

CONTRACT DOCUMENTS

Waterline Improvement Project Crossing I-84, Weber River, and Railroad

Riverdale City, Utah

August 2023



5141 South 1500 West
Riverdale City, Utah 84405
801-866-0550

CONTRACT DOCUMENTS

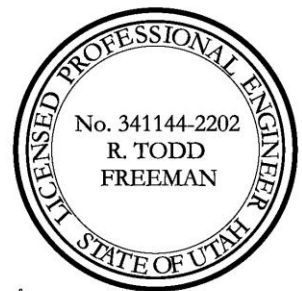
Waterline Improvement Project Crossing I-84, Weber River, and Railroad

Riverdale City, Utah

August 2023

Prepared By

CEC, Civil Engineering Consultants, PLLC



DOCUMENT 00003

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ADVERTISEMENT FOR BIDS

PROJECT NAME: Waterline Improvement Project Crossing I-84, Weber River, and Railroad.

PROJECT LOCATION: I-84 near mile marker 82.9 going northeasterly across I-84, under the Weber River across the undeveloped land to and under the Union Pacific Railroad Tracks, in Riverdale City (see drawings).

OWNER: Riverdale City
4600 South Weber River Drive
Riverdale City, Utah 84405-3764

OWNERS CONTACT: Shawn Douglas Public Works Director, 801-394-5541.

ENGINEER: CEC, Civil Engineering Consultants, PLLC., 5141 South 1500 West, Riverdale City, Utah 84405, Telephone Number: 801-866-0550, Fax Number: 801-866-0551.

BID SUBMITTAL: Sealed bids will be received at the office of the City Recorder, of Riverdale City, until 2:00 PM., on September 6th, 2023; and then at said office publicly opened and read aloud.

DESCRIPTION OF BID WORK: The work includes furnishing all labor, tools, materials, equipment, transportation, and services required for construction of the above projects; consisting of the following items of work: mobilization; furnishing and installing approximately 20-feet of 10-inch pvc waterline in the golf course, furnishing and installing approximately 40-feet of 12-inch HDPE in the UDOT right-of-way on the south side of I-84, furnishing and installing approximately 400-feet of 12-inch HDPE by directional boring under the west bound lanes of I-84 and under the Weber River, furnishing and installing approximately 760-feet of 10-inch pvc waterline in the undeveloped land between the Weber River and the Railroad, and furnishing and installing approximately 150-feet of 10-inch pvc waterline under the Union Pacific Railroad with spacers and end caps and an 18-inch sleeve; miscellaneous landscaping, and all appurtenant work in accordance with the Drawings and Specifications prepared by the Engineer, CEC, Civil Engineering Consultants, PLLC.

CONTRACT DOCUMENTS: Contract documents may be examined at the office of the Engineer at 5141 South 1500 West, Riverdale, Utah, 84405.

COPIES OF THE CONTRACT DOCUMENTS: Copies of Contract Documents may be obtained from the offices of the Engineer for a non-refundable payment of \$45.00 for each. Electronic copies of the Contract Documents may also be obtained from the office of the Engineer.

PROJECT ADMINISTRATION: Questions in regards to the proposed project shall be directed to the Engineer, noted above. No drawing, specifications, product substitution and/or interpretations will be made unless noted with "Addendum".

PRE-BID MEETING: A pre-bid meeting for this project will **NOT BE HELD**. The contractor is encouraged to visit the site.

BID SECURITY: All bids must be accompanied by a Bid Bond, Certified Check or Cashier's Check in the amount of 5% of the maximum bid price, drawn payable to the order of Owner noted herein.

BID GUARANTEE: All Bids submitted shall be in conformance with the Instructions to Bidders and shall be guaranteed by the Bidder for a period of sixty (60) days from the date of Bid Opening.

OWNER'S RIGHTS RESERVED: The Owner hereby reserves the right to reject any or all bids presented, to waive any informality in a bid, and to make award or refuse in the interest of the Owner.

PROJECT CONTRACT TIME: All proposed work contained in the contract documents shall be completed by 15th February 2024.

LIQUIDATED DAMAGES: Liquidated damages or project delay charges will be issued for work not completed on time per the contract documents.

Posted: Starting the 21st August 2023 with the advertisement posted notices running continuously until the bid opening.

Notice Locations: Riverdale City Web Site
Riverdale City Recreation Center
Riverdale City Senior Citizens Center
Riverdale City Civic Center

Electronic Advertisement - SciQuest.com

By: Michelle Marigoni
City Recorder

END OF DOCUMENT

DOCUMENT 00110

GENERAL REQUIREMENTS - SUMMARY

DOCUMENT INCLUDES

- A. Contract Description.
- B. Special Considerations.
- C. Contractor's Use of The Premises.
- D. Reference Standards.
- E. Product Standardization and Installation.
- F. Cleaning During Construction.

A. CONTRACT DESCRIPTION

1. Work of the Project consists of the following as shown on the drawings and contained in the specifications.
 - a. The work includes furnishing all labor, tools, materials, equipment, transportation, and services required for construction of the above projects; consisting of the following items of work: mobilization; installation 12-inch HDPE to extent of UDOT right of way(approx. 40-foot); installation of 10-inch pvc pipe and valve in golf course(approx. 20-foot); directional bore 12-inch HDPE pipe (approx. 400-foot) under west bound lane of I-84 and the Weber River; installation of 10-inch pvc pipe and valves in field between weber river and the railroad tracks (approx. 780-foot); 18-inch sleeve extension (approx. 55-foot); installation of 10-inch pvc, DR-18, C-900 waterline with spacers and end caps in 18-inch sleeve (approx. 130-foot); miscellaneous landscaping, and all appurtenant work in accordance with the Drawings and Specifications prepared by the Engineer, CEC, Civil Engineering Consultants, PLLC.
 - b. Provide and maintain erosion control BMP's including final stabilization.
2. Perform work of the contract per the "General Conditions" and "Supplementary Conditions".

B. SPECIAL CONSIDERATIONS

1. Staging: Space is available at the project site for construction staging. If additional staging area is required, arrangements will need to be made with the Riverdale City Public Works Facility.

2. The existing waterline across I-84 is currently in operation. The Contractor will be responsible to contact and coordinate with Riverdale City, UDOT, Schneider's Riverside Golf course, and affected residents regarding any shutting off of the water to make the connection to the new waterline as required. The Contractor shall not shut off the water such that any businesses are interrupted that require water to run their businesses (restaurants, child care, etc).
3. This is a Riverdale City project. As such, UDOT will not require a fee for this project. The Contractor will still be required to obtain a permit from UDOT for the project. The Contractor shall include in the permit any surveying and other items that the Contractor deems necessary for the project and that may be required in the UDOT Right-of-Way. The Contractor shall be responsible for any additional fees that may be required due to required bonds and insurance, traffic control, UDOT inspectors, etc. of UDOT
4. Staging: Space is available at the project site for construction staging. If additional room is required the contractor must coordinate with Riverdale City to determine the appropriate location.
5. The ground surfaces, both in the construction area and the staging area, shall be restored to pre-existing conditions, or better, as determined by pre-construction video and shown on the drawings. Any disturbed areas shall be re-seeded to obtain proper ground foliage/cover.
6. All trenches and excavations must be backfilled or steel plated nightly unless site fencing is installed and maintained in place.
7. All water for the project will be made available by the City at no cost to the Contractor from designated city fire hydrants. The Contractor shall provide an approved backflow prevention device and gate valve for the fire hydrant connection.
8. The Contractor shall submit a testing and disinfection schedule to the Engineer for approval prior to performing the respective activities. Hydrostatic testing, disinfection, and bacteriological testing of underground associated waterlines, the requirements noted in the Contract Documents, Modification to General Conditions - Paragraph I. "Testing", and/or per the "Utah State, Department of Environmental Quality, Division of Drinking Water Requirements".
9. Prior to beginning construction activities and prior to the issuance of the "Notice to Proceed", the Contractor must furnish a full-coverage video or photographic documentation of the entire project site. The video or photos must include coverage of all areas of the site and adjacent neighboring features that may potentially be impacted by the impending construction work. The video must be in an approved video format for the Engineer and the City to view i.e. (.mp4, .mov, wmv – windows media video) or other as approved.
10. The Contractor shall coordinate with Riverdale City Public Works Department for disconnection and for connection to the existing culinary water system. All requests

shall be made 2-days prior to the needed changes and/or interruptions to the existing culinary water system.

11. The Contractor shall not close any roadways or create any roadway detour without the permission of UDOT and Riverdale City Public Works Department.
12. The Contractor shall provide to Riverdale City:
 - a. Field supervision, inspection, and reporting practices for all work.
 - b. Quality control inspection over subcontractors, suppliers and other services engaged in the project.
 - c. Shop drawings, coordination and checking procedures, including submittals from product manufacturers and subcontractors for approval.
 - d. Methods for protecting finished work prior to the Contract completion.
 - e. Monitoring and documentation of cold weather temperature; freezing temperatures – affecting concrete placement and other work items during the course of the project.
 - f. Monitoring and documenting of the Storm Water Pollution and Prevention Plans (SWPPP), for the site and surrounding properties per the requirements of the State of Utah.

C. CONTRACTOR'S USE OF THE PREMISES

1. The Contractor will be required to work on the site during regular working hours, which are defined as 7:00 AM. to 7:00 PM., local time, except Saturdays, Sundays, and legal holidays. No work shall be done before 7:00 AM. or after 7:00 PM. except as necessary for the proper care and protection of work already performed, or during emergencies. Exceptions will be considered by the Engineer and City Public Works Department and may be granted under certain conditions and project site locations.
2. The Contractor shall make every effort to minimize noise caused by construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise.
3. The Contractor shall restrict operations as nearly as possible to the immediate site, property under the ownership of Riverdale City. Unnecessary removal of concrete improvements, asphalt surfacing, cutting of vegetation or removal of property adjacent to the site, which is not under the ownership of Riverdale City, is prohibited. Every effort shall be made to minimize erosion during and after construction and the site shall be returned to its original condition, except where improvements are indicated or required.

4. The Contractor shall conform to all requirements of the Occupational Safety and Health Administration Regulations for trenching, shoring and excavation, confined spaces, and all other activities where such regulations apply. The Contractor and all subcontractors shall conduct all activities in conformance with federal and state laws and regulations relating to occupational health and safety. Authorized inspectors from Occupational Health and Safety Administration or the State of Utah agencies shall have unobstructed access to the project site and shall not be impeded in any way from performance of their duties.

D. REFERENCE STANDARDS

1. As noted in Document 00700 – General Conditions, the Contractor shall conform to all requirements set forth in the latest edition of the Riverdale City Public Works Development Standards, Technical Specification, and Drawings, the Manual of Standard Specification – APWA, the Manual of Standard Plans – APWA.
2. Where reference is to an industry standard, all labor, products and / or equipment must conform to the current standards.

E. PRODUCT STANDARDIZATION AND INSTALLATION

1. Like items of products furnished and installed throughout the project shall be end products of one manufacturer to achieve standardization for appearance, operation and maintenance, spare parts and replacement, and manufactures service's.
2. Installation of materials and equipment: shall be in conformance with the manufacture's written instruction.

F. CLEANING DURING CONSTRUCTION

1. During execution of work, the Contractor shall maintain a clean site and properly dispose of waste materials, debris, and rubbish to assure that buildings, grounds, roads, and public properties are maintained free from accumulations of waste materials - daily.
2. The Contractor shall provide appropriate containment of dust, debris, and storm water run-off.
3. The Contractor shall provide approved containers for collection and disposal of waste materials, debris and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

4. The Contractor shall handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
5. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. Daily, brush sweep the entry drive and roadways, and all other streets and walkways affected by Work and where adjacent to Work.
9. Remove snow and ice from access roads and construction areas as necessary to maintain access by City and Engineer and to maintain progress of work.

END OF DOCUMENT

DOCUMENT 00200

INSTRUCTIONS TO BIDDERS

DOCUMENT INCLUDES

- A. Bid Documents.
- B. Project Familiarity.
- C. Project Studies, Test Hole Results and Reports.
- D. Bidder Responsibility.
- E. Bid Security – Bid Bond.
- F. Form of the Bid Proposal.
- G. Delivery of the Bid Proposal.
- H. Withdrawal of the Bid Proposal.
- I. Bid Opening.
- J. Bid Proposal Evaluation.
- K. Award of the Project Contract.
- L. Contractual Agreement.
- M. Contract Security.
- N. Certification of Insurance.
- O. Execution of the Contract by the Owner.
- P. Pre-Construction Conference.
- Q. Notice to Proceed.

A. BID DOCUMENTS: A complete set of official bid documents may be obtained as noted in the Advertisement for Bid. The original bid documents are required to be used in preparing a bid; the project owner and the engineer will not assume any responsibility for errors or misinterpretations resulting from the use of unofficial and/or incomplete bid documents.

B. PROJECT FAMILIARITY: Prior to submitting a project bid, each bidder should make a complete examination of contract documents and complete a site visit. Items of additional concern may include but are not limited to:

1. Examination of the specifications, drawings, and other contract documents,
2. Site visit to become familiar with proposed project conditions that may affect costs, progress, performance, or furnishing of the proposed work,
3. Give written notice to the engineer of all conflicts, errors, or discrepancies in the contract documents,
4. Give consideration to federal, state and local laws, rules and regulations that may

affect the costs, progress time-table, performance, or completion of the work,

Should the bidder fail to do any of the suggested foregoing standard research procedures; that omission shall not relieve the bidder from any bid requirements in respect to his submitted bid.

The bidder, if in doubt as to the meaning of any part of the contract documents, or should they find any discrepancies therein, must submit to the engineer a written request for interpretation. The submittal for clarification must be submitted no later than six (6) days prior to the bid date or the date scheduled for opening of the bids.

Interpretation and/or correction of the proposed contract documents shall be made only by official project addendum. Project addendums shall be made available for all prospective bidders and must be acknowledged with bid submittal.

The engineer and owner will not be responsible for any other explanations or interpretations of the proposed contract documents.

C. PROJECT STUDIES, TEST HOLE RESULTS AND REPORTS: All studies, test hole results and reports that may be available or provided to the bidder, by the owner or the engineer shall not be considered a part of the contract documents.

1. The prospective bidder shall develop his own estimates, interpretation, inspections, and/or opinions concerning information contained in any related documents.
2. All additional site examinations, investigations, field explorations and tests shall be performed at the bidder's full responsibility and expense. All testing holes, debris and required clean-up, with full site restoration to its prior conditions, shall be the full responsibility of the bidder.

D. BIDDER RESPONSIBILITY: The bidder is fully responsible to examine and understand all conditions of the contract documents and elements associated with performing the work and the condition at the site.

1. The bidder shall review the accuracy of the estimated quantities shown in the bid schedule.
2. The bidder shall review the accuracy of the site information.
3. A bid submittal will constitute an express representation by the bidder that the bidder understands the proposed work requirements and has complied with every requirement of the contract documents.
4. Upon submittal of the bid, the bidder shall not claim that there was a misunderstanding concerning the scope of work or the quantities of work items.

5. The bid is submitted upon the premise of performing and furnishing all the work required by the contract document.
6. Bidders must hold an appropriate, valid Contractor's License and be properly qualified to do business in the State of Utah.

E. BID SECURITY – BID BOND: All proposed bids must be accompanied by a bid security – bid bond, which must be made payable to the project owner.

1. The bid security – bid bond must be in an amount of five (5) percent of the bidder's maximum bid price.
2. A surety company acceptable to the owner and/or engineer must issue the submitted bid bond.
3. The bid security may be a certified check or a cashier's check made payable to the project owner.
4. The project owner shall retain the bid security – bid bonds of all bidders that submit bids, until a successful bidder has been selected and has executed a contractual agreement with the project owner. Following an executed contractual agreement with the successful bidder all retained bid security documents – bid bonds, shall be returned to all bidders' who submitted bids.
5. If the selected successful bidder fails to execute the contractual agreement, performance bonds, material and payment bonds and produce evidence of insurance within ten (10) days after notice of award, the owner may annul the notice of award and the bid security of the selected bidder will be forfeited.
6. The owner may retain the bid security – bid bonds of all bidders an additional three (3) days after the contractual date of the executed agreement.
7. Bid security – bid bonds submitted by bidders which the owner or engineer determine are not competitive may be returned within ten (10) days after the date of the bid opening.

F. FORM OF THE BID PROPOSAL: All bids shall be made on the original bidding forms and or schedules bound herein.

1. The bid proposal must be prepared and submitted in *ink or typewritten*.
2. The bid proposal must contain:
 - a. No additions, deletions, or alterations to the bid form or bid document.

- b. No unauthorized conditions, limitations, qualifications or provisions may be included or attached to the bid schedule.
 - c. No telegraphic bid proposals or telegraphic modifications of a bid proposal will be considered.
 - d. Violation of the above conditions may render the bid proposal unresponsive and may cause its rejection.
- 3. All bid proposals submitted by corporations must be executed in the corporate name of the company by the president or vice-president or other authorized corporate officer.
 - a. Bid proposals must include evidence of authority to sign, and the corporate seal affixed thereto.
- 4. All bid proposals submitted by partnerships shall be executed in the partnership's name and signed by a partner having authority on behalf of the partnership.
- 5. All bid proposals submitted must be signed by the bidder or the bidder's authorized representative.
- 6. All bid proposals submitted must have all names typed or printed below the signature and must be completed in ink.
- 7. All bid proposals submitted must contain an acknowledgment of receipt of all addenda (the number of addenda must be noted on the bidding documents).
- 8. All bid proposals submitted must include the address, email address, office telephone number and cellular telephone numbers of the bidder. This information must be shown for communications regarding the bid proposal.

G. DELIVERY OF THE BID PROPOSAL: Bid proposals shall be submitted at the time and place indicated in the Advertisement for Bids contained in the contract documents.

- 1. The bid proposal documents shall be enclosed in a sealed envelope addressed to project owner.
- 2. The bid proposal envelope shall be marked on the outside with the project name and the project identification number along with the name, address, and license number of the bidder.
- 3. The bid security – bid bond and other required documents shall be enclosed in the sealed bid proposal envelope.
- 4. If the bid proposal is forwarded to the owner by mail, the sealed envelope containing

the bid documents must be enclosed in a separate envelope addressed to the project owner.

5. Any bid proposal received after the scheduled closing date and time will not be accepted or considered and will be returned to the bidder unopened.

H. WITHDRAWAL OF BID PROPOSAL: Any bid proposal may be modified or withdrawn by the bidder with a formal written request. The withdrawal or modification request must be signed by the bidder or his duly authorized representative. Such written requests must be delivered to the owners' location stipulated in the advertisement for bids, prior to the bid opening.

1. Should a prospective bidder wish to withdraw his bid after the appointed bid opening the following conditions must be demonstrated.
 - a. Withdrawal of a bid must be within 24 hours of the bid opening.
 - b. The withdrawal of a bid must be properly signed and a written statement as to the reasons for the bid withdrawal.
 - c. Reasons for bid withdrawal may be as follows:
 - (1) Material mistake with bid schedule items,
 - (2) Legal conditions,
 - (3) Bonding conditions,
 - (4) Other.
2. Withdrawal of a bid within 24 hours will also require that the bid security – bid bond be returned to the bidder. Thereafter, that bidder will be disqualified from further bidding on the proposed project work.
3. Only as provided above, the bidder may withdraw a bid proposal. No bid proposals may be withdrawn after the 24 hour withdrawal period which is immediately after the date and time of the bid opening. Should there be reasons why the project cannot be awarded within the specified period; the time may be extended by mutual agreement between the owner, the engineer, and the bidder.

I. BID OPENING: All bid proposals will be opened at the appointed date and time as indicated in the Advertisement for bids, unless obviously non-responsive. All bid proposals will be opened and read aloud publicly. All bid proposals shall be subject to acceptance by the owner for a period of sixty (60) days after the day and time specified for the opening of bid proposal.

J. BID PROPOSAL EVALUATION: An individual review of each bid proposal will be completed immediately following the bid opening. The total amount of each bid proposal shall be based on the correct extension and addition of bid schedule items. Discrepancies with the multiplication of quantities of work and their respective unit price will be resolved in favor of the unit prices quoted.

K. AWARD OF THE PROJECT CONTRACT: The project owner reserves the right to reject any and all bids, to waive any and all informalities not involving bid price, time, or changes in the required work, and to negotiate contract terms with the successful bidder.

1. The project owner further reserves the right to disregard any and all nonconforming, non-responsive, unbalanced, or conditional bid proposals.
2. The owner further reserves the right to reject the bid of any bidder, should the owner believe it would not be in the best interest of the owner to make an award to the proposed bidder, whether because that bid is non-responsive, or the bidder is unqualified or of doubtful financial ability, or fails to meet any other pertinent standards or criteria established by the project owner.
3. The project owner may consider the qualifications and experience and qualifications of the bidder, the sub-contractors, suppliers and other organizations or persons proposed for portions of the required work.
 - a. The apparent low bidder, if required, shall supply the names and addresses of suppliers, subcontractors and other persons performing portions of the required work.
 - b. The project owner may also consider the potential project costs, the bidders projected operating costs, project maintenance requirements, and guarantees of major items of the materials and equipment proposed for incorporation into the project.
 - c. The project owner shall have the right to require the bidder prepare and submit within 10 days additional evidence, such as financial statements, previous work experience, present work load commitments, and other similar information.
4. The project owner may investigate the abilities and standings of the bidder as deemed necessary in the evaluation of any proposed bid.
5. The proposed project, if awarded, may be awarded to the most responsible bidder. The submitted bid may or may not be awarded to the financially lowest price bidder. The project award will be considered, granted or rejected in the best interest of the project owner.
6. If the proposed project is to be awarded, the project owner will give the successful bidder a "Notice of Award" within 14 days from the date of the bid opening, unless a longer waiting period before project award is expressly provided in the

Advertisement for Bids or with written addendum.

L. CONTRACTUAL AGREEMENT: A contractual agreement between the project owner and the successful bidder will be required.

1. The successful bidder shall, within 10 calendar days from issuance of the Notice of Award from the owner, sign and execute the contractual agreement, and
2. The successful bidder shall secure and furnish to the project owner all Certificates of Insurance and all bonds, as required by the Contract Documents. All bonds and Certificates of Insurance shall be submitted to the engineer and approved by the owner prior to entering into the contractual agreement, and
3. Failure or refusal of the bidder to enter into and deliver the contractual agreement as required in the contract documents or to comply with any of the requirements connected thereto shall be just cause for annulment of the award and the forfeiture of the bid security. If the bidder fails or refuses to execute the contractual agreement, the project owner may award the project to the next lowest and/or responsible bidder.

M. CONTRACT SECURITY: A performance bond and a labor and materials payment bond shall be required of the successful bidder and must be delivered to the engineer and approved by the project owner. The performance bond and the labor and materials payment bond shall be a minimum of a 100 percent of the proposed "Bid Proposal" amount.

1. All Attorneys-in-fact who sign bid bonds, labor and material payment bonds or performance bonds must submit with each bond, a certified and effective dated copy of their Power-of-Attorney.

N. CERTIFICATION OF INSURANCE: Certification of insurance as required in the contract documents must be submitted by the successful bidder, to the engineer and approved by the project owner.

O. EXECUTION OF THE CONTRACT BY THE OWNER: Upon completion and acceptance by the project owner of all required contract documents, i.e., contract requirements, bonds, notices and certificates of insurance, the owner shall authorize the designated representative to execute the contractual agreement documents with the successful bidder.

1. All contractual documentation required in the contract documents will be prepared in triplicate. Distribution of the three original document copies shall be as follows:
 - a. The project owner
 - b. The successful bidder

- c. The project engineer

P. PRE-CONSTRUCTION CONFERENCE: A Pre-Construction Conference will be required and held prior to the issuance of the Notice to Proceed. Those required to attend the Pre-Construction Conference are:

1. The successful bidder, his representatives, sub-contractors, material suppliers and others as deemed necessary.
2. The engineer, his representatives, surveyors, soil testing inspectors and others as deemed necessary.
3. The owner, his representatives and others as deemed necessary.

The pre-construction conference agenda will be prepared by the engineer and the conference conducted by the engineer, unless otherwise directed by the project owner.

Q. NOTICE TO PROCEED: A Notice to Proceed shall be issued upon the execution of the contractual agreement by the project owner and following the pre-construction conference meeting.

END OF DOCUMENT

DOCUMENT 00220

MODIFICATIONS TO INSTRUCTIONS TO BIDDERS

DOCUMENT INCLUDES

- A. Scope of the Project.
- B. Project Timetable.
- C. Storm Water Pollution Prevention Plan (SWPPP).
- D. Contract Time, Liquidated Damages.
- E. Contract Price Adjustment.
- F. Alternate Bid Items.
- G. Additional Requirements of the Owner.
- H. Bidder Experience Certification - Affidavit.
- I. Bidder Questions Regarding Drawings, Specifications and Other Contract Documents.
- J. Addenda.
- K. Equal Opportunity Employer.

- A. SCOPE OF THE PROJECT:** The scope of the project has been defined in general terms and conditions in the Advertisement for Bids. A short synopsis of the proposed work, labor required, and materials proposed has been briefly indicated in the Advertisement for Bids and contained in document 00110 “General Requirements – Summary”.

The proposed bidder must fully investigate the contract documents, drawings and make investigation at the site in order to fully understand the proposed project.

- B. PROJECT TIMETABLE:** All proposed construction work, asphalt patching and clean-up shall be completed by the 15th of February 2024.

- C. STORM WATER POLLUTION PLAN (SWPPP):** The contractor or his designated representative shall prepare the SWPPP (plan) for the site. The SWPPP (plan) shall comply with the clean storm water discharge standards as mandated by the “Utah Pollutant Discharge Elimination System” (UPDES).

The SWPPP (plan) drawings and the maintenance keeping documents (record) must be submitted and approved by Riverdale City Public Works Department prior to any work taking place on-site.

The Contractor shall also file a “Notice of Intent” (NOI) with the “State of Utah” on any construction site greater than one-acre prior to any work taking place on-site. On project sites greater than one-acre all other State of Utah requirements must be complied with.

The SWPPP (plan) shall cover all the methods proposed to manage “Erosion, Sediment Control Waste and Other” on the site.

1. Erosion, Sediment, Waste and Other Control Items, may include the following:
 - a. Storm water flowing onto and through the project site
 - b. Stabilize soils
 - c. Protect slopes
 - d. Perimeter control and sediment barriers
 - e. Construction entrance/exit
 - f. Off-site control & clean-up of tracking
 - g. Material handling and waste management
 - h. Material storage in staging areas
 - i. Equipment fueling and spill prevention
 - j. Dust control
2. Maintenance records shall be kept on the site and kept current by the Contractor. The records shall be available for inspection by the City SWPPP Manager 24-hours a day.
3. Inspection, Maintenance and Correction plans.
4. Final Stabilization and Project Close-out.

D. CONTRACT TIME, LIQUIDATED DAMAGES: The bidder is herewith instructed that the Owner considers that time is of the essence for the completion of the proposed project.

The bidder is further instructed that the Owner will suffer a financial loss if the proposed work is not completed within the time stated in the contract documents and as noticed in the Advertisement for Bids.

The following requirements and contractual conditions will apply to the proposed project:

1. Work delays and expenses acquired by the Owner due to work delays are difficult and time consuming to document. It is a very involved process in proving, in a legal setting or in an arbitration proceeding, those many delay costs and the actual loss suffered by the Owner, when the work is not completed on time.

Instead of performing such a tedious documentation process to proof the actual loss the Owner has sustained, the Owner will require the successful bidder to pay liquidated damages for work delays. The liquidated damages are not assessed as a penalty but as a work delay charge.
2. Thus, should the contractual bidder fail to complete the required work prior to the time of completion, the Owner will have the right to assess and withhold a work delay charge for each day that expires after the time of completion, as noted in the contract documents.

Upon substantial completion of the project work, the Owner may withdraw the delay charges if the contractual bidder expedites the remaining required work. Should the required work be neglected, refused, or fail to be completed the Owner will have the right to again assess and withhold a work delay charge for each day that expires after the time of completion.

3. The proposed work shall be considered complete as stated in the contract documents.
4. The **liquidated damages (delay charges) shall be assessed at \$650.00 per day** for each day that expires after the contractual time of completion, as noted in the contract documents.

E. CONTRACT PRICE ADJUSTMENTS: The project has been bid based upon the availability of the Owners funds. The scope of the project may be increased or decreased at the discretion of the Owner after the project is awarded. During the progress of the work, the scope of the project may be further adjusted at the option of the Owner. The contractual bidder shall be allowed no additional claims other than those stated in the contract documents.

F ALTERNATE BID ITEMS: Alternate bid items may be listed in the bid schedule documents. Where alternates are listed in the bid schedule documents, alternate bid items are required. The Bidder is requested to bid each alternate item listed.

1. The review and selection of the alternates will be made in the best interest to the Owner. In evaluation of alternates, the total cost (consideration may be given to bid price), related construction costs, useful life, maintenance costs, availability of service, operation costs, other short term and long term conditions and costs as may be considered by the Owner.

G. ADDITIONAL REQUIREMENTS OF THE OWNER: The Contractor will be required to conform to all requirements of the Owner of the proposed work; including but not limited to: daily sweeping and debris clean-up, traffic control, flagging, caution barricades, and all appurtenant items of the proposed work.

H. BIDDER EXPERIENCE CERTIFICATION - AFFIDAVIT: The bidder shall complete the experience certification - affidavit in full and shall include the required experience documentation forms with the bid.

1. The bidder will need to show all experience and qualifications to be considered to perform the proposed work.
2. The Owner reserves the right to reject the bid of any bidder who cannot show the required experience to perform the work or who does not include the experience certification - affidavit with the bid.

- I. BIDDER QUESTIONS REGARDING DRAWINGS, SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS:** Contractors having questions regarding this project shall contact the Project Engineer. Questions as to the meaning of any part of the drawings, specifications, or other contract documents shall be submitted to the Engineer in writing at the address shown in the “Advertisement for Bids”. The Contractor submitting the question(s) will be responsible for their prompt delivery to the Engineer. Neither the Owner nor the Engineer will be responsible for any other explanations or interpretations of the proposed documents.
- J. ADDENDA:** Any addendum issued during the time of bidding shall become part of the Contract Documents and made available to all bidders for the preparation of their bids; all addenda shall be covered in the bid; and, all addenda shall be made a part of the Contract.
- K. EQUAL OPPORTUNITY EMPLOYER:** The Bidder agrees to abide by provisions of Title VI of the Civil Rights Act of 1964 (42 USC 2000e), as amended from time to time, which prohibits discriminations against any employee or applicant for employment or any applicant or recipient of services, on the basis of race, religion, color or national origin; and further agrees to abide by Executive Order No. 11246, as amended, which prohibits discrimination on the basis of sex; 45CFR90, as amended, which prohibits discrimination on the basis of age; and Section 504 of the Rehabilitation Act of 1973, as amended, which prohibits discrimination on the basis of handicap.

END OF DOCUMENT

DOCUMENT 00230

**BIDDER'S EXPERIENCE CERTIFICATION
(Mandatory Document)**

The award of the proposed project, if awarded, will not be based upon the submitted proposed bid price alone. The award will also be based upon the experience and the ability of the bidder to begin, construct and complete the proposed work.

The project bidder must complete this mandatory "Bidder's Experience Certification" and must attach and enclose the certification within the sealed bid proposal. Should the bidder fail to complete in full and submit the "Bidder's Experience Certification" with the tendered bid documents, the bid may be rejected, returned to the bidder and considered a non-responsive bid.

Please answer all questions as briefly as possible:

A. Bidder's Company Name: _____

B. Bidder's Company Address: _____

C. Bidder's Contact Representative: _____

D. Bidder's Telephone Number: _____

E. Bidder's License Classification: _____

License Number(s) / State of License Issuance: _____

Other License Classifications: _____

Qualifying Years of Experience: _____

F. Bidder's Company Officers:

Name (printed)

Title

Name (printed)

Title

Name (printed)

Title

Name (printed)

Title

G. Bidder's Representative Who Evaluated the Proposed Work Site: _____

H. Bidder's Current Work Load and Required Completion Date:

Project Name	Project Completion Date (required date)	Is The Project On Schedule ? (yes or no)
--------------	--	--

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

I. List four projects of similar size; successfully completed:

Construction Cost
(completed cost)

1. _____ \$ _____

Owner, contact person and telephone number

2. _____ \$ _____

Owner, contact person and telephone number

3. _____ \$ _____

Owner, contact person and telephone number

4. _____ \$ _____

Owner, contact person and telephone number

J. List any projects that you have failed to complete:

Project Name:

Reason: (Why was the project not completed ?)

1.	_____	_____

2.	_____	_____

3.	_____	_____

K. Can you complete the proposed project on time as required in the Contract Documents?

L. Bidder's Surety Company(s) and Agent: _____

SUBCONTRACTORS

M. LIST OF SUBCONTRACTORS:

What Percentage of the
Proposed Project will the
Sub-Contractor
Complete?

Company Name

Percentage

LIST OF SUBCONTRACTORS (continued):

Company Name

Percentage

Respectively Submitted:

(Signature)

(Print name / title)

END OF DOCUMENT

DOCUMENT 00400

BID PROPOSAL

- A. PROJECT NAME:** Waterline Improvement Project Crossing I-84, Weber River, and Railroad.
- B. PROPOSAL CONDITIONS:** In compliance with the Advertisement for Bids, the undersigned bidder proposes to perform all Work in accordance with the Contract Documents.
- C. PROJECT COMPLETION TIME:** The undersigned bidder agrees and acknowledges that in his opinion all proposed Work can and will be completed within the time stated for project completion, as contained in the Contract Documents. The bidder further acknowledges that he understands all conditions relative to liquidated damages and delay charges.
- D. INDEPENDENT BIDDING:** The undersigned Bidder certifies that his bid has been generated solely and independently, without consultation with other Bidders relating to the proposed Work.
- E. ADDENDUM:** The undersigned Bidder herewith acknowledges the following Addendum:

(Acknowledge all addendums here)
- F. BID SCHEDULE:**

No.	Item	Quantity	Unit	Unit Price	Total Amount
Schedule A: Waterline Improvement from Sta 0+00 (golf course) to Sta 13+14 (Union Pacific Railroad):					
A1.	Mobilization.	1	ls.	_____	_____
A2.	Traffic Control.	1	ls.	_____	_____
A3.	Storm Water Pollution Prevention Plan (SWPPP).	1	ls.	_____	_____
A4.	Pothole existing waterline.	4	ea.	_____	_____
A5.	Waterline connection at Sta 0+45.00 LT 27.00; Connect existing 10-inch pvc to new 10-inch pvc waterline with appropriate fittings & bends.	1	ls.	_____	_____
A6.	Furnish 10-inch gate valve.	2	ea.	_____	_____
A7.	Furnish and install 10-inch pvc C900 DR18 waterline; Sta 0+45.00 LT 27.00 to Sta 0+80.00 LT 12.00.	20	lf.	_____	_____
A8.	Furnish and install 12-inch HDPE, SDR 11, waterline; Sta 0+45.00 LT 27.00 to Sta 0+80.00 LT 12.00.	35	lf.	_____	_____

A9. Waterline connection at Sta 0+80.00 RT 12.00; Electrofuse new 12-inch HDPE to existing 12-inch HDPE.	1 ls.			
A10. Waterline connection at Sta 2+26.00 LT 5.00; Electrofuse existing 12-inch HDPE to new 12-inch HDPE.	1 ls.			
A11. Furnish and install 12-inch HDPE, SDR 11, waterline by directional boring; Sta 2+26.00 LT 5.00 to Sta 5+70.00 RT 4.50.	360 lf.			
A12. Added cost per foot for encountering cobble rock 6-inch and greater.	360 lf.			
A13. Added cost per foot for encountering solid rock.	360 lf.			
A14. Flowfill and abandon 10-inch existing waterlines.	8 cy.			
A15. Connect 12-inch HDPE to 10-inch PVC waterline with appropriate fittings & bends; at Sta 5+70.00 RT 4.50.	1 ls.			
A16. Reconnection of the 2-inch culinary water service lateral to the main line.	1 ea.			
A17. Furnish & install 2-inch dia. water service to new 10-inch PVC waterline.	20 lf.			
A18. Furnish and install 10-inch PVC, DR-18, C900, waterline; Sta 5+70.00 RT 4.50 to Sta 13+0.00 RT 0.00.	740 lf.			
A19. Furnish 1-inch diameter clean gravel pipe bedding materials.	498 ton			
A20. Furnish clean import material for trench backfill.	785 ton			
A21. Adjust valve box ring and cover to finish grade.	2 ea.			
A22. Remove and replace all landscaping improvements, public/private damaged during construction.	500 sf			
A23. Furnish & install 10-inch gate valve; Sta 13+00 RT 0.00.	1 ea.			

A24. Waterline connection at Sta 13+14.00 RT 0.00; (If railroad permit not issued prior to construction).	1 ls.	_____	_____
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Schedule A: Waterline Improvement from Sta 0+00 (golf course) to Sta 13+14 (Union Pacific Railroad): _____

Schedule B: Waterline improvement from Sta 13+14 to Sta 14+45 (crossing under the Union Pacific

B1. Mobilization (If railroad permit not issued prior to construction).	1 ls.	_____	_____
B2. Storm Water Protection Plan Paperwork (SWPPP) and Implementation (If railroad permit not issued prior to construction).	1 ls.	_____	_____
B3. Pothole existing waterline.	2 ea.	_____	_____
B4. Railpros Field Services/Track Monitoring for railroad crossing.	2 days	_____	_____
B5. Waterline connection at Sta 13+14.00 RT 0.00 (If railroad permit not issued prior to construction).	1 ls.	_____	_____
B6. Remove and dispose of existing 10-inch waterline.	155 lf.	_____	_____
B7. Add for bid item B7 if existing waterline removed is asbestos cement.	155 lf.	_____	_____
B8. Furnish and install 18-inch sleeve extension on both sides of the tracks.	55 lf.	_____	_____
B9. Furnish and install 10-inch, PVC, DR-18, C900 waterline with spacers and endcaps in new/existing sleeve; Sta 13+00.00 RT 0.00 to Sta 14+45.00 RT 5.65.	155 lf.	_____	_____
B10. Waterline connection at Sta 14+45.00 RT 5.65; Connect 10-inch PVC to existing PVC with appropriate fittings & bends.	1 ls.	_____	_____
B11. Furnish 1-inch clean gravel pipe bedding.	70 ton	_____	_____
B12. Furnish trench backfill material.	180 ton	_____	_____
B13. Adjust valve box ring and cover to finish grade.	1 ea.	_____	_____

B14. Remove and replace all landscaping improvements,
public/private damaged during construction.

1 ls. _____

**Schedule B: Waterline improvement from Sta 13+14 to Sta 14+45
(crossing under the Union Pacific Railroad).** _____

**Schedule A: Waterline Improvement from Sta 0+00 (golf course) to
Sta 13+14 (Union Pacific Railroad):** _____

**Schedule B: Waterline improvement from Sta 13+14 to Sta 14+45
(crossing under the Union Pacific Railroad).** _____

TOTAL BID PROPOSAL AMOUNT: _____

G. BID PROPOSAL SIGNATURES:

We the undersigned Bidder herewith submit this bid for consideration. We certify we are in full understanding of the Contract Documents and have complied with the conditions stated in the Contract Documents, to submit this Bid.

Bidder's Signature: _____

Bidder's Name: _____
(Print Name)

Bidder's Company Name: _____

Bidder's Address: _____

Bidder's Email Address: _____

Bidder's Telephone Number: _____

Bidder's License:
Classification: _____

License Number: _____

Submittal Date: _____

END OF DOCUMENT

DOCUMENT 00405

MEASUREMENT AND PAYMENT

A. MEASUREMENT AND PAYMENT:

1. Measurement of completed Work Items shall be made in individual unit price or as a lump sum item.
2. Payment for completed Work items shall be made at the unit price or lump sum bid price as contained in the "Bid Proposal", for the item. Payment will include all costs associated in furnishing labor, tools, equipment, materials, testing, etc.

Payment shall be for completed Work, as specified, and as indicated in the Contract Documents or on the Drawings.

B. BID ITEM – DESCRIPTION OF WORK AND PAYMENT:

Schedule A: Waterline Improvement from Sta 0+0 (golf course) to Sta 13+14 (Union Pacific Railroad)

Bid Item A1. Mobilization.

Mobilization shall include the costs for all preparatory work and operations, such as movement of personnel, supplies and incidental items to the project site; all costs associated with securing all bonds and insurance, establishment of all facilities necessary for work on the project; obtaining UDOT permits, furnishing, erecting and maintaining construction signs and barricades, preparing employee notification boards; daily sweeping/cleaning roadways and/or project site; and all other work and operations which must be performed, or costs incurred prior to beginning work on the project or during work on the project.

Includes the costs associated with obtaining and submitting all bonds and insurance forms required by UDOT and Riverdale City.

The contractor shall assume the sole and complete responsibility for the job site conditions during the course of construction of the project, including the safety of all persons and property. This requirement shall apply continuously and not be limited to normal working hours.

The contractor shall ensure that all trees and vegetation within the project area are protected from any damage. Trees and shrubs shall be pruned by a licensed tree specialist as required.

Payment includes all costs associated for the Contractor to locate all underground utilities, contacting Blue Stakes, and coordinating with all utilities prior to laying pipe within 200 feet of said utilities which may be exposed, damaged, or crossed as shown on the drawings or as identified by Blue Stakes marking. Payment includes all cost associated for the Contractor to coordinate with the utility company to move or support the utility as necessary.

Utilities to be located will include, but not limited to, utilities in the I-84 UDOT ROW and on north and south of ROW to project extents. Existing storm drain systems, existing irrigation systems, existing natural gas main lines and service lines, existing telephone cables, existing power lines, existing fiber optic lines, and existing water lines. Includes the placement of steel traffic plates as required for coordination with the utility companies and Utah Department of Transportation.

No additional payment shall be made for “down time” associated with delays required to coordinate and resolve utility conflicts, utility relocation, and project design modifications as required.

The contractor shall obtain all right-of-access permission to enter upon private property to perform the necessary work and shall restore all private property to pre-construction conditions or better.

This requirement shall apply continuously and not be limited to normal working hours. This requirement includes maintaining reasonable daily access for the pedestrian trail and all roadway’s associated with the project noted above, during the daily construction period and unrestricted access during non-work times, including evenings, weekends, and holidays.

Shall include all work required to maintain environmental control (24-hours) as required. Shall include all work required to maintain dust control (24-hours) as required.

Payment shall be at a lump sum bid price and shall be paid as follows: Payment of 75% with the 1st payment request and the remaining 25% with the final payment request.

Bid Item A2. Traffic Control.

Traffic control & flagging shall include all costs associated with the directional boring, placement, and connection of the HDPE waterline and improvement project. The contractor shall provide qualified personnel & equipment to perform all required traffic control around the site as per UDOT standards and the Manual on Uniform Traffic Control Devices for Streets & Highways (MUTCD) specifications. The walking trail and roadway are to remain open to traffic, both pedestrian and vehicle, at all times, any proposed lane closures must be submitted and approved prior to starting work.

Payment shall be at a lump sum bid price and shall be paid as follows: Payment of 75% with the 1st payment request and the remaining 25% with the final payment request.

Bid Item A3. Storm Water Pollution Prevention Plan (SWPPP).

The contractor shall include all costs associated with storm water pollution prevention plans (SWPPP), installation of best management practices (BMP's) required by the SWPPP, maintaining the SWPPP and all other items associated with the SWPPP throughout the duration of the project. The contractor is responsible for developing and maintaining his own (SWPPP) plan. The Contractor shall assume all responsibility and liability associated with his SWPPP, complete.

Payment shall be at a lump sum bid price and shall be paid as follows: Payment of 75% with the 1st payment request and the remaining 25% with the final payment request.

Bid Item A4. Pothole existing waterline.

Includes all related potholing, earthwork; excavating to the required depth; all necessary labor, supervision, tools, equipment, permits and incidentals to excavate, identify and survey the utility, including backfilling and compacting materials to the required elevations, complete.

This item is to locate the waterline in the following locations:

- 1.) Sta 0+45.00 LT 27.00. At the golf course to the south of the right of way fence,
- 2.) Sta 0+80.00 LT 12.00. Near the south side of I-84 East bound lanes,
- 3.) Sta 2+26.00 LT 5.00 Between the East and West bound lanes of I-84,
- 4.) Sta 5+70.00 RT 4.50. The east side of Weber River next to the trail,

Payment shall be by the unit bid price for each pothole existing waterline, complete.

Bid Item A5. Waterline connection at Sta 0+45.00 LT 27.00. Connect existing 10-inch pvc to new 10-inch pvc waterline with appropriate fittings & bends.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and

trench backfill; dewatering as required; furnishing and installing 10-inch pvc C900 DR18 waterline piping, installing detectable wire and location marking tape, installing fittings, (tees, including fire hydrant tees, bends, sleeves, reducers, caps, plugs and restrained joint fittings not specified in other bid items), and accessories; pressure testing of new waterline; chlorinating, disinfecting, and flushing of the new waterline; and all other appurtenant work, complete.

- a. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and approval by the Engineer. Includes locating utilities to determine conflicts and installing waterline to avoid said conflict.
- b. Includes all related costs to locate all utilities ahead of the construction, during the installation of the waterline.
- c. Coordinate with Schneider's Riverside Golf Course for access to the area outside of UDOT right of way on south side of east bound lanes.

Payment shall be by the unit bid price for waterline connection at Sta 0+45.00 LT 27.00, complete.

Bid Item A6. Furnish 10-inch gate valve.

Includes furnishing and supplying gate valve, valve box, thrust blocks. Installation shall be part of waterline installation.

Payment shall be by the unit bid price for each gate valve furnished, complete.

Bid Item A7. Furnish and install 10-inch pvc C900 DR18 waterline; Sta 0+45.00 LT 27.00 to Sta 0+80.00 LT 12.00.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and trench backfill; dewatering as required; furnishing and installing pvc, C-900, DR18 waterline piping, installing detectable wire and location marking tape, installing fittings, (valves, tees, including fire hydrant tees, bends, sleeves, reducers, caps, plugs, thrust blocks and restrained joint fittings not specified in other bid items), and accessories; pressure testing of new waterline; chlorinating, disinfecting, and flushing of the new waterline; and all other appurtenant work, complete.

- a. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and approval by the Engineer. Includes locating utilities to determine conflicts and installing waterline to avoid said conflict.

- b. Includes all related costs to locate all utilities ahead of the construction and to provide for support of the utility, including power pole support, during the installation of the waterline.
- c. Coordinate with Schneider's Riverside Golf Course for access to the area outside of UDOT right of way on south side of east bound lanes.
- d. Protect UDOT Right of way fence from damage. Any damage done to the fence will be repaired to the owners standards at the contractors expense.

Payment shall be by the unit bid price for each linear foot of 10-inch pvc C900 DR18 waterline furnished and installed, complete.

Bid Item A8. Furnish and install 12-inch HDPE, SDR 11 waterline; Sta 0+45.00 LT 27.00 to Sta 0+80.00 LT 12.00.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and trench backfill; dewatering as required; furnishing and installing pvc, C-900, DR18 waterline piping, installing detectable wire and location marking tape, installing fittings, (valves, tees, including fire hydrant tees, bends, sleeves, reducers, caps, plugs, thrust blocks and restrained joint fittings not specified in other bid items), and accessories; pressure testing of new waterline; chlorinating, disinfecting, and flushing of the new waterline; and all other appurtenant work, complete.

- e. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and approval by the Engineer. Includes locating utilities to determine conflicts and installing waterline to avoid said conflict.
- f. Includes all related costs to locate all utilities ahead of the construction and to provide for support of the utility, including power pole support, during the installation of the waterline.
- g. Coordinate with Schneider's Riverside Golf Course for access to the area outside of UDOT right of way on south side of east bound lanes.
- h. Protect UDOT Right of way fence from damage. Any damage done to the fence will be repaired to the owners standards at the contractors expense.

Payment shall be by the unit bid price for each linear foot of 12-inch HDPE, SDR 11 waterline furnished and installed, complete.

Bid Item A9. Waterline connection at Sta 0+80.00 RT 12.00; Electrofuse 12-inch HDPE to existing 12-inch HDPE.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and trench backfill; dewatering as required; furnishing and installing HDPE SDR-11 waterline piping, installing detectable wire and location marking tape, installing fittings, (tees, including fire hydrant tees, bends, sleeves, reducers, caps, plugs and restrained joint fittings not specified in other bid items), and accessories; pressure testing of new waterline; chlorinating, disinfecting, and flushing of the new waterline; and all other appurtenant work, complete.

- d. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and approval by the Engineer. Includes locating utilities to determine conflicts and installing waterline to avoid said conflict.
- e. Includes all related costs to locate all utilities ahead of the construction and to provide for support of the utility, including power pole support, during the installation of the waterline.
- f. Includes all costs of HDPE thrust anchors and or blocks, HDPE and PVC restrained joints, etc.
- g. Includes all fittings and costs to electro fuse new HDPE to existing HDPE pipe.

Payment shall be by the unit bid price for waterline connection at Sta 0+80.00 RT 12.00, complete.

Bid Item A10. Waterline connection at Sta 2+26.00 LT 5.00; Electrofuse existing 12-inch HDPE to 12-inch HDPE.

Includes all related earthwork including excavating, backfilling and compacting the boring and receiving pits; furnishing, installing and removing required shoring; dewatering as required for the project duration; removal and disposal of excavated unused materials; construction of equipment support pads and landing; backfilling any pits created for installation and compacting the materials in lifts as specified and directed by the Engineer; the pit size shall be as required by the contractor to perform the work; furnishing and installing the 12" diameter HDPE waterline by horizontal directional drilling, complete.

- a. Excavated trench materials are to be re-used as backfill if the materials meet specifications and are approved by the Engineer.
- b. Includes locating existing utilities to determine conflicts and resolving any conflicts per direction of the Engineer.

- c. Includes all costs of HDPE thrust anchors and or blocks, HDPE and PVC restrained joints, etc.
- h. Includes all fittings and costs to electro fuse new HDPE to existing HDPE pipe.

Payment shall be by the unit bid price for waterline connection at Sta 2+26.00 LT 5.00, complete.

Bid Item A11. Furnish and install 12-inch HDPE, SDR 11, waterline by directional boring; Sta 2+26.00 LT 5.00 to Sta 5+70.00 RT 4.50.

Includes all related earthwork including excavating, backfilling and compacting the boring and receiving pits; furnishing, installing and removing required shoring; dewatering as required for the project duration; removal and disposal of excavated unused materials; construction of equipment support pads and landing; backfilling any pits created for installation and compacting the materials in lifts as specified and directed by the Engineer; the pit size shall be as required by the contractor to perform the work; furnishing and installing the 12" diameter HDPE waterline by horizontal directional drilling, complete.

- a. Excavated trench materials are to be re-used as backfill if the materials meet specifications and are approved by the Engineer.
- b. Includes locating existing utilities to determine conflicts and resolving any conflicts per direction of the Engineer.
- c. Includes all costs of HDPE thrust anchors and or blocks, HDPE and PVC restrained joints, etc.
- i. Includes all fittings and costs to electro fuse new HDPE to existing HDPE pipe.

Payment shall be by the unit bid price for each linear foot of 12" HDPE waterline furnished and installed by horizontal directional drilling, complete.

Bid Item A12. Added cost per foot for encountering cobble rock 6-inch and greater.

Includes all related tools and equipment to bore through earth with cobble rock 6" or greater. Backfilling the pit and compacting the materials in lifts as specified and directed by the Engineer; the pit size shall be as required by the contractor to perform the work; furnishing and installing the 12" diameter HDPE waterline by horizontal directional drilling, complete.

- a. Excavated trench materials are to be re-used as backfill if the materials

meet specifications and approved by the Engineer.

- b. Includes all costs of special drilling tips and equipment to bore through dirt with cobble rock 6" or greater.

Payment shall be by the unit bid price for each linear foot for cobble rock infused soil, complete.

Bid Item A13. Added cost per foot for encountering solid rock.

Includes all related tools and equipment to bore through solid rock. Backfilling the pit and compacting the materials in lifts as specified and directed by the Engineer; the pit size shall be as required by the contractor to perform the work; furnishing and installing the 12" diameter HDPE waterline by horizontal directional drilling, complete.

- a. Excavated trench materials are to be re-used as backfill if the materials meet specifications and approved by the Engineer.
- b. Includes all costs of special drilling tips and equipment to bore through solid rock.

Payment shall be by the unit bid price for each linear foot of solid rock, complete.

Bid Item A14. Flowfill and abandon 10-inch existing waterlines.

Includes all related earthwork including excavating, backfilling, and compacting; locating existing pipes; saw-cutting pipes as required; furnishing and installing grout (UDOT specification section 03575) fully filling the, approximately 166-feet of abandon 10-inch waterline (approx. 6± cy.) from end to end (center vent may be required) as directed by the City Engineer and UDOT Engineers; and all other appurtenant work associated, complete.

The pipe to be grouted extends from the UDOT right of way fence on the south side to the right of way fence on the north side. The pipe includes the existing abandoned waterline under the east bound lanes.

Payment shall be by the cubic yard bid price for the furnish and install of the grout, complete.

Bid Item A15. Connect 12-inch HDPE to 10-inch PVC waterline with appropriate fittings & bends; ~Sta 5+70.00 RT 4.50.

Includes all related earthwork; excavating, backfilling, and compacting materials

in trenches; pipe bedding and trench backfill; dewatering as required; furnishing and installing restrained joint fittings, concrete thrust blocks and accessories, and all other appurtenant work, complete.

- a. Excavated trench materials may be re-used as backfill if the materials meet specifications.
- b. Waterline pipe shall be paid in the appropriate bid item.

Payment shall be by the unit bid price for connect 12-inch HDPE to 10-inch PVC to HDPE connection made, complete.

Bid Item A16. Reconnection of the 2-inch culinary water service lateral to the main line.

Includes all related earthwork including excavating, backfilling and compacting; furnishing and installing new double strap brass saddle, installing the corporation stop on the new saddle; disconnecting the existing service lateral from the existing water meter; connecting the new water service lateral pipe to the new corporation stop and water meter; and all other appurtenant work, complete.

Includes all necessary labor to flush and clear debris that may collect in fixtures down stream of connection.

Payment shall be by the unit bid price for each lateral connection made, complete.

Bid Item A17. Furnish & install 2-inch dia. water service to new 10-inch PVC waterline.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and trench backfill; dewatering as required; furnishing and installing 2" poly waterline piping, fittings and accessories; from the new water main to existing water meter; removing and disposing of the old water service lateral piping; and all other appurtenant work, as directed by the engineer, complete.

- a. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and is approval by the Engineer.
- b. Includes all associated work to notify of water shut-down, flush and or repair the existing culinary water residential/commercial service facilities, as required, complete. Includes all necessary labor and material to flush and clearing all debris that may collect in down stream fixtures or equipment.

Payment shall be by the unit bid price for each linear foot of 2-inch poly water service lateral piping furnished and installed, complete.

Bid Item A18. Furnish and install 10-inch PVC, C900 DR-18, waterline; Sta 5+70.00 RT 4.50 to Sta 13+0.00 RT 0.00.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and trench backfill; dewatering as required; furnishing and installing pvc, C-900, DR18 waterline piping, installing detectable wire and location marking tape, installing fittings, (valves, tees, including fire hydrant tees, bends, sleeves, reducers, caps, plugs, thrust blocks and restrained joint fittings not specified in other bid items), and accessories; pressure testing of new waterline; chlorinating, disinfecting, and flushing of the new waterline; and all other appurtenant work, complete.

- i. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and approval by the Engineer. Includes locating utilities to determine conflicts and installing waterline to avoid said conflict.
- j. Includes all related costs to locate all utilities ahead of the construction and to provide for support of the utility, including power pole support, during the installation of the waterline.
- k. Coordinate with Schneider's Riverside Golf Course for access to the area outside of UDOT right of way on south side of east bound lanes.
- l. Coordinate with Bach Homes (307)277-0527 for work between the river and the railroad tracks.
- m. Protect UDOT Right of way fence and walking trail from damage. Any damage done to the fence or walking trail will be repaired to the owners standards at the contractors expense.

Payment shall be by the unit bid price for each linear foot of pvc C900 DR18 waterline furnished and installed, complete.

Bid Item A19. Furnish 1-inch diameter clean gravel pipe bedding materials.

Includes furnishing 1-inch clean gravel backfill for pipe bedding, as directed by the Engineer.

- a. Placement and compaction of gravel bedding materials for pipe shall be paid under the bid item, which utilizes bedding backfill materials, and not to be paid as part of this item.

Payment shall be by the unit price for each ton of gravel bedding material furnished only. Weight tickets must be submitted to the Engineer in order to

document the tonnage.

Bid Item A20. Furnish clean import material for trench backfill.

Includes furnishing clean non-recycled structural backfill material, as directed by the Engineer.

- a. Placement and compaction of non-recycled structural backfill materials for pipeline trenches shall be paid under the bid item, which utilizes structural backfill materials, and not to be paid as part of this item.

Payment shall be by the unit price for each ton of structural backfill material furnished only. Weight tickets must be submitted to the Engineer in order to document the tonnage.

Bid Item A21. Adjust valve box ring and cover to finish grade.

Includes all related earthwork including excavation, backfilling, compacting, and grading; all tools, labor and materials required to adjust the valve box ring and cover to finish grade; furnishing and installing roadbase course under concrete collar; furnishing and installing concrete collar (8-inch thick minimum) around the adjusted valve box ring and cover; and all appurtenant work, complete.

Concrete collar shall be kept 1/4" below the finish asphalt pavement.

Payment shall be by the unit bid price for each valve box ring and cover adjusted to finish grade, complete.

Bid Item A22. Remove and replace all landscaping improvements, public/private damaged during construction.

Includes all related earthwork; removing and disposing of unsuitable materials as required; furnishing, installing and grading the existing ground surface and/or all imported topsoil; furnishing and placing lawn sod as required on public/private property; matching sod joints, type, and elevations; initial watering of newly placed sod (watering required for 2-weeks or from when restoration of the irrigation system is complete); restoring all vegetation adjoining the roadways and walking trail; vegetation to match adjoining vegetation, etc.; protecting and/or replacing existing appurtenances such as sprinklers, rocks, lawn decorations, fences, walls, lawn sod, trees, brick pavers, stamped concrete, shrubbery, concrete curbing, sprinkler system equipment, gates, signs and all landscaping items, replacing all damaged items; and all other appurtenant work, complete.

- a. All lawn sod shall be approved by golf course personnel and placed with 5-inches of topsoil as bedding material.

- b. The minimum width of sod patch shall be 12-inches.
- c. The Contractor is responsible for all landscape replacement and coordination with the affected property owners, complete.
- d. Contractor is to protect right of way fence in place. Any damage to right of way fence is to be repaired to UDOT standards at no cost to the city.
- e. Areas adjoining the freeway and across the field are to be reseeded with native water wise grass/plant blend.

Payment shall be at a square foot bid price for the removal and replacement of the landscaping improvements, complete.

Bid Item A23. Furnish & install 10-inch gate valve; Sta 13+00 RT 0.00.

Includes furnishing and supplying gate valve, valve box, thrust blocks, concrete collar for the valve box and all appurtenances as noted on drawings. Installation shall be part of waterline installation.

Payment shall be by the unit bid price for each gate valve furnished and installed, complete.

**Bid Item A24. Waterline connection at Sta 13+14.00 RT 0.00;
(If railroad permit not issued prior to construction).**

Includes all related earthwork including excavating, backfilling, and compacting; locating existing pipes; saw-cutting pipes as required; furnishing and installing all associated piping, pipe fittings (bends, tees, crosses, sleeves, reducers, etc.), valve boxes, concrete collar for valve boxes, restrained joint fittings and concrete thrust blocks; disconnecting waterlines and fittings, capping and abandoning waterlines, removing abandoned valve boxes and valves as required; and all other appurtenant work, complete.

Includes 24- hour (minimum) notification to the affected residences prior to the water shutoff.

Schedule B: Waterline Improvement from Sta 13+14 to Sta 14+50 (crossing under the Union Pacific Railroad).

Bid Item B1. Mobilization (If railroad permit not issued prior to construction).

Mobilization shall include the costs for all preparatory work and operations, such as movement of personnel, supplies and incidental items to the project site; all

costs associated with securing all bonds and insurance, establishment of all facilities necessary for work on the project; furnishing, erecting and maintaining construction signs and barricades, preparing employee notification boards; daily sweeping/cleaning roadways and/or project site; and all other work and operations which must be performed, or costs incurred prior to beginning work on the project or during work on the project.

Includes the costs associated with obtaining and submitting all bonds and insurance forms required by Riverdale City.

The contractor shall assume the sole and complete responsibility for the job site conditions during the course of construction of the project, including the safety of all persons and property. This requirement shall apply continuously and not be limited to normal working hours.

The contractor shall ensure that all trees and vegetation within the project area are protected from any damage. Trees and shrubs shall be pruned by a licensed tree specialist as required.

Payment includes all costs associated for the Contractor to locate all underground utilities, contacting Blue Stakes, and coordinating with all utilities prior to laying pipe within 200 feet of said utilities which may be exposed, damaged, or crossed as shown on the drawings or as identified by Blue Stakes marking. Payment includes all cost associated for the Contractor to coordinate with the utility company to move or support the utility as necessary.

Utilities to be located will include, but not limited to, existing storm drain systems, existing irrigation systems, existing natural gas main lines and service lines, existing telephone cables, existing power lines, existing fiber optic lines, and existing water lines.

No additional payment shall be made for “down time” associated with delays required to coordinate and resolve utility conflicts, utility relocation, and project design modifications as required.

The contractor shall obtain all right-of-access permission to enter upon private property to perform the necessary work and shall restore all private property to pre-construction conditions or better.

The contractor shall assume the sole and complete responsibility for the job site conditions during the course of construction of the project, including the safety of all persons and property. This requirement shall apply continuously and not be limited to normal working hours. This requirement includes maintaining reasonable daily access for the pedestrian trail and all roadway's associated with the project noted above, during the daily construction period and unrestricted access during non-work times, including evenings, weekends, and holidays.

Shall include all work required to maintain environmental control (24-hours) as

required. Shall include all work required to maintain dust control (24-hours) as required.

This item will only be used if the railroad permit is not in place prior to the contractor reaching the west side of the railroad right of way. Or if Riverdale City determines it is necessary to wait on the crossing of the railroad until the water can be shut down (more than 2 week wait time).

Payment shall be at a lump sum bid price and shall be paid as follows: Payment of 75% with the 1st payment request and the remaining 25% with the final payment request.

Bid Item B2. Storm Water Protection Plan Paperwork (SWPPP) and Implementation. (If railroad permit not issued prior to construction).

The contractor shall include all costs associated with storm water pollution prevention plans (SWPPP), installation of best management practices (BMP's) required by the SWPPP, maintaining the SWPPP and all other items associated with the SWPPP throughout the duration of the project. The contractor is responsible for developing and maintaining his own (SWPPP) plan. The Contractor shall assume all responsibility and liability associated with his SWPPP, complete.

This item will only be used if the railroad permit is not in place prior to the contractor reaching the west side of the railroad right of way. Or if Riverdale City determines it is necessary to wait on the crossing of the railroad until the water can be shut down (more than 2 week wait time).

Payment shall be at a lump sum bid price and shall be paid as follows: Payment of 75% with the 1st payment request and the remaining 25% with the final payment request.

Bid Item B3. Pothole existing waterline.

Includes all related potholing, earthwork; excavating to the required depth; all necessary labor, supervision, tools, equipment, permits and incidentals to excavate, identify and survey the utility, including backfilling and compacting materials to the required elevations, complete.

This item is to locate the waterline in the following locations:

1.) Sta 14+45.00 RT 5.65, East side of railroad tracks.

Payment shall be by the unit bid price for each pothole existing waterline, complete.

Bid Item B4. Railpros Field Services/Track Monitoring for railroad crossing (Estimated 2 days).

Includes all related fees and work services as required by Railpros Field Services and Union Pacific Railroad agreements. Contractor shall adhere to the requirements as stated in the UPRR and Railpros attachments in the Contract Documents; includes track monitoring plan, and track monitoring, work plan, shoring plan, etc. The contractor will be responsible for all costs incurred as a result of working with Railpros to provide the necessary inspections and monitoring for the installation of the 18-inch 0.5-inch thick steel sleeve extensions with end caps and the 10-inch pvc, DR-18, C-900 culinary water pipe with spacers under the UPRR tracks. Contractor shall coordinate all inspections and monitoring required, complete.

Includes all related manpower and equipment necessary to survey the Union Pacific Railroad (UPRR) rails before work starts to provide an accurate elevation and alignment survey of the existing rails. Includes establishing a protected benchmark and surveying a minimum of 7 elevation and alignment points on each rail with one point over the waterline sleeve location and the other points evenly spaced over a distance of 15 feet north and 15 feet south of the existing sleeve centerline.

A “preconstruction base-line” survey shall be completed at least one week prior to the start of construction and shall include the points for the sleeve extension location.

The same location points must be surveyed, each working day, to verify elevation and alignment. The surveyor must be certified with Union Pacific Railroad (UPRR) to be on the tracks and within the railroad right-of-way.

The top of rail shall not deflect more than ¼ inch vertical or horizontal.

The Contractor shall adhere to all UPRR monitoring requirements as specified in the contract documents. All survey documentation shall be submitted to UPRR as required and submitted to the Engineer daily.

Payment shall be by the day bid price for each day required for the sleeve extension and installation of the culinary water pipe in the sleeve as required by Union Pacific Railroad (UPRR) and Railpros Field Services, not to exceed 2 days unless extenuating circumstances arise, complete.

**Bid Item B5. Waterline connection at Sta 13+14.00 RT 0.00;
(If railroad permit not issued prior to construction).**

This item will only be used if the railroad permit is not in place prior to the contractor reaching the west side of the railroad right of way. Or if Riverdale

City determines it is necessary to wait on the crossing of the railroad until the water can be shut down (more than 2 week wait time).

Bid Item B6. Remove and dispose of existing 10-inch waterline.

Includes all related earthwork including excavating, backfilling and compacting; removing and disposing of the existing 10-inch gate valve and existing 10-inch waterline pipe within UPRR right-of-way/and under the tracks; and capping/sealing abandoned pipe to the west; removing and disposing of excess and unsuitable materials to provide proper connections to the new work; and all other appurtenant work, complete.

Payment shall be by the unit bid price per lineal foot of waterline pipe removed and disposed, complete.

Bid Item B7. Add for bid item B7 if existing waterline removed is asbestos cement.

This bid item is for additional cost incurred if the waterline to be removed and disposed, in bid item B7 above, of off site is asbestos cement waterline. This bid item will be the additional costs to properly remove and dispose of each foot of waterline, complete.

Payment shall be by the unit bid price per lineal foot of A/C pipe removed and disposed, complete.

Bid Item B8. Furnish and install 18-inch sleeve extension on both sides of the tracks.

Includes furnishing and installing 55-foot of 0.5-inch thick, 18-inch diameter steel pipe; approximately 10-foot on the west side of the railroad tracks and 45-foot on the east side of the railroad tracks; align the new steel pipe sleeve with the existing steel pipe sleeve and weld them together ensuring no cracks or gaps exist when finished. Furnish and install 2 each - 17 pound magnesium anodes, one installed at each end of the pipe with associated connection lugs

Payment shall be by the unit bid price for each lineal foot of 18-inch diameter steel pipe sleeve extension with cathodic protection, furnished and installed, complete.

Bid Item B9. Furnish and install 10-inch, pvc, DR-18, C-900 waterline with spacers and endcaps in new/existing sleeve.

Includes all related earthwork; excavating trenches to the required depths; backfilling and compacting materials in trenches including pipe bedding and trench backfill; dewatering as required; furnishing and installing pvc, C-900,

DR18 waterline piping, installing spacers, detectable wire and endcaps, installing location marking tape (Where applicable), installing fittings, (valves, tees, including fire hydrant tees, bends, sleeves, reducers, caps, plugs, thrust blocks, and restrained joint fittings not specified in other bid items), and accessories; pressure testing of new waterline; chlorinating, disinfecting, and flushing of the new waterline; and all other appurtenant work, complete.

- a. Excavated trench materials shall be required to be re-used as backfill if the materials meet specifications and approval by the Engineer. Includes locating utilities to determine conflicts and installing waterline to avoid said conflict.
- b. Includes all related costs to locate all utilities ahead of the construction and to provide for support of the utility, including power pole support, during the installation of the waterline.
- c. Protect railroad right of way fence and other adjoining fencing from damage. Any damage done to the fencing will be repaired to the respective owners standards at the contractors expense.

Payment shall be by the unit bid price for each linear foot of waterline furnished and installed, complete.

Bid Item B10. Waterline connection at Sta 14+45.00 RT 5.65; Connect 10-inch PVC to existing PVC with appropriate fittings & bends.

Connect new 10-inch waterline to existing water line using two 10-inch 45° bends with mechanical restraints, thrust blocks, per the drawings and all other appurtenant fittings, complete.

Payment shall be by the unit bid price for each appropriate waterline connection.

Bid Item B11. Furnish 1-inch clean gravel pipe bedding.

Includes furnishing 1-inch clean gravel backfill for pipe bedding, as directed by the Engineer.

- a. Placement and compaction of gravel bedding materials for pipe shall be paid under the bid item, which utilizes bedding backfill materials, and not to be paid as part of this item.

Payment shall be by the unit price for each ton of gravel bedding material furnished only. Weight tickets must be submitted to the Engineer in order to document the tonnage.

Bid Item B12. Furnish trench backfill material.

Includes furnishing structural backfill material, as directed by the Engineer.

- a. Placement and compaction of structural backfill materials for pipeline trenches shall be paid under the bid item, which utilizes structural backfill materials, and not to be paid as part of this item.

Payment shall be by the unit price for each ton of structural backfill material furnished only. Weight tickets must be submitted to the Engineer in order to document the tonnage.

Bid Item B13. Adjust valve box ring and cover to finish grade.

Includes all related earthwork including excavation, backfilling, compacting, and grading; all tools, labor and materials required to adjust the valve box ring and cover to finish grade; furnishing and installing roadbase course under concrete collar; furnishing and installing concrete collar (8-inch thick minimum) around the adjusted valve box ring and cover; and all appurtenant work, complete.

Concrete collar shall be kept $\frac{1}{4}$ " below the finish asphalt pavement.

Payment shall be by the unit bid price for each valve box ring and cover adjusted to finish grade, complete.

Bid Item B14. Remove and replace all landscaping improvements, public/private damaged during construction.

Includes all related earthwork; removing and disposing of unsuitable materials as required; furnishing, installing and grading the existing ground surface and/or all imported topsoil; fences, gates, signs and all landscaping items, replacing all damaged items; protecting, moving or relocation of all indicator signs as required; and all other appurtenant work, complete.

- a. This landscaping item is for regrading and matching existing ground cover as is. Contractor is responsible for all landscape replacement and coordination with the affected property owners, complete.

Payment shall be at a lump sum bid price for the removal and replacement of the landscaping improvements, complete.

END OF DOCUMENT

DOCUMENT 00410

NOTICE OF AWARD

- A. **CONTRACTOR:** _____
- B. **PROJECT DESCRIPTION:** Waterline Improvement Project Crossing I-84, Weber River, and Railroad

- C. **BID CONSIDERED AND ACCEPTED:** The Owner has considered the bids submitted for the above described Work in response to the Advertisement for Bids dated:

1. _____ 2. _____

You are herewith notified that your Bid has been reviewed and accepted by the Owner. The Owner has approved and will award the bid to you in the amount of: \$ _____

- D. **BONDS, INSURANCE AND AGREEMENT:** With the award of the project you must now furnish the required bonds, certificate of insurance and Agreement to the Owner within 10 calendar days of this Award notice.

- | | | |
|----|---------------------------|--|
| 1. | Performance Bond: | 100% of the maximum bid price. |
| 2. | Payment Bond: | 100% of the maximum bid price. |
| 3. | Certificate of Insurance: | Amounts as stated in the Contract Documents. |
| 4. | Worker's Compensation: | Amounts as stated in the Contract Documents. |
| 5. | Contract Agreement: | Signed in Triplicate |

If you fail to furnish said Bonds, Insurance Certifications and Contract Agreement, the Owner shall be entitled to consider all your rights abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such rights as may be granted by law.

- E. **ACKNOWLEDGED RECEIPT:** The Contractor is required to return an acknowledged copy of the Notice of Award to the Engineer and the Owner.

Dated this _____ day of _____, 2023.

BY: _____

TITLE: City Engineer

-
- F. **ACCEPTANCE OF NOTICE:** The receipt of the Notice of Award is hereby acknowledged this _____ day of _____, 2023.

BY: _____

TITLE: _____

DOCUMENT 00420

NOTICE TO PROCEED

- A. **CONTRACTOR:** _____
- B. **PROJECT DESCRIPTION:** Waterline Improvement Project Crossing I-84, Weber River, and Railroad
- C. **NOTIFICATION TO PROCEED:** The Contractor is hereby notified to commence Work in accordance with the Agreement dated _____, 2023.
- D. **WORK COMPLETION DATE:** The Contractor is to complete the Work required in the Contract Documents by _____, 2023.
- E. **ACKNOWLEDGED RECEIPT:** The Contractor is required to return an acknowledged copy of the Notice to Proceed to the Engineer and the Owner.

BY: _____

TITLE: City Engineer

- F. **ACCEPTANCE OF NOTICE TO PROCEED:** Receipt of the Notice to Proceed is hereby acknowledged this _____ day of _____, 2023.

BY: _____

TITLE: _____

DOCUMENT 00500

AGREEMENT

THIS AGREEMENT is herewith dated this _____ day of _____ 2023,
by and between **Riverdale City**, hereinafter called "**OWNER**" and _____
_____ address at, _____
_____ hereinafter called the "**CONTRACTOR**".

WITNESSETH: The OWNER and the CONTRACTOR hereinafter mutually covenant, pledge and bind each other by written agreement, to the conditions and requirements of the Contract Documents, referred to as:

Waterline Improvement Project Crossing I-84, Weber River, and Railroad

IN CONSIDERATION, for payment; the CONTRACTOR shall furnish all materials, labor, supplies, tools, equipment and construction services, to complete the Work as required in said Contract Documents.

IN CONSIDERATION for work performed; the OWNER shall make the required payment(s) upon inspection, approval, completion and compliance of work, as required in said Contract Documents.

NOTEWORTHY CONDITIONS:

- A. Time is of the Essence for completion of said project work.
- B. The CONTRACTOR will commence the construction work immediately as required in the Contract Documents.
- C. The Work will be substantially complete by: _____.
- D. Progress payments to the CONTRACTOR will be processed in the manner as provided in the Contract Documents, by the OWNER.
- E. Upon final completion and acceptance of the Work the security retainage, will be released to the CONTRACTOR.
- F. THIS AGREEMENT, is executed with three (3) copies, each copy shall be deemed an original on the date first above written.

THIS AGREEMENT shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the OWNER and the CONTRACTOR have signed or caused to be executed by their duly authorized officials this Agreement, in triplicate.

OWNER: _____ Riverdale City _____

BY: _____
(signature)

NAME: _____
(please print)

TITLE: _____

(SEAL)

ATTEST: _____
(signature)

NAME: _____
(please print)

TITLE: _____

CONTRACTOR:

BY: _____
(signature)

NAME: _____
(please print)

ADDRESS: _____

(CONTRACTORS SEAL)

ATTEST: _____
(signature)

NAME: _____
(please print)

TITLE: _____

DOCUMENT 00600

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____, as Principal, and _____, as Surety, are held and firmly bound unto _____, hereinafter called “Owner”, in the sum of _____, (5% of the total Bid amount) for the payment of which sum, to be made, we bind ourselves, our heirs, executors, successors, administrators and assigns jointly and severally by these presents.

WHEREAS, said Principal has submitted a bid to said Owner to perform all work required under the bidding proposal and schedule(s) _____, of the Owner’s Contract Documents entitled:

Waterline Improvement Project Crossing I-84, Weber River, and Railroad

NOW THEREFORE, if said Principal is awarded a contract by said Owner and, within the time and in the manner required under the heading “Advertisement for Bids” enters into a written contract with the Owner per the said Contract Documents, furnishes the required certificates of insurance, furnishes the required Performance Bond and Payment Bond within (10) calendar days after receipt of contract from said Owner, then this financial bond obligation shall be null and void; otherwise, it shall remain in full force and effect. In the event suit is brought upon this bid bond by said Owner and judgment is recovered, then said Surety shall pay all costs incurred by said Owner in such suit, including reasonable attorney’s fee to be fixed by the Court.

SIGNED AND SEALED, this _____ day of _____, 20_____.

Principal (Seal)

Surety (Seal)

By: _____

By: _____

(SEAL AND THE NOTARIAL ACKNOWLEDGEMENT OF THE SURETY)

DOCUMENT 00610

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____, as Principal, and _____, as Surety,
are held and firmly bound unto _____, hereinafter called the
“Owner”, in the sum of _____, (not less than 100% of the total Contract Amount)

for the payment of which sum, to be made; we bind ourselves, our heirs, executors, successors,
administrators, successors, and assigns, jointly and severally by these presents.

WHEREAS, said Principal has been awarded and is about to enter into a Contract with said Owner to
perform all work required under the bidding proposal and schedule(s) of the Owner’s Contract
Documents entitled:

Waterline Improvement Project Crossing I-84, Weber River, and Railroad

NOW THEREFORE, if said Principal (Contractor) shall perform all the requirements of the Contract
Documents, required to perform, at the times and in the manner specified, then the obligation shall be
null and void; Otherwise it shall remain in full force and in full effect.

PROVIDED, that all work to be done or the materials furnished, or changes in the time of completion,
which may be made pursuant to the terms of said Contract Documents, shall not release said Principal
or said Surety, nor shall any extensions of time granted under the provisions of said Contract
Documents release either said Principal or said Surety, and notice of such work or extensions of the
Contract is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____ 20_____.

Principal (Seal)

Surety (Seal)

By: _____

By: _____

(SEAL AND THE NOTARIAL ACKNOWLEDGMENT OF THE SURETY)

DOCUMENT 00620

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____, as Principal, and _____, as Surety,
are held and firmly bound unto _____, hereinafter called
“Owner”, in the sum of _____, (not less than 100% of the total amount)

for the payment of which sum, to be made; we bind ourselves, our heirs, executors, successors,
administrators, and assigns, jointly and severally by these presents.

WHEREAS, said Principal has been awarded and is about to enter into a Contract with said Owner to
perform all work required under the bidding proposal and schedule(s) of the Owner’s Contract
Documents entitled:

Waterline Improvement Project Crossing I-84, Weber River, and Railroad

NOW THEREFORE, if said Principal (Contractor), or subcontractor, fails to pay for all materials,
equipment, or other items supplied, or for rental equipment, used on connection with the performance
of work contracted, or for amounts due under applicable Utah State law for any work or labor required,
then said surety will pay for the same in an amount not exceeding the sum herein specified. In the event
suit is brought upon this Payment Bond, a reasonable attorney’s fee may be fixed by the courts. This
Payment Bond shall inure to the benefit of any persons, companies, or corporations entitled to file
claims under applicable Utah State law.

PROVIDED, that all work to be done or the materials furnished, or changes in the time of completion,
which may be made pursuant to the terms of said Contract Documents, shall not release said Principal
or said Surety, nor shall any extensions of time granted under the provisions of said Contract
Documents release either said Principal or said Surety, and notice of such work or extensions of the
Contract is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____ 20____.

Principal (Seal)

Surety (Seal)

By: _____

By: _____

(SEAL AND THE NOTARIAL ACKNOWLEDGMENT OF THE SURETY)

DOCUMENT 00630

NOTICE OF SUBSTANTIAL COMPLETION

- A. **CONTRACTOR:** _____
- B. **PROJECT DESCRIPTION:** Waterline Improvement Project Crossing I-84, Weber River, and Railroad
- C. **NOTIFICATION OF SUBSTANTIAL COMPLETION:** The Work has been reviewed by the Engineer and has been recommended to the Owner as “Substantial Complete”, in accordance with the Contract Documents.
- D. **CONSTRUCTION PUNCH LIST:** A “Construction Punch List” of outstanding construction items, the list may not be all-inclusive, shall be generated by the Engineer and forwarded to the Contractor for immediate action and Work completion. The construction punch list must be completed within ten (10) days from the date of receipt from the Engineer.
- E. **ACKNOWLEDGED RECEIPT:** The Contractor is required to sign and return an acknowledged copy of the Notice of Substantial Completion to the Engineer and Owner.

Dated this ____ day of _____, 2023.

BY: _____

TITLE: City Engineer

- F. **ACCEPTANCE OF NOTICE:** The receipt of the Notice of Substantial Completion is hereby acknowledged this ____ day of _____, 2023.

BY: _____

TITLE: _____

DOCUMENT 00640

NOTICE OF COMPLETION

- A. **CONTRACTOR:** _____
- B. **PROJECT DESCRIPTION:** Waterline Improvement Project Crossing I-84, Weber River, and Railroad
- C. **NOTIFICATION OF COMPLETION:** The Work has been reviewed by the Engineer and has been recommended to the Owner as “Complete”, in accordance with the Contract Documents.
- D. **ACKNOWLEDGED RECEIPT:** The Contractor is required to sign and return an acknowledged copy of the Notice of Completion to the Engineer and Owner.

Dated this ____ day of _____, 2023.

BY: _____

TITLE: City Engineer

-
- E. **ACCEPTANCE OF NOTICE:** The receipt of the Notice of Completion is hereby acknowledged this ____ day of _____, 2023.

BY: _____

TITLE: _____

DOCUMENT 00660

CONTRACTOR AND SURETY CERTIFICATION

- A. **CONTRACTOR:** _____
- B. **PROJECT DESCRIPTION:** Waterline Improvement Project Crossing I-84, Weber River, and Railroad
- C. **CERTIFICATION:** We certify that all required construction Work items and their respective quantities, as contained on the final payment request are correct and, when paid, will constitute payment in full for all work performed under the Agreement.
1. We hereby waive the right to make any additional claims against the owner, engineer and their agents and certify that all work has been performed and material supplied in full accordance with the requirements of the Contract Documents, and duly authorized change orders.
 2. We certify that the foregoing is a true and correct statement of the final contract account; that no part of the amount due for final payment has been received.
 3. We certify that the undersigned and his subcontractors have complied with all labor provisions of the Agreement and that there are no outstanding claims for labor, materials, or equipment used on or incorporated in the construction of the project.
 4. We further certify that the Performance Bond will remain in effect for one (1) year for all utility and street improvement work from the date of signing of this Certification.

We also acknowledge that the acceptance of the Final Payment shall operate as a full and complete release of the Owner and Engineer as set forth in the contract Agreement with the Owner.

- D. **CERTIFYING SIGNATURES:** In witness whereof, the Contractor and his Surety have certified by signature below that all conditions and statements containing herewith are true.

CONTRACTOR: _____

BY: _____
(Signature)

(seal)

NAME: _____
(Please print)

DATE: _____

SURETY: _____

BY: _____
(Signature)

(seal)

NAME: _____
(Please print)

DATE: _____

E. ACCEPTANCE SIGNATURE: In witness whereof, the Owner has accepted this Contractor and Surety Certification.

OWNER: _____

BY: _____
(Signature)

(seal)

NAME: _____
(Please print)

DATE: _____

DOCUMENT 00700

GENERAL CONDITIONS

- A. GENERAL CONDITIONS:** The applicable “General Conditions” of the Contract Documents are adopted in full and contained under separate cover.
- B. MANUAL OF STANDARD SPECIFICATIONS:** The applicable General Conditions are adopted in full and contained in the “Manual of Standard Specifications” – Current Addition (2017 edition or newer) – also known as “A Manual for General Contractors and the Construction Industry”.
- C. OBTAINING DOCUMENTS:** A copy of the applicable “General Conditions” of the Contract Documents may be obtained from:

Civil Engineering Consultants, PLLC
5141 South 1500 West
Riverdale, Utah 84405

801-866-0550

Utah T2 Center
Utah State University
8205 Old Main Hill
Logan, Utah 84322-8205

800-822-8878 or 435-797-2931

END OF DOCUMENT

DOCUMENT 00810

MODIFICATION TO THE GENERAL CONDITIONS

DOCUMENT INCLUDES

- A. Construction Surveying.
- B. Partial Payment Retainage.
- C. Escrow Accounts.
- D. Insurance.
- E. Project Closeout.
- F. Guarantee.
- G. Project Photographs and Video Tapes.
- H. Contractor / Subcontracting.
- I. Testing.

A. CONSTRUCTION SURVEYING: The Engineer will at the Owner's expense establish all survey lines and grades required for proper execution of the Work.

1. The Contractor shall notify the Engineer at least 48 hours in advance of the time surveys will be required. The Contractor shall keep the Engineer advised on a current basis of construction survey requirements, in order that the survey work may be coordinated with the Contractor's sequence of operations.
2. The Contractor will be required to give assistance and provide equipment such as ladders, lights or other equipment as may be deemed necessary in establishing and checking lines and grades. The surveying assistance provided by the Contractor will be given at no cost to the Engineer.
3. The Engineer shall furnish the alignment and grade data in the form of offset stakes or markers, at a convenient distance from the centerline of the Work as follows:
 - a. Sanitary sewer and storm drainage facilities - staking shall include, manholes, clean outs and boxes, pipelines.
 - b. Culinary and secondary water facilities - staking shall include vaults, valves, fittings, meters, hydrants, special facilities, and straight runs of pipe. Grade marks for waterlines shall be established where the Engineer considers grade to be critical.
 - c. Structures - the line and grade stakes shall be provided for each rectangular or square structure and shall be established where the Engineer considers location to be critical.
 - d. Slope staking - slope stakes will be provided at 50-foot intervals and at all changes in vertical and horizontal alignment.

- e. Curb and gutter staking will be provided with an acceptable offset, 50-foot intervals on straight alignments and shall be established where the Engineer considers location to be critical along curves.
4. The Contractor shall protect all staking from damage or disruption until utilized for the Work. All costs for additional staking due to carelessness by the Contractor or sub-contractors shall be reimbursed by the Contractor to the Owner.

Any transfer of line or grade from the stakes or marks to the work shall be the responsible of the Contractor.

B. PARTIAL PAYMENT RETAINAGE: The Owner shall retain five (5) percent of the amount of each partial payment until final completion and acceptance of all Work covered by the contract documents.

1. At any time after fifty (50) percent of the Work has been successfully completed, the Owner may reduce the retainage to two and one-half (2 ½ %) percent on the current and remaining payment requests.
2. When the work has been ruled substantially complete the retained amount may be further reduced below two and one half (2 ½ %) percent to only that amount necessary to assure completion.

C. ESCROW ACCOUNTS: Retainage on partial payments shall comply with the Utah State law enacted in 1983 requiring escrow accounts to be established for placement of withheld retainage.

The Contractor must establish an escrow account in a manner acceptable to the Owner for the purpose of holding the Contractor's payment retainage. The Owner will issue two checks for partial payment requests – one for retainage to the Escrow Account and the other for payment to the Contractor.

1. The Owner and the Contractor will decide prior to the issuance of the "Notice to Proceed" with respect to either the establishment of the escrow account or waiver of the escrow account requirement.
2. The Owner reserves the right to alter this procedure in any manner in accordance with the Utah State legislation governing escrow accounts.

D. INSURANCE: The Contractor shall acquire and maintain insurance that will provide protection from claims which may arise out of or result from the Contractor's execution of the required Work. The insurance shall cover all the Work performed by the Contractor or by any Sub-contractor, or anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable:

1. Claims under workmen's compensation disability benefit or other similar employee benefit acts;

2. Claims for damages due to bodily injury, occupational sickness, disease, or death of an employees;
3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
4. Claims for damages insured by usual personal injury liability coverage which were sustained: (a) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (b) by any other person and;
5. Claims for damages because of injury to or destruction of tangible property, including loss of use.

A copy of the acceptable Certificates of Insurance shall be delivered to the Engineer for review before any Work is started. All Certificates of Insurance shall contain a provision that insurance coverage afforded under any policies will not be canceled unless at least fifteen (15) days prior written notice has been given to the Owner. **All liability insurance policies for the project Work shall include an endorsement naming the Engineer, the Owner, and others as required, as additional insured.**

Additionally the Owner and its elected and appointed officials, employees and volunteers and their agents shall be protected from all claims, demands, judgment's, expenses, and all other damages of every kind and nature, made, rendered, or incurred by or in behalf of any person of persons whomsoever, including the parties hereto and their employees, which may arise out of any act or failure to act, work or other activity related in any way to this Work under this contract, by the Contractor the Contractor's agents, employees, Sub-contractors, or suppliers in the performance and execution of this contract.

The Contractor shall procure and maintain, at his own expense, during the execution of the Work required, liability insurance as hereinafter specified:

The Contractor's General Liability Insurance shall be a comprehensive form and shall include the following coverage's:

- a. Premises/operations, collapse hazard, underground hazard, products/completed operations hazard, contractual insurance applicable to Contractor's obligations under. Indemnification broad form property damage, independent Contractors, and personal injury.
- b. Auto Liability Insurance shall be comprehensive form and shall cover owned, hired and non-owned vehicles.
- c. The limits of liability required for the respective coverage's shall be not less than the following amounts or less where required by law:

Comprehensive General Liability:

(1) Bodily Injury:

\$1,000,000

\$2,000,000

Each Occurrence

Annual Aggregate, Products
and Completed Operations

(2) Property Damage:		
	\$ 500,000	Each Occurrence
	\$1,000,000	Annual Aggregate

(3) Personal Injury, with employment exclusion deleted:		
	\$1,000,000	Annual Aggregate

d. Comprehensive Automotive Liability:

(1) Bodily Injury:		
	\$ 500,000	Each Person
	\$1,000,000	Each Accident

(2) Property Damage:		
	\$ 500,000	Each Occurrence

Worker's Compensation:

(1) State:	Statutory
(2) Employer's Liability	\$500,000

e. Neither Fire and Extended Coverage nor Builder's Risk insurance are required for this project unless other wise noted.

All insurance provided shall remain in effect until final payment and at all times thereafter when the Contractor may be correcting, removing or replacing defective work.

The Contractor shall procure and maintain, at his own expense, during the required Work, in accordance with the provisions of the laws of the state; Workmen's Compensation Insurance.

E. PROJECT CLOSEOUT: Prior to the project closeout, the Contractor, Engineer and a City Representative will conduct a formal walk-through of the project site to identify any outstanding items that do not meet the requirements of Document 00405 of the Contract Documents. Any non-compliance or missing items found will be recorded and placed on a "Construction Punch List". While addressing the "Construction Punch List" items, the Contractor may request follow up walk-throughs until the work is complete. At which point, the project may be declared complete and Document 00640 from the Contract Documents will be issued by the Engineer. Upon completion of the "Construction Punch List" and Document 00640, the Contractor may submit a request for final payment.

1. The "Construction Punch List" shall not be considered all-inclusive or complete after the initial walk-through. If at any time during a follow up walk-through, additional items are identified that were not included on the initial "Construction Punch List", those items may be added by the Engineer to the "Construction Punch List".

2. The Engineer shall record all outstanding construction items identified during the walk-through, after which the Engineer will prepare and forward the punch list to the Contractor for immediate action and Work completion.
3. The "Construction Punch List" must be completed within ten (10) days from the date of receipt from the Engineer. If the "Construction Punch List" is not completed within ten (10) days and no progress has been made, the Owner may elect to use the retained funds to secure a third-party contractor to complete the remaining punch list items.

F. GUARANTEE: The Contractor shall warrant and guarantee that the improvements constructed and provided along with every part hereof will remain in good condition for a period of one (1) year after the date of completion and acceptance of the Owner.

The warranty and guarantee period for roadway surfaces and street improvements such as curb and gutter, asphalt and sidewalk shall be warranted for one (1) year.

1. The date of acceptance shall be the date of approval and final payment by the Owner.
2. The Contractor agrees to make all repairs and/or replacements, for all defects in workmanship, materials and equipment during the guarantee period.
3. The Contractor shall maintain all equipment until the date of acceptance, at which time the Owner will assume normal maintenance.
4. The Contractor also agrees that the performance and payment bond hereto attached shall remain in force until the conditions of this guarantee are fulfilled.
5. The determination of the necessity for repairs rests with the Owner, whose decision shall be final and obligatory upon the Contractor. It is hereby expressly understood and agreed that the Owner shall not finally accept the Work before the date specified above, and then only in the case that all necessary repairs have been made according to standard methods approved by the Engineer.

G. PROJECT PHOTOGRAPHS AND VIDEO TAPES: The Contractor shall provide the Engineer with an approved set of individual photographs and a video tape of the project site. The videotape shall include the entire project area, showing the existing job sites conditions prior to start of construction.

The photographs and video taping shall:

1. All photographs and video tapes shall be submitted prior to the issuance of the "Notice to Proceed" document.
2. All photographs and video tapes shall portray unusual conditions. The video tapes shall include a narration to identify dates, locations, and indicating any special items of interest and all unusual conditions.

3. The Engineer will review the video tape of the project site, prior to construction Work taking place, to determine if the original site conditions are adequately shown by the video tape.

H. CONTRACTOR / SUBCONTRACTING: The Contractor shall be allowed with this Contract to Subcontract a minor portion of the required Work, to specialty Subcontractors if so desired.

1. The Contractor MUST perform a minimum of 51% of the required Work. The subcontracting value of the Work, will be determined from the bidding documents submitted to the Owner. The subcontracting maximum award amount, with this Contract, may be 49% in parts or in whole, to a specialty Subcontractor(s).
2. The Work performed by the Contractor must be completed with men and equipment directly employed by his company.
3. The Contractor shall be fully responsible for the quality of the work performed by his subcontractor(s) on-site. The Contractor shall fully supervise and inspect all work performed by said subcontractor(s) to insure all of the Owner's standards and specifications are met. The Contractor shall be fully responsible for the acts and omissions of all his Subcontractor(s) performing work on the project site.
4. The Contractor shall have appropriate sub-contracts with all Subcontractor(s) employed to do Work on this project. The contracting terms between the Contractor and the Subcontractor(s), insofar as applicable, shall be similar to the contract between the Contractor and the Owner and shall give the Contractor controlling authority to terminate any subcontract, should the Owner require termination of the Contract in parts or in full.
5. There shall be nothing stated or implied in this Contract that infers a contractual relationship between the Owner and any Subcontractor. All payments for Work shall be forwarded to the Contractor per the conditions stated herein.

I. TESTING: The Contractor shall perform all waterline pipe testing, sanitary sewer pipeline testing and storm water pipeline testing in the presence of the Engineer and/or the City Representative. The Contractor shall perform all pipeline testing as required in the Contract Specifications.

1. The Contractor must schedule the pipeline testing with the Engineer a minimum of 2-days prior to the required date of testing.
2. The Contractor will be required to furnish at his expense all equipment, supplies, materials and labor to perform all required testing.
3. The Contractor will be required to successfully perform all testing and perform any additional testing until the pipeline has passed the basic testing requirements of the Contract Documents.

4. The Engineer may schedule additional testing as deemed necessary.
5. The cost of the first waterline bacteriological test will be paid by the City and all failure tests to be paid by the Contractor until the waterline bacteriological test passes.

Bedding, Trench, Roadbase and Asphalt Compaction Testing:

1. The Contractor must schedule the trench and/or roadway surface testing with the Engineer a minimum of 2-days prior to the required date of testing.
2. The Engineer may schedule additional testing as deemed necessary.
3. The cost of the first compaction test will be paid by the City and all failure tests to be paid by the Contractor until the compaction test passes.
4. Contractor shall provide a valid proctor for any import soil material to be used on site. Contractor shall submit the proctor and the date the proctor was obtained to the Engineer. If the proctor was not taken within the last 30 days, the Engineer may require the Contractor to obtain a new proctor. In addition, if at any point during the soil compaction testing it is apparent that material has changed and the proctor is no longer valid, the Engineer may require the Contractor to obtain new proctor.

END OF DOCUMENT

DOCUMENT 00900

CONTRACT ADDENDUM

- A. CONTRACT DOCUMENTS:** The following Addendum(s) shall be included and made part of the Contract Documents.

Addendum Number – 1	Addendum date _____
Addendum Number – 2	Addendum date _____
Addendum Number – 3	Addendum date _____

- B. ACKNOWLEDGEMENT:** The Bidder must acknowledge all addendum (s) with his submitted sealed Bid.

END OF DOCUMENT

CHANGE ORDER NO. _____

PROJECT:

Waterline Improvement Project Crossing I-84, Weber River, and Railroad
Riverdale City, Utah

DATE:

xxx

CONTRACTOR:

xxx

xxx

xxx

CONTRACT MODIFICATIONS:

The Owner has considered the project along with proposed changes that are now required for a successful completion of the project.
The Owner hereby requires the Contractor to adhere with the following Contract changes:

CONTRACT WORK CHANGES:

Description of Work Changes						
No.	Item	Quantity	Unit	Unit Price	Price Decrease	Price Increase
A.	description				\$0.00	\$0.00
B.	description				\$0.00	\$0.00
C.	description				\$0.00	\$0.00
Subtotal					\$0.00	\$0.00
TOTAL CHANGE ORDER AMOUNT						\$0.00

The amount of \$ _____ is hereby added to/deducted from the total contract price.

The new contract amount will be \$ _____.

1. Time is of the essence for completion of the required work. In consideration for the changes in the proposed work the time allowed for the project completion shall be extended by _____ Calendar Days.

The project completion date is now changed to the _____.

2. This document shall become an amendment to the contract and all the provisions of the Contract Documents, Drawings and Specifications will remain unchanged.

CEC, CIVIL ENGINEERING CONSULTANTS, PLLC.**Requested By:**

Contractor _____

Date: _____

Approved by:

City Engineer _____

Date: _____

Approved by:

Riverdale City _____

Date: _____

Attested by:

Riverdale City _____

Date: _____

RailPros Field Services

Customer Billing Information Request

Company Information	
Company Name:	
Street Address:	
City, State, Zip:	
Phone:	
Email:	
Billing Information	
Company Name:	
Billing Contact Name:	
Street Address:	
City, State, Zip:	
Phone:	
Email:	
Do you need a W-9 or new vendor information sheet from RailPros? (Please attach)	☐ YES ☐ NO
How would you like to receive your invoice?	☐ SourceHub ☐ EMAIL ☐ MAIL ☐ FAX
PO# (if required):	

Prevailing Wage Information	
Will our Flagman fall under a Prevailing Wage Requirement for the Project? If yes, please note a revised quote may need to be provided for our services.	☐ YES ☐ NO (If yes, please complete the section below.)
Project Name:	
Project Number:	
City:	
County:	
State:	
Will certified payroll reports be required?	☐ YES ☐ NO
If yes, who will the reports need to go to?	Name:
	Phone Number:
	Email:

(for RailPros Field Services use only)

Job Number:		
Billing Info Confirmed:	Name:	Date:
Assigned RWIC/Flagger:		
RWIC/Flagger Rate:		

Customer Project Information Request

Project Information	
Field Contact Person(s):	
Mobile Number(s):	
Email(s):	
Estimated Start Date:	
Estimated Duration for Flagman:	
Work Schedule:	
Daily Start/End Time:	
City and State:	
Railroad Subdivision:	
Railroad Mile Post:	
Project Description:	
Will any type of equipment be used?	☐ YES ☐ NO
If yes, what type?	
How close will it be to the tracks?	
If instructed by the Railroad, have all on-site personnel completed the Railroad Safety Training?	☐ YES ☐ NO ☐ N/A

By checking this box, I acknowledge that if any ground will be disturbed or excavated upon UP Railroad property, that I will comply with UP's requirements and contact the local UP MSM, in accordance with my permit.

☐ I acknowledge

Additional comments:

RailPros Field Services Utility Observation

THIS AGREEMENT ("Agreement") is made and entered into as of _____, 2017 by and between **Company ABC** ("Company"), located in **City and State** and **RailPros Field Services**, ("RPFS"), located at **Grapevine Texas**. RPFS is a consultant to Union Pacific Railroad ("UPRR").

A. General Background

1. Company is interested in performing a utility construction project that will cross UPRR's property or Right-of-Way per an executed agreement between the Company and UPRR referred to as **Folder No. XXXX-XX** (the "Project").

UPRR requires the Company to utilize the services of RPFS to: 1) observe these services and communicate with UPRR regarding the status of the work and any issues that arise that may impact UPRR or not meet UPRR's executed utility agreement.

B. Services

1. Utility Construction Observation. The Company is required to utilize the services of RPFS to observe and inspect work being performed on the Project by Company and its contractors and to communicate with UPRR regarding issues that may arise during the Project. RPFS' services do not include supervision or direction of the means, methods, or actual work of Company or its contractors.

C. RPFS Non-Responsibility

1. The presence of RPFS observers on site will not relieve Company of its responsibilities to comply with the terms of UPRR permit agreement (**Folder No. XXXX-XX**) and the required specifications. RPFS will not be responsible for job or site safety or security on the Project.

2. RPFS shall not be responsible for delays caused by Company's failure to furnish necessary information promptly as requested, or for delays resulting from faulty equipment or late, slow, or faulty performance by Company, other contractors or sub-consultants of Company, or government agencies whose performance of work is precedent to or concurrent with the performance of RPFS' observation of Company's work.

3. RPFS shall not be in default or be responsible for damages due to any delays in the performance of the work for any reason other than for RPFS' negligence or misconduct, and RPFS shall be entitled to additional compensation for any such non-culpable delay. Any such adjustments to the project duration and compensation shall be put in writing in the form of an invoice issued to Company upon determination of same.

D. Company Responsibilities

1. In accordance with generally accepted construction practices, Company will be solely responsible for working conditions on the job site, including security and safety of all persons and property during the Project, and compliance with UPRR safety requirements, local safety requirements and Occupational Safety and Health Administration (OSHA) regulations. This requirement shall apply continuously and not be limited to normal working hours.

2. Wherein the project site is determined by Company to be unworkable due to inclement weather conditions, the Company must notify RPFS's on-site representative as soon as practicable of any such delays.

E. Compensation

1. Company shall compensate RPFS at the rate or rates shown below for the duration of the project. Compensation will be paid based on the Project Fee, which is defined by the actual number of days worked multiplied by the daily rate stipulated in this section. Invoices are submitted upon completion of

the project or at month end. On-going jobs are billed on a monthly basis. Payments of invoices are due upon receipt, within 30 days. Invoices are subject to a 1% fee for every 30 days the payment is delinquent. The daily rates for said services to be provided under this Agreement are based on eight hours per day and will be as follows:

Mobilization/Administrative Fee.....\$1,000 (Each Project will incur a fee for travel and administrative costs. Project must be cancelled 2 business days prior to the scheduled start date to avoid additional mobilization fee. Multiple mobilization fees could be charged if the project cannot be constructed on consecutive business days, which could result in multiple mobilizations).

Construction Observation/Inspection.....\$1,200/Standard 8-hour day. Overtime rate after 8 hours \$150 Per Hour / Nights Weekends, and Holidays \$1,400 Standard 8-hour day /Overtime rate after 8 hours \$150 per hour (Requires a minimum of 10-business days' notification).

2. RPFS has the right to invoice for fees to cover necessary costs whenever a Project is terminated by the owner, applicant or agent or when the project is installed in absence of RPFS's Utility construction observation and flagging services when required by UPRR.

F. Commencement Date and Term of Services

1. RPFS' services will begin upon acceptance of this Agreement by **Company ABC** and shall continue through completion of the Project impacting UPRR Right-of-Way.

2. This Agreement has been executed by the authorized representatives of the parties, and is intended to create a binding contractual relationship.

3. This Agreement shall take precedence over other documents, purchase orders, work orders that may be issued and/or signed after this Agreement. In no event, shall the terms and conditions in any RPFS or Company purchase order, work order, or similar document issued after the signing of this Agreement govern over this Agreement.

4. The terms of this Agreement shall automatically renew each year unless either party has terminated the agreement as per **Article X** of the Standard Provisions. RPFS reserves the right to modify the agreement terms at any time by written instrument to the Company. Agreement modifications will not take effect until such time any current project(s) with the Company is finished and a signed copy of the modified written instrument is returned by the Company to RPFS. RPFS reserves the right to not begin any new projects until a signed copy of the written instrument is returned.

G. Standard Provisions of Agreement for Professional Services

1. The attached Standard Provisions of Agreement for Professional Services shall apply to the services provided under this Agreement.

RailPros Field Services

By: _____

Title: Project Manager

Date: _____

Company ABC

By: _____
[Authorized Representative]

[Printed Name]

Title: _____

Date: _____

STANDARD PROVISIONS OF RPFS' SCHEDULING, OBSERVATION AND FLAGGING AGREEMENT

The Company and RailPros Field Services ("RPFS"), agree that the following provisions shall be part of this Agreement.

1. The Company shall designate an individual with authority to act on behalf of the Company as to all aspects of the Project and shall give prompt written notice to RPFS if the Company becomes aware of any problems with the Project, and shall otherwise fully cooperate as may be required or appropriate in connection with the Project.

2. RPFS' services shall be performed in a manner consistent with that degree of skill and care typically exercised by similar professionals performing similar services under the same or similar circumstances and conditions. RPFS makes no other representations or any warranties, whether expressed or implied, with respect to the services rendered hereunder.

3. In no event, shall any statute of limitations commence to run any later than the date when RPFS' services are substantially completed and any cause of action against RPFS arising from or pertaining to this Agreement must be initiated no later than two (2) years after the date when RPFS' services are substantially completed.

4. In no event, shall RPFS be liable for consequential damages, including lost profits, loss of investment or other incidental damages.

5. Compensation payable to RPFS pursuant to this Agreement shall be in addition to taxes (except income taxes) that may be assessed against RPFS by any state or political subdivision directly on services performed or payments for services performed by RPFS. Such taxes that RPFS may be required to collect or pay shall be added by RPFS to invoices submitted to the Company pursuant to this Agreement.

6. This Agreement may be terminated by either Company or RPFS upon thirty (30) days written notice for any or no reason. Either party may terminate this Agreement upon three days' notice in the event of a material breach of the Agreement by the other party. Company expressly agrees to hold RPFS harmless from any liability arising out of RPFS' termination of its services hereunder. In the event of termination of this Agreement, Company shall promptly pay RPFS for all of the services performed by RPFS prior to the termination of the Agreement. All fees paid are deemed earned.

7. Neither the Company nor RPFS shall assign its interest in this Agreement without the written consent of the other. The services to be provided pursuant to this Agreement are being performed solely for the benefit of the Company and UPRR and no benefit is meant to be conferred upon any other person or entity, and no such person or entity should rely upon RPFS' performance of its services to the Company; and, no claim against RPFS shall accrue to any contractor, subcontractor, owner, officer, director, consultant, engineer, supplier, fabricator, manufacturer, lender, tenant, surety, or any other third-party as a result of this Agreement or the performance or non-performance of services on this Project.

8. Unless otherwise provided by specific agreement, RPFS shall have no responsibility for the discovery, presence, handling, removal or disposal of or exposure of persons to hazardous materials or toxic substances at the project site.

9. The Company agrees to indemnify and hold RPFS harmless to the same extent the Company agreed to indemnify and hold UPRR harmless in its agreement with UPRR regarding this Project. If the Company lists UPRR as an additional insured on its insurance policy, the Company also agrees to similarly list RPFS as an additional insured on its insurance policy as well.

10. To the extent any damage or claim is covered by insurance during performance of this Agreement, the Company and RPFS waive

all rights against each other and against the contractors, consultants, agents and employees of the other for damages, except such rights as they may have to the proceeds of such insurance. The Company or RPFS, as applicable, shall require of the contractors, consultants, agents and employees of any of them similar waivers in favor of the other parties enumerated herein.

11. Any claim, dispute or other matter in question arising out of or related to this Agreement shall be subject to mediation prior to the commencement of any legal or arbitration proceeding as a condition precedent to the right to recover attorney fees in any proceeding. The mediator shall be jointly selected by the Company and RPFS. The mediator's fees shall be shared equally and shall be held at the location selected by the mediator.

12. Equal Opportunity. RPFS shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a), and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

13. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement.

14. This Agreement is the entire agreement between the Parties pertaining to the subject matter hereof, and supersedes all previous agreements, negotiations or understandings, written or oral, between the Parties. The parties hereto declare and represent that no promises, inducements, representations, warranties or other agreements, whether express or implied, not contained herein, have been made, and further declare and represent that they have not executed this Agreement in reliance upon any such promise, inducement, representation, warranty or other agreement not contained herein.

15. This Agreement may only be modified, amended or supplemented in a writing executed by the Parties hereto.

16. No term or provision of this Agreement shall be deemed waived, and no breach or default shall be deemed excused, unless such waiver, consent or excuse is in writing, and signed by the Parties hereto. A waiver by a Party hereto of any breach or default by the other Party to this Agreement shall not constitute a continuing waiver or a waiver of any subsequent breach or default hereunder by the other Party.

17. In case any one or more of the provisions in this Agreement should be declared by a court, arbitrator, or governmental agency or department to be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

18. Each Party is or had an opportunity to be represented by counsel and made a full and independent investigation of the matters contained herein and is only entering into this Agreement based on the Party's full satisfaction of the results of any investigation and arm's length negotiations. This Agreement will be deemed to have been jointly and equally drafted by the Parties.

19. Time is of the essence in the performance of the terms and conditions of this Agreement.

20. In the event of any legal, equitable or alternative dispute resolution proceeding to interpret or enforce this Agreement, the prevailing party shall be entitled to its reasonable legal fees and costs.

(Revised 05/17/16)

3. Track and Ground Monitoring

A. General track and ground monitoring requirements

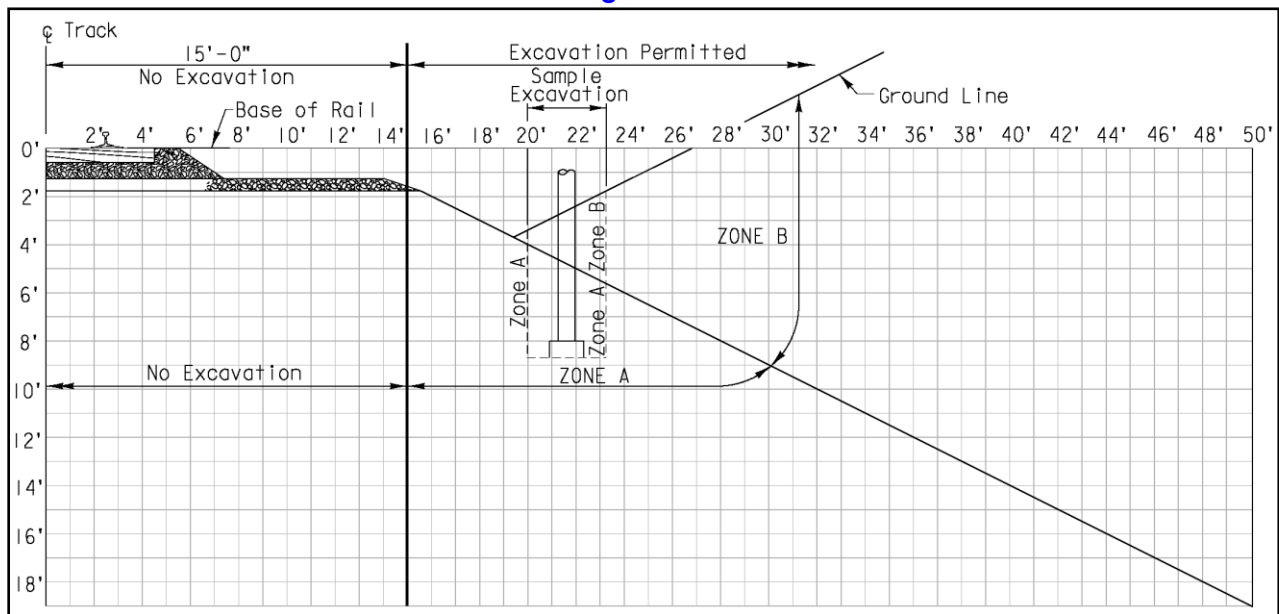
1. General requirements
 - i. Temporary lighting may also be required by the Railroad to identify tripping hazards to train crewmen and other Railroad personnel.
 - ii. Any excavation, holes or trenches on the Railroad property shall be covered, guarded and/or protected. Handrails, fence, or other barrier methods must meet OSHA and FRA requirements.
2. Track and ground monitoring are required as follows:
 - i. For crossings with pipe diameter and depth (below base of rail) as shown below in [Table 3-1](#).
 - ii. For shoring within Zone A of any track, as shown below in [Figure 3-1](#).
 - iii. Additional monitoring may be required by the Railroad on a case by case basis.
3. Monitoring schedule
 - i. Monitoring shall commence once any construction activity is within Zone A. See [Figure 3-1](#).
 - ii. Monitoring shall continue, after installation is complete, for 7 days or as required by the Railroad.
 - a. For large and/or shallow pipeline installations monitoring may be required for up to 30 days.

Table 3-1

Depth, feet (below base of rail)	<=6	<=12	<=18	<=24	<=30	<=36	<=42	<=48	<=54	<=60	>60
<=5	X	X	X	X	X	X	X	X	X	X	X
<=10	X	X	X	X	X	X	X	X	X	X	X
<=15	X	X	X	X	X	X	X	X	X	X	X
<=20			X	X	X	X	X	X	X	X	X
<=25					X	X	X	X	X	X	X
<=30								X	X	X	X
>30										X	X

X = Monitoring is required

Figure 3-1



B. Track Monitoring

1. Track Deflection Limits
 - i. The top of rail shall not permanently deflect more than ¼ inch vertical or horizontal.
2. Targets
 - i. Track monitoring shall not require track access other than to place the track monitoring targets.
 - ii. Monitoring targets should be placed such that monitoring is possible when a train is present. However, monitoring during the passing of a train is not required as the train will temporarily deflect the track.
 - iii. Adhesive backed reflective targets may be attached to the side of the rail temporarily. Targets should be removed once monitoring phase is complete.
3. Monitoring Plan
 - i. If the top of rail does deflect more than 1/4 inch, either vertical or horizontal, all operations shall stop until the matter is resolved.
 - ii. Provide established contingency plan, [See Section 3.D](#), in the event of ground loss and/or the rail deviates ¼ inch vertical or horizontal.
 - iii. Establish a bench mark in the vicinity of the construction. Establish locations for shooting elevations on the top of rail at each area of construction.
 - a. Example locations for shooting rail elevations would be at:
 - At the centerline of an under track crossing.
 - At both outside edges of the crossing. ie. For a wide excavation.
 - At multiple locations from the crossing/excavation edge but no less than 10, 20, 30, 40 and 50 feet from the crossing.
 - iv. Monitoring shall be continuous and recorded in a field log book dedicated for this purpose. Copies of these field log entries can be made available to all concerned parties upon request at any time during construction.

C. Ground Monitoring

1. Provide means for monitoring ground settlement. Submit monitoring plan for Railroad review.
2. Ground monitoring points should be in alignment above the proposed construction activities.

D. Contingency Plans

1. The Contractor shall supply Contingency Plan(s), which anticipate reaching the Threshold and Shutdown values, for all construction activities which may result in horizontal and/or vertical track deflection.
 - i. Track monitoring values:
 - a. Threshold value = 1/8 inch permanent vertical or horizontal deflection
 - b. Shutdown value = 1/4 inch permanent vertical or horizontal deflection
2. The Contingency Plans shall provide means and methods, with options if necessary.
3. The Contractor should anticipate the need to implement each Contingency Plan with required materials, equipment and personnel.
 - i. Once the Threshold value is met, the contractor shall determine the appropriate Contingency Plan(s) and immediately discuss this plan with, and receive approval confirmation from, the Railroad or authorized Railroad representative.
 - ii. Once the Shutdown value is met all project work shall stop and the chosen Contingency Plan shall commence.
 - a. The Railroad may choose to allow and/or require the immediate implementation of specific approved Contingency Plans, submitted by the Contractor, once the Shutdown value is met.

4. Excavation Requirements

A. Shoring Design

1. For temporary earth retention design requirements on the Right-of-Way, see the Railroad Guidelines for Temporary Shoring. http://www.up.com/real_estate/roadxing/industry/index.htm

B. Excavation Safety

1. Guardrails
 - i. Guardrails shall be provided to surround unattended excavations on Railroad Right-of-Way per OSHA Standard Number 1926.502 as follows:
 - a. The guardrail height shall be at least 42 inches above the walking surface.
 - b. The smallest dimension for openings in the guardrail shall be no greater than 19 inches.
 - c. Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge of the guardrail.

5. Glossary

Applicant: Any party proposing to install a new, and/or abandon existing, pipelines or Wirelines on Railroad right-of-way or other Railroad operating location, regardless of track being active or out of service. This includes any contractor, employee or consultant hired by said party.

Call Before You Dig: A Union Pacific Railroad 24-hr by 7-day communication center to assist in protecting, documenting and notifying callers of other utilities installed within the Railroad right-of-way.

1-800-336-9193

Crossing: Refers to a Utility which is crossing the Railroad track(s).

Carrier Pipe: Pipe used to transport the product.

Casing Pipe: Pipe through which the carrier pipe is installed.

Cover: Distance from either the base of rail or finished grade to the top of Pipeline or Wireline.

Encroachment: Utilities on Railroad right-of-way which are generally oriented parallel with Railroad right-of-way and/or track.

Centerline of Track: An imaginary line, that runs down the center of the two rails of a track.

Construction Documents: Design plans and calculations, project and/or standard specifications, geotechnical report and drainage report.

Construction Window: A timeframe in which construction or maintenance can be performed by the Contractor with the required presence of a Flagman.

Contractor: The individual, partnership, corporation or joint venture and all principals and representatives (including Applicant's subcontractors) with whom the contract is made by the Applicant for the construction of the Grade Separation Project.

Facility: Refers to the Applicant's pipeline, wireline, poles, manholes, handholes, splice boxes, storage tanks and other such structures which exist as part of the Applicant's infrastructure.

Flagman (Flagging): A qualified employee of the Railroad providing protection to and from Railroad operations per Railroad requirements.

Guidelines: Information contained in this document.

Industry Track: A secondary track designed to allow access to industries along the main track.

Main Track: A principle track, designated by Timetable or special instructions, upon which train movements are generally authorized and controlled by the train dispatcher. Main Track must not be occupied without proper authority.

Railroad Load: Cooper E-80 loading.

Railroad: Refers to Union Pacific Railroad.

Railroad Manager of Track Maintenance (MTM): Railroad representative responsible for maintenance of the track and supporting subgrade.

Right-of-Entry Agreement: An agreement between the Railroad and an Applicant or a Contractor allowing access to Railroad property.

Right-of-Way: The private property limits owned by the Railroad.

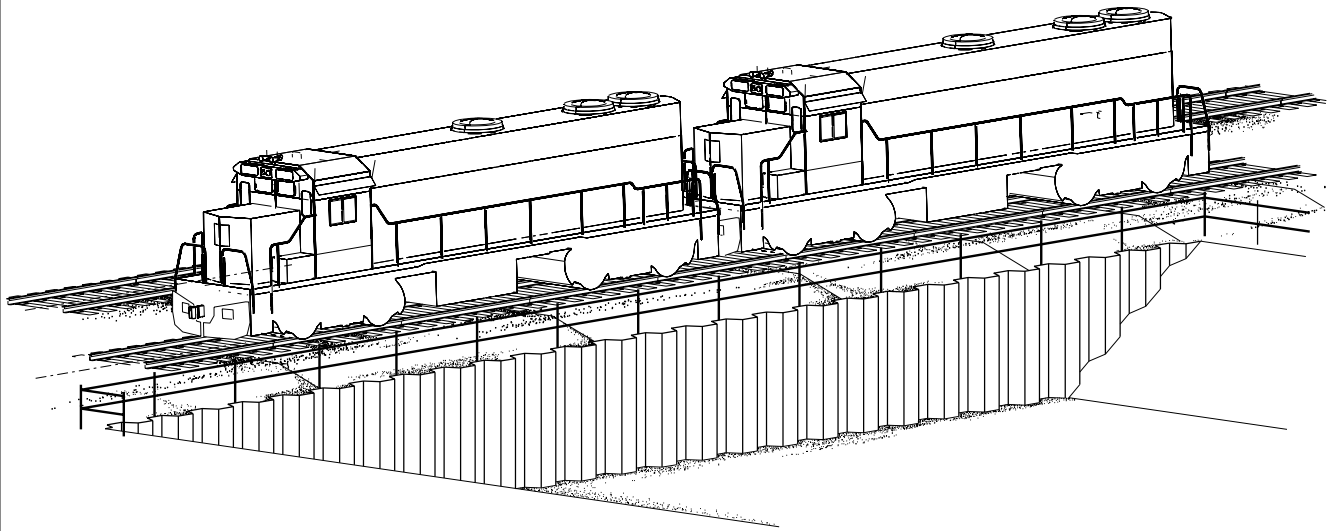
Tracks: The rails, ties and ballast and roadbed that compose the traveling surface used by trains.

Utility: Refers to a pipeline or wireline.

Wireline: Refers to electric power and communication utility systems including, but not limited to, all associated conductors, cables, support structures, and equipment.

Union Pacific Railroad

GUIDELINES FOR TEMPORARY SHORING



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GUIDELINES FOR TEMPORARY SHORING

1. SCOPE

The scope of these guidelines is to inform public agencies, design engineers, contractors and inspectors of current Railroad standards and requirements concerning design and construction of temporary shoring.

1. The term **Railroad** refers to the Burlington Northern & Santa Fe Railway (BNSF) and/or the Union Pacific Railroad (UPRR). The term **Contractor** is defined as any party gaining access to work on Railroad right-of-way or other Railroad operating locations.
2. These guidelines are provided as a reference and may not be taken as authority to construct without prior review and written approval of the Railroad. These guidelines supersede all previous guidelines for temporary shoring and are subject to revision without notice.
3. These guidelines supplement the current, American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual of Recommended Practice. The 2002 AREMA Manual was utilized in developing this guideline. The AREMA Manual is available from:

American Railway Engineering and Maintenance-of-Way Association
8201 Corporate Drive, Suite 1125
Landover, MD 20785-2230
Phone: (301) 459-3200
FAX: (301) 459-8077
www.arema.org

4. The specific requirements for temporary shoring addressed in this document shall be followed for all locations where the Railroad operates, regardless of track ownership.
5. Any items not covered specifically herein shall be in accordance with the AREMA Manual and subject to the review and approval of the Railroad. Where conflicts exist, the most stringent specification should be applied.
6. All excavations shall also be governed by Railroad requirements, Federal, State and Local laws, rules, and regulations concerning construction safety.
7. Safe rail operations shall be required for the duration of the project. All personnel, railroad tracks and property shall be protected at all times.
8. To expedite the review process of the temporary shoring plans, drawings submitted by the Contractors are required to adhere to the project specifications, AREMA and other Railroad requirements.

2. GENERAL CRITERIA

The Contractor must not begin construction of any component of the shoring system affecting the Railroad right-of-way until written Railroad approval has been received.

1. All excavations shall be in compliance with applicable OSHA regulations and shall be shored where there is any danger to tracks, structures or personnel regardless of depth.

2. The Contractor is responsible for planning and executing all procedures necessary to construct, maintain and remove the temporary shoring system in a safe and controlled manner.
3. Emergency Railroad phone numbers are to be obtained from the Railroad representative in charge of the project prior to the start of any work and shall be posted at the job site.
4. The Contractor must obtain a valid right of entry permit from the Railroad and comply with all Railroad requirements when working on Railroad property.
5. The Contractor is required to meet minimum safety standards as defined by the Railroad.
6. All temporary shoring systems that support or impact the Railroad's tracks or operations shall be designed and constructed to provide safe and adequate rigidity.
7. The Railroad requirements, construction submittal review times and review criteria should be discussed at the pre-construction meeting with the Contractor.
8. A flagman is required when any work is performed within 25 feet of track centerline. If the Railroad provides flagging or other services, the Contractor shall not be relieved of any responsibilities or liabilities as set forth in any document authorizing the work. No work is allowed within 50 feet of track centerline when a train passes the work site and all personnel must clear the area within 25 feet of track centerline and secure all equipment when trains are present.
9. Appropriate measures for the installation and protection of fiber optic cables shall be addressed in the plans and contract documents. For specific Railroad requirements and additional information refer to:

www.bnsf.com or call 1-800-533-2891.

www.uprr.com, call 1-800-336-9193 or refer to UPRR Fiber Optic Engineering, Construction and Maintenance Standards.
10. Relocation of utilities or communication lines not owned by the Railroad shall be coordinated with the utility owners. The utility relocation plans must then be submitted to the Railroad utility representative for approval. The shoring plans must include the correct contact for the Railroad, State or Local utility locating service provider. The Railroad will not be responsible for cost associated with any utility, signal, or communication line relocation or adjustments.

3. CONTRACTOR RESPONSIBILITIES

The Contractor shall be solely responsible for the design, construction and performance of the temporary structure. **(AREMA 8.28.1.3)**

1. The Contractor's work shall in no way impede the train operations of the Railroad and must be coordinated with the local Railroad operating department.
2. The Contractor shall develop a work plan that enables the track(s) to remain open to train traffic at all times.
3. The Contractor shall comply with all State and Federal Laws, county or municipal ordinances and regulations which in any manner affect the work.
4. All removed soils will become the responsibility of the Contractor and shall be disposed of outside the Railroad right-of-way according to the applicable Federal, State and Local regulations.
5. The Project Engineer and the Contractor shall evaluate the quality of materials furnished and work performed.

6. The Contractor is responsible to protect the Railroad ballast and subballast from contamination.
7. The Contractor must monitor and record top of rail elevations and track alignment for the duration of the project. The movement shall be within the limits defined in **Table 1, Deflection Criteria** on page 10. Displacements exceeding the limits defined in **Table 1** must be immediately reported to the Railroad. All work on the project must stop and the Railroad may take any action necessary to ensure safe passage of trains. The Contractor must immediately submit a corrective action plan to the Railroad for review and approval. The Railroad must review and approve the proposed repair procedure. The repair must be inspected by the Railroad before the track can be placed back in service.
8. Any damage to Railroad property such as track, signal equipment or structure could result in a train derailment. All damage must be reported immediately to the Railroad representative in charge of the project and to the Railroad Manager of Track Maintenance (MTM).

4. INFORMATION REQUIRED

Plans and calculations shall be submitted, signed and stamped by a Registered Professional Engineer familiar with Railroad loadings and who is licensed in the state where the shoring system is intended for use. Shoring design plans and calculations shall be in English units. If Metric units are used, all controlling dimensions, elevations, design criteria assumptions, and material stresses shall be expressed in dual units, with English units to be in parentheses. Information shall be assembled concerning right-of-way boundary, clearances, proposed grades of tracks and roads, and all other factors that may influence the controlling dimensions of the proposed shoring system. See section 10 for additional requirements.

1. Field Survey.

Sufficient information shall be shown on the plans in the form of profiles, cross sections and topographical maps to determine general design and structural requirements. Field survey information of critical or key dimensions shall be referenced to the centerline of track(s) and top of rail elevations. Existing and proposed grades and alignment of tracks and roads shall be indicated together with a record of controlling elevation of water surfaces or ground water. Show the location of existing/proposed utilities and construction history of the area which might hamper proper installation of the piling, soldier beams, or ground anchors.

2. Geotechnical Report shall provide:

- a. Elevation and location of soil boring in reference to the track(s) centerline and top of rail elevations.
- b. Classification of all soils encountered.
- c. Internal angle of soil friction.
- d. Dry and wet unit weights of soil.
- e. Active and passive soil coefficients, pressure diagram for multiple soil strata.
- f. Bearing capacity and unconfined compression strength of soil.
- g. Backfill and compaction recommendations.
- h. Optimum moisture content of fill material.
- i. Maximum density of fill material.
- j. Minimum recommended factor of safety.
- k. Water table elevation on both sides of the shoring system.
- l. Dewatering wells and proposed flownets or zones of influence.
- m. In seismic areas, evaluation of liquefaction potential of various soil strata.

3. Loads.

All design criteria, temporary and permanent loading must be clearly stated in the design calculations and on the contract and record plans. Temporary loads include, but are not limited to: construction equipment, construction materials and lower water levels adjoining the bulkhead causing unbalanced hydrostatic pressure. Permanent loads include, but are not limited to: future grading and paving, Railroads or highways, structures, material storage piles, snow and earthquake. The allowable live load after construction should be clearly shown in the plans and painted on the pavements behind the bulkheads or shown on signs at the site and also recorded on the record plans. Some of the loads are:

- a. Live load pressure due to E80 loading for track parallel to shoring system.
- b. Live load pressure due to E80 loading for track at right angle to shoring system.
- c. Other live loads.
- d. Active earth pressure due to soil.
- e. Passive earth pressure due to soil.
- f. Active earth pressure due to surcharge loads.
- g. Active pressure due to sloped embankment.
- h. Dead load.
- i. Buoyancy.
- j. Longitudinal force from live load.
- k. Centrifugal forces.
- l. Shrinkage.
- m. Temperature.
- n. Earthquake.
- o. Stream flow pressure.
- p. Ice pressure.

4. Drainage. **(AREMA 8.20.2.4)**

- a. The drainage pattern of the site before and after construction should be analyzed and adequate drainage provisions should be incorporated into the plans and specifications. Consideration should be given to groundwater as well as surface drainage.
- b. Drainage provisions for backfill should be compatible with the assumed water conditions in design.

5. Structural design calculations.

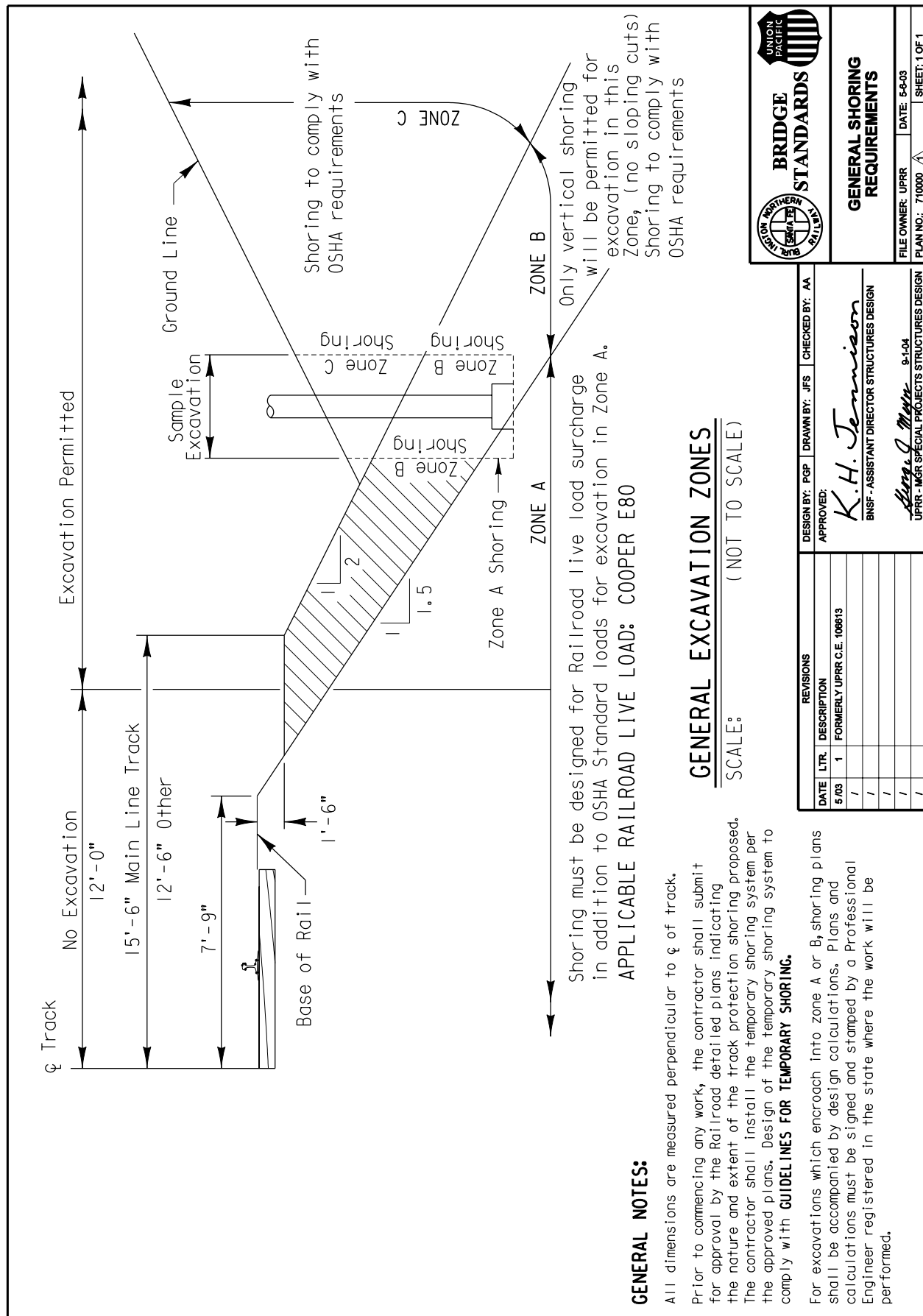
- a. List all assumptions used to design the temporary shoring system.
- b. Determine E80 live load lateral pressure using the Boussinesq strip load equation. See **Figure 2** which illustrates Plan Number **710001 "LIVE LOAD PRESSURE DUE TO COOPER E80"**.
- c. Computerized calculations and programs must clearly indicate the input and output data. List all equations used in determining the output.
- d. Example calculations with values must be provided to support computerized output and match the calculated computer result.
- e. Provide a simple free body diagram showing all controlling dimensions and applied loads on the temporary shoring system.
- f. Calculated lateral deflections of the shoring and effects to the rail system must be included. See section 8, Part 6. Include the elastic deflection of the wall as well as the deflection due to the passive deflection of the resisting soil mass.
- g. Documents and manufacturer's recommendations which support the design assumptions must be included with the calculations.

5. TYPES OF TEMPORARY SHORING

1. A shoring box is a prefabricated shoring system which is installed as the excavation progresses. This shoring system is not accepted by the Railroad. This system is allowed in special applications only, typically where Railroad live load surcharge is not present. The shoring box is moved down into the excavation by gravity or by applying vertical loading from excavation equipment.
2. Anchored systems with tiebacks are discouraged. The tiebacks will be an obstruction to future utility installations and may also damage existing utilities. Tiebacks must be removed per Railroad direction. Removal of tieback assemblies is problematic.
3. An anchored sheet pile wall is a structure designed to provide lateral support for a soil mass and derives stability from passive resistance of the soil in which the sheet pile is embedded and the tensile resistance of the anchors.
 - a. For purposes of these guidelines, ground anchors shall be cement-grouted tiebacks designed, furnished, installed, tested and stressed in accordance with the project specifications and AREMA requirements.
4. An anchored soldier beam with lagging wall is a structure designed to provide lateral support for a soil mass and derives stability from passive resistance of the soil in which the soldier beam is embedded and from the tensile resistance of the ground anchors.
 - a. Anchored soldier beam with lagging walls are generally designed as flexible structures which have sufficient lateral movement to mobilize active earth pressures and a portion of the passive pressure.
 - b. For purposes of these specifications, soldier beams include steel H-piles, wide flange sections or other fabricated sections that are driven or set in drilled holes. Lagging refers to the members spanning between soldier beams.
5. A cantilever sheet pile wall is a structure designed to provide lateral support for a soil mass and derives stability from passive resistance of the soil in which the sheet pile is embedded. If cantilever sheet pile is used for shoring adjacent to an operating track, the shoring system shall be at least 12'-0" away from the centerline of track. Cantilever sheet pile walls shall be used only in granular soils or stiff clays.
6. A cantilever soldier beam with lagging wall is a structure designed to provide lateral support for a soil mass and derives stability from passive resistance of the soil in which the soldier beam is embedded.
7. A braced excavation is a structure designed to provide lateral support for a soil mass and derives stability from passive resistance of the soil in which the vertical members are embedded and from the structural capacity of the bracing members.
 - a. For purposes of these guidelines, the vertical members of the braced excavation system include steel sheet piling or soldier beams comprised of steel H-piles, wide flange sections, or other fabricated sections that are driven or installed in drilled holes. Wales are horizontal structural members designed to transfer lateral loads from the vertical members to the struts. Struts are structural compression members that support the lateral loads from the wales.
8. A cofferdam is an enclosed temporary structure used to keep water and soil out of an excavation for a permanent structure such as a bridge pier or abutment or similar structure. Cofferdams may be constructed of timber, steel, concrete or a combination of these. These guidelines consider cofferdams primarily constructed with steel sheet piles.

6. GENERAL SHORING REQUIREMENTS

For general shoring requirements and specific applications of the following items refer to **Figure 1** on the next page which illustrates Plan Number **710000 "GENERAL SHORING REQUIREMENTS"**.



1. No excavation shall be permitted closer than 12'-0" measured at a right angle from the centerline of track to the trackside of shoring system. If existing conditions preclude the installation of shoring at the required minimum distance, the shifting of tracks or temporary removal of tracks shall be investigated prior to any approval. All costs associated with track shifting or traffic interruption shall be at Contractor's expense.
2. Evaluate slope and stability conditions to ensure the Railroad embankment will not be adversely affected. Local and global stability conditions must also be evaluated.
3. All shoring within the limits of Zone A or Zone B must be placed prior to the start of excavation.
4. Lateral clearances must provide sufficient space for construction of the required ditches parallel to the standard roadbed section. The size of ditches will vary depending upon the flow and terrain and should be designed accordingly.
5. The shoring system must be designed to support the theoretical embankment shown for zones A and B.
6. Any excavation, holes or trenches on the Railroad property shall be covered, guarded and/or protected. Handrails, fence, or other barrier methods must meet OSHA and FRA requirements. Temporary lighting may also be required by the Railroad to identify tripping hazards to train crewmen and other Railroad personnel.
7. The most stringent project specifications of the Public Utilities Commission Orders, Department of Industrial Safety, OSHA, FRA, AREMA, BNSF, UPRR or other governmental agencies shall be used.
8. Secondhand material is not acceptable unless the Engineer of Record submits a full inspection report which verifies the material properties and condition of the secondhand material. The report must be signed and sealed by the Engineer of Record.
9. All components of the shoring system are to be removed when the shoring is no longer needed. All voids must be filled and drainage facilities restored. See compaction requirements section 9, Part 4.
10. Slurry type materials are not acceptable as fill for soldier piles in drilled holes. Concrete and flowable backfill may prevent removal of the shoring system. Use compacted peagravel material.

7. COMPUTATION OF APPLIED FORCES

1. Railroad live load and lateral forces.
 - a. For specific applications of the Coopers E80 live load refer to **Figure 2** on the next page which illustrates Plan Number **710001 "LIVE LOAD PRESSURE DUE TO COOPER E80"**. Supplemental information and sample calculations are provided in the Appendix pages A-1 through A-4.
2. Dead load.
 - a. Spoil pile: must be included assuming a minimum height of two feet of soil adjacent to the excavation.
 - b. Track: use 200 lbs/linear ft for rails, inside guardrails and fasteners.
 - c. Roadbed: ballast, including track ties, use 120 lb per cubic foot.



3. Active earth pressure.

- a. The active earth pressure due to the soil may be computed by the Coulomb Theory or other approved method.
- b. The active earth pressure at depth “ z_a ” is:

$$P_A = K_A \gamma z_a, \text{ where } K_A = \tan^2(45 - \frac{\phi}{2})$$

z_a = depth of soil influencing the active pressure.

4. Active earth pressure due to unbalanced water pressure.

- a. When bulkheads are used for waterfront construction, the bulkhead is subjected to a maximum earth pressure at the low water stage. During a rainstorm or a rapidly receding high water, the water level behind the bulkhead may be several feet higher than in front of the bulkhead.
- b. Drained conditions in backfill apply when clean sand or clean sand and gravel are used and adequate permanent drainage outlets are provided. Where drained conditions exist, the design water level may be assumed at the drainage outlet elevation.

5. Active earth pressure due to surcharge load.

The active earth pressure due to surcharge load q' :

$$P_U = K_A q', \text{ where } K_A = \tan^2(45 - \frac{\phi}{2})$$

6. Passive earth pressure.

The passive earth pressure, P_p , in front of the bulkhead may also be computed by the Coulomb Theory.

$$P_p = K_p \gamma z_p, \text{ where } K_p = \tan^2(45 + \frac{\phi}{2})$$

z_p = vertical distance beginning one foot below dredge line but not to exceed embedment depth

7. Pressure due to embankment surcharges.

Conventional analysis (Rankine, Coulomb, or Log-Spiral) should be used to determine the additional surcharge from embankment slopes.

8. Additional analysis for centrifugal force calculations as described in **AREMA Chapter 15, Part 1, Section 1.3, Article 1.3.6** Centrifugal Loads are required where track curvature exceeds three degrees.

9. Include and compute all other loads that are impacting the shoring system such as a typical Railroad service vehicle (HS-20 truck).

8. STRUCTURAL INTEGRITY

Structures and structural members shall be designed to have design strengths at all sections at least equal to the required strengths calculated for the loads and forces in such combinations as stipulated in **AREMA Chapter 8 Part 2 Article 2.2.4b**, which represents various combinations of loads and forces to which a structure may be subjected. Each part of the structure shall be proportioned for the group loads that are applicable, and the maximum design required shall be used.

1. Embedment depth.

- a. Calculated depth of embedment is the embedment depth required to maintain static equilibrium.

- b. Minimum depth of embedment is the total depth of embedment required to provide static equilibrium plus additional embedment due to the minimum factor of safety.
 1. Embedment depth factor of safety for well-defined loading conditions and thoroughly determined soil parameters is generally 1.3 for most temporary shoring systems. (See **AREMA 8.20.4.1.c**)
 2. All anchored shoring systems require a minimum embedment depth of 1.5 times the calculated depth of embedment. Shallow penetration into strong soil layers is not acceptable. (See **AREMA 8.20.5.1**)
2. The allowable stresses based on AREMA requirements are as follows:

Structural Steel: $0.55F_y$ for Compression in extreme fiber. (**AREMA Ch.15 Table 1-11**)

Structural Steel: $0.35F_y$ for Shear. (**AREMA Ch.15 Table 1-11**)

Sheet Pile Sections: $2/3$ of yield strength for steel. (**AREMA 8.20.5.7**)

Concrete: $1/3$ of Compressive strength. (**AREMA 8.20.5.7**)

Anchor Rods: $1/2$ of yield strength for steel. (**AREMA 8.20.5.7**)
3. AISC allowances for increasing allowable stress due to temporary loading conditions are not acceptable.
4. Gravity type temporary shoring systems must also be analyzed for overturning, sliding and global stability.
5. The contractor is responsible for providing an approved test method to verify the capacity of anchored or tieback systems. The manufacturers recommendations for testing must be satisfied. Systems which support the Railroad embankment will be considered high risk in determining the percentage of elements to be proof tested.
6. Calculated deflections of temporary shoring system and top of rail elevation shall not exceed the criteria outlined in **Table 1 Deflection Criteria**.

Table 1 Deflection Criteria

Horizontal distance from shoring to track C/L measured at a right angle from track	Maximum horizontal movement of shoring system	Maximum acceptable horizontal or vertical movement of rail
$12' < S < 18'$	$3/8''$	$1/4''$
$18' < S < 24'$	$1/2''$	$1/4''$

9. SOIL CHARACTERISTICS

1. Subsurface Exploration. (**AREMA 8.5.2.2**)
 - a. Sufficient borings shall be made along the length of the structure to determine, with a reasonable degree of certainty, the subsurface conditions. Irregularities found during the initial soil boring program may dictate that additional borings be taken.
 - b. The subsurface investigation shall be made in accordance with the provisions of **AREMA Chapter 8 Part 22, Geotechnical Subsurface Investigation**.
2. Type of backfill.
 - a. Backfill is defined as material behind the wall, whether undisturbed ground or fill, that contributes to the pressure against the wall.

- b. The backfill shall be investigated and classified with reference to the soil types described in **AREMA Table 8-5-1**.
- c. Types 4 and 5 backfill shall be used only with the permission of the Engineer. In all cases the wall design shall be based on the type of backfill used.

Table 8-5-1 (AREMA) Types of Backfill for Retaining Walls

Backfill Type	Backfill Description
1	Coarse-grained soil without admixture of fine soil particles, very free-draining (clean sand, gravel or broken stone).
2	Coarse-grained soil of low permeability due to admixture of particles of silt size.
3	Fine silty sand; granular materials with conspicuous clay content; or residual soil with stones.
4	Soft or very soft clay, organic silt; or soft silty clay.
5	Medium or stiff clay that may be placed in such a way that a negligible amount of water will enter the spaces between the chunks during floods or heavy rains.

3. Computation of backfill pressure. (**AREMA 8.5.3.2a**)

- a. Values of the unit weight, cohesion, and angle of internal friction of the backfill material shall be determined directly by means of soil tests or, if the expense of such tests is not justifiable, by means of **AREMA Table 8-5-2** referring to the soil types defined in **AREMA Table 8-5-1**. Unless the minimum cohesive strength of the backfill material can be evaluated reliably, the cohesion shall be neglected and only the internal friction considered. See Appendix page A-6 for AREMA generic soil properties.

Table 8-5-2 (AREMA) Properties of Backfill Materials

Type of Backfill	Unit Weight Lb. Per Cu. Ft.	Cohesion "C"	Angle of Internal Friction
1	105	0	33°-42°(38°for broken stone)
2	110	0	30°
3	125	0	28°
4	100	0	0°
5	120	240	0°

4. Compaction.

- a. The backfill shall preferably be placed in loose layers not to exceed 8 inches in thickness. Each layer shall be compacted before placing the next, but over compaction shall be avoided.
- b. It is required that backfill be compacted to no less than 95% of maximum dry density at a moisture content within 2% of optimum and tested using Modified Proctor ASTM D1557.
- c. Fill within 100 feet of bridge ends or 20 feet outside culverts shall be placed and compacted to not less than 100% of maximum.
- d. No dumping of backfill material shall be permitted in such a way that the successive layers slope downward toward the wall. The layers shall be horizontal or shall slope downward away from the wall.

10. PLANS

The shoring plans must completely identify the site constraints and the shoring system. Use the design templates provided in the appendix as an example to show the required information, specifications and drawings. The specific requirements of the plan submittals are as follows:

1. General plan view should show:
 - a. Railroad right-of-way and North arrow.
 - b. Position of all Railroad tracks and identify each track as mainline, siding, spur, etc.
 - c. Spacing between all existing tracks.
 - d. Location of all access roadways, drainage ditches and direction of flow.
 - e. Footprint of proposed structure, proposed shoring system and any existing structures if applicable.
 - f. Proposed horizontal construction clearances. The minimum allowable is 12 feet measured at a right angle from centerline of track.
 - g. Location of existing and proposed utilities.
 - h. Drawings must be signed and stamped by a Licensed Professional Engineer, registered in the state where the work will be performed.
 - i. Railroad and other "CALL BEFORE YOU DIG" numbers.
 - j. Detailed view of shoring along with controlling elevations and dimensions.
2. Typical section and elevation should show:
 - a. Top of rail elevations for all tracks.
 - b. Offset from the face of shoring system to the centerline of all tracks at all changes in horizontal alignment.
 - c. All structural components, controlling elevations and dimensions of shoring system.
 - d. All drainage ditches and controlling dimensions.
 - e. All slopes, existing structures and other facilities which may surcharge the shoring system.
 - f. Location of all existing and proposed utilities.
 - g. Total depth of shoring system.
3. General criteria
 - a. Design loads to be based on the AREMA manual and Cooper E80 loading.
 - b. Pressure due to embankment surcharges.
 - c. ASTM designation and yield strength for each material.
 - d. Maximum allowable bending stress for structural steel is $0.55F_y$.
 - e. Temporary overstress allowances are not acceptable.
 - f. All timber members shall be Douglas Fir grade 2 or better.
 - g. Insitu soil classification.
 - h. Backfill soil classification.
 - i. Internal angle of friction and unit weight of the soil.
 - j. Active and passive soil coefficients.
 - k. Fill within 100 feet of bridge ends or 20 feet outside culverts shall be placed and compacted to a minimum of 100% of maximum dry density tested per Modified Proctor ASTM D1557.
 - l. Slopes without shoring shall not be steeper than 2 horizontal to 1 vertical

- m. Dredge line elevation.
 - n. Shoring deflection to be calculated and meet Railroad requirements.
4. Miscellaneous:
- a. Project name, location, GPS coordinates, track owner, Railroad line segment, milepost and subdivision in the title block.
 - b. Procedure outlining the installation and removal of the temporary shoring system.
 - c. General notes specifying material requirements, design data, details, dimensions, cross-sections, sequence of construction etc.
 - d. A description of the tieback installation including drilling, grouting, stressing information and testing procedures, anchor capacity, type of tendon, anchorage hardware, minimum unbonded lengths, minimum anchor lengths, angle of installation, tieback locations and spacing.
 - e. All details for construction of drainage facilities associated with the shoring system shall be clearly indicated.
 - f. Details and descriptions of all shoring system members and connection details.
 - g. Settlement and displacement calculations.
 - h. Handrail and protective fence details along the excavation.
 - i. Drawings must be signed and stamped by a Licensed Professional Engineer, registered in the state where the work will be performed.
 - j. Call before you dig number.
 - k. Construction clearance diagram.

11. SUBMITTALS

The Contractor will be responsible for any and all cost associated with the review of plans by the Railroad. Review of design submittals by the Railroad will require a minimum of four (4) weeks. To avoid impacting the construction schedule, the Contractor must schedule submittals well in advance. Partial, incomplete or inadequate designs will be rejected, thus delaying the approval. Revised submittals will follow the same procedure as the initial submittal until all issues are resolved. Submit a minimum of three sets of shoring plans and two sets of calculations with manufacturers' specifications. Drawings and calculations must be signed and stamped by a Registered Professional Engineer familiar with Railway loadings and who is licensed in the state where the shoring system is intended for use. Drawings accompanying the shoring plans shall be submitted on 11" x 17" or 8½" x 11" sized paper.

1. Contractor review.

The Contractor must review the temporary shoring plans to ensure that the proposed method of construction is compatible with the existing site and soil conditions. The Contractor's work plan must be developed to allow train traffic to remain in service. Removal of the shoring system must also be addressed.

2. Applicant and or Engineer of Record review.

The applicant and or Engineer of Record must review and approve the submittal for compliance with the project specifications, AREMA Manual, these guidelines and structural capacity before forwarding the submittal to the Railroad.

3. Review process.

All design submittals shall be forwarded to the Railroad Representative who will send them to the Structures Design Department. The Structures Design Department shall review or have an outside consultant review said submittals. If a Railroad consultant performs said review, the consultant may reply directly to the applicant or their representative after consultation with the Structures Design Department. A copy of the reply will be mailed to the Railroad Representative. During the review process the Railroad Representative is the point of contact to resolve outstanding issues.

12. APPENDIX

ITEM	PAGE
1. SAMPLE PROBLEM	A-1 & A-2
2. CHART A	A-3 & A-4
3. GUIDELINE & WEBSITE DIRECTORY	A-5
4. TABLES	A-6
AREMA Table 8-20-1. Granular Soils	
AREMA Table 8-20-2. Silt and Clay Soils	
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5. TEMPLATES	
GENERAL CRITERIA AND MISCELLANEOUS	A-7
GENERAL PLAN VIEW	A-8
TYPICAL SECTION & ELEVATION VIEW	A-9

13. BIBLIOGRAPHY

The following list of references used in these guidelines are placed here in alphabetical order for your convenience.

1. *Manual for Railway Engineering*, 2002 American Railway Engineering and Maintenance-of-Way Association.
2. *TRENCHING AND SHORING MANUAL*, January 1990, Revision 11/12/96. State of California Department of Transportation, Office of Structures Construction.

SAMPLE PROBLEM

Point in question: S = 12 ft H = 6 ft

$$q = \frac{80,000 \text{ lbs}}{(5 \text{ ft})(9 \text{ ft})} = 1778 \text{ psf for E80 loading, axle spacing} = 5 \text{ ft, tie length } b = 9 \text{ ft}$$

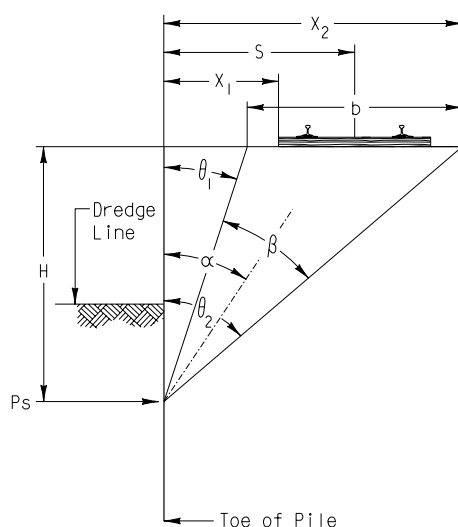
$$\text{Solve for } X_1 = S - b/2 = 7.5 \text{ ft}$$

$$\text{Solve for } X_2 = S + b/2 = 16.5 \text{ ft}$$

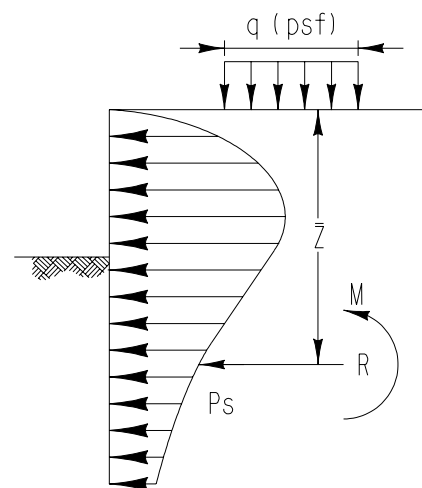
$$\text{Solve for } \theta_1 = \arctan\left(\frac{X_1}{H}\right) = 0.896 \text{ radians} \quad \text{Solve for } \theta_2 = \arctan\left(\frac{X_2}{H}\right) = 1.222 \text{ radians}$$

$$\text{Solve for } \beta = \theta_2 - \theta_1 = 0.326 \text{ radians} \quad \text{Solve for } \alpha = \frac{\theta_1 + \theta_2}{2} = 1.059 \text{ radians}$$

Note: $\tan \alpha \neq \frac{S}{H}$



PRESSURE DISTRIBUTION FOR STRIP LOAD



EQUIVALENT LOADING

- Pressure, Ps due to E80 liveload at the above-identified point:

$$P_s = \frac{2q}{\pi} (\beta - \sin \beta \cos 2\alpha) = \frac{2 * 1778}{\pi} (0.326 - \sin(0.326) \cos(2 * 1.059)) = 558 \text{ psf}$$

- Shear due to E80 liveload at the above-identified point:

$$R_x = \frac{2qH\beta}{\pi} = \frac{2 * 1778 * 6 * 0.326}{\pi} = 2214 \text{ lbs /ft}$$

- Depth $\bar{z}$ from base of tie:

$$\bar{z} = \frac{H^2\beta - bH + X_2^2\left(\frac{\pi}{2} - \theta_2\right) - X_1^2\left(\frac{\pi}{2} - \theta_1\right)}{2H\beta} = \frac{6^2 * 0.326 - 9 * 6 + 16.5^2\left(\frac{\pi}{2} - 1.222\right) - 7.5^2\left(\frac{\pi}{2} - 0.896\right)}{2 * 6 * 0.326} = 3.77 \text{ ft}$$

SAMPLE PROBLEM (CONTINUED)

- Moment due to E80 liveload at the above identified point:

$$M = R_x (H - \bar{z}) = 2214 * (6 - 3.77) = 4940 \text{ ft-lbs/ft}$$

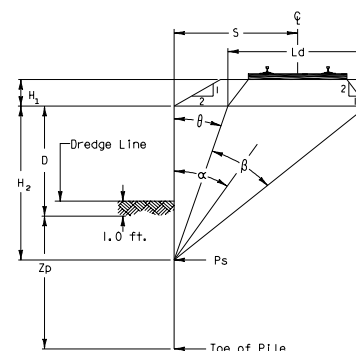
Use the above equations to determine P_s , M , R_x & $\bar{z}$ due to the E80 liveload along the **entire** depth of the shoring system. Typically the equations are evaluated on 6" increments to determine the maximum values along the depth of the shoring system. The resultants must be combined with other applicable pressures and loads to evaluate the total loading on the shoring system for the entire depth of the system. Determine the minimum embedment depth required and the minimum cross sectional properties of the shoring system based on the allowable stresses and the required factors of safety.

CHART A

This chart identifies the active pressure and resulting forces due to E80 live load.

See "SAMPLE PROBLEM" sheet for definitions of variables and equations.

1. Select distance S from track centerline to face of shoring.
2. Select depth H₂ below base of tie.
3. Read Ps, M, R and Z̄ from the table.
4. Use the procedure outlined in the sample problem to determine values at non-tabulated points.



$$P_s = \frac{2q}{\pi} [\beta - \sin \beta \cos(2\alpha)]$$

where q = 1778 psf

Boussinesq surcharge pressure E80 live load for H₁=0

Depth below top of shoring H ₂ (ft)	Variables	Horizontal distance (S) from shoring to track CL measured at a right angle									
		12	14	16	18	20	22	24	26	28	30
2	Ps (psf)	305	220	166	130	105	86	72	61	53	46
	α (radians)	1.38	1.41	1.44	1.45	1.47	1.48	1.48	1.49	1.50	1.50
	β (radians)	0.14	0.10	0.07	0.06	0.05	0.04	0.03	0.03	0.02	0.02
	Z̄ (ft)	1.32	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
	M (ft-lbs/ft)	215	152	114	89	71	58	49	41	36	31
	R (lbs/ft)	317	226	170	132	106	87	73	62	53	46
4	Ps (psf)	496	381	299	240	197	164	138	118	102	89
	α (radians)	1.21	1.27	1.31	1.34	1.36	1.38	1.40	1.41	1.43	1.44
	β (radians)	0.25	0.19	0.14	0.11	0.09	0.07	0.06	0.05	0.05	0.04
	Z̄ (ft)	2.59	2.61	2.63	2.64	2.64	2.65	2.65	2.65	2.65	2.66
	M (ft-lbs/ft)	1,609	1,165	882	692	557	459	384	327	281	244
	R (lbs/ft)	1,141	840	643	508	411	339	285	242	209	182
6	Ps (psf)	558	461	381	317	266	225	193	167	146	128
	α (radians)	1.06	1.13	1.19	1.23	1.27	1.29	1.32	1.34	1.35	1.37
	β (radians)	0.33	0.25	0.20	0.16	0.13	0.11	0.09	0.08	0.07	0.06
	Z̄ (ft)	3.77	3.83	3.88	3.90	3.92	3.94	3.95	3.96	3.96	3.97
	M (ft-lbs/ft)	4,944	3,674	2,830	2,244	1,822	1,508	1,269	1,082	933	813
	R (lbs/ft)	2,214	1,696	1,332	1,070	877	731	618	529	458	400
8	Ps (psf)	535	476	414	358	309	268	234	205	181	160
	α (radians)	0.94	1.02	1.08	1.13	1.17	1.21	1.24	1.26	1.29	1.30
	β (radians)	0.37	0.29	0.24	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	Z̄ (ft)	4.84	4.97	5.06	5.11	5.16	5.19	5.21	5.23	5.24	5.26
	M (ft-lbs/ft)	10,481	8,006	6,286	5,051	4,141	3,452	2,920	2,501	2,165	1,892
	R (lbs/ft)	3,316	2,641	2,134	1,751	1,456	1,228	1,047	903	786	689
10	Ps (psf)	474	449	411	370	329	293	260	232	207	186
	α (radians)	0.83	0.92	0.99	1.04	1.09	1.13	1.17	1.19	1.22	1.24
	β (radians)	0.38	0.32	0.26	0.22	0.19	0.16	0.14	0.12	0.10	0.09
	Z̄ (ft)	5.81	6.02	6.16	6.26	6.34	6.39	6.44	6.47	6.50	6.52
	M (ft-lbs/ft)	18,145	14,227	11,385	9,280	7,689	6,463	5,502	4,736	4,117	3,610
	R (lbs/ft)	4,328	3,571	2,964	2,482	2,099	1,792	1,544	1,341	1,175	1,037
12	Ps (psf)	404	403	386	360	331	302	274	248	225	204
	α (radians)	0.75	0.83	0.90	0.96	1.01	1.06	1.10	1.13	1.16	1.18
	β (radians)	0.38	0.33	0.28	0.24	0.20	0.18	0.15	0.13	0.12	0.11
	Z̄ (ft)	6.68	6.97	7.18	7.34	7.46	7.55	7.61	7.67	7.71	7.75
	M (ft-lbs/ft)	27,703	22,237	18,121	14,980	12,550	10,641	9,121	7,895	6,894	6,068
	R (lbs/ft)	5,207	4,424	3,763	3,214	2,762	2,389	2,080	1,823	1,608	1,427
14	Ps (psf)	338	351	349	337	319	298	276	255	234	215
	α (radians)	0.68	0.76	0.83	0.89	0.94	0.99	1.03	1.07	1.10	1.13
	β (radians)	0.38	0.33	0.28	0.25	0.22	0.19	0.17	0.15	0.13	0.12
	Z̄ (ft)	7.46	7.85	8.13	8.35	8.51	8.64	8.74	8.82	8.89	8.94
	M (ft-lbs/ft)	38,880	31,856	26,395	22,116	18,729	16,021	13,831	12,043	10,568	9,339
	R (lbs/ft)	5,948	5,178	4,499	3,913	3,414	2,990	2,631	2,327	2,068	1,847
16	Ps (psf)	280	301	310	308	300	286	271	254	237	220
	α (radians)	0.62	0.70	0.77	0.83	0.88	0.93	0.97	1.01	1.04	1.07
	β (radians)	0.36	0.32	0.28	0.25	0.22	0.20	0.18	0.16	0.14	0.13
	Z̄ (ft)	8.17	8.64	9.01	9.29	9.51	9.68	9.82	9.93	10.03	10.10
	M (ft-lbs/ft)	51,411	42,880	36,066	30,598	26,183	22,590	19,644	17,207	15,175	13,468
	R (lbs/ft)	6,563	5,829	5,158	4,560	4,034	3,576	3,179	2,837	2,540	2,284

CHART A continued

This chart identifies the active pressure and resulting forces due to E80 live load.
See "SAMPLE PROBLEM" sheet for definitions of variables and equations.
1. Select distance S from track centerline to face of shoring.

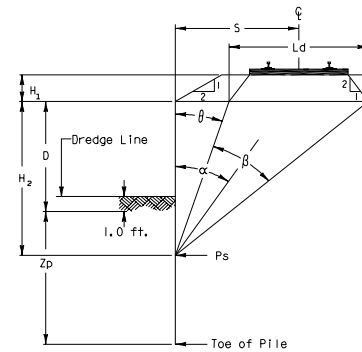
2. Select depth H₂ below base of tie.

3. Read P_s, M, R and $\bar{z}$ from the table.

4. Use the procedure outlined in the sample problem to determine values at non-tabulated points.

$$P_s = \frac{2q}{\pi} [\beta - \sin \beta \cos(2\alpha)]$$

where q = 1778 psf



Boussinesq surcharge pressure E80 live load for H₁=0

Depth below top of shoring H ₂ (ft)	Variables	Horizontal distance (S) from shoring to track CL measured at a right angle									
		12	14	16	18	20	22	24	26	28	30
18	P_s (psf)	231	256	271	277	276	269	259	247	234	220
	α (radians)	0.57	0.64	0.71	0.77	0.82	0.87	0.92	0.96	0.99	1.02
	β (radians)	0.35	0.31	0.28	0.25	0.23	0.20	0.18	0.16	0.15	0.13
	$\bar{z}$ (ft)	8.80	9.37	9.81	10.16	10.44	10.67	10.85	11.00	11.12	11.22
	M (ft-lbs/ft)	65,062	55,110	46,976	40,313	34,834	30,304	26,536	23,384	20,728	18,477
	R (lbs/ft)	7,072	6,386	5,739	5,145	4,609	4,132	3,710	3,338	3,012	2,725
20	P_s (psf)	191	217	236	246	250	249	244	237	227	217
	α (radians)	0.52	0.59	0.66	0.72	0.77	0.82	0.87	0.91	0.94	0.98
	β (radians)	0.33	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14
	$\bar{z}$ (ft)	9.37	10.03	10.56	10.98	11.32	11.59	11.82	12.01	12.16	12.30
	M (ft-lbs/ft)	79,641	68,368	58,973	51,137	44,586	39,093	34,465	30,548	27,216	24,367
	R (lbs/ft)	7,493	6,859	6,245	5,668	5,135	4,651	4,214	3,822	3,474	3,163
22	P_s (psf)	159	184	204	217	225	228	227	223	217	210
	α (radians)	0.49	0.55	0.62	0.67	0.73	0.77	0.82	0.86	0.90	0.93
	β (radians)	0.31	0.29	0.27	0.25	0.23	0.21	0.19	0.17	0.16	0.14
	$\bar{z}$ (ft)	9.89	10.64	11.24	11.73	12.14	12.47	12.74	12.97	13.17	13.33
	M (ft-lbs/ft)	94,986	82,497	71,913	62,945	55,341	48,878	43,370	38,658	34,611	31,122
	R (lbs/ft)	7,842	7,260	6,684	6,131	5,611	5,128	4,685	4,283	3,918	3,590
24	P_s (psf)	133	157	176	191	202	207	210	209	206	201
	α (radians)	0.45	0.52	0.58	0.63	0.68	0.73	0.78	0.82	0.85	0.89
	β (radians)	0.30	0.28	0.26	0.24	0.22	0.20	0.19	0.17	0.16	0.15
	$\bar{z}$ (ft)	10.35	11.19	11.87	12.44	12.90	13.29	13.62	13.89	14.13	14.32
	M (ft-lbs/ft)	110,969	97,366	85,670	75,625	66,997	59,577	53,183	47,661	42,875	38,716
	R (lbs/ft)	8,132	7,600	7,064	6,540	6,037	5,564	5,122	4,715	4,342	4,001
26	P_s (psf)	112	134	153	168	180	188	192	194	193	191
	α (radians)	0.42	0.48	0.54	0.60	0.65	0.69	0.74	0.78	0.82	0.85
	β (radians)	0.28	0.27	0.25	0.23	0.22	0.20	0.19	0.17	0.16	0.15
	$\bar{z}$ (ft)	10.78	11.69	12.45	13.09	13.62	14.07	14.44	14.77	15.04	15.28
	M (ft-lbs/ft)	127,485	112,863	100,135	89,071	79,460	71,105	63,836	57,499	51,963	47,113
	R (lbs/ft)	8,376	7,890	7,393	6,899	6,418	5,959	5,524	5,118	4,741	4,393
28	P_s (psf)	94	114	132	148	160	169	175	179	180	180
	α (radians)	0.40	0.46	0.51	0.56	0.61	0.66	0.70	0.74	0.78	0.81
	β (radians)	0.27	0.26	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15
	$\bar{z}$ (ft)	11.17	12.16	12.99	13.70	14.29	14.80	15.23	15.60	15.91	16.19
	M (ft-lbs/ft)	144,448	128,896	115,211	103,191	92,642	83,385	75,258	68,113	61,823	56,274
	R (lbs/ft)	8,581	8,137	7,677	7,214	6,758	6,315	5,892	5,491	5,115	4,764
30	P_s (psf)	80	98	115	130	142	152	160	165	167	168
	α (radians)	0.37	0.43	0.48	0.53	0.58	0.63	0.67	0.71	0.74	0.78
	β (radians)	0.26	0.25	0.23	0.22	0.21	0.20	0.18	0.17	0.16	0.15
	$\bar{z}$ (ft)	11.52	12.59	13.49	14.26	14.92	15.48	15.97	16.38	16.75	17.06
	M (ft-lbs/ft)	161,789	145,388	130,819	117,903	106,466	96,343	87,381	79,443	72,404	66,153
	R (lbs/ft)	8,755	8,349	7,925	7,492	7,060	6,636	6,227	5,834	5,462	5,112
32	P_s (psf)	69	85	101	115	127	137	145	151	155	157
	α (radians)	0.35	0.41	0.46	0.51	0.55	0.60	0.64	0.68	0.71	0.75
	β (radians)	0.25	0.24	0.22	0.21	0.20	0.19	0.18	0.17	0.16	0.15
	$\bar{z}$ (ft)	11.85	12.98	13.95	14.79	15.51	16.13	16.67	17.13	17.54	17.89
	M (ft-lbs/ft)	179,452	162,274	146,888	133,136	120,859	109,909	100,144	91,432	83,655	76,706
	R (lbs/ft)	8,904	8,532	8,140	7,736	7,329	6,925	6,531	6,150	5,785	5,438

GUIDELINE & WEBSITE DIRECTORY

BNSF guidelines are as follows:

- a. Guidelines for Design and Construction of Grade Separation Structures.

UPRR guidelines are as follows:

- a. **Underpass Structures** – “Guidelines for Design and Construction of Grade Separation Underpass Structures.”
- b. **Overhead Grade Separation** – “Guidelines for Design of Highway Separation Structures Over Railroad (Overhead Grade Separation).”
- c. **Demolition** – “Guidelines for Preparation of a Bridge Demolition and Removal Plan for Structures Over Railroad.”
- d. **Shoofly** – “Guidelines for Design and Construction of Shoofly (Detour) Tracks.”
- e. **Fiber Optic** – “UPRR Fiber Optic Engineering, Construction And Maintenance Standards.” 1/1/2002
- f. **Pipeline** – “Pipeline Installation” available at www.uprr.com.
- g. **Industry Track** – “Technical Specification for Construction of Industrial Tracks”

WEBSITE DIRECTORY:

- 1. www.astm.org
- 2. www.arena.org
- 3. www.bnsf.com
- 4. www.pilespeccs.com
- 5. www.uprr.com

AREMA Table 8-20-1. Granular Soils

Descriptive Term for Relative Density	Standard Penetration Test Blows per Foot "N"
Very Loose	0 - 4
Loose	4 - 10
Medium	10 - 30
Dense	30 - 50
Very Dense	Over 50

AREMA Table 8-20-2. Silt and Clay Soils

Descriptive Term for Consistency	Unconfined Compressive Strength Tons per Square Foot
Very Soft	Less than 0.25
Soft	0.25 - 0.50
Medium	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	Over 4.00

AREMA Table 8-20-3. Unit Weights of Soils, and Coefficients of Earth Pressure

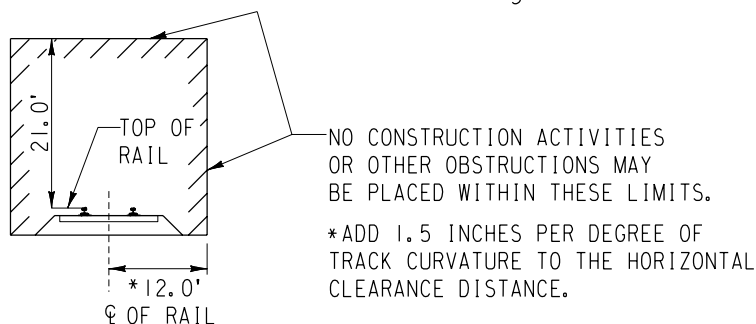
Type of Soil	Unit Weight of Moist Soil, γ (Note 1)		Unit Weight of Submerged Soil, γ' (Note 1)		Coefficient of Active Earth Pressure, K_A				Coefficient of Passive Earth Pressure, K_p		
					For Backfill	For Soils in Place	Friction Angles (Note 2)		For Soils in Place	Friction Angles (Note 2)	
	Minimum	Maximum	Minimum	Maximum			ϕ	δ		ϕ	δ
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Clean Sand:											
Dense	110	140	65	78		0.20	38	20	9.0	38	25
Medium	110	130	60	68		0.25	34	17	7.0	34	23
Loose	90	125	56	63	0.35	0.30	30	15	5.0	30	20
Silty Sand:											
Dense	110	150	70	88		0.25			7.0		
Medium	95	130	60	68		0.30			5.0		
Loose	80	125	50	63	0.50	0.35			3.0		
Silt and Clay (Note 3)	$\frac{165(1 + w)}{1 + 2.65w}$		$\frac{103}{1 + 2.65w}$		1.00	$1 - \frac{q_u}{p + \gamma z}$			$1 + \frac{q_u}{p + \gamma z}$		
Note 1: In pounds per cubic foot. Note 2: These angles, expressed in degrees, are ϕ , the angle of internal friction, and δ , the angle of wall friction, and are used in estimating the coefficients under which they are listed. Note 3: The symbol γ represents γ or γ' , whichever is applicable; p is the effective unit pressure on the top surface of the stratum; q_u is the unconfined compressive strength; w is the natural water content, in percentage of dry weight; and z is the depth below the top surface of the stratum.											

General criteria:

- Design loads to be based on the AREMA manual and Cooper E80 loading.
- Pressure due to embankment surcharges.
- ASTM designation and yield strength for each material.
- Maximum allowable bending stress for steel is $0.55F_y$.
- Temporary overstress allowances are not acceptable.
- All timber members shall be Douglas Fir Grade 2 or better.
- Insitu soil classification.
- Backfill soil classification.
- Internal angle of friction and unit weight of soil.
- Active and passive soil coefficients.
- Backfill compacted to a minimum of 95% Proctor density per ASTM D-1557.
- Slopes without shoring shall not be steeper than 2 horizontal to 1 vertical.
- Dredge line elevation.
- Shoring deflection to be calculated and meet Railroad requirements.

Miscellaneous:

- Project name, location, GPS coordinates, track owner, Railroad line segment, milepost and subdivision in the title block.
- Procedure outlining the installation and removal of the temporary shoring system.
- General notes specifying material requirements, design data, details, dimensions and cross-sections, sequence of construction etc.
- A description of tieback installation including drilling, grouting, stressing information and testing procedures, anchor capacity, type of tendon, anchorage hardware, minimum unbonded lengths, minimum anchor lengths, angle of installation, tieback locations and spacing.
- All details for construction of drainage facilities associated with the shoring system shall be clearly indicated.
- Details and descriptions of all shoring system members and connection details.
- Settlement and displacement calculations.
- Handrail and protective fence details along the excavations.
- Drawings must be signed and stamped by a Licensed Professional Engineer, registered in the state where the work will be performed.
- Call before you dig number.
- Construction clearances diagram as shown below.



MINIMUM CONSTRUCTION

CLEARANCES (NORMAL TO RAILROAD) Not to scale	DESIGN BY:	NAME & LOGO OF ENGINEERING FIRM OR PROJECT OWNER		
	DRAWN BY:			
	SCALE:	GENERAL CRITERIA AND MISCELLANEOUS		
	DRAWING NO:			
	SHEET: 1 of 3	RR M.P.	SUBDIVISION	
	DOT#:	CITY	COUNTY	STATE
	DATE:	PROJECT NAME & LOCATION		

General plan view should show:

- a. Railroad right-of-way and North arrow.
- b. Position of all Railroad tracks and identify each track as mainline, siding, spur, etc.
- c. Spacing between all existing tracks.
- d. Location of all access roadways, drainage ditches and direction of flow.
- e. Footprint of proposed structure, proposed shoring system and any existing structures if applicable.
- f. Proposed horizontal construction clearances. The minimum allowable is 12 feet measured at a right angle from centerline of track.
- g. Location of existing and proposed utilities.
- h. Drawings must be signed and stamped by a Licensed Professional Engineer, registered in the state where the work will be performed.
- i. Railroad and other "CALL BEFORE YOU DIG" numbers.
- j. Detailed view of shoring along with controlling elevations and dimensions.

DESIGN BY:	NAME & LOGO OF ENGINEERING FIRM OR PROJECT OWNER		
DRAWN BY:			
SCALE:	GENERAL PLAN VIEW		
DRAWING NO:			
SHEET: 2 OF 3	RR M.P.	SUBDIVISION	
DOT#:	city	COUNTY	STATE
DATE:	PROJECT NAME & LOCATION		

Typical section and elevation should show:

- a. Top of rail elevations for all tracks.
- b. Offset from the face of shoring system to the centerline of all tracks at all changes in horizontal alignment.
- c. All structural components, controlling elevations and dimensions of shoring system.
- d. All drainage ditches and controlling dimensions.
- e. All slopes, existing structures and other facilities which may surcharge the shoring system.
- f. Location of all existing and proposed utilities.
- g. Total depth of shoring system.

DESIGN BY:	NAME & LOGO OF ENGINEERING FIRM OR PROJECT OWNER		
DRAWN BY:			
SCALE:	TYPICAL SECTION & ELEVATION VIEW		
DRAWING NO:			
SHEET: 3 of 3	RR M.P.	SUBDIVISION	
DOT#:	CITY	COUNTY	STATE
DATE:	PROJECT NAME & LOCATION		

DOCUMENT 20300

HORIZONTAL DIRECTIONAL DRILLING

DOCUMENT INCLUDES

- A. General
- B. Equipment Requirements
- C. Operations

A. GENERAL:

1. **Work Included:** The work specified in this section consists of furnishing and installing underground utilities using the directional boring (horizontal directional drilling, HDD) method of installation, also commonly referred to as guided horizontal boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration.
2. **Quality Assurance:** The requirements set forth in this document specify a wide range of procedural precautions necessary to insure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the Engineer's approval of any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.
3. **Submittals:**
 - a. **Work Plan:** Prior to beginning work, the Contractor must submit to the Engineer a general work plan outlining the procedure and schedule to be used to execute the project. Plan should document the thoughtful planning required to successfully complete the project.
 - b. **Equipment:** Contractor will submit specifications on directional boring equipment to be used to ensure that the equipment will be adequate to complete the project. Spares inventory shall be included.
 - c. **Material:** Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.
 - d. **Personnel:** Documentation of training and relevant experience of personnel shall be submitted.

B. EQUIPMENT REQUIREMENTS:

1. **General:** The directional boring equipment shall consist of a directional boring rig of sufficient capacity to perform the bore and pullback the pipe, a boring fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.
2. **Boring System:**
 - a. **Boring Rig:** The directional boring machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power boring operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during boring and pull-back operations. Sufficient spares shall be kept on hand for any break-downs which can be reasonably anticipated.
 - b. **Bore Head:** The bore head shall be steerable by changing it's rotation and shall provide the necessary cutting surfaces and boring fluid jets.
 - c. **Mud Motors (if required):** Mud motors shall be of adequate power to turn the required boring tools.
 - d. **Drill Pipe:** Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.
3. **Guidance System:** The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.
4. **Boring Fluid (Mud) System:**
 - a. **Mixing System:** A self-contained, closed, boring fluid mixing system shall be of sufficient size to mix and deliver boring fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The boring fluid reservoir tank shall be a minimum as required. Mixing system shall continually agitate the boring fluid during boring operations.

- b. Boring FLUIDS: Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 - 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Boring fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall.
- c. Delivery System: The mud pumping system shall be capable of delivering the boring fluid at a constant minimum pressure. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used boring fluid and boring fluid spilled during boring operations shall be contained and properly disposed of. A berm, minimum of 12" high, shall be maintained around boring equipment, boring fluid mixing system, entry and exit pits and boring fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess boring fluid from containment areas to storage facilities.

5. Other Equipment:

- a. Pipe Rollers: Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.
- b. Pipe Rammers/Pullers: Hydraulic or pneumatic pipe rammers or pullers may only be used if necessary and with the authorization of Engineer.
- c. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

C. OPERATIONS

- 1. **General:** The Engineer and Riverdale City must be notified 48 hours in advance of starting work. The Directional Bore shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. It shall be the responsibility of Engineer to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.
- 2. **Personnel Requirements:** All personnel shall be fully trained in their respective duties as part of the directional boring crew and in safety. Training shall be provided

specific to the project if any potential hazards may be encountered which has not already been included in personnel's training.

3. Drilling Procedure:

- a. Site Preparation: Prior to any alterations to work-site, contractor shall photograph or video tape entire work area, including entry and exit points. One copy of which shall be given to Engineer and one copy to remain with contractor for a period of one year following the completion of the project.

Work site as indicated on drawings, within right-of-way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.

- b. Bore Path Survey: Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.
- c. Utility Locates: Contractor shall notify all companies with underground utilities in the work area via the state or local "one-call" to obtain utility locates. Once the utilities have been located Contractor shall physically identify the exact location of the utilities by vacuum or hand excavation, when possible, in order to determine the actual location and path of any underground utilities which might be within 20 feet of the bore path. Contractor shall not commence boring operations until the location of all underground utilities within the work area have been verified.
- d. Environmental Protection: Contractor shall place silt fence between all boring operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or boring fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200' of any water-body or wetland.
- e. Safety: Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.
- f. Pipe: Pipe shall be connected together in one length prior to pull-back operations, if space permits. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe. Refer to Document 20200 Section 4. Pipe Joining.
- g. Pilot Hole: Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100'. In the event that pilot does deviate from

bore path more than 5% of depth in 100', contractor will notify Engineer and Engineer may require contractor to pull-back and re-drill from the location along bore path before the deviation.

In the event that a boring fluid fracture, inadvertent returns or returns loss occurs during pilot hole boring operations, contractor shall cease boring, wait at least 30 minutes, inject a quantity of boring fluid with a viscosity exceeding 120 seconds as measured by a Marsh funnel and then wait another 30 minutes. If mud fracture or returns loss continues, contractor will cease operations and notify Engineer. Engineer and contractor will discuss additional options and work will then proceed accordingly.

- h. Reaming: Upon successful completion of pilot hole, contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the boring equipment and mud system are designed to safely handle.
- i. Pull-Back: After successfully reaming bore hole to the required diameter, contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations contractor will not apply more than the maximum safe pipe pull pressure at any time.

In the event that pipe becomes stuck, contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, contractor will notify Engineer. Engineer and contractor will discuss options and then work will proceed accordingly.

- 4. **Pipe Testing:** The polyethylene pipe shall be pressure tested after the line and all fittings and valves have been installed. Connections may be left exposed for visual leak inspection. Chlorination to disinfect the new pipeline shall be according to all local standards and requirements. The Engineer must be present during this procedure.
- 5. **Site Restoration:** Following boring operations, contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density. Landscaping will be restored to original.
- 6. **Record Keeping / As-Builts:** Contractor shall maintain a daily project log of boring operations and a guidance system log with a copy given to Engineer at completion of project. As-built drawings shall be certified as to accuracy by contractor.

END OF DOCUMENT

Drawings