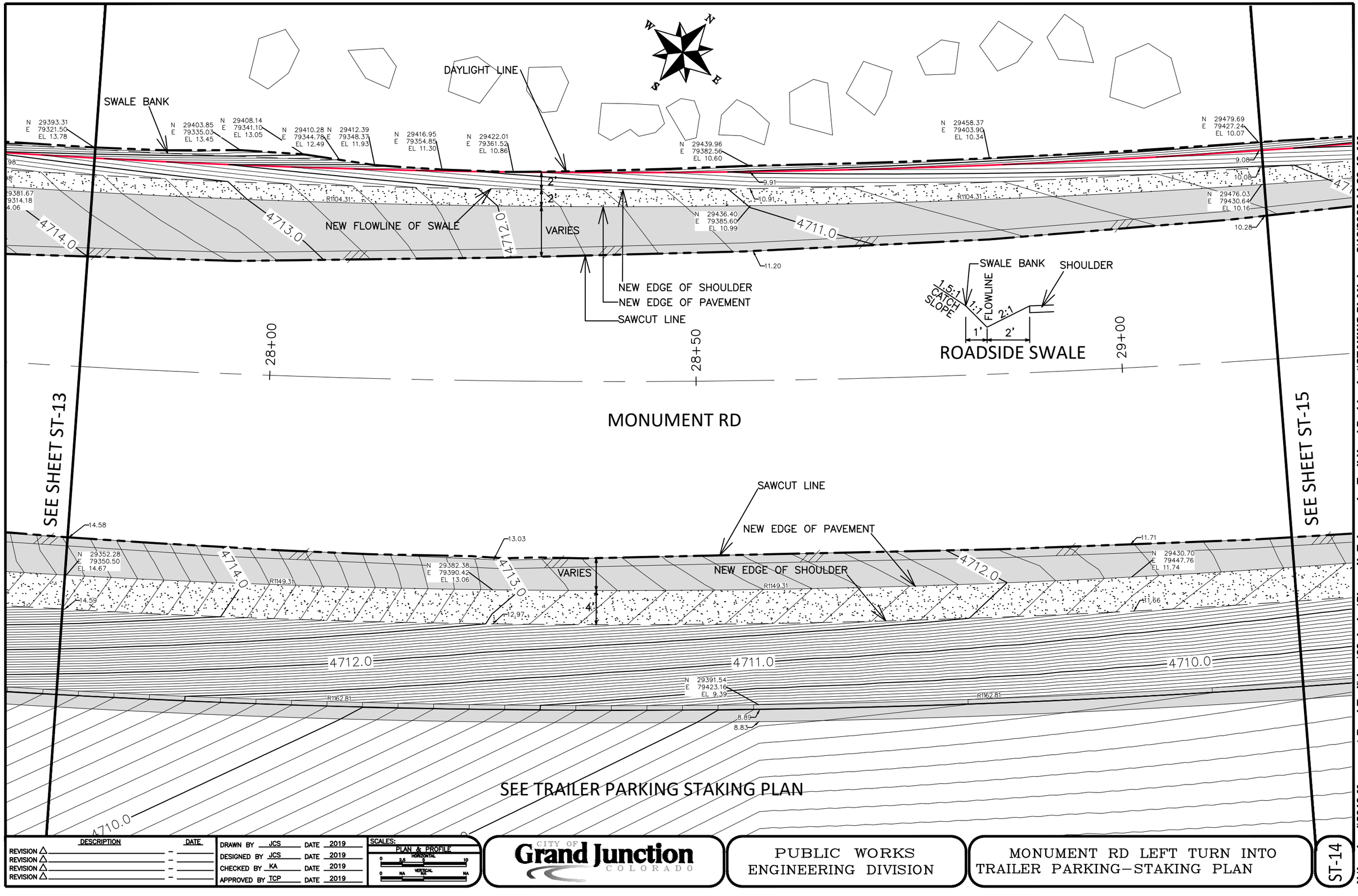
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO
TRAILER PARKING–STAKING PLAN

ST-13

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:41 AM



DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO
TRAILER PARKING–STAKING PLAN

ST-14

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:46 AM

END FULL WIDTH SHLDR

DAYLIGHT LINE

N 29479.69
E 79427.24
EL 10.07

N 29493.32
E 79441.95
EL 9.44

NEW FLOWLINE OF SWALE

N 29504.22
E 79453.34
EL 8.95

N 29520.58
E 79469.34
EL 8.59

N 29546.16
E 79494.77
EL 8.04

9.08
10.08
10.28
7.87
8.86
7.45
8.45
8.49

N 29476.03
E 79430.64
EL 10.16

R1104.31

4710.0'

2'
2'
VARIES

4709.0'

NEW EDGE OF SHOULDER

NEW EDGE OF PAVEMENT

SAWCUT LINE

N 29518.85
E 79471.44
EL 8.87

N 29517.46
E 79472.88
EL 8.95

P.T.

9.00
9.02

N 29518.06
E 79473.45
EL 8.93

N 29543.23
E 79497.79
EL 8.47

29+50

30+00

30+50

MONUMENT RD

SEE SHEET ST-14

SWALE BANK
SHOULDER
1.5:1 CATCH SLOPE
1:1 FLOWLINE
2:1
1'
2'

ROADSIDE SWALE

SAWCUT LINE

NEW EDGE OF PAVEMENT

NEW EDGE OF SHOULDER

N 29514.47
E 79530.65
EL 9.32

N 29513.70
E 79528.84
EL 9.34

N 29513.97
E 79531.21
EL 9.35

11.01
10.98
9.40
9.23
9.29
9.22
8.31
8.26
8.25

R1149.31

N 29464.96
E 79484.18
EL 11.06

4711.0'

VARIES

4'

4710.0'

N 29512.63
E 79532.70
EL 9.33

N 29513.87
E 79534.30
EL 9.79

R5.75

N 29519.02
E 79549.83
EL 8.61

R1162.81

4709.0'

N 29504.91
E 79541.22
EL 8.81

4708.5'

N 29515.24
E 79560.50
EL 8.37

SEE TRAILER PARKING STAKING PLAN

DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

MONUMENT RD LEFT TURN INTO
TRAILER PARKING–STAKING PLAN

ST-15

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg, 2/18/2020 11:20:51 AM

SEE SHEET ST-4

R1198.31

7.25

7.13

R1198.31

N 29364.24
E 79445.88
EL 7.63

4710.0

N 29355.02
E 79453.57
EL 7.51

R1210.31

R1210.31

4709.0

4708.0

4707.0

4706.0

4705.0

4704.0

4703.0

5.0

280.91
383.31
4.47

N 29309.52
E 79425.27
EL 3.30

N 29325.80
E 79444.74
EL 2.72

N 29373.32
E 79501.27
EL 2.20

N 29355.22
E 79479.81
EL 2.81

4702.0

4701.0

N 29350.93
E 79484.02
EL 2.60

4700.0

N 29334.85
E 79474.93
EL 100.00

N 29296.47
E 79434.57
EL 2.29

R71.09

R4.78

N 29330.15
E 79482.46
EL 99.91

N 29341.88
E 79488.93
EL 2.05

HIGH WATER SURFACE EL 4700.75

N 29300.74
E 79449.68
EL 99.69

WATER QUALITY POND STORAGE VOLUME
1,300 CUBIC FEET

N 29283.61
E 79436.85
EL 1.83

N 29292.83
E 79446.94
EL 99.63

N 29332.68
E 79490.48
EL 1.66

R81.20

N 29285.45
E 79458.36
EL 99.50

N 29286.39
E 79459.34
EL 99.51

N 29288.57
E 79461.41
EL 99.45

R81.20

N 29278.81
E 79441.73
EL 1.35

R71.00

N 29290.75
E 79463.47
EL 99.56

4700.0

4701.0

N 29326.35
E 79490.50
EL 1.42

N 29319.64
E 79488.93
EL 1.25

DAYLIGHT LINE

N 29306.91
E 79484.06
EL ???

N 29275.17
E 79451.21
EL 1.01

0.80
0.75
0.80

N 29296.06
E 79478.00
EL 0.91

0.90
0.90
0.70
0.75
0.75
0.90
0.90

N 29279.44
E 79463.79
EL 0.90

N 29286.70
E 79470.66
EL 0.90

N 29284.64
E 79472.84
EL 0.90

N 29277.38
E 79465.97
EL 0.90

N 29281.13
E 79473.65
EL ???

N 29276.77
E 79469.52
EL 0.70

N 29278.95
E 79471.58
EL 0.65

COLORED CONCRETE SPILLWAY
(6" THICK) (INCLUDES 6" A.B.C.)
(PER GRADES SHOWN)

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STAKING PLAN.dwg

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

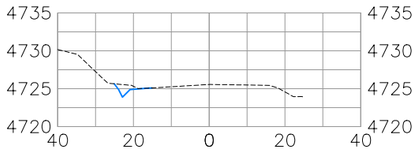
SCALES:
PLAN & PROFILE
HORIZONTAL 0 2.5 5 10
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

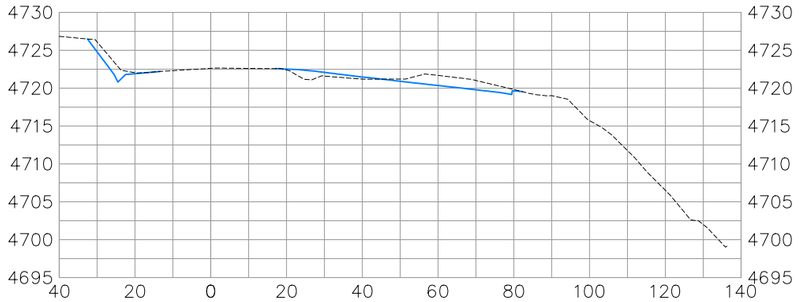
PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
TRAILER PARKING–STAKING PLAN

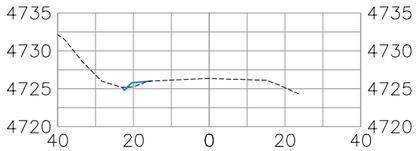
ST-16



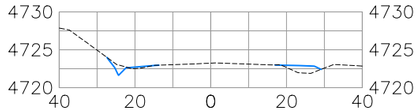
22+00.00



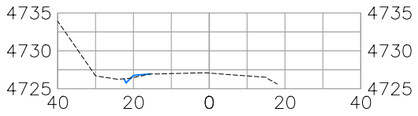
24+00.00



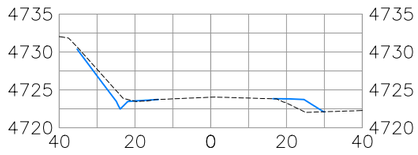
21+50.00



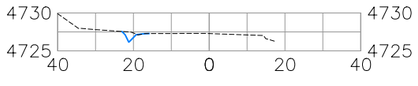
23+50.00



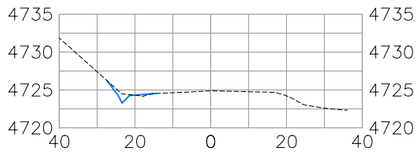
21+00.00



23+00.00



20+50.00



22+50.00

MONUMENT RD/TRAILER PARKING

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 5 10 20

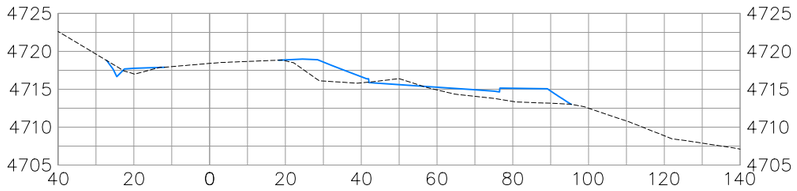
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

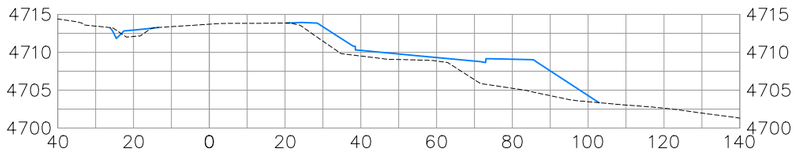
LUNCH LOOP TRAIL HEAD
SITE CROSS SECTIONS

XS-1

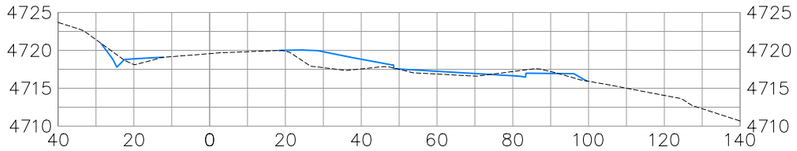
N:\Landproj\2019 Monument Road Trailldwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Monument Road Lt Turn Ln Corridor Design.dwg, 2/18/2020 11:26:24 AM



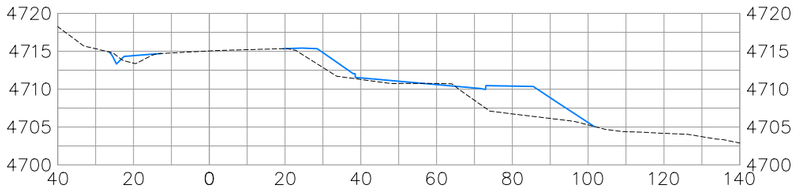
26+00.00



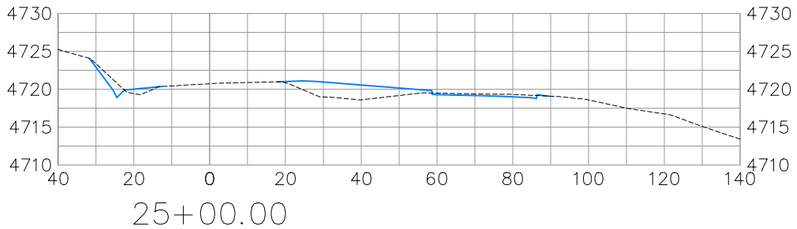
28+00.00



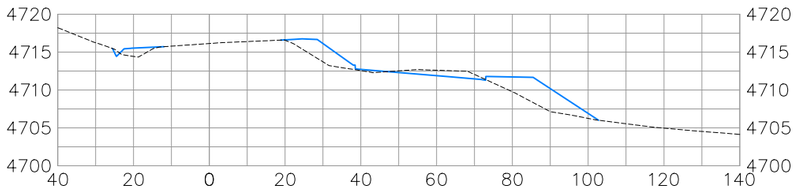
25+50.00



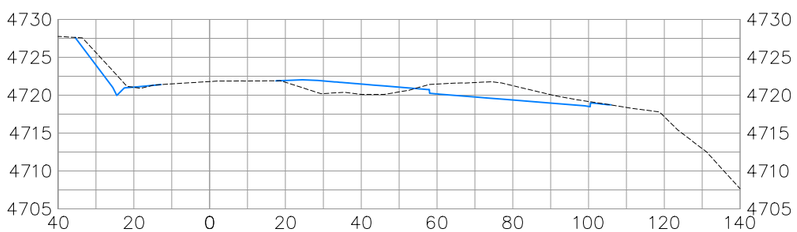
27+50.00



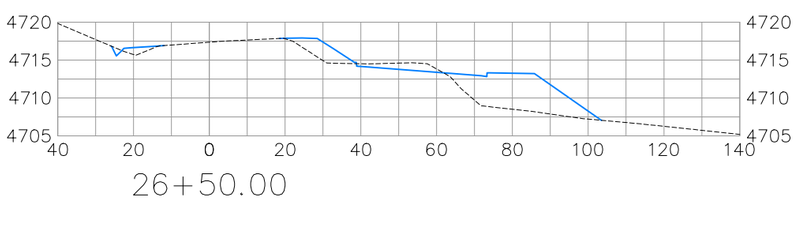
25+00.00



27+00.00



24+50.00



26+50.00

MONUMENT RD/TRAILER PARKING

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 5 10 20

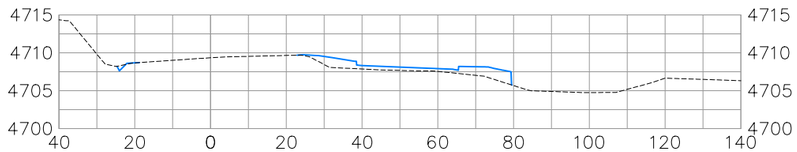
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

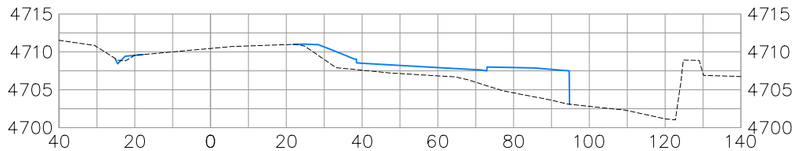
LUNCH LOOP TRAIL HEAD
SITE CROSS SECTIONS

XS-2

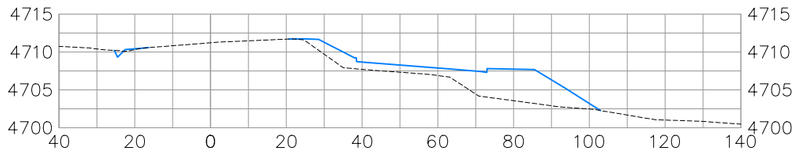
N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Monument Road Lt Turn Ln Corridor Design.dwg, 2/18/2020 11:26:27 AM



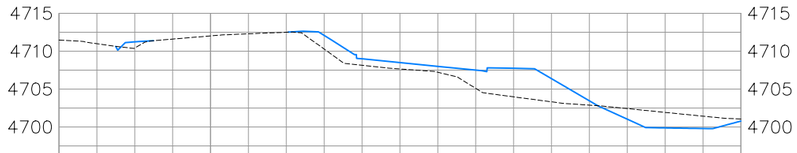
30+00.00



29+50.00



29+00.00



28+50.00

MONUMENT RD/TRAILER PARKING

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 5 10 20

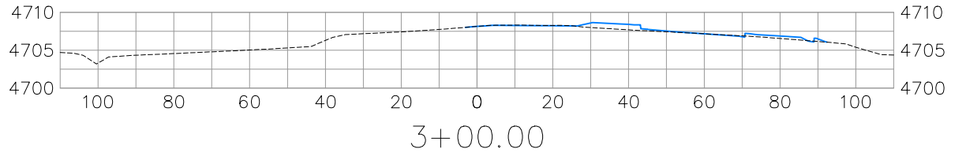
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
SITE CROSS SECTIONS

XS-3

N:\Landproj\2019 Monument Road Traillidwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Monument Road Lt Turn Ln Corridor Design.dwg, 2/18/2020 11:26:30 AM



LUNCH LOOP TRAIL HEAD PARKING LOT

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 5 10 20

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
SITE CROSS SECTIONS

XS-4

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\Monument Road Lt Turn Ln Corridor Design.dwg, 2/18/2020 11:26:32 AM

SUMMARY OF EARTHWORK QUANTITIES

INDEX Book	INDEX Page	INDEX Sheet		PROJECT TOTAL CU. YD.	PROJECT TOTAL *As Const.*
			203-00010 UNCLASSIFIED EXCAVATION (CIP)		
			ROADWAY (QUANTITY CALCULATED FROM CIVIL3D)		
			Lunch Loop Trailhead Parking Lot	6	
			ADDITION OF CONCRETE AND PAVING PRISM	171	
			REMOVAL OF PAVEMENT REMOVAL PAY ITEMS	-36	
			SUBTOTAL:	141	
			Trailer Parking Lot	366	
			ADDITION OF CONCRETE AND PAVING PRISM	691	
			REMOVAL OF PAVEMENT REMOVAL PAY ITEMS	0	
			SUBTOTAL:	1057	
			Monument Road Widening	139	
			ADDITION OF CONCRETE AND PAVING PRISM	764	
			REMOVAL OF PAVEMENT REMOVAL PAY ITEMS	-32	
			SUBTOTAL:	871	
			TOTAL FOR PAY QUANTITIES	**2069**	
			EMBANKMENT MATERIAL (CIP) (FOR INFORMATION ONLY)	**CU. YD.**	
			QUANTITY CALCULATED FROM CIVIL3D		
			Lunch Loop Trailhead Parking Lot	41	
			Trailer Parking Lot	2342	
			Monument Road Widening	275	
			TOTAL	**2658**	

INDEX Book	INDEX Page	INDEX Sheet	ROADWAY QUANTITIES BALANCE (FOR INFORMATION ONLY)	PROJECT TOTAL CU. YD.	PROJECT TOTAL *As Const.*
			Total Unclassified Excavation	2069	
			Total Embankment (net)	2658	
			EMBANKMENT TIMES FACTOR 1.2	3190	
			Import Material (Material to be Imported by Contractor)	1121	

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2018
DESIGNED BY JCS DATE 2018
CHECKED BY TCP DATE 2018
APPROVED BY TCP DATE 2018

SCALES: PLAN & PROFILE HORIZONTAL 0 NA NA NA VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAILHEAD IMPROVEMENTS
SUMMARY OF EARTHWORK QUANTITIES

SEQ1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\SUMMARY OF EARTHWORK QUANTITIES.dwg, 2/18/2020 11:35:36 AM

EROSION CONTROL MEASURES

Contractor to update the SWMP according to specific construction phasing and stormwater management practices for current construction activity when warranted.

Site Description

1. The site has a total disturbance area of 1.8 acres with the majority of disturbance being caused by the Improvements to the LUNCH LOOP trailhead parking lot, addition of trailer parking, and the widening of Monument Road to provide a left turn into the new trailer parking.
2. Stormwater leaves the site through a series of three storm drain collection systems to No Thoroughfare Creek which directly discharges to the Colorado River.
3. Proposed utilities for this project include: storm drain.

Performance Standards

The general requirements for erosion control work shall be as follows:

1. Any grading shall be conducted in such a manner so as to effectively reduce accelerated soil erosion and resulting sedimentation.
2. All grading shall be designed, constructed and completed in such a manner so that exposed area of any disturbed land shall be limited to the shortest time period.
3. Sediment caused by accelerated soil erosion shall be removed from runoff water before leaving the site.
4. The contractor shall try to minimize the amount of disturbance necessary for the construction project by preserving established vegetation to act as a BMP.

During Construction (Temporary Measures)

1. Inlet Protection: The use of inlet protection is proposed at all inlets to trap sediment before entering the storm drain collection systems that discharge directly into No Thoroughfare Creek.
2. Erosion Log in Roadside Swale: The use of erosion logs in the Roadside swale on the north side of Monument Road to trap sediment from cut slopes before entering No Thoroughfare Creek. Erosion Logs are also proposed before the Water Quality Pond that serves the LUNCH LOOP Trailhead Parking to trap sediment before entering said water quality pond.
3. Erosion Log at Toe of Slope Protection: Erosion logs are proposed at toes of slopes to trap sediment before running off newly disturbed areas.

After Construction (Permanent Measures)

1. Reseeding: All disturbed areas will be seeded with a native seed mix if otherwise not proposed to be paved.

Maintenance

1. The contractor or his designated representative shall make routine checks on all erosion control measures to determine if repairs or sediment removal is necessary.
2. After each rainfall or moderate snow melt, erosion control measures are to be checked. If repairs are needed, they shall be completed immediately.
3. When temporary measures are to be removed, any silt and sediment deposits shall be removed and spread evenly in fill areas.

General Notes

1. The SWMP establishes the minimum acceptable requirements for stormwater pollution prevention on site. The Contractor may supplement these requirements as appropriate for specific construction activites. Any changes to the practices shown on this plan must be reviewed by Project Inspector/Engineer prior to implementation.
2. At all times during construction, erosion and sediment control shall be maintained by the contractor or his designated representative.
3. Erosion control systems shall be installed as grading progresses.
4. The Contractor shall provide and maintain a portable concrete washout facilty.
5. Details shown are schematic only. Adjust as necessary to fit field conditions.
6. Negative impacts to downstream areas (or receiving waters) caused by the slope grading to be monitored and corrected by the contractor.
7. Construction traffic entrances shall be cleaned on a continual basis during slope grading.
8. A copy of the SWMP and construction plans shall be maintained on site at all times.

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 25 50 100
VERTICAL 0 NA NA NA

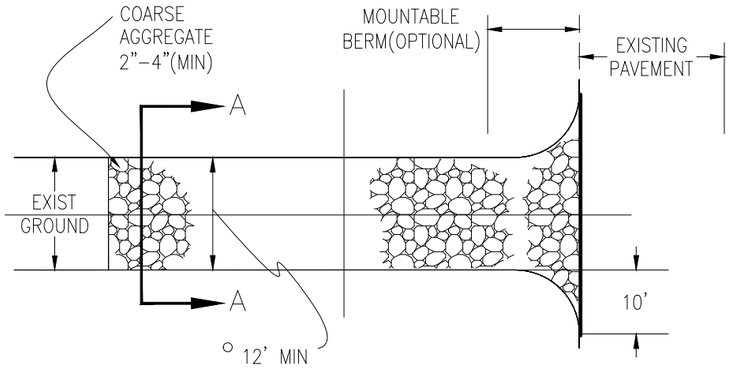
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAILHEAD
STORM WATER MANAGEMENT NOTES

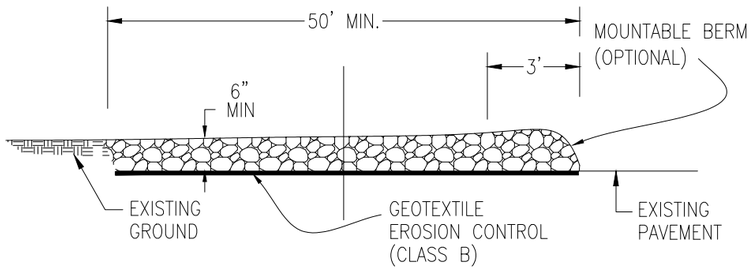
SWM1

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\SWMP.dwg, 2/18/2020 11:37:41 AM

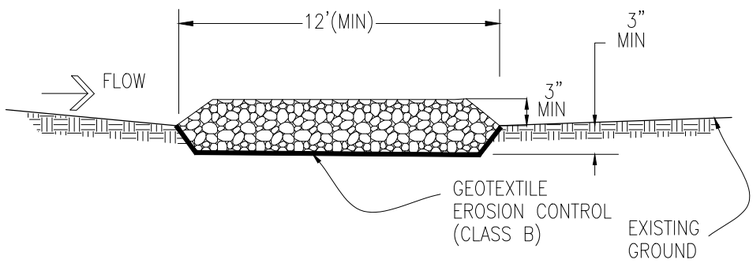


PLAN VIEW

○ MUST EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION.

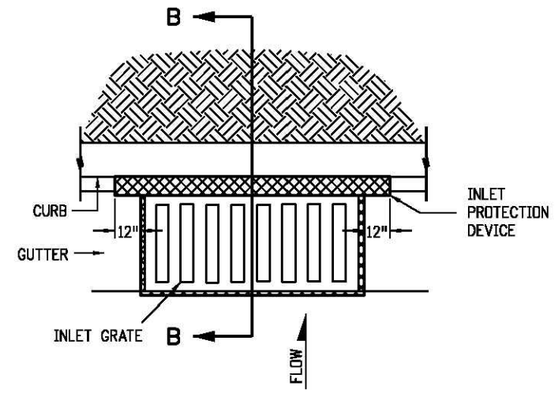


SIDE ELEVATION

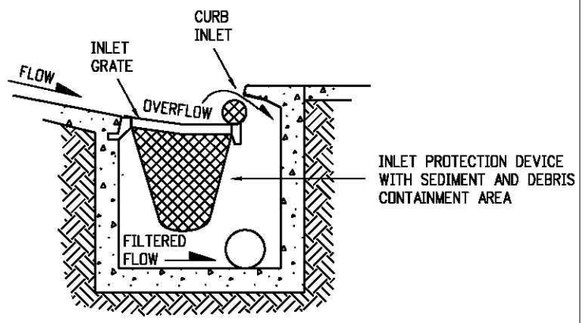


SECTION A–A

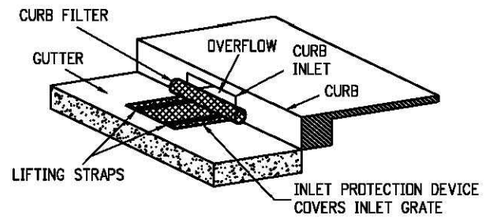
STABILIZED CONSTRUCTION ENTRANCE



PLAN VIEW



SECTION B-B
OPTION A
STORM DRAIN INLET PROTECTION (TYPE II)



ISOMETRIC VIEW
OPTION B
STORM DRAIN INLET PROTECTION (TYPE II)

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 25 50 100
VERTICAL 0 NA NA

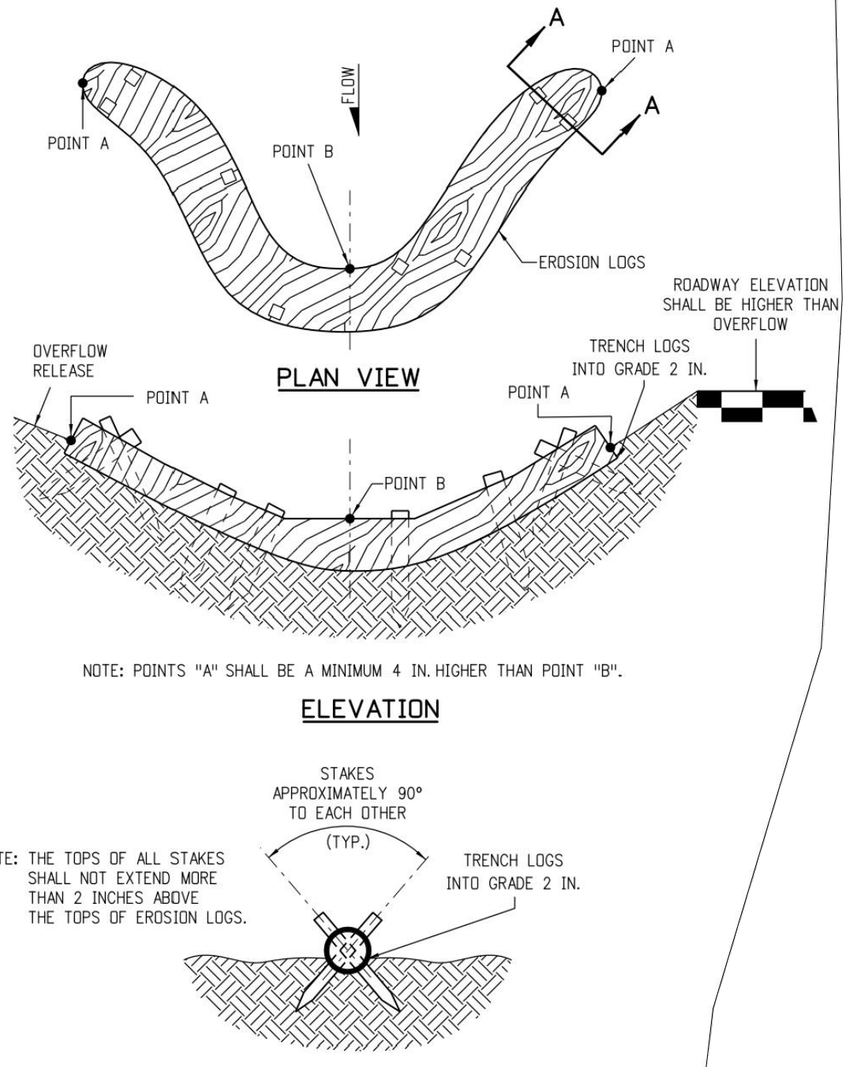
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAILHEAD
STORM WATER MANAGEMENT DETAILS

SWM2

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\SWMP.dwg, 2/18/2020 11:37:43 AM



NOTE: POINTS "A" SHALL BE A MINIMUM 4 IN. HIGHER THAN POINT "B".

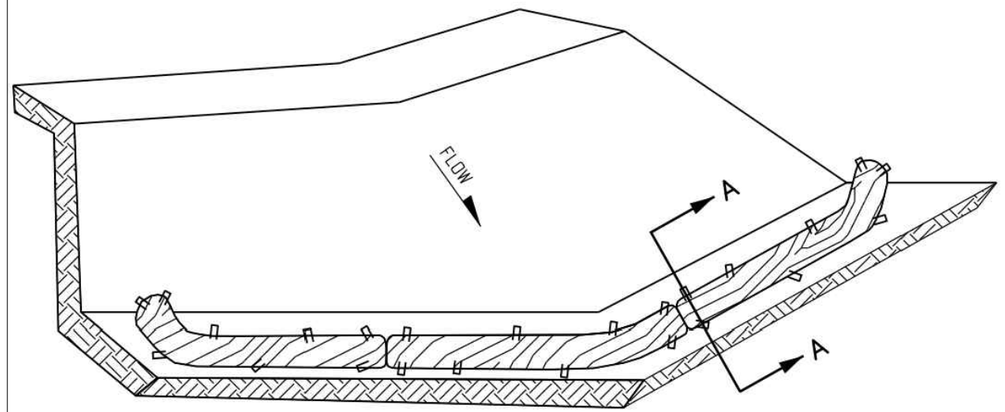
ELEVATION

SECTION A-A

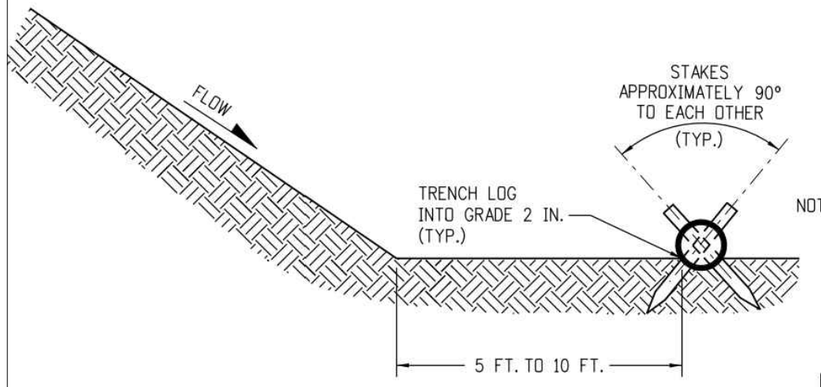
NOTES:

1. EROSION LOGS SHALL BE EMBEDDED 2 INCHES INTO THE SOIL.
2. EROSION LOGS SHALL BE TIGHTLY ABUTTED WITH NO GAPS.
3. V-SHAPED TEMPORARY DITCHES SHALL NOT BE USED. DITCHES SHAL BE GRADED IN A PARABOLIC OR TRAPEZOIDAL SHAPE.

EROSION LOG IN SWALE/ROADSIDE SWALE



ISOMETRIC VIEW



NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.

SECTION A-A

NOTES:

1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

EROSION LOG TOE OF SLOPE PROTECTION

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 25 50 100
VERTICAL 0 NA NA NA

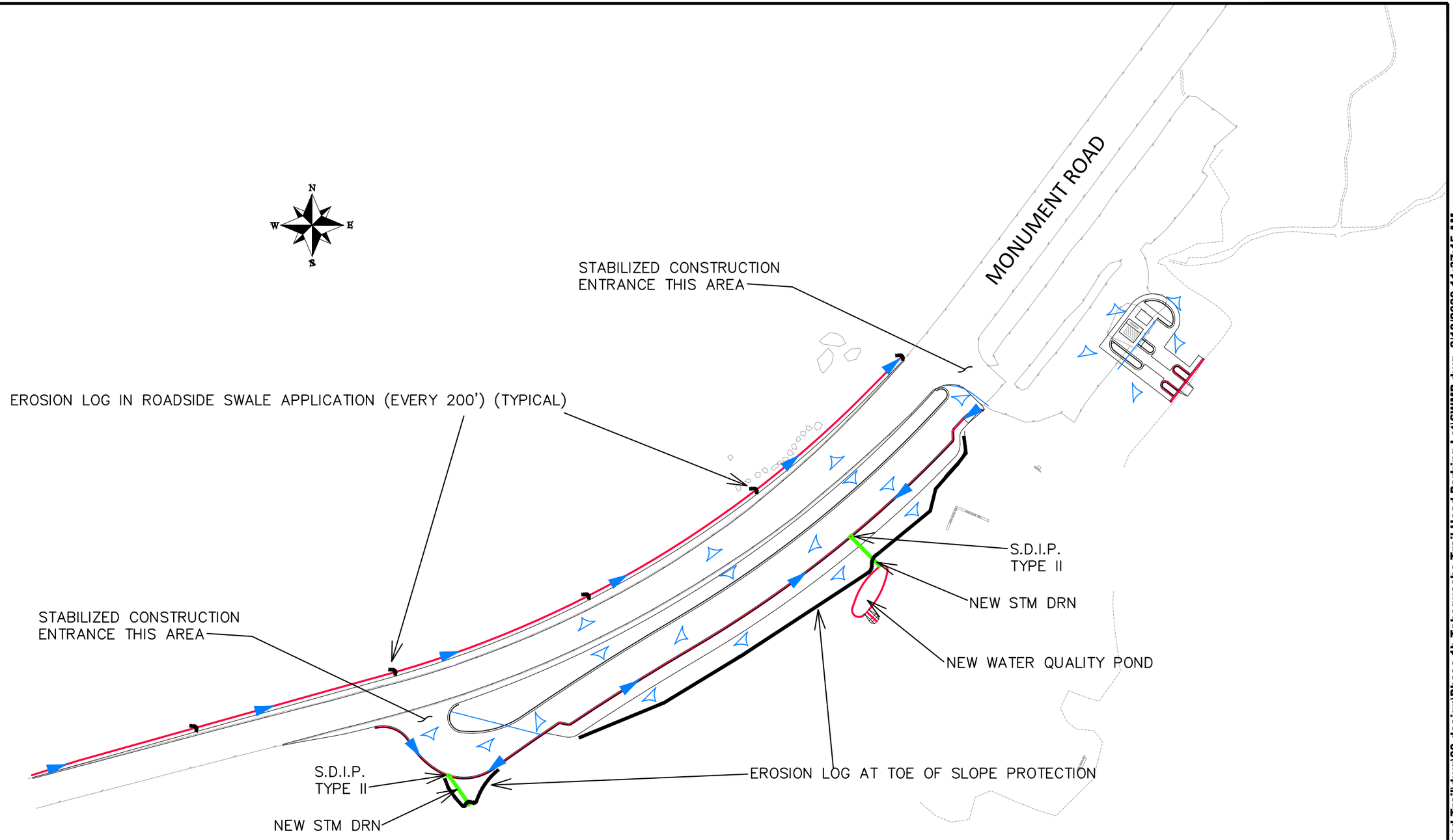
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAILHEAD
STORM WATER MANAGEMENT DETAILS

SWM3

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\SWMP.dwg, 2/18/2020 11:37:44 AM



LEGEND:

	SHEET FLOW CONVEYANCE – SEE PLANS FOR SURFACE TREATMENT
	COLLECTED CONVEYANCE – GUTTER, EARTH DITCH, SWALE ETC.. PER PLANS
STM DRN	STORM DRAIN – SEE PLANS FOR SIZE, MATERIAL, TYPE
S.D.I.P.	STORM DRAIN INLET PROTECTION – TYPE NOTED

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES: PLAN & PROFILE
HORIZONTAL 0 25 50 100
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

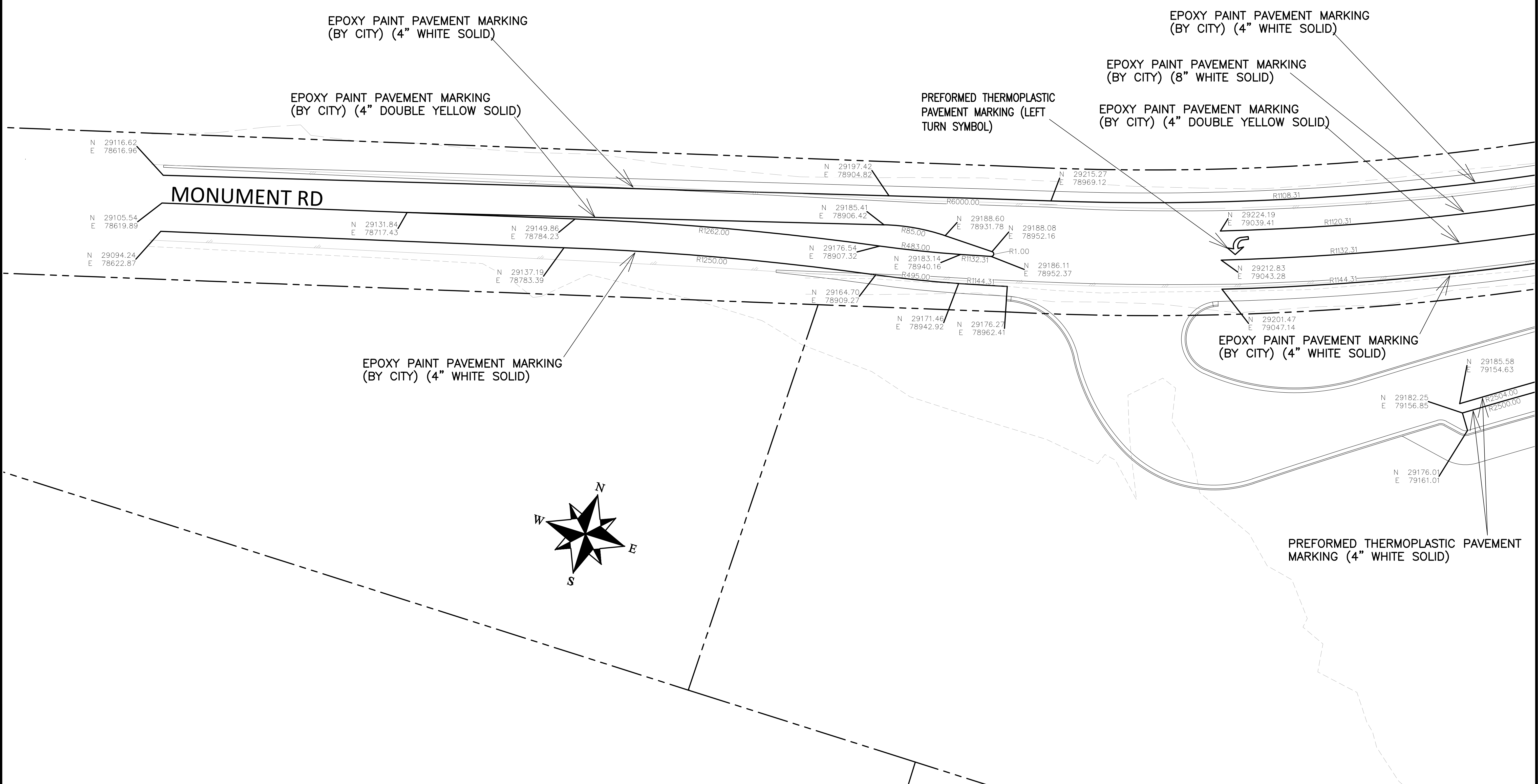
PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAILHEAD
STORM WATER MANAGEMENT PLAN

SWM4

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\SWMP.dwg, 2/18/2020 11:37:45 AM

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STRIPING PLAN.dwg



DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	JCS	DATE	2019
DESIGNED BY	JCS	DATE	2019
CHECKED BY	KA	DATE	2019
APPROVED BY	TCP	DATE	2019

SCALES: PLAN & PROFILE — HORIZONTAL 0 10 20 40; VERTICAL NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
STRIPING AND SIGNAGE

STR1

EPOXY PAINT PAVEMENT MARKING (BY CITY) (4" WHITE SOLID)

EPOXY PAINT PAVEMENT MARKING (BY CITY) (8" WHITE SOLID)

PREFORMED THERMOPLASTIC PAVEMENT MARKING (LEFT TURN SYMBOL)

EPOXY PAINT PAVEMENT MARKING (BY CITY) (4" DOUBLE YELLOW SOLID)

MONUMENT RD

PREFORMED THERMOPLASTIC PAVEMENT MARKING (LEFT TURN SYMBOL)

PREFORMED THERMOPLASTIC PAVEMENT MARKING (4" WHITE SOLID) (TYPICAL)

N 29514.68
E 79475.75

N 29526.74
E 79517.29

R1.00

N 29506.26
E 79484.47

R100.00

N 29525.14
E 79518.39

N 29517.09
E 79527.29

N 29384.45
E 79345.37

N 29382.48
E 79362.75

N 29416.64
E 79400.64

R1108.31

R1120.31

R1132.31

R1144.31

R300.00

N 29372.91
E 79370.00

N 29488.05
E 79555.63

N 29467.16
E 79541.70

N 29462.00
E 79547.14

N 29405.43
E 79489.80

R1184.81

R1188.81

N 29352.85
E 79428.78

N 29185.58
E 79154.63

N 29262.63
E 79277.79

9182.25
9156.85

R2504.00
R2500.00

R2504.00
R2500.00

N 29219.32
E 79228.28

N 29260.58
E 79296.84

N 29304.49
E 79364.36

N 29259.18
E 79279.81

9176.01
9161.01

LARGE BLOCK WALL

LARGE BLOCK WALL

MATERIAL

N

W

E

S

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
STRIPING AND SIGNAGE

STR2

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STRIPING PLAN.dwg

N:\Landproj\2019 Monument Road Trail\dwg\00 design\Phase 1b Tabeguache Trail Head Parking Lot\STRIPING PLAN.dwg

MONUMENT RD

N 29514.68
E 79475.75

N 29506.26
E 79484.47

R100.00

N 29526.74
E 79517.29

R1.00

N 29525.14
E 79527.29

N 29517.098.39
E 79527.29

N 29488.05
E 79555.63

N 29467.16
E 79541.70

N 29462.00
E 79547.14

PREFORMED THERMOPLASTIC PAVEMENT MARKING (4" WHITE SOLID) (TYPICAL)

(BY CITY)

BACK-IN PARKING ONLY

N 29566.87
E 79764.39

N 29562.91
E 79761.33

PREFORMED THERMOPLASTIC PAVEMENT MARKING (HANDICAP SYMBOL)

(BY CITY)

RESERVED PARKING

(BY CITY)

BACK-IN PARKING ONLY

KID'S MEAL

CURT'S LANE

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY JCS DATE 2019
DESIGNED BY JCS DATE 2019
CHECKED BY KA DATE 2019
APPROVED BY TCP DATE 2019

SCALES:
PLAN & PROFILE
HORIZONTAL 0 10 20 40
VERTICAL 0 NA NA NA

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LUNCH LOOP TRAIL HEAD
STRIPING AND SIGNAGE

STR3