



FRUITA

COLORADO

REQUEST FOR QUALIFICATIONS

CONSULTING ENGINEERING SERVICES

FOR

**FRT-17.5-K.25 (MAPLE STREET OVER LITTLE SALT WASH)
BRIDGE REPLACEMENT PROJECT**

CITY OF FRUITA, MESA COUNTY, COLORADO

City of Fruita Project #130-746-77-4335

October 23, 2023

ISSUED BY:

CITY OF FRUITA
ENGINEERING DEPARTMENT
325 E. ASPEN AVENUE
FRUITA, CO 81521

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PART 1 – GENERAL

I. Purpose

The City of Fruita (Fruita) is soliciting statements of qualifications from qualified consultants to provide design, bid solicitation and construction administration services for the FRT-17.5-K.25 (Maple Street over Little Salt Wash) Bridge Replacement Project according to Federal and Colorado Department of Transportation (CDOT) policies and procedures.

II. Scope of Services

The FRT-17.5-K.25 (Maple Street over Little Salt Wash) Bridge Replacement Project replaces a functionally obsolete 2-lane bridge with a single span bridge matching the current road width. The latest Structure Inspection and Inventory Report for the existing bridge structure is included as Exhibit C in this RFQ. The services will include bridge design, utilities coordination, bid documents preparation, project bid process and construction administration. All bridge design and construction documents must be prepared according to CDOT standards and specifications. Fruita is funding the project design and there will be no CDOT oversight during the design phase of this project, however, it is expected CDOT will review and the plans prior to going out for bid. This bridge has been listed in federal funding options for construction, although the federal funds are not currently guaranteed. The intent is to complete the design in 2024 and secure federal funding prior to completing the bid process and bridge construction in 2025.

A. General Project Description

Fruita partnered with Mesa County in 2016 to complete plans for the replacement of the existing bridge. The Issued for Bid plans and 90% Design report completed in 2016 are attached as Exhibit B. In 2022, Fruita contracted with A Project Resource, LLC for land acquisition assistance, River City Consultants for survey assistance and ERO Resources for environmental assistance to complete the land acquisition necessary for the bridge replacement. All referenced consultants remain under contract to assist with the design and land acquisition services for this project as necessary. The Engineer of Record for the 2016 plans was unable to help in bringing the original design to current standards, therefore Fruita has chosen to obtain a new design for the bridge replacement and the land acquisition process was suspended until the new design is solidified and ROW plans are complete.

B. Project Requirements

General Requirements

- The consultant will be expected to provide a full range of engineering services and accept project engineering responsibility at all levels. The requirements discussed

below are not to be considered the final scope of work. The final scope of work will be determined by the selected consultant and Fruita.

- All work shall be completed using the latest AASHTO and CDOT design and construction standards or guidelines, practices, and procedures and the City of Fruita Design Criteria and Construction Specifications Manual. The consultant shall be responsible for coordination and management of all meetings with sub-consultants, agencies and interested stakeholders including utility coordination for design review and preliminary construction scheduling.
- All consulting teams responding to this RFQ shall be pre-qualified with the Colorado Department of Transportation (CDOT) in the following work codes:

BR	Bridge Design
CE	Civil Engineering
GE	Geological Engineering
HD	Highways & Street Design
HY	Hydraulics
SE	Structural Engineering

Preliminary Design

- The consultant will be required to provide detailed design plans for all components of the project at the preliminary design level. A status set of plans will be kept available to the City for review and submittal to the appropriate agencies, utility companies, and affected property owners as needed.
- The Geotechnical Investigation services required to meet current CDOT standards for the design of this project must be provided by the consultant team. There is a geotechnical report available in the 2016 final design report, however it may not meet current CDOT requirements. A preliminary draft of this report is required at this stage of the project.
- Project specific surveying will be provided by the consultant. Fruita currently has a contract with River City Consultants for the Land Acquisition portion of the project and they may be utilized for the design portion based on the needs of the consultant. Project control points must be established along the route based on the Mesa County Local Coordinate System (MCLCS). Notify all utilities for locates and to identify and mark existing and proposed facilities prior to survey. All survey work must be performed under the supervision of a Professional Land Surveyor (PLS) licensed in the state of Colorado.
- The plans must locate all existing utilities and structures. They must be shown both horizontally and vertically and in relation to the proposed bridge. All utility conflicts must be identified, and relocation/removal plans must be coordinated through the appropriate utility companies. The consultant will be required to coordinate all Subsurface Utility Engineering (S.U.E.) services including all utility potholing services and survey of pothole locations.

- ERO Resources has completed the work necessary to obtain an environmental clearance from CDOT for this project, therefore; there is no environmental scope associated with this RFQ. The design consultant is expected to work with ERO to finalize exhibits for the bridge design.
- A preliminary drainage report will be required for review which shall consider historical flows of the basin(s) and suggest appropriate measures to address passing of such flows. The drainage report shall address all historical storm water crossings as well as analysis of the roadway drainage. The drainage report for the 2016 design is included in Exhibit B.
- Coordinate with River City Consultants for Right of Way needs. River City will be responsible for preparing the ROW Plans per CDOT Specifications.
- The consultant shall prepare traffic control plans, details, cross sections and earthwork quantities to evaluate the design during Field Inspection Review (FIR).
- The consultant will be required to prepare all applications for necessary permits required prior to construction.
- The consultant will be required to provide an opinion of probable construction costs based on the 75% complete plans (FIR submittal).
- The consultant shall conduct a formal FIR meeting attended by Fruita staff after the plans have been submitted to Fruita. CDOT will not be involved at this stage of the project.
- At the completion of the Preliminary Design Phase, the consultant shall provide Fruita with an electronic copy of the plans and related specifications (CDOT Special Provisions) in PDF format.

Final Design

- At the final design level, the consultant will be required to provide detailed design plans for all aspects of the project. This includes bridge design sheets, roadway plan/profile, drainage, property restoration, erosion control, signage/stripping and traffic control sheets. Typical CDOT style 11"x17" size drawings will be required at an appropriate scale. An electronic submittal with digital seals/signatures per CDOT requirements is required and one set of final design drawings shall be signed and stamped by a Colorado registered professional engineer in legal size format for City of Fruita records.
- The consultant will be required to prepare contract documents and specifications. The technical specifications shall be in the CDOT format. The bidding documents shall also conform to the CDOT standards with Fruita standard contract and bid forms.
- Near the completion of the Final Design Phase the consultant shall provide Fruita with electronic copies (PDF format) of the 11"x17" sets of review plans, related specifications, and an Engineer's Estimate. The plans should be approximately 95% complete. The consultant shall conduct a formal Final Office Review (FOR) meeting attended by the City staff. The consultant shall incorporate all comments

into the final set of bid documents, and submit one stamped and signed set by the Professional Engineer in charge for the City of Fruita and an electronic submittal with digital seals/signatures per CDOT requirements. CDOT will not be involved at this stage of the project.

Additional Project Coordination and Requirements

- The consultant will be required to provide a preliminary and final drainage report for review which shall consider historical storm water crossings as well as analysis of the roadway drainage.
- The consultant shall prepare all meeting agendas, a task list, minutes and all requirements similar to CDOT FIR and FOR meetings. Justifications letters for changes shall be prepared after the FIR and FOR meetings.
- The consultant shall attend monthly meetings and keep the City project manager informed of all issues and concerns related to the project. The consultant shall provide a bi-weekly status report via phone or email on the project progress.
- The consultant shall provide a design schedule and update it monthly for review.
- The consultant must provide detailed written monthly progress reports throughout the duration of the design. The progress reports will be part of the billing submitted monthly.
- The consultant will be responsible for coordinating the final design drawings and specifications with CDOT into an Approved for Bidding package. This scope of work will be negotiated once Fruita has obtained an Inter-Governmental Agreement with CDOT associated with Federal Funding.
- The consultant will be responsible for the construction administration of the bridge construction according to CDOT procedures. This scope of work will be negotiated once Fruita has obtained an Inter-Governmental Agreement with CDOT associated with Federal Funding.

C. Project Schedule (Anticipated)

- | | |
|------------------------------------|---|
| • RFQ Advertisement Issued | October 22, 2023 |
| • Statements of Qualifications Due | November 17, 2023 (5:00 PM) |
| • Consultant Selection by | November 22, 2023 |
| ▪ Contract Negotiations/Award by | December, 2023 |
| • Preliminary Design and ROW Plans | April 1, 2024 |
| • Final Design | October, 2024 |
| • Bid Process | Anticipated 2025 Dependent on Grant Funding |
| • Construction | Anticipated 2025 Dependent on Grant Funding |

No Pre-Submittal Meeting will be held for this Request for Qualifications. The City of Fruita Engineering Department will be available during normal business hours to answer questions related to the project. Access is available to the existing bridge from Maple Street north of Ottley Ave for inspection by consultants.

III. Instructions to Consultants

A. Submittal Requirements

Qualified consultants interested in performing the work described in this request for proposals should submit the following information to the City in any order they choose.

1. Qualifications of your firm and staff proposed to perform the work on this project.
2. A list of similar projects completed in the last five years.
3. A list of critical issues that the consultant considers to be of importance for the project.
4. Provide a scope of work for the proposed design and management of the project. Upon award of selection, the scope of work will be revised with City staff to formulate the final scope of work for the project.
5. Provide a cost estimate to complete the work as defined in this RFQ. The consultant team must also provide the anticipated rate schedule for completion of the work.
6. References from at least three other projects with similar requirements that have been completed within the past five years and that have involved the staff proposed to work on this project. As part of the reference check process, the City may choose to visit one or more of the listed projects and/or request a copy of the plans and documentation completed.
7. A sample plan and profile sheet(s) of a similar project should be included in the submittal. Examples should be no smaller than 11"x17".
8. Detail any experience your firm has with bridge design and drainage analysis.
9. Consultant's willingness to execute the City of Fruita Standard Contract Agreement included as part of the RFP.
10. Limit the total length of your statement of qualifications to a maximum of 20 pages (excluding covers). The City will reject submissions received that are longer than 20 pages in length.
11. The RFQ is available electronically at <https://www.fruita.org/rfps>, <https://wcca-gj.com/> or [City of Fruita - Bid Opportunities and RFPs | BidNet Direct](#).
12. Proposals must be delivered no later than 5:00 PM (MDT), November 15, 2023. Submit one electronic copy, or if too large for email, provide a link to download your Statement of Qualifications to jvasey@fruita.org.
13. The City of Fruita reserves the right to reject any and/or all submissions, to further negotiate with the successful consultant and to waive informalities and minor irregularities in submissions received, and to accept any portion of the submission if deemed to be in the best interest of the City. The total cost of preparation and submission shall be borne by the consultant. All information submitted in response to this request is public after the Notice of

Award has been issued. The consultant should not include as part of the submission any information which they believe to be a trade secret or other privileged or confidential data. If the consultant wishes to include such material, then the material should be supplied under separate cover and identified as confidential. Entire submissions marked confidential will not be honored. The City will endeavor to keep that information confidential, separate and apart from the submission subject to the provisions of the Colorado Open Records Act or order of court.

B. Contacts

Questions related to the submittal requirements and procedures should be directed to:

John Vasey, PE
Civil Engineer
City of Fruita Engineering Department
(970) 858-8377
jvasey@fruita.org

PART 2 – SELECTION PROCESS

IV. Selection Criteria and Method

A selection committee shall include City of Fruita Engineering and Public Works representatives.

Selection Criteria

Review and Assessment

Professional firms will be evaluated on the following criteria. These criteria will be the basis for review of the written statements of qualifications.

The rating scale shall be from 1 to 10, with 1 being a poor rating, 5 being an average rating and 10 being an outstanding rating.

WEIGHTING FACTOR	QUALIFICATION	STANDARD
3.0	Approach of Proposal	Does the proposal show an understanding of the project objective, methodology to be used and results that are desired from the project?
2.0	Assigned Personnel	Do the persons who will be working on the project have the necessary skills? Are sufficient people of the requisite skills assigned to the project?
2.0	Firm Capability	Does the firm have the support capabilities the assigned personnel require? Has the firm completed previous projects of this type and scope?
2.0	Cost	Is the cost proposal appropriate for the scope of work?
1.0	Availability	Can the work be completed in the necessary time? Can the target start and completion dates be met? Are other qualified personnel available to assist in meeting the project schedule if required? Is the project team available to attend meetings as required by the Scope of Work?
1.0	Motivation	Is the firm interested and are they capable of doing the work in the required time frame?

Reference Evaluation (Top Ranked Firm)

The Project Manager will check references using the following criteria. The evaluation rankings will be labeled Satisfactory/Unsatisfactory.

Qualification	Standard
Overall Performance	Would you hire this Professional again? Did they show the skills required by this project?
Timetable	Was the original Scope of Work Completed within the specified Time? Were interim deadlines met in a timely manner?
Completeness	Was the Professional responsive to client needs: did the Professional anticipate problems? Were problems resolved quickly and effectively?
Budget	Was the original Scope of Work completed within the project budget?
Job Knowledge	Did the consultant have the expertise to complete the Scope of Work? Were problems corrected quickly and effectively?

PART 3 – PROFESSIONAL SERVICES AGREEMENT

V. Terms and Conditions

The successful consultant, upon award of a formal contract, shall be paid on a specific rate and pay basis, not to exceed a stipulated amount without a prior authorization. The consultant may submit invoices at monthly intervals for work satisfactorily completed. The amount of such partial payment shall be based upon certified progress reports and billings covering work performed.

VI. Agreement for Professional Services (Sample of Standard Contract)

See Exhibit A – Professional Services Contract

EXHIBIT A: Professional Services Contract

**EXHIBIT A
PROFESSIONAL SERVICES
CONTRACT**



AN AGREEMENT BY AND BETWEEN THE CITY OF FRUITA,
AND _____
FOR: FRT – 17.5 – K.25 (Maple Street Bridge over Little Salt Wash)
Bridge Replacement Project

1. PARTIES

The parties to this Agreement are the City of Fruita, a Colorado municipal corporation, herein after referred to as the “City”, and _____ herein after referred to as the “Contractor”.

2. RECITALS AND PURPOSE:

- 2.1. The City desires to obtain services of a Contractor for the purpose of designing the FRT – 17.5 – K.25 (Maple Street Bridge over Little Salt Wash) Bridge Replacement Project as outlined in the scope of services listed below.
- 2.2. This Contract sets forth the Scope of Work, Budget, and List of Deliverables, herein after referred to as the “Project”.
- 2.3. The Contractor is a licensed Professional Engineer, capable of providing the professional services required.
- 2.4. The Contractor is willing and able to provide the Owner with the professional services as recited in the Scope of Services below.

3. SCOPE OF SERVICES

The Contractor agrees to provide the City with the specific professional services as set forth in their Statement of Qualifications dated _____ and the Request for Qualifications, included as Exhibits A and B respectively attached hereto and incorporated herein by reference.

4. COMPENSATION

- 4.1. The City shall pay the Contractor for services under this agreement a total not to exceed _____ (Written Dollars Written Cents.) Such amount shall be inclusive of all costs of whatsoever nature associated with the Contractor’s efforts, including but not limited to salaries, benefits, expenses, overhead, administration, profits, and outside consultant fees. No hourly charges shall exceed the hourly rates identified in the Statement of Qualifications dated _____. The scope of services and payment therefor shall only be changed by a properly authorized amendment to this Agreement. No City employee has the authority to bind the City with regard to any payment for any services which exceeds the amount payable under the terms of this Agreement.

- 4.2. The Contractor shall submit monthly a detailed invoice to the City describing the professional services rendered. The invoice shall document the hours spent on the project identifying by work category and subcategory the work performed for the month, the hours worked by employee, and the hourly rate charged for that work. The City shall have access to backup payroll documentation identifying individual employee, date, and hours worked. The City shall pay the invoice within thirty (30) days of receipt unless the work or the documentation therefore are unsatisfactory. Payments made after thirty (30) days may be assessed with an interest charge of one percent (1%) per month unless the delay in payment resulted from unsatisfactory work or documentation therefore.

5. PROJECT REPRESENTATION

- 5.1. The City designates John Vasey, PE Civil Engineer, as the responsible City staff member to provide direction to the Contractor during the conduct of the project. The Contractor shall comply with the directions given by Mr. Vasey.
- 5.2. The Contractor designates Kent Shaffer, PE as its project manager. The City may rely upon the guidance, opinions, and recommendations provided by the Contractor and its representatives. Should any of the representatives be replaced, particularly the project manager, and such replacement require the City or the Contractor to undertake additional reevaluation, coordination, orientations, etc., the Contractor shall be fully responsible for all such additional costs and services.

6. TERM

The Contractor's services under this Agreement shall commence on October 2, 2023 and shall be completed by no later than October 1, 2024.

7. INSURANCE

- 7.1. The Contractor agrees to procure and maintain, at its own cost, the following policy or policies of insurance. The Contractor shall not be relieved of any liability, claims, demand, or other obligations assumed pursuant to the Contract Document by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amount, duration, or types.
- 7.1.1. Contractor shall procure and maintain and shall cause each Subcontractor of the Contractor to procure and maintain or insure the activity of Contractor's Subcontractors in Contractor's own policy, the minimum insurance coverages listed below. Such coverages shall be procured and maintained with forms and insurers acceptable to the City.

All coverages shall be continuously maintained from the date of commencement of services hereunder. In the case of any claims-make policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

- 7.1.1.1. Workers' Compensation insurance to cover obligations imposed by the Workers' Compensation Act of Colorado and any other applicable laws for any employee engaged in the performance of Work under this contract, and Employers' Liability insurance with minimum limits of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) each accident, FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - policy limit, and FIVE HUNDRED THOUSAND DOLLARS (\$500,00) disease – each employee.
- 7.1.1.2. Comprehensive General Liability insurance with minimum combined single limits of ONE MILLION DOLLARS (\$1,000,000) each occurrence, and ONE MILLION DOLLARS (\$1,000,000) aggregate. The policy shall be applicable to all premises and operations. The policy shall include coverage for bodily injury, broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, independent contractors, products, and completed operations. The policy shall contain a severability of interests provision.
- 7.1.1.3. Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than ONE MILLION DOLLARS (\$1,000,000) each occurrence and ONE MILLION DOLLARS (\$1,000,000) aggregate with respect to each of Contractor's owned, hired and/or non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests provision.
- 7.1.1.4. Professional Liability insurance with minimum limits of ONE MILLION DOLLARS (\$1,000,000) each occurrence and ONE MILLION DOLLARS (\$1,000,000) aggregate.
- 7.1.2. The policies required above, except for the Workers' Compensation insurance, Employers' Liability insurance and Professional Liability insurance, shall be endorsed to include the City, and its officers and employees, as additional insureds. Every policy required above shall be primary insurance, and any insurance carried by the City, its officers, or its employees, shall be excess and not contributory insurance to that provided by Contractor. The additional insured endorsement for the Comprehensive General Liability insurance required above shall not contain any exclusion for bodily injury or property damage arising from completed operations. The Contractor shall be solely responsible for any

deductible losses under each of the policies required above.

- 7.1.3. Certificates of insurance shall be completed by the Contractor's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be subject to review and approval by the City. Each certificate shall identify the Project and shall provide that the coverages afforded under the policies shall not be canceled, terminated or materially changed until at least 30 days prior written notice has been given to the City. If the words "endeavor to" appear in the portion of the certificate addressing cancellation, those words shall be stricken from the certificate by the agent(s) completing the certificate. The City reserves the right to request and receive a certified copy of any policy and any endorsement thereto.
- 7.1.4. Failure on the part of the Contractor to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which the City may immediately terminate the contract, or at its discretion may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by the City shall be repaid by Contractor to the City upon demand, or the City may offset the cost of the premiums against any monies due to Contractor from the Owner.
- 7.1.5. The parties hereto understand and agree that the City is relying on and does not waive or intend to waive by any provision of this contract, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, ' 24-10-101 et seq., 10 C.R.S., as from time to time amended, or otherwise available to the City, its officers, or its employees.

8. INDEMNIFICATION

As to claims that allege to arise from Contractor's professional services and to the fullest extent permitted by law, the Contractor agrees to indemnify and hold harmless the City, and its officers and its employees, from and against all liability, claims and demands, on account of injury, loss, or damage, which arise out of or are connected with the services hereunder, to the extent such injury loss or damage, or any portion thereof, is caused by, the negligent act, error, or omission, of the Contractor or any subcontractor of the Contractor, or any officer, employee, or agent of the Contractor or any subcontractor, or any other person for which Contractor is responsible in accordance with C.R.S. 13-21-111.5. The Contractor shall investigate, handle, respond to, and provide defense for and defend against any such liability, claims, and demands, and to bear all other costs and expenses related thereto, including court costs and reasonable attorneys' fees on a comparative fault basis. The Contractor's indemnification obligation shall not be construed to extend to any injury, loss, or damage which is caused by the negligent act, error, or omission of the City.

9. QUALITY OF WORK

Contractor's professional services shall be in accordance with the prevailing standard of practice normally exercised in the performance of professional services of a similar nature in the State of Colorado.

10. INDEPENDENT CONTRACTOR.

- 10.1. Contractor and any persons employed by Contractor for the performance of work hereunder shall be independent Contractors and not employees or agents of the City. Any provisions in this Agreement that may appear to give the City the right to direct Contractor as to details of doing work or to exercise a measure of control over the work mean that Contractor shall follow the direction of the City as to end results of the work only.
- 10.2. Contractor shall have the right to employ such assistance as may be required for the performance of work under this Agreement. Said Contractor shall be responsible for the compensation, insurance, and all clerical detail pertaining to such assistants, and shall be solely responsible for providing any training, tools, benefits, materials, and equipment.
- 10.3. THE PARTIES HERETO UNDERSTAND THAT THE CONTRACTOR AND THE CONTRACTOR'S EMPLOYEES AND SUBCONTRACTORS ARE NOT ENTITLED TO WORKERS' COMPENSATION BENEFITS UNDER ANY WORKERS' COMPENSATION INSURANCE POLICY OF THE CITY, AND THAT CONTRACTOR IS OBLIGATED TO PAY FEDERAL AND STATE INCOME TAX AND OTHER APPLICABLE TAXES AND OTHER AMOUNTS DUE ON ANY MONEYS PURSUANT TO THIS AGREEMENT.

11. ASSIGNMENT.

Contractor shall not assign or delegate this Agreement or any portion thereof, or any monies due to or become due hereunder without the City's prior written consent.

12. DEFAULT

Each and every term and condition hereof shall be deemed to be a material element of this Agreement. In the event either party should fail or refuse to perform according to the terms of this Agreement, such party may be declared in default.

13. TERMINATION

- 13.1. This Agreement may be terminated by either party for material breach or default of this Agreement by the other party not caused by any action or omission of the other party by giving the other party written notice at least thirty (30) days in advance of the termination date. Termination pursuant to this subsection

shall not prevent either party from exercising any other legal remedies which may be available to it.

- 13.2. In addition to the foregoing, this Agreement may be terminated by the City for its convenience and without cause of any nature by giving written notice at least seven (7) days in advance of the termination date. In the event of such termination, the Contractor will be paid for the reasonable value of the services rendered to the date of termination, not to exceed the total amount set forth in Exhibit B, and upon such payment, all obligations of the City to the Contractor under this agreement will cease. Termination pursuant to this Subsection shall not prevent either party from exercising any other legal remedies which may be available to it.

14. INSPECTION

The City and its duly authorized representatives shall have access to any books, documents, papers, and records of the Contractor that are related to this Agreement for the purpose of making audits, examinations, excerpts, and transcriptions.

15. ENFORCEMENT

- 15.1. In the event that suit is brought upon this Agreement to enforce its terms, the prevailing party shall be entitled to its reasonable attorneys' fees and related court costs.
- 15.2. Colorado law shall apply to the construction and enforcement of this Agreement. The parties agree to the jurisdiction and venue of the courts of Mesa County in connection with any dispute arising out of or in any matter connected with this Agreement.

16. COMPLIANCE WITH LAWS

Contractor shall exercise the professional standard of care to comply with all published applicable federal, state, and local laws, including the ordinances, resolutions, rules, and Regulations of the City, in effect as of the date of this agreement; for payment of all applicable taxes; and obtaining and keeping in force all applicable permits and approvals.

17. INTEGRATION AND AMENDMENT

This Agreement represents the entire Agreement between the parties and there are no oral or collateral agreements or understandings. This Agreement may be amended only by an instrument in writing signed by the parties.

18. EQUAL OPPORTUNITY EMPLOYER.

- 18.1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, age, sex, disability or national

origin. The Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, age, sex, disability, or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notice to be provided by an agency of the federal government, setting forth the provisions of the Equal Opportunity Laws.

- 18.2. Contractor shall be in compliance with the applicable provisions of the American with Disabilities Act of 1990 as enacted and from time to time amended and any other applicable federal, state, or local laws and regulations. A signed, written certificate stating compliance with the Americans with Disabilities Act may be requested at any time during the life of this Agreement or any renewal thereof.

19. TABOR CLAUSE

The parties agree that the City's payment of any monies under this agreement is subject to annual budget appropriations as required by provisions of the Taxpayer' Bill of Rights ("TABOR") contained in Article X, Section 20 of the Colorado Constitution, as amended. The parties further agree that any failure to fund the obligations set forth herein as a result of TABOR-related monetary constraints shall not give rise to any legal or equitable cause of action whatsoever.



By their signatures, the parties agree to the terms of this Agreement this

_____ day of _____, 2023.

CITY OF FRUITA, OWNER

By: _____
Michael Bennett, City Manager

Attest: _____
Margaret Sell, Finance Director

CONTRACTOR

Contractor _____

By: _____ Title: _____

ACKNOWLEDGEMENT)
STATE OF COLORADO)ss
COUNTY OF MESA)

The above and foregoing signature of _____ and sworn
before me was subscribed

this _____ day of _____, 2023.

Witness my hand and official seal. My commission expires of: _____

(SEAL)

Notary Public

Address

ADDENDUM A: MUNICIPAL PROVISIONS.

- A.1. Addendum A Controls:** In the event the terms and conditions of this Addendum A conflict in whole or in part with the terms and conditions of the Agreement, the terms and conditions of this Addendum A shall control.
- A.2. No Waiver of Governmental Immunity:** Nothing in this Agreement shall be construed to waive, limit, or otherwise modify any governmental immunity that may be available by law to Fruita, its officials, employees, contractors, or agents, or any other person acting on behalf of Fruita and, in particular, governmental immunity afforded or available pursuant to the Colorado Governmental Immunity Act, Title 24, Article 10, Part 1 of the Colorado Revised Statutes.
- A.3. Affirmative Action:** Producer will not discriminate against any employee or subcontractor for employment because of race, color, religion, sex or national origin. Producer will take affirmative action to ensure applicants are employed, and employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.
- A.4. Article X, Section 20/TABOR:** The Parties understand and acknowledge that Fruita is subject to Article X, § 20 of the Colorado Constitution (“**TABOR**”). The Parties do not intend to violate the terms and requirements of TABOR by the execution of this Agreement. It is understood and agreed that this Agreement does not create a multi-fiscal year direct or indirect debt or obligation within the meaning of TABOR and, therefore, notwithstanding anything in this Agreement to the contrary, all payment obligations of Fruita are expressly dependent and conditioned upon the continuing availability of funds beyond the term of the Fruita’s current fiscal period ending upon the next succeeding December 31. Financial obligations of Fruita payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available in accordance with the rules, regulations, and resolutions of City of Fruita, and other applicable law. Upon the failure to appropriate such funds, this Agreement shall be terminated.
- A.5. Employment of or Contracts with Illegal Aliens:** Producer shall not knowingly employ or contract with an illegal alien to perform work under this Agreement. Producer shall not contract with a subcontractor that fails to certify that the subcontractor does not knowingly employ or contract with any illegal aliens. By entering into this Agreement, Producer certifies as of the date of this Agreement it does not knowingly employ or contract with an illegal alien who will perform work under the public contract for services and that the contractor will participate in the e-verify program or department program in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under the public contract for services. The Producer is prohibited from using either the e-verify program or the department program procedures

to undertake pre-employment screening of job applicants while this Agreement is being performed. If the Producer obtains actual knowledge that a subcontractor performing work under this Agreement knowingly employs or contracts with an illegal alien, Producer shall be required to notify the subcontractor and Fruita within three (3) days that Producer has actual knowledge that a subcontractor is employing or contracting with an illegal alien. Producer shall terminate the subcontract if the subcontractor does not stop employing or contracting with the illegal alien within three (3) days of receiving the notice regarding Producer's actual knowledge. Producer shall not terminate the subcontract if, during such three days, the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien. Producer is required to comply with any reasonable request made by the Department of Labor and Employment made in the course of an investigation undertaken to determine compliance with this provision and applicable state law. If Producer violates this provision, Fruita may terminate this Agreement, and Producer may be liable for actual and/or consequential damages incurred by Fruita, notwithstanding any limitation on such damages provided by such Agreement.

- A.6. No Waiver of Rights:** A waiver by any Party to this Agreement of the breach of any term or provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach by either Party. Fruita's approval or acceptance of, or payment for, services shall not be construed to operate as a waiver of any rights or benefits to be provided under this Agreement. No covenant or term of this Agreement shall be deemed to be waived by Fruita except in writing.
- A.7. Binding Effect:** The Parties agree that this Agreement, by its terms, shall be binding upon the successors, heirs, legal representatives, and assigns.
- A.8. Limitation of Damages:** The Parties agree that Producer's remedies for any claims asserted against Fruita shall be limited to proven direct damages in an amount to exceed amounts due under the Agreement and that City shall not be liable for indirect, incidental, special, consequential or punitive damages, including but not limited to lost profits.
- A.9. No Third-Party Beneficiaries:** Nothing contained in this Agreement is intended to or shall create a contractual relationship with, cause of action in favor of, or claim for relief for, any third party, including any agent, sub-consultant or sub-contractor of Producer. Absolutely no third-party beneficiaries are intended by this Agreement. Any third-party receiving a benefit from this Agreement is an incidental and unintended beneficiary only.
- A.10. Governing Law, Venue, and Enforcement:** This Agreement shall be governed by and interpreted according to the law of the State of Colorado. Venue for any action arising under this Agreement shall be in the appropriate court for Mesa County, Colorado. To reduce the cost of dispute resolution and to expedite the resolution of disputes under this Agreement, the Parties hereby waive any and all right either may have to request a jury trial in any civil action relating primarily to the enforcement of this Agreement. The Parties agree that the rule that ambiguities in a contract are to be construed against the drafting party shall not apply to the interpretation of this Agreement. If there is any conflict between the language of this Agreement and any exhibit or attachment, the language of this Agreement shall govern.

- A.11. Survival of Terms and Conditions:** The Parties understand and agree that all terms and conditions of the Agreement that require continued performance, compliance, or effect beyond the termination date of the Agreement shall survive such termination date and shall be enforceable in the event of a failure to perform or comply.
- A.12. Assignment and Release:** All or part of the rights, duties, obligations, responsibilities, or benefits set forth in this Agreement shall not be assigned by Producer without the express written consent of Fruita. Any written assignment shall expressly refer to this Agreement, specify the particular rights, duties, obligations, responsibilities, or benefits so assigned, and shall not be effective unless approved by Fruita. No assignment shall release the Producer from performance of any duty, obligation, or responsibility unless such release is clearly expressed in such written document of assignment.
- A.13. Severability:** Invalidation of any of the provisions of this Agreement or any paragraph sentence, clause, phrase, or word herein or the application thereof in any given circumstance shall not affect the validity of any other provision of this Agreement.

EXHIBIT B: 2016 FOR BID PLANS AND 90% DESIGN REPORT

**EXHIBIT B
2016 FOR BID PLANS
AND 90% DESIGN REPORT**

EXHIBIT B1: 2016 FOR BID PLANS

**EXHIBIT B1
2016 FOR BID PLANS**

FRT-17.5-K.25 BRIDGE REPLACEMENT

17.5 ROAD OVER LITTLE SALT WASH

CITY OF FRUITA

MESA COUNTY, COLORADO

DOWL PROJECT # 7121.74610.01
DECEMBER 27, 2017



CITY OF FRUITA
PUBLIC WORKS DEPARTMENT

MESA COUNTY PROJECT
NO. 16-03054-FRT



MESA COUNTY DEPARTMENT OF PUBLIC WORKS



VICINITY MAP
NOT TO SCALE

INDEX TO DRAWINGS

GENERAL :

- G-1 TITLE SHEET AND VICINITY MAP (THIS SHEET)
- G-2 CDOT STANDARD PLANS LIST (APPLICABLE STANDARDS INCLUDED BY REFERENCE)
- G-3 GENERAL NOTES
- G-4 SUMMARY OF QUANTITIES AND LEGEND
- V-1 PROPOSED R.O.W. AND EASEMENT MAP
- V-2 SURVEY CONTROL MAP
- D-1 TYPICAL ROADWAY SECTION AND PAVEMENT DETAILS

PLANS, PROFILES, AND CROSS SECTIONS :

- C-1 ROAD IMPROVEMENTS PLAN
- C-2 BRIDGE PLAN
- C-3 ROAD PROFILES
- C-4 GUTTER PROFILES
- C-5 TRAIL PLAN AND PROFILE
- C-6 DOWNHILL WALL AND STORM SEWER PROFILES
- C-7 FOUNDATION PLANS AND PROFILES
- X-1 ROAD CROSS SECTIONS (1 OF 2)
- X-2 ROAD CROSS SECTIONS (2 OF 2)
- X-3 TRAIL CROSS SECTIONS

DETAILS :

- B-1 GENERAL BRIDGE LAYOUT
- B-2 SCHEMATIC BRIDGE ELEVATION
- B-3 ENGINEERING GEOLOGY (TBD)
- B-4 ABUTMENT/ WINGWALL LAYOUT PLAN
- B-5 PRECAST CONCRETE BOX GIRDER LAYOUT PLAN
- B-6 TYPICAL ABUTMENT SECTION AND DETAILS
- B-7 WINGWALL REINFORCING PLAN AND TYPICAL SECTION
- B-8 TYPICAL BRIDGE SECTION AND DETAILS
- B-9 BRIDGE RAIL DETAILS (1 OF 2)
- B-10 BRIDGE RAIL DETAILS (2 OF 2)
- B-11 M.S.E. BACKFILL DETAILS
- B-12 APPROACH SLAB PLAN AND DETAILS
- B-13 BRIDGE DECK SLAB DETAILS
- B-14 TRAIL RETAINING WALL SECTIONS

TABULATION OF LENGTH

STATION	FEET	
	ROADWAY	MAJOR STRUCTURE
17.5 ROAD STA. 0+00 TO STA. 0+90.87	90.87	
MESA 17.5 ROAD BRIDGE STA. 0+90.87 TO STA. 1+67.34		76.47
17.5 ROAD STA. 1+67.34 TO STA. 2+60.00	92.66	
TOTAL	183.53	76.47
SUMMARY OF PROJECT LENGTH	FEET	MILES
17.5 ROAD (NET LENGTH)	183.53	0.0348
MAJOR STRUCTURE	76.47	0.0145
PROJECT GROSS LENGTH	260.00	0.0492

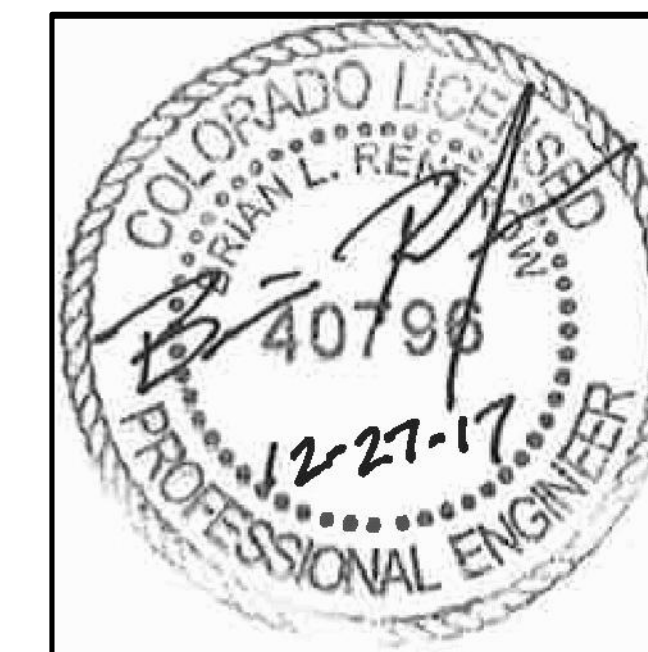
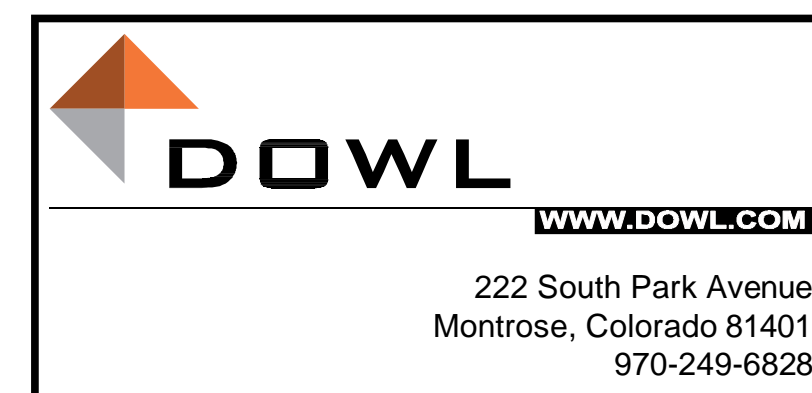
DESIGN DATA

17.5 ROAD / NORTH MAPLE ST. :
ROAD CLASSIFICATION : COLLECTOR
DESIGN SPEED : 35 MPH (REDUCE POSTED SPEED)
MAXIMUM GRADE : 0.81%
MINIMUM GRADE : 0.00%

MESA-17.5 ROAD BRIDGE :
AS A MINIMUM CONFORMS TO THE "GEOMETRIC DESIGN GUIDE FOR LOCAL ROADS AND STREETS" ISSUED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) AND MESA COUNTY STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

LIVE LOAD : AASHTO HL-93 LRFD
DEAD LOAD : ASSUME A MINIMUM OF 25 POUNDS PER SQUARE FOOT FOR BITUMINOUS PAVING

THE HYDRAULIC CAPACITY OF THE BRIDGE IS DESIGNED TO PASS A 100-YEAR STORM EVENT OF 4300 CFS.



**ISSUED
FOR BID**

PROJECT LIST OF CONTACTS

MESA COUNTY PROJECT MANAGER – ERIK BORSCHTEL, P.E. (970) 255-7190	CENTURY LINK – CHRIS JOHNSON (970) 244-4311
CITY OF FRUITA ENGINEER – SAM ATKINS, P.E. (970) 858-8377	GRAND VALLEY POWER – THOMAS WALCH (970) 242-0040
DOWL (ENGINEER OF RECORD) – BRIAN RENFROW, P.E. (970) 497-8841 (970) 249-6828	
XCEL ENERGY – DANNY MOORE (970) 244-2690	

CENTURY LINK	
ACCEPTED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE :	_____ DATE _____
ACCEPTED AS CONSTRUCTED :	_____ DATE _____

XCEL ENERGY	
ACCEPTED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE :	_____ DATE _____
ACCEPTED AS CONSTRUCTED :	_____ DATE _____

GRAND VALLEY POWER	
ACCEPTED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE :	_____ DATE _____
ACCEPTED AS CONSTRUCTED :	_____ DATE _____

PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER
M-100-1		STANDARD SYMBOLS (3 SHEETS)	1-3
M-100-2		ACRONYMS AND ABBREVIATIONS (4 SHEETS)	4-7
M-203-1	<input type="checkbox"/>	APPROACH ROADS (REVISED ON JULY 08, 2013)	8
M-203-2		DITCH TYPES	9
M-203-11		SUPERELEVATION CROWNED AND DIVIDED HIGHWAYS (3 SHEETS)	10-12
M-203-12		SUPERELEVATION STREETS (2 SHEETS)	13-14
M-206-1		EXCAVATION AND BACKFILL FOR STRUCTURES (2 SHEETS)	15-16
M-206-2		EXCAVATION AND BACKFILL FOR BRIDGES (2 SHEETS)	17-18
M-208-1	<input type="checkbox"/>	TEMPORARY EROSION CONTROL (11 SHEETS) (REVISED ON MARCH 29, 2016)	19-30
M-210-1		MAILBOX SUPPORTS (2 SHEETS)	31-32
M-214-1		PLANTING DETAILS	33
M-216-1	<input type="checkbox"/>	SOIL RETENTION COVERING (2 SHEETS) (NEW ON JULY 16, 2015)	34-38
M-412-1	<input type="checkbox"/>	CONCRETE PAVEMENT JOINTS (5 SHEETS) (REVISED ON JULY 24, 2012)	34-38
M-510-1		STRUCTURAL PLATE PIPE H-20 LOADING	39
M-601-1	<input type="checkbox"/>	SINGLE CONCRETE BOX CULVERT (2 SHEETS) (REVISED ON NOVEMBER 25, 2015)	40-41
M-601-2	<input type="checkbox"/>	DOUBLE CONCRETE BOX CULVERT (2 SHEETS) (REVISED ON NOVEMBER 25, 2015)	42-43
M-601-3	<input type="checkbox"/>	TRIPLE CONCRETE BOX CULVERT (2 SHEETS) (REVISED ON NOVEMBER 25, 2015)	44-45
M-601-10		HEADWALL FOR PIPES	46
M-601-11		TYPE "S" SADDLE HEADWALLS FOR PIPE	47
M-601-12		HEADWALLS AND PIPE OUTLET PAVING	48
M-601-20		WINGWALLS FOR PIPE OR BOX CULVERTS	49
M-603-1	<input type="checkbox"/>	METAL PIPE (4 SHEETS) (REVISED ON OCTOBER 02, 2014)	50-53
M-603-2	<input type="checkbox"/>	REINFORCED CONCRETE PIPE (REVISED ON OCTOBER 02, 2014)	54
M-603-3		PRECAST CONCRETE BOX CULVERT	55
M-603-4	<input type="checkbox"/>	CORRUGATED POLYETHYLENE PIPE (AASHTO M294) (REVISED ON OCT. 02, 2014)	56
M-603-5	<input type="checkbox"/>	POLYVINYL CHLORIDE (PVC) PIPE (AASHTO M304) (REVISED ON OCT. 02, 2014)	57
M-603-6	<input type="checkbox"/>	STEEL REINFORCED POLYETHYLENE RIBBED PIPE (AASHTO MP 20) (NEW ON APRIL 30, 2015)	
M-603-10		CONCRETE AND METAL END SECTIONS (2 SHEETS)	58-59
M-604-10		INLET, TYPE C	60
M-604-11		INLET, TYPE D	61
M-604-12		CURB INLET TYPE R (2 SHEETS)	62-63
M-604-13		CONCRETE INLET TYPE 13	64
M-604-20		MANHOLES (3 SHEETS)	65-67
M-604-25		VANE GRATE INLET (5 SHEETS)	68-72
M-605-1		SUBSURFACE DRAINS	73
M-606-1	<input type="checkbox"/>	GUARDRAIL TYPE 3 W-BEAM (20 SHEETS) (REVISED ON OCTOBER 27, 2014)	74-92
M-606-1	<input type="checkbox"/>	MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES (20 SHEETS) (REVISED ON DECEMBER 29, 2015)	
M-606-13	<input type="checkbox"/>	GUARDRAIL TYPE 7 F-SHAPE BARRIER (4 SHEETS) (REVISED ON AUGUST 30, 2013)	93-96
M-606-14		PRECAST TYPE 7 CONCRETE BARRIER (3 SHEETS)	97-99

PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER
M-607-1		WIRE FENCES AND GATES (3 SHEETS)	100-102
M-607-2		CHAIN LINK FENCE (3 SHEETS)	103-105
M-607-3		BARRIER FENCE	106
M-607-4	<input type="checkbox"/>	DEER FENCE, GATES, AND GAME RAMPS (5 SHEETS) (REVISED ON APRIL 30, 2015)	107-109
M-607-10		PICKET SNOW FENCE	110
M-607-15		ROAD CLOSURE GATE (9 SHEETS)	111-119
M-608-1	<input type="checkbox"/>	CURB RAMPS (10 SHEETS) (REVISED ON FEBRUARY 23, 2017)	120-125
M-609-1	<input type="checkbox"/>	CURBS, GUTTERS, AND SIDEWALKS (4 SHEETS) (REVISED ON JULY 24, 2012)	126-129
M-611-1		CATTLE GUARD (2 SHEETS)	130-131
M-611-2	<input type="checkbox"/>	DEER GUARD (2 SHEETS) (NEW ON APRIL 30, 2015)	
M-613-1		ROADWAY LIGHTING (4 SHEETS)	132-135
M-614-1		RUMBLE STRIPS (3 SHEETS)	136-138
M-614-2		SAND BARREL ARRAYS (2 SHEETS)	139-140
M-615-1		EMBANKMENT PROTECTOR TYPE 3	141
M-615-2		EMBANKMENT PROTECTOR TYPE 5	142
M-616-1		INVERTED SIPHON	143
M-620-1		FIELD LABORATORY CLASS 1	144
M-620-2		FIELD LABORATORY CLASS 2 (2 SHEETS)	145-146
M-620-11		FIELD OFFICE CLASS 1	147
M-620-12		FIELD OFFICE CLASS 2	148
M-629-1		SURVEY MONUMENTS (2 SHEETS)	149-150

PLAN NUMBER	NEW OR REVISED	S STANDARD TITLE	PAGE NUMBER
S-612-1	<input type="checkbox"/>	DELINEATOR INSTALLATIONS (7 SHEETS) (REVISED ON DEC. 1, 2016)	151-157
S-614-1	<input type="checkbox"/>	GROUND SIGN PLACEMENT (2 SHEETS) (REVISED ON DECEMBER 12, 2014)	158-159
S-614-2	<input type="checkbox"/>	CLASS I SIGNS (REVISED ON JUNE 24, 2016)	160
S-614-3		CLASS II SIGNS	161
S-614-4	<input type="checkbox"/>	CLASS III SIGNS (3 SHEETS) (REVISED ON DECEMBER 17, 2014)	162-164
S-614-5	<input type="checkbox"/>	BREAK-AWAY SIGN SUPPORT DETAILS (REVISED ON FEBRUARY 8, 2017) FOR GROUND SIGNS (2 SHEETS)	165-166
S-614-6	<input type="checkbox"/>	CONCRETE FOOTINGS AND SIGN ISLANDS FOR CLASS III SIGNS (2 SHEETS) (REVISED ON SEPTEMBER 16, 2013)	167-168
S-614-8	<input type="checkbox"/>	TUBULAR STEEL SIGN SUPPORT DETAILS (6 SHEETS) (REVISED ON DECEMBER 1, 2016)	169-173
S-614-9	<input type="checkbox"/>	PEDESTRIAN PUSH BUTTON POST ASSEMBLY (REVISED ON MAY 24, 2016)	174
S-614-10		MARKER ASSEMBLY INSTALLATIONS	175
S-614-11		MILEPOST SIGN DETAIL FOR HIGH SNOW AREAS	176
S-614-12		STRUCTURE NUMBER INSTALLATION	177
S-614-14		FLASHING BEACON AND SIGN INSTALLATIONS (3 SHEETS)	178-180
S-614-20		TYPICAL POLE MOUNT SIGN INSTALLATIONS	181
S-614-21	<input type="checkbox"/>	CONCRETE BARRIER SIGN POST INSTALLATIONS (REVISED ON MAY 24, 2016)	182
S-614-22		TYPICAL MULTI-SIGN INSTALLATIONS	183
S-614-40	<input type="checkbox"/>	TYPICAL TRAFFIC SIGNAL INSTALLATION DETAILS (5 SHEETS) (REVISED ON JUNE 17, 2016)	184-188
S-614-40A	<input type="checkbox"/>	ALTERNATIVE TRAFFIC SIGNAL INSTALLATION DETAILS (4 SHEETS) (REVISED ON JUNE 17, 2016)	189-192
S-614-41	<input type="checkbox"/>	TEMPORARY SPAN WIRE SIGNALS (REVISED ON APRIL 2, 2015)	193
S-614-42		CABINET FOUNDATION DETAIL (4 SHEETS)	194-197
S-614-43		TRAFFIC LOOP AND MISCELLANEOUS SIGNAL DETAILS (10 SHEETS)	198-207
S-614-44	<input type="checkbox"/>	PEDESTAL POLE SIGNALS (2 SHEETS) (REVISED ON JUNE 17, 2016)	
S-614-50	<input type="checkbox"/>	STATIC SIGN MONOTUBE STRUCTURES (12 SHEETS) (REVISED ON JUNE 17, 2016)	208-219
S-614-60	<input type="checkbox"/>	DYNAMIC SIGN MONOTUBE STRUCTURES (14 SHEETS) (REVISED ON JUNE 17, 2016)	220-233
S-627-1	<input type="checkbox"/>	PAVEMENT MARKINGS (8 SHEETS) (REVISED ON FEBRUARY 8, 2017)	234-238
S-630-1	<input type="checkbox"/>	TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION (24 SHEETS) (REVISED ON JUNE 23, 2016)	239-258
S-630-2	<input type="checkbox"/>	BARRICADES, DRUMS, CONCRETE BARRIERS (TEMP) AND VERTICAL PANELS (REVISED ON JUNE 23, 2016)	259
S-630-3		FLASHING BEACON (PORTABLE) DETAILS	260
S-630-4		STEEL SIGN SUPPORT (TEMPORARY) INSTALLATION DETAILS (2 SHEETS)	261-262
S-630-5	<input type="checkbox"/>	PORTABLE RUMBLE STRIPS (TEMPORARY) (2 SHEETS) (REVISED ON AUGUST 13, 2015)	263-264
S-630-6		EMERGENCY PULL-OFF AREA (TEMPORARY)	265
S-630-7		ROLLING ROADBLOCKS FOR TRAFFIC CONTROL (3 SHEETS)	266-268

COLORADO
 DEPARTMENT OF TRANSPORTATION
M&S STANDARDS PLANS LIST
 July 04, 2012
 Revised on February 23, 2017

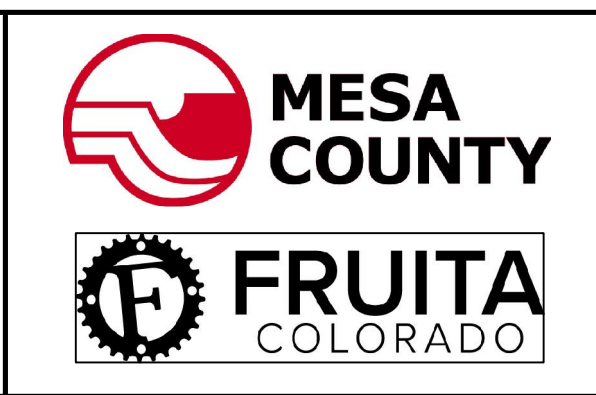
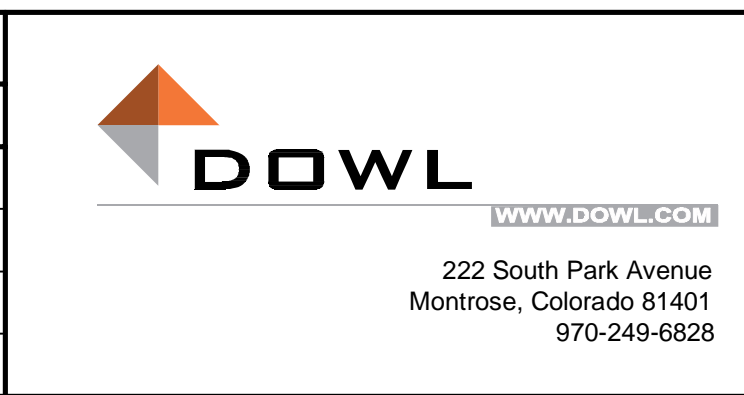
ALL OF THE M&S STANDARD PLANS, AS SUPPLEMENTED AND REVISED, APPLY TO THIS PROJECT WHEN USED BY DESIGNATED PAY ITEM OR SUBSIDIARY ITEM.

NEW OR REVISED STANDARD PLAN SHEETS APPLICABLE TO THIS PROJECT, INDICATED BY A MARKED BOX, WILL BE ATTACHED TO THE PLANS.

**ISSUED
FOR BID**

Computer File Information	
Creation Date: 07/04/12	Initials: JBK
Last Modification Date: 6/24/16	Initials: LTA
Full Path: www.coloradodot.info/business/designsupport	
Drawing File Name: Standards Plans List.dgn	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions	
Date:	Comments
(R-X)	
(R-X)	
(R-X)	
(R-X)	



STANDARDS PLANS LIST
 Issued By: Project Development Branch July 4, 2012

STANDARD PLAN NO.
G-2
Sheet No. 1 of 1

GENERAL NOTES

- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE COLORADO DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" 2011 EDITION, UNLESS SPECIFIC NOTES OR DETAILS ARE PROVIDED IN THE CONSTRUCTION DRAWINGS OR PROJECT SPECIFICATIONS.
- ALL ITEMS NOTED AS "INCIDENTAL" WILL NOT BE MEASURED AND PAID SEPARATELY. THE COST SHALL BE INCLUDED IN OTHER ITEMS OF WORK.
- UTILITY LINES AND LOCATIONS SHOWN ON THE PLANS ARE FROM THE BEST AVAILABLE INFORMATION. UTILITIES COMPANIES MAY BE PERFORMING RELOCATIONS PRIOR TO AND/OR CONCURRENT WITH THIS PROJECT. THE CONTRACTOR SHALL COORDINATE WITH ALL AFFECTED UTILITIES REGARDING RELOCATION AND ADJUSTMENTS DURING CONSTRUCTION TO ACCOMPLISH THE WORK IN A TIMELY MANNER WITH MINIMUM DISRUPTION IN SERVICE. THE CONTRACTOR SHALL CALL 811 FOR UTILITY LOCATES AT LEAST TWO FULL WORKING DAYS (EXCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION.
- THE CONTRACTOR SHALL PROVIDE SANITARY FACILITIES AT THE JOB SITE AT ALL TIMES.
- ALL GROUND SIGNS SHALL BE REPLACED ON THIS PROJECT BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE A TEMPORARY STOP SIGN, WHEREVER A PERMANENT STOP SIGN IS REMOVED, UNTIL THE PERMANENT STOP SIGN IS RE-INSTALLED. EXISTING SIGNS WILL BE REMOVED BY THE CITY OF FRUITA TRAFFIC SAFETY DIVISION. THE CONTRACTOR SHALL PROVIDE A 10 WORKING DAY NOTIFICATION TO THE CITY OF FRUITA TRAFFIC SAFETY DIVISION AT (970) 858-9558 TO SCHEDULE SIGN REMOVAL.
- THE CONTRACTOR SHALL PROTECT ALL PROPERTY PINS. IF DAMAGED, THE CONTRACTOR SHALL RE-ESTABLISH. THIS WORK SHALL BE PERFORMED UNDER THE DIRECTION OF A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF COLORADO. THIS WORK IS INCIDENTAL.
- THE CITY OF FRUITA WILL ACQUIRE ALL NECESSARY EASEMENTS AND RIGHT OF WAY.
- DISPOSAL OF EXCESS MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- DEPTH OF MOISTURE DENSITY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
FULL DEPTH OF ALL EMBANKMENTS
BASES OF CUTS AND FILLS 1.0 FOOT.
EXCAVATION REQUIRED FOR COMPACTION OF BASES OF CUTS AND FILLS WILL BE CONSIDERED AS SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY.
- THE CONTRACTOR SHALL PROVIDE A QUALITY ASSURANCE PROGRAM. THIS PROGRAM SHALL INCLUDE SYSTEMATIC INSPECTION AND TESTING OF THE WORKMANSHIP AND MATERIALS DURING CONSTRUCTION TO ASSURE THE CITY THAT THE CONTRACTOR IS PROVIDING WORK THAT IS IN CONFORMANCE WITH THE PLANS AND SPECIFICATIONS, IN ACCORDANCE WITH THE LATEST EDITION OF THE CDOT MATERIALS MANUAL. REQUIRED TESTING AS DETAILED IN THE PROJECT SPECIAL PROVISIONS WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT WILL BE A SUBSIDIARY OBLIGATION OF THE CONTRACTOR UNDER OTHER CONTRACT ITEMS.
- GEOTECHNICAL ENGINEERING AND DESIGN FOR THIS PROJECT IS BASED UPON THE RECOMMENDATIONS CONTAINED WITHIN THE DOWL GEOTECHNICAL REPORT, DATED DECEMBER 15, 2016, AND THESE RECOMMENDATIONS SHALL BE INCORPORATED INTO THE REQUIREMENTS OF THIS PROJECT.

CONSTRUCTION STAKING

THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION STAKING AS ESTABLISHED FROM THE HORIZONTAL AND VERTICAL CONTROL POINTS PROVIDED.

THE CONTRACTOR SHALL PROVIDE LAYOUT, LINE, AND GRADE FOR IMPROVEMENTS AND THE FOLLOWING FIELD STAKING :

PRIMARY AND SECONDARY CONTROL MONUMENTS AND BENCHMARKS.

THE CONTRACTOR SHALL PERFORM ALL OTHER CONSTRUCTION SURVEYING AND STAKING THAT IS NECESSARY FOR CONSTRUCTION OF THE PROJECT. ITEMS FOR CONTRACTOR STAKING SHALL INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, THE FOLLOWING :

- SLOPE STAKES FOR CUT AND FILL.
- GRADE STAKES (RED TOPS) FOR THE SUB BASE COURSE, AND (BLUE TOPS) FOR THE TOP OF THE AGGREGATE BASE COURSE.
- RIGHT-OF-WAY.
- ROAD CENTERLINE AND EDGES OF PAVEMENT.
- BRIDGE: SEE BRIDGE NOTES, NO. 5.
- GUARDRAIL.

MICROPILE NOTES

- THE CONTRACTOR SHALL CREATE A SITE SPECIFIC AND DETAILED TRAFFIC CONTROL PLAN WHICH COVERS ALL PHASES AND DAY/NIGHT SIGNAGE CONDITIONS OF WORK, INCLUDING DETOUR AND LOCAL TRAFFIC ROUTES SIGNAGE. ALL SIGNAGE SHALL MEET THE APPLICABLE REQUIREMENTS OF THE MUTCD (LATEST VERSION), AND CITY OF FRUITA STANDARDS. THIS PLAN SHALL BE SUBMITTED TO THE CITY OF FRUITA FOR APPROVAL SEVEN (7) WORKING DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING. CONSTRUCTION CANNOT BEGIN UNTIL THE TRAFFIC CONTROL PLAN HAS BEEN APPROVED. CONTRACTOR TO CONTACT FIRST STUDENT (BUS CONTRACTOR, 970-241-1570) TO VERIFY EMERGENCY.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC CONTROL, AND SHALL DESIGNATE A TRAFFIC CONTROL SUPERVISOR (TCS). THE TCS MUST BE AVAILABLE 24 HOURS THROUGHOUT THE CONSTRUCTION (SEE PROJECT SPECIFICATIONS AND SPECIAL PROVISIONS). THE CONTRACTOR SHALL MAINTAIN ACCESS FOR LOCAL TRAFFIC AT ALL TIMES WHILE WORKING.
- CLEARING AND GRUBBING SHALL INCLUDE THE REMOVAL OF ALL TREES, LOGS, LIMBS, BRUSH, AND TRASH TO AN OFFSITE LOCATION. IT WILL BE PAID AS LUMP SUM.
- THE CONTRACTOR SHALL OBTAIN ALL REQUIRED EROSION CONTROL PERMITS.
- THE CONTRACTOR SHALL MAINTAIN AND PROVIDE DRAINAGE AND IRRIGATION THROUGH THE PROJECT SITE DURING CONSTRUCTION.
- ANY MATERIALS NOT DESIGNATED FOR SALVAGE OR REUSE SHALL BE REMOVED FROM THE PROJECT AND SHALL BECOME THE PROPERTY OF THE CONTRACTOR, UNLESS NOTED OTHERWISE. ANY COSTS ASSOCIATED WITH THESE MATERIALS WILL BE CONSIDERED INCIDENTAL TO THE APPROPRIATE SCHEDULED ITEMS.
- THE CONTRACTOR SHALL STRIP AND STOCKPILE THE TOP 4 INCHES OF TOPSOILS WITHIN THE LIMITS OF THE ROADWAY CONSTRUCTION. TOPSOIL SHALL BE PLACED ON ALL NEW FILL AND CUT SLOPES. TOPSOIL STOCKPILING AND PLACEMENT SHALL NOT BE MEASURED AND PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COSTS FOR UNCLASSIFIED EXCAVATION AND EMBANKMENT MATERIAL, COMPLETE IN PLACE.
- SOILS CONTAINING ORGANICS, DEBRIS, TOPSOIL, FROZEN SOIL, SNOW, ICE, AND OTHER DELETERIOUS MATERIALS SHALL BE REMOVED FROM THE SITE AND NOT USED AS BACKFILL MATERIAL.
- EXCAVATIONS FOR WALLS SHOULD BE LAID BACK A MINIMUM OF 35' FROM THE VERTICAL PRIOR TO BACKFILLING AGAINST RETAINING STRUCTURES. FOR SAFETY, EXCAVATIONS SHOULD ALSO BE IN ACCORDANCE WITH OSHA REGULATIONS 29 CFR 1926.
- THE STRUCTURAL FILL MATERIAL PLACED BEHIND ANY WALLS SHOULD BE COMPACTED AS SPECIFIED BY THE DESIGN ENGINEER. OVER-COMPACTION OF THE BACKFILL SHOULD BE AVOIDED SO THAT EXCESSIVE PRESSURES ARE NOT PLACED AGAINST THE ABUTMENTS OR WINGWALLS. UNLESS EXPRESSLY APPROVED BY THE DESIGN ENGINEER, ONLY HAND OPERATED, LIGHT-DUTY COMPACTION EQUIPMENT SHOULD BE USED WITHIN THREE FEET OF THE WALL.
- A REPRESENTATIVE OF DOWL SHALL BE CALLED OUT TO THE SITE TO OBSERVE PLACEMENT OF STRUCTURAL FILL. THE CONTRACTOR SHALL CONTACT DOWL IN ADVANCE OF THE EXCAVATIONS TO DISCUSS THE SPECIFIC TESTING REQUIREMENTS, BUDGET, AND SCHEDULING NEEDED FOR THESE SERVICES.
- TO MINIMIZE THE POTENTIAL FOR EROSION, THE CONTRACTOR SHALL PROVIDE CAREFUL SOIL AND WATER MANAGEMENT AND CONSTRUCTION PRACTICES ALONG DRAINAGES AND NEAR THE BRIDGE SITE TO MAINTAIN THE EXISTING STABILITY OF THE AREA.

MICROPILE NOTES

- BEFORE AN EFFICIENT PRODUCTION PILE SYSTEM CAN BE SPECIFIED, TWO (2) VERIFICATION PILES SHALL BE INSTALLED AND TENSION TESTED PER FHWA STANDARDS (REFERENCE PUBLICATION NHI-05-039). A REPRESENTATIVE OF DOWL SHALL BE AT THE SITE TO SPECIFY THE TEST PILE LOCATIONS, OBSERVE THE INSTALLATION AND ALSO TO OBSERVE THE TENSION TESTS ON BOTH PILES. TEST PILES WILL BE LOCATED SO THAT THEY DO NOT INTERFERE WITH THE EVENTUAL LOCATION OF THE PRODUCTION PILES AND ALSO MAINTAIN A REASONABLE DISTANCE AWAY FROM LOCATED UTILITY MARKINGS.
 - BOTH PILES ARE TO BE INSTALLED TO A MINIMUM DEPTH OF 10 FEET INTO THE FORMATIONAL SHALE THAT EXISTS AT A DEPTH OF 60 FEET BELOW THE SURFACE OF THE EXISTING ASPHALT. THE DRILLER SHALL SLEEVE THE UPPER 30 FEET OF THE TEST PILES.
 - BOTH SACRIFICIAL PILES SHALL BE INSTALLED USING HOLLOW BAR 38 MM WILLIAMS B7X1-38 GEO-DRILL INJECTION ANCHOR. SACRIFICIAL DRILL BITS ARE TO BE 4" B7XB WILLIAMS FORM (CROSS-CUT)
 - PROVIDE 6" x 6" x 5/8" THICK STEEL BEARING PLATE w/ NUTS ABOVE AND BELOW AT EACH MICROPILE AS ILLUSTRATED ON SHTS. B-6 & B-7.
 - FOR BOTH TEST PILES, AS PART OF THE EVALUATION, THE MATERIAL ENCOUNTERED AS THE ANCHOR IS ADVANCED SHALL BE RECORDED.
 - TYPE 1/II (SULFATE RESISTANT) CEMENTITIOUS INJECTION GROUT SHALL BE DESIGNED FOR A 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI. THE DESIRED WATER/CEMENT RATIO WILL BE AVAILABLE AT THE TIME OF INSTALLATION. A REPRESENTATIVE SET OF (4) GROUT CUBES SHALL BE FORMED BY DOWL DURING THE GROUTING OPERATION FOR TESTING AND STRENGTH DETERMINATION.
- TENSION TESTING OF VERIFICATION TEST PILES**
- ONE GROUT CUBE SHALL BE TESTED FOR COMPRESSIVE STRENGTH A MINIMUM OF 3 DAYS (72 HOURS) AFTER FORMING. REMAINING CUBES ARE TO BE TESTED AT 24 HOUR INTERVALS UNTIL A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI IS REACHED. TENSION TESTING OF THE VERIFICATION PILES MAY THEN PROCEED.
 - A DOWL REPRESENTATIVE WILL BE ON-SITE TO TIME, OBSERVE DIAL READINGS, AND RECORD TEST DATA. PILES WILL BE TESTED TO GROUT/GROUND BOND FAILURE.
 - DATA WILL BE USED TO DESIGN GENERAL INSTALLATION SPECIFICATIONS FOR THE PRODUCTION PILES.
- INSTALLATION OF PRODUCTION PILES**
- INSTALLATION OF PRODUCTION PILES WILL BE CARRIED OUT AS DESCRIBED IN THE PRODUCTION PILE PROCEDURE SPECIFICATIONS BY DOWL. ISSUED AFTER THE VERIFICATION TEST RESULTS ARE EVALUATED AND THE PILE SYSTEM IS DESIGNED. A REPRESENTATIVE OF DOWL WILL BE ON THE SITE TO OBSERVE THE INSTALLATION OF ALL PRODUCTION PILES AND TO TAKE RANDOM GROUT SAMPLES AS SPECIFIED IN THE DESIGN.
- PROOF TESTING OF PRODUCTION PILES**
- TEN PERCENT OF THE PRODUCTION PILES SHALL BE CHOSEN BY A DOWL REPRESENTATIVE TO BE TENSION TESTED PER FHWA STANDARDS (REFERENCE PUBLICATION NHI-05-039).

BRIDGE NOTES

GENERAL

- ALL WORK SHALL BE DONE ACCORDING TO THE APPLICABLE CONSTRUCTION DETAILS OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" STATE OF COLORADO, LATEST EDITION.
- STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH STANDARD M-200-2.
- TESTING OF MATERIALS SHALL BE COMPLETED PER CDOT REQUIREMENTS, BY A CDOT QUALIFIED TESTING LABORATORY AND PERSONNEL AT THE COST OF THE CONTRACTOR.
- BRIDGE ABUTMENTS, WINGWALLS, ROAD ALIGNMENT, AND CONSTRUCTION LIMITS SHALL BE STAKED IN FIELD BY THE CONTRACTOR. SEE SPECIAL PROVISIONS SECTION 625 CONSTRUCTION SURVEYING.

REINFORCING STEEL :

REINFORCING STEEL TO BE EPOXY COATED UNLESS NOTED OTHERWISE. REINFORCING STEEL WILL CONFORM TO AASHTO M 31, 60 ksi (ASTM A615 GRADE 60). EPOXY COATED REINFORCING STEEL WILL CONFORM TO AASHTO M 284, 60 ksi. MINIMUM COVER TO THE FACE OF ANY BAR SHALL BE 2" UNLESS NOTED OTHERWISE.

REINFORCING STEEL LAP SPLICES :

MINIMUM LAP SPLICES SHALL BE AS SHOWN IN THE FOLLOWING CHART. ADJACENT BARS MAY BE LAPPED AT THE SAME LOCATION.

BAR SIZE	BLACK BARS		EPOXY BARS	
	*TOP BAR	ALL OTHERS	*TOP BAR	ALL OTHERS
#3	1'-0"	1'-0"	1'-1"	1'-0"
#4	1'-7"	1'-2"	1'-10"	1'-8"
#5	2'-6"	1'-10"	2'-10"	2'-6"
#6	3'-7"	2'-7"	4'-1"	3'-7"
#7	4'-10"	3'-5"	5'-6"	4'-11"
#8	6'-4"	4'-6"	7'-3"	6'-5"
#9	8'-0"	6'-9"	9'-2"	8'-1"
#10	10'-2"	7'-4"	11'-8"	10'-3"

* -TOP BAR REFERS TO A HORIZONTAL BAR WHICH WILL HAVE MORE THAN 1-FOOT OF CONCRETE CAST BELOW IT.

CONCRETE

- THE MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS SHALL NOT BE LESS THAN THE FOLLOWING :
ABUTMENTS, DECK, WINGWALLS, AND CURBS:
CLASS D : f'c = 4500 PSI, SEVERITY OF SULFATE EXPOSURE SHALL BE CLASS 2.
- A SET OF FOUR CONCRETE TEST CYLINDERS SHALL BE CAST PER EACH 30 YARDS OF CONCRETE PLACED, OR AT LEAST ONCE EACH DAY OF PLACEMENT. THE CYLINDERS SHALL BE MADE AND CURED AS SPECIFIED IN THE MATERIAL MANUAL OF THE STATE OF COLORADO.
- TESTING OF MATERIALS SHALL BE COMPLETED PER CITY OF FRUITA REQUIREMENTS, BY A QUALIFIED TESTING LABORATORY AND PERSONNEL AT THE COST OF THE CONTRACTOR.
- CONCRETE PLACED IN THE PILE CAPS AND WINGWALLS SHALL CURE FOR AT LEAST 7 DAYS OR UNTIL A COMPRESSIVE STRENGTH OF AT LEAST 3600 PSI AS DETERMINED BY BREAKING TEST CYLINDERS, HAS BEEN REACHED BEFORE SETTING THE GIRDERS OR BACKFILLING.
- ALL EXPOSED CONCRETE SURFACES, INCLUDING SIDES AND TOPS OF WINGWALLS AND EDGES OF DECK, CURBS, AND FRONT FACES OF ABUTMENTS SHALL HAVE A STRUCTURAL CONCRETE COATING IN ACCORDANCE WITH CDOT SPECIFICATION 601.14, COLOR AS SELECTED BY THE OWNER. SURFACE PREPARATION SHALL BE A HIGH PRESSURE WATER BLAST IN ACCORDANCE WITH CDOT SPECIFICATIONS.

STRUCTURAL STEEL

- ALL STRUCTURAL STEEL COMPONENTS SHALL BE ASTM A36, UNLESS NOTED OTHERWISE.

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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
GENERAL NOTES

PROJECT	7121.74610.01
DATE	12/27/2017
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SHEET	
G-3	

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G:\21\74610-01\65CAD\Fruito 17.5 Road Bridge_Plan.dwg PLOT DATE 2017-12-26 15:08 SAVED DATE 2017-12-26 15:08 USER: jcarter

17.5 ROAD BRIDGE OVER LITTLE SALT WASH - SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	SUPERSTRUCTURE	S. ABUT.	N. ABUT.	QUANTITY
201	CLEARING AND GRUBBING	L.S.				1
202	REMOVAL OF FENCE	L.F.		110	170	280
202	REMOVAL OF BRIDGE	L.S.				1
202	REMOVAL OF TOP PART OF EXISTING ABUTMENTS	L.S.				1
202	REMOVAL OF ASPHALT (PLANING)	S.Y.		400	440	840
202	RELOCATE TELEPHONE BOX	EACH		1		1
202	REMOVE EXISTING POWER POLES	EACH		1	1	2
202	REMOVE EXISTING WOODEN FOOT BRIDGE	EACH			1	1
202	REMOVE EXISTING STORM PIPE	EACH			1	1
202	REMOVE EXISTING STORM MANHOLE	EACH			1	1
203	POTHOLING	HOUR				8
203	UNCLASSIFIED EXCAVATION (ROAD)	C.Y.		265	265	530
203	UNCLASSIFIED EXCAVATION (TRAIL)	C.Y.				1340
203	EMBANKMENT MATERIAL (COMPLETE IN PLACE) (ROAD)	C.Y.		60	355	415
203	EMBANKMENT MATERIAL (COMPLETE IN PLACE) (TRAIL)	C.Y.				10
206	STRUCTURE EXCAVATION (BRIDGE)	C.Y.		1665	3365	5030
206	STRUCTURE BACKFILL (CLASS 1) (BRIDGE)	C.Y.		1150	2705	3855
206	STRUCTURE BACKFILL (CLASS 1) (TRAIL)	C.Y.				280
206	STRUCTURE BACKFILL (NATIVE) (BRIDGE)	C.Y.		155	280	435
206	STRUCTURE BACKFILL (NATIVE) (TRAIL)	C.Y.				75
208	EROSION CONTROL	L.S.				1
210	RELOCATE MAILBOX	EACH		1	1	2
210	RESET SEWER MANHOLE LID	EACH		1		1
210	RESET WATER VALVE LID	EACH			1	1
212	SEEDING (NATIVE)	ACRE				0.2
213	MULCHING (WEED FREE HAY)	ACRE				0.2
213	MULCH TACKIFIER	LBS.				120
250	ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT	L.S.				1
304	AGGREGATE BASE COURSE (CLASS 6) (ROAD AND SIDEWALKS)	C.Y.		170	195	365
304	AGGREGATE BASE COURSE (CLASS 6) (TRAIL)	C.Y.				50
304	AGGREGATE BASE COURSE (CLASS 1) (TRAIL)	C.Y.				100
304	AGGREGATE BASE COURSE (CLASS 6) (RIPRAP BED COURSE)	C.Y.		100	170	270
403	HOT MIX ASPHALT (GRADING SX) (PG 64-22) (2 INCH)	S.Y.	400	755	825	1980
420	GEOTEXTILE (SEPARATOR) (MIRAFI 180N) (AT RIPRAP)	S.Y.		670	1335	2005
420	GEOTEXTILE (SEPARATOR) (MIRAFI 180N) (AT RETAINING WALL)	S.Y.			145	145
420	GEOTEXTILE (REINFORCEMENT) (MIRAGRID 8XT)	S.Y.		1380	3215	4595
502	MICROPILES	L.F.				2545
502	STEEL PILING (HP 12x53)	L.F.		575	475	1050
502	PILE TIP	EACH		11	11	22
506	RIPRAP (D50 = 18-INCH)	C.Y.		580	1005	1585
509	PAINTED STEEL RAILING	L.F.				260
515	WATERPROOFING (MEMBRANE)	S.Y.	510	70	75	655
601	CONCRETE CLASS D (ABUTMENTS, WINGWALLS, AND APPROACH SLABS)	C.Y.		125	185	310
601	CONCRETE CLASS D (DECK SLAB, DECK SIDEWALKS, AND RAIL CURBS)	C.Y.	90	5	5	100
601	CONCRETE CLASS B (ROADWAY SIDEWALKS, CURBS, AND GUTTERS)	C.Y.		30	35	65
601	CONCRETE CLASS D (TRAIL PAVEMENT, WALLS, FOOTINGS, AND PILE CAP)	C.Y.				165
601	STRUCTURAL CONCRETE COATING	S.F.	1000	1270	1600	3870
602	REINFORCING STEEL (EPOXY) (STREET AND BRIDGE)	LBS.	9,530	15,880	22,760	48,170
602	REINFORCING STEEL (EPOXY) (TRAIL)	LBS.				12,175
603	36-INCH REINFORCED CONCRETE PIPE	L.F.			40	40
604	MANHOLE SPECIAL (20 FOOT)	EACH			1	1
604	VERTICAL CURB INLET AND MANHOLE	EACH		2	2	4
605	8" ADS N-12 DRAIN PIPE	L.F.		85	45	130
605	10" ADS N-12 DRAIN PIPE	L.F.			10	10
606	BRIDGE RAIL TYPE 10H W/ HANDRAIL (FINISH PER CITY OF FRUITA)	L.F.	145	60	60	265
606	END ANCHORAGE TYPE SKT	EACH		1	2	3
606	TRANSITION TYPE 3G	EACH		1	1	2
607	REBUILD EXISTING FENCE	L.F.		50	150	200
613	ROUTE OVERHEAD POWERLINE UNDERGROUND	L.S.				1
614	GROUND SIGN	EACH				6
614	STEEL SIGN POST (U-POST) (3 LBS./FT.)	L.F.				60
618	PRESTRESSED BOX GIRDERS (DEPTH 32" THROUGH 48")	S.F.	4,385			4,385
620	FIELD OFFICE (CLASS 1)	EACH				1
620	SANITARY FACILITIES	EACH				1
625	CONSTRUCTION SURVEYING	L.S.				1
626	MOBILIZATION	L.S.				1
626	PUBLIC INFORMATION SERVICES	L.S.				1
627	PAVEMENT MARKING PAINT (YELLOW)	GAL.				7
627	PAVEMENT MARKING PAINT (WHITE)	GAL.				7
630	CONSTRUCTION TRAFFIC CONTROL	L.S.				1
630	VARIABLE MESSAGE SIGN (TWO)	DAY				3
F/A	F/A MINOR CONTRACT REVISIONS	F.A.				1

LEGEND

- x — x — EXISTING FENCE LINE
- 4520 — PROPOSED MAJOR INTERVAL CONTOUR (10 FOOT)
- 4518 — PROPOSED MINOR INTERVAL CONTOUR (2 FOOT)
- - - - 4520 - - - - EXISTING MAJOR INTERVAL CONTOUR (10 FOOT)
- - - - 4518 - - - - EXISTING MINOR INTERVAL CONTOUR (2 FOOT)
- W — EXISTING WATER LINE
- S — EXISTING SANITARY SEWER LINE
- C — EXISTING TELECOM LINE
- G — EXISTING GAS LINE
- SD — EXISTING STORM SEWER LINE
- E — EXISTING OVERHEAD POWER LINE
- E — PROPOSED UNDERGROUND POWER LINE
- PROPOSED ASPHALT
- PROPOSED CONCRETE
- ⊗ EXISTING UTILITY POLE
- ⊙ EXISTING SEWER MANHOLE
- ⊙ EXISTING STORM MANHOLE
- ⊗ EXISTING FIRE HYDRANT
- ⊗ EXISTING WATER VALVE
- ⊙ EXISTING WATER METER
- ⊙ EXISTING TELECOM BOX
- ⊙ EXISTING STORM INLET
- ⊙ EXISTING MAIL BOX

- ① INCLUDES INSTALLATION, TESTING, AND PROOF VERIFICATION.
- ② INCLUDES PDA TESTING FOR TWO PILES.
- ③ INCLUDES FURNISHING AND INSTALLATION OF THE BRONZE STRUCTURE I.D. PLATES AND ASSOCIATED HARDWARE REQUIRED FOR A COMPLETE INSTALLATION (SEE SHEET B-9).
- ④ INCLUDES FIBERMESH REINFORCING.
- ⑤ INCLUDES 50 CUBIC YARDS OF FIBERMESH-REINFORCED CONCRETE.

SUMMARY OF EARTHWORK QUANTITIES

<u>UNCLASSIFIED EXCAVATION:</u>	
ROADWAY EXCAVATION	530 CY
BRIDGE STRUCTURE EXCAVATION	5030 CY
TRAIL EXCAVATION	1340 CY
TOTAL	6900 CY
<u>EMBANKMENT MATERIAL (COMPLETE IN PLACE):</u>	
ROADWAY FILL	415 CY
TRAIL FILL	10 CY
BRIDGE STRUCTURE NATIVE BACKFILL	435 CY
TRAIL STRUCTURE NATIVE BACKFILL	75 CY
TOTAL	935 CY
<u>TOTAL VOLUME OF EXPORTED MATERIAL:</u>	5965 CY

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Know what's below. Call before you dig.

REV	DATE	DESCRIPTION



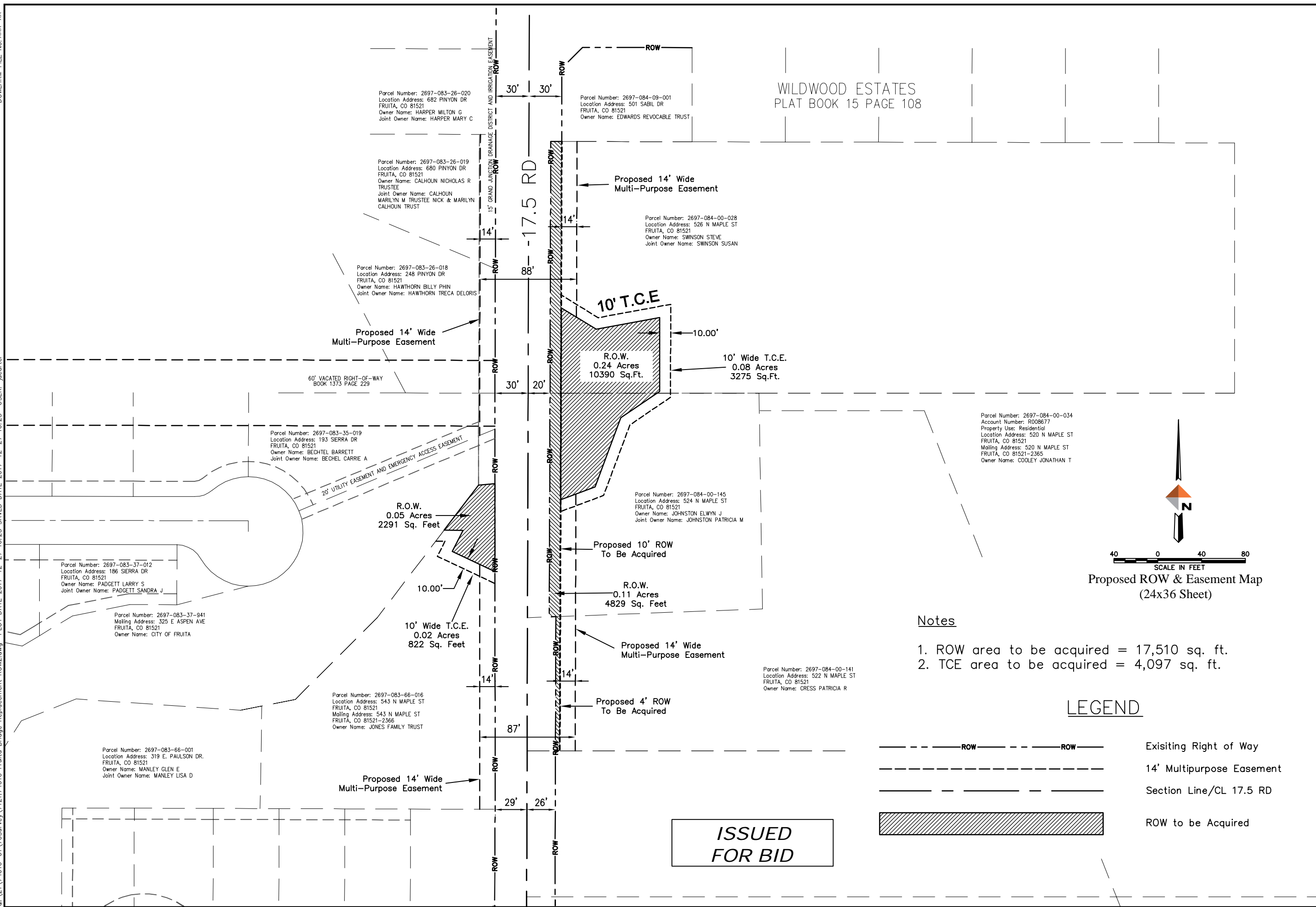
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 SUMMARY OF QUANTITIES AND LEGEND

PROJECT 7121.74610.01
 DATE 12/27/2017

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 SHEET

G-4



WILDWOOD ESTATES
PLAT BOOK 15 PAGE 108

Parcel Number: 2697-083-26-020
Location Address: 682 PINYON DR
FRUITA, CO 81521
Owner Name: HARPER MILTON G
Joint Owner Name: HARPER MARY C

Parcel Number: 2697-084-09-001
Location Address: 501 SABIL DR
FRUITA, CO 81521
Owner Name: EDWARDS REVOCABLE TRUST

Parcel Number: 2697-083-26-019
Location Address: 680 PINYON DR
FRUITA, CO 81521
Owner Name: CALHOUN NICHOLAS R
TRUSTEE
Joint Owner Name: CALHOUN
MARILYN M TRUSTEE NICK & MARILYN
CALHOUN TRUST

Parcel Number: 2697-084-00-028
Location Address: 526 N MAPLE ST
FRUITA, CO 81521
Owner Name: SWINSON STEVE
Joint Owner Name: SWINSON SUSAN

Parcel Number: 2697-083-26-018
Location Address: 248 PINYON DR
FRUITA, CO 81521
Owner Name: HAWTHORN BILLY PHIN
Joint Owner Name: HAWTHORN TRECA DELORIS

10' T.C.E.

R.O.W.
0.24 Acres
10390 Sq.Ft.

10' Wide T.C.E.
0.08 Acres
3275 Sq.Ft.

60' VACATED RIGHT-OF-WAY
BOOK 1373 PAGE 229

Parcel Number: 2697-083-35-019
Location Address: 193 SIERRA DR
FRUITA, CO 81521
Owner Name: BECHTEL BARRETT
Joint Owner Name: BECHEL CARRIE A

20' UTILITY EASEMENT AND EMERGENCY ACCESS EASEMENT

R.O.W.
0.05 Acres
2291 Sq. Feet

Parcel Number: 2697-084-00-145
Location Address: 524 N MAPLE ST
FRUITA, CO 81521
Owner Name: JOHNSTON ELWYN J
Joint Owner Name: JOHNSTON PATRICIA M

Proposed 10' ROW
To Be Acquired

R.O.W.
0.11 Acres
4829 Sq. Feet

Parcel Number: 2697-083-37-012
Location Address: 186 SIERRA DR
FRUITA, CO 81521
Owner Name: PADGETT LARRY S
Joint Owner Name: PADGETT SANDRA J

Parcel Number: 2697-083-37-941
Mailing Address: 325 E ASPEN AVE
FRUITA, CO 81521
Owner Name: CITY OF FRUITA

10' Wide T.C.E.
0.02 Acres
822 Sq. Feet

Proposed 14' Wide
Multi-Purpose Easement

Parcel Number: 2697-084-00-141
Location Address: 522 N MAPLE ST
FRUITA, CO 81521
Owner Name: CRESS PATRICIA R

Proposed 4' ROW
To Be Acquired

Parcel Number: 2697-083-66-016
Location Address: 543 N MAPLE ST
FRUITA, CO 81521
Mailing Address: 543 N MAPLE ST
FRUITA, CO 81521-2366
Owner Name: JONES FAMILY TRUST

Proposed 14' Wide
Multi-Purpose Easement

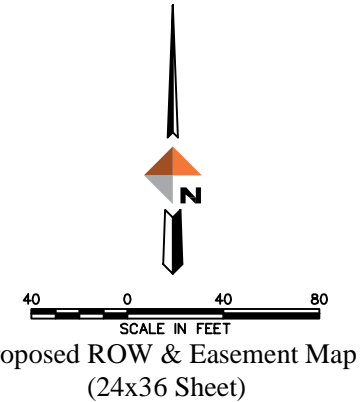
Parcel Number: 2697-083-66-001
Location Address: 319 E. PAULSON DR.
FRUITA, CO 81521
Owner Name: MANLEY GLEN E
Joint Owner Name: MANLEY LISA D

Notes

1. ROW area to be acquired = 17,510 sq. ft.
2. TCE area to be acquired = 4,097 sq. ft.

LEGEND

- ROW ---
- - - - - 14' Multipurpose Easement
- - - - - Section Line/CL 17.5 RD
- ▨ ROW to be Acquired



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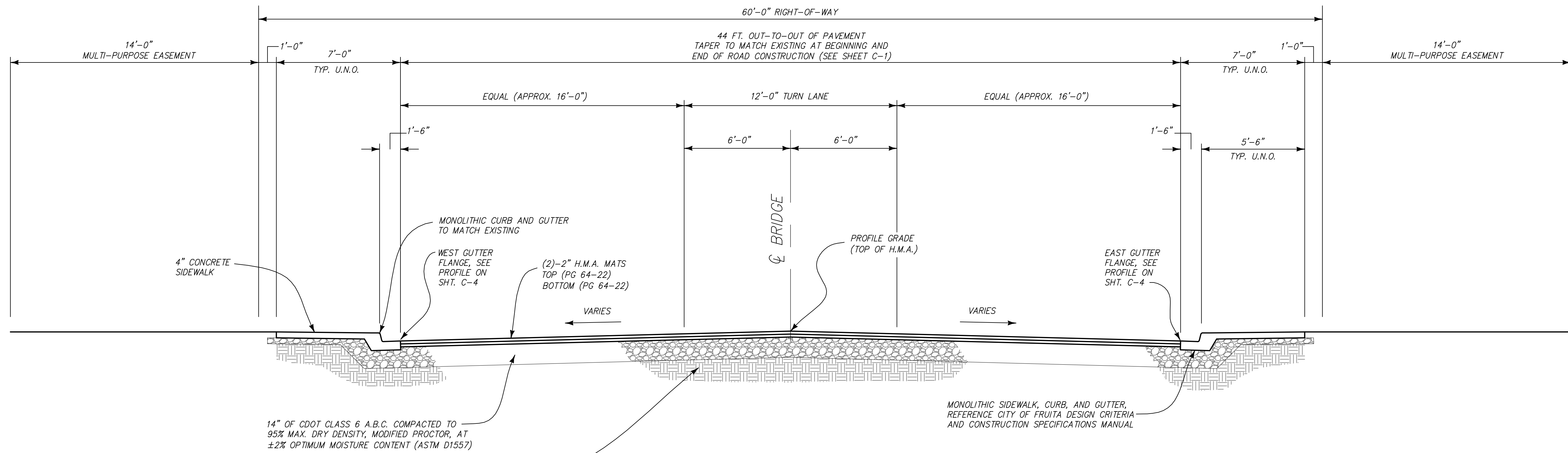


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MESA COUNTY
 17.5 Road Fruita Bridge Replacement
 Proposed ROW & Easement Map

PROJECT 7121.74610.01
 DATE 12/27/17
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 SHEET
 V-1

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TYPICAL ROADWAY SECTION
NOT TO SCALE

NOTE:
1. REFERENCING CITY OF FRUITA DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS MANUAL, THE PAVEMENT WIDTH OF 44 FEET IS SPECIFIED.

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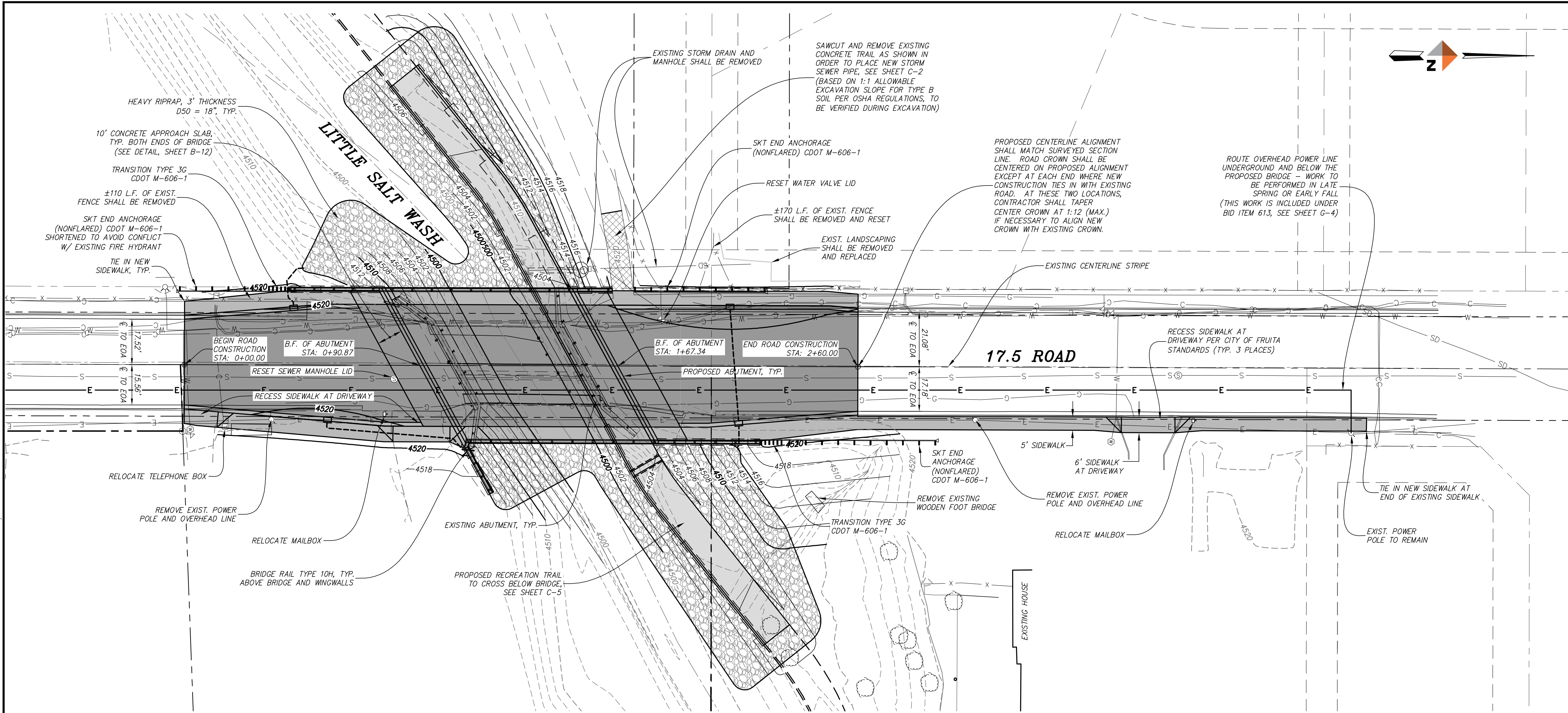
CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
TYPICAL ROADWAY SECTION AND PAVEMENT DETAILS

PROJECT 7121.74610.01
DATE 12/27/2017

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ROAD IMPROVEMENTS PLAN



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CITY OF FRUITA
 17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 ROAD IMPROVEMENTS PLAN

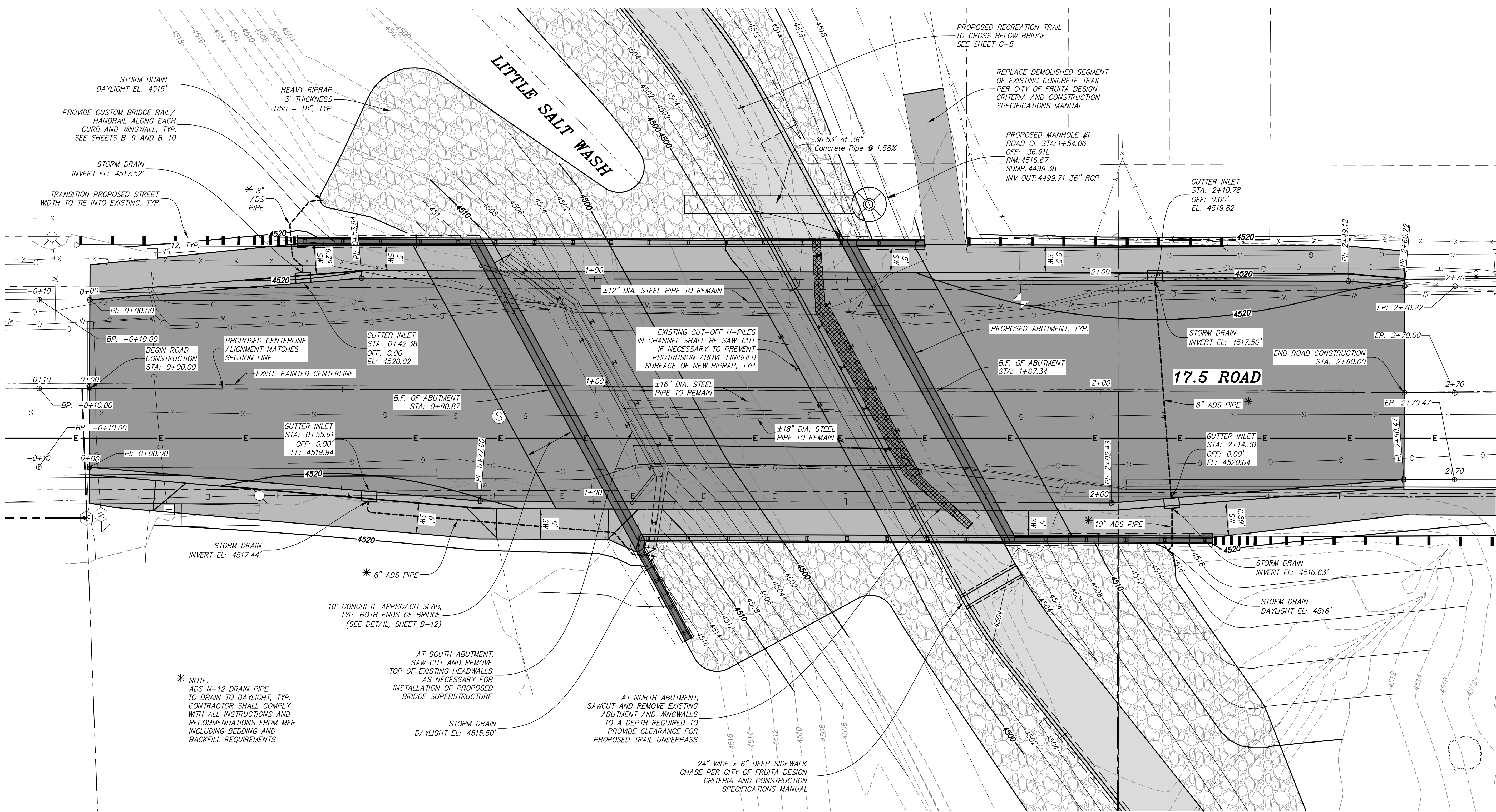
PROJECT 7121.74610.01
 DATE 12/27/2017

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 SHEET

C-1



G:\2174610-01\65CAD\Fruita 17.5 Road Bridge_Plan.dwg PLOT DATE 2017-12-26 15:13 USER: jcarter



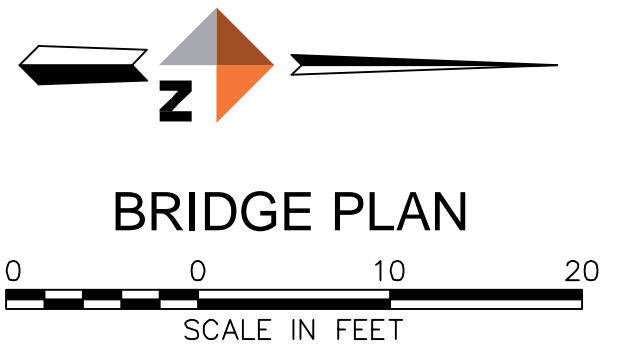
* NOTE:
ADS N-12 DRAIN PIPE
TO DRAIN TO DAYLIGHT, TYP.
CONTRACTOR SHALL COMPLY
WITH ALL INSTRUCTIONS AND
RECOMMENDATIONS FROM MFR.
INCLUDING BEDDING AND
BACKFILL REQUIREMENTS

10' CONCRETE APPROACH SLAB,
TYP. BOTH ENDS OF BRIDGE
(SEE DETAIL, SHEET B-12)

AT SOUTH ABUTMENT,
SAW CUT AND REMOVE
TOP OF EXISTING HEADWALLS
AS NECESSARY FOR
INSTALLATION OF PROPOSED
BRIDGE SUPERSTRUCTURE

AT NORTH ABUTMENT,
SAWCUT AND REMOVE EXISTING
ABUTMENT AND WINGWALLS
TO A DEPTH REQUIRED TO
PROVIDE CLEARANCE FOR
PROPOSED TRAIL UNDERPASS

24" WIDE x 6" DEEP SIDEWALK
CHASE PER CITY OF FRUITA DESIGN
CRITERIA AND CONSTRUCTION
SPECIFICATIONS MANUAL



BRIDGE PLAN

ISSUED
FOR BID



Know what's below.
Call before you dig.

REV	DATE	DESCRIPTION



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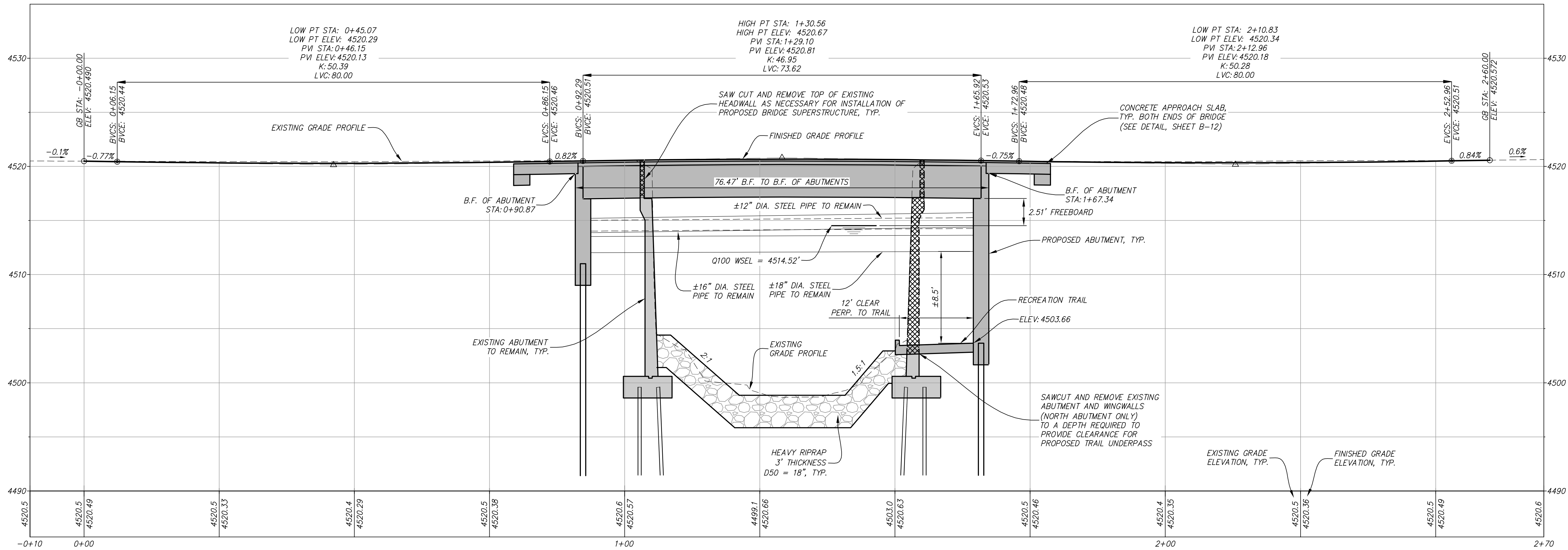
CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
BRIDGE PLAN

PROJECT 7121.74610.01
DATE 12/27/2017

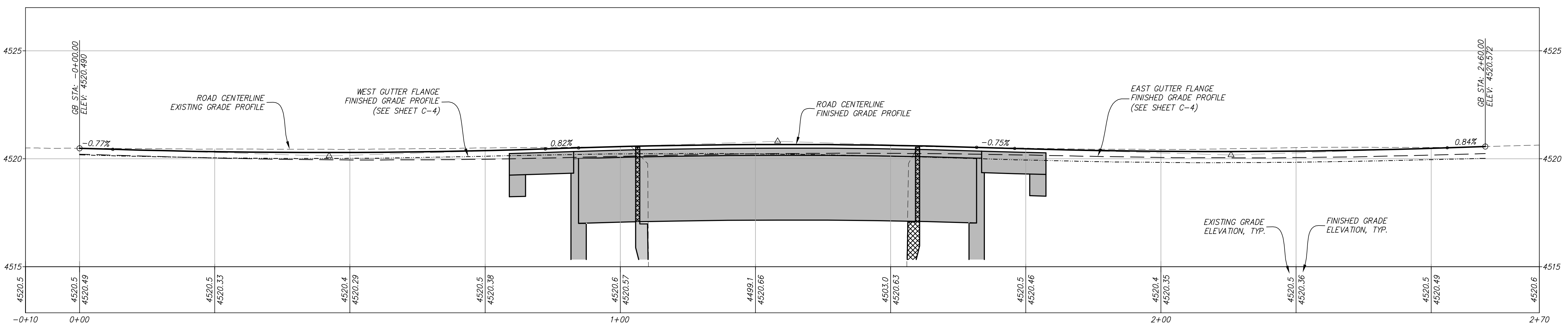
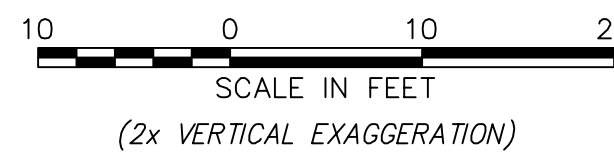
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C-2

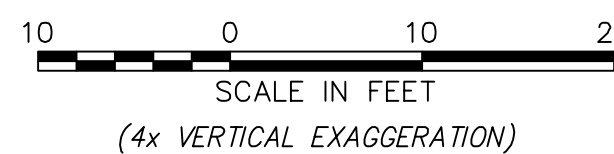
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ROAD CENTERLINE PROFILE



EXAGGERATED ROAD CENTERLINE PROFILE

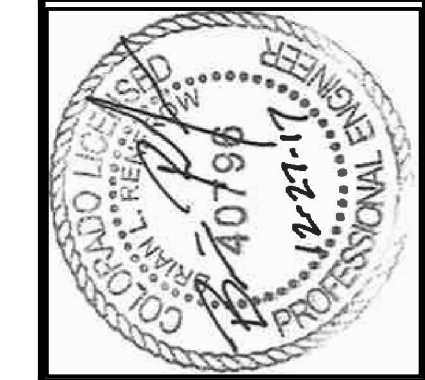


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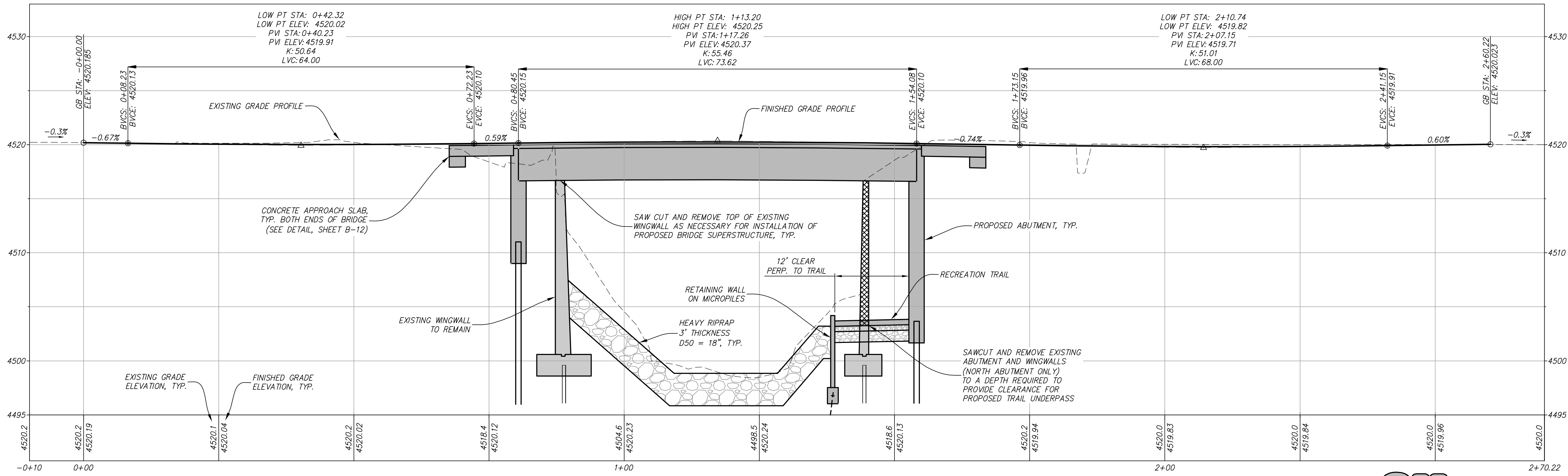
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
ROAD PROFILES

PROJECT 7121.74610.01
DATE 12/27/2017

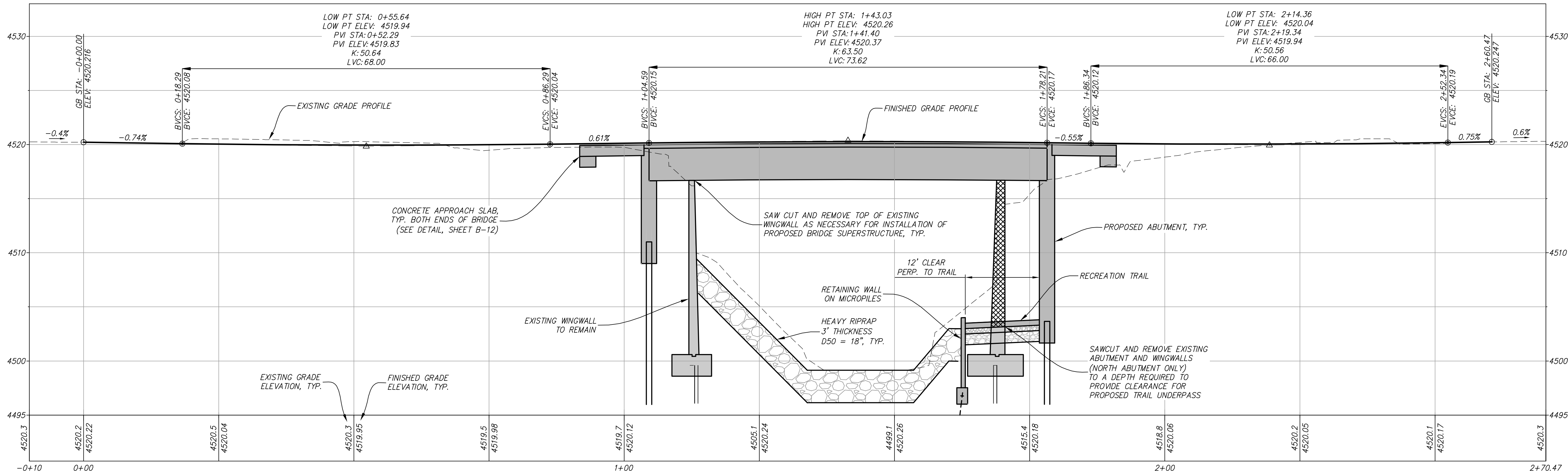
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C-3



WEST GUTTER FLANGE PROFILE

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EAST GUTTER FLANGE PROFILE

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17.5 ROAD BRIDGE OVER LITTLE SALT WASH
GUTTER PROFILES

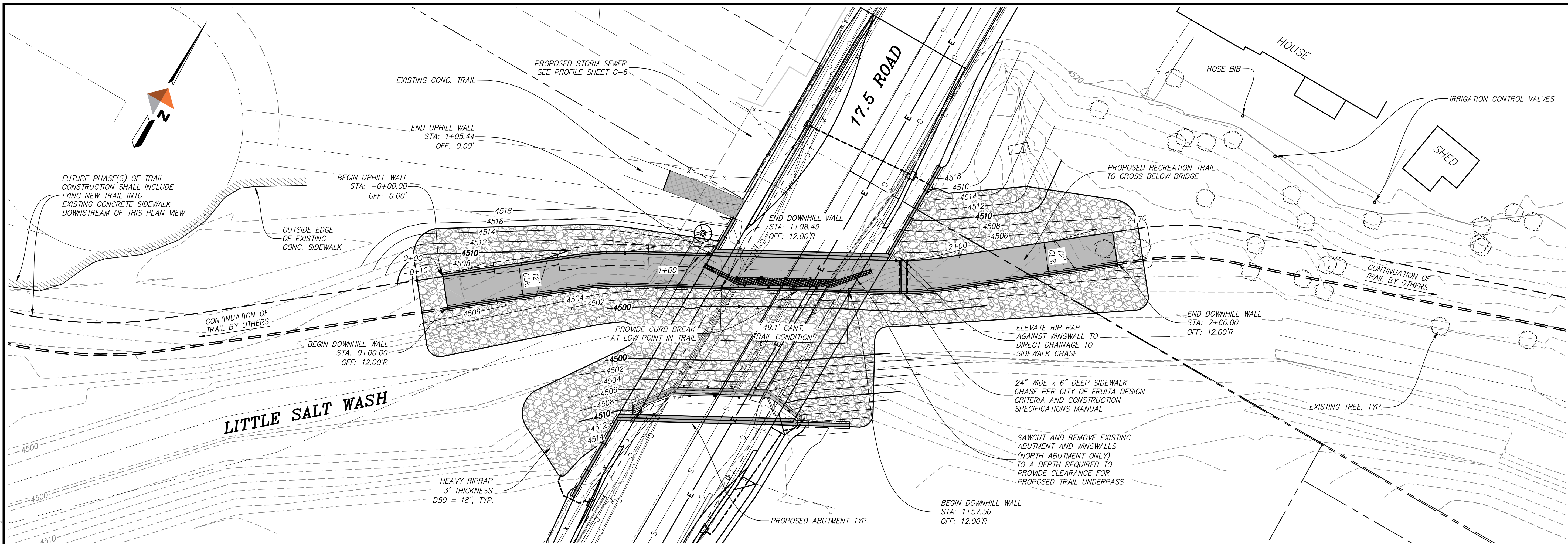
PROJECT 7121.74610.01
DATE 12/27/2017

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C-4

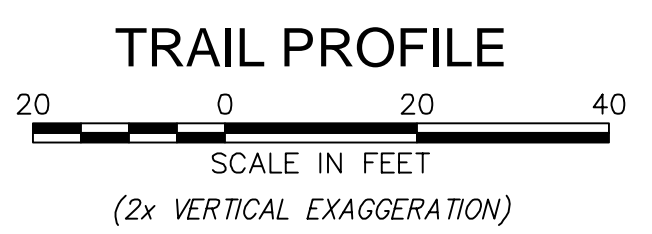
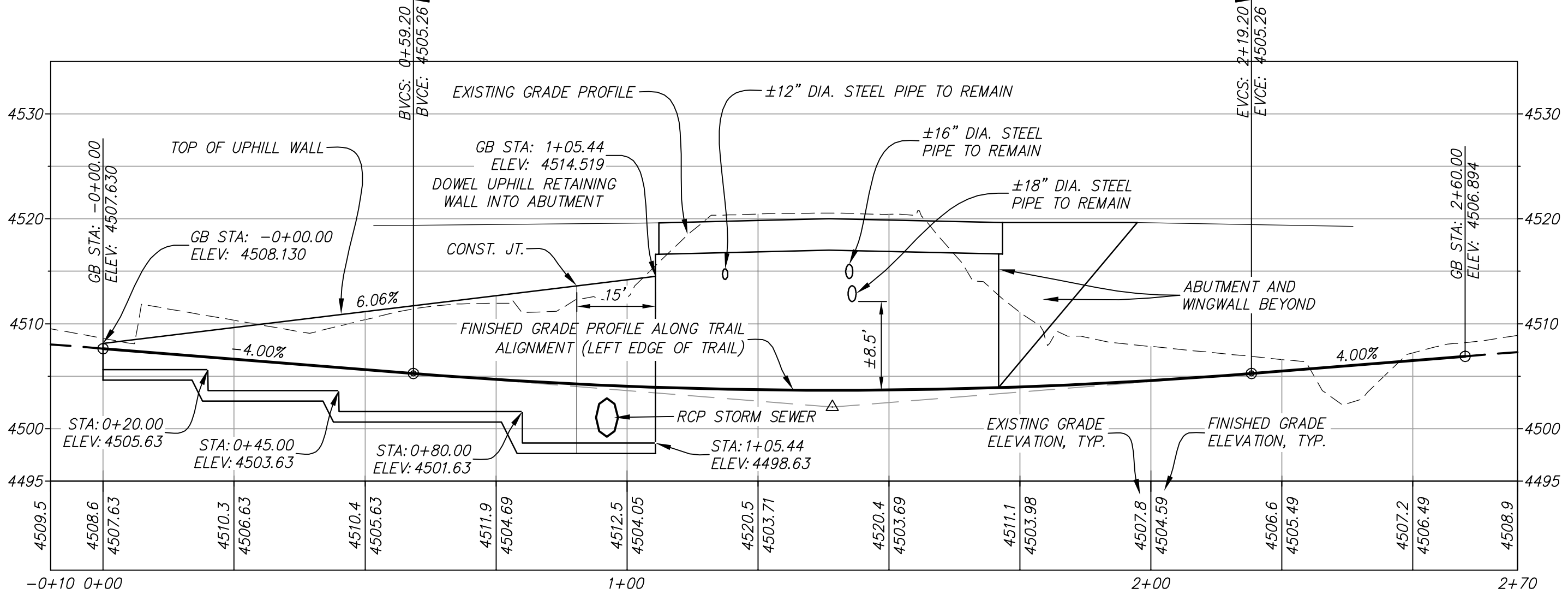
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NOTE:
TRAIL DESIGN PER AASHTO GUIDE FOR THE
DEVELOPMENT OF BICYCLE FACILITIES (1999)

LOW PT STA: 1+39.20
LOW PT ELEV: 4503.66
PVI STA: 1+39.20
PVI ELEV: 4502.06
K: 20.00
LVC: 160.00



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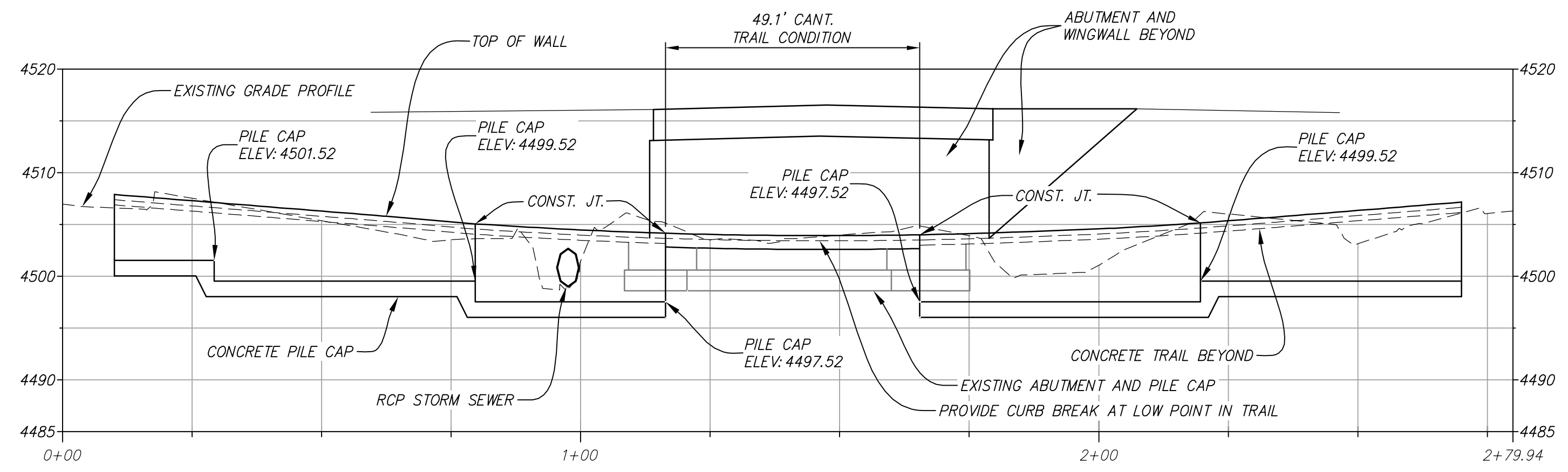
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
TRAIL PLAN AND PROFILE

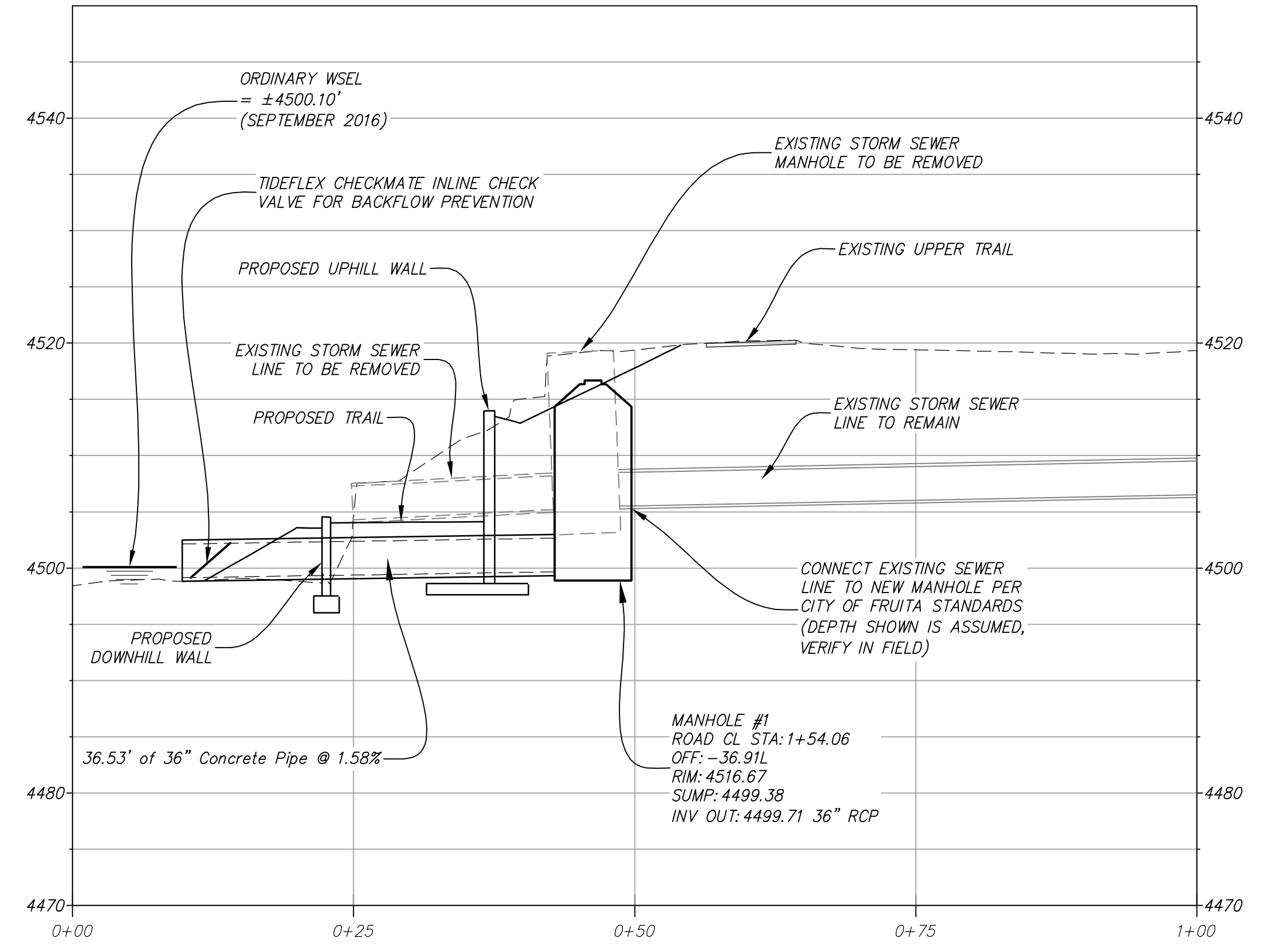
PROJECT 7121.74610.01
DATE 12/27/2017

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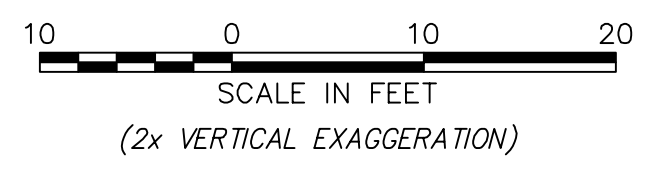
C-5



DOWNHILL WALL PROFILE



STORM SEWER PROFILE



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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 DOWNHILL WALL AND STORM SEWER PROFILES

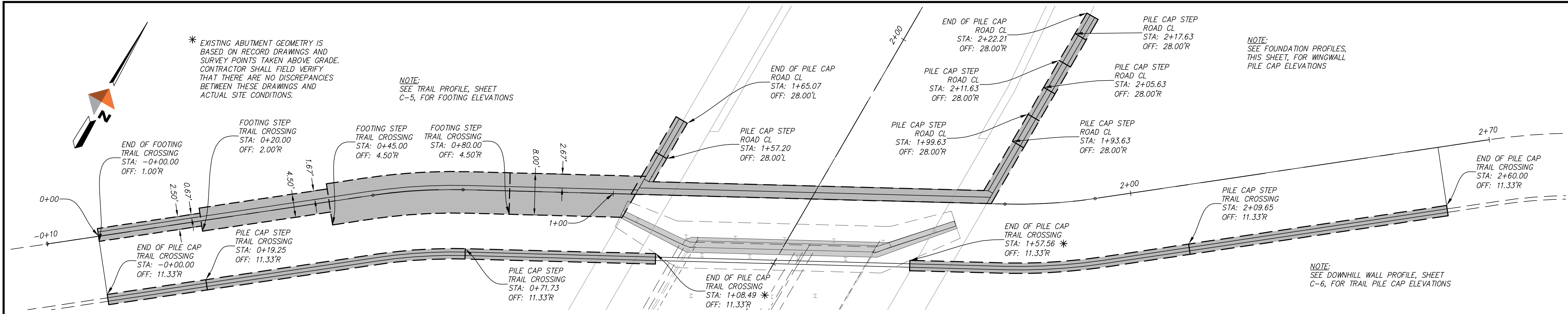
PROJECT 7121.74610.01
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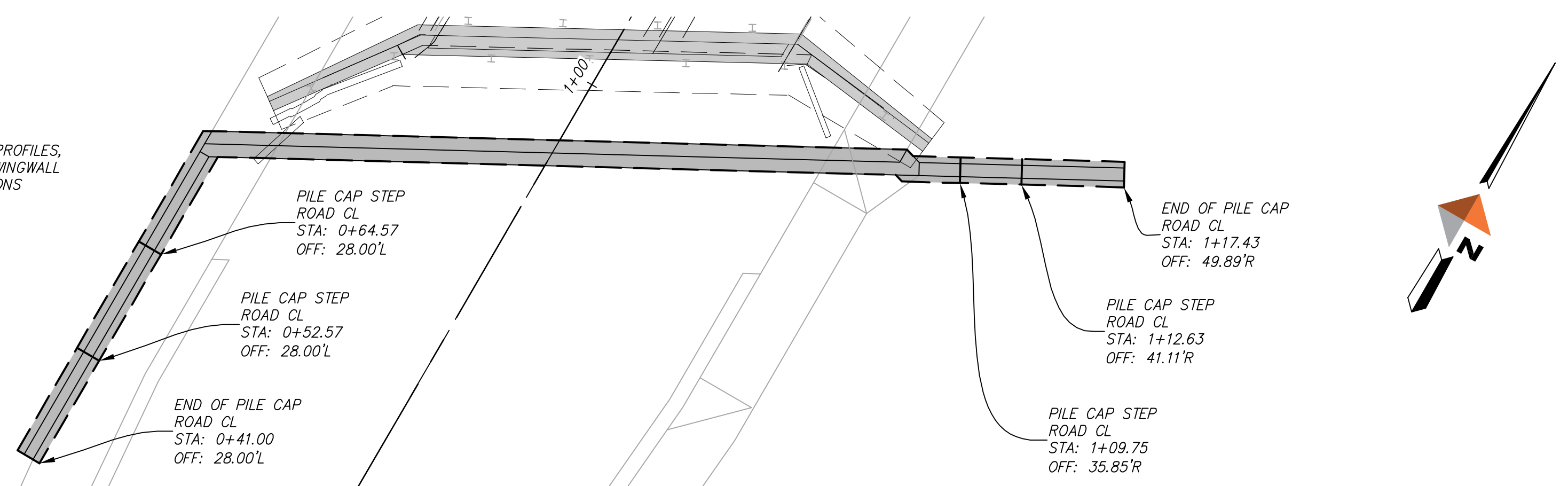
C-6

G:\21\74610-01\65CAD\Fruita 17.5 Road Bridge_Plan.dwg PLOT DATE 2017-12-26 15:20 SAVED DATE 2017-12-26 15:20 USER: jcarlter

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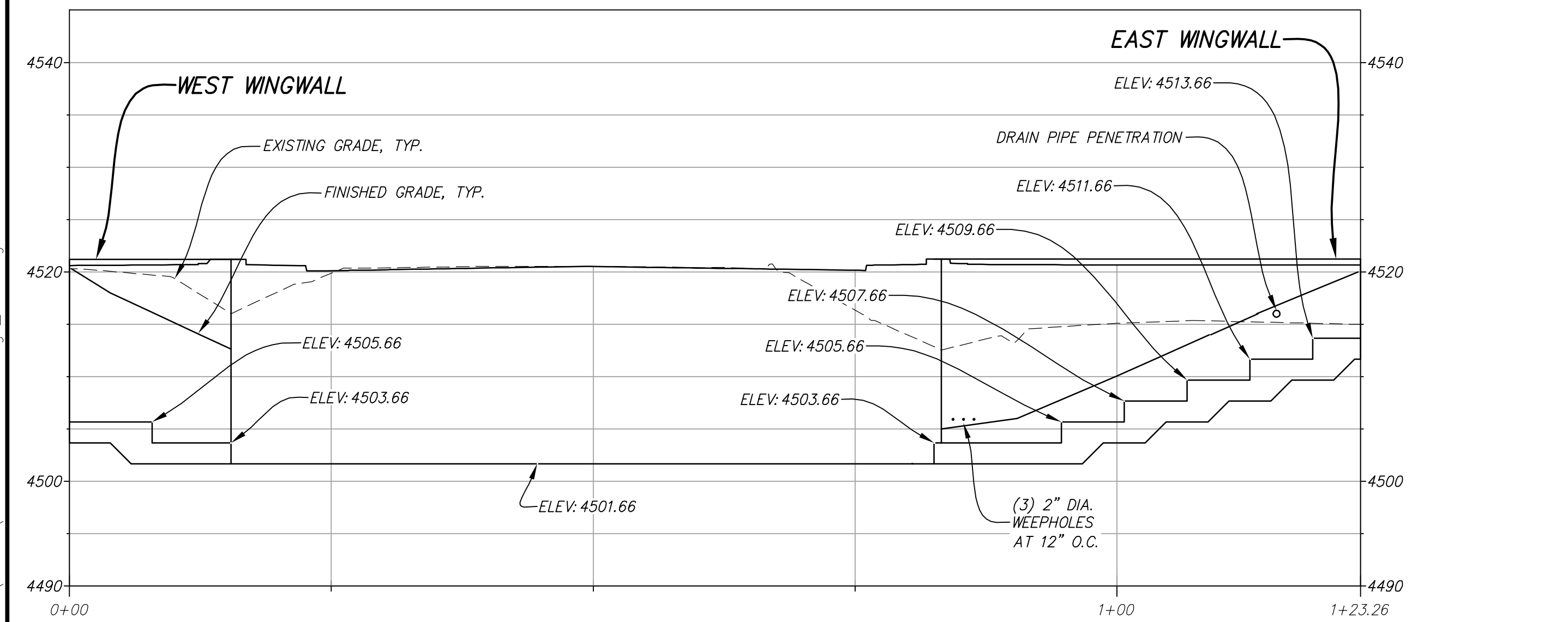
NORTH ABUTMENT FOUNDATION PLAN



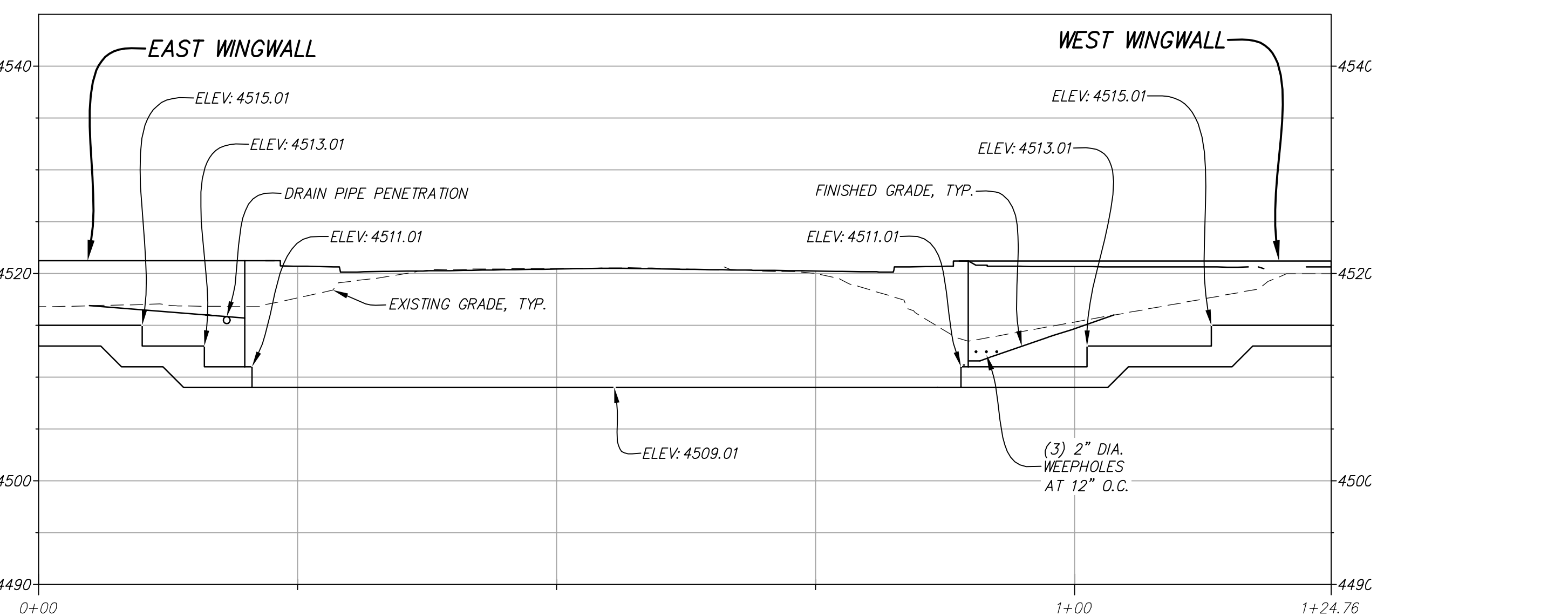
SOUTH ABUTMENT FOUNDATION PLAN



ISSUED FOR BID



NORTH ABUTMENT FOUNDATION PROFILE



SOUTH ABUTMENT FOUNDATION PROFILE



REV	DATE	DESCRIPTION

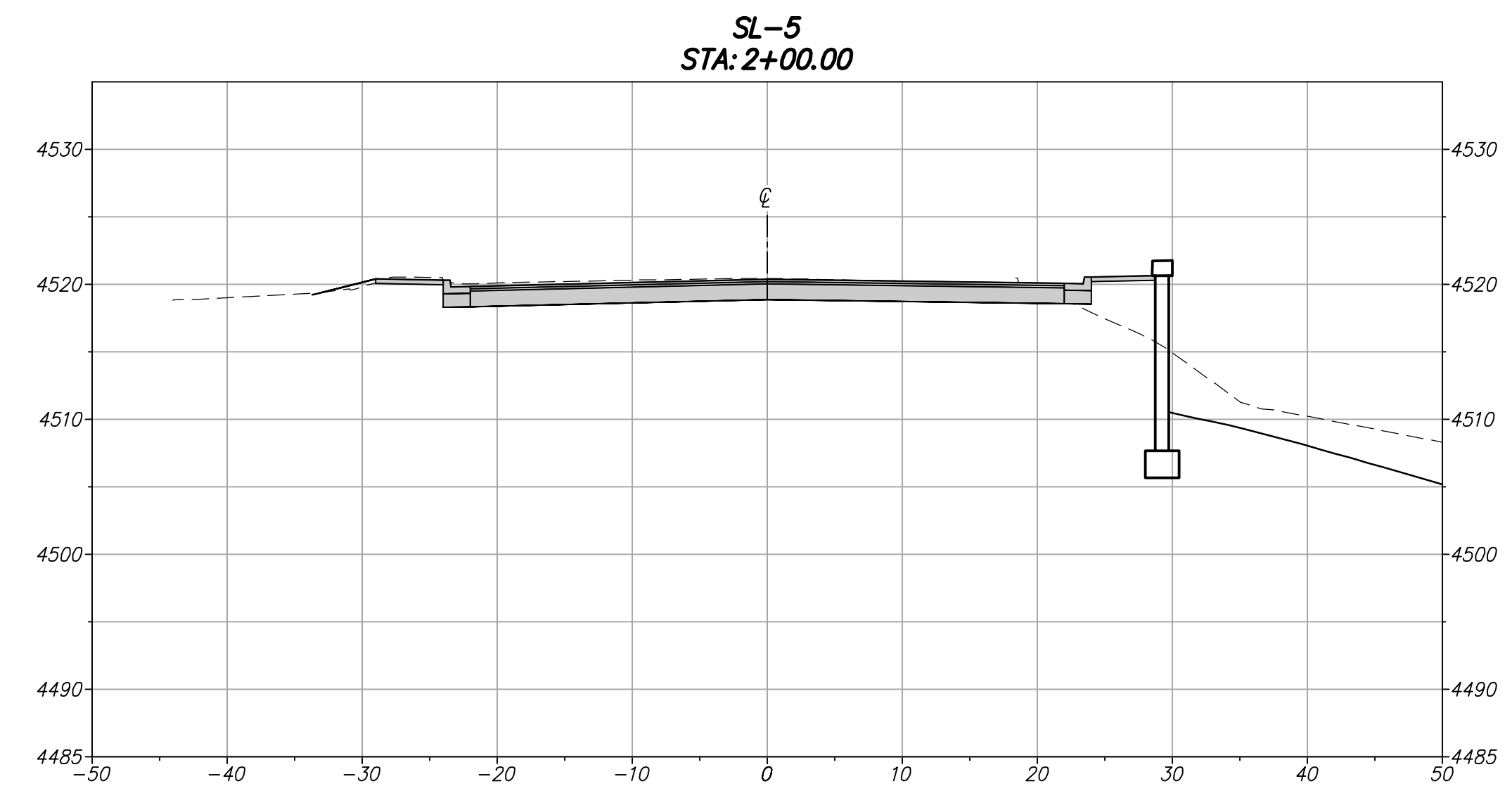
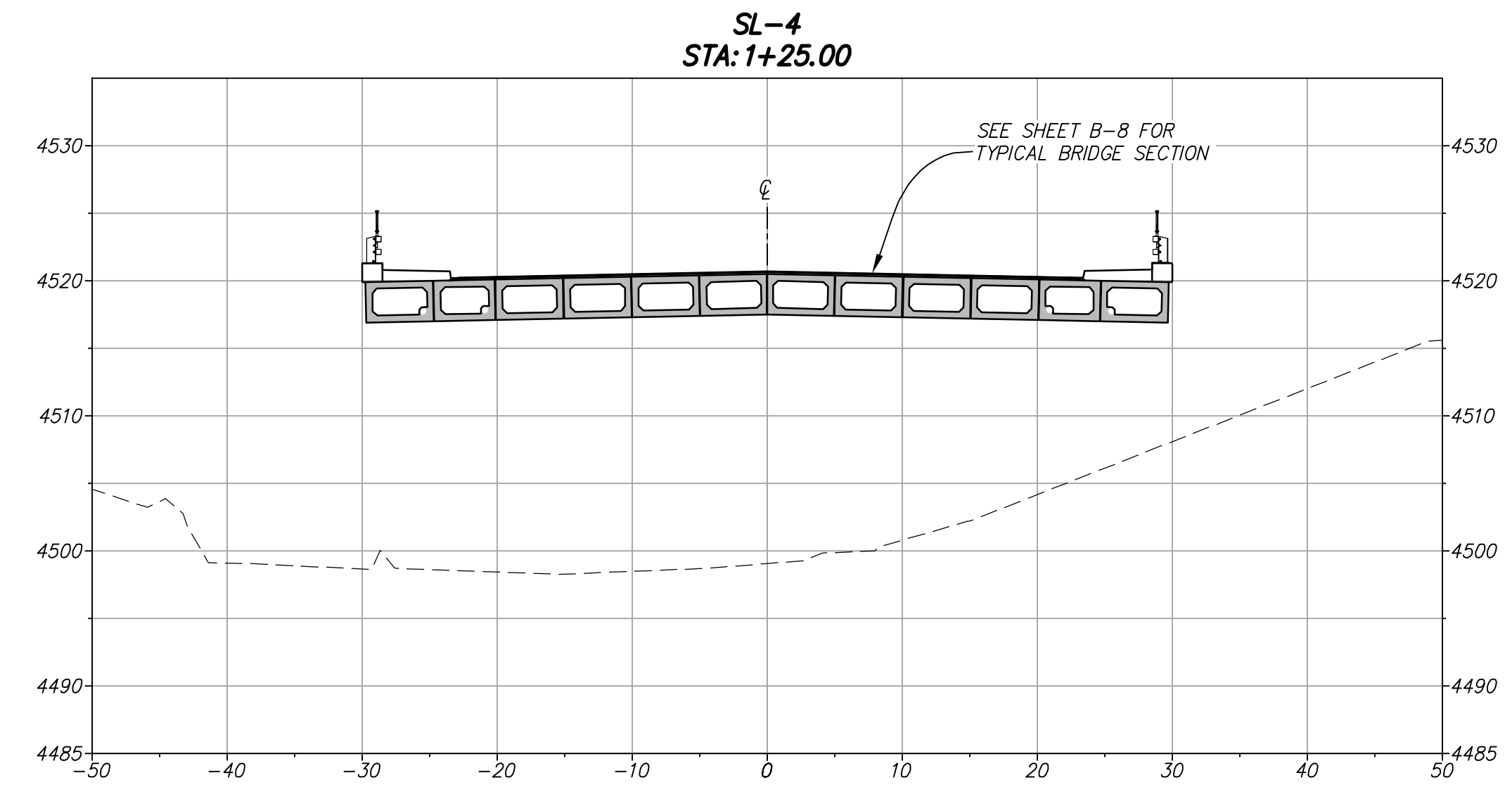
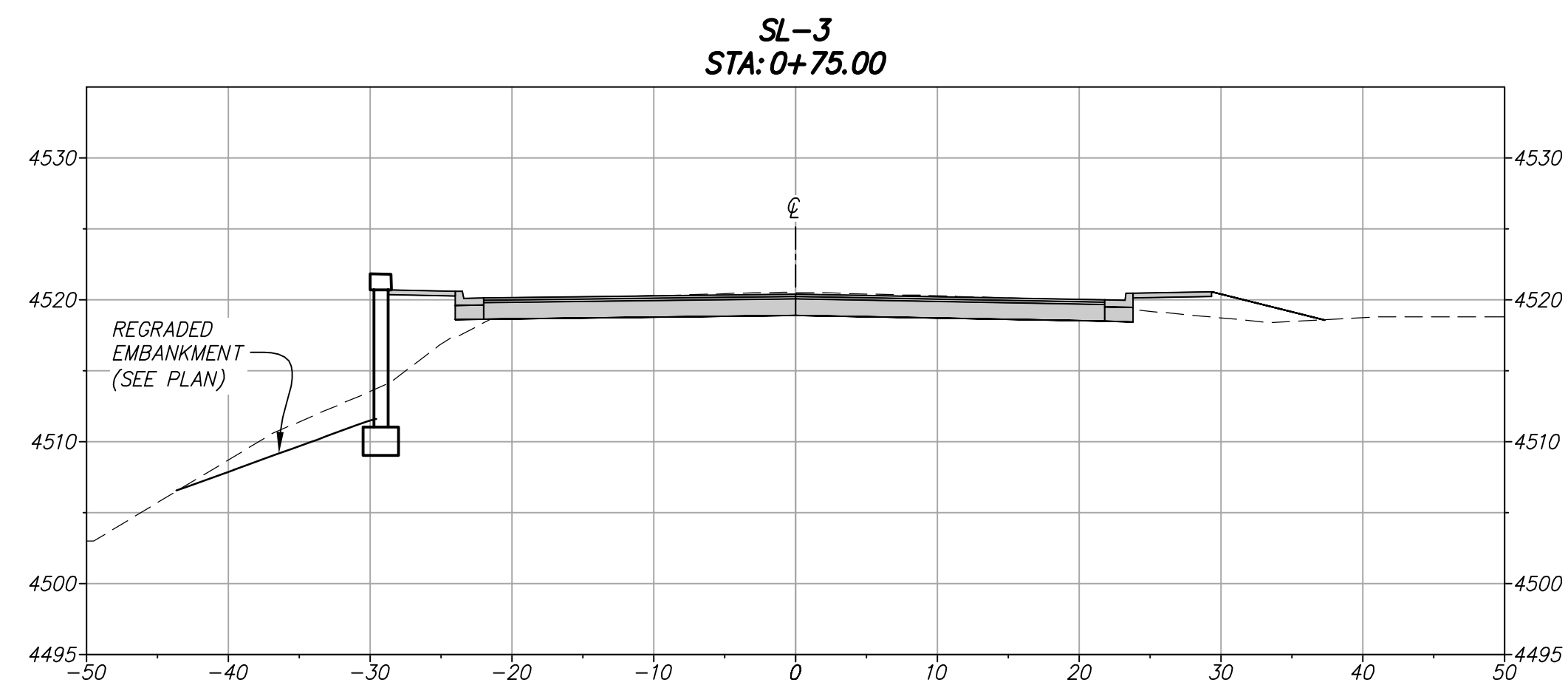
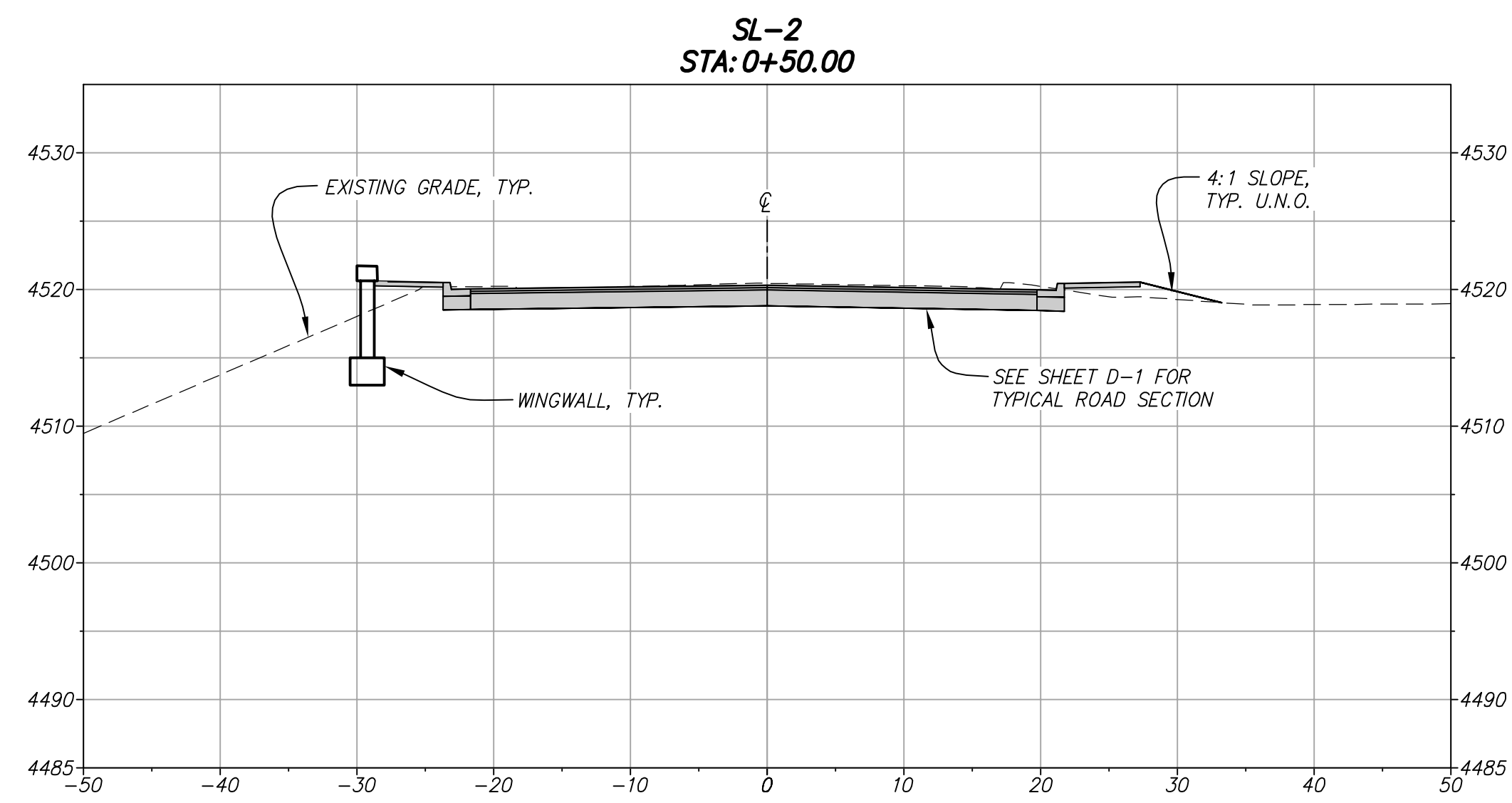
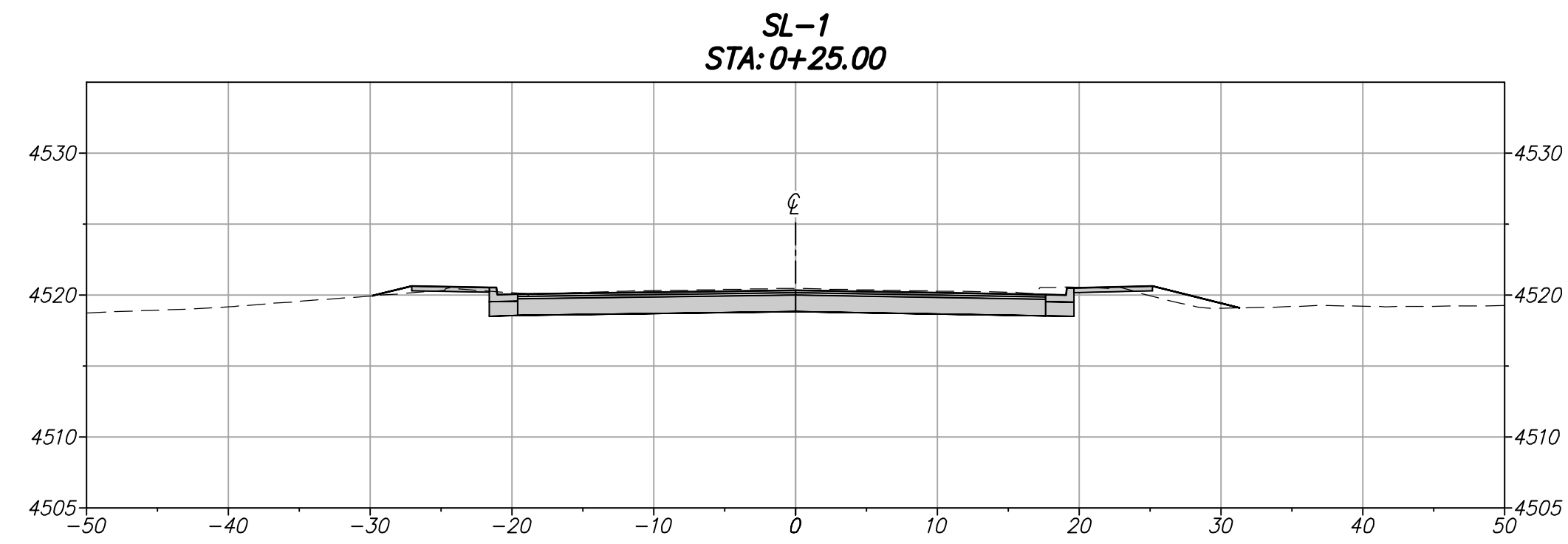


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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 FOUNDATION PLANS AND PROFILES

PROJECT 7121.74610.01
 DATE 12/27/2017

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17.5 ROAD BRIDGE OVER LITTLE SALT WASH
ROAD CROSS SECTIONS (1 OF 2)

PROJECT 7121.74610.01
DATE 12/27/2017

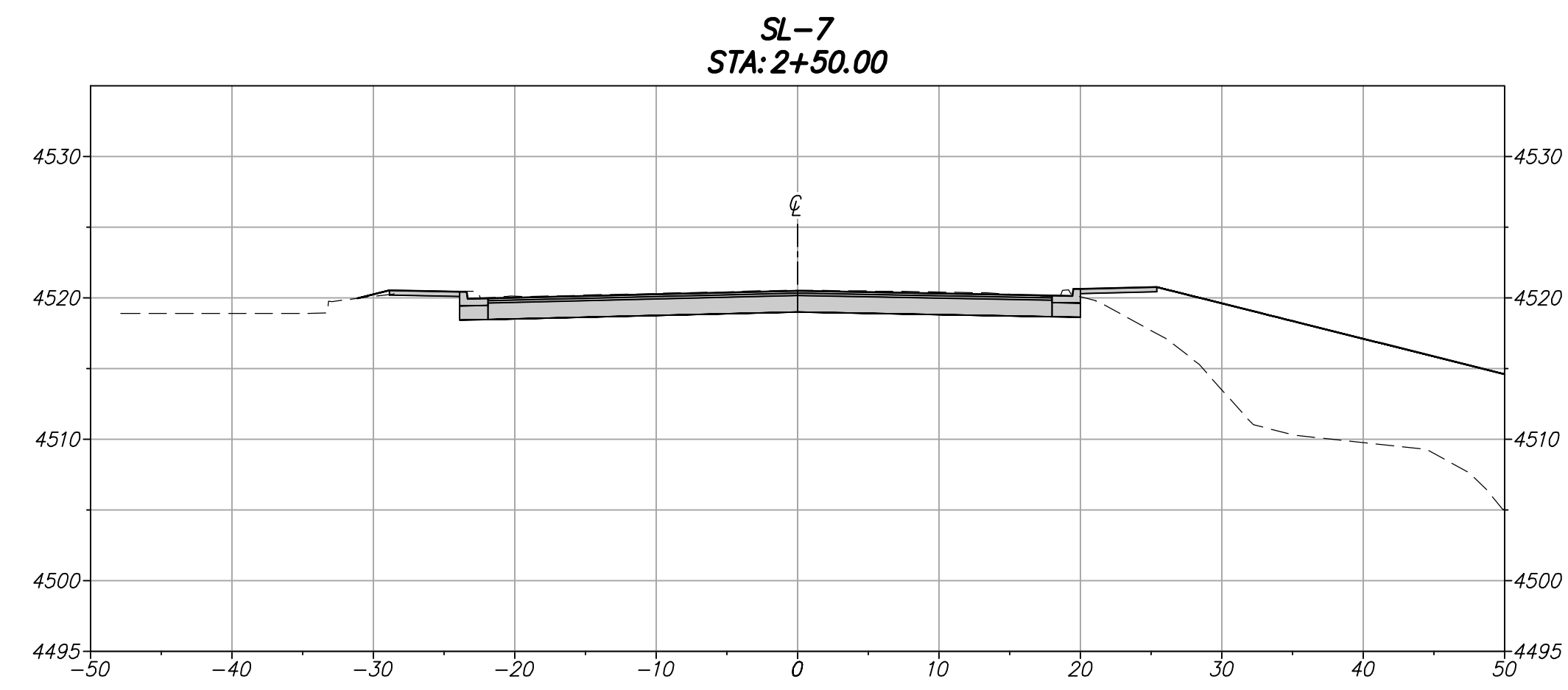
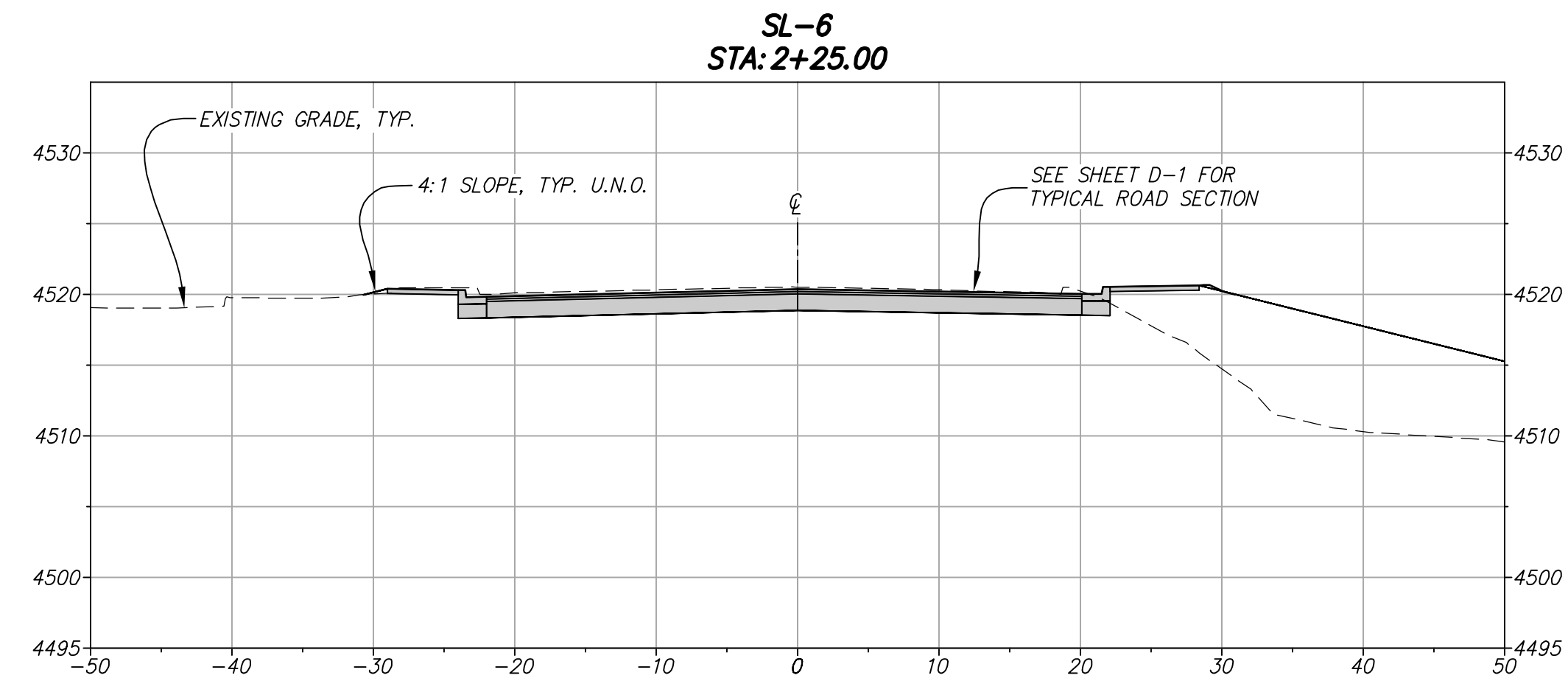
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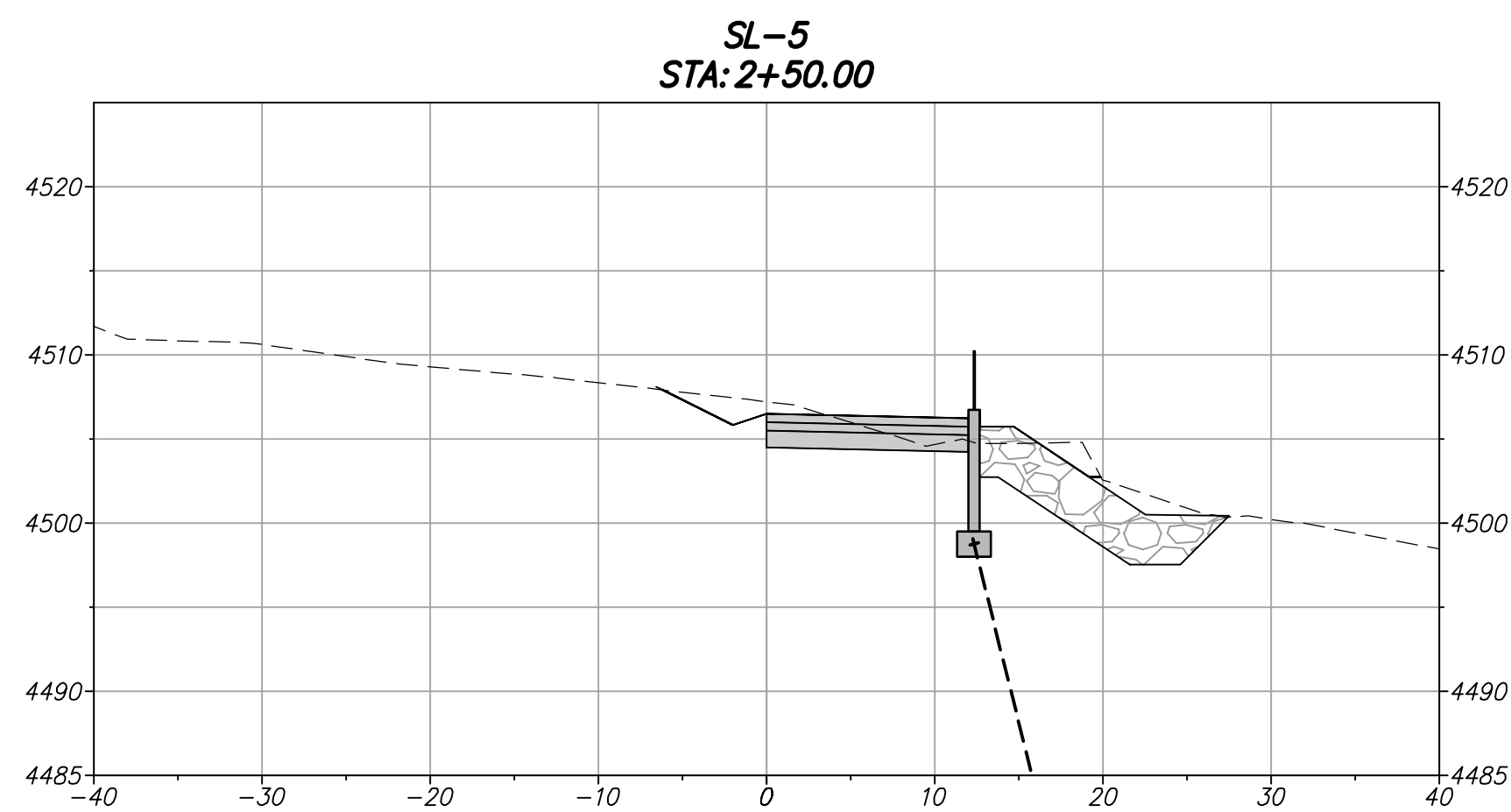
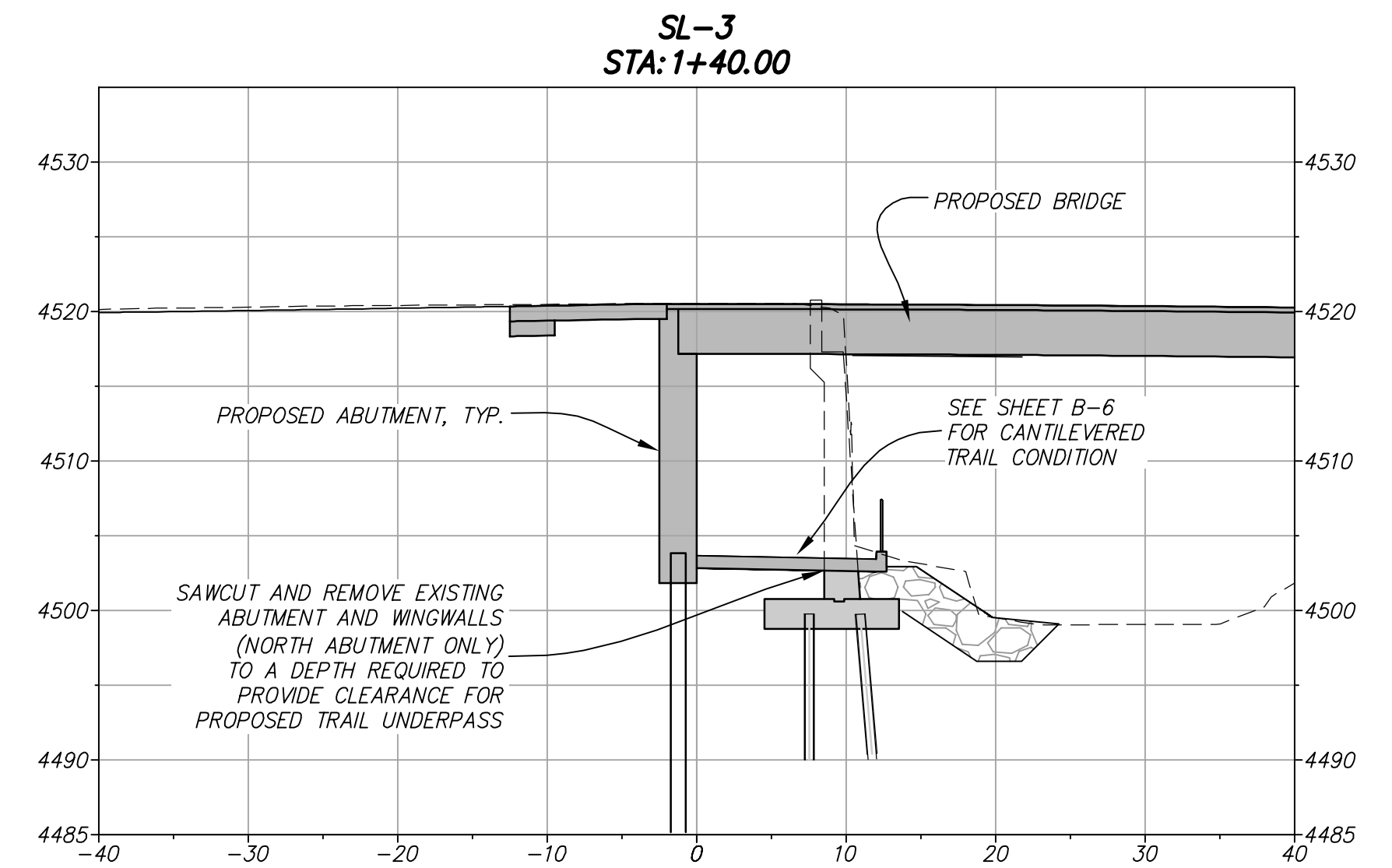
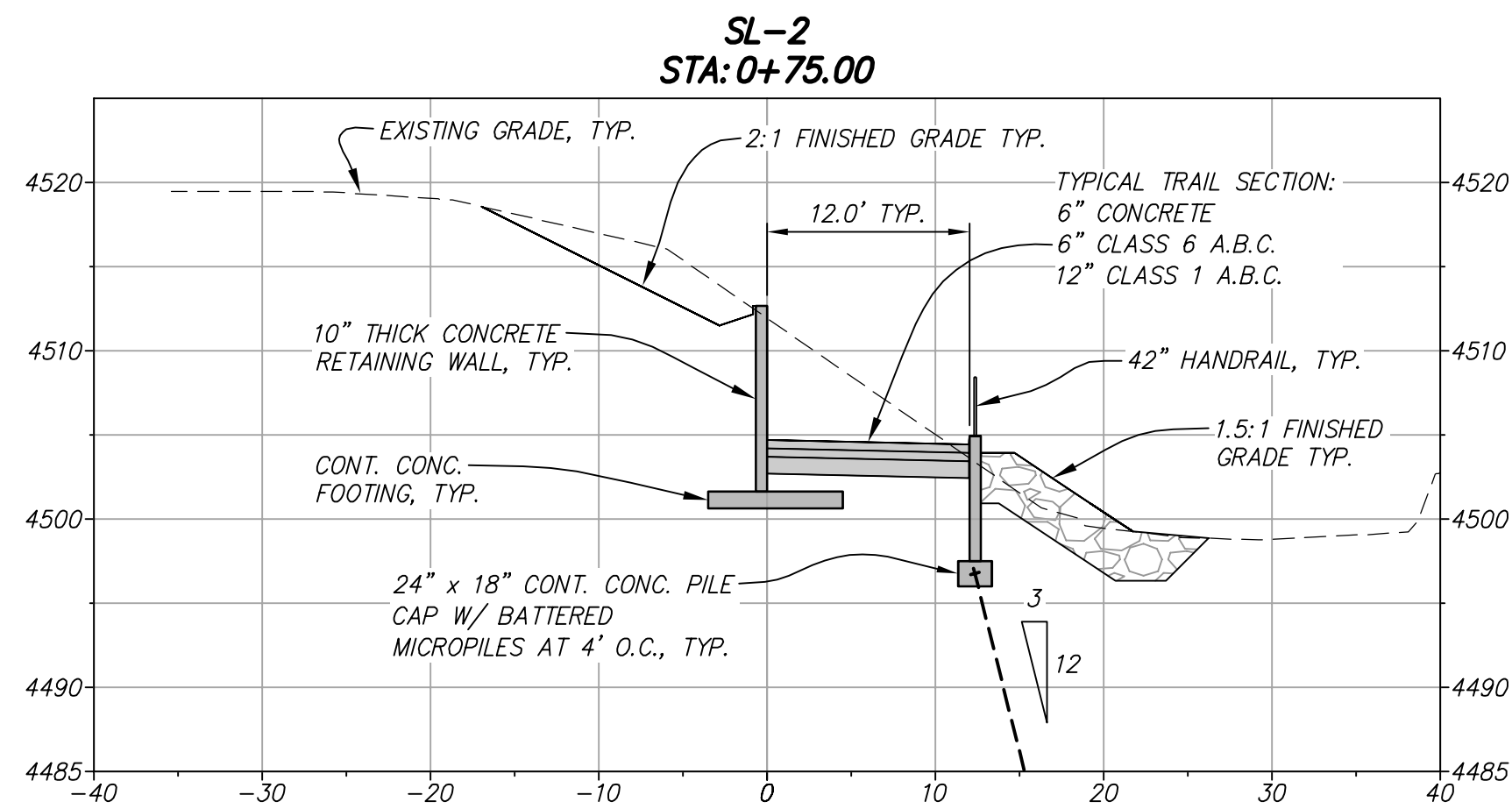
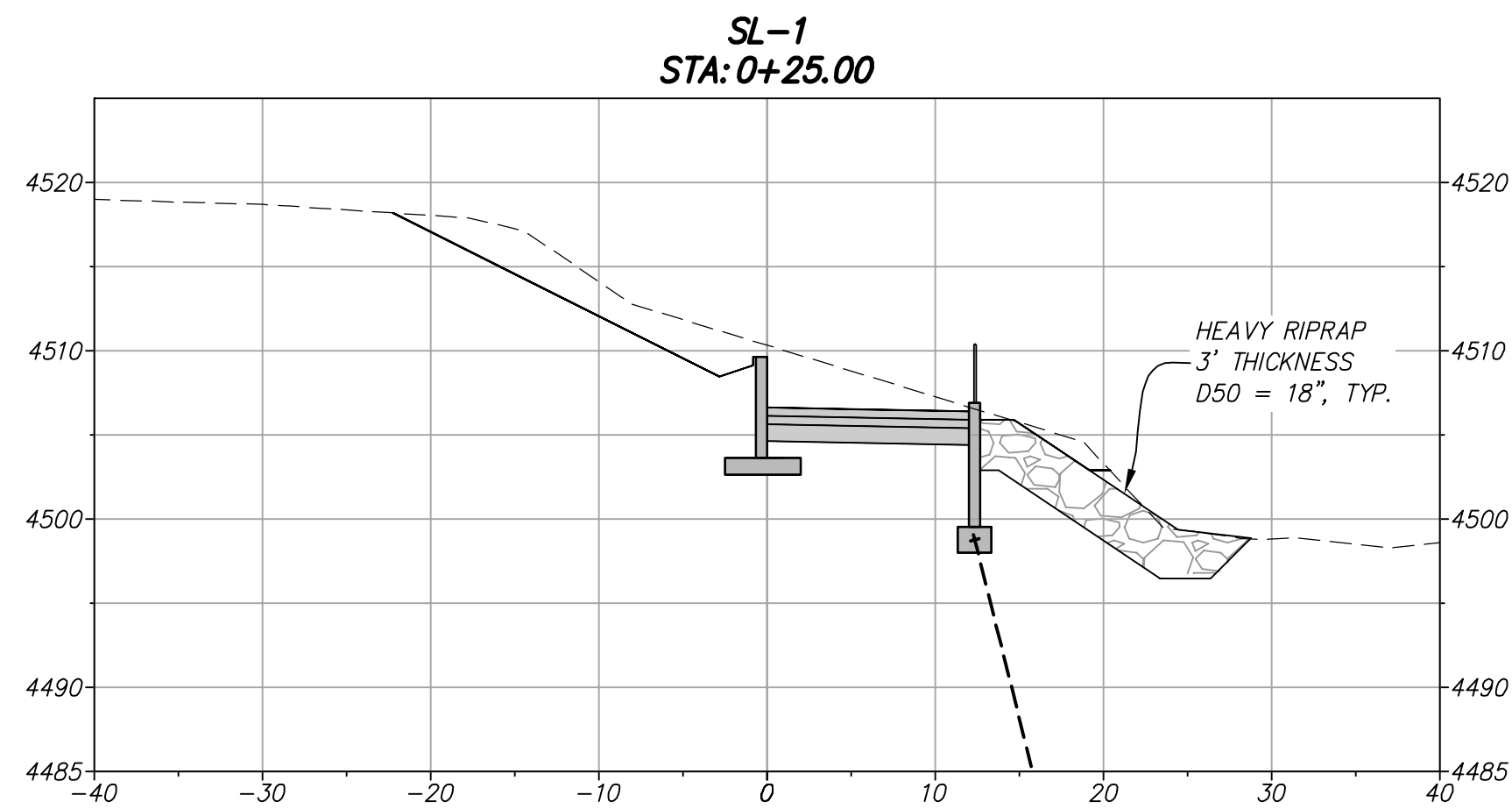
CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
ROAD CROSS SECTIONS (2 OF 2)

PROJECT 7121.74610.01
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
TRAIL CROSS SECTIONS

PROJECT 7121.74610.01
DATE 12/27/2017

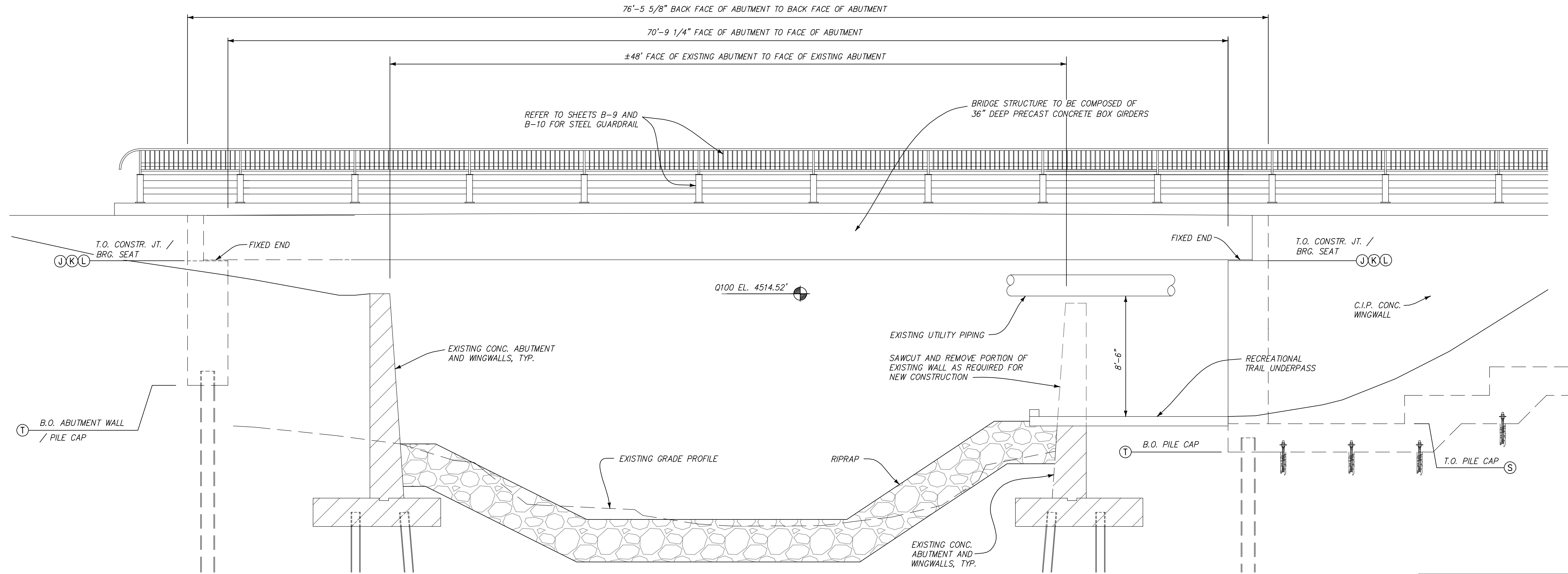
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X-3

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BRIDGE ELEVATION
NOT TO SCALE

ISSUED FOR BID



ELEVATION TABLE

MARK	NORTH ABUTMENT	SOUTH ABUTMENT
(A)	4519.45	4519.54
(B)	4520.03	4520.01
(C)	4519.54	4519.51
(D)	4518.79	4518.87
(E)	4519.35	4519.33
(F)	4518.89	4518.94
(G)	4516.41	4516.49
(H)	4516.98	4516.96
(I)	4516.49	4516.46
(J)	4516.40	4516.48
(K)	4516.96	4516.94
(L)	4516.49	4516.41
(M)	4520.60	4520.61
(N)	4520.63	4520.72
(O)	4520.51	4520.53
(P)	4520.57	4518.50
(Q)	4516.40	4516.48
(R)	4516.49	4516.41
(S)	VARIES, SEE SHEET C-7	
(T)	VARIES, SEE SHEET C-7	

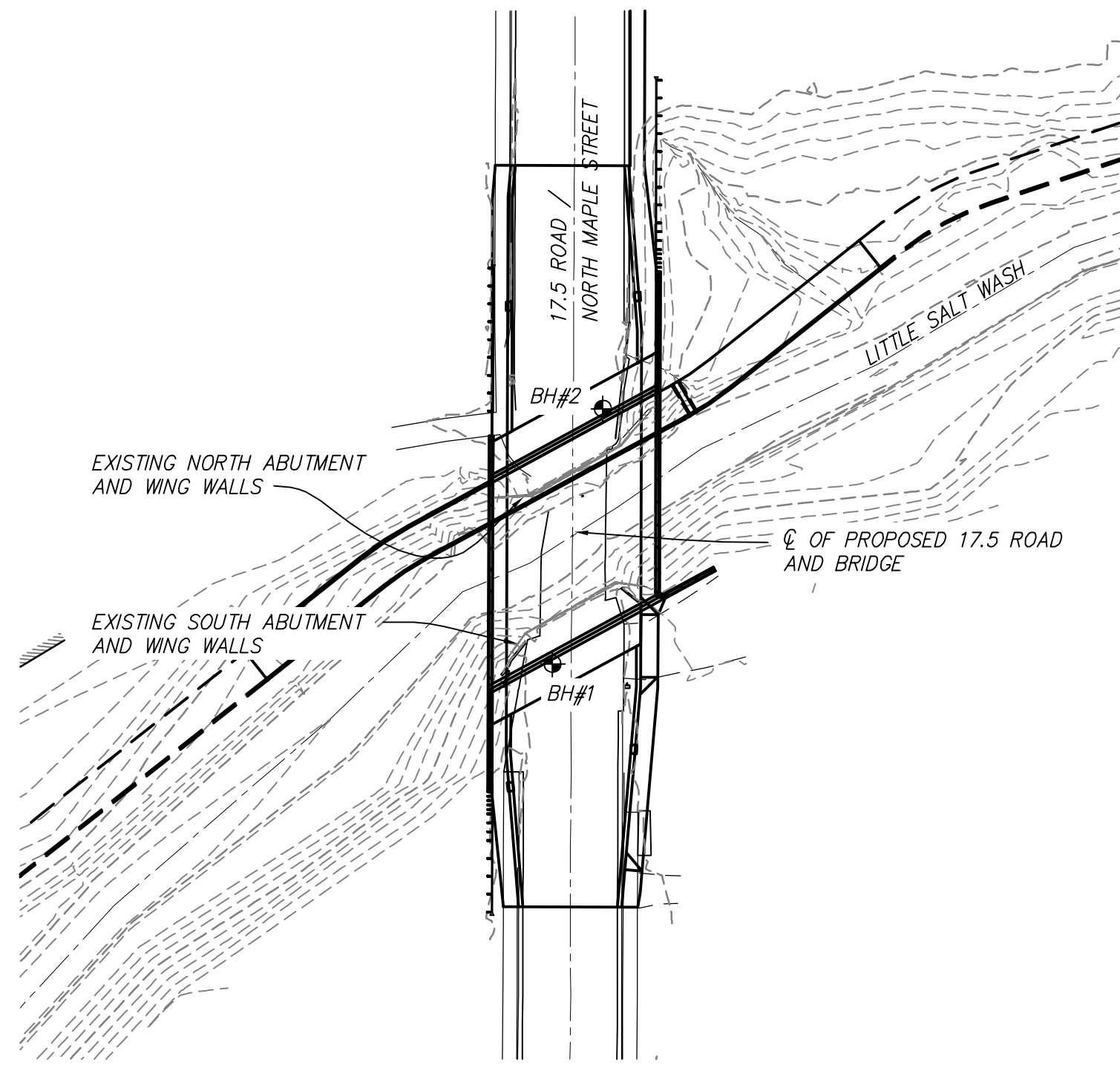
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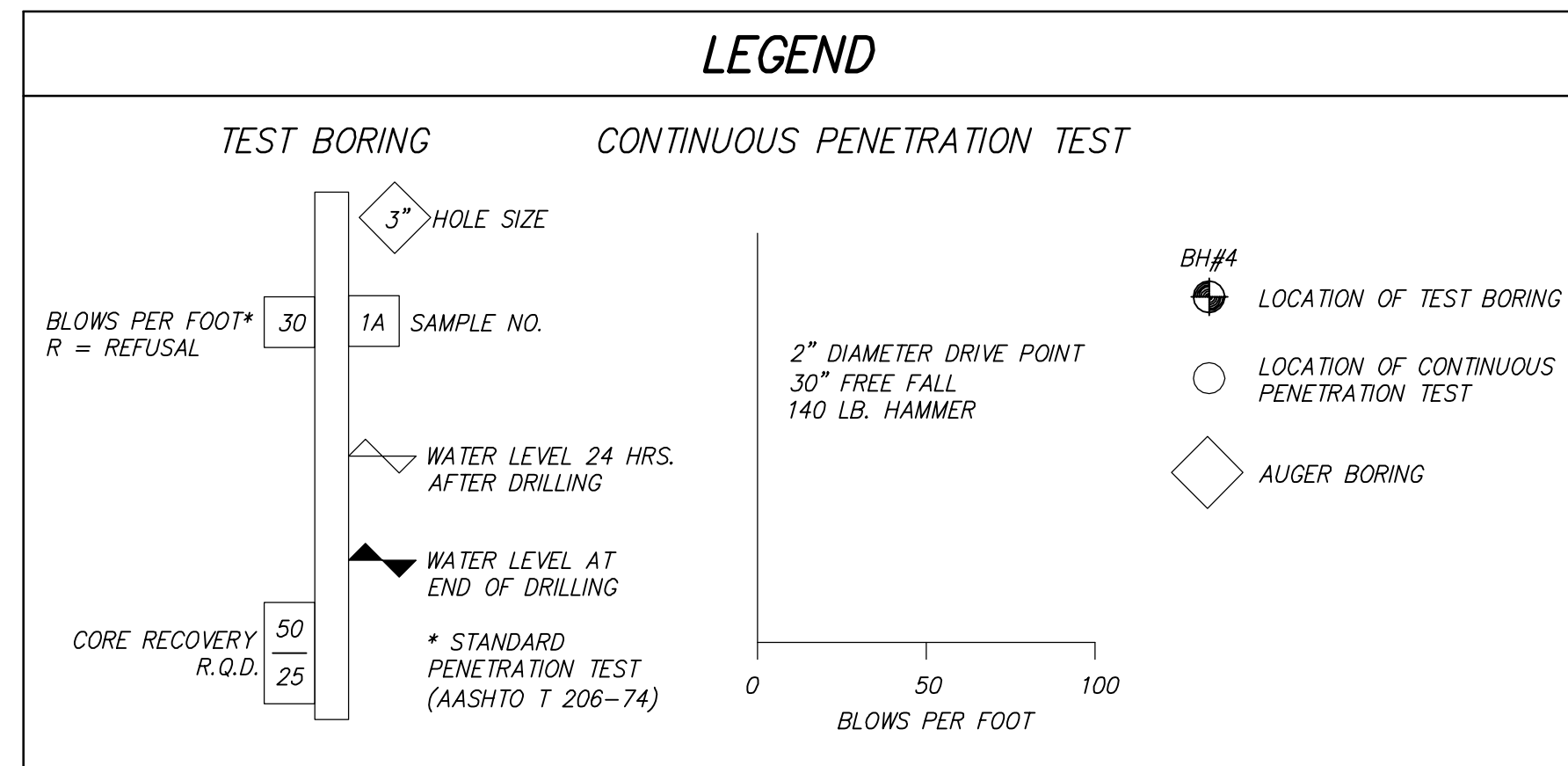
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 SCHEMATIC BRIDGE ELEVATION

PROJECT 7121.74610.01
 DATE 12/27/2017

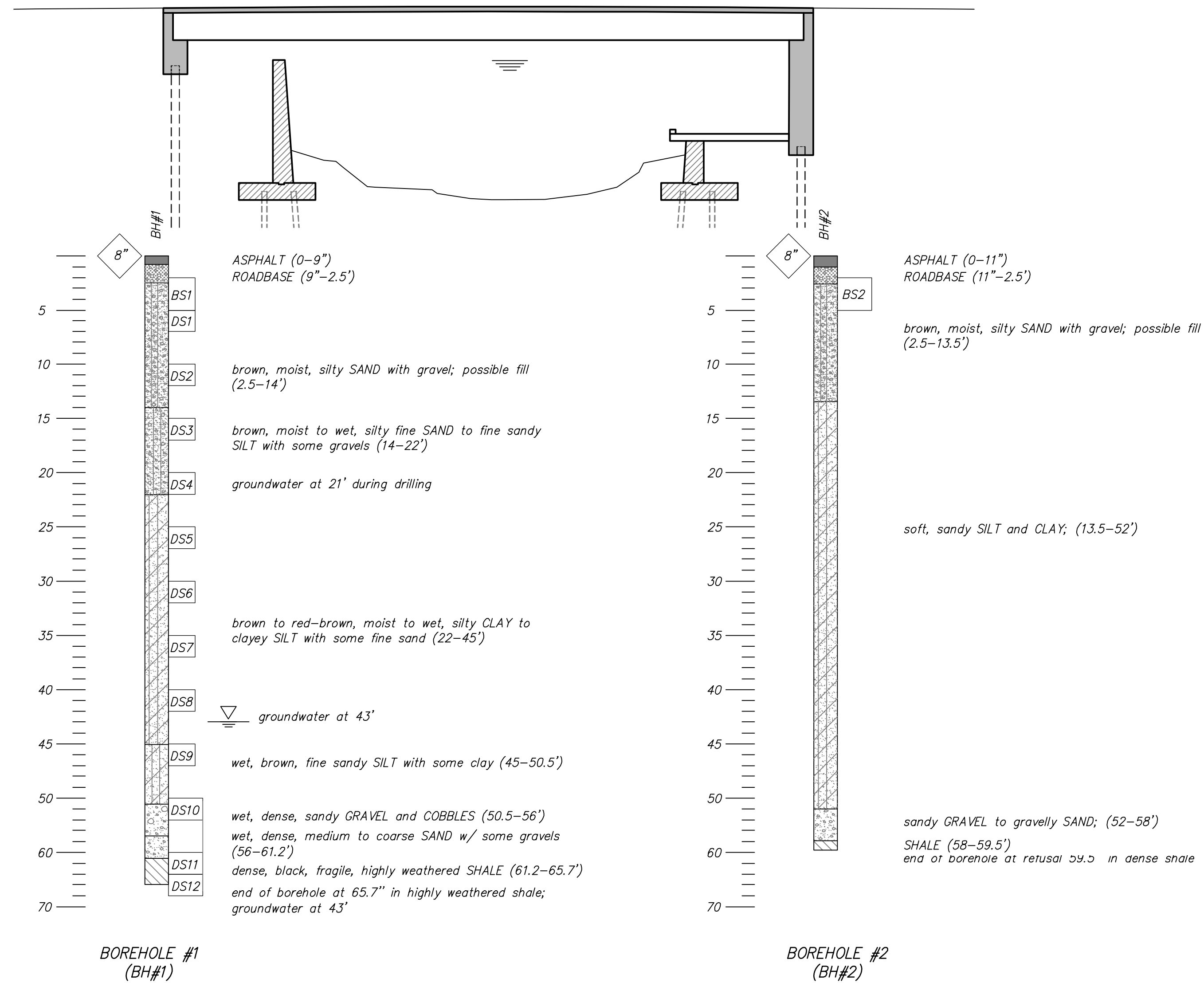


BORE HOLE LOCATION PLAN
NOT TO SCALE



NOTES

1. THE EXPLORATORY BORINGS WERE DRILLED ON OCTOBER 4, 2016 WITH AN 8" HOLLOW-STEM CONTINUOUS FLIGHT AUGER.
2. THE HORIZONTAL AND VERTICAL LOCATIONS OF THE EXPLORATORY BORINGS WERE MEASURED BY A FIELD TOPOGRAPHICAL SURVEY BY DOWL, AND SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. THE LINES BETWEEN MATERIALS SHOWN IN THE EXPLORATORY BORING LOGS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES, AND THE ACTUAL TRANSITIONS MAY BE GRADUAL.
4. GROUND WATER LEVELS SHOWN ON THE LOGS WERE MEASURED AT THE TIME, AND UNDER THE CONDITIONS INDICATED. FLUCTUATIONS IN THE WATER LEVEL MAY OCCUR WITH TIME.
5. FOR BORING LOGS AND MORE DETAILED INFORMATION, SEE GEOTECHNICAL REPORT BY DOWL, INC. DATED DECEMBER 15, 2016.



BRIDGE ELEVATION w/ BORE HOLES
NOT TO SCALE

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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
ENGINEERING GEOLOGY

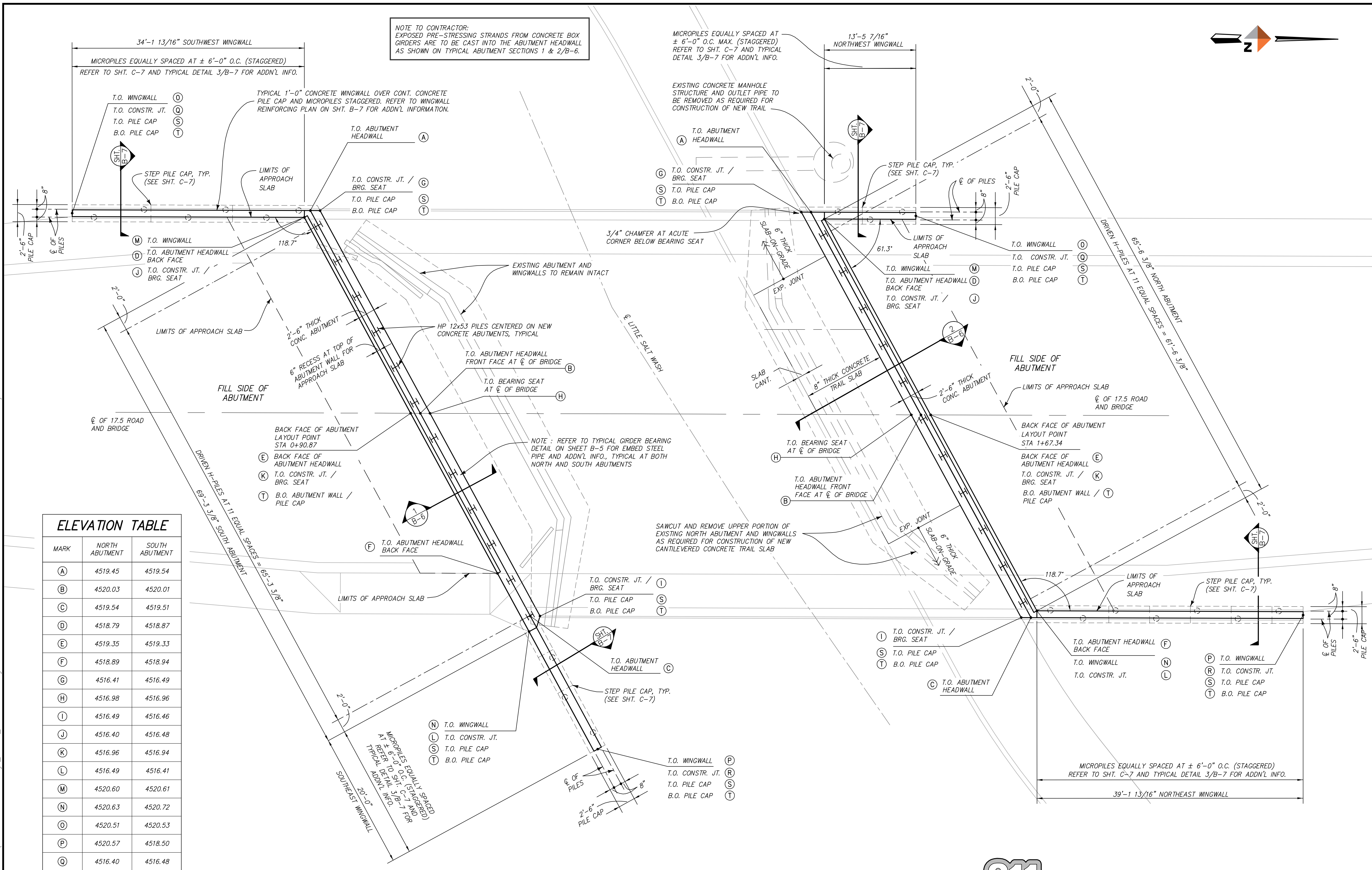
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NOTE TO CONTRACTOR:
EXPOSED PRE-STRESSING STRANDS FROM CONCRETE BOX GIRDERS ARE TO BE CAST INTO THE ABUTMENT HEADWALL AS SHOWN ON TYPICAL ABUTMENT SECTIONS 1 & 2/B-6.

MICROPILES EQUALLY SPACED AT ± 6'-0" O.C. (STAGGERED) REFER TO SHT. C-7 AND TYPICAL DETAIL 3/B-7 FOR ADD'L INFO.

EXISTING CONCRETE MANHOLE STRUCTURE AND OUTLET PIPE TO BE REMOVED AS REQUIRED FOR CONSTRUCTION OF NEW TRAIL

3/4" CHAMFER AT ACUTE CORNER BELOW BEARING SEAT

NOTE: REFER TO TYPICAL GIRDER BEARING DETAIL ON SHEET B-5 FOR EMBED STEEL PIPE AND ADD'L INFO, TYPICAL AT BOTH NORTH AND SOUTH ABUTMENTS

SAWCUT AND REMOVE UPPER PORTION OF EXISTING NORTH ABUTMENT AND WINGWALLS AS REQUIRED FOR CONSTRUCTION OF NEW CANTILEVERED CONCRETE TRAIL SLAB

ELEVATION TABLE		
MARK	NORTH ABUTMENT	SOUTH ABUTMENT
(A)	4519.45	4519.54
(B)	4520.03	4520.01
(C)	4519.54	4519.51
(D)	4518.79	4518.87
(E)	4519.35	4519.33
(F)	4518.89	4518.94
(G)	4516.41	4516.49
(H)	4516.98	4516.96
(I)	4516.49	4516.46
(J)	4516.40	4516.48
(K)	4516.96	4516.94
(L)	4516.49	4516.41
(M)	4520.60	4520.61
(N)	4520.63	4520.72
(O)	4520.51	4520.53
(P)	4520.57	4518.50
(Q)	4516.40	4516.48
(R)	4516.49	4516.41
(S)	VARIES, SEE SHEET C-7	
(T)	VARIES, SEE SHEET C-7	

ABUTMENT / WINGWALL LAYOUT PLAN
NOT TO SCALE



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REV	DATE	DESCRIPTION



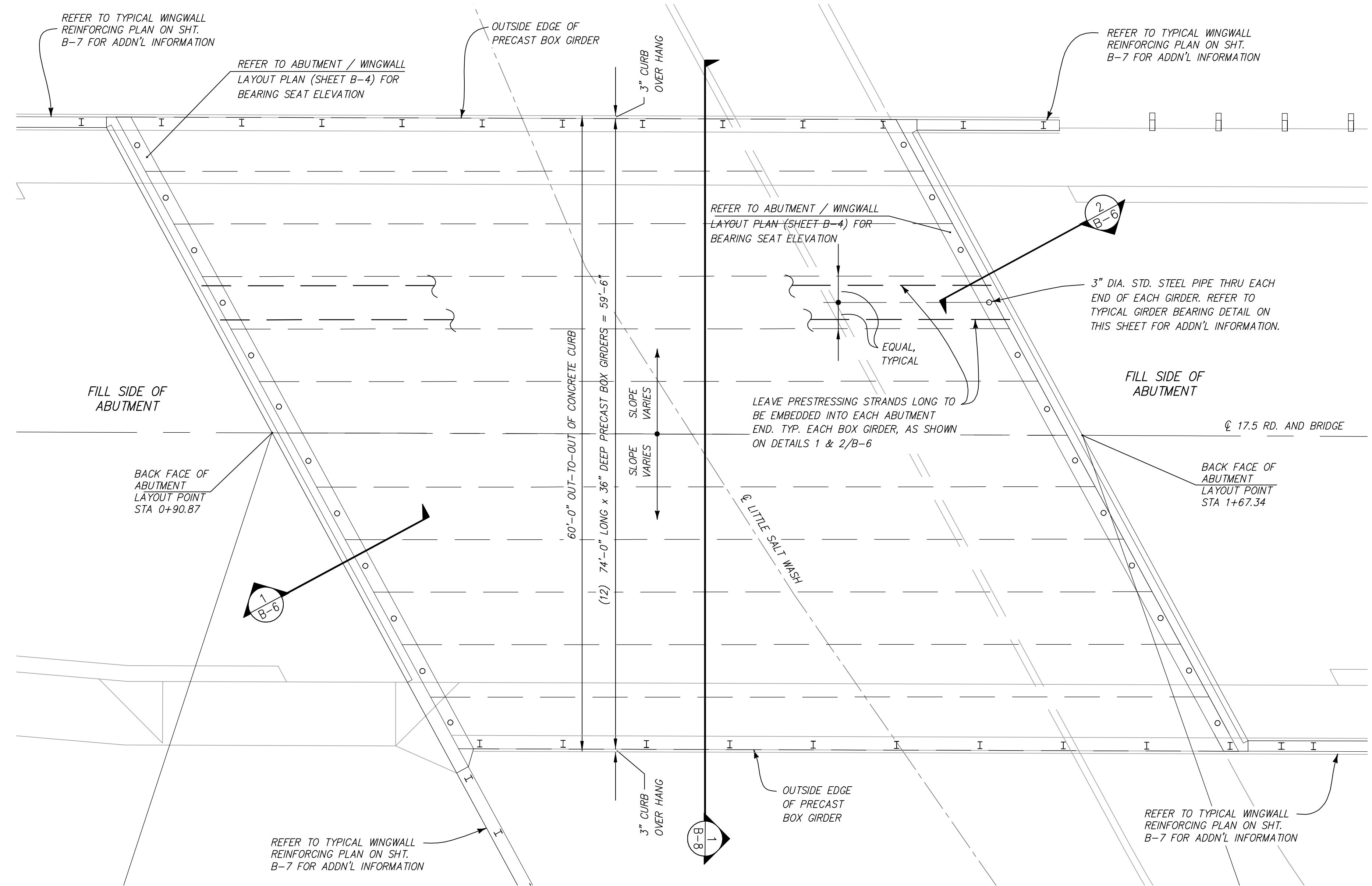
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
ABUTMENT / WINGWALL LAYOUT PLAN

PROJECT 7121.74610.01
DATE 12/27/2017

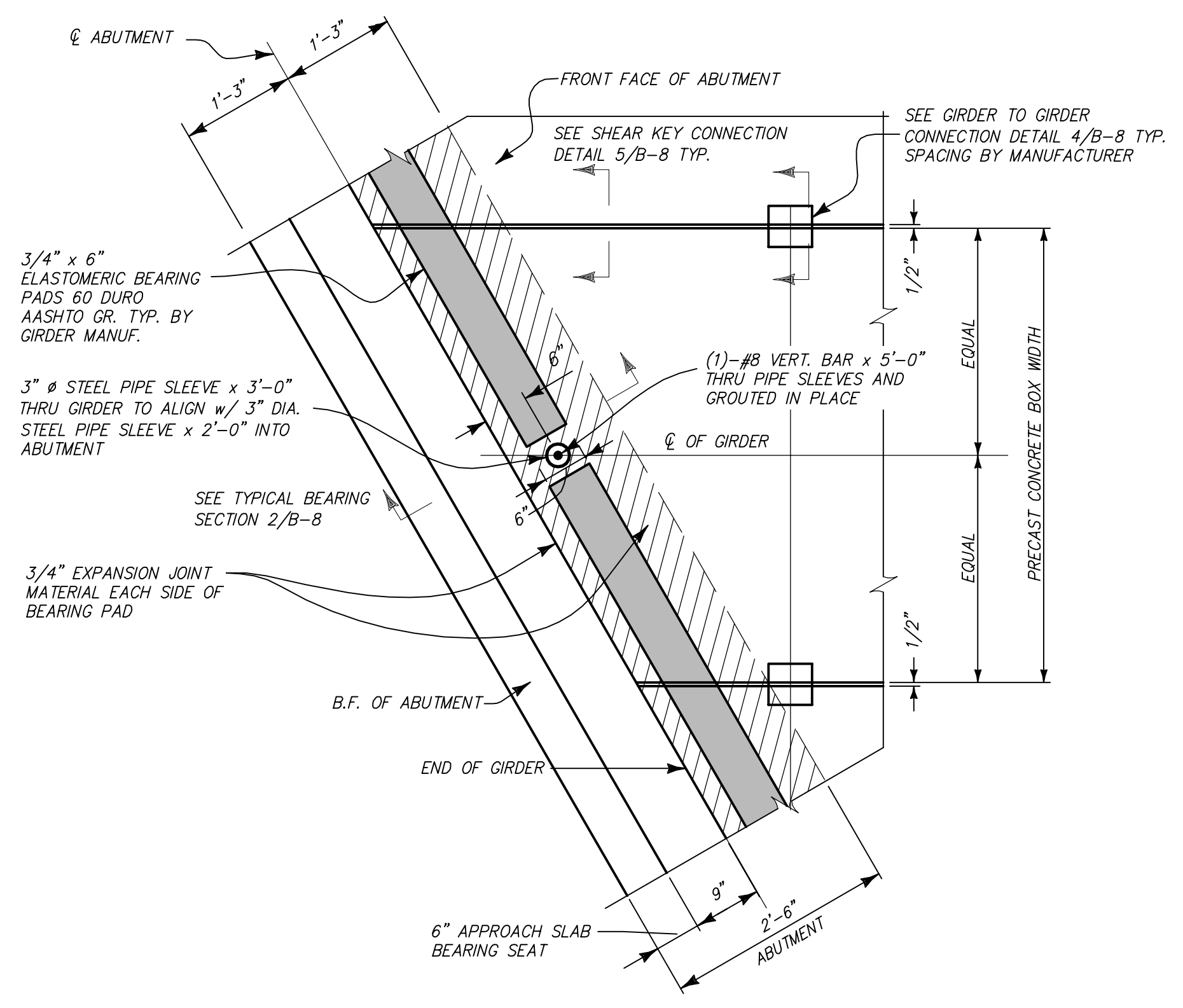
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B-4

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PRECAST CONCRETE BOX GIRDER LAYOUT PLAN
NOT TO SCALE

NOTE : REFER TO ABUTMENT / WINGWALL LAYOUT PLAN ON SHT. B-4 FOR ELEVATIONS AND ADD'L INFORMATION.



TYPICAL PRECAST CONCRETE BOX GIRDER BEARING DETAIL
NOT TO SCALE

PRECAST PRESTRESSED CONCRETE BOX GIRDERS

1. THE PRECAST GIRDERS SHALL BE DESIGNED FOR AASHTO HL-93 LOADING AND MEET THE REQUIREMENTS OF THE APPLICABLE AASHTO AND CDOT SPECIFICATIONS.
2. THE PRECAST GIRDERS DESIGN AND SHOP DRAWINGS SHALL BE CERTIFIED BY A COLORADO REGISTERED PROFESSIONAL ENGINEER AND SUBMITTED TO DOWL FOR APPROVAL.
3. ALL WORK NECESSARY TO FABRICATE AND INSTALL THE INTEGRAL PARTS OF THE PRECAST CONCRETE (INCLUDING ANY SPECIAL EMBEDDED ITEMS AND ELASTOMERIC BEARING PADS) AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE BID PRICE FOR ITEM #618 PRESTRESSED CONCRETE BOX.
4. THE PRECAST GIRDERS SHALL BE LIFTED, HANDLED, AND ANCHORED TO THE STRUCTURE AS PER THE MANUFACTURER'S RECOMMENDATIONS AND UNDER THE SUPERVISION OF A DESIGNATED MANUFACTURER'S REPRESENTATIVE.



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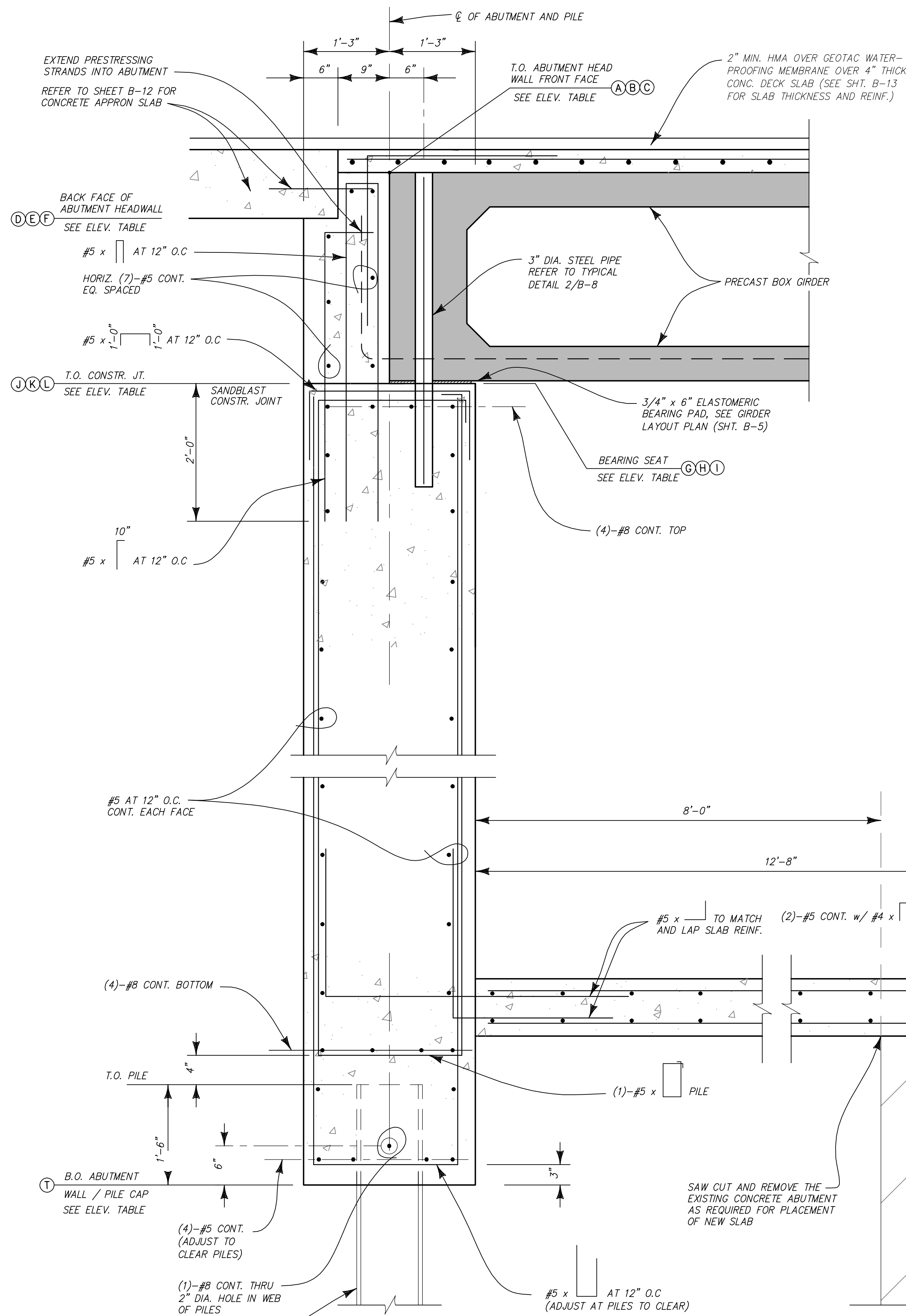
CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
PRECAST CONCRETE BOX GIRDER LAYOUT PLAN

PROJECT 7121.74610.01
DATE 12/27/2017

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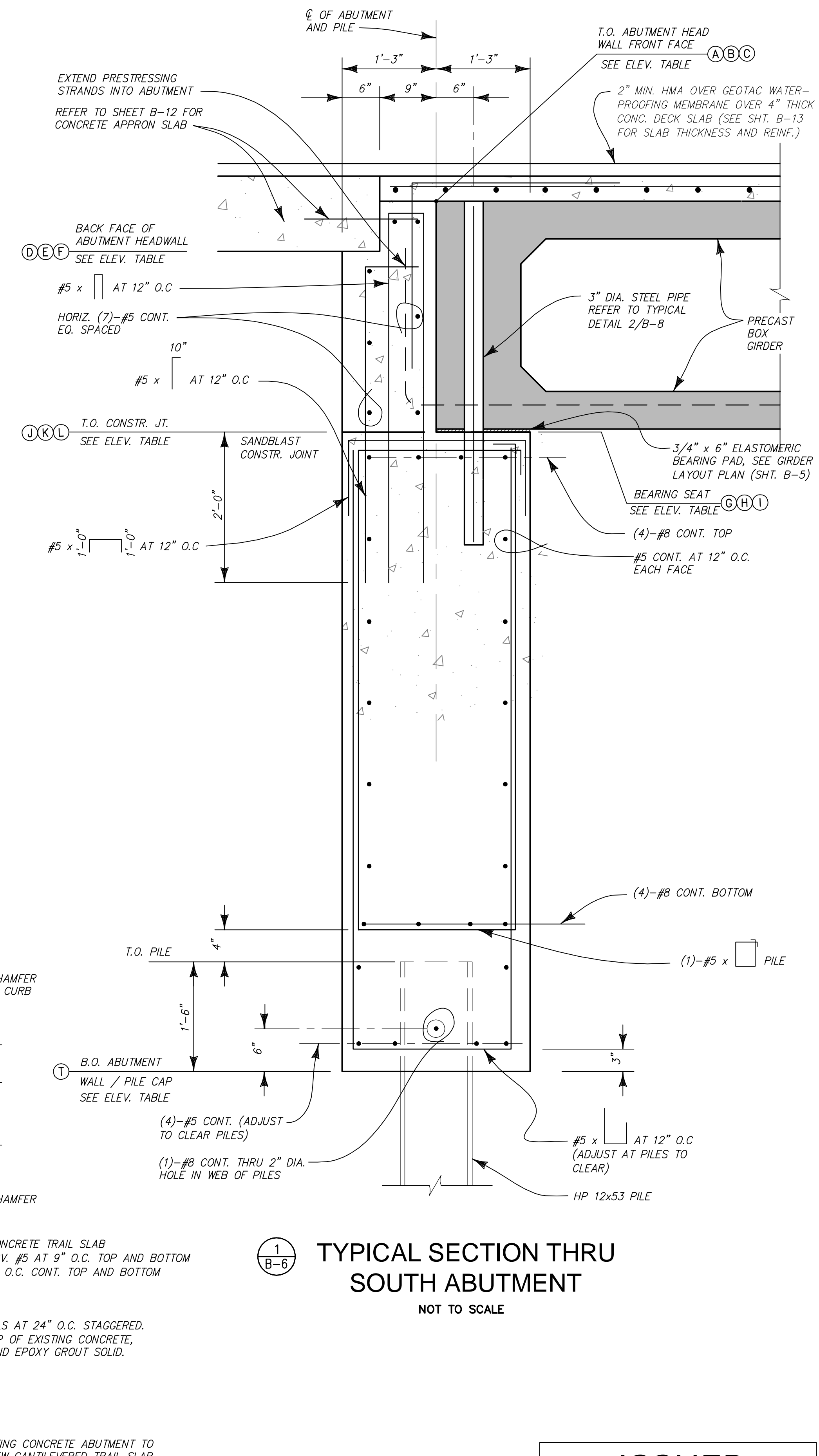
B-5

G:\21\74610-01\65CAD\Fruits 17.5 Road Bridge_Details_11-29-2017.dwg PLOT DATE 2017-12-26 15:49 SAVED DATE 2017-12-26 15:49 USER: jcarter



2
B-6
TYPICAL SECTION THRU NORTH ABUTMENT
NOT TO SCALE

ELEVATION TABLE		
MARK	NORTH ABUTMENT	SOUTH ABUTMENT
(A)	4519.45	4519.54
(B)	4520.03	4520.01
(C)	4519.54	4519.51
(D)	4518.79	4518.87
(E)	4519.35	4519.33
(F)	4518.89	4518.94
(G)	4516.41	4516.49
(H)	4516.98	4516.96
(I)	4516.49	4516.46
(J)	4516.40	4516.48
(K)	4516.96	4516.94
(L)	4516.49	4516.41
(M)	4520.60	4520.61
(N)	4520.63	4520.72
(O)	4520.51	4520.53
(P)	4520.57	4518.50
(Q)	4516.40	4516.48
(R)	4516.49	4516.41
(S)	VARIES, SEE SHEET C-7	
(T)		



1
B-6
TYPICAL SECTION THRU SOUTH ABUTMENT
NOT TO SCALE

ISSUED FOR BID

REVISIONS	DESCRIPTION
REV	DATE

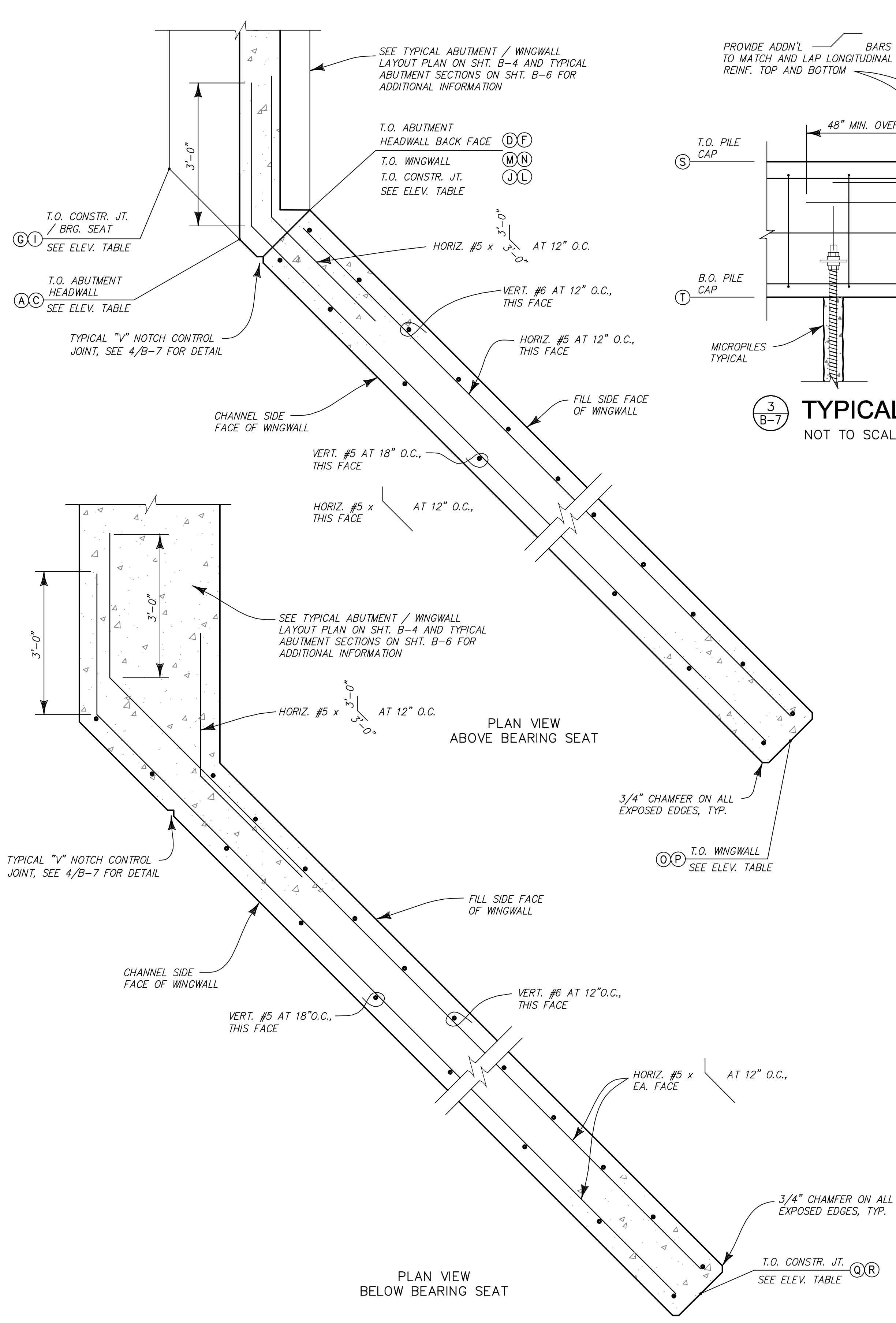
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 TYPICAL ABUTMENT SECTION AND DETAILS

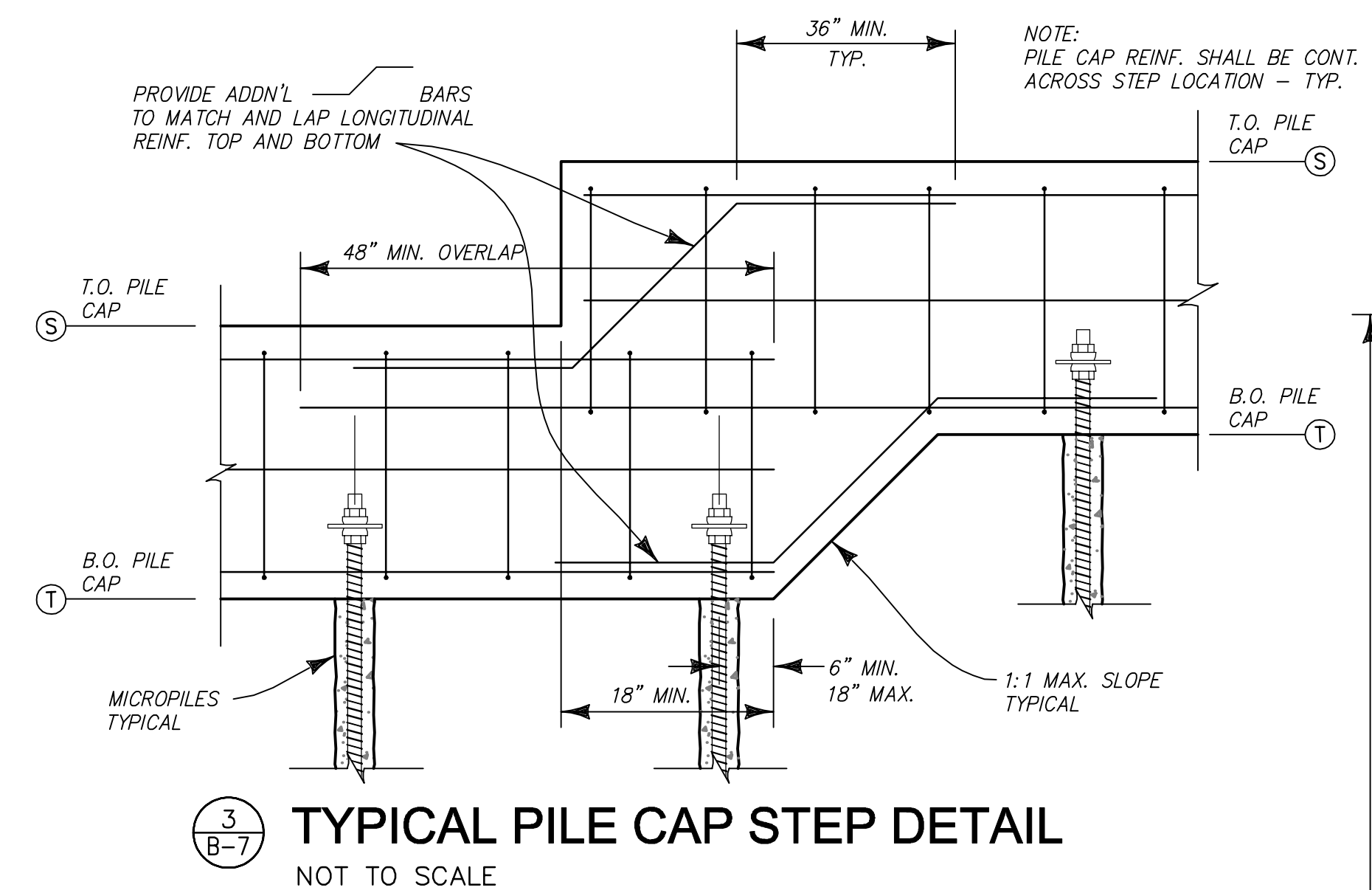
PROJECT 7121.74610.01
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 SHEET
B-6

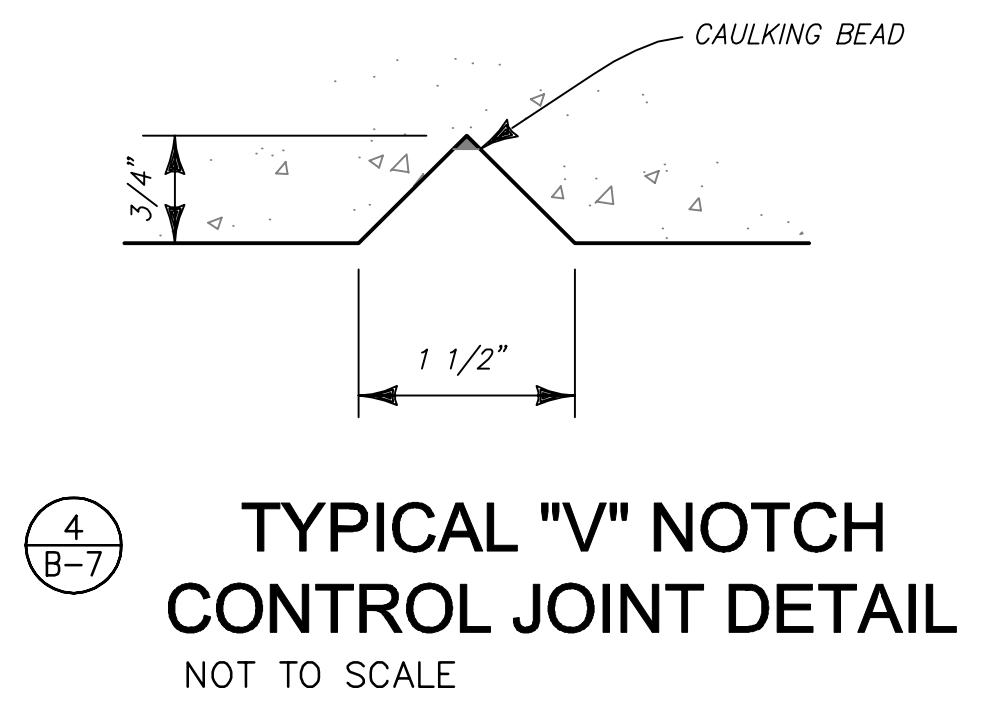
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1
B-7 **TYPICAL WINGWALL REINFORCING PLAN**
NOT TO SCALE

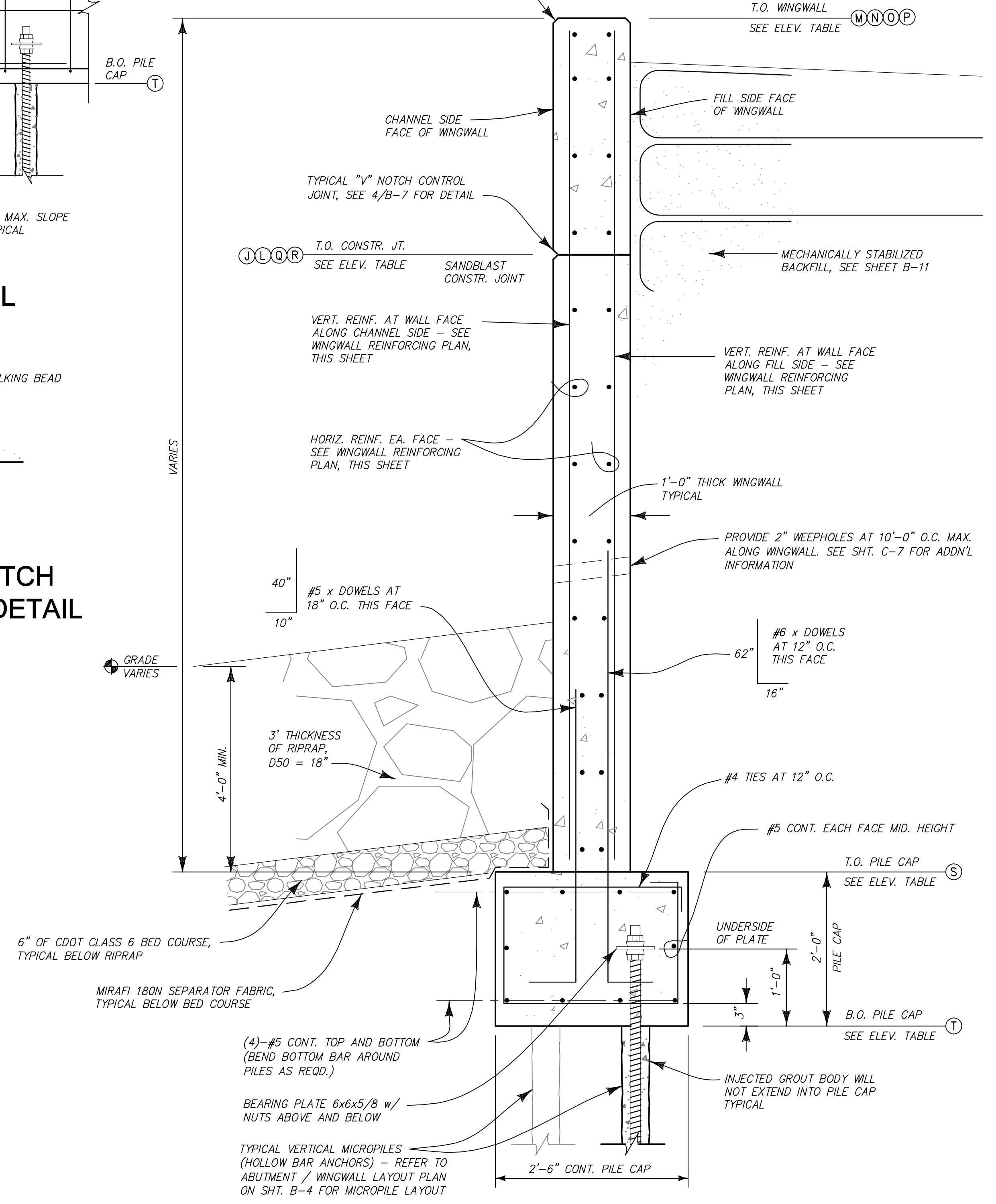


3
B-7 **TYPICAL PILE CAP STEP DETAIL**
NOT TO SCALE



4
B-7 **TYPICAL "V" NOTCH CONTROL JOINT DETAIL**
NOT TO SCALE

ELEVATION TABLE		
MARK	NORTH ABUTMENT	SOUTH ABUTMENT
A	4519.45	4519.54
B	4520.03	4520.01
C	4519.54	4519.51
D	4518.79	4518.87
E	4519.35	4519.33
F	4518.89	4518.94
G	4516.41	4516.49
H	4516.98	4516.96
I	4516.49	4516.46
J	4516.40	4516.48
K	4516.96	4516.94
L	4516.49	4516.41
M	4520.60	4520.61
N	4520.63	4520.72
O	4520.51	4520.53
P	4520.57	4518.50
Q	4516.40	4516.48
R	4516.49	4516.41
S	VARIES, SEE SHEET C-7	
T	VARIES, SEE SHEET C-7	



2
B-7 **TYPICAL WINGWALL SECTION**
NOT TO SCALE

ISSUED FOR BID

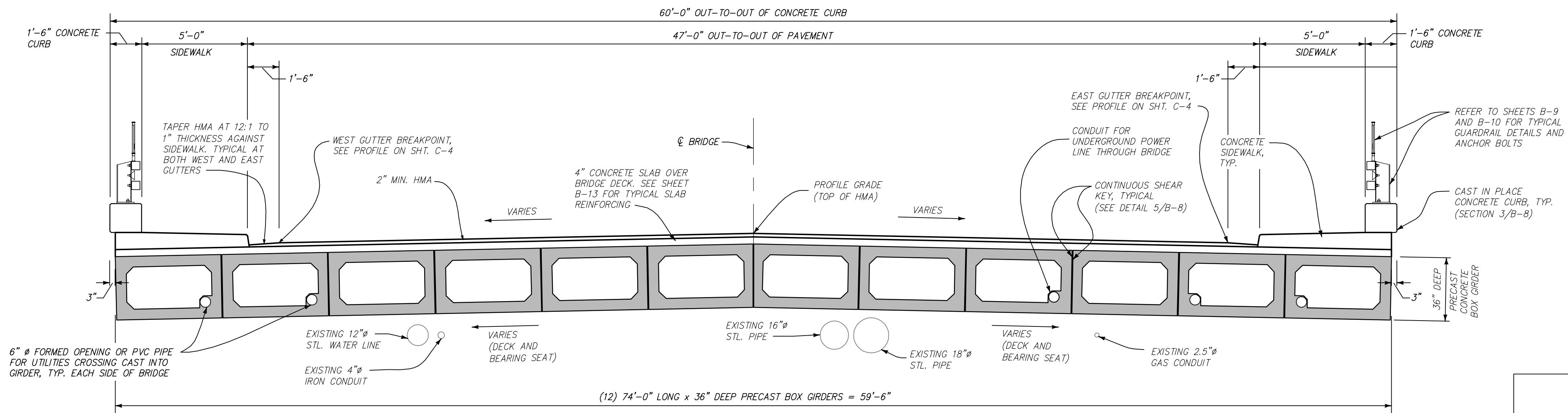
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
WINGWALL REINFORCING PLAN AND TYPICAL SECTION

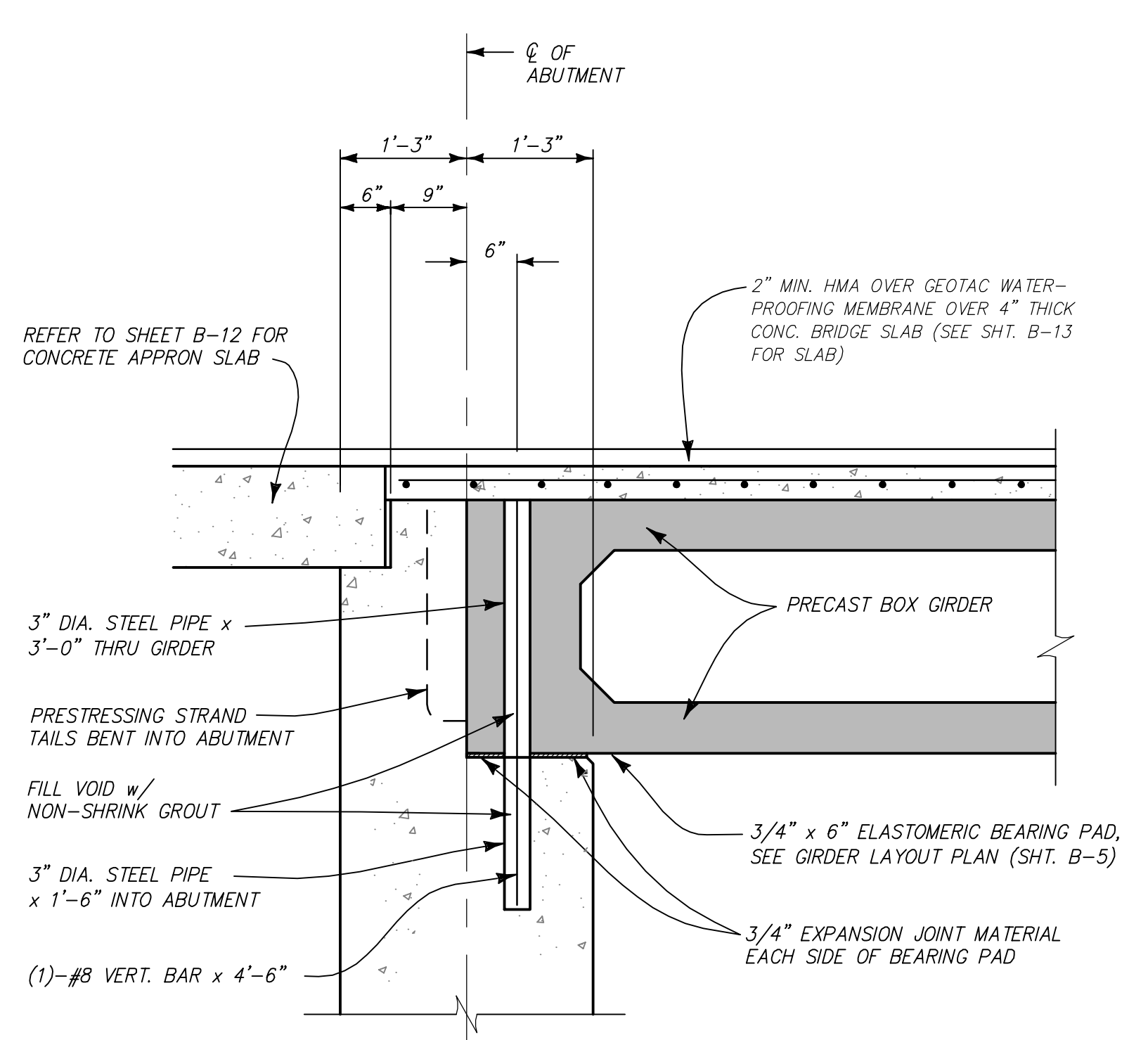
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SHEET
B-7

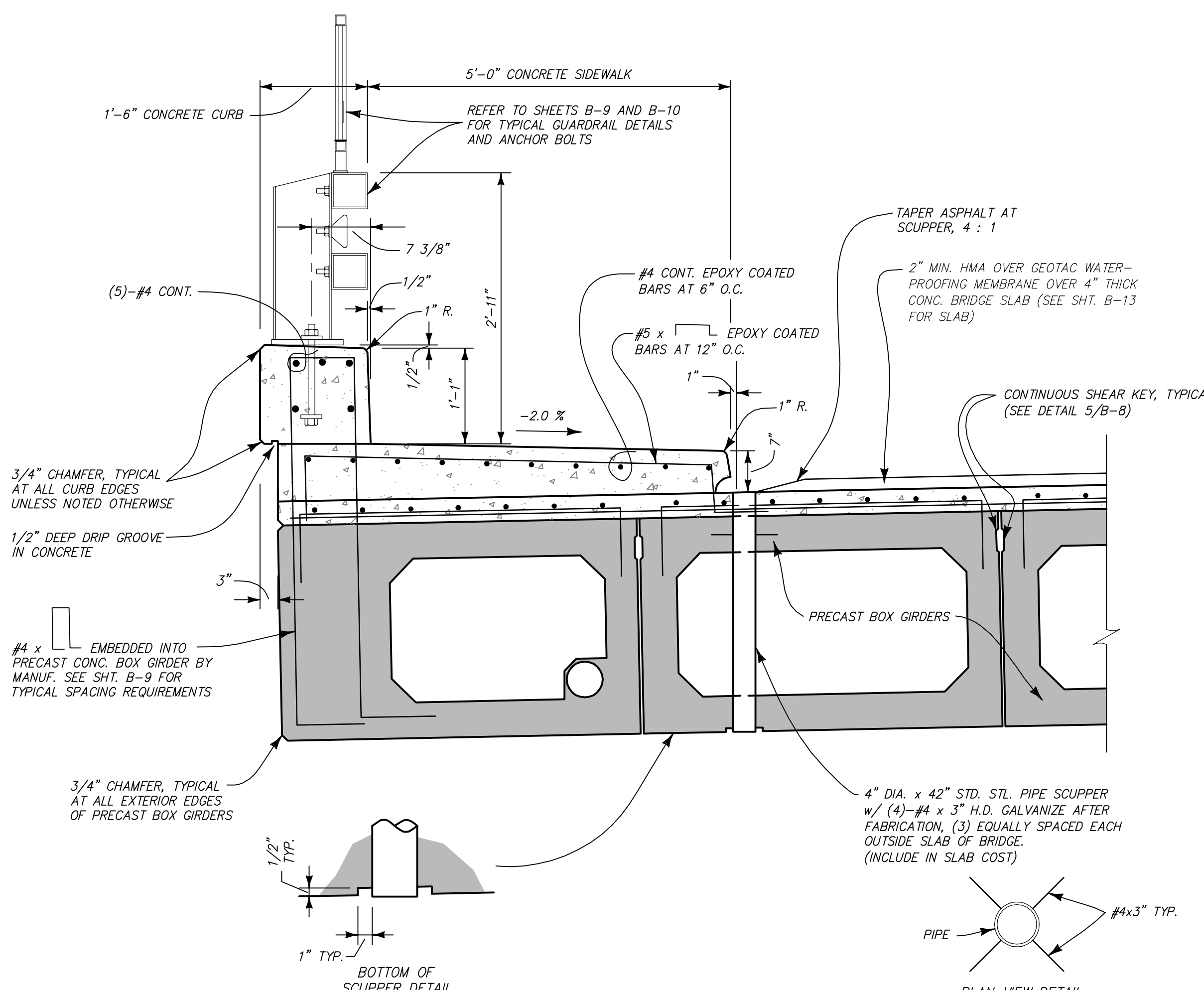


1 TYPICAL BRIDGE SECTION
NOT TO SCALE

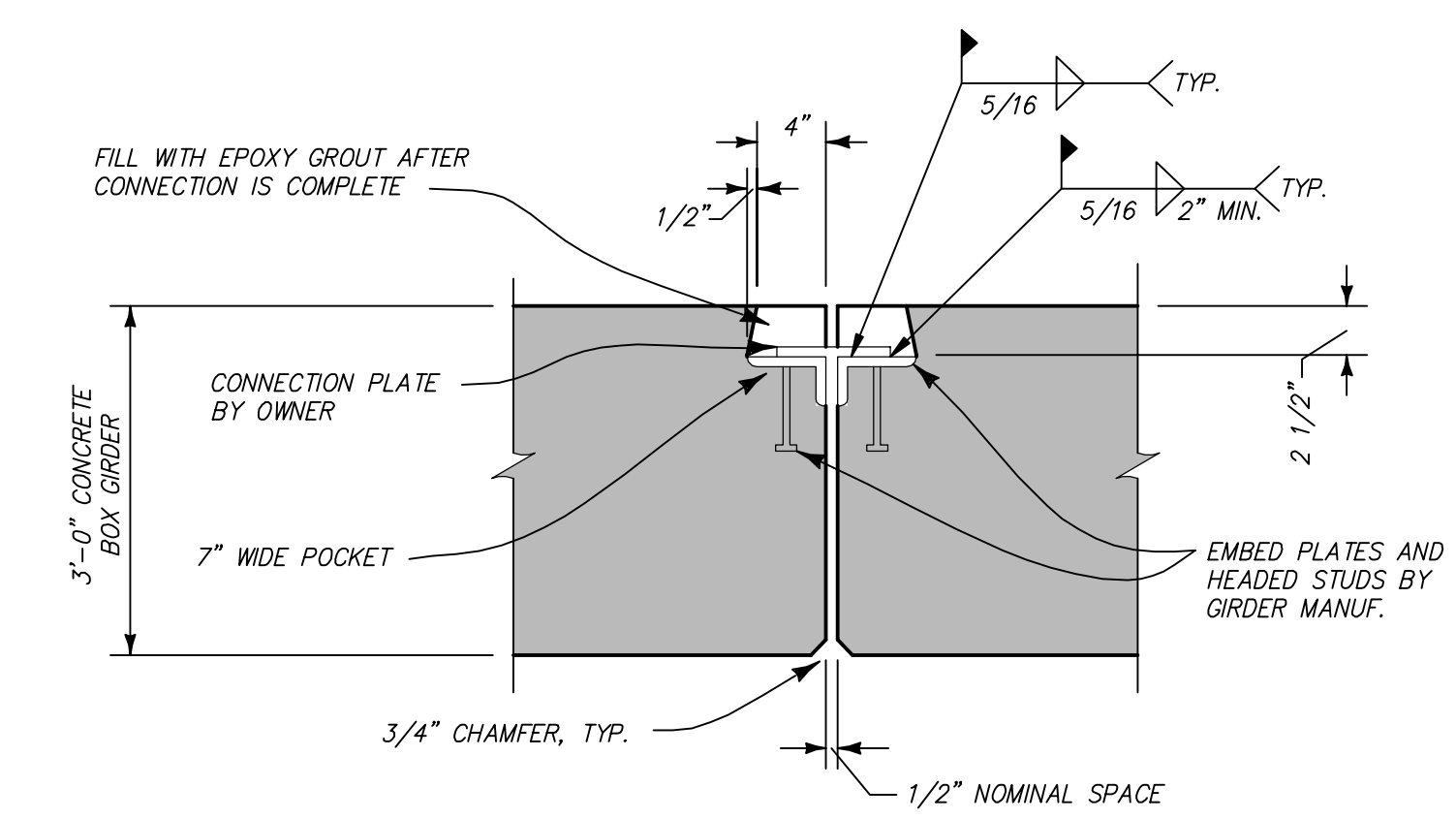
ISSUED FOR BID



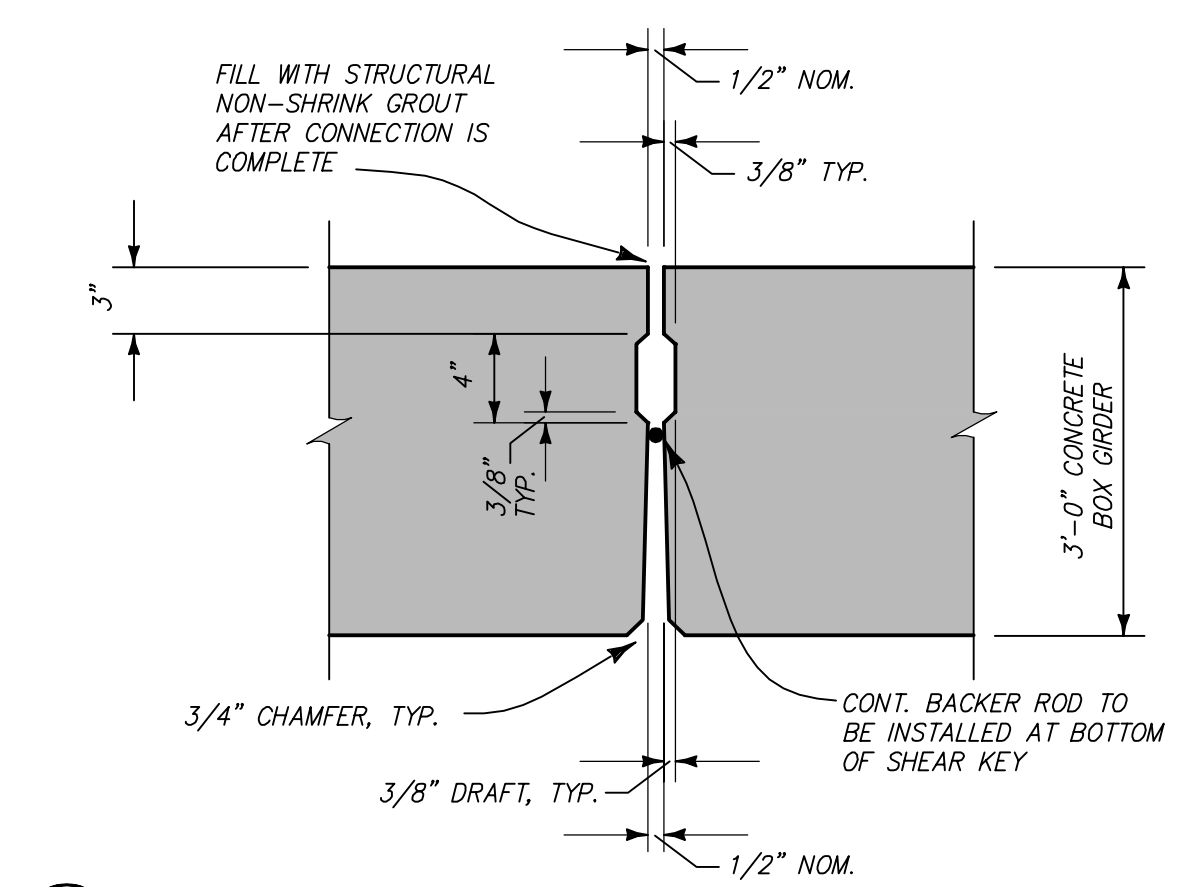
2 TYPICAL PRECAST CONCRETE BOX GIRDER BEARING SECTION
DIMENSIONS ARE PERPENDICULAR TO FACES OF ABUTMENT



3 TYPICAL BRIDGE RAIL AT DECK EDGE SECTION
DIMENSIONS ARE PERPENDICULAR TO FACES OF ABUTMENT



4 GIRDER TO GIRDER CONNECTION
NOT TO SCALE



5 SHEAR KEY CONNECTION
NOT TO SCALE

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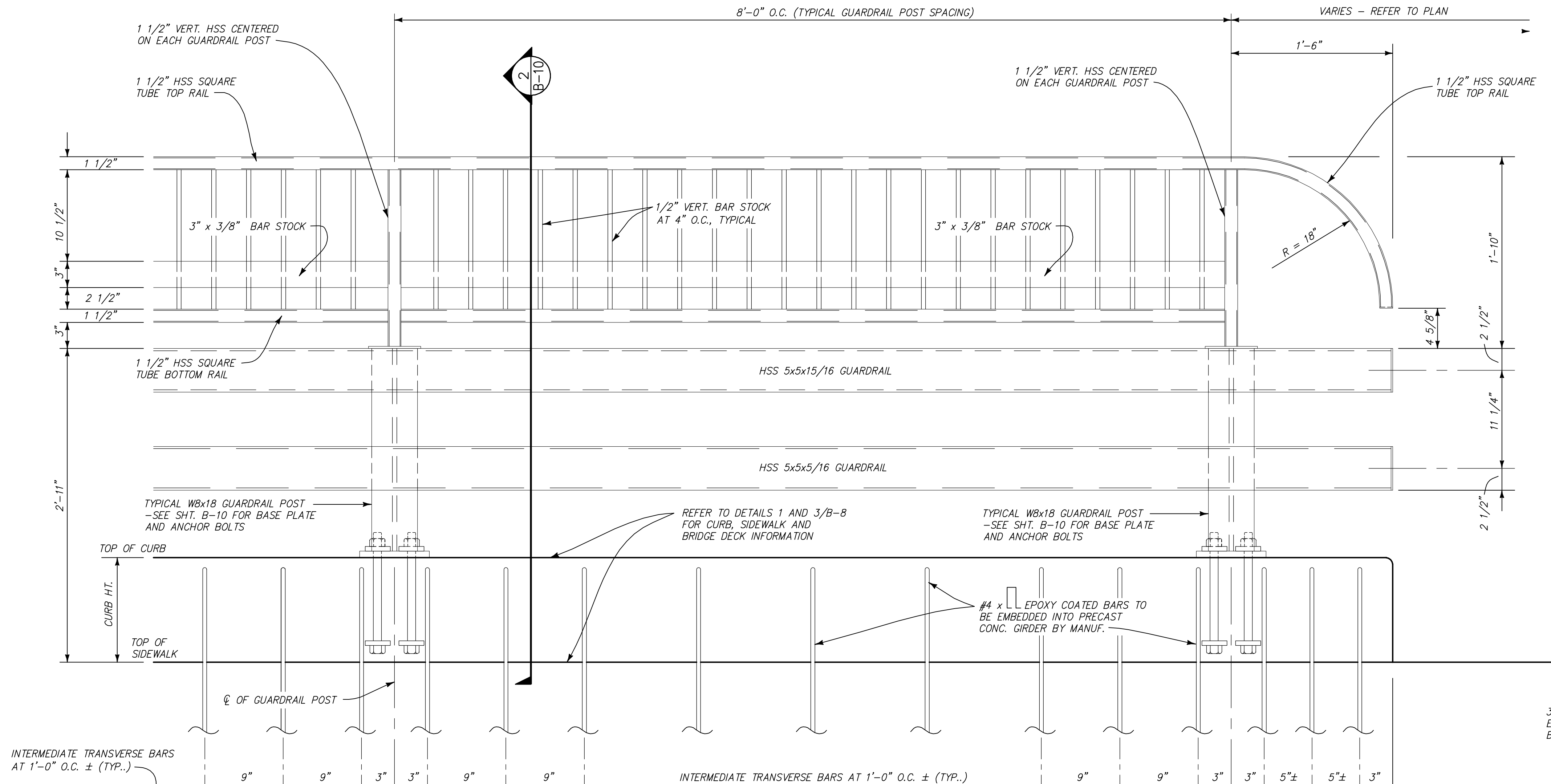
CITY OF FRUITA
 17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 BRIDGE SECTION AND DETAILS

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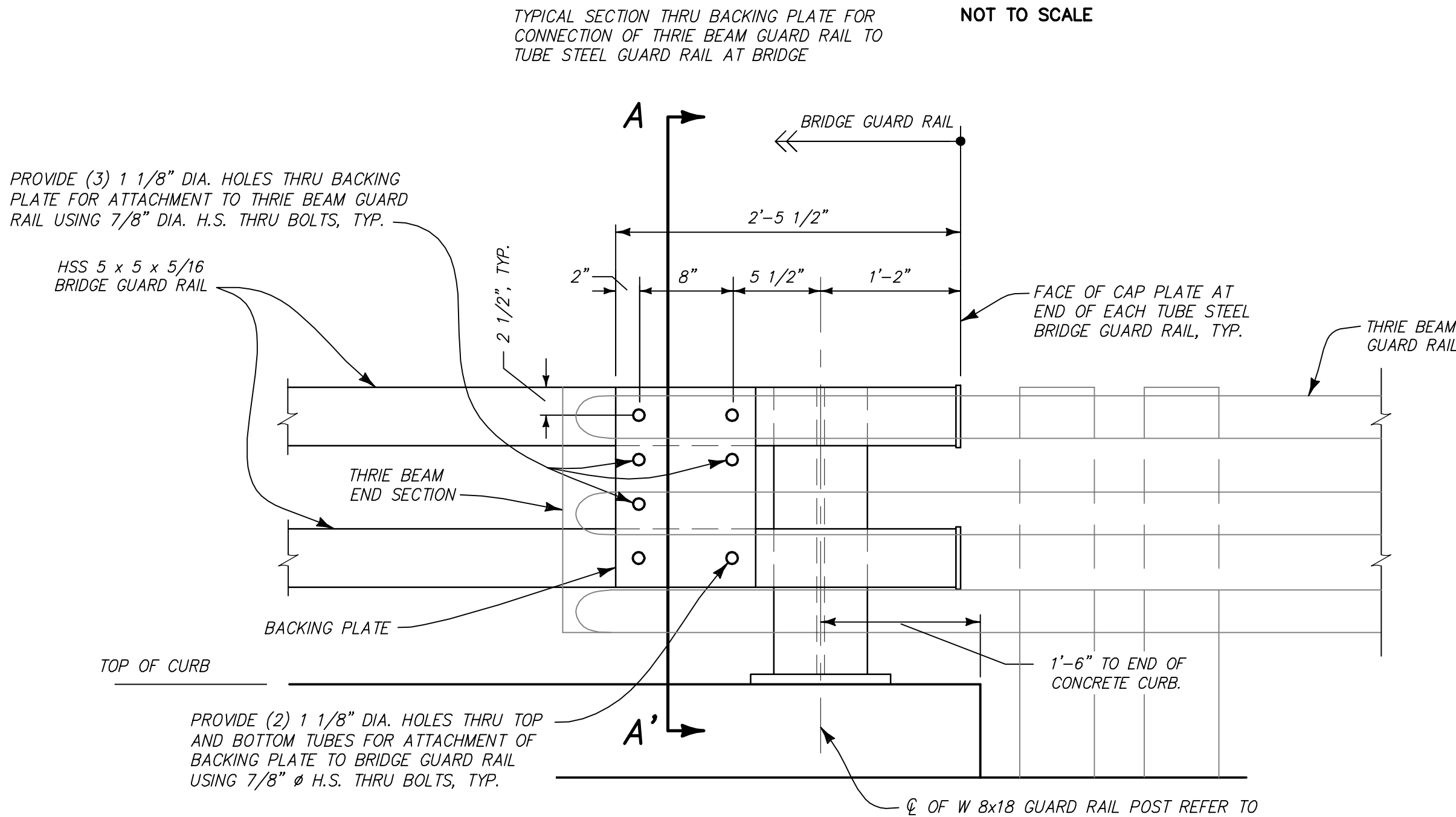
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 SHEET
B-8

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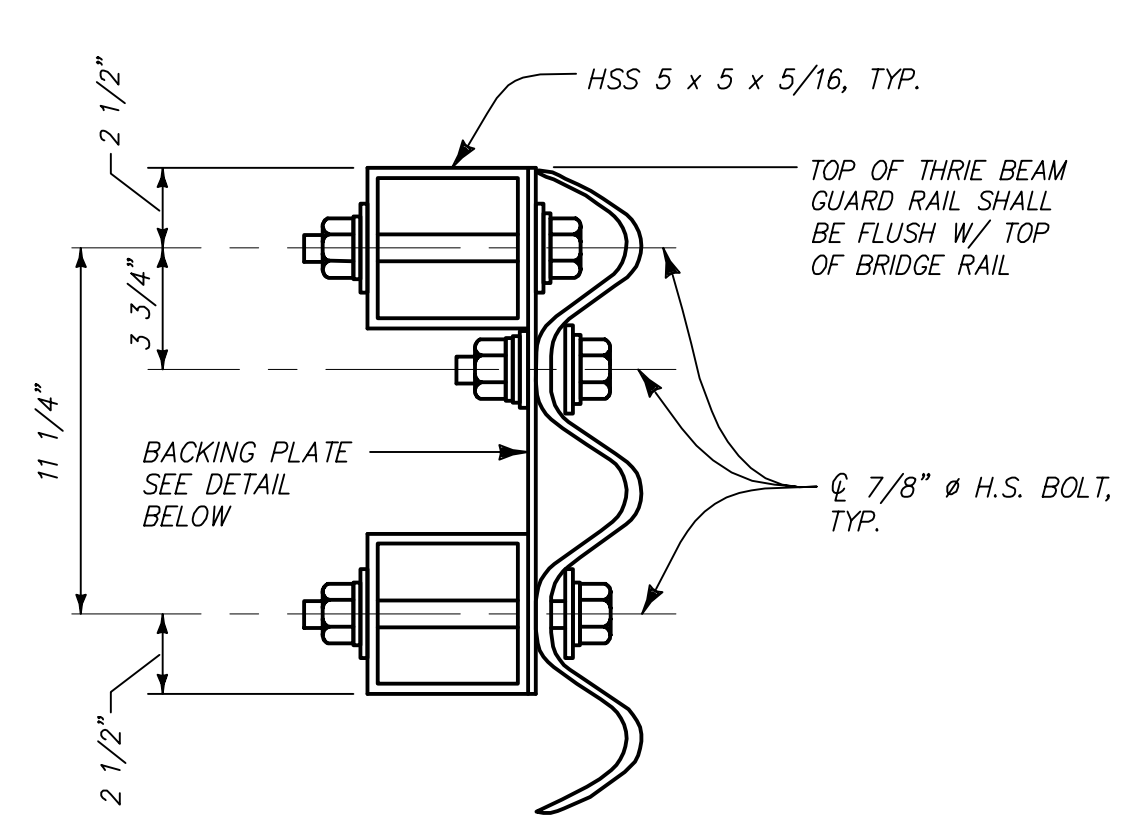
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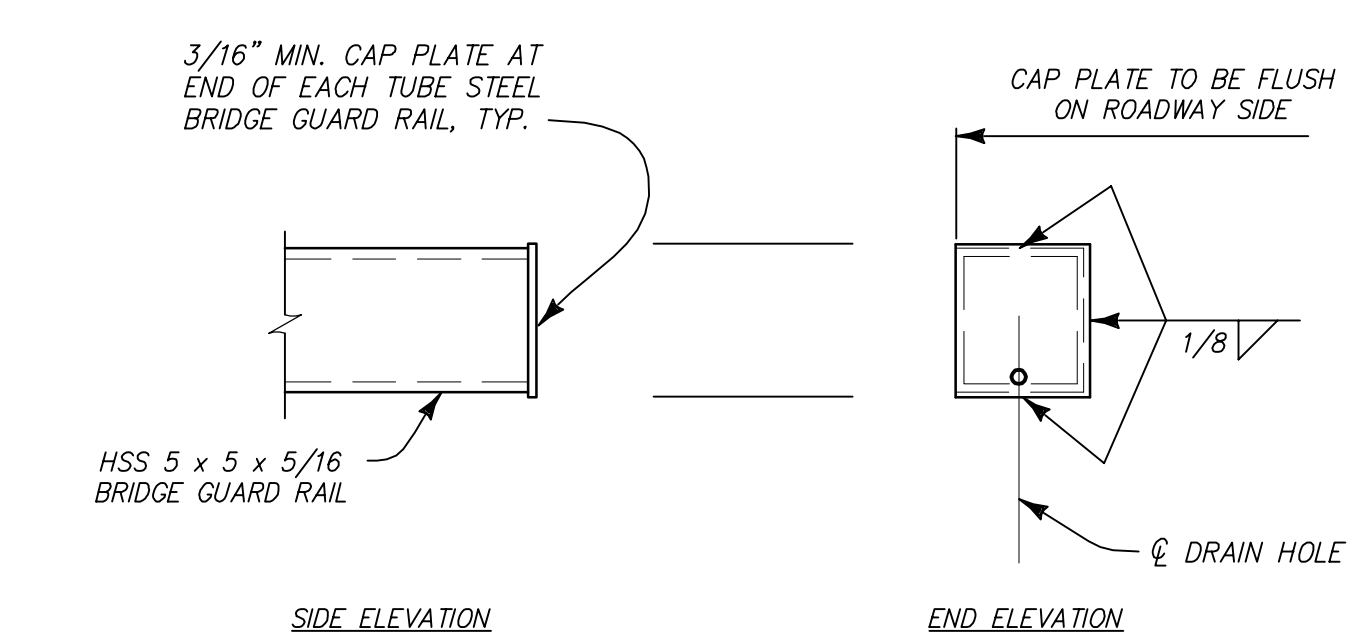
TYPICAL BRIDGE GUARDRAIL ELEVATION
NOT TO SCALE



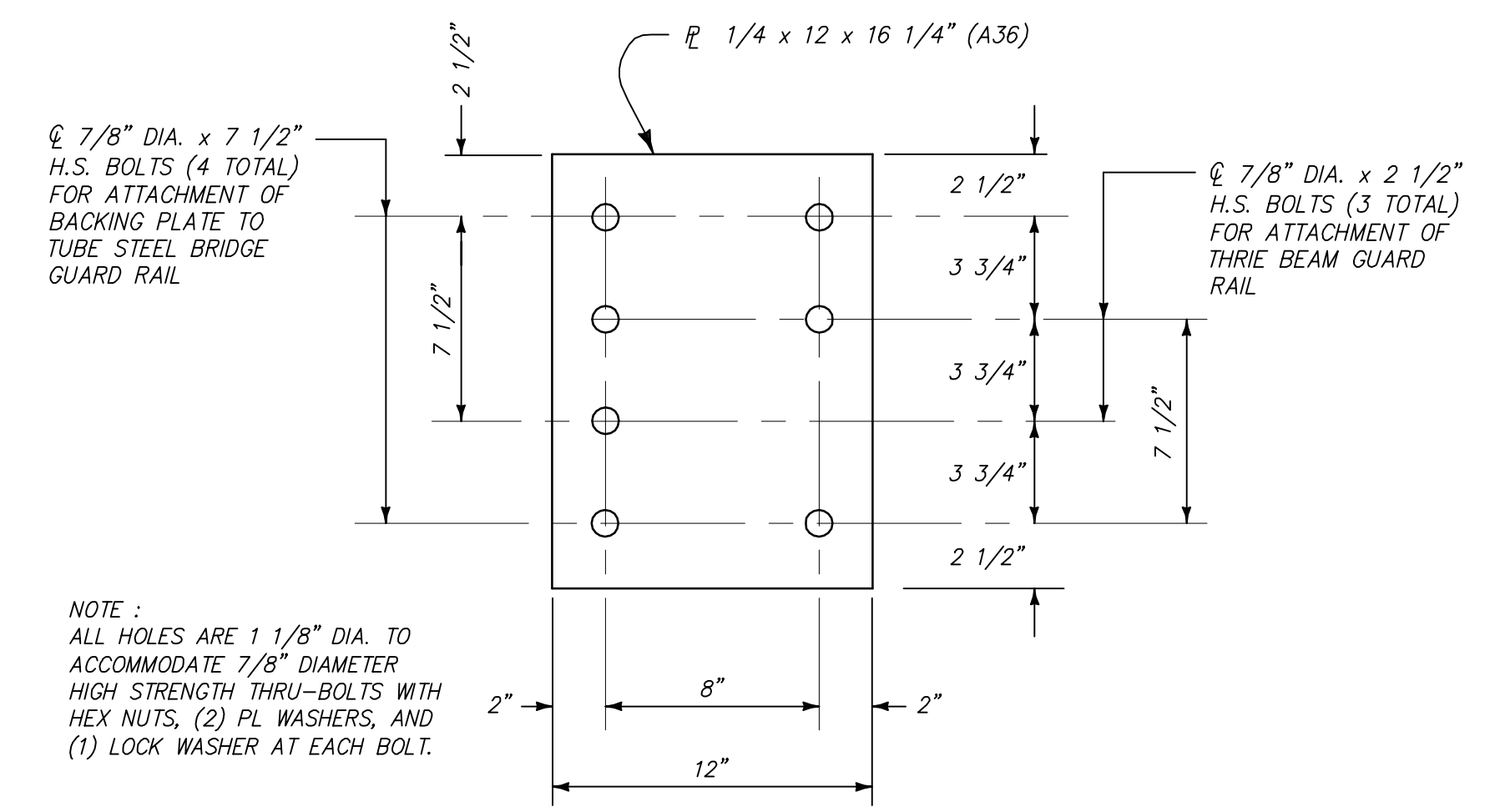
ELEVATION OF THRIE BEAM GUARD RAIL TO TUBE STEEL BRIDGE GUARD RAIL CONNECTION
NOT TO SCALE



TYPICAL SECTION A-A'
NOT TO SCALE



BRIDGE GUARD RAIL CAP PLATE DETAIL
NOT TO SCALE



BACKING PLATE ELEVATION
NOT TO SCALE

ISSUED FOR BID

REV	DATE	DESCRIPTION



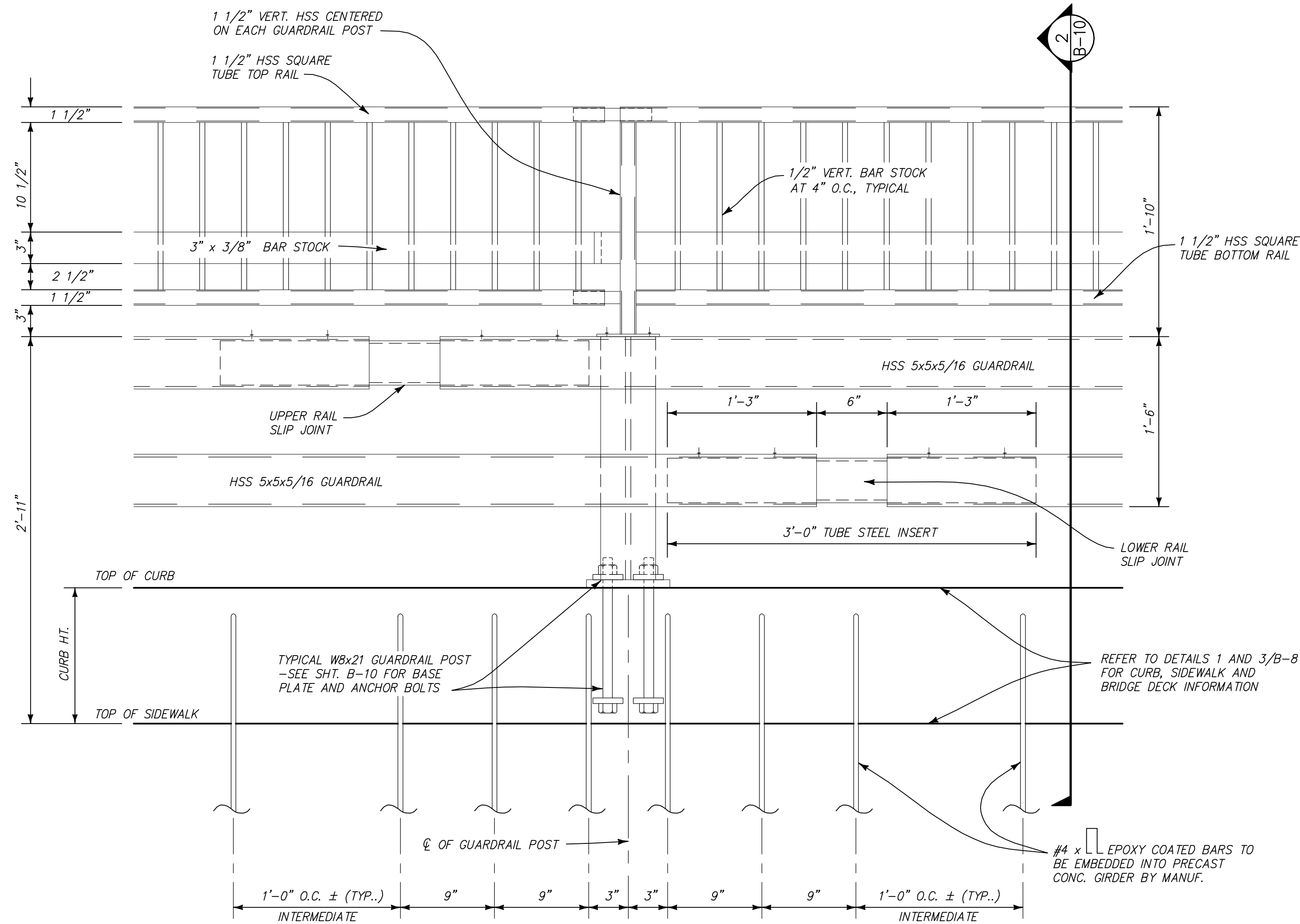
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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
BRIDGE RAIL DETAILS (1 OF 2)

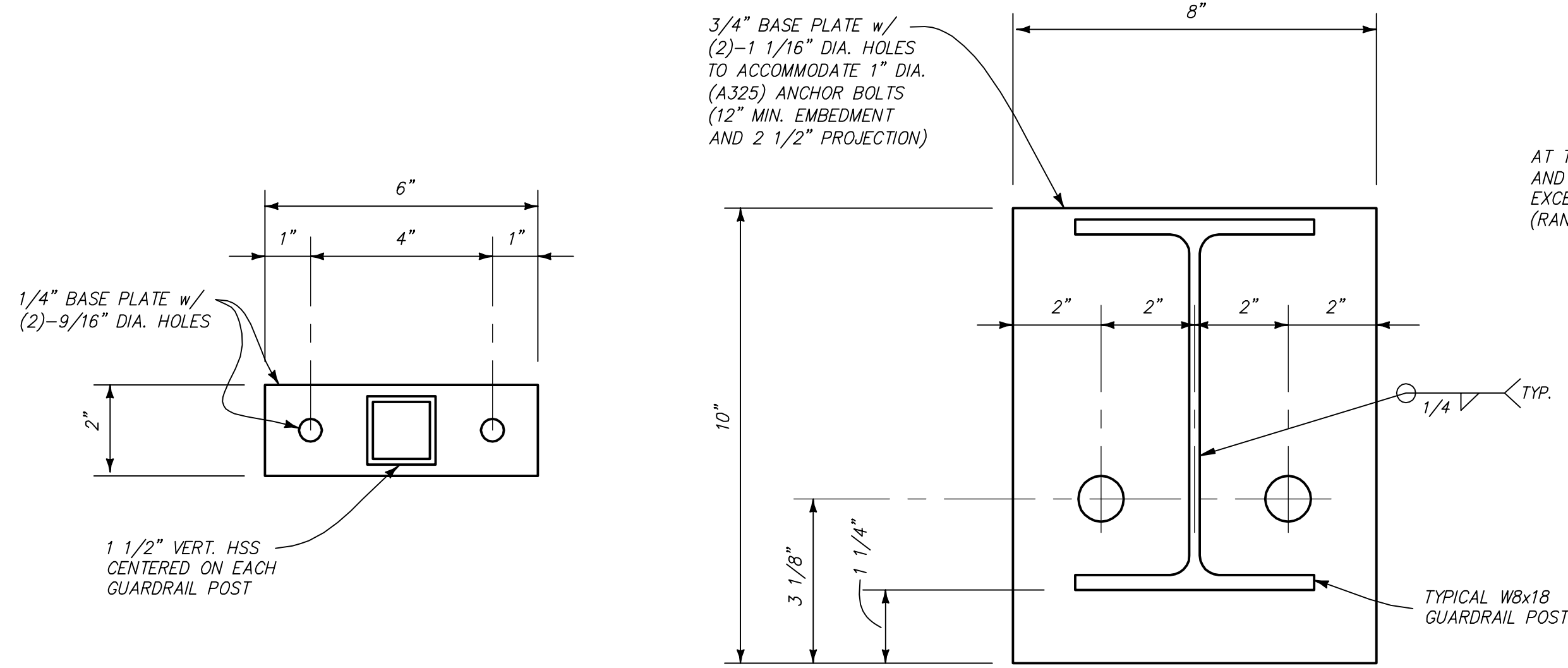
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DATE 12/27/2017

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SHEET
B-9

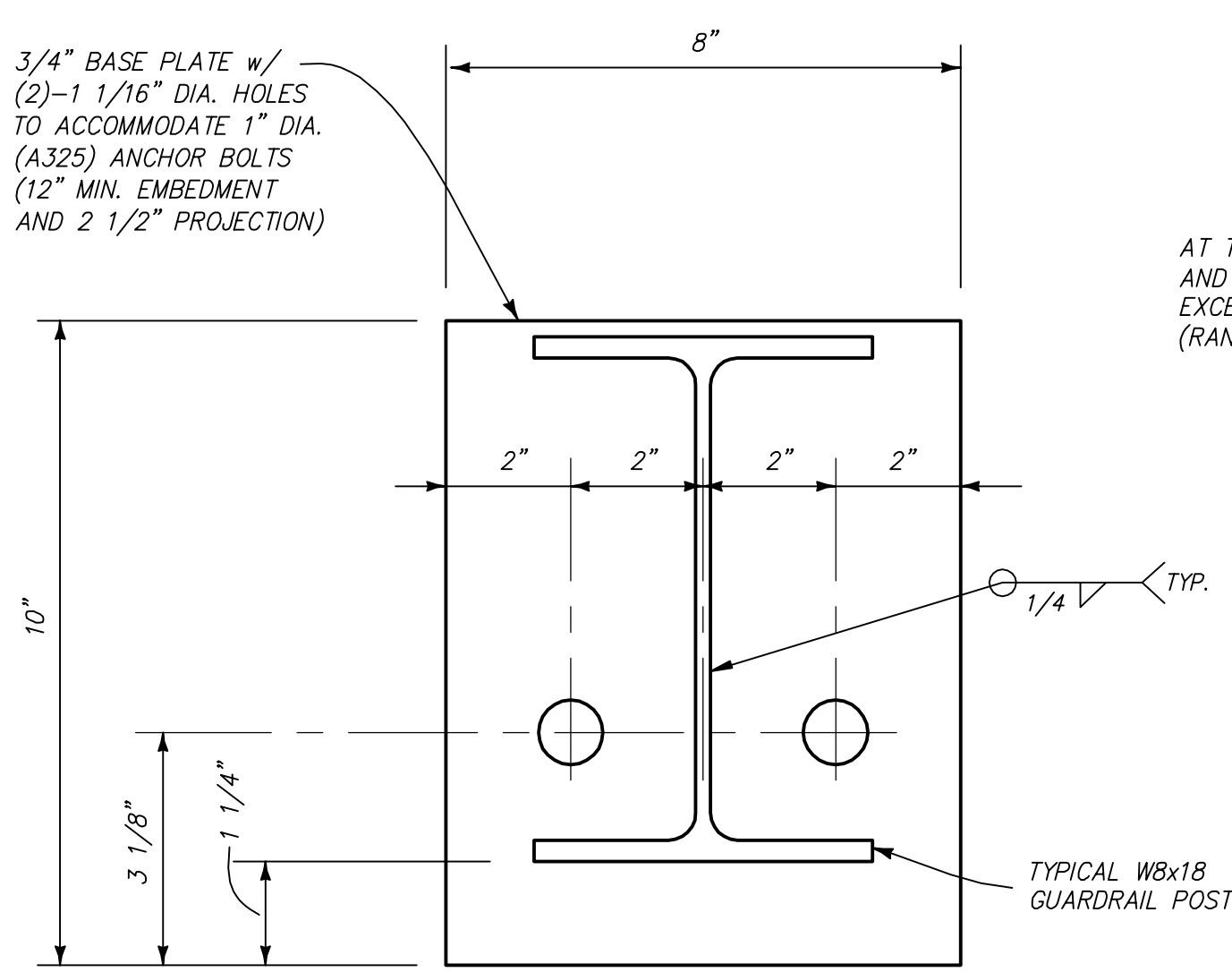
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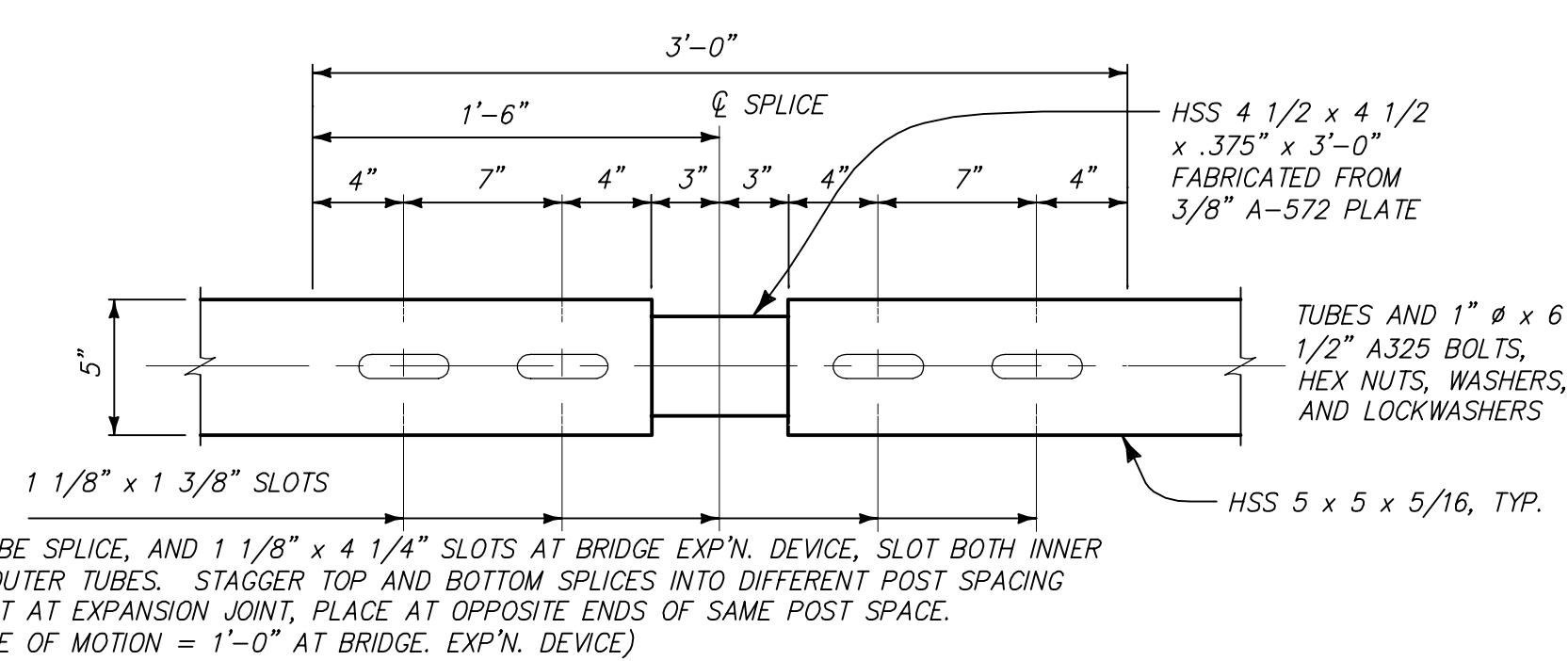
1
B-10 TYPICAL BRIDGE GUARDRAIL SLIP CONNECTION
NOT TO SCALE



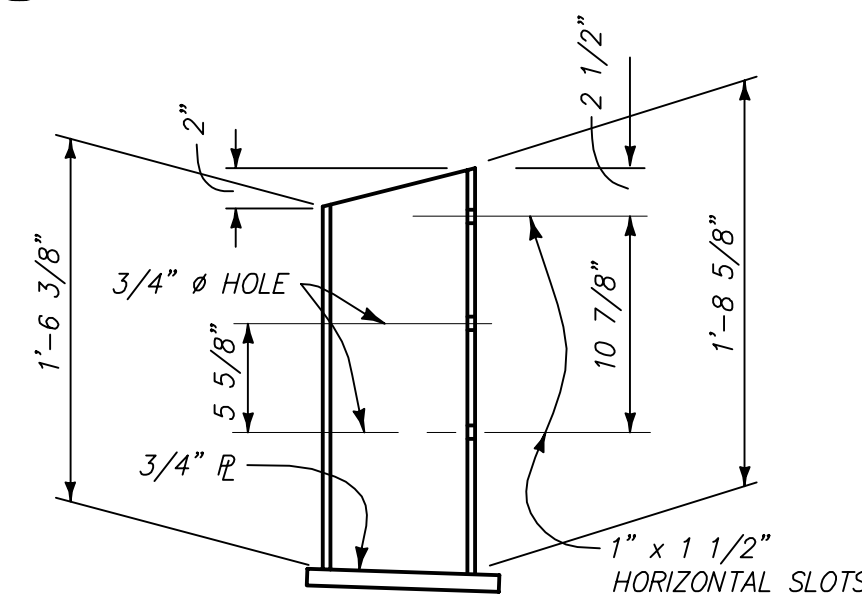
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B-10 TYPICAL 1.5" TS POST BASE PLATE
NOT TO SCALE



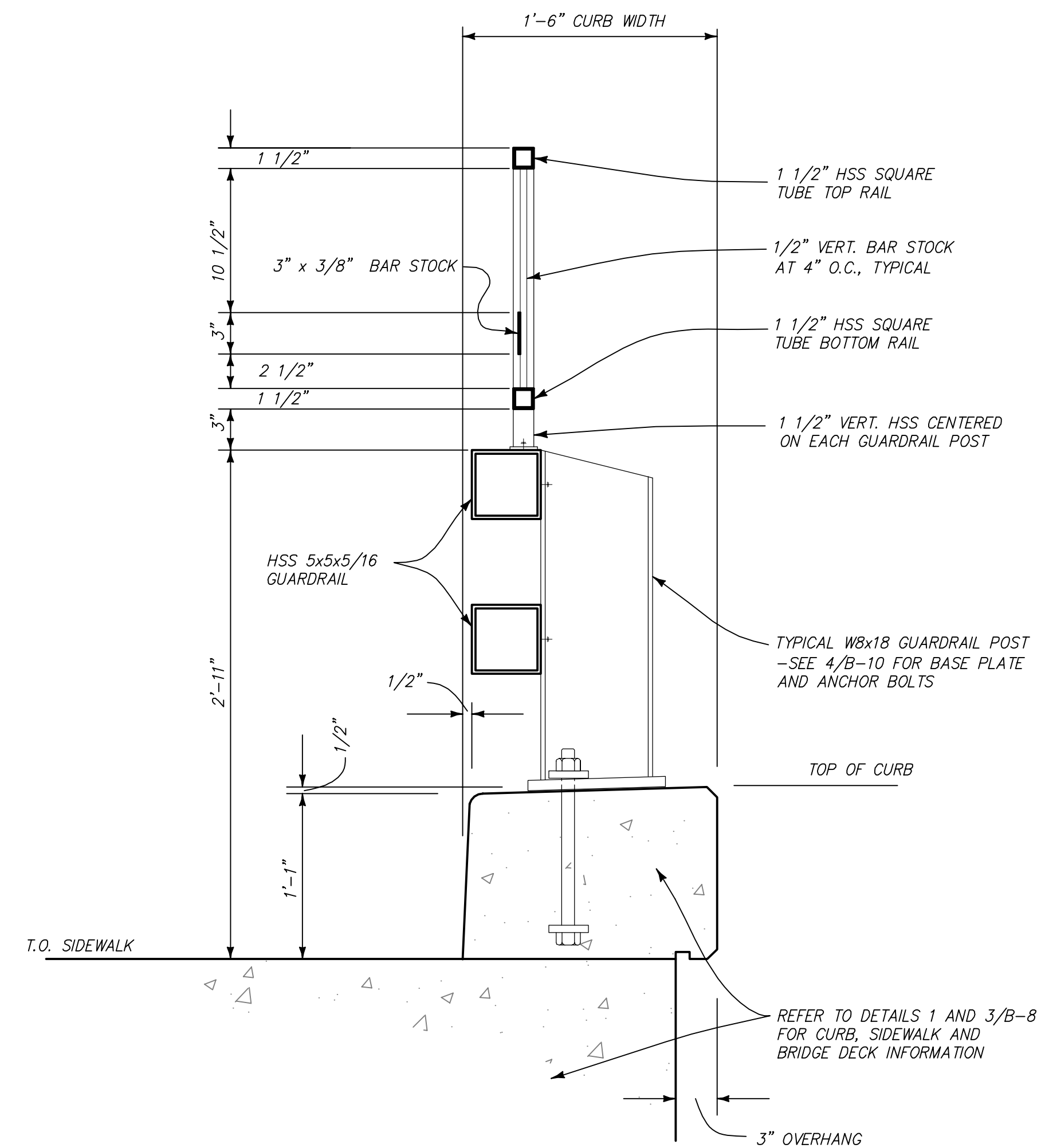
4
B-10 TYPICAL BRIDGE GUARDRAIL POST BASE PLATE
NOT TO SCALE



5
B-10 PLAN - TUBE SPLICE
NOT TO SCALE



6
B-10 TYPICAL BRIDGE GUARDRAIL POST - ELEVATION
NOT TO SCALE



2
B-10 TYPICAL BRIDGE GUARDRAIL SECTION
NOT TO SCALE

ISSUED FOR BID

NOTES

- ALL TUBES SHALL BE ASTM A-500, GRADE B.
- ALL POSTS AND BASE PLATES SHALL BE ASTM A-572 GRADE 50. ALL OTHER STEEL SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED.
- CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS TO CONFORM TO THE REQUIREMENTS OF SECTIONS 601, 602 AND 509, RESPECTIVELY.
- POST ANCHOR, ENCASED IN CONCRETE, SHALL BE ASTM A-36 (AASHTO M-183) STEEL AND WILL BE PAINTED IN ACCORDANCE WITH CITY OF FRUITA STANDARDS.
- THE TUBES SHALL BE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.
- TUBES SHALL BE CONTINUOUS ACROSS NOT LESS THAN TWO POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE TUBE SECTIONS.
- THE CENTERLINE OF THE TUBE SPLICE SHALL BE 1'-8" MINIMUM AND 2'-6" MAXIMUM FROM THE CENTERLINE OF THE POSTS.
- ALL BOLTS THAT HAVE LOCK WASHERS SHALL BE TIGHTENED TO SNUG ONLY.
- POSTS SHALL BE PERPENDICULAR TO THE LONGITUDINAL ROADWAY GRADE.
- ONE OR MORE OF THE TYPICAL POST SPACINGS MAY BE REDUCED (6'-8" MIN.) IN ORDER TO MAINTAIN DIMENSIONS FROM THE END OF THE RAIL AND EXPANSION JOINTS.
- PRIOR TO FABRICATION OF THIS ITEM, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105, SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION.

STRUCTURAL STEEL:

AASHTO M-183 (ASTM A-36) $f_y = 50,000$ psi
 AASHTO M-223 (ASTM A-572) GRADE 50 $f_y = 50,000$ psi
 COLD FORMED ASTM A-500 GRADE B $f_y = 50,000$ psi

FOR ADDITIONAL DETAILS SEE NEXT RAIL SHEETS.

REV	DATE	DESCRIPTION



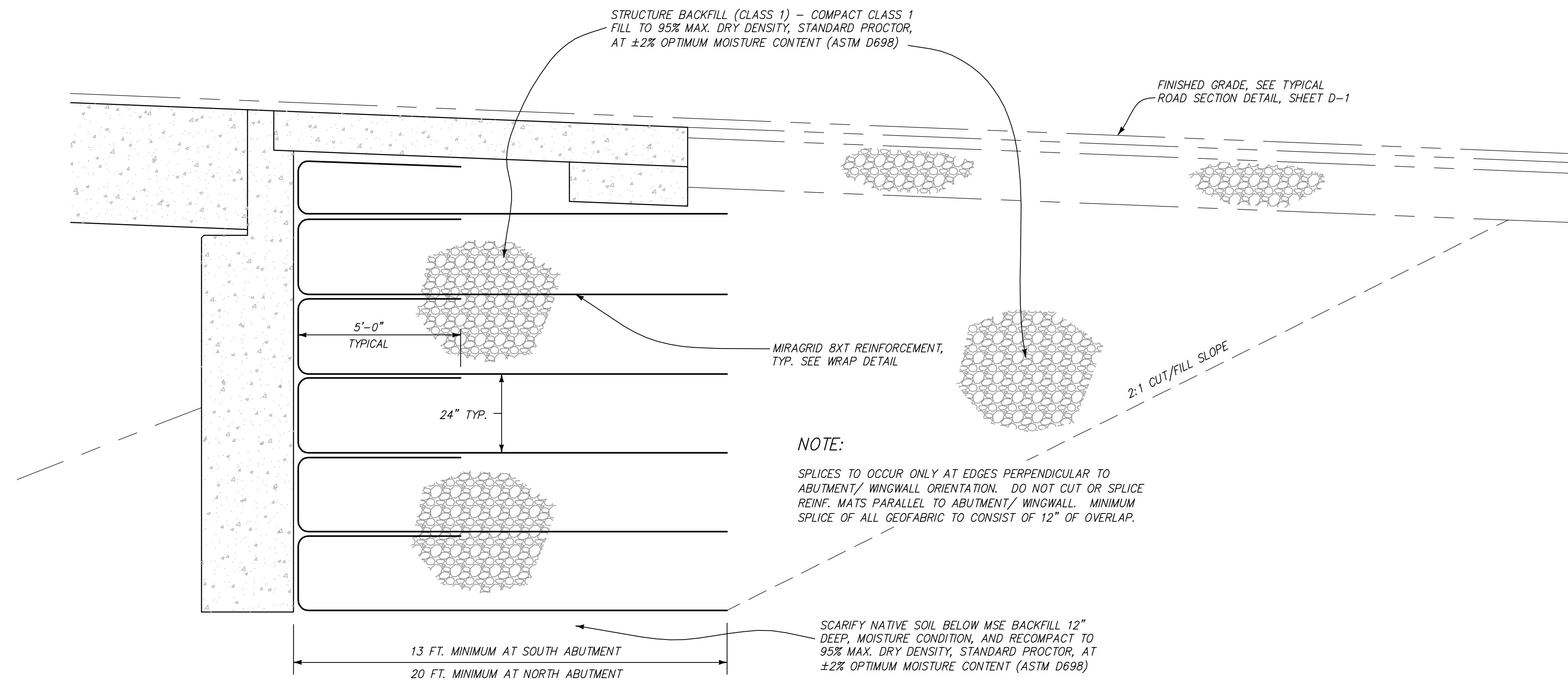
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 17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 BRIDGE RAIL DETAILS (2 OF 2)

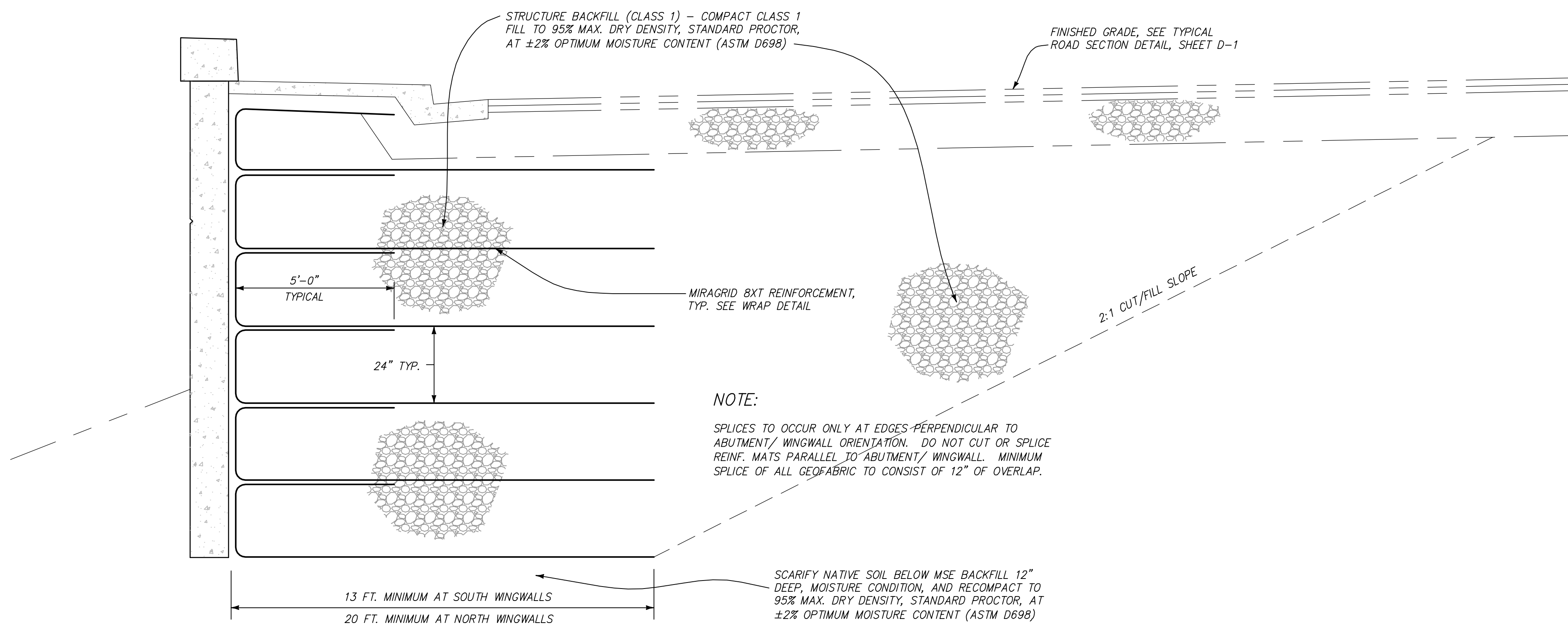
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SECTION PERPENDICULAR TO ABUTMENT
NOT TO SCALE



SECTION PERPENDICULAR TO WINGWALL
NOT TO SCALE

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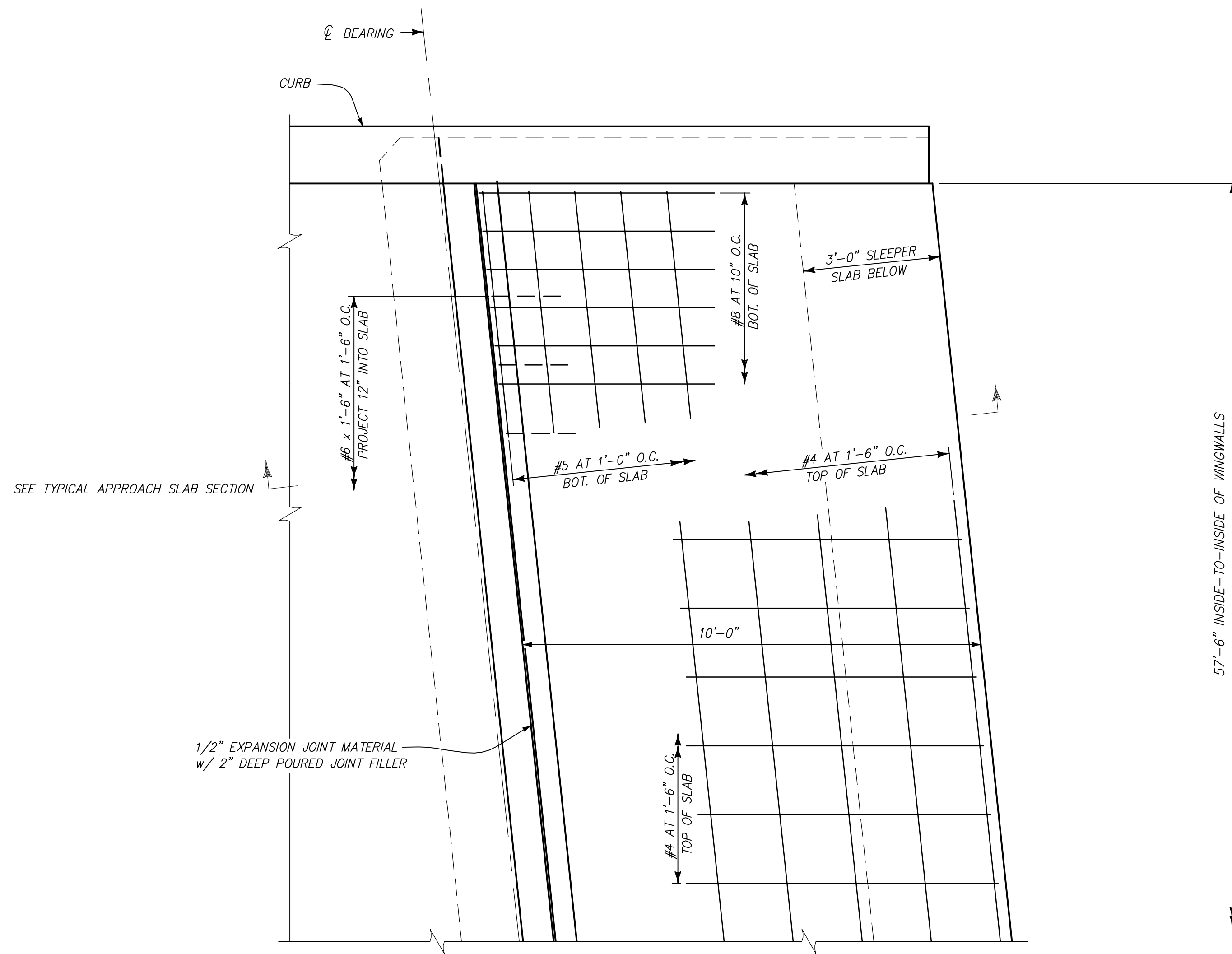
CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
M.S.E. BACKFILL DETAILS

PROJECT 7121.74610.01
DATE 12/27/2017

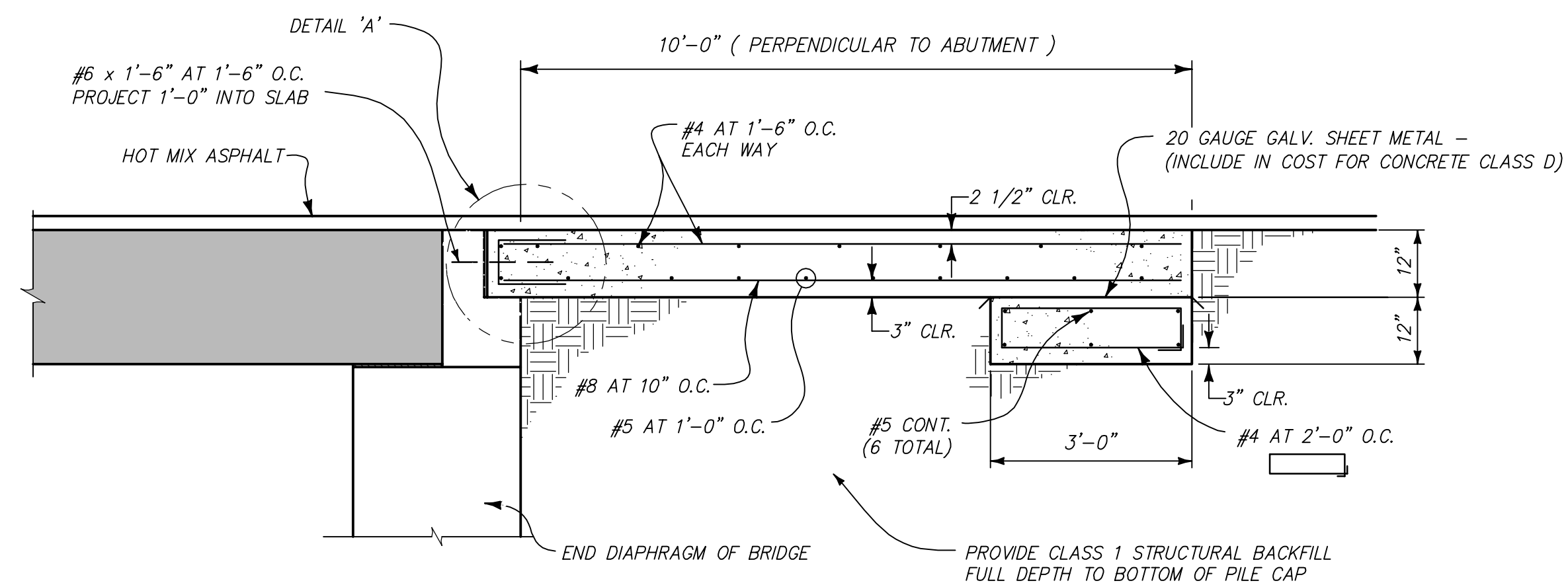
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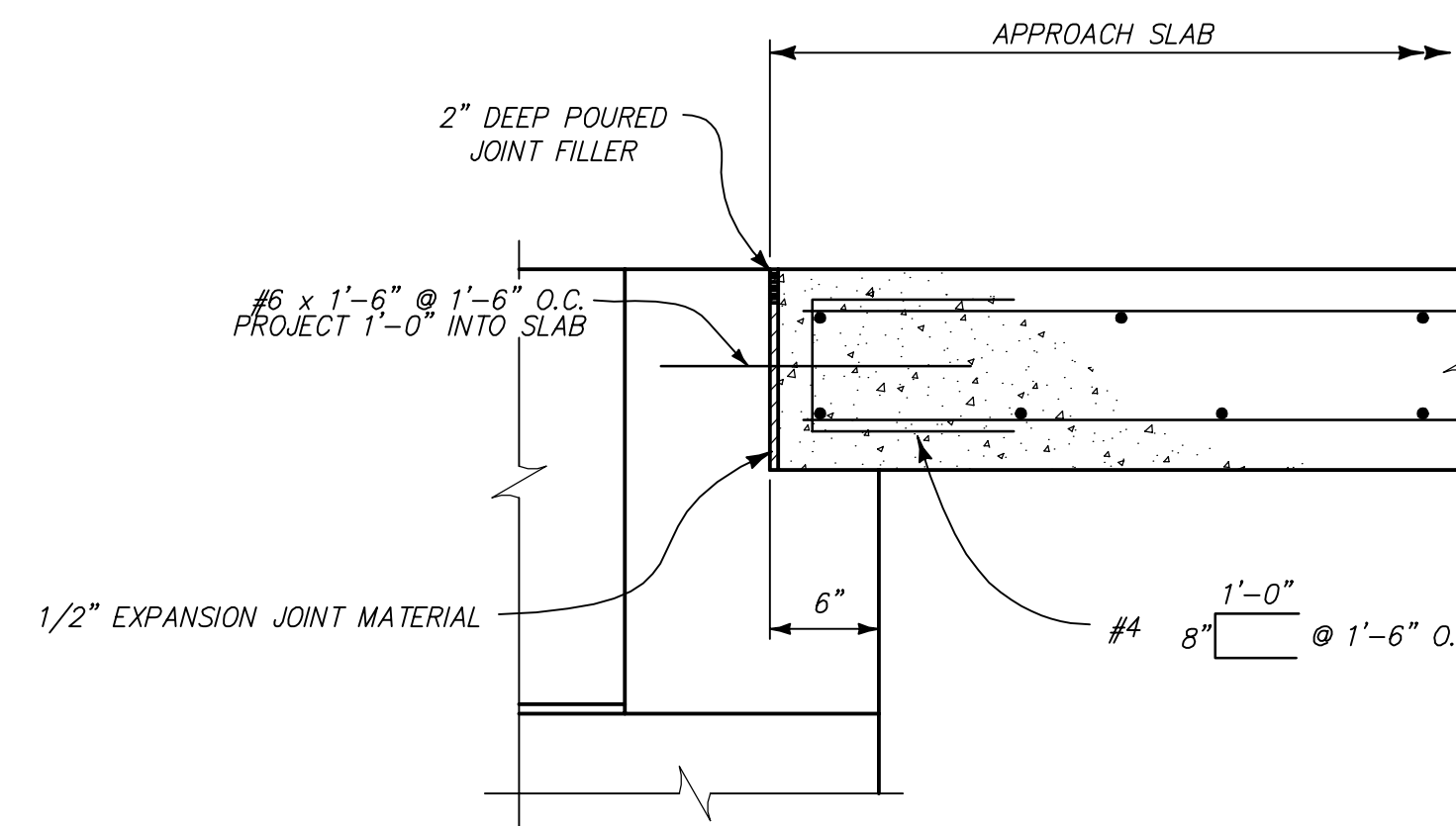
1
B-12 **APPROACH SLAB PARTIAL PLAN**
NOT TO SCALE



3
B-12 **APPROACH SLAB SECTION**
NOT TO SCALE

NOTES

1. CONCRETE FOR APPROACH SLAB TO BE CLASS D.
2. THE 1/2" EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.
3. THE 20 GAUGE GALVANIZED SHEET METAL SHALL BE INCLUDED IN THE COST OF CONCRETE CLASS D.



2
B-12 **DETAIL 'A'**
NOT TO SCALE

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17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 APPROACH SLAB PLAN AND DETAILS

ISSUED FOR BID

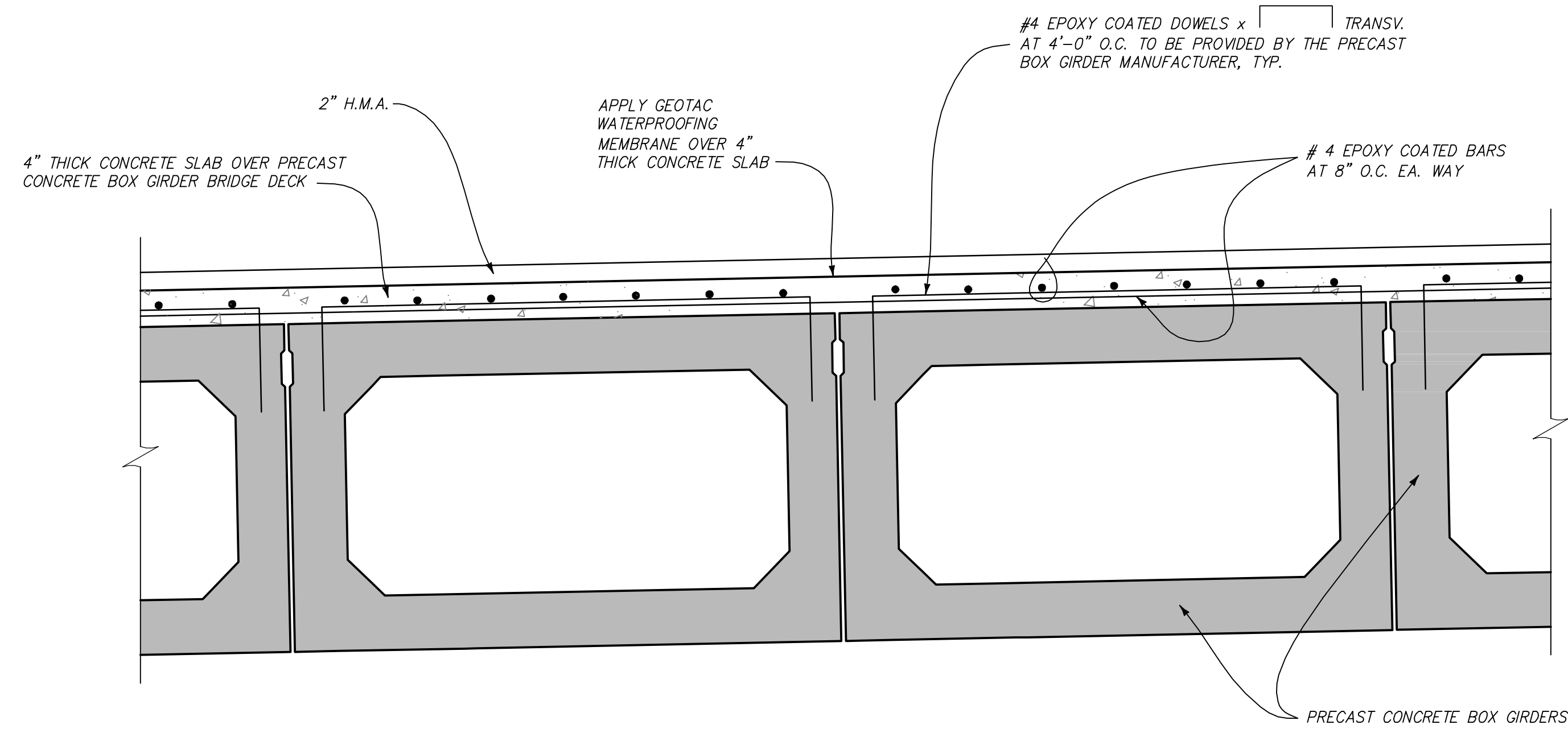


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B-12

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1
B-13

BRIDGE DECK SLAB REINFORCING DETAIL

NOT TO SCALE

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FOR BID**



Know what's below.
Call before you dig.

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BRIDGE SLAB DETAILS

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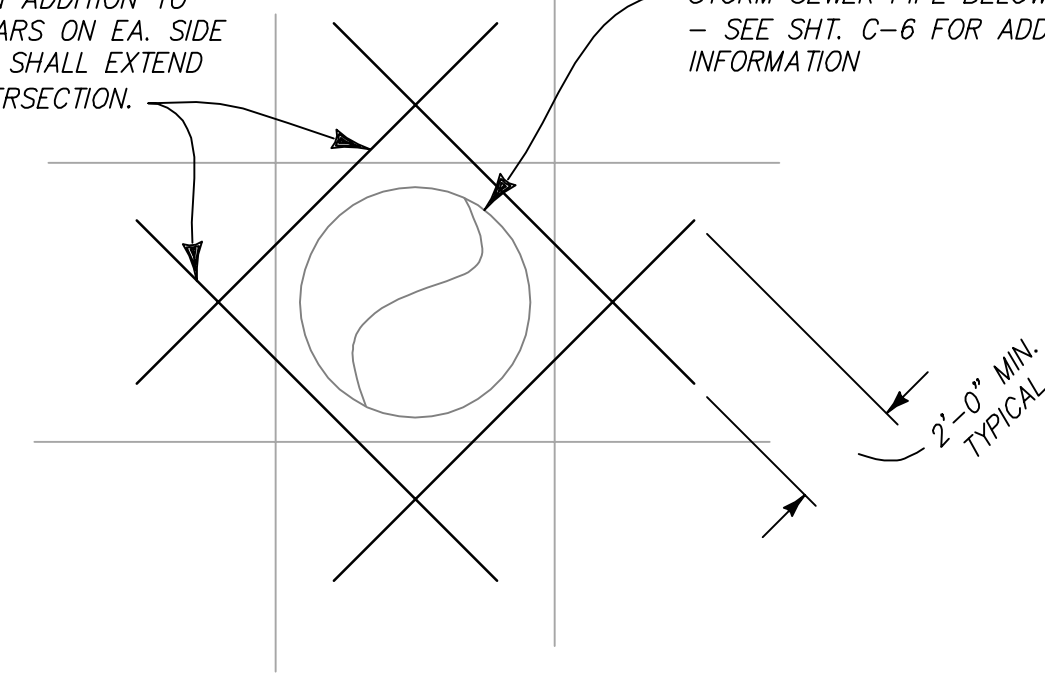
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B-13

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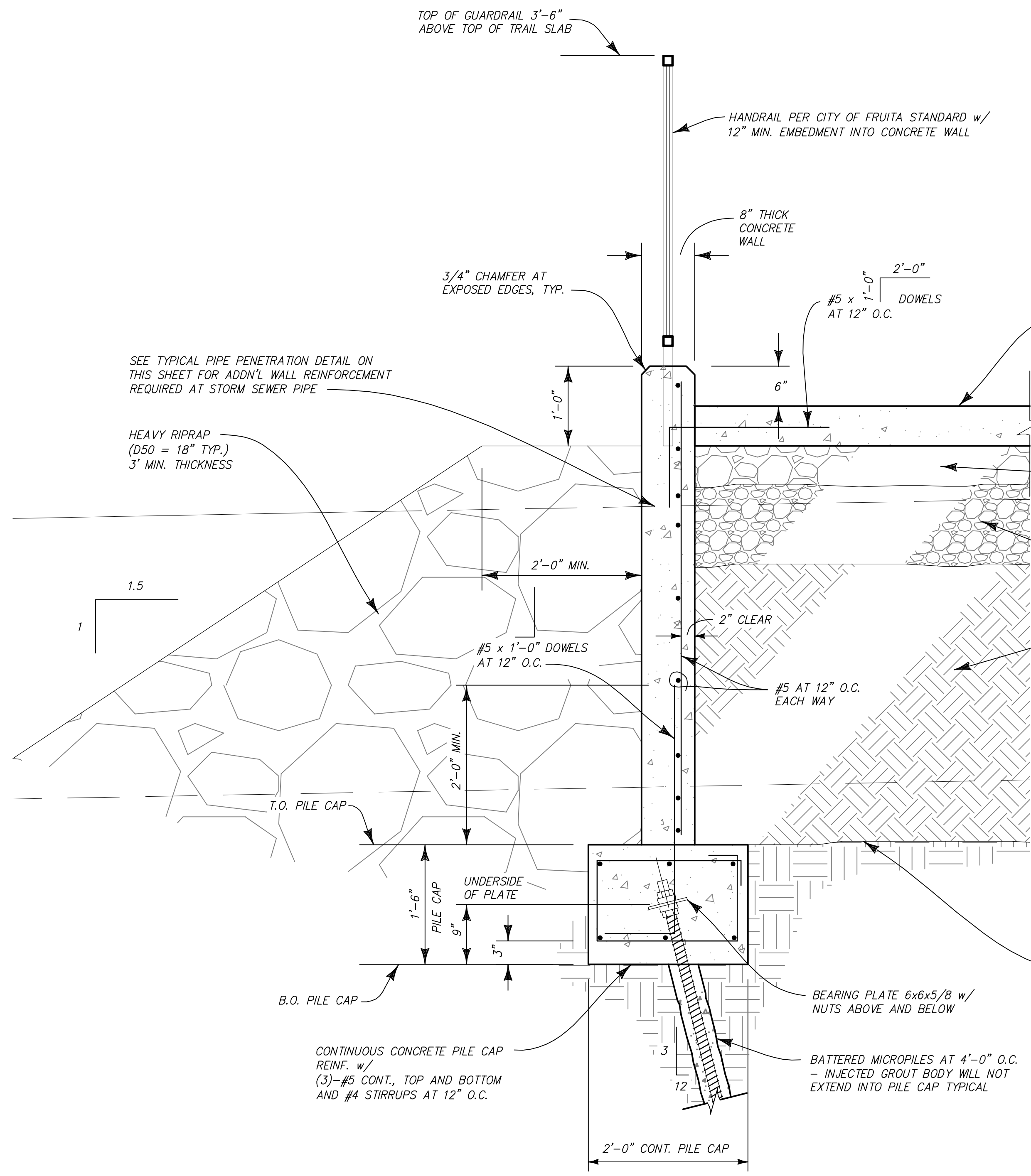
WHERE PIPE PENETRATES UPPER AND LOWER CONC. WALLS, REINFORCE OPENING w/ (4)-#5 BARS ORIENTED DIAGONALLY IN ADDITION TO REGULAR VERT. AND HORIZ. BARS ON EA. SIDE OF OPENING. DIAGONAL BARS SHALL EXTEND 2'-0" BEYOND POINTS OF INTERSECTION.

STORM SEWER PIPE BELOW TRAIL - SEE SHT. C-6 FOR ADD'L INFORMATION

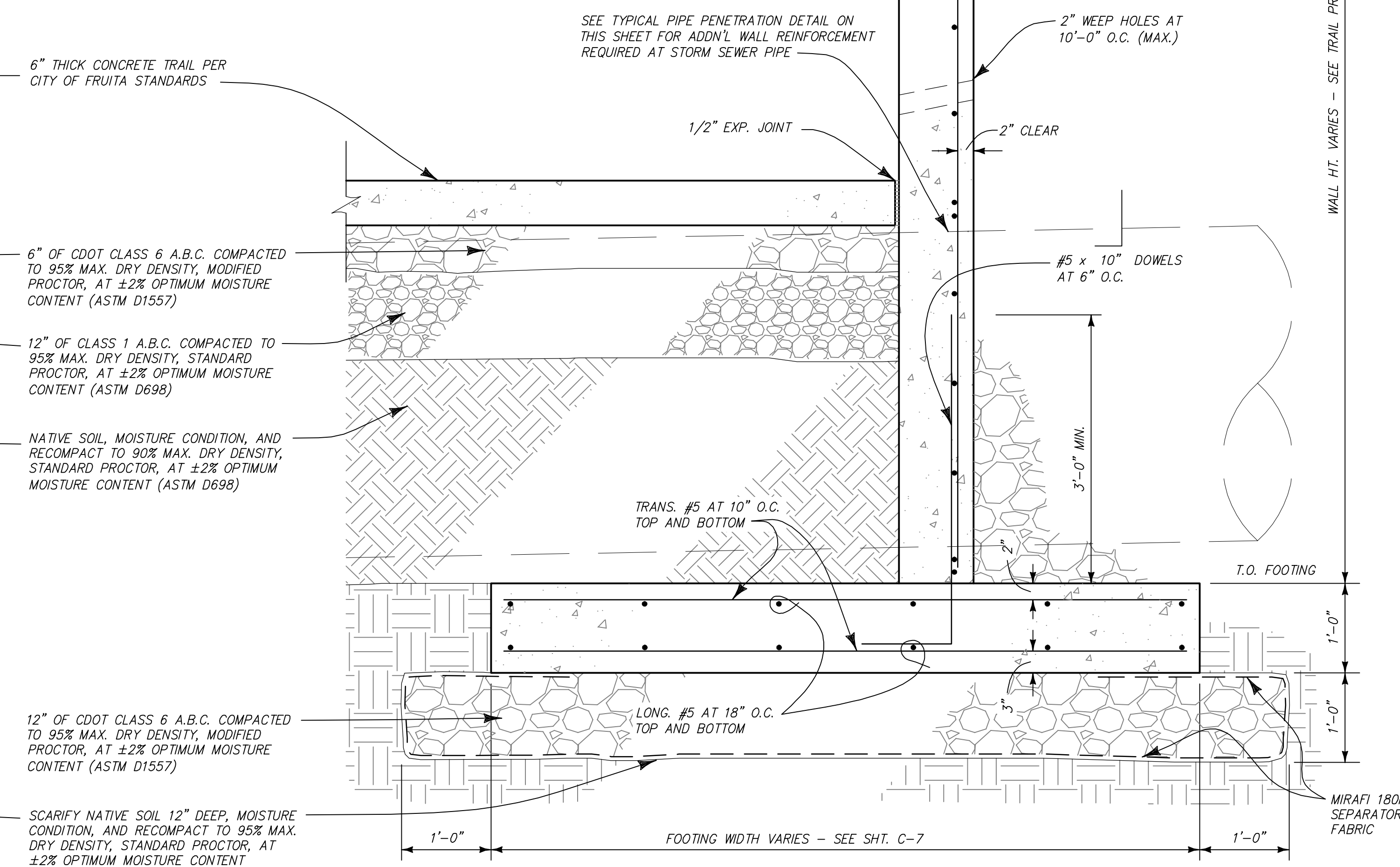


ELEVATION VIEW

TYPICAL PIPE PENETRATION DETAIL
NOT TO SCALE



TYPICAL TRAIL LOWER RETAINING WALL SECTION
NOT TO SCALE



TYPICAL TRAIL UPPER RETAINING WALL SECTION
NOT TO SCALE

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CITY OF FRUITA
17.5 ROAD BRIDGE OVER LITTLE SALT WASH
TRAIL RETAINING WALL SECTIONS

PROJECT 7121.74610.01
DATE 12/27/2017

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B-14

EXHIBIT B2: 90% DESIGN REPORT

EXHIBIT B2
90% DESIGN REPORT



5/16/2017

Mr. Erik Borschel E.I.
Project Manager
Mesa County Public Works
200 S. Spruce
PO Box 20,000
Grand Junction, CO 81502-5013

Subject: 90% Submittal for FRT 17.5-K.25 Bridge Replacement

Dear Erik:

In response to the request for proposal, DOWL has included the following documentation as part of the 90 percent design submittal & preliminary bridge design report:

- 1) Revised Quantities and Opinion of Probable Cost (Appendix A)
- 2) Final Geotechnical Report (Appendix B)
- 3) Final Hydrology Report (Appendix C)
- 4) Survey Exhibits and Descriptions for Permanent Easement and Right-of-Way Acquisition (Appendix D)
- 5) Environmental reports (Appendix E)

As discussed with the City of Fruita, DOWL has instructed ERO Resources to hold on additional work related to the 404 permit and Environmental Assessment until a construction schedule is determined. Both of the aforementioned reports have a 6-month expiration.

Please contact me regarding a preferred time for the 90 percent submittal review meeting.

Respectfully submitted,
DOWL

A handwritten signature in blue ink, appearing to read "B. Renfrow".

Brian Renfrow, P.E.
Senior Project Manager
Direct: (970) 497-8841

Enc.

**FRUITA 17.5 & K.25 BRIDGE REPLACEMENT
CITY OF FRUITA & MESA COUNTY
Bridge Design Report – 90% Submittal**

Prepared By:



222 South Park Avenue
Montrose, CO 81401
Phone (970) 249-6828

FRUITA 17.5 & K.25 ROAD BRIDGE REPLACEMENT STRUCTURE
TABLE OF CONTENTS

BRIDGE DESIGN REPORT

METHODOLOGY SUMMARY PAGES 1-4

APPENDICES

APPENDIX A – REVISED QUANTITIES AND COST ESTIMATE	PAGE 5
APPENDIX B – FINAL GEOTECHNICAL REPORT	PAGE 8
APPENDIX C – FINAL HYDRAULIC REPORT	PAGE 40
APPENDIX D - SURVEY EXHIBITS	PAGE 84
APPENDIX E - ENVIRONMENTAL REPORTS	PAGE 91

EXHIBIT B3: BRIDGE DESIGN PARAMETERS AND ENGINEERS OPINION OF PROBABLE COSTS

**EXHIBIT B3
BRIDGE DESIGN
PARAMETERS
AND
ENGINEERS OPINION OF
PROBABLE COSTS**

DOWL

SHEET 1 OF 4

ENGINEERING DEPARTMENT _____

MADE BY Brian Renfrow DATE 5/18/2017

CLIENT - JOB NO. _____

CHKD. _____ DATE _____

SUBJECT: Design Report 17.5 Road Bridge Replacement

DATE _____

RV. NO. 0 BY _____ APPVD. _____ DATE _____

I. Design Parameters

Design code: AASHTO LRFD Design Specifications 4th Edition

Design vehicle: HL-93

Design speed: 35 mph

Wind: 90 mph - Exposure 'C'

Earthquake: Bridge is located in area with $A = 0.03$, Seismic Zone 1 and Site Coefficient $I=1.0$. Per section 3.10.9.2, the horizontal design connection force in the restrained directions shall not be less than 0.15 times the vertical reaction due to the tributary permanent load and the tributary live loads assumed to exist during an earthquake.

Geotechnical Report: by DOWL preliminary report dated February 18, 2011

All work shall be done according to the applicable construction details of the *Standard Specifications for Road and Bridge Construction*, State of Colorado, 2011

Bridge superstructure geometry:

Superstructure type: Precast

Spans: Single span at 76 feet – 8 inches

Width: 60'-0" total, 44'-0" pavement width with (2) 7'-0" Sidewalks on each side.

Railings: Concrete cast-in-place with Type-10M guardrail

Skew: 28.5 degrees

Box Girder Dimensions: 36 in. deep, 59.5 in. wide

Overhang: N/A

Intermediate diaphragms: N/A

Bridge substructure geometry:

End abutments: Integral abutments supported on one line of steel H-piles supported on shale. Wing-walls are cantilevered from the fill face of the abutment. The approach slab is supported on the integral abutment at one end and a sleeper slab at the other end.

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SHEET 2 OF 4

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SUBJECT: Design Report 17.5 Road Bridge Replacement

DATE _____

RV. NO. 0 BY _____ APPVD. _____ DATE _____

Bridge materials:

Concrete strength

Prestressed girders: Initial strength at transfer, $f_{ci} = 5.0$ ksi

28-day strength, $f'_c = 6.0$ ksi

Substructure: 4.5 ksi

Railings: minimum 36 ksi steel

Reinforcing steel

Yield strength, $f_y = 60$ ksi

Prestressing strands

0.5 inch diameter low relaxation strands Grade 270

Strand area, $A_{ps} = 0.153$ in²

Steel yield strength, $f_{py} = 243$ ksi

Steel ultimate strength, $f_{pu} = 270$ ksi

Prestressing steel modulus, $E_p = 28,500$ ksi

Other parameters affecting girder analysis

Time of Transfer = 1 day

Average Humidity = 70%

III. GIRDER DESIGN

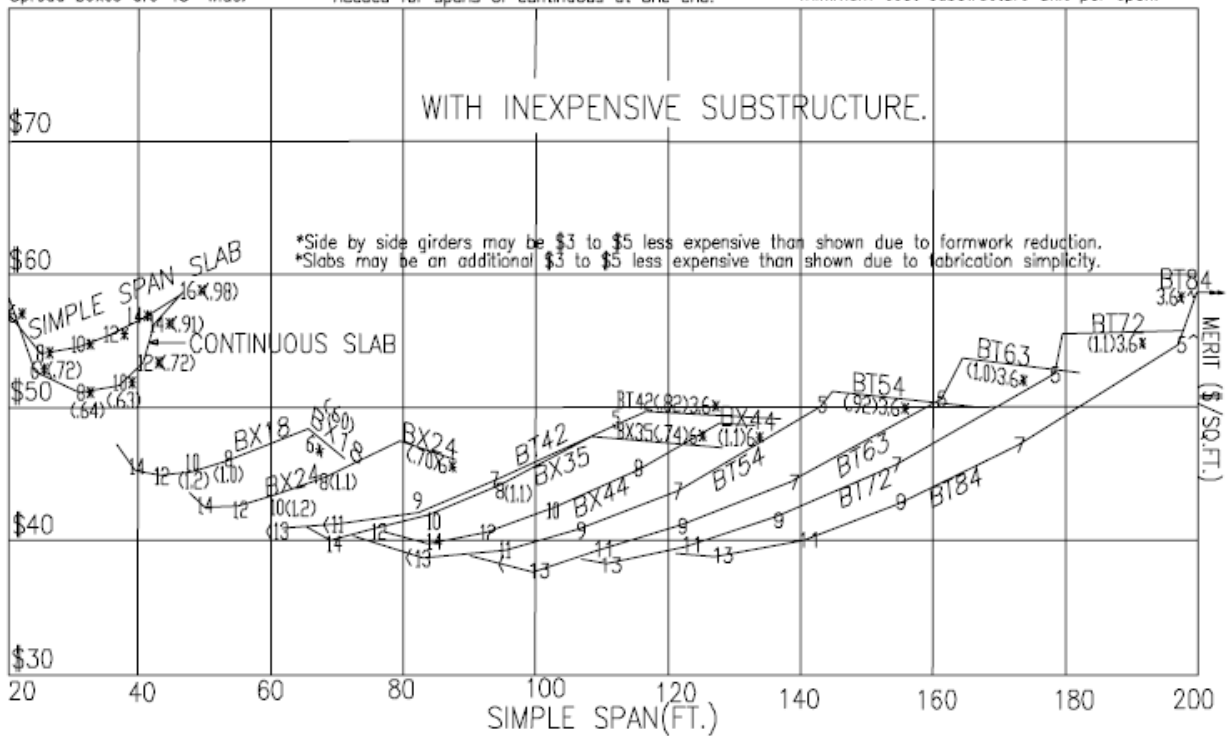
Referencing the CDOT chart below from the CDOT Bridge Design Manual, the most cost effective and hydraulically compatible box girder section is BX35 for the proposed 76 ft -8 in span, which is proposed in the design drawings.

DESIGN DATA AASHTO 1996:
 HS25-44, Alternate, Permit live load
 70 psf added, composite dead load
 8" slab or *5" composite topping
 $f_c = 6500 \text{ psi max.}$ $f_c = 8500 \text{ psi max.}$
 Min. haunch used for precast slabs.
 Weighted avg. haunch for loads.
 Jacking force not limited.
 Spread boxes are 48" wide.

KEY:
 Numbers on lines are precast slab thickness or
 girder spacing as appropriate.
 *Designates section too heavy to ship.
 *Designates girders side by side. <Shear governs.
 (??) designates the ratio of stiffness provided to
 that needed for simple spans. About (.55) is needed
 for spans continuous at two ends and (.66) is
 needed for spans of continuous at one end.

Bridges carrying both pedestrians and traffic
 need 25% greater stiffness.

NOTE:
 This chart may be valid for the positive moment
 areas of continuous spans if the span is taken
 as the maximum distance between points of
 inflection for combined deadload and live load.
 Merit is related to total cost, including one
 minimum cost substructure unit per span.



DOWL

SHEET 4 OF 4

ENGINEERING DEPARTMENT _____

MADE BY Brian Renfrow DATE 5/18/2017

CLIENT - JOB NO. _____

CHKD. _____ DATE _____

SUBJECT: Design Report 17.5 Road Bridge Replacement

DATE _____

RV. NO. 0 BY _____ APPVD. _____ DATE _____

IV. Substructure Design – Abutment and Pile

Preliminary vertical load analysis yields the following:

AASHTO Load Combination Vertical Forces:

Strength 1 - 1.25 DC + 1.5 (DW+ES) + 1.75 (LL+LS) + 1.33 (LL)

Strength 2 - 1.25 DC + 1.5 (DW+ES) + 1.35 (LL+LS) + 1.33(LL)

Strength 1 Controls = 26981 lbs/ft x 6 feet spacing = 161886 lbs per pile

Reviewing the geotechnical report the ultimate pile capacity for an HP12x53 ($f_y = 50$ ksi) is 767 kips estimated length of 65 feet per pile. Downdrag is considered 1500 psf. The surface area is calculated as 6 s.f. per foot down to formational material at 60 feet. 1500 psf x 6 s.f. x 50 feet = 450 kips of lost capacity. 767 kips – 450 kips = 317 kips (0.65) = 206 kips > 162 kips

Therefore HP 12x53 Piles are o.k. at 6 ft. spacing.

Appendix A



MESA COUNTY / CITY OF FRUITA
FRT 17.5 & K.25 Bridge Replacement

REVISED CONSTRUCTION EXPENSE FOR ROAD & BRIDGE
 Updated May 18, 2017

CDOT	DESCRIPTION	UNIT	QUANT	UNIT PRICE	COST
201-00000	Clearing and Grubbing	LS	1	\$ 6,000.00	\$ 6,000.00
202-01000	Removal of Fence	L.F.	280	\$ 1.00	\$ 280.00
202-00400	Removal of Bridge	EACH	1	\$ 20,000.00	\$ 20,000.00
202-00155	Removal of Top Part of Concrete Abutment	LS		\$ 4,000.00	\$ 4,000.00
202-00240	Removal of Asphalt Mat (Planing)	SY	840	\$ 2.00	\$ 1,680.00
202-00000	Relocate Telephone Box	LS	1	\$ 200.00	\$ 200.00
202-00000	Remove Existing Power Poles	EACH	2	\$ 500.00	\$ 1,000.00
202-00000	Remove Existing Foot Bridge	LS	1	\$ 200.00	\$ 200.00
202-00000	Remove Existing Storm Pipe	LS	1	\$ 500.00	\$ 500.00
202-00000	Remove Existing Storm Manhole	LS	1	\$ 500.00	\$ 500.00
203-01597	Potholing	HOUR	8	\$ 200.00	\$ 1,600.00
203-00010	Unclassified Excavation (Road)	CY	530	\$ 20.00	\$ 10,600.00
203-00010	Unclassified Excavation (Trail)	CY	1340	\$ 20.00	\$ 26,800.00
203-00010	Embankment Material (Road) CIP	CY	415	\$ 20.00	\$ 8,300.00
203-00010	Embankment Material (Trail) CIP	CY	10	\$ 20.00	\$ 200.00
206-00000	Structure Excavation (Bridge)	CY	3570	\$ 10.00	\$ 35,700.00
206-00100	Structure Backfill (Class 1) (Bridge)	CY	1275	\$ 40.00	\$ 51,000.00
206-00100	Structure Backfill (Class 1) (Trail)	CY	280	\$ 40.00	\$ 11,200.00
206-00100	Structure Backfill (Native) (Bridge)	CY	1920	\$ 15.00	\$ 28,800.00
206-00100	Structure Backfill (Native) (Trail)	CY	75	\$ 15.00	\$ 1,125.00
208-00002	Erosion Control	LS	1	\$ 5,000.00	\$ 5,000.00
210-00000	Relocate Mailbox	EACH	2	\$ 100.00	\$ 200.00
210-00000	Reset Sewer Manholoe Lid	EACH	1	\$ 100.00	\$ 100.00
210-00000	Reset Water Valve Lid	EACH	1	\$ 100.00	\$ 100.00
212-00006	Seeding (Native)	ACRE	0.2	\$ 3,000.00	\$ 600.00
213-00004	Mulching (Weed Free Straw)	ACRE	0.2	\$ 4,000.00	\$ 800.00
213-00061	Mulch Tackifier	LB	60	\$ 5.00	\$ 300.00
250-00010	Environmental Health and Safety Management	LS	1	\$ 5,000.00	\$ 5,000.00
304-06007	Aggregate Base Course (Class 6) Road & Sidewalks	CY	365	\$ 40.00	\$ 14,600.00
304-06007	Aggregate Base Course (Class 6) Trail	CY	50	\$ 40.00	\$ 2,000.00
304-01005	Aggregate Base Course (Class 1)	CY	100	\$ 15.00	\$ 1,500.00
304-06007	Aggregate Base Course (Class 6) RIPRAP Bed Course	CY	270	\$ 40.00	\$ 10,800.00
403-34751	Hot Mix Asphalt (Grade SX)(PG 64-28)(2 inch)	TON	210	\$ 100.00	\$ 21,000.00
420-00103	Geotextile (Separator 180N)	SY	1510	\$ 6.00	\$ 9,060.00

420-00300	Geotextile (Miragrid 8XT)	SY	4595	\$ 25.00	\$ 114,875.00
502-00000	Micropiles	LF	2545	\$ 50.00	\$ 127,250.00
502-00460	Pile Tip	EACH	22	\$ 160.00	\$ 3,520.00
502-11253	Steel Piling (HP 12x53)	LF	1050	\$ 75.00	\$ 78,750.00
506-00000	Rip-Rap (D50 = 18-inch)	C.Y.	1585	\$ 75.00	\$ 118,875.00
509-00000	Painted Steel Railing	LF	260	\$ 40.00	\$ 10,400.00
515-00000	Geotac Waterproofing Membrane	SY	655	\$ 35.00	\$ 22,925.00
601-03040	Concrete Class D (Abutments, Wingwalls, and Approach Slabs)	CY	310	\$ 750.00	\$ 232,500.00
601-03040	Concrete Class D (Deck slab, deck sidewalks, and rail curbs)	CY	100	\$ 750.00	\$ 75,000.00
601-03040	Concrete Class B (Roadway sidewalks, curbs, and gutters)	CY	65	\$ 750.00	\$ 48,750.00
601-03040	Concrete Class D (Trail pavement, walls, footings, and pile cap)	CY	165	\$ 750.00	\$ 123,750.00
601-00000	Concrete coating	S.F.	3870	\$ 4.00	\$ 15,480.00
602-00020	Reinforcing Steel (Epoxy Coated)	LB	48170	\$ 1.75	\$ 84,297.50
602-00000	Reinforcing Steel	LB	12175	\$ 1.50	\$ 18,262.50
603-01125	12-inch Reinforced Concrete Pipe (Complete in Place)	LF	40	\$ 75.00	\$ 3,000.00
603-01360	36-in Reinforced Concrete Pipe (Complete in Place)	LF	95	\$ 100.00	\$ 9,500.00
604-19025	Manhole Special (20 Foot)	EACH	1	\$ 5,500.00	\$ 5,500.00
604-00350	Vertical Curb inlet and manhole	EACH	4	\$ 5,500.00	\$ 22,000.00
605-00080	8-inch ADS N-12 Drain Pipe	LF	95	\$ 32.00	\$ 3,040.00
606-11032	Bridge Rail Type 10M (Special w/ Handrail_Galvanized)	LF	265	\$ 350.00	\$ 92,750.00
613-00000	Route Overhead Powerline Underground	LS	1	\$ 20,000.00	\$ 20,000.00
614-00000	Ground Sign	EACH	6	\$ 75.00	\$ 450.00
614-00000	Steel Sign Post (U-Post) 3 lbs /ft	L.F.	60	\$ 20.00	\$ 1,200.00
618-01994	Prestressed Concrete Box (depth 32" through 48")	SF	4385	\$ 60.00	\$ 263,100.00
620-00001	Field Office (Class 1)	EACH	1	\$ 10,000.00	\$ 10,000.00
620-00020	Sanitary Facility	EACH	1	\$ 1,500.00	\$ 1,500.00
625-00000	Construction Surveying	LS	1	\$ 12,000.00	\$ 12,000.00
626-00000	Mobilization	LS	1	\$ 15,000.00	\$ 15,000.00
626-00000	Public Information Services	LS	1	\$ 2,500.00	\$ 2,500.00
627-00002	Pavement Marking Paint (Yellow)	GAL	7	\$ 70.00	\$ 490.00
627-00002	Pavement Marking Paint (White)	GAL	7	\$ 70.00	\$ 490.00
630-00000	Construction Traffic Control including signage and barriers	LS	1	\$ 26,000.00	\$ 26,000.00
700-70010	F/A Minor Contract Revisions	FA	1	\$ 100,000.00	\$ 100,000.00

Total **\$1,943,900.00**

EXHIBIT B4: GEOTECHNICAL REPORT

EXHIBIT B4 GEOTECHNICAL REPORT

Offices:

Colorado

Wyoming

Montana

Arizona

North Dakota

Oregon

Washington

Alaska

**GEOTECHNICAL REPORT
CITY OF FRUITA
FRT-17.5-K.25 BRIDGE REPLACEMENT
(N. MAPLE ST/17.5 RD BRIDGE)
MESA COUNTY, COLORADO**

December 15, 2016

Prepared for:

**Sam Atkins, PW Director
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Introduction

DOWL was engaged to conduct a geotechnical evaluation for the proposed FRT-17.5-K.25 bridge replacement at North Maple Street and 17.5 Road in Fruita, Colorado. This evaluation will supplement other services provided by DOWL including the survey, drainage report, structural and civil design for the replacement bridge and road improvements. The current FRT-17.5-K.25 Bridge was constructed in 1970 and spans the Little Salt Wash. It is located on 17.5 Road (N. Maple Street) approximately 0.25 miles north of K Road. The surrounding area is residential, with homes, schools and parks. Current ADT at the structure is 4,293 vehicles and the most recent inspection report classifies the structure as functionally obsolete. It is in Mesa County and the City of Fruita's goal is to replace the structure to current standards and accommodate a collector street section for 17.5 Road (N. Maple Street) to improve multimodal transportation in the area.

Subsurface exploration was performed on October 4, 2016. Our evaluation consisted of a site reconnaissance, drilling of two boreholes, logging and testing of representative materials found, and analysis of available data. The existing bridge will be constructed in roughly the same location of the existing bridge. The old bridge will be demolished and new abutments will be constructed adjacent to the existing abutments with the existing acting to support utilities and the new abutment structures. The new construction will incorporate a pedestrian "tunnel" between the old and new bridge abutments on the north side of the bridge.

Site Conditions

The existing site conditions are illustrated by the following photographs taken at the time of our field exploration. The current bridge location is noted on the Vicinity Map, Appendix A, Map 1. As seen on the Site Plan (Appendix A, Map 2), the project area is located on North Maple Street over the Little Salt Wash, 0.25 miles north of K Road in Fruita.



Looking north showing the existing bridge deck with drill rig positioned at the location of BH#2 near the north abutment.



Photographs show the Little Salt Wash, the underside of the bridge, and general abutment conditions.

According to the Preliminary Drainage Report for this bridge produced by DOWL, the Little Salt Wash basin is approximately 33.2 square miles and originates to the northeast in the Bookcliffs within Mesa County. Topography of the Little Salt Wash basin ranges from an elevation of approximately 8,276 feet (MSL) at the top of the basin in the northeast to 4,526 feet (MSL) at the 17.5 (N. Maple St) road crossing. The general direction of the drainage in the project area is northeast to southwest. The Little Salt Wash is a perennial stream channel that is fed by irrigation return flows as well as natural runoff.

We drilled two boreholes (one at the south and one at the north end of the existing bridge) as indicated on the Site Plan. Boreholes #1 and #2 (BH#1 and BH#2) were located in the general vicinity of the proposed bridge abutments. The results of our field and laboratory testing are discussed in the *Soil Characteristics* Section of this report.

Geologic Setting

According to the *Surficial Geologic Map of the Grand Junction 1° x 2° Quadrangle* (USGS Map I-1289, Whitney: 1981), the subject bridge site is located on Quaternary alluvium on low terraces adjacent to the current Colorado River floodplain. The extensive Holocene alluvium consists of clay, silt, sand, and gravel deposited by the Colorado River and its tributaries in current or former channels and in floodplain deposits. The Big and Little Salt Wash drainages bring fine-grained and sandy alluvium from the Bookcliffs down to the southwest from the Bookcliffs and this material intertongues and overlies coarser Colorado River alluvium. According to the *Geologic and Structure Map of the Grand Junction Quadrangle, Colorado and Utah* (USGS Map I-736, Cashion: 1973), the bedrock underlying the bridge and the City of Fruita is Cretaceous Mancos Shale (Km), a dark gray to black, soft calcareous shale with some thin sandstone beds. These unconsolidated alluvial materials as well as the underlying Mancos Shale were encountered in our boreholes as are discussed in the *Soil Characteristics* Section of this report.

There are no mapped faults, folds, intrusions or other major geologic features in the vicinity of the bridge project.

Geologic Hazards

The primary geologic hazards relevant to the FRT-17.5-K.25 Bridge over the Little Salt Wash are erosion, flooding and seismicity. These hazards are discussed below.

Erosion

As discussed in DOWL's Preliminary Drainage Report for the FRT-17.5-K.25 Bridge, the Little Salt Wash has a drainage basin of 33.2 square miles, a flow path of 21.1 miles and an average slope of 3.3%. However, in the vicinity of the subject bridge, the stream and surrounding terrain have a more gentle gradient of less than 1% down to the southwest. The banks and channel generally contain a dense cover of trees and shrubs; however, there are some exposed areas, as seen in the photograph below. Also, the bank is generally stable, but some areas show signs of erosion and slumping due to undercutting during flood flows. The silty to sandy soils that compose the banks have low cohesion and are susceptible to scour and erosion where not protected by vegetation.



View upstream (east) of the Little Salt Wash channel under the FRT-17.5-K.25 Bridge. This photo shows the nature of the channel and vegetation in the vicinity of the bridge. Although the vegetation is generally dense, note the scour on the opposite bank and the bare soil in the area of the bridge abutment. No shallow or surficial bedrock is present in this area.

Armoring of the bridge abutments, channel, and streambanks in the vicinity of the bridge will be important design features to protect the channel from scour and the banks from further erosion. See the DOWL Drainage Report for more details on erosion protection.

Flooding

Federal Emergency Management Agency (FEMA) flood elevation mapping is available for the Little Salt Wash near this bridge site. Although the Little Salt Wash does not have a stream gage and no historic flood flow data is available, DOWL performed a USGS StreamStats ungaged site report that indicates 100-year peak flow of 4,650 cfs at this location. The FEMA estimated flow for the same event is 4,300 cfs and the 500-year storm is 8,100 cfs. Modeling by DOWL indicates that the proposed bridge design will pass the 100-year event with a freeboard of 1.92 feet, which indicates flood pressures and debris that can potentially impact the bridge deck and abutments. Please refer to the Drainage Report conducted by DOWL to

evaluate flood water levels and scour potential of the Little Salt Wash for more information about modeled flooding results.

Due to the scour potential at the bridge abutments from high flows associated with a 100-year event and the low cohesion of the native soils, the channel in the vicinity of the crossing will need to be armored. Armoring recommendations are beyond the scope of this study and will be addressed in the DOWL drainage report.

Seismicity

Fruita and the bridge site are located in the Colorado Plateau Seismotectonic Province in Colorado, where maximum credible earthquakes are estimated to be on the order of magnitude 5.5 to 6.5, which is equivalent to Modified Mercalli (MM) V to VIII (Colorado Geological Survey Bulletin #43). Please refer to the *Seismic Design Criteria* Section of the *Recommendations* section for site-specific seismic design recommendations interpreted from Section 3.10 of the *AASHTO LRFD Bridge Design Specifications, 4th Edition (2008 Interim Revisions)*.

Soil Characteristics

Two borings (BH#1 and BH#2) were advanced to depths of about 65.2 feet and 59.5 feet, respectively, using a CME 55 track-mounted drill rig at the locations noted on the attached Site Plan. BH#1 and BH#2 were selected to represent bridge abutment locations on the north and south sides of the Little Salt Wash. BH#1 was advanced the entire 65.2-foot depth using an 8-inch hollow stem auger (HSA); BH#2 was drilled using a HSA to 35 feet and a driven dynamic cone was driven to 59.5 feet using the Dynamic Cone Penetration Test (DCPT). Soil samples were obtained at discrete depths in BH#1 by inserting a standard 1.375-inch inside diameter (I.D.) split-spoon sampler without liners to perform in-situ Standard Penetration Tests (SPTs) in general accordance with ASTM Standard D-1586. The number of blows required to drive the sampler 12 inches in 6-inch increments were recorded (field SPT blow counts) and, when properly evaluated, indicate the relative density or consistency of the soils as SPT "N" values. The DCPT test in the lower portion of BH#2 was advanced by continuously driving an expendable cone tip at the end of the drill rod. The blow count recorded in this manner is not an actual N-value, but we have found the results to be comparable for most deposits.

The soil, bedrock, and groundwater conditions were logged, and representative samples of subsurface materials were tested in our laboratory. The subsurface conditions found in the borings and laboratory results are shown on the attached Borehole Logs (Appendix B). The following photograph was taken of the surface site conditions looking south from BH#2.



Left Photograph showing drill rig at the BH#2 site, view to the south. Right photograph showing contact between overlying sand/gravels (right of the pen) and shale (left of the pen) in BH#1 at about 61 feet below grade.

In the boreholes (BH#1 and BH#2), we found loose silt/sand and silt/clays with varying degrees of gravels to a depth of about 50 feet. These softer deposits were underlain by dense gravels and sand/gravels to about 60 feet, where shale bedrock was contacted. The softer deposits had N-values of 4 to 10 blows per foot (bpf) while the gravels had N-values of greater than 50 bpf. Groundwater was encountered at a depth of about 43 feet during drilling in BH#1. However, it should be mentioned that the soils were wet to saturated at a much shallower depth (around 20 feet), but free water was not observed during the short interval of drilling. The clayey soils "hold onto" the water in the short-term, but would likely release the water and indicate a shallower water table if the borehole had been left open longer.

Laboratory tests were performed on selected native soil types to evaluate general compositional characteristics (see attached Particle Size Distribution and Atterberg Limits test reports in Appendix C). Atterberg limits tests were performed on one of the finer-grained soils collected at depths of 20-21.5 feet in BH#1. An Atterberg limits test was also performed on a bulk roadway subgrade sample collected from the pavement areas around the two borings. The fine-grained soil had a liquid limit (LL) of 26, plastic limit (PL) of 15, and plasticity indices (PI) of 11. A soil with a PI of less than 15 is considered to have a low potential for swelling when wetted and shrinking when dried. The roadway subgrade sample was found to be non-plastic. A gradation analyses performed on the finer-grained sample indicated the soil to be composed of about 34% clay and silt, 43% sand, and 23% gravel. Based on these laboratory test results, this soil classifies as a lean clay with sand (CL) according to the Unified Soil Classification System (USCS). Another gradation analysis was performed on the native soil obtained at a depth of 15-16.5 feet and it was composed of 23% gravel, 43% sand, 16% silt and 18% clay. This soil classifies as a clayey sand with gravel (SC) according to the USCS and it shows the composition of coarser lenses within the generally soft soil column. A gradation analyses performed on the roadway subgrade sample indicated the soil to be composed of about 13% clay and silt, 44% sand, and 43% gravel. Based on these laboratory test results, this soil classifies as a silty sand with gravel (SM) according to the Unified Soil Classification System (USCS).

A Modified Proctor was performed on the roadway bulk subgrade sample limits and gradation analyses were also performed on the streambed soils sampled in BH#3 at 5-7 feet (sample

DS14). This soil is non-plastic and is composed of 4% clay, 6% silt, 51% sand, and 39% gravel. The USCS soil classification of this soil is a poorly graded sand with silt and gravel (SP-SM). An additional bulk sample of a sediment pile in the stream channel near BH#3 (sample GS1) is also non-plastic and is composed of 3% clay, 10% silt, 80% sand (mostly fine sand), and 7% gravel (see Particle Size Distribution test report). This soil classifies as a silty sand (SM).

A geochemical test was conducted on deep clayey soil sample retained from 35-36.5 feet in BH#1 to evaluate the corrosivity of the soil. The soil sample had water soluble sulfate concentration of 0.420%, chloride content of 80 ppm, electro-conductivity of 408 $\mu\text{S}/\text{cm}$, and pH value of 8.2. The water soluble sulfates content is considered "severe," the chlorides content is moderate, and the electro-conductivity values are moderate for corrosive soil, while the pH values indicate strongly alkaline conditions. Recommendations for addressing the corrosive nature of the soil are presented in the *Recommendations* section of this report.

The field observations and laboratory testing indicates that the soils that underlie this bridge site are non-plastic to low plasticity, have low cohesion, have variable and moderately low density, have moderate consolidation potential, and are dominated by clay, silt and fine sand with some gravels. Formational material is fairly deep (about ± 60 feet to Mancos Shale) and the permanent water table is relatively deep (about 40 feet). Due to the fine-grained and erodible nature of the embankment and foundation soils, scour and erosion mitigation will be required. Aggressive channel armoring is recommended for the long-term stability of the channel and bank in the vicinity of the Little Salt Wash.

RECOMMENDATIONS

Based on preliminary project team discussions, the preferred foundation option is driven H-piles seated in the underlying formational shale. The new abutments will require the addition of about 10 feet of fill thickness over the 50 foot deck width. This will induce some settlement within the upper portion of the underlying loose/soft soils which extend to about 40 feet. Our recommendations are predicated on these assumptions.

Seismic Design Criteria

In accordance with the 2009 AASHTO Guide Specifications for LRFD Seismic Bridge Design and our limited knowledge of the site, we recommend that this site be designated as Site Class E (soft soil with $N < 15$ or $PI > 20$). This classification is based on limited exploratory data primarily the one deep boring performed (BH#1). The peak ground acceleration (PGA) is 0.076g. The mapped spectral response acceleration at short periods (0.2 second, S_s) is 0.159g and at one second (S_1) is 0.039g. These values are derived from data from the USGS National Seismic Hazard Mapping Project based on the latitude and longitude coordinates for the site.

Embankment

Fills up to 10 feet will be necessary to provide access to the bridge. Due to the unconsolidated nature of some of the deeper deposits, settlements on the order of one to one and a half inches

are estimated to occur with the greatest settlements at the center of the fill mass. Piles driven within the embankment footprint would then experience downdrag forces in addition to bridge structural loads which must be accounted for in the design. In order to minimize the downdrag forces and the corresponding embankment induced settlement, we recommend that if feasible the embankment dead loads be placed early on in the construction process and settlement monitored until it has essentially ceased. Recommendations are presented below.

1. Structural embankment fill material may consist of suitable inorganic soils "free" of organic contamination. The recommended structural fill is Class 2 CDOT roadbase or similar if approved by DOWL.
2. Grading of all permanent cut and fill slopes should not exceed 2H:1V. Existing or created permanent slopes greater than 2H:1V and over 3 feet in vertical height upon which permanent improvements are constructed and/or where retention or enhancement of current slope stability is desired, should be restrained by an engineered retaining structure/system.
3. Disturbed areas should be revegetated as soon as practical to reduce soil erosion.
4. Fill used at this site should meet the gradational and compaction requirements listed in Tables 2 and 3 below. Fill should be placed and compacted in **maximum 6-inch lifts**, unless otherwise directed by the design engineer. Structural fill should not be placed on frozen or wet existing soil or fill material.

Table 2. Gradation Requirements for Recommended Fill Material

Type	Sieve	%Passing, by weight
Structural Fill (CDOT Class 2 roadbase)	4" (100 mm)	100
	3" (75 mm)	95-100
	#200 (0.075 mm)	3-15

Note: The Plasticity Index for all fill soils should be less than 6.

Table 3. Compaction Requirements for Fill Material

Application	Compaction Requirement	Proctor	Moisture
Embankment	95% max. dry density	Modified	±2% of optimum
Road Subbase	95% max. dry density	Modified	±2% of optimum
Road base course	95% max. dry density	Modified	±2% of optimum
Behind retaining walls	Per project specifications*		
Utility Trenches	Per project specifications*		
General landscaping	Per project specifications*		

*As specified by the design engineer on project documents or in accordance with local municipal requirements.

5. Any soils containing organics, debris, topsoil, frozen soil, snow, ice, and other deleterious materials shall not be used for anything other than landscaping.
6. The Engineer, or his representative should be called out to the site to observe placement of structural fill and verify the compacted density per the schedule included in the Plan Set.

Driven H-Piles

The preferred method of support is driven 12x53 H-Piles. It is anticipated that the piles will need to penetrate the shale at least 5-10 feet to attain ultimate end bearing conditions. Therefore expected pile embedment lengths are on the order of 70 to 75 feet below prevailing bridge deck grade. Actual pile lengths will be based on field conditions and PDA testing.

The following recommendations are provided.

1. We recommend a pre-construction meeting with the geotechnical engineer, foundation engineer, contractor, and pile driving subcontractor to discuss the construction process and highlight typical challenges associated with on driven pile installations.
2. For the preferred 12x53 H-pile (Grade 50), we recommend a LRFD Ultimate Nominal Capacity of 767 kips. For Grade 36 pile the recommended LRFD Ultimate nominal Capacity is 558 kips.
3. A downdrag skin frictional force of 1500 psf should be assumed over the length of the pile equal to twice the embankment width (least dimension) or 50 feet whichever is less. If the embankments can be constructed early on and allowed to induce settlement in the deeper soils before pile driving then downdrag forces can be eliminated. This will require incorporating settlement monitoring instrumentation into the embankment to record settlement over time until the settlement has leveled off to 0.1 inch or less for three consecutive months. Weekly readings are recommended for the first three months, followed by bi-monthly readings for three months and then monthly readings thereafter if necessary. We recommend allowing a minimum 9 month window for embankment settlement to occur prior to driving H-Piles within the embankment footprint. If this is not feasible then downdrag forces need to be considered in the pile design and capacities.
4. Piles should be driven to the recommended minimum depths on the structural design plans. All production pile driving should be monitored by a Pile Driving Analyzer (PDA) to confirm capacity. A minimum of one production pile at each abutment should be driven as a "test" pile using the PDA prior to initiating the production piles in order to establish relative pile length/depths required to achieve the design capacity.
5. Pile spacing should be a minimum of three diameters on-center for axially-loaded piles and eight diameters on-center for laterally-loaded piles. Piles spaced more closely should be analyzed for group behavior and utilize appropriate reductions in capacity.
6. Piles damaged prior to, during, or after installation should not be used.

7. A piling contractor with demonstrated successful experience driving similar piles with qualified personnel in similar conditions should be chosen to perform the pile installations.
8. Observation of the pile installation operations should be performed by a representative of DOWL. A log should be maintained on the number of blows per foot required to seat each pile. This observation will aid in attaining an adequate foundation system and any abnormal subsurface condition encountered during foundation installation can be identified and corrective measures taken, as required.
9. Bridge abutment protection, such as rip rap, shall be designed according to recommendations provided in DOWL's hydrology report. Lateral pressures for native soils and backfill are provided in the *Retaining Structures* Section below.

Lateral Earth Pressures

1. Retaining walls should be designed using the lateral earth pressures given in Table 1 below. These values assume a level backslope with no hydraulic pressures behind the wall, the use of structural fill as backfill within the active zone (defined as a triangular area with a hypotenuse defined by a 35° imaginary line as rotated from the back of the wall and extending to the surface from the base of the wall, and no surcharge loads applied in the backslope zone.

Table 1. Lateral Earth Pressures

	Structural Fill	
Active Earth Pressure	35	pcf*
Passive Earth Pressure	400	pcf*
At-Rest Earth Pressure	55	pcf*
Unit weight of soil	125	pcf**
Coefficient of Friction	0.32	***
* pounds per cubic foot (fluid equivalent)		
** pounds per cubic foot		
*** concrete on dry soil conditions		

2. Excavations should be laid back in accordance with OSHA Regulations 29 CFR 1926.
3. The free-draining granular fill material placed behind the abutment retaining walls should be compacted as specified by the design engineer. Over-compaction of the backfill should be avoided so that excessive pressures are not placed against the retaining wall. Unless expressly approved by the design engineer, only hand-operated light-duty compaction equipment should be used within three feet of the wall. If flowable fill is used in lieu free-draining material, the active and at-rest pressures will be less than given in Table 1 so design using the Table 1 values should be conservative.

Concrete

A water-soluble sulfate test conducted on a sample of the soil found in our excavations showed sulfate concentrations of 0.420%. Therefore, we recommend that the cementitious material requirements for Class 2 sulfate exposure in Section 601.04 of the latest edition of the CDOT Specifications for Road and Bridge Construction be consulted and followed.

Excavation Safety

1. Temporary excavations should be in accordance with Occupational Safety and Health Administration (OSHA) regulations and with worker safety in mind.
2. Construction equipment, materials, and soil stockpiles should be located a minimum horizontal distance equal to the height of the excavation from the crest of the excavation unless otherwise approved by the design engineer.
3. Based upon our evaluation, the silt/clay found in our borings would be most nearly represented by an OSHA Type A soil. ***We note, however, that the recommended excavation slope angles for this classification do not consider topographic slope angle or surcharges which must be accounted for when excavating.*** Our assessment is based upon the soil and groundwater conditions found in our limited evaluation and sampling. The contractor's "competent person" (defined by OSHA as "an individual capable of identifying existing and predictable hazards...and who has the authorization to take prompt corrective measures to eliminate or manage these hazards and conditions) should evaluate the soil materials exposed during excavation based on composition, structure, and environmental conditions per 29 CFR 1926 and recommend appropriate slope laybacks or shoring, as required. Refer to OSHA's Technical Manual Section V: Chapter 2 on *Excavations: Hazard Recognition in Trenching and Shoring* (available on-line at: www.osha.gov) for further excavation guidelines. We can provide these services, as requested.
4. If the excavations will be made or remain open during wet weather, it is recommended that polyethylene sheeting be secured over the excavation face to minimize sediment runoff and deterioration of the foundation soils. Surface runoff above the cuts should be directed away from the excavation using berms or diversion ditches. Water should not be allowed to accumulate and/or pond anywhere upon the foundation soils. It should be removed by gravity or pumped to avoid this condition until permanent drainage systems are operational.
5. We anticipate that the excavation of the site soils can be accomplished by conventional excavating equipment.

Closing Considerations

Standard of Care and Interpretation of Subsurface Data

This report has been prepared in a manner consistent with local standards of professional geotechnical engineering practice. Evaluation of environmental contaminants was not part of our scope of services performed at this site. The classification of soils and interpretation of subsurface conditions is based on our training and years of experience, but is necessarily based on limited subsurface observation and testing. As such, inferred ground conditions cannot be guaranteed to be exact. No other warranty, express or implied, is made.

Observations and monitoring of deep foundation test and production piles by DOWL are integral to these recommendations. If subsurface conditions differing from those described herein are discovered DOWL can recommend remedial measures to allow construction to proceed.

Use of This Report

This report is intended for use by the design team specifically to address the site and subsurface conditions as they relate to the proposed structure(s) described in the *Construction Plans* Section. Changes to the site or proposed development plans may alter or invalidate the recommendations contained herein.

DOWL retains an ownership and property interest in this report. Consistent with the industry, copies of this document that may be relied upon by the design team are limited to those that are signed and sealed by the Geotechnical Engineer (*Standard Form of Agreement Between Owner and Geotechnical Engineer for Professional Services*, Engineer's Joint Contract Documents Committee, 1996). This report together with ancillary data, analyses, test results, and other components and/or supporting parts are not intended or represented to be suitable for reuse by the design team or others on extensions to this project or on any other project. Any such reuse or modification invalidates all aspects of the report and excuses the Geotechnical Engineer for all responsibility and liability or legal exposure.

This report is considered valid for a period of two years from the date of issue provided the site conditions and development plans have not changed from what is referenced in this report. Changes to the site may occur due to development or natural processes. Additionally, technological advances made in construction and changes in legislation may alter the recommendations made herein. Depending upon the site and proposed development changes, DOWL may require additional evaluation (at additional cost) to update the recommendations contained herein.

Retention of Samples

Samples of soil and rock collected during the course of our geotechnical evaluation(s) are routinely held in our laboratory for a period of three months from the date of the evaluation and then are discarded. A written request by the client or design team is required for samples to be stored for a longer period.

Additional Services

To provide continuity and consistency from project start to finish, we should be retained to make observations and carry out material testing as a service to the owner. As noted above, we recommend the owner contact us to discuss required services and scheduling in advance of the construction phase.

DOWL is a full-service engineering firm providing foundation, on-site wastewater system, site drainage, structural and retaining structure design services, as well as surveying, construction materials testing, and inspections. Please visit **www.dowl.com** for a full description of our services.

Thank you for the opportunity to perform this geotechnical evaluation for you. If you require any of the above services or have any questions regarding this report, please contact us.

Respectfully Submitted
ELECTRONICALLY,
DOWL, LLC



Laurie J. Brandt, C.P.G.
Certified Professional Geologist



Wayne Pandorf, P.E.
Senior Geotechnical Engineer

Enclosures: Appendix A – Maps (Vicinity Map, Site Plan)
 Appendix B – Borehole Logs
 Appendix C – Laboratory test results

APPENDIX A

Map 1 – Vicinity Map
Map 2 – Site Plan

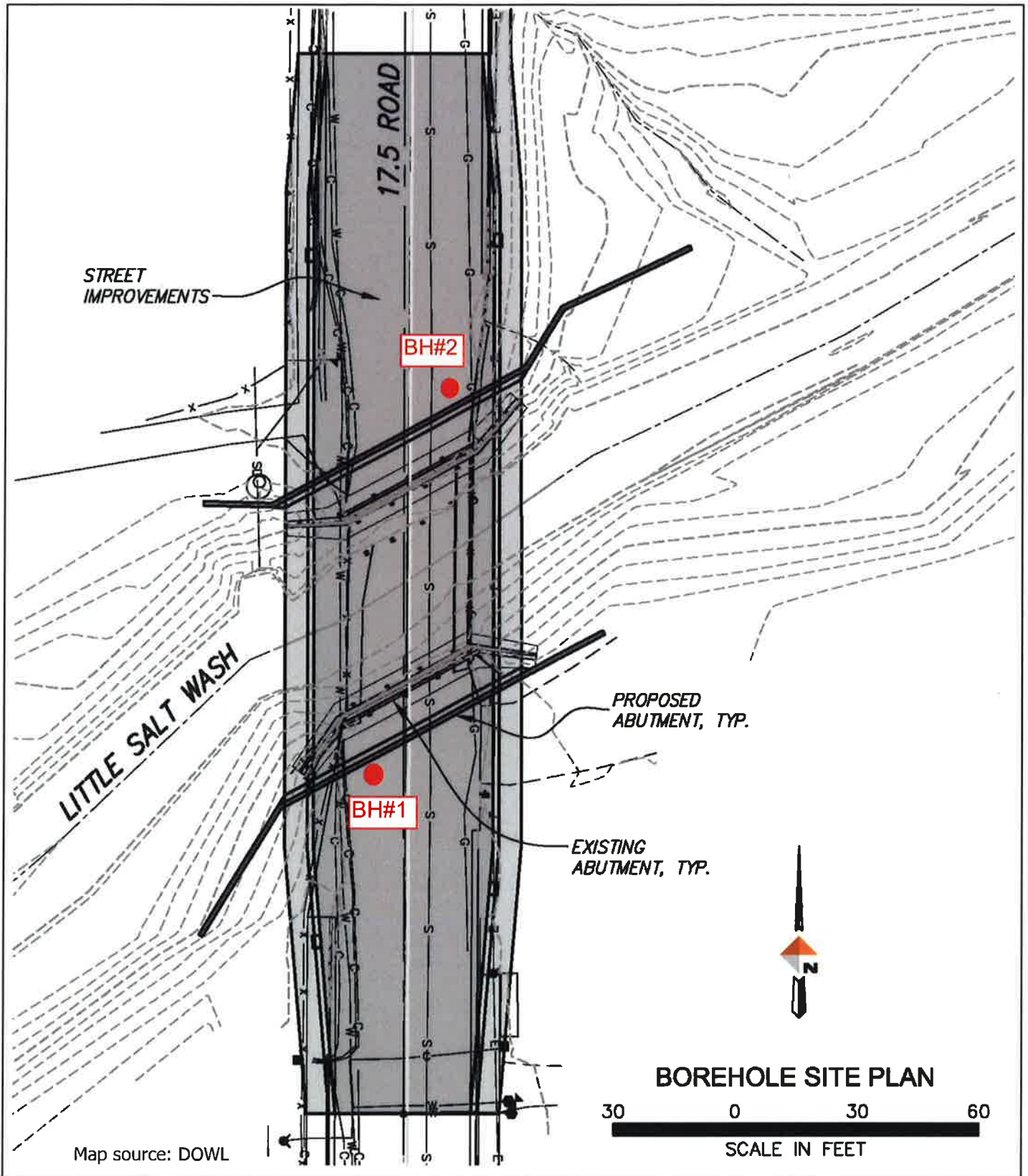
VICINITY MAP



Map source: Google Earth (scale unknown)

MAP NUMBER 1 OF 2	FIELD STAFF	LB	FRT-17.5-K.25 Bridge Maple St & 17.5 Rd Fruita, Colorado	 DOWL Consulting Engineers 222 S. Park Ave. Montrose, Colorado 81401 (970) 249-6828 Ph. (970) 249-0945 Fax www.dowl.com
	DRAFTING STAFF	LB		
	FIELD DATE	10/04/16		
	PROJECT #	7121.74610.01		

SITE PLAN



MAP NUMBER	FIELD STAFF	LB
2	DRAFTING STAFF	LB
	FIELD DATE	10/04/16
OF 2	PROJECT #	7121.74610.01

FRT-17.5-K.25 Bridge
 Maple St & 17.5 Rd
 Fruita, Colorado



APPENDIX B

Borehole Logs

Log of Borehole #1 (BH#1) - Sheet 1 of 2

BOREHOLE LOCATION: S. side of bridge (West lane)

DRILLING COMPANY: HRL

DRILL RIG: CME 55 tracked

SAMPLER: Std. split spoon

DRILL STEM: 8" H.S.A.

DEPTH (ft)	WATER LEVEL	GRAPHIC	SAMPLE	SAMPLE #	FIELD BLOW COUNTS	FIELD "N" VALUE (BPF)	SPT "N" VALUE (BPF)	SUBSURFACE DESCRIPTION	FIELD & LABORATORY TEST RESULTS
		[Graphic: 0-0.8' asphalt]						asphalt (0-0.8')	
5		[Graphic: 0.8-2.5' roadbase, silty SAND and GRAVEL]	ST	DS1	8,6,6	12	12	roadbase, silty SAND and GRAVEL (0.8-2.5')	<u>BS1/BS2 @2-5' (SM)</u> PI=Non-Plastic gravel=43.0% sand=44.4% silt/clay=12.6% Method C Standard Proctor: 134.3 pcf at 6.9% optimum MC (rock correction applied)
		[Graphic: 2.5-14' brown, moist, silty SAND with GRAVEL]						brown, moist, silty SAND with GRAVEL; probable fill material; relatively easy to drill from 2.5-5', then more gravel and denser to 14' (2.5-14')	
10		[Graphic: 14-20' brown, moist to wet, SILTY to CLAYEY FINE SAND]	ST	DS2	7,5,6	11	11		
		[Graphic: 20-21.5' brown, moist to wet, SILTY to CLAYEY FINE SAND]						brown, moist to wet, SILTY to CLAYEY FINE SAND (SC) with some GRAVEL (14-20')	
15		[Graphic: 21.5-25' brown to red-brown, soft, moist to wet, SILTY CLAY]	ST	DS3	3,3,3	6	6		
		[Graphic: 25-30' brown to red-brown, soft, moist to wet, SILTY CLAY]						brown, moist to wet, SILTY to CLAYEY FINE SAND (SC) with some GRAVEL (14-20')	
20		[Graphic: 30-35' brown to red-brown, soft, moist to wet, SILTY CLAY]	ST	DS4	1,1,3	4	4		
		[Graphic: 35-40' brown to red-brown, soft, moist to wet, SILTY CLAY]						brown to red-brown, soft, moist to wet, SILTY CLAY (CL) to CLAYEY SILT (ML) with some FINE SAND (20-45')	
25		[Graphic: 40-45' brown to red-brown, soft, moist to wet, SILTY CLAY]	ST	DS5	2,3,4	7	7		
		[Graphic: 45-50' brown to red-brown, soft, moist to wet, SILTY CLAY]						brown to red-brown, soft, moist to wet, SILTY CLAY (CL) to CLAYEY SILT (ML) with some FINE SAND (20-45')	
30		[Graphic: 50-55' brown to red-brown, soft, moist to wet, SILTY CLAY]	ST	DS6	1,2,2	4	4		
		[Graphic: 55-60' brown to red-brown, soft, moist to wet, SILTY CLAY]						brown to red-brown, soft, moist to wet, SILTY CLAY (CL) to CLAYEY SILT (ML) with some FINE SAND (20-45')	
35		[Graphic: 60-65' brown to red-brown, soft, moist to wet, SILTY CLAY]						(continued on next page, Sheet 2 of 2)	

Borehole	Field Staff	LB	FRT-17.5-K.25 Bridge Maple St & 17.5 Rd Fruita, Colorado
Log	Drafting Staff	LB	
1a	Field Date	10/4/2016	
of 2	Project #	7121.74610.01	

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Log of Borehole #1 (BH#1) - Sheet 2 of 2

BOREHOLE LOCATION: S. side of bridge (West lane)

DRILLING COMPANY: HRL

DRILL RIG: CME 55 tracked

SAMPLER: Std. split spoon

DRILL STEM: 8" H.S.A.

DEPTH (ft)	WATER LEVEL	GRAPHIC	SAMPLE	SAMPLE #	FIELD BLOW COUNTS	FIELD "N" VALUE (BPF)	SPT "N" VALUE (BPF)	SUBSURFACE DESCRIPTION	FIELD & LABORATORY TEST RESULTS
35			ST	DS7	1,3,3	6	6	brown to red-brown, soft, moist to wet, SILTY CLAY (CL) to CLAYEY SILT (ML) with some FINE SAND (20-45')	<u>DS7 @35-36.5'</u> water soluble sulfates=0.420% chlorides=80 ppm Electro-conductivity=408 µS/cm pH=8.2
40			ST	DS8	1,4,6	10	10	soils are saturated, but no groundwater reading at 40'	
45	▽		ST	DS9	2,3,5	8	8	groundwater at 43' during drilling brown, wet, soft, FINE SANDY SILT with some CLAY (ML/CL); sandier than above (45-50.5')	
50			ST	DS10	4,26,50/1"	50/1"	50/1"	gray-brown, wet, dense, SANDY GRAVELS and COBBLES (50.5-56')	
55								gray-brown, wet, dense, med to coarse SAND with some GRAVELS; sand flowed into saturated hole (56-61.2')	
60			ST	DS11	3,5,50/3"	55/9"	55/9"	black, dense, moist to dry, fissile, HIGHLY WEATHERED MANCOS SHALE (61.2-65.2')	
65			ST	DS12	50/2"	50/2"	50/2"	SPT refusal @65.2' in dense formational Mancos Shale groundwater at 43'	
70									

Borehole	Field Staff	LB	FRT-17.5-K.25 Bridge Maple St & 17.5 Rd Fruita, Colorado
Log	Drafting Staff	LB	
1b	Field Date	10/4/2016	
of 2	Project #	7121.74610.01	

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Log of Borehole #2 (BH#2) - Sheet 1 of 2

BOREHOLE LOCATION: N. side of bridge (East lane)

DRILLING COMPANY: HRL

DRILL RIG: CME 55 tracked

SAMPLER: Std. split spoon

DRILL STEM: 8" H.S.A. to 35'; DCPT 35 to 59.5'

DEPTH (ft)	WATER LEVEL	GRAPHIC	SAMPLE	SAMPLE #	DCPT BLOW COUNTS	FIELD "N" VALUE (BPF)	SPT "N" VALUE (BPF)	SUBSURFACE DESCRIPTION	FIELD & LABORATORY TEST RESULTS
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">5</div> <div style="margin-bottom: 10px;">10</div> <div style="margin-bottom: 10px;">15</div> <div style="margin-bottom: 10px;">20</div> <div style="margin-bottom: 10px;">25</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">35</div> </div>				BS2				asphalt (0-0.9') roadbase, silty SAND and GRAVEL (0.9-2.5') Silty SAND with GRAVEL; probable fill material for bridge abutment; variable density (2.5-13.5') soft, FINE SANDY SILT and CLAY (CL/SC) (13.5-52') auger to 35' then switch to DCPT (Dynamic Cone Pen. Testing) (continued on next page, Sheet 2 of 2)	<u>BS1/BS2 @2-5' (SM)</u> PI=Non-Plastic gravel=43.0% sand=44.4% silt/clay=12.6% Method C Standard Proctor: 134.3 pcf at 6.9% optimum MC (rock correction applied)

Borehole	Field Staff	LB	FRT-17.5-K.25 Bridge Maple St & 17.5 Rd Fruita, Colorado
Log	Drafting Staff	LB	
2a	Field Date	10/4/2016	
of 2	Project #	7121.74610.01	

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Log of Borehole #2 (BH#2) - Sheet 2 of 2

BOREHOLE LOCATION: N. side of bridge (East lane)

DRILLING COMPANY: HRL

DRILL RIG: CME 55 tracked

SAMPLER: Std. split spoon

DRILL STEM: 8" H.S.A. to 35'; DCPT 35 to 59.5'

DEPTH (ft)	WATER LEVEL	GRAPHIC	SAMPLE #	DCPT BLOW COUNTS	FIELD "N" VALUE (BPF)	SPT "N" VALUE (BPF)	SUBSURFACE DESCRIPTION	FIELD & LABORATORY TEST RESULTS
35				0				
				2				
				3				
				5				
				7				
40				7			soft, FINE SANDY SILT and CLAY (CL/SC) (13.5-52')	
				9				
				10				
				11				
				12				
45				15			denser from 45-52'; possibly sandier as in BH#1	
				17				
				19				
				21				
				23				
50				20				
				23				
				28				
				26				
55				27			dense, SANDY GRAVELS to GRAVELLY SAND (52-58')	
				26				
				27				
				30				
				42				
60				50/5"			dense, FORMATIONAL MANCOS SHALE (58-59.5')	
							refusal using DCPT @59.5' in dense formational Mancos Shale unknown depth to groundwater due to DCPT method	
65								
70								

Borehole Log 2b of 2	Field Staff	LB
	Drafting Staff	LB
	Field Date	10/4/2016
	Project #	7121.74610.01

FRT-17.5-K.25 Bridge
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 Fruita, Colorado

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BOREHOLE LOG KEY

BOREHOLE LOCATION:

DRILLING COMPANY:

DRILL RIG:

SAMPLER

DRILL STEM:

DEPTH (ft)	WATER LEVEL	GRAPHIC	SAMPLE	SAMPLE #	FIELD BLOW COUNTS	FIELD "N" VALUE (BPF)	SPT "N" VALUE (BPF)	SUBSURFACE DESCRIPTION	FIELD & LABORATORY TEST RESULTS																												
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">5</div> <div style="margin-bottom: 10px;">10</div> <div style="margin-bottom: 10px;">15</div> <div style="margin-bottom: 10px;">20</div> <div style="margin-bottom: 10px;">25</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">35</div> <div style="margin-bottom: 10px;">40</div> <div style="margin-bottom: 10px;">45</div> </div>			CA ST DS1		9,12,14 26 18			<p>drive sample, California sampler</p> <p>drive sample, standard sampler</p> <p>core sample</p> <p>bulk sample, obtained from augers</p> <p>Sample identifier: DS = Drive sample BS = Bulk sample from augers CS = Core sample GS = Grab sample</p> <p>Blows required to drive sampler 6" three times; first 6" is considered to be the "seating" drive</p> <p>Indicates 26 blows required to drive the sampler 12 inches</p> <p>Indicates blows/foot (BPF) using a 140-lb hammer falling 30" free water depth at time of drilling</p> <p>Unified Soil Classification System (ASTM D-2487) CL = lean clay to sandy/gravelly lean clay ML = silt to sandy/gravelly silt CH = high plasticity clay to sandy/gravelly high plasticity clay MH = high elasticity silt to sandy/gravelly high elasticity silt SW = well-graded sand or well-graded sand with gravel SP = poorly graded sand or poorly graded sand with gravel SM = silty sand to silty sand with gravel SC = clayey sand to clayey sand with gravel GW = well-graded gravel or well-gravel with sand GP = poorly graded gravel or poorly graded gravel with sand GM = silty gravel or silty gravel with sand GC = clayey gravel or clayey gravel with sand</p> <p>Rock Weathering Classification W1 = Fresh W2 = Slightly weathered W3 = Moderately weathered W4 = Highly weathered W5 = Completely weathered W6 = Residual soil, no structure RQD = Rock Quality Designation</p> <p>Intact Rock Strength Classification R0 = Extremely weak rock, 35-150 psi R1 = Very weak rock, 150-725 psi R2 = Weak rock, 725-3,625 psi R3 = Medium strong rock, 3,625-7,250 psi R4 = Strong rock, 7,250-14,500 psi R5 = Very strong rock, 14,500-36,000 psi R6 = Extremely strong rock, >36,000 psi</p>	<p>Notes in this column indicate tests performed and test results:</p> <p>DD: dry density, pcf MC: moisture content, % LL: liquid limit PL: plastic limit PI: plasticity index GF: gravel fraction, % SF: sand fraction, % Fines: silt/clay, % Sh: Shear resistance P: Penetration resistance CBR: California Bearing Ratio SP: swelling pressure TM: total movement UCS: unconfined compressive strength psf: pounds per square foot pcf: pounds per cubic foot psi: pounds per square inch</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">N value</th> <th style="text-align: left;">Relative density</th> </tr> </thead> <tbody> <tr> <td colspan="2">sands (non-cohesive soils)</td> </tr> <tr> <td>0-4</td> <td>very loose</td> </tr> <tr> <td>4-10</td> <td>loose</td> </tr> <tr> <td>10-30</td> <td>medium</td> </tr> <tr> <td>30-50</td> <td>dense</td> </tr> <tr> <td>>50</td> <td>very dense</td> </tr> <tr> <td colspan="2">clays (cohesive soils)</td> </tr> <tr> <td><2</td> <td>very soft</td> </tr> <tr> <td>2-4</td> <td>soft</td> </tr> <tr> <td>4-8</td> <td>medium</td> </tr> <tr> <td>8-15</td> <td>stiff</td> </tr> <tr> <td>15-30</td> <td>very stiff</td> </tr> <tr> <td>>30</td> <td>hard</td> </tr> </tbody> </table>	N value	Relative density	sands (non-cohesive soils)		0-4	very loose	4-10	loose	10-30	medium	30-50	dense	>50	very dense	clays (cohesive soils)		<2	very soft	2-4	soft	4-8	medium	8-15	stiff	15-30	very stiff	>30	hard
N value	Relative density																																				
sands (non-cohesive soils)																																					
0-4	very loose																																				
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30-50	dense																																				
>50	very dense																																				
clays (cohesive soils)																																					
<2	very soft																																				
2-4	soft																																				
4-8	medium																																				
8-15	stiff																																				
15-30	very stiff																																				
>30	hard																																				
		TOPSOIL CLAY SILT SAND GRAVEL SHALE SAND STONE HARD BEDROCK																																			

Borehole Log of	Field Staff	Borehole Log Key
	Drafting Staff	
	Field Date	
	Project #	

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FIELD SOIL IDENTIFICATION TERMS

Relative Density of Cohesionless Soils

Description	Field Identification	N Value
Very Loose	Easily penetrated with hand shovel	0-4
Loose	Easily penetrated with 1/2" rebar pushed by hand; excavated with hand shovel	easily 4-10
Moderately Dense	Easily penetrated with 1/2" rebar driven with 5 lb. hammer; difficult to excavate with hand shovel	10-30
Dense	Penetrated 1 ft. with driven rebar; must be loosened with pick to excavate	30-50
Very Dense	Penetrated only a few inches with driven rebar; very difficult to excavate even with pick	>50

Consistency & Relative Density of Cohesive Soils

Description	Field Identification	Undrained Shear Strength (psf)	N Value (Approx.)
Very Soft	Extrudes between fingers when squeezed	<250	0-2
Soft	Molded by light finger pressure	250-500	2-4
Firm	Molded by strong finger pressure	500-1,000	4-8
Stiff	Indented by thumb	1,000-2,000	8-15
Very Stiff	Indented by thumbnail	2,000-4,000	15-30
Hard	Difficult to indent with thumbnail	>4,000	>30

Soil Constituents

Modifier	trace	little	some	-ey or -y	and
% (by weight)	0 - 5	5 - 12	12 - 20	20 - 30	>30

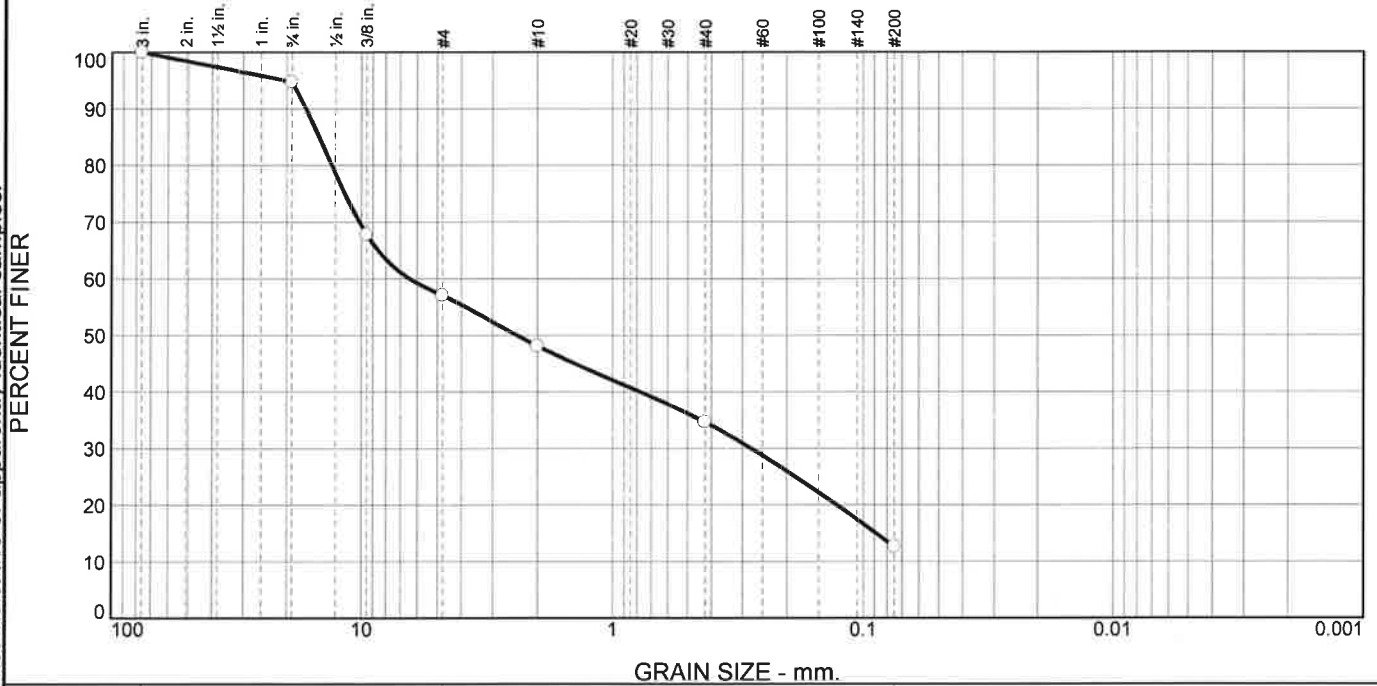
Sheet 1 of 1	Field Staff	Field Soil Identification Terms
	Drafting Staff	
	Field Date	
	Project #	

APPENDIX C

Laboratory Test Results

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.3	37.7	8.9	13.4	22.1	12.6	

Test Results (ASTM C136 & ASTM C117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
3/4"	94.7		
3/8"	67.8		
#4	57.0		
#10	48.1		
#40	34.7		
#200	12.6		

* (no specification provided)

Material Description

brown silty SAND with gravel

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 16.6980 D₈₅= 14.7673 D₆₀= 6.4284
D₅₀= 2.4068 D₃₀= 0.2770 D₁₅= 0.0889
D₁₀= C_u= C_c=

Remarks

Date Received: 10/5/16 Date Tested: 10/17/16

Tested By: BK/SJ

Checked By: _____

Title: _____

Source of Sample: BH#1/BH#2
Sample Number: BS1/BS2 blend

Depth: 2-5'

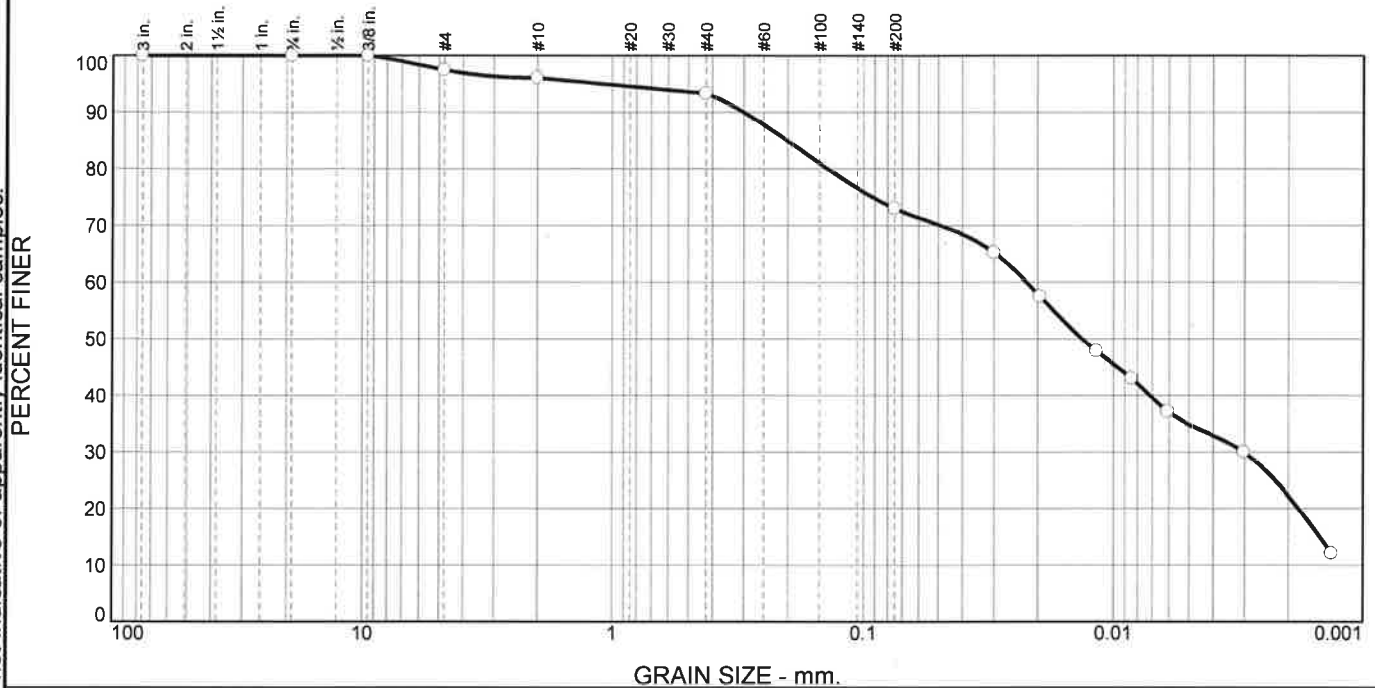
Date Sampled: 10/4/16



Client: Mesa County
Project: FRT @17.5 and K.25 Rd. Bridge
N. Maple St. Bridge
Project No: 7121.74610.01

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.5	1.4	2.8	20.3	38.2	34.8

TEST RESULTS (ASTM D422)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
3/4"	100.0		
3/8"	100.0		
#4	97.5		
#10	96.1		
#40	93.3		
#200	73.0		
0.0300 mm.	65.2		
0.0196 mm.	57.5		
0.0117 mm.	47.8		
0.0084 mm.	43.0		
0.0061 mm.	37.2		
0.0030 mm.	29.9		
0.0013 mm.	12.1		

* (no specification provided)

Material Description

brown lean CLAY with sand

Atterberg Limits (ASTM D 4318)

PL= 15 LL= 26 PI= 11

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-6(6)

Coefficients

D₉₀= 0.3011 D₈₅= 0.2021 D₆₀= 0.0222
D₅₀= 0.0134 D₃₀= 0.0030 D₁₅= 0.0015
D₁₀= C_u= C_c=

Remarks

Date Received: 10/5/16 Date Tested: 10/13/16

Tested By: SJ

Checked By: _____

Title: _____

Source of Sample: BH#1 Depth: 20-21.5'
Sample Number: DS4

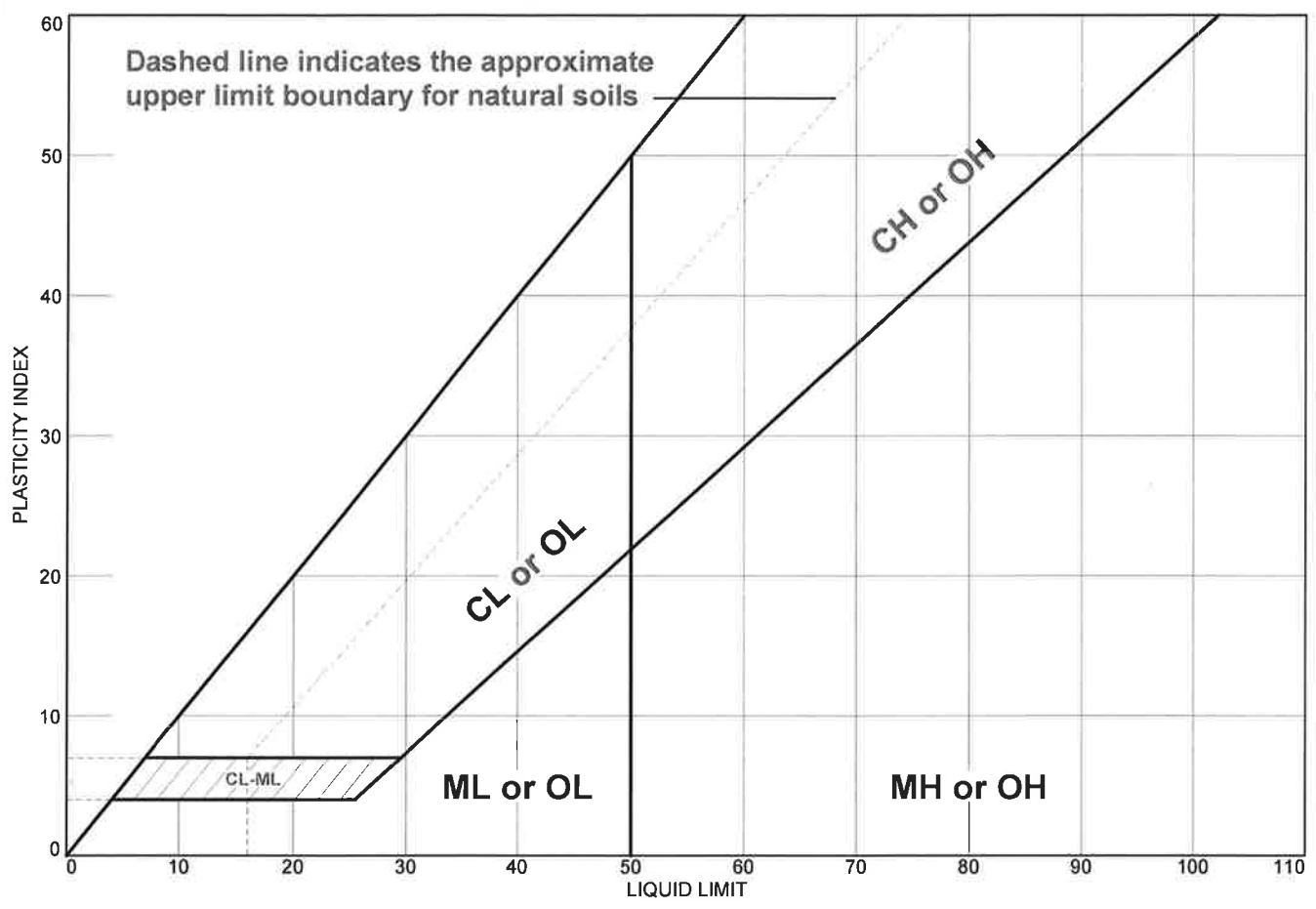
Date Sampled: 10/4/16



Client: Mesa County
Project: FRT @17.5 and K.25 Rd. Bridge
N. Maple St. Bridge
Project No: 7121.74610.01

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

ATTERBERG LIMITS



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● brown silty SAND with gravel	NP	NP	NP	34.7	12.6	SM

Project No. 7121.74610.01 **Client:** Mesa County
Project: FRT @17.5 and K.25 Rd. Bridge
 N. Maple St. Bridge
 ● **Source:** BH#1/BH#2 **Depth:** 2-5' **Sample No.:** BS1/BS2 blend

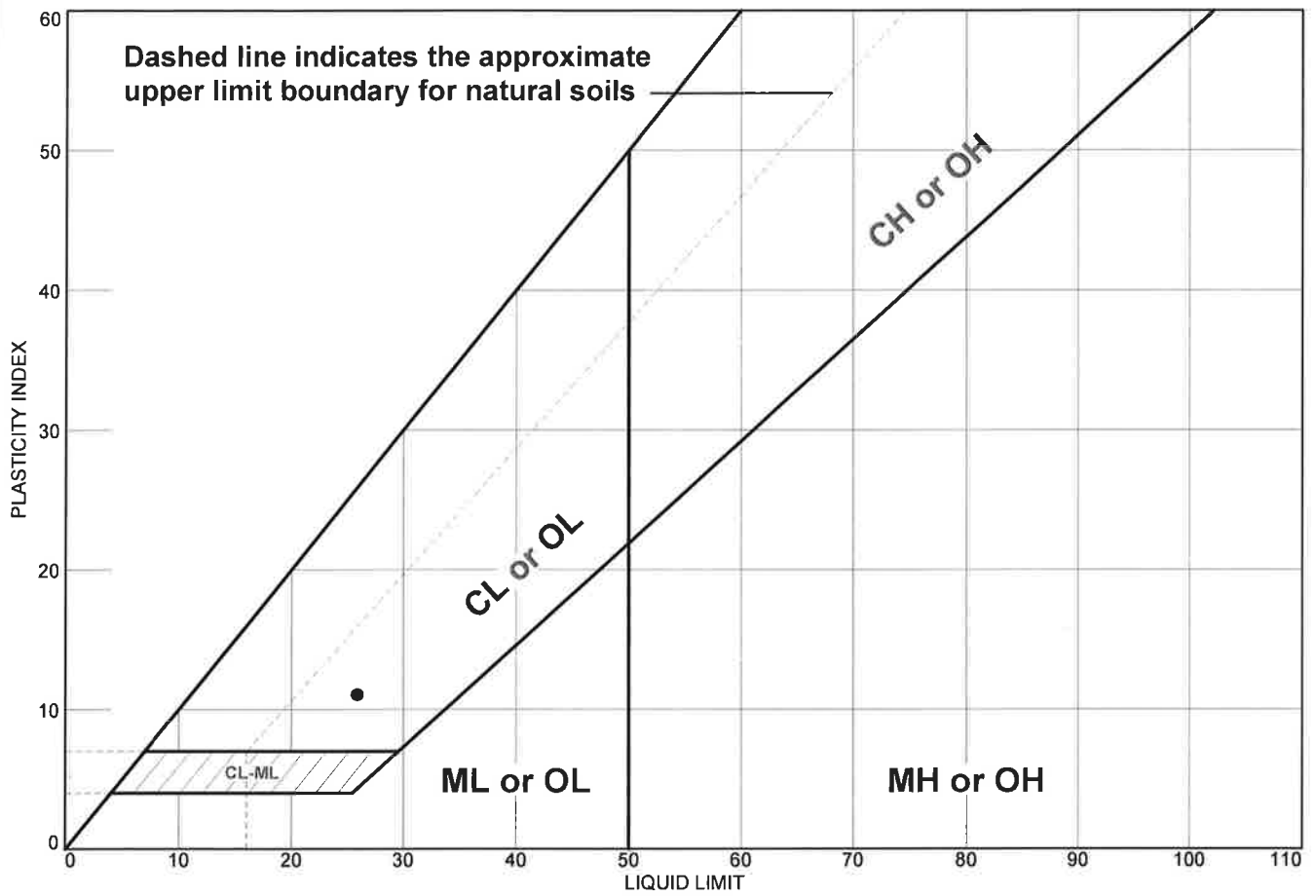
Remarks:



Tested By: SJ

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

ATTERBERG LIMITS



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● brown lean CLAY with sand	26	15	11	93.3	73.0	CL

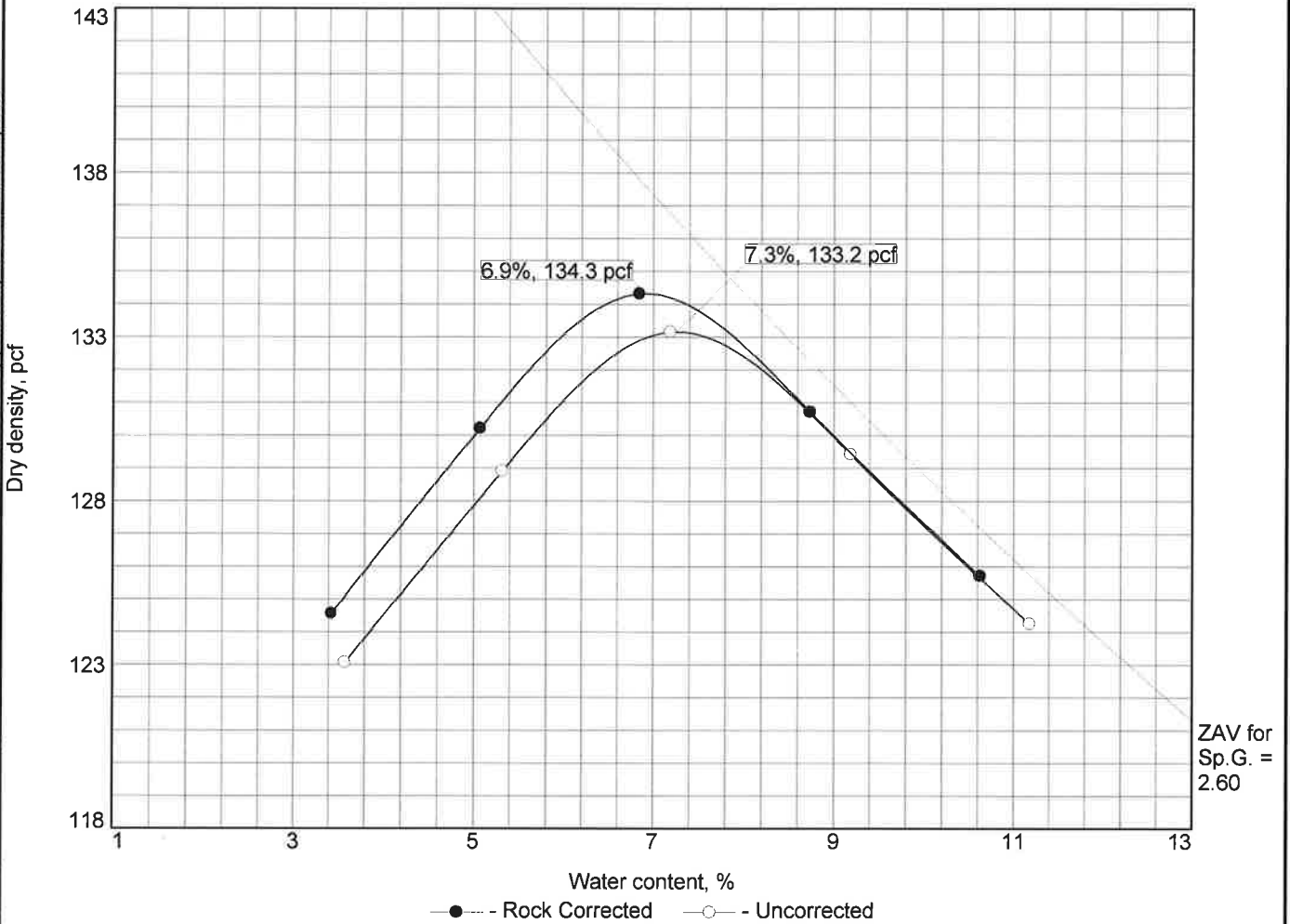
Project No. 7121.74610.01 **Client:** Mesa County
Project: FRT @17.5 and K.25 Rd. Bridge
 N. Maple St. Bridge
 ● **Source of Sample:** BH#1 **Depth:** 20-21.5' **Sample Number:** DS4

Remarks:



Tested By: SJ

MOISTURE-DENSITY RELATIONSHIP



Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Test specification: ASTM D 698-12 Method C Standard
 ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
2-5'	SM	A-1-b		2.60	NP	NP	5.3	12.6

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 134.3 pcf	133.2 pcf	brown silty SAND with gravel
Optimum moisture = 6.9 %	7.3 %	

Project No. 7121.74610.01 **Client:** Mesa County
Project: FRT @17.5 and K.25 Rd. Bridge
 N. Maple St. Bridge
Source of Sample: BH#1/BH#2 **Sample Number:** BS1/BS2 blend

Remarks:



Tested By: BK



970-249-6828 ■ 800-865-9847 (fax) ■ 222 South Park ■ Montrose, Colorado 81401 ■ www.dowl.com
Alaska ■ Arizona ■ Colorado ■ Montana ■ North Dakota ■ Oregon ■ Washington ■ Wyoming

Corrosivity Series

Based on HACH methods

Project Name	<u>FRT @17.5 and K.25 Rd. Bridge</u>	Date	<u>10/13/2016</u>
Project Location	<u>N. Maple St. Bridge</u>	Project No.	<u>7121.74610.01</u>
Client	<u>Mesa County</u>	Sample By	<u>LB</u>
Sample Location	<u>BH#1 @35-36.5'</u>	Tested By	<u>SJ</u>
Sample No.	<u>DS7</u>		
Soil Description	<u>brown CLAY</u>		

(ASTM D2488)
*salts visually present

Water-soluble sulfates, dry soil basis	0.420 %
Chlorides	80 ppm
Electro-conductivity	408 μS/cm
pH	8.2

EXHIBIT B5: FINAL DRAINAGE REPORT

**EXHIBIT B5
FINAL DRAINAGE REPORT**

Offices:

Colorado

Wyoming

Montana

Arizona

North Dakota

Oregon

Washington

Alaska

**FINAL DRAINAGE REPORT
FRT-17.5-K.25 BRIDGE REPLACEMENT PROJECT
IFB 16-03054-FRT
MESA COUNTY, COLORADO**

December 9, 2016

Prepared for:

**Mesa County Public Works
Attention: Eric Borschel
P.O. Box 20,000
Grand Junction, CO 81502**



Consulting Engineers
222 S. Park Ave. Montrose, Colorado 81401
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www.dowl.com

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Final Drainage Report
Mesa County, Colorado

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1. INTRODUCTION

Mesa County has requested the preparation of this Drainage Report to support the proposed 17.5-K.25 Road bridge replacement across the Little Salt Wash in Fruita, Colorado. The existing bridge is undersized for pedestrian access and is in need of replacement.

This report generally follows the requirements of the 2004 Colorado Department of Transportation (CDOT) Drainage Design Manual (DDM) as they relate to roadway drainage improvement design and construction.

Section 2 of this report discusses general site characteristics and Section 3 presents the hydrologic analyses methods used for basin analysis. Section 4 addresses the hydraulic analysis used in sizing the proposed replacement bridge. The remaining sections provide closure, references and software employed in this report preparation.

2. GENERAL SITE CHARACTERISTICS

A. Hydrologic Setting and Stream Characteristics

17.5 Road, also known as Maple Street, crosses Little Salt Wash near its intersection with K 0.25 Road approximately 0.7 miles northeast of downtown Fruita, Colorado. The Little Salt Wash basin is located in Mesa County and its watershed basin is approximately 33.2 square miles in extent. The StreamStats® ungaged site report for the Little Salt Wash basin appears as Appendix C to this report. The basin is currently ungaged and no record of USGS stream gages was found in our research for this report.

The basins fall entirely within the USGS Northwest region as presented in their "Regional Regression Equations for Estimation of Natural Streamflow Statistics for Colorado". Each region in Colorado uses a different regression equation to calculate peak flows and precipitation based on topography and geomorphology of the region.

Little Salt Wash basin is drained by numerous shallow ephemeral stream channels that create a large drainage channel which experiences significant flow during spring runoff and storm events

Figure 1 details the Little Salt Wash contributing basin and Figure 2 presents the soils map for the Little Salt Wash basin.

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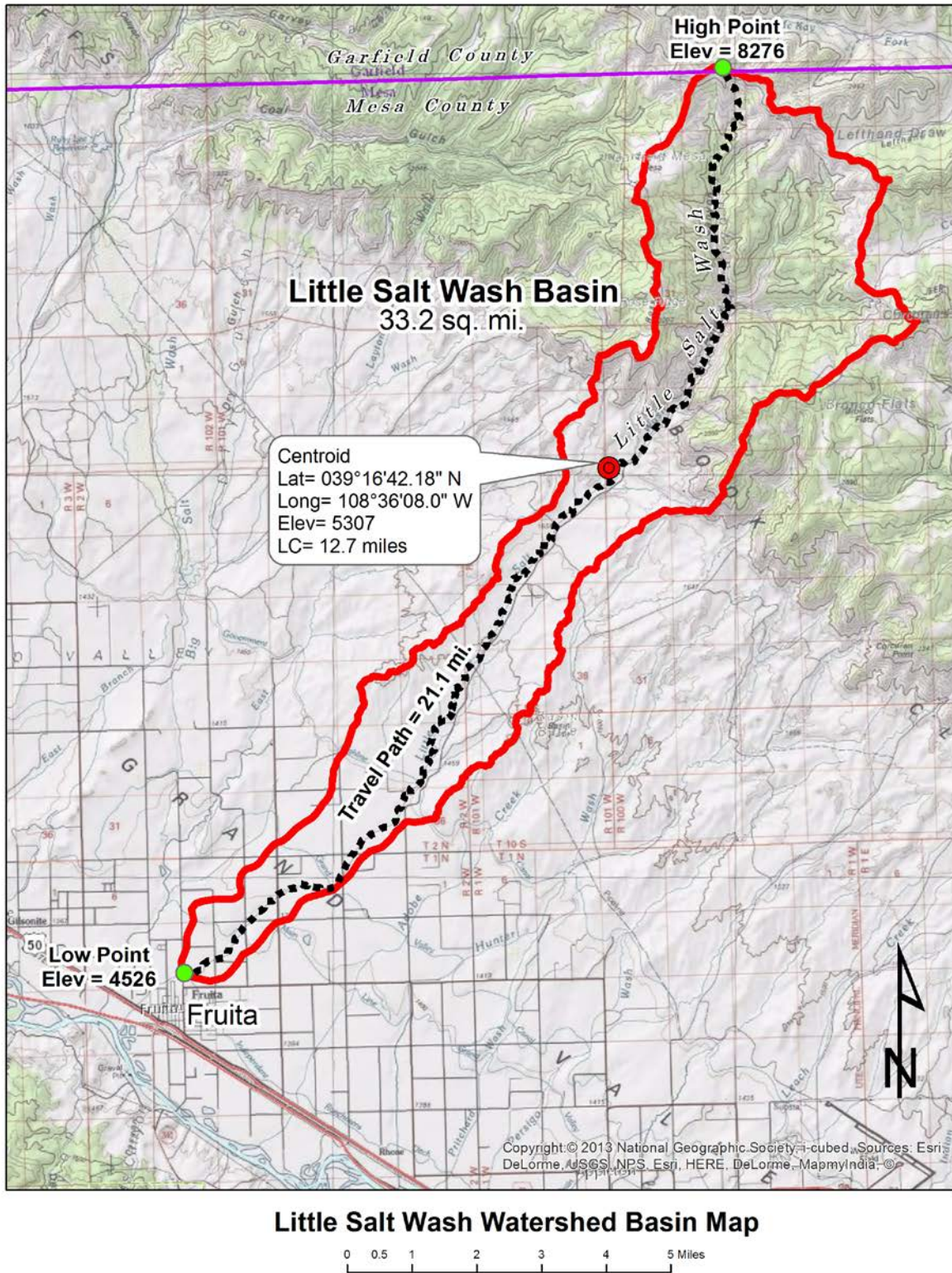


Figure 1. Little Salt Wash drainage basin.

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B. Topography

Topography of the Little Salt Wash basin ranges from an elevation of approximately 8,276 feet (MSL) at the top of the basin in the northeast to 4,526 feet (MSL) at the 17.5 Road crossing location. The general direction of the drainage in the project area is northeast to southwest. The watershed basin is approximately 33.2 square miles or 21,248 acres in area with a flow path of 21.1 miles and an average slope of 0.0336 ft/ft or 3.3%. The basin features are shown on Figure 1 above.

C. Vegetation

Vegetation in the basin consists of a mix of irrigated crops, pasture, sagebrush and grasses. Vegetative cover density varies from less than 10 percent in the sandstone bedrock areas to 90 percent in vegetated stream channels. The Little Salt Wash stream bed is heavily vegetated with willows, elms, cottonwoods and Russian olives trees at the proposed bridge location.

D. Soils and Geology

Information from an NRCS Web Soil Survey (WSS) of the region near the project site indicates there are 42 distinct soil map units in the Little Salt Wash basin upstream of the 17.5 Road crossing location. Complete soils information from the WSS is presented in Appendix B of this report. These soils groups have hydrologic soil group ratings that range from A to D which indicate low to high runoff potential.

The geology of the project area is characterized by alluvium washed from the nearby Wasatch and Mesaverde Formations which is cross cut by a series of stream channels and washes running generally perpendicular to the basin center line. The channel cuts down to resistant soil layers which are subject to potential during high storm runoff events. Additional geological information is presented in the companion Geotechnical Report prepared by DOWL for this project and dated November 4, 2016.

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3. HYDROLOGIC DATA

This section of the report reviews the sources for hydrologic data and the hydrologic and hydraulic modeling used in the crossing options analysis in Section 4. The NOAA Atlas 14 was consulted for estimates of local rainfall depth and frequency-duration for the interval storms over a 24-hour period. The data for Fruita, Colorado with a 90% confidence interval was used for our analysis and is presented in Appendix C.

RETURN PERIOD	6-HR TOTAL PRECIPITATION (IN)	24-HR TOTAL PRECIPITATION (IN)
2-year	0.73	1.04
5-year	0.88	1.27
10-year	1.02	1.48
25-year	1.23	1.98
50-year	1.40	2.03
100-year	1.58	2.28

Table 1. Summary of NOAA Atlas 14 precipitation data for varying recurrence periods at Fruita, Colorado reporting station (ID 05-3146).

3.1 Streamstats Data

As an initial check of the Little Salt Wash basin and its flow characteristics, we ran a USGS StreamStats (Beta version 4) ungaged site report for the contributing basin. Little Salt Wash does not have any historic stream gage data and is not currently gaged. Results indicated a 100-year peak flow of 4,650 cfs with a 75% prediction error.

3.2 FEMA Data

Review of existing FEMA mapping for the project area indicates that the 17.5 Bridge over the Little Salt Wash is between cross-section H and I on FEMA NFIS Map No. 08077C0436F with an effective date of July 6, 2010. The respective 100-year flood elevations for those two cross-sections are 4,509.7 feet and 4,514.5 feet. Complete FEMA data for the project area is presented in Appendix D of this report. Calculated flows for the 0.2, 1.0, 2.0 and 10.0 percent annual chance flood events presented in Table 3 the Flood Information Study for Mesa County, dated October 16, 2102, are reproduced in Table 2 below.

RETURN PERIOD	ESTIMATED FLOW (CFS)
10-year	1,500
50-year	3,170
100-year	4,300
500-year	8,100

Table 2. Summary of Annual Chance flows from Mesa County FIS (October 16, 2012)

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Based on the accuracy of the HEC-1 analysis used in the original 1990 determination of flood flows, we used the flow values from Table 2 in our independent HEC-RAS analysis of the Little Salt Wash drainage in the 17.5 Road bridge project location. The HEC-1 model was not available for our analysis, but the tabular output results of the original 1990 model run were reviewed for preparation of this report. For our hydraulic analysis of the proposed replacement bridge, we used the return flows from the Mesa County FIS.

3.3 Existing 100-Year Floodplains\Easements

The published FEMA floodplain insurance rate map (FIRM) for the Little Salt Wash drainage channel in the project area is map No. 08077C0436F. A Flood Insurance Study (FIS) for Mesa County, FIS # 08077CV000B, dated October 16, 2012, includes Little Salt Wash in the analysis and includes the project location between river stations H and I.

4. HEC-RAS HYDRAULIC MODEL

Using the output flows generated in the original 1990 HEC-1 analyses and summarized in Table 2. above, we created a hydraulic model of the existing stream channel to analyze several bridge options. We perform this analysis using the USACE HEC-RAS version 4.1 software. We created a base model of the existing stream system (15-5Road_Base.prj) and a proposed bridge (finalbridge.prj) that will pass the 100-year flow of 4,300 cfs with a minimum freeboard of 1 foot as required in the 2004 CDOT Drainage Design Manual. All HEC-RAS models are included in the data CD that accompanies this report. Selected output results are presented in Appendix E of this report.

Results of the specific HEC-RAS analyses for the recommended bridge are presented in Section 5 below. The base model results estimate water surface elevations at the Little Salt Wash and 17.5 Road intersection with a peak 100-year water surface elevation of approximately 4514.52 feet at river station (RS) 4+00 for the existing bridge configuration. Water surface elevations for other recurrence intervals at the current bridge are presented in Table 3 below. As indicated by the cross-section in Figure 3 below, the existing 17.5 bridge over the Little Salt Wash can pass the 100-year flow with more than the required 1-foot freeboard, but would be overtopped by the 500-year event flow.

RETURN PERIOD	FEMA HEC-2 FLOW (CFS)	WATER SURFACE ELEVATION (FT)
10-year	1,500	4509.27
50-year	3,170	4512.80
100-year	4,300	4514.52
500-year	8,100	4521.18

Table 3. Summary of HEC-2 flows and Existing Water Surface Elevations from Mesa County FIS at RS 400.

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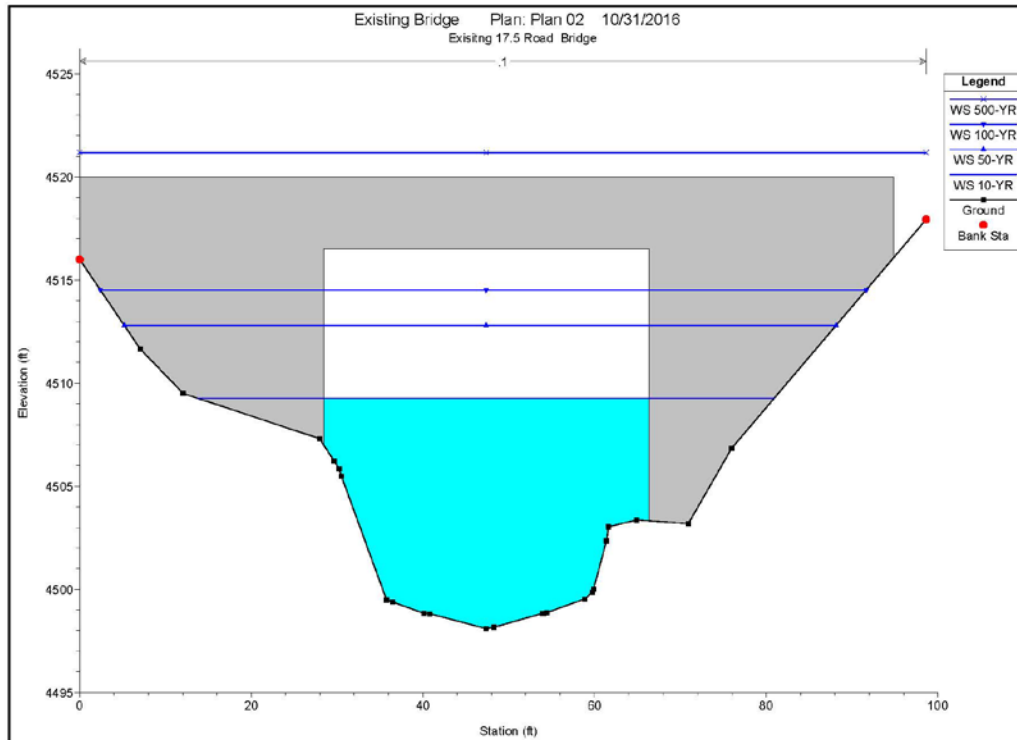


Figure 3. HEC-RAS cross-section of the existing 17.5 Road bridge and Little Salt Wash channel. 100-year water surface elevation is 4514.52. Lower chord of the bridge is at 4516.5 feet.

5. PROPOSED BRIDGE

Using the hydraulic results obtained in Section 4, we examined several options of new bridges with pedestrian underpasses across the Little Salt Wash at 17.5 Road before selecting the recommended span presented in this section. The following assumptions were used for the analysis:

- Maximum 100-year flow of 4,300 cfs for the bridge crossing location
- Required minimum freeboard of 1 foot for the bridge option
- Manning's "n" value of 0.1 was used for the channel and banks due to the dense vegetation

Based on the need to provide a shared use path under the proposed bridge parallel with the Little Salt Wash, we examined two options for incorporating that path with the bridge design. Those options are: Option 1 - pedestrian underpass and Option 2 - pedestrian tunnel separated from the Little Salt Wash channel. Figures 4 and 5 present the proposed cross-section at the bridge for those two shared use path options. Results of hydraulic modeling for both options indicate that both an underpass and a tunnel shared path will be inundated by the 10-year storm event flow of 1,500 cfs, but that both designs with 55-foot spans will pass the 100-year storm flow of 4,300 cfs with more than 1 foot of freeboard as required. Table 4 presents the comparative water surface elevations (WSEL) results of HEC-

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RAS analyses for both shared use path options for the bridge. Detailed results of the HEC-RAS analyses are presented in Appendix E of this report.

RETURN PERIOD	FEMA HEC-2 FLOW (CFS)	OPTION 1- WSEL (FT)	OPTION 2 – WSEL (FT)
10-year	1,500	4509.11	4509.14
50-year	3,170	4512.75	4512.82
100-year	4,300	4514.60	4514.67
500-year	8,100	4520.15	4520.44

Table 4. Comparative WSEL's for HEC-2 design flows for shared use path Options 1 and 2.

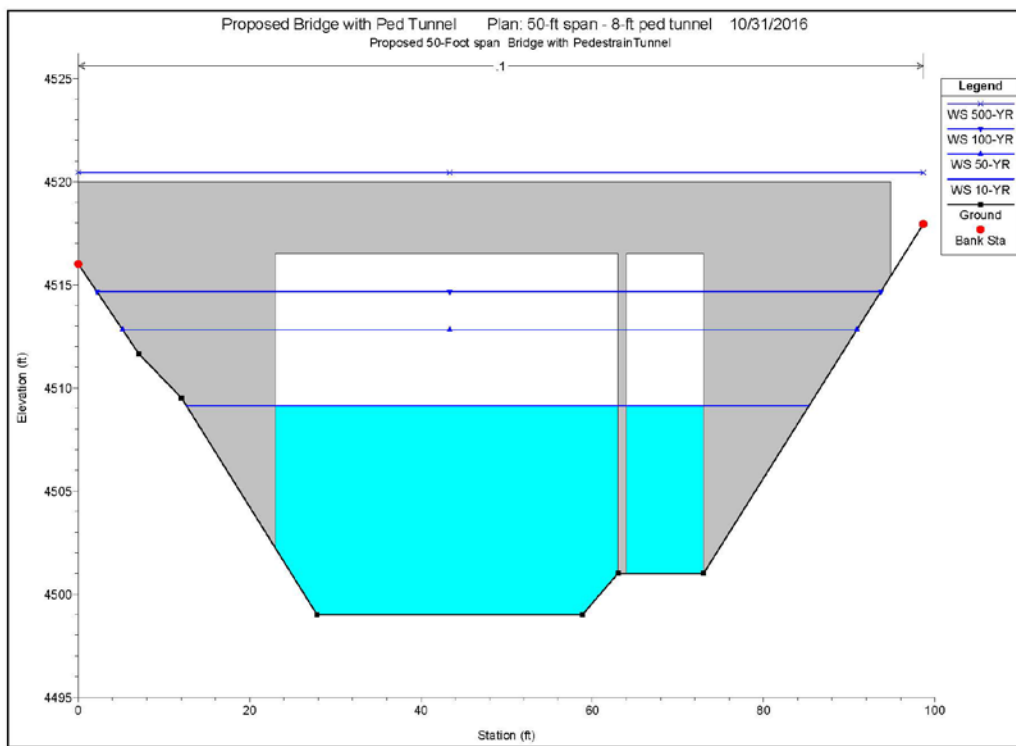


Figure 4. Cross-section at RS 4+00 of proposed bridge with shared use path tunnel using the existing abutment as the channel side tunnel wall. 100-year WSEL is 4514.67 and lower chord of the bridge deck is at 4516.5 for a freeboard of 1.83 feet.

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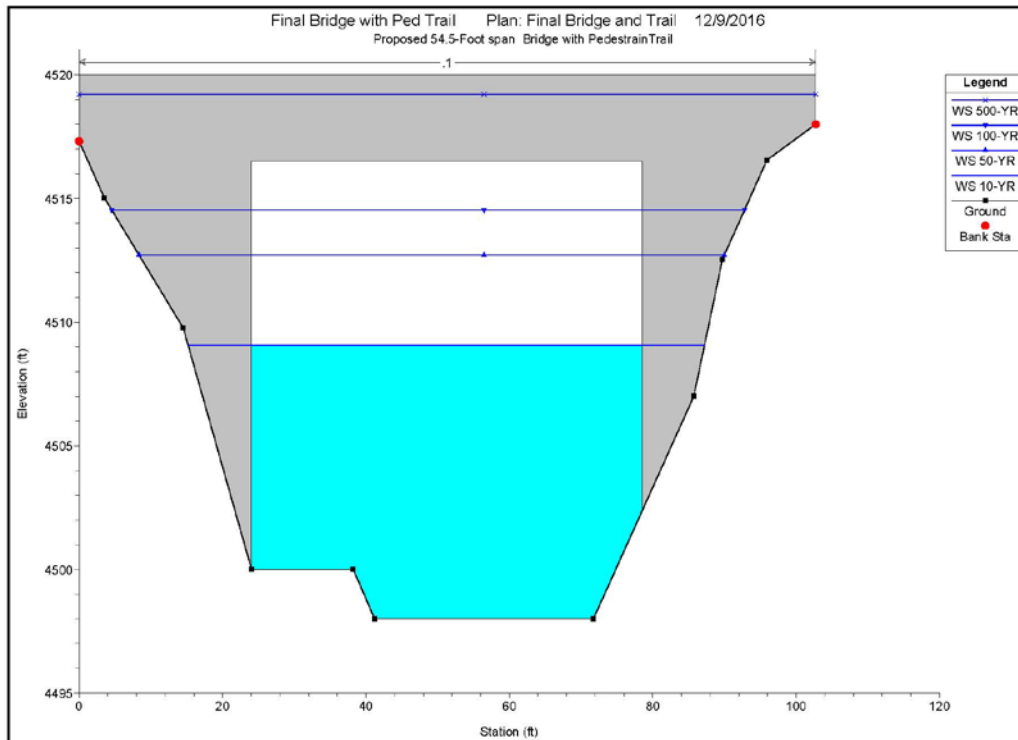


Figure 5. Cross-section of bridge Option 1 at RS 4+00 of the proposed bridge and pedestrian underpass. 100-year WSEL is at 4514.6 feet and lower chord of the proposed bridge deck is at 4516.5 feet for a freeboard of 1.9 feet.

Based on estimated construction costs and the fact that both options are inundated by the 10-year event flow of 1,500 cfs, Option 1 was selected by Mesa County and City of Fruita for final design. Figure 5. presents the HEC-RAS cross-section of the selected bridge.

6. SCOUR ANALYSIS

After selection of the Option 1 bridge with integrated pedestrian trail, we used the hydraulic design function in HEC-RAS to estimate the potential scour at the RS 400 bridge cross-section. Assumptions for the scour analysis included:

- 500-year flow of 8,100 cfs
- D50 of 10.0 mm for channel material per observed conditions and soil samples
- Spill through abutments

Results of the scour analysis are presented in detail in Appendix F of this report. In summary, the contraction scour is approximately 2.28 feet and abutment scour varies between 25.56 feet at the left abutment to 25.98 feet at the right abutment. Total scour of between 27.84 feet and 28.26 was estimated in the 500-year flood conditions and the ultimate design of bridge foundations should include scour protection to a minimum of 29 feet to accommodate scour.

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7.

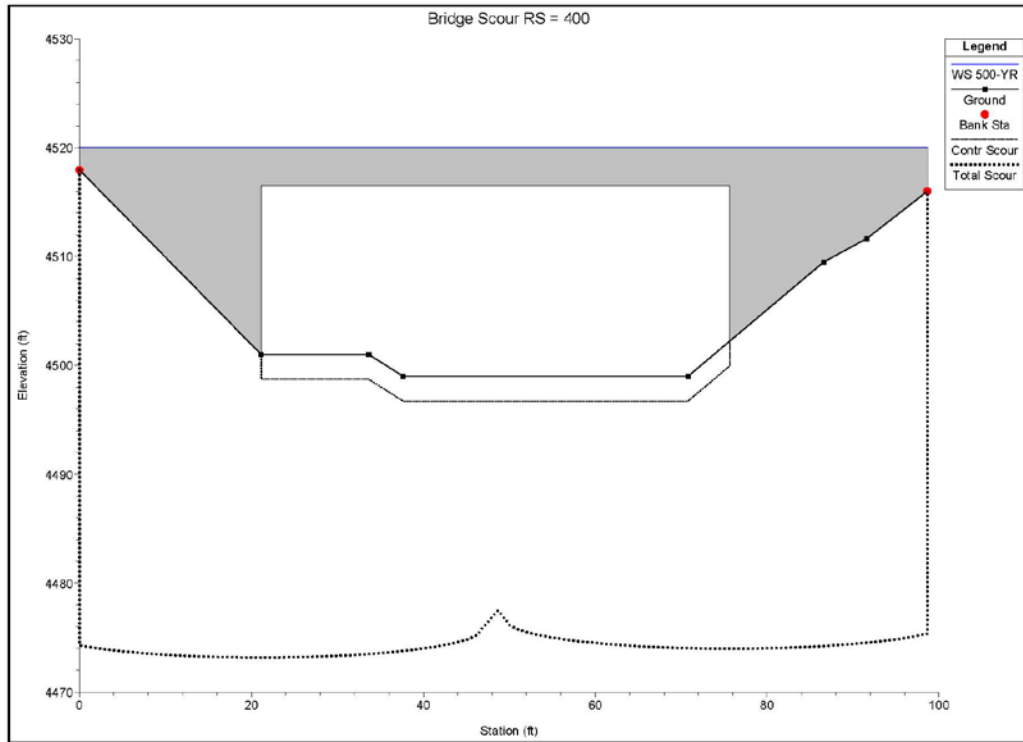


Figure 6. Cross-section of scour depth for 500-year flow of 8,100 cfs. Total combined contraction and abutment scour ranges from 27.84 feet on the left abutment to 28.26 feet on the right abutment.

7. CONCLUSIONS

This report represents a preliminary analysis of potential bridge options at the Little Salt Wash crossing location. After reviewing and modeling the Mesa County FIS HEC-2 data for the existing conditions, we analyzed two options of providing bridge designs that (a) passes the 100-year design storm flow and (b) provided for an elevated shared use path on one side of the Little Salt Wash channel for required trail connectivity. Both options are 55-foot span bridges that provide greater than 1 foot of freeboard for the 100-year flow.

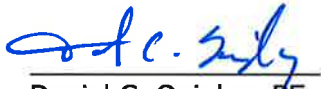
In our opinion, the 55-foot span bridge with pedestrian trail best meets the design objective of passing the estimated 100-year flow while providing required pedestrian connection to the City of Fruita trail system. The existing western abutment can be retained to assist in supporting the new bridge and a new eastern abutment will define the limits of the bridge span and the pedestrian/bicycle underpass trail. Lighting and signage per AASHTO and CDOT design guidelines for bicycle and pedestrian facilities should be used in the final trail design.

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8. REPORT CERTIFICATION

I, Daniel C. Quigley, a duly registered professional engineer in the State of Colorado, (registration #38334), have prepared this report, related documents, and supervised the preparation of the drawings enclosed. The information included is, to the best of my knowledge, accurate and conforming to the CDOT Drainage Design Manual (2004 edition) and accepted engineering practices for the hydraulic analyses of bridges.

December 9, 2016


Daniel C. Quigley, PE
Project Engineer



17.5-K.25 Bridge Replacement Project
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9. REFERENCES

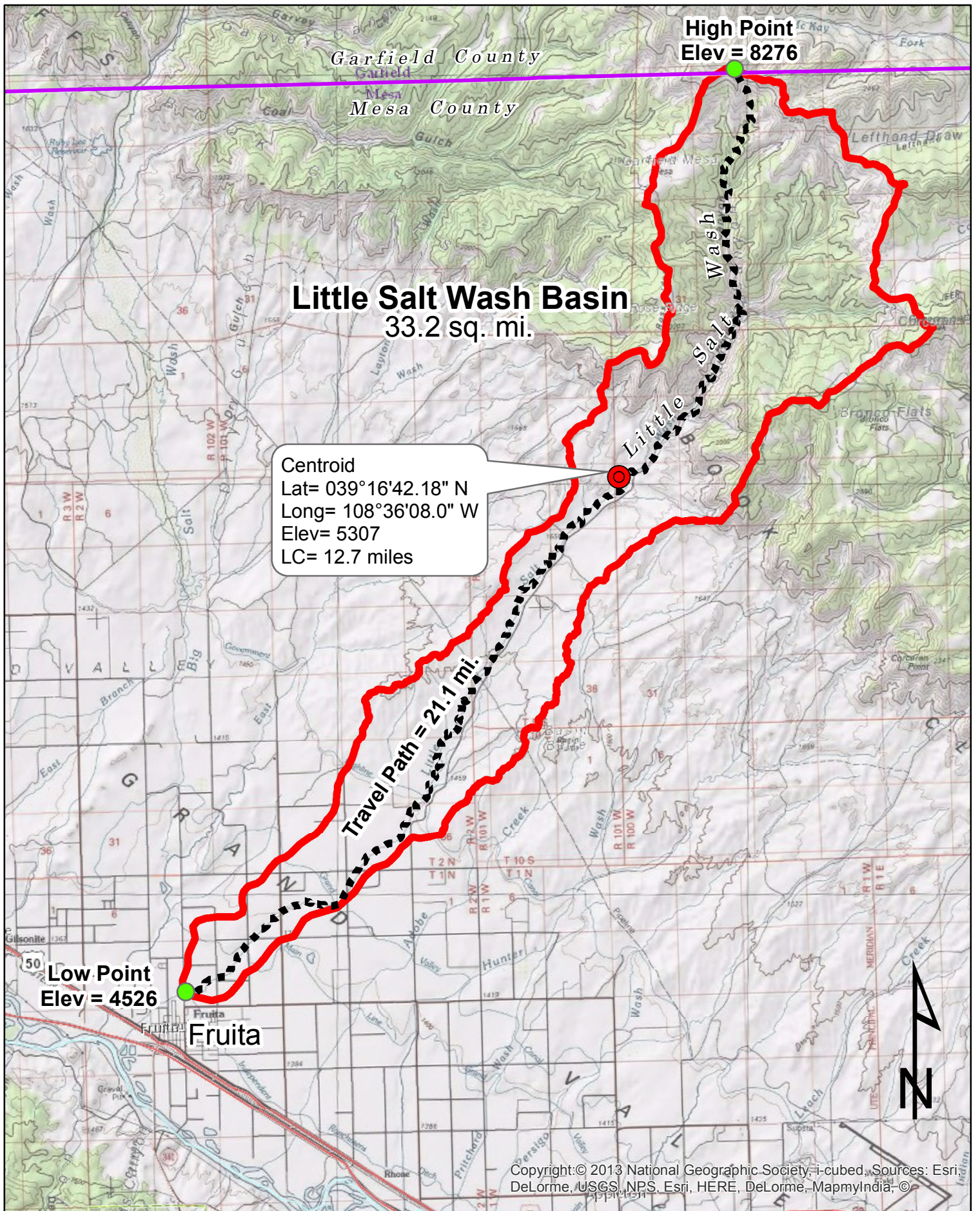
- Regional Regression Equations for Estimation of Natural Streamflow Statistics for Colorado, USGS Scientific Investigations Report 2009-5136, 2009
- Drainage Design Manual, Colorado Department of Transportation, 2004
- Flood Insurance Study, Mesa County and Incorporated Areas, FIS # 08077CV0000B, October 16, 2012
- NOAA Atlas 14, Volume 8, 2013
- Chapter 7, Hydrologic Soil Groups, Part 630 Hydrology, National Engineering Handbook, USDA-NRCS, 210-VI-NEH, May 2007
- Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials, 1999
- Chapter 14- Bicycle and Pedestrian Facilities, Colorado Department of Transportation – Roadway Design Guide, 1/4/2013 revision

10. SOFTWARE

- StreamStats, Colorado, US Geological Survey, Beta 3.0, 2015
- HEC-RAS, version 4.1.0, US Army Corps of Engineers, January 2010



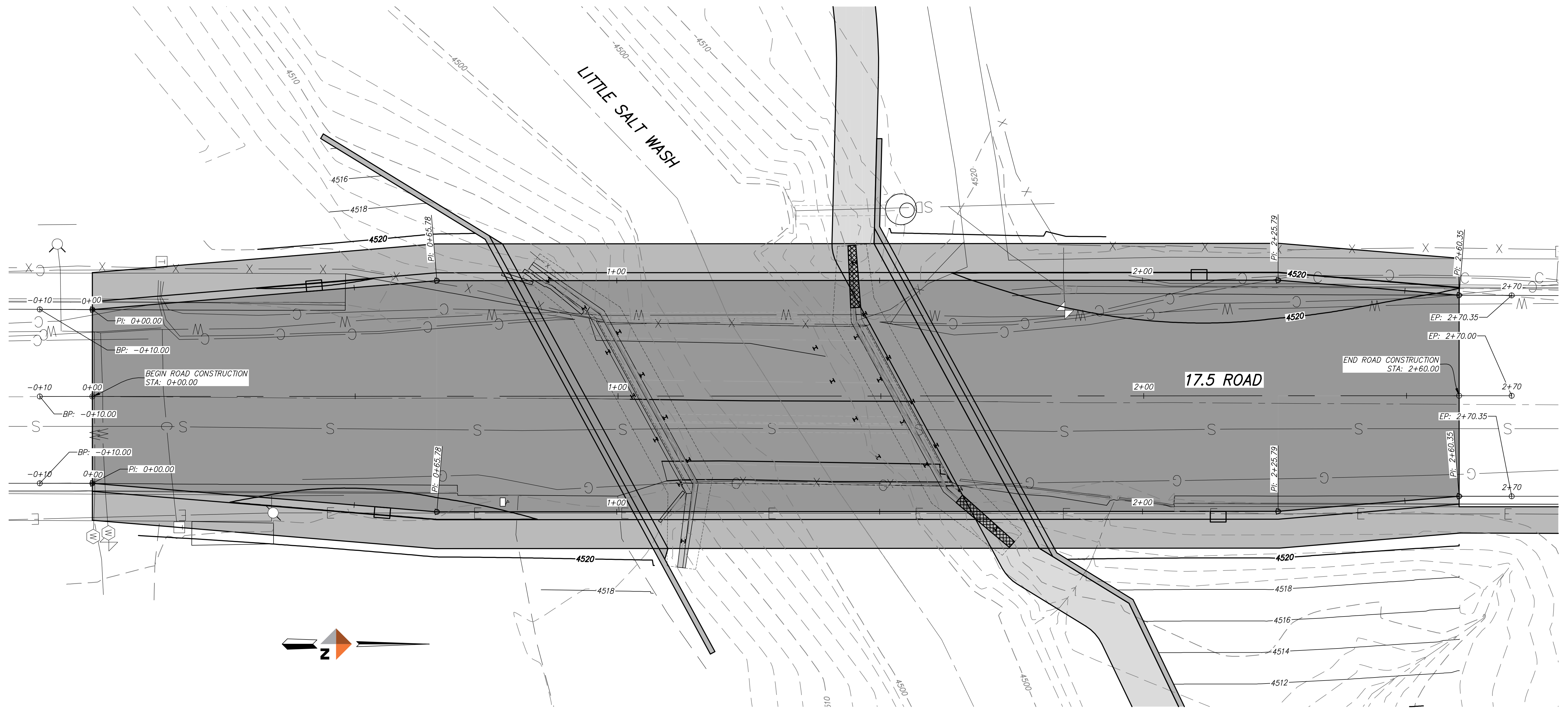
APPENDIX A
BASIN MAP
AND
PRELIMINARY SITE PLAN



Little Salt Wash Watershed Basin Map



G:\21\74610-01\65CAD\Fruitto 17.5 Road Bridge_Plan.dwg PLOT DATE 2016-11-3 14:44 SAVED DATE 2016-11-03 14:18 USER: cbrannan



BRIDGE PLAN

SCALE IN FEET

REV	DATE	DESCRIPTION	BY

DOWL
WWW.DOWL.COM
 222 South Park Avenue
 Montrose, Colorado 81401
 970-249-6628

MESA COUNTY
 17.5 ROAD BRIDGE OVER LITTLE SALT WASH
 BRIDGE PLAN

PROJECT 7121.74610.01
 DATE 11/3/2016

© DOWL 2016
 SHEET

C-2

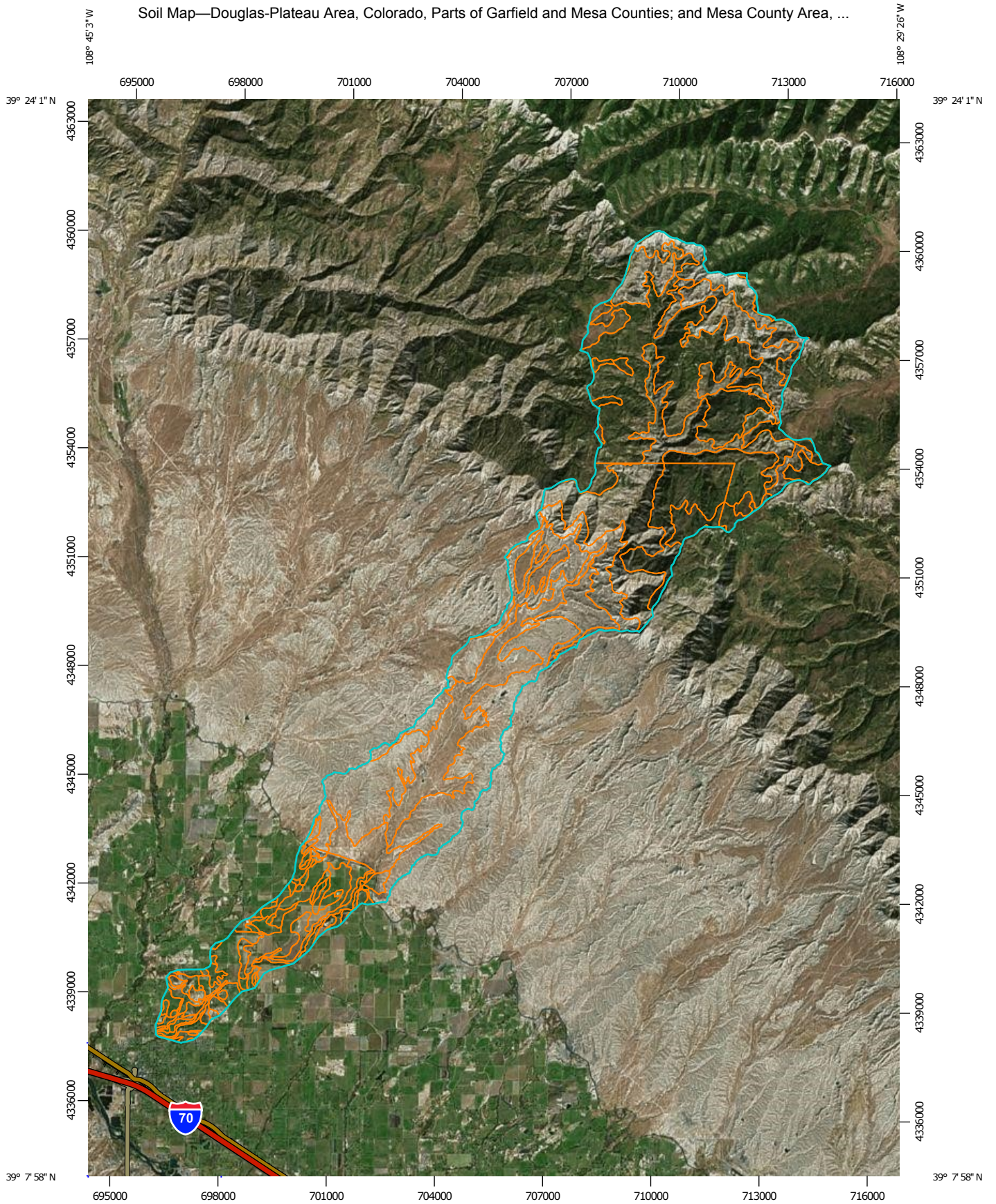
PRELIMINARY
 FOR REVIEW & COMMENT





APPENDIX B
NRCS SOILS MAP AND LEGEND

Soil Map—Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties; and Mesa County Area, ...



Map Scale: 1:145,000 if printed on A portrait (8.5" x 11") sheet.




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





MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties
 Survey Area Data: Version 8, Sep 22, 2015

Soil Survey Area: Mesa County Area, Colorado
 Survey Area Data: Version 6, Sep 23, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

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

Map Unit Legend

Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties (CO682)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Badland	1,394.7	6.6%
17	Cathedral-Veatch complex, 25 to 85 percent slopes	13.3	0.1%
27	Cryorthents-Rock outcrop complex, 50 to 90 percent slopes	0.0	0.0%
46	Happle-Rock outcrop association, 25 to 65 percent slopes	703.6	3.3%
47	Hesperus-Empedrado, moist-Pagoda complex 5 to 35 percent slopes	323.1	1.5%
48	Hesperus-Empedrado, moist-Pagoda complex, 35 to 55 percent slopes	62.5	0.3%
61	Rock outcrop-Torriorthents complex, 15 to 90 percent slopes	1,195.8	5.6%
62	Shawa loam, 3 to 20 percent slopes	53.1	0.2%
65	Torriorthents, cool-Rock outcrop complex, 35 to 90 percent slopes	4,022.1	18.9%
67	Tosca channery loam, 25 to 80 percent slopes MLRA 48A	125.7	0.6%
Subtotals for Soil Survey Area		7,893.9	37.1%
Totals for Area of Interest		21,263.6	100.0%

Mesa County Area, Colorado (CO680)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
52	Badlands-Deaver-Chipeta complex, 25 to 99 percent slopes, extremely stony	626.6	2.9%
68	Killpack-Badlands-Persayo complex, 3 to 25 percent slopes, saline	2,394.4	11.3%
74	Turley-Sagrlite-Fruitland complex, 0 to 3 percent slopes	456.7	2.1%
75	Uffens fine sandy loam, 1 to 6 percent slopes	384.7	1.8%
85	Trail fine sandy loam, 0 to 5 percent slopes	1,583.2	7.4%
87	Persayo-Blackston complex, 6 to 45 percent slopes	997.1	4.7%

Mesa County Area, Colorado (CO680)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
108	Killpack-Persayo complex, 3 to 25 percent slopes	1,130.2	5.3%
210	Torriorthents, cool-rock outcrop, 35 to 90 percent slopes	1,120.3	5.3%
261	Hesperus-Empedrado, moist-Pagoda complex 5 to 35 percent slopes	222.5	1.0%
275	Torriorthents, warm-rock outcrop, 35 to 90 percent slopes	1,537.1	7.2%
Av	Avalon sandy loam, gravelly substratum, 2 to 5 percent slopes	20.1	0.1%
Ba	Massadona silty clay loam, 0 to 2 percent slopes	18.5	0.1%
Bc	Sagers silty clay loam, 0 to 2 percent slopes	119.3	0.6%
BcA	Skumpah silt loam, 0 to 2 percent slopes	7.8	0.0%
Cc	Persayo silty clay loam, 5 to 12 percent slopes	72.6	0.3%
Cd	Persayo silty clay loam, 0 to 2 percent slopes	44.0	0.2%
Ce	Persayo silty clay loam, 2 to 5 percent slopes	13.0	0.1%
Fe	Fruitvale clay loam, 0 to 2 percent slopes	98.6	0.5%
Ff	Fruitvale clay loam, 2 to 5 percent slopes	17.9	0.1%
Fg	Fruitvale clay loam, 0 to 2 percent slopes	96.8	0.5%
Fh	Fruitvale clay loam, 2 to 5 percent slopes	0.2	0.0%
Fp	Fruitland fine sandy loam, 0 to 2 percent slopes	199.3	0.9%
Fr	Fruitland fine sandy loam, 2 to 5 percent slopes	86.2	0.4%
Fs	Fruitvale fine sandy loam, 0 to 2 percent slopes	86.6	0.4%
Gt	Glenton very fine sandy loam, 0 to 2 percent slopes	7.1	0.0%
Hj	Killpack silty clay, 2 to 5 percent slopes	155.9	0.7%
Hk	Killpack silty clay, 0 to 2 percent slopes	329.4	1.5%
Ma	Mack loam, 0 to 2 percent slopes	3.0	0.0%

Mesa County Area, Colorado (CO680)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Rc	Fruitland sandy clay loam, 0 to 2 percent slopes	481.6	2.3%
Re	Sagrlite loam, 0 to 2 percent slopes	314.8	1.5%
Rs	Oxyaquic Torrifuvents, 0 to 2 percent slopes	141.0	0.7%
Tr	Turley clay loam, 0 to 2 percent slopes	603.3	2.8%
Subtotals for Soil Survey Area		13,369.8	62.9%
Totals for Area of Interest		21,263.6	100.0%



APPENDIX C
NOAA ATLAS 14 AND
STREAMSTATS DATA

NOAA Atlas 14, Volume 8, Version 2 FRUITA
Station ID: 05-3146



Location name: Fruita, Colorado, US*
Latitude: 39.1653°, Longitude: -108.7331°
Elevation:
Elevation (station metadata): 4524 ft*
* source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

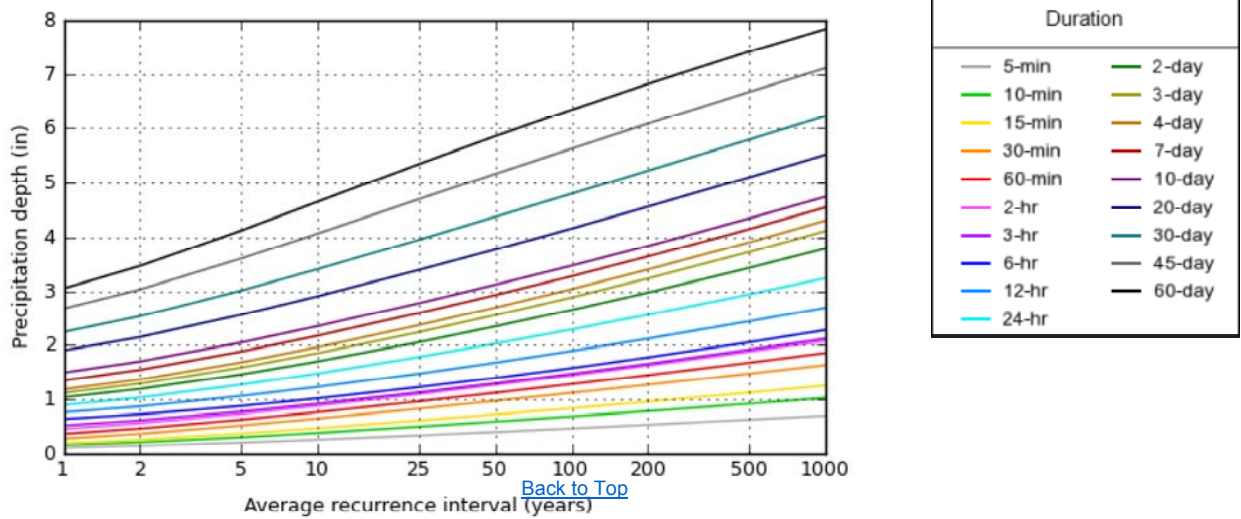
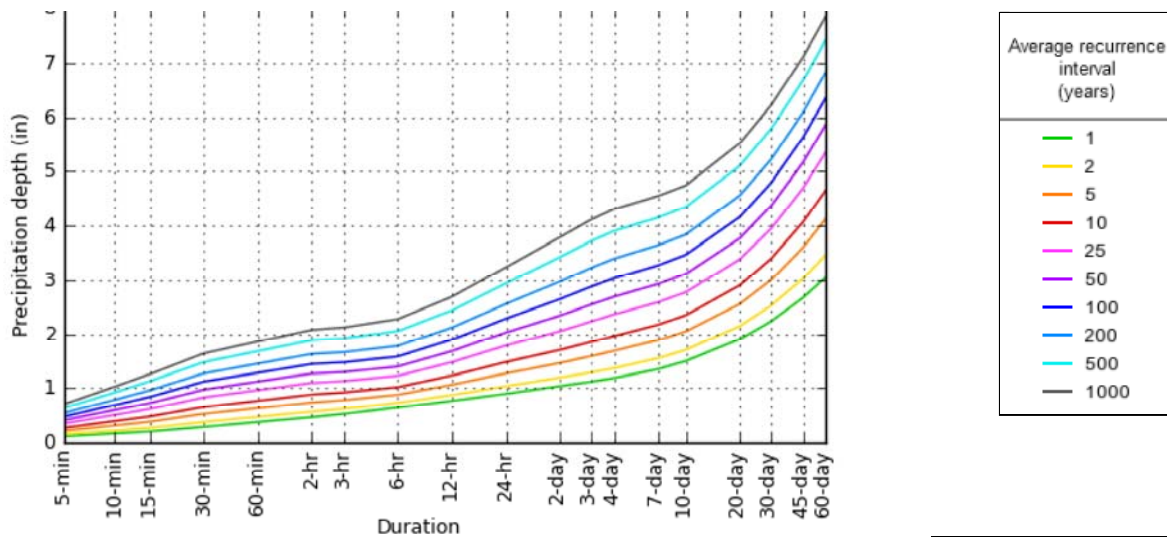
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.112 (0.090-0.145)	0.149 (0.119-0.193)	0.212 (0.169-0.276)	0.266 (0.211-0.348)	0.344 (0.263-0.472)	0.406 (0.302-0.566)	0.471 (0.336-0.675)	0.538 (0.367-0.796)	0.631 (0.411-0.964)	0.703 (0.445-1.09)
10-min	0.164 (0.131-0.212)	0.218 (0.175-0.283)	0.310 (0.248-0.404)	0.390 (0.309-0.510)	0.504 (0.385-0.691)	0.595 (0.442-0.829)	0.689 (0.493-0.988)	0.788 (0.537-1.17)	0.923 (0.602-1.41)	1.03 (0.652-1.60)
15-min	0.200 (0.160-0.258)	0.266 (0.213-0.345)	0.378 (0.302-0.492)	0.475 (0.377-0.622)	0.614 (0.470-0.843)	0.725 (0.539-1.01)	0.840 (0.601-1.21)	0.961 (0.655-1.42)	1.13 (0.734-1.72)	1.26 (0.795-1.95)
30-min	0.284 (0.228-0.368)	0.374 (0.300-0.485)	0.524 (0.418-0.681)	0.651 (0.517-0.852)	0.832 (0.635-1.14)	0.974 (0.724-1.35)	1.12 (0.800-1.60)	1.27 (0.866-1.88)	1.48 (0.962-2.25)	1.64 (1.04-2.54)
60-min	0.374 (0.300-0.484)	0.469 (0.376-0.609)	0.630 (0.503-0.820)	0.768 (0.610-1.01)	0.965 (0.737-1.32)	1.12 (0.833-1.56)	1.28 (0.916-1.83)	1.45 (0.988-2.14)	1.68 (1.09-2.56)	1.86 (1.17-2.88)
2-hr	0.463 (0.377-0.591)	0.565 (0.459-0.721)	0.737 (0.596-0.944)	0.885 (0.711-1.14)	1.10 (0.850-1.48)	1.27 (0.955-1.74)	1.44 (1.05-2.03)	1.63 (1.12-2.37)	1.88 (1.24-2.83)	2.08 (1.33-3.17)
3-hr	0.523 (0.428-0.661)	0.618 (0.505-0.782)	0.780 (0.636-0.991)	0.923 (0.747-1.18)	1.13 (0.883-1.51)	1.30 (0.987-1.76)	1.47 (1.08-2.06)	1.66 (1.16-2.39)	1.92 (1.28-2.86)	2.12 (1.37-3.21)
6-hr	0.642 (0.533-0.799)	0.729 (0.604-0.908)	0.881 (0.728-1.10)	1.02 (0.836-1.28)	1.23 (0.974-1.62)	1.40 (1.08-1.87)	1.58 (1.17-2.18)	1.77 (1.26-2.53)	2.05 (1.39-3.02)	2.27 (1.49-3.39)
12-hr	0.767 (0.645-0.939)	0.875 (0.735-1.07)	1.06 (0.889-1.31)	1.23 (1.02-1.52)	1.48 (1.19-1.91)	1.68 (1.31-2.21)	1.89 (1.42-2.56)	2.12 (1.52-2.96)	2.44 (1.67-3.52)	2.69 (1.79-3.94)
24-hr	0.899 (0.766-1.08)	1.04 (0.881-1.25)	1.27 (1.08-1.54)	1.48 (1.24-1.80)	1.78 (1.45-2.27)	2.03 (1.60-2.62)	2.28 (1.74-3.04)	2.56 (1.86-3.52)	2.94 (2.04-4.17)	3.24 (2.18-4.67)
2-day	1.04 (0.897-1.23)	1.19 (1.03-1.42)	1.46 (1.26-1.74)	1.70 (1.45-2.03)	2.05 (1.70-2.57)	2.34 (1.88-2.98)	2.65 (2.04-3.47)	2.97 (2.19-4.02)	3.43 (2.42-4.79)	3.79 (2.59-5.38)
3-day	1.12 (0.975-1.31)	1.29 (1.12-1.52)	1.59 (1.38-1.87)	1.85 (1.59-2.19)	2.23 (1.86-2.77)	2.55 (2.06-3.21)	2.88 (2.24-3.74)	3.23 (2.40-4.33)	3.72 (2.65-5.16)	4.12 (2.83-5.78)
4-day	1.19 (1.04-1.38)	1.37 (1.20-1.60)	1.68 (1.47-1.97)	1.96 (1.70-2.30)	2.36 (1.98-2.91)	2.69 (2.19-3.36)	3.03 (2.37-3.91)	3.40 (2.54-4.52)	3.90 (2.79-5.36)	4.31 (2.98-6.00)
7-day	1.35 (1.20-1.55)	1.55 (1.37-1.78)	1.88 (1.66-2.17)	2.17 (1.90-2.52)	2.59 (2.19-3.13)	2.92 (2.41-3.60)	3.27 (2.59-4.15)	3.64 (2.75-4.77)	4.15 (3.00-5.61)	4.55 (3.18-6.25)
10-day	1.50 (1.33-1.70)	1.70 (1.51-1.94)	2.05 (1.82-2.34)	2.35 (2.07-2.70)	2.77 (2.36-3.32)	3.12 (2.58-3.79)	3.47 (2.76-4.35)	3.84 (2.92-4.97)	4.34 (3.16-5.82)	4.74 (3.34-6.46)
20-day	1.90 (1.72-2.13)	2.15 (1.94-2.40)	2.56 (2.30-2.87)	2.90 (2.59-3.28)	3.39 (2.92-3.97)	3.77 (3.16-4.50)	4.16 (3.36-5.11)	4.56 (3.51-5.79)	5.10 (3.76-6.70)	5.51 (3.95-7.38)
30-day	2.24 (2.04-2.48)	2.53 (2.30-2.80)	3.01 (2.73-3.35)	3.40 (3.07-3.81)	3.95 (3.43-4.57)	4.37 (3.70-5.15)	4.80 (3.90-5.82)	5.22 (4.05-6.55)	5.79 (4.30-7.51)	6.22 (4.49-8.24)
45-day	2.67 (2.46-2.93)	3.03 (2.78-3.32)	3.60 (3.29-3.96)	4.07 (3.70-4.50)	4.69 (4.09-5.36)	5.16 (4.40-6.00)	5.62 (4.61-6.74)	6.08 (4.75-7.53)	6.67 (4.99-8.54)	7.10 (5.17-9.30)
60-day	3.05 (2.82-3.31)	3.46 (3.20-3.77)	4.12 (3.79-4.50)	4.65 (4.25-5.10)	5.34 (4.68-6.03)	5.85 (5.00-6.74)	6.34 (5.22-7.52)	6.81 (5.35-8.35)	7.41 (5.57-9.39)	7.83 (5.74-10.2)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical



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Maps & aeri

NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Sat Aug 6 15:55:06 2016

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910

StreamStats Version 3.0

Flow Statistics Ungaged Site Report

Date: Mon Sept 26, 2016 5:50:35 PM GMT-6

Study Area: Colorado

NAD 1983 Latitude: 39.1676 (39 10 03)

NAD 1983 Longitude: -108.7293 (-108 43 46)

Drainage Area: 33.4 mi²

Peak-Flows Basin Characteristics			
100% Northwest Region Peak Flow (33.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	33.4	1	5250
Percent above 7500 ft (percent)	0.85	0	99
Mean Annual Precipitation (inches)	12.79	8	49

Low-Flows Basin Characteristics			
100% Northwest Region Min Flow (33.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	33.4	5	5250
Mean Basin Elevation (feet)	5830 (below min value 6880)	6880	10480

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Flow-Duration Basin Characteristics			
100% Northwest Region Flow Duration (33.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	33.4	1	5250
Mean Annual Precipitation (inches)	12.79	8	49

Maximum-Flows Basin Characteristics			
100% Northwest Region Max Flow (33.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	33.4	5	5250
Mean Annual Precipitation (inches)	12.79	8	49
Percent above 7500 ft (percent)	0.85	0	99

Mean-Flows Basin Characteristics		
100% Northwest Region Mean Flow (33.4 mi ²)		
Parameter	Value	Regression Equation Valid Range

		Min	Max
Drainage Area (square miles)	33.4	1	5250
Mean Annual Precipitation (inches)	12.79	8	49

Peak-Flows Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	183	ft3/s	110			
PK5	546	ft3/s	88			
PK10	1030	ft3/s	79			
PK25	2070	ft3/s	74			
PK50	3150	ft3/s	74			
PK100	4650	ft3/s	75			
PK200	6490	ft3/s	76			
PK500	9680	ft3/s	79			

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

Capesius_ J.P._ and Stephens_ V. C._ Regional Regression Equations for Estimation of Natural Streamflow Statistics in Colorado: U. S. Geological Survey Scientific Investigations Report 2009-5136_ 32 p.

Low-Flows Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
M7D2Y	0.0587	ft3/s				
M7D10Y	0.0211	ft3/s				
M7D50Y	0.0191	ft3/s				

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

Capesius_ J.P._ and Stephens_ V. C._ Regional Regression Equations for Estimation of Natural Streamflow Statistics in Colorado: U. S. Geological Survey Scientific Investigations Report 2009-5136_ 32 p.

Flow-Duration Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
D10	1.67	ft3/s	73			
D25	0.72	ft3/s	77			
D50	0.34	ft3/s	83			
D75	0.13	ft3/s	100			
D90	0.0406	ft3/s	150			

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

Capesius_ J.P._ and Stephens_ V. C._ Regional Regression Equations for Estimation of Natural Streamflow Statistics in Colorado: U. S. Geological Survey Scientific Investigations Report 2009-5136_ 32 p.

Maximum-Flows Statistics						

Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
V7D2Y	0.0499	ft3/s	86			
V7D10Y	0.19	ft3/s	59			
V7D50Y	0.71	ft3/s	51			

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

Capesius_ J.P._ and Stephens_ V. C._ Regional Regression Equations for Estimation of Natural Streamflow Statistics in Colorado: U. S. Geological Survey Scientific Investigations Report 2009-5136_ 32 p.

Mean-Flows Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
Q1	0.59	ft3/s	85			
Q2	0.68	ft3/s	77			
Q3	0.91	ft3/s	68			
Q4	1.54	ft3/s	84			
Q5	4.85	ft3/s	71			
Q6	1.03	ft3/s	80			
Q7	2.07	ft3/s	75			
Q8	2.76	ft3/s	90			
Q9	3.14	ft3/s	100			
QA	1.39	ft3/s	55			
Q10	1.07	ft3/s	94			
Q11	0.73	ft3/s	83			
Q12	0.67	ft3/s	79			

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

<http://pubs.usgs.gov/sir/2009/5136/#http://pubs.usgs.gov/sir/2009/5136/#>

Capesius_ J.P._ and Stephens_ V. C._ Regional Regression Equations for Estimation of Natural Streamflow Statistics in Colorado: U. S. Geological Survey Scientific Investigations Report 2009-5136_ 32 p.

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URL: http://streamstatsags.cr.usgs.gov/v3_beta/FTreport.htm

Page Contact Information: [StreamStats Help](#)

Page Last Modified: 11/24/2015 13:32:58 (Web1)

[Streamstats Status](#)

[News](#)





APPENDIX D

FEMA DATA

Table 3 - Summary of Discharges

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (cfs)</u>			
		<u>10-Percent Annual Chance</u>	<u>2-Percent Annual Chance</u>	<u>1-Percent Annual Chance</u>	<u>0.2-Percent Annual Chance</u>
Kannah Creek					
At Confluence with Indian Creek	133.22	649	2,651	4,271	9,102
At Confluence with North Fork Kannah Creek	98.13	291	1,649	2,843	6,545
1.9 miles upstream of Divide Road	71.31	251	1,362	2,329	5,317
At Upper Kannah Creek Road Bridge	57.52	190	1,007	1,708	3,879
Leach Creek					
Downstream of River Road	-- ¹	639	1,243	1,465	2,408
Downstream of Confluence with Leach Creek	7.4	636	1,240	1,460	2,387
Downstream of G and 24 1/2 Road	-- ¹	390	852	1,091	1,909
Downstream of Interstate Highway 70	-- ¹	380	850	1,077	1,972
At H Road	12	378	848	1,073	1,961
Little Salt Wash ²					
At Denver and Rio Grande Western Railroad	33	1,500	3,170	4,300	8,100
Plateau Creek					
At Confluence with Grove Creek	316.6	2,880	4,000	4,850	6,900
At Confluence with Buzzard Creek	295.1	2,780	3,850	4,660	6,700
At Eastern Corporate Limits of the Town of Collbran	113.3	1,325	1,800	2,100	2,920
Ranchmen's Ditch					
At 26 Road	4.22	305	489	603	1,245

¹ Flows were determined by routing procedures; drainage areas were not determined

² Peak discharges shown were used in entire study reach

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LITTLE SALT WASH								
A	1,670	100	880	4.9	4,482.0	4,482.0	4,482.3	0.3
B	2,660	78	380	11.4	4,482.1	4,482.1	4,482.5	0.4
C	3,031	150	1,377	3.2	4,489.1	4,489.1	4,489.8	0.7
D	3,721	195	1,572	2.8	4,489.3	4,489.3	4,490.2	0.9
E	4,681	47	301	14.4	4,492.1	4,492.1	4,492.1	0.0
F	5,141	105	1,168	3.7	4,500.2	4,500.2	4,500.2	0.0
G	6,705	70	559	7.8	4,504.9	4,504.9	4,505.1	0.2
H	8,085	94	605	7.2	4,509.7	4,509.7	4,509.7	0.0
I	8,519	125	955	4.5	4,514.5	4,514.5	4,514.5	0.0
J	10,579	64	396	10.9	4,519.1	4,519.1	4,519.9	0.8
K	11,799	46	298	14.6	4,528.3	4,528.3	4,528.3	0.0
L	12,559	131	756	5.7	4,535.4	4,535.4	4,535.4	0.0
M	14,199	188	621	7.0	4,543.1	4,543.1	4,543.1	0.0
N	15,539	75	515	8.4	4,554.9	4,554.9	4,554.9	0.0
O	16,249	47	398	10.9	4,560.0	4,560.0	4,560.0	0.0
P	16,626	63	689	6.3	4,569.1	4,569.1	4,569.1	0.0

¹Feet Above Confluence with Colorado River

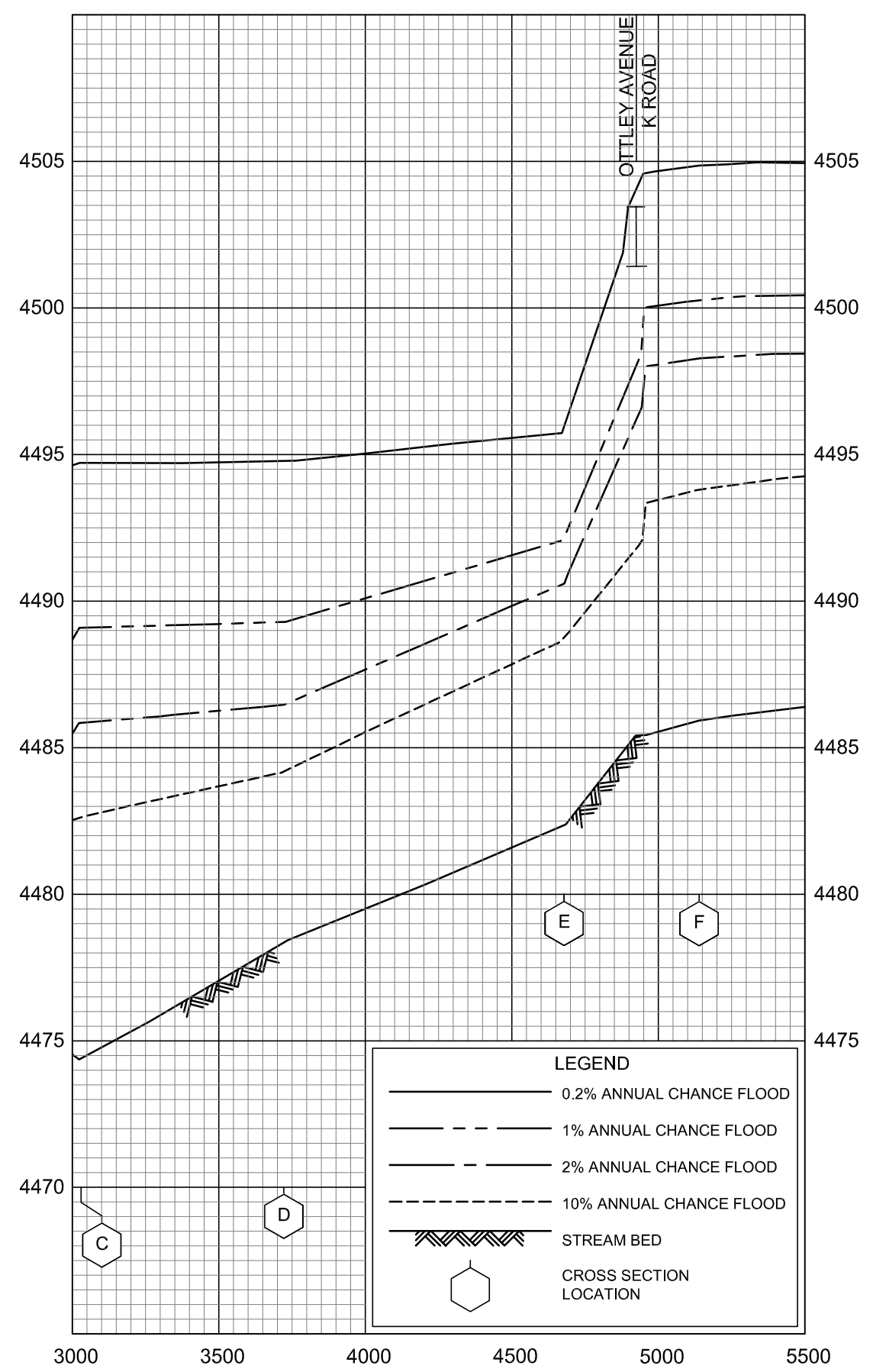
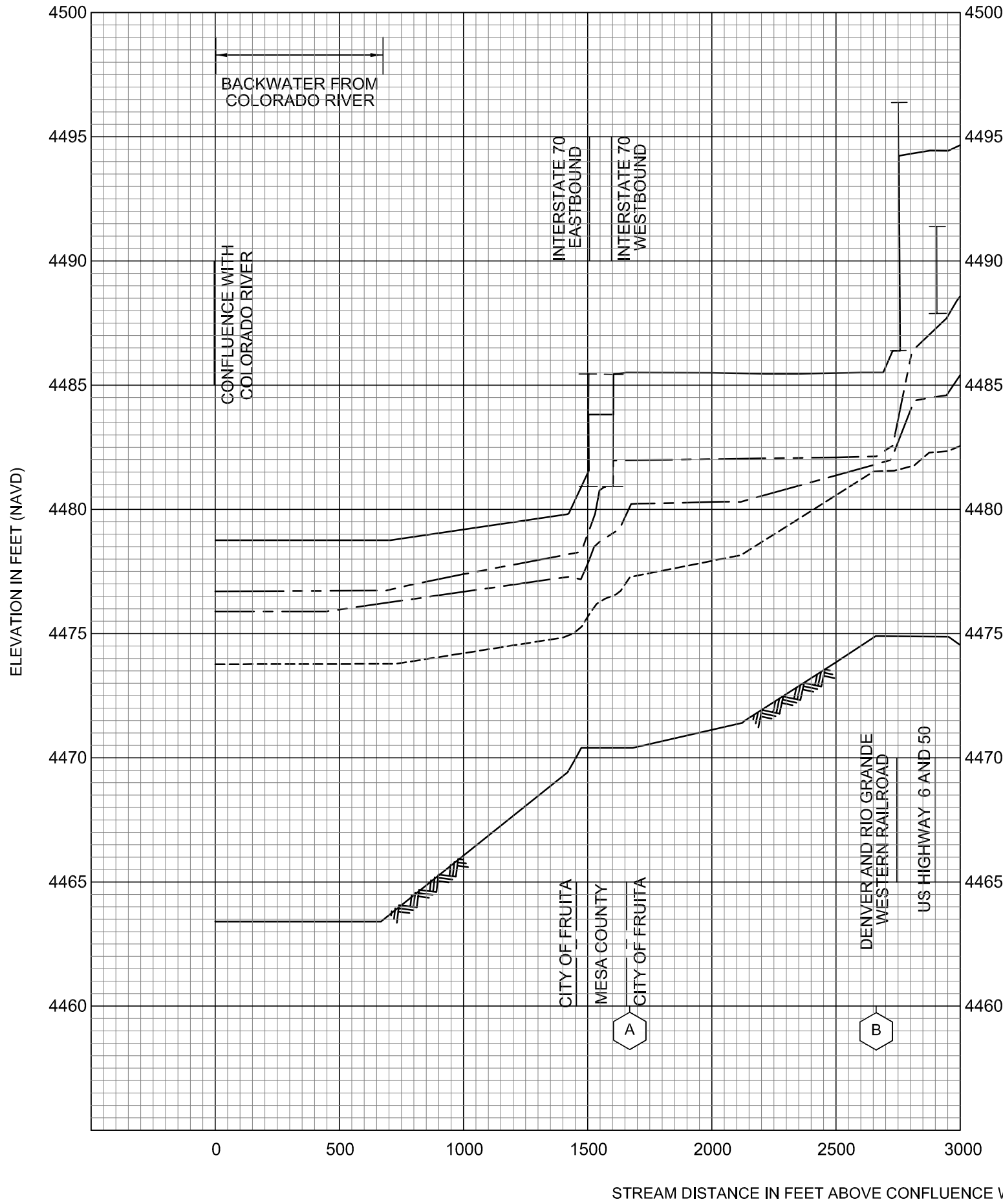
TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MESA COUNTY, CO
AND INCORPORATED AREAS**

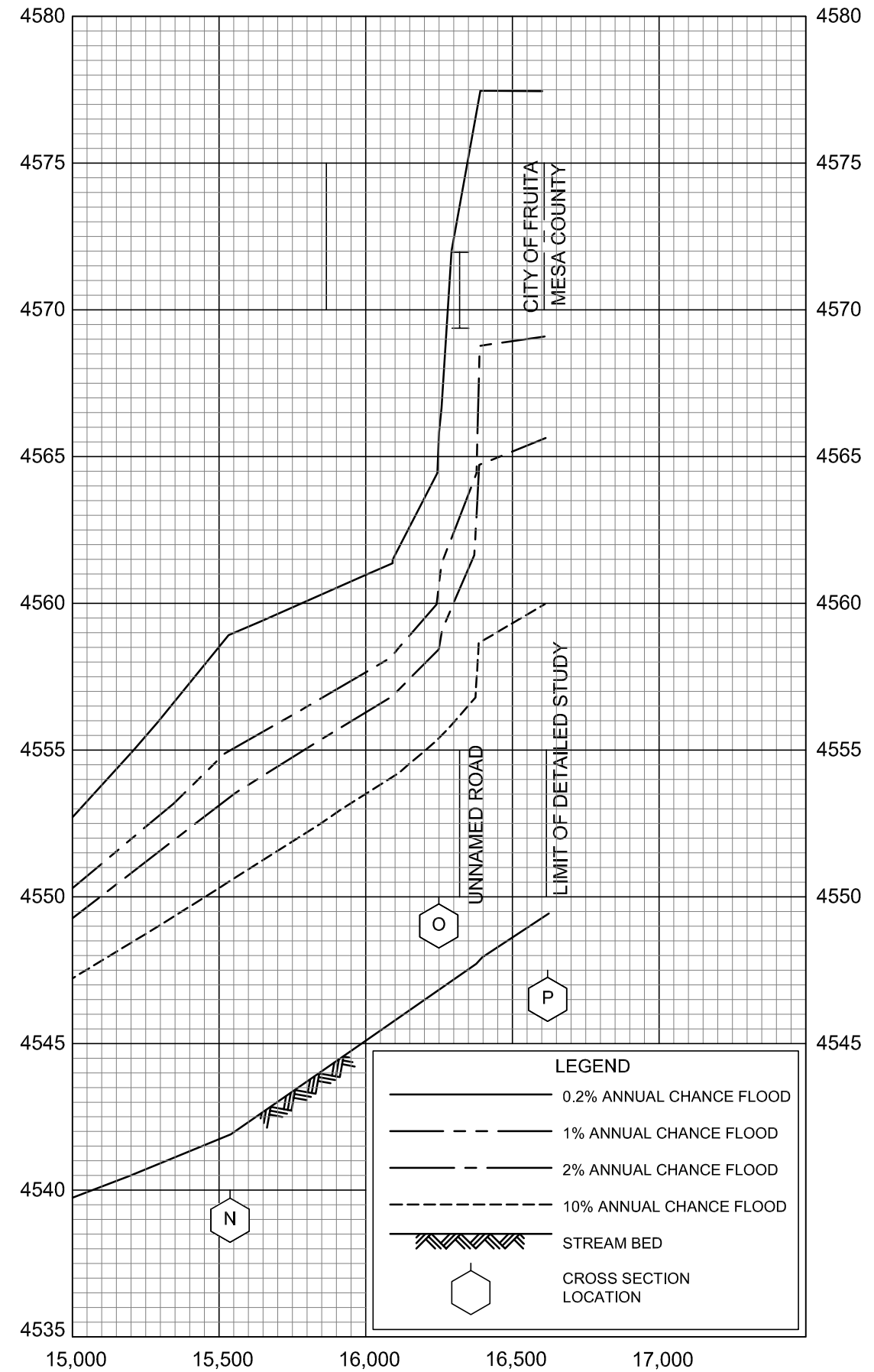
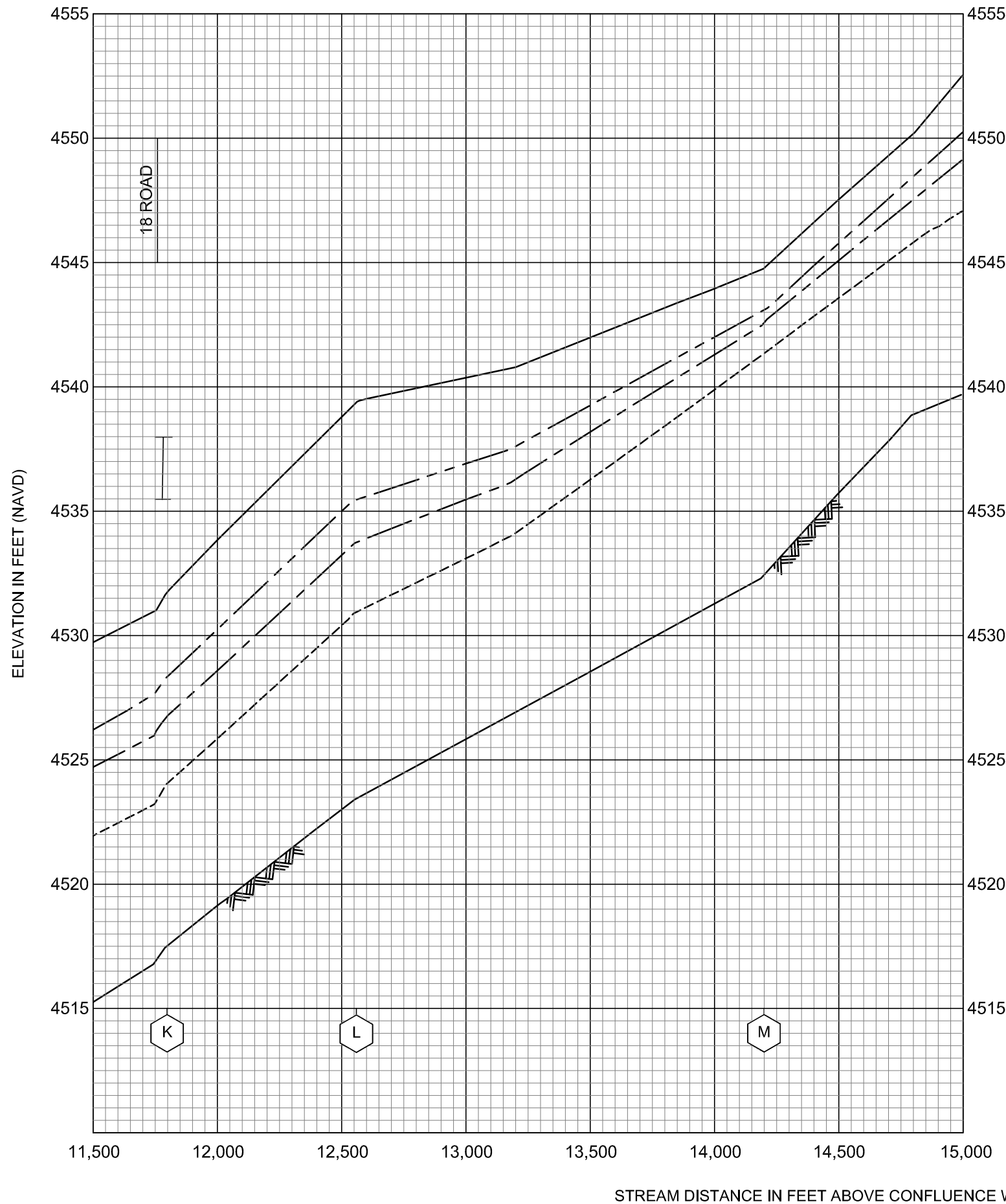
FLOODWAY DATA

LITTLE SALT WASH



FLOOD PROFILES
LITTLE SALT WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
MESA COUNTY, CO
AND INCORPORATED AREAS



FLOOD PROFILES

LITTLE SALT WASH

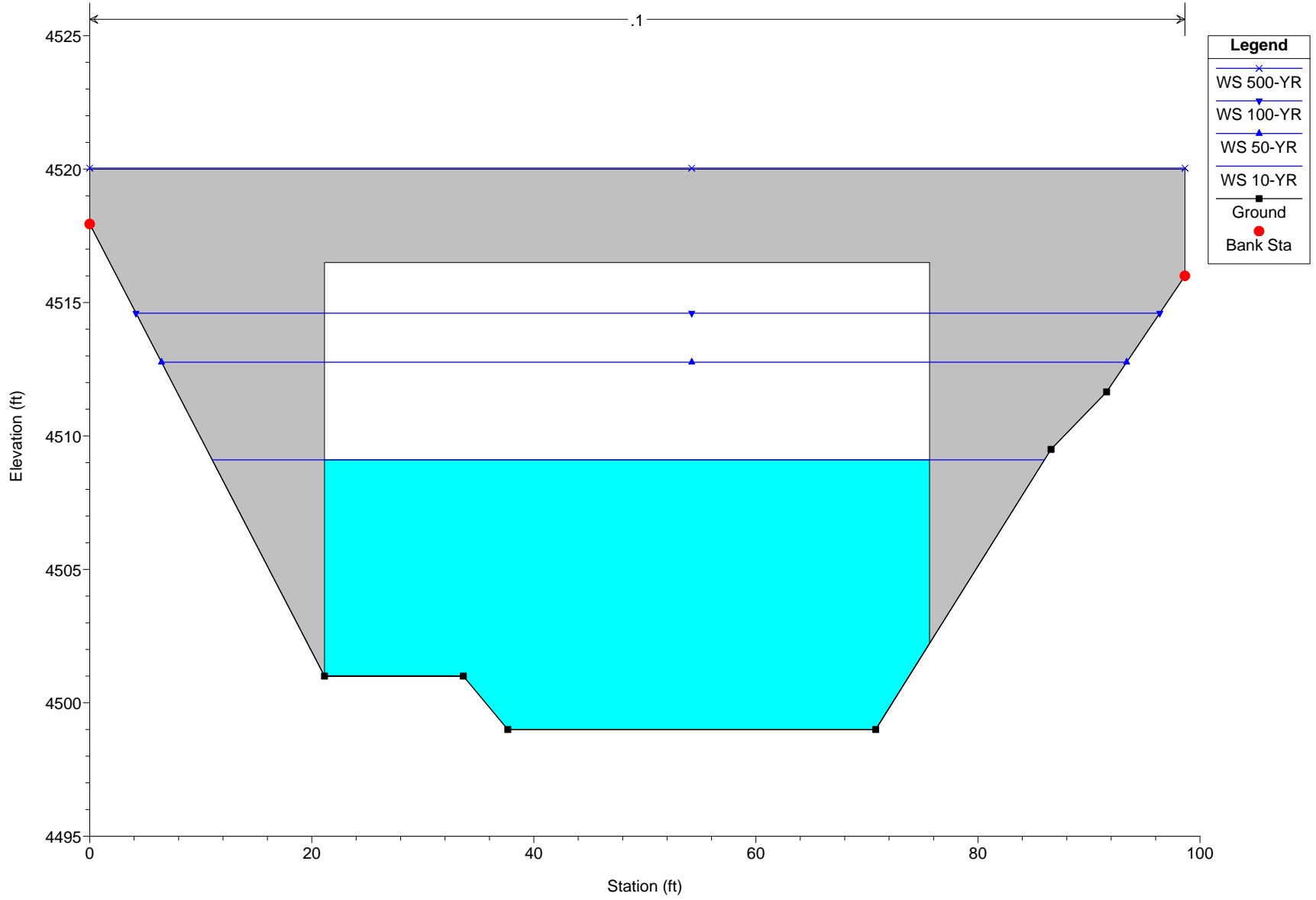
FEDERAL EMERGENCY MANAGEMENT AGENCY

MESA COUNTY, CO
AND INCORPORATED AREAS



APPENDIX E
HEC-RAS OUTPUT

Final Bridge with Ped Trail Plan: Final Bridge and Trail 12/10/2016
Proposed 55-Foot span Bridge with Pedestrian Trail



Plan: Final Bridge 2 LITTLE SALT WASH CHANNEL FL RS: 400 Profile: 100-YR

E.G. US. (ft)	4515.13	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	4514.88	E.G. Elev (ft)	4515.04	4514.94
Q Total (cfs)	4300.00	W.S. Elev (ft)	4514.60	4514.55
Q Bridge (cfs)	4300.00	Crit W.S. (ft)	4505.48	4504.64
Q Weir (cfs)		Max Chl Dpth (ft)	15.60	16.54
Weir Sta Lft (ft)		Vel Total (ft/s)	5.29	5.03
Weir Sta Rgt (ft)		Flow Area (sq ft)	813.48	855.49
Weir Submerg		Froude # Chl	0.24	0.22
Weir Max Depth (ft)		Specif Force (cu ft)	6800.64	7418.04
Min El Weir Flow (ft)	4520.01	Hydr Depth (ft)	14.93	15.70
Min El Prs (ft)	4516.50	W.P. Total (ft)	55.95	56.40
Delta EG (ft)	0.31	Conv. Total (cfs)	72008.8	77898.3
Delta WS (ft)	0.31	Top Width (ft)	54.50	54.50
BR Open Area (sq ft)	916.89	Frctn Loss (ft)	0.08	0.05
BR Open Vel (ft/s)	5.29	C & E Loss (ft)	0.02	0.07
Coef of Q		Shear Total (lb/sq ft)	3.24	2.89
Br Sel Method	Energy only	Power Total (lb/ft s)	0.00	0.00

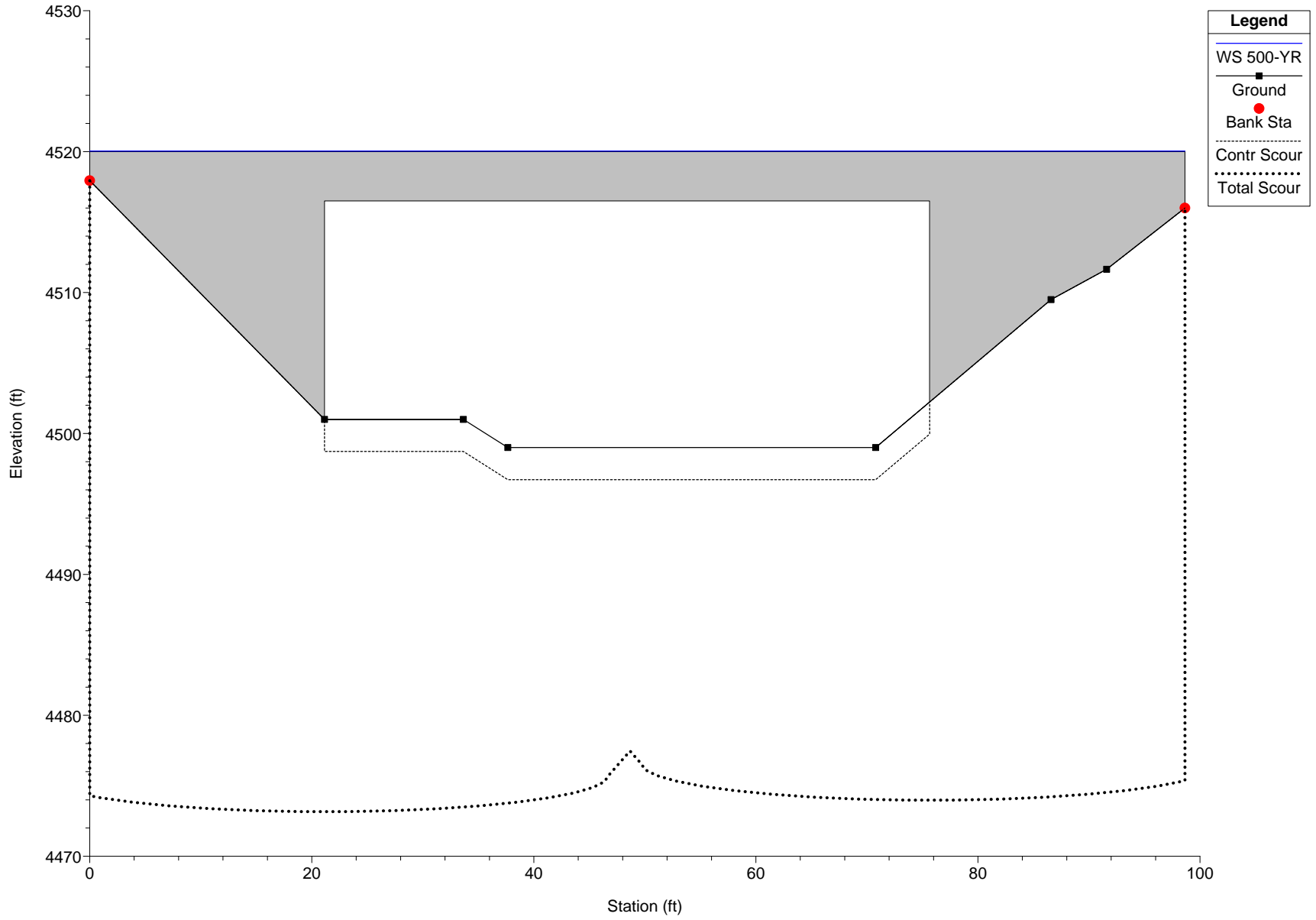
HEC-RAS Plan: Final Bridge 2 River: LITTLE SALT WASH Reach: CHANNEL FL

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
CHANNEL FL	938.9	10-YR	1500.00	4499.58	4511.82		4512.00	0.004467	3.45	434.27	59.88	0.23
CHANNEL FL	938.9	50-YR	3170.00	4499.58	4516.03		4516.31	0.005090	4.31	736.06	80.51	0.25
CHANNEL FL	938.9	100-YR	4300.00	4499.58	4518.15		4518.50	0.005116	4.69	915.97	88.01	0.26
CHANNEL FL	938.9	500-YR	8100.00	4499.58	4524.16		4524.64	0.004579	5.56	1457.82	90.55	0.24
CHANNEL FL	888.9	10-YR	1500.00	4499.60	4511.63		4511.79	0.003845	3.14	476.97	67.34	0.21
CHANNEL FL	888.9	50-YR	3170.00	4499.60	4515.83		4516.07	0.004199	3.96	800.80	85.88	0.23
CHANNEL FL	888.9	100-YR	4300.00	4499.60	4517.96		4518.25	0.004276	4.33	992.30	94.12	0.24
CHANNEL FL	888.9	500-YR	8100.00	4499.60	4524.00		4524.41	0.003794	5.11	1584.56	98.38	0.22
CHANNEL FL	838.9	10-YR	1500.00	4499.61	4511.48		4511.61	0.002958	2.85	526.76	71.86	0.19
CHANNEL FL	838.9	50-YR	3170.00	4499.61	4515.66		4515.87	0.003427	3.66	865.03	90.40	0.21
CHANNEL FL	838.9	100-YR	4300.00	4499.61	4517.79		4518.04	0.003543	4.03	1066.77	98.95	0.22
CHANNEL FL	838.9	500-YR	8100.00	4499.61	4523.85		4524.22	0.003268	4.86	1666.66	98.95	0.21
CHANNEL FL	788.9	10-YR	1500.00	4499.35	4511.29		4511.44	0.003828	3.14	477.83	67.00	0.21
CHANNEL FL	788.9	50-YR	3170.00	4499.35	4515.44		4515.68	0.004315	3.92	809.69	90.03	0.23
CHANNEL FL	788.9	100-YR	4300.00	4499.35	4517.56		4517.85	0.004239	4.26	1008.51	96.11	0.23
CHANNEL FL	788.9	500-YR	8100.00	4499.35	4523.64		4524.04	0.003767	5.08	1595.47	96.61	0.22
CHANNEL FL	738.9	10-YR	1500.00	4499.08	4511.11		4511.25	0.003488	2.99	501.65	70.62	0.20
CHANNEL FL	738.9	50-YR	3170.00	4499.08	4515.25		4515.47	0.003810	3.74	846.96	88.35	0.21
CHANNEL FL	738.9	100-YR	4300.00	4499.08	4517.37		4517.64	0.003890	4.14	1038.10	92.81	0.22
CHANNEL FL	738.9	500-YR	8100.00	4499.08	4523.46		4523.85	0.003728	5.05	1604.69	93.13	0.21
CHANNEL FL	688.9	10-YR	1500.00	4498.32	4510.96		4511.06	0.003712	2.66	564.84	103.48	0.20
CHANNEL FL	688.9	50-YR	3170.00	4498.32	4515.13		4515.29	0.002713	3.16	1003.83	105.25	0.18
CHANNEL FL	688.9	100-YR	4300.00	4498.32	4517.26		4517.46	0.002669	3.50	1228.00	105.25	0.18
CHANNEL FL	688.9	500-YR	8100.00	4498.32	4523.37		4523.66	0.002633	4.33	1870.86	105.25	0.18
CHANNEL FL	638.9	10-YR	1500.00	4498.34	4510.74		4510.87	0.003924	2.90	516.88	82.72	0.20
CHANNEL FL	638.9	50-YR	3170.00	4498.34	4514.93		4515.13	0.003517	3.60	879.91	89.93	0.20
CHANNEL FL	638.9	100-YR	4300.00	4498.34	4517.05		4517.30	0.003556	4.01	1072.84	91.53	0.21
CHANNEL FL	638.9	500-YR	8100.00	4498.34	4523.12		4523.50	0.003603	4.97	1628.50	91.53	0.21
CHANNEL FL	588.9	10-YR	1500.00	4499.21	4510.28		4510.58	0.007843	4.44	337.97	45.92	0.29
CHANNEL FL	588.9	50-YR	3170.00	4499.21	4514.31		4514.82	0.009770	5.76	550.35	59.77	0.33
CHANNEL FL	588.9	100-YR	4300.00	4499.21	4516.36		4516.98	0.010298	6.32	680.69	66.99	0.35
CHANNEL FL	588.9	500-YR	8100.00	4499.21	4522.34		4523.18	0.009188	7.37	1098.72	70.53	0.33
CHANNEL FL	489.47	10-YR	1500.00	4498.69	4509.21		4509.63	0.011841	5.16	290.79	43.38	0.35
CHANNEL FL	489.47	50-YR	3170.00	4498.69	4512.96		4513.65	0.014067	6.66	475.78	54.75	0.40
CHANNEL FL	489.47	100-YR	4300.00	4498.69	4514.88		4515.72	0.015361	7.33	586.95	62.57	0.42
CHANNEL FL	489.47	500-YR	8100.00	4498.69	4521.18		4522.14	0.011687	7.90	1025.76	72.65	0.37
CHANNEL FL	439.47	10-YR	1500.00	4499.00	4509.17	4502.54	4509.27	0.002033	2.52	595.03	75.13	0.16
CHANNEL FL	439.47	50-YR	3170.00	4499.00	4512.94	4504.39	4513.13	0.002819	3.51	902.54	87.44	0.19
CHANNEL FL	439.47	100-YR	4300.00	4499.00	4514.88	4505.42	4515.13	0.003150	3.99	1077.30	93.00	0.21
CHANNEL FL	439.47	500-YR	8100.00	4499.00	4521.22	4508.27	4521.57	0.002970	4.78	1696.02	98.65	0.20
CHANNEL FL	400		Bridge									
CHANNEL FL	389.47	10-YR	1500.00	4498.00	4509.06		4509.15	0.001648	2.38	629.38	72.01	0.14
CHANNEL FL	389.47	50-YR	3170.00	4498.00	4512.72		4512.90	0.002620	3.49	909.06	81.66	0.18
CHANNEL FL	389.47	100-YR	4300.00	4498.00	4514.57		4514.82	0.003149	4.03	1066.35	88.38	0.20
CHANNEL FL	389.47	500-YR	8100.00	4498.00	4519.42		4519.85	0.004179	5.27	1537.38	102.74	0.24
CHANNEL FL	339.47	10-YR	1500.00	4496.89	4508.62		4508.93	0.007959	4.41	340.00	47.06	0.29
CHANNEL FL	339.47	50-YR	3170.00	4496.89	4511.96		4512.54	0.011901	6.12	517.75	59.86	0.37
CHANNEL FL	339.47	100-YR	4300.00	4496.89	4513.65		4514.39	0.013387	6.89	624.35	66.34	0.40
CHANNEL FL	339.47	500-YR	8100.00	4496.89	4518.09		4519.27	0.014912	8.70	930.83	69.80	0.42
CHANNEL FL	289.47	10-YR	1500.00	4496.60	4508.23		4508.52	0.008198	4.30	348.92	52.77	0.29
CHANNEL FL	289.47	50-YR	3170.00	4496.60	4511.41		4511.95	0.011462	5.87	539.93	64.78	0.36
CHANNEL FL	289.47	100-YR	4300.00	4496.60	4513.04		4513.73	0.012436	6.64	647.66	67.26	0.38
CHANNEL FL	289.47	500-YR	8100.00	4496.60	4517.40		4518.52	0.014444	8.50	953.41	71.75	0.41
CHANNEL FL	239.47	10-YR	1500.00	4496.37	4507.79		4508.07	0.009583	4.30	349.22	59.44	0.31
CHANNEL FL	239.47	50-YR	3170.00	4496.37	4510.82		4511.36	0.011977	5.91	536.13	64.00	0.36
CHANNEL FL	239.47	100-YR	4300.00	4496.37	4512.38		4513.08	0.013295	6.74	637.82	66.36	0.38
CHANNEL FL	239.47	500-YR	8100.00	4496.37	4516.57		4517.75	0.016014	8.71	930.14	72.16	0.43
CHANNEL FL	189.47	10-YR	1500.00	4496.19	4506.79	4503.91	4507.32	0.024828	5.84	257.06	55.97	0.48
CHANNEL FL	189.47	50-YR	3170.00	4496.19	4509.59	4506.80	4510.49	0.025043	7.58	418.06	58.90	0.50
CHANNEL FL	189.47	100-YR	4300.00	4496.19	4510.97	4507.87	4512.12	0.026920	8.60	500.26	60.34	0.53
CHANNEL FL	189.47	500-YR	8100.00	4496.19	4514.68	4510.88	4516.59	0.031329	11.07	731.41	64.22	0.58
CHANNEL FL	139.47	10-YR	1500.00	4496.19	4502.98	4502.98	4504.86	0.116764	10.99	136.44	37.24	1.01
CHANNEL FL	139.47	50-YR	3170.00	4496.19	4505.76	4505.76	4508.08	0.105250	12.23	259.17	57.06	1.01
CHANNEL FL	139.47	100-YR	4300.00	4496.19	4506.82	4506.82	4509.61	0.101112	13.41	320.57	58.55	1.01
CHANNEL FL	139.47	500-YR	8100.00	4496.19	4509.80	4509.80	4513.85	0.094045	16.16	501.29	62.65	1.01



APPENDIX F
SCOUR ANALYSIS

Bridge Scour RS = 400



Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):		14.12	
Approach Velocity (ft/s):		7.90	
Br Average Depth (ft):		9.33	
BR Opening Flow (cfs):		8100.00	
BR Top WD (ft):		98.65	
Grain Size D50 (mm):	10.00	10.00	10.00
Approach Flow (cfs):		8100.00	
Approach Top WD (ft):		72.65	
K1 Coefficient:		0.640	
Results			
Scour Depth Ys (ft):		2.28	
Critical Velocity (ft/s):		5.57	
Equation:		Live	

Abutment Scour

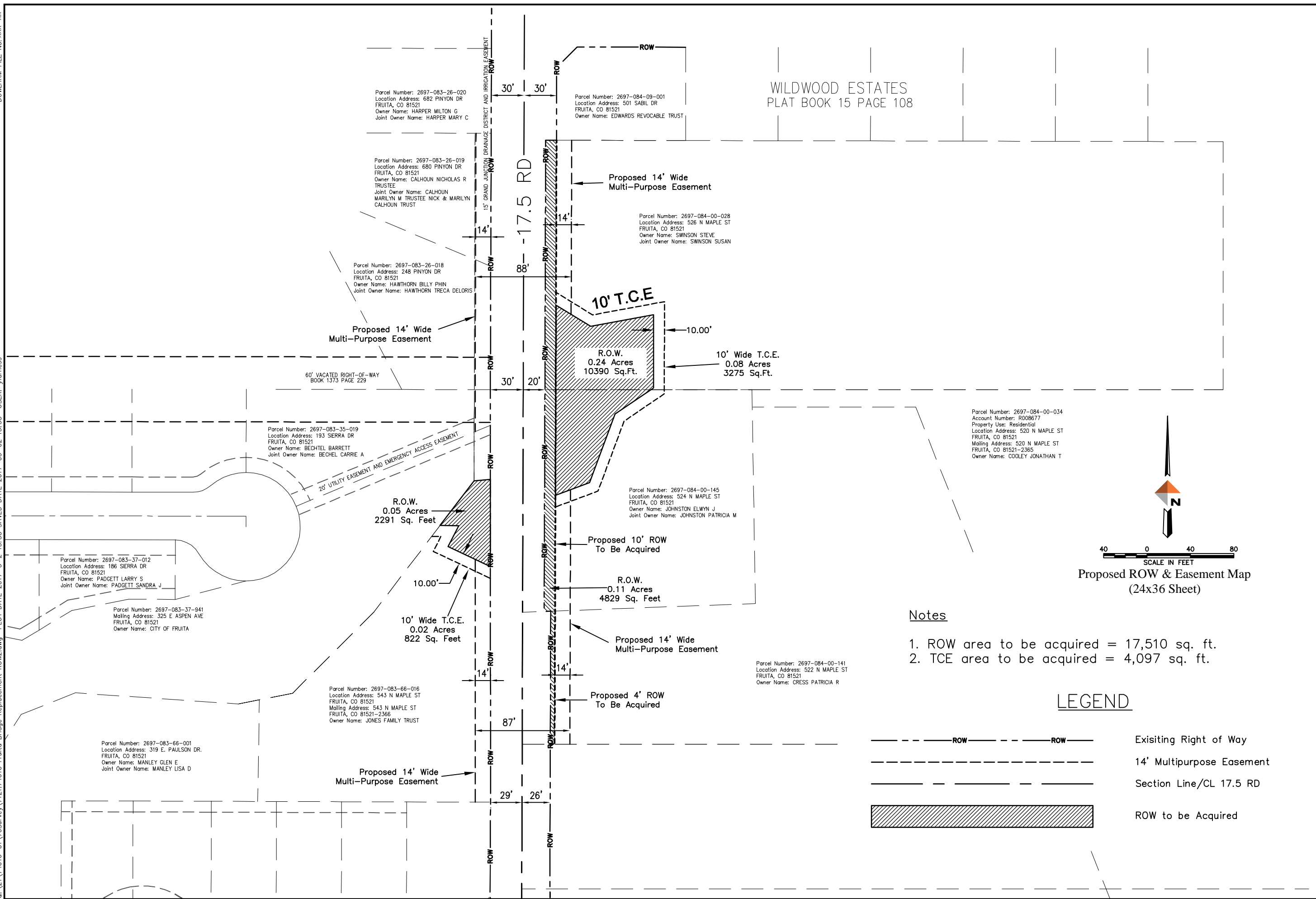
	Left	Right
Input Data		
Station at Toe (ft):	21.15	75.65
Toe Sta at appr (ft):	21.15	49.65
Abutment Length (ft):	21.15	23.00
Depth at Toe (ft):	20.22	18.99
K1 Shape Coef:	0.55 - Spill-through abutment	
Degree of Skew (degrees):	90.00	90.00
K2 Skew Coef:	1.00	1.00
Projected Length L' (ft):	21.15	23.00
Avg Depth Obstructed Ya (ft):	14.12	14.12
Flow Obstructed Qe (cfs):	2357.53	2564.35
Area Obstructed Ae (sq ft):	298.55	324.74
Results		
Scour Depth Ys (ft):	25.56	25.98
Qe/Ae = Ve:	7.90	7.90
Froude #:	0.37	0.37
Equation:	Froehlich	Froehlich

Combined Scour Depths

Left abutment scour + contraction scour (ft):	27.84
Right abutment scour + contraction scour (ft):	28.26

EXHIBIT B6: RIGHT OF WAY EXHIBITS

EXHIBIT B6
RIGHT OF WAY EXHIBITS



WILDWOOD ESTATES
PLAT BOOK 15 PAGE 108

Notes

1. ROW area to be acquired = 17,510 sq. ft.
2. TCE area to be acquired = 4,097 sq. ft.

LEGEND

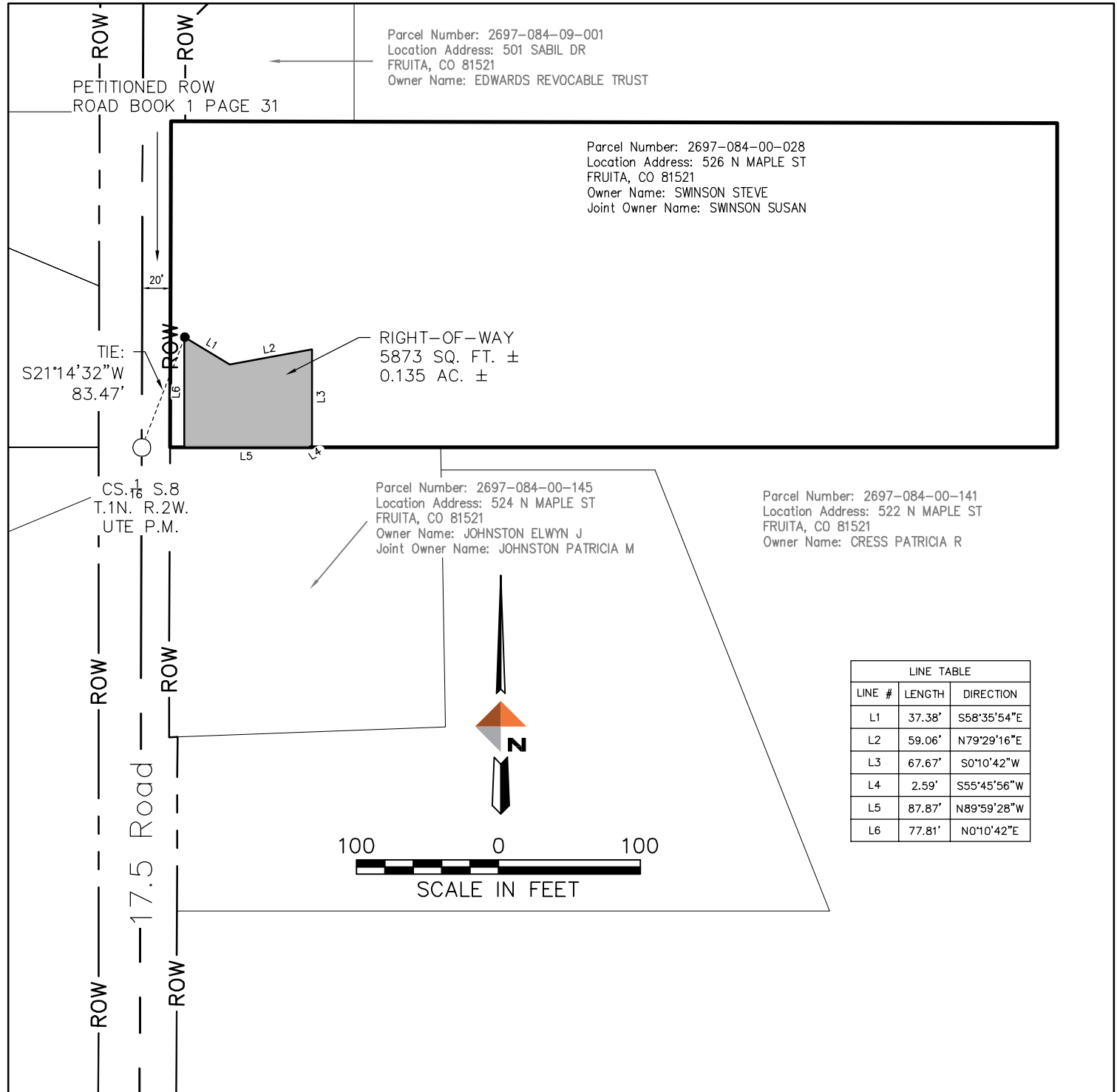
- Existing Right of Way
- 14' Multipurpose Easement
- Section Line/CL 17.5 RD
- ROW to be Acquired

REV	DATE	DESCRIPTION	BY

DOWL
 WWW.DOWL.COM
 222 South Park Avenue
 Montrose, Colorado 81401
 970-249-6628

MESA COUNTY
 17.5 Road Fruita Bridge Replacement
 Proposed ROW & Easement Map

PROJECT	7121.74610.01
DATE	05/02/17
© DOWL 2016	
SHEET	
V-1	



Parcel Number: 2697-084-09-001
 Location Address: 501 SABIL DR
 FRUITA, CO 81521
 Owner Name: EDWARDS REVOCABLE TRUST

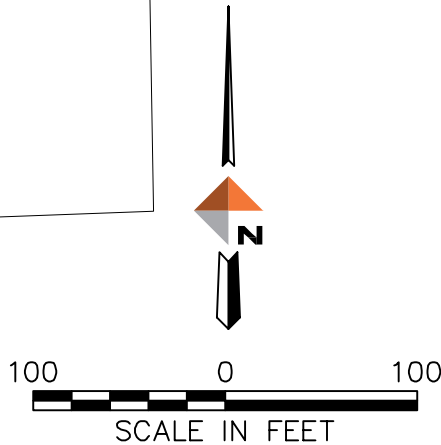
Parcel Number: 2697-084-00-028
 Location Address: 526 N MAPLE ST
 FRUITA, CO 81521
 Owner Name: SWINSON STEVE
 Joint Owner Name: SWINSON SUSAN

RIGHT-OF-WAY
 5873 SQ. FT. ±
 0.135 AC. ±


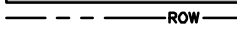

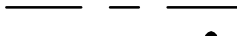


Parcel Number: 2697-084-00-145
 Location Address: 524 N MAPLE ST
 FRUITA, CO 81521
 Owner Name: JOHNSTON ELWYN J
 Joint Owner Name: JOHNSTON PATRICIA M


Parcel Number: 2697-084-00-141
 Location Address: 522 N MAPLE ST
 FRUITA, CO 81521
 Owner Name: CRESS PATRICIA R

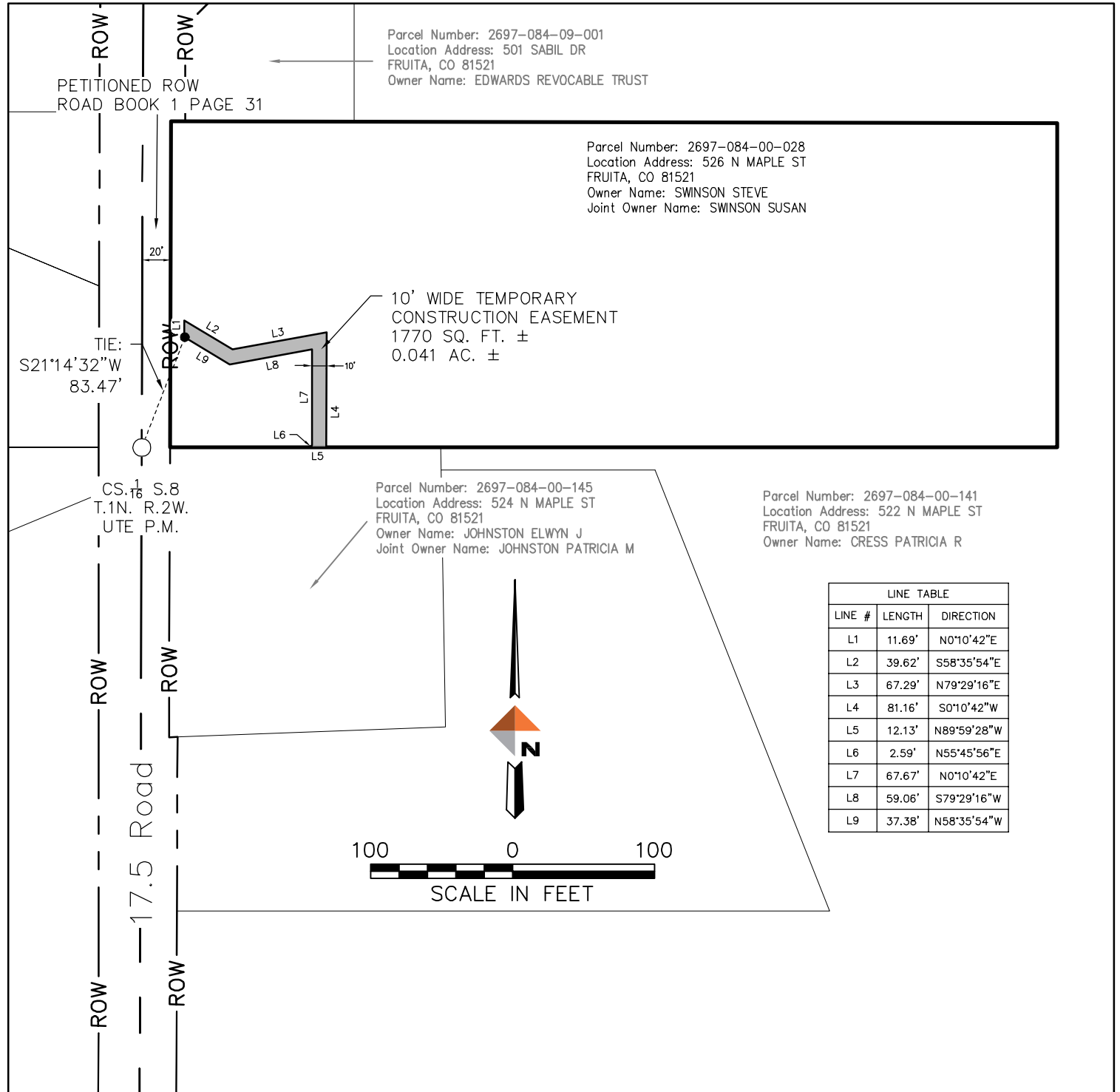
LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	37.38'	S58°35'54"E
L2	59.06'	N79°29'16"E
L3	67.67'	S0°10'42"W
L4	2.59'	S55°45'56"W
L5	87.87'	N89°59'28"W
L6	77.81'	N0°10'42"E



LEGEND


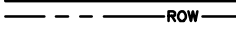

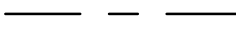


-  PROPOSED RIGHT-OF-WAY
-  EXISTING RIGHT-OF-WAY
-  PROPERTY LINE
-  ALIQUOT LINE
-  POINT OF BEGINNING
-  FOUND SURVEY MONUMENT

DRAWING NUMBER EXHIBIT B	DESIGNER: JSR	AREA: JSR	TRAIL RIGHT-OF-WAY 2697-084-00-028 (SWINSON) EXHIBIT "B" - 17.5 RD	 WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828
	DRAFTER: JDH	CHECKED: JSR		
	DATE 05/02/2017			
	JOB NO. 7121.74610			



LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	11.69'	N0°10'42"E
L2	39.62'	S58°35'54"E
L3	67.29'	N79°29'16"E
L4	81.16'	S0°10'42"W
L5	12.13'	N89°59'28"W
L6	2.59'	N55°45'56"E
L7	67.67'	N0°10'42"E
L8	59.06'	S79°29'16"W
L9	37.38'	N58°35'54"W

LEGEND

-  PROPOSED TEMPORARY CONSTRUCTION EASEMENT
-  EXISTING RIGHT-OF-WAY
-  PROPERTY LINE
-  ALIQUOT LINE
-  POINT OF BEGINNING
-  FOUND SURVEY MONUMENT


DRAWING NUMBER EXHIBIT B	DESIGNER: JSR	AREA: JSR	TEMPORARY CONSTRUCTION EASEMENT 2697-084-00-028 (SWINSON) EXHIBIT "B" - 17.5 RD	 WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828
	DRAFTER: JDH	CHECKED: JSR		
	DATE: 05/02/2017			
	JOB NO. 7121.74610			

EXHIBIT "A"

Parcel Number: 2697-084-00-028-ROW (Trail)

Location Address: 526 N MAPLE ST. FRUITA, CO 81521

Owner Name: SWINSON STEVE

Joint Owner Name: SWINSON SUSAN

A parcel of land for roadway, utility and all other public purposes located upon the land described in a deed recorded with Mesa County Clerk & Recorder at Reception No. 2660636 which lies within the SE $\frac{1}{4}$ of Section 8, Township 1 North, Range 2 West of the Ute Principal Meridian, County of Mesa, State of Colorado, more particularly described as follows:

Beginning at a point from whence the CS 1/16 corner bears S 21°14'32" W 83.47';
thence S 58°35'54" E 37.38';
thence N 79°29'16" E 59.06';
thence S 00°10'42" W 67.67';
thence S 55°45'56" W 2.59' to a point on the south line of the aforementioned land;
thence along said south line N 89°59'28" W 87.87';
thence N 00°10'42" E 77.81' to the point of beginning.

Described parcel containing 0.135 acres, 5873 square feet, more or less.

Description written by:

Joseph S. Rease, P.L.S. 36067



INSPIRATION • INNOVATION • INTEGRITY

EXHIBIT "A"

Parcel Number: 2697-084-00-028-TCE

Location Address: 526 N MAPLE ST. FRUITA, CO 81521

Owner Name: SWINSON STEVE

Joint Owner Name: SWINSON SUSAN

A temporary construction easement being 10' in width and located upon the land described in a deed recorded with Mesa County Clerk & Recorder at Reception No. 2660636 which lies within the SE¼ of Section 8, Township 1 North, Range 2 West of the Ute Principal Meridian, County of Mesa, State of Colorado, more particularly described as follows:

Beginning at a point from whence the CS 1/16 corner bears S 21°14'32" W 83.47';
thence N 00°10'42" E 11.69';
thence S 58°35'54" E 39.62';
thence N 79°29'16" E 67.29';
thence S 00°10'42" W 81.16' to the south line of the aforementioned land;
thence along said south line N 89°59'28" W 12.13';
thence N 55°45'56" E 2.59';
thence N 00°10'42" E 67.67';
thence S 79°29'16" W 59.06';
thence N 58°35'54" W 37.38' to the point of beginning.

Described parcel containing 0.041 acres, 1770 square feet, more or less.

Description written by:

Joseph S. Rease, P.L.S. 36067



INSPIRATION • INNOVATION • INTEGRITY

EXHIBIT B7: ENVIRONMENTAL REPORTS

**EXHIBIT B7
ENVIRONMENTAL
REPORTS**

April 28, 2017

To: Brian Renfrow, DOWL
From: Aleta Powers, ERO Resources Corporation
Re: Natural Resources Assessment/Biology Report – Maple Street Bridge

ERO Resources Corporation (ERO) was contracted by DOWL to survey for state- and county-listed noxious weeds; federal threatened, endangered, proposed, and candidate (TEPC) species as protected under the Endangered Species Act (ESA), as amended (16 U.S.C. 1531 et seq.); Migratory Bird Treaty Act (MBTA) issues; wetland resources; and general wildlife habitat in the vicinity of the proposed Maple Street Bridge Replacement Project (FRT 17.5-K.25 Bridge Design Project). The survey area included the east and west sides of Maple Street at the Little Salt Wash crossing in the City of Fruita, Mesa County, Colorado (Figure 1). The project is proposed to improve traffic safety and roadway conditions. This memo summarizes ERO's findings and recommendations relative to biological resources. A separate wetland delineation report has been prepared (ERO 2017).

The total project area, as defined by DOWL, encompasses approximately 0.4 acres. The legal description of the approximate project center is UTM NAD 83: Zone 12N; 696195mE, 4337847mN; Latitude, Longitude: 39.167737°N, 108.729005°W; USGS Fruita, CO Quadrangle (Figure 1).

Methods

ERO biologist Esa Crumb surveyed the project area on November 1st, 2016. Photo documentation and field notes were recorded for Waters of the U.S., vegetation and habitat, wildlife, noxious weeds, and potential TEPC species in the project area. Colorado Parks and Wildlife (CPW) habitat and species/nest occurrence maps (CPW 2016) were referenced prior to and during field surveys. ERO also reviewed the most recent aerial photography (June 2016), U.S. Fish and Wildlife Service Information, Planning, and Conservation documents (FWS 2016), State of Colorado (CDA 2017) and the Mesa County Noxious Weed Lists (Mesa County 2017). National Resource

Denver
1842 Clarkson St.
Denver, CO 80218
303.830.1188

Durango
1015 ½ Main Avenue
Durango, CO 81301
970.422.2136

Hotchkiss
P.O. Box 932
161 South 2nd St.
Hotchkiss, CO 81419
970.872.3020

Idaho
4001 East Main Street
Emmett, ID 83617
208.365.7684

Conservation Service soil maps (NRCS 2016) and National Wetland Indicator maps (NWI 2016).

Site Summary

The site occurs where Maple Street (running north-south) crosses Little Salt Wash, a lower perennial stream. The project area has steep and eroding banks with dense weedy, riparian woodland vegetation. Wetland fringe is generally absent within the project area. The mapped stream bed (ordinary high water mark; OHWM) was about 0.14 acres within the project area.

The riparian corridor consists predominantly of non-native species (Ackerfield 2015) including Siberian elm (*Ulmus pumila*), tamarisk (*Tamarix sp.*), Russian olive (*Elaeagnus angustifolia*), and cottonwood (*Populus deltoides*). The understory is sparsely vegetated with upland herbaceous species including lamb's quarters (*Chenopodium album*), tall wheatgrass (*Thinopyrum ponticum*) and other senesced upland grass species. The project area borders private residential parcels in an urban setting.

Threatened, Endangered, Proposed, and Candidate Species

ERO reviewed the project area for TEPC species. According to the FWS-Information Planning and Conservation Program (IPaC) (FWS 2016) online database, four endangered species and five threatened species may be in or near the project area. Based on existing habitat within the project area and known habitat preferences for listed species, no TEPC-listed species have the potential or are likely to occur within the project area (Table 1).

Table 1. TEPC-listed species, habitat descriptions, and potential to occur in the project area.

Common Name (<i>Scientific Name</i>)	Status	Habitat description	Potential to occur in project area
Mexican spotted owl (<i>Stix occidentalis lucida</i>)	Threatened	In western Colorado, nests in steep-walled canyons with riparian components.	None
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Threatened	Deciduous riparian woodlands, with dense cottonwood and willow, and sometimes tamarisk.	None

Common Name (<i>Scientific Name</i>)	Status	Habitat description	Potential to occur in project area
Bonytail chub (<i>Gila elegans</i>)	Endangered	Found within the Colorado River and its tributaries.	None
Colorado pikeminnow (=squawfish) (<i>Ptychocheilus Lucius</i>)	Endangered	Found within the Colorado River and its tributaries.	None
Greenback cutthroat trout (<i>Oncorhynchus clarki stomias</i>)	Threatened	Found within the Colorado River and its tributaries.	None
Humpback chub (<i>Gila cypha</i>)	Endangered	Found within the Colorado River and its tributaries.	None
Razorback sucker (<i>Xyrauchen texanus</i>)	Endangered	Found within the Colorado River and its tributaries.	None
Colorado hookless cactus (<i>Sclerocactus glaucus</i>)	Threatened	On exposed, gravel-covered clay hills; in saltbrush or sagebrush flats; or in pinyon-juniper woodlands.	None
North American wolverine (<i>Gulo gulo luscus</i>)	Threatened	In alpine conifer forests, tundra, and remote grasslands and shrublands.	None

Source: FWS-IPaC 2016; NatureServe 2016.

The yellow-billed cuckoo was listed as threatened under the ESA in October 2014. There is no proposed critical habitat in the project area. Yellow-billed cuckoo habitat consists of deciduous riparian woodlands, including dense mature cottonwood and willow stands, and in some places, tamarisk (NatureServe 2016). The woodland cover in the proposed project area does not include adequate density or structure for cuckoo habitat. Although the overstory (elm, tamarisk) totals about 60 percent cover, there is no shrub layer and the herbaceous cover is low (about 10 percent). In addition, cuckoos are not likely be found in the project vicinity due to the extensive human activity and disturbance in the area, which includes residential and commercial property and a major road.

The project would have no direct impacts to the Colorado River floodplain, which is critical habitat for the endangered Colorado River fishes. In addition, no depletions are expected to result from the project, and therefore no indirect impacts are anticipated for the species.

Raptors and Migratory Birds

No potential raptor nests or substrates were observed within the project area and no visual or auditory raptor observations were detected during the site visit. CPW has no documented raptor nests, active or inactive, within at least a mile of the project area (CPW 2016).

Other migratory birds may also nest and forage in the project area. For this reason, ERO recommends that any tree and/or shrub removal required for the project take place during the non-nesting season, generally between September and March.

In addition, swallow nests were observed on the bridge surface. ERO recommends those nests be scraped off while they are not active. It is a violation of the migratory bird treaty act to remove an active nest, including chicks and/or eggs. Swallows quickly rebuild nests if they are removed during the breeding season; therefore if construction must occur while these birds are active, nest removal must begin prior to any egg-laying, and be continued on a daily basis to prevent any eggs or chicks from being destroyed. Alternatively, a thin mesh/screen could be placed around the bridge to prevent birds from nesting.

General Wildlife Habitat

According to CPW, no state-mapped wildlife habitat occurs within at least one mile of the project area (CPW 2016).

Noxious Weeds

State of Colorado (CDA 2017) and Mesa County (Mesa County 2013) noxious weeds were found in the project area. Tamarisk and Russian olive were present along the creek banks. Most of the species observed belong to the State of Colorado Noxious Weed “List B,” which identifies the species for which “state noxious weed management plans are designed to stop the continued spread of these species”.

Recommendations

ERO’s recommendations are summarized in the table (Table 2) below.

Table 2. Recommendations by Resource.

Resource	Recommendation
Noxious Weeds	Treat weeds prior to construction if possible; use Best Management Practices for cleaning equipment used during construction; monitor and treat weeds post-construction to avoid spread of weeds.
Threatened, Endangered and Sensitive Species	No impacts; no recommendations
General Wildlife habitat	Low impacts; no recommendations
Migratory Birds	Conduct vegetation clearing during non-nesting season (September through March); if this is not possible, complete nesting surveys to comply with the Migratory Bird Treaty Act. Scrape swallow nests prior to any egg-laying activities as noted above.
Wetlands and other Waters of the U.S.	Impact analysis not complete

Please feel free to contact me at (970) 872-3020 if you have any questions about the contents of this memo or attached documentation.

Regards,



Aleta Powers
Principal/Natural Resource Specialist

References

- Ackerfield, J. 2015. Flora of Colorado. Brit. Press
- Colorado Department of Agriculture (CDA). 2017. Noxious Weed Lists. Available: <https://www.colorado.gov/pacific/sites/default/files/CurrentNoxiousWeedList.pdf>
- Colorado Parks and Wildlife (CPW). 2016. Natural Diversity Information Source (NDIS). Available: <http://cpw.state.co.us/learn/Pages/KMZ-Maps.aspx>.
- ERO 2017. Wetland Delineation Report, FRT 17.5-K.25 Bridge Design Project. Mesa County, Colorado. Prepared for City of Fruita.
- Mesa County. 2017. Noxious Weed List. Available at: <http://www.mesacounty.us/WorkArea/DownloadAsset.aspx?id=27112>
- National Wetland Inventory, U.S. Fish and Wildlife Service (NWI). 2016. Wetland Mapper. Available at: <https://www.fws.gov/wetlands/data/mapper.html>.

NatureServe Explorer: An online encyclopedia of life [web application]. 2016.
Available: <http://www.natureserve.org/conservation-tools/data-maps-tools/natureserve-explorer>.

U.S. Department of Agriculture; Natural Resources Conservation Service (NRCS).
2016. Web Soil Survey. Available at:
<http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.

U.S. Fish and Wildlife Service (FWS). 2016. IPaC: Information, Planning and
Conservation Program. Available at: <https://ecos.fws.gov/ipac/>.

FRT 17.5-K.25 Bridge Design Project
Natural Resources Assessment/Biology Report



Photo 1. Northwest corner of the project area near SP-01, looking downstream on Little Salt Wash. View is to the southwest.



Photo 2. Representative image of the north creek bank below the existing Maple Street Bridge crossing. View is to the east.



Photo 3. View of the project area near the northeast corner and upstream view of Little Salt Wash. View is to the northeast.



Photo 4. Small wetland bench on north bank of Little Salt Wash. View is to the south.

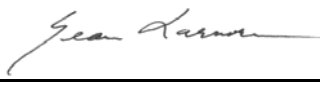
LIMITED-RESULTS CULTURAL RESOURCE SURVEY FORM

(Page 1 of 4)

This form (#1420) is for small scale limited results projects - block surveys less than 160 acres with linear surveys under four miles. Additionally, there should be no sites and a maximum of four Isolated Finds. This form must be typed.

I. IDENTIFICATION

1. Report Title (include County): Cultural Resources Survey, Maple Street Bridge Project, Mesa County, Colorado
2. Date of Field Work: 01/19/2017
3. Form completed by: Kathy Croll Date: 01/26/2017
4. Survey Organization/Agency: ERO Resources Corporation
Principal Investigator: Sean Larmore

Principal Investigator's Signature: 
Other Crew: _____
Address: 1015 1/2 Main Avenue Durango, CO 81301
5. Lead Agency / Land Owner: US Army Corps of Engineers
Contact: _____
Address: _____
6. Client: City of Fruita
7. Permit Type and Number: Colorado State Permit No. 2016-50
8. Report / Contract Number: SHPO No. not yet assigned/ ERO #6722
9. Comments: _____

II. DESCRIPTION OF UNDERTAKING / PROJECT

10. Type of Undertaking: Bridge replacement project
11. Size of Undertaking (acres): .37 Size of Project (if different) _____
12. Nature of the Anticipated Disturbance: Heavy equipment use
13. Comments: _____

III. PROJECT LOCATION

Please attach a photocopy of USGS Quad. clearly showing the project location. The Quad. should be clearly labeled with the Prime Meridian, Township, Range, Section(s), Quad. map name, size, and date. Please do not reduce or enlarge the photocopy.

14. Description: The project area is located on the northern side of Fruita at the intersection of Maple Street and the Little Salt Wash.

15. Legal Location: Quad. Map: Fruita Date(s): 1975

Principal Meridian: 6th NM Ute X

NOTE: Only generalized subdivision ("quarter quarters") within each section is needed

Township: 1N Range: 2W Sec.: 8 1/4s SE ;

Township: Range: Sec.: 1/4s ;

Township: Range: Sec.: 1/4s ;

If section(s) is irregular, explain alignment method:

16. Total number of acres surveyed: .37

17. Comments:

IV. ENVIRONMENT

18. General Topographic Setting: Project is located northeast of the Colorado River along Little Salt Wash. The project area has steep and eroding banks with dense riparian woodland.

Current Land Use: developed, built environment

19. Flora: The riparian corridor consists predominantly of Siberian elm (Ulmus pumila), tamarisk (Tamarix sp.), Russian olive (Elaeagnus angustifolia), and cottonwood (Populus deltoides). The understory is sparsely vegetated with upland herbaceous species including goosefoot (Chenopodium album), tall wheatgrass (Thinopyrum ponticum) and other senesced upland grass species.

20. Soils/Geology: Fruitland sandy clay loam complex on 0 to 2 percent slopes and Oxyaquic torrifluvents complex on 0 to 2 percent slopes / Pinedale and Bull Lake gravels and alluviums

21. Ground Visibility: 50 to 90 percent

22. Comments:

V. LITERATURE REVIEW

23. Location of File Search: Colorado Office of Archaeology and Historic Preservation (OAHP) Compass Online database Date: 1/18/2017

24. Previous Survey Activity - In the project area: None

In the general region: Other surveys in the area were conducted for nearby ditches and highway improvements.

25. Known Cultural Resources - In the project area: None

In the general region (summarize): historic architectural sites and ditches surround the project area.

26. Expected Results: No sites were expected given the small size of the project area

VI. STATEMENT OF OBJECTIVES

27. Section 106 compliance. To identify and evaluate potential historic properties for listing on the NRHP.

VII. FIELD METHODS

28. Definitions: Site A site is defined as a discrete locus of patterned human activity greater than 50 years of age and consisting of 5 or more prehistoric artifacts with or without features or over 50 historic artifacts with associated features.

IF: Isolated finds are identified as 4 or fewer artifacts without associated features. Exceptions to this definition include historic trash dumps without associated features; a single core reduction event with a single core and associated debitage; a single pot drop where all the shards are from a single vessel; or five or fewer prospect pits with or without artifacts and no associated historic structures or features Less than 10 artifacts in a confined area

29. Describe Survey Method: Pedestrian survey with transects 20 meters apart

VIII. RESULTS

30. List IFs if applicable. Indicate IF locations on the map completed for Part III.

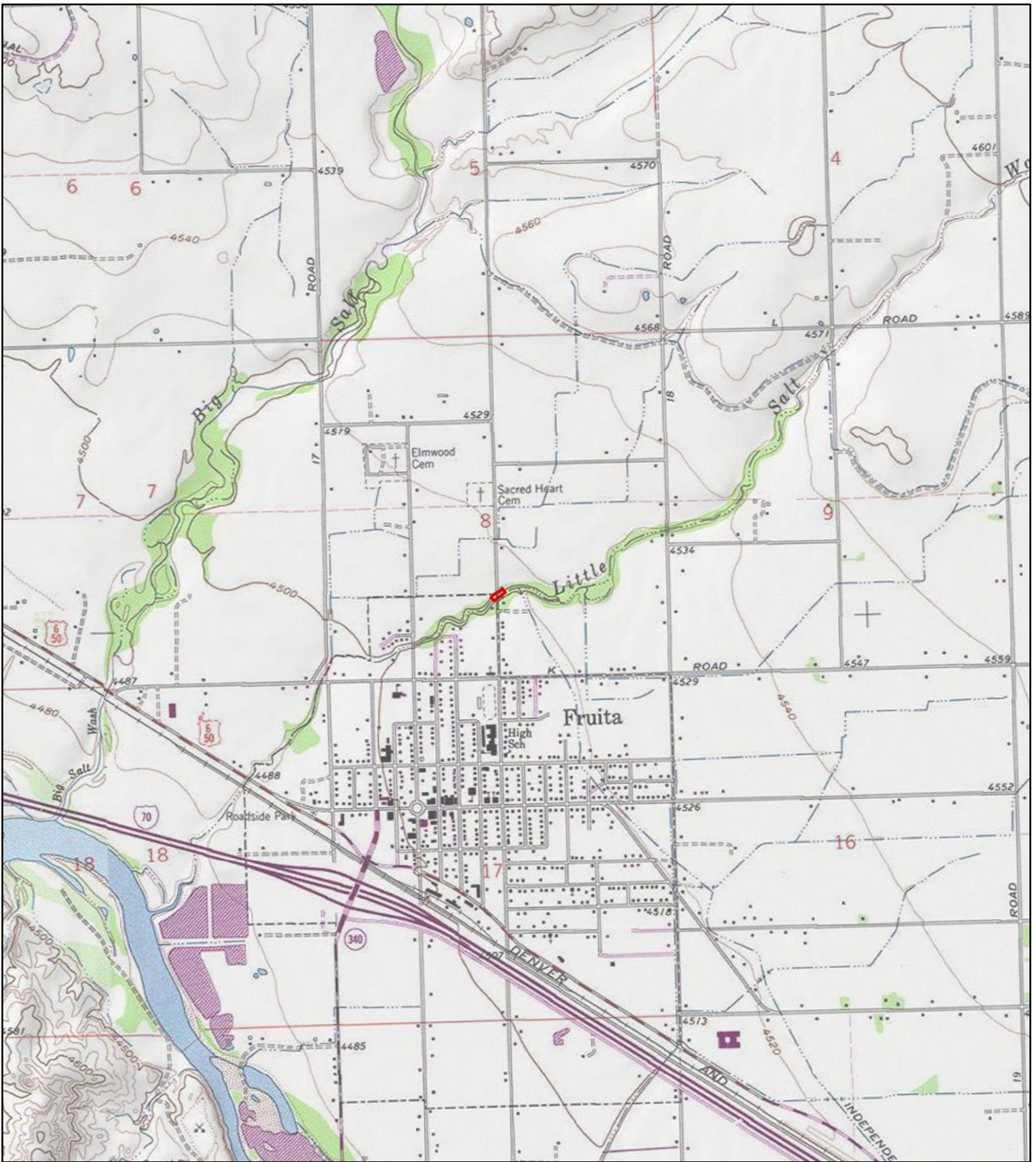
A. Smithsonian Number: _____ Description: _____

B. Smithsonian Number: _____ Description: _____

31. Using your professional knowledge of the region, why are there none or very limited cultural remains in the project area? Is there subsurface potential?

The project area is very small and the majority is within the wash with eroded steep slopes.

There is little subsurface potential.



CULTURAL RESOURCES SURVEY
 MAPLE STREET BRIDGE PROJECT
 MESA COUNTY, COLORADO

T1N, R2W, Section 8; Ute PM
 Fruita, CO USGS Quad. (1975)



Figure 1.
 Project Location

 Project Area

0 1,000 2,000
 Feet

1:24,000

Prepared for: City of Fruita
 File: Fig1.mxd (KC)
 January 2017

ERO
 ERO Resources Corp.

WETLAND DELINEATION REPORT

FRT 17.5-K.25 BRIDGE DESIGN PROJECT MESA COUNTY, COLORADO

Prepared for –
City of Fruita
324 E. Aspen Avenue
Fruita, Co 81521

Prepared by –
ERO Resources Corporation
P.O. Box 932, 161 S. 2nd St.
Hotchkiss, Colorado 81419

ERO Project #6722

January 2016



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**WETLAND DELINEATION REPORT
FRT 17.5-K.25 BRIDGE DESIGN PROJECT
MESA COUNTY, COLORADO**

JANUARY 2016

Project Description

ERO Resources Corporation (ERO) was contracted by the City of Fruita to survey for wetlands and waters of the U.S. for replacement of the Maple Street Bridge over Little Salt Wash Creek (Figure 1). ERO's scope of work also included surveys for noxious weeds, threatened, endangered, proposed, and candidate (TEPC) species, as protected under the Endangered Species Act (ESA) as amended (16 U.S.C. 1531 et seq.), Migratory Bird Treaty Act (MBTA) habitat, and general wildlife habitat. The project has been proposed to improve traffic safety and roadway conditions.

The legal description of the approximate project center is UTM NAD 83: Zone 12N; 696195mE, 4337847mN; Latitude, Longitude: 39.167737°N, 108.729005°W; USGS Fruita, CO Quadrangle (Figure 1). The delineation limits extended roughly 100 feet up and downstream of the existing Maple Street Bridge (Figure 2).

Methods

ERO biologist Esa Crumb surveyed the project area on November 1st, 2016 for the purpose of delineating wetlands. Photo documentation and field notes were recorded for waters of the U.S., vegetation and habitat, wildlife, noxious weeds, and potential TEPC species in the project area. Colorado Parks and Wildlife habitat and species/nest occurrence maps (CPW 2016) were referenced prior to and during field surveys. ERO also reviewed the most recent aerial photography (June 2016), U.S. Fish and Wildlife Service Information, Planning, and Conservation documents (FWS 2016), State of Colorado (Colorado Department of Agriculture 2015) and the Mesa County Noxious Weed Lists (Mesa County 2013). National Resource Conservation Service (NRCS) soil maps (NRCS 2016) and National Wetland Indicator maps (NWI 2016). A cultural resources inventory will be conducted in conjunction with this report.

Site Summary

The site occurs where Maple Street (running north-south) crosses Little Salt Wash. The project area has steep and eroding banks with dense riparian woodland. Wetland fringe is generally absent within the project area. The riparian corridor consists predominantly of Siberian elm (*Ulmus pumila*), tamarisk (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolia*), and cottonwood (*Populus deltoides*). The understory is sparsely vegetated with upland herbaceous species including lamb’s quarters (*Chenopodium album*), tall wheatgrass (*Thinopyrum ponticum*) and other senesced upland grass species.

The project area borders private residential parcels. The NRCS Web Soil Survey indicates that the project area primarily contains primarily Oxyaquic Torrifluvents with 0 to 2 percent slopes. These soils are moderately well-drained and not prone to flooding or ponding, and are not considered suitable for prime farmland. They also are associated with floodplains and are alluvium derived from sandstone and shale. Fruitland clay loam soil with 0 to 2 percent slopes is present on some outer edges of the project area and there is a very small occurrence of Sagrlite loam, 0 to 2 percent slopes towards the north end of the project area (NRCS 2016). Fruitland clay loam soils are well-drained and not prone to flooding or ponding, and not considered suitable for prime farmland if irrigated. USFWS TEPC species with the potential to occur in the vicinity were provided by IPaC and are listed in Table 2. The following vegetation was commonly observed in the project area.

Table 1. Dominant vegetation observed in the project area.

Common Name	Scientific Name	Indicator Status
Siberian elm	<i>Ulmus pumila</i>	UPL
Eastern cottonwood	<i>Populus deltoides</i>	FAC
Tall wheatgrass	<i>Thinopyrum ponticum</i>	UPL
Canary reed grass	<i>Phalaris arundinacea</i>	FACW
Goosefoot	<i>Chenopodium album</i>	FACU
Russian olive	<i>Elaeagnus angustifolia</i>	FAC
Tamarisk	<i>Tamarisk</i> sp.	FACU

Source: Weber and Wittmann 2012

Wetlands and Waters of the U.S.

Methods

Wetlands were determined based on the presence of the three defined wetland indicators – hydrophytic vegetation, hydric soils, and hydrology – specified by the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West* (2008). The wetland indicator status for plant species was determined according to the 2016 National Wetland Plant List (Lichvar 2016) and plant taxonomy from the USDA National Plants Database (USDA 2016).

The ordinary high water mark (OHWM), and other erosional features were identified using the guidance provided in the *Review of Ordinary High Water Mark Indicators for Delineating Arid Streams in the Southwestern United States* (Corps 2004) and the *Regulatory Guidance Letter: Ordinary High Water Mark Identification* (Corps 2005). The Corps defines “stream bed” as the substrate of the stream channel between the OHWMs. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. The Corps defines “ordinary high water mark” as “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank, shelving, changes in the soil character, destruction of terrestrial vegetation, presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (33 CFR 328.3(e)). Due accessibility issues within the project area, the OHWM of the Little Salt Wash channel was mapped using reference points in the field and topographic data from project surveys.

Data were collected using a Trimble ProXR Global Positioning System (GPS) unit with sub-meter accuracy and a TBC1 data logger. Data were differentially corrected with the nearest base station and processed with Trimble Pathfinder Office 4.20 software.

Open Waters

Little Salt Wash

Little Salt Wash is shown as an intermittent creek on the USGS quadrangle map and is a tributary to the Colorado River. The Creek’s ordinary high water mark (OHWM) in the project area is approximately 25 to 30 feet wide (Photos 1, 2, and 3). It has deeply incised and eroded banks and lacks wetland vegetation. The tree canopy is dominated by Siberian elm and tamarisk

on the terraces and cottonwood on the higher slopes. The understory is generally bare or consists of duff and dead plant material. The creek margin on the southeast edge of the bridge is dominated by dense tamarisk and lower terraces on the northeast side of the bridge support tall wheatgrass (Photo 3). The southeast and southwest margins of the creek were not accessible due to steep banks and/or access restraints.

Wetlands

Wetland 1

The project area lacks wetland fringe within the project area. A small wetland bench (roughly four square feet in area) is located on the bank of the creek just below the northeast edge of the existing Maple Street Bridge. This small area of wetland fringe supports reed canary grass (*Phalaris arundinacea*) on a lower elevation terrace (Photo 4, Figure 2). Due to the location of the terrace below the OHWM and presence of hydrophytic vegetation, wetland hydrology and hydric soils are assumed.

A single data point was captured in the project area to document the common vegetation within the project area and soil characteristics (SP-1). The vegetative community around SP-1 (upland) was dominated by an overstory of Siberian elm and Russian olive, with an understory of lamb’s quarters and an unknown (dry) grass species. The soil had a fine sand texture with a chroma matrix of 100 percent 2.5YR4/2 to a depth of 12 inches. Hydric soils were not present; wetland hydrology also was not present.

Threatened, Endangered, Proposed, and Candidate Species

ERO reviewed the project area for federal and state threatened, endangered, proposed, and candidate (TEPC) species (Table 2). Based on existing habitat within the project area and known habitat preferences for listed species, no TEPC-listed species have the potential to occur within the project area.

Table 2. TEPC species and their potential to occur in the project area.

Common Name	Scientific Name	USFWS Status	State Status	Potential to Occur?
Mammals				
North American wolverine	<i>Gulo gulo luscus</i>	PT	T	No
Birds				
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	T	SC	No

WETLAND DELINEATION REPORT
FRT 17.5-K.25 BRIDGE DESIGN PROJECT

Common Name	Scientific Name	USFWS Status	State Status	Potential to Occur?
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	-	No
Fish				
Bonytail chub*	<i>Gila elegans</i>	E	SE	No
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E	ST	No
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	T	ST	No
Humpback chub*	<i>Gila cypha</i>	E	ST	No
Razorback sucker*	<i>Xyrauchen texanus</i>	E	SE	No

E = Federal Endangered; T = Federal Threatened; C = Federal Candidate; P = Federal Proposed; PE = Federal Proposed Endangered; PT = Federal Proposed Threatened; SE = State Endangered; ST = State Threatened; SC = State Special Concern.

*These fish species may be affected by water depletions in the Colorado River Basin.

Source: FWS 2016

Project activities are not likely to directly affect the Colorado River fish. These fish could potentially be indirectly affected by short-term sediment pulses associated with construction activities; however, the project area is more than 1 ½ miles from the river and any effects would be negligible and discountable. Water depletions are not anticipated.

Raptors and Migratory Birds

No potential raptor nests or substrates were observed within the project area and no visual or auditory raptor observations were detected during the site visit. CPW has no documented raptor nests, active or inactive, within at least a mile of the project area (CPW 2016).

Other migratory birds may also nest and forage in the project area. For this reason, ERO recommends that any tree and/or shrub removal required for the project take place during the non-nesting season, generally between September and March.

General Wildlife Habitat

According to CPW, no state-mapped wildlife habitat occurs within at least one mile of the project area (CPW 2016).

Noxious Weeds

State of Colorado (Colorado Department of Agriculture 2015) and Mesa County (Mesa County 2013) noxious weeds were found in the project area. Tamarisk (*Tamarisk* sp.) and Russian olive (*Elaeagnus angustifolia*) were present along the creek banks. Most of the species observed belong to the State of Colorado Noxious Weed “List B,” which identifies the species

for which “state noxious weed management plans are designed to stop the continued spread of these species”.

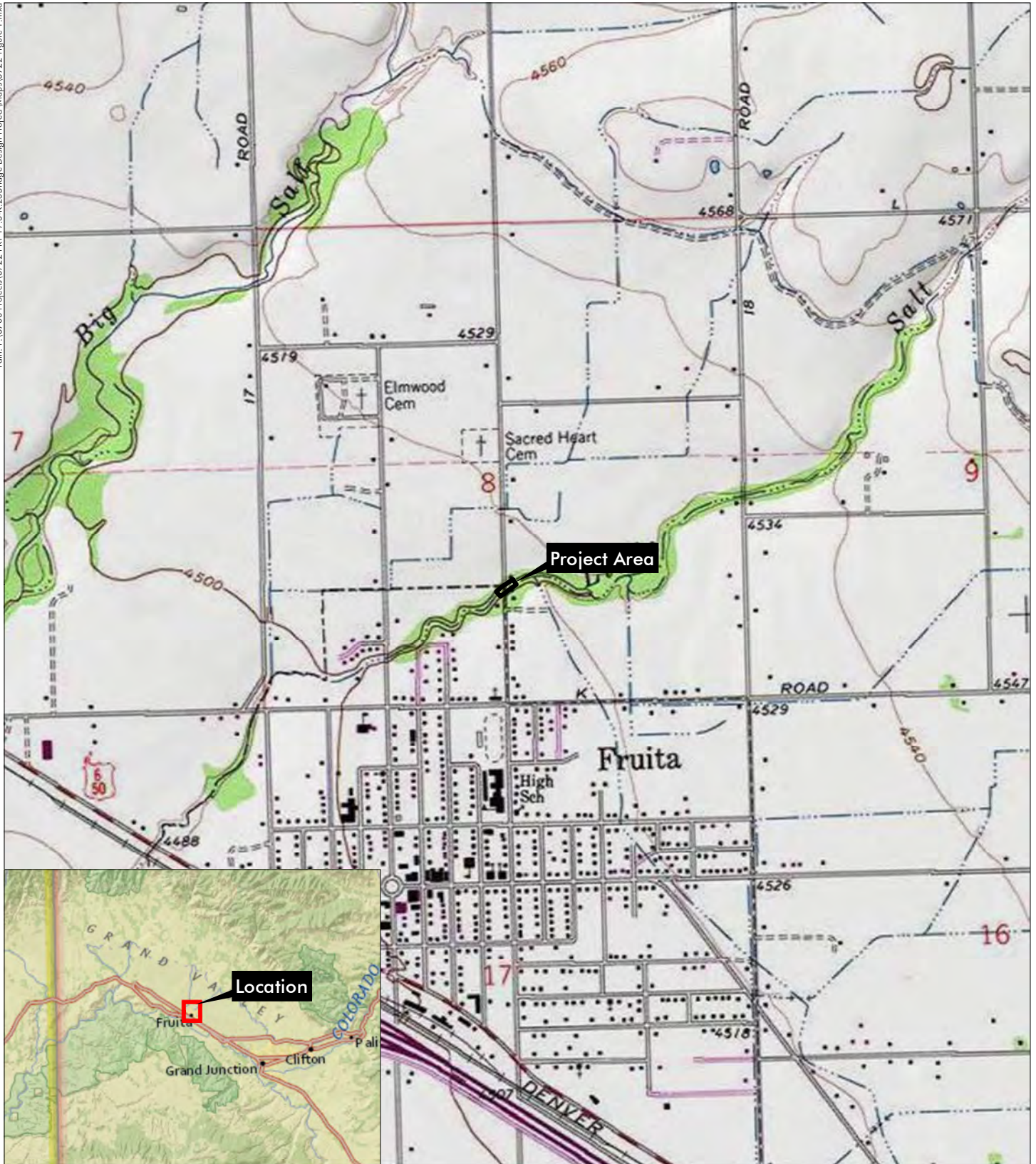
Table 3. Noxious weeds observed in the project area.

Common Name	<i>Scientific Name</i>	Mesa County Noxious Weed List	State of Colorado List
Russian olive	<i>Elaeagnus angustifolia</i>	No	B
Tamarisk	<i>Tamarisk</i> sp.	Yes	B

Source CDA 2015

References

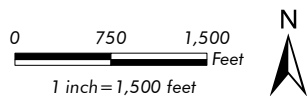
- Ackerfield, J. 2015. Flora of Colorado. Brit. Press
- Colorado Department of Agriculture (CDA). 2015. Noxious Weed Lists. Available: https://www.colorado.gov/pacific/sites/default/files/Current%20Noxious%20Weed%20List_123015.pdf.
- Colorado Parks and Wildlife (CPW). 2016. Natural Diversity Information Source (NDIS). Available: <http://cpw.state.co.us/learn/Pages/KMZ-Maps.aspx>.
- Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2016 Update of Wetland Ratings. *Phytoneuron* 2014-41: 1-42.
- Mesa County. 2013. Noxious Weed List. Available at: <http://www.mesacounty.us/pest/noxious-weeds.aspx>.
- National Wetland Inventory, U.S. Fish and Wildlife Service (NWI). 2016. Wetland Mapper. Available at: <http://www.fws.gov/wetlands/Wetlands-Mapper.html>.
- U.S. Army Corps of Engineers (Corps). 1987. Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- U.S. Army Corps of Engineers (Corps). 2008. Regional Supplement to the Army Corps of Engineers Wetland Delineation Manual: Arid West Region. Ed. J.S.Wakeley, R.W.Lichvar, and C.V. Noble. ERDC/EL TR-08-13. Vicksburg, MS: U.S. Army Research and Development Center.
- U.S. Department of Agriculture; Natural Resources Conservation Service (NRCS). 2016. Web Soil Survey. Available at: <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- U.S. Fish and Wildlife Service (FWS). 2016. IPaC: Information, Planning and Conservation Program. Available at: <https://ecos.fws.gov/ipac/>.
- Weber, William A. and Ronald C. Wittmann. 2012. Colorado Flora: Western Slope. Fourth Edition. University Press of Colorado, Boulder, Colorado.



Fruita Bridge Replacement Project

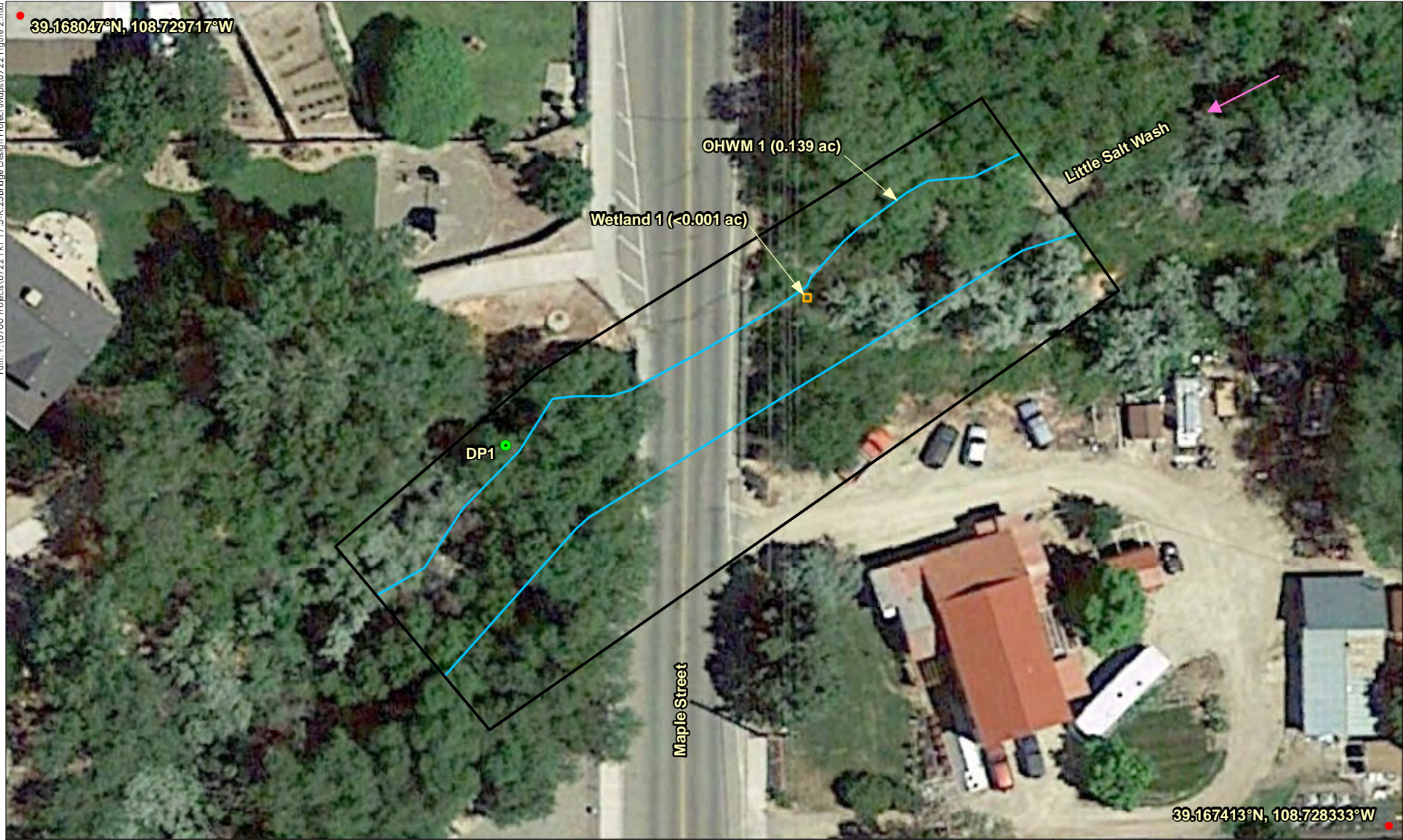
Section 8, T1N, R2W; Ute Meridian
 UTM NAD 83: Zone 12N; 696195mE, 4337847mN
 Latitude, Longitude: 39.167737°N, 108.729005°W
 USGS Fruita, CO Quadrangle
 Mesa County, Colorado

Figure 1 Vicinity Map



Prepared for: City of Fruita
 File: 6722 Figure 1.mxd (GS)
 January 3, 2017





Fruita Bridge Replacement Project

- Data Point
- ➔ Flow Direction
- Limit of Delineation (0.368 ac)

- ~ Ordinary High Water Mark (0.139 ac)
- ~ Wetland (<0.001 ac)

Image Source: Google Earth©, June 2016

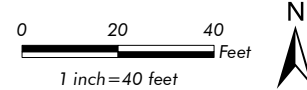


Figure 2
Existing Conditions

Prepared for: City of Fruita
File: 6722 Figure 2.mxd (GS)
January 3, 2017



FRT 17.5-K.25 Bridge Design Project
Wetland Delineation Report



Photo 1. Northwest corner of the project area near SP-01, looking downstream on Little Salt Wash. View is to the southwest.



Photo 2. Representative image of the north creek bank below the existing Maple Street Bridge crossing. View is to the east.



Photo 3. View of the project area near the northeast corner and upstream view of Little Salt Wash. View is to the northeast.



Photo 4. Small wetland bench on north bank of Little Salt Wash. View is to the south.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: _____ City/County: _____ Sampling Date: _____
 Applicant/Owner: _____ State: _____ Sampling Point: _____
 Investigator(s): _____ Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
 Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No _____ Hydric Soil Present? Yes _____ No _____ Wetland Hydrology Present? Yes _____ No _____	Is the Sampled Area within a Wetland? Yes _____ No _____
Remarks: _____ _____ _____	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: _____ Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: _____)				Hydrophytic Vegetation Indicators: ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 ¹ ___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: _____)				Hydrophytic Vegetation Present? Yes _____ No _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____				
Remarks: _____ _____ _____				

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (**LRR C**)
- 1 cm Muck (A9) (**LRR D**)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)

- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (**LRR C**)
- 2 cm Muck (A10) (**LRR B**)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1) (**Nonriverine**)
- Sediment Deposits (B2) (**Nonriverine**)
- Drift Deposits (B3) (**Nonriverine**)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Biotic Crust (B12)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water Marks (B1) (**Riverine**)
- Sediment Deposits (B2) (**Riverine**)
- Drift Deposits (B3) (**Riverine**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____
 Water Table Present? Yes _____ No _____ Depth (inches): _____
 Saturation Present? Yes _____ No _____ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

EXHIBIT C: EXISTING BRIDGE 2022 STRUCTURE INSPECTION AND INVENTORY REPORT

**EXHIBIT C
EXISTING BRIDGE 2022
STRUCTURE INSPECTION
AND
INVENTORY REPORT**

Routine Inspection Colorado Department of Transportation Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 00000 U
Mile Post (ON) 11: 0.995 mi
Linear Ref. Sys. MP: 0.995 mi

Bridge Key: FRT-17.5-K.25 Inspection Date: 03/24/2022 Suff Rating: 49.4 FO G/F/P Condition: Fair

NBI Reporting ID:	FRT-17.5-K.25	Main Mat/Desgn 43A/B:	3	02	Bridge Cost 94:	292,130.00
District (Region/Sect):	Reg 3 MSec 2	Appr Mat/Desgn 44A/B:	0	0	Roadway Cost 95:	29,213.00
Tran Region 2T:	05	Main Spans Unit 45:	1		Total Cost 96:	321,343.00
County Code 3:	077	Approach Spans 46:	0		Year of Cost Estimate 97:	2020
077 MESA		Horiz Clr 47:	22.30	ft	Brdr Brdg Code/% 98A/B:	-2 0.00
Place Code 4:	28745	Max Span 48:	48.0	ft	Border Bridge Number 99:	
FRUITA		Str Length 49:	52.6	ft	Defense Highway 100:	0
Rte.(On/Under) 5A:	1	Curb Wdth L/R 50A/B:	3.5	ft 3.5	Parallel Structure 101:	N
Signing Prefix 5B:	5	Width Curb to Curb 51:	22.30	ft	Direction of Traffic 102:	2
Level of Service 5C:	1	Width Out to Out 52:	30.0	ft	Temporary Structure 103:	-
Direction Suffix 5E:	0	Deck Area:	1578		Highway Systems 104:	0
Feature Intersected 6:		Min Clr Ovr Brdg 53:	99.99		Fed Lands Hiway 105:	0
LITTLE SALT WASH		Min Undrclr Ref 54A:	N		Year Reconstructed 106:	
Facility Carried 7:		Min Underclr 54B:	0.0	ft	Deck Type 107:	1
MAPLE STREET		Min Lat Clrnce Ref R 55A:	N		Wearing Surface 108A:	6
Alias Str No.8A:		Min Lat Undrclr R 55B:	0.0	ft	Membrane 108B:	0
		Min Lat Undrclr L 56:	0.0	ft	Deck Protection 108C:	0
Prll Str No. 8P:		Deck 58:	7		Truck ADT 109:	5.00 %
N/A		Super 59:	6		Trk Net 110:	0
Location 9:		Sub 60:	7		Pier Protection 111:	!
.3 MI N OF OTTLEY AVE		Channel/Protection 61:	7		NBIS Length 112:	Y
Max Clr 10:	99.99	Culvert 62:	N		Scour Critical 113:	8
BaseHiway Net12:	0	Oprtng Rtg Method 63:	1	LF Load Fact	Scour Watch 113M:	N
IrsinvRout 13A:	077-0-2013	Operating Rating 64:	25.50		Future ADT 114:	6,236
IrsubRout No13B:	00	Operating Factor 64:	-		Year of Future ADT 115:	2038
Latitude 16:	39d 10' 3.90"	Inv Rtnng Method 65:	1	LF Load Fact	CDOT Str Type 120A:	WGK
Longitude 17:	108d 43' 44.60"	Inventory Rating 66:	15.30		CDOT Constr Type 120B:	00
Detour Length 19:	1 mi	Inventory Factor 66:	-		Expansion Dev/Type 124:	O
Toll Facility 20:	3	Asph/Fill Thick 66T:	8.0	in	Brdg Rail Type/Mod 125A/B:	XX 0
Custodian 21:	04	Str. Evaluation 67:	4		Posting Trucks 129A/B/C:	22.4 35.6 33.9
Owner 22:	04	Deck Geometry 68:	2		Str Rating Date 130:	04/26/2018
Functional Class 26:	17	Undrclr Vert/Hor 69:	N		Special Equip 133:	0.00
Year Built 27:	1970	Posting 70:	3	10.0-19.9%bel	Vert Clr N/E 134A/B/C:	X 99.99 0.00
Lanes On 28A:	2	Waterway Adequacy 71:	8		Vert Clr S/W 135A/B/C:	X 99.99 0.00
Lanes Under 28B:	0	Approach Alignment 72:	8		Vertical Clr Date:	01/01/1901
ADT 29:	4,130	Type Of Work 75A:	36		Weight Limit Color 139:	N, Not Checked
Year of ADT 30:	2018	Work Done By 75B:	1		Userkey 1, Insp System:	OFFSYS
Design Load 31:	5 MS 18 (HS 20)	Length of Improvment 76:	0		Userkey 4, Insp Sched:	EVN MAR S_0
Apr Rdwy Width 32:	36.00	Insp Team Indicator 90B:	STANTEC		Userkey 5, UW Sched:	
Median 33:	0	Inspector Name 90C:	ZLATKINA		Userkey 6, Pin Sched:	
Skew 34:	30 °	Frequency 91:	24	months	FHWA Bridge Risk:	HIGH
Structure Flared 35:	0	FC Frequency 92A:			FHWA UW Risk:	NA
Sfty Rail 36a/b/c/d:	0 0 0 0	UW Frequency 92B:			FHWA Load Rating Risk:	HIGH
Rail ht36h:	35.0	SI Frequency (Pin) 92C:			CBTE:	NA
Hist Signif 37:	5	FC Inspection Date 93A:			Inspection Key:	BJNE
Posting status 41:	P	UW Inspection Date 93B:			Date Entered:	4/12/2022 12:00
Service on/un 42A/B:	5 5	SI Date (Pin) 93C:			Entered By:	BUELTERC

Inspection Type:	Regular NBI
EOR:	STANTEC

Data Responsibility: Asset Management Inspection Rating

Routine Inspection
Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 00000 U

Mile Post (ON) 11: 0.995 mi

Linear Ref. Sys. MP: 0.995 mi

Element Inspection Report

Elm/Env	Description	Unit	Total Qty	% in 1	Qty. St. 1	% in 2	Qty. St. 2	% in 3	Qty. St. 3	% in 4	Qty. St. 4
12/1	Re Concrete Deck	sq.ft	1578	100%	1571	0%	7	0%	0	0%	0
Concrete. Small areas of active efflorescence on underside of deck near Abutment 1 in Bay A. Minor honeycomb with exposed rebar due to lack of cover in Bay B near Abutment 2. One insignificant transverse crack with very light efflorescence in Bay A at midspan. A few vertical insignificant cracks in exterior face of deck.											
510/1	Wearing Surfaces	sq.ft	1173	91%	1068	0%	0	9%	105	0%	0
8 inch asphalt. Overlaid between 2006 and 2008. Longitudinal and transverse cracks up to 0.2 inch wide in asphalt on deck.											
3220/1	Crack (Wearing Sur)	sq.ft	105	0%	0	0%	0	100%	105	0%	0
See Element 510 comments.											
1090/1	Exposed Rebar	sq.ft	2	0%	0	100%	2	0%	0	0%	0
See Element 12 comments.											
1120/1	Efflorescence/Rust Stain	sq.ft	5	0%	0	100%	5	0%	0	0%	0
See Element 12 comments.											
107/1	Steel Opn Girder/Beam	ft	210	0%	0	91%	191	9%	19	0%	0
(4) welded plate girders with channel diaphragms at 1/3 points. R1 rust of edges of bottom flanges of all girders throughout and spotty elsewhere. R2 rust of Girder D for 2 feet at both abutments, and Girder A bottom flange for 15 feet at Abutment 1. Moderate accumulation of bird waste at bearings.											
515/1	Steel Protective Coating	sq.ft	210	0%	0	0%	0	0%	0	100%	210
Galvanized. Failed at rust locations.											
1000/1	Corrosion	ft	210	0%	0	91%	191	9%	19	0%	0
See Element 107 comments.											
215/1	Re Conc Abutment	ft	69	94%	65	6%	4	0%	0	0%	0
Concrete. One insignificant horizontal cold joint crack full length in each abutment. Vertical insignificant cracks throughout. Light efflorescence at northeast and southwest corners. Dark stains at southeast corner. Several pigeons on bearing seats.											
1120/1	Efflorescence/Rust Stain	ft	4	0%	0	100%	4	0%	0	0%	0
See Element 215 comments.											
260/1	Slope Prot/Berms	(EA)	2	100%	2	0%	0	0%	0	0%	0
Irregularly shaped earth berms in front of both abutments. Erosion trench at southeast corner due to drainage.											
310/1	Elastomeric Bearing	each	8	100%	8	0%	0	0%	0	0%	0
Girders bear on elastomeric pads on concrete seat. Bearing pads 1A and 2B displaced slightly. Verified during follow up on 9/12/2022.											
322/1	Approach Roadway	(EA)	1	100%	1	0%	0	0%	0	0%	0
Asphalt. Previously sealed transverse cracks reopened at back face of both abutments.											
326/1	Bridge Wingwalls	(EA)	4	75%	3	25%	1	0%	0	0%	0
Concrete, flared. Less than 6 inch diameter shallow spall in top of northwest, northeast, and southeast wingwalls. Vertical, horizontal, and diagonal insignificant cracks. 0.75 inch horizontal crack in top of northeast, with some differential movement. 1 foot wide x 10 inch high x 6 inch deep spall at utility pipe in southwest wingwall.											
329/1	Sidewalk/Median/Curb	(LF)	105	26%	27	67%	70	8%	8	0%	0
Concrete sidewalk at each side. (4) transverse cracks up to 0.5 inch wide in each sidewalk at traffic face. A few vertical insignificant cracks in curb on outside surface. Scaling with exposed course aggregate in most of west curb and a few places on the east curb.											
330/1	Metal Bridge Railing	ft	105	85%	89	15%	16	0%	0	0%	0
Galvanized W-beam rail with flared end sections on painted steel angle posts. R1 rust at all posts.											
515/1	Steel Protective Coating	sq.ft	105	85%	89	0%	0	0%	0	15%	16
Galvanized W-beam, no significant defects. Painted posts, failed at rust locations.											

Routine Inspection
Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 00000 U

Mile Post (ON) 11: 0.995 mi

Linear Ref. Sys. MP: 0.995 mi

1000/1	Corrosion	ft	16	0%	0	100%	16	0%	0	0%	0
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See Element 330 comments.

501/1	Channel/Bank	(EA)	1	100%	1	0%	0	0%	0	0%	0
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Silt, sand, and gravel channel. Good alignment. Trees growing in channel with branches overhanging bridge. Moderate sloped banks upstream and downstream, lined with trees and brush. Erosion and cutting at north bank upstream. A few chunks of concrete rubble, tree limbs, branches and remnants of old piles under bridge.

600/1	General Notes	(EA)	1	100%	1	0%	0	0%	0	0%	0
-------	---------------	------	---	------	---	----	---	----	---	----	---

Bridge is posted at 22T/35T/33T as required at time of inspection. Object markers on ends of bridge rails. (2) large steel utility conduit under center of bridge and through west wingwalls, steel utility conduit under east side of bridge, and (2) steel utility conduits along west side of bridge.

Inspection References and Definitions:

Crack Width Descriptions for Reinforced Concrete:

Insignificant cracking (in.) = Less than 0.012 wide
Moderate cracking (in.) = 0.012 to 0.05 wide
Wide cracking (in.) = Greater than 0.05 wide

Rust Codes (R Codes):

R1 = Peeling of the paint, pitting, surface rust, etc., no measurable section loss.
R2 = Flaking, minor section loss (< 10% thickness loss).
R3 = Flaking, swelling, mod section loss (10% < thickness loss <30%).
R4 = Heavy section loss (> 30% thickness loss), may have holes through base metal.

Crack Width Descriptions for Prestressed Concrete:

Insignificant cracking (in.) = Less than 0.004 wide
Moderate cracking (in.) = 0.004 to 0.009 wide
Wide cracking (in.) = Greater than 0.009 wide

Concrete Scaling Codes (S Codes):

S1 = Light scale up to 1/4" deep.
S2 = Moderate scale up to 1/2" deep with agg. exposed.
S3 = Heavy scale up to 1" deep with some agg. loose or missing.
S4 = Critical scale > 1" deep with reinforcing bars exposed and general disintegration of the concrete.

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Priority
156.00	Deck-Seal	3/24/2022	_	2023	Low

Seal cracks in asphalt on deck.

156.00	Approach Roadway	3/24/2022	_	2023	Low
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Reseal cracks in asphalt over abutments.

206.01	Misc-Remove Vegetation	3/8/2006	1	2023	Low
--------	------------------------	----------	---	------	-----

Tim trees in channel around bridge.

Routine Inspection
 Colorado Department of Transportation
 Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 00000 U
 Mile Post (ON) 11: 0.995 mi
 Linear Ref. Sys. MP: 0.995 mi

306.05	Approach Railing	3/15/2012	1	2022	High
--------	------------------	-----------	---	------	------

Install transitions, approach rails, and rail ends to meet current AASHTO/CDOT standards.

306.07	Bridge Rail-Replace	3/15/2012	1	2023	High
--------	---------------------	-----------	---	------	------

Replace bridge rails to meet current AASHTO/CDOT standards.

355.01	Paint-Structural	3/15/2012	1	2025	Medium
--------	------------------	-----------	---	------	--------

Clean, prime and paint girders to mitigate rust.

Bridge Notes (Inspection > Inventory > Admin)

Inspection Notes (Inspection > Condition)

Date - 3/24/2022
 Temp: 65 degrees Time: 1:00 PM Weather: Clear, calm

Follow up Inspection
 Date: 9/12/2022
 Team Leader: Karen Bosworth
 Temp: 85 degrees Time: 2:20 PM Weather: Clear, calm

Scour Item 113 Documentation (Inspection > CDOT Bridge)

FRT-17.5-K.25 SCOUR Item 113 Screening Memo 2016 04 20.pdf

Bat Present At Bridge (Inspection > Inventory > Agency Items > userkey9)

NO

Inspection Access Requirements (Inspection > CDOT Bridge)

Scheduling Notes (Inspection > Schedule)

Routine Inspection
Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 00000 U

Mile Post (ON) 11: 0.995 mi

Linear Ref. Sys. MP: 0.995 mi

Scope:

NBI Element Underwater Fracture Critical Other Type: Regular NBI

Team Leader Inspection Check-off:

FCM's Vertical Clearance
 Posting Signs Stream Bed Profile
 Essential Repair Verification

Inspection Team: STANTEC

Inspection Date: 03/24/2022

Inspector: Unknown

Inspector (Team Leader): ALEX ZLATKIN

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**



Roadway looking north



Elevation looking east

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**



Superstructure looking north



Channel looking east upstream

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**



Channel looking west downstream



South approach load posting sign

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**



North approach load posting sign



Sealed transverse crack in asphalt at back face of Abutment 2 reopening

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**



Wide transverse crack in west sidewalk



Transverse and longitudinal cracks in asphalt on deck

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**



R2 rust of bottom flange of Girder D at Abutment 1



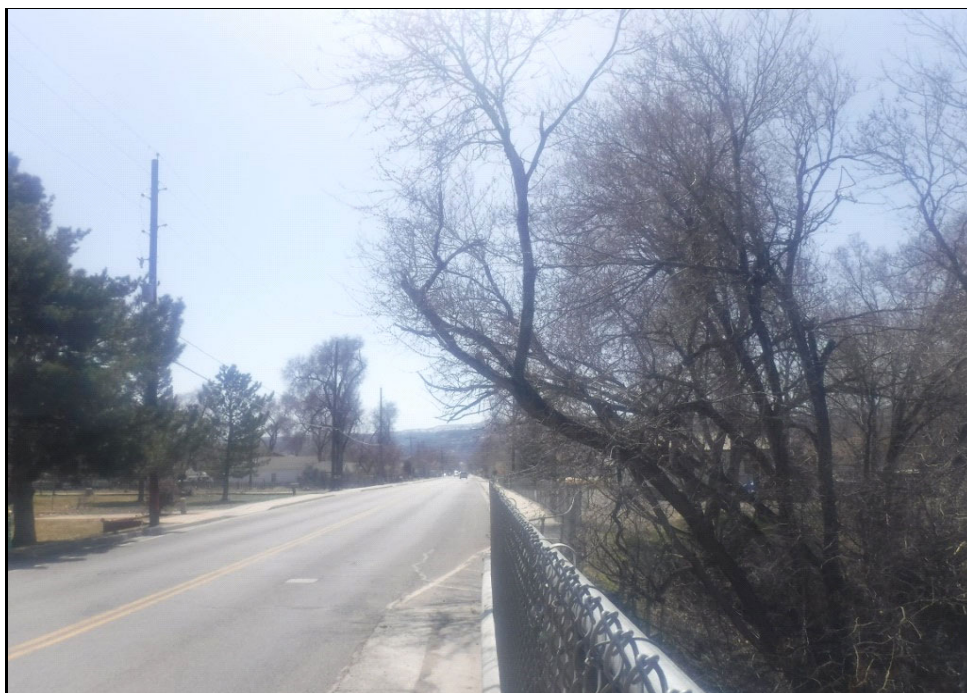
Spall in southwest wingwall at utility

Structure Number: **FRT-17.5-K.25**
Facility Carried: **MAPLE STREET**
Feature Intersected: **LITTLE SALT WASH**

Owner: **City of Fruita**
Inspection Date: **3/24/2022**

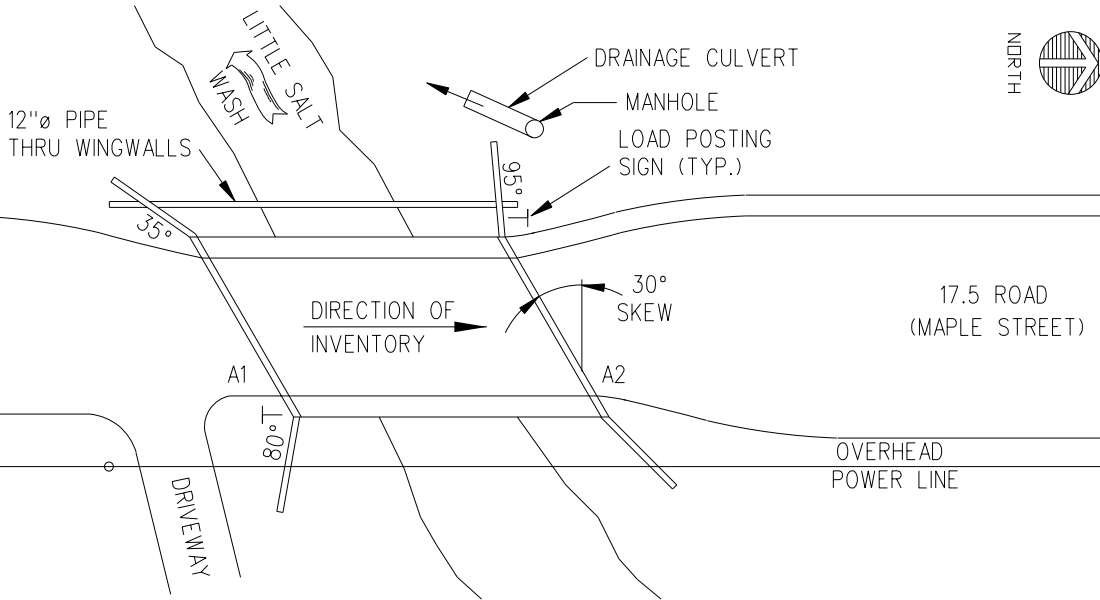


Wide horizontal crack in northeast wingwall



Tree overhanging bridge at southwest corner

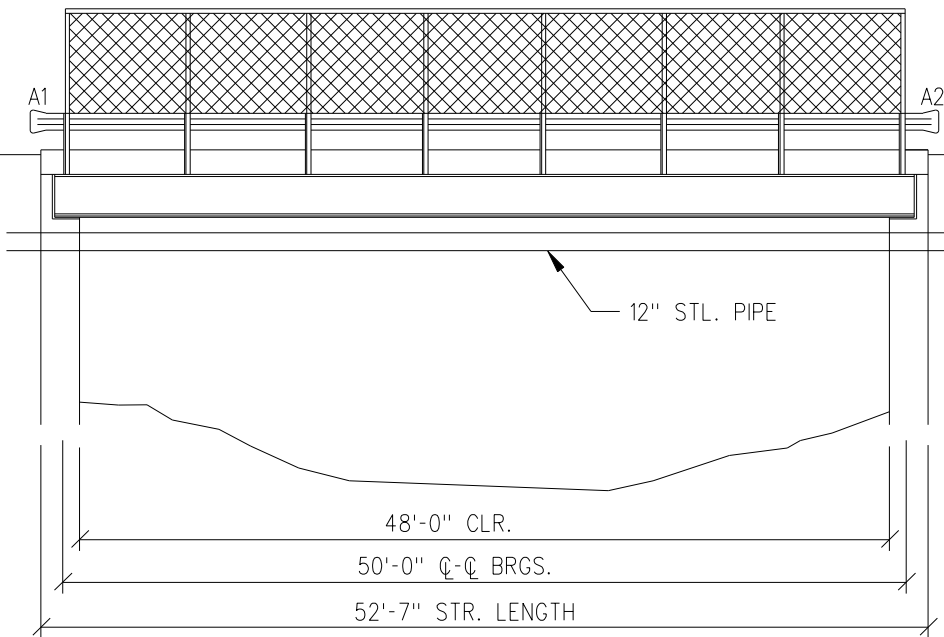
WINGWALLS:
12" THK. C.I.P. CONCRETE
(16' LONG, ANGLE ON PLAN)



APPROACH RAILS:
NONE
PLAN

ELEVATION
LOOKING WEST

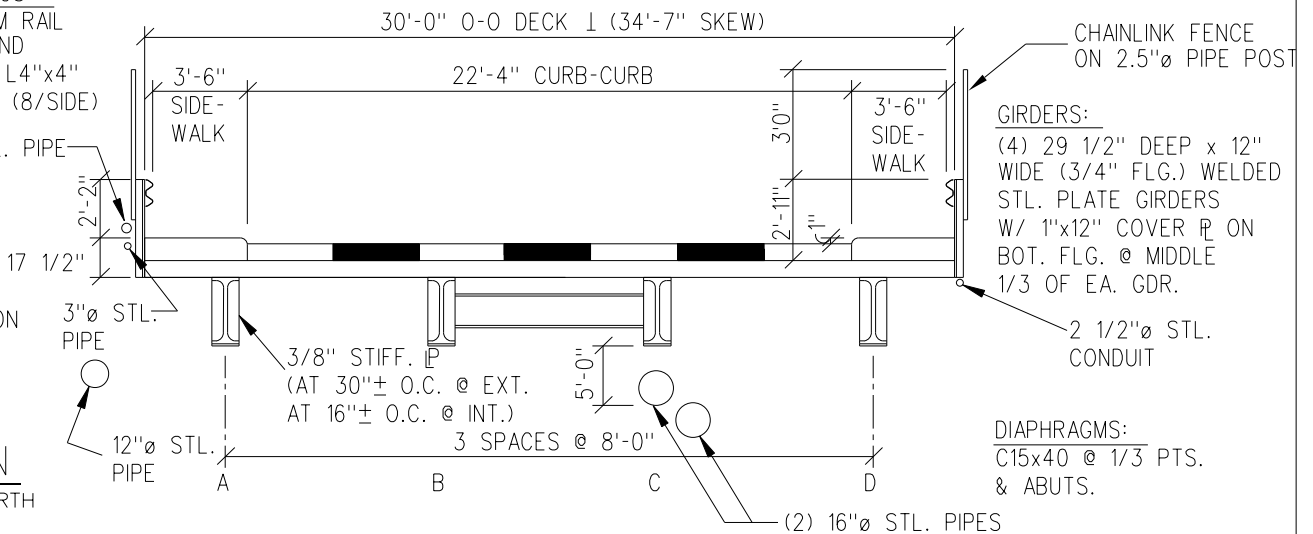
ABUTMENTS:
CAST-IN-PLACE
CONCRETE



BRIDGE RAILINGS:
GALV. W-BEAM RAIL
W/ FLARED END
SECTIONS ON L4"x4"
ANGLE POSTS (8/SIDE)

DECK:
8" ASPHALT ON
7 1/2" CONC.
DECK

SECTION
LOOKING NORTH



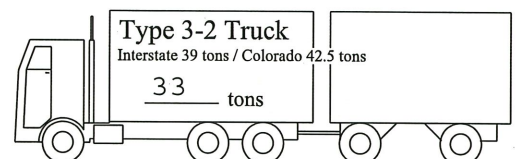
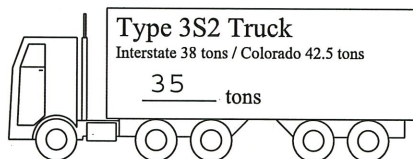
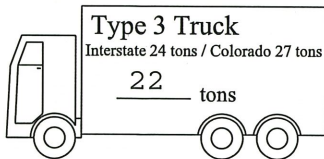
GIRDERS:
(4) 29 1/2" DEEP x 12"
WIDE (3/4" FLG.) WELDED
STL. PLATE GIRDERS
W/ 1"x12" COVER PL. ON
BOT. FLG. @ MIDDLE
1/3 OF EA. GDR.

DIAPHRAGMS:
C15x40 @ 1/3 PTS.
& ABUTS.

COLORADO DEPARTMENT OF TRANSPORTATION LOAD FACTOR RATING SUMMARY	Structure #	FRT-17.5-K.25
	State Highway #	17.5 Road
Rated using: Asphalt thickness: <u>8</u> in. <input checked="" type="checkbox"/> Colorado legal loads <input type="checkbox"/> Interstate legal loads	Batch I.D.	
	Structure Type	WGK
	Parallel Structure #	N/A

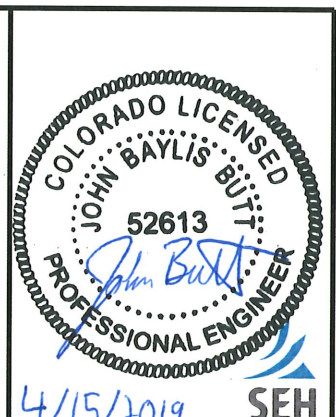
Structural Member	Deck	Int. Girder	Ext. Girder		
Tons					
Inventory	15.0	15.3	18.4		
Operating	25.1	25.5	30.7		

Type 3 truck	30.1	22.4	27.0		
Type 3S2 truck	47.5	35.6	42.9		
Type 3-2 truck	47.5	33.9	40.8		
Type SU4 truck (27T)	35.5	22.6	27.2		
Type SU5 truck (31T)	40.7	23.5	28.3		
Type SU6 truck (35T)	45.7	24.0	28.9		
Type SU7 truck (39T)	50.9	24.8	29.9		
NRL (40T)	52.6	25.1	30.3		
EV2 (28.75T)	19.1	28.8	27.2		
EV3 (43T)	31.0	29.3	27.7		
Permit Truck (96T) Single Lane D.F.					
Modified Tandem (50T) Single Lane D.F.					



Comments:
 8" asphalt on 7 1/2" thick composite concrete deck, fc'=4 ksi (assumed). Deck ratings calculated based on previous load rating results.
 30'-0" O/O, 22'-4" Curb/Curb. (4) built-up welded girders spaced at 8'-0" spanning 50'-0" BRG/BRG with diaphragms at third points, Fy=36 ksi, 30° skew. Girders: Web: 28" x 0.35" (thickness taken from 2008 rating), flanges: 12" x 3/4" with 12" x 1" cover plate on bottom flange at middle third of span. 3/8" thick stiffeners spaced at 30" on one side of girder.

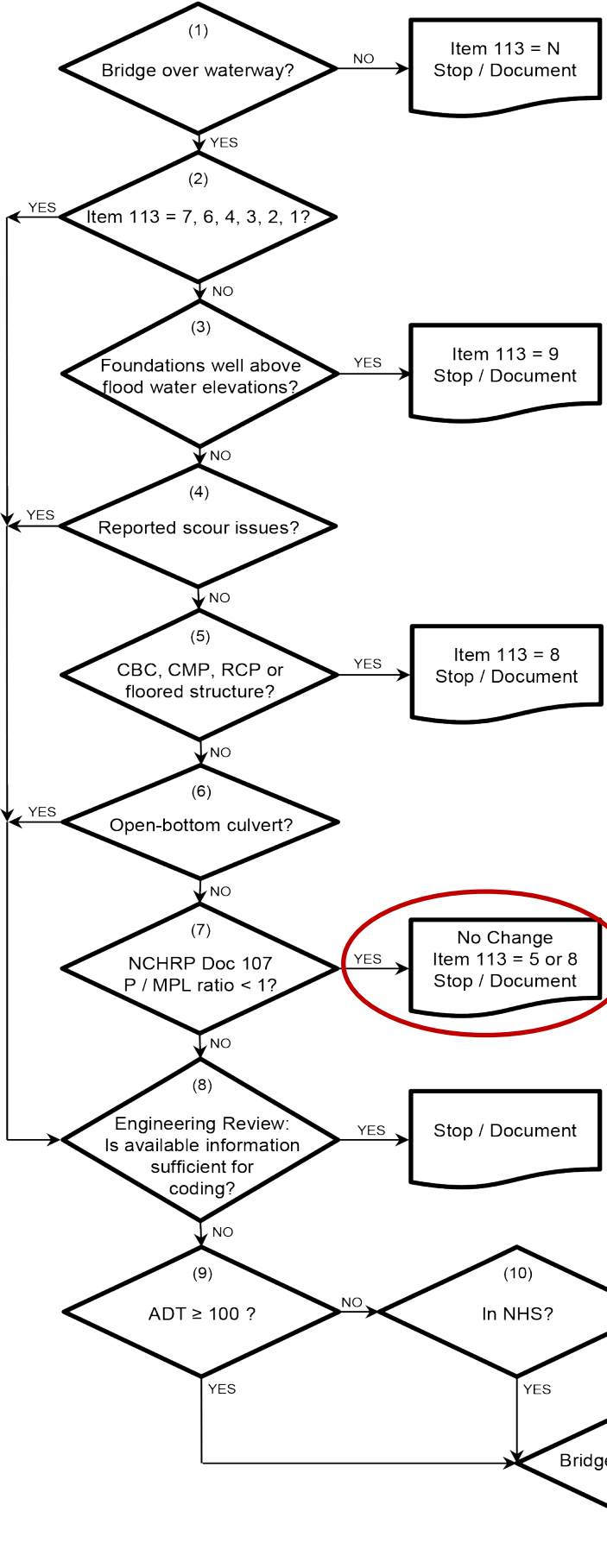
PLEASE POST AS SHOWN ABOVE FOR COLORADO TRUCKS
 POSTING ALSO RECOMMENDED FOR: SU4: 22 Tons, SU5: 23 Tons, SU6: 24 Tons, SU7: 24 Tons, EV2: 27 Tons, EV3: 27 Tons



Rated by: (Print name and sign) Nina Dickhausen	Date: 4/26/2018	Checked by: (Print name and sign) John Butt	Date: 5/21/2018
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CDOT OFF-SYSTEM BRIDGE SCOUR SCREENING CHART



STRUCTURE ID: FRT-17.5-K.25
 FACILITY CARRIED: MAPLE STREET
 FEATURE INTERSECTED: LITTLE SALT WASH

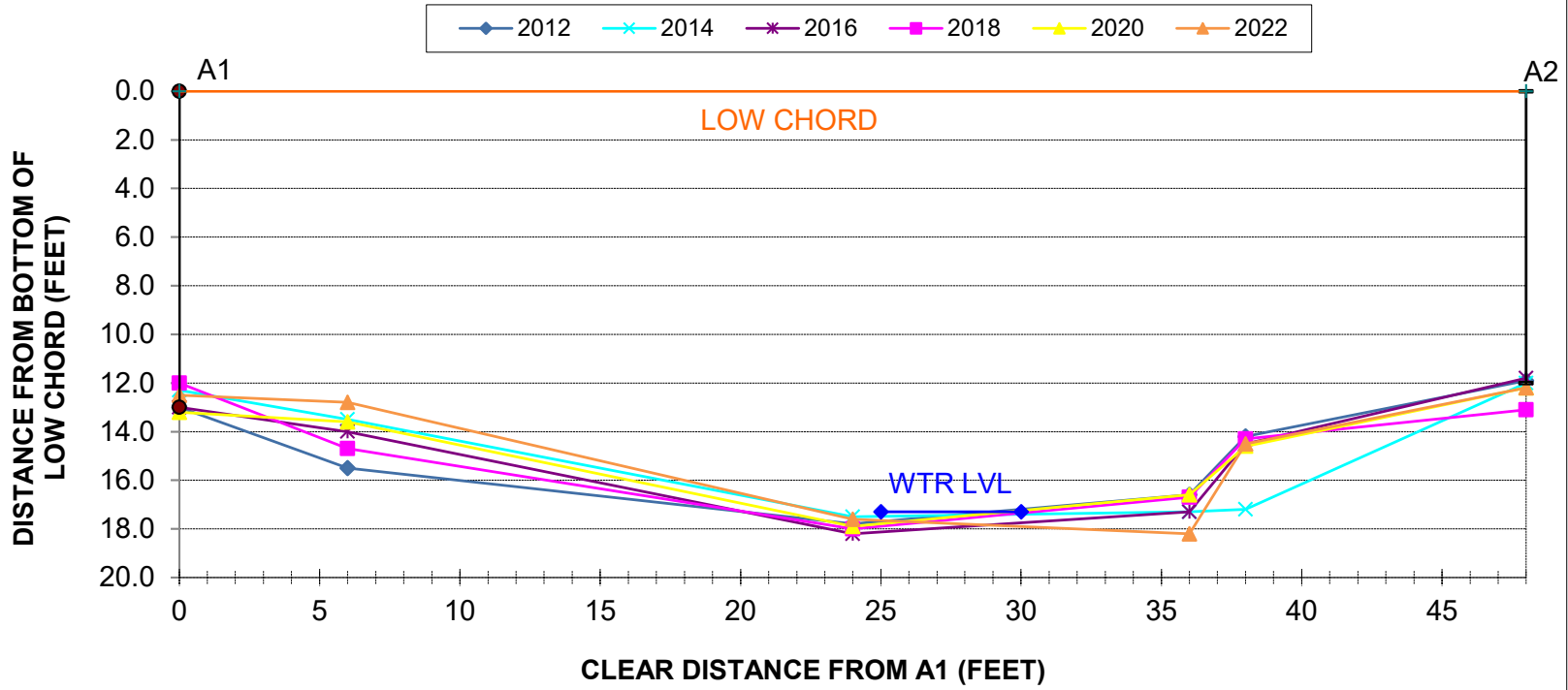
Structure Probability of Failure (P): 0.00025
 Minimum Performance Level (MPL): 0.001
 Ratio (P/MPL): 0.25

ITEM 113 = 8
 POA REQUIRED (Y/N): N
 POA COMPLETION DATE: N/A

EVALUATED BY: Auto-Generated
 ORGANIZATION: Stantec Consulting
 DATE: 4/20/2016

REVIEWER COMMENTS:
 FRT-17.5-K.25 was previously rated Item 113=5 or 8, has no reported scour problems, and passes the P/MPL test. Item 113 code will not change.

STREAMBED HISTORY



	0	6	24	36	38	48
2012	13.0	15.5	17.8	16.6	14.2	11.9
2014	12.3	13.5	17.5	17.3	17.2	12.0
2016	13.0	14.0	18.2	17.3	14.5	11.8
2018	12.0	14.7	18.0	16.7	14.3	13.1
2020	13.2	13.6	17.9	16.6	14.6	12.2
2022	12.5	12.8	17.6	18.2	14.5	12.2

WTR LVL
17.0
16.9
17.7
17.6
17.4
17.3

STRUCTURE NUMBER: FRT-17.5-K.25
 INSPECTION DATE: 3/24/2022

PERFORMED BY: JC