

INVITATION TO BID

OLD ST. VRAIN ROAD BRIDGE OVER SOUTH ST. VRAIN CREEK

Bid # 6661-17



SUBMITTAL DUE DATE

**Wednesday, June 7, 2017
10:00 a.m.**

BOULDER COUNTY PURCHASING

**2025 14TH STREET
BOULDER CO 80302**

Purchasing@bouldercounty.org

INVITATION TO BID

The Boulder County Transportation Department is seeking bids for replacement of the Old St. Vrain Road Bridge over South St Vrain Creek and roadway replacement on Old St. Vrain Road, east of the bridge site. The proposed bridge is a single span and 180' long that is made of a prefabricated structural steel truss bridge with a non-composite deck. Other major work elements for this project include: 1) pavement replacement, 2) bridge abutment construction, 3) riprap bank installation 4) channel grading, and 5) approach/departure rail.

Specifications and a sample contract with a FEMA specific addendum are attached. The successful bidder shall execute the attached addendum as part of any contract with the county, and comply with all FEMA requirements set forth in that addendum.

MANDATORY PRE-BID MEETING

A MANDATORY Pre-Bid Meeting will be held **THURSDAY, MAY 18, 2017, 3:00 P.M.**, at the office of Boulder County Transportation, 2525 13th Street, Suite 203, Boulder, Colorado 80304. Please allow time to park prior to the meeting. Boulder County highly recommends that potential bidders visit the project site prior to the pre-bid meeting.

Bids from firms not represented at the mandatory, pre-bid meeting will not be accepted.

WRITTEN INQUIRIES

All inquiries regarding this Bid shall be submitted via email to the Boulder County Purchasing Office at purchasing@bouldercounty.org on or before **10:00 A.M., THURSDAY, JUNE 1, 2017**. A response from the County to all inquiries shall be posted and sent via email no later than close of business on **MONDAY, JUNE 5, 2017**.

SUBMITTAL INSTRUCTIONS:

Bids are due at the Administrative Services Front Desk or the email box listed below (preferred), for time and date recording and verification on or **BEFORE 10:00 A.M., MOUNTAIN TIME, WEDNESDAY, JUNE 7, 2017**.

Your response can be submitted in the following ways. Please note that e-mail responses to this solicitation are preferred, but are limited to a maximum of 25MB capacity. NO ZIP FILES ALLOWED. Electronic submittals must be received in the e-mail box listed below. Submittals sent to any other box will NOT be forwarded or accepted. This e-mail box is only accessed on the due date of your questions or proposals. Please use the Delivery Receipt option to verify receipt of your email. It is the sole responsibility of the proposer to ensure their documents are received before the deadline specified above. Boulder County does not accept responsibility under any circumstance for delayed or failed email or mailed submittals.

E-Mail purchasing@bouldercounty.org; identified as **BID #6661-17** in the subject line.

-OR-

US Mail **One (1)** unbound copy of your proposal, printed double-sided, 11 point, on at least 50% post-consumer, recycled paper must be submitted in a sealed envelope, clearly marked as **BID #6661-17**, and delivered to the Administrative Services Front Desk at 2025 14th Street, Boulder, CO 80302.

All BIDs must be received and time and date **recorded and verified** at the Administrative Services Front Desk by the above due date and time. Sole responsibility rests with the Offeror to see that their BID is received on time at the stated location(s). Any BID's received after due date and time will be returned to the bidder. No exceptions will be made.

Bidders must be listed on the current Colorado State Department of Transportation's qualifications list to qualify with experience in fabrication and constructing bridge members and/ or projects. Proposals requested for the furnishing of all labor and materials on a UNIT basis.

Bid security in the form of a Bid Bond, Cashier's Check or Certified Check, payable to Boulder County, in the amount equal to ten (10%) percent of the total amount of the Bid, to be retained by the County until a Contract is executed. If the successful Bidder should fail to enter into a Contract with the County to furnish bid, his check or bid bond will be held as liquidated damages; in which event the Contract may then be awarded to the next lowest bidder.

Bidder must submit qualifications, per project specifications, for bridge manufacturers that have not been pre-approved by the County no less than seven (7) business days prior to bid opening.

Proof of current insurance must be provided with your proposal in the form of a sample certificate or your proposal will be deemed non-responsive. If you require a waiver of insurance requirements (e.g. Workers' Comp and sole proprietorships) you may request one in your response with an explanation.

The Board of County Commissioners reserve the right to reject any and all BIDs, to waive any informalities or irregularities therein, and to accept the proposal in whole, or portions of the proposal that, in the opinion of the Board, is in the best interest of the Board and of the County of Boulder, State of Colorado.

Americans with Disabilities Act (ADA): If you need special services provided for under the Americans with Disabilities Act, contact the ADA Coordinator or the Human Resources office at (303) 441-3525 at least 48 hours before the scheduled event.

END OF INVITATION TO BID

TERMS AND CONDITIONS

1. **Bidders are expected to examine the drawing, specifications, schedule of delivery, and all instructions. Failure to do so will be at the bidder’s risk.**
2. **Each bidder shall furnish the information required in the Invitation to Bid.**
3. **The Contract/Purchase Order will be awarded to that responsible bidder whose submittal, conforming to the Invitation to Bid, will be most advantageous to the County of Boulder, price and other factors considered.**
4. **The County of Boulder reserves the right to reject any or all bids and to waive informalities and minor irregularities in bids received, and to accept any portion of or all items proposed if deemed in the best interest of the County of Boulder to do so.**
5. **No submittal shall be withdrawn for a period of thirty (30) days subsequent to the opening of bids without the consent of the County Purchasing Agent or delegated representative.**
6. **A signed purchase order or contract furnished to the successful bidder results in a binding contract without further action by either party.**
7. **Late or unsigned bids will not be accepted or considered. It is the responsibility of bidders to insure that the bid arrives at the Administrative Services Front Desk or appropriate email box prior to the time indicated in the “Invitation to Bid.”**
8. **The proposed price shall be exclusive of any Federal or State taxes from which the County of Boulder is exempt by law.**
9. **Any interpretation, correction or change of the bid documents will be made by Addendum. Interpretations, corrections and changes of the bid documents made in any other manner will not be binding, and bidder shall not rely upon such interpretations, corrections and changes. The County’s Representative will not be responsible for oral clarification.**
10. **Confidential/Proprietary Information: Bids submitted in response to this “Invitation to Bid” and any resulting contract are subject to the provisions of the Colorado Public (Open) Records Act, 24-72-201 et.seq., C.R.S., as amended. Any restrictions on the use or inspection of material contained within the bid and any resulting contract shall be clearly stated in the bid itself. Confidential/proprietary information must be readily identified, marked and separated/packaged from the rest of the bid. Co-mingling of confidential/proprietary and other information is NOT acceptable. Neither a bid, in its entirety, nor bid price information will be considered confidential/proprietary. Any information that will be included in any resulting contract cannot be considered confidential.**
11. **Boulder County promotes the purchase/leasing of energy efficient, materials efficient and reduced toxic level products where availability, quality and budget constraints allow. Bidders are expected whenever possible to provide products that earn the ENERGY STAR and meet the ENERGY STAR specifications for energy efficiency with power management features enabled. Bidders are encouraged to offer products and equipment with post-consumer recycled-content materials. Products should be packaged and delivered with a minimum amount of recycled packaging that adequately protects the product, but is not excessive.**

**BOULDER COUNTY TRANSPORTATION DEPARTMENT
 OLD ST. VRAIN ROAD BRIDGE OVER SOUTH ST. VRAIN CREEK**

The *2011 Standard Specifications for Road and Bridge Construction*, controls construction of this project. The following special provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans.

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**BOULDER COUNTY TRANSPORTATION DEPARTMENT
OLD ST. VRAIN ROAD BRIDGE OVER SOUTH ST. VRAIN CREEK**

STANDARD SPECIAL PROVISION INDEX

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Revision of Section 106 – Buy America Requirements	(November 6, 2014)	1
Revision of Section 106 – Certificates of Compliance & Certified Test Reports	(February 3, 2011)	1
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Revision of Section 107 – Responsibility for Damage Claims, Insurance Types and Coverage Limits	(February 3, 2011)	1
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Revision of Section 201 – Clearing and Grubbing	(November 10, 2016)	1
Revision of Section 203 – Excavation and Embankment	(November 10, 2016)	11
Revision of Section 206 – Imported Material for Structure Backfill	(July 19, 2012)	2
Revision of Section 206 – Structure Backfill (Flow-Fill)	March 23, 2017	3
Revision of Section 206 – Structure Backfill at Bridge Abutments	(January 30, 2014)	1
Revision of Sections 206, 304, and 613 – Compaction	(November 10, 2016)	1
Revision of Sections 206 and 601 – Maturity Meters and Concrete Form and Falsework Removal	(December 18, 2015)	3
Revision of Section 208 – Erosion Control	(April 20, 2017)	22
Revision of Section 212 – Seed	(April 26, 2012)	1
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Revision of Section 216 – Soil Retention Covering	(July 16, 2015)	6

**BOULDER COUNTY TRANSPORTATION DEPARTMENT
 OLD ST. VRAIN ROAD BRIDGE OVER SOUTH ST. VRAIN CREEK**

STANDARD SPECIAL PROVISIONS

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Revision of Section 250 – Environmental, Health and Safety Management	(March 23, 2017)	14
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Revision of Section 401 – Compaction of Hot Mix Asphalt	(April 26, 2012)	1
Revision of Section 401 – Compaction Pavement Test Section (CTS)	(July 19, 2012)	1
Revision of Section 401 – Temperature Segregation	(February 3, 2011)	1
Revision of Sections 401 and 412 – Safety Edge	(May 2, 2013)	2
Revision of Sections 412, 601, and 711 – Liquid Membrane-Forming Compounds for Curing Concrete	(May 5, 2011)	1
Revision of Section 503 – Drilled Shafts	(January 12, 2017)	16
Revision of Section 518 – Bridge Expansion Device	(October 31, 2013)	1
Revision of Section 601 – Class B, BZ, D, DT, and P Concrete	(February 18, 2016)	2
Revision of Section 601 – Concrete Batching	(February 3, 2011)	1
Revision of Section 601 – Concrete Finishing	(February 3, 2011)	1
Revision of Section 601 – Concrete Slump Acceptance	(October 29, 2015)	1
Revision of Section 601 – Depositing Concrete Under Water	(May 2, 2013)	1
Revision of Section 601 – QC Testing Requirements for Structural Concrete	(May 8, 2014)	1
Revision of Section 601 – Structural Concrete Strength Acceptance	(April 30, 2015)	1
Revision of Sections 601 and 701 – Cements and Pozzolans	(November 6, 2014)	4
Revision of Section 603 – Culvert Pipe Inspection	(October 2, 2014)	1
Revision of Sections 603, 624, 705, 707, and 712 – Drainage Pipe	April 30, 2015)	3
Revision of Section 612 – Delineators	(February 3, 2011)	1
Revision of Section 627 – Preformed Plastic Pavement Marking	(May 12, 2016)	1
Revision of Section 630 – Retroreflective Sign Sheeting	(May 8, 2014)	1
Revision of Section 702 – Bituminous Materials	(March 29, 2016)	11
Revision of Section 703 – Aggregate for Bases	(October 31, 2013)	1
Revision of Section 703 – Aggregates for Hot Mix Asphalt	(November 1, 2012)	2
Revision of Section 703 – Classification for Aggregate Base Course	(October 20, 2016)	1
Revision of Section 703 – Concrete Aggregate	(July 28, 2011)	1
Revision of Section 709 – Epoxy Coated Reinforcing Bars	(February 18, 2016)	1
Revision of Section 712 – Geotextiles	(November 1, 2012)	2
Revision of Section 712 – Water for Mixing or Curing Concrete	(February 3, 2011)	1
Required Contract Provisions – Federal-Aid Construction Contracts: Form-1273	(October 20, 2016)	11

NOTICE TO BIDDERS

NOTICE: The proposal guaranty shall be a certified check, cashier's check or bid bond in the amount of 10% of the Contractor's total bid.

Both a payment and a performance bond are required for this project and must equal 100% of the proposed cost. Please include the cost of this bonding into the total proposed cost.

Contractor hereby proposes to furnish all labor, machinery, equipment, materials and supplies, and to sustain all the expense incurred in doing the work per the proposal schedule, and in pursuance of a certain advertisement of the County Commissioners, County of Boulder, of the State of Colorado, and in accordance with the full details, Plans, and Specifications as prescribed by said County Engineer.

The Boulder County Transportation Department is seeking bids for replacement of the Old St. Vrain Road Bridge over South St Vrain Creek and roadway replacement on Old St. Vrain Road, east of the bridge site. The proposed bridge is a single span and 180' long that is made of a prefabricated structural steel truss bridge with a non-composite deck. Other major work elements for this project include: 1) pavement replacement, 2) bridge abutment construction, 3) riprap bank installation 4) channel grading, and 5) approach/departure rail.

COMMENCEMENT AND COMPLETION OF WORK

The Contractor shall commence work under the Contract on or before the 5th day following the Contract execution unless such time for beginning the work is changed by the Project Engineer in the "Notice to Proceed." The Contractor shall complete all work (excluding punch list items) within 100 working days in accordance with the "Notice to Proceed" and the punch list items shall be completed within 20 working days. Pavement work being done on Old St Vrain Road, east of the Bridge area (STA 201+00 to 204+00) shall be done within 10 continuous working days. Work may be temporarily suspended for cold or inclement weather that would impact the quality of the final work or if bridge delivery is delayed beyond the time the project is ready to receive the bridge. Only punch list type work can occur during suspension, which will be counted towards the 20 working day punch list,, unless otherwise approved by the engineer. Punch list work shall be done efficiently and effectively so as not to unnecessarily delay work.

**REVISION OF SECTION 101
DEFINITIONS AND TERMS**

Certain terms utilized in the latest edition of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction shall be interpreted to have different meanings within the scope of this Contract. A summary of redefinitions follows:

Section 101 of the Standard Specifications is hereby revised for this project as follows:

Subsection 101.23: "Contractor" shall mean prefabricator and/or contractor as described in subsection 101.23

Subsection 101.28: "Department" shall mean Boulder County, Colorado.

Subsection 101.29: "Engineer" shall mean County Engineer, Boulder County, Colorado or designated representative.

Subsection 101.36 Holidays shall include:

Additional holidays recognized by Boulder County are:

President's Day
Election Day (Even Years)
Day after Thanksgiving Day

Subsection 101.39: "Laboratory" shall mean Boulder County, Colorado or their designated representative.

Subsection 101.51: "Project Engineer" shall mean Boulder County's duly authorized representative who may be a Boulder County or an employee of a consulting engineer (consultant) under contract to Boulder County.

Subsection 101.51 (a): "CDOT Project Engineer" shall be replaced with "Project Engineer" within these specifications. When these documents reference a CDOT engineer, this reference shall be construed to mean Project Engineer.

Subsection 101.51 (b): shall be replaced with the following:

"Consultant Project Engineer". The consultant employee under the responsible charge of the consultant's Professional Engineer who is in direct charge of the work and is responsible for the administration and satisfactory completion of the project. The Consultant Project Engineer's duties are delegated by the Project Engineer in accordance with the scope of work in the consultant's contract with Boulder County. The Consultant Project Engineer is not authorized to sign or approve Contract Modification Orders.

Subsection 101.58 "Region Transportation Director" shall mean Boulder County Engineer, Boulder County, Colorado or designated representative

Subsection 101.76 "State" shall mean Boulder County, Colorado (where applicable).

**REVISION OF SECTION 102
PROJECT PLANS AND OTHER DATA**

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Subsection 102.05 shall include the following:

Boulder County will provide electronic files of drawings, the sample contract document, the project technical specifications in PDF format, online at the designated internet bid advertisement site, and they will be considered as the official bid set and record set.

Upon contract execution, Boulder County will provide one original wet signed and stamped set of plans and specifications. A copy of those original signed and stamped documents will be provided in electronic format as a PDF.

**REVISION OF SECTION 104
SCOPE OF WORK**

Section 104 of the Standard Specifications is revised for this project as follows:

Subsection 104.02, Suspensions of work shall include the following:

The Contractor is required to complete the Contract with sustained work efforts once he begins the project. The Contractor will coordinate work activities with the Engineer to minimize impacts to the water quality of the creek and potential safety hazards to personnel and materials. Work may be temporarily suspended for cold or inclement weather that would impact the quality of the final work or if bridge delivery is delayed beyond the time the project is ready to receive the bridge. No additional payment will be made for remobilization if the project is suspended.

**REVISION OF SECTION 105
SHOP DRAWINGS**

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Subsection 105.02 (b) shall include the following:

Shop drawings, working drawings, and other submittals shall be delivered to the Engineer in either hard copy or electronic format. Contractor shall verify that the submittal has been received by the Engineer.

Subsection 105.02 (c) shall be revised as follows:

The time required for the Engineer's review of each submittal will not exceed one (1) week after a complete submittal of shop drawings is received by the Engineer.

**REVISION OF SECTION 107
SAFETY, HEALTH, AND SANITATION PROVISIONS**

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.06 shall be revised to include the following:

The Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards (Rules and Regulations of the Federal Occupational Safety and Health Act of 1970 (OSHA) and as amended).

All facilities and work conditions shall comply with Colorado and local Health Department Regulations and with OSHA requirements.

Subsection 107.07, shall include the following:

Access to Aggregate Industries must be maintained at all times.

All delivery truck traffic must access the site from State Highway 7 not on Old St. Vrain Road, unless otherwise approved by the engineer. Trucks one (1) ton or less may utilize Old St. Vrain Road.

**REVISION OF SECTION 107
 PERFORMANCE OF SAFETY CRITICAL WORK**

Section 107 of the Standard Specifications is hereby revised as follows:

Add subsection 107.061 immediately following subsection 107.06 as follows:

107.061 Performance of Safety Critical Work. The following work elements are considered safety critical work for this project:

- (1) Work requiring the use of cranes or other overhead lifting equipment

The Contractor shall submit, for record purposes only, an initial detailed construction plan that addresses safe construction of each of the safety critical elements. When the specifications already require an erection plan or a bridge removal plan, it shall be included as a part of this plan. The detailed construction plan shall be submitted two weeks prior to the safety critical element conference described below. The construction plan shall be stamped “Approved for Construction” and signed by the Contractor. The construction plan will not be approved by the Engineer.

The Construction Plan shall include the following:

- (1) Safety Critical Element for which the plan is being prepared and submitted.
- (2) Contractor or subcontractor responsible for the plan preparation and the work.
- (3) Schedule, procedures, equipment, and sequence of operations, that comply with the working hour limitations
- (4) Temporary works required: falsework, bracing, shoring, etc.
- (5) Additional actions that will be taken to ensure that the work will be performed safely.
- (6) Names and qualifications of workers who will be in responsible charge of the work:
 - A. Years of experience performing similar work
 - B. Training taken in performing similar work
 - C. Certifications earned in performing similar work
- (7) Names and qualifications of workers operating cranes or other lifting equipment
 - A. Years of experience performing similar work
 - B. Training taken in performing similar work
 - C. Certifications earned in performing similar work
- (8) The construction plan shall address how the Contractor will handle contingencies such as:
 - A. Unplanned events (storms, traffic accidents, etc.)
 - B. Structural elements that don't fit or line up
 - C. Work that cannot be completed in time for the roadway to be reopened to traffic
 - D. Replacement of workers who don't perform the work safely
 - E. Equipment failure
 - F. Other potential difficulties inherent in the type of work being performed
- (9) Name and qualifications of Contractor's person designated to determine and notify the Engineer in writing when it is safe to open a route to traffic after it has been closed for safety critical work.
- (10) Erection plan or bridge removal plan when submitted as required elsewhere by the specifications. Plan requirements that overlap with above requirements may be submitted only once.

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**REVISION OF SECTION 107
PERFORMANCE OF SAFETY CRITICAL WORK**

A safety critical element conference shall be held two weeks prior to beginning construction on each safety critical element. The Engineer, the Contractor, the safety critical element subcontractors, and the Contractor's Engineer shall attend the conference. Required pre-erection conferences or bridge removal conferences may be included as a part of this conference.

After the safety critical element conference, and prior to beginning work on the safety critical element, the Contractor shall submit a final construction plan to the Engineer for record purposes only. The Contractor's Engineer shall sign and seal temporary works related to construction plans for the safety critical elements. The final construction plan shall be stamped "Approved for Construction" and signed by the Contractor.

The Contractor shall perform safety critical work only when the Engineer is on the project site. The Contractor's Engineer shall be on site to inspect and provide written approval of safety critical work for which he provided stamped construction details. Unless otherwise directed or approved, the Contractor's Engineer need not be on site during the actual performance of safety critical work, but shall be present to conduct inspection for written approval of the safety critical work.

When ordered by the Engineer, the Contractor shall immediately stop safety critical work that is being performed in an unsafe manner or will result in an unsafe situation for the traveling public. Prior to stopping work, the Contractor shall make the situation safe for work stoppage. The Contractor shall submit an acceptable plan to correct the unsafe process before the Engineer will authorize resumption of the work.

When ordered by the Engineer, the Contractor shall remove workers from the project that are performing the safety critical work in a manner that creates an unsafe situation for the public in accordance with subsection 108.05.

Should an unplanned event occur or the safety critical operation deviate from the submitted plan, the Contractor shall immediately cease operations on the safety critical element, except for performing any work necessary to ensure worksite safety, and provide proper protection of the work and the traveling public. If the Contractor intends to modify the submitted plan, he shall submit a revised plan to the Engineer prior to resuming operations.

No explosives shall be allowed on or used on the project site.

All costs associated with the preparation and implementation of each safety critical element construction plan will not be measured and paid for separately, but shall be included in the work.

Nothing in the section shall be construed to relieve the Contractor from ultimate liability for unsafe or negligent acts or to be a waiver of the Colorado Governmental Immunity Act on behalf of the County.

**REVISION OF SECTION 107
PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE**

Section 107 of the Standard Specification is hereby revised as follows:

Subsection 107.12 shall include the following:

The Contractor shall save existing vegetation, except for those that must be removed to accommodate construction of the project.

The Contractor shall perform all the work in such a manner that the least environmental damage will result. Any questionable areas or items shall be brought to the attention of the Engineer for approval prior to vegetation removal or any damaging activity. Damaged or destroyed trees, shrubs, or wetlands, which could have been saved, shall be replaced at the expense of the Contractor.

If any trees or shrubs are to be removed between April 1st and August 31st, a nesting bird survey must be completed for active nests. The survey will be conducted by Boulder County. If an active nest(s) is found, no work may be done within 50 feet of the nest(s) until Boulder County is notified and further direction of construction limitations have been defined. These requirements are in order to avoid the Migratory Bird Act of 1918.

**REVISION OF SECTION 107
 RESPONSIBILITY OF DAMAGE CLAIMS, INSURANCE TYPES AND COVERAGE**

Subsection 107.15 shall be revised to include the following:

All insurance policies in this section shall name Boulder County and JUB Engineers, Inc as additional insured.

Subsection 107.15 (a) insurance kinds and amounts shall be replaced (when applicable) as follows:

General Liability

- \$1,000,000 Each Occurrence
- \$2,000,000 General Aggregate
- \$2,000,000 Products Completed Operations Aggregate
- Two (2) year Products/Completed Operations

Excess or Umbrella

- \$3,000,000 Following Form

Automobile Liability

- \$1,000,000 Each Accident
- *Including Hired & Non-Owned auto

Worker’s Compensation and Employer’s Liability

- Statutory limits

Pollution Liability

- \$1,000,000 per Loss
- \$1,000,000 Aggregate
- Coverage maintained or extended discovery for three (3) years.

Note that the above insurance amounts are the minimum required for this project. Proof of current insurance must be provided with your bid in the form of a sample certificate. If you require a waiver of insurance requirements (e.g. Workers’ Comp and sole proprietorships) you may request one in your response with an explanation.

New certificates will be requested **if the contract process takes more than 30 days after an award.**

The Contractor shall provide a Certificate of Insurance to Boulder County demonstrating that the insurance requirements have been met prior to the commencement of Work under this Contract. Boulder County and J-U-B Engineers shall be named as an additional insured for General Liability and Pollution Liability, as designated in the contract. Additional insured shall be endorsed to the policy.

**REVISION OF SECTION 107
CONTRACTOR'S RESPONSIBILITY OF WORK**

Subsection 107.17, Contractor's Responsibility for Work, add the following:

The Contractor shall be responsible for any damage to their work arising from running water from either a natural source or from landscape watering at no additional cost to the contract.

The Contractor shall be responsible for any damages done by the Contractor that is outside the scope of this work.

**REVISION OF SECTION 107
 WATER QUALITY CONTROL**

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.25(b) 8 shall include the following:

Structure and Riprap Dewatering. The contractor shall be responsible for all dewatering on the project. It is anticipated that substantial dewatering will be required on this project. The dewatering processes shall follow these specifications:

Prior to the preconstruction conference the Contractor shall submit their dewatering plan to the Engineer and Owner to communicate the Contractors intent in regards to dewatering to achieve the required performance contained in these specifications. Submittal of a dewatering plan shall not be interpreted as an acceptance or approval by the Owner or Engineer of the Contractor’s dewatering plan.

The dewatering plan shall include at a minimum:

1. Major components of the dewatering system including size, location, spacing and details of major dewatering features the Contractor anticipates utilizing.
2. Contingency plans for equipment or power failure.
3. Procedures for verification that water levels have been lowered to the specified levels prior to trench or structure excavation and installation.
4. Location of dewatering disposal or discharge locations and the capacity to accept dewatering discharge. Provide a contingency plan for higher than anticipated flows when capacity of planned discharge and disposal locations may conceivably be exceeded.
5. Location and details of Best Management Practices (BMP’s)
6. Agreements with entities accepting discharges
7. All permits obtained by the Contractor including any permit conditions and approvals for the discharge of water generated during the execution of the Work.
8. Other permits required for construction or operation of the dewatering system including the drilling of wells, temporary power drops, etc.

Structure dewatering construction requirements:

1. Obtain a construction dewatering permit and water quality shall conform to subsection 107.25(b) 7&8 of the CDOT specifications.
2. Dewatering discharge to or across adjacent canals, drains, right-of-way, and private property outside of the designated limits of construction shall not be allowed unless the Contractor has obtained written approval from agency or property owner having jurisdiction. Provide Agreements with dewatering plan submittal as described above
3. Furnish, install and prepare for operation, all necessary machinery, appliances and equipment to maintain all structure excavations free from water during construction.
4. Contractor shall provide temporary power sources for all dewatering equipment that requires a power source.
5. Dewater and dispose of water in such a manner that it does not cause injury to public or private property, or to cause a nuisance or a menace to the general public.
6. The Contractor will be responsible for devising a system to achieve the required level of dewatering. It is anticipated that this system may incorporate wells, well points, interception trenches, sumps, etc. In addition, design and provide dewatering conveyance system to an approved disposal location. The Contractor shall submit details of this plan as described above.

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**REVISION OF SECTION 107
WATER QUALITY CONTROL**

7. Draw and maintain static water level to at least three feet (3') below the bottom of the excavation prior to excavating below the water table to maintain the undisturbed state of the foundation soils and allow placement of bedding material and backfill to the required density.
8. Remove all groundwater, seepage, stormwater and other water that accumulates in the excavation during construction. All structure excavations shall be kept free of water during construction or until otherwise requested by the Contractor and approved by the Engineer.
9. Prevent softening of the bottom of excavations and the formation of "quick" conditions or "boils" during excavation. The occurrence of such conditions will require over-excavation and subsequent backfilling of soils meeting the requirements of the CDOT Specifications at no additional cost to the Owner.
10. Additional cost for trench bottom stabilization resulting from inadequate dewatering and non-compliance with the performance specifications included herein, as determined by the Engineer, will be incidental to the work.
11. Compact native soil at the bottom of the excavation prior to placing bedding in accordance with the CDOT specifications and of these specifications.
12. Maintain static water level at least three feet (3') below the bottom of the excavation until the specified foundation and structure is placed in accordance with these specifications. Maintain water levels at least three feet (3') below the level of backfill during backfilling operations.
13. Control surface runoff to prevent entry or collection of water in excavations.
14. Install and operate a dewatering system so that adjacent structures or property are not endangered by the reduction in the groundwater level.
15. Monitor discharge from dewatering operations for changes in visual or odor components indicating the presence of contaminants including, but not limited to, gasoline and pesticides and other hazardous materials and toxins.
16. Cease dewatering operations and notify Engineer and regulatory agencies immediately upon observation of conditions that may indicate the presence of hazardous contaminants in the dewatering discharge or excavation.

Observation Requirements:

1. Contractor's superintendent shall routinely observe conditions in excavations where dewatering is being performed on a daily basis to verify performance requirements are being met and that conditions in the excavation are in accordance with the Contract Documents.
2. Notify Engineer of any observations that may jeopardize the Work or is not in accordance with the Contract Documents.
3. Prior to advancing the structure excavation below the pre-construction groundwater level, the Contractor shall excavate a test pit or install another form of groundwater measurement. Water levels in the test pit shall be measured and recorded and the information provided to the Engineer. Measured water levels must show that the groundwater has been lowered to the minimum level stated herein. If monitoring shows that the specified level of dewatering has not been achieved, cease construction of the affected work and continue dewatering or modify dewatering activities until the specified level of dewatering is achieved at no additional cost to the Owner.

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REVISION OF SECTION 107
WATER QUALITY CONTROL

Dewatering Discharge:

1. Comply with all State & Federal requirements
2. Water quality shall conform to subsection 107.25(b)8 of the CDOT Specification
3. Work required to comply with water quality and permit requirements are considered incidental and additional payment will not be made for this Work.

Termination:

1. Allow groundwater to return to static level after excavations are backfilled as necessary to prevent floatation of constructed improvements.
2. Prevent disturbance of the compacted backfill and prevent flotation or movement of installed structure.
3. Remove or abandon all temporary improvements associated with the dewatering system in accordance with these specifications and any applicable state and federal rules and regulations.
4. Provide surface restoration as required to repair/replace any surface impacted by dewatering activities to a condition as good or better than preconstruction conditions at no additional cost to the Owner. Surface rehabilitation performed as a result of dewatering activities is considered incidental and no additional payment will be made.
5. Comply with any dewatering termination requirements of any State and Federal permits.

Subsection 107.25(c)1 shall be modified as follows:

Delete the first occurrence of the word “dewatering” from the sentence.

Add the following:

Dewatering will not be measured but will be paid as Lump Sum on this project

Measurement and Payment

Pay Item	PAY UNIT
Dewatering	Lump Sum

REVISION OF SECTION 108 PROSECUTION AND PROGRESS

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.03 shall include the following:

The Contractor shall submit a preliminary progress schedule or bar chart to the Engineer at least 3 working days prior to the preconstruction meeting. This bar chart or preliminary progress schedule shall show the major salient features of the project through completion.

The minimum salient features to be shown on the Contractor's Progress Schedule are:

- (1) Erosion Control, Mobilization
- (2) Bridge Fabrication
- (3) Construction Surveying
- (4) Removal of existing structure components (including Clearing and Grubbing)
- (5) Caisson Installation
- (6) Abutment Installation
- (7) Bridge delivery and installation
- (8) Channel Grading
- (9) Riprap Placement
- (10) Excavation (CIP)
- (11) Embankment (CIP)
- (12) Bridge Rail Fabrication and Installation
- (13) Hot Mix Asphalt Paving
- (14) Striping & Signing
- (15) Planting, Seeding & Clean Up

Meetings will be required to review progress and plan upcoming activities. The Traffic Control Supervisor, the Erosion Control Supervisor and representatives from the Contractor and all active subcontractors shall attend the meetings as necessary. Such meetings will be required on a weekly basis at a time to be determined by the Engineer and the Contractor.

At the weekly progress meetings, the Contractor shall submit a written statement of planned activities and anticipated inspection, testing, and surveying requirements for the upcoming three (3) weeks. The Contractor shall provide a twenty-four hour notice to the Engineer if the Contractor elects to change a planned activity.

The Contractor must complete all aspects of the project including punch-list items within an approved not-to exceed the period indicated in the Project Special Provision “Commencement and Completion of Work or liquidated damages per the table included in Section 108.09 of the CDOT Standard Special Provisions will be incurred.

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**REVISION OF SECTION 108
PROSECUTION AND PROGRESS**

Subsection 108.05, shall include the following:

All work performed by the Contractor or any of his agents shall be accomplished during the established working hours of 7:00 A.M. and 5:00 P.M., Monday through Friday. Neither the Contractor nor his agents shall work outside of the daily working hours without prior approval by the Engineer.

In the event that the Contractor receives approval to work additional hours beyond the normal working hours or days in Section 108.05 above for his convenience, the Contractor shall reimburse the County for the cost of providing additional engineering and inspection services. The reimbursement to the County will be at a rate of \$65.00 per hour for each County employee or consultant required by the County to be on the job site. This cost will be deducted from any money due the Contractor.

Neither the Contractor nor his agents shall work outside of the daily working hours without prior approval by the Engineer.

**REVISION OF SECTION 201
CLEARING AND GRUBBING**

Section 201 of the Standard Specifications is hereby revised for this project as follows:

Subsection 201.02 Add the following:

The removal tree with a caliper less than 6” shall be included in this section, and will not be paid separately. Trees are measured 18” from the ground.

It is the responsibility of the Contractor to visit the site and determine the resources necessary to clear and grub the project limits, per the design specifications, and no additional compensation will be allowed therefore.

**REVISION OF SECTION 202
 REMOVAL OF BARRICADE**

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work shall include the removal of all existing barricades standing at the south abutment, at the north approach as shown on the Demolition Plan or as directed by the Engineer.

Subsection 202.02 shall include the following:

Barriers shall be delivered to the Boulder County Road Maintenance Yard located at: 5201 St. Vrain Road, #5, Longmont, CO 80503. Delivery shall be coordinated with the Engineer.

Subsection 202.03 shall include the following:

The existing barricades shall be removed without damage, salvaged, delivered as property of the Department. If Contractor damages the barriers at any time, Contractor shall replace the item at no cost to the project.

Subsection 202.12 shall include the following:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Removal of Barricade	Lump Sum

Transport of barricades to the Boulder County Road Maintenance yard will not be measured and paid for separately but shall be included in the work.

**REVISION OF SECTION 202
 REMOVAL OF PORTIONS OF PRESENT STRUCTURE**

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work shall include the removal of all or portions of the following: bridge abutment standing at the south bank, along with the damaged bridge abutment and superstructure elements displaced downstream of the bridge alignment as shown on the Demolition Plan. It should be noted that additional concrete from the existing bridge may be found during excavation. This material shall be removed as part of this pay item.

Subsection 202.12 shall include the following:

Payment will be made under:

Pay Item

Pay Unit

Removal of Portions of Present Structure

Lump Sum

**REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT**

Section 203 of the Standard Specifications is hereby revised for this project as follows:

Subsection 203.01, add the following:

Earthwork excavated from the South St. Vrain Creek channel may be used within the project limits if it meets the required specifications. It is anticipated that channel material will be able to be used for roadway embankment.

Subsection 203.03(a), add the following:

All embankment material used within the roadway prism shall consist of clean non-expansive, granular fill with a minimum "R" value of 30.

The Contractor shall furnish evidence that the material from the site or other sources, for use in the roadway embankment, meets the above requirements and shall pay for such tests as may be required to show compliance. All material shall be sampled and tested in accordance with the appropriate Colorado Department of Transportation or AASHTO procedures.

Material required to backfill the riprap below the final channel bottom is calculated as embankment material.

Subsection 203.13 shall include the following:

The quantity for Unclassified Excavation will not be measured, but will be the quantity designated in the Contract, unless field changes are ordered. If field changes are ordered, the quantities will be calculated using the revised dimensions and the additional volume of material shall be approved in writing by the Engineer prior to beginning the work. No allowances shall be made for shrinkage, swell, subsidence due to compaction of the existing ground or any other losses.

Subsection 203.14 shall include the following:

All material from Unclassified Excavation shall become property of the Contractor. Haul for disposing of removed materials will not be paid for separately, but shall be included in the work.

**REVISION OF SECTION 206
EXCAVATION AND BACKFILL FOR STRUCTURES**

Section 206 of the Standard Specifications is hereby revised for this project as follows:

Subsection 206.02, shall include the following:

- (a) Structural Excavation shall include all excavation required to place the riprap detailed in the plans. This quantity shall include the volume of the riprap and the excavation below the finished channel bottom that is required to install the riprap.

Subsection 206.07 shall include the following:

All material from Structure Excavation not used on the project shall become property of the Contractor. Haul for disposing of removed materials will not be paid for separately, but shall be included in the work.

**REVISION OF SECTION 207
TOPSOIL**

Section 207 of the Standard Specification is hereby revised as follows:

Subsection 207.01, shall include the following:

All disturbed areas outside of the channel to be seeded are to have the top four (4) inches of amended topsoil.

Subsection 207.03 shall include the following:

Relieving Compaction

Areas to receive topsoil that have been compacted by heavy equipment shall be ripped or chiseled **prior to redistribution of topsoil**. Construction areas and other compacted areas will be chiseled to a minimum depth of 10 inches, with no more than a 10 inch interval between chiseled furrows. Two passes with a chiseler may be necessary, with the second pass chiseling between the first furrows, or perpendicular to original furrows.

Distribution of Topsoil and Application of Soil Conditioning:

The topsoil should be distributed uniformly over the disturbed areas, minimizing compaction by equipment. **Topsoil distribution shall not occur under wet soil conditions.** If topsoil is contaminated, compacted or otherwise improperly handled, topsoil should be conditioned with compost at a rate of 3 cubic yards per 1000 square feet of disturbed area to provide a suitable seedbed at the contractor's expense. Compost shall consist of at least 40 % organic matter, with a pH not to exceed 8.0, and soluble salts not greater than 10 Mmhos/cm. The carbon to nitrogen ratio of the compost shall be between 10:1 and 20:1. Compost shall be incorporated evenly throughout topsoil.

**REVISION OF SECTION 208
 EROSION CONTROL**

Section 208 of the Standard Specification is hereby revised as follows:

Subsection 208.02(h) shall be replaced with the following:

All erosion logs shall be biodegradable. Photodegradable will not be accepted.

(h) Erosion log. Shall be of the following type unless otherwise shown on the plans:

- (1) Erosion Log (Type 1) shall be curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log. The casing shall be seamless, 100% bio-degradable tube netting sewn together with cotton, biodegradable thread and shall have minimum dimensions shown in Table 208-1, based on the diameter of the log called for on the plans.. The curled aspen wood excelsior shall be fungus free, resin free, and free of growth or germination inhibiting substances.

Erosion log (Type 1) shall have minimum dimensions as shown in Table 208-1, based on the diameter of the log.

**Table208-1
 NOMINAL DIMENSIONS OF EROSION LOGS**

Diameter Type 1 (Inches)	Length (feet)		Weight (minimum) (pounds/foot)	Stake Dimensions (Inches)
	Min.	Max.		
9	10	180	1.6	1.5 by 1.5 (nominal) by 18
12	10	180	2.5	1.5 by 1.5(nominal) by 24
20	10	100	4.0	2 by 2 (nominal) by 30

Stakes to secure erosion logs shall consist of pinewood or hardwood.

Subsection 208.02 (k) shall include the following:

Prior to the initial arrival onto the project site, all equipment shall be thoroughly power washed, including the undercarriages and tires. Equipment must be clean of mud, vegetative matter, and other debris to prevent importation of non-native and noxious weed seeds from other project sites.

Subsection 208.12 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Erosion Log (Biodegradable) (___ Inch)	Linear Foot

**REVISION OF SECTION 212
SEEDING**

Section 212 of the Standard Specifications is hereby revised as follows:

Subsection 212.03 Table for seeding time shall be removed and replaced with the following:

Seeding shall occur between September 15th and April 15th. Seeding outside of this window of time must be approved by the Project Manager.

**REVISION OF SECTION 214
 PLANTING**

Section 214 of the Standard Specifications is hereby revised as follows:

Subsection 214.01 shall include the following:

This work consists of furnishing all plants, labor, materials and equipment and performing all work necessary and incidental to installing live willow cuttings or poles for the stabilization of soil and riprap and/or environmental mitigation in accordance with other contract documents, at the direction of the Engineer. These plants must be harvested in early spring while dormant and before the buds leaf out (usually before April 15th), unless otherwise approved by the Engineer.

Subsection 214.02 shall include the following:

- (e) Live Willow– Stakes shall be collected from sources that have been approved by the Engineer before beginning cutting operations. All stakes shall be collected on or near the site (within 1,000 vertical feet) whenever possible, as directed by a qualified ecologist. All stakes shall be harvested when dormant (before leaves emerge or after they are dropped) from live plants 0.5 to 0.75 inch in diameter. The stem shall be stripped of all branches before cutting and then trimmed to the desired length. The lower (rooting) end of the stem shall be cut at a 45 degree angle and the upper end shall be cut at a 90 degree angle. The cuttings shall be placed into water within five minutes of cutting, or if longer, recut the ends, and soaked—with a minimum of 50% of the cutting submerged—for at least 72 hours, but not more than 14 days, prior to planting. The stakes shall be kept wet until placed into the ground and will not be allowed out of water for more than 10 minutes during planting. All cuttings shall be trimmed after installation to ensure that no more than 12” is left above ground.

Subsection 214.03 (h), shall include the following:

Live Willow Stake Installation. Using a piece of rebar or other equipment, create a vertical hole deep enough to reach the water table throughout the growing season. Insert the cutting into the hole so that the rooting end of the cutting is in contact with the water table. At least $\frac{2}{3}$ of the cutting length must be below ground. After proper installation, trim above ground length so that no more than 12 inches (with at least two live buds showing) is left above ground. Dead blow hammers, rubber mallets, or other hammering devices shall NOT be used to install the cuttings. Soil shall be placed in any spaces around the cuttings and tamped into place to remove any air pockets. Water shall be applied immediately (within five minutes) to the planted cuttings/stakes until the soil around the plant is saturated.

Subsection 214.06, add the following:

Payment will be made under:

Pay Item	Pay Unit
Willow Cuttings	Each

**REVISION OF SECTION 214
ROOTWADS**

Section 214 of the Standard Specifications is hereby revised as follows:

Subsection 214.01 shall include the following:

This work also consists of installing rootwads in the low-flow channel bank as shown on the plans or as directed.

Subsection 214.02 shall include the following:

(2) *Rootwad*. Streambank restoration shall include live willow stakes and rootwad logs. Material specifications for each of these components are provided below:

1. *Live Willow Stakes*. The live willow stakes shall conform to Revision of Section 214 - Planting.
2. *Rootwad Logs*. The Contractor will salvage trees with trunk diameter at breast height (DBH) of 12 to 24 inches as part of the demolition plan DM-101. The logs shall measure 12 –15 feet long including the intact rootwad end.

Subsection 214.03 shall include the following:

Trees to stockpile for the rootwad installation will be identified by Boulder County Transportation Staff prior to the start of the grading operations on site. All material shall be safely stored on site until the rootwad installation can begin in the creek channel. Unused material including trimmings shall be cut up to 2 feet lengths and evenly distributed around the wetland mitigation site.

Rootwad and deflection log structures shall be installed once site conditions are approved by Boulder County Transportation Staff.

The creek bank shall be excavated to accommodate the entire length of the rootwad log trunk. The excavation shall be slightly angled to become deeper further inland from the edge of the waterbody. The excavated bank materials shall be reused for the final layer when backfilling.

The rootwad log trunk shall be placed in the excavation resting on the footer log so that it is embedded into the creek bank. The rootwad log trunk shall be angled slightly in the excavation so that the rootwad structure is facing upstream at an angle, as specified in the Contract Documents.

The previously excavated bank material shall be placed as needed to create the subgrade for the topsoil overbank as shown in the Contract Documents.

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**REVISION OF SECTION 214
 ROOTWADS**

Subsection 214.05 shall include the following:

Rootwad shall be measured by the actual number of rootwads installed and accepted. Rootwad Rock Backfill will not be measured and paid for separately, but shall be included in the work.

Subsection 214.06 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Rootwad	Each

Excavation and embankment will not be measured and paid for separately but shall be included in the cost of the item.

**REVISION OF SECTION 216
 SOIL RETENTION COVERING**

Section 216 of the Standard Specifications is hereby revised as follows:

Subsection 216.02 shall include the following:

All soil retention coverings shall be biodegradable. Photodegradable will not be accepted.

Subsection 216.02 (a) 3 shall include the following:

The Blanket shall have, at a minimum, the following physical requirements:

- Roll Width: 6.5 ft
- Thickness, per ASTM D6525, 300 mils
- Matrix Fill Material 100% Coconut
- Mass per Unit Area, per ASTM D6475, 26 oz/sy
- Minimum Tensile Strength, per ASTM D4595, 1968 lb/ft
- Minimum Open Area, 36%
- Open Weave shall be a minimum of 0.5in x0.5 inch.

Subsection 216.05 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Soil Retention Blanket (Coconut) (Biodegradable)	Linear Foot

**REVISION OF SECTION 217
NOXIOUS WEED MANAGEMENT**

Section 217 of the Standard Specifications is hereby revised as follows:

Subsection 217.01 shall include the following:

This work includes the prevention, control, and monitoring of noxious weeds using all methods that are available for the targeted weed species. Noxious weed management will include the prevention and control of noxious weeds identified in the project area. Effective noxious weed management procedures shall use a combination of the four basic methods: chemical (herbicide), mechanical, cultural, or biological techniques, including prevention and monitoring.

The Contractor shall control and prevent the spread of noxious weeds throughout construction to comply with Title CRS 35-5.5, Colorado Weed Management Act.

Perform treatment in accordance with Colorado and Federal regulations. Provide BCPOS with current Commercial/Professional Applicator license upon request.

Subsection 217.02 shall include the following:

The material for Noxious Weed Management, other than chemical (herbicide) shall conform to the following:

- (a) *Mechanical Control.* Mechanical control shall consist of mowing and brush cutting, hand pulling, blading, grubbing, and the use of hand operated tools, such as power weeders, string trimmers, chain saws, brushhooks, or heavy equipment. Engineer or Owner shall approve any planned mowing.
- (b) *Cultural Control.* Cultural control to enhance the vigor of desirable plants shall consist of native seeding and plantings using the appropriate project seed mix(es), mulching, , as appropriate and in accordance with CDOT Standard Specifications, Sections 212, 213, 214, 216, and as shown on the plans.
- (c) *Biological Control.* Biological control shall consist of the use of approved living organisms (insects, animals, or pathogens) with assistance provided by the Colorado Department of Agriculture's Division of Plant Industry or Colorado State University Cooperative Extension.

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**REVISION OF SECTION 217
 NOXIOUS WEED MANAGEMENT**

Subsection 217.03 shall include the following:

Prior to starting the Work, submit a proposed invasive species treatment schedule, including specific sequence and timing of control techniques, for review. Do not perform any Work until the schedule is approved. Below is a table outlining the known primary invasive plant species requiring treatment.

Table 1: Primary Known Invasive Plant Species Requiring Treatment

Common Name	Scientific Name	State List
Bull thistle	<i>Cisium vulgare</i>	B
Canada thistle	<i>Cirsium arvense</i>	B
Common mullein	<i>Verbascum Thapsus</i>	C
Diffuse knapweed	<i>Centaurea diffusa</i>	B
Moth mullein	<i>Verbascum blattaria</i>	B
Musk thistle	<i>Carduus nutans</i>	B
Sulfur cinquefoil	<i>Potentilla recta</i>	B

Subsection 217.04 shall include the following:

The quantity to be measured for Noxious Weed Management will be the total number of actual person hours that are used to remove weeds, . The hour price will be full compensation for all work, materials and personnel required to complete the item. Stripping of topsoil infested with noxious weeds will be paid for in accordance to Section 207. Mechanical, cultural, biological or chemical removal of noxious weeds will not be measured, but shall be included in the work.

Subsection 217.05 shall include the following:

The accepted quantities will be paid for at the contract unit price for Noxious Weed Management.

Payment will be made under:

Pay Item	Pay Unit
Noxious Weed Management	Hour

**REVISION OF SECTION 506
RIPRAP**

Section 506 of the Standard Specifications is hereby revised for this project as follows:

Subsection 506.03 shall include the following:

Riprap shall be placed at the locations as shown on the drawings and installed with the following requirements:

- A. Prior to beginning the structure excavation for riprap installation, the contractor must have a dewatering plan approved by Boulder County. Refer to section 107.25 of these specifications for dewatering plan requirements.
- B. Channel slopes, bottoms, or other areas that are to be protected with riprap shall be free of brush, trees, stumps, and other objectionable material and be graded to a smooth compacted surface. Contractor shall excavate areas to receive riprap to the specified depth.

The contractor shall place filter fabric and place the riprap on stable subgrade materials. If unsuitable materials are encountered (after dewatering per the approved dewatering plan), they shall be removed and replaced as directed by Boulder County and shall be paid under 206 Structure Excavation. When subgrade is built up with embankment material, approved material shall be placed and compacted in a maximum of four-inch (4") lifts to ninety-five percent (95%) of Maximum Standard Proctor Density (ASTM D698). After an acceptable subgrade is established, place the filter fabric and then six (6) inches of Type II Bedding Material. The riprap shall be immediately placed on the bedding and leveled to the specified elevation.

- C. All fabric, bedding, and rock is to be placed in a dewatered condition beginning at the toe of the slope or other lowest point. Place a first layer of smaller riprap of approximate d_{50} thickness. Then place the top layer with surface rocks that are largely d_{50} or greater, filling voids as necessary with smaller riprap. Surface grades shall be a plane or as indicated, but projections above or depressions under the finished design grade of more than ten percent (10%) of the rock layer thickness shall not be allowed. Smaller rock shall be securely locked between the larger stone. Any large voids shall be filled with rock. The majority of the riprap on this project will be buried with a substantial amount of embankment. Riprap shall be covered with a minimum eight (8) inches of native soil such that no rock points are protruding. Four (4) inches of topsoil shall be placed on the native soil on the buried riprap. The final surface shall be thoroughly wetted for good compaction, smoothed and compacted by vibrating equipment; the surface shall then be hand raked to receive planting or seeding. Planting and/or seeding shall be completed as soon as possible after riprap installation. All channel riprap shall be topped with an erosion blanket as called out in the plan.
- D. Boulder County shall reject placed riprap which does not conform to this section and the contractor shall immediately remove and rework the riprap to conform to said sections. Riprap shall be rejected which is either delivered to the job site or placed that does not conform to this section. Rejected riprap from stockpiles or that has been placed shall be removed from the project site by the Contractor and at contractor's expense.

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**REVISION OF SECTION 506
RIPRAP**

Subsection 506.10 shall include the following:

Payment will be made under

Pay Item	Pay Unit
Buried Riprap (24 Inch)	CY

Payment for Riprap will be full compensation for all work and materials required to complete the item, including but not limited to, bedding material, filter fabric, rock, labor and equipment, and topping with eight (8) inches of native material and topsoil. Excavation for the placement of riprap will be paid under Unclassified Excavation.

**REVISION OF SECTION 509
PREFABRICATED STRUCTURAL STEEL BRIDGE**

Section 509 of the Standard Specifications is hereby revised to include the following:

Subsection 509.01 shall include the following:

This work consists of fabricating the Structural Steel Bridge that includes the steel truss structure (Weathering Steel), Structural Fasteners, Anchor Bolts, Bearing Plates, furnish and installation of the Structural Steel Bridge in accordance with these specifications, and in conformity to the plans.

Add subsection 509.051 immediately following subsection 509.05 under the Materials section.

509.051 Structural Steel Bridge Materials

Bridges specified as “weathering” shall be fabricated from rolled beam or wide flange shapes designated ASTM A709 Grade 50W. Secondary weathering members may be tubular shapes carrying the ASTM A847 (50 ksi) designation; all domestically produced and provided by an AISC recognized supplier.

All bolted connections shall utilize ASTM A-325 High Strength Bolts. All bolts for weathering steel components shall be ASTM A325 Type 3. Galvanized bolts shall be A325 Type 1, hot dip galvanized in accordance with ASTM A-153 specifications.

The anchor bolts supplied with all bridge systems shall be ASTM A449 Full Thread Studs Hot Dip Galvanized as per ASTM A153. Each anchor bolt shall be provided with one A563 Galvanized Heavy Hex Nut and one F436 Galvanized Flat Washer.

The Stay-in-Place (SIP) corrugated metal decking forms shall have a minimum depth of 2”, Type 8.5P, as supplied by Wheeling Corrugated. The minimum thickness shall be 20 gage and shall have G165 Galvanized Coating. The minimum laying width per sheet of decking shall be 34”. The SIP forms shall be supported by support angles “field welded” to the stringer beams. SIP form shall be attached to support angles using self- tapping screws approved by the SIP manufacturer.

The bridge shall utilize the following bridge bearings: Laminated Elastomeric Bearing Pads beneath Load Plates. Laminated elastomeric bearing pads shall be custom molded from neoprene or natural rubber. Laminated pads shall be reinforced with internal steel plates and vulcanize-bonded to alternating layers of the elastomer during the molding process.

The bridge style in section shall be an all-bolted Warren half through-truss (a.k.a. pony truss) as shown in the contract drawings. The elevation of each truss shall have a polygonal top chord, two diagonal members in each truss panel, and a vertical member at each interior bottom chord panel point. The bottom (tension) chord of each truss shall consist of two equal-sized members with adequate section properties to provide redundancy. The truss girders shall be designed using gusset plates on each side of the chord member and high strength structural fasteners (bolts) to connect web (diagonal and vertical) members to the chord members. Shim or fill plates shall be used where web members do not dimensionally fit up with the larger chord members.

All steel materials shall meet Buy America requirements and supporting documentation shall be submitted prior to delivery.

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**REVISION OF SECTION 509
PREFABRICATED STRUCTURAL STEEL BRIDGE**

Manufacturers:

1. CONTECH Engineered Solutions, LLC
9025 Centre Pointe Drive
West Chester, OH 45069
2. Big-R Bridge, Inc.
P.O. Box 1290
Greeley, Colorado 80632
3. US Bridge
5765 Leehigh Circle
Nashport, OH 43830
4. Or approved equal

All other prospective manufacturers, not pre-approved by the Owner are required to submit a signed application with the following documentation supporting their ability to meet the above referenced qualifications no less than seven (7) business days prior to bid opening:

- Copy of current AISC certifications as provided below.
- Copy of Quality Assurance Programs.
- Splicing and erection procedures.
- Approved welding process procedures.
- The name and qualifications of the Manufacturer's representative designated to represent the Manufacturer for all pre-bid activities.
- The name and qualifications of the Technical Assistant that will conduct on-site assistance during field installation of the Bridge until secure and stable.
- If any part of the Bridge is to be galvanized, a copy of the written warranty issued by the galvanizer that warrants against corrosion of the superstructure (other than bridge flooring) for a period of not less than 35 years.
- List ten (10) permanent steel bridges similar in size and configuration to the Bridge, which the applicant has manufactured in the preceding five (5) years, together with drawings, calculations, project details and contact information.
- Complete list of plant, equipment, employees and others to be used by the applicant to design and manufacture the Bridge including copies of all Professional Engineering licenses for designers and welding certificates for welders.
- **AISC Certification:** The Manufacturer shall be an approved steel fabricator under the AISC Quality Management System Certification Program as an Intermediate Steel Bridge Fabricator including Fracture Critical and Sophisticated Paint System endorsements, for a period of at least five (5) continuous years immediately preceding the bid opening.

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**REVISION OF SECTION 509
PREFABRICATED STRUCTURAL STEEL BRIDGE**

The Structural Steel Bridge shall be delivered to the site in pre-assembled sections ready for installation with no field welding of the major structure required.

Deliver anchor bolts, sleeves and anchorage devices which are to be embedded in concrete to the project site in time for installation under appropriate trades. Furnish setting drawings, templates and installation instructions as required.

Subsection 509.14(a) shall include the following:

A current copy of the AISC Program Manual describing the Bridge Manufacturer's operations and practices shall be maintained by the quality Control Manager for review by designated quality control inspectors. Copies of the AISC Certification Manual shall be made available to customers and their representatives, upon requests.

Subsection 509.15 shall include the following:

The engineering design of the Bridge shall be performed by, or under the direct supervision of a Licensed Professional Engineer in the State in which the Bridge will be erected. The design shall be completed in accordance with recognized engineering principles and design practices and with a standard of care commensurate with the Manufacturer's role in the project.

The Bridge shall be designed in accordance with AASHTO LRFD Bridge Design Specifications 7th Edition including all interims. Additionally, the live load shall be specified as HL-93 (AASHTO LRFD)

The structural analysis for the Bridge shall include, at a minimum, a two dimensional analysis for gravity dead loads and moving live (truck) loads on transverse and longitudinal members, as applicable. Location of axle loads, lane loads, wheel loads; and the distribution of wheel loads shall be applied as such to produce the maximum stress (or applied force) in the member or members under consideration.

Due to their configuration, a U-frame analysis is required for half-through trusses, to confirm the top chord's stability by computing the relative stiffness of the Bridge's cross sectional members to determine the resistance of the top chord members to buckling. The analysis shall follow E. C. Holt, Jr. and R. M. Barnoff's research performed for the Column Research Council, (1950-1957).

The Manufacturer shall utilize three-dimensional CAD software with integrated model-data-CNC file transfer of the Bridge components and assemblies to prepare Engineering and Shop Drawings. This is to promote efficiency during plan development and to improve quality of the delivered Bridge order.

A load rating of the Bridge's superstructure shall be supplied to the Owner, after the bridge's fabrication is complete. The Load Rating shall be follow AASHTO LRFD and CDOT Bridge Rating requirements.

All applicable dead and live loads shall be applied and combined as specified in the Design Specification. A wearing surface of 36 psf shall be applied as a dead load. Longitudinal forces from thermal expansion and contraction, and vehicles; along with lateral forces from wind, flood or seismic events shall be computed and combined as applicable and in accordance with the Design Specification.

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**REVISION OF SECTION 509
PREFABRICATED STRUCTURAL STEEL BRIDGE**

Gusset plates shall be adequately designed to transfer member forces in accordance with governing sections of the Design Specifications and FHWA Publication Number IF-09-014. All gusset plates shall have 1" radiused corners, except for the lower corners aligned toward the mid-line of the bridge. They shall be square to aid their orientation during assembly.

Calculation of the Bridge's dead and live load deflection is required. Live load deflection of the primary members should be limited to the span-to- deflection ratio of L/600 unless otherwise specified. Dead load deflection shall be accommodated by forming camber into the unloaded geometry of the members. Profile grade curvature shall also be taken into account when determining the fabricated (or induced) camber of the members.

The concrete deck slab shall be designed by the bridge manufacturer in accordance with the Design Specification.

Bolted steel connections of truss components and gusset plates provide a greater level of internal redundancy than welded connections. These connections shall be utilized within the design and fabrication process. Exceptions to their use should be justified to the owner and submitted in writing for approval, prior to commencing design.

The Manufacturer shall design the prefabricated bridge and prepare Drawings in accordance with the following minimum requirements. Engineering Drawings and Calculations, sealed by a Registered Professional Engineer in the state where the Bridge is to be erected, will be submitted to the Owner for Approval within (4) weeks of receipt of the Purchase Order, contingent upon receiving all scope information at the time of purchase order; and after receiving answers to requests for information (RFI). Shop Drawings will be supplied to the Owner.

Unless otherwise requested, an electronic version of the Shop Drawings will be submitted in portable document format (.PDF) via email to the Owner or the Owner's designated contact. After final approval by the Owner, the Manufacturer shall provide the Owner with two 24" x 36" paper copies of the Engineering Drawings. (2) sets of the As-Fabricated Drawings (11" x 17") shall be transmitted to the Contractor at the time of Bridge Delivery.

Subsection 509.16 shall include the following:

For all welded assemblies the inspector shall be a Certified Weld Inspector that is qualified under the AWS QC-1 program. Each inspection shall include as a minimum requirement the following: review of Shop Drawings, weld procedures, welder qualifications and weld testing reports, visual inspection of welds and verification of overall dimensions and geometry of the Bridge. Non-destructive testing of welds shall be performed both prior to and after galvanizing. All welds shall be visually inspected 100%. All welds shall be magnetic particle tested for a minimum length or 12". Welds over 12" long shall be magnetic particle tested at least 12" for every 10" of length. A report of these inspections shall be provided.

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**REVISION OF SECTION 509
 PREFABRICATED STRUCTURAL STEEL BRIDGE**

Subsection 509.19(a) shall include the following:

The Manufacturer shall maintain a program to receive, inspect, record and trace materials used in the Bridge. Material Test Reports shall be used to prove domesticity, and document chemistry and physical test records. Certificates of Conformance shall be used to document compliance with specifications. Traceability shall be met by heat and lot numbers records from the producing mill or supplier. This program shall be in evidence by the Manufacturer's AISC Certification and a written copy found in the Manufacturer's AISC Certification Manual.

Subsection 509.20(k) shall include the following:

All bolt hole fabrication for high strength, slip critical bolted connections shall conform to the workmanship requirements of the Research Council on Structural Connections (RCSC) Specifications for Structural Joint Using A325 or A490 Bolts. Computer Numerically Controlled (CNC) drilling equipment shall be utilized as a manufacturing method as it allows for highly accurate hole location along with precise and rapid shop operations. Exceptions to CNC processing should be submitted in writing to the owner for approval, prior to commencing fabrication.

Subsection 509.20 shall include the following:

- (l) Welding of tubular connections is covered in the AWS D1.1 Welding Code. All welding shall utilize E70 or E80 series electrodes. The weld process used shall be Flux Core Arc Welding (FCAW) or Shielded Manual Arc Welding (SMAW) per ANSI/AASHTO/AWS D1.5 "Bridge Welding Code." Welding operators shall be properly accredited and experienced. Qualifications of welders shall be made available upon request.
- (m) *Plate & Shape Cutting*: Plate and shape cutting shall conform to methods specified in AASHTO/AWS D1.5 Bridge Welding Code Section 3 Workmanship. Computer Numerically Controlled (CNC) cutting equipment shall be utilized as a manufacturing method as it allows for highly accurate dimensional cutting along with precise and rapid shop operations. Exceptions to CNC processing should be submitted in writing to the owner for approval, prior to commencing fabrication.

Subsection 509.27 shall include the following:

Delivery of the Bridge will be within an agreed period of time after approval of Engineering Drawings (12 weeks). Bearing plates, anchor bolts and expansion joints shall be furnished in advance of the Bridge for incorporation into the abutment construction, upon receipt of a timely request by the Contractor. Delivery of the bridge shall be coordinated between the Manufacturer or their Supplier and the Contractor. The Supplier shall communicate this information to the Manufacturer depending on the agreement and subsequent responsibilities.

The Manufacturer will advise the Owner/Contractor of the attachment points and other necessary information required to install the bridge. The method and sequence of erection shall be the responsibility of the Contractor unless otherwise included in the agreement. Unloading, stabilization, splicing, bolting, and proper rigging and lifting are the responsibility of the Contractor.

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REVISION OF SECTION 509
PREFABRICATED STRUCTURAL STEEL BRIDGE

The successful bidder through the Manufacturer and/or Supplier shall provide a qualified Technical Assistant at the jobsite while the primary structure components are installed. The Contractor shall notify the Manufacturer or their representative at least two weeks in advance of the planned installation. The Technical Assistant shall have at least five (5) years of experience in the installation of similar bridges.

Subsection 509.32 shall include the following:

Prefabricated Structural Steel Bridge will be measured and paid for by Lump Sum (LS), installed complete. Work shall include all steel, hardware, anchor bolts, bearing plates, washers, nuts, temporary shoring and other incidentals to the erection of the bridge.

Subsection 509.33 shall include the following:

Payment will be made under:

Pay Item

Pay Unit

Prefabricated Structural Steel Bridge

Lump Sum

REVISION OF SECTION 601 ARCHITECTURAL FEATURES

Section 601 of the Standard Specifications is hereby revised to include the following:

Subsection 601.01 shall include the following:

This work consists of constructing the architectural features of the bridge monuments that includes the textured face (fish/fishing images, creek name), installation of the sandstone rock face, furnish and installation of the sandstone cap in accordance with these specifications, and in conformity to the plans.

Furnishing and placement of the concrete and rebar for the bridge monuments shall be in accordance with specification 601 and 602 and paid under “Concrete Class D (Bridge)”, “Structural Concrete Coating”, and “Reinforcing Steel (Epoxy Coated)”. The furnishing and placement of the reinforcing steel shall be in accordance with specification 602 and paid under “Bridge Rail Type 10M” and the painting of the monuments shall be in accordance with specification 601 and paid under “Bridge Rail Type 10M”.

Textured Face – Contractor shall provide a formliner that provides a ½” relief with the fish/fishing /creek name images. Boulder County shall provide a DWG and/or JPG file of the Fish/Fishing images upon request. No deviations shall be made to this image. The creek name shall be three (3) inches tall letters, “Modern No. 20” font.

Sandstone veneer – Contractor shall provide Lyons Red Sandstone to construct the veneer.

Sandstone Cap – The cap shall be a Lyons Red Sandstone and attached to the concrete monument by epoxy and doweling as shown on the plans.

CONSTRUCTION REQUIREMENTS

Subsection 601.12(n) Epoxy Bonder shall include the following:

Prior to bonding the sandstone veneer and the sandstone cap to the concrete, the surface shall be sandblasted to a Concrete Surface Profile Three (CSP 3) as defined in Technical Guideline No. 03732, “Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays” by the International Concrete Repair Institute.

Concrete shall have reached the 28 day compressive strength prior to adhering the sandstone veneer and sandstone cap to the concrete face.

A structural epoxy adhesive shall be used to adhere the sandstone veneer and sandstone cap to the concrete surface. The epoxy adhesive shall meet the requirements of AASHTO M235 and subsection 712.10 and manufacturer’s application instructions shall be adhered to. Submit manufacturer's product data and specifications for epoxy adhesive, including certification that it complies with the specifications.

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REVISION OF SECTION 601
ARCHITECTURAL FEATURES

Subsection 601.12(o) Non-Shrink Grout shall be added to this section and include the following:

Use a non-shrink, cementitious grout for the grouting in between the sandstone veneer.

- a. Use gray, non-shrink grout concrete, containing no calcium chloride or admixture containing calcium chloride and is non-metallic.
- b. Use quick-setting, rapid strength gain, non-shrink, and high-bond strength grout.
- c. The grout shall meet the following requirements:
 - i. ASTM C-1107 (grade C)
 - ii. Flexural Strength ASTM C-293
 - iii. Bond Strength ASTM C-882
 - iv. Tensile Splitting Strength ASTM C-496
- d. Submit manufacturer's product data and specifications for non-shrink grout, including certification that it complies with the specifications.
- e. Minimum ambient and substrate temperature shall be 45 degrees and rising at the time of application. The Contractor shall maintain 45 degrees during and for 48 hours after completion.
- f. Manufacturers application instructions shall be followed.

Subsection 601.19 **METHOD OF MEASUREMENT** shall include the following:

Architectural Features will be paid on a lump sum basis. This payment will include all materials and labor to provide the textured face, install the sandstone veneer and sandstone cap. Epoxy adhesive, non-shrink grout, and dowels will be considered incidental to the work.

Subsection 601.20 **BASIS OF PAYMENT** shall include the following:

Pay Item	Pay Unit
Architectural Features	Lump Sum

**REVISION OF SECTION 630
TRAFFIC CONTROL MANAGEMENT**

Section 630 of the Standard Specifications is hereby revised as follows:

Subsection 630.11 shall include the following:

The Contractor's Superintendent and Traffic Control Manager (TCM) shall be equipped with a mobile telephone unit at all times that has a local number for contact with one another, the Project Engineer, or emergency response dispatchers when emergency services are required. The TCM shall make immediate contact with emergency personnel as required to assist accident victims, expedite the removal of broken-down vehicles, and maintain the smooth flow of traffic.

The Construction Superintendent shall also have a mobile telephone available for use.

The Contractor shall supply a 5-watt, FM band hand-held radio, capable of transmitting and receiving on three frequencies throughout the limits as required for traffic and safety control, to the Project Engineer, Assistant Project Engineer, Head Tester, Traffic Control Supervisor, each flagger, and other personnel as required. The radios shall be equipped with battery chargers and rechargeable batteries. The radios shall be supplied one week prior to the commencement of work.

Traffic Control Management and Inspection shall be performed in accordance with this Section and shall be considered incidental to the traffic pay item.

Subsection 630.15 shall include the following:

Portable hand-held radios will not be measured and paid for separately, but shall be included in the work.

Traffic Control Management and Inspection will not be measured and paid separately.

**REVISION OF SECTION 703
AGGREGATES**

Section 703 of the Standard Specification is hereby revised for this project as follows:

Subsection 703.03, Aggregate for Bases, replace the first sentence in the first paragraph as follows:

Aggregates for bases shall be crushed stone, crushed gravel or natural gravel, which conforms to the quality requirements of AASHTO M 147 except that the requirements for the ratio of minus 75 μm (No. 200) sieve fraction to the minus NO. 40 sieve fraction, state in 2.2.2 of AASHTO M 147, shall not apply. No crushed slag, crushed reclaimed concrete or asphalt material may be used on the project.

TRAFFIC CONTROL PLAN - GENERAL

The key elements of the Contractor's Method of Handling Traffic (MHT) are outlined in Subsection 630.09.

The components of the Traffic Control Plan (TCP) for this project are included in the following:

- 1) Subsection 104.04 and Section 630 of the Standard Specifications,
- 2) Standard Plan S-630-1
- 3) Schedule of Construction Traffic Control Devices
- 4) Manual of Traffic Control Devices (MUTCD)

Special Traffic Control Plan requirements for this project are as follows:

One lane in each direction on Old St. Vrain Road and State Highway 7 shall remain open at all times unless approved by Boulder County and/or the Colorado Department of Transportation for changes on State Highway 7. Boulder County may allow one lane of traffic on Old St. Vrain Road with a flagging operation for asphalt removal and paving. Contractor must coordinate the one lane closure with other construction projects within the project area so as not to significantly disrupt their work.

The Contractor shall submit to the County Traffic Engineer and Colorado Department of Transportation a method of handling vehicular traffic for approval at least two weeks prior to each construction phase, prior to changes in traffic control and prior to any construction. Contractor shall obtain any necessary permits required from CDOT.

Access to local residents and properties will be maintained.

All costs incidental to the foregoing requirements shall be included in the original contract prices for the project

UTILITIES

The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavating or grading is planned in the area of underground utility facilities. The Contractor shall notify all affected utilities at least two (2) business days, not including the actual day of notice, prior to commencing such operations. The Contractor shall contact the Utility Notification Center of Colorado (UNCC) at 811, to have locations of UNCC registered lines marked by member companies. All other underground facilities shall be located by contacting the respective owner. Please note that UNCC marks only its member’s facilities – other facilities, such as ditches and drainage pipes may exist, and it is the Contractor’s responsibility to investigate, locate and avoid such facilities. Utility service laterals shall also be located prior to beginning excavation or grading.

The following table includes contacts for known utilities: *(There are no known utilities within the area of construction. However, if utilities are discovered the contractor shall follow this specification)*

UTILITY OWNER / ADDRESS	CONTACT / EMAIL	PHONE / FAX
Poudre Valley REA 7649 REA Parkway Fort Collins, CO 80528	Matt Organ morgan@pvrea.com	(970) 282-6436
CenturyLink 3702 Automation Way, Suite 106 Fort Collins, CO 80525	Sam Banulis Samuel.banulis@centurylink.com	(970) 490-7507

The Contractor shall coordinate with the Engineer and any appropriate utility company to facilitate the installation, placement and relocation of all utilities impacted on this project.

The work described in these plans and specifications requires full cooperation between the Contractor and the utility owners in accordance with Subsection 105.11 in conducting their respective operations, so the utility work can be completed with minimum delay to all parties concerned. Also, in accordance with the plans and specifications, and as directed by the Engineer, the Contractor shall keep each utility owner advised of any work being done to its facility, so that each utility owner can coordinate its inspections for final acceptance of the work with the Engineer.

The Contractor shall coordinate the work with the owners of the utilities impacted by the work. Coordination with utility owners includes, but is not limited to, staking construction features, providing and periodically updating an accurate construction schedule which includes all utility work elements, providing written notification of upcoming required utility work elements as the construction schedule indicates, allowing the expected number of working days for utilities to complete necessary relocation work, conducting necessary utility coordination meetings, and all other necessary accommodations as directed by the Project Engineer. Surveying and/or staking of utility relocations to be performed by the owner shall be the responsibility of the utility owner.

Prior to excavating or performing any earthwork operations, the Contractor shall positively locate all potential conflicts with existing underground utilities and proposed construction, as determined by the Contractor according to proposed methods and schedule of construction. The Contractor shall modify construction plans to avoid existing underground facilities as needed, and as approved by the Engineer.

The Contractor shall provide traffic control for any utility work expected to be coordinated with construction, as directed by the Engineer.

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UTILITIES

The location of utility facilities as shown on the plans, and herein described, was obtained from the best available information.

All costs incidental to the foregoing requirements will not be paid for separately but shall be included in the work.

THE WORK LISTED BELOW SHALL BE PERFORMED BY THE CONTRACTOR:

NOTE: The Contractor shall provide written notice to each utility owner, with a copy to the Engineer, immediately prior to each utility work element expected to be coordinated with construction. The number of days of prior notice is noted for each owner.

NONE

THE WORK LISTED BELOW WILL BE COMPLETED BY THE UTILITY COMPANIES OR THEIR AGENTS:

NONE

FORCE ACCOUNT ITEMS

DESCRIPTION

This special provision contains the Department's estimate for force account items included in the Contract. The estimated amounts marked with an asterisk will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

BASIS OF PAYMENT

Payment will be made in accordance with subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at \$5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

<u>Force Account Item</u>	<u>Estimated Quantity</u>	<u>Amount</u>
F/A Minor Contract Revisions	F.A.	\$ 100,000.00*
F/A Erosion Control	F.A.	\$ 50,000.00*

**CDOT STANDARD SPECIFICATIONS
SECTION B**

REVISION OF SECTIONS 101 AND 630
CONSTRUCTION ZONE TRAFFIC CONTROL

Sections 101 and 630 of the Standard Specifications are hereby revised for this project as follows:

In subsection 101.01 add the following:

MASH Manual for Assessing Safety Hardware

In subsection 630.01, delete the first paragraph and replace with the following:

630.01 This work consists of furnishing, installing, moving, maintaining, and removing temporary traffic signs, advance warning arrow panels, flashing beacon (portable), barricades, channelizing devices, delineators, temporary traffic signals, mobile pavement marking zones, masking and unmasking existing signs in construction zones, and concrete barriers as required by the Manual on Uniform Traffic Control Devices for Streets and Highways and the Colorado Supplement thereto, in accordance with the Contract. Devices shall comply with the performance criteria contained in NCHRP Report 350 (only applicable for devices developed prior to 2011) or MASH (acceptable for all devices). Devices temporarily not in use shall, as a minimum, be removed from the shoulder area. Moving will include devices removed from the project and later returned to use.

In subsection 630.02, delete the second paragraph, and replace with the following:

Temporary sign support assembly shall be timber, perforated square metal tubing inserted into a larger base post or slip base or perforated metal U-channel with a slip base. The temporary sign support assembly shall conform to NCHRP (only applicable for sign support assemblies developed prior to 2011) or MASH (acceptable for all sign support assemblies), and AASHTO requirements regarding temporary sign supports during construction.

Subsection 630.02 shall include the following:

If a timber post is selected, it shall conform to the requirements of subsection 614.02.

In subsection 630.07(a), delete the first paragraph and replace with the following:

(a) *Stackable Vertical Panels.* Stackable vertical panels shall comply with the crash test requirements contained in NCHRP Report 350 (only applicable for vertical panels developed prior to 2011) or MASH (acceptable for all vertical panels) and shall meet MUTCD requirements for vertical panels. Vertical panels shall be retroreflectorized with Type IV sheeting, in accordance with subsection 630.02. The stackable vertical panels shall have the following properties:

In subsection 630.07(b), delete the first paragraph and replace with the following:

(b) *Stackable Tubular Markers.* Stackable tubular markers shall comply with the crash test requirements contained in NCHRP Report 350 (only applicable for stackable tubular markers developed prior to 2011) or MASH (acceptable for all stackable tubular markers) and shall conform to MUTCD requirements for Tubular Markers. The stackable tubular markers shall have the following properties:

In subsection 630.09, delete the second and third paragraphs, and replace with the following:

Work zone devices designated by FHWA as Category I, II, or III, shall comply with the performance criteria contained in NCHRP Report 350 (only applicable for devices developed prior to 2011) or MASH (acceptable for all devices). Devices designated as Category IV, including but not limited to portable or trailer-mounted devices such as flashing arrow panels, temporary traffic signals, area lighting supports, and changeable message signs are not required to meet NCHRP 350 or MASH requirements.

Except for Category IV devices, the Contractor shall obtain and present to the Engineer the manufacturer's written NCHRP 350 (only applicable for devices developed prior to 2011) or MASH (acceptable for all devices) certification for each work zone device before it is first used on the project.

REVISION OF SECTIONS 101 AND 630
CONSTRUCTION ZONE TRAFFIC CONTROL

In subsection 630.10(a) (3) (iii), delete the third paragraph, and replace with the following:

Groups 1 and 2 shall each be equipped with a truck-mounted Advance Warning Flashing or Sequencing Arrow Panel (C Type), and a truck mounted impact attenuator. The impact attenuator shall be located on the rearmost vehicle of each group. A separate vehicle for this attenuator may be used. Each truck-mounted impact attenuator shall be certified by the manufacturer to be able to withstand a 62 MPH impact in accordance with NCHRP 350, Test Level 3 (only applicable for truck-mounted impact attenuators developed prior to 2011) or MASH, Test Level 3 (acceptable for all truck-mounted impact attenuators). The cone setting truck and the cone pickup truck shall not be the same vehicle.

In subsection 630.16, delete the 5th paragraph.

REVISION OF SECTION 105
DISPUTES AND CLAIMS FOR CONTRACT ACCEPTANCE

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsections 105.22, 105.23 and 105.24 and replace with the following:

105.22 Dispute Resolution. Subsections 105.22, 105.23, and 105.24 detail the process through which the parties (CDOT and the Contractor) agree to resolve any issue that may result in a dispute. The intent of the process is to resolve issues early, efficiently, and as close to the project level as possible. Figure 105-1 in the standard special provisions outlines the process. Specified time frames may be extended by mutual agreement of the Engineer and the Contractor. In these subsections, when a time frame ends on a Saturday, Sunday or holiday, the time frame shall be extended to the next scheduled work day.

An issue is a disagreement concerning contract price, time, interpretation of the Contract, or all three between the parties at the project level regarding or relating to the Contract. Issues include, but are not limited to, any disagreement resulting from a delay, a change order, another written order, or an oral order from the Project Engineer, including any direction, instruction, interpretation, or determination by the Project Engineer, interpretations of the Contract provisions, plans, or specifications or the existence of alleged differing site conditions.

The Contractor shall be barred from any administrative, equitable, or legal remedy for any issue which meets either of the following criteria;

1. The Contractor did not to bring the issue to the Project Engineer's attention in writing within 20 days of the Contractor being aware of the issue.
2. The Contractor fails to continually (weekly or otherwise approved by both parties) work with CDOT towards a resolution.

A dispute is an issue in which the Contractor and CDOT have not been able to resolve and of which the Contractor submits a written formal notice of dispute per section (b) below.

A claim is a dispute not resolved at the Resident Engineer level or resolved after a DRB recommendation.

The term "merit" refers to the right of a party to recover on a claim or dispute, irrespective of quantum, based on the substance, elements, and grounds of that claim or dispute. The term "quantum" refers to the quantity or amount of compensation or time deserved when a claim or dispute is found to have merit.

Disputes from subcontractors, material suppliers, or any other entity not party to the Contract shall be submitted through the Contractor. Review of a pass-through dispute does not create privity of Contract between CDOT and the subcontractor.

If CDOT does not respond within the specified timelines, the Contractor may advance the dispute to the next level.

When the Project Engineer is a Consultant Project Engineer, actions, decisions, and determinations specified herein as made by the Project Engineer shall be made by the Resident Engineer.

The dispute resolution process set forth in this subsection shall be exhausted in its entirety prior to initiation of litigation or arbitration. Failure to comply with the requirements set forth in this subsection shall bar either party from any further administrative, equitable, or legal remedy. If a deadline is missed that does not prejudice either party, further relief shall be allowed.

All written notices of dispute shall be submitted within 30 days of date of the Project Engineer's Final Acceptance letter; see subsection 105.21(b).

When a project has a landscape maintenance period, the Project Engineer will grant partial acceptance in accordance with subsection 105.21(a). This partial acceptance will be project acceptance of all the construction work performed prior to this partial acceptance.

All disputes and claims related to the work in which this partial acceptance is granted shall be submitted within 30 days of the Project Engineer's partial acceptance.

REVISION OF SECTION 105
DISPUTES AND CLAIMS FOR CONTRACT ACCEPTANCE

Should the Contractor's dispute use the Total Cost approach for calculating damages, damages will be determined by subtracting the contract amount from the total cost of performance. Should the Contractor's dispute use the Modified Total Cost approach for calculating damages, if the Contractor's bid was unrealistic in part, and/or some of its costs were unreasonable and/or some of its damages were caused by its own errors, those costs and damages will be deducted from the total cost of performance to arrive at the Modified Total Cost. The Total Cost or Modified Total Cost basis for calculating damages shall not be available for any disputes or claims seeking damages where the Contractor could have kept separate cost records at the time the dispute arose as described in subsection 105.22(a).

- (a) *Document Retention.* The Contractor shall keep full and complete records of the costs and additional time incurred for each dispute for a period of at least three years after the date of final payment or until dispute is resolved, whichever is more. The Contractor, subcontractors, and lower tier subcontractors shall provide adequate facilities, acceptable to the Engineer, for an audit during normal business hours. The Contractor shall permit the Engineer or Department auditor to examine and copy those records and all other records required by the Engineer to determine the facts or contentions involved in the dispute. The Contractor shall identify and segregate any documents or information that the Contractor considers particularly sensitive, such as confidential or proprietary information.

Throughout the dispute, the Contractor and the Project Engineer shall keep complete daily records of extra costs and time incurred, in accordance with the following procedures:

1. Daily records shall identify each operation affected, the specific locations where work is affected, and the potential effect to the project's schedule. Such records shall also reflect all labor, material, and equipment applicable to the affected operations.
 2. On the first work day of each week following the date of the written notice of dispute, the Contractor shall provide the Project Engineer with the daily records for the preceding week. If the Contractor's records indicate costs greater than those kept by the Department, the Project Engineer will meet with the Contractor and present his records to the Contractor at the meeting. The Contractor shall notify the Engineer in writing within three work days of any inaccuracies noted in, or disagreements with, the Department's records.
- (b) *Initial Dispute Resolution Process.* To initiate the dispute resolution process the Contractor shall provide a written notice of dispute to the Project Engineer upon the failure of the Parties to resolve the issue through negotiation. Disputes will not be considered unless the Contractor has first complied with specified issue resolution processes such as those specified in subsections 104.02, 106.05, 108.08(a), and 108.08(d).

The Contractor shall supplement the written notice of dispute within 15 days with a written Request for Equitable Adjustment (REA) providing the following:

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- (1) The date of the dispute
- (2) The nature of the circumstances which caused the dispute
- (3) A statement explaining in detail the specific provisions of the Contract and any basis, legal or factual, which support the dispute.
- (4) If any, the estimated quantum, calculated in accordance with methods set forth in subsection 105.24(b)12., of the dispute with supporting documentation
- (5) An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption.

The Contractor shall submit as much information on the quantum and impacts to the Contract time as is reasonably available with the REA and then supplement the REA as additional information becomes available. If the dispute escalates to the DRB process the DRB shall not hear any issue or consider any information that was not contained in the Request for Equitable Adjustment and fully submitted to the Project Engineer and Resident Engineer during the 105.22 process.

- (c) *Project Engineer Review.* Within 15 days after receipt of the REA, the Project Engineer will meet with the Contractor to discuss the merits of the dispute. Within seven days after this meeting, the Project Engineer will issue a written decision on the merits of the dispute.

The Project Engineer will either deny the merits of the dispute or notify the Contractor that the dispute has merit. This determination will include a summary of the relevant facts, Contract provisions supporting the determination, and an evaluation of all scheduling issues that may be involved.

If the dispute is determined to have merit, the Contractor and the Project Engineer will determine the adjustment in payment, schedule, or both within 30 days. When a satisfactory adjustment is determined, it shall be implemented in accordance with subsections 106.05, 108.08, 109.04, 109.05 or 109.10 and the dispute is resolved.

If the Contractor accepts the Project Engineer's denial of the merits of the dispute, the dispute is resolved and no further action will be taken. If the Contractor does not respond in seven days, it will be assumed he has accepted the denial. If the Contractor rejects the Project Engineer's denial of the merits of the dispute or a satisfactory adjustment of payment or schedule cannot be agreed upon within 30 days, the Contractor may further pursue resolution of the dispute by providing written notice to the Resident Engineer within seven days, according to subsection 105.22(d).

- (d) *Resident Engineer Review.* Within seven days after receipt of the Contractor's written notice to the Resident Engineer of unsatisfactory resolution of the dispute, the Project Engineer and Resident Engineer will meet with the Contractor to discuss the dispute. Meetings shall continue weekly for a period of up to 30 days and shall include a Contractor's representative with decision authority above the project level.

If these meetings result in resolution of the dispute, the resolution will be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the dispute is resolved.

If these meetings do not result in a resolution or the participants mutually agree that they have reached an impasse, the dispute shall be presented to the Dispute Review Board in accordance with subsection 105.23.

105.23 Dispute Review Board. A Dispute Review Board (DRB) is an independent third party that will provide specialized expertise in technical areas and administration of construction contracts. The DRB will assist in and facilitate the timely and equitable resolution of disputes between CDOT and the Contractor in an effort to avoid animosity and construction delays, and to resolve disputes as close to the project level as possible. The DRB shall be established and operate as provided herein and shall serve as an independent and impartial board.

There are two types of DRBs: the "On Demand DRB" and the "Standing DRB". The DRB shall be an "On Demand DRB" unless a "Standing DRB" is specified in the Contract. An On Demand DRB shall be established only when the Project Engineer initiates a DRB review in accordance with subsection 105.23(a). A Standing DRB, when specified in the Contract, shall be established at the beginning of the project.

- (a) *Initiation of Dispute Review Board Review.* When a dispute has not been resolved in accordance with

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subsection 105.22, the Project Engineer will initiate the DRB review process within 5 days after the period described in subsection 105.22(d).

(b) *Formation of Dispute Review Board.* DRBs will be established in accordance with the following procedures:

1. CDOT, in conjunction with the Colorado Contractors Association, will maintain a statewide list of suggested DRB candidates experienced in construction processes and the interpretation of contract documents and the resolution of construction disputes. The Board members shall be experienced in highway and transportation projects. After December 31, 2013 only individuals who have completed training (currently titled DRB Administration & Practice Training) through the Dispute Resolution Board Foundation or otherwise approved by CDOT can be a DRB member. When a DRB is formed, the parties shall execute the agreement set forth in subsection 105.23(l).
2. If the dispute has a value of \$250,000 or less, the On Demand DRB shall have one member. The Contractor and CDOT shall select the DRB member and execute the agreement within 30 days of initiating the DRB process. If the parties do not agree on the DRB member, each shall select five candidates. Each party shall numerically rank their list using a scale of one to five with one being their first choice and five being their last choice. If common candidates are listed, but the parties cannot agree, that common candidate with the lowest combined numerical ranking shall be selected. If there is no common candidate, the lists shall be combined and each party shall eliminate three candidates from the list. Each party shall then numerically rank the remaining candidates, with No. 1 being the first choice. The candidate with the lowest combined numerical ranking shall be the DRB member. The CDOT Project Engineer will be responsible for having all parties execute the agreement.
3. If the dispute has a value over \$250,000, the On Demand DRB shall have three members. The Contractor and CDOT shall each select a member and those two members shall select a third. Once the third member is approved the three members will nominate one of them to be the Chair and execute the agreement within 45 days of initiating the DRB process.
4. The Standing DRB shall always have three members. The Contractor and CDOT shall each select a member and those two members shall select a third member. Once the third member is approved the three members will nominate one of them to be the Chair.. The Contractor and CDOT shall submit their proposed Standing DRB members within 5 days of execution of the Contract. The third member shall be selected within 15 days of execution of the Contract. Prior to construction starting the parties shall execute the Three Party Agreement. The CDOT Project Engineer will be responsible for having all parties execute the agreement. The Project Engineer will invite the Standing DRB members to the Preconstruction and any Partnering conferences.
5. DRB members shall not have been involved in the administration of the project under consideration. DRB candidates shall disclose to the parties the following relationships:
 - (1) Prior employment with either party
 - (2) Prior or current financial interests or ties to either party
 - (3) Prior or current professional relationships with either party
 - (4) Anything else that might bring into question the impartiality or independence of the DRB member
 - (5) Prior to agreeing to serve on a DRB, members shall notify all parties of any other CDOT DRB's they are serving or that they will be participating in another DRB.

If either party objects to the selection of a potential DRB member based on the disclosures of the potential member, that potential member shall not be placed on the Board.

6. There shall be no ex parte communications with the DRB at any time.
7. The service of a Board member may be terminated only by written agreement of both parties.
8. If a Board member resigns, is unable to serve, or is terminated, a new Board member shall be selected within four weeks in the same manner as the Board member who was removed was originally selected.

(c) *Additional Responsibilities of the Standing Disputes Review Board*

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1. General. Within 120 days after the establishment of the Board, the Board shall meet at a mutually agreeable location to:
 - (1) Obtain copies of the Contract documents and Contractor's schedules for each of the Board members.
 - (2) Agree on the location of future meetings, which shall be reasonably close to the project site.
 - (3) Establish an address and telephone number for each Board member for the purposes of Board business.
 2. Regular meetings. Regular meetings of the Board shall be held approximately every 120 to 180 days throughout the life of the Contract, except that this schedule may be modified to suit developments on the job as the work progresses. Regular meetings shall be attended by representatives of the Contractor and the Department.
 3. The Board shall establish an agenda for each meeting which will cover all items that the Board considers necessary to keep it abreast of the project such as construction status, schedule, potential problems and solutions, status of past claims and disputes, and potential claims and disputes. Copies of each agenda shall be submitted to the Contractor and the Department at least seven days before the meeting date. Oral or written presentations or both shall be made by the Contractor and the Department as necessary to give the Board all the data the Board requires to perform its functions. The Board will prepare minutes of each meeting, circulate them to all participants for comments and approval, and issue revised minutes before the next meeting. As a part of each regular meeting, a field inspection trip of all active segments of the work at the project site may be made by the Board, the Contractor, and the Department.
 4. Advisory Opinions
 - (1) Advisory opinions are typically used soon after the parties find they have a potential dispute and have conducted preliminary negotiations but before expenditure of additional resources and hardening their positions. Advisory opinions provide quick insight into the DRB's likely assessment of the dispute. This process is quick and may be entirely oral and does not prejudice the opportunity for a DRB hearing.
 - (2) Both parties must agree to seek an advisory opinion and so notify the chairperson. The procedure for requesting and issuing advisory opinions should be discussed with the DRB at the first meeting with the parties.
 - (3) The DRB may or may not issue a written opinion, but if a written advisory opinion is issued, it must be at the specific request of both parties.
 - (4) The opinion is only advisory and does not require an acceptance or rejection by either party. If the dispute is not resolved and a hearing is held, the oral presentations and advisory opinion are completely disregarded and the DRB hearing procedure is followed.
 - (5) Advisory opinions should be limited to merit issues only.
- (d) *Arranging a Dispute Review Board Hearing.* When the Project Engineer initiates the DRB review process, the Project Engineer will:
1. Contact the Contractor and the DRB to coordinate an acceptable hearing date and time. The hearing shall be held at the Resident Engineer's office unless an alternative location is agreed to by both parties. Unless otherwise agreed to by both parties the DRB hearing will be held within 30 days after the DRB agreement is signed by the CDOT Chief Engineer.
 2. Ensure DRB members have copies of all documents previously prepared by the Contractor and CDOT pertaining to the dispute, the DRB request, the Contract documents, and the special provisions at least two weeks before the hearing.
- (e) *Pre-Hearing Submittal:* At least fifteen days prior to the hearing, CDOT and the Contractor shall submit by e-mail to the DRB Chairperson their parties pre-hearing position paper. The DRB Chairperson shall simultaneously distribute by e-mail the pre-hearing position papers to all parties and other DRB members, if any. At the same time, each party shall submit a copy of all its supporting documents to be used at the hearing to all DRB Members and the other party unless the parties have agreed to a common set of

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documents as discussed in #2 below. In this case, CDOT shall submit the common set of documents to the Board and the Contractor. The pre-hearing position paper shall contain the following:

1. A joint statement of the dispute, and the scope of the desired decision. The joint statement shall summarize in a few sentences the nature of the dispute. If the parties are unable to agree on the wording of the joint statement, each party's position paper shall contain both statements, and identify the party authoring each statement. The parties shall agree upon a joint statement at least 20 days prior to the hearing and submit it to the DRB or each party's independent statement shall be submitted to the DRB and the other party at least 20 days prior to the hearing.
2. The basis and justification for the party's position, with reference to specific contract language and other supporting documents for each element of the dispute. To minimize duplication and repetitiveness, the parties may identify a common set of documents that will be referred to by both parties and submit them in a separate package to the DRB. The engineer will provide a hard copy of the project plans and Project and Standard Special Provisions, if necessary, to the DRB. Other standard CDOT documents such as Standard Specifications and M&S Standards are available on the CDOT website.
 - (1) If any party contends that they are not necessary to the proceedings, the DRB shall determine that issue in the first instance. Should the DRB determine that a dispute does not involve a party, that party shall be relieved from participating in the DRB hearing and paying any further DRB costs.
 - (2) When the scope of the hearing includes quantum, the requesting party's position paper shall include full cost details, calculated in accordance with methods set forth in subsection 105.24(b)12. The Scope of the hearing will not include quantum if CDOT has ordered an audit and that audit has not been completed.
3. A list of proposed attendees at the hearing. In the event of any disagreement, the DRB shall make the final determination as to who attends the hearing.
4. A list of any intended experts including their qualifications and a summary of what their presentation will include and an estimate of the length of the presentation.

The number of copies, distribution requirements, and time for submittal shall be established by the DRB and communicated to the parties by the Chairperson.

A pre-hearing phone conference with all DRB members and the parties shall be conducted as soon as a hearing date is established but no later than 10 days prior to the hearing. The DRB Chairperson shall explain the specifics of how the hearing will be conducted including how the two parties will present their information to the DRB (Ex: Each party makes a full presentation of their position or presentations will be made on a "point by point" basis with each party making a presentation only on an individual dispute issue before moving onto to the next issue). If the pre-hearing position papers and documents have been received by the Board prior to the conference call, the DRB Chairperson shall at this conference discuss the estimated hours of review and research activities for this dispute (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB). If the pre-hearing position papers and documents have not been received by the Board prior to the conference call, another conference call will be scheduled during the initial conference call to discuss the estimated hours of review. Compensation for time agreed to in advance by the parties will be made at an agreed rate of \$125 per hour in accordance with subsection 105.23 (k) 2. Compensation for the phone conference time will also be made at an agreed to rate of \$125 per hour in accordance with subsection 105.23 (k) 2. The Engineer shall coordinate the phone conference.

(f) *Dispute Review Board Hearing.* The DRB shall preside over a hearing. The chairperson shall control the hearing and conduct it as follows:

1. An employee of CDOT presents a brief description of the project and the status of construction on the project.
2. The party that requested the DRB presents the dispute in detail as supported by previously submitted information and documentation in the pre-hearing position paper. No new information or disputes will be

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heard or addressed by the DRB.

3. The other party presents its position in detail as supported by previously submitted information and documentation in the pre-hearing position paper. No new information or disputes will be heard or addressed by the DRB.
 4. Employees of each party are responsible for leading presentations at the DRB hearing.
 5. Attorneys shall not participate in the hearing unless the DRB specifically addresses an issue to them or unless agreed to by both parties. Should the parties disagree on attorney participation, the DRB shall decide on what, if any, participation will be permitted. Attorneys representing the parties are permitted to attend the hearing, provided their presence has been noted in the pre-hearing submittal.
 6. Either party may use experts. A party intending to offer an outside expert's analysis at the hearing shall disclose such intention in the pre-hearing position paper. The expert's name and a general statement of the area of the dispute that will be covered by his presentation shall be included in the disclosure. The other party may present an outside expert to address or respond to those issues that may be raised by the disclosing party's outside expert.
 7. If both parties approve, the DRB may retain an outside expert. The DRB chairperson shall include the cost of the outside expert in the DRB's regular invoice. CDOT and the Contractor shall equally bear the cost of the services of the outside expert employed by the DRB.
 8. Upon completion of their presentations and rebuttals, both parties and the DRB will be provided the opportunity to exchange questions and answers. All questions shall be directed to the chairperson first. Attendees may respond only when board members request a response.
 9. The DRB shall hear only those disputes identified in the written request for the DRB and the information contained in the pre-hearing submittals. The board shall not hear or address other disputes. If either party attempts to discuss a dispute other than those to be heard by the DRB or attempts to submit new information, the chairperson shall inform such party that the board shall not hear the issue and shall not accept any additional information. The DRB shall not hear any issue or consider any information that was not contained in the Request for Equitable Adjustment and fully submitted to the Project Engineer and Resident Engineer during the 105.22 process.
 10. If either party fails to timely deliver a position paper, the DRB may reschedule the hearing one time. On the final date and time established for the hearing, the DRB shall proceed with the hearing using the information that has been submitted.
 11. If a party fails to appear at the hearing, the DRB shall proceed as if all parties were in attendance.
- (g) *Dispute Review Board Recommendation.* The DRB shall issue a Recommendation in accordance with the following procedures:
1. The DRB shall not make a recommendation on the dispute at the meeting. Prior to the closure of the hearing, the DRB members and the Contractor and CDOT together will discuss the time needed for analysis and review of the dispute and the issuance of the DRB's recommendation. The maximum time shall be 30 days unless otherwise agreed to by both parties. At a minimum, the recommendation shall contain all the elements listed in Rule 35, Form of Award, of the Arbitration Regular Track Provisions listed at the end of subsection 105.24.

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2. After the meeting has been closed, the DRB shall prepare a written Recommendation signed by each member of the DRB. In the case of a three member DRB, where one member dissents that member shall prepare a written dissent and sign it.
3. The chairperson shall transmit the signed Recommendation and any supporting documents to both parties.

- (h) *Clarification and Reconsideration of Recommendation.* Either party may request clarification or reconsideration of a decision within ten days following receipt of the Recommendation. Within ten days after receiving the request, the DRB shall provide written clarification or reconsideration to both parties unless otherwise agreed to by both parties.

Requests for clarification or reconsideration shall be submitted in writing simultaneously to the DRB and to the other party.

The Board shall not accept requests for reconsideration that amount to a renewal of a prior argument or additional argument based on facts available at the time of the hearing. The Board shall not consider any documents or arguments which have not been made a part of the pre-hearing submittal other than clarification and data supporting previously submitted documentation.

Only one request for clarification or reconsideration per dispute from each party will be allowed.

- (i) *Acceptance or Rejection of Recommendation.* CDOT and the Contractor shall submit their written acceptance or rejection of *the* Recommendation, in whole or in part, concurrently to the other party and to the DRB within 14 days after receipt of the Recommendation or following receipt of responses to requests for clarification or reconsideration.

If the parties accept the Recommendation or a discreet part thereof, it will be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the dispute is resolved.

If either party rejects the Recommendation in whole or in part, it shall give written explanation to the other party within 14 days after receiving the Recommendation. When the Recommendation is rejected in whole or in part by either party, the other party may either abandon the dispute or pursue a formal claim in accordance with subsection 105.24.

If either party fails to submit its written acceptance or rejection of the Dispute Board's recommendation, according to these specifications, such failure shall constitute that party's acceptance of the Board's recommendation.

- (j) *Admissibility of Recommendation.* Recommendations of a DRB issued in accordance with subsection 105.23 are admissible in subsequent proceedings but shall be prefaced with the following paragraph:

This Recommendation may be taken under consideration with the understanding that:

1. The DRB Recommendation was a proceeding based on presentations by the parties.
2. No fact or expert witnesses presented sworn testimony or were subject to cross-examination.
3. The parties to the DRB were not provided with the right to any discovery, such as production of documents or depositions.
4. There is no record of the DRB hearing other than the Recommendation.

- (k) *Cost and Payments.*

1. General Administrative Costs. The Contractor and the Department shall equally share the entire cost of the following to support the Board's operation:

- (1) Copies of Contract and other relevant documentation
- (2) Meeting space and facilities
- (3) Secretarial Services
- (4) Telephone

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- (5) Mail
 - (6) Reproduction
 - (7) Filing
2. The Department and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,200 per day if time spent on-site per meeting is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$800 per day if time spent on-site per meeting is less than or equal to four hours. The time spent traveling to and from each meeting shall be reimbursed at \$50 per hour if the travel distance is more than 50 miles. The agreed daily and travel time rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel of more than 50 miles and incidentals for each day, or portion thereof that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB), has been specifically agreed to in advance by the Department and Contractor. Time away from the project that has been specifically agreed to in advance by the parties will be compensated at an agreed rate of \$125 per hour. The agreed amount of \$125 per hour shall include all incidentals. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all-inclusive rate per day or rate per hour for an individual project.
3. Payments to Board Members and General Administrative Costs. Each Board member shall submit an invoice to the Contractor for fees and applicable expenses incurred each month following a month in which the Board members participated in Board functions. Such invoices shall be in the format established by the Contractor and the Department. The Contractor shall submit to the Department copies of all invoices. No markups by the Contractor will be allowed on any DRB costs. The Department will split the cost by authorizing 50 percent payment on the next progress payment. The Contractor shall make all payments in full to Board members within seven calendar days after receiving payment from the Department for this work.

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(I) *Dispute Review Board Three Party Agreement.*

DISPUTE REVIEW BOARD
 THREE PARTY AGREEMENT
 COLORADO PROJECT NO.

THIS THREE PARTY AGREEMENT, made as of the date signed by the Chief Engineer below, by and between:
 the Colorado Department of Transportation, hereinafter called the "Department"; and

_____,
 hereinafter called the "Contractor"; and

_____,
 _____,
 _____,

and
 _____,
 hereinafter called the "Dispute Review Board" or "Board".

WHEREAS, the Department is now engaged in the construction of the

 [Project Name]

and

WHEREAS, the Contract provides for the establishment of a Board in accordance with subsections 105.22 and
 105.23 of the specifications.

NOW, THEREFORE, it is hereby agreed:

ARTICLE I
 DESCRIPTION OF WORK AND SERVICES

The Department and the Contractor shall form a Board in accordance with this agreement and the provisions of
 subsection 105.23.

ARTICLE II
 COMMITMENT ON PART OF THE PARTIES HERETO

The parties hereto shall faithfully fulfill the requirements of subsection 105.23 and the requirements of this
 agreement.

ARTICLE III
 COMPENSATION

The parties shall share equally in the cost of the Board, including general administrative costs (meeting space and
 facilities, secretarial services, telephone, mail, reproduction, filing) and the member's individual fees.
 Reimbursement of the Contractor's share of the Board expenses for any reason is prohibited.

The Contractor shall make all payments in full to Board members. The Contractor will submit to the Department
 an itemized statement for all such payments, and the Department will split the cost by including 50 percent
 payment on the next progress payment. The Contractor and the Department will agree to accept invoiced costs
 prior to payment by the Contractor.

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THREE PARTY AGREEMENT PAGE 2
 COLORADO PROJECT NO.

Board members shall keep all fee records pertaining to this agreement available for inspection by representatives of the Department and the Contractor for a period of three years after the termination of the Board members' services.

Payment to each Board member shall be at the fee rates established in subsection 105.23 and agreed to by each Board member, the Contractor, and the Department. In addition, reimbursement will be made for applicable expenses.

Each Board member shall submit an invoice to the Contractor for fees incurred each month following a month in which the members participated in Board functions. Such invoices shall be in the format established by the Contractor and the Department.

Payments shall be made to each Board member within 60 days after the Contractor and Department have received all the applicable billing data and verified the data submitted by that member. The Contractor shall make payment to the Board member within seven calendar days of receipt of payment from the Department.

ARTICLE IV
 ASSIGNMENT

Board members shall not assign any of the work to be performed by them under this agreement. Board members shall disclose any conflicts of interest including but not limited to any dealings with the either party in the previous five years other than serving as a Board member under other contracts.

ARTICLE V
 COMMENCEMENT AND TERMINATION OF SERVICES

The commencement of the services of the Board shall be in accordance with subsection 105.23 of the specifications and shall continue until all assigned disputes under the Contract which may require the Board's services have been heard and a Recommendation has been issued by the Board as specified in subsection 105.23. If a Board member is unable to fulfill his responsibilities for reasons specified in subsection 105.23(b)7, he shall be replaced as provided therein, and the Board shall fulfill its responsibilities as though there had been no change.

ARTICLE VI
 LEGAL RELATIONS

The parties hereto mutually agree that each Board member in performance of his duties on the Board is acting as an independent contractor and not as an employee of either the Department or the Contractor. Board members will guard their independence and avoid any communication about the substance of the dispute without both parties being present.

The Board members are absolved of any personal liability arising from the Recommendations of the Board. The parties agree that members of the dispute review board panel are acting as mediators for purposes of C.R.S. § 13-22-302(4) and, as such, the liability of any dispute review board member shall be limited to willful and wanton misconduct as provided for in C.R.S. § 13-22-305(6)

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COLORADO PROJECT NO.

IN WITNESS HEREOF, the parties hereto have caused this agreement to be executed the day and year first written above.

BOARD MEMBER: _____.

BY: _____.

BOARD MEMBER: _____.

BY: _____.

BOARD MEMBER: _____.

BY: _____.

CONTRACTOR: _____.

BY: _____.

TITLE:

COLORADO DEPARTMENT OF TRANSPORTATION

BY: _____ Date: _____.

TITLE: CHIEF ENGINEER

105.24 Claims for Unresolved Disputes. The Contractor may file a claim only if the disputes resolution process described in subsections 105.22 and 105.23 has been exhausted without resolution of the dispute. Other methods of nonbinding dispute resolution, exclusive of arbitration and litigation, can be used if agreed to by both parties.

This subsection applies to any unresolved dispute or set of disputes between CDOT and the Contractor with an aggregate value of more than \$15,000. Unresolved disputes with an aggregate value of more than \$15,000 from subcontractors, materials suppliers or any other entity not a party to the Contract shall be submitted through the Contractor in accordance with this subsection as a pass-through claim. Review of a pass-through claim does not create privity of Contract between CDOT and any other entity.

Subsections 105.22, 105.23 and 105.24 provide both contractual alternative dispute resolution processes and constitute remedy-granting provisions pursuant to Colorado Revised Statutes which must be exhausted in their entirety.

Merit-binding arbitration or litigation proceedings must commence within 180-calendar days of the Chief Engineer's decision, absent written agreement otherwise by both parties.

The venue for all unresolved disputes with an aggregate value \$15,000 or less shall be the County Court for the City and County of Denver.

Non-binding Forms of alternative dispute resolution such as Mediation are available upon mutual agreement of the parties for all claims submitted in accordance with this subsection.

The cost of the non-binding ADR process shall be shared equally by both parties with each party bearing its own preparation costs. The type of nonbinding ADR process shall be agreed upon by the parties and shall be conducted within the State of Colorado at a mutually acceptable location. Participation in a nonbinding ADR process does not in any way waive the requirement that merit-binding arbitration or litigation proceedings must commence within 180-calendar days of the Chief Engineer's decision, absent written agreement otherwise by both parties.

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(a) *Notice of Intent to File a Claim.*

Within 30 days after rejection of the Dispute Resolution Board's Recommendation issued in accordance with subsection 105.23, the Contractor shall provide the Region Transportation Director with a written notice of intent to file a claim. The Contractor shall also send a copy of this notice to the Resident Engineer. For the purpose of this subsection Region Transportation Director shall mean the Region Transportation Director or the Region Transportation Director's designated representative. CDOT will acknowledge in writing receipt of Notice of Intent within 7 days.

(b) *Claim Package Submission.* Within 60 days after submitting the notice of intent to file a claim, the Contractor shall submit five copies of a complete claim package representing the final position the Contractor wishes to have considered. All claims shall be in writing and in sufficient detail to enable the RTD to ascertain the basis and amount of claim. The claim package shall include all documents supporting the claim, regardless of whether such documents were provided previously to CDOT.

If requested by the Contractor the 60 day period may be extended by the RTD in writing prior to final acceptance. As a minimum, the following information shall accompany each claim.

1. A claim certification containing the following language, as appropriate:

A. For a direct claim by the Contractor:

CONTRACTOR'S CLAIM CERTIFICATION

Under penalty of law for perjury or falsification, the undersigned, _____ (name),
 _____ (title), of _____ (company), hereby certifies that the claim of

\$ _____ for extra compensation and ____ Days additional time, made herein for work on this contract is true to the best of my knowledge and belief and supported under the Contract between the parties.

This claim package contains all available documents that support the claims made herein and I understand that no additional information, other than for clarification and data supporting previously submitted documentation, may be presented by me.

Dated _____/s/_____

Subscribed and sworn before me this ____ day of _____.

 NOTARY PUBLIC

My Commission Expires: _____

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B. For a pass-through claim:

PASS-THROUGH CLAIM CERTIFICATION	
Under penalty of law for perjury or falsification, the undersigned, _____ (name), (title) _____, of _____ (company), hereby certifies that the claim of \$ _____ for extra compensation and ___ Days additional time, made herein for work on this Project is true to the best of my knowledge and belief and supported under the contract between the parties. This claim package contains all available documents that support the claims made herein and I understand that no additional information, other than for clarification and data supporting previously submitted documentation, may be presented by me.	
Dated _____ /s/ _____ Subscribed and sworn before me this ___ day of _____.	
_____ NOTARY PUBLIC	My Commission Expires: _____
Dated _____ /s/ _____ The Contractor certifies that the claim being passed through to CDOT is passed through in good faith and is accurate and complete to the best of my knowledge and belief.	
Dated _____ /s/ _____ Subscribed and sworn before me this ___ day of _____.	
_____ NOTARY PUBLIC	My Commission Expires: _____

2. A detailed factual statement of the claim for additional compensation, time, or both, providing all necessary dates, locations, and items of work affected by the claim. The Contractor's detailed factual statement shall expressly describe the basis of the claim and factual evidence supporting the claim. This requirement is not satisfied by simply incorporating into the claim package other documents that describe the basis of the claim and supporting factual evidence.
3. The date on which facts were discovered which gave rise to the claim.
4. The name, title, and activity of all known CDOT, Consultant, and other individuals who may be knowledgeable about facts giving rise to such claim.
5. The name, title, and activity of all known Contractor, subcontractor, supplier and other individuals who may be knowledgeable about facts giving rise to such claim.
6. The specific provisions of the Contract, which support the claim and a statement of the reasons why such provisions support the claim.
7. If the claim relates to a decision of the Project Engineer, which the Contract leaves to the Project Engineer's discretion, the Contractor shall set out in detail all facts supporting its position relating to the decision of the Project Engineer.
8. The identification of any documents and the substance of all oral communications that support the claim.
9. Copies of all known documents that support the claim.
10. The Dispute Review Board Recommendation.
11. If an extension of contract time is sought, the documents required by subsection 108.08(d).
12. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:
 - A. These categories represent the only costs that are recoverable by the Contractor. All other costs or categories of costs are not recoverable:

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- (1) Actual wages and benefits, including FICA, paid for additional labor
- (2) Costs for additional bond, insurance and tax
- (3) Increased costs for materials
- (4) Equipment costs calculated in accordance with subsection 109.04(c) for Contractor owned equipment and based on certified invoice costs for rented equipment
- (5) Costs of extended job site overhead
- (6) Salaried employees assigned to the project
- (7) Claims from subcontractors and suppliers at any level (the same level of detail as specified herein is required for all such claims)
- (8) An additional 16 percent will be added to the total of items (1) through (7) as compensation for items for which no specific allowance is provided, including profit and home office overhead.
- (9) Interest shall be paid in accordance with CRS 5-12-102 beginning from the date of the Notice of Intent to File Claim

B. In adjustment for the costs as allowed above, the Department will have no liability for the following items of damages or expense:

- (1) Profit in excess of that provided in 12.A.(8) above
- (2) Loss of Profit
- (3) Additional cost of labor inefficiencies in excess of that provided in A. above
- (4) Home office overhead in excess of that provided in A. above
- (5) Consequential damages, including but not limited to loss of bonding capacity, loss of bidding opportunities, and insolvency
- (6) Indirect costs or expenses of any nature in excess of that provided in A. above
- (7) Attorney's fees, claim preparation fees, and expert fees

(c) *Audit.* An audit may be performed by the Department for any dispute or claim, and is mandatory for all disputes and claims with amounts greater than \$250,000. All audits will be complete within 60 days of receipt of the complete claim package, provided the Contractor allows the auditors reasonable and timely access to the Contractor's books and records. For all claims with amounts greater than \$250,000 the Contractor shall submit a copy of certified claim package directly to the CDOT Audit Unit at the following address:

Division of Audit
 4201 E. Arkansas Ave
 Denver, Co. 80222

(d) *Region Transportation Director Decision.* When the Contractor properly files a claim, the RTD will review the claim and render a written decision to the Contractor to either affirm or deny the claim, in whole or in part, in accordance with the following procedure.

The RTD may consolidate all related claims on a project and issue one decision, provided that consolidation does not extend the time period within which the RTD is to render a decision. Consolidation of unrelated claims will not be made.

The RTD will render a written decision to the Contractor within 60 days after the receipt of the claim package or receipt of the audit whichever is later. In rendering the decision, the RTD: (1) will review the information in the Contractor's claim; (2) will conduct a hearing if requested by either party; and (3) may consider any other information available in rendering a decision.

The RTD will assemble and maintain a claim record comprised of all information physically submitted by the Contractor in support of the claim and all other discoverable information considered by the RTD in reaching a decision. Once the RTD assembles the claim record, the submission and consideration of additional information, other than for clarification and data supporting previously submitted documentation, at any subsequent level of review by anyone, will not be permitted.

The RTD will provide a copy of the claim record and the written decision to the Contractor describing the information considered by the RTD in reaching a decision and the basis for that decision. If the RTD fails to

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render a written decision within the 60 day period, or within any extended time period as agreed to by both parties, the Contractor shall either: (1) accept this as a denial of the claim, or (2) appeal the claim to the Chief Engineer, as described in this subsection.

If the Contractor accepts the RTD decision, the provisions of the decision shall be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the claim is resolved.

If the Contractor disagrees with the RTD decision, the Contractor shall either: (1) accept the RTD decision as final, or (2) file a written appeal to the Chief Engineer within 30 days from the receipt of the RTD decision. The Contractor hereby agrees that if a written appeal is not properly filed, the RTD decision is final.

- (e) *Chief Engineer Decision.* When a claim is appealed, the RTD will provide the claim record to the Chief Engineer. Within 15 days of the appeal either party may submit a written request for a hearing with the Chief Engineer or duly authorized Headquarters delegates. The Chief Engineer or a duly authorized Headquarters delegate will review the claim and render a decision to affirm, overrule, or modify the RTD decision in accordance with the following.

The Contractor's written appeal to the Chief Engineer will be made a part of the claim record.

The Chief Engineer will render a written decision within 60 days after receiving the written appeal. The Chief Engineer will not consider any information that was not previously made a part of the claim record, other than clarification and data supporting previously submitted documentation.

The Contractor shall have 30 days to accept or reject the Chief Engineer's decision. The Contractor shall notify the Chief Engineer of its acceptance or rejection in writing.

If the Contractor accepts the Chief Engineer's decision, the provisions of the decision will be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the claim is resolved.

If the Contractor disagrees with the Chief Engineer's decision, the Contractor shall either (1) pursue an alternative dispute resolution process in accordance with this specification or (2) initiate litigation or merit binding arbitration in accordance with subsection 105.24(f).

If the Chief Engineer does not issue a decision as required, the Contractor may immediately initiate either litigation or merit binding arbitration in accordance with subsection 105.24(f).

For the convenience of the parties to the Contract it is mutually agreed by the parties that any merit binding arbitration or De Novo litigation shall be brought within 180-calendar days from the date of the Chief Engineer's decision. The parties understand and agree that the Contractor's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action.

- (f) *De Novo Litigation or Merit Binding Arbitration.* If the Contractor disagrees with the Chief Engineer's decision, the Contractor may initiate de novo litigation or merit binding arbitration to finally resolve the claim that the Contractor submitted to CDOT, depending on which option was selected by the Contractor on Form 1378 which shall be submitted at the preconstruction conference. Such litigation or arbitration shall be strictly limited to those claims that were previously submitted and decided in the contractual dispute and claims processes outlined herein. This does not preclude the joining in one litigation or arbitration of multiple claims from the same project provided that each claim has gone through the dispute and claim process specified in subsections 105.22 through 105.24. The parties may agree, in writing, at any time, to pursue some other form of alternative dispute resolution.

Any offer made by the Contractor or the Department at any stage of the claims process, as set forth in this subsection, shall be deemed an offer of settlement pursuant to Colorado Rule of Evidence 408 and therefore inadmissible in any litigation or arbitration.

If the Contractor selected litigation, then de novo litigation shall proceed in accordance with the Colorado Rules of Civil Procedure and the proper venue is the Colorado State District Court in and for the City and County of Denver, unless both parties agree to the use of arbitration.

If the Contractor selected merit binding arbitration, or if both parties subsequently agreed to merit binding arbitration, arbitration shall be governed by the modified version of ARBITRATION PROVIDER's Construction Industry Arbitration Rules which follow. Pursuant to the modified arbitration rules (R35 through R39), the

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arbitrators shall issue a binding decision with regard to entitlement and a non-binding decision with regard to quantum. If either party disagrees with the decision on quantum, the disagreeing party may seek a trial de novo in Denver District Court with regard to quantum only.

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**AMERICAN ARBITRATION ASSOCIATION CONSTRUCTION INDUSTRY ARBITRATION RULES MODIFIED
FOR USE WITH CDOT SPECIFICATION SUBSECTION 105.24**

REGULAR TRACK PROCEDURES

R-1. Agreement of Parties

- (a) The parties shall be deemed to have made these rules a part of their Contract. These rules and any amendments shall apply in the form in effect at the time the administrative requirements are met for a demand for arbitration. The parties, by written agreement, may vary the procedures set forth in these rules. After appointment of the arbitrator, such modifications may be made only with the consent of the arbitrator.
- (b) Unless the parties determine otherwise, the Fast Track Procedures shall apply in any case in which aggregate claims do not exceed \$100,000, exclusive of interest and arbitration fees and costs. Parties may also agree to use these procedures in larger cases. Unless the parties agree otherwise, these procedures will not apply in cases involving more than two parties except for pass-through claims. The Fast Track Procedures shall be applied as described in Sections F-1 through F-13 of these rules, in addition to any other portion of these rules that is not in conflict with the Fast Track Procedures.
- (c) Unless the parties agree otherwise, the Procedures for Large, Complex Construction Disputes shall apply to all cases in which the disclosed aggregate claims of any party is at least \$1,000,000, exclusive of claimed interest, arbitration fees and costs. Parties may also agree to use these procedures in cases involving claims under \$1,000,000, or in nonmonetary cases. The Procedures for Large, Complex Construction Disputes shall be applied as described in Sections L-1 through L-4 of these rules, in addition to any other portion of these rules that is not in conflict with the Procedures for Large, Complex Construction Disputes.
- (d) All other cases shall be administered in accordance with Sections R-1 through R-45 of these rules.

R-2. Independent Arbitration Provider and Delegation of Duties

When parties agree to arbitrate under these rules, or when they provide for arbitration by an independent third-party (Arbitration Provider) and arbitration is initiated under these rules, they thereby authorize the Arbitration Provider to administer the arbitration. The authority and duties of the Arbitration Provider are prescribed in the parties' Contract and in these rules, and may be carried out through such of the Arbitration Provider's representatives as it may direct. The Arbitration Provider will assign the administration of an arbitration to its Denver office

R-3. Initiation of Arbitration

Arbitration shall be initiated in the following manner.

- (a) The Contractor shall, within 30 days after the Chief Engineer issues a decision, submit to the Chief Engineer written notice of its intention to arbitrate (the "demand"). The demand shall indicate the appropriate qualifications for the arbitrator(s) to be appointed to hear the arbitration.
- (b) CDOT may file an answering statement with the Contractor within 15 days after receiving the demand. If a counterclaim is asserted, it shall contain a statement setting forth the nature of the counterclaim, the amount involved, if any, and the remedy sought.
- (c) The Chief Engineer shall retain an Arbitration Provider, such as the American Arbitration Association, which will administer an arbitration pursuant to these Rules, except to the extent that such rules conflict with the specifications, in which case the specifications shall control.

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(d) The Arbitration Provider shall confirm its retention to the parties.

R-4. Consolidation or Joinder

If the parties' agreement or the law provides for consolidation or joinder of related arbitrations, all involved parties will endeavor to agree on a process to effectuate the consolidation or joinder.

If they are unable to agree, the Arbitration Provider shall directly appoint a single arbitrator for the limited purpose of deciding whether related arbitrations should be consolidated or joined and, if so, establishing a fair and appropriate process for consolidation or joinder. All requests for consolidation or joinder must be submitted to the Arbitration Provider prior to the appointment of an arbitrator or within 90 days of the date the Arbitration Provider determined that all administrative filing requirements were satisfied, whichever is later. The Arbitration Provider may take reasonable administrative action to accomplish the consolidation or joinder as directed by the arbitrator. Requests for consolidation or joinder submitted beyond these timeframes shall not be permitted absent a determination by the Merits Arbitrator that good cause was shown for the late request.

To request consolidation of arbitrations, the requesting party must have filed a demand for arbitration, including the applicable arbitration provision(s) from the parties' contract(s) and must provide a written request for consolidation which provides the supporting reasons for such request.

To request joinder of parties, the requesting party must file with the AAA a written request to join parties to an existing arbitration which provides the names and contact information for such parties, names and contact information for the parties' representatives, if known, and supporting reasons for such request.

R-5. Appointment of Arbitrator

An arbitrator shall be appointed in the following manner:

- (a) Immediately after the Arbitration Provider is retained, the Arbitration Provider shall send simultaneously to each party to the dispute an identical list of 10 names of potential arbitrators. The parties are encouraged to agree to an arbitrator from the submitted list and to advise the ARBITRATION PROVIDER of their agreement. Absent agreement of the parties, the arbitrator shall not have served as the mediator in the mediation phase of the instant proceeding.
- (b) If the parties cannot agree to arbitrator(s), each party to the dispute shall have 15 calendar days from the transmittal date in which to strike names objected to, number the remaining names in order of preference, and return the list to the Arbitration Provider. If a party does not return the list within the time specified, all persons named therein shall be deemed acceptable. From among the persons who have been approved on both lists, and in accordance with the designated order of mutual preference, the Arbitration Provider shall invite an arbitrator to serve.
- (c) Unless both parties agree otherwise one arbitrator shall be used for claims less than \$250,000 and three arbitrators shall be used for claims \$250,000 and greater. Within 15 calendar days from the date of the appointment of the last arbitrator, the Arbitration Provider shall appoint a chairperson.
- (d) The entire claim record will be made available to the arbitrators by the Chief Engineer within 15 calendar days from the date of the appointment of the last arbitrator.

R-6. Changes of Claim

The arbitrator(s) will not consider any information that was not previously made a part of the claim record as transmitted by the Chief Engineer, other than clarification and data supporting previously submitted documentation.

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R-7. Disclosure

- (a) Any person appointed or to be appointed as an arbitrator shall disclose to the Arbitration Provider any circumstance likely to give rise to justifiable doubt as to the arbitrator's impartiality or independence, including any bias or any interest in the result of the arbitration or any relationship with the parties or their representatives. Such obligation shall remain in effect throughout the arbitration.
- (b) Upon receipt of such information from the arbitrator or another source, the Arbitration Provider shall communicate the information to the parties and, if it deems it appropriate to do so, to the arbitrator and others.
- (c) In order to encourage disclosure by arbitrators, disclosure of information pursuant to this Section R-6 is not to be construed as an indication that the arbitrator considers that the disclosed circumstances are likely to affect impartiality or independence.
- (d) In no case shall an arbitrator be employed by, affiliated with, or have consultive or business connection with the claimant Contractor or CDOT. An arbitrator shall not have assisted either in the evaluation, preparation, or presentation of the claim case either for the Contractor or the Department or have rendered an opinion on the merits of the claim for either party, and shall not do so during the proceedings of arbitration.

R-8. Disqualification of Arbitrator

- (a) Any arbitrator shall be impartial and independent and shall perform his or her duties with diligence and in good faith, and shall be subject to disqualification for: (i) partiality or lack of independence, (ii) inability or refusal to perform his or her duties with diligence and in good faith; and/or (iii) any grounds for disqualification provided by applicable law.
- (b) Upon objection of a party to the continued service of an arbitrator, or on its own initiative, the Arbitration Provider shall determine whether the arbitrator should be disqualified under the grounds set out above, and shall inform the parties of its decision, which decision shall be conclusive.

R-9. Communication with Arbitrator

No party and no one acting on behalf of any party shall communicate *ex parte* with an arbitrator or a candidate for arbitrator concerning the arbitration.

R-10. Vacancies

- (a) If for any reason an arbitrator is unable to perform the duties of the office, the Arbitration Provider may, on proof satisfactory to it, declare the office vacant. Vacancies shall be filled in accordance with the applicable provisions of these rules.
- (b) In the event of a vacancy in a panel of neutral arbitrators after the hearings have commenced, the remaining arbitrator or arbitrators may continue with the hearing and determination of the controversy, unless the parties agree otherwise.
- (c) In the event of the appointment of a substitute arbitrator, the panel of arbitrators shall determine in its sole discretion whether it is necessary to repeat all or part of any prior hearings.

R-11. Jurisdiction

- (a) The arbitrator shall have the power to rule on his or her own jurisdiction, including any objections with respect to the existence, scope or validity of the arbitration agreement.

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- (b) The arbitrator shall have the power to determine the existence or validity of a contract of which an arbitration clause forms a part. Such an arbitration clause shall be treated as an agreement independent of the other terms of the contract. A decision by the arbitrator that the contract is null and void shall not for that reason alone render invalid the arbitration clause.
- (c) A party must object to the jurisdiction of the arbitrator or to the arbitrability of a claim or counterclaim no later than 15 days after the Arbitration Provider confirms its retention to the parties. The arbitrator may rule on such objections as a preliminary matter or as part of the final award.

R-12. Administrative Conference

At the request of any party or upon the Arbitration Provider's own initiative, the Arbitration Provider may conduct an administrative conference, in person or by telephone, with the parties and/or their representatives. The conference may address such issues as arbitrator selection, potential exchange of information, a timetable for hearings and any other administrative matters.

RuleR-13. Preliminary Hearing

- (a) At the request of any party or at the discretion of the arbitrator or the Arbitration Provider, the arbitrator may schedule as soon as practicable a preliminary hearing with the parties and/or their representatives. The preliminary hearing may be conducted by telephone at the arbitrator's discretion.
- (b) During the preliminary hearing, the parties and the arbitrator should discuss the future conduct of the case, including clarification of the issues and claims, a schedule for the hearings and any other preliminary matters.

R-14. Pre-Hearing Exchange and Production of Information

(a) *Authority of arbitrator.* The arbitrator shall manage any necessary exchange of information among the parties with a view to achieving an efficient and economical resolution of the dispute, while at the same time promoting equality of treatment and safeguarding each party's opportunity to fairly present its claims and defenses.

(b) *Documents.* The arbitrator may, on application of a party or on the arbitrator's own initiative:

- i. require the parties to exchange documents in their possession or custody on which they intend to rely;
- ii. require the parties to update their exchanges of the documents on which they intend to rely as such documents become known to them;
- iii. require the parties, in response to reasonable document requests, to make available to the other party documents, in the responding party's possession or custody, not otherwise readily available to the party seeking the documents, reasonably believed by the party seeking the documents to exist and to be relevant and material to the outcome of disputed issues; and
- iv. require the parties, when documents to be exchanged or produced are maintained in electronic form, to make such documents available in the form most convenient and economical for the party in possession of such documents, unless the arbitrator determines that there is good cause for requiring the documents to be produced in a different form. The parties should attempt to agree in advance upon, and the arbitrator may determine, reasonable search parameters to balance the need for production of electronically stored documents relevant and material to the outcome of disputed issues against the cost of locating and producing them.

(a) At the request of any party or at the discretion of the arbitrator, consistent with the expedited nature of arbitration, the arbitrator may direct:

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- i. the production of documents and other information;
- ii. require the parties to update their exchanges of the documents on which they intend to rely as such documents become known to them;
and/or
- iii. the identification of any witnesses to be called.

(b) At least five business days prior to the hearing, the parties shall exchange copies of all exhibits they intend to submit at the hearing.

(c) The arbitrator is authorized to resolve any disputes concerning the exchange of information.

(d) Additional discovery may be ordered by the arbitrator in extraordinary cases when the demands of justice require it.

R-15. Date, Time, and Place of Hearing

(a) The arbitrator shall set the date, time, and place for each hearing and/or conference. The parties shall respond to requests for hearing dates in a timely manner, be cooperative in scheduling the earliest practicable date, and adhere to the established hearing schedule.

(b) The parties may mutually agree on the locale where the arbitration is to be held. Absent such agreement, the arbitration shall be held in the City and County of Denver.

(c) The Arbitration Provider shall send a notice of hearing to the parties at least ten calendar days in advance of the hearing date, unless otherwise agreed by the parties.

R-16. Attendance at Hearings

The arbitrator and the Arbitration Provider shall maintain the privacy of the hearings unless the law provides to the contrary. Any person having a direct interest in the arbitration is entitled to attend hearings. The arbitrator shall otherwise have the power to require the exclusion of any witness, other than a party or other essential person, during the testimony of any other witness. It shall be discretionary with the arbitrator to determine the propriety of the attendance of any person other than a party and its representative.

R-17. Representation

Any party may be represented by counsel or other authorized representative. A party intending to be so represented shall notify the other party and the Arbitration Provider of the name and address of the representative at least three calendar days prior to the date set for the hearing at which that person is first to appear.

R-18. Oaths

Before proceeding with the first hearing, each arbitrator may take an oath of office and, if required by law, shall do so. The arbitrator may require witnesses to testify under oath administered by any duly qualified person and, if it is required by law or requested by any party, shall do so.

R-19. Stenographic Record

Any party desiring a stenographic record shall make arrangements directly with a stenographer and shall notify the other parties of these arrangements at least three days in advance of the hearing. The requesting party or parties shall pay the cost of the record. If the transcript is agreed by the parties, or determined by the arbitrator to be the official record of the proceeding, it must be provided to the arbitrator and made available to the other parties for inspection, at a date, time, and place determined by the arbitrator.

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R-20. Interpreters

Any party wishing an interpreter shall make all arrangements directly with the interpreter and shall assume the costs of the service.

R-21. Postponements

The arbitrator for good cause shown may postpone any hearing upon agreement of the parties, upon request of a party, or upon the arbitrator's own initiative.

R-22. Arbitration in the Absence of a Party or Representative

Unless the law provides to the contrary, the arbitration may proceed in the absence of any party or representative who, after due notice, fails to be present or fails to obtain a postponement. An award shall not be made solely on the default of a party. The arbitrator shall require the party who is present to submit such evidence as the arbitrator may require for the making of an award.

R-23. Conduct of Proceedings

- (a) The Contractor shall present evidence to support its claim. CDOT shall then present evidence supporting its defense. Witnesses for each party shall also submit to questions from the arbitrator and the adverse party. The arbitrator has the discretion to vary this procedure; provided that the parties are treated with equality and that each party has the right to be heard and is given a fair opportunity to present its case.
- (b) The arbitrator, exercising his or her discretion, shall conduct the proceedings with a view to expediting the resolution of the dispute and may direct the order of proof, bifurcate proceedings, and direct the parties to focus their presentations on issues the decision of which could dispose of all or part of the case. The arbitrator shall entertain motions, including motions that dispose of all or part of a claim or that may expedite the proceedings, and may also make preliminary rulings and enter interlocutory orders.
- (c) The parties may agree to waive oral hearings in any case.

R-24. Evidence

- (a) The arbitrators shall consider all written information available in the claim record and all oral presentations in support of that record by the Contractor and CDOT. Conformity to legal rules of evidence shall not be necessary.
- (b) The arbitrators shall not consider any written documents or arguments which have not previously been made a part of the claim record, other than clarification and data supporting previously submitted documentation. The arbitrators shall not consider an increase in the amount of the claim, or any new claims.
- (c) The arbitrator shall determine the admissibility, relevance, and materiality of any evidence offered. The arbitrator may request offers of proof and may reject evidence deemed by the arbitrator to be cumulative, unreliable, unnecessary, or of slight value compared to the time and expense involved. All evidence shall be taken in the presence of all of the arbitrators and all of the parties, except where: (i) any of the parties is absent, in default, or has waived the right to be present, or (ii) the parties and the arbitrators agree otherwise.
- (d) The arbitrator shall take into account applicable principles of legal privilege, such as those involving the confidentiality of communications between a lawyer and client.

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- (e) An arbitrator or other person authorized by law to subpoena witnesses or documents may do so upon the request of any party or independently.

R-25. Evidence by Affidavit and Post-hearing Filing of Documents or Other Evidence

- (a) The arbitrator may receive and consider the evidence of witnesses by declaration or affidavit, but shall give it only such weight as the arbitrator deems it entitled to after consideration of any objection made to its admission.
- (b) If the parties agree or the arbitrator directs that documents or other evidence be submitted to the arbitrator after the hearing, the documents or other evidence, unless otherwise agreed by the parties and the arbitrator, shall be filed with the Arbitration Provider for transmission to the arbitrator. All parties shall be afforded an opportunity to examine and respond to such documents or other evidence.

R-26. Inspection or Investigation

An arbitrator finding it necessary to make an inspection or investigation in connection with the arbitration shall direct the Arbitration Provider to so advise the parties. The arbitrator shall set the date and time and the Arbitration Provider shall notify the parties. Any party who so desires may be present at such an inspection or investigation. In the event that one or all parties are not present at the inspection or investigation, the arbitrator shall make an oral or written report to the parties and afford them an opportunity to comment.

R-27. Interim Measures

- (a) The arbitrator may take whatever interim measures he or she deems necessary, including injunctive relief and measures for the protection or conservation of property and disposition of perishable goods.
- (b) A request for interim measures addressed by a party to a judicial authority shall not be deemed incompatible with the agreement to arbitrate or a waiver of the right to arbitrate.

R-28. Closing of Hearing

When satisfied that the presentation of the parties is complete, the arbitrator shall declare the hearing closed.

If documents or responses are to be filed as provided in Section R-24, or if briefs are to be filed, the hearing shall be declared closed as of the final date set by the arbitrator for the receipt of documents, responses, or briefs. The time limit within which the arbitrator is required to make the award shall commence to run, in the absence of other agreements by the parties and the arbitrator, upon the closing of the hearing.

R-29. Reopening of Hearing

The hearing may be reopened on the arbitrator's initiative, or by direction of the arbitrator upon application of a party, at any time before the award is made. If reopening the hearing would prevent the making of the award within the specific time agreed to by the parties in the arbitration agreement, the matter may not be reopened unless the parties agree to an extension of time. When no specific date is fixed by agreement of the parties, the arbitrator shall have 15 calendar days from the closing of the reopened hearing within which to make an award.

R-30. Waiver of Rules

Any party who proceeds with the arbitration after knowledge that any provision or requirement of these rules has not been complied with and who fails to state an objection in writing shall be deemed to have waived the right to object.

R-31. Extensions of Time

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The parties may modify any period of time by mutual agreement. The Arbitration Provider or the arbitrator may for good cause extend any period of time established by these rules, except the time for making the award. The Arbitration Provider shall notify the parties of any extension.

R-32. Serving of Notice

- (a) Any papers, notices, or process necessary or proper for the initiation or continuation of an arbitration under these rules; for any court action in connection therewith, or for the entry of judgment on any award made under these rules, may be served on a party by mail addressed to the party or its representative at the last known address or by personal service, in or outside the state where the arbitration is to be held, provided that reasonable opportunity to be heard with regard thereto has been granted to the party.
- (b) The Arbitration Provider, the arbitrator and the parties may also use overnight delivery, electronic facsimile transmission (fax), or electronic mail (email) to give the notices required by these rules.
- (c) Unless otherwise instructed by the Arbitration Provider or by the arbitrator, any documents submitted by any party to the Arbitration Provider or to the arbitrator shall simultaneously be provided to the other party or parties to the arbitration.

R-33. Majority Decision

When the panel consists of more than one arbitrator, unless required by law or by the arbitration agreement, a majority of the arbitrators must make all decisions; however, in a multi-arbitrator case, if all parties and all arbitrators agree, the chair of the panel may make procedural decisions.

Where there is a panel of three arbitrators, absent an objection of a party or another member of the panel, the chairperson of the panel is authorized to resolve or delegate to another member of the panel to resolve any disputes related to the exchange of information or procedural matters without the need to consult the full panel.

R-34. Time of Award

The award shall be made promptly by the arbitrator and, unless otherwise agreed by the parties or specified by law, no later than 30 calendar days from the date of closing the hearing, or, if oral hearings have been waived, from the date of the Arbitration Provider's transmittal of the final statements and proofs to the arbitrator.

R-35. Form of Award

After complete review of the facts associated with the claim, the arbitrators shall render a written explanation of their decision. When three arbitrators are used, and only two arbitrators agree then the award shall be signed by the two arbitrators. The arbitrator's decision shall include:

- (a) A summary of the issues and factual evidence presented by the Contractor and the Department concerning the claim;
- (b) Decisions concerning the validity of the claim;
- (c) Decisions concerning the value of the claim as to cost impacts if the claim is determined to be valid;
- (d) The contractual and factual bases supporting the decisions made including an explanation as to why each and every position was accepted or rejected;
- (e) Detailed and supportable calculations which support any decisions.

R-36. Scope of Award

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- (a) The arbitrator may grant any remedy or relief that the arbitrator deems just and equitable and within the scope of the agreement of the parties, including, but not limited to, equitable relief and specific performance of a contract.
- (b) In addition to the final award, the arbitrator may make other decisions, including interim, interlocutory, or partial rulings, orders, and awards. (c) The award of the arbitrator may include interest at the statutory rate and from such date as the arbitrator may deem appropriate.

R-37. Delivery of Award to Parties

Parties shall accept as notice and delivery of the award the placing of the award or a true copy thereof in the mail addressed to the parties or their representatives at the last known address, personal or electronic service of the award, or the filing of the award in any other manner that is permitted by law.

R-38. Modification of Award

Within 10 calendar days after the transmittal of an award, the arbitrator on his or her initiative, or any party, upon notice to the other parties, may request that the arbitrator correct any clerical, typographical, technical or computational errors in the award. The arbitrator is not empowered to redetermine the merits of any claim already decided.

If the modification request is made by a party, the other parties shall be given 10 calendar days to respond to the request. The arbitrator shall dispose of the request within 25 calendar days after transmittal by the Arbitration Provider to the arbitrator of the request.

If applicable law provides a different procedural time frame, that procedure shall be followed.

R-39. Appeal of Award

Appeal of the arbitrators' decision concerning the merit of the claim is governed by the Colorado Uniform Arbitration Act, C.R.S. §§ 13-22-202 to -230. Either party may appeal the arbitrator's decision on the value of the claim to the Colorado State District Court in and for the City and County of Denver for trial de novo.

R-40. Release of Documents for Judicial Proceedings

The Arbitration Provider shall, upon the written request of a party, furnish to the party, at its expense, certified copies of any papers in the Arbitration Provider's possession that may be required in judicial proceedings relating to the arbitration.

R-41. Applications to Court and Exclusion of Liability

- (a) No judicial proceeding by a party relating to the subject matter of the arbitration shall be deemed a waiver of the party's right to arbitrate.
- (b) Neither the Arbitration Provider nor any arbitrator in a proceeding under these rules is a necessary or proper party in judicial proceedings relating to the arbitration.
- (c) Parties to these rules shall be deemed to have consented that judgment upon the arbitration award may be entered in any federal or state court having jurisdiction thereof.
- (d) Parties to an arbitration under these rules shall be deemed to have consented that neither the Arbitration Provider nor any arbitrator shall be liable to any party in any action for damages or injunctive relief for any act or omission in connection with any arbitration under these rules.

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R-42. Administrative Fees

The Arbitration Provider shall prescribe filing and other administrative fees and service charges to compensate it for the cost of providing administrative services. The fees in effect when the fee or charge is incurred shall be applicable. Such fees and charges shall be borne equally by the parties.

The Arbitration Provider may, in the event of extreme hardship on the part of any party, defer or reduce the administrative fees.

R-43. Expenses

The expenses of witnesses for either side shall be paid by the party producing such witnesses. All other expenses of the arbitration, including required travel and other expenses of the arbitrator, Arbitration Provider representatives, and any witness and the cost of any proof produced at the direct request of the arbitrator, shall be borne equally by the parties.

R-44. Neutral Arbitrator's Compensation

Arbitrators shall be compensated a rate consistent with the arbitrator's stated rate of compensation.

If there is disagreement concerning the terms of compensation, an appropriate rate shall be established with the arbitrator by the Arbitration Provider and confirmed to the parties.

Such compensation shall be borne equally by the parties.

R-45. Deposits

The Arbitration Provider may require the parties to deposit in advance of any hearings such sums of money as it deems necessary to cover the expense of the arbitration, including the arbitrator's fee, if any, and shall render an accounting to the parties and return any unexpended balance at the conclusion of the case.

R-46. Interpretation and Application of Rules

The arbitrator shall interpret and apply these rules insofar as they relate to the arbitrator's powers and duties by a majority vote. If that is not possible, either an arbitrator or a party may refer the question to the Arbitration Provider for final decision. All other rules shall be interpreted and applied by the Arbitration Provider.

R-45. Suspension for Nonpayment

If arbitrator compensation or administrative charges have not been paid in full, the Arbitration Provider may so inform the parties in order that the parties may advance the required payment. If such payments are not made, the arbitrator may order the suspension or termination of the proceedings. If no arbitrator has yet been appointed, the Arbitration Provider may suspend the proceedings.

FAST TRACK PROCEDURES

F-1. Limitations on Extensions

In the absence of extraordinary circumstances, the Arbitration Provider or the arbitrator may grant a party no more than one seven-day extension of the time in which to respond to the demand for arbitration or counterclaim as provided in Section R-3.

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F-2. Changes of Claim

The arbitrator will not consider any information that was not previously made a part of the claim record as transmitted by the Chief Engineer, other than clarification and data supporting previously submitted documentation

F-3. Serving of Notice

In addition to notice provided above, the parties shall also accept notice by telephone. Telephonic notices by the Arbitration Provider shall subsequently be confirmed in writing to the parties. Should there be a failure to confirm in writing any such oral notice, the proceeding shall nevertheless be valid if notice has, in fact, been given by telephone.

F-4. Appointment and Qualification of Arbitrator

Immediately after the retention of the Arbitration Provider, the Arbitration Provider will simultaneously submit to each party a listing and biographical information from its panel of arbitrators knowledgeable in construction who are available for service in Fast Track cases. The parties are encouraged to agree to an arbitrator from this list, and to advise the Arbitration Provider of their agreement, or any factual objections to any of the listed arbitrators, within 7 calendar days of the transmission of the list. The Arbitration Provider will appoint the agreed-upon arbitrator, or in the event the parties cannot agree on an arbitrator, will designate the arbitrator from among those names not stricken for factual objections.

The parties will be given notice by the Arbitration Provider of the appointment of the arbitrator, who shall be subject to disqualification for the reasons specified above. Within the time period established by the Arbitration Provider, the parties shall notify the Arbitration Provider of any objection to the arbitrator appointed. Any objection by a party to the arbitrator shall be for cause and shall be confirmed in writing to the Arbitration Provider with a copy to the other party or parties.

F-5. Preliminary Telephone Conference

Unless otherwise agreed by the parties and the arbitrator, as promptly as practicable after the appointment of the arbitrator, a preliminary telephone conference shall be held among the parties or their attorneys or representatives, and the arbitrator.

F-6. Exchange of Exhibits

At least 2 business days prior to the hearing, the parties shall exchange copies of all exhibits they intend to submit at the hearing. The arbitrator is authorized to resolve any disputes concerning the exchange of exhibits.

F-7. Discovery

There shall be no discovery, except as provided in Section F-4 or as ordered by the arbitrator in extraordinary cases when the demands of justice require it.

F-8. Date, Time, and Place of Hearing

The arbitrator shall set the date and time, and place of the hearing, to be scheduled to take place within 30 calendar days of confirmation of the arbitrator's appointment. The Arbitration Provider will notify the parties in advance of the hearing date. All hearings shall be held within the City and County of Denver.

F-9. The Hearing

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- (a) Generally, the hearing shall not exceed 1 day. Each party shall have equal opportunity to submit its proofs and complete its case. The arbitrator shall determine the order of the hearing, and may require further submission of documents within two business days after the hearing. For good cause shown, the arbitrator may schedule 1 additional hearing day within 7 business days after the initial day of hearing.
- (b) Generally, there will be no stenographic record. Any party desiring a stenographic record may arrange for one pursuant to the provisions above.

F-10. Time of Award

Unless otherwise agreed by the parties, the award shall be rendered not later than 14 calendar days from the date of the closing of the hearing or, if oral hearings have been waived, from the date of the Arbitration Provider's transmittal of the final statements and proofs to the arbitrator.

F-11. Time Standards

The arbitration shall be completed by settlement or award within 45 calendar days of confirmation of the arbitrator's appointment, unless all parties and the arbitrator agree otherwise or the arbitrator extends this time in extraordinary cases when the demands of justice require it and such agreement is memorialized by the arbitrator prior to the expiration of the initial 45-day period.

F-12. Arbitrator's Compensation

Arbitrators will receive compensation at a rate to be suggested by the Arbitration Provider regional office.

PROCEDURES FOR LARGE, COMPLEX CONSTRUCTION DISPUTES

L-1. Large, Complex Construction Disputes

The procedures for large, complex construction disputes shall apply to any claim with a value exceeding \$500,000 or as agreed to by the parties.

L-2. Administrative Conference

Prior to the dissemination of a list of potential arbitrators, the Arbitration Provider shall, unless the parties agree otherwise, conduct an administrative conference with the parties and/or their attorneys or other representatives by conference call. The conference call will take place within 14 days after the retention of the Arbitration Provider. In the event the parties are unable to agree on a mutually acceptable time for the conference, the Arbitration Provider may contact the parties individually to discuss the issues contemplated herein. Such administrative conference shall be conducted for the following purposes and for such additional purposes as the parties or the Arbitration Provider may deem appropriate:

- (a) To obtain additional information about the nature and magnitude of the dispute and the anticipated length of hearing and scheduling;
- (b) To discuss the views of the parties about the technical and other qualifications of the arbitrators;
- (c) To obtain conflicts statements from the parties; and
- (d) To consider, with the parties, whether mediation or other non-adjudicative methods of dispute resolution might be appropriate.

L-3. Arbitrators

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- (a) Large, Complex Construction Cases shall be heard and determined by three arbitrators.
- (b) The Arbitration Provider shall appoint arbitrator(s) in the manner provided in the Regular Construction Industry Arbitration Rules.

L-4. Preliminary Hearing

As promptly as practicable after the selection of the arbitrator(s), a preliminary hearing shall be held among the parties and/or their attorneys or other representatives and the arbitrator(s). Unless the parties agree otherwise, the preliminary hearing will be conducted by telephone conference call rather than in person.

At the preliminary hearing the matters to be considered shall include, without limitation:

- (a) Service of a detailed statement of claims, damages and defenses, a statement of the issues asserted by each party and positions with respect thereto, and any legal authorities the parties may wish to bring to the attention of the arbitrator(s);
- (b) Stipulations to uncontested facts;
- (c) The extent to which discovery shall be conducted;
- (d) Exchange and premarking of those documents which each party believes may be offered at the hearing;
- (e) The identification and availability of witnesses, including experts, and such matters with respect to witnesses including their biographies and expected testimony as may be appropriate;
- (f) Whether, and the extent to which, any sworn statements and/or depositions may be introduced;
- (g) The extent to which hearings will proceed on consecutive days;
- (h) Whether a stenographic or other official record of the proceedings shall be maintained;
- (i) The possibility of utilizing mediation or other non-adjudicative methods of dispute resolution; and
- (j) The procedure for the issuance of subpoenas.

By agreement of the parties and/or order of the arbitrator(s), the pre-hearing activities and the hearing procedures that will govern the arbitration will be memorialized in a Scheduling and Procedure Order.

L-5. Management of Proceedings

- (a) Arbitrator(s) shall take such steps as they may deem necessary or desirable to avoid delay and to achieve a just, speedy and cost-effective resolution of Large, Complex Construction Cases.
- (b) Parties shall cooperate in the exchange of documents, exhibits and information within such party's control if the arbitrator(s) consider such production to be consistent with the goal of achieving a just, speedy and cost effective resolution of a Large, Complex Construction Case.
- (c) The parties may conduct such discovery as may be agreed to by all the parties provided, however, that the arbitrator(s) may place such limitations on the conduct of such discovery as the arbitrator(s) shall deem appropriate. If the parties cannot agree on production of document and other information, the arbitrator(s), consistent with the expedited nature of arbitration, may establish the extent of the discovery.

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- (d) At the discretion of the arbitrator(s), upon good cause shown and consistent with the expedited nature of arbitration, the arbitrator(s) may order depositions of, or the propounding of interrogatories to such persons who may possess information determined by the arbitrator(s) to be necessary to a determination of the matter.
- (e) The parties shall exchange copies of all exhibits they intend to submit at the hearing 10 business days prior to the hearing unless the arbitrator(s) determine otherwise.
- (f) The exchange of information pursuant to this rule, as agreed by the parties and/or directed by the arbitrator(s), shall be included within the Scheduling and Procedure Order.
- (g) The arbitrator is authorized to resolve any disputes concerning the exchange of information.
- (h) Generally hearings will be scheduled on consecutive days or in blocks of consecutive days in order to maximize efficiency and minimize costs.

The following flow chart provides a summary of the disputes and claims process described in subsections 105.22, 105.23, and 105.24

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**Figure 105-1
 DISPUTES AND CLAIMS FLOW CHART**

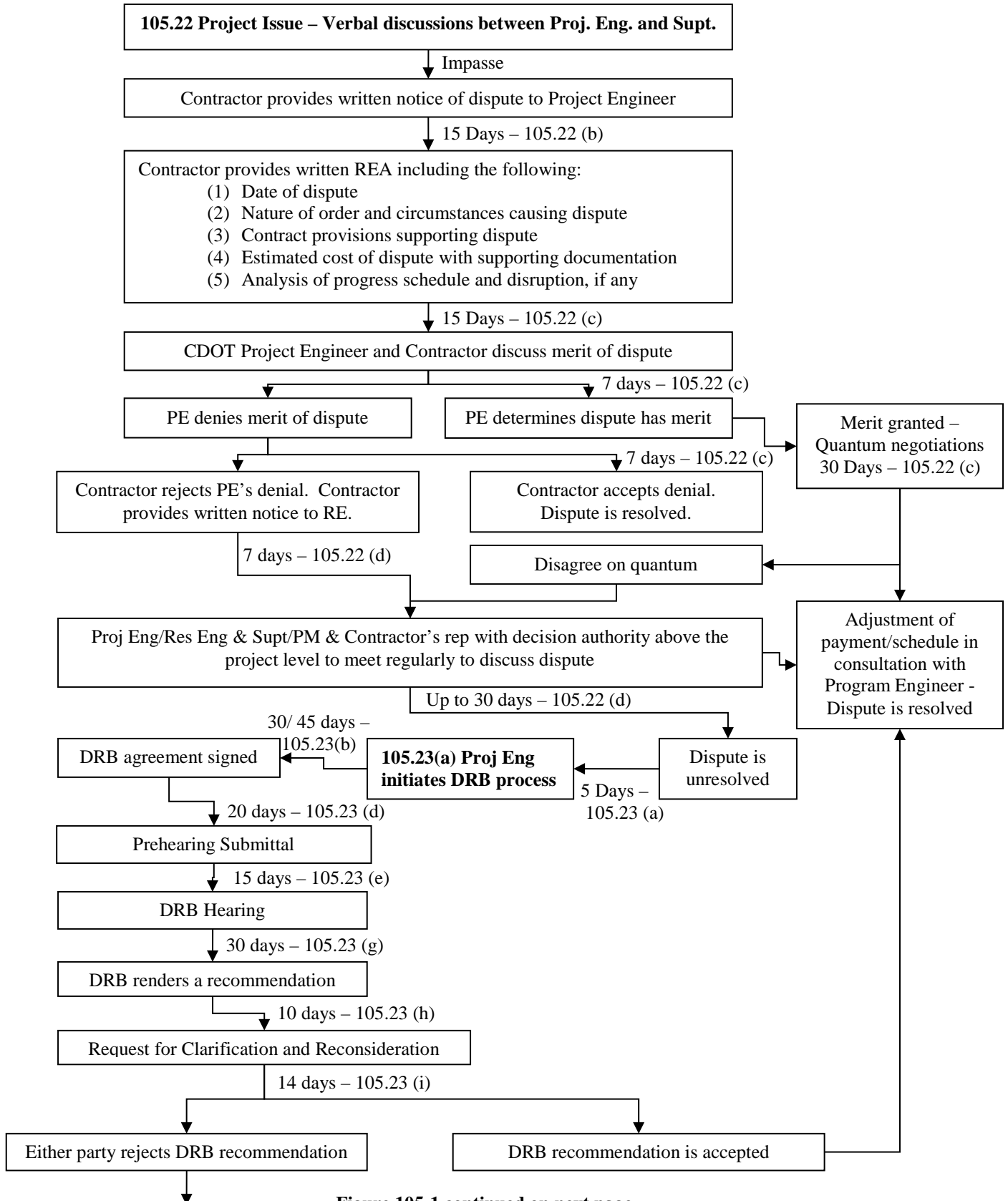
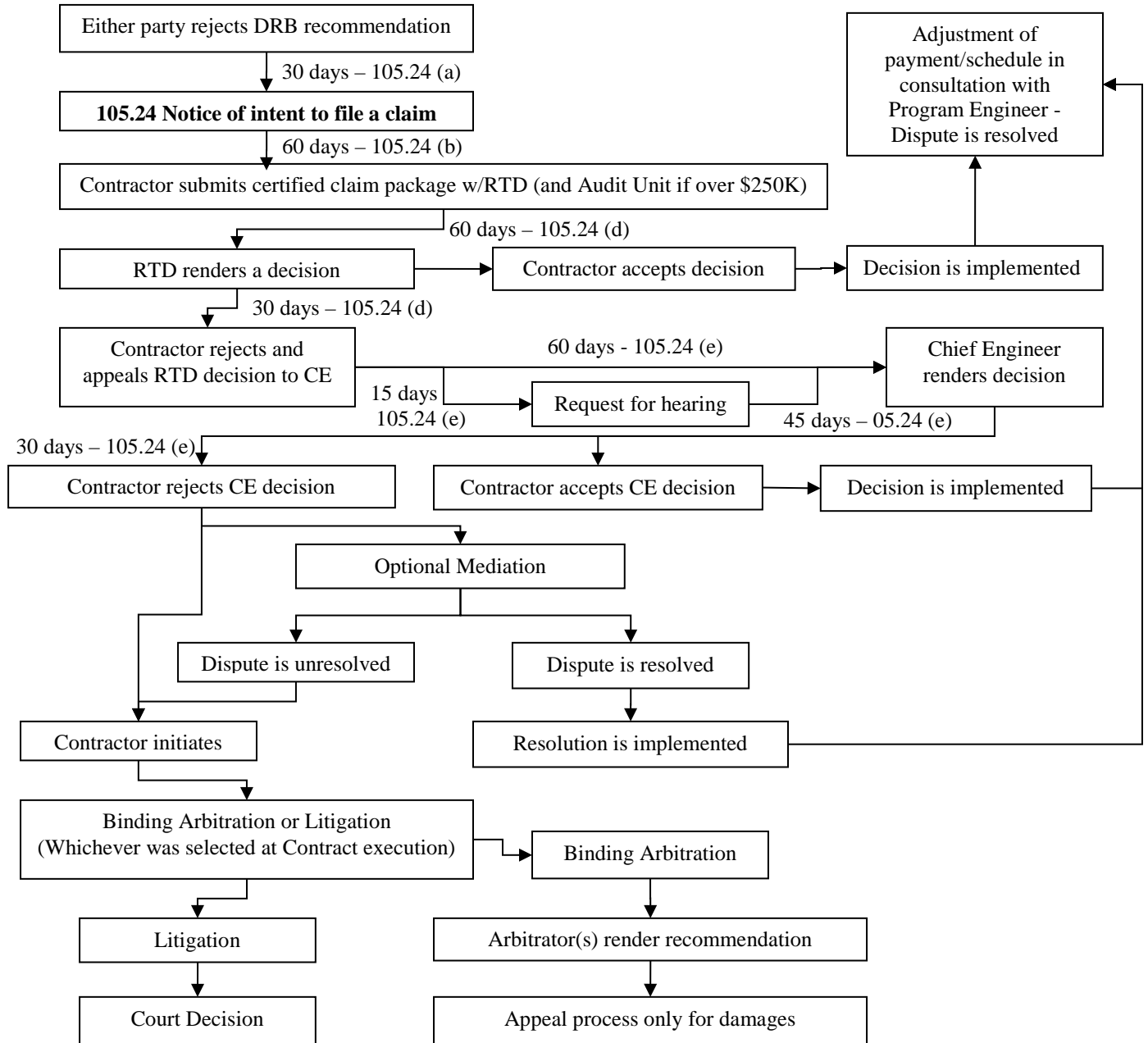


Figure 105-1 continued on next page

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Figure 105-1 (continued)



REVISION OF SECTION 105
HOT MIX ASPHALT PAVEMENT SMOOTHNESS

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 105.07 and replace with the following:

105.07 Conformity to Roadway Smoothness Criteria of HMA. Roadway smoothness testing and corrective work shall be performed as described below. The pavement smoothness category shall be MRI Category II unless shown on the plans. At least 2 weeks prior to the pre-paving conference the Contractor may request a change to the pavement smoothness category based on the CDOT's Design Bulletin guidelines for assigning pavement smoothness categories https://www.codot.gov/business/designsupport/bulletins_manuals/design-bulletins/. The Contractor shall not assume a change will be granted and be prepared to build the pavement according to the assigned smoothness category.

(a) *Smoothness Quality Control Testing.*

1. The Contractor shall perform Smoothness Quality Control (SQC) testing. The test results shall be submitted to the Engineer within 48 hours of completion. SQC test results shall show the Mean Roughness Index (MRI) for each 0.10 mile.

All traffic control costs associated with SQC testing will be paid for in accordance with Section 630.

SQC testing shall be performed on the first 2,000 tons for the final layer.

SQC testing shall be performed using the Contractor's inertial profiler, pursuant to the methods described in subsection 105.07(b) and in accordance with the manufacturer's recommendations. The Contractor's Profiler shall be certified according to CP 78. A list of certified profilers is located at <https://www.codot.gov/business/designsupport/materials-and-geotechnical/pave-smooth-testing/2016-certified-profilers/view>.

Production shall be suspended if SQC testing indicates that corrective work is required in accordance with subsection 105.07 (c). If the SQC data becomes available after production has started for the day, suspension will begin at the end of that production day. Production will remain suspended until the problem is identified and corrected. Each time production is suspended, corrective actions shall be proposed in writing by the Contractor. Production will not be allowed to resume until the proposed corrective actions have been accepted by the Project Engineer in writing.

When production resumes, the Contractor shall profile the first 2,000 tons of HMA. The conditions above for suspension of work will apply.

2. The finished transverse and longitudinal surface elevation of the pavement shall be measured using a 10 foot straightedge. Areas to be measured will be directed by the Engineer. The Contractor shall furnish an approved 10 foot straightedge, depth gauge and operator to aid the Engineer in testing the pavement surface. Areas showing high spots of more than 3/16 inch in 10 feet shall be marked and diamond ground until the high spot does not exceed 3/16 inch in 10 feet.

(b) *Initial Smoothness Acceptance Testing.* The Contractor shall perform Smoothness Acceptance Testing (SA) which will be used for acceptance and calculation of incentive adjustments.

All traffic control costs associated with SA testing will be paid for in accordance with Section 630.

1. Longitudinal Pavement Surface Smoothness Acceptance. Pavement surfaces shall be tested and accepted for longitudinal smoothness as described herein.
 - A. Testing Procedure (General). The longitudinal surface smoothness of the final pavement surface shall be tested by the Contractor in accordance with CP 74 and using the Contractor's high-speed profiler (HSP). The Contractor's Profiler shall be certified according to CP 78. A list of certified

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profilers is located at <https://www.codot.gov/business/designsupport/materials-and-geotechnical/pave-smooth-testing/2016-certified-profilers/view>

The HSP instrumentation shall be verified in accordance with CP 74 prior to measurements. The Contractor shall lay out a distance calibration site. The distance calibration site shall be located no more than ten miles from the Project limits. The distance calibration site shall be 1056 feet long and shall be on a relatively flat, straight section of pavement as approved by the Engineer. The site shall have a speed limit equal to the Project's highest speed limit that allows for the HSP to operate uninterrupted. The limits of the site shall be clearly marked and the distance shall be measured to an accuracy of +/- 3 inches. The Contractor shall provide in writing the site location to the Engineer. The cost of the distance calibration site will not be measured and paid for separately, but shall be included in the work.

The entire length of each through lane, climbing lane and passing lane including bridge approaches, bridge decks and intersections from the beginning to the end of the project shall be profiled in their planned final configuration. Shoulders less than 12 foot in width and medians will not be profiled and will not be subject to incentive adjustments. Shoulders with a width of 12 feet or greater, ramps, tapers, turn slots, acceleration lanes and deceleration lanes will be profiled, but will not be subject to incentive/disincentive adjustments. Shoulders with a width of 12 feet or more, ramps, tapers, turn slots, acceleration lanes and deceleration lanes will be evaluated for MRI and shall require corrective work if a 0.10 mile or fraction thereof section exceeds an MRI greater than 100.0 in/mile. The profile of the entire length of a lane shall be taken at one time. However, the Engineer should break a project into sections to accommodate Project phasing.

A sufficient distance shall be deleted from the profile to allow the profiler to obtain the testing speed plus a 300 foot distance to stop and start when required. Incentive adjustments will not be made for this area. The final surface of these areas shall be tested in accordance with subsection 105.07(a) 2.

Shoulders less than 12 foot in width and medians constructed as part of this project shall be measured in accordance with subsection 105.07(a) 2.

The profile shall include transverse joints when pavement is placed by the project on both sides of the joint. When pavement is placed on only one side of the joint, the profile shall start and stop at project paving limits.

The profile of the section of pavement 25 feet outside the paving limits to 5 feet inside paving limits will be evaluated in accordance with subsection 105.07(a) 2.

The profile of the area 25 feet each side of every railroad crossing, cattle guard, bus pad, manhole, gutter pan and intersection (where there is a planned breakpoint in the profile grade line in the direction of traffic) shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for these areas. Areas deleted from the profile shall be tested in accordance with subsection 105.07(a) 2.

When both new pavement and a new bridge or new bridge pavement are being constructed in a project, the profile of the area 25 feet each side of the bridge deck shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for this area. Areas deleted from the profile shall be tested in accordance with subsection 105.07(a) 2. Corrective work required in these areas will not be measured and paid for separately, but shall be included in the work. For all other projects, the profile of the area 25 feet each side of the bridge deck shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for this area. If the Engineer determines that corrective work is required in this area, payment will be made in accordance with subsection 109.04.

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The Contractor shall notify the Engineer in writing at least five working days in advance of his intention to perform SA testing. The Contractor shall profile the Project within 14 days after the completion of paving operations. The Engineer will witness the SA profiling. Within 24 hours after each profile is collected, the Contractor shall submit the data electronically to the Department at DOT_Profiles@state.co.us and to the Project Engineer.

The Contractor shall not perform any corrective work that will affect the pavement smoothness for ten working days after completion of the SA testing or as approved by the Engineer. This time is to allow for the Department to analyze the data and perform smoothness verification testing.

- B. Smoothness Testing Procedures. The Contractor shall submit a Method for Handling Traffic (MHT) to the Engineer for approval at least five days in advance of SA testing. The MHT shall detail the methods for traffic control that will allow for continuous non-stop profiling of each lane to be profiled at a minimum speed of 15 mph and for the placement of triggers. The Contractor shall provide the traffic control in accordance with the approved MHT. SA testing shall not be performed without an approved MHT

The Contractor shall mark the profiling limits and excluded areas. The Engineer will verify that the Contractor's marks are located properly. The Contractor shall use traffic cones with reflective tape or reflective tape on the pavement at the beginning and end of each lane for triggering the start and stop locations on the profiler and at any other location, where portions of the profile are being excluded. These locations shall be marked with temporary paint so that the Department's profiler uses the same locations for smoothness verification testing.

The ambient temperature shall be at least 34 °F for the profiler to operate.

The Contractor shall clear the lanes to be tested of all debris before profiling.

Each lane shall be profiled at least once. Profiling shall be at a constant speed (+/- 5 mph of the distance calibration speed) with a minimum speed of 15 mph and a maximum speed of 70 mph. Shoulders with a width of 12 feet or more, ramps, tapers, turn slots, acceleration lanes and deceleration lanes shall be profiled. The profile shall be taken in the planned direction of travel. The left and right wheel paths shall be profiled simultaneously. The collected profiles shall be electronically submitted to the Department and Engineer to be analyzed using CP 74.

- (1) The Department will determine a MRI for each 0.1 mile section or fraction thereof of completed pavement. The MRI consists of the left and right wheel path's profile passed through the International Roughness Index (IRI) filter. The IRI for the left and right wheel paths will be averaged to determine MRI.

The Contractor's SA test results will be available within ten working days of the completion of SA testing. The Engineer will give the Contractor a report that will include the lane profiled, the MRI in 0.10 mile increments and a summary of areas requiring corrective work. The Engineer may determine that it is necessary for the Contractor to re-profile a lane.

Areas requiring corrective work will be determined according to subsection 105.07(c)

Sections less than 0.005 miles in length shall not be subject to corrective work as specified by Table 105-10. Sections less than 0.005 miles in length shall be evaluated in accordance with subsection 105.07(a) 2.

- C. Acceptance and incentive adjustments for pavement smoothness will be made on a square yard basis in accordance with the following:

Incentive adjustments will be based on the MRI for each 0.1 mile section or fraction thereof. Incentive adjustments for Pavement Smoothness will be made in accordance with Table 105-6.

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 HOT MIX ASPHALT PAVEMENT SMOOTHNESS

Incentive payments will not be made until all sections requiring corrective work have been corrected.

**Table 105-6
 HMA PAVEMENT SMOOTHNESS (INCHES/MILE)
 MEAN ROUGHNESS INDEX**

Pavement Smoothness Category	Maximum Incentive Payment (\$/sqyd)	Incentive Payment (\$/sqyd)	No Incentive	Corrective Work Required
I	MRI ≤ 46.0 I = \$1.28	MRI > 46.0 and < 73.0 I = 3.46 - 0.0474 MRI	MRI ≥ 73.0 and ≤ 88.0	MRI > 88.0
II	MRI ≤ 40.0 I = \$1.28	MRI > 40.0 and < 67.0 I = 3.18 - 0.0474 MRI	MRI ≥ 67.0 and ≤ 82.0	MRI > 82.0
III	MRI ≤ 52.0 I = \$1.28	MRI > 52.0 and < 80.0 I = 3.66 - 0.0457 MRI	MRI ≥ 80.0 and ≤ 97.0	MRI > 97.0

**Table 105-7
 CORRECTIVE WORK CRITERIA (INCHES/MILE)
 0.005 to 0.10 MILE SECTIONS
 MEAN ROUGHNESS INDEX**

Pavement Smoothness Category	Corrective Work Required D = Section Length (miles)
I	MRI > 134.32 - 463.16 D
II	MRI > 125.16 - 431.58 D
III	MRI > 148.05 - 510.53 D

(c) *Corrective Work.*

The Department will analyze the SA testing for acceptance and indicate areas requiring corrective work in accordance with subsection 105.07(b). Corrective work shall be proposed in writing by the Contractor. Corrective work shall not be performed until approved in writing by the Engineer. The Contractor shall not perform any corrective work on the final layer until after the Engineer returns the results of the Initial Smoothness Acceptance testing and after the Department's Smoothness Verification testing, if performed. The Contractor shall perform corrective work in the areas indicated by the SA testing.

Corrective work on lower layers shall be at the Contractor's discretion.

The Contractor shall profile the roadway to demonstrate the required corrective work has been completed.

If the Contractor elects to perform corrective work prior to the completion of initial SA testing, the entire 0.10 mile section, or fraction thereof, will not be eligible for incentive payment. The Engineer will not modify the limits of the 0.10 mile sections to group corrective work areas in an effort to reduce the number of sections impacted by this decision.

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The criteria for determining if a 0.1 mile section requires corrective work is specified in Table 105-6. The criteria for determining if a section less than 0.10 miles in length and greater than 0.005 miles in length requires corrective work is specified in Table 105-7

- A. Corrective Methods. Corrective work shall consist of diamond grinding, an approved overlay, or removal and replacement.

Corrective work shall conform to one of the following conditions:

- (1) Removal and Replacement. The pavement requiring corrective work shall be removed, full width of the lane and the full thickness of the layer in accordance with subsection 202.09.

The removal area shall begin and end with a transverse butt joint, which shall be constructed with a transverse saw cut perpendicular to centerline. Replacement material shall be placed in sufficient quantity so the finished surface conforms to grade and smoothness requirements. Sections removed and replaced shall be at least 0.20 miles in length.

- (2) Overlay. The overlay shall cover the full width of the pavement including shoulders. The area overlaid shall begin and end with a transverse butt joint, which shall be constructed with a transverse saw cut and asphalt removal. All material shall be approved hot bituminous mixtures that meet all contract requirements. The overlay shall be placed so that the finished surface conforms to grade and smoothness requirements. The overlay area shall be compacted to the specified density. The overlay thickness shall be equivalent to that of the final layer in accordance with the Contract. Sections overlaid shall be at least 0.20 miles in length.

- (3) Diamond Grinding. Grinding shall not reduce planned pavement thickness by more than 0.3 inches. Diamond grinding shall be the full width of a wheel path, the wheel path is from the stripe to the center of the lane. The entire ground area of the final pavement surface shall be covered with a Tack Coat conforming to Section 407 (CSS-1h at 0.1 gallons per square yard of diluted emulsion; the emulsion shall be diluted with water at the rate of 50 percent water and 50 percent emulsion) when grinding is complete. The grinding process shall produce a pavement surface that is true to grade and uniform in appearance. The grooves shall be evenly spaced. Any ridges on the outside edge next to the shoulder, auxiliary, ramps or adjacent lanes greater than 3/16 inch high shall be feathered out to the satisfaction of the Engineer in a separate, feather pass operation.

The pavement surface after grinding shall have no depressions or misalignment of slope in the longitudinal direction exceeding 1/8 inch in 12 feet when measured with a 12 foot straightedge placed parallel to the centerline. All areas of deviation shall be reground at no additional cost.

The slurry and residue resulting from the grinding operation shall not be allowed to flow across lanes occupied by the traffic and shall be continuously removed during the grinding operation, leaving the pavement in a clean condition. The Contractor shall haul the grinding residue to a suitable location at an approved location at no additional cost.

Cores shall be taken to verify that minimum pavement thicknesses have been maintained. A minimum of one core shall be taken every 100 cumulative feet or fraction thereof per lane of diamond grinding, as directed by the Engineer. Coring shall be at the Contractor's expense.

- (d) *Final Smoothness Acceptance Testing.* After the Contractor has completed the required corrective work the Contractor shall retest the pavement in accordance with subsection 105.07(b). Final SA testing shall only be required on lanes with sections requiring corrective work. Final SA testing shall start and stop at the same locations as the Initial SA testing. If additional corrective work is required, the Contractor shall perform the corrective work and perform additional Final SA Testing. Time count will be charged pursuant to contract requirements during the time period required for all Final SA Testing. Delays associated with additional Final SA Testing will be considered non-excusable and non-compensable.

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HOT MIX ASPHALT PAVEMENT SMOOTHNESS

The Contractor shall notify the Engineer pursuant to 105.07(b) to schedule the final SA testing.

Final acceptance and incentive adjustments for pavement smoothness will be made on a square yard basis in accordance with the following:

Incentive payments will be based on the MRI for each 0.1 mile section or fraction thereof from the Contractor's initial SA testing.

Those sections requiring corrective work indicated by the initial SA testing, will be re-evaluated; however, no incentives may be earned in these areas, regardless of the final smoothness.

- (e) *Department Smoothness Verification Testing (SV)*. The Department may elect to perform smoothness verification (SV) testing using the Department's inertial profiler, with the methods described in subsection 105.07(b). The Engineer will notify the Contractor of the Department's intention to perform SV testing. All traffic control costs associated with Department SV testing will be paid for by the Department in accordance with Section 630.

The Contractor's SA test results will be compared to the Department's SV test results. The Contractor's SA test results will be considered acceptable and will be used for incentive payment if the following criteria are met:

- (1) The difference in MRI for a 1/10 mile section is less than 6.1 inches/mile for a minimum of 90 percent of the 1/10 mile sections for each lane.
- (2) The difference in average MRI for each lane is less than 6.1 inches/mile.
- (3) The difference in the length of each lane is less than 0.2 percent

When the Contractor's SA test results are not considered acceptable, the Department's SV test results will be used for incentive payment and the Contractor's profiler certification will be evaluated pursuant to CP 78. The Department will have 30 days to complete this evaluation.

The Contractor will be assessed a charge of \$1,000 for SV testing when the Contractor's SA test results are not considered acceptable.

- (f) *MRI Category IV: HMA Recycling Treatments Thin Lifts and Urban Rehabilitation treatments smoothness criteria*. For MRI Category IV pavements, the following shall be used for acceptance:

An MRI for each 0.1 mile section shall be determined on the original pavement surface prior to beginning the work.

An MRI for each 0.1 mile section shall be determined on the pavement surface after the work is complete.

When a 0.1 mile section has a final MRI greater than 92.0 in/mile and the final MRI is greater than the MRI prior to performing the work, that 0.1 mile section shall be corrected by a method approved in writing by the Engineer. Corrective work shall be such that the resulting final MRI is equal to or less than the initial MRI or 92.0 in/mile, whichever is greater. All costs associated with corrective work shall be at the Contractor's expense, including but not limited to traffic control, additional hot mix asphalt, grinding and milling.

Incentive adjustments for smoothness will not be made for Category IV.

The pavement smoothness for HMA Recycling Treatments and Thin Lifts that will be overlaid with a final riding surface will not be evaluated by the Department for Smoothness acceptance.

REVISION OF SECTIONS 105 AND 106
CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT
(LESS THAN 5000 TONS)

Sections 105 and 106 of the Standard Specifications are hereby revised for this project as follows:

Delete subsection 105.05 and replace with the following:

105.05 Conformity to the Contract of Hot Mix Asphalt. Conformity to the Contract of all Hot Mix Asphalt, Item 403, except Hot Mix Asphalt (Patching) and temporary pavement will be determined by tests and evaluations of elements that include asphalt content, gradation, in-place density and joint density in accordance with the following:

All work performed and all materials furnished shall conform to the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown in the Contract.

For those items of work where working tolerances are not specified, the Contractor shall perform the work in a manner consistent with reasonable and customary manufacturing and construction practices.

When the Engineer finds the materials or work furnished, work performed, or the finished product are not in conformity with the Contract and has resulted in an inferior or unsatisfactory product, the work or material shall be removed and replaced or otherwise corrected at the expense of the Contractor.

Materials will be sampled randomly and tested by the Department in accordance with Section 106 and with the applicable procedures contained in the Department's Field Materials Manual. The approximate maximum quantity represented by each sample will be as set forth in Section 106. Additional samples may be selected and tested as set forth in Section 106 at the Engineer's discretion.

A process will consist of either a single test value or a series of test values resulting from related tests of an element of the Contractor's work and materials. An element is a material or workmanship property that can be tested and evaluated for quality level by the Department approved sampling, testing, and analytical procedures. All materials produced will be assigned to a process. A change in process is defined as a change that affects the element involved. For any element, with the exception of the process for joint density element, a process normally will include all produced materials associated with that element prior to a change in the job mix formula (Form 43). For joint density, a new process will be established for each new layer of pavement or for changes in joint construction. Density measurements taken within each compaction test section will be a separate process. The Engineer may separate a process in order to accommodate small quantities or unusual variations.

Evaluation of materials for pay factors (PF) will be done using only the Department's acceptance test results. Each process will have a PF computed in accordance with the requirements of this Section. Test results determined to have sampling or testing errors will not be used.

Except for in-place density measurements taken within a compaction test section, any test result for an element greater than the distance $2 \times V$ (see Table 105-2) outside the tolerance limits will be designated as a separate process and the pay factor will be calculated in accordance with subsection 105.05(a). An element pay factor less than zero shall be zero. The calculated PF will be used to determine the Incentive/Disincentive Payment (I/DP) for the process.

In the case of in-place density or joint density the Contractor will be allowed to core the exact location (or immediately adjacent location for joint density) of a test result more than $2 \times V$ outside the tolerance limit. The core must be taken and furnished to the Engineer within eight hours after notification by the Engineer of the test result. The result of this core will be used in lieu of the previous test result. Cores not taken within eight hours after notification by the Engineer will not be used in lieu of the test result. All costs associated with coring will be at the Contractor's expense.

(a) *Representing Small Quantities.* When it is necessary to represent a process by only one or two test results, PF will be the average of PFs resulting from the following:

REVISION OF SECTIONS 105 AND 106
 CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT
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If the test result is within the tolerance limits then PF = 1.00

If the test result is above the maximum specified limit, then

$$PF = 1.00 - [0.25(T_O - T_U)/V]$$

If the test result is below the minimum specified limit, then

$$PF = 1.00 - [0.25(T_L - T_O)/V]$$

- Where: PF = pay factor.
- V = V factor from Table 105-2.
- T_O = the individual test result.
- T_U = upper specification limit.
- T_L = lower specification limit.

The calculated PF will be used to determine the I/DP for the process.

- (b) *Determining Quality Level.* Each process with three or more test results will be evaluated for a quality level (QL) in accordance with Colorado Procedure 71.
- (c) *Gradation Element.* Each specified sieve, with the exception of 100 percent passing sieves, will be evaluated for QL separately. The lowest calculated QL for a sieve will be designated as the QL for gradation element for the process.
- (d) *Joint Density Element.* Joint Density will be tested according to subsection 401.17.
- (e) *Process Pay Factor.* Using the calculated QL for the process, compute PF as follows: The final number of random samples (Pn) in each process will determine the final pay factor. . As test values are accumulated for each process, Pn will change accordingly. When the process has been completed, the number of random samples it contains will determine the computation of PF, based on Table 105-3 and formula (1) below. When Pn is from 3 to 9, or greater than 200, PF will be computed using the formulas designated in Table 105-3. Where Pn is equal to or greater than 10 and less than 201, PF will be computed by formula (1):

$$(1) PF = \frac{(PF_1 + PF_2)}{2} + \left[\frac{(PF_2 + PF_3)}{2} - \frac{(PF_1 + PF_2)}{2} \right] \times \frac{(Pn_2 - Pn_X)}{(Pn_2 - Pn_3)}$$

Where, when referring to Table 105-3:

- PF₁= PF determined at the next lowest Pn formula using process QL
- PF₂= PF determined using the Pn formula shown for the process QL
- PF₃= PF determined at the next highest Pn formula using process QL
- Pn₂= the lowest Pn in the spread of values listed for the process Pn formula
- Pn₃= the lowest Pn in the spread of values listed for the next highest Pn formula
- Pn_X= the actual number of test values in the process

REVISION OF SECTIONS 105 AND 106
CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT
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When evaluating the item of Furnish Hot mix asphalt, the PF for the element of In-Place Density shall be 1.0.

Regardless of QL, the maximum PF in relation to Pn is limited in accordance with Table 105-3.

As test results become available, they will be used to calculate accumulated QL and PF numbers for each process. The process I/DP's will then be calculated and accumulated for each element and for the item. The test results and the accumulated calculations will be made available to the Contractor upon request.

Numbers from the calculations will be carried to significant figures and rounded according to AASHTO Standard Recommended Practice R-11, Rounding Method.

(f) *Evaluation of Work.* When the PF of a process is 0.75 or greater, the finished quantity of work represented by the process will be accepted at the appropriate pay factor. If the PF is less than 0.75, the Engineer may:

1. Require complete removal and replacement with specification material at the Contractor's expense;

or

2. Where the finished product is found to be capable of performing the intended purpose and the value of the finished product is not affected, permit the Contractor to leave the material in place.

If the material is permitted to remain in place the PF for the process will not be greater than 0.75. When condition red, as described in Section 106, exists for any element, resolution and correction will be in accordance with Section 106. Material, which the Engineer determines is defective, may be isolated and rejected without regard to sampling sequence or location within a process.

If removal and replacement is required because the joint density PF for a process is below 0.75, the Contractor shall remove and replace the full lane width adjacent to and including at least 6 inches beyond the visible joint line for the entire length of joint representing the process. If the lane removed is adjacent to another joint, that joint shall also be removed to a point 6 inches beyond the visible joint line. When a single joint density core is more than 2V outside the tolerance limits, the removal and replacement limits shall be identified by coring the failing joint at 25 foot intervals until two successive cores are found to be 1V or less below the minimum tolerance limit. If removal and replacement is required, the Contractor shall submit documentation identifying the process to be used to correct the area in question in writing. The process will be approved by the Engineer before commencing the corrective work.

REVISION OF SECTIONS 105 AND 106
 CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT
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Table 105-2
“W” AND “V” FACTORS FOR VARIOUS ELEMENTS

Hot Mix Asphalt		
Element	V Factor	W Factor
2.36 mm (No. 8) mesh and larger sieves	2.80	N/A
600 µm (No. 30) mesh sieve	1.80	N/A
75 µm (No. 200) mesh sieve	0.80	N/A
Gradation	N/A	15
Asphalt Content	0.20	25
In-place Density	1.10	45
Joint Density	1.60	15

Table 105-3
FORMULAS FOR CALCULATING PF BASED ON PN

Pn	When Pn as shown at left is 3 to 9, or greater than 200, use designated formula below to calculate Pay Factor, PF = ..., when Pn is 10 to 200, use formula (1) above:	Maximum PF
3	$0.31177 + 1.57878 (QL/100) - 0.84862 (QL/100)^2$	1.025
4	$0.27890 + 1.51471 (QL/100) - 0.73553 (QL/100)^2$	1.030
5	$0.25529 + 1.48268 (QL/100) - 0.67759 (QL/100)^2$	1.030
6	$0.19468 + 1.56729 (QL/100) - 0.70239 (QL/100)^2$	1.035
7	$0.16709 + 1.58245 (QL/100) - 0.68705 (QL/100)^2$	1.035
8	$0.16394 + 1.55070 (QL/100) - 0.65270 (QL/100)^2$	1.040
9	$0.11412 + 1.63532 (QL/100) - 0.68786 (QL/100)^2$	1.040
10 to 11	$0.15344 + 1.50104 (QL/100) - 0.58896 (QL/100)^2$	1.045
12 to 14	$0.07278 + 1.64285 (QL/100) - 0.65033 (QL/100)^2$	1.045
15 to 18	$0.07826 + 1.55649 (QL/100) - 0.56616 (QL/100)^2$	1.050
19 to 25	$0.09907 + 1.43088 (QL/100) - 0.45550 (QL/100)^2$	1.050
26 to 37	$0.07373 + 1.41851 (QL/100) - 0.41777 (QL/100)^2$	1.055
38 to 69	$0.10586 + 1.26473 (QL/100) - 0.29660 (QL/100)^2$	1.055
70 to 200	$0.21611 + 0.86111 (QL/100)$	1.060
≥ 201	$0.15221 + 0.92171 (QL/100)$	1.060

(g) Process I/DP Computation.

REVISION OF SECTIONS 105 AND 106
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$$I/DP = (PF - 1)(QR)(UP)(W/100)$$

Where:	I/DP	=	Incentive/Disincentive Payment
	PF	=	Pay Factor
	QR	=	Quantity in Tons of HMA Represented by the Process
	UP	=	Unit Bid Price of Asphalt Mix
	W	=	Element Factor from Table 105-2

When AC is paid for separately UP shall be:

$$UP = [(Ton_{HMA})(UP_{HMA}) + (Ton_{AC})(UP_{AC})]/Ton_{HMA}$$

Where:	Ton _{HMA}	=	Tons of Asphalt Mix
	UP _{HMA}	=	Unit Bid Price of Asphalt Mix
	Ton _{AC}	=	Tons of Asphalt Cement
	UP _{AC}	=	Unit Bid Price of Asphalt Cement

For the joint density element:

$$UP = UP_{HMA}$$

Where: UP_{HMA} is as defined above.

When AC is paid for separately UP shall be:

$$UP = [(BTon_{HMA})(BUP_{HMA}) + (BTon_{AC})(BUP_{AC})]/BTon_{HMA}$$

Where:	BTon _{HMA}	=	Bid Tons of Asphalt Mix
	BUP _{HMA}	=	Unit Bid Price of Asphalt Mix
	BTon _{AC}	=	Bid Tons of Asphalt Cement
	BUP _{AC}	=	Unit Bid Price of Asphalt Cement

- (h) *Element I/DP.* The I/DP for an element shall be computed by accumulating the process I/DP's for that element.
- (i) *I/DP for a Mix Design.* The I/DP for a mix design shall be computed by accumulating the individual I/DP's for the asphalt content, in-place density, and gradation elements for that mix design. The accumulated quantities of materials for each element must be the same at the end of I/DP calculations for a mix design.
- (j) *Project I/DP.* The I/DP for the project shall be computed by accumulating the mix design I/DP's and the joint density I/DP's. The accumulated quantities of materials for each element must be the same at the end of I/DP calculations for the project.

Delete subsection 106.05 and replace with the following:

106.05 Sampling and Testing of Hot Mix Asphalt. All hot mix asphalt, Item 403, except Hot Mix Asphalt (Patching) and temporary pavement shall be tested in accordance with the following program of process control testing and acceptance testing:

The Contract will specify whether process control testing by the Contractor is mandatory or voluntary.

- (a) *Process Control Testing.*

REVISION OF SECTIONS 105 AND 106
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1. **Mandatory Process Control.** When process control testing is mandatory the Contractor shall be responsible for process control testing on all elements and at the frequency listed in Table 106-1. Process control testing shall be performed at the expense of the Contractor.

After completion of compaction, in-place density tests for process control shall be taken at the frequency shown in Table 106-1. The results shall be reported in writing to the Engineer on a daily basis. Daily plots of the test results with tonnage represented shall be made on a chart convenient for viewing by the Engineer. All of the testing equipment used for in-place density testing shall conform to the requirements of acceptance testing standards, except nuclear testing devices need not be calibrated on the Department's calibration blocks.

For elements other than in-place density, results from quality control tests need not be plotted, or routinely reported to the Engineer. This does not relieve the Contractor from the responsibility of performing such testing along with appropriate plant monitoring as necessary to assure that produced material conforms to the applicable specifications. Quality control test data shall be made available to the Engineer upon request.

2. **Voluntary Process Control.** The Contractor may conduct process control testing. Process control testing is not required, but is recommended on the elements and at the frequency listed in Table 106-1.

All of the testing equipment used for in-place density testing shall conform to the requirements of acceptance testing standards, except nuclear testing devices need not be calibrated on the Department's calibration blocks.

- (b) **Acceptance Testing.** Acceptance testing is the responsibility of the Department. For acceptance testing the Department will determine the locations where samples or measurements are to be taken and as designated in Section 403. The maximum quantity of material represented by each test result, the elements, the frequency of testing and the minimum number of test results will be in accordance with Table 106-1. The location or time of sampling will be based on the stratified random procedure as described in CP 75. Acceptance sampling and testing procedures will be in accordance with the Schedule for Minimum Materials Sampling, Testing and Inspection in the Department's Field Materials Manual. Samples for project acceptance testing shall be taken by the Contractor in accordance with the designated method. The samples shall be taken in the presence of the Engineer. Where appropriate, the Contractor shall reduce each sample to the size designated by the Engineer. The Contractor may retain a split of the each sample which cannot be included as part of the Contractor's process control testing. Dispute of the acceptance test results in accordance with CP-17 will not be allowed unless a provision for check testing has been included in the Contract and it has been successfully completed. All materials being used are subject to inspection and testing at any time prior to or during incorporation into the work.

REVISION OF SECTIONS 105 AND 106
 CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT
 (LESS THAN 5000 TONS)

Table 106-1
SCHEDULE FOR MINIMUM SAMPLING AND TESTING

Element	Process Control	Acceptance
Asphalt Content	1/500 tons	1/1000 tons
Theoretical Maximum Specific Gravity	1.1000 tons, minimum 1/day	1/1000 tons, minimum 1/day
Gradation	1/Day	1/2000 tons
In-Place Density	1/500 tons	1/500 tons
Joint Density	1 core/2500 linear feet of joint	1 core /5000 linear feet of joint
Aggregate Percent Moisture ⁽³⁾	1/2000 tons or 1/Day if less than 2000 tons	1/2000 tons
Percent Lime ^{(3) (4)}	1/Day	Not applicable
Notes: (1) The minimum number of in-place density tests for acceptance will be 5. (2) Process control tests for gradation are not required if less than 250 tons are placed in a day. The minimum number of process control tests for gradation shall be one test for each 1000 tons or fraction thereof. (3) Not to be used for incentive/disincentive pay. Test according to CP 60B and report results from Form 106 or Form 565 on Form 6. (4) Verified per Contractor's QC Plan.		

REVISION OF SECTIONS 105 AND 106
CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT
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- (c) *Reference Conditions.* Three reference conditions can exist determined by the Moving Quality Level (MQL). The MQL will be calculated in accordance with the procedure in CP 71 for Determining Quality Level (QL). The MQL will be calculated using only acceptance tests. The MQL will be calculated on tests 1 through 3, then tests 1 through 4, then tests 1 through 5, then thereafter on the last five consecutive test results. The MQL will not be used to determine pay factors. The three reference conditions and actions that will be taken are described as follows:
1. Condition green will exist for an element when an MQL of 90 or greater is reached, or maintained, and the past five consecutive test results are within the specification limits.
 2. Condition yellow will exist for all elements at the beginning of production or when a new process is established because of changes in materials or the job-mix formula, following an extended suspension of work, or when the MQL is less than 90 and equal to or greater than 65. Once an element is at condition green, if the MQL falls below 90 or a test result falls outside the specification limits, the condition will revert to yellow or red as appropriate.
 3. Condition red will exist for any element when the MQL is less than 65. The Contractor shall be notified immediately in writing and the process control sampling and testing frequency increased to a minimum rate of 1/250 tons for that element. The process control sampling and testing frequency shall remain at 1/250 tons until the process control QL reaches or exceeds 78. If the QL for the next five process control tests is below 65, production will be suspended.

If gradation is the element with MQL less than 65, the Department will test one randomly selected sample in the first 1250 tons produced in condition red. If this test result is outside the tolerance limits, production will be suspended. (This test result will not be included as an acceptance test.)

After condition red exists, a new MQL will be started. Acceptance testing will stay at the frequency shown in Table 106-1. After three acceptance tests, if the MQL is less than 65, production will be suspended.

Production will remain suspended until the source of the problem is identified and corrected. Each time production is suspended, corrective actions shall be proposed in writing by the Contractor and approved in writing by the Engineer before production may resume.

Upon resuming production, the process control sampling and testing frequency for the elements causing the condition red shall remain at 1/250 tons. If the QL for the next five process control tests is below 65, production will be suspended again. If gradation is the element with MQL less than 65, the Department will test one randomly selected sample in the first 1250 tons produced in condition red. If this test result is outside the tolerance limits, production will be suspended.

November 6, 2014

REVISION OF SECTION 106
BUY AMERICA REQUIREMENTS

Section 106 of the Standard Specifications is hereby revised for this project as follows:

Subsection 106.11 shall include the following:

The Contractor shall maintain a document summarizing the date and quantity of all steel and iron material delivered to the project. The document shall show the pay item, quantity of material delivered to the project, along with the quantity of material installed by the cutoff date for the monthly progress payment. The summary shall also reconcile the pay item quantities to the submitted Buy America certifications. The Contractor shall also maintain documentation of the project delivered cost of all foreign steel or iron permanently incorporated into the project. Both documents shall be submitted to the Engineer within five days of the cutoff date for the monthly progress payment. A monthly summary shall be required even if no steel or iron products are incorporated into the project during the month. The summary document does not relieve the Contractor of providing the necessary Buy America certifications of steel and or iron prior to permanent incorporation into the project.

February 3, 2011

REVISION OF SECTION 106
CERTIFICATES OF COMPLIANCE AND
CERTIFIED TEST REPORTS

Section 106 of the Standard Specifications is hereby revised for this project as follows:

In subsection 106.12, delete the second paragraph and replace it with the following:

The original Certificate of Compliance shall include the Contractor's original signature as directed above. The original signature (including corporate title) on the Certificate of Compliance, under penalty of perjury, shall be of a person having legal authority to act for the manufacturer. It shall state that the product or assembly to be incorporated into the project has been sampled and passed all specified tests in conformity to the plans and specifications for this project. One legible copy of the fully signed Certificate of Compliance shall be furnished to the Engineer prior to installation of material. The original shall be provided to the Engineer before payment for the represented item will be made.

In subsection 106.13, delete the second paragraph and replace it with the following:

The Certified Test Report shall be a legible copy or an original document and shall include the Contractor's original signature as directed above. The signature (including corporate title) on the Certified Test Report, under penalty of perjury, shall be of a person having legal authority to act for the manufacturer or the independent testing laboratory. It shall state that the test results show that the product or assembly to be incorporated into the project has been sampled and passed all specified tests in conformity to the plans and specifications for this project. One legible copy or original document of the fully signed Certified Test Report shall be furnished to the Engineer prior to installation of material. Failure to comply may result in delays to the project or rejection of the materials.

October 31, 2013

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REVISION OF SECTION 106
MATERIAL SOURCES

Section 106 of the Standard Specifications is hereby revised for this project as follows:

In subsection 106.02 (a), delete the third paragraph and replace with the following:

The Contract will indicate whether the Department has or has not obtained the necessary County or City Zoning Clearance and the required permit from Colorado Department of Natural Resources needed to explore and remove materials from the available source. If the Department did not obtain the necessary clearances or permits, the Contractor shall obtain them. Any delays to the project or additional expenses that are incurred while these clearances or permits are being obtained shall be the responsibility of the Contractor. The Contractor shall ensure that the requirements of the permits do not conflict with the pit construction and reclamation requirements shown in the Contract for the available source.

In subsection 106.02 (b), delete the first paragraph and replace with the following:

(b) *Contractor Source*. Sources of sand, gravel, or borrow other than available sources will be known as contractor sources. The contractor source will be tested by the Department and approved by the Engineer prior to incorporation of the material into the project. If the submitted materials do not meet the contract specifications it will become the Contractor's responsibility to re-sample and test the material. The Contractor will supply the Department with passing test results from an AASHTO accredited laboratory and signed and sealed by a Professional Engineer. If requested by the Engineer, the Department will then re-sample and re-test the material for compliance to the contract specifications. The Contractor shall produce material which meets contract specifications throughout construction of the project.

The cost of sampling, testing, and corrective action by the Contractor will not be paid for separately but shall be included in the work.

REVISION OF SECTIONS 106, 627 AND 713
 GLASS BEADS FOR PAVEMENT MARKING

Sections 106, 627, and 713 are hereby revised for this project as follows:

Subsection 106.11 shall include the following:

All post-consumer and industrial glass beads for pavement marking shall have been manufactured from North American glass waste streams in the United States of America. The bead manufacturer shall submit a COC in accordance with subsection 106.12 confirming that North American glass waste streams were used in the manufacture of the glass beads.

Subsection 627.06 (c) shall include the following:

Glass beads shall be applied into the thermoplastic pavement marking by means of a low pressure, gravity drop bead applicator.

In subsection 713.08, delete the first and third paragraphs and replace with the following:

713.08 Glass Beads for Pavement Marking. Glass beads for pavement marking shall conform to AASHTO M 247, except for the following:

(1) Gradation:

U.S. Mesh	Microns	% Passing	
		Epoxy and MMA	Waterborne, Low VOC and High Build
16	1180	90-100	100
18	1000	65-80	97-100
20	850		85-100
30	600	30-50	50-70
40	425		10-35
50	300	0-5	0-10
80	180		0-5

(2) Roundness: All beads shall meet a minimum of 80 percent true spheres in accordance with the Office of Federal Lands Highways FLH T520 or a computerized optical testing method.

(3) Color / Clarity: Beads shall be colorless, clear, and free of carbon residues.

(4) Refractive Index: Minimum 1.51 by oil immersion method.

(5) Air Inclusions: Less than 5 percent by visual count.

(6) Coatings: Per manufacturer's recommendation for optimum adhesion and embedment.

(7) Chemical Resistance: Beads shall be resistant to hydrochloric acid, water, calcium chloride, and sodium sulfide as tested per methods outlined in sections 4.3.6 to 4.3.9 of the TT-B Federal Spec.1325D.

(8) For Epoxy Pavement Marking, a minimum of 50 percent of the total weight shall be manufactured using a molten kiln direct melt method. For Waterborne and Low VOC Paint, a minimum of 15 percent of the total weight shall be manufactured using a molten kiln direct melt method. All molten kiln direct melt glass beads shall be above the 600 µm (#30) sieve.

(9) Glass beads used for any type of pavement marking shall not contain more than 75 parts per million (ppm) arsenic, 75 ppm antimony and 100 ppm lead, as tested in accordance with EPA methods 3052 and 6010C, or other approved testing method

February 3, 2011

REVISION OF SECTION 107
RESPONSIBILITY FOR DAMAGE CLAIMS,
INSURANCE TYPES AND COVERAGE LIMITS

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 107.15(c) and replace it with the following:

- (c) Each insurance policy shall include provisions preventing cancellation or non-renewal without at least 30 days prior notice to Contractor. The Contractor shall forward to the Engineer any such notice received within seven days of the Contractor's receipt of such notice.

January 30, 2014

REVISION OF SECTION 107
WARNING LIGHTS FOR WORK VEHICLES AND EQUIPMENT

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.06 (b) shall include the following:

All work vehicles and mobile equipment shall be equipped with one or more functioning warning lights mounted as high as practicable, which shall be capable of displaying in all directions one or more flashing, oscillating, or rotating lights for warning roadway traffic. The lights shall be amber in color. The warning lights shall be activated when the work vehicle or mobile equipment is operating within the roadway, right of way or both. All supplemental lights shall be SAE Class 1 certified.

REVISION OF SECTIONS 107 AND 208
WATER QUALITY CONTROL
UNDER ONE ACRE OF DISTURBANCE

Sections 107 and 208 of the Standard Specifications are hereby revised for this project as follows:

In subsection 107.25(b) 6 delete the second paragraph and replace it with the following:

The Contractor shall record the location of potential pollutants on the plans. Descriptions of the potential pollutants shall be submitted to and approved by the Engineer.

In subsection 208.03 delete the first paragraph and replace it with the following:

Prior to construction the Contractor shall implement BMPs in accordance with the approved project schedule as described in subsection in 208.03(b).

In subsection 208.03 delete the third, fourth, and fifth paragraphs and replace them with the following:

The Contractor shall evaluate all non-stormwater coming onto the site, such as springs, seeps, and landscape irrigation return flow. If such flow is identified, BMPs shall be used to protect off-site water from becoming contaminated with sediment or other pollutants.

The Contractor shall review existing inlets and culverts to determine if inlet protection is needed due to water flow patterns. Prior to beginning construction, inlets and culverts needing protection shall be protected and the location of the implemented BMP added to the plans.

When additional BMPs are required and approved by the Engineer, the Contractor shall implement the additional BMPs and shall record and describe them on the plans. The approved BMPs will be measured and paid for in accordance with subsections 208.11 and 208.12.

Delete subsections 208.03(c) and (d) and replace them with the following:

(c) *Implementation, Maintenance and Revision of the SWMP.*

The Contractor's responsibilities shall be as follows:

- (1) Install, construct, and maintain all BMPs specified in the Contract and coordinate the construction of BMPs with all other construction operations.
- (2) Implement suitable temporary erosion and sediment control features as necessary to correct unforeseen conditions or emergency situations. Dismantle those features when their purpose has been fulfilled unless the Engineer directs that the features be left in place.
- (3) Implement necessary actions to reduce anticipated or presently existing water quality or erosion problems resulting from construction activities.
- (4) Make available, all labor, material, and equipment needed to install, maintain, and remove BMPs.
- (5) The Contractor shall assign to the project an individual to serve in the capacity of Stormwater Administrator (SWMP Administrator). These duties may be assumed by the Superintendent. The SWMP Administrator shall be experienced in all aspects of construction and have satisfactorily completed a Transportation Erosion Control Supervisor Certification (TECS) training authorized by the Department. Proof that this requirement has been met shall be submitted to the Engineer prior to or at the preconstruction conference. A list of authorized TECS training programs will be provided by the Engineer upon request by the Contractor. The SWMP Administrator shall be the person responsible for ensuring that the responsibilities listed in (1) through (7) in (d) are fulfilled.

(d) *Documentation Available on the Project.* The following Contract documents and references will be made available for reference in one location on the project during construction.

1. Project Documents. The following documents shall be kept, maintained, and updated in a single notebook:

- (1) SWMP Sheets
- (2) SWMP site map, if applicable to the project.
- (3) Details of BMPs used on the project not covered in Standard Plan M-208-1.
- (4) List of potential pollutants as described in subsection 107.25.
- (5) Spill Response Plan and reports of spills submitted to CDPHE.

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- (6) Form 105s and all other correspondence relating to water quality.
- (7) Project environmental permits and associated applications and certifications.

2. Reference Materials

- (1) CDOT *Erosion Control and Stormwater Quality Guide*.
- (2) CDOT *Erosion Control and Stormwater Quality Field Guide*.
- (3) Copy of biological opinion, if applicable.

In subsection 208.04 delete the first and second paragraphs and replace them with the following:

The Contractor shall modify the SWMP to clearly describe and locate all BMPs implemented at the site to control potential sediment discharges from vehicle tracking.

Vehicle tracking pads shall be used at all vehicle and equipment access points to the site to prevent sediment exiting the project site onto paved public roads. Access shall be provided only at locations approved by the Engineer.

Delete subsection 208.04(e) and replace it with the following:

- (e) *Stabilization*. Once earthwork has begun on a section, it shall be pursued until completion.

Clearing and grubbing operations shall be scheduled and performed so that grading operations and final stabilization measures can follow immediately thereafter if the project conditions permit. Otherwise temporary stabilization measures shall be taken between successive construction stages. Additional work required because the Contractor has failed to properly coordinate the entire erosion control schedule, thus causing previously seeded areas to be disturbed by operations that could have been performed prior to the seeding shall be performed at the Contractor's expense.

In subsection 208.06 delete the first paragraph and replace it with the following:

208.06 Materials Handling and Spill Prevention. The Contractor shall clearly describe and record on the SWMP, all practices implemented at the site to minimize impacts from procedures or significant material that could contribute pollutants to runoff. Areas or procedures where potential spills can occur shall have spill contingency plans in place as specified in subsections 107.25(b) 6 or 208.06(c).

In subsection 208.07 delete the second paragraph and replace it with the following:

Erodible stockpiles (including topsoil) shall be contained with acceptable BMPs at the toe (or within 20 feet of the toe) throughout construction. BMPs shall be approved by the Engineer.

In subsection 208.08, delete the first paragraph and replace it with the following:

The Contractor shall limit construction activities to those areas within the limits of disturbance shown on the plans and cross-sections. Construction activities, in addition to the Contract work, shall include the on-site parking of vehicles or equipment, on-site staging, on-site batch plants, haul roads or work access, and all other action which would disturb existing conditions. Off road staging areas must be pre-approved by the Engineer, unless otherwise designated in the Contract. Construction activities beyond the limits of disturbance due to Contractor negligence shall be restored to the original condition by the Contractor at the Contractor's expense. The Contractor shall tabulate additional disturbances not identified in the SWMP and indicate locations and quantities on the SWMP and report to the Engineer.

In subsection 208.06 (c), delete (1) and replace with the following:

- (1) Identification and contact information of the Contractor, CDOT spill cleanup coordinators and the SWMP Administrator.

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In subsection 208.09, second paragraph, delete the list and replace it with the following:

- (1) Failure to include erosion control in the project schedule or failure to include erosion control in each schedule update as specified in subsection 208.03(b).
- (2) Failure of the Contractor to implement necessary actions required by the Engineer as required by subsection 208.03(c) 4.
- (3) Failure to amend SWMP and implement BMPs as required by subsection 208.04.
- (4) Failure to keep documentation and records current.
- (5) Failure to construct or implement erosion control or spill containment measures required by the Contract, or failure to construct or implement them in accordance with the Contractor's approved schedule as required by subsection 208.06(c).
- (6) Failure to stabilize disturbed areas as required by subsections 208.04(e) and 208.08.
- (7) Failure to replace or perform maintenance on an erosion control feature after notice from the Engineer to replace or perform maintenance as required by subsection 208.04(f).
- (8) Failure to remove and dispose of sediment from BMPs as required.
- (9) Failure to install and properly utilize a concrete washout structure for containing washout from concrete placement operations.
- (10) Failure to perform permanent stabilization as required by subsection 208.04 (e).

The Engineer will immediately notify the Contractor in writing of each incident of failure to perform erosion control in accordance with these specifications, including items (1) through (10) above. Correction shall be made as soon as possible but no later than 48 hours from the date of notification to correct the failure. The Contractor will be charged liquidated damages in the amount of \$970 for each day after the 48 hour period has expired, that one or more of the incidents of failure to perform the requirements for each notification, including items (1) through (10) above, remains uncorrected. Liquidated damages will begin at Midnight of the date the 48 hours has expired.

This deduction will not be considered a penalty, but will be considered liquidated damages based on estimated additional construction engineering costs. The liquidated damages will accumulate, for each cumulative day that one or more of the incidents remain uncorrected. The number of days for which liquidated damages are assessed will be cumulative for the duration of the project; that is: the damages for a particular day will be added to the total number of days for which liquidated damages are accumulated on the project. The liquidated damages will be deducted from any monies due the Contractor.

When a failure meets any one of the following conditions, the Engineer will immediately issue a Stop Work Order in accordance with subsection 105.01 irrespective of any other available remedy:

- (1) It may endanger health or the environment.
- (2) It consists of a spill or discharge of hazardous substances or oil which may cause pollution of the waters of the state.
- (3) It consists of a discharge which may cause an exceedance of a water quality standard.

If the Contractor requires more than 96 hours to perform the corrective work from the date on the Form 105, the Contractor shall submit a request for deferment. The deferment request shall be in writing and shall include the specific failure, temporary measures until final correction is made, the methodology which will be employed to make the correction and interim milestones to completing the work. The Region Water Pollution Control Manager

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(RWPCM), Engineer, the SWMP Administrator and the Contractor shall concur on this deferral and set a proposed date of completion. If approved, the Contractor shall complete the corrective measures by Midnight of the proposed completion date. If corrective work is not corrected by the completion date the Engineer will issue a Stop Work Order. Liquidated Damages will apply retroactively back to the 48 hours after the 105 date of notification. Liquidated Damages will be assessed until the corrective work has been completed and accepted.

Deferment of work to correct failure to perform erosion control will not affect the Contractor's other Contractual responsibilities, notifications for other non-compliance, nor the final completion date of the project. Liquidated damages for other non-compliance notifications will continue to apply during the deferment period in addition to liquidated damages associated with the deferment.

Based on the submittal date of the approved deferment Liquidated Damages and a Stop Work Order may not be mandated to the Contractor.

Disagreements regarding the suggested corrective action for a BMP compliance issue between the Engineer, SWMP Administrator, and Superintendent, shall be discussed with the Resident Engineer. If after the discussions, the SWMP Administrator, Engineer and the Contractor are still in disagreement and feel that additional compensation is owed, the Contractor will follow the decision of the Project Engineer, keep track of the costs and negotiate further with the Project Engineer. If after pursuing the issue, the Contractor is unable to reach agreement with the Project Engineer, then the Contractor can follow the dispute process outlined in subsection 105.22.

If the Contractor's corrective action plan and schedule are not submitted and approved within 96 hours of the initial notice, the Engineer will issue a Stop Work Order and have an on-site meeting with the Superintendent, SWMP Administrator. This meeting will also be attended by the Resident Engineer and the Region Program Engineer. This meeting will identify and document needed corrective actions and a schedule for completion. If after the meeting, the unacceptable work is not remedied within the schedule as agreed to in the meeting, the Engineer will take action to effect compliance by utilizing CDOT Maintenance personnel or other non-Contractor forces and deduct the cost from any moneys due or to become due to the Contractor pursuant to subsection 105.17. Delays due to these Stop Work Orders shall be considered non-excusable. The Stop Work Order shall be in place until the project is in compliance.

If the Contractor remains non-responsive to requirements of the on-site meeting, the Engineer will start default or Contract termination procedures in accordance with subsections 108.09 and 108.10. CDOT will proceed with corrective or disciplinary action in accordance with the Rules for Prequalification, Debarment, Bidding and Work on Transportation, Road, Highway and Bridge Public Projects.

Delete subsection 208.10 and replace it with the following:

208.10 Items to Be Accomplished Prior to Requesting Partial Acceptance of Water Quality Work.

- (a) *Reclamation of Washout Areas.* After concrete operations are complete, washout areas shall be reclaimed in accordance with subsection 208.05(n) at the Contractor's expense.
- (b) *Survey.* The Contractor shall survey Permanent Water Quality BMPs (Permanent BMPs) on the project after they are constructed and confirm they are at final configuration and grade. The Engineer will identify which Permanent BMPs shall be surveyed prior to the final walk through. The survey shall be performed in accordance with Section 625.
- (c) *Removal of Temporary BMPs.* Temporary BMPs subject to removal will be determined by the Engineer at the final walk through of the project and shall be removed by the Contractor. If any temporary BMPs are left in place, the Region's Water Pollution Control Manager shall be notified of the BMP locations.

In subsection 208.12, delete the first paragraph and replace with the following:

SWMP Administrator duties on projects having less than one acre of total disturbed area will not be measured and paid for separately but shall be included in the work. The Erosion Control Management Pay Item will not apply to these projects.

REVISION OF SECTION 108
DELAY AND EXTENSION OF CONTRACT TIME

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In subsection 108.08, delete (c) and (d) and replace with the following:

(c) *Delay*. Any event, action or factor that extends the performance period of the Contract.

1. *Excusable Delay*: A delay that was beyond the Contractor's control and was not due to the Contractor's fault or negligence. The Department may grant a contract time extension for an excusable delay.
 - A. *Compensable Delay*: A delay that the Department, not the Contractor, is responsible for entitling the Contractor to a time extension and monetary compensation. Monetary compensation for compensable delays will be made in accordance with Subsection 109.10.
 - B. *Noncompensable Delay*: An excusable delay that neither the Contractor nor the Department is responsible for that may entitle the Contractor to a contract time extension but no additional monetary compensation. Contract time allowed for the performance of the work may be extended for delays due to force majeure (i.e. acts of God, acts of the public enemy, terrorist acts, fires, floods, area wide strikes, embargoes, or unusually severe weather).
2. *Nonexcusable Delay*: A delay that was reasonably foreseeable or within the control of the Contractor for which the Department will not grant monetary compensation or a contract time extension.
3. *Concurrent Delay*. Independent delays to critical activities occurring at the same time.
 - A. The Department will not grant a time extension or additional compensation for the period of time that a non-excusable delay is concurrent with an excusable delay.
 - B. The Department may grant time but no compensation for the period of time that a non-compensable delay is concurrent with a compensable delay.

Delays in delivery of materials or fabrication scheduling resulting from late ordering, financial considerations, or other causes that could have been foreseen or prevented will be considered nonexcusable delays. However, delays caused by fuel shortage or delay in delivery of materials to the Contractor due to some unusual market condition caused by industry-wide strike, national disaster, area-wide shortage, or other reasons beyond the control of the Contractor which prevent procurement of materials or fuel within the allowable contract time limits will be considered excusable delays.

(d) *Extension of Contract Time*. The Contractor's assertion that insufficient contract time was specified is not a valid reason for an extension of contract time. For time extension requests, the Contractor shall provide a two-part submittal: part one shall consist of a written notice of the delay and part two shall consist of the Contractor's delay documentation and supporting analysis.

Part 1: The Contractor shall provide the written notice of delay within seven days of the delay occurrence. The notice shall describe the delay and include documentation substantiating the nature and cause of the delay. Failure to submit the written notice constitutes a waiver of entitlement to additional time or compensation.

Part 2: This shall be submitted within 30 days of the written notice. The Contractor shall include all documentation needed to support the time extension request. In order to request additional contract time for an unexpected delay, the Contractor shall provide a contemporaneous schedule analysis in accordance with subsection 108.03. The schedule analysis shall show that the delayed activity or activities were on the critical path or became critical due to the delay.

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DELAY AND EXTENSION OF CONTRACT TIME

The Engineer will base a determination of an allowable contract time extension on:

- (1) The current Schedule in effect at the time of the alleged delay;
- (2) The supporting documentation submitted by the Contractor;
- (3) The contemporaneous schedule analysis; and
- (4) Any other relevant information available to the Engineer.

For a time extension request resulting from a change order, the Contractor shall demonstrate the delay to the project completion date by:

- (1) Inserting a fragnet containing the change order activities into an unprogressed copy of the schedule that is current at the time of the change order;
- (2) tying the fragnet into the schedule logic; and
- (3) Recalculating the schedule.

The Department will not consider delays to activities which do not affect the performance period of the Contract as a basis for a Contract time extension. If the Engineer grants a contract time extension, the revised Contract Completion date will be in effect as though it were the original contract date.

A Contractor's failure to have an approved, or approved with comments, current project schedule in place will preclude the Department from considering a Contractor's a time extension request.

October 29, 2015

REVISION OF SECTION 108
 LIQUIDATED DAMAGES

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In subsection 108.09, delete the Schedule of Liquidated Damages and replace with the following:

Original Contract Amount (\$)		Liquidated Damages per Calendar Day (\$)
From More Than	To And Including	
0	150,000	500
150,000	500,000	1,000
500,000	1,000,000	1,600
1,000,000	2,000,000	2,300
2,000,000	4,000,000	4,100
4,000,000	10,000,000	5,800
10,000,000	----	7,000

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REVISION OF SECTION 108
PROJECT SCHEDULE

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 108.03 and replace with the following:

108.03 Project Schedule.

(a) *Definitions.*

Activity. An activity is a project element on a schedule that affects completion of the project. An activity has a description, start date, finish date, duration, and one or more logic ties.

Activity ID. A unique, alphanumeric, identification code assigned to an activity and remains constant throughout the project.

Bar Chart. A simple depiction of a Project Schedule without relationships or supporting logic of the schedule.

Calendar. Defined work periods and no work periods that determine when project activities can occur. Multiple calendars may be used for different activities; e.g., a 5-day work-week and a 7-day work-week calendar.

Constraint. A restriction imposed in a schedule, which fixes a value that would otherwise be calculated within the schedule. Examples of values that can be fixed by a constraint include start date, end date, and completion date.

Critical Path. The sequence of activities that determines the duration of the project.

Critical Path Method Scheduling. (CPM Scheduling) is a logic-based planning technique using activity durations and relationships between activities to calculate a schedule determining the minimum total project duration.

Data Date. The starting point from which to schedule all remaining work.

Duration. The estimated amount of time needed to complete an activity.

Float. The amount of time between the earliest date an activity can start and the latest date when an activity must start, or the earliest date an activity can finish and latest date when an activity can finish before the activity becomes critical. The time between the Project Schedule completion date and the Contract completion date is not considered float.

Gantt Chart. A time-scaled graphical display of the project's schedule.

Lag. A time-value assigned to a relationship.

Logic. Relationships between activities defining the sequence of work (See also predecessor activity and successor activity).

Milestone. An activity, with no duration used to represent an event.

Open-Ended Activity. An activity that does not have both a predecessor activity and a successor activity.

Predecessor Activity. An activity that is defined by schedule logic to precede another activity.

Relationship. The interdependence between activities.

Salient Feature. An item of work that is of special interest for CDOT in coordinating the project schedule but may not affect the overall completion of the project.

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PROJECT SCHEDULE

Successor Activity. An activity that is defined by schedule logic to follow another activity.

Time-Scaled Logic Diagram. Gantt chart that illustrates logic links depicting both schedule logic and the time at which activities are performed.

(b) *Project Schedule - General*

The Contractor shall use either Microsoft Project or Primavera Scheduling software to develop and manage a CPM Project Schedule to plan, schedule, and report the progress of the work. Prior to, or at the Pre-construction Conference, the Contractor shall notify the Engineer in writing, which scheduling software the Contractor shall use to manage the project. The Contractor's selection and use of particular scheduling software cannot be changed after the first schedule submittal. If the Contractor selects Primavera, the Contractor shall calculate the schedule using the Retained Logic scheduling option. The Department will not allow use of bar charts for the Project Schedule.

The Contractor shall submit schedules for approval by the Engineer. The purpose of these schedules is to allow the Contractor and the Department to jointly manage the work and evaluate progress. The schedules also serve to evaluate the affect of changes and delays to the scheduled project completion. Either party may require a formal schedule review meeting.

The Contractor's schedule shall consist of a time-scaled logic diagram and shall show the logical progression of all activities required to complete the work.

The Contractor shall use activity descriptions that ensure the work is easily identifiable. The Contractor shall show the no-work days in the schedule calendars.

The Contractor shall use durations for individual construction activities that do not exceed 15 calendar days unless approved by the Engineer. The Contractor may group a series of activities with an aggregate duration of five days or less into a single activity. Non-construction activities may have durations exceeding 15 working days, as approved by the Engineer.

The Contractor may include summary bars in the schedule as long as the detailed activities to complete the work are displayed.

The Contractor shall not use the following:

- (1) Negative lags
- (2) Lags in excess of 10 working days without approval by the Engineer. The Contractor's written request shall justify the need for the lag. Lags shall be identified.
- (3) Start-to-finish relationships.
- (4) Open-ended activities - every activity shall have at least one predecessor activity and at least one successor activity, except for the first and last activities in the network. If the contractor uses a start-to-start relationship to link two activities, then both of those two activities should also have successor activities linked by either a finish-to-start or a finish-to-finish relationship.
- (5) Constraints without approval by the Engineer. The Contractor's written request shall explain why the use of constraints in the schedule is necessary.

The Project Schedule shall show all activities required by all parties to complete the work. The Project Schedule shall include subcontracted work, delivery dates for critical material, submittal and review periods, permits and governmental approvals, milestone requirements, utility work by others and no work periods. The Contractor, its subcontractors, suppliers, and engineers, at any tier, shall perform the work according to the approved Project Schedule.

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Float within the Baseline Schedule or any other Project Schedule is not for the exclusive use or benefit of either party, but is a project resource available to both parties as needed until it is depleted.

For any schedule submittal that shows completion in less than 85 percent of the Contract Time, the Contractor shall submit planned production rates in the schedule for all activities with float of 10 days or less. The Engineer may require additional methods statements for activities with float of 10 days or less.

The Engineer's review of the schedule will not exceed 10 calendar days. The Engineer will provide the Contractor with one of the following responses within 10 days after receipt of the Project Schedule:

- (1) Approved, no exceptions taken;
- (2) Approved-as-Noted; or
- (3) Revise and Resubmit within 10 days.

The Contractor shall not assume that approval of the Project Schedule relieves the Contractor of its obligation to complete all work within the Contract Time.

(c) *Schedule Submittals.* The Contractor shall include a time-scaled logic diagram with all schedule submittals that:

- (1) Is plotted on a horizontal time-scale in accordance with the project calendar.
- (2) Uses color to clearly identify the critical path.
- (3) Is based on early start and early finish dates of activities.
- (4) For Schedule Updates and Schedule Revisions, shows actual completion dates up to but not including the data date.
- (5) Clearly shows the sequence and relationships of all activities necessary to complete the contract work.
- (6) Includes an activity block for each activity with the following information:

Activity ID	Activity Description
Original Duration	Total Float
Early start date	Early finish date
Late start date*	Late finish date*
Actual Start date^	Actual Finish date^
Calendar used on the activity	Activity Responsibility
Remaining Duration^	Duration Percent Complete^
Gantt chart (time-scaled logic diagram)	
*Required with the Preliminary and Baseline Schedule.	
^Required with the Project Schedule Update and Schedule Revision.	

The Contractor shall include the following with all schedule submittals:

- (1) A Job Progress Narrative Report that includes the following:
 - (i) A description of the work performed since the previous month's schedule update.
 - (ii) A description of problems encountered or anticipated since the previous month's schedule submission.
 - (iii) A description of unusual labor, shift, equipment, or material conditions or restrictions encountered or anticipated.

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- (iv) The status of all pending items that could affect the schedule.
- (v) Explanations for milestones forecasted to occur late.
- (vi) Scheduled completion date status and any change from the previous month's submission.
- (vii) An explanation for a scheduled completion date forecasted to occur before or after the contract completion date or contract time.
- (viii) Schedule Delays:
 - 1. A description of current and anticipated delays including: Identification of the delayed activity or activities by Activity ID(s) and description(s).
 - 2. Delay type with reference to the relevant specification subsection.
 - 3. Delay cause or causes.
 - 4. Effect of the delay on other activities, milestones, and completion dates.
 - 5. Identification of the actions needed to avoid a potential or mitigate an actual delay.
 - 6. A description of the critical path impact and effect on the scheduled completion date in the previous month's schedule update.
- (ix) A list of all added and deleted activities along with an explanation for the change.
- (x) All logic and duration changes along with an explanation for the change.
- (2) A Predecessor Activity and Successor Activity report that defines all schedule logic and clearly indicates all logical relationships and constraints.
- (3) An Early Start report listing all activities, sorted by actual start/early start date.
- (4) A Float report listing all activities sorted in ascending order of available float.
- (5) A Critical Path report listing all activities not yet complete with the percent complete, sorted by float and then by early start.
- (6) A listing of all non-work days.

For all required schedule submittals, the Contractor shall submit two electronic copies on two compact disk, USB flash drive, or other media as directed by the Engineer. Electronic copies of CPM schedules shall be submitted both in the native schedule format and in "PDF" format. The Contractor shall also provide two printed copies of the CPM Schedule and all reports.

Each schedule submittal shall be appropriately labeled as a Preliminary Schedule, Baseline Schedule, Project Schedule Update, or Schedule Revision. The title bar shall include the CDOT project number, subaccount, project name, contractor name, schedule data date. If an originally submitted schedule is revised during review, the title bar shall also include a revision number (REV1, REV2, etc.) and revision date.

- (d) *Preliminary Schedule.* Within 14 days of award of the Contract, the Contractor may submit a Preliminary Schedule showing all planned activities from the Notice to Proceed through the first 60 days of the project. If the Contractor elects not to submit a Preliminary Schedule, then the Contractor shall submit a complete Baseline Schedule within 14 days of award of the Contract, which will be subject to all requirements of a Baseline submittal. The Preliminary Schedule shall not show any progress and it will be approved by the Engineer before work can commence. The Preliminary Schedule shall be used as the basis for the Baseline Schedule.
- (e) *Baseline Schedule.* If the Contractor elects to submit a Preliminary Schedule, within 45 days of the award of Contract, the Contractor shall submit a Baseline Schedule that includes all work activities completed within Contract Time. The Contractor shall not show progress in the Baseline Schedule. Further partial payments will not be made beyond 60 days after the start of Contract Time unless the Baseline Schedule is approved. When approved, the Baseline Schedule shall become the Project Schedule.

The Contractor shall use all information known by the Contractor at the time of bid submittal to develop the Baseline Schedule.

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If the Contractor elects to submit a Baseline Schedule in lieu of a Preliminary Schedule, the Baseline Schedule shall be approved before work can commence.

- (f) *Methods Statements.* The Contractor shall submit a Methods Statement for each salient feature or as directed by the Engineer that describes all work necessary to complete the feature. The Contractor shall include the following information in the Methods Statement:
- (1) Salient feature name;
 - (2) Responsibility for the salient feature work;
 - (3) Planned work procedures;
 - (4) The planned quantity of work per day for each salient feature using the same units of measure as the applicable pay item;
 - (5) The anticipated labor force by labor type;
 - (6) The number, types, and capacities of equipment planned for the work;
 - (7) The planned time for the work including the number of work days per week, number of shifts per day, and the number of hours per shift.
- (g) *Project Schedule Update.* The Contractor shall submit a monthly update of the Project Schedule updated through the cut-off date for the monthly progress pay estimate, and a projection for completing all remaining activities. A schedule update may show a completion date that is different than the Contract completion date, after the baseline schedule is approved. Approval of this schedule shall not relieve the Contractor of its obligation to complete the work within the Contract Time. In this case, the Contractor shall provide an explanation for a late scheduled completion date in the Job Progress Narrative Report included with the schedule submittal.
- When approved, the Project Schedule Update will become the Project Schedule. The Engineer will not issue a monthly progress payment if the Engineer has not received the Project Schedule Update. The Engineer will not make monthly progress payments for the months following the Project Schedule Update submission until the Engineer approves the Project Schedule Update.
- When the project has a maintenance or landscape establishment period, the Engineer may waive the monthly update requirement. The Contractor shall submit a final Project Schedule Update that shows all work through the final acceptance date.
- (h) *Weekly Planning Schedule.* The Contractor shall submit, in writing, a Weekly Planning Schedule that shows the Contractor's and all Subcontractor's planned activities for a minimum of two weeks immediately following the date of submittal and actual days worked versus planned for the week prior to the date of submittal. This schedule shall include the description, duration and sequence of work activities and anticipated lane closures for the upcoming two weeks. The Weekly Planning Schedule may be a time-scaled logic diagram or other standard format as approved by the Engineer. subsection 108.03(c) Schedule Submittal requirements for reports do not apply to the Weekly Planning Schedule.
- (i) *Schedule Revision.* A Schedule Revision is required in the event of any major change to the work. Examples of major changes are:
- (1) Significant changes in logic or methods of construction or changes to the critical path;
 - (2) Addition, deletion, or revision of activities required by contract modification order;
 - (3) Approval of a Contractor submitted Value Engineering Change Proposal;
 - (4) Delays in milestones or project completion;
 - (5) Phasing revisions, or;
 - (6) If the Engineer determines that the schedule does not reflect the actual work.

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REVISION OF SECTION 108
PROJECT SCHEDULE

This revision shall include a description of the measures necessary to achieve completion of the work within the Contract Time. The Contractor may also need to submit revised Methods Statements. The Contractor shall provide a Schedule Revision within 10 days of written notification and shall include the diagrams and reports as described in subsection 108.03 (b) Schedule - General and (c) Schedule Submittals. In this case, the Contractor shall provide an explanation for a late scheduled completion date in the Job Progress Narrative Report included with the schedule.

Once approved, the Schedule Revision becomes the Project Schedule.

- (j) *Payment.* All costs relating to the requirements of this subsection will not be paid for separately, but shall be included in the work.

January 31, 2013

REVISION OF SECTION 108
SUBLETTING OF CONTRACT

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 108.01 and replace with the following:

108.01 Subletting of Contract. The Contractor shall not sublet, sell, transfer, assign, or dispose of the Contract or Contracts, or any portion thereof without written permission of the Engineer. Prior to beginning any work by subcontractor, the Contractor shall request permission from the Engineer by submitting a completed Sublet Permit Application, CDOT Form No. 205. The subcontract work shall not begin until the Contractor has received the Engineer's written permission. The Contractor shall make all project related written subcontracts, agreements, and purchase orders available to the Engineer for viewing, upon request and at a location convenient to the Engineer.

The Contractor will be permitted to sublet a portion of the Contract, however, the Contractor's organization shall perform work amounting to 30 percent or more of the total original contract amount. Any items designated in the contract as "specialty items" may be performed by subcontract. The cost of "specialty items" so performed by subcontract may be deducted from the total original contract amount before computing the amount of work required to be performed by the Contractor's own organization. The original contract amount includes the cost of material and manufactured products which are to be purchased or produced by the Contractor and the actual agreement amounts between the Contractor and a subcontractor. Proportional value of a subcontracted partial contract item will be verified by the Engineer. When a firm both sells material to a prime contractor and performs the work of incorporating the materials into the project, these two phases shall be considered in combination and as constituting a single subcontract.

The calculation of the percentage of subcontracted work shall be based on subcontract unit prices.

Subcontracts or transfer of Contract shall not release the Contractor of liability under the Contract and Bond.

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 REVISION OF SECTION 109
 ASPHALT CEMENT COST ADJUSTMENT
 (ASPHALT CEMENT INCLUDED IN THE WORK)

Section 109 of the Standard Specifications is hereby revised for this project as follows:

Subsection 109.06 shall include the following:

(i) *Asphalt Cement Cost Adjustments.* Contract cost adjustments will be made to reflect increases or decreases in the monthly average price of asphalt cement from the average price for the month preceding the month in which bids were received for the Contract. These cost adjustments are not a change to the contract unit prices bid.

1. Cost adjustments will be based on the asphalt cement price index established by the Department and calculated as shown below. The index will be the average for the month of the daily Hardisty WCS spot price. This will be calculated by applying the monthly Hardisty WCS differential (as published on http://www.fhr.com/refining/crude_oil.aspx) from the West Texas Intermediate (WTI) daily spot price (as published on <http://www.up.com/customers/surcharge/wti/prices/index.htm>). The daily prices and the average index number for the month will be posted as soon as they are available on the CDOT website at:

<http://www.coloradodot.info/business/designsupport/construction-specifications/2011-Specs/asphalt-cement-cost-adjustment>

2. Cost adjustments will be made on a monthly basis subject to the following conditions:

A. Adjustment will be based on the pay quantities on the monthly partial pay estimate for the following two pay items when measured by the ton and asphalt cement is included in the pay items:

Item No.	Item	Pay Unit
403*	Hot Mix Asphalt (Grading __) (Asphalt)	Ton
403	Stone Matrix Asphalt (Grading __) (Asphalt)	Ton
*Hot Mix Asphalt (Patching) is not subject to asphalt cement cost adjustment.		

B. A cost adjustment will be made only when the asphalt cement price index varies by more than 5 percent from the asphalt cement price index at the time of bid, and only for that portion of the variance in excess of 5 percent. Cost adjustments may be either positive or negative dollar amounts.

C. Asphalt cement cost adjustments will not be made for any partial estimate falling wholly after the expiration of contract time.

D. Adjustment formula:

EP greater than BP:
 $ACCA = (EP - 1.05 BP)(PA) (Q)$

EP less than BP:
 $ACCA = (EP - 0.95 BP) (PA) (Q)$

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REVISION OF SECTION 109
ASPHALT CEMENT COST ADJUSTMENT
(ASPHALT CEMENT INCLUDED IN THE WORK)

Where:

BP = Average Asphalt Cement price index for the calendar month prior to the calendar month in which bids are opened

EP = Average Asphalt Cement price index for the calendar month prior to the calendar month in which the partial estimate pay period ends

ACCA = Asphalt Cement Cost Adjustment

PA = Percent of the paving mixture that is asphalt cement. Asphalt Cement content will be determined by the weighted average of all asphalt cement content percentages obtained from the field acceptance tests for that item (Use decimal in formula, e.g.: 0.05.). If Reclaimed Asphalt Pavement (RAP), Reclaimed Asphalt Shingles (RAS), or both is used, the percent of Virgin Asphalt Cement added to the mix will be determined by subtracting the percent of asphalt cement in the RAP, RAS, or both from the percent of asphalt cement in the mix as calculated from Revision of Section 401, Reclaimed Asphalt Pavement and Revision of Section 401 Reclaimed Asphalt Shingles.

Q = Increased pay quantity for all 403 items shown above on the monthly partial pay estimate in Tons.

Example: Bids are opened on July 16. The BP will be the average of the daily postings for June 1 through June 30. For an estimate cut-off date selected by the Contractor at the Pre-Construction Conference of the 20th of the month a February estimate will include HMA quantities measured from the 21st of January through the 20th of February, and the EP index used to calculate ACCA will be the average of the daily prices for January 1 through January 31 as established by CDOT)

- E. Cost adjustment will not be made for the quantity of any item that is left in place at no pay or for material removed and replaced at the Contractor's expense.
- F. Cost adjustments will not be made to items of work added to the Contract by Change Order after the award of the Contract.
- G. The asphalt cement cost adjustment will be the sum of the individual adjustments for each of the pay items shown above. No adjustment will be made for asphalt cement costs on items other than those shown above.
- H. Asphalt cement cost adjustments resulting in an increased payment to the Contractor will be paid for under the planned force account item: Asphalt Cement Cost Adjustment. Asphalt cement cost adjustments resulting in a decreased payment to the Contractor will be deducted from monies owed the Contractor.

May 5, 2011

REVISION OF SECTION 109
COMPENSATION FOR COMPENSABLE DELAYS

In subsection 109.10, delete the first two paragraphs and replace with the following:

109.10 Compensation for Compensable Delays. If the Engineer determines that a delay is compensable in accordance with either subsection 105.22, 105.23, 105.24, or 108.08, monetary compensation will be determined in accordance with this subsection.

(a) These categories represent the only costs that are recoverable by the Contractor. All other costs or categories of costs are not recoverable:

- (1) Actual wages and benefits, including FICA, paid for additional labor not otherwise included in (5) below;
- (2) Costs for additional bond, insurance and tax;
- (3) Increased costs for materials;
- (4) Equipment costs calculated in accordance with subsection 109.04(c) for Contractor owned equipment and based on invoice costs for rented equipment;
- (5) Costs of extended job site overhead;
- (6) Costs of salaried employees not otherwise included in (1) or (5) above incurred as a direct result of the delay;
- (7) Claims from subcontractors and suppliers at any level (the same level of detail as specified herein is required for all such claims);
- (8) An additional 16 percent will be added to the total of items (1) through (7) as compensation for items for which no specific allowance is provided, including profit and home office overhead.

REVISION OF SECTION 109
MEASUREMENT OF QUANTITIES

Section 109 of the Standard Specifications is hereby revised for this project as follows:

In subsection 109.01, delete the 17th paragraph and replace it with the following:

Vehicles used to haul material being paid for by weight shall bear a plainly legible identification mark. Each of these vehicles shall be weighed empty daily at times directed by the Engineer. The Contractor shall furnish to the Engineer, in writing, a vehicle identification sheet that lists the following for each delivery vehicle to be used on the project:

- (1) identification mark
- (2) vehicle length
- (3) tare weight
- (4) number of axles
- (5) the distance between extreme axles
- (6) information related to legal weight, including the Permit No. and permitted weight of each vehicle for which the State has issued an overweight permit.

This information shall be furnished prior to time of delivery of the material and at any subsequent time the Contractor changes vehicles, combination vehicles, axle length relationships, or overweight permitting of vehicles.

October 29, 2015

REVISION OF SECTION 109
SCALES

Section 109 of the Standard Specifications is hereby revised for this project as follows:

In subsection 109.01, delete the 11th paragraph and replace with the following:

Materials measured or proportioned by weight shall be weighed on accurate scales. Scales shall be accurate within the allowable tolerances as prescribed by State law. The scales shall be tested for accuracy by the Colorado Department of Agriculture or an approved Colorado Department of Agriculture vendor (<https://www.colorado.gov/pacific/aginspection/scale-companies>) as least once each year, each time the scales are relocated, and as often as the Engineer may deem necessary. Scales shall be furnished by the Contractor or the Contractor may utilize commercial scales.

November 10, 2016

REVISION OF SECTION 201
CLEARING AND GRUBBING

Section 201 of the Standard Specifications is hereby revised for this project as follows:

In subsection 201.02, delete the third paragraph and replace with the following:

All surface objects, trees, stumps, roots, and other protruding obstructions not designated to remain shall be cleared and grubbed. In areas to be rounded at the tops of backslopes, stumps shall be removed to at least 2 feet below the surface of the final slope line.

In subsection 201.02, delete the ninth paragraph and replace with the following:

The Contractor shall clear and grub the areas within the excavation or embankment grading limits and shall include the removal from the ground of brush, roots, sod, grass, residue of agricultural crops, sawdust, and other vegetable matter. See subsection 208.04(e) for disturbed area limits.

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT

Section 203 of the Standard Special Provisions is hereby deleted for this project and replaced with the following:

DESCRIPTION

203.01 General. This work consists of excavation, hauling, disposal, placement, and compaction of all material encountered within the limits of the work, including construction of dikes and the excavation for ditches and channels, necessary for the construction of the roadway in accordance with the Contract.

MATERIALS

203.02 Definitions. All excavation will be defined as, "unclassified excavation", "stripping", "removal of unsuitable material", "rock excavation", "borrow", or "potholing" as described below:

- (a) *Unclassified Excavation.* Unclassified Excavation shall consist of the excavation of all materials of whatever character required for the work, obtained within the right of way, including surface boulders and excavation for ditches and channels that is not removed under some other item.
- (b) *Stripping.* Stripping shall consist of removing overburden or other specified material from borrow pits, and the replacement of overburden or other specified material over the disturbed area of the site or pit after the underlying material has been removed.
- (c) *Removal of Unsuitable Material.* Removal of Unsuitable Material shall consist of the removal of soils or mixtures of soil and organic matter identified in the Contract or as directed by the Engineer that would be detrimental to the roadway or embankment if left in place in its existing condition.
- (d) *Rock Excavation.* Rock Excavation shall consist of igneous, metamorphic, and sedimentary rock which cannot be excavated without blasting or with the use of rippers, including all boulders or other detached stones having a volume of $\frac{1}{2}$ cubic yard or more. Unless specified in the Contract, Rock Excavation is material that meets one of the following field test criteria to be conducted by the Contractor:
 - 1. Ripping Test: Material that cannot be broken down by one pass with a single tooth ripper mounted on a crawler type tractor in low gear with a minimum net flywheel power rating of 235 horsepower; or material that cannot be broken down with a 48000 pound tracked excavator utilizing a bucket with rock teeth.
 - 2. Seismic Test: Material that has a seismic velocity of 6,000 feet per second or greater. The Contractor shall submit the qualifications of the individual performing or interpreting the seismic testing to the Engineer a minimum of 14 days prior to testing. The ripping test will be used to resolve differences if seismic velocities fall below 6,000 feet per second.
 - 3. Handling Test: Any boulder or detached stone having a volume of $\frac{1}{2}$ -cubic yard or more that cannot be readily broken down with the excavation equipment described above in 1.
- (e) *Borrow.* Borrow shall consist of approved material obtained from outside the right of way, required for the construction of the project.
- (f) *Potholing.* Potholing consists of exposing and verifying the location of existing utilities at locations as directed.

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT

203.03 Embankment Materials. Embankment Material shall consist of approved material acquired from excavations or borrow pits, and hauled and placed in embankments. Approval of Embankment Material shall be contingent on the material meeting the Atterberg Limit and gradation requirements specified in the Contract. Approval of the embankment material in the upper 2 feet of embankment below the subgrade elevation is contingent on the material meeting one of the following as specified in the Contract:

- (1) the specified resistance value when tested by the Hveem Stabilometer, or equivalent resilient modulus
- (2) the specified Atterberg Limit and gradation requirements
- (3) the specified resistance value when tested by the Hveem Stabilometer, or equivalent resilient modulus, and the specified Atterberg Limit and gradation requirements

Non-durable bedrock shall be identified and classified using Colorado Procedure CP-L 3104. Any material that classifies as Soil-like Non-durable (S-N) as defined in the procedure shall be pulverized, broken down and processed to 6-inch maximum particle sizes before incorporation into embankment fill. These materials shall be placed and compacted as "Soil Embankment" in accordance with subsection 203.07 (a). Non-durable bedrock particles in excess of 6 inches shall not be placed into embankment fill.

If recycled concrete or asphalt are to be incorporated into embankment fill; the maximum dimension permitted for concrete is 24 inches and the maximum dimension permitted for asphalt is 12 inches.

Embankment Material imported onto the project will be tested for water soluble sulfates using CP-L 2103 Method B. The average of three consecutive tests shall show that the sulfate content is not greater than that corresponding to the sulfate exposure level specified in the Contract. No single test shall have a sulfate content more than 20 percent greater than that corresponding to the sulfate exposure level specified in the Contract. A single failing test shall have the remaining sample split into four equal portions. CDOT Region Lab shall receive one portion, the Contractor shall receive one portion and the remaining two portions shall go to the CDOT Central lab. The CDOT Region Lab, CDOT Central Lab and the Contractor's Lab shall retest the sample. If the results from the three Labs are within 10 percent of each other, the results will be averaged. The averaged result will be used for determining Contract compliance. If the results from the Labs are not within 10 percent of each other, the remaining split sample will be sent to an independent laboratory for testing using CP-L 2103. The independent laboratory will be mutually agreed upon by the Department and the Contractor. The Independent Lab's test result will be used for determining Contract compliance.

If the water soluble sulfate content is less than that corresponding to the sulfate exposure level specified in the Contract, CDOT will bear all costs associated with the independent lab test. If the soluble sulfate content is greater than that corresponding to the sulfate exposure level specified in the Contract, all costs associated with independent lab testing shall be at the Contractor's expense. Embankment represented by failing tests shall be removed from the project and replaced at the Contractor's expense.

Imported Material used for backfilling pipes (storm sewer, cross culverts, side drains, etc) shall be tested for compatibility with the selected pipe material. When Non-reinforced Concrete Pipe or Reinforced Concrete Pipe is used, the imported material shall be tested for sulfate and pH. When Corrugated Steel Pipe, Bituminous Coated Corrugated Steel Pipe or Pre-coated Corrugated Steel Pipe is used, the imported material shall be tested for sulfates, chlorides, pH and resistivity. When Aramid Fiber Bonded Corrugated Steel Pipe or Corrugated Aluminum Pipe is used, the imported material shall be tested for pH and resistivity. When Plastic pipe is selected, the imported material does not need to be tested for sulfates, chlorides, pH or resistivity.

Sulfates, chlorides, pH and resistivity shall be determined by the following procedures:

- (1) Water soluble sulfates using CP-L 2103 Method B
- (2) Chlorides using CPL 2104
- (3) Resistivity using ASTM G57
- (4) pH using ASTM G51

REVISION OF SECTION 203
 EXCAVATION AND EMBANKMENT

The average of three consecutive tests shall show the imported material's sulfate, chloride, pH and resistivity is not greater than the limits corresponding to the Pipe Class in Table 203-1 or 203-2 for the pipe class specified in the Contract. No single test shall have a result more than 20 percent greater than that corresponding to the limit in Table 203-1 or Table 203-2 for sulfates, chlorides and resistivity. No single test shall have a result more than 5 percent outside the limit in Table 203-1 for pH. The remaining sample material from a single failing test shall be split into three equal portions. CDOT shall receive one portion, the Contractor shall receive one portion and the remaining portion shall be retained by the Project. CDOT and the Contractor's Lab shall retest the failed sample; if the results from those tests are within 10 percent of each other, the results will be averaged. The averaged result will be used for Contract compliance. If the results from the Labs are not within 10 percent of each other, the remaining sample portion will be sent to an independent laboratory for testing using the testing requirements specified above. The independent laboratory will be mutually agreed upon by the Department and the Contractor. The Independent Lab's test result will be used for Contract compliance.

If the imported material's sulfates, chlorides, and resistivity are less than the limits and the pH is within the limits in Table 203-1 or 203-2, CDOT will bear all costs associated with the independent lab test. If the imported material's sulfates, chlorides, and resistivity is greater than the limits and the pH is outside the limits in Table 203-1 or 203-2, all costs associated with independent lab testing shall be at the Contractor's expense.

Embankment represented by failing tests shall be removed from the project and replaced at the Contractor's expense.

**Table 203-1
 SULFATE, CHLORIDE AND PH OF IMPORTED MATERIAL**

Pipe Class	SOIL		
	Sulfate	Chloride	
	(SO ₄)	(Cl)	pH
	% max	% max	
0, 7	0.05	0.05	6.0-8.5
1, 7	0.10	0.10	6.0-8.5
2, 8	0.20	0.20	6.0-8.5
3, 9	0.50	0.50	6.0-8.5
4, 9	1.00	1.00	5.0-9.0
5, 10	2.00	2.00	5.0-9.0
6, 10	>2.00	>2.00	<5 or >9

**Table 203-2
 RESISTIVITY AND PH OF IMPORTED MATERIAL**

SOIL SIDE	
Resistivity, R (Ohm – cm)	pH
≥1,500	5.0-9.0
≥250	3.0-12.0

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT

Embankment Material shall be classified into one of the material groups listed below, and placed and compacted in accordance with the appropriate methods specified in subsection 203.07. If any material does not meet the criteria for one of the following classifications, it shall be processed on site to meet the requirements for one of the material groups listed below, or disposed of at the Contractor's expense.

(a) *Soil Embankment.* Soil Embankment shall have all particle sizes less than 6 inches. The material shall be classified in accordance with AASHTO M 145 and placed and compacted in accordance with subsection 203.07 (a).

(b) *Rock Embankment.* Rock Embankment shall meet all of the following requirements:

- (1) Contains 50 percent or more retained on the 4.75 mm (No. 4) sieve.
- (2) Contains > 30 percent retained on the 19.0 mm (¾-inch) sieve.
- (3) Classifies as an AASHTO A-1 soil type.
- (4) All particle sizes shall be less than 6 inches.
- (5) Particles retained on the 4.75mm (No. 4) sieve shall not be composed of non-durable bedrock types.

Rock Embankment can be placed without moisture density control as described in subsection 203.07 (b).

(c) *Rock Fill.* Rock Fill shall meet all of the following requirements:

- (1) A minimum of 50 percent of the material shall be retained on a 100 mm (4-inch) sieve.
- (2) Maximum dimension of any particle permitted is 36 inches.
- (3) Shall be well-graded by visual inspection.
- (4) Shall contain less than 20 percent by volume of material passing the 75 µm (No. 200) sieve based on visual inspection. This requirement shall be at the discretion of the Engineer.
- (5) Particles retained on the 4.75 mm (No. 4) sieve shall not be composed of non-durable bedrock types.

Rock Fill can be placed without moisture density control as described in subsection 203.07 (c).

CONSTRUCTION REQUIREMENTS

203.04 General. The excavations and embankments shall be finished to smooth and uniform surfaces conforming to the typical sections specified. Variation from the subgrade plan elevations specified shall not be more than 0.08 foot. Where asphalt or concrete surfacing materials are to be placed directly on the subgrade, the subgrade plane shall not vary more than 0.04 foot. Materials shall not be wasted without written permission of the Engineer. Excavation operations shall be conducted so material outside of the slope limits will not be disturbed. Prior to beginning grading operations, all necessary clearing and grubbing in that area shall have been performed in accordance with Section 201.

The Contractor shall notify the Engineer not less than five working days prior to beginning excavation so the necessary cross sections may be taken. The Contractor shall not excavate beyond the dimensions and elevations established.

Archaeological and paleontological materials encountered during the work shall be dealt with in accordance with subsection 107.23.

All excavation activities in areas where asbestos is encountered or expected to be encountered shall conform to the Colorado Department of Public Health and Environment's Asbestos-Contaminated Soil Guidance Document or the State of Colorado's Asbestos Contaminated Soil Statewide Management Plan (ACS), whichever is more recent at the time of advertisement and in accordance with subsection 250.07(d) and the Air Quality Control Commission Regulation No. 8 Part B or Section 5.5 of the solid Waste Regulation 6 CCR 1007-2, as applicable.

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EXCAVATION AND EMBANKMENT

203.05 Excavation. Excavation shall be one or more of the following:

- (a) *Rock.* Unless otherwise specified, rock shall be excavated to a minimum depth of 0.5 foot and a maximum depth of 1 foot below subgrade, within the limits of the roadbed. Rock removed in excess of 1 foot below subgrade will not be paid for. Backfilling of the depth in excess of 1 foot below subgrade shall be at the Contractor's expense. Approved embankment material shall be used to bring the rock-excavated areas to subgrade elevations within the tolerances specified in subsection 203.04.

Undrained pockets shall not be left in the rock surface and depressions shall be drained at the Contractor's expense.

Any change to cut slopes by the Department will be made prior to the next drilling operations.

When required for rock excavation, controlled blasting shall be conducted in accordance with the Contract.

- (b) *Unclassified.* Excess or unsuitable excavated material, including rock and boulders, that cannot be used in embankments may be placed on the side slopes of the nearest fill as approved.

Unless otherwise specified by the Engineer, intercepting ditches shall be made above the top of cut slopes and carried to outlets near the ends of the cuts. In order to blend the intersection of cut slopes with the slope of the adjacent natural ground surfaces in a uniform manner, the tops of all cut slopes, except those in solid rock, shall be flattened and rounded in accordance with typical sections and details specified. Earth overburden lying above solid rock cuts shall be treated in the same manner as earth cuts.

The Department reserves the right to change cut slopes during the progress of excavation.

- (c) *Unsuitable Material.* Unsuitable materials encountered in the subgrade that are determined to be detrimental to the roadway or embankment shall be removed to the depth and extents as directed by the Engineer. The excavated area shall be backfilled to the finished graded section with approved material. Materials that contain organics or that cannot be dried or moisture conditioned, then compacted to the required density will be disposed of and cannot be reused as embankment fill. Materials not containing organics and that can be dried or moisture conditioned and compacted to the required density can be reused as embankment fill as approved by the Engineer.
- (d) *Borrow.* If the Contractor places more borrow than is specified or approved and causes a waste of roadway excavation, the quantity of waste will be deducted from the borrow volume. All borrow areas shall be bladed and shaped to permit accurate measurements after excavation is completed. The finished borrow areas shall be graded to a smooth and uniform surface and shall be finished so water will not collect or stand therein, unless otherwise specified.
- (e) *Stripping.* Overburden shall be removed to the depth required for the production of acceptable material, and at least 5 feet beyond the working limits of the area being excavated.
- (f) *Potholing.* All necessary potholing as determined by the Contractor and agreed to by the Engineer shall be completed under this item with appropriate equipment as approved.

The Contractor shall acquire necessary permits, locate utilities, excavate all materials of whatever character required to expose the utilities, survey the location of the utilities, and backfill the excavation to existing grade lines with the excavated or other approved materials. Backfilling shall be accomplished in accordance with subsection 206.03.

The Contractor shall use extreme caution during this work. All damage to existing utility lines or adjacent facilities shall be repaired promptly at the Contractor's expense.

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EXCAVATION AND EMBANKMENT

203.06 General Embankment Construction Requirements. When Contractor Process Control is required, the Contractor's Process Control Representative shall be certified for WAQTC Embankment and Base Testing and CDOT's Excavation, Embankment, and Soil Inspection certification course.

Embankment construction shall include preparation of the areas upon which embankments are to be placed, construction of dikes, placing and compacting of approved material within roadway areas including holes, pits, and other depressions within the roadway area. Only approved materials shall be used in the construction of embankments and fills.

All sod, vegetable and other organic matter, stumps, and roots shall be removed from the surface upon which the embankment is to be placed in accordance with Section 201. Unless a thickness is otherwise specified in the Contract, the upper 4 inches of the ground surface will be considered top soil and shall be removed in accordance with Section 207 prior to placement of Embankment Fill.

The cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 inches or as specified in the Contract, the moisture content increased or reduced as necessary, and compacted to the specified embankment density for the material type present.

When embankment is placed on a slope that is steeper than 4H:1V, as measured in the steepest direction, the existing slope shall be benched as the embankment is placed in layers. A 2-foot deep key shall be excavated at the base of the existing slope and backfilled with approved and compacted material. The embankment shall be placed in layers from that key. Each horizontal cut shall begin at the intersection of the original ground and the vertical sides of the previous bench. Excavated material from benching may be placed and compacted with the embankment material at the Contractor's expense.

During the course of construction, embankment side slopes shall be built a minimum of 12 inches beyond the final grade indicated in the Contract to allow for compaction equipment to compact the outer edges of the embankment. Once the specified level of compaction is achieved, the side slopes shall be trimmed back to final grade. Excess material placement and removal to satisfy this requirement shall be at the Contractor's expense.

If embankment can be placed on only one side of structures such as retaining walls, abutments, wing walls, piers, or culvert headwalls, compaction shall be accomplished without initiating movement or deformation of the structure and without placing excessive pressure against the structure. When noted in the Contract, the fill adjacent to the abutment of a bridge shall not be placed higher than the bottom of the backwall until the superstructure is in place. When embankment is placed on both sides of a concrete wall or box type structure, the embankment shall be brought up equally on both sides of the structure.

Where embankment is to be placed and compacted and end dumping is permitted, the slopes of the original ground or embankment shall be deeply plowed or scarified before starting end dumping.

Embankment fill other than A-1 soil types shall not be placed within standing water, unless otherwise noted in the Contract. During the construction of the embankment, the top surface shall be maintained so that it is well drained at all times.

Frozen materials shall not be used in construction of embankments. Frozen material will be identified by the visual observation of ice crystals within the foundation or embankment material, or by measuring the surface temperature of the ground surface.

203.07 Embankment Placement and Compaction Requirements. Materials incorporated into embankment fill shall be placed and compacted according to the following requirements:

- (a) *Soil Embankment.* All Soil Embankment shall be placed in horizontal layers not to exceed 8 inches in loose lift thickness. Each layer shall be compacted prior to the placement of subsequent layers. Spreading equipment shall be used to obtain uniform thickness prior to compaction. As the compaction progresses, continuous mixing, leveling, and manipulating shall be done to assure uniform moisture and density. Additional work involved in drying Soil Embankment to the required moisture content shall be included in the contract price paid for excavating or furnishing the material with no additional

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compensation.

Soil Embankment that classifies as A-1 material can be used to bridge across standing water or swampy ground within the embankment foundation, and can be placed in lift thicknesses greater than 8 inches if used for this purpose as approved by the Engineer.

Soil Embankment with less than or equal to 30 percent retained on the 19mm (¾-inch) sieve shall be tested for compaction using CP 80. Materials that classify as AASHTO A-1, A-2-4, A-2-5, and A-3 soils shall be compacted at ± 2 percent of Optimum Moisture Content (OMC) and to at least 95 percent of maximum dry density determined in accordance with AASHTO T 180 as modified by CP 23. All other soil types will be compacted to 95 percent of the maximum dry density determined in accordance with AASHTO T 99 as modified by CP 23. Soils with 35 percent fines or less shall be compacted at ± 2 percent of OMC. Soils with greater than 35 percent fines shall be compacted at a moisture content equal to or above OMC to achieve stability of the compacted lift. Stability is defined as the absence of rutting or pumping as observed and documented by the Contractor's Process Control Representative and as approved by the Engineer. If the soils cannot be compacted and prove to be unstable at a moisture content equal to or above OMC, then the required moisture content for compaction can be reduced below OMC as approved by the Engineer.

Prior to placing any Soil Embankment with greater than 30 percent retained on the 19 mm (¾-inch) sieve, the Contractor will be required to construct a test strip to the dimensions specified in the Contract or as directed by the Engineer. The test strip can be incorporated into the final embankment. The Contractor will be responsible for determining the moisture conditioning necessary to achieve compaction, and will determine the equipment and number of passes necessary to achieve adequate compaction. The Contractor is required to use compression-type or vibratory rollers on granular materials and sheepfoot rollers on cohesive soils. Adequate compaction will be demonstrated by the absence of rutting, pumping, or deflection following a proof roll of the test strip using any piece of construction equipment that exerts a minimum 18-kip per axle load. The proof roll will be observed and accepted by the Engineer. Once the test strip passes a proof roll, the Contractor can resume embankment construction with the same moisture conditioning and compaction methods as the test strip was constructed.

Placement, moisture conditioning, and compaction of every lift of soil embankment with greater than 30 percent retained on the 19 mm (¾-inch) sieve will be observed by the Contractor's Process Control Representative, and accepted by the Engineer. Adequate compaction of each lift will be demonstrated as the absence of rutting, pumping, or deflection as construction equipment is routed over a lift following the compactive efforts that were used and accepted for the respective test strip. The Engineer may request a proof roll at any time to document the condition of a lift.

Significant changes in the material being hauled for soil embankment with greater than 30 percent retained on the 19 mm (¾-inch) sieve will require construction of a new test strip, and demonstration of adequate compaction methods using a proof roll. The Contractor's Process Control representative shall be authorized to require additional test strips at their discretion. However, the requirement for an additional test strip shall not be waived without the written approval of the Engineer.

Non-durable bedrock shall be watered to promote slaking and break down, and pulverized/processed to a maximum particle size of 6 inches. These materials shall be placed and compacted as Soil Embankment; except they shall be compacted with a heavy tamping foot roller, weighing at least 30 tons. Each tamping foot shall protrude from the drum a minimum of 4 inches. Each embankment layer shall receive a minimum of four passes with the tamping foot roller. The roller shall be operated at a uniform speed not exceeding 3 miles per hour. No additional compensation will be made for additional roller passes to achieve specified density requirements.

Non-durable Bedrock shall not be used to bridge over standing water or swampy ground within an embankment foundation. Non-durable bedrock shall also not be placed within 2 feet of the final subgrade elevation.

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- (b) *Rock Embankment and Rock Fill.* Rock Embankment shall be placed in horizontal layers not to exceed 8 inches in loose lift thickness. The lift thickness can be increased when bridging over standing water or swampy ground in the embankment foundation as directed by the Engineer. Each layer shall be compacted prior to the placement of subsequent layers. Spreading equipment shall be used to obtain uniform thickness prior to compaction.

Rock Fill shall be placed in horizontal layers not to exceed a loose lift thickness equivalent to the average particle size up to a maximum permitted lift thickness of 18 inches. Particles with a maximum dimension of 36 inches are permitted; however, rocks larger than the lift thickness shall be separated enough to allow compaction equipment to operate in between. Material shall be placed to fill in voids between larger stones with finer particle sizes and to avoid nesting. Spreading equipment shall be used to obtain uniform thickness prior to compaction. If the use of leveling equipment is not practical, the Engineer may permit rock fill material to be cast or end dumped. In such cases sufficient hand or machine work will be required to construct a compact, stable fill and to finish the slopes to a neat and smooth appearance. Rock Fill shall not be placed within 2 feet of the final subgrade elevation. When a Rock Fill is placed over any structure, the structure shall be covered with a minimum of 2 feet of compacted Soil or Rock Embankment material before the Rock Fill is placed.

The Contractor will be responsible for determining the moisture conditioning necessary to achieve compaction for Rock Embankment or Rock Fill. Vibratory or compression-type rollers will be used to compact these materials. At a minimum, compression-type rollers weighing 20 tons shall complete 4 passes over the entire width of a lift at a speed not to exceed 3 miles per hour. Vibratory rollers shall exert a minimum dynamic force of 30,000 pounds of impact per vibration, and achieve a minimum 1,000 vibrations per minute. Vibratory rollers shall complete a minimum of 4 passes over the entire width of a lift at a speed not to exceed 1.5 miles per hour.

Prior to placing Rock Embankment or Rock Fill, the Contractor will be required to construct a test strip to the dimensions specified in the Contract, or as directed by the Engineer. The test strip can be incorporated into the final embankment. Adequate compaction of the Rock Embankment or Rock Fill test strip will be demonstrated by the absence of rutting, pumping, or deflection following a proof roll of the test strip using any piece of construction equipment that exerts a minimum 18-kip per axle load. The proof roll will be observed and accepted by the Engineer. Once the test strip passes a proof roll, the Contractor can resume Rock Embankment or Rock Fill construction with the same moisture conditioning and compaction methods as the test strip was constructed. Placement, moisture conditioning, and compaction of every lift of Rock Embankment and Rock Fill will be observed by the Contractor's Process Control Representative, and accepted by the Engineer. Adequate compaction of each lift will be demonstrated as the absence of rutting, pumping, or deflection as construction equipment is routed over a lift following the compactive efforts that were used and accepted for the respective test strip. The Engineer may request a proof roll at any time to document the condition of a lift.

Significant changes in the characteristics of material being hauled for Rock Embankment or Rock Fill will require construction of a new test strip, and demonstration of adequate compaction methods using a proof roll. The Contractor's Process Control representative shall be authorized to require additional test strips at their discretion. However, the requirement for an additional test strip shall not be waived without the written approval of the Engineer.

If the Contractor wishes to deviate from the minimum equipment and compactive efforts specified above for Rock Embankment or Rock Fill, the Contractor must first demonstrate the adequacy of their proposed methods with a test strip and passing proof roll. In addition, a proof roll will be required for every lift placed for the first 2,000 cubic yards of Rock Embankment or Rock Fill placed. The proof rolls used to demonstrate adequate compaction of the first 2,000 cubic yards placed will not be measured and paid separately, but will be performed at the Contractor's expense.

Recycled concrete and asphalt can be incorporated into embankment material, and shall be processed, placed, and compacted in accordance with 203.07 (a) or (b); depending on the overall classification of the embankment material once the recycled material is incorporated. Rebar shall not extend more than one inch beyond the edges of recycled concrete particles. Recycled concrete or asphalt shall not be

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EXCAVATION AND EMBANKMENT

permitted in the upper 2 feet of the final subgrade elevation or within 2 feet of the final finished side slopes unless otherwise noted in the Contract.

203.08 Proof Rolling. Proof rolling with pneumatic tire equipment shall be performed using a minimum axle load of 18 kips per axle. A weigh ticket from an approved scale shall be furnished by the Contractor to substantiate this weight.

The subgrade shall be proof rolled after the required compaction has been obtained and the subgrade has been shaped to the required cross section.

The proof roller shall be operated in a systematic manner so that a record may be readily kept of the area tested and the working time required for the testing. Areas that are observed to have soft spots in the subgrade, where deflection is not uniform or is excessive as determined by the Engineer, shall be ripped, scarified, dried or wetted as necessary and recompacted to the requirements for density and moisture at the Contractor's expense. After recompaction, these areas shall be proof rolled again and all failures again corrected at the Contractor's expense.

Upon approval of the proof rolling, the sub base, base course, or initial pavement course shall be placed within 48 hours. If the Contractor fails to place the sub base, base course, or initial pavement course within 48 hours or the condition of the subgrade changes due to weather or other conditions, proof rolling and correction shall be performed again at the Contractor's expense.

203.09 Blading. Blading shall consist of furnishing motor graders of the specified horsepower rating, with operators, for shaping roadway, shoulders, or other areas as designated by the Engineer.

When scarifying is specified the motor grader shall be equipped with an independently operated "V" type scarifier and attachments.

203.10 Dozing. Dozing shall consist of furnishing crawler-type tractors of the specified horsepower rating, complete with operators and bulldozer blades. Rippers, if specified, will not be measured and paid for separately, but shall be included in the work.

METHOD OF MEASUREMENT

203.11 Items paid for by volume will be the quantities designated in the Contract. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies in the Contract in an amount of at least plus or minus two percent of the plan quantity.

(a) *Excavation.* The original cross-sections will be used for determination of volumes of excavated material removed, unless changes have been directed. These measurements will include authorized excavation of rock, shale, or other unsuitable material. All accepted stripping will be measured in stockpiled locations by cross-sectioning.

When the excavation conforms to the staked lines and grades, the original cross-sections and the staked sections shall be used for the determination of volumes excavated. Volumes will be computed from the cross-sections by the average end area or other acceptable method.

When topsoil or wetland topsoil is included as an additional pay item and is specified, the measured volume of excavation will be reduced by the volume of topsoil or wetland topsoil removed from the area shown as excavation in the Contract.

Measurements will include over-breakage in rock excavation from the back slopes to an amount not to exceed, in any half station of 50 feet, 10 percent of the actual quantity required for that half station.

Costs associated with ripping tests or seismic tests to evaluate if a material meets the criteria for "Rock

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT

Excavation” shall not be measured or payed separately, but shall be incurred by the Contractor and included in the cost for excavation.

- (b) *Embankment.* If provided in the Contract, embankment material will be measured in its final compacted position in the roadway. Measurement will be made upward from the original ground line without any allowance for subsidence due to compaction of the base under the embankment. The original cross-sections will be used for determination of volumes of embankment material placed, unless changes have been directed.

The measured volume of embankment material will be increased by the volume of topsoil or wetland topsoil removed from the area below the original ground line and under the embankment

- (c) *Rock Fill.* Rock fill will be measured as the volume in cubic yards in its final position, unless otherwise specified, and shall be limited to the elevations specified.
- (d) *Blading and Dozing.* The quantity measured under blading and dozing will be the number of hours that each motor grader or bulldozer is actually used as ordered. A minimum of four hours for any half shift or part thereof will be paid for unless the equipment is inoperative due to breakdown or other causes determined to be the Contractor’s responsibility. Time involved in moving onto or off the project will not be measured and paid for.

Time will be paid for moving motor graders or bulldozers from one location on the project to another, if directed; but time will not be allowed for moves which are made for the convenience of the Contractor.

Payment for a minimum of four hours will not be allowed in cases where the motor grader, bulldozer, or operator is assigned to work on other pay items connected with the project.

- (e) *Potholing.* Potholing will be measured by the total number of hours that excavation and backfilling equipment is actually used as directed. All other related work, including removal of existing pavement, backfilling, shoring, and labor will not be measured and paid for separately, but shall be included in the work.
- (f) *Proof Rolling.* Proof rolling will be measured by the actual number of hours that the pneumatic equipment is used as a proof roller.

The time to be measured under this item will be the number of hours that each piece of equipment is actually used as ordered.

Proof rolling will be measured and paid for only once for each test strip required during construction; for final verification of subgrade prior to placement of subbase, base coarse, or pavement; or for each incident where the Engineer directs it through the course of construction. Additional proof rolling that is required due to failure of embankment fill; due to the Contractor’s failure to place sub base, base course, or initial pavement course within 48 hours of the initial proof roll; or due to the condition of the subgrade changing due to weather; or additional proof rolls deemed necessary due to the Contractor’s choice to deviate from minimum equipment and compaction efforts specified herein, shall be at the Contractor’s expense.

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 REVISION OF SECTION 203
 EXCAVATION AND EMBANKMENT

BASIS OF PAYMENT

203.12 The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	Pay Unit
Rock Excavation	Cubic Yard
Rock Fill	Cubic Yard
Unclassified Excavation	Cubic Yard
Unclassified Excavation (Complete in Place)	Cubic Yard
Unsuitable Materials	Cubic Yard
Borrow	Cubic Yard
Borrow (Complete in Place)	Cubic Yard
Embankment Material (Complete in Place)	Cubic Yard
Stripping	Cubic Yard
Blading	Hour
Dozing	Hour
Potholing	Hour
Proof Rolling	Hour

Water will not be measured and paid for separately but shall be included in the work.

Compaction will not be measured and paid for separately, but shall be included in the work.

Payment for replacement of Unsuitable Material shall be as follows: If excavated material can be re-used as embankment fill by moisture conditioning and compaction, replacement shall be included in the cost for Removal of Unsuitable Material. If the material cannot be re-used as embankment fill, payment for replacement of Unsuitable Material shall be for the volume that is placed in the excavated area at the respective unit price for the material that is approved by the Engineer and used.

Payment for Unclassified Excavation (Complete in Place), Embankment Material (Complete in Place), and Borrow (Complete in Place) shall be full compensation for all work necessary to complete the item including construction of embankments, rework of existing materials to satisfy benching requirements, unclassified excavation, borrow, compaction, compaction of bases of cuts and fills, all work in available materials pits, and disposal of excess excavated material.

All costs associated with reducing the size of the claystone particles, removing the oversized particles, and disposal of the oversized particles will not be paid for separately but shall be included in the work.

Pavement replacement if required due to potholing, shall be accomplished, measured, and paid for in accordance with appropriate sections of the specifications.

Pneumatic tire equipment and load required to achieve the desired weight of proof rolling equipment will not be measured and paid for separately, but shall be included in the work.

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 REVISION OF SECTION 206
 IMPORTED MATERIAL FOR STRUCTURE BACKFILL

Section 206 of the Standard Specifications is hereby revised for this project as follows:

Subsection 206.02 (a) shall include the following:

Imported Material used as structure backfill for pipes (storm sewer, cross culverts, side drains, etc) shall be tested for compatibility with the selected pipe material.

When Nonreinforced Concrete Pipe or Reinforced Concrete Pipe is used, the imported material shall be tested for sulfate and pH.

When Corrugated Steel Pipe, Bituminous Coated Corrugated Steel Pipe or Precoated Corrugated Steel Pipe is used, the imported material shall be tested for sulfates, chlorides, pH and resistivity.

When Aramid Fiber Bonded Corrugated Steel Pipe or Corrugated Aluminum Pipe is used, the imported material shall be tested for pH and resistivity.

When Plastic pipe is selected, the imported material does not need to be tested for sulfates, chlorides, pH and resistivity.

Sulfates, chlorides, pH and resistivity shall be determined by the following procedures:

- (1) Water soluble sulfates using CP-L 2103 Method B.
- (2) Chlorides using CPL 2104
- (3) Resistivity using ASTM G57
- (4) pH using ASTM G51.

The average of three consecutive tests shall show the imported material's sulfate, chloride, pH and resistivity is not greater than the limits corresponding to the Pipe Class in Table 206-1 or 206-2 for the pipe class specified on the plans. No single test shall have a result more than 20 percent greater than that corresponding to the limit in Table 206-1 or Table 206-2 for sulfates, chlorides and resistivity. No single test shall have a result more than 5 percent outside the limit in Table 206-1 for pH. The remaining sample material from a single failing test shall be split into three equal portions. CDOT shall receive one portion, the Contractor shall receive one portion and the remaining portion shall be retained by the Project. CDOT and the Contractor's Lab shall retest the failed sample; if the results from those tests are within 10 percent of each other, the results will be averaged. The averaged result will be used for Contract compliance. If the results from the Labs are not within 10 percent of each other, the remaining sample portion will be sent to an independent laboratory for testing using the testing requirements specified above. The independent laboratory will be mutually agreed upon by the Department and the Contractor. The Independent Lab's test result will be used for Contract compliance.

If the imported material's sulfates, chlorides, and resistivity are less than the limits and the pH is within the limits in Table 203-1 or 203-2, CDOT will bear all costs associated with the independent lab test. If the imported material's sulfates, chlorides, and resistivity is greater than the limits and the pH is outside the limits in Table 206-1 or 206-2, all costs associated with independent lab testing shall be at the Contractor's expense.

Embankment represented by failing tests shall be removed from the project and replaced at the Contractor's expense.

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 REVISION OF SECTION 206
 IMPORTED MATERIAL FOR STRUCTURE BACKFILL

**Table 206-1
 SULFATE, CHLORIDE AND PH OF IMPORTED MATERIAL**

Pipe Class	SOIL		
	Sulfate	Chloride	
	(SO ₄)	(Cl)	pH
	% max	% max	
0, 7	0.05	0.05	6.0-8.5
1, 7	0.10	0.10	6.0-8.5
2, 8	0.20	0.20	6.0-8.5
3, 9	0.50	0.50	6.0-8.5
4, 9	1.00	1.00	5.0-9.0
5, 10	2.00	2.00	5.0-9.0
6, 10	>2.00	>2.00	<5 or >9

**Table 206-2
 RESISTIVITY AND PH OF IMPORTED MATERIAL**

SOIL SIDE	
Resistivity, R (Ohm – cm)	pH
≥1,500	5.0-9.0
≥250	3.0-12.0

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 REVISION OF SECTION 206
 STRUCTURE BACKFILL (FLOW-FILL)

Section 206 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 206.02 (a) and replace with the following:

- (a) *Structure Backfill.* Class 1 and Class 2 structure backfill shall be composed of non-organic mineral aggregates and soil from excavations, borrow pits, or other sources. Material shall conform to the requirements of subsection 703.08. Class of material shall be as specified in the Contract or as designated.

Structure backfill (Flow-Fill) meeting the following requirements shall be used to backfill bridge abutments. The Contractor may substitute structure backfill (Flow-Fill) for structure backfill (Class 1) or structure backfill (Class 2) to backfill culverts and sewer pipes.

Flow-Fill is a self-leveling low strength concrete material composed of cement, fly ash, aggregates, water, chemical admixtures and/or cellular foam for air-entrainment. Flow-fill shall have a slump of 7 to 10 inches, when tested in accordance with ASTM C143 or a minimum flow consistency of 6 inches when tested in accordance with ASTM D6103. Flow-Fill shall have a minimum compressive strength of 50 psi at 28 days, when tested in accordance with ASTM D4832. Flash fill is a rapid setting Flow-Fill that may be used when approved by the Engineer and will be tested, accepted, and paid for as Flow-Fill.

Flow-Fill placed in areas that require future excavation, such as utility backfill shall have a Removability Modulus (RM) of 1.5 or less.

Removability Modulus, RM, is calculated as follows:

$$RM = \frac{W^{1.5} \times 104 \times C^{0.5}}{10^6}$$

where : W = unit weight (pcf)
 C = 28-day compressive strength (psi)

Materials for structure backfill (Flow-Fill) shall meet the requirements specified in the following subsections:

Fine Aggregate ^{1, 4}	703.01
Coarse Aggregate ^{2, 4}	703.02
Portland Cement	701.01
Fly Ash ^{3, 4}	701.02
Water	712.01
Air Entraining Admixture	711.02
Chemical Admixtures	711.03

¹ Fine aggregate not meeting the requirements of subsection 703.01 may be used if testing indicates acceptable results for strength and air content.

² Coarse aggregate not meeting the requirements of subsection 703.02 may be used if testing indicates acceptable results for strength and air content.

³ Fly ash not meeting the requirements of subsection 701.02 may be used if testing indicates acceptable results for strength and air content.

⁴ Industrial by-product aggregates (foundry sand, bottom ash, etc..) and fly ash not meeting the requirements of subsection 701.02 shall submit a report from the supplier documenting the results of testing in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) described in 40 CFR 261. The report shall include the results of TCLP testing for heavy metals and other contaminants. Materials shall not exceed the TCLP limits of 40 CFR 261.24 for heavy metals

Cellular foam shall conform to ASTM C869 and ASTM C796

Recycled broken glass (glass cullet) is acceptable as part or all of the aggregate. Aggregate including glass must conform to the required gradations. All containers used to produce the cullet shall be empty prior to processing. Chemical, pharmaceutical, insecticide, pesticide, or other glass containers containing or having

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 REVISION OF SECTION 206
 STRUCTURE BACKFILL (FLOW-FILL)

contained toxic or hazardous substances shall not be allowed and shall be grounds for rejecting the glass cullet. The maximum debris level in the cullet shall be 10 percent. Debris is defined as any deleterious material which impacts the performance of the structure backfill (Flow-Fill) including all non-glass constituents.

The Contractor may use aggregate which does not meet the above specifications if the aggregate conforms to the following gradation:

Sieve Size	Percent Passing
25.0 mm (1 inch)	100
75 µm (No. 200)	0-10 ¹

¹ The amount of material passing the 75 µm (No. 200) screen may exceed 10 percent if testing indicates acceptable results for strength and air content.

The Contractor shall submit a structure backfill (Flow-Fill) mix design for approval prior to placement. The mix design shall include the following laboratory test data:

- (1) ASTM C231, Air content
- (2) ASTM D6023, Unit Weight
- (3) ASTM C143, Slump or ASTM D6103 flow consistency
- (4) ASTM D4832 28-day Compressive Strength
- (5) Removability Modulus (RM)

The Contractor shall submit a Process Control (PC) Plan with the mix design to the Engineer. The PC plan shall address the batching, mixing, testing and placement of the structure backfill (Flow-Fill).

In subsection 206.03, delete the thirteenth through fifteenth paragraphs and replace with the following:

Compaction of structure backfill (Flow-Fill) shall not be performed.

The maximum layer thickness for structure backfill (Flow-Fill) shall be 3 feet unless otherwise approved by the Engineer. The Contractor shall not place structure backfill (Flow-Fill) in layers that are too thick to cause damage to culverts, pipes and other structures, or that will cause formwork or soil failures during placement. Structure backfill (Flow-Fill) shall have an indention diameter less than 3 inches and the indention shall be free of visible water when tested in accordance with ASTM D6024 by the Contractor prior to placing additional layers of structure backfill (Flow-Fill). Testing structure backfill (Flow-Fill) in accordance with ASTM D6024 will be witnessed by the Engineer. Damage resulting from placing structure backfill (Flow-Fill) in layers that are too thick or from not allowing sufficient time between placements of layers shall be repaired at the Contractor's expense.

The Contractor shall secure culverts, pipes and other structures to prevent floating and displacement of these items during the placement of the structure backfill (Flow-Fill).

When Flash Fill is used, it shall be batched with a volumetric mixing truck. Volumetric mixing trucks to produce Flow-Fill and Flash Fill shall have a computer batching system, capable of producing the approved mix design and printing tickets. For Flash Fill, the batch weights of cement and/or fly ash per cubic yard shall be within 2 percent of the mix design batch weights and the batch weight of water per cubic yard shall be within 2 percent of the mix design batch weight.

Prior to the placement of structure backfill (Flow-Fill), the Contractor shall sample the structure backfill (Flow-Fill) in accordance with ASTM D5971. The Contractor shall test the structure backfill (Flow-Fill) unit weight in accordance with ASTM D6023. For Flash Fill, the measured unit weight shall be within 5.0 percent or 5.0 pcf, whichever is larger, of the approved mix design unit weight. The Contractor shall test the structure backfill (Flow-Fill) for slump in accordance with ASTM C143 or flow consistency according to ASTM D6103.

The Contractor shall sample and test the first three loads of structure backfill (Flow-Fill) for each placement and then randomly once every 50 cubic yards. Sampling and testing will be witnessed by the Engineer

REVISION OF SECTION 206
STRUCTURE BACKFILL (FLOW-FILL)

When structure backfill (Flow-Fill) is placed in areas that require future excavation, the unit weight of the placed structure backfill (Flow-Fill) shall not exceed the unit weight of the approved mix design by more than 2.0 pcf.

Structure backfill (Flow-Fill) shall not be allowed to freeze during placement and until it has set sufficiently according to ASTM D6024. Frozen structure backfill (Flow-Fill) shall be removed and replaced at the Contractor's expense.

When the Contractor substitutes Structure Backfill (Flow-Fill) for Structure Backfill (Class 1) or (Class 2), the trench width may be reduced to provide a minimum 6 inch clearance between the outside diameter of the culvert and the trench wall.

January 30, 2014

REVISION OF SECTION 206
STRUCTURE BACKFILL AT BRIDGE ABUTMENTS

Section 206 of the Standard Specifications is hereby revised for this project as follows:

In subsection 206.02 (a), delete the first sentence of the second paragraph and replace with the following:

Structure backfill (Class 1) with mechanical reinforcement shall be used to backfill bridge abutments, unless otherwise shown on the Plans. When structure backfill (flow-fill) is called for, it shall meet the following requirements.

REVISION OF SECTIONS 206, 304 AND 613
COMPACTION

Sections 206, 304 and 613 of Standard Specifications are hereby revised for this project as follows:

In subsection 206.03, delete the fourth and fifth paragraphs and replace with the following:

Backfill shall consist of approved materials uniformly distributed in layers brought up equally on all sides of the structure. Each layer of backfill shall not exceed 6 inches and shall be compacted to the required density before successive layers are placed. Structure backfill (Class 1) shall be compacted to a density of not less than 95 percent of maximum dry density determined in accordance with AASHTO T 180 as modified by CP 23. Backfill shall be compacted at ± 2 percent of Optimum Moisture Content (OMC).

Structure backfill (Class 2) shall be compacted to a density of not less than 95 percent of maximum dry density. The maximum dry density and OMC for A-1, A-2-4, A-2-5 and A-3 materials will be determined in accordance with AASHTO T 180 as modified by CP 23. The maximum dry density and OMC for all other materials will be determined in accordance with AASHTO T 99 as modified by CP 23. Materials shall be compacted at ± 2 percent of Optimum Moisture Content (OMC). Materials having greater than 35 percent passing the 75 μm (No. 200) sieve shall be compacted at 0 to 3 percent above OMC.

In subsection 304.06, delete the first paragraph and replace with the following:

304.06 Shaping and Compaction. Compaction of each layer shall continue until a density of not less than 95 percent of the maximum density determined in accordance with AASHTO T 180 as modified by CP 23 has been achieved. The moisture content shall be at ± 2 percent of optimum moisture content. The surface of each layer shall be maintained during the compaction operations so that a uniform texture is produced and the aggregates are firmly keyed. Moisture conditioning shall be performed uniformly during compaction.

In subsection 613.07, delete the 15th paragraph and replace with the following:

Trenching shall be backfilled and compacted as follows: Backfill shall be deposited in uniform layers. The thickness of each layer shall be 6 inches or less thick prior to compaction. The space under the conduit shall be completely filled. The remainder of the trench and excavation shall be backfilled to the finished grade. The backfill material shall be compacted to the density of not less than 95 percent of maximum dry density. The maximum dry density and optimum moisture content (OMC) for A-1, A-2-4, A-2-5 and A-3 materials will determined in accordance with AASHTO T 180 as modified by CP 23. The maximum dry density and OMC for all other materials will determined in accordance with AASHTO T 99 as modified by CP 23. Materials shall be compacted at ± 2 percent of Optimum Moisture Content (OMC). Materials having greater than 35 percent passing the 75 μm (No. 200) sieve shall be compacted at 0 to 3 percent above OMC. Each layer shall be mechanically compacted by tamping with power tools approved by the Engineer. Compaction methods or equipment that damage the conduit shall not be used.

REVISION OF SECTIONS 206 AND 601
MATURITY METER AND CONCRETE
FORM AND FALSEWORK REMOVAL

Sections 206 and 601 of the Standard Specifications are hereby revised for this project as follows:

In subsection 206.03, delete the ninth paragraph and replace with the following:

Backfill material shall not be deposited against newly constructed masonry or concrete structures, until the concrete has developed a compressive strength of $0.8 f'_c$, except in cases where the structures support lateral earth pressure. Concrete compressive strength for structures supporting lateral earth pressure shall conform to subsection 601.12 (o). Concrete compressive strength shall be determined by maturity meters.

In subsection 601.09, delete (h) and replace with the following:

(h) *Removal of Forms.* The forms for any portion of the structure shall not be removed until the concrete is strong enough to withstand damage when the forms are removed.

Unless specified in the plans, forms shall remain in place for members that resist dead load bending until concrete has reached a compressive strength of at least 80 percent of the required 28 day strength, $0.80f'_c$. Forms for columns shall remain in place until concrete has reached a compressive strength of at least 1,000 psi. Forms for sides of beams, walls or other members that do not resist dead load bending shall remain in place until concrete has reached a compressive strength of at least 500 psi.

Forms and supports for cast-in-place concrete box culverts (CBCs) shall not be removed until the concrete compressive strength exceeds $0.6 f'_c$ for CBCs with spans up to and including 12 feet, and $0.67 f'_c$ for CBCs with spans exceeding 12 feet but not larger than 20 feet. Forms for CBCs with spans larger than 20 feet shall not be removed until after all concrete has been placed in all spans and has attained a compressive strength of at least $0.80f'_c$.

Concrete compressive strength shall be determined by maturity meters. At the pre-pour conference, the Contractor shall submit the location where maturity meters will be placed.

The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meter and wire. . At a minimum a maturity meter will be placed at the mid-span of beams and at support locations. Placement shall be as directed by the Engineer.

For structures with multiple maturity meters, the lowest compressive strength shall determine when the forms can be removed.

Acceptance cylinders shall not be used for determining compressive strength to remove forms.

When field operations are controlled by maturity meters, the removal of forms, supports and housing, and the discontinuance of heating and curing may begin when the concrete is found to have the required compressive strength.

Forms for median barrier, railing or curbs, may be removed at the convenience of the Contractor after the concrete has hardened.

All forms shall be removed except permanent steel bridge deck forms and forms used to support hollow abutments or hollow piers when no permanent access is available into the cells. When permanent access is provided into box girders, all interior forms and loose material shall be removed, and the inside of box girders shall be cleaned.

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REVISION OF SECTIONS 206 AND 601
MATURITY METER AND CONCRETE
FORM AND FALSEWORK REMOVAL

In subsection 601.11, delete (e) and replace with the following:

- (e) *Falsework Removal.* Unless specified in the plans or specifications, falsework shall remain in place until concrete has attained a minimum compressive strength of 0.80f'c.

Falsework supporting any span of a simple span bridge shall not be released until after all concrete, excluding concrete above the bridge deck, has attained a compressive strength of at least 0.80f'c.

Falsework supporting any span of a continuous or rigid frame bridge shall not be released until after all concrete, excluding concrete above the bridge deck, has been placed in all spans and has attained the compressive strength of at least 0.80f'c.

Falsework for arch bridges shall be removed uniformly and gradually, beginning at the crown, to permit the arch to take its load slowly and evenly.

Falsework supporting overhangs and deck slabs between girders shall not be released until the deck concrete has attained a compressive strength of at least 0.80f'c.

Falsework for pier caps which will support steel or precast concrete girders shall not be released until the concrete has attained a compressive strength of at least 0.80f'c. Girders shall not be erected onto such pier caps until the concrete in the cap has attained the compressive strength of at least 0.80f'c.

Falsework for cast-in-place prestressed portions of structures shall not be released until after the pre-stressing steel has been tensioned.

Concrete compressive strength shall be determined by maturity meters. At the pre-pour conference, the Contractor shall submit the location that maturity meters will be placed.

The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meters and wires. At a minimum a maturity meter will be placed at the mid-span of beams and at support locations. Placement shall be as directed by the Engineer.

For structures with multiple maturity meters, the lowest compressive strength shall determine when the falsework can be removed.

Acceptance cylinders shall not be used for determining compressive strength to remove falsework.

Subsection 601.12 (l) shall include the following after the first paragraph:

Concrete compressive strength shall be determined by maturity meters.

Subsection 601.12 shall include the following:

- (o) *Backfilling Structures that Support Lateral Earth Pressure.* Concrete compressive strengths shall reach f'c before backfilling operations can begin with heavy equipment, such as skid-steers or self-powered riding compactors. Concrete compressive strengths shall reach 0.8 f'c before backfilling operations can begin with hand operated equipment. Concrete compressive strength shall be determined by maturity meters.

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REVISION OF SECTIONS 206 AND 601
MATURITY METER AND CONCRETE
FORM AND FALSEWORK REMOVAL

Delete subsections 601.13 (2) and 601.13 (3) and replace with the following:

- (2) The minimum curing period shall be from the time the concrete has been placed until the concrete has met a compressive strength of 80 percent of the required field compressive strength. The Contractor shall develop a maturity relationship for the concrete mix design in accordance with CP 69. The Contractor shall provide the maturity meter and all necessary thermocouples, thermometers, wires and connectors. The Contractor shall place, protect and maintain the maturity meters and associated equipment. Locations where the maturity meters are placed shall be protected in the same manner as the rest of the structure.

Subsection 601.17 shall include the following:

- (f) *Maturity Meter Strength.* When maturity meters are specified for determining strength for removing forms, removing false work, backfilling against structures or loading the structure, the Contractor shall provide the Engineer a report of maturity relationships in accordance with CP 69 prior to placement of concrete.

If a maturity meter fails, is tampered with, is destroyed or was not placed, the following shall apply:

The minimum curing time or waiting time for removing forms, removing false work, backfilling against structures or loading the structure shall be 28 days.

The Contractor may choose at his own expense to core the structure represented by the maturity meter. Cores will be obtained and tested according to CP 65. Cores will be a minimum of 4 inches in diameter. A minimum of three cores in a two square foot area will be obtained. If the compressive strength of any one core differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two cores. If the compressive strength of more than one core differs from the average by more than 10 percent the average strength will be determined using all three compressive strengths of the cores. The average compressive strength of the cores shall be achieve the specified compressive strength of the structure. A structure may only be cored once.

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Section 208 is hereby deleted from the Standard Specifications for this project and replaced with the following:

DESCRIPTION

208.01 This work consists of constructing, installing, maintaining, and removing when required, Best Management Practices (BMPs) during the life of the Contract to prevent or minimize erosion, sedimentation, and pollution of any State waters as defined in subsection 107.25, including wetlands.

The Contractor shall coordinate the construction of temporary BMPs with the construction of permanent BMPs to assure economical, effective, and continuous erosion and sediment control throughout the construction period.

When a provision of Section 208 or an order by the Engineer requires that an action be immediate or taken immediately, it shall be understood that the Contractor shall at once begin effecting completion of the action and pursue it to completion in a manner acceptable to the Engineer, and in accordance with the Colorado Discharge Permit System Stormwater Construction Permit (CDPS-SCP) requirements.

MATERIALS

208.02 Erosion control materials are subject to acceptance in accordance with subsection 106.01. Erosion control materials shall be subject to the following approval process:

Material	Approval Process	Notes:
Erosion Bales (Weed Free)	COC	The Contractor shall provide a transit certificate number or a copy of the transit certificate as supplied from the producer.
Silt Fence	COC	
Silt Berm	APL	
Erosion Log (Type 1 and 2)	COC	
Silt Dikes	COC	
Pre-fabricated Concrete Washout Structures (above ground)	APL	
Pre-fabricated Vehicle Tracking Pad	APL	
Aggregate Bag	COC	
Storm Drain Inlet Protection (Type I, II and III)	APL	

The material for BMPs shall conform to the following:

- (a) *Erosion Bales.* Material for erosion bales shall consist of Certified Weed Free hay or straw. The hay or straw shall be certified under the Colorado Department of Agriculture Weed Free Forage Certification Program and inspected as regulated by the Weed Free Forage Act, Title 35, Article 27.5, CRS. Each certified weed free erosion bale shall be identified by blue and orange twine binding the bales.

The Contractor shall not place certified weed free erosion bales or remove their identifying twine until the Engineer has inspected and accepted them.

The Contractor may obtain a current list of Colorado Weed Free Forage Crop Producers who have completed certification by contacting the Colorado Department of Agriculture, Weed Free Forage Program, 305 Interlocken Pkwy, Broomfield, CO 80021, Contact: Weed Free Forage Coordinator at (303) 869-9038. Also available at www.colorado.gov/ag/csd.

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Bales shall be approximately 5 cubic feet of material and weigh at least 35 pounds. Stakes shall be wood and shall be 2 inch by 2 inch nominal.

- (b) *Silt Fence*. Silt fence posts shall be wood with a minimum length of 42 inches. Wood posts shall be 1.5 inch by 1.5 inch nominal. Geotextile shall be attached to wood posts with three or more staples per post.

Silt fence geotextile shall conform to the following requirements:

Physical Requirements for Silt Fence Geotextiles

Property	Wire Fence Supported Requirements	Self-Supported Requirements Geotextile Elongation <50%	Test Method
Grab Strength, lbs	90 minimum	124 minimum	ASTM D 4632
Permittivity sec-1	0.05	0.05	ASTM D 4491
Ultraviolet Stability	Minimum 70% Strength Retained	Minimum 70% Strength Retained	ASTM D 4355

Silt Fence (Reinforced). Silt fence posts shall be metal "studded tee" T-post with a minimum length of 66 inches. Metal posts shall be "studded tee" with .095 inch minimum wall thickness. Wire fabric reinforcement for the silt fence geotextile shall be a minimum of 14 gauge, with a maximum mesh spacing of 6 inches. Geotextile shall be attached to welded wire fabric with ties or nylon cable ties 12 inch O.C. at top, mid and bottom wire. Welded wire fabric shall be attached to the post with a minimum three 12 gauge wire ties per post. Vinyl or rubber safety caps shall be installed on all T-post.

- (c) *Temporary Berms*. Temporary berms shall be constructed of compacted soil.
- (d) *Temporary Slope Drains*. Temporary slope drains shall consist of fiber mats, plastic sheets, stone, concrete or asphalt gutters, half round pipe, metal or plastic pipe, wood flume, flexible rubber or other materials suitable to carry accumulated water down the slopes. Outlet protection riprap shall conform to section 506. Erosion control geotextile shall be a minimum Class 2, conforming to subsection 712.08.
- (e) *Silt Berm*. Silt berm shall consist of an ultraviolet (UV) stabilized high-density polyethylene, shall be triangular in shape, and shall have the following dimensions:

Width	6 - 11 inches
Height	6 - 10 inches
Weight	0.3 - 1.4 lbs./sq. ft.
Percent Open Area	30 – 50%

Securing spikes shall be 10 to 12 inch x 0.375 inch diameter (minimum).

- (f) *Rock Check Dam*. Rock Check dams shall be constructed of stone. Stone shall meet the requirements of Section 506.
- (g) *Sediment Trap*. In constructing an excavated Sediment Trap, excavated soil may be used to construct the dam embankment, provided the soil meets the requirements of subsection 203.03. Outlet protection riprap shall be the size specified in the Contract and shall conform to Section 506. Erosion control geotextile shall be a minimum Class 1, conforming to subsection 712.08.

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(h) *Erosion log.* Shall be one of the following types unless otherwise shown on the plans:

- (1) Erosion Log (Type 1) shall be curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log. The casing shall be seamless, photo-degradable tube netting and shall have minimum dimensions as shown in Table 208-1, based on the diameter of the log called for on the plans. The curled aspen wood excelsior shall be fungus free, resin free, and free of growth or germination inhibiting substances.
- (2) Erosion Log (Type 2) shall consist of a blend of 30-40 percent weed free compost and 60-70 percent wood chips. The compost/wood blend material shall pass a 50 mm (2 inch) sieve with a minimum of 70 percent retained on the 9.5 mm (3/8 inch) sieve and comply to subsection 212.02 for the remaining compost physical properties. The compost/wood chip blend may be pneumatically shot into a geotextile cylindrical bag or be pre-manufactured. The geotextile bag shall consist of material with openings of 1/8 to 3/8 inches of HDPE or polypropylene mesh (knitted, not extruded), and contain the compost/wood chip material while not limiting water infiltration.

Erosion log (Type 1 and Type 2) shall have minimum dimensions as shown in Table 208-1, based on the diameter of the log.

Table208-1
NOMINAL DIMENSIONS OF EROSION LOGS

Diameter Type 1 (Inches)	Diameter Type 2 (Inches)	Length (feet)		Weight (minimum) (pounds/foot)	Stake Dimensions (Inches)
		Min.	Max.		
9	8	10	180	1.6	1.5 by 1.5 (nominal) by 18
12	12	10	180	2.5	1.5 by 1.5(nominal) by 24
20	18	10	100	4.0	2 by 2 (nominal) by 30

Stakes to secure erosion logs shall consist of pinewood or hardwood.

- (i) *Silt Dikes.* Silt dikes shall be pre-manufactured triangular shaped urethane foam covered with a woven geotextile fabric. The fabric aprons shall extend a minimum of two feet beyond each side of the triangle.

Each silt dike shall have the following dimensions:

Dimension	Length
Center height	8 to 10 inches
Base	16 to 21 inches
Section length	3 to 7 feet
Section width including fabric extensions	5.6 feet

Staples shall be 6 gauge and at least 8 inches long.

- (j) *Concrete Washout Structure.* The Contractor shall construct a washout structure that will contain washout from concrete placement and construction equipment cleaning operations. Embankment required for the concrete washout structure may be excavated material, provided that this material meets the requirements of Section 203 for embankment.

A pre-fabricated concrete washout structure shall only be used when specified in the Contract. It shall consist of a watertight container designed to contain liquid and solid waste from concrete washout.

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- (k) *Vehicle Tracking Pad.* Aggregate for the vehicle tracking pad shall be crushed natural aggregate with at least two fractured faces that meets the following gradation requirements:

Sieve size	Percent by weight Passing Square Mesh Sieves
75 mm (3 inch)	100
50 mm (2 inch)	0-25
19.0 mm (¾ inch)	0-15

Recycled crushed concrete or asphalt shall not be used for vehicle tracking pads.

Erosion Control Geotextile shall be Class 2 and conform to the requirements of subsection 712.08.

Pre-fabricated vehicle tracking pads if specified in the Contract shall have the following properties.

Minimum overall dimensions of the modular systems shall be:

Width of pad along edge of roadway	14 feet
Length of pad	30 feet

Weight (min.) (lbs./sq. ft.)	8
Crush strength (min.) (psi)	400

- (l) *Aggregate Bag.* Aggregate bags shall consist of crushed stone or recycled rubber filled fabric with the following properties:

Diameter (inches)	Weight (minimum) (pounds per foot)
6-8	6
10	10
12	15

Rubber used in bags shall be clean, 95 percent free of metal and particulates.

Crushed stone contained in the aggregate bags shall conform to subsection 703.09, Table 703-7 for Class C.

The aggregate bag shall consist of a woven geotextile fabric with the following properties:

Property	Requirement	Test Method
Grab Tensile Strength	90 lbs. min.	ASTM D 4632
Trapezoid Tear Strength	25 lbs. min.	ASTM D 4533
Mullen Burst	300 psi	ASTM D 3786
Ultraviolet Resistance	70%	ASTM D 4355

- (m) *Storm Drain Inlet Protection.* Storm drain inlet protection shall consist of aggregate filled fabric with the following dimensions:

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Storm Drain Inlet Protection Properties	Protection Types		
	¹ Type I	Type II	³ Type III
Diameter	4 in.	4 in.	N/A
Minimum Section Length	7 ft.	5 ft.	5 ft.
Apron Insert	---	30 in. or sized to grate	30 in or sized to grate
¹ Type I protection shall be used with Inlet Type R. ² Type II protection shall be used with Combination Inlet. Option A or B ³ Type III protection Inlet Vane Gate only. Option A or B			

The storm drain inlet protection (Type I, II and III) shall consist of a woven geotextile fabric with the following properties:

Property	Test Method	Unit	Requirement
Grab tensile strength	ASTM D 4632	lbs.	minimum 350X280
Mullen Burst Strength	ASTM D 3786	lbs.	600
Trapezoid Tear Strength	ASTM D 4533	lbs.	minimum 110X95
Percent Open Area	COE-22125-86	%	28
Water Flow Rate	ASTM D 4491	gal./min./sq. ft.	250
Ultraviolet Resistance	ASTM D 4355	%	70

Curb roll for storm drain inlet protection (Type I and II) shall have an approximate weight of 7 to 10 pounds per linear foot of device. The device shall be capable of conforming to the shape of the curb. Aggregate contained in the storm drain inlet device shall consist of gravel or crushed stone conforming to Table 703-7 for Class C.

Storm drain inlet protection (Type III) shall have insert containment (option A) or insert without storage capacity (option B).

CONSTRUCTION REQUIREMENTS

208.03 Project Review, Schedule, and Erosion Control Management. Prior to construction, an on-site Environmental Pre-construction Conference shall be held. The conference shall be attended by:

- (1) The Engineer,
- (2) The Superintendent,
- (3) The Contractor's SWMP Administrator
- (4) Supervisors or Foremen of subcontractors working on the project,
- (5) The Region Water Pollution Control Manager (RWPCM), and

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- (6) CDOT personnel (e.g., CDOT Landscape Architect) who prepared or reviewed the Stormwater Management Plan (SWMP).

At this conference, the attendees shall discuss the SWMP, CDPS-SCP, sensitive habitats on site, wetlands, other vegetation to be protected, and the enforcement mechanisms for not meeting the requirements of this specification.

Prior to beginning construction the Contractor shall evaluate the project site for storm water draining into or through the site. When such drainage is identified, BMPs (i.e., Control Measures) shall be used if possible to divert stormwater from running on-site and becoming contaminated with sediment or other pollutants. The diversion may be accomplished with a temporary pipe or other conveyance to prevent water contamination or contact with pollutants. Run-on water that cannot be diverted shall be treated as construction runoff and adequate BMPs shall be employed.

The SWMP Administrator shall evaluate all non-stormwater coming onto the site, such as springs, seeps, and landscape irrigation return flow. If such flow is identified, BMPs shall be used to protect off-site water from becoming contaminated with sediment or other pollutants.

The SWMP Administrator shall review existing inlets and culverts to determine if inlet protection is needed due to water flow patterns. Prior to beginning construction, inlets and culverts needing protection shall be protected and the location of the implemented BMP added to the SWMP site map.

Prior to construction, the Contractor shall implement appropriate BMPs for protection of wetlands, sensitive habitat and existing vegetation from ground disturbance and other pollutant sources, in accordance with the approved project schedule as described in subsection 208.03(b).

When additional BMPs are required and approved by the Engineer, the Contractor shall implement the additional BMPs and the SWMP Administrator shall record and describe them on the SWMP site map. The approved BMPs will be measured and paid for in accordance with subsections 208.11 and 208.12.

- (a) *Project Review.* The Contractor may submit modifications to the Contract's BMPs in a written proposal to the Engineer. The written proposal shall include the following information:

- (1) Reasons for changing the BMPs.
- (2) Diagrams showing details and locations of all proposed changes.
- (3) List of appropriate pay items indicating new and revised quantities.
- (4) Schedules for accomplishing all erosion and sediment control work.
- (5) Effects on permits or certifications caused by the proposed changes.

The Engineer will approve or reject the written proposal in writing within 5 working days after the submittal. The Engineer may require additional control measures prior to approving the proposed modifications. Additional modifications and additional BMPs will be paid for at the Contract Unit Price for the specific items involved. If no items exist, they will be paid for as extra work in accordance with subsection 109.04.

- (b) *Erosion and Sediment Control Activities.* The erosion and sediment control activities shall be included in the weekly meeting update. The project schedule shall specifically indicate the sequence of clearing and grubbing, earthwork operations, and construction of temporary and permanent erosion control features and stabilization. Project schedule shall include erosion and sediment control work for haul roads, borrow pits, storage and asphalt or concrete batch sites, and all areas within the project limits. If during construction the Contractor proposes changes which would affect the Contract's BMPs, the Contractor shall propose revised BMPs to the Engineer for approval in writing. If necessary, the SWMP Administrator shall update proposed sequencing of major activities in the SWMP. Revisions shall not be implemented until the proposed measures have been approved in writing by the Engineer.
- (c) *Erosion Control Management (ECM).* Erosion Control Management for this project shall consist of Erosion Control Inspection and the SWMP Administration. All ECM staff shall have working knowledge and experience in construction, and shall have successfully completed the Transportation Erosion Control Supervisory Certificate Training (TECS) as provided by the Department. The Superintendent will not be permitted to serve in an ECM role. The Erosion Control Inspector (ECI) and the SWMP Administrator may be the same person in projects involving less than 40 acres of disturbed area.

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1. SWMP Administration. The SWMP shall be maintained by a SWMP Administrator. In the case of a project requiring only one TECS, the SWMP Administrator may also be the ECI for the project. The name of the SWMP Administrator shall be recorded on the SWMP Section 3. B. The SWMP Administrator shall have full responsibility to maintain and update the SWMP and identify to the Superintendent critical action items needed to conform to the CDPS-SCP as follows:
 - (1) Complete the SWMP Notebook as described in subsection 208.03 (d).
 - (2) Participate in the Environmental Pre-construction Conference
 - (3) Attend weekly meetings
 - (4) Attend all Headquarter and Region water quality control inspections. The Contractor and the Contractor's SWMP Administrator will be notified a minimum of five days in advance of each inspection by the CDOT region or headquarter water quality staff.
 - (5) Coordinate with the Superintendent to implement necessary actions to reduce anticipated or presently existing water quality or erosion problems resulting from construction activities.
 - (6) Coordinate with the Superintendent to ensure that all labor, material, and equipment needed to install, maintain, and remove BMPs are available as needed.
 - (7) During construction, update and record the following items on the SWMP site map as changes occur:
 - (i) Limits of Construction (LOC).
 - (ii) Areas of disturbance (AD)
 - (iii) Limits of Disturbance (LDA)
 - (iv) Limits of cut and fill.
 - (v) Areas used for storage of construction materials, equipment, soils, or wastes.
 - (vi) Location of any dedicated asphalt or concrete batch plants.
 - (vii) Location of construction offices and staging areas.
 - (viii) Location of work access routes during construction.
 - (ix) Location of borrow and waste.
 - (x) Location of temporary, interim and permanent stabilization.
 - (xi) Location of outfall(s)
 - (xii) Arrows showing direction of surface flow
 - (xiii) Structural and non-structural BMPs
 - (xiv) LDA and LOC lines as defined in subsection 107.25
 - (8) Amend the SWMP whenever there are: additions, deletions, or changes to BMPs. SWMP revisions shall be recorded immediately. Items shall be dated and initialed by the SWMP Administrator. Specifically, amendments shall include the following:
 - (i) A change in design, construction, operation, or maintenance of the site which would require the implementation of new or revised BMPs; or

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- (ii) Changes when the SWMP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activity.
 - (iii) Changes when BMPs are no longer necessary and are removed.
- (9) Complete vegetative survey transects when required in accordance with CDOT Erosion Control and Stormwater Quality Guide.
- (10) Start a new site map before the current one becomes illegible. All site maps shall remain in the SWMP notebook.
- (11) Document all inspection and maintenance activities. The SWMP and documentation shall be kept on the project site.
- (12) When adding or revising BMPs on the SWMP, add a narrative explaining what, when, where, why, and how the BMP is being used, and add a detail to the SWMP notebook.
- (i) How to install and inspect the BMP
 - (ii) Where to install the BMP
 - (iii) When to maintain the BMP
- (13) If using existing topography, vegetation, etc. as a BMP, label it as such on the SWMP site map; add a narrative as to when, where, why, and how the BMP is being used.
- (14) Indicate BMPs in use or not in use by recording on Standard Plans M-208-1, M-216-1, and M-615-1 in the SWMP notebook
- (15) Record on the SWMP, the approved Method Statement for Containing Pollutant Byproducts.
- (16) Update the potential pollutants list in the SWMP notebook and Spill Response Plan throughout construction.
2. Erosion Control Inspection.
- One ECI is required for every 40 acres of total disturbed area which is currently receiving temporary and interim stabilization measures as defined in subsection 208.04 (e). An ECI shall not be responsible for more than 40 acres in the project. Accepted permanent stabilization methods as defined in subsection 208.04 (e) will not be included in the 40 acres.
- ECI duties shall be as follows:
- (1) Coordinate with the SWMP Administrator on reporting the results of inspections
 - (2) Review the construction site for compliance with the Stormwater Construction Permit.
 - (3) Inspect with the Superintendent and the Engineer (or their designated representatives) the stormwater management system at least every seven calendar days. Post storm event inspections shall be conducted within 24 hours after the end of any precipitation or snow melt event that may cause surface erosion. If no construction activities will occur following a storm event, post-storm event inspections shall be conducted prior to commencing construction activities, but no later than 72 hours following the storm event. The occurrence of delay in inspections shall be documented in the inspection report. Form 1176 shall be used for all 7 day inspections and inspections following storm events. The Contractor shall notify the Erosion control inspector when a storm event occurs. Failure to perform inspections on time will result in liquidated damages in accordance with subsection 208.09.

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Inspections are not required at sites when construction activities are temporarily halted, when snow cover exists over the entire site and melting conditions do not pose a risk of surface erosion. This exception shall be applicable only during the period where melting conditions do not exist, and applies to the routine 7 day, Headquarters and Region inspections, as well as the post-storm event inspections. The following information shall be documented on Form 1176 for use of this exclusion: dates when snow cover occurred, date when construction activities ceased, and date melting conditions began.

The order of precedence for required inspections shall be as follows:

- (i) Headquarter water quality inspections
- (ii) Region water quality inspections
- (iii) Post-storm event inspections
- (iv) 7 day inspections

When one of the listed inspections is performed, the inspections listed below it need not be performed on that day if the required CDOT and Contractor personnel participated in the inspection.

For example: A 7 day inspection is not required on the same day a headquarters or Region inspection is conducted. A sheet shall be placed in the inspections area of the SWMP Notebook to refer to the date inspection performed.

- (4) Follow all other agency Stormwater requirements and inspections unless a waiver or other agreement has been made.
 - (5) The ECI shall immediately report to the Contractor's Superintendent and the SWMP Administrator the following instances of noncompliance:
 - (i) Noncompliance which may endanger health or the environment.
 - (ii) Spills or discharge of hazardous substance or oil which may cause pollution of waters of the State.
 - (iii) Discharge of stormwater which may cause an exceedance of a water quality standard.
 - (iv) Upset conditions that occur on site.
 - (6) Spills, leaks, or overflows that result in the discharge of pollutants shall be documented on the Form 1176 by the ECI. The ECI shall record the time and date, weather conditions, reasons for spill, and how it was remediated.
- (d) *Documentation Available on the Project.* The following Contract documents and references will be made available for reference at the CDOT field office during construction:
1. SWMP Notebook. The Engineer will provide a SWMP Notebook at the Preconstruction Conference, which is and shall remain the property of CDOT. CDOT will initially provide the documentation for the first four items when available. The Contractor shall provide the contents required for items (5) through (18). The notebook shall be stored in the CDOT field office or at another on-site location approved by the Engineer. The SWMP Administrator shall modify and update the notebook as needed to reflect actual site conditions, prior to or as soon as practicable but in no case more than 72 hours after the change. The following Contract documents and reports shall be kept, maintained, and updated in the notebook under the appropriate items by the SWMP Administrator:

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- (1) SWMP Plan Sheets - Notes, tabulation, sequence of major activities, area of disturbance, existing soil data, existing vegetation percent cover, potential pollutant sources, receiving water, non-stormwater discharges and environmental impacts.
- (2) SWMP Site Maps and Plan Title Sheet - Construction site boundaries, ground surface disturbance, limits of cut and fill, flow arrows, structural BMPs, non-structural BMPs, Springs, Streams, Wetlands and surface water. Also included on the sheets is the protection of trees, shrubs and cultural resources.
- (3) Specifications - Standard and Project special provisions related to Stormwater and Erosion Control.
- (4) Standard Plans M-208-1, M-216-1 and M-615-1
- (5) BMP Details not in Standard Plan M-208-1 - Non-standard details.
- (6) Weekly meeting sign in sheet.
- (7) Calendar of Inspections -Calendar of inspections marking when all inspections take place.
- (8) Form 1176 – Weekly meeting notes and inspection report
- (9) Region and Headquarter Water Quality Reports and Form 105(s) relating to Water Quality.
- (10) Description of Inspection and Maintenance Methods - Description of inspection and maintenance methods implemented at the site to maintain all BMPs identified in the SWMP and Items not addressed in the design
- (11) Spill Response Plan - Reports of reportable spills submitted to CDPHE
- (12) List and Evaluation of Potential Pollutants - List of potential pollutants as described in subsection 107.25 and approved Method Statement for Containing Pollutant Byproducts.
- (13) Other Correspondence e.g., agreements with other MS4s, approved deferral request, CDPHE audit documentation, Water Quality Permit Transfer to Maintenance Punch List and other miscellaneous documentation.
- (14) TECS Certifications of the SWMP Administrator and all ECIs, keep current through the life of the project.
- (15) Environmental Pre-construction Conference – Conference agenda with a certification of understanding of the terms and conditions of the CDPS-SCP and SWMP. The certification shall be signed by all attendees. A certification shall also be signed by all attendees of meetings held for new subcontractors beginning work on the project that could adversely affect water quality after the Environmental Pre-construction Conference has been held.
- (16) All Project Environmental Permits - All project environmental permits and associated applications and certifications, including, CDPS-SCP, Senate Bill 40, USACE 404, temporary stream crossings, dewatering, biological opinions and all other permits applicable to the project, including any separate CDPS-SCP obtained by the Contractor for staging area on private property, asphalt or concrete plant, etc.
- (17) Photographs Documenting Existing Vegetation – Project photographs shall be time stamped on paper with a maximum of four colored images per 8 ½ inch by 11 inch sheet and/or a digital copy of all photographs on CD-ROM/Flash Drive in (JPG format), documenting existing vegetation prior to construction commencing. On the bottom of each photograph shall be a description using Station Number or Mile Post of where the photograph was taken.
- (18) Permanent Water Quality Plan Sheets - Plan sheets and specifications for permanent water quality structures, riprap.

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The Engineer will incorporate the documents and reports available at the time of award. The Contractor shall provide and insert all other documents and reports as they become available during construction.

The SWMP Administrator shall finalize the SWMP for CDOT Maintenance use upon completion of the project. SWMP completeness shall be approved by the Engineer, corrections to the SWMP shall be at the Contractor's expense. The following Reference materials shall be used:

- (1) CDOT Erosion Control and Stormwater Quality Guide.
- (2) CDOT Erosion Control and Stormwater Quality Field Guide.

(e) *Weekly Meetings.* The Engineer, Superintendent and the SWMP Administrator shall conduct a weekly meeting with supervisors involved in construction activities that could adversely affect water quality. The meeting shall follow an agenda prepared by the Engineer or a designated representative, and have a sign in sheet on which the names of all attendees shall be recorded. The SWMP Administrator shall take notes of water quality comments and action items at each weekly meeting, and place the agenda and sign in sheet in the SWMP notebook. At this meeting the following shall be discussed and documented on Form 1176:

- (1) Requirements of the SWMP.
- (2) Problems that may have arisen in implementing the site specific SWMP or maintaining BMPs.
- (3) Unresolved issues from inspections and concerns from last inspection
- (4) BMPS that are to be installed, removed, modified, or maintained.
- (5) Planned activities that will effect stormwater in order to proactively phase BMPs.
- (6) Recalcitrant inspection findings

All subcontractors who were not in attendance at the Environment Pre-construction conference shall be briefed on the project by the Engineer, Superintendent, and the SWMP Administrator prior to start of work. The SWMP Administrator shall record the names of these subcontractors as an addendum to the list of attendees, and added the SWMP Notebook.

208.04 Best Management Practices (BMPs) for Stormwater.

The SWMP Administrator shall modify the SWMP to clearly describe and locate all BMPs implemented at the site to control potential sediment discharges.

Vehicle tracking control shall be used at all vehicle and equipment exit points from the site to prevent sediment exiting the Limits of Construction (LOC) of the project site. Access shall be provided only at locations approved by the Engineer. The SWMP Administrator shall record vehicle tracking control pad locations on the SWMP site map.

New inlets and culverts shall be protected during their construction. Appropriate protection of each culvert and inlet shall be installed immediately. When riprap is called for at the outlet of a culvert, it shall be installed within 24 hours of completion of each pipe. The Contractor shall remove sediment, millings, debris, and other pollutants from within the newly constructed drainage system in accordance with the CDPS-SCP, prior to use, at the Contractor's expense. All removed sediment shall be disposed of outside the project limits in accordance with all applicable regulations.

Concrete products wasted on the ground during construction shall include, but shall not be limited to: excess concrete removed from forms, spills, slop, and all other unused concrete are potential pollutants that shall be contained or protected by an approved BMP at a pre-approved containment area. The concrete shall be picked up and recycled in accordance with 6 CCR 1007-2 (CDPHE Regulations Pertaining to Solid Waste Sites and Facilities) at regular intervals, as directed. The uses of recycled concrete from approved recycling facilities shall be in accordance with Section 203.

- (a) *Unforeseen Conditions.* The Contractor shall design and implement erosion and sediment BMPs for correcting conditions unforeseen during the design of the project, or for emergency situations, that develop during construction. The Department's "Erosion Control and Stormwater Quality Guide" shall be used as a reference document for the purpose of designing erosion and sediment BMPs. Measures and methods proposed by the Contractor shall be reviewed and approved in writing by the Engineer prior to installation.
- (b) *Other Agencies.* If CDPHE, US Army Corps of Engineers (USACE), or the Environmental Protection Agency (EPA)

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reviews the project site and requires additional measures to prevent and control erosion, sediment, or pollutants, the Contractor shall cease and desist activities resulting in pollutant discharge and immediately implement these measures. If the work may negatively affect another MS4, the Contractor shall cease and desist activities resulting in the discharge and shall implement appropriate measures to protect the neighboring MS4, including installing additional measures. . Implementation of these additional measures will be paid for at contract unit price.

- (c) *Work Outside the Right of Way.* Disturbed areas, including staging areas, which are outside CDOT ROW and outside easements acquired by CDOT for construction, are the responsibility of the Contractor. These areas may be subject to a separate CDPS-SCP or other permits. The Contractor shall acquire these permits and submit copies to the Engineer prior to any disturbance. These permits, shall be acquired and all erosion and sediment control work performed at the Contractor's expense. These areas are subject to inspections by CDOT or any other agency, as agreed upon in writing.
- (d) *Construction Implementation.* The Contractor shall incorporate BMPs into the project as outlined in the accepted schedule.
- (e) *Stabilization.* Once earthwork has started, the Contractor shall continue erosion BMPs until permanent stabilization of the area has been completed and accepted. Clearing, grubbing and slope stabilization measures shall be performed regularly to ensure final stabilization. Failure to properly maintain erosion control and stabilization methods, either through improper phasing or sequencing will require the Contractor to repair or replace sections of earthwork at his expense. The Contractor shall schedule and implement the following stabilization measures during the course of the project:
- (1) *Temporary Stabilization.* At the end of each day, the Contractor shall stabilize disturbed areas by surface roughening, vertical tracking, or a combination thereof. Disturbed areas are locations where actions have been taken to alter the existing vegetation and/or underlying soil of a site, such as clearing, grading, road bed preparation, soil compaction, and movement and stockpiling of top soils. Other stabilization measures may be implemented, as approved. The maximum area of temporary stabilization shall not exceed 20 acres.
 - (2) *Interim Stabilization.* Stockpiles and disturbed areas as soon as known with reasonable certainty that work will be temporarily halted for 14 days or more shall be stabilized using one or more of the specified following methods:
 - (i) Application of 1.5 tons of mechanically crimped certified weed free hay or straw in combination with an approved organic mulch tackifier.
 - (ii) Placement of bonded fiber matrix in accordance with Section 213.
 - (iii) Placement of mulching (hydraulic) wood cellulose fiber mulch with tackifier, in accordance with Section 213.
 - (iv) Application of spray-on mulch blanket in accordance with Section 213. Magnesium Chloride, Potassium Chloride and Sodium Chloride, or other salt products, will not be permitted as a stabilization method. Protection of the interim stabilization method is required. Reapplication may be required as approved.
 - (3) *Summer and Winter Stabilization.* Summer and winter stabilization is defined as months when seeding will not be permitted. As soon as the Contractor knows shutdown is to occur, interim stabilization shall be applied to the disturbed area. Protection of the interim stabilization method is required. Reapplication of interim stabilization may be required as directed.
 - (4) *Permanent Stabilization.* Permanent stabilization is defined as the covering of disturbed areas with seeding, mulching with tackifier, soil retention coverings, and such non-erodible methods such riprap, road shouldering, etc., or a combination thereof as required by the Contract. Other permanent stabilization techniques may be proposed by the Contractor, in writing, and shall be used when approved in writing by the Engineer. Permanent stabilization shall begin within 48 hours after topsoil placement, soil conditioning, or combination thereof starts and shall be pursued to completion.

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(5) Final Stabilization. Final stabilization is defined as when all ground disturbing activities at the site have been completed, and uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, or equivalent permanent physical erosion reduction methods have been employed.

- (f) *Maintenance*. Erosion and sediment control practices and other protective measures identified in the SWMP as BMPs for stormwater pollution prevention shall be maintained in effective operating condition until the CDPS-SCP has been transferred to CDOT. BMPs shall be continuously maintained in accordance with good engineering, hydrologic and pollution control practices, including removal of collected sediment when silt depth is 50 percent or more of the height of the erosion control device. When possible, the Contractor shall use equipment with an operator rather than labor alone to remove the sediment.

Maintenance of erosion and sediment control devices shall include replacement of such devices upon the end of their useful service life as recommended by the Contractor and approved by the Engineer. Maintenance of rock check dams and vehicle tracking pads shall be limited to removal and disposal of sediment or addition of aggregate. Damages resulting from failure to maintain BMPs shall be paid at the contractors expense.

Complete site assessment shall be performed as part of comprehensive inspection and maintenance procedures, to assess the adequacy of BMPs at the site and the necessity of changes to those BMPs to ensure continued effective performance. Where site assessment results in the determination that new or replacement BMPs are necessary, the BMPs shall be installed to ensure continuous effectiveness. When identified, BMPs shall be maintained, added, modified or replaced as soon as possible, immediately in most cases.

Approved new or replaced BMPs will be measured and paid for in accordance with subsections 208.11 and 208.12. Devices damaged due to the Contractor's negligence shall be replaced at Contractor's expense.

From the time seeding and mulching work begins until the date the Contract work is accepted, the Contractor shall maintain all seeded areas. Damage to seeded areas or to mulch materials shall be immediately restored. Damage to seeded areas or to mulch materials due to Contractor negligence shall be immediately restored at the Contractor's expense. Restoration of other damaged areas will be measured and paid for under the appropriate bid item.

Temporary BMPs may be removed upon completion of the project, as determined by the Water Quality Partial Acceptance walk-through. If removed, the area in which these BMPs were constructed shall be returned to a condition similar to that which existed prior to its disturbance. Removed BMPs shall become the property of the Contractor.

If a project delay occurs, the Contractor shall be responsible to continue erosion and sediment control operations beyond the original contract time.

Sediment removed during maintenance of BMPs and material from street sweeping may be used in or on embankment, provided it meets conditions of Section 203 and is distributed evenly across the embankment.

Whenever sediment collects on the paved surface, the surface shall be cleaned. Street washing will not be allowed. Storm drain inlet protection shall be in place prior to shoveling, sweeping, or vacuuming. Sweeping shall be completed with a pickup broom or equipment capable of collecting sediment. Sweeping with a kick broom will not be allowed.

Material from pavement saw cutting operations shall be cleaned from the roadway surface during operations using a vacuum. A BMP, such as a berm, shall be placed to contain slurry from joint flushing operations until the residue can be removed from the soil surface. Aggregate bags, erosion logs or other permeable BMPs shall not be used. Residue shall not flow into driving lanes. It shall be removed and disposed of in accordance with subsection 107.25(b) 13. Material containment and removal will not be paid for separately, but shall be included in the work.

208.05 Construction of BMPs. BMPs shall be constructed in accordance with Standard Plans M-208-1, M-216-1 and with the following.

- (a) *Seeding, Mulching, Sodding, Soil Retention Blanket*. Seeding, mulching, sodding, and soil retention blanket shall be performed in accordance with Sections 212, 213, and 216.
- (b) *Erosion Bales*. The bales shall be anchored securely to the ground with wood stakes.

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- (c) *Silt Fence*. Silt fence shall be installed in locations specified in the Contract prior to any grubbing or grading activity.
- (d) *Temporary Berms*. Berms shall be constructed to the dimensions shown in the Contract, and sufficiently compacted to prevent erosion or failure. If the berm erodes or fails, it shall be immediately repaired or replaced at the Contractor's expense.
- (e) *Temporary Diversion*. Diversions shall be constructed to the dimensions shown in the Contract, and graded to drain to a designated outlet. The berm shall be sufficiently compacted to prevent erosion or failure. If the diversion erodes or fails, it shall be immediately repaired or replaced at the Contractor's expense.
- (f) *Temporary Slope Drains*. Temporary slope drains shall be installed prior to installation of permanent facilities or growth of adequate ground cover on the slopes. All temporary slope drains shall be securely anchored to the slope. The inlets and outlets of temporary slope drains shall be protected to prevent erosion.
- (g) *Silt Berm*. Prior to installation of silt berms, the Contractor shall prepare the surface of the areas in which the berms are to be installed such that they are free of materials greater than 2 inches in diameter and are suitably smooth for the installation of the silt berms, as approved. Silt berms shall be secured with spikes. The Contractor shall install the silt berm in a manner that will prevent water from going around or under the silt berm. Silt berms shall be installed on top of soil retention blanket.
- (h) *Rock Check Dam*. Rock shall be installed at locations shown on the plans. Rock check dams shall conform to the dimensions shown on the plans.
- (i) *Riprap Outlet Protection*. Geotextile used shall be protected from cutting or tearing. Overlaps between two pieces of geotextile shall be 1 foot minimum. Riprap size shall be as shown on the plans.
- (j) *Storm Drain Inlet Protection*. Prior to installation, the Contractor shall sweep the surface of the area in which the storm drain inlet protection devices are to be installed such that the pavement is free of sediment and debris. The ends of the inlet protection Type 1 and Type 2 shall extend a minimum of 1 foot past each end of the inlet.

The Contractor shall remove all accumulated sediment and debris from the surface surrounding all storm drain inlet protection devices after each rain event or as directed. The Contractor shall remove accumulated sediment from Type II and III containment area when it is more than a maximum one third full of sediment, or as directed.

The Contractor shall protect storm drain facilities adjacent to locations where pavement cutting operations involving wheel cutting, saw cutting, sand blasting, or abrasive water jet blasting are to take place.

- (k) *Sediment Trap*. Sediment traps shall be installed to collect sediment laden water and to minimize the potential of pollutants leaving the project site. Locations shall be as shown on the plans or as directed.

Sediment traps shall be constructed prior to disturbance of upslope areas and shall be placed in locations where runoff from disturbed area can be diverted into the trap.

The area under the embankment shall be cleared, grubbed and stripped of any vegetation and roots.

Fill material for the embankment shall be free of roots or other vegetation, organic material, large stones, and other objectionable material.

Sediment shall be removed from the trap when it has accumulated to one half of the wet storage depth of the trap and shall be disposed of in accordance with subsection 208.04(f).

- (l) *Erosion Logs*. Erosion logs shall be embedded 2 inches into the soil. Stakes shall be embedded to a minimum depth of 12 inches. At the discretion of the Engineer, a shallower depth may be permitted if rock is encountered.

The Contractor shall maintain the erosion logs during construction to prevent sediment from passing over or under the logs.

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- (m) *Silt Dikes*. Prior to installation of silt dikes, the Contractor shall prepare the surface of the areas in which the silt dikes are to be installed such that they are free of materials greater than two inches in diameter and are suitably smooth for the installation of the silt dikes, as approved by the Engineer.
- (n) *Concrete Washout Structure*. The concrete washout structure shall meet or exceed the dimensions shown on the plans or be used in accordance with manufacturer's recommendations. Work on this structure shall not begin until written acceptance is provided by the Engineer.

Concrete washout structure shall conform to standard plan M-208-1 and shall meet the following requirements:

- (1) Structure shall contain all washout water.
- (2) Stormwater shall not carry wastes from washout and disposal locations.
- (3) The site shall be located a minimum of 50 horizontal feet from State waters and shall meet all requirements for containment and disposal as defined in subsection 107.25.
- (4) The site shall be signed as "Concrete Washout".
- (5) The site shall be accessible to appropriate vehicles.
- (6) Freeboard capacity shall be included into structure design to reasonably ensure the structure will not overtop during or because of a precipitation events.
- (7) The Contractor shall prevent tracking of washout material out of the washout structure.
- (8) Solvents, flocculents, and acid shall not be added to wash water.
- (9) The structure shall be surrounded on three sides by a compacted berm.
- (10) The structure shall be fenced with orange plastic construction fencing to provide a barrier to construction equipment and to aid in identification of the concrete washout area.
- (11) Concrete waste, liquid and solid, shall not exceed 2/3 the storage capacity of the washout structure.

Pre-fabricated concrete washout structures shall meet the following requirements:

- (1) Structure shall contain all washout water.
- (2) Structure shall be located 50 horizontal feet away from State waters, and shall be confined so that no potential pollutants will enter State waters and other sensitive areas as defined in the Contract. Locations shall be as approved by the Engineer. The site shall signed as "Concrete Washout".
- (3) The site shall be accessible to appropriate vehicles.
- (4) Freeboard capacity shall be included into structure design to reasonably ensure the structure will not overtop during or because of a precipitation event.
- (5) Solvents, flocculants, and acid shall not be added to wash water.

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- (6) Concrete waste, liquid and solid, shall not exceed 2/3 the storage capacity of the washout structure.
- (7) Prefabricated structures cannot be moved when they contain liquid, unless otherwise approved.
- (8) The concrete washout structure shall be completed and ready for use prior to concrete placement operations.
- (9) Washout areas shall be checked and maintained as required. On site permanent disposal of concrete washout waste is not allowed.

All liquid and solid wastes, including contaminated sediment and soils generated from concrete washout shall be hauled away from the site and disposed of properly at the Contractor's expense.

- (o) *Vehicle Tracking Pad (VTP)*. Vehicle tracking pads shall be constructed to the minimum dimensions shown in the Contract, unless otherwise directed by the Engineer. Construction of approved vehicle tracking pads shall be completed before any disturbance of the area.

The Contractor shall maintain each vehicle tracking pad during the entire time that it is in use for the project. The vehicle tracking pad shall be removed at the completion of the project unless otherwise directed by the Engineer. Additional aggregate may be required for maintenance and will be paid for under Pay Item, Maintenance Aggregate (Vehicle Tracking Pad).

- (p) *Detention Pond*. Permanent detention ponds shown on the construction plans may be used as temporary BMPs if all the following conditions are met:

- (1) The pond is designated as a construction BMP in the SWMP.
- (2) The pond outfall and outlet are designed and implemented for use as a BMP during construction in accordance with good engineering, hydrologic, and pollution control practices. The stormwater discharges from the outfall shall not cause degradation or pollution of State waters, and shall have BMPs, as appropriate.

- (3) All silt shall be removed and the pond returned to the design grade and contour prior to project acceptance

- (q) *Aggregate Bag*. Aggregate bags shall be placed on a stable surface, consisting of pavement, grass or gravel. Aggregate bags shall be placed to conform to the surface without gaps. Discharge water shall not cause erosion.
- (r) *Surface Roughening*. Surface roughening creates horizontal grooves along the contour of the slope. Roughening may be accomplished by furrowing, scarifying, ripping or disking the soil surface to create a 2 to 4 inch minimum variation in soil surface. Surface roughening will not be paid for separately, but shall be included in the work.
- (s) *Vertical Tracking*. Vertical tracking involves driving a tracked vehicle up and down the soil surface and creating horizontal grooves and ridges along the contour of the slope. Sandy soils or soils that are primarily rock need not be tracked. Vertical tracking will not be paid for separately, but shall be included in the work.

208.06 Materials Handling and Spill Prevention. The SWMP Administrator shall clearly describe and record on the SWMP, all practices implemented at the site to minimize impacts from procedures or significant material that could contribute pollutants to runoff. Areas or procedures where potential spills can occur shall have a Spill Response Plan in place as specified in subsections 107.25(b) 6 or 208.06(c). Construction equipment, fuels, lubricants, and other petroleum distillates shall not be stored or stockpiled within 50 horizontal feet of any State waters or more if the Contractor determines necessary. Equipment fueling and servicing shall occur only within approved designated areas.

- (a) *Bulk Storage Structures*. Bulk storage structures for petroleum products and other chemicals shall have impervious secondary containment or equivalent adequate protection so as to contain all spills and prevent any spilled material from entering State waters. Secondary containment shall be capable of containing the combined volume of all the storage containers plus at least 10 percent freeboard. For secondary containment that is used and may result in accumulation of stormwater within the containment, a plan shall be implemented to properly manage and dispose of all accumulated stormwater which is deemed to be contaminated (e.g., has an unusual odor or sheen).

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- (b) *Lubricant Leaks.* The Contractor shall inspect equipment, vehicles, and repair areas daily to ensure petroleum, oils, and lubricants (POL) are not leaking onto the soil or pavement. Absorbent material or containers approved by the Engineer shall be used to prevent leaking POL from reaching the soil or pavement. The Contractor shall have onsite approved absorbent material or containers of sufficient capacity to contain any POL leak that can reasonably be foreseen. The Contractor shall inform all Spill Response Coordinators in accordance with the Spill Response Plan if unforeseen leakage is encountered. All materials resulting from POL leakage control and cleanup shall become the property of the Contractor and shall be removed from the site. Control, cleanup, and removal of by-products resulting from POL leaks shall be performed at the Contractor's expense.
- (c) *Spill Response Plan.* A spill Response Plan shall be developed and implemented to establish operating procedures for handling potential pollutants and preventing spills.

The Response Plan shall contain the following information:

- (1) Identification and contact information of each Spill Response Coordinator
- (2) Locations of areas on project site where equipment fueling and servicing operations are permitted.
- (3) Location of cleanup kits.
- (4) Quantities of chemicals and locations stored on site.
- (5) Label system for chemicals and Safety Data Sheets (SDS) for products.
- (6) Clean up procedures to be implemented in the event of a spill that does not enter State waters or ground water.
- (7) Procedures for spills of any size that enter surface waters or ground water, or have the potential to do so. CDOT's Erosion Control and Stormwater Quality Guide contains Spill notification contacts and phone numbers required in the Spill Response Plan.
- (8) A summary of the employee training provided.

Information in items (1) through (8) shall be updated in the SWMP Notebook when they change.

208.07 Stockpile Management. Material stockpiles shall be located 50 horizontal feet away from State waters, and shall be confined so that no potential pollutants will enter State waters and other sensitive areas as defined in the Contract. Locations shall be approved by the Engineer.

Erodible stockpiles (including topsoil) shall be contained with acceptable BMPs at the toe (or within 20 feet of the toe) throughout construction. BMPs shall be approved by the Engineer. The SWMP Administrator shall describe, detail, and record the sediment control devices on the SWMP.

208.08 Limits of Disturbance. The Contractor shall limit construction activities to those areas within the limits of disturbance shown on the plans and cross-sections. Construction activities, in addition to the Contract work, shall include the on-site parking of vehicles or equipment, on-site staging, on-site batch plants, haul roads or work access, and all other action which would disturb existing soil conditions. Staging areas within the LDA shall be as approved by the Engineer. Construction activities beyond the limits of disturbance due to Contractor negligence shall be restored to the original condition by the Contractor at the Contractor's expense. The SWMP Administrator shall tabulate additional disturbances not identified in the CDPS_SCP application and indicate changes to locations and quantities on the SWMP. The Contractor shall report the changes and additional disturbances to the Engineer, Water Quality Control Division of CDPHE and all other involved agencies.

The Contractor shall pursue and stabilize all disturbances to completion.

208.09 Failure to Perform Erosion Control. Failure to implement the Stormwater Management Plan is a violation of the CDPS – SCP and CDOT specifications. CDOT is obligated to implement enforcement mechanisms in accordance with CDOT's MS4 Permit COS000005 for Stormwater Management and erosion control Best Management Practices. Penalties may be assessed to the Contractor by the appropriate agencies. Penalties will be assessed by the Department

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as liquidated damages for failure to meet the Permit. All fines assessed to the Department for the Contractor's failure to implement the SWMP will be deducted from monies due the Contractor in accordance with subsection 107.25(c) 2.

The Contractor will be subject to liquidated damages for incidents of failure to perform erosion control as required by the Contract. Liquidated damages will be applied for failure to comply with the CDPS-SCP and these specifications, including the following:

- (1) Failure to include erosion control in the project schedule or failure to include erosion control in each schedule update as specified in subsection 208.03(b).
- (2) Failure of the Contractor to perform the inspections required by subsection 208.03(c) 2.
- (3) Failure of the Contractor to implement necessary actions required by the Engineer as required by subsection 208.03(c).
- (4) Failure to amend the SWMP and implement BMPs as required by subsection 208.04.
- (5) Failure to keep documentation and records current.
- (6) Failure to construct or implement erosion control or spill containment measures required by the Contract, or failure to construct or implement them in accordance with the Contractor's approved schedule as required by subsection 208.06(c).
- (7) Failure to limit temporary stabilization to 20 or fewer acres as required by subsection 208.04 (e).
- (8) Failure to replace or perform maintenance on an erosion control feature after notice from the Engineer or from a water quality inspection as required by subsection 208.04(f).
- (9) Failure to remove and dispose of sediment from BMPs as required.
- (10) Failure to install and properly utilize a concrete washout structure for containing washout from concrete placement operations.
- (11) Failure to perform stabilization as required by subsection 208.04 (e).
- (12) Failure of the Superintendent or designated representative to attend inspections as required by subsection 208.03(c) and record findings in the appropriate form.
- (13) Failure to prevent discharges not composed entirely of stormwater from leaving the Construction Site.
- (14) Failure to provide the survey of Permanent Water Quality BMPs when required on the project in accordance with 208.10.

The Engineer will immediately notify the Contractor of each incident of failure to perform erosion control in accordance with the CDPS-SCP and these specifications, including items (1) through (14) above by issuing the Form 105. Correction shall be made as soon as possible but no later than 48 hours from the date of notification to correct the failure. The Contractor will be charged liquidated damages in the amount of \$970 for each day after the 48 hour period has expired, that one or more of the incidents of failure to perform the requirements for each Form 105 remains uncorrected. Liquidated damages will begin at Midnight of the date the 48 hours has expired.

This deduction will not be considered a penalty, but will be considered liquidated damages based on estimated additional construction engineering costs. The liquidated damages will accumulate, for each cumulative day that one or more of the incidents remain uncorrected. The number of days for which liquidated damages are assessed will be cumulative for the duration of the project; that is: the damages for a particular day will be added to the total number of days for which

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liquidated damages are accumulated on the project. The liquidated damages will be deducted from any monies due the Contractor.

If all other failures are not corrected within 48 hours after liquidated damages have begun to be assessed, the Engineer will issue a Stop Work Order in accordance with subsection 105.01. Work shall not resume until the Engineer has approved a written corrective action plan submitted by the Contractor that includes measures to prevent future violations and a schedule for implementation.

If the Contractor requires more than 96 hours to perform the corrective work from the date on the Form 105, the Contractor shall submit a request for deferment. The deferment request shall be in writing and shall include the specific failure, temporary measures until final correction is made, the methodology which will be employed to make the correction and interim milestones to completing the work. The Region Water Pollution Control Manager (RWPCM), Engineer, the SWMP Administrator and the Contractor shall concur on this deferral and set a proposed date of completion. If approved, the Contractor shall complete the corrective measures by Midnight of the proposed completion date. If corrective work is not corrected by the completion date the Engineer will issue a Stop Work Order. Liquidated Damages will apply retroactively back to the 48 hours after the 105 date of notification. Liquidated Damages will be assessed until the corrective work has been completed and accepted.

Deferment of work to correct failures to perform erosion control will not affect the Contractor's other contractual responsibilities, notifications for other non-compliance, nor the final completion date of the project. Liquidated Damages for other non-compliance notifications will continue to apply during the deferment period in addition to liquidated damages associated with the deferment.

Based on the submittal date of the approved deferment Liquidated Damages and a Stop Work Order may not be mandated to the Contractor.

Disagreements regarding the suggested corrective action for a BMP compliance issue between the Project Engineer, SWMP Administrator, and Superintendent, shall be discussed with the Resident Engineer and Region Water Pollution Control Manager. If after the discussions, the Project Engineer and the Contractor are still in disagreement and feel that additional compensation is owed, the Contractor will follow the decision of the Project Engineer, keep track of the costs and negotiate further with the Project Engineer. If after pursuing the issue, the Contractor is unable to reach agreement with the Project Engineer, then the Contractor can follow the dispute process outlined in subsection 105.22.

If the Contractor's corrective action plan and schedule are not submitted and approved within 96 hours of the initial notice, the Engineer will issue a Stop Work Order and have an on-site meeting with the Superintendent, SWMP Administrator, and the Superintendent's supervisor. This meeting will also be attended by the Resident Engineer, the Region Water Pollution Control Manager, and the Region Program Engineer. This meeting will identify and document needed corrective actions and a schedule for completion. If after the meeting, the unacceptable work is not remedied within the schedule as agreed to in the meeting, the Engineer will take action to effect compliance with the CDPS-SCP and these specifications by utilizing CDOT Maintenance personnel or other non-Contractor forces and deduct the cost from any monies due or to become due to the Contractor pursuant to subsection 105.17. Delays due to these Stop Work Orders shall be considered non-excusable. The Stop Work Order shall be in place until the project is in CDPS-SCP compliance.

If the Contractor remains non-responsive to requirements of the on-site meeting, the Engineer will start default or Contract termination procedures in accordance with subsections 108.09 and 108.10. CDOT will proceed with corrective or disciplinary action in accordance with the Rules for Prequalification, Debarment, Bidding and Work on Transportation, Road, Highway and Bridge Public Projects.

When a failure meets any one of the following conditions, the Engineer will immediately issue a Stop Work Order in accordance with subsection 105.01 irrespective of any other available remedy:

- (1) It may endanger health or the environment.
- (2) It consists of a spill or discharge of hazardous substances or oil which may cause pollution of the waters of the state.
- (3) It consists of a discharge which may cause a violation of a water quality standards.

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208.10 Items to Be Completed Prior to Requesting Partial Acceptance of Water Quality Work.

- (a) *Reclamation of Washout Areas.* After concrete operations are complete, washout areas shall be reclaimed in accordance with subsection 208.05(n) at the Contractor's expense.
- (b) *Survey.* When Permanent Water Quality BMPs (Permanent BMP) are required on the project, the Contractor shall survey the BMPs to confirm that they conform to the configuration and grade shown on the Plans. The survey shall conform to Section 625. The results of the survey shall be submitted as Microstation or AutoCad drawing files and PDF files, showing both designed and final elevations and configurations. Paper versions of the drawings shall be submitted with the stamp and seal of the Contractor's Surveyor.

The Engineer and the CDOT Hydraulics Engineer for the region will perform a walkthrough of the Permanent BMPs to confirm conformance to material requirements, locations and dimensions of the Permanent BMPs. Permanent BMPs not meeting the Contract requirements will be identified in writing by the Engineer, and shall be repaired or replaced at the Contractor's expense. Correction surveys shall be performed at the Contractor's expense to confirm the locations and dimensions of each Permanent BMP. Final as-built plans of the Permanent BMPs shall be provided to the Engineer and the CDOT Region and Headquarter Permanent Water Quality Control Specialist for their records.

- (c) *Locations of Temporary BMPs.* The Engineer will identify locations where modification, cleaning or removal of temporary BMPs are required, and will provide these in writing to the Contractor. Upon completion of work required, the SWMP Administrator shall modify the SWMP to provide an accurate depiction of BMPS to remain on the project site.

METHOD OF MEASUREMENT

208.11 Erosion Control Management will be measured as the actual number of days of ECM work performed, regardless of the number of personnel required for SWMP Administration and Erosion Control Inspection, including erosion control inspections, documentation, meeting participation, SWMP Administration, and the preparation of the SWMP notebook. If the combined hours of SWMP Administration and Erosion Control Inspection is four hours or less in a day, the work will be measured as ½ day. If the combined hours of SWMP Administration and Erosion Control Inspection is more than four hours in a day, the work will be measured as one day. Total combined hours of ECM work exceeding eight hours in a day will still be paid as one day.

Erosion bales will be measured by the actual number installed and accepted.

Silt fence, silt berms, erosion logs, aggregate bags, silt dikes, temporary berms, rock check dams, temporary diversions, and temporary slope drains, will be measured by the actual number of linear feet that are installed and accepted. Measured length will not include required overlap.

Concrete washout structure will be measured by the actual number of structures that are installed and accepted.

Storm drain inlet protection will be measured by linear foot or actual number of devices that are installed and accepted.

Sediment trap quantities will be measured by the actual number installed and accepted.

Removal of trash that is not generated by construction activities will be measured by the actual number of hours that Contractor workers actively remove trash from the project. Each week the Contractor shall submit to the Engineer a list of workers and the hours spent collecting such trash.

Removal of accumulated sediment from traps, basins, areas adjacent to silt fences and erosion bales, and other clean out excavation of accumulated sediment, and the disposal of such sediment, will be measured by the number of hours that equipment, labor, or both are used for sediment removal.

Vehicle tracking pads will be measured by the actual number constructed and accepted.

Additional aggregate required for maintaining vehicle tracking pads will be measured as the actual number of cubic yards installed and accepted.

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BASIS OF PAYMENT

208.12 ECM and BMPs will be paid for at the Contract unit price for each of the items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	Pay Unit
Aggregate Bag	Linear Foot
Concrete Washout Structure	Each
Erosion Bales (Weed Free)	Each
Erosion Control Management	Day
Erosion Log (Type 1) (____ Inch)	Linear Foot
Erosion Log (Type 2) (____ Inch)	Linear Foot
Pre-Fabricated Concrete Washout Structure	Each
Pre-Fabricated Vehicle Tracking Pad	Each
Maintenance Aggregate (Vehicle Tracking Pad)	Cubic Yard
Removal and Disposal of Sediment (Equipment)	Hour
Removal and Disposal of Sediment (Labor)	Hour
Removal of Trash	Hour
Rock Check Dam	Each
Sediment Basin	Each
Sediment Trap	Each
Silt Berm	Linear Foot
Silt Dike	Linear Foot
Silt Fence	Linear Foot
Silt Fence (Reinforced)	Linear Foot
Storm Drain Inlet Protection (Type__)	Linear Foot
Storm Drain Inlet Protection (Type__)	Each
Sweeping (Sediment Removal)	Hour
Temporary Berm	Linear Foot
Temporary Diversion	Linear Foot
Temporary Slope Drains	Linear Foot
Vehicle Tracking Pad	Each

Payment for Erosion Control Management (ECM) will be full compensation for all labor, materials and equipment necessary for the SWMP Administrator and Erosion Control Inspectors to perform all the work described in this specification. This includes assembling items 5-19 and required updates to the SWMP Notebook on site.

The SWMP Administrator and ECI's commute times will not be measured and paid for separately, but shall be included in the work.

Modifications to the SWMP Notebook due to construction errors or survey errors by the contractor shall be at the Contractor's expense.

Temporary erosion control will be measured and paid for by the BMPs used. Surface roughening and vertical tracking will not be measured and paid for separately but shall be included in the work. Payment for each BMP item will be full compensation for all work and materials required to furnish, install, maintain and remove the BMP when directed.

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REVISION OF SECTION 208
EROSION CONTROL

Payment for Removal and Disposal of Sediment (Equipment) will be full compensation for use of the equipment, including the operator. Payment for Removal and Disposal of Sediment (Labor) will be full compensation for use of the labor.

Payment for concrete washout structure, whether constructed or prefabricated, will be full compensation for all work and materials required to install, maintain, and remove the item. Maintenance and relocation, as required, of these structures throughout the duration of the project will not be measured and paid for separately, but shall be included in the work.

Silt berm spikes will not be measured and paid for separately, but shall be included in the work. When required, soil retention blankets will be measured and paid for in accordance with Section 216. Silt dike staples will not be measured and paid for separately, but shall be included in the work.

Spray-on mulch blankets required by the Contract, including those used in both interim and final stabilization, will be measured and paid for in accordance with Section 213.

Payment for storm drain inlet protection will be full compensation for all work, materials, and equipment required to complete the item, including surface preparation, maintenance throughout the project, and removal upon completion of the work. Aggregate will not be measured and paid for separately, but shall be included in the work.

Sweeping, when used as a BMP as shown in the Contract, will be measured by the number of hours that a pickup broom or equipment capable of collecting sediment, authorized by the Engineer, is used to remove sediment from the roadway or other paved surfaces. Each week the Contractor shall submit to the Engineer a statement detailing the type of sweeping equipment used and the number of hours it was used to pick up sediment. Operator will not be measured and paid for separately, but shall be included in the work.

Stakes, anchors, connections, geotextile, riprap and tie downs used for temporary slope drains will not be measured and paid for separately, but shall be included in the work.

Payment for vehicle tracking pad will be full compensation for all work, materials and equipment required to construct, maintain, and remove the entrance upon completion of the work. Aggregate and geotextile will not be measured and paid for separately, but shall be included in the work. If additional aggregate for maintenance of vehicle tracking pads is required, it will be measured by the cubic yard in accordance with Section 304 and will be paid for under this Section.

Seeding, sod, mulching, soil retention blanket, and riprap will be measured and paid for in accordance with Sections 212, 213, 216, and 506.

Geotextile (Erosion Control) (Class 2) will be measured and paid for in accordance with Section 420.

All work and materials required to perform the permanent BMP survey and furnish the electronic files shall be included in the original unit price bid for surveying. Surveying will be measured and paid for in accordance with Section 625.

Payment will be made for BMPs replaced as approved by the Engineer. Temporary erosion and sediment BMPs required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer or for the Contractor's convenience, shall be performed at the Contractor's expense. If the Contractor fails to complete construction within the contract time, payment will not be made for Section 208 pay items for the period of time after expiration of the contract time. These items shall be provided at the Contractor's expense.

April 26, 2012

REVISION OF SECTION 212
SEED

Section 212 of the Standard Specifications is hereby revised for this project as follows:

In subsection 212.02 (a), delete the first paragraph and replace with the following:

- (a) *Seed.* All seed shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the seed name, the lot number, net weight, origin, the percent of weed seed content, the guaranteed percentage of purity and germination, pounds of pure live seed (PLS) of each seed species, and the total pounds of PLS in the container. All seeds shall be free from noxious weed seeds in accordance with current state and local lists and as indicated in Section 213. The Contractor shall furnish to the Engineer a signed statement certifying that the seed is from a lot that has been tested by a recognized laboratory for seed testing within thirteen months prior to the date of seeding. The Engineer may obtain seed samples from the seed equipment, furnished bags or containers to test seed for species identification, purity and germination. Seed tested and found to be less than 10 percent of the labeled certified PLS and different than the specified species will not be accepted. Seed which has become wet, moldy, or damaged in transit or in storage will not be accepted.

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 REVISION OF SECTION 213
 MULCHING

Section 213 of the Standard Specifications is hereby revised for this project as follows:

In subsection 213.01, delete the last paragraph and replace with the following:

This work includes furnishing and applying spray-on mulch blanket or bonded fiber matrix on top of rock cuts and slopes after seeding or as temporary stabilization as shown on the plans or as directed by the Engineer.

In subsection 213.02, delete the eighth paragraph and replace with the following:

The hydromulch material for hydraulic mulching shall consist of virgin wood fibers manufactured expressly from clean whole wood chips. The chips shall be processed in such a manner as to contain no growth or germination inhibiting factors. Fiber shall not be produced from recycled materials such as sawdust, paper, cardboard, or residue from pulp and paper plants. The wood cellulose fibers of the mulch must maintain uniform suspension in water under agitation. Upon application, the mulch material shall form a blotter like mat covering the ground. This mat shall have the characteristics of moisture absorption and percolation and shall cover and hold seed in contact with the soil. The Contractor shall obtain certifications from suppliers that laboratory and field testing of their product has been accomplished, and that it meets all of the foregoing requirements pertaining to wood cellulose fiber mulch.

In subsection 213.02, delete the eleventh paragraph and replace with the following:

Material for mulch tackifier shall consist of a free-flowing, noncorrosive powder produced either from the natural plant gum of Plantago Insularis (Desert Indianwheat) or pre-gelatinized 100 percent natural corn starch polymer. The powders shall possess the following properties:

Plantago Insularis (Desert Indianwheat):

Property	Requirement	Test Method
(1) pH 1% solution	6.5 - 8.0	
(2) Mucilage content	75% min.	ASTM D7047

Pre-gelatinized 100 percent natural corn starch polymer:

(1) Organic Nitrogen as protein	5.5-7%
(2) Ash content	0-2%
(3) Fiber	4-5%
(4) pH 1% solution	6.5 – 8.0
(5) Size	100% thru 850 microns (20 mesh)
(6) Settleable solids	<2%

All fibers shall be colored green or yellow with a biodegradable dye.

Delete the last paragraph in subsection 213.02 and replace with the following:

(a) *Spray-on Mulch Blanket.* Spray on mulch blanket shall be one of the following, unless otherwise shown on the plans:

- (1) Spray-on Mulch Blanket (Type 1) shall be a hydraulically applied matrix containing organic fibers, water soluble cross-linked tackifier, reinforcing natural and/or synthetic interlocking fibers. Mulch Blanket (Type 1) shall conform to the following:

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 REVISION OF SECTION 213
 MULCHING

Properties	Requirement	Test Method
Organic Fibers	71% Min.	ASTM D 2974
Cross linked Tackifiers	10% +/- 2% Min.	
Reinforcing Interlocking Fibers	10% +/- 1% Min.	
Biodegradability	100%	ASTM D 5338
Ground Cover @ Application Rate	90% Min.	ASTM D 6567
Functional Longevity	12 Months Min.	
Cure Time	< 8 hours	
Application		
Application Rate	3,000 lb./acre	

The organic fiber shall not contain lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach. The organic fibers and reinforcing interlocking fibers cannot be produced from sawdust, cardboard, paper, or paper by-products.

- (2) Spray-on Mulch Blanket (Type 2) shall be a hydraulically applied matrix pre-packaged in 50 pound bags containing both a soil and fiber stabilizing compound and thermally processed wood fiber.

The sterilized weed-free wood fiber mulch shall be manufactured through a thermo-mechanical defibrating process containing a specific range of fiber lengths averaging 0.25 inches or longer.

Mulch Blanket (Type 2) shall meet the following requirements:

Property	Requirement	Test Method
Fiber Retention On 28-Mesh Screen	≥ 40%	Tyler Ro-Tap Method
Moisture Content	12% ± 2%	Total Air Dry Weight Basis
Organic Matter	99.2% ± 0.2%	Oven Dry Weight Basis
Ash Content	0.8% ± 0.2%	Oven Dry Weight Basis
pH At 3% Consistency In Water	4.5-7.0 ± 0.5%	
Sterilized Weed-Free	Yes	
Non-Toxic To Plant Or Animal Life	Yes	

The soil and fiber stabilizing compound shall be composed of linear anionic copolymers of acrylamide pre-packed within the bag having a minimum content of 1.0 percent. The compound shall conform to the following:

Property	Requirement
Molecular Weight	≥ 12x10 ⁶
Charge Density	> 25%
Non-Toxic To Plant Or Animal Life	Yes

- (b) *Bonded Fiber Matrices (BFM)*. BFM shall consist of hydraulically-applied matrix with a minimum of 70 percent non-toxic thermally processed or refined long strand organic fibers and water soluble tackifier to provide erosion control and designed to be functional for a minimum of 9 months. BFMs form an erosion-resistant

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 REVISION OF SECTION 213
 MULCHING

blanket that promotes vegetation and prevents soil erosion. The BFM shall be 100 percent biodegradable. The binder in the BFM should also be biodegradable. Biodegradable BFMs should not be applied immediately before, during, or immediately after rainfall if the soil is saturated. BFM shall conform to the following requirements:

Property	Requirement	Test Method
Ground Cover (%)	95	ASTM 6567
Bio-degradability (%)	100	ASTM 5338
Functional Longevity (months)	9 month minimum	
Cure Time (hours)	24-48	
Cross-linked tackifier	10% minimum	

Application	
Application Rate (lbs./Acre)	3000

The fibers shall not contain lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach. Fiber shall not be produced from sawdust, cardboard, paper, or paper by-products.

In subsection 213.03 (b) 2, delete the second paragraph and replace with the following:

Application Rate: Apply this as an overspray at the following rate or as approved by the Engineer.

Powder	Fiber	Water
200 lbs./Acre	300 lbs./Acre	2000 gal./Acre

In subsection 213.03, delete (f) and replace with the following:

- (f) *Spray-on Mulch Blanket*. Spray-on Mulch Blanket shall strictly comply with the Manufacturer's mixing recommendations and installation instructions. No chemical additives with the exception of fertilizer, soil pH modifiers, extended-term dyes and bio nutrients will be permitted. Apply Spray-on mulch blanket in a uniform application using a minimum 22 degree arc type nozzle. Apply hydro slurry in two direction (from top of slope down and from toe of the slope up, as well as, be applied at a minimum of two layers).

Hydromulching vessel shall be filled with water to at least 1/3 capacity (high enough to cover agitators) prior to adding any material. Continue to fill vessel with water and slowly add the fibers while agitators are in motion. Run agitators at ¾ speed. Continue to mix tank a minimum of 10 minutes prior to application.

Co-polymer shall not be used use in channels, swales, or other areas where concentrated flows are anticipated and should not be used on saturated soils that have groundwater seeps.

Subsection 213.03 shall include the following:

- (g) *Bonded Fiber Matrices (BFM)*. Bonded fiber matrices shall strictly comply with the Manufacturer's mixing recommendations and installation instructions. No chemical additives with the exception of fertilizer, soil pH modifiers, extended-term dyes and bio stimulant materials shall be permitted. BFM shall be applied in a uniform application using a minimum 22 degree arc type nozzle. Apply BFM in two direction (from top of slope down and from toe of the slope up, as well as, be applied at a minimum of two layers).

Biodegradable BFMs should not be applied immediately before, during, or immediately after rainfall if the soil is saturated.

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 REVISION OF SECTION 213
 MULCHING

Product shall not be used use in channels, swales, or other areas where concentrated flows are anticipated and should not be used on saturated soils that have groundwater seeps.

Foot traffic, mechanical traffic or grazing shall not be permitted on treated areas until vegetated. Treated areas damaged due to circumstances beyond Contractor’s control shall be repaired or re-applied as ordered. Payment for corrective work, when ordered, shall be at contract rates.

In subsection 213.04, delete the first paragraph and replace with the following:

The quantity of hay and straw mulch, wood chip mulch, wood fiber and, spray-on mulch tackifier, bonded fiber matrix and tackifier will not be measured but shall be the quantity designated in the Contract, except that measurements will be made for revisions requested by the Engineer, or for discrepancies of plus or minus five percent of the total quantity designated in the Contract. Measurement for acres will be by slope distances.

In subsection 213.04, delete the fourth paragraph and replace with the following:

Spray-on Mulch Blanket and Bonded Fiber Matrix will be measured by the acre or by the actual pounds of product applied, as shown on the plans. The area will be calculated on the basis of actual or computed slope measurements. The Contractor shall verify prior to application, weight of spray on mulch blanket and bonded fiber matrix bags for certification of materials and application rate.

Subsection 213.05 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Bonded Fiber Matrix	Acre
Bonded Fiber Matrix	Pound
Spray on Mulch Blanket	Pound

Payment for spray-on mulch blanket and bonded fiber matrix will be full compensation for all work and materials necessary to complete this item.

REVISION OF SECTION 216
 SOIL RETENTION COVERING

Section 216 of the Standard Specifications is hereby deleted for this project and replaced with the following:

DESCRIPTION

216.01 This work consists of furnishing, preparing, applying, placing, and securing soil retention blankets and turf reinforcement mats for erosion control on roadway slopes or channels as designated in the Contract.

MATERIALS

216.02 Soil retention covering shall be either a soil retention blanket or a turf reinforcement mat as specified in the Contract. It shall be one of the products listed on CDOT's Approved Products List and shall conform to the following:

- (a) *Soil Retention Blanket.* Soil retention blanket shall be composed of degradable natural fibers mechanically bound together between two slowly degrading synthetic or natural fiber nettings to form a continuous matrix and shall conform to the requirements of Tables 216-1 and 216-2. The blanket shall be of consistent thickness with the fiber evenly distributed over the entire area of the mat.

When specified lightweight polypropylene netting shall be 1.5 pounds per 1000 square feet; heavyweight netting shall be 2.9 pounds per 1000 square feet.

When biodegradable blanket is specified, the thread shall be 100 percent biodegradable; polypropylene thread is not allowed.

When photodegradable netting is specified the thread shall be polyester, biodegradable or photodegradable.

Blankets and nettings shall be non-toxic to vegetation and shall not inhibit germination of native seed mix as specified in the Contract. The materials shall not be toxic or injurious to humans. Class 1 blanket shall be an extended term blanket with a typical 24 month functional longevity. Class 2 blanket shall be a long term blanket with a typical 36 month functional longevity. The class of blanket is defined by the physical and performance characteristics.

- 1. *Soil Retention Blanket (Straw-Coconut).* Soil Retention Blanket (Straw-Coconut) shall be a machine produced mat consisting of 70 percent certified weed free agricultural straw or Colorado native grass straw and 30 percent coconut fiber. The blanket shall be either biodegradable or photodegradable. Blankets shall be sewn together on a maximum 2 inch centers.

Netting shall be as follows:

When biodegradable netting is specified, the top and bottom netting shall be 100 percent biodegradable organic jute fiber. Netting shall be constructed using a weave unattached at intersections which allows the strands of the net to move independently of each other.

When photodegradable netting is specified, the bottom side shall be lightweight polypropylene. The top side shall be heavyweight or lightweight polypropylene.

- 2. *Soil Retention Blanket (Excelsior).* Soil Retention Blanket (Excelsior) blanket shall consist of a machine produced mat of 100 percent curled wood excelsior , 80 percent of which shall be 6 inches or longer in fiber length. It shall be either biodegradable or photodegradable. Blankets shall be sewn together at a maximum of 4 inch centers.

Netting shall be as follows:

When biodegradable netting is specified, the top and bottom netting shall be 100 percent biodegradable organic jute fiber. Netting shall be constructed using a weave unattached at intersections which allows the strands of the net to move independently of each other.

When photodegradable netting is specified, the bottom side shall be lightweight polypropylene. The top side shall be heavyweight or lightweight polypropylene.

- 3. *Soil Retention Blanket (Coconut).* Soil Retention Blanket (Coconut) shall be a machine produced mat consisting of 100 percent coconut fiber. It shall be either biodegradable or photodegradable.

REVISION OF SECTION 216
 SOIL RETENTION COVERING

Netting shall be as follows:

When biodegradable netting is specified, the top and bottom netting shall be 100 percent biodegradable organic jute fiber. Netting shall be constructed using a weave which is unattached at the intersections, and which allows the strands of the net to move independently of each other.

When photodegradable netting is specified, the bottom and top side shall be heavyweight polypropylene.

**Table 216-1
 PHYSICAL REQUIREMENTS FOR SOIL RETENTION BLANKET –
 PHOTODEGRADABLE OR BIODEGRADABLE BLANKETS**

Photo/Bio Degradable Class	Minimum Roll Width	Minimum Thickness ASTM D 6525	Acceptable Matrix Fill Material	Min. Mass per Unit Area ASTM D 6475	Size of Net Opening	
					Photo-degradable	Bio-degradable
1	6.5 ft.	250 mils	Straw/Coconut	8 oz/sy	Minimum: 0.50"x0.50" Maximum: 0.75"x0.75"	Minimum: 0.50"x0.50" Maximum: 0.5"x1.0"
1	6.5 ft.	250 mils	Excelsior	8 oz/sy	Minimum: 0.50"x0.50" Maximum: 1.0"x2.0"	NONE
2	6.5 ft.	200 mils	Coconut	8oz/sy	Minimum: 0.50" x0.5" Maximum: 0.75"x0.75"	Minimum: 0.50"x0.50" Maximum: 0.5"x1.0"

**Table 216-2
 PERFORMANCE REQUIREMENTS FOR SOIL RETENTION BLANKET –
 PHOTODEGRADABLE OR BIODEGRADABLE BLANKETS**

Photo/Bio Degradable Class	Slope Application "C" Factor ¹ ASTM D 6459	Minimum Tensile Strength MD ² ASTM D 6818
1	≤ 0.10@3:1	8.33 lb/in
2	≤ 0.10@3:1	10.42 lb/in
Notes: ¹ "C" Factor calculated as ratio of soil loss from soil retention blanket protected slope (tested at specified or greater gradient, 3H:1V) to ratio of soil loss from unprotected (control) plot in large-scale testing. ² MD is for machine direction testing (along the length of the roll).		

Blankets shall be tested for physical properties and have published data from an independent testing facility. Large scale testing of Slope Erosion Protection ("C" factor) shall be performed by an independent testing facility.

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 REVISION OF SECTION 216
 SOIL RETENTION COVERING

- (b) *Turf Reinforcement Mat.* Turf reinforcement mat (TRM) shall be a rolled mat consisting of UV stabilized, corrosion resistant, non-degradable synthetic fibers, filaments, or nets processed into a permanent three-dimensional matrix of the thickness specified in Tables 216-3 and 216-4. TRMs shall provide sufficient thickness, strength and void space to permit soil filling and retention, and the development of vegetation within the matrix. The class of TRM is defined by the physical and performance characteristics as specified in the following tables.

**Table 216-3
 PHYSICAL REQUIREMENTS¹ FOR TURF REINFORCEMENT MAT**

Product Class	Minimum Roll Width	Minimum Thickness ASTM D 6525	Acceptable Matrix Fill Material ²	Size of Net Opening ²
1	6.5 ft.	250 mils	Excelsior, Straw/Coconut, Coconut, or Polymer fibers	Minimum: 0.50"x0.50" Maximum: 0.75"x0.75"
2	6.5 ft.	250 mils	100% UV Stabilized Synthetic or Coconut Fibers	Maximum 0.50"x 0.50"
3	6.5 ft.	250 mils	100% UV Stabilized Synthetic Fibers	Maximum 0.50"x 0.50"

Notes:

¹ For TRMs containing degradable components, all property values shall be obtained on the non-degradable portion of the matting alone.

² For TRMs with nets and fill material. Netted TRMs shall be sewn together on a maximum 2 inch centers.

**Table 216-4
 PERFORMANCE REQUIREMENTS FOR TURF REINFORCEMENT MAT**

Product Class	Tensile Strength MD ASTM D 6818	Minimum UV Stability @ 500 Hours ASTM D 4355	Minimum Permissible Shear Stress ¹ (Unvegetated) ASTM D 6460
1	125 lbs/ft	80%	1.8 lbs/sf
2	150 lbs/ft	80%	2.5 lbs/sf
3	175 lbs/ft	80%	3.1 lbs/sf

Notes:

¹ Permissible shear stress is the minimum shear stress that a product must be able to sustain when placed on a channel un-vegetated without physical damage or excess soil loss. Failure is defined as ½ inch of soil loss during a 30 minute flow event in large scale testing.

TRMs shall be tested for physical properties and have published data from an independent testing facility. Large scale testing of Permissible Shear Stress will be performed by an independent testing facility.

- (c) *Staples.* Staples shall be made of ductile steel wire, 0.165 inches in diameter, 8 inches long and have a 1 inch crown. "T" shaped staples will not be permitted.

A sample of the staples and a Certificate of Compliance (COC) including the manufacturer's product data showing that the product meets the Contract requirements shall be submitted for approval at the

REVISION OF SECTION 216 SOIL RETENTION COVERING

environmental preconstruction conference. Installation of the blanket will not begin until approval has been received from the Engineer in writing.

- (d) *Earth Anchors*. The mechanical earth anchor shall be composed of a load bearing face plate, a tendon rod or wire rope, and a locking head or percussion anchor. Each element of the anchor shall be composed of corrosion resistant materials. The anchor and wire rope shall have a breaking strength of 9,500 pounds utilizing standard tensile testing and ASTM A1007 - 07. The anchor shall have a minimum 1,000 pounds ultimate holding strength in normal soil and a manufacturer's recommended minimum driven depth of 3.5 feet.

A sample of the anchors and a Certificate of Compliance (COC) including the manufacturer's product data showing that the product meets the Contract requirements shall be submitted for approval at the environmental preconstruction conference. Installation of the blanket will not begin until approval has been received from the Engineer in writing.

CONSTRUCTION REQUIREMENTS

216.03 The Contractor shall install soil retention coverings in accordance with Standard Plan M-216-1 and the following procedure:

- (1) Prepare soil in accordance with subsection 212.06 (a).
- (2) Apply topsoil or soil conditioning as directed in the Contract to prepare seed bed.
- (3) Place seed in accordance with the Contract.
- (4) Unroll the covering parallel to the primary direction of flow.
- (5) Ensure that the covering maintains direct contact with the soil surface over the entirety of the installation area.
- (6) Do not stretch the material or allow it to bridge over surface inconsistencies.
- (7) Staple the covering to the soil such that each staple is flush with the underlying soil.
- (8) Ensure that staples or earth anchors are installed full depth to resist pull out. No bent over staples will be allowed. Install anchor trenches, seams, and terminal ends as shown on the plans.

The Contractor shall install TRMs using the following procedure:

- (1) Place 3 inches of topsoil or soil amended with soil conditioning.
- (2) Apply half of the specified seed at the broadcast rate and rake into soil.
- (3) Install TRM
- (4) Place 1 inch of topsoil or soil amended with soil conditioning into the matrix to fill the product thickness.
- (5) Apply the remaining half of the specified seed at the broadcast rate and rake into soil.
- (6) Install soil retention blanket (Photodegradable or Biodegradable Class 1) over the seeded area and TRM.

When applicable, the covering shall be unrolled with the heavyweight polypropylene netting on top and the lightweight polypropylene netting shall be in contact with the soil.

216.04 Slope Application. Soil retention coverings shall be installed on slopes as follows:

The upslope end shall be buried in a trench 3 feet beyond the crest of the slope if possible. Trench depth shall be a minimum of 6 inches unless required by the manufacture to be deeper. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil, compacted by foot tamping, and seeded. Fabric shall be brought back over trench and secured with staples or earth anchors at 1 foot on center.

There shall be an overlap wherever one roll of fabric ends and another begins with the uphill covering placed on top of the downhill covering. Staples shall be installed in the overlap.

There shall be an overlap wherever two widths of covering are applied side by side. Staples shall be installed in the overlap.

Staple checks shall be installed on the slope length at a maximum of every 35 feet. Each staple check shall consist of two rows of staggered staples.

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SOIL RETENTION COVERING

The down slope end shall be buried in a trench 3 feet beyond the toe of slope. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil, compacted by foot tamping, and seeded. Fabric shall be brought back over trench and secured with staples or earth anchors. If a slope runs into State waters or cannot be extended 3 feet beyond the toe of slope, the end of covering shall be secured using a staple check as described above.

Coverings shall be securely fastened to the soil by installing staples or earth anchors at the minimum rate shown on the Standard Plan M-216-1. Staple or earth anchor spacing shall be reduced where required due to soil type or steepness of slope.

216.05 Channel Application. Soil retention coverings shall be installed as follows on a channel application:

Coverings shall be anchored at the beginning and end of the channel across its entire width by burying the end in a trench. Trench depth shall be a minimum of 6 inches, unless a larger depth is specified by the manufacturer recommendations. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil and compacted by foot tamping, and seeded. Fabric shall be brought back over the trench and stapled.

Covering shall be unrolled in the direction of flow and placed in the bottom of the channel first. Seams shall not be placed down the center of the channel bottom or in areas of concentrated flows when placing rolls side by side.

There shall be an overlap wherever one roll of covering ends and another begins with the upstream covering placed on top of the downstream covering. Two rows of staggered staples shall be placed.

There shall be an overlap wherever two widths of covering are applied side by side. Staples shall be placed in the overlap.

The covering shall have a channel check slot every 30 feet along the gradient of the flowline. Check slots shall extend the entire width of the channel. The covering shall be buried in a trench. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil, compacted by foot tamping, and seeded. Fabric shall be brought back over trench and continued down the channel.

Coverings shall be securely fastened to the soil by installing staples at the minimum rate shown on the plans. Staple spacing shall be reduced where needed due to soil type or high flows.

216.06 Maintenance. The Contractor shall maintain the soil retention coverings until all work on the Contract has been completed and accepted. Maintenance shall consist of the repair of areas where damage is due to the Contractor's operations. Maintenance shall be performed at the Contractor's expense. Repair of those areas damaged by causes not attributable to the Contractor's operations shall be repaired by the Contractor and will be paid for at the contract unit price. Areas shall be repaired to reestablish the condition and grade of the soil and seeding prior to application of the covering.

METHOD OF MEASUREMENT

216.07 Soil retention coverings, including staples, complete in place and accepted, will be measured by the square yard of finished surface, excluding overlap, which is installed and accepted. Earth Anchors will be measured by the actual number of earth anchors complete in place and accepted.

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BASIS OF PAYMENT

216.08 The accepted quantities of soil retention coverings will be paid for at the contract unit price per square yard. The accepted quantities of earth anchors will be paid for at the contract unit price per each installed.

Payment will be made under:

Pay Item	Pay Unit
Soil Retention Blanket () (Photodegradable Class _)	Square Yard
Soil Retention Blanket () (Biodegradable Class _)	Square Yard
Turf Reinforcement Mat (Class _)	Square Yard
Earth Anchors	Each

Preparation of seedbed, fertilizing, and seeding will be measured and paid for in accordance with Section 212.

Placing and preparation of seedbed, fertilizing, and seeding of soil under the TRM layer will be measured and paid for in accordance with Section 212.

Topsoil or amended soil and seed placed on the TRM will be measured and paid for in accordance with Sections 207 and 212.

Staples will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 250
 ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT

Section 250 of the Standard Specifications is hereby deleted for this projected and replaced with the following:

DESCRIPTION

250.01 This work consists of protection of the environment, persons, and property from contaminants that may be encountered on the Project. This includes monitoring the work for encounters with contaminants or suspected soil and groundwater contaminants; the management of solid, special, and hazardous waste; and management of visual emissions associated with hazardous waste, when encountered on the project.

250.02 The Contractor shall furnish all personnel, materials, equipment, laboratory services and traffic control necessary to perform the contamination monitoring, testing, and site remediation when required. Traffic control shall be in accordance with the requirements of Section 630.

Monitoring equipment used to detect flammable gas, oxygen level, and toxic gas shall be capable of detection to meet the following standards:

Instrument Detection		
Constituent	Threshold Limit	Increments
Flammable Gas	1% LEL	1%
Oxygen	19%	0.1%
Toxic Gas	1 PPM	1 PPM
LEL = lower explosive limit PPM = parts per million		

CONSTRUCTION REQUIREMENTS

250.03 General. Prospective bidders, including subcontractors, are required to review the environmental documents available for this project. These documents are listed in subsection 102.05 as revised for this project.

This project may be in the vicinity of property associated with petroleum products, heavy metal based paint, landfill, buried foundations, abandoned utility lines, industrial area or other sites which can yield hazardous substances or produce dangerous gases. These hazardous substances or gases can migrate within or into the construction area and could create hazardous conditions. The Contractor shall use appropriate methods to reduce and control known landfill, industrial gases, and visible emissions from asbestos encounters and hazardous substances which exist or migrate into the construction area. The Contractor shall follow CDOT's *Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure, dated October 18, 2016* for proper handling of asbestos-contaminated soil, and follow all applicable Solid and Hazardous Waste Regulations for proper handling of soils encountered that contain any other substance mentioned above.

Encountering suspected contaminated material, including groundwater, old foundations, building materials, demolition debris, or utility lines that may contain asbestos or be contaminated by asbestos, is possible at some point during the construction of this project. When suspected contaminated material, including groundwater, is encountered or brought to the surface, the procedures under subsection 250.03(d) and 250.05 shall be followed.

Transportation of waste materials on public highways, streets and roadways shall be done in accordance with Title 49, Code of Federal Regulations (CFR). All labeling, manifesting, transportation, etc. of waste materials generated on this project shall be coordinated with the Engineer. All hazardous waste manifests for waste materials generated on this project shall list the Colorado Department of Transportation as the generator of the waste materials except as otherwise noted. If the Contractor contaminates the site, the Contractor shall be listed as the generator on the hazardous waste manifests, permits, and other documents for such material. If the project is not on a State Highway or frontage road, then the appropriate local governmental entity having jurisdiction over the transportation system facility shall be listed as the hazardous waste generator.

If waste materials must be handled in a permitted treatment, storage and disposal (TSD) facility, the facility shall

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be designated in writing by the Engineer. If the waste materials are the result of the Contractor's actions, the Contractor shall designate the facility.

The hazardous waste transportation phase of the work involves insurance required by law and regulations. If the waste materials are determined to be hazardous, the Contractor must submit proof that the transportation company is covered by the appropriate type and amount of insurance required by laws and regulations governing the transportation of hazardous waste.

The Contractor alone bears the responsibility for determining that the work is accomplished in strict accordance with all applicable federal, state and local laws, regulations, standards, and codes governing special waste, petroleum and hazardous substance encounters and releases.

The Contract will list known or suspected areas of contamination. Health and Safety Officer, Monitoring Technician, and Health and Safety Plan shall be required when so stated in the Contract.

(a) *Health and Safety Officer (HSO)*. The Contractor shall designate a HSO, not the project superintendent, who shall have at least two years field experience in chemical related health and safety. The HSO shall be either a certified industrial hygienist (CIH), certified hazardous materials manager (CHMM), professional engineer (PE) licensed in the State of Colorado, certified safety professional (CSP), or registered environmental manager (REM) meeting the criteria set forth in 29 CFR 1926.

When regulated asbestos contaminated soil (RACS) is present or is suspected to be present on or near a project, the HSO shall have knowledge of RACS regulations. The HSO shall meet the minimum training and medical surveillance requirements established by the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) for a supervisory Site Safety Official per 29 CFR 1962.65. The Contractor shall furnish documentation to the Engineer, at the preconstruction conference, that the above requirements have been met. Certification as an Asbestos Building Inspector in accordance with subsection 250.03 (b) is recommended.

The HSO shall *be* equipped with the following:

- (1) Communication equipment as required in subsection 250.03(d) 2.A. and a vehicle.
- (2) Monitoring and detection equipment for flammable gas, oxygen sufficiency, toxic gas, radiological screening and other hazards. This includes, as required, a combustible gas indicator, flame ionization or photo ionization detector, oxygen meter, radiation monitor with Geiger Mueller detector and other foreseeable equipment.
- (3) Depth gauging equipment, sampling equipment and sampling containers.
- (4) Personal protective equipment (levels C and D) when required.

The HSO shall recommend and supervise those actions which will minimize the risk of hazardous substance related injury to the workers, Department personnel, the general public, property and the environment. Hazardous substance is defined in 29 CFR 1926.32. The HSO shall prepare written procedures for the monitoring of confined space entry and working in or near excavations, including but not limited to trenches and drill holes associated with this project. The HSO shall conduct or supervise all hazardous substance and solid waste related testing, sampling, monitoring and handling for this project to ensure compliance with applicable statutes and regulations, and other applicable environmental requirements under subsections 107.01 and 107.02.

The HSO shall be available for consultation and assistance with contaminated materials related testing, sampling, and field monitoring as required by the Engineer.

The HSO shall prepare and submit a bound and indexed final site report to the Engineer at the end of the project. This site report shall include a detailed summary of all contaminated materials and contaminated water that were encountered and their final disposition.

During each week the HSO is utilized, the HSO shall prepare a daily diary which shall be submitted to the

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Contractor and the Engineer. This diary shall be submitted at the end of the week and shall become a part of the Department's records. The diary shall contain a chronological log of activities on the project including: dates and times on site, equipment used and calibrations, field monitoring results, visual observations, conversations, directives both given and received, and disposition of suspected hazardous substances. The Engineer will review this submittal and approve the actual number of hours to be paid.

- (b) *Monitoring Technician (MT)*. The Contractor shall designate a monitoring technician to be responsible for monitoring of hazardous substances during work on the project. The MT shall have a minimum of two years of actual field experience in assessment and remediation of hazardous substances that may be encountered during highway construction projects. When asbestos is present or is suspected to be present on or near a project, the MT shall have additional 40 hours experience in RACS project management and certification as an Asbestos Building Inspector in accordance with the Colorado Air Quality Control Commission Regulation No. 8 Part B. The MT shall be experienced in the operation of monitoring devices, identifying substances based upon experience and observation, and field sampling (for testing) of all media that may be found on the site. Completion of the 40 hour hazardous waste and 8 hour supervisory training required by OSHA and U.S. EPA rules and regulations which complies with the accreditation criteria under the provisions of the proposed 29 CFR 1910.121 is required prior to beginning work. The Contractor shall furnish documentation at the Preconstruction Conference that demonstrates these requirements have been met.

The MT shall be equipped with the following:

- (1) Communication equipment as required in subsection 250.03(d) 2.A. and a vehicle.
- (2) Monitoring and detection equipment for flammable gas, oxygen sufficiency, toxic gas, radiological screening and other hazards. This includes, as required, a combustible gas indicator, flame ionization or photo ionization detector, oxygen meter, radiation monitor with Geiger Mueller detector and other foreseeable equipment.
- (3) Depth gauging equipment, sampling equipment and sampling containers.
- (4) Personal protective equipment (levels C and D) when required.

The MT shall be present on site and perform monitoring as required by 250.03(d) when work is being performed in areas of suspected contamination and on a predetermined basis throughout other work on the project.

The MT shall monitor for compliance with regulations, the project Health and Safety Plan and the Materials Management Plan (if they exist for the project), the Contract, and the environmental documents for the project. The MT shall immediately notify the Contractor, the Engineer and the HSO of any hazardous condition.

During each week the MT is utilized, the MT shall prepare a daily monitoring diary which shall be submitted to the Contractor, HSO and the Engineer. This diary shall be submitted at the end of the week and shall become a part of the Department's records. The diary shall contain a chronological log of activities on the project including: dates and times on site, equipment used and calibrations, field monitoring results, visual observations, conversations, directives both given and received, and disposition of suspected hazardous substances. The Engineer will review this submittal and approve the actual number of hours to be paid.

- (c) *Health and Safety Plan (HASP)*. The HSO shall prepare a written HASP for the project, formatted as shown in Appendix B, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, DHHS (NIOSH) Publication Number 85-115, available from the Superintendent of Documents, U.S. Government Printing Office. The Contractor and the HSO shall review the environmental documents listed prior to preparation of the HASP.

Four signed copies of the HASP shall be furnished to the Engineer for acceptance. The Engineer shall have seven calendar days to review and accept or reject the proposed HASP. Within five calendar days after acceptance, the HSO shall distribute signed and stamped (or sealed) copies of the accepted HASP to each emergency response agency servicing the project area, the HASP designated emergency hospital, and five

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copies to the Engineer. Earth or demolition work shall not occur until after the HASP is accepted and the HASP has been distributed. The HASP shall also be available to the Contractor's employees, their representatives, and officials of OSHA, EPA, Colorado Department of Public Health and Environment (CDPHE), local government health department, Federal Highway Administration, and other appropriate agencies and officials as may be designated by the Engineer. The Engineer will distribute the accepted HASP to appropriate Department personnel. The HASP shall be kept current and shall be revised by the HSO as warranted by changes in the field conditions.

All on-site workers (Contractor's, Department's, Utilities', and others) shall be briefed by the HSO on the contents of the HASP and any revisions thereof. The HSO shall conduct briefings (group or individual) to inform new employees, subcontractors, utility companies and other on-site workers of the HASP contents prior to their entry on site. All personnel involved in excavation or other soil disturbing activities shall receive the required two-hour Asbestos Awareness training by a Certified Asbestos Inspector, when asbestos discoveries are anticipated, or discoveries are made. A signature log of all briefing attendees shall be kept and furnished to the Engineer. The Contractor shall provide, as required, eye wash equipment and stations, emergency showers, hand and face washing facilities and first aid equipment.

The Contractor shall provide, as required, decontamination facilities for personnel and equipment employed in the work. The exact procedure for decontamination and frequency shall be included in the accepted HASP. Decontamination facilities shall meet the criteria set forth in the Code of Federal Regulations (29 CFR and 40 CFR).

- (d) *Precautions and Procedures.* The following minimum precautions and procedures shall be followed during the construction of the project:
1. General construction precautions:
 - A. All monitoring and piezometer wells and test borings shall be established or abandoned by the Contractor as regulated by the State Engineer's Office. Copies of all required permits, notification, and abandonment documents shall be submitted to the Engineer prior to payment approval.
 - B. Hazardous substance related activities shall have a work plan for each work phase which shall be coordinated with the Engineer at least three working days prior to commencement of each phase of the work.
 - C. The Contractor shall properly handle all investigation derived waste generated by this project. Documentation shall be submitted to the Engineer of all tests performed for Treatment, Storage and Disposal (TSD) determination; classification of waste; hauling records; TSD acceptance; manifest (if required); etc. in accordance with applicable laws and regulations.
 - D. When the work may involve air emissions, the Contractor shall contact the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division to ascertain if an air pollution emission notice (APEN) or permit is required for this operation. The Contractor shall be responsible for filing the APEN and obtaining said permit, if required. The processing of air pollution permits, if required, in non-attainment areas or where public hearings are required, likely will take more than 90 days.
 2. For construction on a known or potentially contaminated site, the following conditions shall apply, in addition to those listed in subsection 250.03(d)1:
 - A. The HSO shall be on site or readily available by radio, telephone or pager at all times during the work. When on site, the HSO shall have an operational portable or mobile cellular telephone available for immediate use in areas where such service is available. When on site in cellular telephone non-service areas, the HSO shall have available, for immediate use, radio access to a site with telephone service. The HSO shall be notified at least 24 hours prior to the start of confined space entry, storage tank removal, drilling, excavation, trenching, or dewatering operations.

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- B. The HSO shall designate the onsite monitoring equipment for flammable gases, oxygen deficient or enriched atmosphere, and toxic gases, such as but not limited to, a flame ionization detector, photoionization detector, combustible gas indicator, and oxygen meter. This designated equipment shall be on site during all construction operations and be utilized during trenching, drilling, excavating, confined space entry, underground storage tank removal, and other appropriate construction operations. The exact equipment to fulfill this requirement shall be specified in the accepted HASP. The HSO shall conduct or supervise the monitoring. The monitoring equipment shall be calibrated as recommended by the manufacturer.
 - C. When drilling, trenching, or excavating in the presence of detectable concentrations of explosive gases, the soil shall be wetted and the operating equipment shall be provided with spark proof exhausts.
 - D. The Contractor, through the HSO, is responsible for ensuring that 29 CFR 1926 is fully complied with during the construction of the project.
 - E. Affected excavation operations shall be discontinued and personnel shall be removed from the affected excavation sites where any of the following levels are detected:
 - (1) 20.0 percent or more LEL flammable gas, or 10.0 percent in an underground or confined space,
 - (2) Permissible Exposure Limit (PEL) of any toxic gas,
 - (3) 19.5 percent or less oxygen,
 - (4) 25.0 percent or more oxygen,
 - (5) Greater than 2 mrem/hr. (Beta particle & photon radioactivity),
 - (6) Greater than 15 pCi/L (Gross alpha particle activity), or
 - (7) Other action levels as determined by the HSO.
 - (8) Uncovering of suspect Asbestos Containing Material (ACM), including but not limited to, buried facility components, active or abandoned utility lines, buried foundations and demolition debris, or miscellaneous ACM dispersed in the soil. The Contractor shall follow the procedures outlined in the HASP and 29 CFR 1926 to address these conditions. Work shall resume in these areas when approved by the Engineer.
 - F. Personnel shall be issued and utilize appropriate Health and Safety equipment as determined by the HSO, who shall provide the Engineer with a written explanation of what personal protective equipment (PPE) shall be worn, when, and by which personnel. Except in emergency cases, the Engineer shall be advised by the HSO of changes in the degree of PPE prior to implementation.
 - G. Personnel shall avoid the area immediately downwind of any excavation unless the excavation is monitored and declared safe.
 - H. The operators of excavating, trenching, or drilling equipment shall wear appropriate PPE as required in the HASP.
 - I. Exhaust blowers shall be present at the location where required in the accepted HASP.
 - J. The Contractor shall accomplish the work with employees who have been trained and equipped as required by the HASP and applicable provisions of 29 CFR 1910 and 29 CFR 1926.
 - K. Fire extinguishers, electrical equipment and wiring shall conform to the applicable requirements of 29 CFR 1926 and 49 CFR.
 - L. Smoking shall not be permitted within 50 feet of any excavation.
3. For construction within 1000 feet of a known or potentially contaminated site, the following conditions, in addition to those listed in subsection 250.03(d) 1. shall apply:
- A. The areas under construction shall be checked with a combustible gas indicator before excavation

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- begins to determine if flammable or combustible gas is in the area.
- B. Excavations, trenches and drill holes shall be monitored by the HSO for flammable gas, toxic gas and oxygen deficiency or enrichment. This shall be carried out continuously unless the presence of flammable, combustible or toxic gas, or oxygen deficiency or enrichment in the area can be ruled out by the HSO. The recommendation to discontinue monitoring must be agreed to by the Engineer and the Contractor. Prior to implementation, this agreement shall be written, and shall contain specific conditions that will require re-evaluation of the area.
 - C. When flammable or toxic gas is found in the area, those precautions and procedures in subsection 250.03(d)2 shall apply.
4. The following procedures shall be followed if the level of contamination as documented in the environmental documents referenced in subsection 102.05 as revised for this project is exceeded, or if previously unidentified contaminated air, soil or water, is encountered during the construction of the project:
- A. Work in the immediate area of the release or discovery of contamination shall cease. The Engineer shall be immediately notified.
 - B. If no HSO is required by the Contract, the Contractor shall designate an HSO as directed, in accordance with subsection 250.03(a).
 - C. The Engineer may direct the HSO to evaluate the material for potential hazardous substance or other contamination or unsafe conditions. This evaluation may include, but is not limited to, on site field monitoring, on site testing, and on or off site laboratory analysis. Removal of storage tanks and surrounding contaminated soils shall be in accordance with applicable laws, regulations and established procedures. If the contaminated material cannot be placed in the embankment or remediated on site, it must be removed to an appropriate TSD facility, as designated in writing by the Engineer. The HSO shall supervise the necessary testing required to make appropriate TSD determinations. Disposal of the unsuitable material shall be considered as remediation work as described in subsection 250.03(d)4.D and 250.03(d)4.E.
 - D. If this site is determined to be contaminated with petroleum products, hazardous substances or other solid waste in excess of that indicated in the above listed site investigation documents, a thorough Site Investigation and Waste Management Plan shall be accomplished under the supervision of the HSO. The Site Investigation and Waste Management Plan shall be submitted to the Engineer for approval and shall determine the extent of contamination and propose at least three types of remedial action for the contaminated area as required by applicable statutes and regulations. The HSO shall be available to assist the Engineer in explaining this study to the regulatory agencies. When requested by the Engineer, the Contractor shall prepare a Remediation Plan based on the selected remedial method, and shall submit this to the Engineer for approval. The time required for the Engineer's review of the Remediation Plan, including all necessary drawings, calculations, specifications, and other documentation will not exceed four weeks after a complete submittal is received. This work shall not be done unless authorized in writing by the Engineer.
 - E. If the site is determined to be contaminated with petroleum products; hazardous chemicals, materials, or wastes; or other solid wastes, and is required to be remediated, the HSO or other qualified individuals will supervise the Remediation Plan implementation as concurred to by the regulatory agencies, as directed. Hazardous Waste generated by remedial activities shall list the Colorado Department of Transportation as the hazardous waste generator on the required paperwork for projects on State Highways and their associated frontage roads. If this project is not on a State Highway or frontage road, then the appropriate local governmental entity having jurisdiction over the transportation system facility shall be listed as the hazardous waste generator. If the waste disturbed or produced was caused by Contractor negligence, the Contractor shall be listed as the hazardous waste generator. Remediation work shall be done only when authorized by the Engineer in writing.

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250.04 Heavy Metal Based Paint Management. When the work includes the removal of paint or items covered with paint which may contain lead, chromium or other heavy metals, the requirements of this subsection shall apply in addition to the requirements of subsection 250.03.

The requirements of the HASP shall be in accordance with OSHA Publication Number 3142, *Working with Lead in the Construction Industry*.

Paint Removal and Waste Disposal work shall be performed in accordance with 29 CFR 1926.62, State and local air quality regulations, the Steel Structures Painting Council (SSPC) Guide for Containing Debris Generated During Paint Removal Operations, the *Industrial Lead Paint Removal Handbook* (SSPC 91-18), and the references contained therein.

The following minimum precautions and procedures shall be followed unless modified in the approved HASP or its updates:

- (a) The Contractor shall contact the CDPHE, Air Pollution Control Division to ascertain if an air pollution permit is required for the cleaning or demolition work. If an air pollution permit is required, the Contractor shall obtain the permit. The Contractor shall furnish the Engineer with a copy of the permit application and the permit issued prior to starting cleaning or demolition activities. A copy of the Air Pollution Emission Notice [APEN] shall be provided to the Engineer, if such notice is required under the Colorado Air Quality Control Commission's regulations. The processing of air pollution permits in non-attainment areas, or where public hearings are required, likely will take more than 90 days.
- (b) The Contractor shall contain paint chips, corrosion residues, and spent abrasives, herein referred to as waste materials, resulting from the cleaning or demolition operations. The Contractor shall not deposit or release waste material into the water, air or onto the ground below or adjacent to the structure. The Contractor shall conduct cleaning operations to minimize the waste materials produced. Prior to beginning the work, the Contractor shall submit to the Engineer for acceptance, a detailed methods statement for capturing, testing, and disposing of the removed materials. The Engineer will have seven calendar days to review, and accept or reject this methods statement.
- (c) Abrasives utilized for blast cleaning shall be low-dusting and low waste. Unless approved otherwise, vacuum blasting or wheel blasting shall be used.
- (d) The HSO shall sample and test the waste material for lead, chromium, and other paint associated heavy metals using the Toxicity Characteristic Leaching Procedure (TCLP) Test, Method 1311 of the EPA publication, Test Methods for Evaluating Solid Waste 846. Sample collection methodology and frequency shall be recommended by the HSO and accepted by the Engineer with an adequate number of samples taken to be representative of all waste material collected. If the waste material does not pass the TCLP test, it shall be disposed of in a permitted TSD facility as designated in writing by the Engineer. The waste materials handling decision shall be documented by a report (five copies) submitted to the Engineer. This documentation shall include a description of sample collection methodology, testing performed, test results and comparison of test results with hazardous waste requirements. The waste material shall not be held at an unpermitted TSD facility site in excess of Resource Conservation and Recovery Act (RCRA) temporary storage time limits.
- (e) When an item coated with paint is removed, all loose paint shall be removed and collected from the item within 24 hours of the time it is removed or placed onto the ground. All loose paint shall be removed and collected from a painted item before it is removed from the site. The Contractor shall contain loose paint until it is removed and collected. Loose paint is defined as that which can be removed by manual scraping methods. Over waterways, the Contractor shall capture all paint debris by the method specified in the methods statement. The paint debris shall be collected on a daily basis and shall be stored in a properly labeled, tightly sealed container and placed in a secured location at the end of each working day.
- (f) All painted steel components which are not designated to be salvaged shall be recycled. Contractor

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possession of the steel for future use shall be considered a form of recycling. Prior to transport of the components off-site, the Contractor shall obtain a letter from the recipients of the painted steel components stating that they have been fully informed of the contents of the paint and are capable of handling the paint. If the Contractor is to maintain future possession of the steel, the Contractor shall supply this letter. If there will be more than one recipient of the painted material, one letter shall be obtained from each recipient. The Contractor shall provide a copy of each letter to the Engineer. If the painted steel components will be recycled by melting, the letter from the recipient is not required. The Contractor shall submit a letter stating the destination of the painted steel components and that they will be melted.

- (g) When the work consists of the removal of a bridge or components of a bridge coated with paint which has been assumed to contain lead, chromium, other heavy metals, or a combination thereof the Contractor shall capture paint debris which is dislodged during removal operations. The Contractor may choose any method for dismantling the bridge, subject to the following required construction sequence limitations:
- (1) The concrete deck shall be removed prior to removal of the steel superstructure.
 - (2) If the methods statement indicates that girders will be dropped to the ground during dismantling, all debris from the concrete deck removal operation shall be removed from the area below the bridge before any girders are dropped into this area.
 - (3) Girders may be cut and dropped only if the span is located entirely over land.

250.05 Material Handling. This work consists of the additional handling of groundwater and soils to be excavated for construction of the project which are suspected or known to be contaminated. This work also includes stockpiling or containerization, analytical sampling and testing, and final disposition of contaminated groundwater and soils requiring special handling.

The Contractor shall maintain vertical trench walls for the work in the specified areas of known or potential contamination, as shown on the plans. Shoring may be necessary to meet this requirement. The Contractor shall confine the removal of contaminated groundwater and soils encountered as a result of the excavation activities in the specified areas to the vertical and horizontal limits of structure excavation specified in the Contract. The Contractor shall be responsible for any contaminated materials generated beyond the limits of excavation. This shall include any sampling, analysis, and disposal required, and the costs thereof. The Contractor shall be listed as the generator of any such material. The limits of excavation shall be determined as 18 inches outside of structures, including sewers, water lines, inlets, manholes, and other underground structures to be constructed, or as directed.

Specific areas of known or potential contamination have been identified in the project plans. There is the potential of encountering contaminated groundwater and soil, which has not been summarized in the plans or specifications, at unknown locations on the site. Suspected contaminated soil and groundwater shall be handled by one of three methods as follows:

- (a) *Materials Handling (Stockpile & Containerization).* When recommended by the HSO and authorized by the Engineer, material shall be stockpiled or containerized for analysis and characterization for proper handling and, disposal, or both. Sampling and testing of materials shall be as described in the Contract. If analysis indicates that soil samples are designated as uncontaminated, as determined by the criteria shown in the Contract or as determined by the CDPHE, the associated soils will not require any special handling and will become the property of the Contractor and may be used on site, subject to other requirements of the Contract. Health and safety monitoring and strict fugitive dust control shall be conducted during the placement of these soils. If analysis indicates that groundwater samples are designated as uncontaminated, as determined by the criteria shown in the Contract or as determined by the CDPHE, the groundwater shall be handled in accordance with subsection 107.25.

Stockpiled and containerized materials shall be secured in compliance with the following provisions until they are determined to be uncontaminated:

1. The Contractor shall not store the material for more than 90 days.

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2. The Contractor shall prevent any runoff from infiltrating the ground or running out of the containment area.
 3. Soils and groundwater containing different contaminants shall be placed in separate containers or stockpiles.
 4. The Contractor shall prevent the dispersion of materials or the dilution or mixing of containers and stockpiles.
 5. The ground surface on which the contaminated soils will be placed shall be covered with plastic sheeting which will withstand the placement and removal of stockpiled materials without breaching.
 6. The ground surface shall be graded to drain toward the edge of the soil piles and the berm or trench around them shall be covered by plastic sheeting.
 7. Proper security shall be provided in accordance with 40 CFR.
- (b) *Solid Waste Disposal.* Soils determined to be contaminated, but not hazardous, as established by criteria in the Contract or as determined by CDPHE or other regulatory agencies having jurisdiction, shall be handled and disposed of, or both as recommended by the HSO and approved by the Engineer. The Contractor shall haul this material to a solid waste disposal facility.
- (c) *Contaminated Groundwater Disposal.* Groundwater determined to be contaminated, but not hazardous, as established by criteria in the Contract or as determined by CDPHE or other regulatory agencies having jurisdiction, shall be handled and disposed of, or both as recommended by the HSO and approved by the Engineer. The Contractor shall prepare a dewatering plan proposing at least three types of treatment and/or disposal options of contaminated groundwater as required by applicable statutes and regulations. One of the treatment options shall include permitting and onsite treatment prior to discharge or disposal. The dewatering plan shall be submitted to the Engineer for approval four weeks before dewatering activities begin.
- (d) *Hazardous Waste Disposal.* Soils and groundwater that are designated or suspected to be hazardous shall be containerized *immediately* upon excavation or upon discovery. Hazardous material shall be labeled and transported to a permitted treatment, storage and disposal (TSD) facility or to a hazardous waste disposal facility approved by the Engineer.
- (e) *Additional Requirements.* Stockpiled or containerized material characterized as uncontaminated, contaminated or hazardous shall be stored and disposed of in a manner consistent with current established federal, state, and local regulations for waste materials.

Materials with contaminants not specifically regulated shall be disposed of by the Contractor as directed, in consultation with CDPHE. All areas where wastes are generated shall be reviewed by the HSO to identify potential contaminant sources that may result in a contaminated waste stream.

Contaminated groundwater and soils, which have been identified as solid waste or hazardous waste, requiring disposal according to federal, state, and local regulations, shall be transported in accordance with 49 CFR by the Contractor to an appropriately permitted treatment facility, landfill, incinerator or asphalt plant or other facility approved to accept the waste. CDPHE and the landfill or other treatment or disposal facility shall be notified by the HSO of the material to be disposed of and the corresponding analytical test results prior to shipment. Potentially contaminated water collected from the lined trench of a stockpile shall be treated as required by Colorado Wastewater Discharge Permit System (CDPS) permits, 29 CFR and 40 CFR and reimbursed separately in accordance with Contract requirements.

250.06 Sample delivery. This work consists of the collection, containerization and delivery of material samples for analysis to the testing facility designated in the Contract.

Environmental Protection Agency (EPA) protocol and standards shall be followed in the collection, containerization and transport of samples to be analyzed, including the documentation of the proper chain of

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custody of all samples. The Contractor shall collect sufficient sample material to perform the required analysis and is responsible for ensuring that appropriate climate control has been provided for sample transport. Sample delivery shall be made within the maximum allowable holding time for each sample type, not to exceed 24 hours, excluding weekends. The time period required for sample collection and delivery to the testing facility will not be considered an excusable delay. The analysis to be completed and turnaround time shall be approved by the Engineer.

The Contractor shall provide the Engineer with a copy of documentation indicating that proper chain of custody requirements have been followed for all samples.

Quality control samples shall be provided by the Contractor in accordance with the quality control requirements of the testing facility designated in the Contract (quality control requirements are available from the Engineer). The Contractor shall prepare, label and transport these samples to the testing facility in conjunction with the delivery of other samples authorized for analysis by the Engineer, at no additional cost.

The Engineer may request splits of samples, in advance of collection, which shall be provided at no additional cost by the Contractor.

250.07 Regulated Asbestos Contaminated Soils (RACS) Management . Environmental documents or plans listed in the special provisions should include known or suspected locations that could involve encounters with RACS during excavation and other soil disturbing construction activities. Unexpected discoveries of RACS may occur during excavation and soil disturbing construction activities. RACS shall be properly managed or remediated, in accordance with subsection 250.07(a).

All asbestos related activities shall be performed by CDPHE certified asbestos professionals, contractors, or consultants. Certifications are issued by the CDPHE, Indoor Air Quality Unit. A Colorado Certified Asbestos Building Inspector shall manage the assessment and disposal of RACS and other ACM. The Indoor Air Quality Unit within CDPHE is the only unit that certifies such professionals. The Contractor shall furnish a copy of the certification to the Engineer.

- (a) *Regulatory Compliance.* RACS management is governed by 6 CCR 1007-2, Section 5.5, which includes and references regulatory compliance with Colorado Air Quality Control Commission *Regulation No. 8 Part B-Asbestos*. Colorado Regulation No. 8 governs all asbestos activities, demolition, permitting, and certification of Certified Asbestos Professionals in the State of Colorado. The Contractor shall conform to all current regulations, policy directives, or both, issued by the CDPHE, and the Department.
- (b) *Asbestos Management and Visual Inspections* Asbestos management shall be performed by a CDPHE certified asbestos building inspector. All inspections of the area of asbestos contaminated soil removal shall be performed by a CDPHE certified Asbestos Building Inspector to determine what, if any, controls must be instituted to allow future activity in the excavation area.
- (c) *Permitting and Notification.* The CDPHE requires notification of any soil disturbing activity where asbestos is known, suspected, or discovered. A 24-hour notification to CDPHE is required after any soil disturbing activity of an unplanned asbestos discovery. A 10 working day notification to CDPHE is required prior to any soil disturbing activity in an area with known or potential RACS. Removal of asbestos-containing material on a facility component, that is located on or in soil that will be disturbed, with asbestos quantities above the following trigger levels shall be permitted and abated in accordance with the requirements of Colorado Air Quality Control Commission Regulation No. 8 (5 CCR 1001-10, Part B):
 - (1) 260 linear feet on pipes,
 - (2) 160 square feet on other surfaces, or
 - (3) The volume of a 55-gallon drum.

All permit applications shall be submitted to the Colorado Department of Public Health and Environment a minimum of 10 days prior to start of work for approval. The permit application and notification shall be submitted simultaneously. A CDPHE certified General Abatement Contractor shall obtain all required State

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and local permits and shall be responsible for all associated fees. Permit application, notification, and waiver request forms shall be submitted to:

Colorado Department of Public Health and Environment Permit Coordinator/APCD - SS - B1 4300
 Cherry Creek Drive South Denver, CO 80246-1530 Phone: (303) 692-3100 Fax: (303) 782-0278

Application and waiver forms are available on the CDPHE website: asbestos@state.co.us

(d) *CDOT's Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure, dated October 18, 2016.* Asbestos contaminated soil shall be managed in accordance with 6 CCR 1007-2, Part 1, Section 5.5, Management of RACS.. Regulations apply only upon unexpected discovery of asbestos materials during excavation and soil disturbing activities on construction projects, or when asbestos encounters are expected during construction. The Contractor shall comply with procedures detailed in the *CDPHE's Management of Regulated Asbestos Contaminated Soil Regulation* and CDOT's CDPHE approved *Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure, dated October 18, 2016*, including the following minimum requirements:

- (1) Immediate actions and implementation of interim controls to prevent visible emissions, exposure, and asbestos contamination in surrounding areas.
- (2) Soil Characterization.
- (3) Training required for all personnel involved in excavation and other soil disturbing activities, once asbestos is encountered during construction or on projects where asbestos encounters are expected. Asbestos Awareness Training shall be given by a qualified and certified Asbestos Building Inspector with a minimum of six months experience inspecting asbestos contaminated soil.
- (4) Assessment for the presence and extent, within the proposed area of disturbance, of asbestos discoveries, whether expected or unexpected, by a CDPHE Certified Asbestos Building Inspector.
- (5) Investigation and sampling required for risk assessment and management. Investigation, if required, shall be conducted by a CDPHE Certified Asbestos Building Inspector.
- (6) Risk assessment and determinations for further management or abatement.
 - (i) Risk assessment and determinations must be made by a CDPHE Certified Asbestos Building Inspector, and coordinated with the Engineer.
 - (ii) Soil remediation is not necessarily required, depending on the circumstances.
- (7) Submit CDPHE 24-hour Notification form for unexpected RACS discovery included in Attachment 1 of the CDOT Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure
- (8) Submit CDPHE 10-day Notification form for planned RACS management included in Attachment 1 of the CDOT Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure.

(e) *Risk Assessment and Determinations for Further Management Or Remediation.* Risk assessment and determinations for further management or remediation must be closely coordinated with the Project Engineer and Project Manager of the Statewide Management Plan.

250.08 Methamphetamine Lab Sites. Demolition of former Methamphetamine (meth) labs is enforced by the Governing Authority, which varies from county to county. The Contractor shall demolish all buildings that are identified as former meth labs, as listed in public listings by the Governing Authority. The Contractor shall provide evidence of demolition to the Governing Authority, obtain receipt of such evidence by the Governing Authority, and shall submit these to Engineer immediately following demolition.

Septic tank removal at known meth lab sites shall undergo preliminary assessment by an Industrial Hygienist or

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Certified Industrial Hygienist to determine proper removal and disposal. Work shall proceed in accordance with the recommendations of the Hygienist.

METHOD OF MEASUREMENT

250.09 Environmental Health and Safety Management will not be measured, but will be paid for on a lump sum basis. This will include all work, materials, and hourly time charges by the HSO and other personnel required to accomplish the following:

- (1) Preparation, submittal and briefing of the initial HASP
- (2) Preparation and submittal of the Waste Management Plan
 - 1. Preparation and Submittal of the Dewatering Plan
 - 2. Preparation and Submittal of the Remediation Plan
- (3) Procedures and equipment specified in subsections 250.03 - 250.07
- (4) PPE (levels C and D) for Contractor's personnel for any contamination identified in the preconstruction investigations
- (5) Preparation and submittal of the final site report

The quantity to be measured for Health and Safety Officer will be the total number of hours that the Health and Safety Officer is actually used, as authorized, for the following work:

- (1) Field monitoring necessary to ensure the safety of workers on the site;
- (2) Hours in excess of the items listed under Environmental Health and Safety Management;
- (3) Hours that are necessary due to unforeseen site conditions; and
- (4) Hours of additional consultation or field work that is requested by the Engineer.

Equipment specified in subsection 250.03(a), preparation and submittal of the daily HSO diary, travel to and from the project site, and PPE (Levels C and D) required for use by the HSO will not be measured and paid for separately, but shall be included in the hourly cost of the HSO.

The quantity to be measured for Monitoring Technician will be the total number of hours that Monitoring Technician is actually used as authorized. Equipment specified in subsection 250.03(b), supervision of the MT, preparation and submittal of the daily monitoring diary, travel to and from the project site, and PPE required for use by the MT (Levels C & D) will not be measured and paid for separately, but shall be included in the hourly cost of the MT.

Solid stockpiled materials will be measured by the cubic yard computed from cross sections by the average end area or other requirements acceptable method. Disposal of solid waste and solid hazardous waste materials will be measured by the cubic yard in the disposal container.

Materials Sampling and Delivery will be measured by the actual number of samples collected, containerized and transported to the testing facility indicated in the Contract.

Additional environmental health and safety management work required and authorized by the Engineer, but not included in the items listed above, will be considered extra work to be paid for in accordance with subsection 109.04, unless such work is caused by the Contractor's action.

BASIS OF PAYMENT

250.10 Partial payment for Environmental Health and Safety Management, as determined by the Engineer, will be made as the work progresses. The Contractor shall submit a schedule of environmental related Health and Safety Management work before the first partial payment is made. The schedule shall indicate the environmental related Health and Safety Management time for each work item that requires Contractor environmental related Health and Safety Management effort and the total time for the project.

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The accepted quantity for Health and Safety Officer will be the number of hours actually used and approved for payment by the Engineer and will be paid for at the contract unit bid price.

The accepted quantity for Monitoring Technician will be the number of hours of onsite monitoring as approved by the Engineer and will be paid at the Contract unit price.

Environmental Health and Safety Management, Health and Safety Officer and Monitoring Technician bid items shall include vehicles, phone charges, supplies, printing, postage, office support, and all other miscellaneous costs associated with the work.

Payment for Groundwater Handling (Containerization & Analysis) will be paid for in accordance with subsection 109.04. Payment for Soil Handling (Stockpile) will be made at the contract unit price for all excavated material required to be stockpiled for analysis. The contract unit price will be full compensation for furnishing all materials, labor, equipment and incidentals necessary to complete this work, and all handling of the material prior to disposal. This includes haul, stockpile, and security. Payment for this work will be in addition to any payment made under other bid items for excavation, embankment or backfill on the project, or waste disposal of this material.

Payment for Solid Waste Disposal and Solid Hazardous Waste Disposal will be made at the appropriate contract unit price for the disposal of material determined to be either solid waste or solid hazardous waste. The contract unit prices will be full compensation for furnishing all materials, labor, equipment, tools, storage containers for transport, containerization of material for up to 60 days, and incidentals necessary to complete this work. This includes all handling of the material, loading for disposal, unloading for disposal, and borrow material required for replacement of excavated material disposed of offsite. It does not include stockpiling or containerization required for analysis which is included in the item Materials Handling (Stockpile & Containerization) paid for as described above. Payment for waste disposal fees and transport of hazardous waste will be made as shown below. Payment for this work will be in addition to any payment made under other bid items for excavation, embankment, backfill or material handling (stockpile & containerization) on the project.

- (1) *Solid Waste*. Transport costs to the disposal facility and disposal fees will be included in the contract unit price for this work.
- (2) *Solid Hazardous Waste*. Transport, Disposal and /or Treatment costs will be paid for by planned force account in accordance with subsection 109.04.
- (3) *Liquid Hazardous Waste*. Transport, Disposal and /or Treatment costs will be paid for by planned force account in accordance with subsection 109.04.

The cost of shoring required to limit the removal of contaminated materials to the specified limits shall be included in the bid unit prices for any excavation to be performed. Such shoring ordered by the Engineer in areas other than the specified areas of known or potential contamination, as shown in the plans, will be paid for in accordance with subsection 109.04.

Payment for Materials Sampling and Delivery will be made at the contract unit price for each material sample collected, containerized and transported to the laboratory testing facility as designated in the Contract. The Contract unit price will be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete this work including required sampling kits, containers, sample splits and quality control samples.

The Contractor shall be responsible for damage caused by Contractor negligence to the environment, persons, or property. Expenditures associated with actions of the Contractor shall be borne by the Contractor at no cost to the project.

Contaminated groundwater containerized, treated or disposed under the requirements of this specification will be paid for by planned force account in accordance with subsection 109.04.

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

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Pay Item	Pay Unit
Environmental Health and Safety Management	Lump Sum
Health and Safety Officer	Hour
Monitoring Technician	Hour
Materials Sampling and Delivery	Each
Materials Handling (Stockpile)	Cubic Yard
Solid Waste Disposal	Cubic Yard

October 31, 2013

REVISION OF SECTIONS 304 AND 703
 AGGREGATE BASE COURSE (RAP)

Sections 304 and 703 of the Standard Specifications are hereby revised for this project as follows:

Subsection 304.06, shall include the following after the first paragraph:

Compaction of each reclaimed asphalt pavement aggregate layer shall continue until a wet density of not less than 95 percent of the maximum wet density when determined in accordance with a one point AASHTO T 180, Method D test has been achieved.

Subsection 304.08 shall include the following:

Pay Item	Pay Unit
Aggregate Base Course (RAP)	Ton, Cubic Yard

Subsection 703.03 shall include the following

Aggregate Base Course (RAP) shall be 100 percent reclaimed asphalt pavement material conforming to the requirements of Table 703-3A.

Table 703-3A
CLASSIFICATION FOR RECLAIMED ASPHALT PAVEMENT
AGGREGATE BASE COURSE

Sieve Size	Mass Percent Passing Square Mesh Sieves
	ABC (RAP)
50 mm (2")	100
25 mm (1")	85-100
19 mm (3/4")	75-100
12.5 mm (1/2")	55-90
9.5 mm (3/8")	45-80
4.75 mm (#4)	25-55
1.18 mm (#16)	5-25
75 µm (#200)	0-5

April 26, 2012

REVISION OF SECTION 401
COMPACTION OF HOT MIX ASPHALT

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, delete the first paragraph and replace with the following:

401.17 Compaction. The hot mix asphalt shall be compacted by rolling. Both steel wheel and pneumatic tire rollers will be required. The number, weight, and type of rollers furnished shall be sufficient to obtain the required density while the mixture is in a workable condition. Compaction shall begin immediately after the mixture is placed and be continuous until the required density is obtained. When the mixture contains unmodified asphalt cement (PG 58-28 or PG 64-22) or modified (PG 58-34), and the surface temperature falls below 185 °F, further compaction effort shall not be applied unless approved, provided the Contractor can demonstrate that there is no damage to the finished mat. If the mixture contains modified asphalt cement (PG 76-28, PG 70-28 or PG 64-28) and the surface temperature falls below 230 °F, further compaction effort shall not be applied unless approved, provided the Contractor can demonstrate that there is no damage to the finished mat.

Warm Mix Asphalt compaction requirements shall conform to CP 59.

In subsection 401.17, delete the third paragraph and replace with the following:

SMA shall be compacted to a density of 93 to 97 percent of the daily theoretical maximum specific gravity, determined according to CP 51. All other HMA shall be compacted to a density of 92 to 96 percent of the daily theoretical maximum specific gravity, determined according to CP 51. If more than one theoretical maximum specific gravity test is taken in a day, the average of the theoretical maximum specific gravity results will be used to determine the percent compaction. Field density determinations will be made in accordance with CP 44 or 81.

In subsection 401.17, second to last paragraph, delete the first sentence and replace with the following:

After production paving work has begun, a new Roller Pattern shall be demonstrated when a change in the compaction process is implemented.

REVISION OF SECTION 401
COMPACTION PAVEMENT TEST SECTION (CTS)

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, delete the fifteenth paragraph and replace with the following:

Two sets of random cores shall be taken within the last 200 tons of the CTS. Each set shall consist of seven random cores. The Engineer will determine the coring locations using a stratified random sampling process. The locations of these cores will be such that one set can serve as a duplicate of the other. One set of these cores shall be immediately submitted to the Engineer. This set will be used for determining acceptance of the CTS and determining density correction factors for nuclear density equipment. Densities of the random samples will be determined by cores according to CP 44. Density correction factors for nuclear density equipment will be determined according to CP 81. Coring shall be performed under CDOT observation. Coring will not be measured and paid for separately but shall be included in the work. For SMA, a CTS is not used. The Contractor shall follow the requirements for the demonstration control strip in accordance with the Revision of Section 403, Stone Matrix Asphalt Pavement.

REVISION OF SECTION 401
TEMPERATURE SEGREGATION

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.16 delete the twelfth (last) paragraph and replace it with the following:

The Engineer may evaluate the HMA for low density due to temperature segregation any time industry best practices, as detailed on Form 1346, are not being followed or the Engineer suspects temperature segregation is occurring. The Engineer will first meet with the Contractor to discuss the paving practices that are triggering the temperature investigation. Areas across the mat, excluding the outside 1 foot of both edges of the mat, that are more than 25 °F cooler than other material across the width may be marked for density testing. Material for temperature comparison will be evaluated in 3-foot intervals behind the paver across the width of the mat. The material shall be marked and tested in accordance with CP 58. If four or more areas within a lot of 500 tons have densities of less than 93 percent of the material's maximum specific gravity for SMA mixes or less than 92 percent of the material's maximum specific gravity for all other HMA mixes, a 5 percent price disincentive will be applied to the 500 ton lot. The 500 ton count begins when the Engineer starts looking for cold areas, not when the first cold area is detected. This price disincentive will be in addition to those described in Sections 105 and 106. Only one area per delivered truck will be counted toward the number of low density areas. Temperature segregation checks will be performed only in areas where continuous paving is possible.

May 2, 2013

1
REVISION OF SECTIONS 401 AND 412
SAFETY EDGE

Sections 401 and 412 of the Standard Specifications are hereby revised for this project as follows:

Subsection 401.10 shall include the following:

The paver shall include an approved longitudinal paver wedge system to create a sloped safety edge as shown on the plans. The wedge system shall be attached to the screed and shall compact the HMA to a density at least as dense as the compaction imparted to the rest of the HMA layer by the paving screed. The system shall provide a sloped Safety Edge equal to 32 degrees plus or minus 5 degrees measured from the pavement surface cross slope extended. The use of a single plate strike off is not permitted. The system shall be adjustable to accommodate varying paving thicknesses. The Engineer may allow the Contractor to use handwork for short sections or to saw cut the sloped Safety Edge after paving operations are completed in areas such as transitions at driveways, intersections, interchanges.

The Contractor shall submit the proposed system for approval at the Preconstruction Conference. The Engineer may require proof that the system has been used on previous projects with acceptable results or may require a test section constructed prior to the beginning of work to demonstrate that it creates an acceptable wedge shape and compaction. Paving shall not begin until the system is approved in writing by the Engineer. The Safety Edge may be constructed on each lift of HMA or on the full specified plan depth on the final lift. The finished shape of the Safety Edge shall extend for the full depth of the asphalt pavement or for the top 5 inches whichever is less.

Subsection 401.22 shall include the following:

All costs associated with the construction of the Safety Edge will not be paid for separately, but shall be included in the work.

Subsection 412.07 shall include the following:

The Contractor shall use an approved longitudinal paver wedge system to create a sloped Safety Edge. The Contractor shall modify the paver screed to create a Safety Edge that meets the final cross-section shown on the plans. The system shall provide a sloped Safety Edge equal to 32 degrees plus or minus 5 degrees measured from the pavement surface cross slope extended. There may be areas where it is not possible to place the Safety Edge in conjunction with mainline paving but where the Safety Edge is required, such as transitions at driveways, intersections, interchanges, etc. In these areas the Engineer may allow the Contractor to use handwork for short sections or to saw cut the sloped Safety Edge after paving operations are completed.

The Contractor shall submit the proposed system for approval at the Preconstruction Conference. The Engineer may require proof that the system has been used on previous projects with acceptable results or may require a test section constructed prior to the beginning of work to demonstrate that it creates an acceptable wedge shape. Paving shall not begin until the system is approved in writing by the Engineer. The finished shape of the Safety Edge shall extend for the full depth of the concrete pavement or for the top 5 inches whichever is less.

May 2, 2013

2
 REVISION OF SECTIONS 401 AND 412
 SAFETY EDGE

Subsection 412.23 shall include the following:

Concrete Safety Edge will be measured by the actual number of linear feet that are installed and accepted.

Subsection 412.24 shall include the following:

Pay Item	Pay Unit
Concrete Safety Edge	Linear Foot

Payment for concrete safety edge will be full compensation for all work and materials required to complete the item.

REVISION OF SECTIONS 412, 601 AND 711
 LIQUID MEMBRANE-FORMING COMPOUNDS
 FOR CURING CONCRETE

Sections 412, 601 and 711 of the Standard Specifications are hereby revised for this project as follows:

In subsection 412.14, first paragraph, delete the second sentence and replace with the following:

The impervious membrane curing compound shall meet the requirements of ASTM C 309, Type 2 and shall be volatile organic content (VOC) compliant.

In subsection 601.13 (b), first paragraph, delete the second sentence and replace with the following:

A volatile organic content (VOC) compliant curing compound conforming to ASTM C 309, Type 2 shall be used on surfaces where curing compound is allowed, except that Type 1 curing compound shall be used on exposed aggregate or colored concrete, or when directed by the Engineer.

In subsection 601.16 (a) 1., delete the first sentence and replace with the following:

1. Membrane Forming Curing Compound Method. A volatile organic content (VOC) compliant curing compound conforming to ASTM C 309, Type 2 shall be uniformly applied to the surface of the deck, curbs and sidewalks at the rate of 1 gallon per 100 square feet.

Delete subsection 711.01 and replace with the following:

711.01 Curing Materials. Curing materials shall conform to the following requirements:

Burlap Cloth made from Jute or Kenaf	AASHTO M 182
Liquid Membrane-Forming Compounds for Curing Concrete	ASTM C 309
Sheet Materials for Curing Concrete	AASHTO M 171*
*Only the performance requirements of AASHTO M171 shall apply.	

Straw used for curing shall consist of threshed straw of oats, barley, wheat, or rye. Clean field or marsh hay may be substituted for straw when approved by the Engineer. Old dry straw or hay which breaks readily in the spreading process will not be accepted.

1
REVISION OF SECTION 503
DRILLED SHAFTS

Section 503 of the Standard Specifications is hereby deleted for this project and replaced with the following:

DESCRIPTION

503.01 This item of work consists of furnishing all materials, labor, tools, equipment, services and incidentals necessary to construct the drilled shafts (also referred to as drilled caissons, drilled piers, cast-in-place-drilled-holes, or cast-in-situ piles) in accordance with the Contract Documents and this Specification.

SUBMITTALS AND MEETINGS

503.02 Submittals. At least 30 days prior to the start of drilled shaft construction, the Contractor shall submit to the Engineer an electronic file of a project reference list verifying the successful completion by the Contractor of at least three separate foundation projects within the last five years with drilled shafts of similar size (diameter and depth) and construction difficulty to those shown in the Plans in similar subsurface geotechnical conditions. A brief description of each project and the project owner's contact name and current phone number shall be included for each project listed. Work shall not begin until all the required submittals have been received by the Engineer.

(a) *Experience and Personnel.* The personnel assigned to the project shall have the following minimum experience:

1. On-site supervisors shall have a minimum of two years of experience in supervising construction of drilled shaft foundations of similar size (diameter and depth) and installation method to those shown in the Plans and similar geotechnical conditions to those described in the geotechnical report. The work experience shall be direct supervisory responsibility for the on-site drilled shaft construction operations. Project management level positions indirectly supervising on-site drilled shaft construction operations are not acceptable for this experience requirement.
2. Drill rig operators shall have a minimum one year experience in construction of drilled shaft foundations.

The Engineer may request a list identifying on-site supervisors and drill rig operators assigned to the project for review. The list shall contain a detailed summary of each individual's experience in drilled shaft excavation operations. The Contractor shall inform the Engineer in writing of changes to field personnel.

(b) *Drilled Shaft Installation Plan.* At least 30 days prior to the start of drilled shaft construction the Contractor shall submit an electronic file of a Drilled Shaft Installation Plan narrative. In preparing the narrative, the Contractor shall reference the available subsurface geotechnical data provided in the Contract and any geotechnical reports prepared for this project. This narrative shall provide at a minimum the following information:

- (1) Description of overall construction operation sequence and the sequence of drilled shaft construction when in groups or lines.
- (2) A list, description and capacities of proposed equipment including but not limited to cranes, drills, augers, bailing buckets, final cleaning equipment and drilling unit. As appropriate, the narrative shall describe why the equipment was selected and suitability to the anticipated site and subsurface conditions.
- (3) Details of drilled shaft excavation methods, including proposed drilling methods, methods for cleanout of the bottom of the excavation hole and a disposal plan for excavated material including drilling slurry (if applicable). This shall include means and methods to address subsurface geotechnical conditions including boulder and obstruction removal techniques if such are indicated in the Contract subsurface geotechnical information or Contract Documents.

2
REVISION OF SECTION 503
DRILLED SHAFTS

Details of the methods to be used to ensure drilled shaft hole stability (i.e., prevention of caving, bottom heave, etc. using temporary casing, slurry, or other means) during excavation and concrete placement.

- (4) Detailed procedures for mixing, using, maintaining, storing, and disposing of the slurry shall be provided if applicable. A detailed mix design (including all additives and their specific purpose in the slurry mix) and a discussion of its suitability to the anticipated subsurface geotechnical and site conditions shall also be provided for the proposed slurry.
 - (5) The submittal shall include a detailed plan for process control of the selected slurry including property tests, test methods, and minimum and/or maximum property requirements which must be met to ensure that the slurry functions as intended for the anticipated subsurface conditions and shaft construction methods in accordance with the slurry manufacturer's recommendations and these Specifications.
 - (6) When casings are proposed or required, casing dimensions and detailed procedures for casing installation, removal, advancing the casing, and excavating the drilled shaft hole in accordance with subsection 503.13 (b) of this Specification shall be provided. When removing casing, detail the method to extract the casing to maintain shaft reinforcement in proper alignment and keep concrete workable during casing extraction.
 - (7) Details of concrete placement including proposed equipment and procedures for delivering concrete to the drilled shaft, placement of the concrete into the shaft, placement and raising of the tremie or pump line during placement, size of tremie and pump lines, operational procedures for pumping, and a sample uniform yield form to be used by the Contractor for plotting the volume of concrete placed versus the depth of shaft for all shaft concrete placement. Describe the method to be used to form a horizontal construction joint during concrete placement. Include details of procedures to prevent loss of slurry or concrete into waterways, and other areas to be protected.
 - (8) Describe the method and materials that will be used to fill or eliminate all voids below the top of shaft between the plan shaft diameter and excavated shaft diameter, or between the shaft casing and surrounding soil if permanent casing is specified.
 - (9) Details of any required load tests or shaft integrity tests including equipment, instrumentation, procedures, calibration data for test equipment, calculations and drawings.
 - (10) Details and procedures for protecting existing structures, utilities, roadways and other facilities during drilled shaft installation.
- (c) *Slurry Technical Assistance.* If slurry is to be used to construct the drilled shafts, the Contractor shall provide or arrange for technical assistance from the slurry manufacturer as specified in subsection 503.13 (b).5.(1) of this Specification. The Contractor shall submit three copies of the following to the Engineer at least 14 days prior to the start of drilled shaft construction:
- (1) The name and current phone number of the slurry manufacturer's technical representative assigned to the project.
 - (2) The names of the Contractor's personnel assigned to the project and trained by the slurry manufacturer's technical representative in the proper use of the slurry. The submittal shall include a signed training certification letter from the slurry manufacturer for each individual including the date of the training.
- (d) *Logs of Shaft Construction.* The Contractor's Quality Control staff shall prepare inspection logs using CDOT Form 1333 – Inspector's Report of Caisson Installation documenting each shaft construction activity. In addition, the Contractor shall prepare and submit the logs documenting any subsurface investigation borings or rock core holes performed by the Contractor at drilled shaft foundation locations.

3
REVISION OF SECTION 503
DRILLED SHAFTS

In addition to the information required on the Form 1333, the Contractor shall provide the following information: type and dimensions of tools and equipment used, and any changes to the tools and equipment; type of drilling fluid if used, the results of slurry tests, any problems encountered, and method used for bottom cleaning.

In addition to the information required on the Form 1333, concrete placement records shall include at least the following information: tremie tip elevation during concrete placement, and concrete yield curve (volume versus concrete elevation, actual and theoretical).

A complete set of shaft inspection logs for an individual drilled shaft shall be submitted to the Engineer within 48 hours of the completion of concrete placement at the shaft.

503.03 Meetings. The Engineer will evaluate the Drilled Shaft Installation Plan for conformance with the Contract within ten working days after receipt of the submission. At the option of the Department, a Shaft Installation Plan Submittal Meeting may be scheduled following review of the Contractor's initial submittal of the Plan. Those attending the Shaft Installation Plan Submittal Meeting, if held, should include the following:

- (1) The superintendent, on-site supervisors, and other Contractor personnel involved in the preparation and execution of the Drilled Shaft Installation Plan.
- (2) The Project Engineer and Owner's personnel involved with the structural, geotechnical, and construction review of the Drilled Shaft Installation Plan together with Owner's personnel who will provide inspection and oversight during the drilled shaft construction phase of project.

The Contractor shall submit to the Engineer updates or modifications to the Drilled Shaft Installation Plan whenever such updates or modifications are proposed. The Engineer will evaluate the new information for conformance with the Contract Plans and Specifications and respond within ten working days after receipt of the submission.

A shaft preconstruction meeting shall be held at least five working days prior to the Contractor beginning any shaft construction work at the site to discuss investigative boring information, construction procedures, personnel, and equipment to be used, and other elements of the accepted Shaft Installation Plan as specified in Subsection 503.02.(b) of this Specification. If slurry is used to construct the shafts, the frequency of scheduled site visits to the project site by the slurry manufacturer's representative will be discussed. Those attending shall include:

- (1) The superintendent, on site supervisors, and other key personnel identified by the Contractor as being in charge of excavating the shaft, placing the casing and slurry as applicable, placing the steel reinforcing bars, and placing the concrete. If slurry is used to construct the shafts, the slurry manufacturer's representative and a Contractor's employee trained in the use of the slurry, as identified to the Engineer in accordance with Subsection 503.04.(c).4.(1) of this Specification, shall also attend.
- (2) The Engineer, key inspection personnel, and appropriate representatives of the Department. If the Contractor's key personnel change, or if the Contractor proposes a significant revision of the approved Drilled Shaft Installation Plan, an additional conference may be held at the request of the Engineer before any additional shaft construction operations are performed.

503.04 Control and Disposal of Materials. Collect and properly dispose offsite all slurry and water displaced during final cleaning and concrete placement. Open pits for collection of materials may be allowed during construction activities for later disposal. Control all excavated material, slurry, water, and other matter so that at no time it enters or encroaches upon the adjacent travel lanes, railroad, water ways, and environmentally sensitive or restricted areas as shown on the plans. All environmental regulations for handling, discharge, and disposal of all construction materials shall be followed.

REVISION OF SECTION 503
DRILLED SHAFTS**MATERIALS**

503.05 Concrete. Concrete used in the construction of drilled shafts shall be Class BZ and shall conform to the requirements of Section 601. If the concrete does not meet the requirements of Section 601, reductions shall be applied to the Subsection 503.24 drilled caisson pay item. The concrete slump shall be between 6 in. and 9 in. and the coarse aggregate size shall not exceed 0.375 in. A minimum of 6 in. slump shall be maintained during the period equal to the anticipated pour period plus 2.0 hours. The use of retarders and mid-range water reducers is allowed to extend the slump life of the concrete.

503.06 Reinforcing Steel. Reinforcing steel used in the construction of drilled shafts shall conform to Section 602. When necessary, vertical bars shall be bundled in order to maximize clear space between vertical reinforcement. Rolled hoops or bundled spirals shall be used in order to maximize the clear space between horizontal reinforcement. Reinforcing steel cages for drilled shafts with varying shaft and socket diameters shall be designed with a single, uniform diameter. At all times, the reinforcing bars and fabricated steel reinforcing cage shall be supported off the ground surface and shall be protected from contamination with mud, oils and solvents, and other deleterious materials. The steel should be free of excessive rust (flaking, peeling, and thick coating) at the time of cage placement into the hole. Any contamination or excessive rust shall be cleaned and removed by the Contractor to the Engineer's acceptance prior to placement.

503.07 Casings. All permanent structural casing shall be of steel conforming to ASTM A36/A36M or ASTM A252 Gr 2 unless specified otherwise in the Plans. All splicing of permanent structural casing shall be in accordance with Section 6.13.3, "Welded Connections," of the AASHTO LRFD Bridge Design Specifications, which includes AASHTO/AWS D 1.5M/ D 1.5 Bridge Welding Code. All casing shall be watertight and clean prior to placement in the excavation. Where the minimum thickness of the casing is specified in the Plans, it is specified to satisfy structural design requirements only. The Contractor shall increase the casing thickness from the minimum specified thickness, as necessary and accepted by the Engineer, to satisfy the construction installation requirements.

All permanent casing shall be of ample strength to resist damage and deformation from transportation and handling, installation stresses, and all pressures and forces acting on the casing. For permanent nonstructural casing, corrugated casing may be used. The diameter of permanent casing shall be as shown on the Plans unless a larger diameter casing is approved by the Engineer. When a larger size permanent casing is approved by the Engineer, no additional payment will be made for the increased weight of casing steel or the increased quantity of drilled shaft excavation and concrete.

All temporary casing shall be a smooth wall structure steel except where corrugated metal pipe is shown in the Plans as an acceptable alternative material. All temporary casing shall be of ample strength to resist damage and deformation from transportation and handling, installation and extraction stresses, and all pressures and forces acting on the casing. The casing shall be capable of being installed and removed without deforming and causing damage to the completed shaft and without disturbing the surrounding soil. Temporary casing shall be completely removed, unless otherwise shown on the Plans or approved by the Engineer. The outside diameter of temporary casing shall not be less than the specified diameter of the shaft.

503.08 Mineral Slurry. Mineral Slurry shall be used in conformance with the quality control plan specified in Subsection 503.02.(b).(5)

Mineral slurry shall conform to the following requirements:

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Property	Test	Requirement
Density (pcf)	Mud Weight (Density) API 13B-1, Section 1	64.3 to 72
Viscosity (seconds/quart)	Marsh Funnel and Cup API 13b-1, Section 2.2	28 to 50
pH	Glass Electrode, pH Meter, or pH Paper	8 to 11
Sand Content (percent)	API 13B-1, Section 5	4.0 max immediately prior to placing concrete

503.09 Polymer Slurry. Polymer slurries, either natural or synthetic, shall be used in conformance with the manufacturer's recommendations, and shall conform to the quality control plan specified in Subsection 503.02.(b).(5) of this Specification. The polymer slurry shall conform to the following requirements:

Property	Test	Requirement
Density (pcf)	Mud Weight (Density) API 13B-1, Section 1	64.3 max.
Viscosity (seconds/quart)	Marsh Funnel and Cup API 13b-1, Section 2.2	32 to 135
pH	Glass Electrode, pH Meter, or pH Paper	8 to 1.5
Sand Content (percent)	API 13B-1, Section 5	1.0 max immediately prior to placing concrete

The sand content of polymer slurry prior to final cleaning and immediately prior to placing concrete shall be less than or equal to 1.0 percent, in accordance with American Petroleum Institute API 13B-1, Section 5. Slurry temperature shall be at least 40°F when tested.

503.11 Water Slurry. Water may be used as slurry when casing is used for the entire length of the drilled hole, or to stabilize the bedrock below the temporary casing provided that the method of drilled shaft installation maintains stability at the bottom of the shaft excavation. Water slurry shall conform to the following requirements:

Property	Test	Requirement
Density (pcf)	Mud Weight (Density) API 13B-1, Section 1	64 max.
Sand Content (percent)	API 13B-1, Section 5	1.0 max

503.12 Access Tubes for CSL Testing. Access tubes for CSL testing shall be steel pipe of 0.145 inches minimum wall thickness and at least 1-1/2 inch inside diameter. The access tubes shall have a round, regular inside diameter free of defects and obstructions, including all pipe joints, in order to permit the free, unobstructed passage of 1.3 inch maximum diameter source and receiver probes used for the CSL tests. The access tubes shall be non-galvanized, watertight, free from corrosion, and with clean internal and external faces to ensure good bond between the concrete and the access tubes. The access tubes shall be fitted with watertight threaded caps on the bottom and the top. Grout for filling the access tubes at the completion of the CSL tests shall be a neat cement grout with a minimum water/cement ratio of 0.45.

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503.13 Drilled Shaft Excavation. . The excavation and drilling equipment shall have adequate capacity, including power, torque and down pressure to excavate a hole of both the maximum diameter and to a depth of 20 feet or 20 percent beyond the maximum shaft length shown on the Plans, whichever is greater. Blasting will only be permitted if specifically stated on the Plans or authorized in writing by the Engineer. Once the excavation

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operation has been started, the excavation shall be conducted in a continuous operation until the excavation of the shaft is completed except for pauses and stops. Pauses or interruptions during this excavation operation will not be allowed except for casing installation, casing splicing and removal of materials or obstructions. Drilled shaft excavation operation interruptions not conforming to this definition shall be considered stops. The Contractor shall provide temporary casing at the site in sufficient quantities to meet the needs of the construction method.

If the drilled shaft excavation is not complete at the end of the shift or series of continuous shifts, the drilled shaft excavation operation may be stopped provided the Contractor protects the shaft as indicated in subsection 503.13.(b) of this Specification before the end of the work day.

If slurry is present in the shaft excavation, the Contractor shall conform to the requirements of subsection 503.13 (b).5.(2) of this Specification regarding the maintenance of the minimum level of drilling slurry throughout the stoppage of the shaft excavation operation, and shall recondition the slurry to the required slurry properties in accordance with Sections 503.09, 503.10 and 503.11 of this Specification prior to recommencing shaft excavation operations.

Sidewall over reaming shall be performed when the time for shaft excavation exceeds 24 hours (measured from the beginning of excavation below the casing when casing is used). Sidewall over reaming shall also be performed when the sidewall of the hole is determined by the Engineer to have softened due to the excavation methods, swelled due to delays in the start of concrete placement, or degraded because of slurry cake buildup. Over reaming thickness shall be a minimum of 1/2-inch or as directed by the Engineer. Over reaming may be accomplished with a grooving tool, over reaming bucket, or other equipment approved by the Engineer. If over reaming is required as a result of the excavation time exceeding the time limit specified herein, the Contractor shall bear the costs associated with both sidewall over reaming and additional drilled shaft concrete related to over reaming.

Excavation to the foundation cap elevation shall be completed before drilled shaft construction begins unless otherwise noted in the Contract Documents or approved by the Engineer. Any disturbance to the foundation cap area caused by shaft installation shall be repaired by the Contractor prior to placing the cap concrete. When drilled shafts are to be installed in conjunction with embankment construction, the Contractor shall construct drilled shafts after placement of the embankment fill unless otherwise shown on the Contract Documents or approved by the Engineer. Drilled shafts installed prior to the completion of the embankment fill shall not be capped until the fill has been placed to the bottom of cap level.

(a) *Drilled Shaft Excavation.* The dry construction method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, placing the reinforcing cage, and concreting the shaft in relatively dry excavation. The dry construction method may only be used if the shaft excavation demonstrates that the following conditions are met: less than 12 inches of water accumulates above the base of excavation over a period of one hour when no pumping is performed, the sides and bottom of the hole remain stable without detrimental caving, sloughing or swelling between the completion of excavation and concrete placement, all loose material and water can be satisfactorily removed prior to inspection and concrete placement (no more than 2 inches of water will be permitted in the bottom of the shaft excavation at the time of concrete placement), and the Engineer can visually inspect the sides and bottom of the shaft prior to placing the concrete. The drilled shaft excavations shall not be left open overnight unless cased full depth or otherwise protected against sidewall instability. An open excavation is defined as a drilled shaft that has not been filled with concrete, or temporarily backfilled with a material approved by the Engineer in accordance with Subsection 503.02 (b) of this Specification or protected in accordance with Subsection 503.13 (b). The use of slurry to protect a drilled shaft during a drilling stoppage or overnight shutdown may be approved by the Engineer. The excavation shall be protected with a suitable cover which will prevent persons or materials from falling into the hole. Casing of drilled shafts in stable rock formations during stoppages is not required if accepted by the Engineer unless shown on the Plans or specified herein.

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- (b) *Drilled Shaft Excavation Protection Methods.* The Contractor bears full responsibility for selection and execution of the methods of stabilizing and maintaining the drilled shaft excavation. The walls and bottom of the drilled shaft excavation shall be protected so that sidewall caving and bottom heaves are prevented from occurring. For shafts where the soils above the bedrock do not contribute to the bearing calculations as shown on the plans, the soils surrounding the temporary casing may be disturbed during the installation of temporary casing using uncontrolled in-situ slurries.

Acceptable protection methods include the use of casing, drilling slurry, or both.

1. Temporary Casing Construction Method

The Contractor shall conduct casing installation and removal operations and drilled shaft excavation operations such that the adjacent soil outside the casing and drilled shaft excavation for the full height of the drilled shaft is minimally disturbed. For shafts where the soils above the bedrock do not contribute to the bearing calculations as shown on the plans, the soils surrounding the temporary casing may be disturbed during the installation of temporary casing using uncontrolled in-situ slurries.

If the Contractor is utilizing casing that is sealed into the underlying bedrock, water may infiltrate the shaft below the casing. Excavation of the bedrock may continue without the use of casing or slurry if the shaft remains stable.

The Contractor shall remove all temporary casings from the excavation as concrete placement is completed, unless approval has been received from the Engineer to leave specified temporary casings in place. As the temporary casing is withdrawn, sufficient head of fluid concrete must be maintained to ensure that water or slurry outside the temporary casing will not breach the column of freshly placed concrete. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis. Excessive rotation of the casing shall be avoided to limit deformation of the reinforcing steel cage.

2. Permanent Casing Construction Method

After the casing has been filled with concrete, all void space occurring between the casing and drilled shaft excavation shall be filled with a material which approximates the geotechnical properties of the in-situ soils, in accordance with the Drilled Shaft Installation Plan specified in subsection 503.02.(b) of this Specification.

Tops of permanent casings for the drilled shafts shall be removed to the top of the drilled shaft or finished ground line, whichever is lower, unless the top of permanent casing is shown in the Plans at a different elevation. For those drilled shafts constructed within a permanent body of water, tops of permanent casings for drilled shafts shall be removed to the low water elevation unless otherwise shown on the Plans or directed otherwise by the Engineer. Casing used for forming shafts installed through a body of water shall not be removed.

3. Alternative Casing Methods

When approved by the Engineer, installation of casing using rotating or oscillating methods will be permitted. Use of this alternative casing method shall be in accordance with the equipment and procedures shown in the approved Drilled Shaft Installation Plan, and shall comply with all other requirements specified herein. Drilled shaft casing shall be equipped with cutting teeth or a cutting shoe and installed by either rotating or oscillating the casing.

4. Uncontrolled In-Situ Slurry

The uncontrolled in-situ slurry consists of in-situ soils from the drilled shaft mixed with water. For shafts where the soils above the bedrock do not contribute to the bearing calculations as shown on the plans, the contractor can use uncontrolled in-situ slurry to install temporary casing. For shafts where the soils

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above the bedrock do contribute to the bearing calculations, the use of uncontrolled in-situ slurry to install temporary casing shall not be allowed. Slurry in accordance with subsections 503.09, 503.10 and 503.11 or temporary casing in accordance with subsection 503.13 will be required if the drilled shaft does not remain stable using uncontrolled in-situ slurry.

5. Slurry

The Contractor may use slurry in accordance with Subsections 503.09, 503.10 and 503.11 of this Specification to maintain a stable excavation during drilled shaft excavation and concrete placement operations once water begins to enter the drilled shaft excavation and remain present.

The Contractor may use slurry to maintain stability during drilled shaft excavation and concrete placement operations in the event that water begins to enter the drilled shaft excavation at a rate of greater than twelve inches per hour, or if the Contractor is not able to restrict the amount of water in the drilled shaft to less than three inches prior to concrete placement, or to equilibrate water pressure on the sides and base of the drilled shaft excavation when groundwater is encountered or anticipated based on the available subsurface data.

A. Slurry Technical Assistance

If slurry is used, the manufacturer's representative, as identified to the Engineer in accordance with Subsection 503.02. (c) of this Specification, shall provide technical assistance for the use of the slurry.

The manufacturer's representative or the Contractor's employee trained in the use of the slurry, as identified to the Engineer in accordance with Subsection 503.02.(c) of this Specification, shall be present at the site throughout the shaft slurry operations for this project to perform the duties specified above.

B. Minimum Level of Slurry in the Excavation

When slurry is used to maintain a stable excavation, the slurry level in the excavation shall be maintained to obtain hydrostatic equilibrium throughout the construction operation at a height required to provide and maintain a stable hole, but not less than 5 feet above the water table.

Slurry levels shall be as follows:

- (1) not less than five feet above the water table for mineral slurries,
- (2) not less than ten feet above the water table for water slurry and uncontrolled in-situ slurries,
- (3) not less than ten feet above the water table for polymer slurries, except when a lesser dimension is specifically recommended by the slurry manufacturer for the site conditions and construction methods.

The Contractor shall provide casing, or other means, as necessary to meet these requirements.

The slurry level shall be maintained above all unstable zones a sufficient distance to prevent bottom heave, caving or sloughing of those zones.

Throughout all stops in drilled shaft excavation operations, the Contractor shall monitor and maintain the slurry level in the excavation the greater of the following elevations:

- (1) no lower than the groundwater level elevation outside the drilled shaft,
- (2) elevation as required to provide and maintain a stable hole.

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C. Cleaning Slurry

The Contractor shall clean, re-circulate, de-sand, or replace the slurry, as needed, in order to maintain the required slurry properties. Sand content will only be required to be within specified limits immediately prior to concrete placement.

503.14 Obstructions. When obstructions are encountered, the Contractor shall notify the Engineer promptly. An obstruction is defined as a specific object not identified in the Plans or Geotechnical Report in accordance with subsection 102.05 (including, but not limited to, boulders, logs, and manmade objects) encountered during the drilled shaft excavation operation which prevents or hinders the advance of the drilled shaft excavation. When efforts to advance past the obstruction to the design drilled shaft tip elevation result in the rate of advance of the drilled shaft drilling equipment being significantly reduced relative to the rate of advance for the portion of the drilled shaft excavation in the geological unit that contains the obstruction, then the Contractor shall remove, bypass or break up the obstruction under the provisions of subsection 503.24 of this Specification. Blasting will not be permitted unless approved in writing by the Engineer.

Drilling tools that are lost in the excavation will not be considered obstructions, and shall be promptly removed by the Contractor. All costs due to lost tool removal will be borne by the Contractor including, but not limited to, costs associated with the repair of hole degradation due to removal operations or an excessive time that the hole remains open.

503.15 Protection of Existing Structures and Drilled Holes. The Contractor shall control operations to prevent damage to existing structures and recently drilled holes, utilities, roadways and other facilities. Preventative measures shall include, but are not limited to, selecting construction methods and procedures that will prevent excessive caving of the drilled shaft excavation and monitoring and controlling the vibrations from the driving of casing or sheeting, drilling of the shaft, or from blasting, if permitted.

503.16 Slurry Sampling and Testing. Mineral slurry and polymer slurry shall be mixed and thoroughly hydrated in slurry tanks, lined ponds, or storage areas. The Contractor shall draw sample sets from the slurry storage facility and test the samples for conformance with the appropriate specified material properties before beginning slurry placement in the drilled hole. Slurry shall conform to the quality control plan included in the Drilled Shaft Installation Plan in accordance with Subsection 503.02.(b).(5) of this Specification and approved by the Engineer. A sample set shall be composed of samples taken at mid-height and within two feet of the bottom of the storage area.

The Contractor shall sample and test all slurry in the presence of the Engineer, unless otherwise approved by the Engineer. The date, time, names of the persons sampling and testing the slurry, and the results of the tests shall be recorded. A copy of the recorded slurry test results shall be submitted to the Engineer at the completion of each drilled shaft, and during construction of each drilled shaft when requested by the Engineer.

Slurry samples shall be taken at mid-height and within two feet of the bottom of the drilled shaft and tested during drilling as necessary to verify the control of the properties of the slurry. As a minimum, sample sets of polymer slurry shall be taken and tested at least once every four hours after beginning its use during each shift. Sample sets of all slurry shall be taken and tested immediately prior to placing concrete.

503.17 Drilled Shaft Excavation Inspection. The Contractor shall use best methods such as a cleanout bucket, air lift, or hydraulic pump to clean the bottom of the excavation of all drilled shafts. For wet drilled shaft excavation in soils, the base of the excavation shall be covered with not more than 3 inches of sediment or loose or disturbed material just prior to placing concrete. For dry drilled shaft excavations in soils, the base of excavation shall be covered with not more than 1.5 inches sediment or loose or disturbed material just prior to placing concrete. For wet and dry drilled shaft excavations in rock, the base of the excavation shall be covered with not more than 0.5 inch for 50 percent of the base area of sediment or loose or disturbed material just prior to placing concrete.

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The excavated drilled shaft will be inspected and approved by the Engineer prior to proceeding with construction. The bottom of the excavated drilled shaft shall be sounded with an airlift pipe, a tape with a heavy weight attached to the end of the tape, a borehole camera with visual sediment depth measurement gauge, or other means acceptable to the Engineer to determine that the drilled shaft bottom meets the requirements in the Contract. The contractor shall supply all needed equipment required to inspect the drilled shaft excavation.

503.18 Assembly and Placement of Reinforcing Steel. The contractor shall show bracing and any extra reinforcing steel required for fabrication of the cage on the shop drawings. The contractor will be responsible for engineering the temporary support and bracing of the reinforcing cages to ensure that they maintain their planned configuration during assembly, transportation and installation.

The reinforcing cage shall be rigidly braced to retain its configuration during handling and construction. Individual or loose bars will not be permitted. All (100%) intersections of vertical and horizontal bars must be tied. At least 4 vertical bars of each cage, equally spaced around the circumference, shall be tied at all reinforcement intersections with double wire ties. The remaining reinforcement intersections in each cage shall be tied with single wire ties.

The reinforcement shall be carefully positioned and securely fastened to provide the minimum clearances specified or shown on the Plans, and to ensure that no displacement of the reinforcing steel cage occurs during placement of the concrete. Splicing of the reinforcement cage during placement of the cage in the shaft excavation will not be permitted unless otherwise shown on the Plans or approved by the Engineer. If the reinforcing cage is spliced during placement of the cage into the drilled shaft excavation, the splice details and location of the splices shall be in accordance with the Plans and the accepted Drilled Shaft Installation Plan. In addition, the work shall be performed within the time limits specified in Subsection 503.13

The steel reinforcing cage shall be securely held in position throughout the concrete placement operation. The reinforcing steel cage shall be supported from the top during the placement of the concrete to achieve the clearances shown on the plans. Setting the cage on the bottom of the hole will not be permitted. The support system shall be concentric to prevent racking and displacement of the cage. The reinforcing steel in the drilled shaft shall be tied and supported so that the location of the reinforcing steel will remain within allowable tolerance. Concrete spacers or other approved non-corrosive spacing devices shall be used at sufficient intervals (near the bottom, the top and at intervals not exceeding 10 feet vertically) to ensure concentric spacing for the entire cage length. The number of spacers required at each level will be one spacer for each foot of excavation diameter, with a minimum of four spacers at each level. The spacers shall be of adequate dimension to ensure an annular space between the outside of the reinforcing cage and the side of the excavation along the entire length of the drilled shaft as shown in the Plans. Acceptable feet made of plastic, or concrete (bottom supports) shall be provided to ensure that the bottom of the cage is maintained at the proper distance above the base of the excavation unless the cage is suspended from a fixed base during the concrete pour.

Minimum concrete cover to reinforcing steel shall be as follows:

Drilled Shaft Diameter	Minimum Concrete Cover
Less than or equal to 3'-0"	3"
Greater than 3'-0" and less than 5'-0"	4"
5'-0" or larger	6"

If concrete placement does not immediately follow the cage placement, the Engineer may order the steel to be removed from the excavation so that the integrity of the excavation, including the presence of loose material in the bottom of the hole, and the surface condition of the reinforcing steel may be determined by inspection.

Bracing steel which constricts the interior of the reinforcing cage must be removed after lifting the cage if freefall concrete or wet tremie methods of concrete placement are to be used.

The elevation of the top of the steel cage shall be checked before and after the concrete is placed. If the upward displacement of the rebar cage exceeds 2 inches, or if the downward displacement exceeds 6 inches, the drilled shaft will be considered defective. Corrections shall be made by the Contractor to the satisfaction of the Engineer.

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No additional drilled shafts shall be constructed until the Contractor has modified the rebar cage support in a manner satisfactory to the Engineer.

503.19 Concrete Placement, Curing and Protection. Concrete placement shall commence as soon as possible after completion of drilled shaft excavation by the Contractor and inspection by the Engineer. Immediately prior to commencing concrete placement, the drilled shaft excavation and the properties of the slurry (if used) shall conform to subsections 503.09, 503.10 and 503.11 of this Specification. The CSL access tubes shall be filled with potable water before concrete placement and the top watertight threaded caps shall be reinstalled. Concrete placement shall continue in one operation to the top of the drilled shaft, or as shown in the Plans.

If water is not present (a dry shaft), the concrete shall be deposited through the center of the reinforcement cage by tremie or free-fall preventing segregation of aggregates. The concrete shall be placed such that the free-fall is vertical down the center of the drilled shaft without hitting the sides, the steel reinforcing bars, or the steel reinforcing bar cage bracing.

If water exists in amounts greater than two inches in depth or enters at a rate of more than twelve inches per hour then the drilled shaft excavation must be filled with slurry to at least the level specified in Subsection 503.13 (b).5.(2) and concrete placed by tremie methods outlined in this section.

The elapsed time for concrete placement shall not exceed the time limit defined in the accepted Drilled Shaft Installation Plan and demonstrated by a successful technique shaft or test shaft. The concrete placement time shall commence at the mixing of the concrete and extend through to the completion of placement of the concrete in the drilled shaft excavation, including removal of any temporary casing. For wet placement methods, the placement time shall start at the batching of the initial load of concrete to be placed in the shaft. Prior to concrete placement, the Contractor shall provide test results of both a trial mix and a slump loss test conducted by an approved testing laboratory using approved methods to demonstrate that the concrete meets this defined placement time limit. The concrete mix shall maintain a slump of 4 inches or greater over the defined placement time limit as demonstrated by trial mix and slump loss tests. The trial mix and slump loss tests shall be conducted at ambient temperatures appropriate for site conditions. Ambient air temperature at the time of concrete placement shall not be greater than the ambient temperature at the time of the concrete trial tests and slump loss tests.

All admixtures, when approved for use, shall be adjusted for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the defined placement time limit.

Before placing any fresh concrete against concrete deposited in water or slurry (construction joint), the Contractor shall remove all scum, laitance, loose gravel and sediment on the surface of the concrete deposited in water or slurry, and chip off any high spots on the surface of the existing concrete that would prevent any steel reinforcing bar cage from being placed in the position required by the Plans.

The Contractor shall not perform foundation piling driving or casing installation using oscillation method within a radius of 20 feet, nor drilled shaft excavation operations within a clear distance of three diameters of a newly poured drilled shaft 24 hours of the placement of concrete and only when the concrete has reached a minimum compressive strength of 1800 psi.

For any portion of the caisson socketed in fine grained bedrock susceptible to slaking and degradation such as, but not limited to, claystone, siltstone, or shale and provided the proper slurry properties have been achieved. If the concrete is not placed within four hours of drilling, the Contractor shall drill into the bedrock an additional 1/3 of the plan specified rock socket prior to placing the concrete. The reinforcing cage shall extend to the new tip elevation. For the use of polymer slurry this requirement can be waived.

Throughout the underwater concrete placement operation, the discharge end of the tube shall remain submerged in the concrete at least five feet and the tube shall always contain enough concrete to prevent water from entering. The concrete placement shall be continuous until the work is completed, resulting in a seamless, uniform shaft. If the concrete placement operation is interrupted, the Engineer may require the contractor to prove by core drilling or other tests that the drilled shaft contains no voids or horizontal joints. If testing reveals voids or

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joints, the Contractor shall repair them or replace the drilled shaft at no expense to the Owner. Responsibility for coring and testing costs, and calculation of time extension, shall be in accordance with Section 503.21 of this Specification. The Contractor shall use a concrete pump or gravity tremie. A tremie shall have a hopper at the top that empties into a watertight tube at least eight inches in diameter. If a pump is used, a watertight tube shall be used with a minimum diameter of four inches. The discharge end of the tube on the tremie or concrete pump line shall include a device to seal out water or slurry while the tube is first filled with concrete. In lieu of a seal at the discharge end of the pipe, the Contractor may opt to place a "Pig" or "Rabbit" in the hopper prior to concrete placement which moves through the tremie when pushed by the concrete, forcing water or slurry from the tremie pipe. The Contractor shall complete a concrete yield plot for each wet shaft poured by tremie methods. This yield plot will be submitted to the Engineer within 24 hours of completion of the concrete pour.

The hopper and tubes shall not contain aluminum parts that will have contact with the concrete. The inside and outside surfaces of the tubes shall be clean and smooth to allow both flow of concrete and the unimpeded withdrawal of the tube during concrete placement.

503.20 Drilled Shaft Construction Tolerances. Drilled shafts shall be constructed so that the center of the poured shaft at the top of the drilled shaft or mudline, whichever is lower, is within the following horizontal tolerances:

Drilled Shaft Diameter	Tolerance
Less than or equal to 2'-0"	3"
Greater than 2'-0" and less than 5'-0"	4"
5'-0" or larger	6"

Drilled shafts in soil and rock shall be within 1.5 percent of plumb. Plumbness shall be measured from the top of poured drilled shaft elevation or mudline, whichever is lower. During drilling or excavation of the drilled shaft, the Contractor shall make frequent checks on the plumbness, alignment, and dimensions of the drilled shaft. Any deviation exceeding the allowable tolerances shall be corrected with a procedure approved by the Engineer.

Drilled shaft steel reinforcing bars shall be no higher than six inches above or three inches below the plan elevation.

The reinforcing cage shall be concentric with the drilled shaft excavation within a horizontal tolerance of 1-1/2 inches.

The top elevation of the completed drilled shaft shall have a tolerance of plus one inch or minus three inches.

The diameter of the drilled shaft shall not be less than the diameter on the Plans.

Tolerances for casings shall be in accordance with American Pipe Institute tolerances applicable to regular steel pipe.

Drilled shaft excavations and completed drilled shafts not constructed within the required tolerances will be considered defective. The Contractor shall be responsible for correcting all defective drilled shafts to the satisfaction of the Engineer. Materials and work necessary, including engineering analysis and redesign, to complete corrections for out-of-tolerance drilled shafts shall be furnished without either cost to the Owner or an extension of the completion date of the project. Redesign drawings and computations submitted by the Contractor shall be signed by a registered Professional Engineer licensed in the State of Colorado.

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503.21 Integrity Testing. CSL testing shall be performed in accordance with ASTM D6760. The minimum number of shafts tested shall be indicated in the plans. CSL testing shall be performed on shafts constructed using tremie concrete placement methods and drilled shafts selected by the Engineer. The Engineer may increase the number of shafts tested as deemed necessary. The Contractor shall accommodate the CSL testing by furnishing and installing access tubes in accordance with Subsection 503.12 of this Specification.

The Contractor shall install access tubes for CSL testing in drilled shafts as shown on the plans selected by the Engineer to permit access for the CSL test probes. If, in the opinion of the Engineer, the condition of the drilled shaft excavation permits drilled shaft construction in the dry, the Engineer may specify that the testing be omitted.

The Contractor shall securely attach the access tubes to the interior of the reinforcement cage of the drilled shaft. One access tube shall be furnished and installed for each foot of drilled shaft diameter, rounded up to the nearest whole number, unless otherwise shown in the Plans. A minimum of three tubes will be required. The access tubes shall be placed around the drilled shaft, inside the spiral or hoop reinforcement and three inches clear of the vertical reinforcement, at a uniform spacing measured along the circle passing through the centers of the access tubes. If these minimums cannot be met due to close spacing of the vertical reinforcement, then the access tubes shall be bundled with the vertical reinforcement.

If trimming the cage is required and access tubes for CSL testing are attached to the cage, the Contractor shall either shift the access tubes up the cage, or cut the access tubes provided that the cut tube ends are adapted to receive the watertight cap as specified.

The access tubes shall be installed in straight alignment and as near to parallel to the vertical axis of the reinforcement cage as possible. The access tubes shall extend from the bottom of the drilled shaft to at least two feet above the top of the drilled shaft. Couple tubes as required with threaded couplers, such that inside of tube remains flush. The Contractor shall clear the access tubes of all debris and extraneous materials before installing the access tubes. Care shall be taken to prevent damaging the access tubes during reinforcement cage installation and concrete placement operations in the drilled shaft excavation.

The access tubes shall be filled with potable water before concrete placement, and the top watertight threaded caps shall be reinstalled.

Prior to performing any crosshole sonic log testing operations specified in this subsection, the Contractor shall remove the concrete at the top of the drilled shaft down to sound concrete.

The Contractor shall engage a qualified Specialty Engineer to perform the CSL testing. The qualified CSL Specialty Engineer must have a minimum three years of experience of CSL testing and have a Colorado Licensed Professional Engineer supervising the collection and interpretation of data. The contractor shall provide all necessary assistance to the CSL Specialty Engineer to satisfactorily perform the testing.

The testing shall be performed after the drilled shaft concrete has cured at least 96 hours. Additional curing time prior to testing may be required if the drilled shaft concrete contains admixtures, such as set retarding admixture or water reducing admixture. The additional curing time prior to testing required under these circumstances shall not be grounds for additional compensation or extension of time to the Contractor. No subsequent construction shall be performed on the completed drilled shaft until the CSL tests are approved and the drilled shaft accepted by the Engineer.

After placing the drilled shaft concrete and before beginning the CSL testing of a drilled shaft, the Contractor shall inspect the access tubes. Each access tube that the test probe cannot pass through shall be replaced, at the Contractor's expense, with a two inch diameter hole cored through the concrete for the entire length of the drilled shaft. Unless directed otherwise by the Engineer, cored holes shall be located approximately six inches inside the reinforcement and shall not damage the drilled shaft reinforcement. Descriptions of inclusions and voids in cored holes shall be logged and a copy of the log shall be submitted to the Engineer. Findings from cored holes shall be preserved, identified as to location, and made available for inspection by the Engineer.

The Engineer may approve the continuation of drilled shaft construction prior to approval and acceptance of the first shaft if the Engineer's observations of the construction of the first shaft are satisfactory, including, but not

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limited to, conformance to the Drilled Shaft Installation Plan as approved by the Engineer, and the Engineer's review of Contractor's daily reports and inspector's daily logs concerning excavation, steel reinforcing bar placement, and concrete placement.

Drilled shafts with velocity reduction exceeding 30% are not acceptable without additional offset CSL testing and Three Dimensional (3-D) Tomography analysis

If subsequent testing at a drilled shaft indicates the presence of a defect(s) in the drilled shaft, the testing costs and the delay costs resulting from the additional testing shall be borne by the Contractor. If this additional testing indicates that the drilled shaft has no defect, the testing costs and the delay costs resulting from the additional testing will be paid by the Owner, and, if the drilled shaft construction is on the critical path of the Contractor's schedule, a time extension equal to the delay created by the additional testing will be granted.

If the Engineer determines a drilled shaft is unacceptable based on the CSL tests and tomographic analyses, or observes problems during drilled shaft construction, coring of the shaft to allow further evaluation and repair is required, or the shaft has to be replaced. If coring to allow further evaluation of the shaft and repair is chosen, one or more core samples shall be taken from each unacceptable shaft for full depth of the shaft or to the depth directed by the Engineer. The Engineer will determine the number, location, and diameter of the cores based on the results of 3-D tomographic analysis of offset and horizontal CSL data. An accurate log of cores has to be kept. Properly mark and place the cores in a crate showing the shaft depth at each interval of core recovery. Transport the cores, along with five copies of the coring log to the Engineer. Perform strength testing by an AASHTO certified lab on portions of the cores that exhibit questionable concrete as determined by the Engineer. If the drilled shaft offset CSL testing, 3-D tomographic analyses and coring indicate the shaft is defective, propose remedial measures for approval by the Engineer. Such improvement may consist of, but is not limited to correcting defective portions of the shaft, providing straddle shafts to compensate for capacity loss, or providing a replacement shaft. Repair all detected defects and conduct post repair integrity testing using horizontal and offset CSL testing and 3-D tomographic imaging as described in this Section. Perform all work described in this Section at no additional cost to the Department, and with no increase in Contract Time.

All access tubes and cored holes shall be dewatered and filled with a 4000 psi grout after tests are completed and the drilled shaft is accepted. The access tubes and cored holes shall be filled using grout tubes that extend to the bottom of the tube or hole or into the grout already placed.

503.22 Drilled Shafts Load Tests. Test shafts shall be installed at the locations shown on the Plans unless otherwise directed or approved by the Engineer.

Test shafts shall be installed to the same dimensions, details and elevations shown on the Plans, and shall be installed using the same equipment and installation procedures proposed for installation of the foundation drilled shafts.

If the methods or procedures are changed following the completion of load testing, the Contractor shall install additional load test shafts, and conduct additional load tests as directed by the Engineer at no additional cost to the Owner.

A stamped report of load test results within five business days of the testing completion is required. Load testing results will be evaluated by the Engineer before installing any production drilled shafts, unless otherwise authorized by the Engineer, to allow for design modifications based on the load test results. Load test data as reported shall conform to the Drilled Shaft Foundation Testing (DSHAFT) and be available in electronic form at the project website (<http://srg.cce.iastate.edu/shaft>).

- (a) *Static Load Tests.* Static load tests shall be performed in accordance with the procedures specified in ASTM D 1143.

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REVISION OF SECTION 503
DRILLED SHAFTS

(b) *Force Pulse (Rapid) Load Tests.* Force pulse (rapid) load tests shall be performed in accordance with the procedures specified in ASTM D 7383.

METHOD OF MEASUREMENT

503.23 Drilled caisson will be measured by the linear foot from the elevation shown on the plans to the bottom of the hole as drilled.

Each approved splice of the reinforcing cage for additional length of caisson will be measured as ½ linear foot of additional length of drilled caisson.

BASIS OF PAYMENT

503.24 The unit price of drilled shafts shall be full compensation for making all excavations; hauling and disposal of excavated material; provision and disposal of slurry, performing all necessary pumping; furnishing and placing required concrete and reinforcement steel, including the reinforcement projecting above the tops of the drilled shafts necessary for splicing and any intermediate reinforcement splices; furnishing and placing of CSL tubes; all backfilling; furnishing, placing, and removing temporary casings; furnishing permanent casing if required to complete the work; and for furnishing all tools, labor, equipment, and incidentals necessary to complete the work. Costs associated with repairing defects found in the drilled shaft shall be included in the cost of the drilled shaft.

(a) *Payment.* The accepted quantities for drilled caissons will be paid for at the Contract unit price per linear foot except for price adjustments allowed in (b) below.

Payment will be made under:

Pay Item	Pay Unit
Drilled Caisson (XX Inch dia.)	Linear Foot
Load Tests	Each
CSL Testing	Each

Obstruction Encounter and Removal will not be measured, and will be paid for in accordance with subsection 109.04 under Force Account Item, Obstruction Encounter and Removal.

(b) *Price Adjustments.* When the Engineer orders holes to be drilled to a lower elevation than shown on the plans, compensation for additional depth will be as follows:

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REVISION OF SECTION 503
DRILLED SHAFTS

Additional Length	Compensation
0 to 5 feet	Contract Unit Price
Over 5 feet to 15 feet	Contract Unit Price plus 15%
Over 15 feet	As provided in subsection 109.04

Additional compensation will not be paid for the portions of a caisson that are extended due to the Contractor's method of operation, as determined by the Engineer.

October 31, 2013

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REVISION OF SECTION 518
BRIDGE EXPANSION DEVICE

Section 518 of the Standard Specifications is hereby revised for this project as follows:

In subsection 518.04, delete the fifth paragraph and replace with the following:

All structural steel elements of the bridge expansion device, including cover plates, shall be galvanized after fabrication in accordance with Section 509, whether or not they are in contact with the elastomeric seals.

In subsection 518.05 (b), delete the third paragraph and replace with the following:

All structural steel elements of the bridge expansion device, including cover plates, shall be galvanized after fabrication in accordance with Section 509, whether or not they are in contact with the elastomeric seals.

1
 REVISION OF SECTION 601
 CLASS B, BZ, D, DT AND P CONCRETE

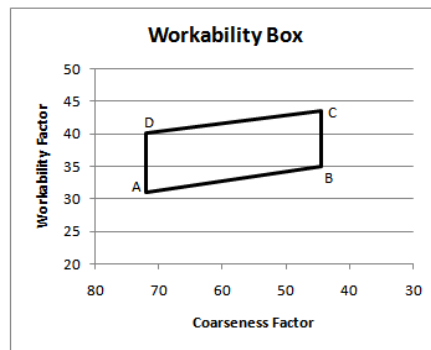
Section 601 of the Standard Specifications is hereby revised for this project as follows:

Subsection 601.02 shall include the following:

Deviations from the Standard Class B, Class BZ, Class D, DT and P concrete may be made under the following conditions:

- (1) The minimum cement content may be reduced from that specified in Table 601-1 if lab test results show that the permeability of the mix does not exceed 2,500 Coulombs at an age of not more than 56 days as determined by ASTM C1202.
- (2) The maximum cement content may be increased from that specified in Table 601-1 if lab test results show that the unrestrained shrinkage is less than 0.050 percent when tested by CP-L 4103.
- (3) The maximum amount of fly ash substituted for ASTM C150 cement or the maximum pozzolan content when ASTM C595 or C1157 cement is used may exceed the limits in subsection 601.05 if lab test results show that the permeability of the mix does not exceed 2,500 Coulombs at an age of not more than 56 days as determined by ASTM C1202 and the salt scaling resistance is less than 3 as determined by ASTM C672.
- (4) Except for Class DT, the concrete mix may use an Optimized Gradation (OG). When an OG is used aggregate proportions must be a result of an optimized combined aggregate gradation (CAG) developed by an approved mix design technique such as Shilstone or KU Mix. The amount of aggregate in the CAG passing the 19 mm (¾ inch) sieve and retained on the 12.5 mm (½ inch) sieve shall be a minimum of 8 percent for the trial mix design. The coarseness factor (CF) and workability factor (WF) must plot within the workability box (ABCD) depicted graphically by the following 4 coordinate points:
 - a. Point A > (CF,WF) 72, 31
 - b. Point B > (CF,WF) 44.5, 35
 - c. Point C > (CF,WF) 44.5, 43.5
 - d. Point D > (CF,WF) 72, 40

Figure 601-1



$CF = (S / T) \times 100$

Where:

S = Percent Cumulative Retained on 9.5 mm (3/8 inch) Sieve

T = Percent Cumulative retained on 2.36 mm (No. 8) Sieve

WF is the percent passing the 2.36 mm (No. 8) sieve. Increase workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used in excess of 564 pounds per cubic yard in the mix design. Decrease workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used below 564 pounds per cubic yard in the mix design. The Contractor shall not adjust the workability factor if the amount of cementitious material is 564 pounds per cubic yard.

- (5) Aggregate gradings not obtained through an OG may be used if lab test results show that the unrestrained shrinkage is less than 0.050 percent when tested by CP-L 4103.

REVISION OF SECTION 601
CLASS B, BZ, D, DT AND P CONCRETE

Concrete with any of the above deviations shall be known as Class () Non Standard concrete (Class __-NS concrete). For example Class B-NS. Non Standard concrete may be substituted for the equivalent standard concrete. Non Standard concrete shall be tested, accepted, measured and paid for as standard concrete or the pay item specifying standard concrete.

Subsection 601.05 shall include the following in the second paragraph:

- (8) Concrete with an OG shall indicate the gradation proportions that results in a combined aggregate gradation corresponding to compliance within the specified CF and WF box and shall include the following charts used to perform aggregate gradation analysis:
- (i) Coarseness Factor
 - (ii) Workability Factor
 - (iii) 0.45 power
 - (iv) Combined gradation

Delete Subsection 601.06 (10) and (11) and replace with the following:

- (10) Weights of fine and coarse aggregates or combined weight when an OG is pre-blended
(11) Moisture of fine and coarse aggregates or combined moisture when an OG is pre-blended

Subsection 601.17 shall include the following:

(g) *Water to cementitious material content (w/cm) ratio.* When a Non Standard concrete is used the maximum w/cm ratio is the w/cm ratio that was used in the in the laboratory trial mix for the Concrete Mix Design. The w/cm ratio shall be determined for each batch of Non Standard concrete by the Contractor and provided to the Engineer for approval prior to placement. If an adjustment to the mix is made after the Engineer's approval, the w/cm shall be determined and submitted to the Engineer prior to the continuation of placement. Any Non Standard concrete that is placed without the Engineer's approval shall be removed and replaced at the Contractor's expense.

February 3, 2011

REVISION OF SECTION 601
CONCRETE BATCHING

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

In subsection 601.06, delete (13) and (17) and replace with the following:

- (13) Gallons of water added by truck operator, the time the water was added and the quantity of concrete in the truck each time water is added.

- (17) Water to cementitious material ratio.

February 3, 2011

REVISION OF SECTIONS 601 CONCRETE FINISHING

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

In subsection 601.12 (a) delete the fifth paragraph and replace it with the following:

Water shall not be added to the surface of the concrete to assist in finishing operations.

Hand finishing should be minimized wherever possible. The hand finishing methods shall be addressed in the Quality Control Plan for concrete finishing. Hand finished concrete shall be struck off and screeded with a portable screed that is at least 2 feet longer than the maximum width of the surface to be struck off. It shall be sufficiently rigid to retain its shape. Concrete shall be thoroughly consolidated by hand vibrators. Hand finishing shall not be allowed after concrete has been in-place for more than 30 minutes or when initial set has begun. Finishing tools made of aluminum shall not be used.

The Contractor shall provide a Quality Control Plan (QCP) to ensure that proper hand finishing is accomplished in accordance with current Industry standards. It shall identify the Contractor's method for ensuring that the provisions of the QCP are met. The QCP shall be submitted to the Engineer at the Preconstruction Conference. Concrete placement shall not begin until the Engineer has approved the QCP. The QCP shall identify and address issues affecting the quality finished concrete including but not limited to:

- (1) Timing of hand finishing operations
- (2) Methodology to place and transport concrete
- (3) Equipment and tools to be utilized
- (4) Qualifications and training of finishers and supervisors

When the Engineer determines that any element of the approved QCP is not being implemented or that hand finished concrete is unacceptable, work shall be suspended. The Contractor shall supply a written plan to address improperly placed material and how to remedy future hand finishing failures and bring the work into compliance with the QCP. The Engineer will review the plan for acceptability prior to authorizing the resumption of operations.

In subsection 601.14(a) delete the fourth paragraph.

October 29, 2015

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 REVISION OF SECTION 601
 CONCRETE SLUMP ACCEPTANCE

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

Delete the fifth paragraph of Subsection 601.05 and replace with the following:

Except for Class BZ concrete, the slump of the delivered concrete shall be the slump of the approved concrete mix design plus or minus 2.0 inch. The laboratory trial mix must produce an average compressive strength at least 115 percent of the required field compressive strength specified in Table 601-1. When entrained air is specified in the Contract for Class BZ concrete, the trial mix shall be run with the required air content.

Delete Subsection 601.17 (b), 601.17 (d) and Table 601-3 and replace with the following:

(b) *Slump*. Slump acceptance, but not rejection, may be visually determined by the Engineer. Any batch that exceeds the slump of the approved concrete mix design by 2.0 inches will be retested. If the slump is exceeded a second time, that load is rejected. If the slump is greater than 2 inches lower than the approved concrete mix design, the load can be adjusted with a water reducer, or by adding water (if the w/cm allows) and retested.

Portions of loads incorporated into structures prior to determining test results which indicate rejection as the correct course of action shall be subject to reduced payment or removal as determined by the Engineer.

(d) *Pay Factors*. The pay factor for concrete which is allowed to remain in place at a reduced price shall be according to Table 601-3 and shall be applied to the unit price bid for Item 601, Structural Concrete.

If deviations occur in air content and strength within the same batch, the pay factor for the batch shall be the product of the individual pay factors.

**Table 601-3
 PAY FACTORS**

Percent Total Air		Strength		
Deviations From Specified Air (Percent)	Pay Factor (Percent)	Below Specified Strength (psi) [< 4500 psi Concrete]	Pay Factor (Percent)	Below Specified Strength (psi) [≥ 4500 psi Concrete]
0.0-0.2	98	1-100	98	1-100
0.3-0.4	96	101-200	96	101-200
0.5-0.6	92	201-300	92	201-300
0.7-0.8	84	301-400	84	301-400
0.9-1.0	75	401-500	75	401-500
Over 1.0	Reject	Over 500	Reject	
			65	501-600
			54	601-700
			42	701-800
			29	801-900
			15	901-1000
			Reject	Over 1000

May 2, 2013

REVISION OF SECTION 601
DEPOSITING CONCRETE UNDER WATER

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

In subsection 601.12, delete (f) and replace with the following:

(f) *Depositing Concrete Under Water.* Concrete, except for cofferdam seals, shall not be deposited under water, unless approved by the Engineer. If approved, care shall be exercised to prevent the formation of laitance. Concrete shall not be deposited until all laitance, which may have formed on concrete previously placed, has been removed. Pumping shall be discontinued while depositing foundation concrete if it results in a flow of water inside the forms. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a concrete pump and tremie. The discharge or bottom end of the tremie shall be lowered to contact the foundation at the start of the concrete placement and shall be raised during the placement at a rate which will insure that the bottom or discharge end of the tremie is continuously embedded or buried in fresh concrete a minimum of 12 inches. Air and water shall be excluded from the tremie pipe by keeping the pipe continuously filled. The continuity of the placement operation shall be maintained without breaking the seal between the concrete mass and the discharge end of the tremie until the lift is completed. The concrete placement shall not be disturbed after it has been deposited.

May 8, 2014

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REVISION OF SECTION 601
QC TESTING REQUIREMENTS FOR STRUCTURAL CONCRETE

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

Delete the first paragraph of subsection 601.17 and subsection 601.17(a) and replace with the following:

601.17 Acceptance and Pay Factors. These provisions apply to all concrete. The Contractor shall sample 601 pay items for both QC and QA in accordance with CP 61. The Engineer will witness the sampling and take possession of the QA samples at a mutually agreed upon location. The Contractor shall be responsible for Quality Control (QC) testing for 601 pay items. QC testing shall be performed at least once per day and then once per 50 cubic yards for concrete slump, unit weight and concrete temperature for each 601 pay item.

- (a) *Air Content.* The first three batches at the beginning of each day's production for each 601 pay item shall be tested by the Contractor's QC and CDOT's QA for air content. When the QC and QA air content measurements differ by more than 0.5 percent, both the QC and QA air meters shall be checked in accordance with ASTM C 231. When air content is below the specified limit, it may be adjusted in accordance with subsection 601.08. Successive batches shall be tested by the Contractor's QC and witnessed by the Engineer until three consecutive batches are within specified limits. After the first three batches, CDOT will follow the random minimum testing schedule. After the first three batches the Contractor shall perform QC testing at a frequency of one random sample per 50 cubic yards. Air content shall not be adjusted after a CDOT QA test.

Subsection 601.19 shall include the following:

The Contractor's QC testing will not be measured and paid separately, but shall be included in the work.

April 30, 2015

REVISION OF SECTION 601
STRUCTURAL CONCRETE STRENGTH ACCEPTANCE

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

In subsection 601.17 (c), delete the first paragraph and replace with the following:

- (c) *Strength (When Specified)*. The concrete will be considered acceptable when the running average of three consecutive strength tests per mix design for an individual structure is equal to or greater than the specified strength and no single test falls below the specified strength by more than 500 psi. A test is defined as the average strength of three test cylinders cast in plastic molds from a single sample of concrete and cured under standard laboratory conditions prior to testing. If the compressive strength of any one test cylinder differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two test cylinders.

REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS

Sections 601 and 701 of the Standard Specifications are hereby revised for this project as follows:

In subsection 601.03, first paragraph, the following shall be added to the table:

High-Reactivity Pozzolans 701.04

Subsection 601.03 shall include the following:

Pozzolans shall consist of Fly Ash, Silica Fume and High-Reactivity Pozzolan.

In subsection 601.04, delete the third and fourth paragraphs and replace with the following

Cementitious material requirements are as follows:

Class 0 requirements for sulfate resistance shall be one of the following:

- (1) ASTM C 150 Type I, II or V
- (2) ASTM C 595 Type IL, IP, IP(MS), IP(HS) or IT
- (3) ASTM C 1157 Type GU, MS or HS
- (4) ASTM C 150 Type III cement if it is allowed, as in Class E concrete

Class 1 requirements for sulfate resistance shall be one of the following:

- (1) ASTM C 150 Type II or V; Class C fly ash shall not be substituted for cement.
- (2) ASTM C 595 Type IP(MS) or IP(HS).
- (3) ASTM C 1157 Type MS or HS; Class C fly ash shall not be substituted for cement.
- (4) When ASTM C 150 Type III cement is allowed, as in Class E concrete, it shall have no more than 8 percent C_3A . Class C fly ash shall not be substituted for cement.
- (5) ASTM C 595 Type IL; having less than 0.10 percent expansion at 6 months when tested according to ASTM C 1012. Class C fly ash shall not be substituted for cement.
- (6) ASTM C 595 Type IT; having less than 0.10 percent expansion at 6 months when tested according to ASTM C 1012.

Class 2 requirements for sulfate resistance shall be one of the following:

- (1) ASTM C 150 Type V with a minimum of a 20 percent substitution of Class F fly ash by weight
- (2) ASTM C 150 Type II or III with a minimum of a 20 percent substitution of Class F fly ash by weight. The Type II or III cement shall have no more than 0.040 percent expansion at 14 days when tested according to ASTM C 452
- (3) ASTM C 1157 Type HS; Class C fly ash shall not be substituted for cement.
- (4) ASTM C 150 Type II, III, or V plus High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012

REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS

- (5) ASTM C 1157 Type MS plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012
- (6) A blend of portland cement meeting ASTM C 150 Type II or III with a minimum of 20 percent Class F fly ash by weight, where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012.
- (7) ASTM C 595 Type IP(HS).
- (8) ASTM C 595 Type IL plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012
- (9) ASTM C 595 Type IT; having less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012.

Class 3 requirements for sulfate resistance shall be one of the following:

A blend of portland cement meeting ASTM C 150 Type II, III, or V with a minimum of a 20 percent substitution of Class F fly ash by weight, where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.

- (1) ASTM C 1157 Type HS having less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012. Class C fly ash shall not be substituted for cement.
- (2) ASTM C 1157 Type MS or HS plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (3) ASTM C 150 Type II, III, or V plus High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (4) ASTM C 595 Type 1L plus High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (5) ASTM C 595 Type IP(HS) or IT having less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (6) ASTM C 595 Type IL with a minimum of a 20 percent substitution of Class F fly ash by weight, where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.

When fly ash or High-Reactivity Pozzolan is used to enhance sulfate resistance, it shall be used in a proportion greater than or equal to the proportion tested in accordance to ASTM C1012, shall be the same source and it shall have a calcium oxide content no more than 2.0 percent greater than the fly ash or High-Reactivity Pozzolan tested according to ASTM C 1012.

In subsection 601.05 delete the first paragraph and replace with the following:

601.05 Proportioning. The Contractor shall submit a Concrete Mix Design for each class of concrete being placed on the project. Concrete shall not be placed on the project before the Concrete Mix Design Report has been reviewed and approved by the Engineer. The Concrete Mix Design will be reviewed and approved following the procedures of CP 62. The Concrete Mix Design will not be approved when the laboratory trial mix data are the results from tests performed more than two years in the past or aggregate data are the results from tests performed more than two years in the past. The concrete mix design shall show the weights and sources of all ingredients including cement, pozzolan, aggregates, water, additives and the water to cementitious material ratio

REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS

(w/cm). When determining the w/cm, the weight of cementitious material (cm) shall be the sum of the weights of the cement, fly ash, silica fume and High-Reactivity Pozzolan.

In subsection 601.05, delete the 12th, 13th, 14th, 15th, and 16th paragraphs and replace with the following:

The Concrete Mix Design Report shall include Certified Test Reports showing that the cement, fly ash, High-Reactivity Pozzolan and silica fume meet the specification requirements and supporting this statement with actual test results. The certification for silica fume shall state the solids content if the silica fume admixture is furnished as slurry.

For all concrete mix designs with ASTM C150 cements, up to a maximum of 20 percent Class C, 30 percent Class F or 30 percent High-Reactivity Pozzolan by weight of total cementitious material may be substituted for cement.

For all concrete mix designs with ASTM C595 Type IL cements, up to a maximum of 20 percent Class C, 30 percent Class F or 30 percent High-Reactivity Pozzolan by weight of total cementitious material may be substituted for cement.

For all concrete mix designs with ASTM C595 Type IP, IP(MS), IP(HS) or IT cements; fly ash or High-Reactivity Pozzolan shall not be substituted for cement.

For all concrete mix designs with ASTM C1157 cements, the total pozzolan content including pozzolan in cement shall not exceed 30 percent by weight of the cementitious material content.

When the Contractor's use of fly ash or High-Reactivity Pozzolan results in delays to the project, when it is necessary to make changes in admixture quantities, the source, or the Contractor performs, the cost of such delays and corrective actions shall be borne by the Contractor.

The Contractor shall submit a new Concrete Mix Design Report meeting the above requirements when a change occurs in the source, type, or proportions of cement, fly ash, High-Reactivity Pozzolan, silica fume or aggregate. When a change occurs in the source of approved admixtures, the Contractor shall submit a letter stamped by the Concrete Mix Design Engineer approving the changes to the existing mix design. The change will need to be approved by the Engineer prior to use.

In subsection 601.06, second paragraph, delete (9) and replace with the following:

(9) Type, brand, and amount of cement, fly ash and High-Reactivity Pozzolan

In subsection 601.06, delete (a) and replace with the following:

(a) *Portland Cement, Fly Ash, High-Reactivity Pozzolan and Silica Fume.* These materials may be sacked or bulk. No fraction of a sack shall be used in a batch of concrete unless the material is weighed.

All bulk cement shall be weighed on an approved weighing device. The bulk cement weighing hopper shall be sealed and vented to preclude dusting during operation. The discharge chute shall be so arranged that cement will not lodge in it or leak from it.

Separate storage and handling equipment shall be provided for the fly ash, silica fume and High-Reactivity Pozzolan. The fly ash, silica fume, and High-Reactivity Pozzolan may be weighed in the cement hopper and discharged with the cement.

REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS

In subsection 701.01 delete and replace the second paragraph with the following:

All concrete, including precast, prestressed and pipe shall be constructed with one of the following hydraulic cements, unless permitted otherwise.

ASTM C 150 Type I

ASTM C 150 Type II

ASTM C 150 Type V

ASTM C 595 Type IL

ASTM C 595 Type IP

ASTM C 595 Type IP(MS)

ASTM C 595 Type IP(HS)

ASTM C 595 Type IT

ASTM C 1157 Type GU, consisting of no more than 15 percent limestone

ASTM C 1157 Type MS, consisting of no more than 15 percent limestone

ASTM C 1157 Type HS, consisting of no more than 15 percent limestone

In subsection 701.02 add the following after the first paragraph:

Blending of pozzolans according to ASTM D5370 is permitted to meet the requirements of ASTM C 618.

Add subsection 701.04 immediately following subsection 701.03 as follows:

701.04 High-Reactivity Pozzolans. High-Reactivity Pozzolans (HRP) shall conform to the requirements of AASHTO M321. HRPs are but not limited to metakaolin, rice hull ash, zirconium fume, ultra-fine fly ash, and fume from the production of 50 percent ferrosilicon (with SiO₂ less than 85 percent).

HRPs shall meet the following optional requirement of AASHTO M321: The sulfate expansion at 14 days shall not exceed 0.045 percent

HRP shall be from a preapproved source listed on the Department's Approved Products List. The HRP intended for use on the project shall have been tested and accepted prior to its use. Certified Test Reports showing that the HRP meets the specification requirements and supporting this statement with actual test results shall be submitted to the Engineer.

The HRP shall be subject to sampling and testing by the Department. Test results that do not meet the physical and chemical requirements may result in the suspension of the use of HRP until the corrections necessary have been taken to ensure that the material conforms to the specifications.

REVISION OF SECTION 603
CULVERT PIPE INSPECTION

Section 603 of the Standard Specifications is hereby revised for this project as follows:

Delete the first paragraph of subsection 603.09 and replace with the following:

603.09 Backfilling. After the conduit or section of conduit is placed, it shall be inspected before any backfill is placed. Reinforced concrete pipe (RCP) shall be visually inspected in accordance with AASHTO LRFD Bridge Construction Specifications, Section 27.6. Conduit found to be damaged shall be replaced, and conduit found to be out of alignment or unduly settled shall be taken up and relaid. The trench shall then be backfilled with material in accordance with Section 206.

In subsection 603.09, delete the fifth paragraph.

Add subsection 603.091 immediately following subsection 603.09 as follows:

603.091 Deflection Testing of Metal and Plastic Pipe. After a metal or plastic pipe is backfilled and earthwork over the pipe is complete to the top of the subgrade, the pipe deflection shall be measured in the presence of the Engineer. The maximum allowable deflection shall be 5 percent. Deflection is a reduction in the nominal diameter of the pipe measured in any direction. Measurement shall be made using a mandrel, laser profile, or other method approved by the Engineer. Measurement shall be made 30 days or more following the pipe installation. Pipe having any deflections in excess of 5 percent at any location within the pipe shall be removed and reinstalled at the Contractor's expense. Pipe that is permanently deformed or damaged in any way shall be replaced at the Contractor's expense. Replaced pipe shall be retested 30 days or more after the installation in accordance with the method described above.

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 REVISION OF SECTIONS 603, 624, 705, 707 AND 712
 DRAINAGE PIPE

Sections 603, 624, 705, 707 and 712 of the Standard Specifications are hereby revised for this project as follows:

Subsection 603.07 shall include the following:

Joint systems for siphons, irrigation systems, and storm drains shall be watertight.

Subsection 603.07(c) shall include the following:

Watertight joint systems for plastic pipe shall conform to subsection 705.03.

Subsection 624.02 shall include the following material type and requirement:

Abbreviation	Description	Subsection
ALT2 CSP	Aluminized Corrugated Steel Pipe Type 2	707.11
Plastic	Polyvinyl Chloride (PVC), Polyethylene (PE), Steel Reinforced Polyethylene (SRPE) and Polypropylene (PP)	712.13

In subsection 624.02 delete the third paragraph and replace it with the following:

Connecting bands shall receive the same corrosion protection as the pipe with which they are used. Coatings conforming to the requirements of Sections 706 and 707 will be permitted as applicable. Connecting bands and pipe extensions shall be of similar metal, or of non-metallic material, to avoid galvanic corrosion.

End sections for concrete or metal pipe shall be the same material as the pipe and meet the requirements for the same class as that specified for the pipe in accordance with Table 624-1.

Plastic end sections shall not be used. When plastic pipe is to be installed with end sections, steel or concrete end sections meeting the same class as that specified for the pipe in accordance with Table 624-1 shall be used.

In subsection 624.02 delete the fourth paragraph and replace it with the following:

The Contractor may furnish any pipe material allowed in Table 624-1 for the class of pipe specified in the Contract except for storm drains. The Contractor may furnish RCP, PVC, SRPE or PP allowed in Table 624-1 for the class of pipe specified in the Contract for storm drains. The Contractor shall state at the preconstruction conference the pipe materials intended to be furnished.

In subsection 624.02 delete Table 624-1 and replace it with the following:

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 REVISION OF SECTIONS 603, 624, 705, 707 AND 712
 DRAINAGE PIPE

TABLE 624-1
Materials Allowed for Class of Pipe

Material Allowed**	Class of Pipe*										
	0	1	2	3	4	5	6 ⁴	7	8	9	10 ⁴
CSP	Y	N	N	N	N	N	N	N	N	N	N
ALT2 CSP	Y	Y	Y	Y	Y	N	N	N	N	N	N
Bit. Co. CSP	Y	Y ¹	N	N	N	N	N	N	N	N	N
A.F. Bo. CSP	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
CAP	Y	Y ²	Y ²	Y ²	Y ²	Y	N	N	N	N	N
PCSP - both sides	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
PVC ⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PE ⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PP ⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SRPE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
RCP (SP0) ^{3,5}	Y	Y	N	N	N	N	N	Y	N	N	N
RCP (SP1) ^{3,5}	Y	Y	Y	N	N	N	N	Y	Y	N	N
RCP (SP2) ^{3,5}	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N
RCP (SP3) ^{3,5}	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

* As determined by the Department in accordance with the CDOT *Pipe Selection Guide*. Determination is based on abrasion and corrosion resistance.
 ** Y=Yes; N=No.

¹ Coated Steel Structural Plate Pipe of equal or greater diameter, conforming to Section 510, may be substituted for Bit. Co. CSP at no additional cost to the project.
² Aluminum Alloy Structural Plate Pipe of equal or greater diameter, conforming to Section 510, may be substituted for CAP at no additional cost to the project.
³ SP= Class of Sulfate Protection required in accordance with subsection 601.04 as revised for this project. RCP shall be manufactured using the cementitious material required to meet the SP class specified.
⁴ For pipe classes 6 and 10, the RCP shall be coated in accordance with subsection 706.07 when the pH of either the soil or water is less than 5. The Contract will specify when RCP is to be coated.
⁵ Concrete shall have a compressive strength of 4500 psi or greater.
⁶ In accordance with subsection 712.13.

Subsection 624.03 shall include the following:

Joint systems for siphons, irrigation systems, and storm drains shall be watertight. Watertight joint systems for plastic pipe shall conform to subsection 705.03.

Installation for Aluminized Corrugated Steel Pipe Type 2 shall conform to all requirements for Corrugated Steel Pipe (CSP) including the fill height tables and requirements in Standard Plan M-603-1.

Subsection 705.03 shall include the following:

Watertight joint systems for plastic pipe shall be in accordance with ASTM D3212.

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REVISION OF SECTIONS 603, 624, 705, 707 AND 712
DRAINAGE PIPE

Add subsection 707.11 as follows:

707.11 Aluminized Corrugated Steel Pipe Type 2. Aluminized Corrugated Steel Pipe Type 2 shall conform to the requirements of AASHTO M 274.

In subsection 712.13 (b), delete (1) and (2) and replace with the following:

- (1) AASHTO M 304 (Profile) for nominal pipe sizes of 4 to 36 inches.
- (2) ASTM F794 (Profile) for nominal pipe sizes 4 to 36 inches with 46 psi minimum pipe stiffness

Add subsection 712.13 and (c) and (d) as follows:

(c) *Polypropylene (PP) Pipe.*

AASHTO M330 for nominal pipe sizes of 12 to 60 inches with the following exceptions: Type S and Type SP are acceptable (Type C, Type CP and Type D will not be accepted).

The Contractor shall provide a polypropylene (PP) pipe product that is prequalified under the AASHTO National Transportation Product Evaluation Program (NTPEP). Only products from suppliers whose manufacturing plant and PP pipe products comply with this specification shall be placed by the Contractor. The current list of plants and PP pipe products that meet these requirements is located at: www.ntpep.org. The Contractor shall use plants listed as compliant and a size listed in the NTPEP reports on PP Thermoplastic Pipe. Every Certificate of Compliance (COC) on each diameter PP pipe product delivered to the project shall include a statement that the product has been manufactured at a NTPEP inspected plant, has been tested by NTPEP, has a NTPEP product number, and is currently on the NTPEP website. The COC shall confirm that the supplied pipe meets the applicable specification limits in subsection 712.13. Manufacturers shall remain acceptable to CDOT as long as the results of verification samples and performance in the field are satisfactory. Any changes in the PP pipe formulation will require re-submittal for prequalification testing by NTPEP.

(d) *Steel Reinforced Polyethylene (SRPE).* SRPE pipe shall be AASHTO MP 20 ribbed pipe for nominal pipe sizes 12 to 60 inches with the following exceptions:

- (1) Nominal pipe sizes 30 to 60 inches are acceptable; nominal pipe sizes 12 to 27 inches will not be accepted.

February 3, 2011

REVISION OF SECTION 612
DELINEATORS

Section 612 of the Standard Specifications is hereby revised for this project as follows:

In subsection 612.02(a) 1, delete the last sentence, and replace with the following:

Posts shall conform to the requirements shown on the plans, and reflectors shall conform to the requirements in subsections 713.07 and 713.10.

In subsection 612.02(a) 2.B, delete the first paragraph, and replace with the following:

- B. Base Anchoring. The posts shall be designed to facilitate a permanent installation that resists overturning, twisting, and displacement from wind and impact forces. It shall have an anchoring depth of 18 to 24 inches. Actual depth shall be as recommended by the manufacturer. If soil conditions prohibit anchoring depth to less than 18 inches, installation shall be in accordance with manufacturer's recommendations.

REVISION OF SECTION 627
 PREFORMED PLASTIC PAVEMENT MARKING

Section 627 of the Standard Special Provisions is hereby revised for this project as follows:

In subsection 627.08, delete the fourth, fifth and sixth paragraphs and replace with the following:

The air and surface temperature shall be a minimum 40 °F or per manufacturer recommendation.

In subsection 627.08, delete the fourteenth paragraph and replace with the following:

The preformed plastic pavement marking shall be inlaid on new and existing pavements as shown in the Contract. The material shall be capable of use for patching worn areas of the same type according to the manufacturer's recommendations.

The Contractor shall not perform wet cutting of pavement unless otherwise directed. Application and removal of temporary pavement marking associated with wet-cutting of pavement shall be at the Contractor's expense.

In subsection 627.08 (a), delete the first paragraph and replace with the following:

(a) *Inlaid Preformed Plastic Pavement Marking.* The grooved width for inlaid preformed plastic pavement marking is called for in the Contract, grooved width shall be the pavement marking width plus 1 inch, with a tolerance of ± ¼ inch. The depth of the grooves shall be 130 mils ± 5 mils. Groove position shall be a minimum of 2 inches from the edge of the pavement marking to the longitudinal pavement joint.

Grooving shall not be performed on bridge decks with Polyester Polymer Concrete Overlays.

In subsection 627.13, delete the following pay items

Pay Item	Pay Unit
Preformed Plastic Pavement Marking (___ mils)	Square Foot
Preformed Plastic Pavement Marking (Type ___)	Square Foot
Preformed Plastic Pavement Marking (Word-Symbol) (Type ___)	Square Foot
Preformed Plastic Pavement Marking (Xwalk-Stop Line) (Type ___)	Square Foot

Section 627.13 shall include the following:

Pay Item	Pay Unit
Preformed Plastic Pavement Marking (Word-Symbol) (Type I) (Inlaid)	Square Foot
Preformed Plastic Pavement Marking (Xwalk-Stop Line) (Type I) (Inlaid)	Square Foot

In subsection 627.13 delete the second and third paragraphs.

May 8, 2014

REVISION OF SECTION 630
 RETROREFLECTIVE SIGN SHEETING

Section 630 of the Standard Specifications is hereby revised for this project as follows:

In subsection 630.02, delete the sixth and seventh paragraphs, including Table 630-1, and replace them with the following:

Retroreflective sheeting for all signs requiring an orange background shall be Type VI or Type Fluorescent.

Retroreflective sheeting for all signs requiring a yellow background shall be Type Fluorescent.

**Table 630-1
 RETROREFLECTIVE SHEETING TYPES**

Sheeting	Type IV	Type VI (Roll-up sign material)	Type Fluorescent ¹
Application	Work Zone	Work Zone	Work Zone
All Orange Construction Signs			X
Orange Construction Signs that are used only during daytime hours for short term or mobile operations		X ⁴	X
Barricades (Temporary)	X		X
Vertical Panels	X		X
Flaggers Stop/Slow Paddle	X		X
Drums ²	X		X
Non-orange Fixed Support signs with prefix "W"	X		
Special Warning Signs			X
STOP sign (R1-1) YIELD sign (R1-2) WRONG WAY sign (R5-1a) DO NOT ENTER sign (R5-1) EXIT sign (E5-1a)	X		
DETOUR sign (M4-9) or (M4-10)			X
All other fixed support signs ³	X		X
All other signs used only during working hours	X		X
All other signs that are used only during daytime hours for short term or mobile operations	X	X ⁵	X

1 Fluorescent Sheeting shall be of a brand that is on the CDOT Approved Products List.
 2 Drum Sheeting shall be manufactured for flexible devices.
 3 Fixed support signs are defined as all signs that must remain in use outside of working hours. They shall be mounted in accordance with Standard Plan S-630-1.
 4 RS 24 only.
 5 White only.

REVISION OF SECTION 702
BITUMINOUS MATERIALS

Section 702 of the Standard Specifications is hereby deleted for this project and replaced with the following:

702.01 Asphalt Cements.

(a) *Superpave Performance Graded Binders.* Superpave Performance Graded Binders shall conform to the requirements listed in Table 702-1. (Taken from AASHTO M 320)

Asphalt cement shall not be acid modified or alkaline modified.

Asphalt cement shall not contain any used oils that have not been re-refined. Modifiers that do not comply with environmental rules and regulations including 40 CFR Part 261.6(a) (3) (IV), and part 266/Subpart C shall not be added. Modifiers shall not be carcinogenic.

The supplier of the PG binder shall be certified in accordance with CP 11.

REVISION OF SECTION 702
BITUMINOUS MATERIALS

Acceptance Samples of the PG binder will be taken on the project in accordance with the Schedule in the Field Materials Manual.

The Department will test for acid modification and alkaline modification during the binder certification process. Thereafter, the Department will randomly test for acid modification and alkaline modification.

(b) *Damp proofing.* Asphalt for damp proofing shall conform to the requirements of ASTM D 449, and the asphaltic primer shall conform to the requirements of ASTM D 41.

702.02 Emulsified Asphalts. Emulsified asphalts shall conform to AASHTO M 140 or M 208 for the designated types and grades. Emulsified asphalt and aggregate used for surface seals shall be sampled and will be tested for information only in accordance with CP-L 2213.

Emulsified asphalt (HFMS-2S) with a residual penetration greater than 300 dmm shall conform to all properties listed in AASHTO M 140, Table 1 except that ductility shall be reported for information only.

(a) *Emulsion for Tack and Fog Coats.* Emulsions for tack and fog coats shall conform to the requirements listed in Table 702-2 or 702-3, prior to dilution.

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

Table 702-2
TACK AND FOG COAT EMULSIONS

Property	CSS-1h	SS-1h	AASHTO Test No.
Viscosity, at 25 °C, Saybolt-Furol, s	min	20	T 59
	max	100	
Storage stability, 24 hr, % max ¹	1.0	1.0	T 59
Particle charge test	Positive		T 59
Sieve test, % max	0.10	0.10	T 59
Oil Distillate by volume, % max	3.0	3.0	T-59
Residue by distillation/ evaporation, % min ³	57 ³	57 ³	T 59/ CP-L 2212 ²
Tests on residue:			
Penetration, 25 °C, 100g, 5s, min, dmm	40	40	T 49
Penetration, 25 °C, 100g, 5s, max, dmm	120	120	
Ductility, 25 °C, 5 cm/min, cm, min	40	40	T 51
Solubility, in trichloroethylene% min	97.5	97.5	T 44
¹ If successful application is achieved in the field, the Engineer may wave this requirement. ² CP-L 2212 is a rapid evaporation test for determining percent residue of an emulsion and providing material for tests on residue. CP-L 2212 is for acceptance only. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test in conformance with AASHTO T-59 to determine acceptability. ³ For polymerized emulsions the distillation and evaporation tests will in be in conformance with AASHTO T-59 or CP-L 2212 respectively with modifications to include 205 ± 5 °C (400 ± 10 °F) maximum temperature to be held for 15 minutes.			

- (b) *Emulsion for Chip Seals* Polymerized emulsions for chip seals shall conform to the requirements listed in Table 702-3. Emulsion for chip seals shall be an emulsified blend of polymerized asphalt, water, and emulsifiers. The asphalt cement shall be polymerized prior to emulsification and shall contain at least 3 percent polymer by weight of asphalt cement. The emulsion standing undisturbed for a minimum of 24 hours shall show no white, milky separation but shall be smooth and homogeneous throughout. The emulsion shall be pumpable and suitable for application through a distributor.

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

**Table 702-3
 POLYMERIZED EMULSIONS FOR CHIP SEALS**

Property	CRS-2	CRS-2P	CRS-2R	HFMS-2P	AASHTO Test No.
Tests on Emulsion:					
Viscosity, at 50 °C, Saybolt-Furol, s	min	50	50	50	T 59
	max	450	450	450	
Storage stability, 24 hr, % max	1.0	1.0	1.0	1.0	T 59
Particle charge test	Positive	Positive	Positive		T 59
Sieve test, % max	0.10	0.10	0.10	0.10	T 59
Demulsibility ¹ , % min	40	40	40		T 59
Oil Distillate by volume, % max or range	3.0	3.0	3.0	3.0	T-59
Residue by distillation/ evaporation, % min ³	65 ³	65 ³	65 ³	65 ³	T 59/ CP-L 2212 ²
Tests on residue:					
Penetration, 25 °C, 100g, 5s, min, dmm	70	70	70	70	T 49
Penetration, 25 °C, 100g, 5s, max, dmm	150	150	150	150	
Ductility, 25 °C, 5 cm/min, cm, min	40			75	T 51
Ductility, 4 °C, 5 cm/min, cm, min			40		
Solubility, in trichloroethylene% min ⁴	97.5 ⁴	97.5 ⁴	97.5 ⁴	97.5 ⁴	T 44
Elastic Recovery, 25 °C min				58	T 301
Float Test, 60 °C, s min				1200	T 50
Toughness, in-lbs, min		70	90		CP-L 2210
Tenacity, in-lbs, min		45	45		CP-L 2210

¹If successful application is achieved in the field, the Engineer may waive this requirement.

² CP-L 2212 is a rapid evaporation test for determining percent residue of an emulsion and providing material for tests on residue. CP-L 2212 is for acceptance only. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test in conformance with AASHTO T-59 to determine acceptability.

³ For polymerized emulsions the distillation and evaporation tests will in be in conformance with AASHTO T-59 or CP-L 2212 respectively with modifications to include 205 ± 5 °C (400 ± 10 °F) maximum temperature to be held for 15 minutes.

⁴ Solubility may be determined on the base asphalt cement prior to polymer modification.

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

(c) *Emulsion for Slurry Seals and Micro-Surfacing.* Emulsions for slurry seals and micro-surfacing shall conform to the requirements listed in Table 702-4. The modified emulsion shall contain a minimum of 3 percent polymer, SBR latex, or natural latex by weight.

Table 702-4
SLURRY SEAL AND MICRO-SURFACING EMULSIONS

Property	CQS-1hL	CQS-1hP	AASHTO Test No.
Viscosity, at 25 °C, Saybolt-Furol, s	15	15	T 59
	100	100	
Storage stability, 24 hr, % max ¹	1.0	1.0	T 59
Particle charge test	Positive	Positive	T 59
Sieve test, % max	0.10	0.10	T 59
Oil Distillate by volume, % max	0.5	0.5	T-59
Residue by distillation/ evaporation, % min ³	62 ³	62 ³	T 59/ CP-L 2212 ²
Penetration, 25 °C, 100g, 5s, min, dmm	40	40	T 49
Penetration, 25 °C, 100g, 5s, max, dmm	150	150	
Ductility, 25 °C, 5 cm/min, cm, min	50	50	T 51
Solubility, in trichloroethylene% min	97.5	97.5	T 44

¹If successful application is achieved in the field, the Engineer may wave this requirement.

² CP-L 2212 is a rapid evaporation test for determining percent residue of an emulsion and providing material for tests on residue. CP-L 2212 is for acceptance only. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test in conformance with AASHTO T-59 to determine acceptability.

³ For polymerized emulsions the distillation and evaporation tests will in be in conformance with AASHTO T-59 or CP-L 2212 respectively with modifications to include 205 ± 5 °C (400 ± 10 °F) maximum temperature to be held for 15 minutes.

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

- (d) *Emulsion for Prime Coat.* Emulsion for prime coat shall conform to the requirements of Table 702-5. Circulate before use if not used within 24 hours.

Table 702-5
ASPHALT EMULSION FOR PRIME COAT (AEP)

Property	Requirement	AASHTO Test No.
Viscosity, Saybolt Furol, at 50 °C (122 °F), s	20-150	T 59
% Residue	65% min.	T 59 to 260 °C (500 °F)
Oil Distillate by Volume, %	7% max.	T59
Tests on Residue from Distillation:		
Solubility in Trichloroethylene, %	97.5 min.	T 44

- (e) *Recycling Agent.* Recycling Agent for Item 406, Cold Bituminous Pavement (Recycle), shall be either a high float emulsified asphalt (polymerized) or an emulsified recycling agent as follows:

1. High Float Emulsified Asphalt (Polymerized). High Float Emulsified Asphalt (Polymerized) for Cold Bituminous Pavement (Recycle) shall be an emulsified blend of polymer modified asphalt, water, and emulsifiers conforming to Table 702-6 for HFMS-2sP. The asphalt cement shall be polymerized prior to emulsification, and shall contain at least 3 percent polymer.

The emulsion standing undisturbed for a minimum of 24 hours shall show no white, milky separation, and shall be smooth and homogeneous throughout.

The emulsion shall be pumpable and suitable for application through a pressure distributor.

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

Table 702-6
HIGH FLOAT EMULSIFIED ASPHALT
(POLYMERIZED) (HFMS-2sP)

Property	Requirement		AASHTO Test
	Minimum	Maximum	
Tests on Emulsion:			
Viscosity, Saybolt Furol at 50 °C (122 °F), sec	50	450	T 59
Storage Stability test, 24 hours, %		1	T 59
Sieve test, %		0.10	T 59
% Residue ¹	65		T 59
Oil distillate by volume, %	1	7	T 59
Tests on Residue:			
Penetration, 25 °C (77 °F), 100g, 5 sec	150	300 ²	T 49
Float Test, 60 °C (140 °F), sec	1200		T 50
Solubility in TCE, %	97.5		T 44
Elastic Recovery, 4 °C (39.2 °F), %	50		T 301
¹ 400 ± 10° F maximum temperature to be held for 15 minutes. ² When approved by the Engineer, Emulsified Asphalt (HFMS-2sP) with a residual penetration greater than 300 dmm may be used with Cold Bituminous Pavement (Recycle) to address problems with cool weather or extremely aged existing pavement. Emulsified Asphalt (HFMS-2sP) with a residual penetration greater than 300 dmm shall meet all properties listed in Table 702-4 except that Elastic Recovery shall be reported for information only.			

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

2. *Emulsified Recycling Agent.* Emulsified Recycling Agent for use in Cold Bituminous Pavement (Recycle) shall conform to the requirements in Table 702-7.

**Table 702-7
 EMULSIFIED RECYCLING AGENT**

Property	Requirement		Test
	Minimum	Maximum	
Tests on Emulsion:			
Viscosity @ 25 °C, SFS	20	200	ASTM D 244
Pumping Stability	Pass		GB Method ¹
			ASTM D 244 ²
Sieve Test, %w		0.1	
Cement Mixing, %w		2.0	ASTM D 244
Particle Charge	Positive		ASTM D 244
Conc. Of Oil Phase	64		ASTM D 244 ³
Tests on Residue:			
Viscosity @ 60 °C , CST	2000	4000	ASTM D 2170
Flash Point, COC, °C (° F)	232		ASTM D 92
Maltenes Dist. Ratio ⁴	$\frac{PC+A_1}{S+A_2}$	0.6	ASTM D 2006
PC/S Ratio	0.4		ASTM D 2006
Asphaltenes, % max.		11.0	ASTM D 2006
<p>¹Pumping stability is determined by charging 450 ml of emulsion into a one liter beaker and circulating the emulsion through a gear pump (Roper 29.B22621) having a 6.3 mm (1/4 inch) inlet and outlet. The emulsion passes if there is no significant separation after circulating ten minutes.</p> <p>²Test procedure identical with ASTM D 244 except that distilled water shall be used in place of 2 percent sodium oleate solution.</p> <p>³ASTM D 244 Evaporation Test for percent of residue is modified by heating 50 gram sample to 149°C (300 °F) until foaming ceases, then cooling immediately and calculating results.</p> <p>⁴In the Maltenes Distribution Ratio Test by ASTM Method D 2006.</p> <p>PC = Polar Compounds S = Saturates A₁ = First Acidaffin A₂ = Second Acidaffins</p>			

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

(f) Asphalt Rejuvenating Agents. Asphalt rejuvenating agents (ARA) shall be composed of a petroleum resin-oil base uniformly emulsified with water and shall conform to the physical and chemical requirements of Table 702-8 or ASTM D 4552.

Table 702-8
ASPHALT REJUVENATING AGENT

Property	Test Method	Requirement
Viscosity, S.F., @ 25 °C (77 °F), s	ASTM D 244	20-40
¹ Residue, % min.	ASTM D 244	60-65
² Miscibility Test	ASTM D 244	No coagulation
³ Sieve Test, % max.	ASTM D 244	0.10
Particle Charge Test	ASTM D 244	Positive
ASTM D244 (Mod):		
Viscosity, 60 °C (140 °F), mm ² /s	ASTM D 445	100 - 200
Flash Point, COC, °C, min.	ASTM D 92	196
Asphaltenes, % max.	ASTM D2006	1.0
⁴ Maltenes Dist. Ratio $\frac{PC+A_1}{S+A_2}$	ASTM D 2006	0.3-0.6
Saturated Hydrocarbons, %	ASTM D 2006	21-28
<p>¹ ASTM D244 Modified Evaporation Test for percent of residue is made by heating 50-gram sample to 149 °C (300 °F) until foaming ceases, then cooling immediately and calculating results.</p> <p>² Test procedure identical with ASTM D244 except that 0.02 Normal Calcium Chloride solution shall be used in place of distilled water.</p> <p>³ Test procedure identical with ASTM D244 except that distilled water shall be used in place of 2% sodium oleate solution.</p> <p>⁴ In the Maltenes Distribution Ratio Test by ASTM Method D4124:</p> <p style="text-align: center;">PC = Polar Compounds S = Saturates A₁ = First Acidaffin A₂ = Second Acidaffins</p>		

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 REVISION OF SECTION 702
 BITUMINOUS MATERIALS

For hot-in-place recycling ARA-1P is an acceptable alternative to ARA. ARA-1P shall meet the requirements below:

Emulsified Polymer Modified Asphalt Rejuvenating Agent (ARA-1P) for use in hot-in-place recycling of bituminous pavements shall be modified with a minimum of 1.5 percent styrene-butadiene solution polymer. The finished product shall conform to the physical requirements listed in Table 702-9 below.

**Table 702-9
 ARA-1P**

Property	Test Method	Min	Max
Test on Emulsion			
Viscosity, Saybolt-Furol @ 77 °F, s	ASTM D 244		100
Residue @ 350 °F, %	ASTM D 244 Mod	60	
Sieve Test, %	ASTM D 244		0.10
Oil distillate, %	ASTM D 244		2.0
Test on Residue			
Penetration @ 39.2 °F, 100g, 5s, dmm	ASTM D-5 Modified	150	250
Asphaltenes, %	ASTM D 4124		15

702.03 (unused)

702.04 Hot Poured Joint and Crack Sealant. Hot poured material for filling joints and cracks shall conform to the requirements of ASTM D 6690, Type II or Type IV. The concrete blocks used in the Bond Test shall be prepared in accordance with CP-L 4101.

Sealant material shall be supplied pre-blended, pre-reacted, and prepackaged. If supplied in solid form the sealant material shall be cast in a plastic or other dissolvable liner having the capability of becoming part of the crack sealing liquid. The sealant shall be delivered in the manufacturer's original sealed container.

Each container shall be legibly marked with the manufacturer's name, the trade name of the sealer, the manufacturer's batch or lot number, the application temperature range, the recommended application temperature, and the safe heating temperature.

The sealant shall be listed in CDOT's Approved Products List prior to use.

October 31, 2013

1
REVISION OF SECTION 703
AGGREGATE FOR BASES

Section 703 of the Standard Specifications is hereby revised for this project as follows:

In subsection 703.03, first paragraph, delete the first sentence and replace with the following:

Aggregates for bases other than Aggregate Base Coarse (RAP) shall be crushed stone, crushed slag, crushed gravel, natural gravel, crushed reclaimed concrete or crushed reclaimed asphalt pavement (RAP). All materials except Aggregate Base Course (RAP) shall conform to the quality requirements of AASHTO M 147 except that the requirements for the ratio of minus 75 μm (No. 200) sieve fraction to the minus 425 μm (No. 40) sieve fraction, stated in 3.2.2 of AASHTO M 147, shall not apply.

The requirements for the Los Angeles wear test (AASHTO T 96 & ASTM C535) shall not apply to Class 1, 2, and 3. Aggregates for bases shall meet the grading requirements of Table 703-3 for the class specified for the project, unless otherwise specified.

1
 REVISION OF SECTION 703
 AGGREGATES FOR HOT MIX ASPHALT

Section 703 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 703.04 and replace with the following:

703.04 Aggregates for Hot Mix Asphalt. Aggregates for hot mix asphalt (HMA) shall be of uniform quality, composed of clean, hard, durable particles of crushed stone, crushed gravel, natural gravel, or crushed slag. Excess of fine material shall be wasted before crushing. A percentage of the aggregate retained on the 4.75 mm (No. 4) sieve for Gradings S, SX and SG— and on the 2.36 mm (No. 8) sieve for Gradings SF and ST—shall have at least two mechanically induced fractured faces when tested in accordance with Colorado Procedure 45. This percentage will be specified in Table 403-1, as revised for the project in Section 403. The angularity of the fine aggregate shall be a minimum of 45.0 percent when determined according to AASHTO T 304. Grading SF mixes, when determined by RME, may not require fine aggregate angularity of 45.0 percent. Aggregate samples representing each aggregate stockpile shall be non-plastic if the percent of aggregate passing the 2.36 mm (No. 8) sieve is greater than or equal to 10 percent by weight of the individual aggregate sample. Plasticity will be determined in accordance with AASHTO T 90. The material shall not contain clay balls, vegetable matter, or other deleterious substances.

The aggregate for Gradings ST, S, SX and SG shall have a percentage of wear of 45 or less when tested in accordance with AASHTO T 96.

**Table 703-4
 MASTER RANGE TABLE FOR HOT MIX ASPHALT**

Sieve Size	Percent by Weight Passing Square Mesh Sieves				
	Grading SF**	Grading ST	Grading SX	Grading S	Grading SG
37.5 mm (1½")					100
25.0 mm (1")				100	90 – 100
19.0 mm (¾")			100	90 – 100	
12.5 mm (½")		100	90 – 100	*	*
9.5 mm (¾")	100	90 – 100	*	*	*
4.75 mm (#4)	90 – 100	*	*	*	*
2.36 mm (#8)	*	28 – 58	28 – 58	23 – 49	19 – 45
1.18 mm (#16)	30 – 54				
600 µm (#30)	*	*	*	*	*
300 µm (#50)					
150 µm (#100)					
75 µm (#200)	2 – 12	2 – 10	2 – 10	2 – 8	1 – 7

* These additional Form 43 Specification Screens will initially be established using values from the As Used Gradation shown on the Design Mix.

**SF applications are limited and the CDOT Pavement Design Manual should be referenced, prior to use.

Aggregates for stone matrix asphalt (SMA) shall be of uniform quality, composed of clean, hard, durable particles of crushed stone, crushed gravel, or crushed slag. A minimum of 90 percent of the particles retained on the 4.75 mm (No. 4) sieve shall have at least two mechanically induced fractured faces when tested in accordance with Colorado Procedure 45. The particles passing the 4.75 mm (No. 4) sieve shall be the product of crushing rock larger than 12.5 mm (½ inch) and shall be non-plastic when tested in accordance with AASHTO T 90.

REVISION OF SECTION 703
 AGGREGATES FOR HOT MIX ASPHALT

Additionally, each source of aggregate for SMA shall meet the following requirements:

- (1) No more than 30 percent when tested in accordance with AASHTO T 96 Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- (2) No more than 12 percent when tested in accordance with AASHTO T 104 Soundness of Aggregate by Use of Sodium Sulfate.

The aggregate for Hot Mix Asphalt (HMA) shall meet the requirements of Table 703-4A when tested in accordance with CP-L 4211 Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus. The Contractor shall be assessed a price reduction of \$1000 for each production sample of the combined aggregate with a value greater than 20 according to CP-L 4211.

Table 703-4A
AGGREGATE DEGRADATION BY ABRASION
IN THE MICRO-DEVAL CP-L 4211

	Not to exceed
Combined Aggregate (Mix Design)	18
Combined Aggregate (1/10,000 tons, or fraction thereof during production)	20

October 20, 2016

REVISION OF SECTION 703
 CLASSIFICATION FOR AGGREGATE BASE COURSE

Section 703 of the Standard Specifications is hereby revised for this project as follows:

In subsection 703.03 delete Table 703-3 and replace with the following:

Table 703-3
CLASSIFICATION FOR AGGREGATE BASE COURSE

Sieve Size	Mass Percent Passing Square Mesh Sieves						
	LL not greater than 35			LL not greater than 30			
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
150mm (6")			100				
100mm (4")		100					
75mm (3")		95-100					
60mm (2 ½")	100						
50mm (2")	95-100			100			
37.5mm (2")				90-100	100		
25mm (1")					95-100	100	100
19mm (¾")				50-90		95-100	
4.75mm (#4)	30-65			30-50	30-70	30-65	
2.36mm (#8)						25-55	20-85
75 µm (#200)	3-15	3-15	20 max	3-12	3-15	3-12	5-15
NOTE: Class 3 material shall consist of bank or pit run material.							

July 28, 2011

REVISION OF SECTION 703
CONCRETE AGGREGATES

Section 703 of the Standard Specifications is hereby revised for this project as follows:

Delete the second paragraph of subsection 703.00 and Table 703-1.

Delete subsections 703.01 and 703.02 and replace with the following:

703.01 Fine Aggregate for Concrete. Fine aggregate for concrete shall conform to the requirements of AASHTO M 6, Class A. The minimum sand equivalent, as tested in accordance with Colorado Procedure 37 shall be 80 unless otherwise specified. The fineness modulus, as determined by AASHTO T 27, shall not be less than 2.50 or greater than 3.50 unless otherwise approved.

703.02 Coarse Aggregate for Concrete. Coarse aggregate for concrete shall conform to the requirements of AASHTO M 80, Class A aggregates, except that the percentage of wear shall not exceed 45 when tested in accordance with AASHTO T 96.

February 18, 2016

REVISION OF SECTION 709
EPOXY COATED REINFORCING BARS

Section 709 of the Standard Specifications is hereby revised for this project as follows:

In subsection 709.01, delete the last row of the table and replace with the following

Epoxy Coated Reinforcing Bars	AASHTO A 775
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Delete the first sentence of subsection 709.03 and replace with the following:

Tie bars for longitudinal and transverse joints shall conform to AASHTO A 775 and shall be grade 40, epoxy-coated, and deformed.

1
REVISION OF SECTION 712
GEOTEXTILES

Section 712 of the Standard Specifications is hereby revised for this project as follows:

In subsection 712.08, delete the third and fourth paragraphs and replace with the following:

Physical requirements for all geotextiles shall conform to the requirements of AASHTO M-288. Materials shall be selected from the New York Department of Transportation's Approved Products List of Geosynthetic materials that meet the National Transportation Product Evaluation Program (NTPEP) and AASHTO M-288 testing requirements. The current list of products that meet these requirements is located at:

www.dot.ny.gov

The Geotextile Approved Products List may be accessed by clicking on the following tabs once on the NYDOT site to:

- (1) A To Z Site Index
- (2) Approved List
- (3) Approved Products
- (4) Materials and Equipment
- (5) Geosynthetics for Highway Construction
- (6) Geotextiles

In subsection 712.08, delete Table 712-2 and replace with the following

2
 REVISION OF SECTION 712
 GEOTEXTILES

Table 712-2
TYPICAL VALUES OF PERMEABILITY COEFFICIENTS¹

Turbulent Flow	Particle Size Range Millimeters (inches)		Effective Size	Permeability Coefficient k cm/s
	D max	D min	D 20 mm (inches)	
Derrick STONE	3000 (120)	900 (36)	1200 (48)	100
One-man STONE	300 (12)	100 (4)	150 (6)	30
Clean, fine to coarse GRAVEL	80 (3)	10 (1/4)	13 (1/2)	10
Fine, uniform GRAVEL	8 (3/8)	1.5 (1/16)	3 (1/8)	5
Very coarse, clean, uniform SAND	3 (1/8)	0.8 (1/32)	1.5 (1/16)	3
Laminar Flow				
Uniform, coarse SAND	2 (1/8)	0.5 (1/64)	0.6	0.4
Uniform, medium SAND	0.5	0.25	0.3	0.1
Clean, well-graded SAND & GRAVEL	10	0.05	0.1	0.01
Uniform, fine SAND	0.25	0.05	0.06	40 x 10 ⁻⁴
Well-graded, silty SAND & GRAVEL	5	0.01	0.02	4 x 10 ⁻⁴
Silty SAND	2	0.005	0.01	1.0 x 10 ⁻⁴
Uniform SILT	0.05	0.005	0.006	0.5 x 10 ⁻⁴
Sandy CLAY	1.0	0.001	0.002	0.05 x 10 ⁻⁴
Silty CLAY	0.05	0.001	0.0015	0.01 x 10 ⁻⁴
CLAY (30% to 50% clay sizes)	0.05	0.0005	0.0008	0.001 x 10 ⁻⁴
Colloidal CLAY (-2 µm 50%)	0.01	10	40	10 ⁻⁹
¹ Basic Soils Engineering, R.K. Hough, 2nd Edition, Ronald Pess Co.; 1969, Page 76. Note: Since the permeability coefficient of the soil will be unknown in most non-critical, non-severe applications for erosion control and drainage, the soil-permeability coefficients listed in Table 712-2 may be used as a guide for comparing the permeability coefficient of the fabric with that of the in-place soil				

February 3, 2011

REVISION OF SECTION 712
WATER FOR MIXING OR CURING CONCRETE

Section 712 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 712.01 and replace it with the following:

712.01 Water. Water used in mixing or curing concrete shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetation, or other substance injurious to the finished product. Concrete mixing water shall meet the requirements of ASTM C1602. The Contractor shall perform and submit tests to the Engineer at the frequencies listed in ASTM C1602. Potable water may be used without testing. Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, and other foreign materials.

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

FHWA-1273 -- Revised May 1, 2012

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release,

or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following

the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and

so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe

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benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable

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classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

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2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

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3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered

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transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier

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prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered

into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY
SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD
CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**BID TABULATION
SECTION C**

OLD ST. VRAIN ROAD BRIDGE
FEMA PROJ. NO TD-SEPT12C14; BOULDER COUNTY PROJECT BR-84S-001-SSV1-FLOOD

BID TABULATION

May 10, 2017

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTAL UNITS	UNIT COST	TOTAL COST
201-00000	Clearing & Grubbing	LS	1		
202-00005	Removal of Debris (Flood Debris)	LS	1		
202-00010	Removal of Trees (6" to < 12")	EACH	53		
202-00011	Removal of Trees (12" to < 24")	EACH	17		
202-00012	Removal of Trees (24" and Greater)	EACH	4		
202-00070	Removal of Barricade	EACH	5		
202-00220	Removal of Asphalt Mat	SY	779		
202-00495	Removal of Portions of Present Structure	LS	1		
202-01000	Removal of Fence	LF	209		
203-00000	Unclassified Excavation	CY	3220		
203-01597	Potholing	HR	8		
206-00000	Structure Excavation	CY	5722		
206-00100	Structure Backfill (Class 1)	CY	536		
206-00360	Mechanical Reinforcement of Soil	CY	502		
207-00205	Topsoil (Borrow)	CY	904		
208-00002	Erosion Log (12 Inch) (Biodegradable)	LF	50		
208-00020	Silt Fence	LF	875		
208-00045	Concrete Washout Structure	EACH	2		
208-00070	Vehicle Tracking Pad	EACH	2		
208-00206	Erosion Control Supervisor	DAY	40		

OLD ST. VRAIN ROAD BRIDGE
 FEMA PROJ. NO TD-SEPT12C14; BOULDER COUNTY PROJECT BR-84S-001-SSV1-FLOOD
 BID TABULATION
 May 10, 2017

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTAL UNITS	UNIT COST	TOTAL COST
208-00520	Temporary Stream Crossing	EACH	1		
210-00810	Reset Ground Sign	EACH	3		
211-03005	Dewatering	LS	1		
212-00006	Seeding (Native)	ACRE	1.78		
212-00205	Deciduous Tree (2 Gallon Container)	EACH	45		
212-00310	Deciduous Shrub (1 Gallon Container)	EACH	1		
212-00320	Deciduous Shrub (2 Gallon Container)	EACH	68		
212-00350	Deciduous Shrub (5 Gallon Container)	EACH	13		
212-00450	Evergreen Tree (5 Gallon Container)	EACH	7		
212-01210	Seeding Establishment	LS	1		
213-00012	Spray-on Mulch Blanket	ACRE	1.68		
214-01015	Willow Cuttings	EACH	48		
214-01227	Rootwads	EACH	7		
216-00037	Soil Retention Blanket (Coconut) (Biodegradable)	SY	1409		
217-00016	Noxious Weed Management	HR	80		
304-06000	Aggregate Base Course (Class 6)	TON	440		
403-32741	Hot Mix Asphalt (Grading S) (75) (PG 64-22)	TON	154		
403-33741	Hot Mix Asphalt (Grading SX) (75) (PG 64-22)	TON	311		
503-00030	Drilled Caisson (30 Inch)	LF	326		
503-00100	CSL Testing	EACH	8		
506-00524	Buried Riprap (24 Inch)	CY	1245		
509-00011	Prefabricated Structural Steel Bridge	LS	1		

OLD ST. VRAIN ROAD BRIDGE
 FEMA PROJ. NO TD-SEPT12C14; BOULDER COUNTY PROJECT BR-84S-001-SSV1-FLOOD
 BID TABULATION
 May 10, 2017

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTAL UNITS	UNIT COST	TOTAL COST
515-00120	Waterproofing (Membrane)	SY	668		
518-01050	Bridge Expansion Joint (Special)	LF	77		
601-03040	Concrete Class D (Bridge)	CY	352		
601-04008	Architectural Features	LS	1		
601-40301	Structural Concrete Coating	SY	272		
602-00020	Reinforcing Steel (Epoxy Coated)	LB	82900		
603-01245	24 Inch Reinforced Concrete Pipe (Complete In Place)	LF	126		
606-00301	Guardrail Type 3 W-Beam (6-3 Post Spacing)	LF	50		
606-01370	Transition Type 3G	EACH	4		
606-01385	End Anchorage Type 3K	EACH	2		
606-02005	End Anchorage (Flared)	EACH	2		
606-11030	Bridge Rail Type 10M	LF	415		
607-01000	Fence Barbed Wire with Metal Posts	LF	158		
607-11525	Fence (Plastic)	LF	1000		
612-00001	Delineator (Type I)	EACH	16		
613-00400	4 Inch Electrical Conduit	LF	413		
620-00012	Field Office (Class 2)	EACH	1		
620-00020	Sanitary Facility	EACH	2		
625-00000	Construction Survey	LS	1		
626-00000	Mobilization	LS	1		
627-00005	Epoxy Pavement Marking	GAL	5		
627-30405	Preformed Thermoplastic Pavement Marking (Word-Symbol)	SF	13		

OLD ST. VRAIN ROAD BRIDGE
 FEMA PROJ. NO TD-SEPT12C14; BOULDER COUNTY PROJECT BR-84S-001-SSV1-FLOOD
 BID TABULATION
 May 10, 2017

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTAL UNITS	UNIT COST	TOTAL COST
627-30410	Preformed Thermoplastic Pavement Marking (Xwalk-Stopline)	SF	20		
629-01005	Survey Monument (Type 5)	EACH	1		
630-00000	Flagging	HR	300		
630-80335	Barricade (Type 3 M-A) (Temporary)	EACH	5		
630-80342	Construction Traffic Sign (Panel Size B)	EACH	10		
630-80360	Drum Channelizing Device	EACH	30		
	FORCE ACCOUNT		1		
700-70010	MINOR CONTRACT REVISIONS	F/A	1	\$100,000.00	\$100,000.00
700-70380	EROSION CONTROL	F/A	1	\$5,000.00	\$5,000.00
	TOTAL				<u> </u>

Enclosed herewith is the required bid bond in the amount of ten percent (10%) (\$_____) which the bidder agrees to be forfeited to and become the property of the County of Boulder as liquidated damage should this proposal be accepted and a Contract be awarded to him and he fails to enter into a Contract in the form prescribed and to furnish the required bonds and insurance within ten days upon his signing the contract and delivering the approved bonds. In submitting the bid it is understood that the right is reserved by the County of Boulder to reject any and all bids.

SIGNATURE PAGE

Bid #6661-17

Old St. Vrain Road Bridge over South St. Vrain Creek

Failure to complete, sign and return this signature page with your bid may be cause for rejection.

Contact Information	Response
Company Name including DBA	
List Type of Organization (Corporation, Partnership, etc.)	
Name and Title of Person Authorized to Contract with Boulder County	
Name and Title of Person Submitting Bid	
Email Address for Person Submitting Bid	
Company Address	
Company Phone Number	
Company Website	
Company Fax Number	

By signing below I certify that:

I am authorized to bid on my company's behalf.

I am not currently an employee of Boulder County.

None of my employees or agents is currently an employee of Boulder County.

I am not related to any Boulder County employee or Elected Official.

I am not a Public Employees' Retirement Association (PERA) retiree.

**Signature of Person Authorized to Bid on
Company's Behalf**

Date

Note: If you cannot certify the above statements, please explain in a statement of explanation.

**BOULDER COUNTY
PROJECT NO.
CONTRACT ID**

THIS CONTRACT ("Contract") is entered into between the County of Boulder, State of Colorado, acting by and through its Board of County Commissioners ("County") and _____, ("Contractor") (Collectively the "Parties").

In consideration of the rights and obligations specified below, the County and the Contractor agree as follows:

1. Incorporation into Contract: The Invitation for Bid, Bid Specifications of Boulder County Bid No. «F15», the Standard Specifications for Road and Bridge Construction 2011, Plans, Contract Documents, Special Provisions and the Contractor's Proposal, all being applicable to the Project and on file in the office of the County Engineer, together with any alterations and/or modifications to these Specifications (the "Bid Documents"), are expressly incorporated into this Contract by this reference.
2. Work to be Performed: The Contractor will, in a good and workmanlike manner and at its own cost and expense, furnish all labor and equipment and do all work necessary and incidental to performing (specify type of work) as specified in the Bid Documents and this Contract (the "Work". The Contractor shall perform the Work in strict accordance with the Bid Documents and this Contract to complete construction of Boulder County Project: «F1» - «F2».
3. Payment for Work Performed: In consideration of the foregoing, the County hereby agrees to pay to the Contractor, according to the requirements of the Specifications contained in the documents referenced in paragraph 1, the amounts required for the completed Unit Price Work at the bid price of \$_____, calculated according to the prices bid, but not to exceed the maximum amount of \$_____, and such further amounts as may be required for the extra work or materials, all according to the provisions and subject to the conditions as set forth in the Specifications.
4. Contract Term and Project Time: The term of this contract will continue from the date of execution until (**date – end of calendar year**) (the "Contract Term"). It is further agreed that **time is of the essence** of this Contract, and that work shall begin within ten days of the date of the execution of this Contract and be completed within «F9» WORKING DAYS (the "Project Time"). If the Project Time will exceed the Contract Term, the Parties must agree, in writing, to extend or renew the Contract under the provisions of paragraph 5.
5. Extension and/or Renewal of Contract Term:
 - a. The County, in its sole discretion, may elect to extend the term of this Contract. In the event the County elects to exercise this right, it shall send notice to Contractor, pursuant to paragraph 17, of its intent to extend the term of the Contract. The

notice shall set forth the length of the extension.

- b. Upon mutual agreement by the Parties, this Contract may be renewed for four additional one-year periods through (date) during which time this Contract shall be in full force and effect, subject to the termination provisions of paragraph 16. If this option to renew is exercised, the Parties shall execute a written agreement no later than thirty (30) days before the expiration of this Contract or any subsequent renewals.
 - a. All of the provisions of this Contract shall remain in full force and effect during any extension or renewed term except that the scope of services and compensation to be paid to Contractor during any extension or renewed term shall be mutually agreed upon prior to the commencement of any extension or renewed term. The agreed upon scope of services and compensation shall be reduced to writing, signed by both Parties, and attached to this Contract.
 - b. **TEN CALENDAR DAYS BEFORE THE COMMENCEMENT OF ANY EXTENDED TERM THE CONTRACTOR SHALL SUBMIT TO THE COUNTY PROOF OF INSURANCE AS REQUIRED IN PARAGRAPH 10.**
 - c. Should the Parties fail to agree upon the scope of services or compensation to be paid to Contractor for any extension or renewed term, or should Contractor fail to submit the required documents within the time period specified in paragraph 5(d), then this Contract shall terminate at the end of the then current term and no extension or renewal of the term of the Contract shall occur.
6. **Bond:** If this Contract involves the payment of more than fifty thousand dollars (\$50,000) for the construction, erection, repair, maintenance, or improvements or any building, road, bridge, viaduct, tunnel, excavation or the public work for this County, before entering upon the performance of any such work included in this Contract, the Contractor shall duly execute and deliver to, and file with the board, officer, body, or person by whom such Contract was awarded a good and sufficient bond, or other acceptable surety approved by such contracting board, officer, body, or person, in a penal sum not less than one-half of the total amount payable by the terms of the Contract. Such bond shall be duly executed by a qualified corporate surety, conditioned upon the faithful performance of the Contract, and, in addition, shall provide that, if the Contractor or his subcontractor fails to duly pay for any labor, materials, team hire, sustenance, provisions, provender, or other supplies used or consumed by such Contractor or his subcontractor in performance of the work contracted to be done or fails to pay any person who supplies rental machinery, tools, or equipment, in the prosecution of the work, the surety will pay the same in an amount not exceeding the sum specified in the bond together with interest at the rate of eight (8) percent per annum. Unless such is executed, delivered, and filed, no claim in favor of the Contractor arising under such Contract shall be audited, allowed or paid. A certified or cashier's check or a bank money order made payable to the treasurer of the state of Colorado or to the treasurer or other officer designated by the governing body or to the treasurer or other officer designated by the governing body of

the contracting local government may be accepted in lieu of a bond. This provision is in compliance with C.R.S.38-26-106.

7. Quality of Performance: The Contractor shall perform the Contract in a manner satisfactory and acceptable to the County. The County shall be the sole judge of the quality of performance.
8. Schedule of Work: The Contractor shall perform the Work during the hours designated by the County so as to avoid inconvenience to the County and its personnel and interference with the County's operations.
9. Indemnity: The Contractor shall be liable and responsible for any and all damages to persons or property caused by or arising out of the action, obligations, or omissions of the Contractor, its employees, agents, representatives, or other person acting under the Contractor's direction or control in performing or failing to perform the work under this Contract. The Contractor will indemnify and hold harmless the County, its elected and appointed officials, employees, agents and representatives (hereinafter referred to as "indemnified parties") from any and all liability, claims, demands, actions, damage, losses, judgments, costs or expenses, including but not limited to attorney's fees, which may be made or brought or which may result against any of the indemnified parties as a result or on account of the actions or omissions of the Contractor, its employees, agents or representatives, or other persons acting under the Contractor's direction or control.
10. Insurance Requirements: The Contractor shall procure and maintain at its own expense, and without cost to the County, the following kinds and minimum amounts of insurance for purposes of insuring the liability risks which the Contractor has assumed until this Contract has expired or is terminated:

- a. Commercial General Liability.

Coverage should be provided on an Occurrence form, ISO CG0001 or equivalent. The policy shall be endorsed to include Additional Insured endorsements CG 2010 (or equivalent), Designated Construction Projects General Aggregate Endorsement CG2503 (or equivalent) and Additional Insured (for products/completed operations) CG 2037 (or equivalent). Minimum limits required of \$1,000,000 Each Occurrence, \$2,000,000 General Aggregate and \$2,000,000 Products Completed Operations Aggregate". The County requires Products/Completed Operations coverage to be provided 2 years after completion of construction. An endorsement must be included with the certificate.

- b. Automobile Liability.

Bodily Injury and Property Damage for any owned, hired, and non-owned vehicles used in the performance of the Contract. Minimum limits \$1,000,000 Each Accident.

- c. Workers' Compensation and Employer's Liability.

Workers' Compensation must be maintained with the statutory limits. Employer's Liability is required for minimum limits of \$100,000 Each Accident/\$500,000 Disease-Policy Limit/\$100,000 Disease-Each Employee.

d. Pollution Liability.

Coverage shall cover the Contractor's completed operations. The coverage must also include sudden and gradual pollution conditions including clean-up costs when mandated by governmental authority, when required by law or as a result of a third party claim. Minimum limits required are \$1,000,000 Per Loss and \$1,000,000 Aggregate. If the coverage is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this Contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning from the time that work under this contract is completed.

e. Miscellaneous.

Commercial Umbrella or Excess Liability in the amount of \$3,000,000 following form.

The Contractor shall provide a Certificate of Insurance to Boulder County demonstrating that the insurance requirements have been met prior to the commencement of Work under this Contract. Boulder County shall be named as an additional insured for General Liability and Pollution Liability, as designated in the contract. Additional insured shall be endorsed to the policy.

THE ADDITIONAL INSURED WORDING SHOULD BE AS FOLLOWS: *County of Boulder, State of Colorado, a body corporate and politic, is named as Additional Insured.*

Contractor shall forward certificates of insurance directly to:

Boulder County Transportation
Attn: Rose Walters
P.O. Box 471
Boulder, CO 80306

Notice of Cancellation: Each insurance policy required by the insurance provisions of this Contract shall provide the required coverage and shall not be suspended, voided or canceled except after thirty (30) days prior written notice has been given to the County, except when cancellation is for non-payment of premium, then ten (10) days prior notice may be given. If any insurance company refuses to provide the required notice, the Contractor or its insurance broker shall notify the County of any cancellation, suspension, and/or nonrenewal of any insurance within seven (7) days of receipt of insurers' notification to that effect.

Please forward certificates to the county representative named above.

11. Nondiscrimination: The Contractor agrees to comply with the letter and spirit of the Colorado Anti-Discrimination Act, C.R.S. § 24-34-401, et seq., as amended, and all applicable local, state and federal laws respecting discrimination and unfair employment practices. Boulder County prohibits unlawful discrimination on the basis of race, color, religion, gender, gender identity, national origin, age 40 and over, disability, socio-economic status, sexual orientation, genetic information, or any other status protected by applicable federal, state or local law and the Boulder County Policy manual (of which is available upon request).
12. Nondiscrimination Provisions Binding on Subcontractors, Including Procurement of Materials and Equipment: In all solicitations by the Contractor for any Work related to this Contract to be performed under a subcontract, either by competitive bidding or negotiation and including procurement of materials or equipment, the Contractor shall notify each potential subcontractor of the Contractor's obligations under this Contract, and of all pertinent regulations relative to nondiscrimination and unfair employment practices.
13. Information and Reports: The Contractor will provide to authorized governmental representatives, including those of the County, State and Federal Government, all information and reports which they may require for any purpose authorized by law. The Contractor will permit such authorized governmental representatives access to the Contractor's facilities, books, records, accounts, and any other relevant sources of information. Where any information required by any such authorized government representative is in the exclusive possession of a person other than the Contractor, then such Contractor shall so certify to the County, and shall explain what efforts it has made to obtain the information.
14. Subcontractors: The Contractor will include the provisions of paragraph 6 through 8, and 11 through 12 in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations, order, or instructions issued pursuant thereto. The Contractor will take such action with respect to any subcontract or procurement as the County of Boulder may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the County to enter into such litigation to protect the interests of the County.
15. Independent Contractor: The Parties recognize and agree that the Contractor is an independent contractor for all purposes, both legal and practical, in performing services under this Contract, and that the Contractor and its agents and employees are not agents or employees of Boulder County for any purpose. As an independent contractor, the Contractor shall be responsible for employing and directing such personnel and agents as it requires to perform the services purchased hereunder, shall exercise complete authority over its personnel and agents, and shall be fully responsible for their actions.

Contractor acknowledges that it is not entitled to unemployment insurance benefits or worker's compensation benefits from Boulder County, its elected officials, agents, or any program administered or funded by Boulder County. Contractor shall be entitled to unemployment insurance or worker's compensation insurance only if unemployment compensation coverage or worker's compensation coverage is provided by Contractor, or some other entity that is not a party to this contract. Contractor is obligated to pay federal and state income tax on any monies earned pursuant to the contractual relationship.

16. Termination and Related Remedies:

- a. If the County fails to make payment within forty five (45) calendar days of receiving the Application for Payment, the Contractor may upon seven (7) additional days written notice to the County, pursuant to paragraph 17, terminate the Contract and recover from the County payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools and construction equipment and machinery applicable to the Project. The above charges include reasonable profit and damages.
- b. If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision of the Contract, the County, after seven (7) days written notice to the Contractor pursuant to paragraph 17 and without prejudice to any other remedy it may have, may make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due to the Contractor or, at its option, may terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method it may deem expedient, and if the unpaid balance of the Contract sum exceeds the expense of finishing the Work, such excess shall be paid to the Contractor, but if such expense exceeds such unpaid balance, the Contractor shall pay the difference to the County.
- c. **Boulder County is prohibited by law from making financial commitments beyond the term of its current fiscal year.** The County reserves the right to terminate further work under this Contract if funds for this purpose are not appropriated, budgeted, or otherwise made available for years subsequent to the current fiscal year. In such an event, Boulder County is released from all liability whatsoever and will not be responsible for payment of any costs or expenses incurred in reliance upon this Contract beyond that amount which has been appropriated and made available for this Contract and neither party shall have any further liability hereunder, said Contract to cease and terminate as of such date.
- d. The preceding provisions of this paragraph notwithstanding, the performance of work under this Contract may be terminated, in whole or from time to time in part, by the County whenever for any reason the County shall determine that such termination is in the best interests of the County. Termination of work hereunder

shall be effected by delivery of written notice to the Contractor pursuant to paragraph 17 specifying the extent to which performance of work under the Contract is terminated and the date upon which such termination becomes effective.

- (1) After receipt of the written notice, Contractor shall cancel its outstanding commitments hereunder covering the procurement of materials, supplies, equipment and miscellaneous items. In addition, the Contractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of its outstanding commitments covering personal services and extending beyond the date of such termination to the extent that they relate to the performance of any work terminated by the notice. The Contractor shall then submit a claim for all outstanding amounts due as soon as reasonably possible.

17. Notices: For purposes of the notices required under paragraph 5, 10, and 16, all such notices shall be in writing, and shall be either sent by Certified U.S. Mail, return receipt requested, Electronic Mail (Email), or hand-delivered to the following representatives of the Parties at the following addresses:

For the County: George Gerstle, Director
 Transportation Department
 P. O. Box 471
 Boulder, Colorado 80306
 ggerstle@bouldercounty.org

For the Contractor:

In the event a notice is mailed pursuant to the provisions of this paragraph, the time periods specified in paragraph 16 shall commence to run on the day after the postmarked date of mailing.

18. Statutory Requirements: This Contract is subject to all statutory requirements which are or may become applicable to counties or political subdivisions of the State of Colorado generally. Without limiting the scope of this provision, the Contract is specifically subject to the following statutory requirements:

- a. Colorado Labor: Colorado Labor shall be employed to perform the Work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed under this Contract, in accordance with C.R.S., Section 8-17-101, et seq. "Colorado labor" means any person who is a resident of the State of Colorado at the time of employment

hereunder without discrimination as to race, color, creed, sex, age, or religion, except when sex, or age is a bona fide occupational qualification.

- b. Bribery or Abuse of Public Office: Contractor asserts that it is familiar with the provisions of C.R.S. Sections 18-8-301, et seq. (Bribery and Corrupt Influences) and Section 18-8-401, et. seq., (Abuse of Public Office) and that no violation of such provisions has occurred with regard to this Contract
- c. Non-Payment to Sub-contractors: Contract Payments may be withheld pursuant to C.R.S. Section 38-26-107, if the County receives a verified statement that the Contractor has not paid amounts due to any person who has supplied labor or materials for the project.

19. Prohibitions on Public Contract for Services:

Pursuant to Colorado Revised Statute (C.R.S.), § 8-17.5-101, et. seq., as amended, the Contractor shall meet the following requirements prior to signing this Agreement (public contract for service) and for the duration thereof:

- a. *The Contractor shall not knowingly employ or contract with an illegal alien to perform work under this public contract for services.*
- b. *The Contractor shall not enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this public contract for services.*
- c. *At the time of signing this public contract for services, the Contractor has confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this public contract for services through participation in either the E-Verify Program or the Department Program.*
- d. *The Contractor shall not use either the E-Verify Program or the Department Program procedures to undertake pre-employment screening of job applicants while this public contract for services is being performed.*
- e. *If Contractor obtains actual knowledge that a subcontractor performing work under this public contract for services knowingly employs or contracts with an illegal alien, the Contractor shall: notify the subcontractor and the County within three days that the Contractor has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and, terminate the subcontract with the subcontractor if within three days of receiving the notice required pursuant to the previous paragraph, the subcontractor does not stop employing or contracting with the illegal alien; except that the contractor shall not terminate the contract with the subcontractor if during such three days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien.*
- f. *Contractor shall comply with any reasonable requests by the Department of Labor and Employment (the Department) made in the course of an investigation that the Department is undertaking pursuant to the authority established in C.R.S. § 8-17.5-102(5).*

- g. *If Contractor violates any provisions of this Section of this Agreement, the County may terminate this Agreement for breach of contract. If the Agreement is so terminated, the Contractor shall be liable for actual and consequential damages to the County.*
20. Sanctions for Noncompliance: In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the County shall impose such Contract sanctions as it may determine to be appropriate, including but not limited to:
- a. Withholding of payments to the Contractor under the Contract until the Contractor complies, and/or
 - b. Cancellation, termination, or suspension of the Contract, in whole or in part effective upon seven (7) days written notice to the Contractor pursuant to paragraph 16.
21. Amendments: This Contract may be altered, amended or repealed only on the mutual agreement of the County and the Contractor by a duly executed written instrument.
22. Assignment: This Contract shall not be assigned or subcontracted by the Contractor without the prior written consent of the County.
23. Complete Agreement/Binding Effect: This agreement represents the complete agreement between the Parties hereto and shall be fully binding upon the successors, heirs, and assigns of the Parties, if any, during the term hereof.
24. Governing Law: The laws of the State of Colorado shall govern the interpretation and enforcement of this Contract. Any litigation that may arise between the Parties involving the interpretation or enforcement of the terms of this Contract shall be initiated and pursued by the Parties in the Courts of the 20th Judicial District of the State of Colorado and the applicable Colorado Appellate Courts.
25. Breach: Any waiver of a breach of this Contract shall not be held to be a waiver of any other or subsequent breach of this Contract. All remedies afforded in this Contract shall be taken and construed as a cumulative, that is, in addition to every other remedy provided herein or by law.
26. Termination of Prior Agreements: This Contract cancels and terminates, as of its effective date, all prior agreements between the Parties relating to the services covered by this Contract, whether written or oral or partly written and partly oral.
27. Invalidity Provision: Should any of the provisions of this agreement be held to be invalid or unenforceable, then the balance of the agreement shall be held to be in full force and effect as though the invalid portion was not included; provided, however, that should the invalidity or unenforceability go to the essence of the agreement or be of substantial nature, then the Party or Parties who would receive the benefit of the provision, were it not invalid or unenforceable, shall have the option to terminate this agreement, forthwith.

28. Third Party Beneficiary: The enforcement of the terms and conditions of this Contract and all rights of action relating to such enforcement shall be strictly reserved to the County and the Contractor, and nothing contained in this Contract shall give or allow any claim or right of action whatsoever by any other or third person. It is the express intent of the Parties to this Contract that any person receiving services or benefits under this Contract shall be deemed an incidental beneficiary only.
29. Governmental Immunity: By requiring this right to indemnification the County in no way waives or intends to waive the County's immunity protection under the Colorado Governmental Immunity Act, C.R.S. Section 24-10-101, et. seq., as amended.
30. Guaranty and Warranties: The Contractor shall furnish the County with a written guaranty for one year covering all labor, materials and workmanship incorporated in the work. The Contractor, in instances of work performed by the specification, shall procure such warranties and deliver them to the County on completion of the work. Such warranties will not lessen the Contractor's responsibilities under the purchase order documents. Whenever warranties or guarantees are required by the specifications for a period longer than one year, such longer period shall govern.
31. Determination of Unit Prices:
- a. The County will determine the actual quantities and classifications of Unit Price Work performed by Contractor. The County will review with Contractor the County's preliminary determinations on such matters before rendering written decision thereon (by recommendation of an Application for Payment or otherwise). The County's written decision thereon will be final and binding upon Contractor.
 - b. The value of any Unit Price Work covered by a Change order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:
 - (1) By application of unit prices to the quantities of the items involved, subject to the following provisions:
 - (i) Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Contract. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made in accordance with Paragraph 28a.

- (ii) Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- (iii) Where the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Contract and there is no corresponding adjustment with respect to any other item of Work and if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may make a claim for an increase in the Contract Price. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party promptly (but in no event later than ten calendar days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within twenty calendar days after such occurrence and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph.

32. Execution by Counterparts; Electronic Signatures: This agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same instrument. The Parties approve the use of electronic signatures for execution of this Agreement. Only the following two forms of electronic signatures shall be permitted to bind the Parties to this Agreement: (1) Electronic or facsimile delivery of a fully executed copy of a signature page; (2) The image of the signature of an authorized signer inserted onto PDF format documents. All use of electronic signatures shall be governed by the Uniform Electronic Transactions Act, C.R.S. §§ 24-71.3-101 to 121.

[Signature Page to Follow]

IN WITNESS WHEREOF, the Parties have executed and entered into this Contract as of the latter day and year indicated below.

Executed by Boulder County on _____.
(date)

**COUNTY OF BOULDER
STATE OF COLORADO**

ATTEST: _____

By: _____
Administrative Assistant
Clerk to the Board of
Commissioners

By: _____
, Chair,
Board of County Commissioners

(seal)

Executed by Contractor on _____.
(date)

CONTRACTOR:

Signature: _____

(If this Contract is executed on behalf of a corporation, it must be signed by an agent duly authorized by the corporation to execute such Contract, and if specified by the corporate by-laws, the corporate seal must be affixed to the Agreement by the Secretary of the corporation or other authorized keeper of the corporate seal.)

CONTRACTOR’S CERTIFICATION OF COMPLIANCE

Pursuant to Colorado Revised Statutes, § 8-17.5-101, et seq., as amended, as a prerequisite to entering into a contract for services with Boulder County, Colorado, the undersigned Contractor hereby certifies that at the time of this certification, Contractor does not knowingly employ or contract with an illegal alien who will perform work under the attached contract for services and that the Contractor will participate in the E-Verify Program or Department program, as those terms are defined in C.R.S. § 8-17.5-101, et seq., in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under the attached contract for services.

CONTRACTOR:

Company Name

Date

Name (Print or Type)

Signature

Title

Note: Registration for the E-Verify Program can be completed at: <https://e-verify.uscis.gov/enroll/>.

**ADDENDUM TO CONTRACT
FEDERAL EMERGENCY MANAGEMENT AGENCY'S GRANT PROGRAM
REQUIREMENTS FOR PROCUREMENT CONTRACTS**

This is an addendum to the [CONTRACT NAME], RFP _____, Agreement between [CONTRACTOR] ("Contractor"), and Boulder County, (the "County").

The parties acknowledge that the above-referenced contract is subject to the provisions of 44 CFR § 13.36 and the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.). This addendum is hereby expressly incorporated into the agreement between Boulder County and the Contractor. To the extent that the terms of the Agreement and this Addendum conflict, the terms of this Addendum shall control. Nothing in this Addendum shall be construed as making this Agreement contingent upon a Presidential disaster declaration or FEMA's approval or obligation of funds.

The following provisions are hereby added and incorporated into the above-referenced Agreement:

1. EQUAL EMPLOYMENT OPPORTUNITY COMPLIANCE *(applicable to all construction contracts awarded in excess of \$10,000 by grantees and their contractors or subgrantees; 44 CFR§13.36(i)(3))*

Contractor agrees to comply with Executive Order 11246 of September 24, 1965, entitled "Equal Employment Opportunity," as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR Part 60).

2. ANTI-KICKBACK ACT COMPLIANCE *(applicable to all contracts and subgrants for construction or repair; 44 CFR§13.36(i)(4))*

Contractor agrees to comply with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3).

3. ACCESS TO RECORDS

A. The Contractor agrees to provide the County, FEMA, the Comptroller General of the United States or any their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this Agreement for the purposes of making audits, examinations, excerpts and transcriptions. 44 CFR§13.36(i)(10).

B. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

C. The Contractor agrees to maintain all books, records, accounts and reports required under this Agreement for a period of not less than three years after the later of: (a) the date of termination or expiration of this Agreement or (b) the date County makes final payment under this Agreement, except in the event of litigation or settlement of claims arising from the performance of this Agreement, in which case, Contractor agrees to maintain same until the County, FEMA, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. 44 CFR§13.36(i)(11).

4. CONTRACT WORK HOURS AND SAFETY STANDARDS (*applicable to construction contracts awarded by grantees and subgrantees in excess of \$2,000, and in excess of \$2500 for other contracts which involve the employment of mechanics or laborers; 44 CFR §13.36(i)(6)*)

Contractor agrees that it shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327–330) as supplemented by Department of Labor regulations (29 CFR Part 5), which are incorporated herein.

5. NOTICE OF REPORTING REQUIREMENTS

A. Contractor acknowledges that it has read and understands the reporting requirements of FEMA stated in 44CFR§ 13.40 et seq., 13.50-13.52 and Part III of Chapter 11 of the United States Department of Justice’s Office of Justice Programs Financial Guide, and agrees to comply with any such applicable requirements.

B. The Contractor agrees to include the above clause in each third party subcontract financed in whole or in part with Federal assistance provided by FEMA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions

6. PATENT RIGHTS (*applicable to contracts for experimental, research, or development projects financed by FEMA; 44 CFR §13.36(i)(8)*)

A. General. If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under this Agreement, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the County and Contractor agree to take actions necessary to provide immediate notice and a detailed report to FEMA.

B. Unless the Government later makes a contrary determination in writing, irrespective of Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), the County and Contractor agree to take the necessary actions to provide, through FEMA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” 37 CFR, Part 401.

C. The Contractor agrees to include paragraphs A and B above in each third party subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FEMA.

7. NOTICE OF REQUIREMENTS PERTAINING TO COPYRIGHTS

A. Contractor agrees that FEMA shall have a royalty-free, nonexclusive, and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, for government purposes:

(1) The copyright in any work developed with the assistance of funds provided under this Agreement;

(2) Any rights of copyright to which Contractor purchases ownership with the assistance of funds provided under this Agreement. 44 CFR §13.34, 13.36(i)(8)- (9).

B. The Contractor agrees to include paragraph A above in each third party subcontract financed in whole or in part with Federal assistance provided by FEMA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

8. ENERGY CONSERVATION REQUIREMENTS

A. The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act. 44 CFR § 13.36(i)(13).

B. The Contractor agrees to include paragraph A above in each third party subcontract financed in whole or in part with Federal assistance provided by FEMA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

9. CLEAN AIR AND WATER REQUIREMENTS (*applicable to all contracts and subcontracts in excess \$100,000, including indefinite quantities where the amount is expected to exceed \$100,000 in any year; 44 CFR §13.36(i)(12))*)

A. Contractor agrees to comply with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

B. Contractor agrees to report each violation of these requirements to the County and understands and agrees that the County will, in turn, report each violation as required to assure notification to FEMA and the appropriate EPA regional office.

C. The Contractor agrees to include paragraph A and B above in each third party subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FEMA.

10. TERMINATION FOR CONVENIENCE OF COUNTY (*applicable to all contracts in excess of \$10,000; 44 CFR §13.36(i)(2)*)

A. County shall have the option, in its sole discretion, to terminate this Agreement, at any time during the term hereof, for convenience and without cause. County shall exercise this option by giving Contractor written notice of termination. The notice shall specify the date on which termination shall become effective

B. Upon receipt of the notice, Contractor shall commence and perform, with diligence, all actions necessary on the part of Contractor to effect the termination of this Agreement on the date specified by County and to minimize the liability of Contractor and County to third parties as a result of termination. All such actions shall be subject to the prior approval of the County. Such actions shall include, without limitation:

(1) Halting the performance of all services and other work under this Agreement on the date(s) and in the manner specified by County.

(2) Not placing any further orders or subcontracts for materials, services, equipment or other items.

(3) Terminating all existing orders and subcontracts.

(4) At County's direction, assigning to County any or all of Contractor's right, title, and interest under the orders and subcontracts terminated. Upon such assignment, County shall have the right, in its sole discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.

(5) Subject to County's approval, settling all outstanding liabilities and all claims arising out of the termination of orders and subcontracts.

(6) Completing performance of any services or work that County designates to be completed prior to the date of termination specified by County.

(7) Taking such action as may be necessary, or as the County may direct, for the protection and preservation of any property related to this Agreement which is in the possession of Contractor and in which County has or may acquire an interest.

C. Within 30 days after the specified termination date, Contractor shall submit to County an invoice, which shall set forth each of the following as a separate line item:

(1) The reasonable cost to Contractor, without profit, for all services and other work County directed Contractor to perform prior to the specified termination date, for which services or work County has not already tendered payment. Reasonable costs may include a reasonable allowance for actual overhead, not to exceed a total of 10% of Contractor's direct costs for services or other work. Any overhead allowance shall be separately itemized. Contractor may also recover the reasonable cost of preparing the invoice. Taking such action as may be necessary, or as the County may direct, for the protection and preservation of any property related to this Agreement which is in the possession of Contractor and in which County has or may acquire an interest.

(2) A reasonable allowance for profit on the cost of the services and other work described in the immediately preceding subsection (1), provided that Contractor can establish, to the satisfaction of County, that Contractor would have made a profit had all services and other work under this Agreement been completed, and provided further, that the profit allowed shall in no event exceed 5% of such cost.

(3) The reasonable cost to Contractor of handling material or equipment returned to vendor, delivered to the County or otherwise disposed of as directed by the County.

- D. In no event shall County be liable for costs incurred by Contractor or any of its subcontractors after the termination date specified by County, except for those costs specifically enumerated and described in the immediately preceding subsection (c). Such non-recoverable costs include, but are not limited to, anticipated profits on this Agreement, post-termination employee salaries, post-termination administrative expenses, post-termination overhead or unabsorbed overhead, attorneys' fees or other costs related to the prosecution of a claim or lawsuit, prejudgment interest, or any other expense which is not reasonable or authorized under such subsection (c).
- E. In arriving at the amount due to Contractor under this Section, County may deduct:
 - (4) All payments previously made by County for work or other services covered by Contractor's final invoice;
 - (5) Any claim which County may have against Contractor in connection with this Agreement;
 - (6) Any invoiced costs or expenses excluded pursuant to the immediately preceding subsection (d); and
 - (7) In instances in which, in the opinion of the County, the cost of any service or other work performed under this Agreement is excessively high due to costs incurred to remedy or replace defective or rejected services or other work, the difference between the invoiced amount and County's estimate of the reasonable cost of performing the invoiced services or other work in compliance with the requirements of this Agreement.
- F. County's payment obligation under this Section shall survive termination of this Agreement.

11. TERMINATION FOR DEFAULT

Contractor's failure to perform or observe any term, covenant or condition of this document (Federal Emergency Management Agency's Emergency Management Performance Grant Program Requirements for Procurement Contracts) shall constitute an event of default under this Agreement.

- A. Each of the following shall also constitute an event of default ("Event of Default") under this Agreement:
 - (1) Contractor fails or refuses to perform or observe any other term, covenant or condition contained in this Agreement, and such default continues for a period of ten days after written notice thereof from County to Contractor.
 - (2) Contractor (a) is generally not paying its debts as they become due, (b) files, or consents by answer or otherwise to the filing against it of a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency or other debtors' relief law of any jurisdiction, (c) makes an assignment for the benefit of its creditors, (d) consents to the appointment of a

custodian, receiver, trustee or other officer with similar powers of Contractor or of any substantial part of Contractor's property or (e) takes action for the purpose of any of the foregoing.

(3) A court or government authority enters an order (a) appointing a custodian, receiver, trustee or other officer with similar powers with respect to Contractor or with respect to any substantial part of Contractor's property, (b) constituting an order for relief or approving a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency or other debtors' relief law of any jurisdiction or (c) ordering the dissolution, winding-up or liquidation of Contractor.

- B.** On and after any Event of Default, County shall have the right to exercise its legal and equitable remedies, including, without limitation, the right to terminate this Agreement or to seek specific performance of all or any part of this Agreement. In addition, County shall have the right (but no obligation) to cure (or cause to be cured) on behalf of Contractor any Event of Default; Contractor shall pay to County on demand all costs and expenses incurred by County in effecting such cure, with interest thereon from the date of incurrence at the maximum rate then permitted by law. County shall have the right to offset from any amounts due to Contractor under this Agreement or any other agreement between County and Contractor all damages, losses, costs or expenses

incurred by County as a result of such Event of Default and any liquidated damages due from Contractor pursuant to the terms of this Agreement or any other agreement.

C. All remedies provided for in this Agreement may be exercised individually or in combination with any other remedy available hereunder or under applicable laws, rules and regulations. The exercise of any remedy shall not preclude or in any way be deemed to waive any other remedy

12. SOCIOECONOMIC ENGAGEMENT

Contractor will take the following affirmative steps to engage small and minority firms, women's business enterprises, and labor surplus area firms.

- A. Place qualified small and minority business and women's business enterprises on sub-contractor solicitation lists.
- B. Assure that such firms are solicited whenever they are potential sources.
- C. Divide total requirements into smaller tasks or quantities to permit maximum participation by such firms.
- D. Establish delivery schedules which encourage participation by such firms

13. NO SUSPENSION OR DEBARMENT

Contractor certifies that neither it nor its Principals (as defined at 49 C.F.R. §29.105) or any of its subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this Agreement by any Federal department or agency.

Except as modified herein, all terms and conditions of the existing contract between the parties remain in full force and effect.

IF THIS ADDENDUM IS INCORPORATED BY REFERENCE INTO THE CONTRACT, THE PARTIES DO NOT NEED TO SIGN THE ADDENDUM, AND THE SIGNATURE BLOCKS MAY BE REMOVED

Accepted by **CONTRACTOR** on

(Date)

By: _____

TITLE

Accepted by **BOULDER COUNTY** on

(Date)

, Chair

BOULDER COUNTY TRANSPORTATION DEPARTMENT

HIGHWAY CONSTRUCTION BID PLANS OF PROPOSED
FEMA FLOOD PROJECT NO. TD-SEPT12C14

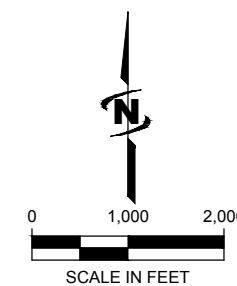
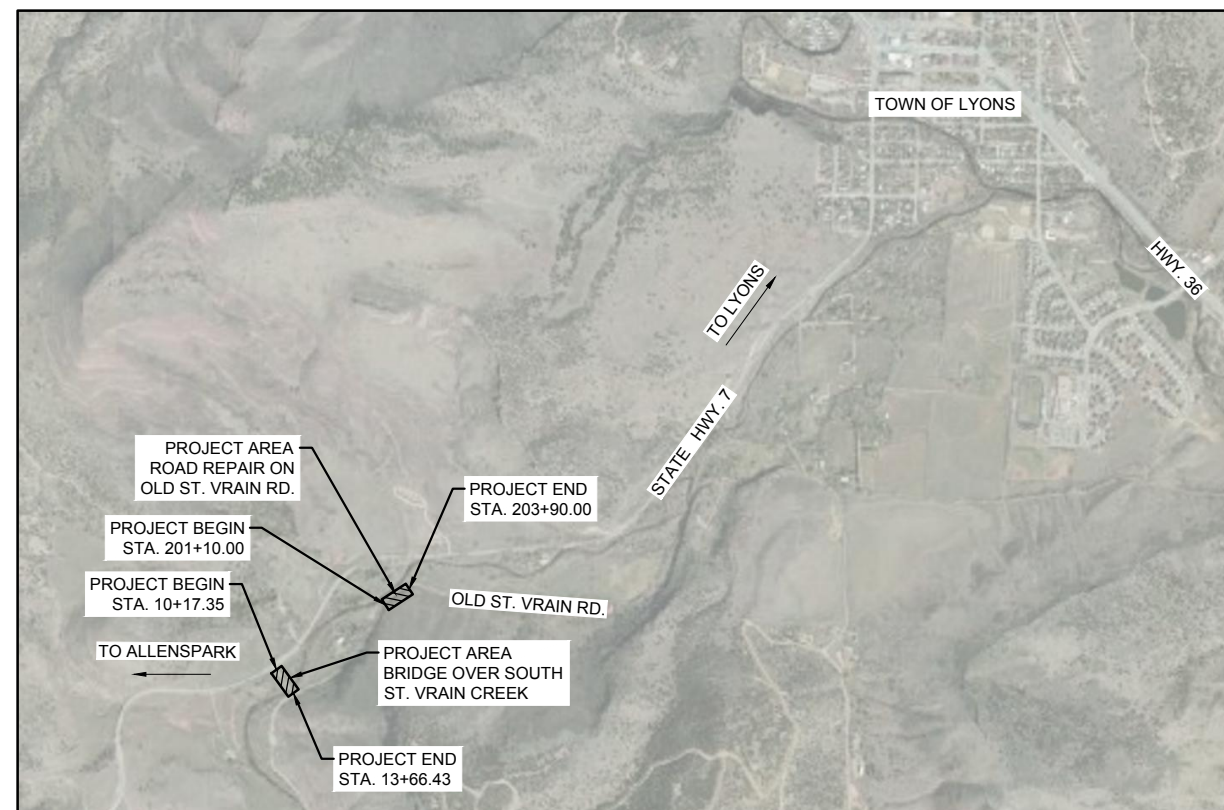
BOULDER COUNTY PROJECT NO. BR-84S-001-SSV1-FLOOD
OLD ST. VRAIN ROAD BRIDGE
BOULDER COUNTY
T3N R71W

TABULATION OF LENGTH & DESIGN DATA

STATION	FEET	
	ROADWAY OLD ST. VRAIN	MAJOR STRUCTURE
STA. 10+17.35 BEGIN ROADWAY CONSTRUCTION	109.65	192.33
STA. 11+27.00 BEGIN STRUCTURE / CREEK RESTORATION		
STA. 13+19.33 END STRUCTURE / CREEK RESTORATION		
STA. 13+66.43 END ROADWAY CONSTRUCTION	47.10	
STA. 201+10.00 BEGIN ROADWAY CONSTRUCTION (NORTHEAST AREA)	280.00	
STA. 203+90.00 END ROADWAY CONSTRUCTION (NORTHEAST AREA)		
TOTAL	436.75	192.33
SUMMARY OF PROJECT LENGTH	FEET	MILES
ROADWAY (NET LENGTH)	436.75	0.084
MAJOR STRUCTURE	192.33	0.036
PROJECT GROSS LENGTH	629.08	0.120
DESIGN DATA	OLD ST. VRAIN	
MAXIMUM RADIUS OF CURVE	N/A	
MAXIMUM GRADE	6.67%	
MAXIMUM DESIGN SPEED	25 MPH	
2012 DESIGN TRAFFIC	ADT=70 VPD	
CLEAR ZONE DISTANCE (TANGENT)	10 FEET	

FOR INFORMATION ONLY

SHEET LIST TABLE		
Sheet Number(s)	Subset Number	Subset
1-4	G-001 TO G-004	GENERAL
5	G-005	TYPICAL SECTIONS
6	G-006	GENERAL NOTES
7	G-007	SUMMARY OF QUANTITIES
8	G-008	SUMMARY OF EARTHWORK
9	G-009	TABULATIONS
10-12	DM-101 TO DM-103	DEMOLITION PLANS
13-14	GM-201 TO GM-202	SURVEY CONTROL & GEOMETRICS
15-16	PP-301 TO PP-302	PLAN & PROFILE
17-18	GR-501 TO GR-502	GRADING PLANS
19	GR-503	RIPRAP DETAILS
20-21	GR-504 TO GR-505	EMBANKMENT STABILIZATION PLANS
22-39	S-601 TO S-618	STRUCTURAL PLANS
40-45	SW-701 TO SW-706	STORM WATER MANAGEMENT PLAN
46-47	SN-801 TO SN-802	SIGNING & STRIPING PLAN
48	SN-803	TRAFFIC CONTROL PLAN
49-51	XS-1001 TO XS-1003	CROSS SECTIONS



PROJECT LOCATION MAP

AD SET
MAY 2017

APPROVED FOR CONSTRUCTION:

MICHAEL A. THOMAS, P.E. DATE
COUNTY ENGINEER



Know what's below.
Call before you dig.

Computer File Information		Index of Revisions		 	AD SET		SOUTH ST. VRAIN BRIDGE COVER SHEET		Project No.		
Creation Date: 5/4/17	Initials: DW				No Revisions: mm/dd/yy			Designer: J. TEMPLE Detailer: D. WOOD Sheet Subset: General Subset Sheet: 1 of 9		TD-SEPT12C14 Drawing Number G-001 Sheet Number 1	
Last Modification Date: 5/9/17	Initials: RCUNDIFF			Revised: mm/dd/yy							
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet				Void: mm/dd/yy							
Drawing File Name: 87-15-018_G-001.dwg											
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET									

AD SET

LINE DESCRIPTION	EXISTING LINE	PROPOSED LINE
BOUNDARY		
PROPERTY LINE		
RIGHT OF WAY		
RIGHT OF WAY, ABANDONED		
RIGHT OF WAY, RESERVED		
TEMPORARY EASEMENT		
PERMANENT EASEMENT		
SECTION LINE		
QUARTER SECTION LINE		
DOMESTIC WATER		
WATER (GENERAL)		
WATER (SPECIFIED SIZE)		
WATER SERVICE		
IRRIGATION		
IRRIGATION		
NATURAL GAS		
NATURAL GAS		
NATURAL GAS SERVICE		
POWER / COMMUNICATIONS		
OVERHEAD POWER		
UNDERGROUND POWER		
OVERHEAD TELEPHONE		
UNDERGROUND TELEPHONE		
FIBER OPTIC		
CABLE TELEVISION		
UNDERGROUND POWER, TEL, CABLE TV		
UNDERGROUND POWER, TEL, CABLE TV, GAS		
ROADWAY		
ROAD SHOULDER		
ROAD CENTERLINE		
ROAD ASPHALT		
ROAD GRAVEL		
TOP BACK OF CURB		
LIP OF GUTTER		
SITE		
FENCE (3-STRAND)		
FENCE (DOWEL)		
MAJOR CONTOUR		
MINOR CONTOUR		
TOE OF SLOPE		
TOP OF SLOPE		
CUT LIMITS		
FILL LIMITS		
DITCH		
STORM SWALE		
EDGE OF WATER		
HIGH WATER		
WETLAND		
SANITARY SEWER		
SANITARY SEWER		
STORM DRAIN		
STORM DRAIN (GENERAL)		
STORM DRAIN		

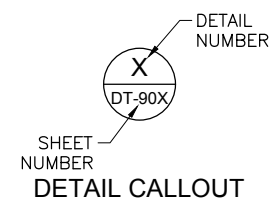
SYMBOL DESCRIPTION	EXISTING SYMBOL	PROPOSED SYMBOL
COMMUNICATIONS		
TELE. MANHOLE		
TELE. PEDESTAL		
TELE. POLE		
TV PEDESTAL		
GUY WIRE		
DOMESTIC WATER		
FIRE HYDRANT		
WATER MANHOLE		
WATER METER		
WATER VALVE		
IRRIGATION		
IRRIGATION VALVE		
IRRIGATION VALVE BOX		
NATURAL GAS		
GAS METER		
GAS VALVE		
POWER		
ELEC. MANHOLE		
ELEC. METER		
ELEC. SERVICE		
ELEC. TRANS.		
GUY WIRE		
JUNCTION BOX		
POWER POLE		
POWER STUB		
STREET LIGHT		
STREET LIGHT W/ ARM		
ROAD MARKINGS		
ARROW LEFT		
ARROW RIGHT		
SANITARY SEWER		
CLEANOUT		
SEWER STUB		
SS MANHOLE		

SYMBOL DESCRIPTION	EXISTING SYMBOL	PROPOSED SYMBOL
STORM DRAIN		
CATCH BASIN		
FLARE END		
SD MANHOLE		
SITE		
BOLLARD		
BORE HOLE		
FLAGPOLE		
GATE		
MAIL BOX		
POST		
ROCK		
SIGN		
SPOT ELEVATION		
TREE (SHRUB)		
TREE (STUMP)		
TREE (CONIFEROUS)		
TREE (DECIDUOUS)		
TEST HOLE		
WELL		
SURVEY		
CAP (ALUMINUM)		
BENCHMARK		
CTRL PT 1/2" REBAR		
CTRL PT 5/8" REBAR		
CTRL PT 60D NAIL		
CTRL PT PK NAIL		
NAIL		
UTILITIES		
MANHOLE (GENERIC)		
THRUST BLOCK		
VALVE (GENERIC)		
VAULT		
UTILITY POLE		
VERTICAL PIPE		

SYMBOL DESCRIPTION	EXISTING SYMBOL	PROPOSED SYMBOL
TYPICAL DETAILS		
OBJECT BREAK LINE		
PIPE END		
WATER SURFACE		

ABBREVIATIONS	
ASSY	ASSEMBLY
>	ANGLE
@	AT (MEASUREMENTS)
BLDG	BUILDING
BM	BENCH MARK
BSC	BITUMINOUS SURFACE COURSE
BSW	BACK OF SIDEWALK
BW	BOTH WAYS
C	CHANNEL (STRUCTURAL)
C/L	CENTER LINE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
CONT	CONTINUOUS
CPLG	COUPLING
CU FT	CUBIC FEET
CU YD	CUBIC YARD
DEG OR °	DEGREE
DET	DETAIL
DIA OR Ø	DIAMETER
DIP	DUCTILE IRON PIPE
DIST	DISTRIBUTION
DWG	DRAWING
EA	EACH
EG	EDGE OF GRAVEL
ELB	ELBOW
ELEV	ELEVATION
EW	EACH WAY
EXIST OR EX	EXISTING
FG	FINISH GRADE
FH	FIRE HYDRANT
FLG	FLANGE
FT OR '	FEET
GV	GATE VALVE
HORIZ	HORIZONTAL
ID	INSIDE DIAMETER
IN OR "	INCH
LB OR #	POUND
LF	LINEAL FEET
LN	LINEAL
MAX	MAXIMUM
MIN	MINIMUM
NO OR #	NUMBER
PE	POLYETHYLENE
PL	PLATE
PL	PROPERTY LINE
PVC	POLYVINYL-CHLORIDE
R	RADIUS
RP	RADIUS POINT
R&R	REMOVE & REPLACE
REM	REMOVE

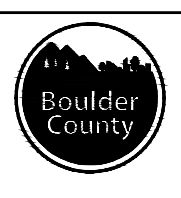
REQ'D	REQUIRED
REV	REVISION
R/W	RIGHT-OF-WAY
S	SLOPE
SPEC	SPECIFICATION
STA	STATION
STD	STANDARD
STL	STEEL
ST STL	STAINLESS STEEL
TBC	TOP BACK OF CURB
TYP	TYPICAL
TFC	TOP FACE OF CONCRETE
W/	WITH
W/O	WITHOUT
W/REQ'D	WHERE REQUIRED



AD SET

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Revised: mm/dd/yy	
Void: mm/dd/yy	

SOUTH ST. VRAIN BRIDGE LEGEND & ABBREVIATIONS	
Designer:	J. TEMPLE
Detailer:	D. WOOD
Sheet Subset:	General
Subset Sheet:	2 of 9

Project No.	
TD-SEPT12C14	
Drawing Number G-002	
Sheet Number 2	

PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER	PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER	PLAN NUMBER	NEW OR REVISED	S STANDARD TITLE	PAGE NUMBER
M-100-1		STANDARD SYMBOLS (3 SHEETS)	1-3	M-607-1		WIRE FENCES AND GATES (3 SHEETS)	100-102	S-612-1	■	DELINEATOR INSTALLATIONS (7 SHEETS)	151-157
M-100-2		ACRONYMS AND ABBREVIATIONS (4 SHEETS)	4-7	M-607-2		CHAIN LINK FENCE (3 SHEETS)	103-105	S-614-1	□	GROUND SIGN PLACEMENT (2 SHEETS)	158-159
M-203-1	□	APPROACH ROADS (REVISED ON JULY 08, 2013)	8	M-607-3		BARRIER FENCE	106	S-614-2	□	CLASS I SIGNS (REVISED ON JUNE 24, 2016)	160
M-203-2		DITCH TYPES	9	M-607-4	□	DEER FENCE, GATES, AND GAME RAMPS (5 SHEETS)	107-109	S-614-3		CLASS II SIGNS	161
M-203-11		SUPERELEVATION CROWNED AND DIVIDED HIGHWAYS (3 SHEETS)	10-12		(REVISED ON APRIL 30, 2015)			S-614-4	□	CLASS III SIGNS (3 SHEETS)	162-164
M-203-12		SUPERELEVATION STREETS (2 SHEETS)	13-14	M-607-10		PICKET SNOW FENCE	110	S-614-5	□	BREAK-AWAY SIGN SUPPORT DETAILS FOR GROUND SIGNS (2 SHEETS)	165-166
M-206-1		EXCAVATION AND BACKFILL FOR STRUCTURES (2 SHEETS)	15-16	M-607-15		ROAD CLOSURE GATE (9 SHEETS)	111-119	S-614-6	□	CONCRETE FOOTINGS AND SIGN ISLANDS FOR CLASS III SIGNS (2 SHEETS)	167-168
M-206-2		EXCAVATION AND BACKFILL FOR BRIDGES (2 SHEETS)	17-18	M-608-1	□	CURB RAMPS (10 SHEETS)	120-125	S-614-8	□	TUBULAR STEEL SIGN SUPPORT DETAILS (6 SHEETS)	169-173
M-208-1	■	TEMPORARY EROSION CONTROL (11 SHEETS)	19-30	M-609-1	□	CURBS, GUTTERS, AND SIDEWALKS (4 SHEETS)	126-129	S-614-9	□	PEDESTRIAN PUSH BUTTON POST ASSEMBLY	174
M-210-1		MAILBOX SUPPORTS (2 SHEETS)	31-32	M-611-1		CATTLE GUARD (2 SHEETS)	130-131	S-614-10		MARKER ASSEMBLY INSTALLATIONS	175
M-214-1		PLANTING DETAILS	33	M-611-2	□	DEER GUARD (2 SHEETS)	(NEW ON APRIL 30, 2015)	S-614-11		MILEPOST SIGN DETAIL FOR HIGH SNOW AREAS	176
M-216-1	■	SOIL RETENTION COVERING (2 SHEETS)	(NEW ON JULY 16, 2015)	M-613-1		ROADWAY LIGHTING (4 SHEETS)	132-135	S-614-12		STRUCTURE NUMBER INSTALLATION	177
M-412-1	□	CONCRETE PAVEMENT JOINTS (5 SHEETS)	(REVISED ON JULY 24, 2012)	M-614-1		RUMBLE STRIPS (3 SHEETS)	136-138	S-614-14		FLASHING BEACON AND SIGN INSTALLATIONS (3 SHEETS)	178-180
M-510-1		STRUCTURAL PLATE PIPE H-20 LOADING	39	M-614-2		SAND BARREL ARRAYS (2 SHEETS)	139-140	S-614-20		TYPICAL POLE MOUNT SIGN INSTALLATIONS	181
M-601-1	□	SINGLE CONCRETE BOX CULVERT (2 SHEETS)	(REVISED ON NOVEMBER 25, 2015)	M-615-1		EMBANKMENT PROTECTOR TYPE 3	141	S-614-21	□	CONCRETE BARRIER SIGN POST INSTALLATIONS	182
M-601-2	□	DOUBLE CONCRETE BOX CULVERT (2 SHEETS)	(REVISED ON NOVEMBER 25, 2015)	M-615-2		EMBANKMENT PROTECTOR TYPE 5	142	S-614-22		TYPICAL MULTI-SIGN INSTALLATIONS	183
M-601-3	□	TRIPLE CONCRETE BOX CULVERT (2 SHEETS)	(REVISED ON NOVEMBER 25, 2015)	M-616-1		INVERTED SIPHON	143	S-614-40	□	TYPICAL TRAFFIC SIGNAL INSTALLATION DETAILS (5 SHEETS)	184-188
M-601-10		HEADWALL FOR PIPES	46	M-620-1		FIELD LABORATORY CLASS 1	144	S-614-40A	□	ALTERNATIVE TRAFFIC SIGNAL INSTALLATION DETAILS (4 SHEETS)	189-192
M-601-11		TYPE "S" SADDLE HEADWALLS FOR PIPE	47	M-620-2		FIELD LABORATORY CLASS 2 (2 SHEETS)	145-146	S-614-41	□	TEMPORARY SPAN WIRE SIGNALS	193
M-601-12		HEADWALLS AND PIPE OUTLET PAVING	48	M-620-11		FIELD OFFICE CLASS 1	147	S-614-42	□	CABINET FOUNDATION DETAIL (4 SHEETS)	194-197
M-601-20		WINGWALLS FOR PIPE OR BOX CULVERTS	49	M-620-12		FIELD OFFICE CLASS 2	148	S-614-43		TRAFFIC LOOP AND MISCELLANEOUS SIGNAL DETAILS (10 SHEETS)	198-207
M-603-1	□	METAL PIPE (4 SHEETS)	(REVISED ON OCTOBER 02, 2014)	M-629-1		SURVEY MONUMENTS (2 SHEETS)	149-150	S-614-44	□	PEDESTAL POLE SIGNALS (2 SHEETS)	(REVISED ON JUNE 17, 2016)
M-603-2	■	REINFORCED CONCRETE PIPE	(REVISED ON OCTOBER 02, 2014)					S-614-50	□	STATIC SIGN MONOTUBE STRUCTURES (12 SHEETS)	208-219
M-603-3		PRECAST CONCRETE BOX CULVERT	55					S-614-60	□	DYNAMIC SIGN MONOTUBE STRUCTURES (14 SHEETS)	220-233
M-603-4	□	CORRUGATED POLYETHYLENE PIPE (AASHTO M294)	(REVISED ON OCT. 02, 2014)					S-627-1	■	PAVEMENT MARKINGS (8 SHEETS)	(REVISED ON FEBRUARY 8, 2017)
M-603-5	□	POLYVINYL CHLORIDE (PVC) PIPE (AASHTO M304)	(REVISED ON OCT. 02, 2014)					S-630-1	□	TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION (24 SHEETS)	(REVISED ON JUNE 23, 2016)
M-603-6	□	STEEL REINFORCED POLYETHYLENE RIBBED PIPE (AASHTO MP 20)	(NEW ON APRIL 30, 2015)					S-630-2	■	BARRICADES, DRUMS, CONCRETE BARRIERS (TEMP) AND VERTICAL PANELS	(REVISED ON JUNE 23, 2016)
M-603-10		CONCRETE AND METAL END SECTIONS (2 SHEETS)	58-59					S-630-3		FLASHING BEACON (PORTABLE) DETAILS	260
M-604-10		INLET, TYPE C	60					S-630-4		STEEL SIGN SUPPORT (TEMPORARY) INSTALLATION DETAILS (2 SHEETS)	261-262
M-604-11		INLET, TYPE D	61					S-630-5	□	PORTABLE RUMBLE STRIPS (TEMPORARY) (2 SHEETS)	263-264
M-604-12		CURB INLET TYPE R (2 SHEETS)	62-63					S-630-6		EMERGENCY PULL-OFF AREA (TEMPORARY)	265
M-604-13		CONCRETE INLET TYPE 13	64					S-630-7		ROLLING ROADBLOCKS FOR TRAFFIC CONTROL (3 SHEETS)	266-268
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	■	GUARDRAIL TYPE 3 W-BEAM (20 SHEETS)	(REVISED ON OCTOBER 27, 2014)								
M-606-1	□	MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES (20 SHEETS)	(REVISED ON DECEMBER 29, 2015)								
M-606-13	□	GUARDRAIL TYPE 7 F-SHAPE BARRIER (4 SHEETS)	(REVISED ON AUGUST 30, 2013)								
M-606-14		PRECAST TYPE 7 CONCRETE BARRIER (3 SHEETS)	97-99								

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.



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AD SET

Computer File Information		Index of Revisions				AD SET		SOUTH ST. VRain BRIDGE STANDARD PLANS LIST		Project No.	
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ACAD Ver. ACAD 2013	Scale: AS SHOWN	☐ R-5									

Units: FEET

Sheet Subset: General

Subset Sheet: 3 of 9

TO ESTABLISH GEOMETRIC CONTROL FOR THE CONSTRUCTION OF THIS PROJECT, THE DEPARTMENT HAS PROVIDED THE FOLLOWING INFORMATION:

Format *
 Horizontal Control Project Control Diagram
 Vertical Control Project Control Diagram
 Roadway Alignment Plan Sheet
 Original Terrain Data Plan Sheet
 Other: _____

* Specify the information format, ie., plan sheet, computer disk, computer printout, or other. The information marked is either contained on the plans or is available from the Engineer.

TYPE OF PROJECT

- Landscaping
- Signalization
- Asphalt Overlay
- Concrete Overlay
- Minor Widening
- Major Reconstruction
- New Roadway Construction
- Bridge Replacement
- Bridge Widening
- New Bridge
- Other: Flood Repair

SURVEY WORK TO BE PERFORMED BY OTHERS: _____

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER SECTION 625:

- Establish and Maintain Project Centerline or Engineer Approved Offset Line(s)
- Verification and Maintenance of Horizontal and Vertical Control
- Verify or Determine existing grades and alignments
- Verify or Determine existing topography
- GPS/RTS (Global Positioning System/Robotic Total Station) Construction Machine Control
- Clearing and Grubbing Limits (Section 201)
- Removal Limits (Section 202)
- Reset Items (Section 210)
- Excavation and Embankment (Section 203)

- Excavation
 - Unclassified
 - Stripping
 - Muck
 - Rock
 - Borrow
 - Other: _____
 - Potholing

- Embankment
- Site Grading
- Erosion Control (Perm)
- Other: Channel
- As Staked Earthwork Quantities (See General Notes)

- Landscaping
 - Top Soil (Section 207)
 - Seeding (Section 212)
 - Mulching (Section 213)
 - Planting (Section 214)
 - Herbicide (Section 217)
 - Other: _____

- Erosion Control (Section 208)
 - Seeding (Temp)
 - Silt Fence
 - Erosion Bales
 - Erosion Logs
 - Riprap (Temp)
 - Other: _____

- Roadway Bases
 - Untreated Subgrade
 - Treated Subgrade
 - Aggregate Base Course (Section 304)
 - Reconditioning
 - PMBB - Plant Mix Bituminous Base
 - Other: _____

	Slope Staking (Y/N)	Grid (Y/N)	Grade (Y/N)	Special Interval
Excavation	Y	-	Y	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-

	Slope Staking (Y/N)	Grid (Y/N)	Grade (Y/N)	Special Interval
Embankment	Y	-	Y	-
	Y	-	Y	-
	Y	-	Y	-

	Grid (Y/N)	Grade (Y/N)	Special Interval	Special Offset
Roadway Bases	Y	-	25'	-
	-	-	-	-
	Y	-	25'	-
	-	-	-	-
	-	-	-	-

- Pavements
 - HMA - Hot Mix Asphalt (Section 403)
 - Concrete (Section 412)
 - Heating & Scarifying Treatment
 - Prime Coat, Tack Coat & Rejuvenating Agent (Section 407)
 - Seal Coat or Chip Seal (Section 409)
 - Other: _____

	Grid (Y/N)	Special Interval	Special Offset
Pavements	Y	25'	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

- Roadway Elements
 - Curb and Gutter (Section 609)
 - Drop inlets -
 - alignment and grades (Section 604)
 - Retaining Walls
 - Guard Rail (Section 606)
 - Sidewalk (Section 608)
 - Overlay Stationing
 - Other: _____

	Tangent Interval	Curve Interval	Special Offset
Curb & Gutter	-	-	-
	-	-	-

	Left Interval	Center Interval	Right Interval
Stationing	-	-	-
	-	-	-

- Riprap (Perm) (Section 506)
- Slope and Ditch Paving (Section 507)
- Minor Structures
 - Structure Excavation limits (Section 206)
 - Culverts (Section 603)
 - Culverts w/ Headwalls and Wingwalls (Section 601)
 - Concrete Box Culverts w/ Headwalls and Wingwalls
 - Pipes (Section 603)
 - Sanitary Sewer
 - Storm Sewer
 - Water
 - Irrigation
 - Miscellaneous
 - Manholes (Section 604)
 - Inlets (Section 604)
 - Permanent Water Quality BMP (Section 208)
 - Other: _____

- Major Structures - Overhead Signs (Section 614), Concrete Box Culverts, Bridges - and all other structures assigned a structure number
 - Structure Excavation limits (Section 206)
 - Concrete Box Culverts (Section 603) w/ Headwalls and Wingwalls (Section 601)
 - Piling locations and cut off elevations (Section 502)
 - Caisson locations and elevations (Section 503)
 - Footing locations, alignment, and elevations
 - Abutment/Pier locations, alignment, and elevations
 - Wingwall skew angles/offsets
 - Structural concrete form locations
 - Substructure As-constructed survey
 - required for Bridges (Subsection 601 .12) and Overhead signs (S-614-50)
 - Bridge expansion joint(s) alignment and grade (longitudinal and transverse)
 - Deck grades at Girder 10th or "n" th point locations and elevations
 - Slope and Ditch Paving (Section 507)
 - Other: Riprap Limits

- Fencing (Section 607)
 - Temporary
 - Permanent
 - Sound Barrier
 - Other: _____

- Delineators (Section 612)
 - Temporary
 - Permanent
- Lighting (Section 613) and Traffic Control Devices (Permanent) (Section 614)
 - Signal pole locations and elevations
 - Light pole locations and elevations
 - Sign locations
 - Field verify sign post locations, elevations, and lengths before fabrication.
 - Other: _____

- Pavement Marking (Section 627)
 - Striping (Temp)
 - Striping (Perm)
 - Symbols
 - Other: _____
- Temporary Lighting and Construction Traffic Control Devices (Section 630)
 - Signal pole locations and elevations (Temp)
 - Light pole locations and elevations (Temp)
 - Sign Locations (Temp)
 - Other: _____
- All Easements (Temp Staking by P.L.S. Only)
- Right of Way (Temp Staking by P.L.S. Only)

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER SECTION 629:

- Monumentation (Section 629)
 - Control
 - Right of Way
 - Land corners, Aliquot corners
 - Easements
 - Reference the specified existing monuments: ** _____
 - Replace the specified existing monuments: ** _____
 - Locate monuments. It is estimated _____ hours are required.

NOTE: All 629 items shall include adequate research, calculations, and evaluations of evidence for monuments to be set.

** A Tabulation of Survey Monuments may be provided on the plans.

GENERAL NOTES:

- Unless indicated otherwise on this Survey Tabulation Sheet, all survey work and staking intervals shall be done in accordance with the latest edition of the CDOT Survey Manual.
- Adequate information for establishing lines, grades, and locations for all work items have been specified on the plans. Any additional information required to stake the item or element shall be generated by the Contractor's surveyor.
- The Contractor's surveyor shall provide an estimate of the man-hours necessary to complete the work items indicated on this sheet. A copy of this sheet, with the estimated man-hours written on the blank line to the left of the specified items, shall be submitted with the Survey Schedule to the Engineer 7 days prior to the Presurvey Conference - Construction Survey.
- Stakes and Monuments which are damaged or destroyed by the progress of construction shall be replaced by the Contractor at no additional cost to the Department.
- The Contractor shall furnish an As Staked (or GPS/RTS Construction Machine Control) Earthwork Quantity report to the Engineer prior to completion of twenty percent (20%) of the planned earthwork in any phase as per the CDOT Survey Manual. A printed copy of the As Staked (or GPS/RTS Construction Machine Control) Earthwork data report and a computer disk with that information on it, in the specified format shall be submitted to the Engineer. The Contractor shall field verify original ground cross sections at a maximum 500 feet intervals.
- Prior to beginning work on any subsequent operation, such as placing base course or paving, the Contractor shall certify in writing to the Engineer that the final grade is within specified tolerance.
- The Contractor's surveyor shall perform all field surveying and calculations necessary to tie plan grades into field grades.
- The Contractor shall coordinate construction staking on the project with any utility work.
- Fieldbooks shall contain daily records of points set and or measurements observed. The information recorded shall contain: date, crew members' names, point no., description, staking information, and sketches. If the survey information is collected electronically, information recorded shall be provided to the Project Engineer in a hard copy format that is intuitive, clear and related to the supplemental information recorded in the field books. All linear surveys, such as slope stakes and blue tops, shall have the station and offset information related to the measured information. Non-linear surveys such as structures staking shall have sketches relating electronic information, such as point numbers, to the sketch.
- The Contractor's surveyor shall submit the following fieldbooks to the Engineer:
 - Horizontal Control (Primary & Secondary)
 - Vertical Control (i.e. Benchmarks)
 - Property Pin Ties
 - Horizontal Alignment
 - Grading
 - Slope Staking
 - Minor Structures
 - Major Structures
 - One fieldbook for each work category shown on this sheet
 - Other Fieldbook(s): _____
- The final survey submitted by contractor's surveyor shall be certified. The final survey shall include shots of the newly constructed bridge, including low chords and top of curb.



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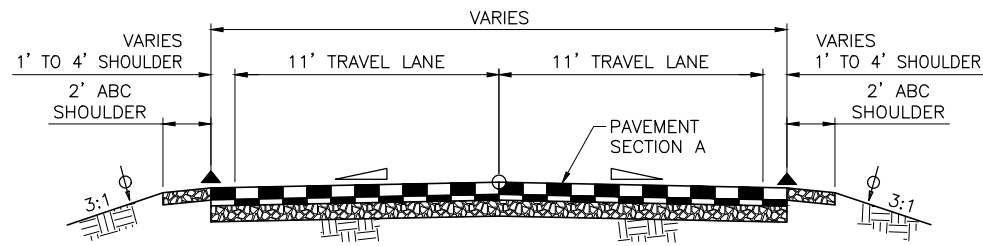
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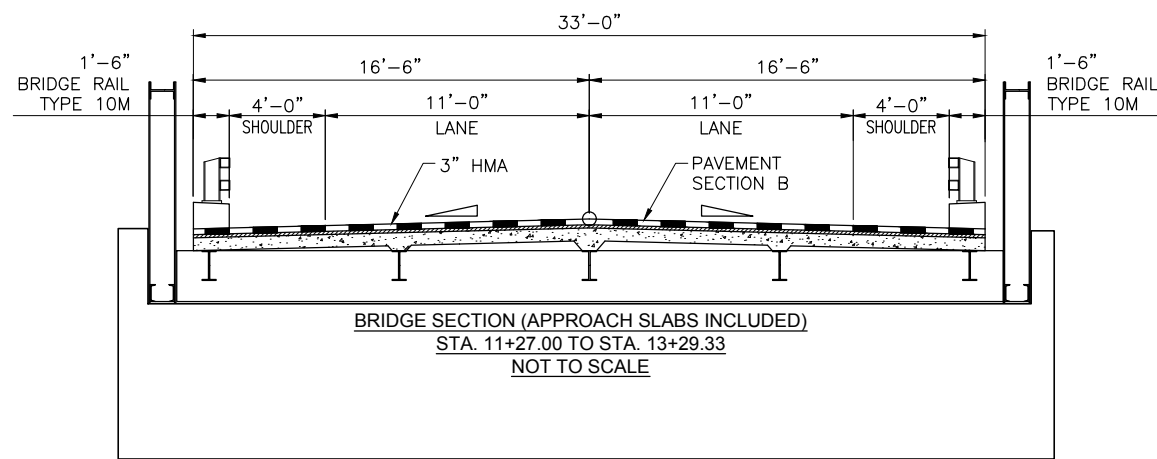


JUB
 J-U-B ENGINEERS, INC.
 4745 Boardwalk Drive
 Building D, Suite 200
 Fort Collins, CO 80525
 Phone: 970.377.3602

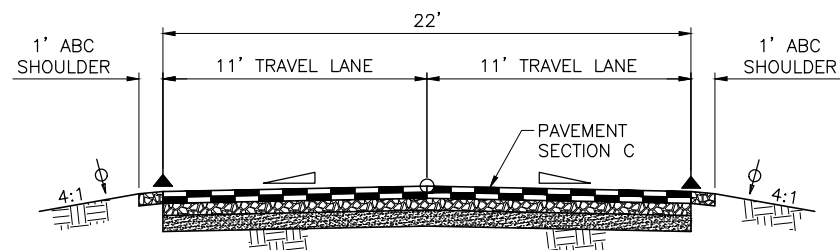
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No Revisions: mm/dd/yy				TD-SEPT12C14
Revised: mm/dd/yy		Designer: J. TEMPLE		Drawing Number G-004
Void: mm/dd/yy		Detailer: D. WOOD		Sheet Number 4
		Sheet Subset: General	Subset Sheet: 4 of 9	



STA. 10+17.35 TO STA. 11+27.00
 STA. 13+29.33 TO STA. 13+66.43
 NOT TO SCALE



BRIDGE SECTION (APPROACH SLABS INCLUDED)
 STA. 11+27.00 TO STA. 13+29.33
 NOT TO SCALE

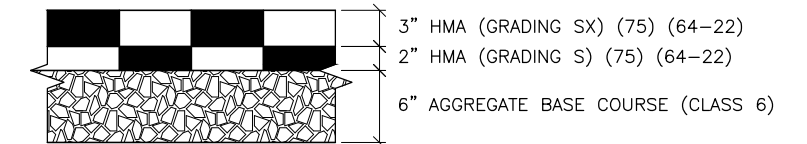


STA. 201+10 TO STA. 203+90
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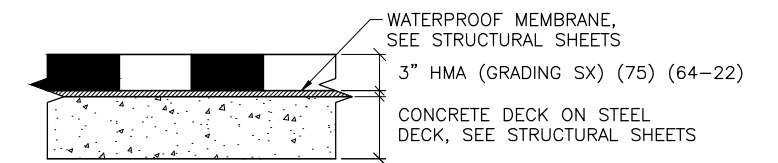
TYPICAL SECTION NOTES

- THE CONTRACTOR WILL BE REQUIRED TO PLACE 6 IN. OF TOPSOIL TO THIS LINE AFTER COMPLETION OF PAVING OPERATION.
- BREAK POINTS IN SLOPES AND IN BOTTOMS OF DITCHES SHALL BE ROUNDED DURING CONSTRUCTION FOR A PLEASING APPEARANCE.
- 2% ROADWAY SLOPE.
- VERTICAL ALIGNMENT CONTROL POINTS.

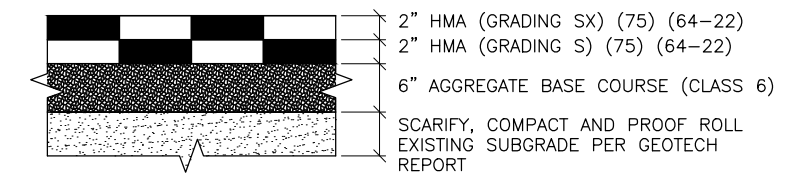
PAVEMENT - SECTION A



PAVEMENT - SECTION B



PAVEMENT - SECTION C



NOTES:

1. REFER TO PLAN & PROFILE SHEETS FOR EXACT LOCATION AND LAYOUT OF GUARDRAIL AND PAVEMENT TRANSITIONS REQUIRED FOR GUARDRAIL.
2. REFER TO DWGS GR-501 TO GR-502 FOR GRADING PLANS
3. REFER TO GEOTECHNICAL REPORT ENTITLED: "SOUTH ST. VRAIN BRIDGE REPLACEMENT" PREPARED BY TERRACON CONSULTANTS, INC., DATED: JUNE 16, 2016.
4. REFER TO PLAN & PROFILE SHEETS FOR EXACT LOCATIONS OF PAVEMENT TRANSITIONS.



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Computer File Information		Index of Revisions				AD SET		SOUTH ST. VRAIN BRIDGE		Project No.	
Creation Date: 5/2/17	Initials: DW	(R-1)				No Revisions: mm/dd/yy			TYPICAL SECTIONS		TD-SEPT12C14
Last Modification Date: 5/9/17	Initials: RCUNDIFF	(R-2)		J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	Revised: mm/dd/yy	Designer: J. TEMPLE			Drawing Number G-005		
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ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET	(R-5)								

GENERAL NOTES

- ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, BOULDER COUNTY MULTIMODAL TRANSPORTATION STANDARDS, PROJECT SPECIAL PROVISIONS, AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE SPECIFICATIONS, OR ANY APPLICABLE STANDARDS, THE MOST RESTRICTIVE STANDARD SHALL APPLY. ALL WORK SHALL BE INSPECTED BY BOULDER COUNTY.
- THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH BOULDER COUNTY, AND ALL UTILITY COMPANIES INVOLVED, WITH REGARD TO RELOCATIONS, ADJUSTMENTS, EXTENSIONS AND REARRANGEMENTS OF EXISTING UTILITIES DURING CONSTRUCTION, AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING, IN ADVANCE, ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE AS WELL AS THE UTILITY COMPANIES.
- THE CONTRACTOR SHALL HAVE, ONSITE AT ALL TIMES, AN UP TO DATE STORMWATER EROSION CONTROL PLAN, A BMP MAINTENANCE FOLDER, ONE (1) SIGNED COPY OF THE APPROVED PLANS, ONE (1) COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY. REFER TO OSHA PUBLICATION 2226, EXCAVATING AND TRENCHING.
- IF, DURING THE CONSTRUCTION PROCESS, CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT BOULDER COUNTY IMMEDIATELY.
- ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD, UNLESS SPECIFICALLY STATED OTHERWISE.
- MUD AND DEBRIS MUST BE REMOVED FROM OLD ST. VRAIN ROAD BY THE END OF EACH WORKING DAY BY AN APPROPRIATE MECHANICAL METHOD (I.E. STREET SWEEPER, LIGHT DUTY FRONT-END LOADER, ETC.) OR AS APPROVED BY BOULDER COUNTY. POWER BROOMS WILL NOT BE ACCEPTABLE--MUST USE STREET SWEEPER. THIS WORK SHALL BE INCIDENTAL TO OTHER ITEMS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING AS-BUILT INFORMATION ON A SET OF RECORD DRAWINGS KEPT ON THE CONSTRUCTION SITE, AND AVAILABLE TO BOULDER COUNTY INSPECTOR AT ALL TIMES. THESE UPDATES SHALL BE DONE AS WORK PROGRESSES. PREPARATION OF AS-BUILT PLANS WILL NOT BE PAID FOR SEPARATELY.
- THE CONTRACTOR SHALL COMPLY WITH ALL TERMS AND CONDITIONS OF THE COLORADO PERMIT FOR STORM WATER DISCHARGE, THE STORM WATER MANAGEMENT PLAN, AND THE EROSION CONTROL PLAN.
- ALL EROSION CONTROL MEASURES SHALL BE INSTALLED, AT THE LIMITS OF CONSTRUCTION AND AT AREAS WITH DISTURBED SOIL, ON- OR OFF-SITE, PRIOR TO ANY OTHER GROUND-DISTURBING ACTIVITY. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR, UNTIL SUCH TIME AS THE ENTIRE DISTURBED AREA IS STABILIZED WITH HARD SURFACE OR LANDSCAPING. TO MITIGATE EROSION, THE CONTRACTOR SHALL USE STANDARD EROSION CONTROL TECHNIQUES PER THE CDOT M & S STANDARD PLAN M-208-1.
- UPON COMPLETION OF CONSTRUCTION, THE SITE SHALL BE CLEANED AND RESTORED TO A CONDITION EQUAL TO, OR BETTER THAN, THAT WHICH EXISTED BEFORE CONSTRUCTION, OR TO THE GRADES AND CONDITION AS REQUIRED BY THESE PLANS.
- A STATE CONSTRUCTION DEWATERING WASTEWATER DISCHARGE PERMIT IS REQUIRED ON THIS PROJECT IN ORDER TO COMPLETE THE WORK AND WATER WILL BE DISCHARGED INTO A STORM SEWER, CHANNEL, IRRIGATION DITCH OR ANY WATERS OF THE UNITED STATES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THIS PERMIT.
- THE CONTRACTOR IS EXPECTED TO ENCOUNTER GROUND WATER ON THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING EFFORTS ON THIS PROJECT. A DEWATERING PLAN IS REQUIRED TO BE APPROVED BY BOULDER COUNTY PRIOR TO ANY EXCAVATION IN THE CHANNEL. PLEASE REFER TO SPECIAL PROVISIONS. PAYMENT FOR DEWATERING WILL BE PER THE BID ITEM 211 - DEWATERING.
- THE CONTRACTOR SHALL PROCEED WITH ALL PERMIT ACQUISITION AS SOON AS HE DEEMS NECESSARY FOLLOWING THE NOTICE OF AWARD. NO CONTRACT DELAYS OR EXTENSIONS WILL BE GRANTED TO THE CONTRACTOR FOR FAILURE TO DEVELOP THE REQUIRED PLANS AND OBTAIN THE REQUIRED STATE/COUNTY PERMITS IN A TIMEFRAME NECESSARY TO BEGIN THE WORK AS SPECIFIED IN THE CONTRACT.
- THE CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING AND VERIFYING ELEVATIONS OF ALL EXISTING PAVEMENT AND UTILITIES AT THE POINTS OF CONNECTION SHOWN ON THE PLANS, AND AT ANY UTILITY CROSSINGS PRIOR TO INSTALLING ANY OF THE NEW IMPROVEMENTS. IF A CONFLICT EXISTS AND/OR A DESIGN MODIFICATION IS REQUIRED, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO MODIFY THE DESIGN. DESIGN MODIFICATION(S) MUST BE APPROVED BY BOULDER COUNTY PRIOR TO BEGINNING CONSTRUCTION.
- ALL STATIONING IS BASED ON CENTERLINE OF OLD ST. VRAIN ROAD OR THE SOUTH ST. VRAIN CREEK @ UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES, AS SHOWN ON THESE PLANS, IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811 AT LEAST 2 WORKING DAYS PRIOR TO BEGINNING EXCAVATION OR GRADING, TO HAVE ALL REGISTERED UTILITY LOCATIONS MARKED. OTHER UNREGISTERED UTILITY ENTITIES (I.E. DITCH / IRRIGATION COMPANY) ARE TO BE LOCATED BY CONTACTING THE RESPECTIVE REPRESENTATIVE. UTILITY SERVICE LATERALS ARE ALSO TO BE LOCATED PRIOR TO BEGINNING EXCAVATION OR GRADING.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES DURING CONSTRUCTION AND FOR COORDINATING WITH THE APPROPRIATE UTILITY COMPANY FOR ANY UTILITY CROSSINGS REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF ALL MEANS REQUIRED TO PROTECT EXISTING UTILITIES AND/OR TO WORK AROUND SUCH UTILITIES. THIS INCLUDES BUT IS NOT LIMITED TO SUPPORTING EXISTING UTILITIES, SHORING AROUND EXISTING UTILITIES AND PHASING/TRAFFIC CONTROL.
- UTILITY CONTACT LIST:
THE FOLLOWING IS A LIST OF KNOWN UTILITIES WITH SERVICE WITHIN THE PROJECT AREA AND THE CONTACT INDIVIDUALS:
AGENCY {UTILITY} CONTACT [PHONE]
- Poudre Valley REA (ELECTRIC) MATT ORGAN (970) 282-6436
- CENTURY LINK (COMMUNICATIONS) SAM BANULIS (970) 490-7507
- CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITIES TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE AND/OR TOES OF SLOPE AS SHOWN ON THE PLANS AND CROSS SECTIONS. ANY DISTURBANCES BEYOND THESE LIMITS SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. CONSTRUCTION ACTIVITIES IN ADDITION TO NORMAL CONSTRUCTION PROCEDURE SHALL INCLUDE THE PARKING OF VEHICLES OR EQUIPMENT. DISPOSAL OF LITTER, AND ANY OTHER ACTION WHICH WOULD ALTER EXISTING CONDITIONS. ANY OFF ROAD STAGING AREAS MUST BE PRE-APPROVED BY THE PROJECT ENGINEER.
- DISPOSAL OF EXCESS MATERIAL OFF-SITE OR THE IMPORTING OF MATERIALS ON-SITE, REGARDLESS OF PROPERTY OWNERSHIP, MUST BE DONE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS AND MUST ABIDE BY THE CDOT PRAIRIE DOG POLICY.
- THE CONTRACTOR SHALL PROVIDE A CERTIFIED SCALE AND CERTIFIED WEIGHER AT THE POINT OF LOADING FOR ALL AGGREGATES, CEMENT, FLY ASH, AND WATER DELIVERED TO THE PROJECT. A CERTIFIED TICKET SHALL BE PROVIDED FOR EACH LOAD OF MATERIAL DELIVERED TO THE PROJECT. THE TICKET SHALL SHOW GROSS, TARE, AND NET WEIGHTS. THE CONTRACTOR SHALL NOT DELIVER ANY LOAD EXCEEDING THE LEGAL WEIGHT LIMIT. DELIVERY OF ANY OVERWEIGHT LOADS MAY RESULT IN WITHHOLDING OF MONTHLY PAYMENT FOR THE RELATED ITEM.
- ALL EXCESS MATERIAL GENERATED WITHIN THE PROJECT LIMITS SHALL BE REMOVED FROM THE PROJECT SITE AT NO COST TO THE PROJECT UNLESS SPECIFIED BY THE PLANS.
- CONCRETE SULFATE EXPOSURE FOR THIS PROJECT IS CLASS 0.
- R-VALUE (MINIMUM REQUIREMENT): EMBANKMENT WITHIN ROADWAY PRISM = 30, ABC CL. 6 = 78.
- THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH ALL OTHER CONTRACTORS WORKING IN THE SAME OR SIMILAR VICINITY AS THIS PROJECT.

CONSTRUCTION NOTES

- REMOVAL OF ASPHALT MAT REQUIRED ON THIS PROJECT SHALL BE SAW CUT TO A VERTICAL EDGE. COST OF SAWING TO BE INCLUDED IN WORK.
- THE CONTRACTOR SHALL PROTECT ALL WORK AREAS AND FACILITIES FROM WATER AT ALL TIMES. AREA AND FACILITIES SUBJECT TO FLOODING, REGARDLESS OF THE SOURCE OF WATER SHALL BE PROMPTLY DEWATERED AND RESTORED AT NO COST TO THE OWNER. THIS SHALL INCLUDE REMOVAL OF ANY DEBRIS CAUSED BY FLOODING.
- LIMITS OF CONSTRUCTION SHALL BE CONFINED TO PUBLIC RIGHTS-OF-WAY, EASEMENTS, CONSTRUCTION LIMIT AREAS, OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
- REPAIR OF ANY DAMAGE TO EXISTING IMPROVEMENTS, INCLUDING PRIVATE PROPERTY, IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL ASSOCIATED COSTS FOR IMPROVEMENTS REPAIR SHALL BE PAID FOR BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER.
- EROSION CONTROL MEASURES SHALL BE IMPLEMENTED BEFORE CONSTRUCTION AND GRADING OPERATIONS BEGIN. ALL EROSION CONTROL MEASURES SHALL BE PLACED CONTINUALLY AS DRAINAGE FEATURES ARE BEING CONSTRUCTED. MEASURES SHALL REMAIN IN PLACE UNTIL ALL CONSTRUCTION IS COMPLETE AND SUBSTANTIALLY STABILIZED.
- ALL EQUIPMENT SHALL BE STORED OUTSIDE THE FLOODPLAIN LIMITS.

EARTHWORK NOTES

- WATER SHALL BE USED AS A DUST PALLIATIVE, WHERE REQUIRED. LOCATIONS SHALL BE AS ORDERED. WATER USED FOR DUST PALLIATIVE AND TO OBTAIN MOISTURE DENSITY WILL NOT BE PAID FOR SEPARATELY. DEPTH OF MOISTURE - MONISTRY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
FULL DEPTH OF ALL EMBANKMENTS
BASES OF CUTS AND FILLS 8 INCHES
- 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 TYPE OF COMPACTION FOR EARTHWORK ON THIS PROJECT SHALL BE AASHTO T99 (STANDARD PROCTOR), PROOF ROLLING OF ALL SUBGRADE WILL BE REQUIRED PRIOR TO PAVING AND SHALL BE INCLUDED IN COST OF THE WORK. THE EQUIPMENT USED FOR PROOF ROLLING SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.

SIGNING, STRIPING, TRAFFIC CONTROL NOTES

- SEE SIGNING AND STRIPING PLAN (SN-802).

DRAINAGE / STORM SEWER NOTES

- THE CONTRACTOR IS REQUIRED TO KEEP ALL DRAINAGE FACILITIES FUNCTIONAL AND MAINTAIN DRAINAGE TO THOSE FACILITIES AT ALL TIMES DURING CONSTRUCTION.
- THIS PROJECT IS SHOWN ON FEMA MAP NUMBER 08013C0233F (BOULDER COUNTY) CURRENT EFFECTIVE MAP DATE 06/02/1995) THE PROJECT IS IN THE FLOODPLAIN.

PAVEMENT NOTES

- FOR PLAN QUANTITIES OF PAVEMENT MATERIAL, THE FOLLOWING RATES OF APPLICATION WERE USED:

AGGREGATE BASE COURSE @136 LBS. PER CU. FT.
HOT MIX ASPHALT @111 LBS. PER SQ. YD./INCH
TACK COAT DILUTED EMULSIFIED ASPHALT (SLOW-SETTING) @0.1 GALS. PER SQ. YD (DILUTED)
- A TACK COAT OF EMULSIFIED ASPHALT (SLOW-SETTING) IS TO BE APPLIED TO IMPROVE BOND AT THE FOLLOWING LOCATIONS:
- BEFORE PLACING NEW PAVEMENT OVER EXISTING PAVEMENT
- ADJACENT TO EXISTING PAVEMENT, AND OTHER SURFACES AGAINST WHICH ASPHALT IS PLACED
- BETWEEN PAVEMENT COURSES WHEN ORDERED BY ENGINEER
- THIS WORK SHALL BE SUBSIDIARY TO THE HMA BID ITEMS.
- ANY LAYER OF BITUMINOUS PAVEMENT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE SUCCEEDING LAYER IS PLACED.
- WHERE IT IS REQUIRED TO CUT EXISTING ASPHALT PAVEMENT, THE CUTTING SHALL BE DONE TO A NEAT WORK LINE WITH A SAW OR OTHER METHOD AS APPROVED BY ENGINEER.
- THE FOLLOWING SHALL BE FURNISHED WITH EACH BITUMINOUS PAVER:
A. A SKI TYPE DEVICE AT LEAST 30 FEET IN LENGTH
B. SHORT SKI OR SHOE
C. 1500 FEET OF CONTROL LINE AND STAKES

EROSION CONTROL NOTES

- SEE STORMWATER MANAGEMENT PLAN (SW-701 THRU SW-706).

SEEDING, PLANTING AND MULCHING NOTES

- SEE STORMWATER MANAGEMENT PLAN (SW-701 THRU SW-705).
- SEE EMBANKMENT STABILIZATION (GR-504 THRU GR-505).

ENVIRONMENTAL NOTES

- WATER QUALITY: IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN EXISTING BMP'S AND ENSURE THEIR COMPLETE REMOVAL FROM THE PROJECT ONCE 70% OF PRE-EXISTING VEGETATION HAS BEEN ESTABLISHED.
- THE MIGRATORY BIRD TREATY ACT (MBTA) PROTECTS MIGRATORY BIRDS AND THEIR NESTS AND EGGS. FOR PROJECTS THAT COULD POTENTIALLY HAVE AN IMPACT, THE FOLLOWING CONDITIONS APPLY:
A. TREE TRIMMING/REMOVAL: TREE TRIMMING AND/OR REMOVAL ACTIVITIES SHALL BE COMPLETED BEFORE BIRDS BEGIN TO NEST OR AFTER THE YOUNG HAVE FLEDGED. IN COLORADO, MOST NESTING AND REARING ACTIVITIES OCCUR BETWEEN APRIL 1 AND AUGUST 31. HOWEVER, SINCE SOME BIRDS NEST AS EARLY AS FEBRUARY, A NESTING BIRD SURVEY SHALL BE CONDUCTED BY BOULDER COUNTY BEFORE ANY TREE TRIMMING OR REMOVAL ACTIVITIES BEGIN.
B. BRIDGE/BOX CULVERT WORK: BRIDGE OR BOX CULVERT WORK THAT MAY DISTURB NESTING BIRDS SHALL BE COMPLETED BEFORE BIRDS BEGIN TO NEST OR AFTER THE YOUNG HAVE FLEDGED. NO BRIDGE OR BOX CULVERT WORK MAY TAKE PLACE BETWEEN APRIL 1 AND AUGUST 31. IF WORK ACTIVITIES ARE PLANNED BETWEEN THESE DATES, NESTS SHALL BE REMOVED (BEFORE NESTING BEGINS) AND APPROPRIATE MEASURES TAKEN TO ASSURE NO NEW NESTS ARE CONSTRUCTED. FAILURE TO REMOVE AND KEEP NESTS FROM BECOMING ESTABLISHED MAY POSTPONE PROJECT CONSTRUCTION. NESTING BIRD SURVEY WILL BE CONDUCTED BY BOULDER COUNTY.
C. CLEARING/GRUBBING ACTIVITIES: CLEARING AND GRUBBING OF VEGETATION THAT MAY DISTURB GROUND NESTING BIRDS SHALL BE COMPLETED BEFORE BIRDS BEGIN TO NEST OR AFTER THE YOUNG HAVE FLEDGED. IF WORK ACTIVITIES ARE PLANNED BETWEEN APRIL 1 AND AUGUST 31, VEGETATION SHALL BE REMOVED AND/OR TRIMMED TO A HEIGHT OF SIX (6) INCHES OR LESS PRIOR TO APRIL 1. ONCE VEGETATION HAS BEEN REMOVED AND/OR TRIMMED, APPROPRIATE MEASURES, I.E. REPEATED MOWING/TRIMMING, SHALL BE IMPLEMENTED TO ASSURE VEGETATION DOES NOT GROW MORE THAN SIX (6) INCHES. FAILURE TO MAINTAIN VEGETATION HEIGHT OF SIX (6) INCHES OR LESS MAY POSTPONE PROJECT CONSTRUCTION.

ENVIRONMENTAL NOTES

(CONTINUED)

- NOXIOUS WEEDS: NOXIOUS WEEDS MAY PERSIST ON OR ADJACENT TO THE PROJECT LOCATION. SEE THE "NOXIOUS WEED MANAGEMENT" REPORT BY SMITH ENVIRONMENTAL DATED JANUARY 12, 2016 FOR NOXIOUS WEED SPECIES IDENTIFIED IN THE STUDY AREA. CDOT MANDATES THAT ALL WEED SPECIES ON THE STATE WEED LAW LIST A AND B BE ADDRESSED ACCORDING TO STATUTE. INFORMATION REGARDING NOXIOUS WEEDS IS AVAILABLE AT WWW.COLORADO.GOV/PACIFIC/AGCONSERVATION/NOXIOUS-WEED-SPECIES.
- ENVIRONMENTAL WALKTHROUGH: ONCE CONSTRUCTION HAS BEEN COMPLETED, THE BOULDER COUNTY PROJECT MANAGER, AND THE CONTRACTOR WILL CONDUCT A WALKTHROUGH OF THE PROJECT SITE. THE PURPOSE OF THE WALKTHROUGH IS TO IDENTIFY ANY AREAS WHERE BMP'S NEED TO BE REMOVED OR MAINTAINED AND IDENTIFICATION OF RESPONSIBLE PARTY UNTIL CDPS PERMIT IS CLOSED.
- 404 PERMIT: THE PROPOSED WORK AS SHOWN ON THE PLANS HAS BEEN PERMITTED BY THE U.S. ARMY CORPS OF ENGINEERS (USACE) UNDER SECTION 404 OF THE CLEAN WATER ACT. ANY ADDITIONAL IMPACTS TO OPEN WATER OR WETLAND AREAS ARE PROHIBITED. THE CONTRACTOR MUST COMPLY WITH ALL SPECIAL AND GENERAL CONDITIONS ATTACHED TO THE PERMIT.
- COLORADO SENATE BILL 40 (SB40) CERTIFICATION FROM COLORADO PARKS AND WILDLIFE (CPW) HAS BEEN OBTAINED FOR THIS PROJECT. THE CONTRACTOR MUST COMPLY WITH ALL GENERAL AND SPECIAL PROVISIONS OF THE CERTIFICATION.
- CONSTRUCTION LIMITS: WORK ACTIVITIES, INCLUDING THE MOVEMENT AND PLACEMENT OF VEHICLES AND EQUIPMENT, SHALL NOT DISTURB WETLANDS OR RIPARIAN HABITAT EXCEPT THOSE PERMITTED. THE LIMITS OF CONSTRUCTION MUST BE FENCED WITH PLASTIC FENCING PRIOR TO CONSTRUCTION TO AVOID ANY UN-PERMITTED IMPACTS TO THESE RESOURCES.
- WASTE MANAGEMENT: CONTRACTOR SHALL INSPECT EQUIPMENT AND VEHICLES AS OFTEN AS IS NECESSARY TO INSURE THAT PETROLEUM, OILS, AND LUBRICANTS (POL) ARE NOT LEAKING ONTO THE SOIL, WATERWAYS, OR PAVEMENT. ABSORBENT MATERIALS OR CONTAINERS APPROVED BY THE ENGINEER SHALL BE USED TO PREVENT LEAKING POL FROM REACHING THE SOIL, WATERWAYS, OR PAVEMENT. CONTRACTOR SHALL HAVE READY APPROVED ABSORBENT MATERIALS OR CONTAINERS OF SUFFICIENT CAPACITY TO CONTAIN ANY LEAK OF POL THAT CAN REASONABLY BE FORESEEN. ALL MATERIALS RESULTING FROM POL LEAKAGE CONTROL AND CLEANUP REMAIN THE PROPERTY OF THE CONTRACTOR. THE COST FOR CONTROL AND CLEANUP OF POL LEAKS WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE INCLUDED IN THE COST OF WORK.
- WASTE MATERIALS: THERE SHALL BE NO STOCKPILING OR SIDE CASTING OF WASTE MATERIALS INCLUDING, BUT NOT LIMITED TO, PAINT CHIPS, ASPHALT, OR CONCRETE ADJACENT TO THE SOUTH ST. VRAIN CREEK. ANY PAINT MATERIAL REMOVED IN THE COURSE OF RESTRIPIPING SHALL BE PROPERLY CONTAINED AND DISPOSED OF TO PREVENT SUCH MATERIALS FROM ENTERING WATERS OF THE STATE.
- MATERIALS STOCKPILES: ALL STOCKPILED PROJECT MATERIALS SHALL BE LOCATED AWAY FROM SENSITIVE AREAS AND CONFINED SO THAT NO MATERIAL(S) OR THEIR RUNOFF ENTER WETLANDS OR WATERS OF THE US, INCLUDING THE SOUTH ST. VRAIN CREEK, WHETHER FLOWING OR DRY.
- INVASIVE AQUATIC SPECIES: THE USACE AND THE CPW HAVE THE FOLLOWING CONDITIONS FOR WORK IN STREAMS. IF HEAVY EQUIPMENT IS USED THAT WAS PREVIOUSLY WORKING IN ANOTHER STREAM, RIVER, LAKE, POND, OR WETLAND WITHIN 10 DAYS OF WORKING ON THIS PROJECT, ONE OF THE FOLLOWING DISINFECTATION PRACTICES IS NECESSARY PRIOR TO CONSTRUCTION TO PREVENT THE SPREAD OF NEW ZEALAND MUD SNAILS AND OTHER AQUATIC HITCHHIKERS INTO THIS DRAINAGE. ALSO CLEAN ANY HAND TOOLS, BOOTS, OR OTHER EQUIPMENT THAT WILL BE IN THE WATER WITH ONE OF THE BELOW METHODS. THESE PRACTICES ALSO ARE NECESSARY AFTER PROJECT COMPLETION, PRIOR TO THIS EQUIPMENT BEING USED IN ANOTHER STREAM, RIVER, LAKE, POND, OR WETLAND FOR THE SAME PURPOSE:
a. REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, ETC.) AND THEN KEEP EQUIPMENT DRY FOR 10 DAYS; OR
b. REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, ETC.) AND SPRAY/SOAK EQUIPMENT WITH A 1:1 SOLUTION OF FORMULA 409 HOUSEHOLD CLEANER AND WATER, OR A 1:15 SOLUTION OF SPARQUAT INSTITUTIONAL CLEANER AND WATER. KEEP ALL EQUIPMENT MOIST FOR AT LEAST 10 MINUTES, OR
c. REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, ETC.) AND SPRAY/SOAK EQUIPMENT WITH WATER GREATER THAN 130 DEGREES FAHRENHEIT FOR AT LEAST 10 MINUTES.

STRUCTURAL NOTES

- SEE DRAWING S-601 FOR STRUCTURAL NOTES.



Know what's below.
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Computer File Information		Index of Revisions			<p>J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602</p>	AD SET		SOUTH ST. VRAIN BRIDGE		Project No.	
Creation Date: 5/4/17	Initials: DW	(R-1)				No Revisions: mm/dd/yy	GENERAL NOTES		TD-SEPT12C14		
Last Modification Date: 5/5/17	Initials: RCUNDIFF	(R-2)				Revised: mm/dd/yy	Designer:	J. TEMPLE	Drawing Number G-006		
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet		(R-3)				Void: mm/dd/yy	Detailer:	D. WOOD	Sheet Number 6		
Drawing File Name: 87-15-018_G-006.dwg		(R-4)				Sheet Subset: General		Subset Sheet: 6 of 9			
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET		(R-5)									

AD SET

INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY		STRUCTURES		PROJECT TOTALS	
BOOK	PAGE	SHEET				PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.
			1	201-00000	Clearing & Grubbing	LS	1			1	
			2	202-00070	Removal of Barricade	EACH	5			5	
			3	202-00005	Removal of Debris (Flood Debris)	LS	1			1	
			4	202-00010	Removal of Trees (6" to < 12")	EACH	53			53	
			5	202-00011	Removal of Trees (12" to < 24")	EACH	17			17	
			6	202-00012	Removal of Trees (24" and Greater)	EACH	4			4	
			7	202-00220	Removal of Asphalt Mat	SY	779			779	
			8	202-00495	Removal of Portions of Present Structure	LS	1			1	
			9	202-01000	Removal of Fence	LF	209			209	
			10	203-00000	Unclassified Excavation	CY	3,220			3,220	
			11	203-01597	Patholing	HR	8			8	
			12	206-00000	Structure Excavation	CY	5,360	362		5,722	
			13	206-00100	Structure Backfill (Class 1)	CY		536		536	
			14	206-00360	Mechanical Reinforcement of Soil	CY		502		502	
			15	207-00205	Topsoil (Borrow)	CY	904			904	
			16	208-00002	Erosion Log (12 Inch) (Biodegradable)	LF	50			50	
			17	208-00020	Silt Fence	LF	875			875	
			18	208-00045	Concrete Washout Structure	EACH	2			2	
			19	208-00070	Vehicle Tracking Pad	EACH	2			2	
			20	208-00206	Erosion Control Supervisor	DAY	40			40	
			21	208-00520	Temporary Stream Crossing	EACH	1			1	
			22	210-00810	Reset Ground Sign	EACH	3			3	
			23	211-03005	Dewatering	LS	1			1	
			24	212-00006	Seeding (Native)	ACRE	1.78			1.78	
			25	212-00205	Deciduous Tree (2 Gallon Container)	EACH	45			45	
			26	212-00310	Deciduous Shrub (1 Gallon Container)	EACH	1			1	
			27	212-00320	Deciduous Shrub (2 Gallon Container)	EACH	68			68	
			28	212-00350	Deciduous Shrub (5 Gallon Container)	EACH	13			13	
			29	212-00450	Evergreen Tree (5 Gallon Container)	EACH	7			7	
			30	212-01210	Seeding Establishment	LS	1			1	
			31	213-00012	Spray-on Mulch Blanket	ACRE	1.68			1.68	
			32	214-01015	Willow Cuttings	EACH	48			48	
			33	214-01227	Rootwads	EACH	7			7	
			34	216-00037	Soil Retention Blanket (Coconut) (Biodegradable)	SY	1,409			1,409	
			35	217-00016	Noxious Weed Management	HR	80			80	
			36	304-06000	Aggregate Base Course (Class 6)	TON	440			440	
			37	403-32741	Hot Mix Asphalt (Grading S) (75) (PG 64-22)	TON	154			154	
			38	403-33741	Hot Mix Asphalt (Grading SX) (75) (PG 64-22)	TON	202	109		311	
			39	503-00030	Drilled Caisson (30 Inch)	LF		326		326	
			40	503-00100	CSL Testing	EACH		8		8	
			41	506-00524	Buried Riprap (24 Inch)	CY	1,245			1,245	
			42	509-00011	Prefabricated Structural Steel Bridge	LS		1		1	
			43	515-00120	Waterproofing (Membrane)	SY		668		668	
			44	518-01050	Bridge Expansion Joint (Special)	LF		77		77	
			45	601-03040	Concrete Class D (Bridge)	CY		352		352	
			46	601-04008	Architectural Features	LS		1		1	
			47	601-40301	Structural Concrete Coating	SY		272		272	
			48	602-00020	Reinforcing Steel (Epoxy Coated)	LB		82,900		82,900	
			49	603-01245	24 Inch Reinforced Concrete Pipe (Complete In Place)	LF	126			126	
			50	606-00301	Guardrail Type 3 W-Beam (6-3 Post Spacing)	LF	50			50	

INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY		STRUCTURES		PROJECT TOTALS	
BOOK	PAGE	SHEET				PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.
			51	606-01370	Transition Type 3G	EACH	4			4	
			52	606-01385	End Anchorage Type 3K	EACH	2			2	
			53	606-02005	End Anchorage (Flared)	EACH	2			2	
			54	606-11030	Bridge Rail Type 10M	LF		415		415	
			55	607-01000	Fence Barbed Wire with Metal Posts	LF	158			158	
			56	607-11525	Fence (Plastic)	LF	1,000			1,000	
			57	612-00001	Delineator (Type 1)	EACH	16			16	
			58	613-00400	4 Inch Electrical Conduit	LF		413		413	
			59	620-00012	Field Office (Class 2)	EACH	1			1	
			60	620-00020	Sanitary Facility	EACH	2			2	
			61	625-00000	Construction Survey	LS	1			1	
			62	626-00000	Mobilization	LS	1			1	
			63	627-00005	Epoxy Pavement Marking	GAL	5			5	
			64	627-30405	Preformed Thermoplastic Pavement Marking (Word-Symbol)	SF	13			13	
			65	627-30410	Preformed Thermoplastic Pavement Marking (Xwalk-Stopline)	SF	20			20	
			66	629-01005	Survey Monument (Type 5)	EACH	1			1	
			67	630-00000	Flagging	HR	300			300	
			68	630-80335	Barricade (Type 3 M-A) (Temporary)	EACH	5			5	
			69	630-80342	Construction Traffic Sign (Panel Size B)	EACH	10			10	
			70	630-80360	Drum Channelizing Device	EACH	30			30	
			71	700-70010	Minor Contract Revision	FA	1			1	
			72	700-70380	Erosion Control	FA	1			1	

AD SET



Know what's below.
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Computer File Information		Index of Revisions				AD SET		SOUTH ST. VRain BRIDGE		Project No.	
Creation Date: 5/4/17	Initials: DW					No Revisions: mm/dd/yy		SUMMARY OF QUANTITIES		TD-SEPT12C14	
Last Modification Date: 5/10/17	Initials: KARMBRUSTER					Revised: mm/dd/yy	Designer: J. TEMPLE			Drawing Number G-007	
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet					Detailer: D. WOOD				Sheet Number 7		
Drawing File Name: 87-15-018_G-007.dwg					Sheet Subset: General		Subset Sheet: 7 of 9				
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET											

EARTHWORK AREA BREAKDOWN

STATION/LOCATION (SEE DIAGRAMS BELOW)	UNCLASSIFIED EXCAVATION (CY)	EMBANKMENT MATERIAL (C.I.P.) (CY)*	STRUCTURE EXCAVATION (CY)	STRUCTURE BACKFILL (CY)	TOPSOIL (BORROW) (CY)	BURIED RIPRAP (24 INCH) (CY)
AREA 1 (ROADWAY)	3	270			72	
AREA 2 (CHANNEL)	3,194	188			551	
AREA 3 (ROADWAY)	20	364			230	
OSV ROAD**	3	111			51	
North Rip Rap			2,998			652
South Rip Rap			2,362			593
BRIDGE			▲ 362	▲ 536		
TOTAL CHANNEL:	3,194	188	5,360		551	1,245
TOTAL ROADWAY:	26	745	362	536	353	0
TOTAL OVERALL:	3,220	933	5,722	536	904	1,245

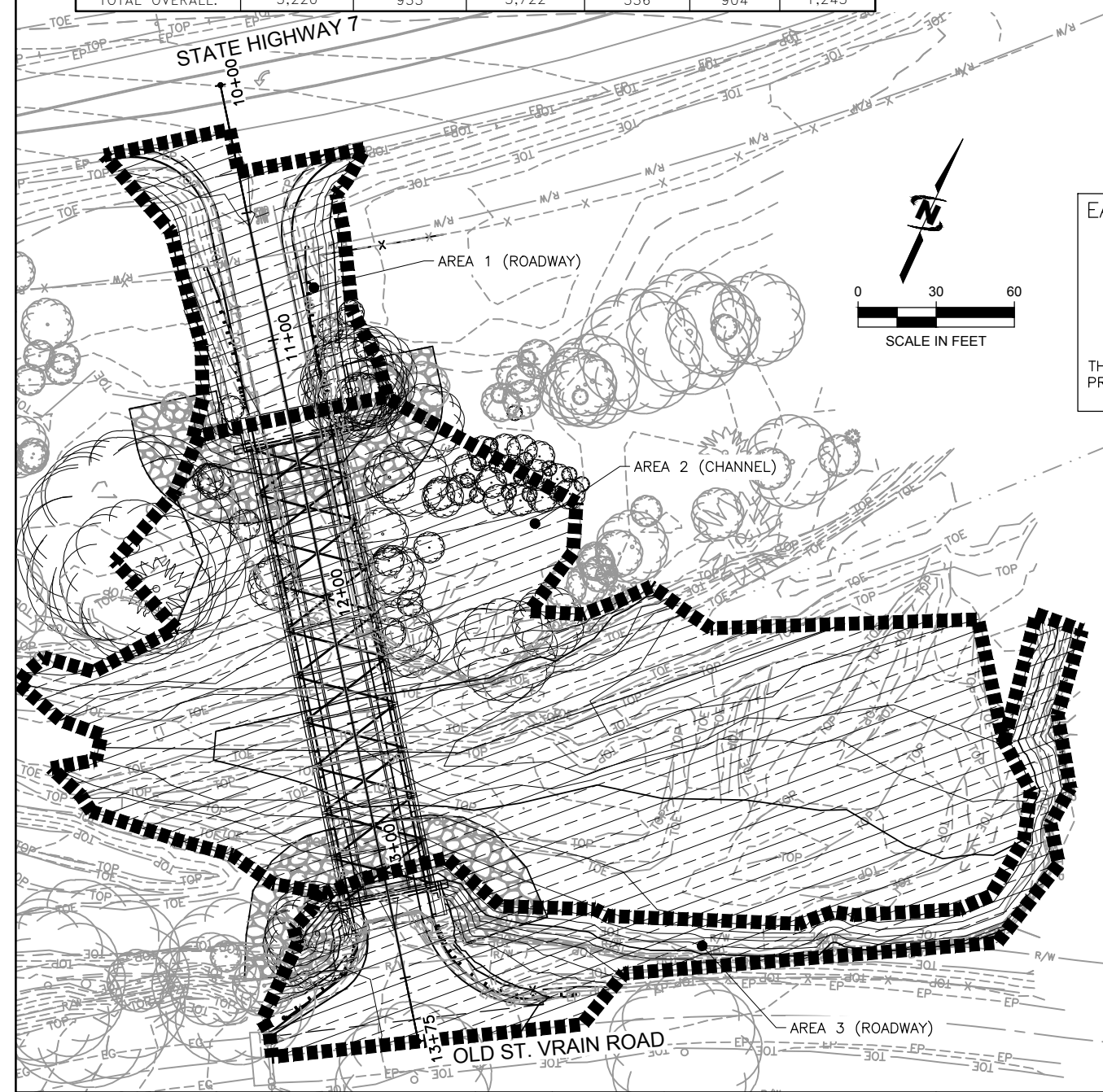
▲ QUANTITY CARRIED FORWARD FROM STRUCTURE TABULATIONS ON DWG S-601.

* FOR INFORMATION ONLY

** OLD SOUTH SAINT VRAIN ROAD (OSV) IS THE SECTION OF ROAD BEING REPAIRED - SEE DEMOLITION PLAN DM-102

SUMMARY OF EARTHWORK QUANTITIES

UNCLASSIFIED EXCAVATION (C.I.P.)	CU. YARDS
ROADWAY	
NORTH OF BRIDGE (STA. 10+07 - STA. 11+27)	3
SOUTH OF BRIDGE (STA. 13+30 - STA. 13+75)	20
ALONG ROADWAY (STA. 201+00 - STA. 204+00)	3
SOUTH ST VRAIN CHANNEL	3,194
TOTAL	3,220
STRUCTURE EXCAVATION	
BRIDGE (DWG S-601)	▲ 362
SOUTH ST VRAIN CREEK RIPRAP	
NORTH SIDE	2,998
SOUTH SIDE	2,362
TOTAL	5,722
EMBANKMENT MATERIAL (C.I.P.)	
ROADWAY	
NORTH OF BRIDGE (STA. 10+07 - STA. 11+27)	270
SOUTH OF BRIDGE (STA. 13+30 - STA. 13+75)	364
ALONG ROADWAY (STA. 201+00 - STA. 204+00)	111
SOUTH ST VRAIN CHANNEL	188
SOUTH ST VRAIN CREEK RIPRAP (BACKFILL)	
NORTH SIDE	2,265
SOUTH SIDE	1,695
STRUCTURE BACKFILL (CLASS 1)	
BRIDGE (DWG S-601)	▲ 536
TOTAL	5,429
TOPSOIL	
NORTH OF BRIDGE (STA. 10+07 - STA. 11+27)	72
SOUTH OF BRIDGE (STA. 13+30 - STA. 13+75)	230
ALONG ROADWAY (STA. 201+00 - STA. 204+00)	51
SOUTH ST VRAIN CHANNEL	551
TOTAL	904
EARTHWORK QUANTITIES BALANCE (SEE NOTE 1)	
	CU. YARDS
TOTAL EXCAVATION FROM PROJECT	8,942
TOTAL EMBANKMENT NEEDED FOR PROJECT	5,429
EXCESS MATERIAL FROM PROJECT	3,513



EARTHWORK PAY ITEMS ON THIS PROJECT INCLUDE:

STRUCTURE EXCAVATION:	5,722 CY
UNCLASSIFIED EXCAVATION:	3,220 CY
STRUCTURE BACKFILL (CLASS 1)	536 CY
TOPSOIL (BORROW)	904 CY
BURIED RIPRAP (24 INCH)	1,245 CY

THE CONTRACTOR SHALL INCLUDE ALL EARTHWORK COST REQUIRED ON THIS PROJECT IN THE ITEMS ABOVE.

EARTHWORK NOTES

1. EARTHWORK QUANTITIES ARE IN PLACE MEASUREMENT. NO SHRINK OR SWELL FACTORS WERE APPLIED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INTERPRET THE SOIL CONDITION AND APPLY COMPACTION SWELL FACTORS.
2. SEE DRAWING GR-501 AND GR-503 FOR CHANNEL RIPRAP GEOMETRICS & DETAILS.
3. TOPSOIL SHALL BE IMPORTED BORROW MATERIAL.
4. DEWATERING PER THE SPECIFICATIONS WILL BE REQUIRED PRIOR TO STRUCTURE EXCAVATION. REFER TO GENERAL NOTE #13 ON DWG G-006.
5. RIPRAP PAY ITEM ON THIS PROJECT INCLUDES COST OF PLACING NATIVE SOILS OVER RIPRAP. SEE DWG GR-503.



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Computer File Information		Index of Revisions			<p>J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602</p>	AD SET		SOUTH ST. VRAIN BRIDGE SUMMARY OF EARTHWORK		Project No.	
Creation Date: 5/2/17	Initials: DW					No Revisions: mm/dd/yy	Designer: J. TEMPLE			TD-SEPT12C14	
Last Modification Date: 5/2/17	Initials: RCUNDIFF			Revised: mm/dd/yy	Detailer: D. WOOD			Drawing Number G-008			
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet				Void: mm/dd/yy	Sheet Subset: General	Subset Sheet: 8	of 9	Sheet Number 8			
Drawing File Name: 87-15-018_G-008.dwg											
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET									

AD SET

TABULATION OF SURFACING ITEMS					
STATION/LOCATION	AREA (SF)	HOT MIX ASPHALT (HMA)			AGGREGATE BASE COURSE (CLASS 6)
		GRADING SX (75) (PG 64-22)		GRADING S (75) (PG 64-22)	
		3"	2"	2"	
		(TONS)	(TONS)	(TONS)	
OLD ST VRAIN BRIDGE APPROACH					
STA. 10+17 TO STA. 11+27	3,223	60		40	118
STA. 13+29 TO STA. 13+66	1,988	37		25	70
BRIDGE		▲ 109			
OLD ST VRAIN ROAD					
STA. 201+10 TO STA. 203+90	6,160		76	76	211
SUBTOTALS		206	76	140	400
10% ADDITIONAL		21	8	14	40
TOTALS		311		154	440

▲ QUANTITY CARRIED FORWARD FROM STRUCTURE TABULATIONS ON DWG S-601.

* SEE REMOVAL OF TREE NOTES ON DWG DM-101 AND DM-102.

TABULATION OF REMOVAL, ADJUSTMENT, RELOCATE, AND RESET ITEMS											
STATION/LOCATION	SIDE	REMOVAL OF PORTIONS OF PRESENT STRUCTURE (LS)	REMOVAL OF FLOOD DEBRIS (LS)	REMOVAL OF TREES (6" TO 12") (EACH)	REMOVAL OF TREES (12" TO 24") (EACH)	REMOVAL OF TREES (24" AND GREATER) (EACH)*	REMOVAL OF ASPHALT MAT (SY)	REMOVAL OF BARRICADE (EACH)	REMOVAL OF FENCE (LF)	RESET GROUND SIGN (EACH)	REMARKS
Old St Vrain Road											
10+17.35 TO 12+07.51	LT/RT						475	3			
10+51.87	LT									1	Stop Sign
10+71.37	LT							70			
10+76.96	RT									1	Aggregate Sign
10+95.54 TO 12+34.84	LT			48	12						
11+22.42 TO 11+92.09	RT			4	3						
11+64.30 TO 11+78.93	RT					3					
12+10.00	LT									1	No Parking Sign
12+34.81	LT					1					
13+23.55 TO 13+29.68	RT			1	2						
13+25.54 TO 13+32.53	LT/RT	1									Old Bridge Abutment
13+26.66 TO 13+70.77	LT/RT						196	2			
13+33.53 TO 13+50.41	RT								48		
13+37.33 TO 13+70.97	LT								91		
201+10.00 TO 201+49.00	LT/RT						74				
203+52.46 TO 203+97.62	LT		1								
203+69.58 TO 203+90.00	LT/RT						34				
TOTALS		1	1	53	17	4	779	5	209	3	

TABULATION OF GUARDRAIL & TRANSITION ITEMS							
STATION	SIDE	GUARDRAIL TYPE 3 W-BEAM (6-3 POST SPACING) (LF)	TRANSITION TYPE 3G (EACH)	END ANCHORAGE TYPE 3K (EACH)	END ANCHORAGE (FLARED) (EACH)	BRIDGE RAIL TYPE 10M * (LF) ▲	
10+68.27 TO 11+06.02	LT				1		
10+68.28 TO 11+06.02	RT				1		
11+06.02 TO 11+26.66	LT		1				
11+06.02 TO 11+26.66	RT		1				
11+26.66 TO 13+29.66	LT						207.5
11+26.66 TO 13+29.66	RT						207.5
13+29.66 TO 13+49.45	LT		1				
13+29.66 TO 13+46.22	RT		1				
13+46.22 TO 13+51.34	RT	12.5					
13+49.45 TO 13+68.89	LT	37.5					
13+51.24 TO 13+55.73	RT			1			
13+68.89 TO 13+69.85	LT			1			
TOTALS		50.0	4	2	2		415

TABULATION OF DRAINAGE ITEMS	
STATION/LOCATION	603 24 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE) (LF)
STA. 13+41.63, 46.10' R TO STA. 13+63.59, 77.66' L	126
TOTALS	126

TABULATION OF FENCE ITEMS	
STATION/LOCATION	FENCE BARBED WIRE WITH METAL POSTS (LF)
OLD ST VRAIN ROAD	
STA: 10+71.56 TO STA: 10+73.47 L	48
STA: 13+37.35 TO STA: 13+50.41 R	38
STA: 13+41.34 TO STA: 13+70.88 L	72
TOTALS	158










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Computer File Information		Index of Revisions				AD SET		SOUTH ST. VRAIN BRIDGE TABULATIONS		Project No.	
Creation Date: 5/9/17	Initials: DW					No Revisions: mm/dd/yy			TD-SEPT12C14		
Last Modification Date: 5/9/17	Initials: RCUNDIFF				Revised: mm/dd/yy	Designer: J. TEMPLE		Drawing Number G-009			
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet					Void: mm/dd/yy	Detailer: D. WOOD		Sheet Subset: General		Subset Sheet: 9 of 9	
Drawing File Name: 87-15-018_G-009.dwg										Sheet Number 9	
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET									

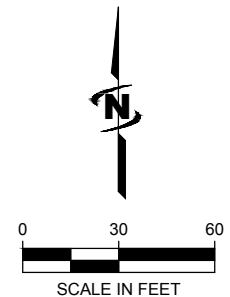
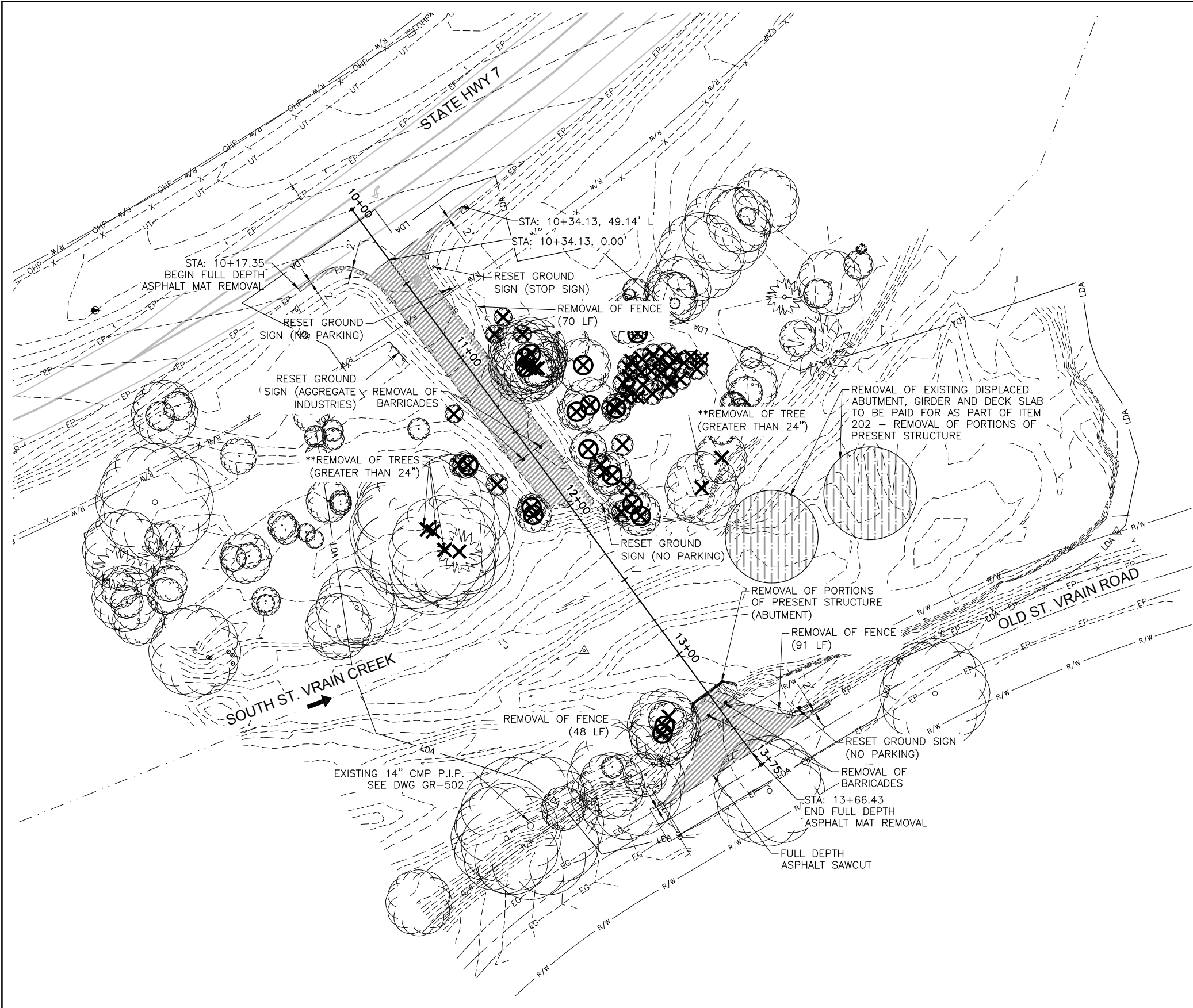
AD SET

LEGEND

-  REMOVAL OF ASPHALT MAT, FULL DEPTH REMOVAL
-  REMOVAL OF DEBRIS
- P.I.P. PROTECT IN PLACE
-  CUT PROPOSED CUT LINE
-  FILL PROPOSED FILL LINE
-  LDA LIMITS OF DISTURBED AREA
-  REMOVAL OF TREE (6" TO 12" UNLESS OTHERWISE SPECIFIED)
-  REMOVAL OF TREE (12" TO 24")

DEMOLITION NOTES

1. COST OF ASPHALT SAWCUTS SHALL BE INCIDENTAL TO OTHER PAY ITEMS.
 2. THE CONTRACTOR SHALL REMOVE ALL BARRIERS (CONCRETE AND WOODEN) THAT WERE PLACED BY BOULDER COUNTY. BARRIERS SHOULD BE DELIVERED TO THE BOULDER COUNTY MAINTENANCE YARD LOCATED AT:
5201 ST. VRAIN RD. #5
LONGMONT, CO 80503
IF CONTRACTOR DAMAGES BARRIERS, CONTRACTOR SHALL REPLACE AT NO COST TO THE PROJECT. TRANSPORT OF BARRIERS SHALL BE INCLUDED IN THE ITEM "REMOVAL OF BARRIER"
 3. ANY TREES TO BE REMOVED THAT ARE A MINIMUM OF 12" AND MAXIMUM OF 24" IN DIAMETER MEASURED AT BREAST HEIGHT (DBH) SHALL BE REMOVED AND STOCKPILED AS FOLLOWS FOR ROOTWADS: TREE SHALL BE CUT 10-15 FEET VERTICALLY FROM BASE AND REMOVED SO ROOTWAD IS STILL INTACT AND ATTACHED TO THE 10-15 FOOT TRUNK. STOCKPILE ROOTWADS AS DIRECTED BY THE ENGINEER. TREES SHALL BE PAID FOR AS: REMOVAL OF TREE (12" TO 24"). SEE REMOVAL DETAIL ON DWG DM-103.
 4. END FENCE REMOVAL AT NEAREST EXISTING POST.
- ** TREE REMOVAL OF GREATER THAN 24" DIAMETER TREES ON UPSTREAM SIDE OF BRIDGE IS DEPENDANT ON FINAL APPROVAL BY THE PROJECT MANAGER AND PARKS AND OPEN SPACE ECOLOGIST.



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Computer File Information	
Creation Date: 5/3/17	Initials: DW
Last Modification Date: 5/3/17	Initials: RCUNDIFF
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet	
Drawing File Name: 87-15-018_DM-101.dwg	
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET	

Index of Revisions	
(R-1)	
(R-2)	
(R-3)	
(R-4)	
(R-5)	



JUB
J-U-B ENGINEERS, INC.
4745 Boardwalk Drive
Building D, Suite 200
Fort Collins, CO 80525
Phone: 970.377.3602



AD SET
No Revisions: mm/dd/yy
Revised: mm/dd/yy
Void: mm/dd/yy

SOUTH ST. VRAIN BRIDGE DEMOLITION PLAN	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: DEMO PLANS	Subset Sheet: 1 of 3

Project No.	TD-SEPT12C14
Drawing Number DM-101	
Sheet Number 10	

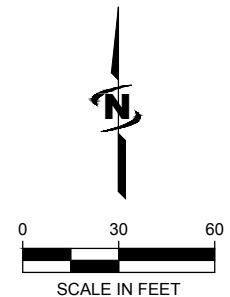
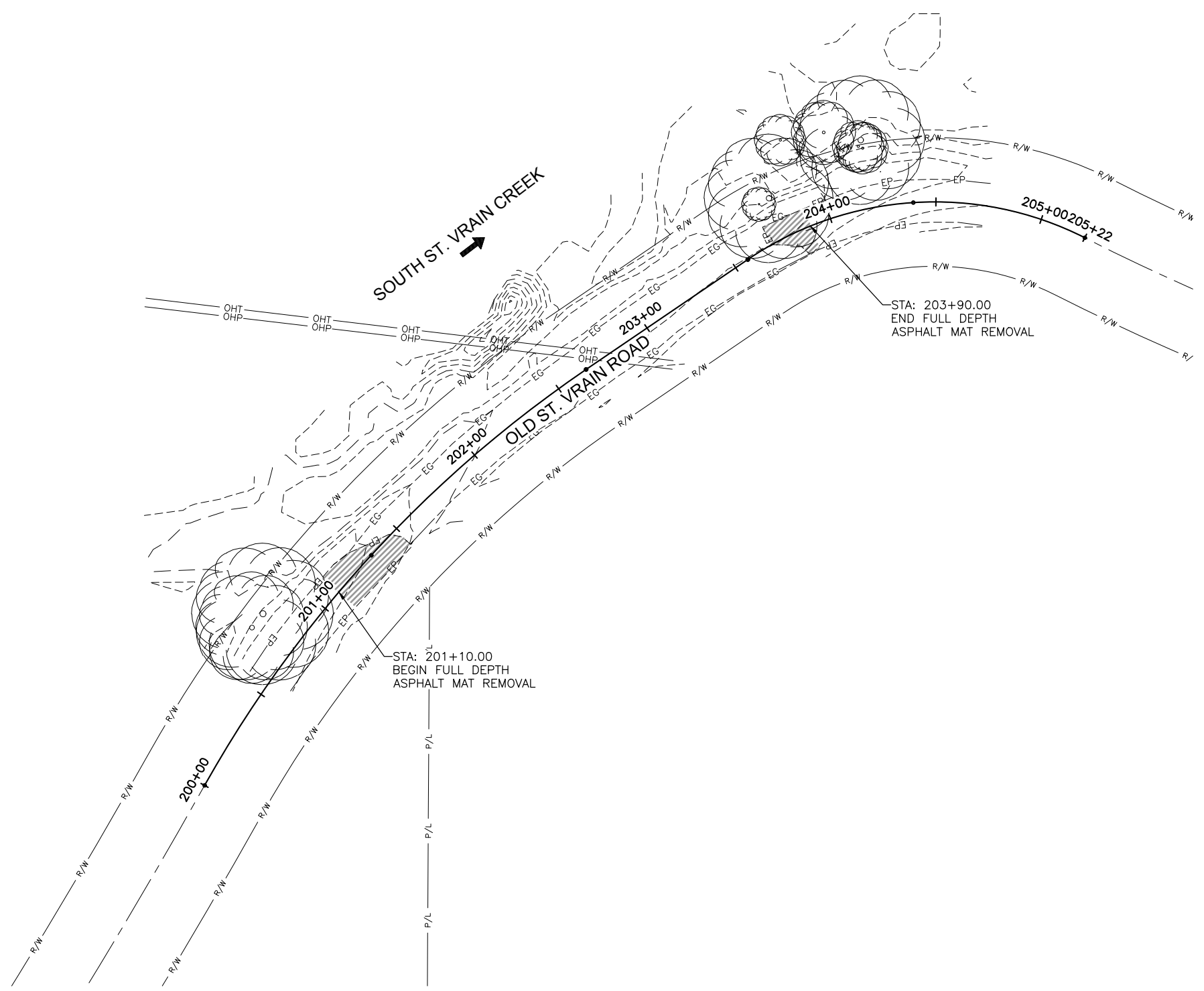
AD SET

LEGEND


-  REMOVAL OF ASPHALT MAT, FULL DEPTH REMOVAL
-  REMOVAL OF DEBRIS
- P.I.P. PROTECT IN PLACE
- CUT — PROPOSED CUT LINE
- FILL — PROPOSED FILL LINE
- LDA — LIMITS OF DISTURBED AREA
- ⊗ REMOVAL OF TREE (6" TO 12" UNLESS OTHERWISE SPECIFIED)
- ⊗ REMOVAL OF TREE (12" TO 24")

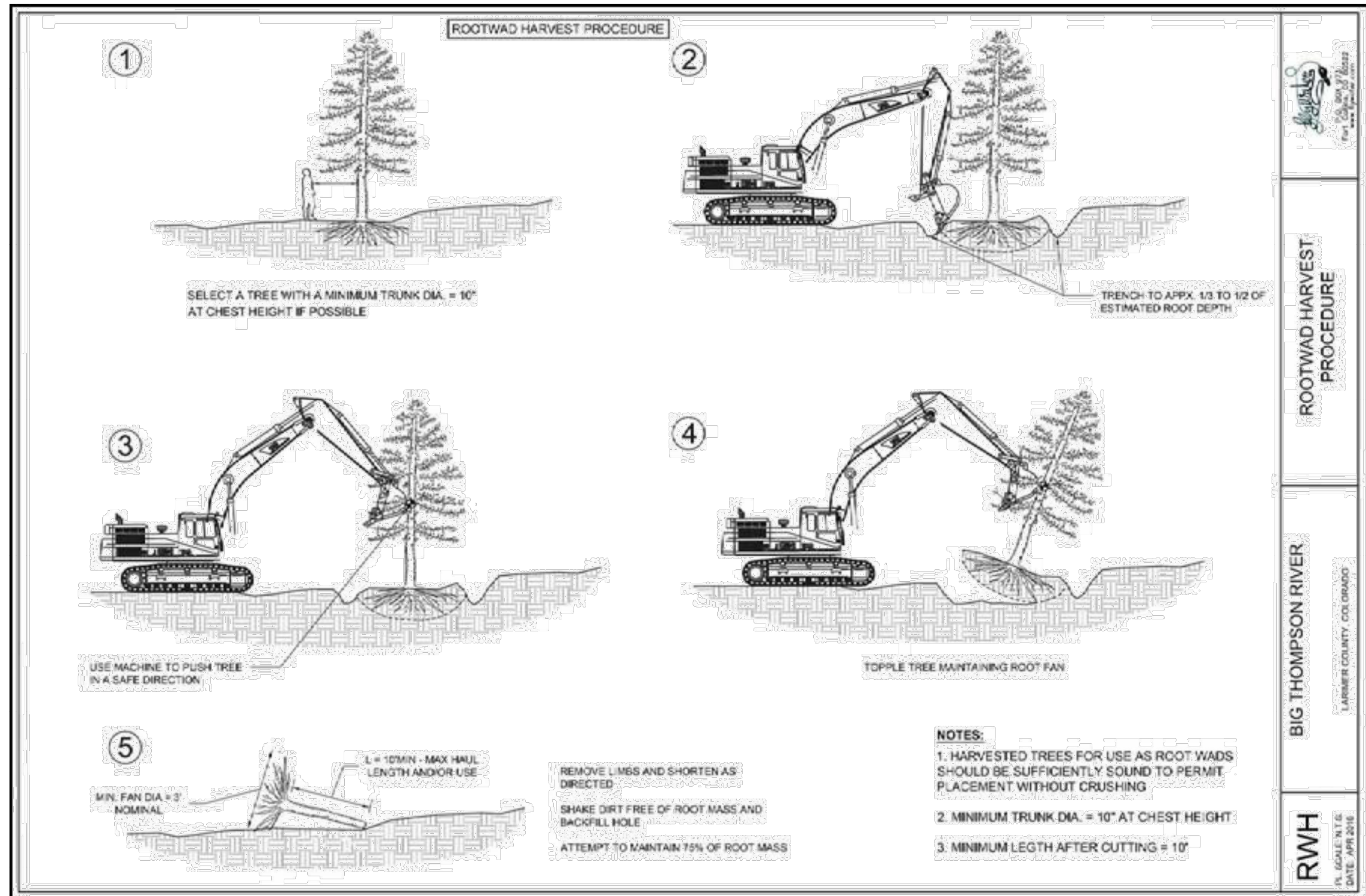
DEMOLITION NOTES

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 2. THE CONTRACTOR SHALL REMOVE ALL BARRIERS (CONCRETE AND WOODEN) THAT WERE PLACED BY BOULDER COUNTY. BARRIERS SHOULD BE DELIVERED TO THE BOULDER COUNTY MAINTENANCE YARD LOCATED AT:
5201 ST. VRAIN RD. #5
LONGMONT, CO 80503
IF CONTRACTOR DAMAGES BARRIERS, CONTRACTOR SHALL REPLACE AT NO COST TO THE PROJECT. TRANSPORT OF BARRIERS SHALL BE INCLUDED IN THE ITEM "REMOVAL OF BARRIER"
 3. ANY TREES TO BE REMOVED THAT ARE A MINIMUM OF 12" AND MAXIMUM OF 24" IN DIAMETER MEASURED AT BREAST HEIGHT (DBH) SHALL BE REMOVED AND STOCKPILED AS FOLLOWS FOR ROOTWADS: TREE SHALL BE CUT 10-15 FEET VERTICALLY FROM BASE AND REMOVED SO ROOTWAD IS STILL INTACT AND ATTACHED TO THE 10-15 FOOT TRUNK. STOCKPILE ROOTWADS AS DIRECTED BY THE ENGINEER. TREES SHALL BE PAID FOR AS: REMOVAL OF TREE (12" TO 24"). SEE REMOVAL DETAIL ON DWG DM-103.
 4. END FENCE REMOVAL AT NEAREST EXISTING POST.
- ** TREE REMOVAL OF GREATER THAN 24" DIAMETER TREES ON UPSTREAM SIDE OF BRIDGE IS DEPENDANT ON FINAL APPROVAL BY THE PROJECT MANAGER AND PARKS AND OPEN SPACE ECOLOGIST.



AD SET

Computer File Information		Index of Revisions			 JUB J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	AD SET		SOUTH ST. VRAIN BRIDGE DEMOLITION PLAN		Project No.		
Creation Date: 5/3/17	Initials: DW	(R-1)				No Revisions: mm/dd/yy					TD-SEPT12C14	
Last Modification Date: 5/5/17	Initials: RCUNDIFF	(R-2)				Revised: mm/dd/yy			Designer: J. TEMPLE		Drawing Number DM-102	
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Drawing File Name: 87-15-018_DM-102.dwg		(R-4)						Sheet Subset: DEMO PLANS		Subset Sheet: 2 of 3		
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET	(R-5)									



ROOTWAD HARVEST PROCEDURE

BIG THOMPSON RIVER

LARKSPUR COUNTY, COLORADO

RWH
P.L. SCALE: N.T.S.
DATE: APR. 2016



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Computer File Information	
Creation Date: 5/3/17	Initials: DW
Last Modification Date: 5/3/17	Initials: RCUNDIFF
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet	
Drawing File Name: 87-15-018_DM-103.dwg	
ACAD Ver. ACAD 2013	Scale: AS SHOWN Units: FEET

Index of Revisions	



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J-U-B ENGINEERS, INC.
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Building D, Suite 200
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Phone: 970.377.3602

AD SET	
No Revisions: mm/dd/yy	
Revised: mm/dd/yy	
Void: mm/dd/yy	

SOUTH ST. VRAIN BRIDGE ROOTWAD HARVEST PROCEDURE	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: DEMO PLANS	Subset Sheet: 3 of 3

Project No.	
TD-SEPT12C14	
Drawing Number DM-103	
Sheet Number 12	

VERTICAL DATUM:

BENCHMARK: NGS BENCHMARK NGS "7"
ELEVATION=5308.61' NAVD88

HORIZONTAL DATUM:

COLORADO STATE PLANE COORDINATES
NAD 83(2007) DATUM. HORIZONTAL
CONTROL BASED UPON TRIMBLE VRS
NETWORK.

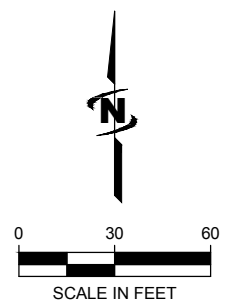
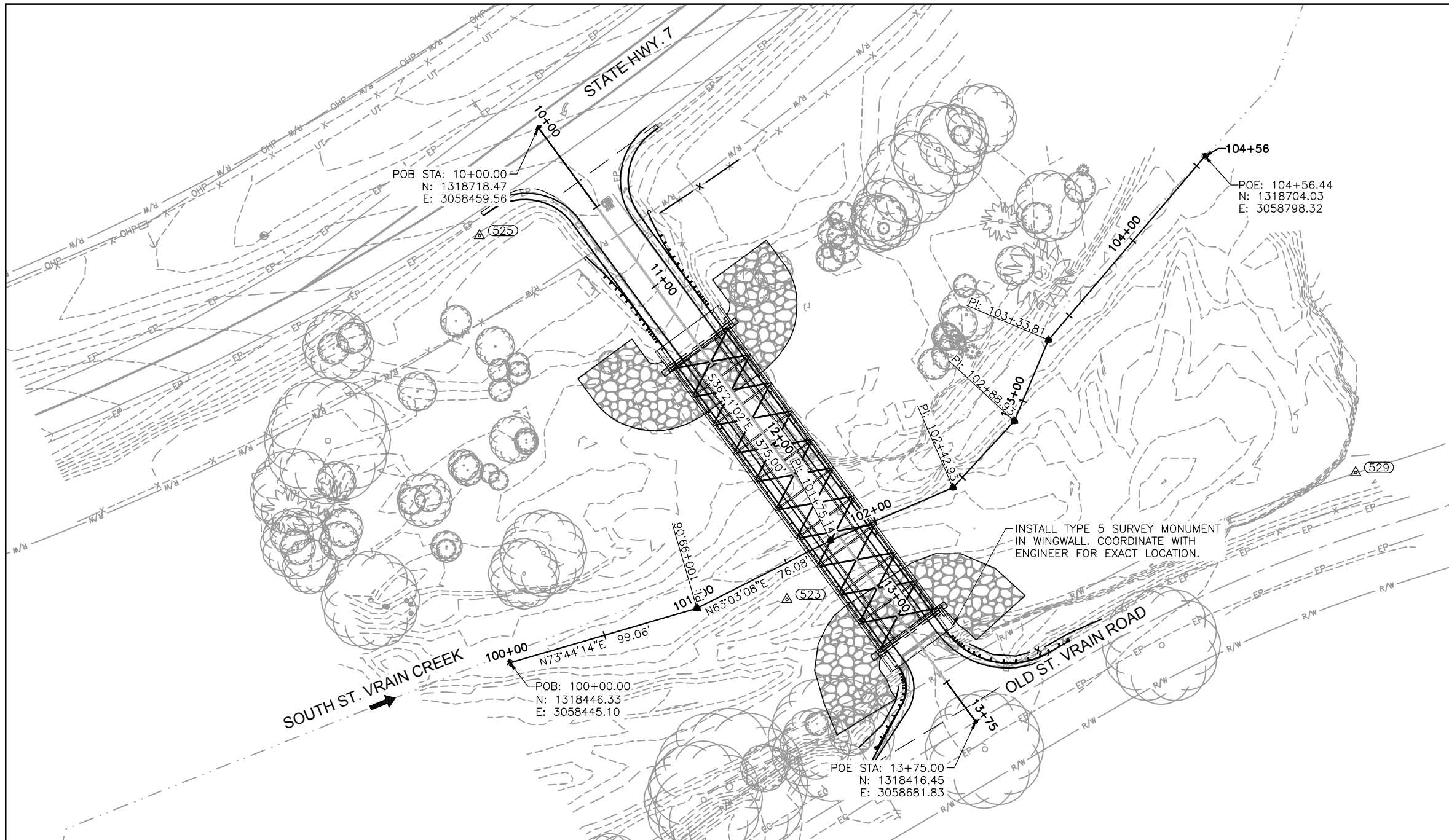
NOTES:

1. THIS DRAWING IS AT MODIFIED STATE
PLANE. TO REDUCE TO STATE PLANE
COORDINATES, SCALE AT 0.99969569
(1.000304403) ABOUT THE ORIGIN 0,0.

2. ALL PROPERTY PINS, INTERSECTION
MONUMENTS, AND SECTION CORNERS
DISTURBED DURING CONSTRUCTION MUST
BE REFERENCED AND REPLACED UNDER
THE SUPERVISION OF A LICENSED
SURVEYOR.

LEGEND

- POB - POINT OF BEGINNING
- POE - POINT OF ENDING
- PI - POINT OF INTERSECTION
- PC - POINT OF CURVATURE
- PT - POINT OF TANGENCY
- (XXX) - SURVEY CONTROL POINTS



SURVEY CONTROL					
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	LOCATION
504	1318089.53	3061795.47	5918.78	SE COR SEC 24 - STONE	OFF SHEET
506	1320709.15	3061776.42	5606.77	E1/4 COR SEC 24 1" IP WITH 2.5" BC GLO 1912	OFF SHEET
510	1317950.88	3056793.50	5547.18	BM GPS BC9907 1999	OFF SHEET
512	1323428.43	3059146.73	6136.03	N1/4 COR SEC 24 1" IP WITH 2.25" BC GLO 1912	OFF SHEET
514	1320788.55	3056472.05	5831.58	W1/4 COR SEC 24 1" IP WITH 2.25" BC GLO 1912	OFF SHEET
516	1318139.98	3056465.54	5549.53	SW COR SEC 24 2" IP WITH 2.5" BC GLO 1912	OFF SHEET
523	1318478.55	3058585.83	5465.08	CP HARO	DWG. GM-201

SURVEY CONTROL					
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	LOCATION
525	1318663.58	3058429.56	5472.94	CP REDLINE	DWG. GM-201
527	1318283.40	3058235.12	5472.56	CP GT	OFF SHEET
529	1318543.09	3058874.95	5465.18	CP HUTCH	DWG. GM-201
531	1319590.80	3059786.15	5443.36	CP JMC	DWG. GM-202
533	1319384.21	3059570.86	5446.36	CP CW	DWG. GM-202
535	1319671.25	3059955.01	5441.50	WP 535	DWG. GM-202



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Computer File Information Creation Date: 12/11/15 Initials: DW Last Modification Date: 5/9/17 Initials: RCUNDIFF Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet Drawing File Name: 87-15-018_GM-201.dwg ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET		Index of Revisions (R-1) (R-2) (R-3) (R-4) (R-5)				J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602		AD SET No Revisions: mm/dd/yy Revised: mm/dd/yy Void: mm/dd/yy		SOUTH ST. VRAIN BRIDGE SURVEY CONTROL & GEOMETRICS Designer: J. TEMPLE Detailer: D. WOOD Sheet Subset: Horiz. Cntrl. Subset Sheet: 1 of 2		Project No. TD-SEPT12C14 Drawing Number GM-201 Sheet Number 13	
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AD SET

VERTICAL DATUM:

BENCHMARK: NGS BENCHMARK NGS "7"
ELEVATION=5308.61' NAVD88

HORIZONTAL DATUM:

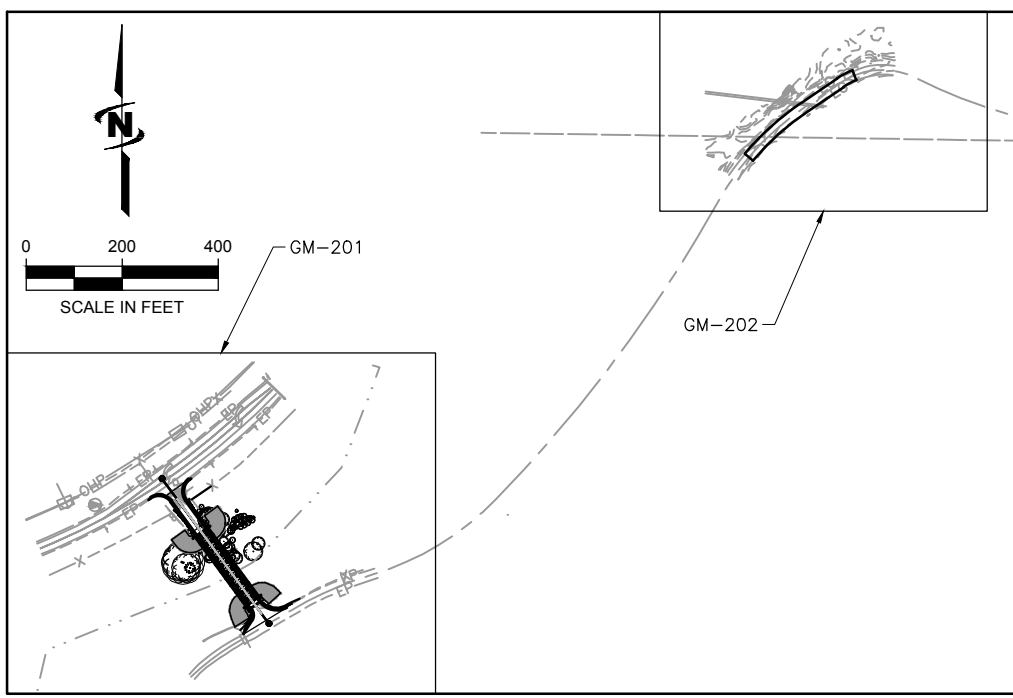
COLORADO STATE PLANE COORDINATES
NAD 83(2007) DATUM. HORIZONTAL
CONTROL BASED UPON TRIMBLE VRS
NETWORK.

NOTES:

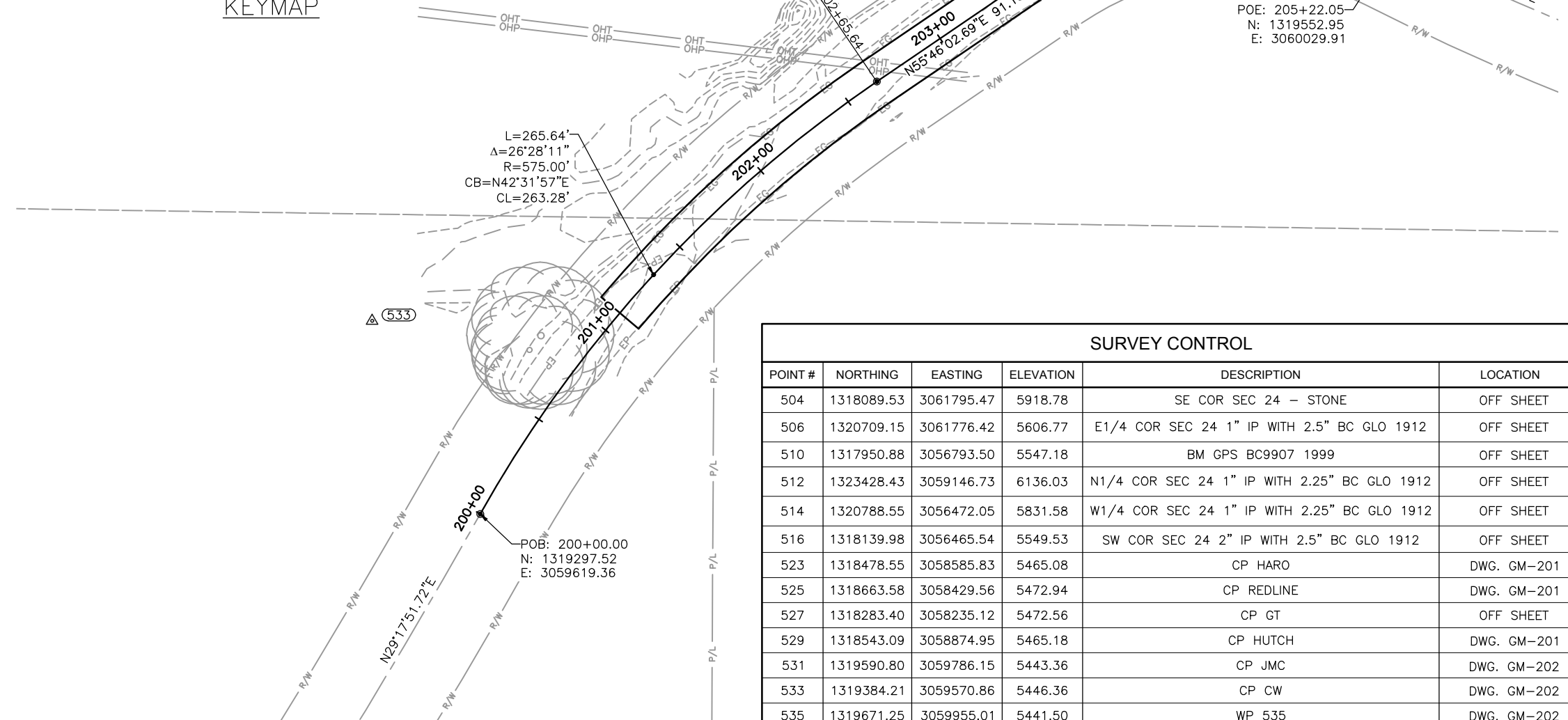
1. THIS DRAWING IS AT MODIFIED STATE PLANE. TO REDUCE TO STATE PLANE COORDINATES, SCALE AT 0.99969569 (1.000304403) ABOUT THE ORIGIN 0,0.
2. ALL PROPERTY PINS, INTERSECTION MONUMENTS, AND SECTION CORNERS DISTURBED DURING CONSTRUCTION MUST BE REFERENCED AND REPLACED UNDER THE SUPERVISION OF A LICENSED SURVEYOR.

LEGEND

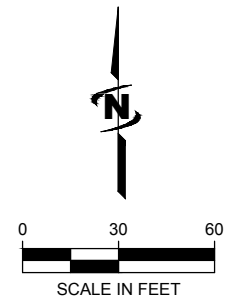
- POB - POINT OF BEGINNING
- POE - POINT OF ENDING
- PI - POINT OF INTERSECTION
- PC - POINT OF CURVATURE
- PT - POINT OF TANGENCY
- (XXX) - SURVEY CONTROL POINTS



KEYMAP



SURVEY CONTROL					
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	LOCATION
504	1318089.53	3061795.47	5918.78	SE COR SEC 24 - STONE	OFF SHEET
506	1320709.15	3061776.42	5606.77	E1/4 COR SEC 24 1" IP WITH 2.5" BC GLO 1912	OFF SHEET
510	1317950.88	3056793.50	5547.18	BM GPS BC9907 1999	OFF SHEET
512	1323428.43	3059146.73	6136.03	N1/4 COR SEC 24 1" IP WITH 2.25" BC GLO 1912	OFF SHEET
514	1320788.55	3056472.05	5831.58	W1/4 COR SEC 24 1" IP WITH 2.25" BC GLO 1912	OFF SHEET
516	1318139.98	3056465.54	5549.53	SW COR SEC 24 2" IP WITH 2.5" BC GLO 1912	OFF SHEET
523	1318478.55	3058585.83	5465.08	CP HARO	DWG. GM-201
525	1318663.58	3058429.56	5472.94	CP REDLINE	DWG. GM-201
527	1318283.40	3058235.12	5472.56	CP GT	OFF SHEET
529	1318543.09	3058874.95	5465.18	CP HUTCH	DWG. GM-201
531	1319590.80	3059786.15	5443.36	CP JMC	DWG. GM-202
533	1319384.21	3059570.86	5446.36	CP CW	DWG. GM-202
535	1319671.25	3059955.01	5441.50	WP 535	DWG. GM-202



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Drawing File Name: 87-15-018_GM-202.dwg	
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET	

Index of Revisions	
(R-1)	
(R-2)	
(R-3)	
(R-4)	
(R-5)	



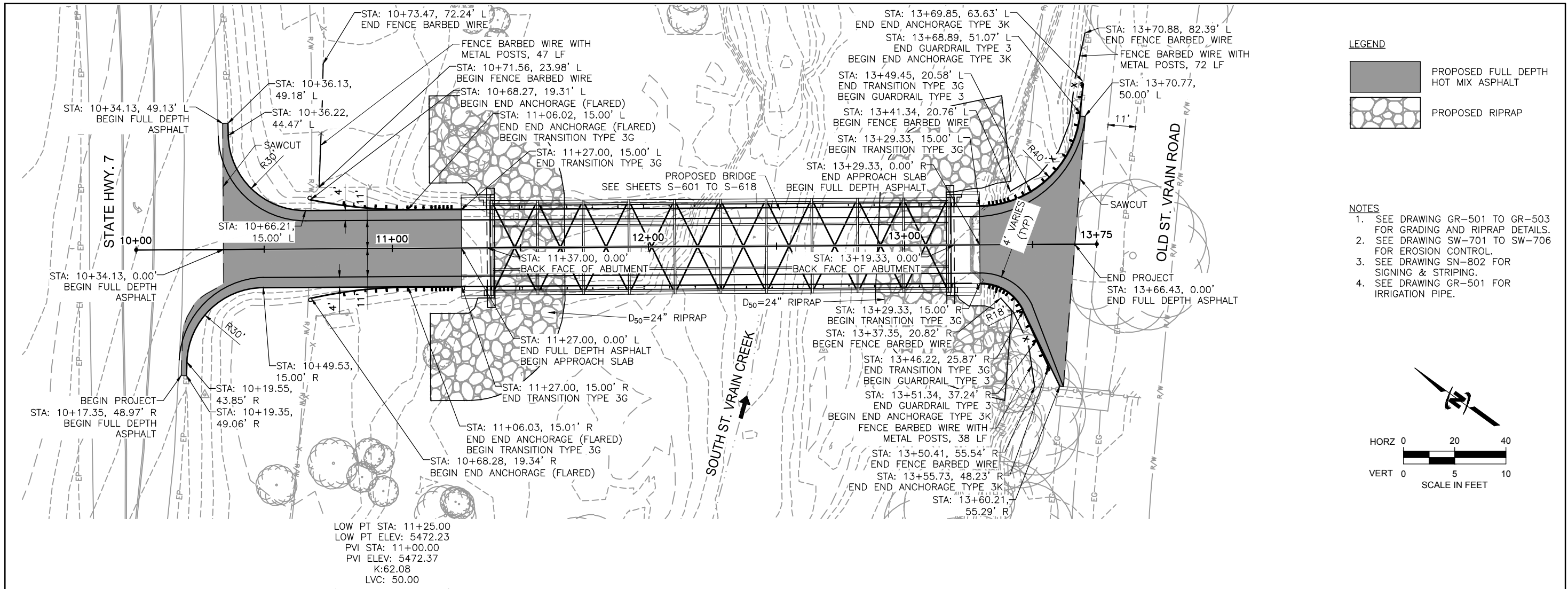
JUB
J-U-B ENGINEERS, INC.
4745 Boardwalk Drive
Building D, Suite 200
Fort Collins, CO 80525
Phone: 970.377.3602

AD SET
No Revisions: mm/dd/yy
Revised: mm/dd/yy
Void: mm/dd/yy

SOUTH ST. VRAIN BRIDGE SURVEY CONTROL & GEOMETRICS	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: Horiz. Contrl.	Subset Sheet: 2 of 2

Project No.
TD-SEPT12C14
Drawing Number GM-202
Sheet Number 14

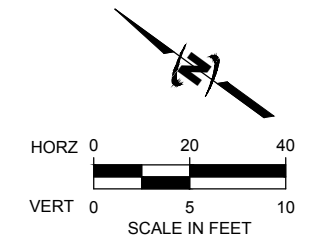
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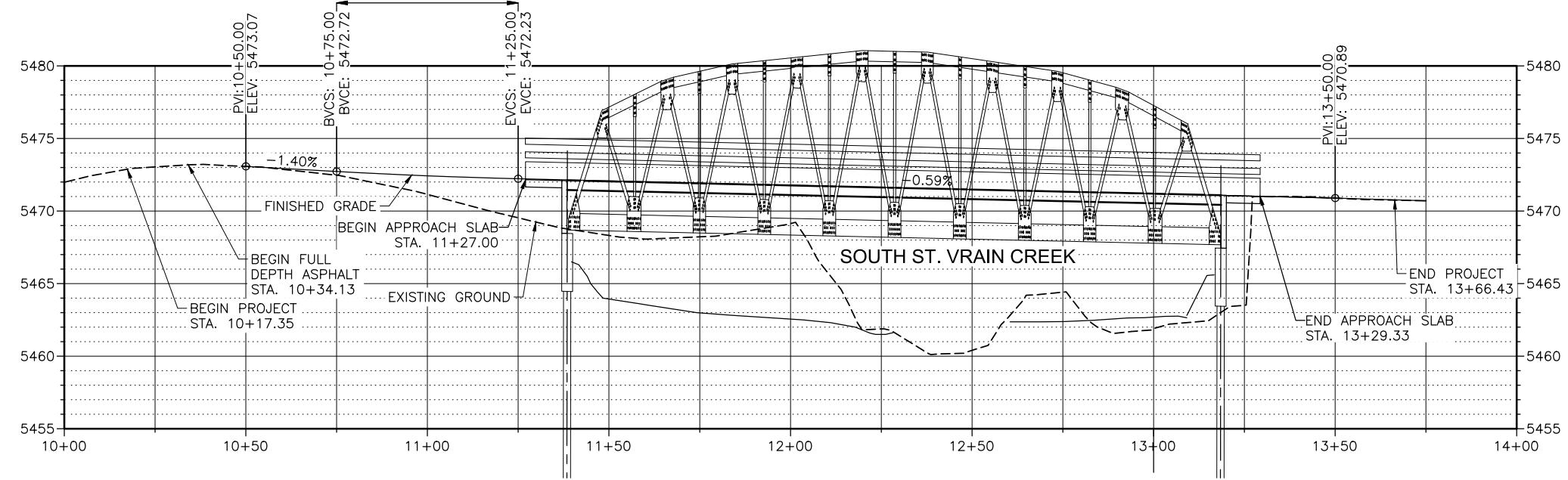
LEGEND

- PROPOSED FULL DEPTH HOT MIX ASPHALT
- PROPOSED RIPRAP

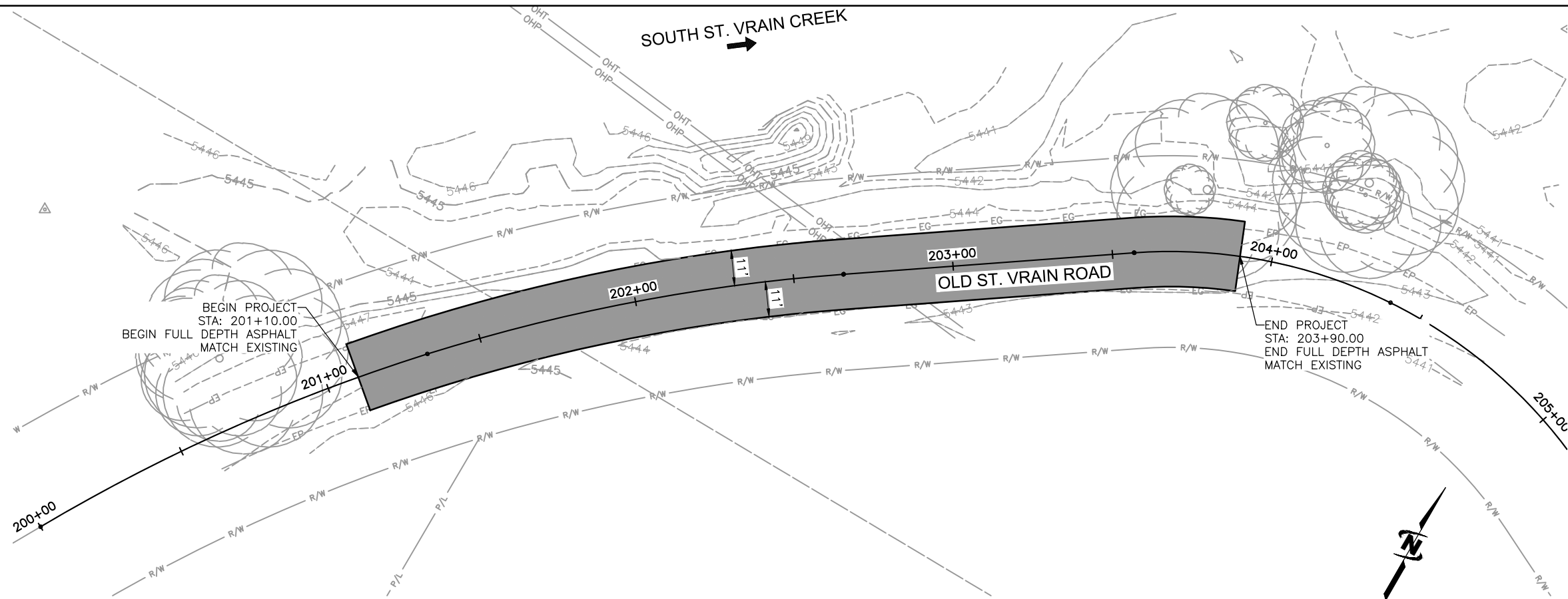
- NOTES**
1. SEE DRAWING GR-501 TO GR-503 FOR GRADING AND RIPRAP DETAILS.
 2. SEE DRAWING SW-701 TO SW-706 FOR EROSION CONTROL.
 3. SEE DRAWING SN-802 FOR SIGNING & STRIPING.
 4. SEE DRAWING GR-501 FOR IRRIGATION PIPE.



LOW PT STA: 11+25.00
 LOW PT ELEV: 5472.23
 PVI STA: 11+00.00
 PVI ELEV: 5472.37
 K:62.08
 LVC: 50.00



Computer File Information		Index of Revisions				AD SET		SOUTH ST. VRAIN BRIDGE		Project No.									
Creation Date: 5/3/17 Initials: DW		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20px; text-align: center;">R-1</td><td></td></tr> <tr><td style="text-align: center;">R-2</td><td></td></tr> <tr><td style="text-align: center;">R-3</td><td></td></tr> <tr><td style="text-align: center;">R-4</td><td></td></tr> <tr><td style="text-align: center;">R-5</td><td></td></tr> </table>				R-1		R-2		R-3		R-4		R-5		No Revisions: mm/dd/yy		PLAN & PROFILE	
R-1																			
R-2																			
R-3																			
R-4																			
R-5																			
Last Modification Date: 5/4/17 Initials: RCUNDIFF				J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602		Revised: mm/dd/yy		Designer: J. TEMPLE		Drawing Number PP-301									
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet						Void: mm/dd/yy		Detailer: D. WOOD		Sheet Number 15									
Drawing File Name: 87-15-018_PP-301.dwg								Sheet Subset: Plan & Profile		Subset Sheet: 1 of 2									
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET																			



LEGEND

- PROPOSED FULL DEPTH HOT MIX ASPHALT
- PROPOSED RIPRAP

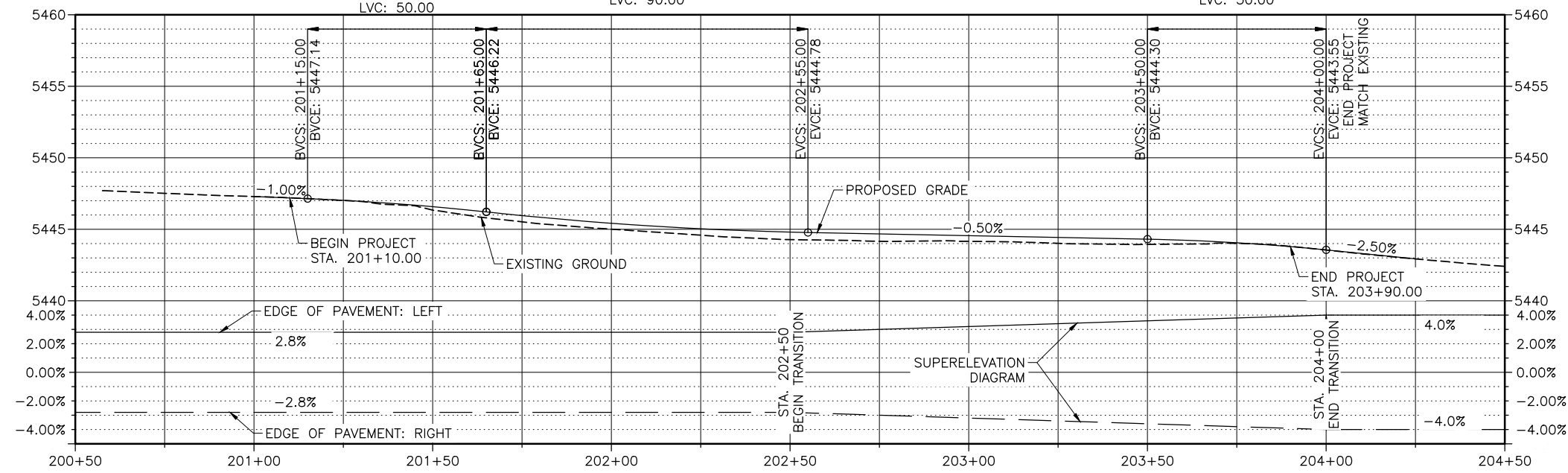
NOTES

1. SEE DRAWING GR-501 TO GR-503 FOR GRADING AND RIPRAP DETAILS.
2. SEE DRAWING SW-701 TO SW-706 FOR EROSION CONTROL.
3. SEE DRAWING SN-802 FOR SIGNING & STRIPING.
4. SEE DRAWING GR-501 FOR IRRIGATION PIPE.

HP STA: 201+15.00
HP ELEV: 5447.139
PVI STA: 201+40.00
PVI ELEV: 5446.89
K: 29.34
LVC: 50.00

LOW PT STA: 202+55.00
LOW PT ELEV: 5444.78
PVI STA: 202+10.00
PVI ELEV: 5445.00
K: 40.85
LVC: 90.00

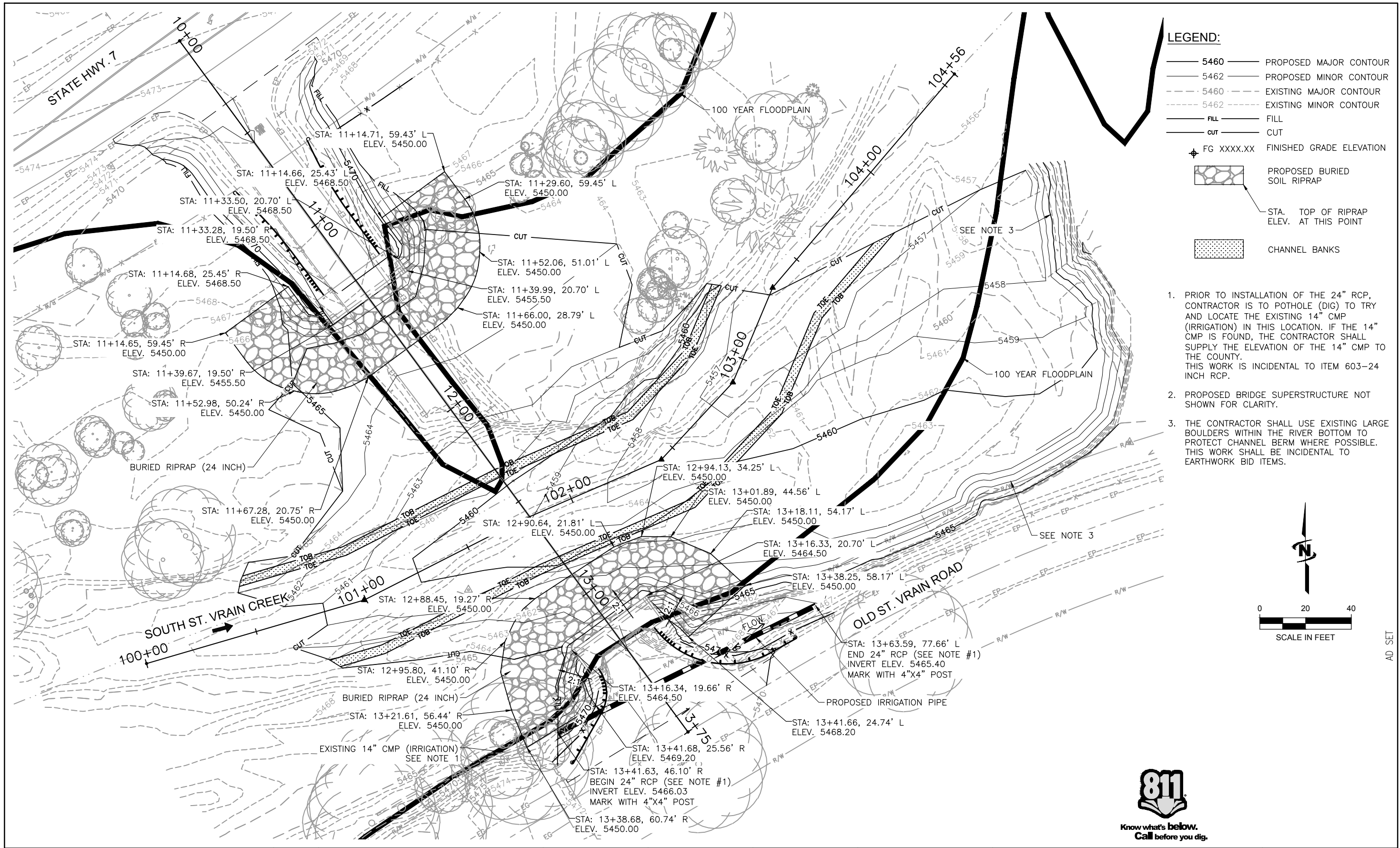
HP STA: 203+50.00
HP ELEV: 5444.304
PVI STA: 203+75.00
PVI ELEV: 5444.18
K: 24.94
LVC: 50.00



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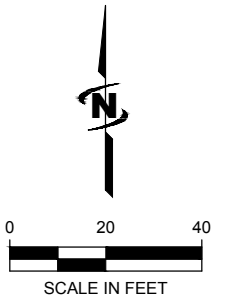
Computer File Information		Index of Revisions		 J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	AD SET		SOUTH ST. VRAIN BRIDGE		Project No.	
Creation Date: 5/2/17 Initials: DW					No Revisions: mm/dd/yy		PLAN & PROFILE		TD-SEPT12C14	
Last Modification Date: 5/4/17 Initials: RCUNDIFF					Revised: mm/dd/yy		Designer: J. TEMPLE		Drawing Number PP-302	
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Drawing File Name: 87-15-018_PP-302.dwg						Sheet Subset: Plan & Profile		Subset Sheet: 2 of 2		
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET										

AD SET



- LEGEND:**
- 5460 — PROPOSED MAJOR CONTOUR
 - 5462 — PROPOSED MINOR CONTOUR
 - - - 5460 - - - EXISTING MAJOR CONTOUR
 - . - . 5462 - . - . EXISTING MINOR CONTOUR
 - FILL — FILL
 - CUT — CUT
 - ⊕ FG XXXX.XX FINISHED GRADE ELEVATION
 - PROPOSED BURIED SOIL RIPRAP
 - ⊕ STA. TOP OF RIPRAP ELEV. AT THIS POINT
 - CHANNEL BANKS

1. PRIOR TO INSTALLATION OF THE 24" RCP, CONTRACTOR IS TO POT HOLE (DIG) TO TRY AND LOCATE THE EXISTING 14" CMP (IRRIGATION) IN THIS LOCATION. IF THE 14" CMP IS FOUND, THE CONTRACTOR SHALL SUPPLY THE ELEVATION OF THE 14" CMP TO THE COUNTY. THIS WORK IS INCIDENTAL TO ITEM 603-24 INCH RCP.
2. PROPOSED BRIDGE SUPERSTRUCTURE NOT SHOWN FOR CLARITY.
3. THE CONTRACTOR SHALL USE EXISTING LARGE BOULDERS WITHIN THE RIVER BOTTOM TO PROTECT CHANNEL BERM WHERE POSSIBLE. THIS WORK SHALL BE INCIDENTAL TO EARTHWORK BID ITEMS.



Computer File Information	
Creation Date: 5/4/17	Initials: DW
Last Modification Date: 5/4/17	Initials: RCUNDIFF
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Drawing File Name: 87-15-018_GR-501.dwg	
ACAD Ver. ACAD 2013	Scale: AS SHOWN Units: FEET

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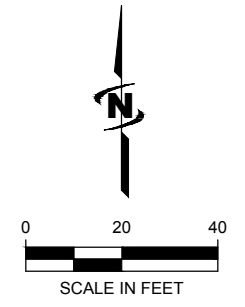
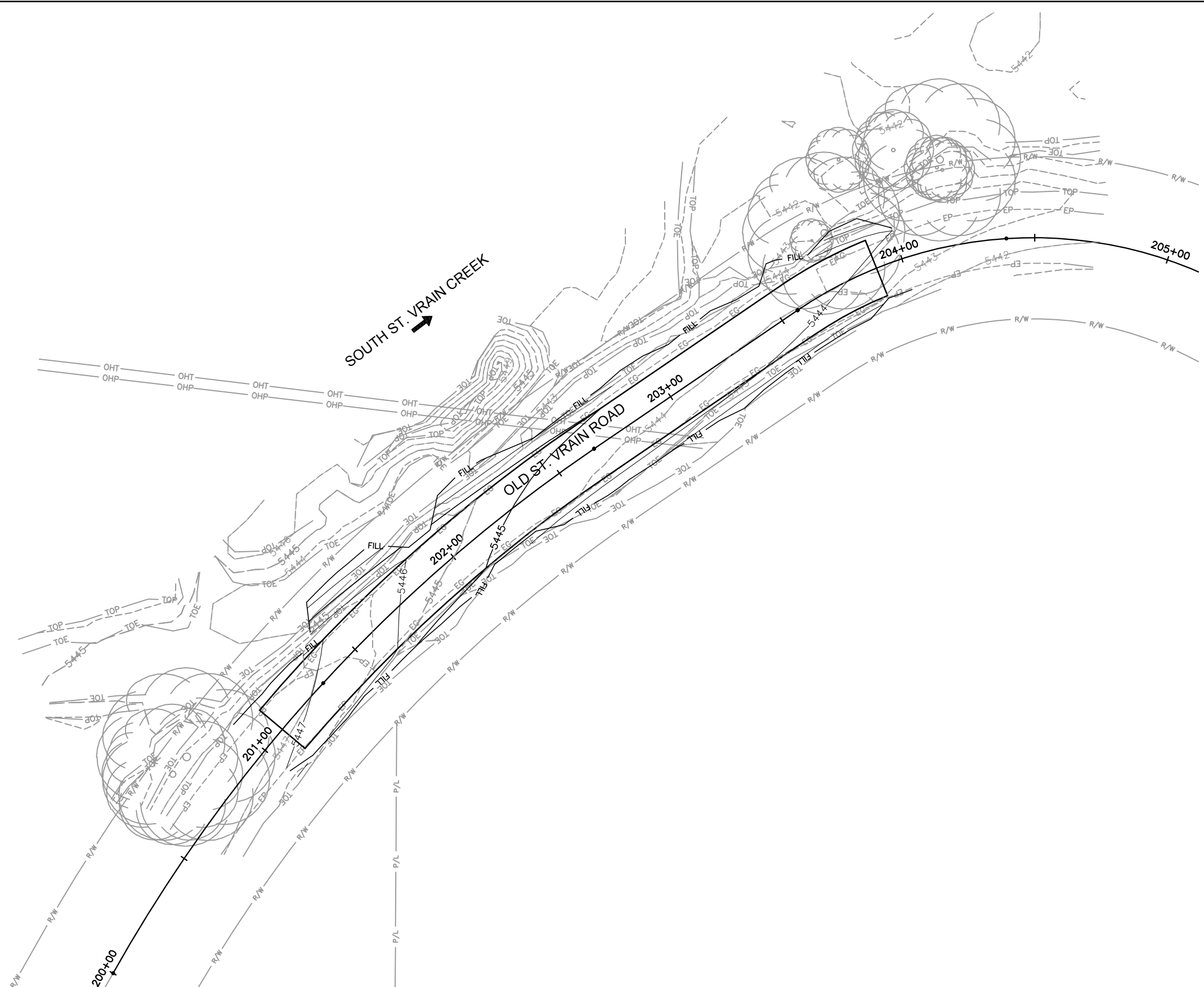
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Revised: mm/dd/yy
Void: mm/dd/yy

SOUTH ST. VRAIN BRIDGE GRADING PLAN	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: Grading Plans	Subset Sheet: 1 of 5

Project No.
TD-SEPT12C14
Drawing Number GR-501
Sheet Number 17

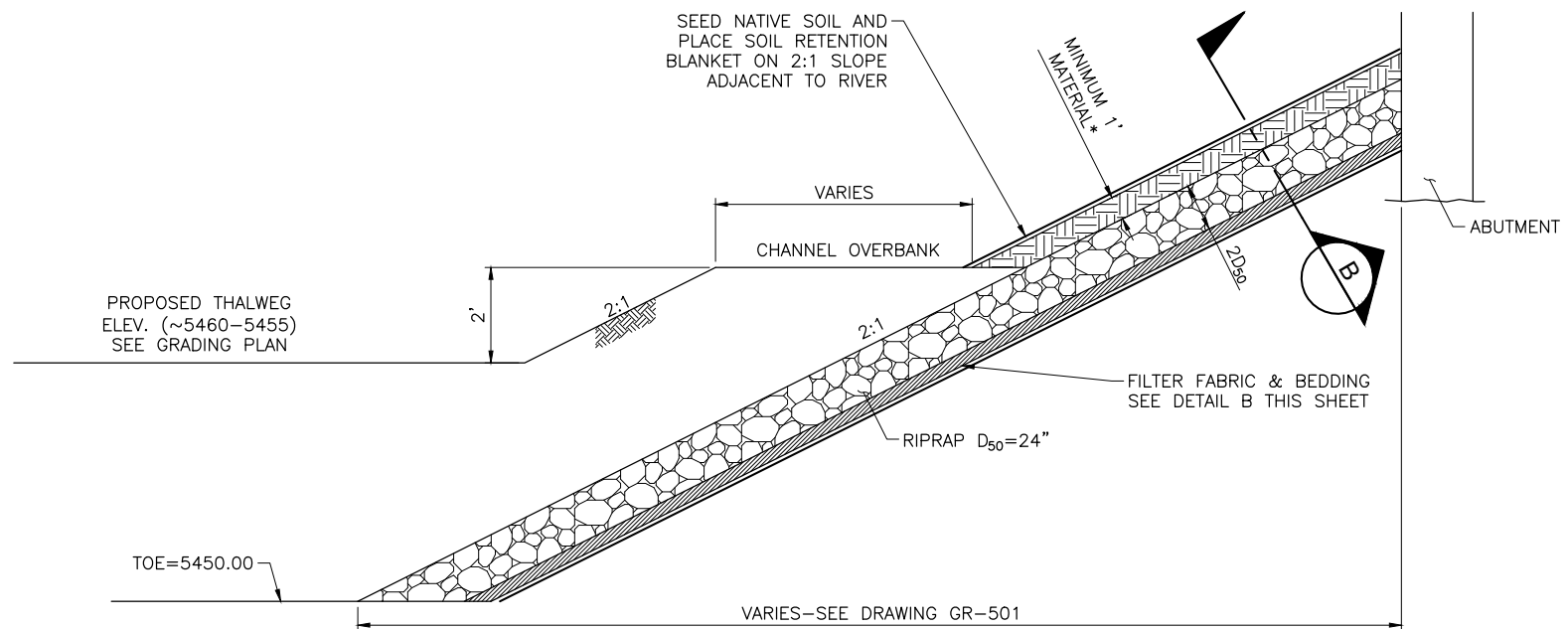
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- 5460 —— PROPOSED MAJOR CONTOUR
- 5462 —— PROPOSED MINOR CONTOUR
- - - - 5460 - - - - EXISTING MAJOR CONTOUR
- - - - 5462 - - - - EXISTING MINOR CONTOUR
- FILL —— FILL
- CUT —— CUT
- ⊕ FG XXXX.XX FINISHED GRADE ELEVATION

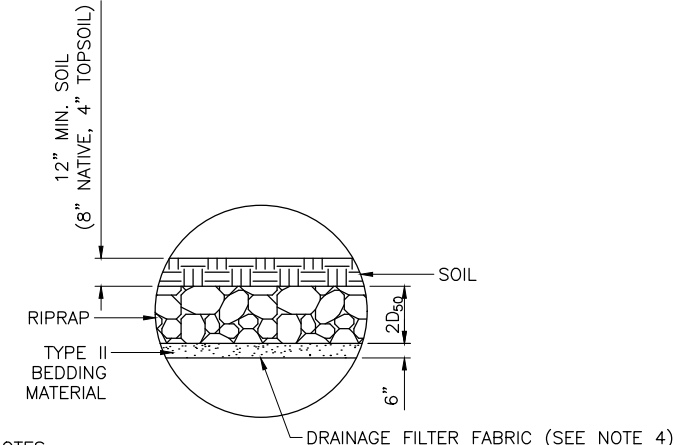


Computer File Information		Index of Revisions		 JUB J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	AD SET	SOUTH ST. VRAIN BRIDGE GRADING PLAN		Project No.
Creation Date: 12/17/15	Initials: DW	(R-1)			No Revisions: mm/dd/yy			TD-SEPT12C14
Last Modification Date: 5/9/17	Initials: RCUNDIFF	(R-2)			Revised: mm/dd/yy	Designer: J. TEMPLE		Drawing Number GR-502
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Drawing File Name: 87-15-018_GR-502.dwg		(R-4)				Sheet Subset: Grading Plans	Subset Sheet: 2 of 5	
ACAD Ver. ACAD 2013	Scale: AS SHOWN	(R-5)						

AD SET



A RIPRAP CROSS-SECTION
SCALE: NTS



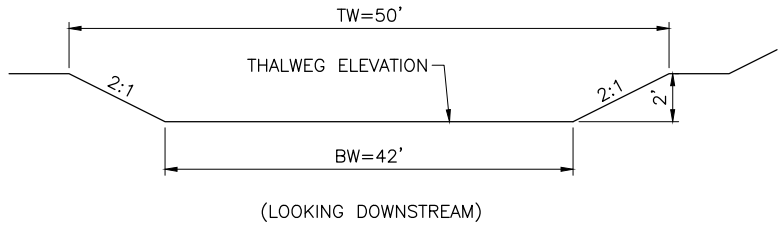
- NOTES:
1. ALL RIPRAP ABOVE CHANNEL OVERBANK SHALL BE INSTALLED 12 INCHES BELOW FINAL GRADE AND BURIED WITH NATIVE CHANNEL BED MATERIAL (SAND, GRAVEL, & COBBLE), THEN TOPPED WITH TOPSOIL.
 2. GENERAL PLACEMENT TECHNIQUES SHOULD RESULT IN LARGER ROCK AT THE SURFACE WITH ROCK SECURELY INTERLOCKED AT THE DESIGN THICKNESS AND GRADE, COMPACTION AND LEVELING SHOULD RESULT IN MINIMAL VOIDS AND PROJECTIONS ABOVE GRADE.
 3. REFER TO SPECIFICATIONS FOR MATERIALS AND PLACEMENT REQUIREMENTS FOR RIPRAP AND GRANULAR BEDDING MATERIAL.
 4. FILTER FABRIC SHALL CONFORM TO AASHTO M-288 STANDARDS FOR A CLASS 1 SUBSURFACE DRAINAGE APPLICATION (US205NW OR APPROVED EQUAL).
 5. DRAINAGE FILTER FABRIC AND BEDDING MATERIALS ARE INCLUDED IN THE UNIT PRICE OF THE RIPRAP.

B RIPRAP
SCALE: NTS

GRADATION OF ROCK FOR RIPRAP		
PAY ITEM	PERCENT SMALLER THAN GIVEN SIZE (BY WEIGHT)	INTERMEDIATE ROCK DIMENSION (POUNDS, INCHES)
RIPRAP (24 INCHES)	100	3500, 42
	50-70	1700, 33
	35-50	650, 24
	2-10	35, 9

GRADATION OF TYPE II BEDDING MATERIAL	
SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
3"	90-100
3/4"	20-90
#4	0-20
#200	0-3

***NOTE:**
ALL 24" RIPRAP ON THIS PROJECT SHALL BE BURIED RIPRAP. REFER TO DWG GR-501 FOR PRELIMINARY GRADING AND RIPRAP. THE CONTRACTOR SHALL COVER THE RIPRAP WITH A MINIMUM OF 8" OF NATIVE CHANNEL BED MATERIAL (SAND, GRAVEL, AND COBBLES) AND 4" OF TOPSOIL. WORK WILL BE PAID AS STRUCTURE EXCAVATION, BURIED RIPRAP (24 INCH), AND TOPSOIL.

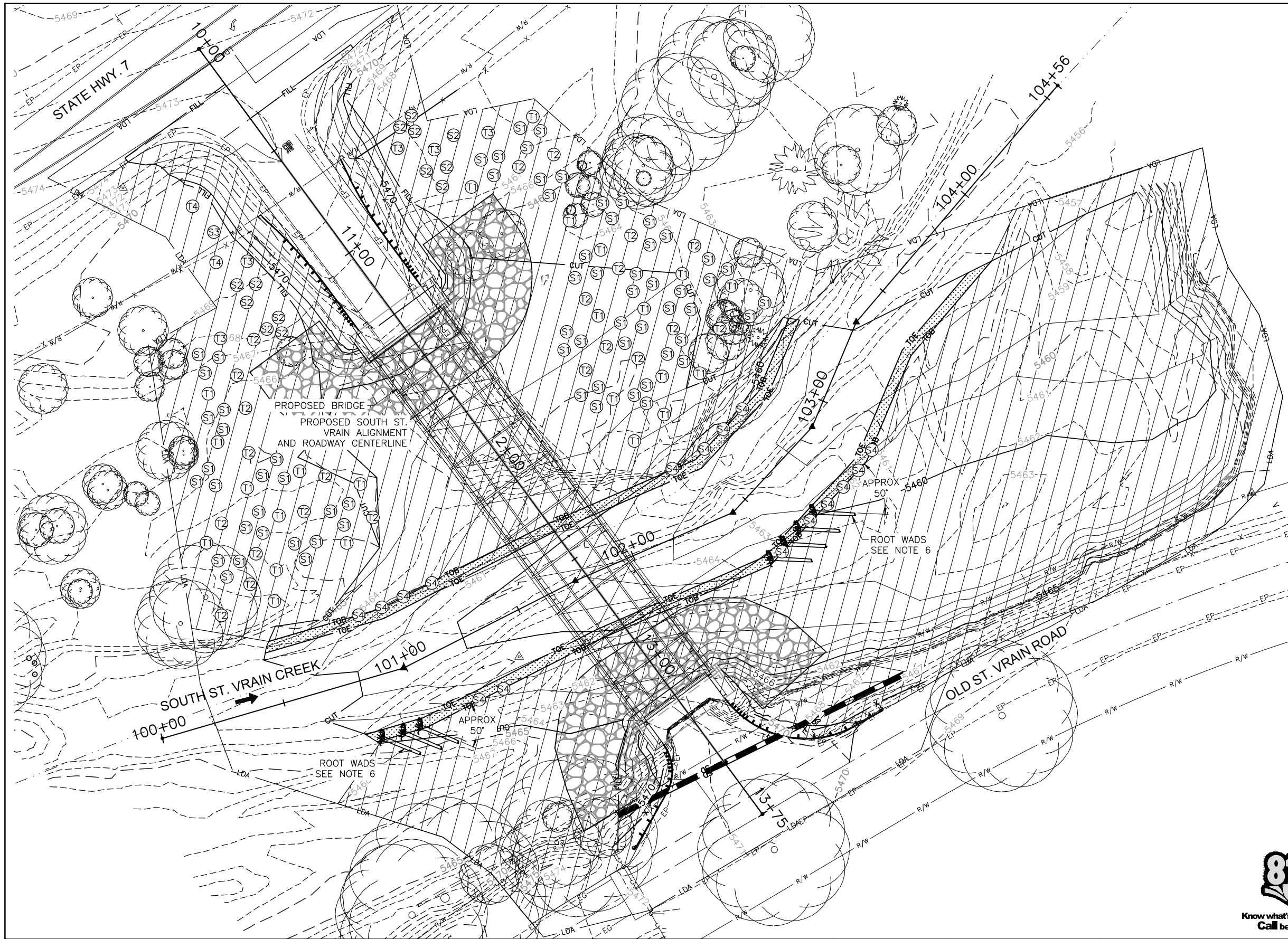


C LOW FLOW CHANNEL
SCALE: NTS



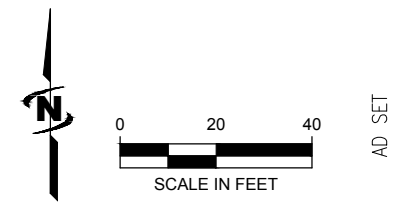
Computer File Information		Index of Revisions			<p>J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602</p>	AWARD SET		SOUTH ST. VRAIN BRIDGE RIPRAP DETAIL		Project No.	
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Last Modification Date: 5/3/17	Initials: RCUNDIFF	(R-2)		Revised: mm/dd/yy		Designer: J. TEMPLE				Sheet Number 19	
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet		(R-3)		Void: mm/dd/yy		Detailer: D. WOOD					
Drawing File Name: 87-15-018_GR-503.dwg		(R-4)				Sheet Subset: Grading Plans	Subset Sheet: 3	of 5			
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET	(R-5)								

AD SET



- LEGEND:**
- LDA— LIMITS OF DISTURBANCE AREA
 - CHANNEL BANKS
 - NATIVE SEEDING AREA - RIPARIAN MIX
- REPLACEMENT TREE**
- T1 NARROWLEAF COTTONWOOD
 - T2 PLAINS COTTONWOOD
 - T3 PONDEROSA PINE
 - T4 ROCKY MOUNTAIN JUNIPER
- REPLACEMENT SHRUB**
- S1 CHOKECHERRY
 - S2 AMERICAN PLUM
 - S3 RUBBER RABBITBRUSH
 - S4 SANDBAR WILLOW (CLUSTERS OF 3)

- NOTES:**
1. DISTURBED AREAS IN THE SOUTH ST. VRAIN CREEK CHANNEL TO BE REVEGETATED USING SEED MIX SHOWN ON DWG GR-505.
 2. CONTOURS SHOWN ARE TOP OF FINISHED GRADE IN CHANNEL.
 3. PROPOSED LOCATIONS OF STABILIZATION MEASURES ARE APPROXIMATE AND CAN BE FIELD ADJUSTED BY THE ENGINEER.
 4. SEE EMBANKMENT STABILIZATION NOTES ON DWG GR-505.
 5. CONTRACTOR SHALL PLACE ORANGE PLASTIC FENCE ALONG LDA BORDER AS DIRECTED BY BOULDER COUNTY.
 6. MINIMUM OF (3) ROOT WADS PER GROUP, AND OVERLAP ROOT WADS BY 1'-0". SEE DETAIL ON DWG GR-505.



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ACAD Ver. ACAD 2013	Scale: AS SHOWN Units: FEET

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JUB

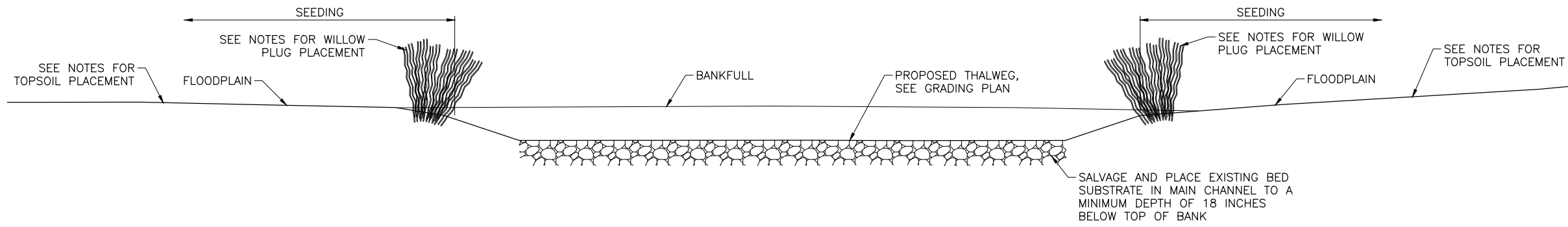
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No Revisions: mm/dd/yy
Revised: mm/dd/yy
Void: mm/dd/yy

SOUTH ST. VRAIN BRIDGE EMBANKMENT STABILIZATION	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: Grading Plans	Subset Sheet: 4 of 5

Project No.
TD-SEPT12C14
Drawing Number GR-504
Sheet Number 20

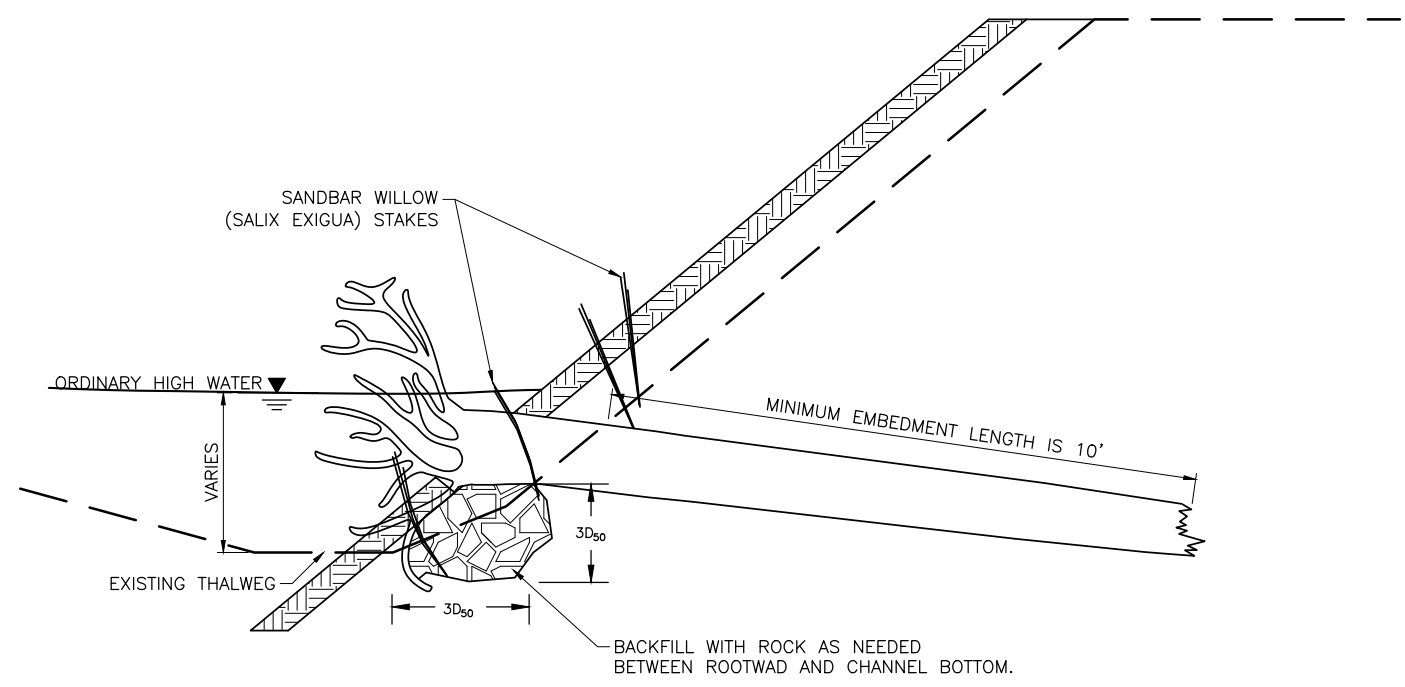
AD SET



WILLOW & SEEDING PLACEMENT DETAIL (TYP.)
SCALE:NTS

Embankment Stabilization Tabulation										
Location Along River	Area (Sq Ft)	Seeding (Native) (Acres)	Willow Cuttings (Each)	Narrowleaf Cottonwood	Plains Cottonwood	Ponderosa Pine	Rocky Mountain Juniper	Chokecherry	American Plum	Rubber Rabbitbrush
Left Flood Plain	32,050	0.84	24	23	22	5	2	68	13	1
Right Flood Plain	11,245	0.84	24							
Totals	43,295	1.68	48							

Riparian Seed Mix				
Common Name	Latin name	Variety	% of mix	PLS/Acre
Sideoats grama	<i>Bouteloua curtipendula</i>	Vaughn	7	1.92
Blue grama	<i>Bouteloua gracilis</i>	Native	15	0.95
Canada Wildrye	<i>Elymus canadensis</i>	VNS - Native	12	5.45
Squirreltail	<i>Elymus elymoides</i>	BCPOS provided	10	2.72
Slender wheatgrass	<i>Elymus trachycaulus</i>	San Luis	12	3.95
Thickspike wheatgrass	<i>Elymus lanceolatus</i>	Critana	8	2.72
Western wheatgrass	<i>Pascopyrum smithii</i>	Arriba	8	3.8
Switchgrass	<i>Panicum virgatum</i>	Nebraska 28 or Trailblazer	10	1.34
Little bluestem	<i>Schizachyrium scoparium</i>	Cimarron or Pastura	5	1.01
Fringed sage	<i>Artemisia frigida</i>	VNS	2	0.02
Showy milkweed	<i>Asclepias speciosa</i>	VNS	2	1.65
Rabbitbrush	<i>Chrysothamnus nauseosus</i>	VNS	4	0.52
Hairy golden aster	<i>Heterotheca villosa</i>	VNS	5	0.3
Total			100	26.35



ROOT WAD DETAIL
SCALE:NTS

NOTES

- WILLOW PLUGS TO BE PLACED ON BOTH SIDES OF CHANNEL AS SHOWN ON DRAWING GR-504. EACH WILLOW PLUG CONSISTS OF THREE (3) WILLOW CUTTINGS.
- WILLOW CUTTINGS SHALL BE SANDBAR WILLOW (SALIX EXIGUA) CUTTINGS:
 - CUTTINGS SHALL BE 1/2-INCH DIAMETER OR LARGER.
 - CUTTINGS SHALL BE 3 TO 5 FEET LONG.
 - CUTTINGS CAN BE HARVESTED AT GROUND LEVEL OF LIVE PLANT. DO NOT REMOVE MORE THAN 1/3 OF ANY INDIVIDUAL PLANT.
 - TRIM OFF THE APICAL BUD AND ALL SIDE BRANCHES SO CUTTING IS A SINGLE STEM.
 - PRIOR TO PLANTING, SOAK CUTTINGS FOR A MINIMUM OF 24 HOURS.
 - PLANT CUTTINGS ON 2-FOOT CENTERS.
 - PLANT SO THAT CUTTINGS ARE 12 TO 18 INCHES BELOW GROUND AND EXTEND AT LEAST 6 INCHES INTO THE WATER TABLE OR CAPILLARY FRINGE DURING LOW FLOWS IN THE CREEK.
 - PLANT OR TRIM SO 3 OR 4 BUDS REMAIN ABOVE GROUND.
- WHEN AVAILABLE, WILLOW CUTTINGS SHALL BE OBTAINED FROM EXISTING WILLOWS IN THE PROJECT AREA. CUTTINGS SHALL BE TAKEN WITHOUT PERMANENTLY HARMING EXISTING PLANTS. WILLOW CUTTINGS WILL BE PAID PER CUTTING REGARDLESS OF SOURCE.
- THE SEED MIX ON THIS SHEET IS DESIGNED IN ACCORDANCE WITH BOULDER COUNTY PARKS AND OPEN SPACE. AREAS HATCHED ON DRAWING GR-504 SHALL BE SEEDDED WITH THIS MIX AND PAID AS SEEDING (NATIVE). THIS SAME SEED MIX IS ALSO SHOWN ON DWG SW-703.
- REFER TO STORM WATER MANAGEMENT PLANS (SW-701 TO SW-706) FOR ADDITIONAL PROJECT EROSION CONTROL INFORMATION.
- SEE DGW SW-703 FOR ADDITIONAL SEEDING AND CONDITIONING NOTES.
- ALL DISTURBED AREAS OUTSIDE OF THE CHANNEL BOTTOM SHALL RECEIVE TOPSOIL AND EITHER SPRAY-ON MULCH BLANKET, OR SOIL RETENTION BLANKET.
- ALL DISTURBED AREAS OUTSIDE THE LOW FLOW CHANNEL SHALL RECEIVE SEED.

AD SET

Computer File Information		Index of Revisions				AWARD SET		SOUTH ST. VRAIN BRIDGE EMBANKMENT STABILIZATION		Project No.	
Creation Date: 12/1/16	Initials: DW	(R-1)				No Revisions: mm/dd/yy			TD-SEPT12C14		
Last Modification Date: 5/4/17	Initials: ABEAHM	(R-2)		J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602		Revised: mm/dd/yy		Designer: J. TEMPLE		Drawing Number GR-505	
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet		(R-3)				Void: mm/dd/yy		Detailer: D. WOOD		Sheet Number 21	
Drawing File Name: 87-15-018_GR-505.dwg		(R-4)						Sheet Subset: Grading Plans		Subset Sheet: 5 of 5	
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET	(R-5)								

GENERAL NOTES

DETAILING

EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH M-206-1.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

A COLORED STRUCTURAL CONCRETE COATING FINISH WILL BE REQUIRED, AS SHOWN ON THE PLANS, ON EXPOSED CONCRETE SURFACES. THE COLOR SHALL BE FEDERAL COLOR 22563. CONTRACTOR SHALL PROVIDE TEST PANELS, PRIOR TO APPLICATION, FOR APPROVAL.

ALL EXPOSED CONCRETE SURFACES SHALL RECEIVE A CLASS 2 FINAL FINISH TO ONE FOOT BELOW THE GROUND LINE, EXCEPT THOSE SURFACES NOTED TO RECEIVE STRUCTURAL CONCRETE COATING. CLASS 2 FINAL FINISH IS INCIDENTAL TO CONCRETE.

THE FOLLOWING STRUCTURAL STEEL SHALL BE ASTM A847 GRADE 50W: PREFABRICATED STRUCTURAL STEEL BRIDGE TUBING.

THE FOLLOWING STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 50W: BEARING PLATES AND BEARING DEVICES, AND PREFABRICATED STRUCTURAL STEEL BRIDGE STRUCTURAL SHAPES.

THE FOLLOWING STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 (ASTM A-572): BRIDGE RAILING TUBES, POSTS, AND BASE PLATES.

AASHTO M-222 (ASTM A-588) MAY BE SUBSTITUTED FOR M270 GRADE 50 (ASTM A-572) AT NO ADDITIONAL COST TO THE PROJECT.

ALL BOLTS SHALL BE 7/8" DIAMETER, HIGH STRENGTH, UNLESS OTHERWISE NOTED.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED.

(N) DENOTES NON-EPOXY COATED (BLACK) REINFORCING STEEL.

ALL THE PROVISIONS FOR BRIDGE DECK CONCRETE SHALL ALSO APPLY TO APPROACH SLAB CONCRETE.

AN EMERGENCY DECK CONSTRUCTION JOINT MAY BE LOCATED AT THE ONE QUARTER SPAN POINT BACK FROM A PIER OR ABUTMENT WITH RESPECT TO THE DIRECTION OF THE TOPPING SLAB PLACEMENT.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER OR LESS THAN 3" OF LATERAL COVER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER OR LESS THAN 3" OF LATERAL COVER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS SHALL BE INCREASED BY 20% FOR 3 BAR BUNDLES AND 33% FOR 4 BAR BUNDLES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD PRIOR TO ORDERING, FABRICATING, OR INSTALLING ANY MATERIAL.

ALL LONGITUDINAL AND TRANSVERSE DIMENSIONS ARE MEASURED HORIZONTALLY AND INCLUDE NO CORRECTION FOR GRADE.

ALL CONCRETE COVER OVER REINFORCING BARS SHALL BE 2" UNLESS NOTED OTHERWISE.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AND THE EXISTING BRIDGE FOUNDATIONS IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 (1-800-922-1987) AT LEAST 3 DAYS (2 DAYS NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

BRIDGE DESCRIPTION

STRUCTURE NO. BR-84S-001-SSV1-FLOOD ONE SPAN 179'-4" LENGTH, 33' WIDTH, CARRYING OLD ST VRAIN RD OVER THE S ST VRAIN CREEK. SIMPLE SPAN, PREFABRICATED STEEL PONY TRUSS WITH CAST-IN-PLACE CONCRETE DECK. BRIDGE CENTERLINE IS APPROXIMATELY 90' TO THE S ST VRAIN FLOW LINE.

DESIGN DATA

AASHTO, SEVENTH EDITION LRFD WITH CURRENT INTERIMS

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN

LOAD: HL-93 (DESIGN TRUCK OR TANDEM, AND DESIGN LANE LOAD) ASSUMES 36 LBS. PER SQ. FT. FOR BRIDGE DECK OVERLAY

DEAD LOAD: ASSUMES 5 LBS. PER SQ. FT. FOR PERMANENT STEEL DECK FORMS

STREAM LOAD: 150 KIPS ACTING TRANSVERSELY ON STEEL TRUSS FOR 100-YR FLOOD

REINFORCED CONCRETE:

ABUTMENT CAPS, AND WINGWALLS: CLASS D CONCRETE: f'c = 4,500 PSI

REINFORCING STEEL: fy = 60,000 PSI

ABUTMENT DIAPHRAGMS, DECK, AND APPROACH SLABS: CLASS D CONCRETE: f'c = 4,500 PSI

REINFORCING STEEL: fy = 60,000 PSI

CAISSON CONCRETE: CLASS BZ CONCRETE: f'c = 4,000 PSI

REINFORCING STEEL: fy = 60,000 PSI

SEISMIC DESIGN CRITERIA

EARTHQUAKE DESIGN METHOD: FORCE BASED
LATITUDE = 40° 12' 23"N
LONGITUDE = 105° 17' 36"W

AASHTO SPECTRUM FOR 7% PE IN 75 YEARS (1000YR RETURN PERIOD)

PERIOD (sec)	SA (g)	
0.0	0.06	PGA - SITE CLASS B
0.2	0.13	SS - SITE CLASS B
1.0	0.03	S1 - SITE CLASS B

SPECTRAL RESPONSE ACCELERATIONS: AS = FPGa*PGA, SDS = FA*SS, AND SD1 = FV*SD1

FPGA = 1.60, FA = 1.60, FV = 2.40

PERIOD (sec)	SA (g)	
0.0	0.07	AS - SITE CLASS C
0.2	0.16	SDS - SITE CLASS C
1.0	0.06	SD1 - SITE CLASS C

OPERATIONAL CLASS: TYPICAL

SEISMIC ZONE OR SEISMIC DESIGN CATEGORY: ZONE=1 OR CATEGORY=A

RESPONSE MODIFICATION FACTORS:
R-FACTOR: 0.8 (CONNECTIONS)

STRUCTURE QUANTITIES						
ITEM NO.	DESCRIPTION	UNIT	SUPERSTRUCTURE	ABUTMENT 1	ABUTMENT 2	TOTAL
206	STRUCTURE EXCAVATION ***	CY		241	121	362
206	STRUCTURE BACKFILL (CLASS 1) ***	CY		228	308	536
206	MECHANICAL REINFORCEMENT OF SOIL	CY		214	288	502
403	HOT MIX ASPHALT (GRADING SX) (75) (PG 64-22) *	TON	109			109
503	DRILLED CAISSON (30 INCH)	LF		238	88	326
503	CSL TESTING	EACH		4	4	8
509	PREFABRICATED STRUCTURAL STEEL BRIDGE	LS	1			1
515	WATERPROOFING (MEMBRANE)	SY	668			668
518	BRIDGE EXPANSION DEVICE (SPECIAL)	LF	77			77
601	ARCHITECTURAL FEATURES	LS	1			1
601	CONCRETE CLASS D (BRIDGE)	CY	250	46	56	352
601	STRUCTURAL CONCRETE COATING	SY	218	27	27	272
602	REINFORCING STEEL (EPOXY COATED)	LB	57700	12400	12800	82900
606	BRIDGE RAIL TYPE 10M **	LF	415			415
613	4 INCH ELECTRICAL CONDUIT	LF	413			413

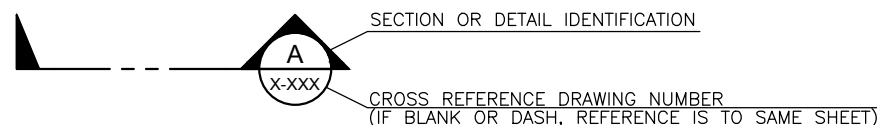
* QUANTITY CARRIED TO SURFACE ITEM TABULATION ON DWG G-009

** QUANTITY CARRIED TO GUARDRAIL TABULATION ON DWG G-009

*** QUANTITY CARRIED TO EARTHWORK TABULATION ON DWG G-008

CONCRETE AND REINFORCING STEEL REQUIRED FOR THE REINFORCED CONCRETE MONUMENTS ARE INCLUDED IN ITEMS 601, CONCRETE CLASS D (BRIDGE), AND 602 REINFORCING STEEL (EPOXY COATED).

SHEET LIST	
DRAWING NUMBER	SHEET TITLE
S-601	GENERAL INFORMATION
S-602	GENERAL LAYOUT
S-603	ENGINEERING GEOLOGY
S-604	HYDRAULIC INFO
S-605	CONSTRUCTION LAYOUT
S-606	FOUNDATION LAYOUT
S-607	FOUNDATION DETAILS
S-608	ABUTMENT PLAN & ELEV
S-609	ABUTMENT SECTION
S-610	WINGWALL DETAILS
S-611	BEARING DEVICE DETAILS
S-612	DECK REINFORCEMENT
S-613	APPROACH SLAB DETAILS
S-614	EXPANSION DEVICE DETAILS
S-615	BRIDGE RAIL TYPE 10M
S-616	BRIDGE RAIL DETAILS
S-617	BRIDGE AESTHETICS
S-618	MECH STABILIZED BACKFILL

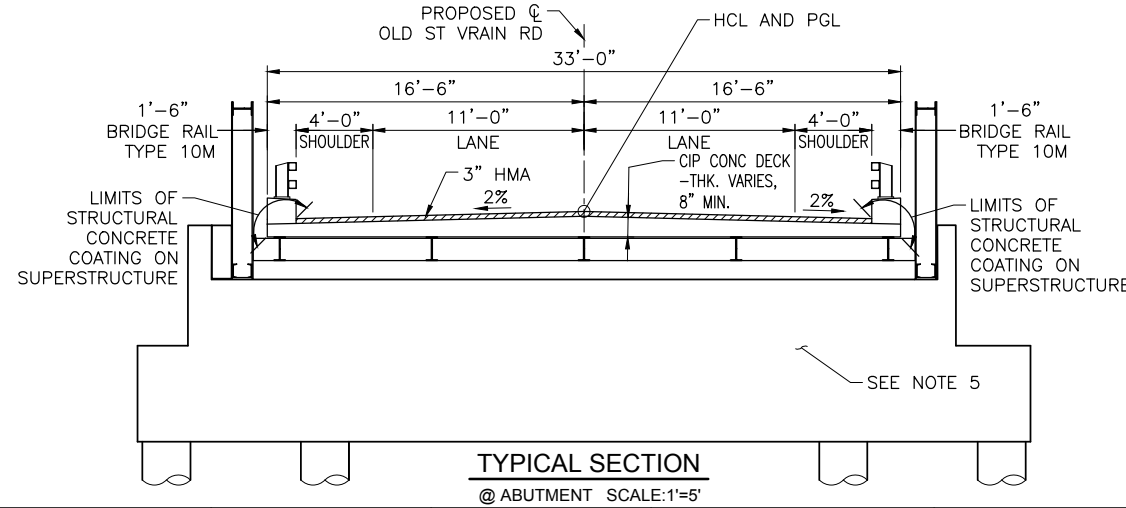
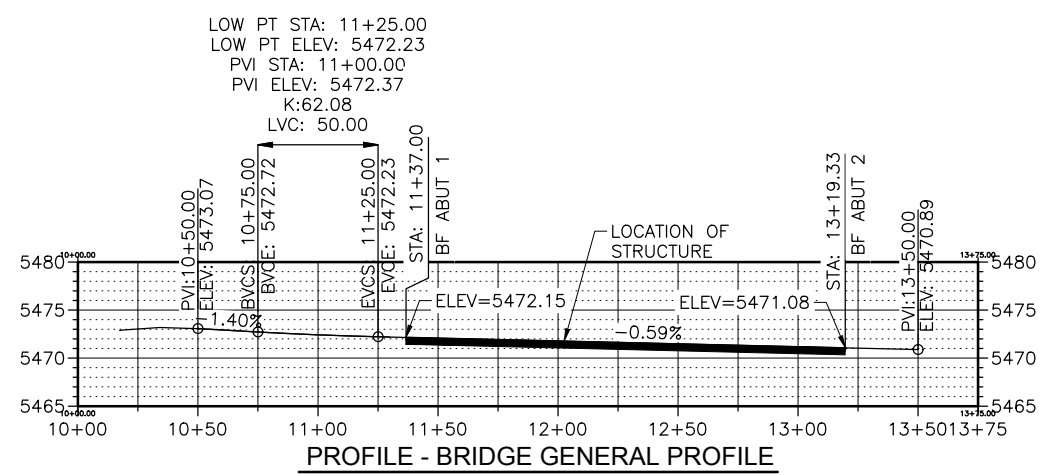
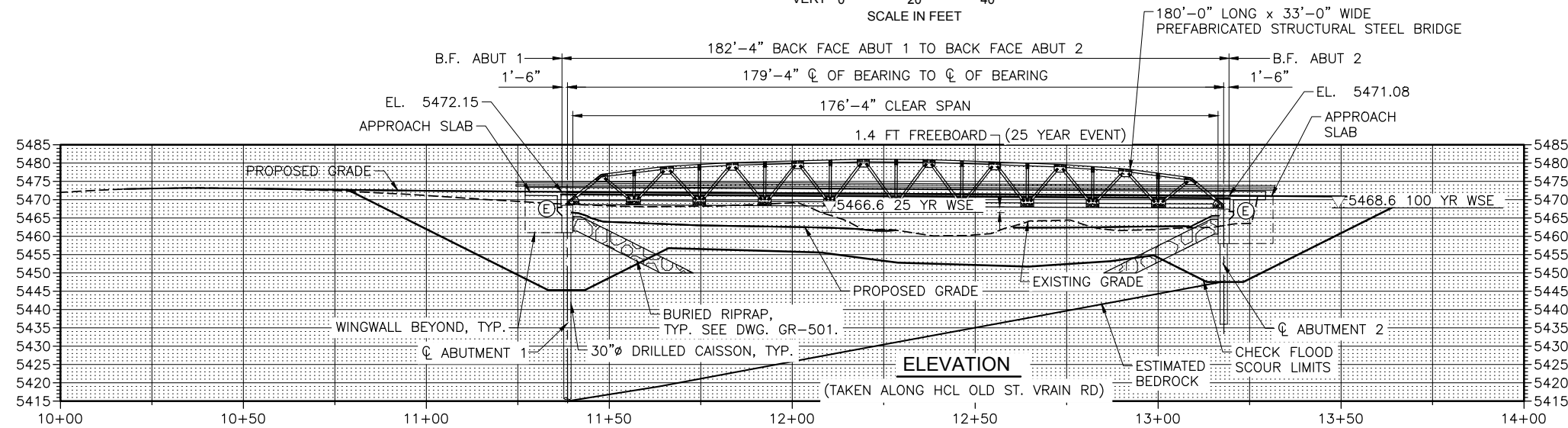
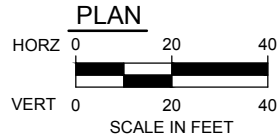
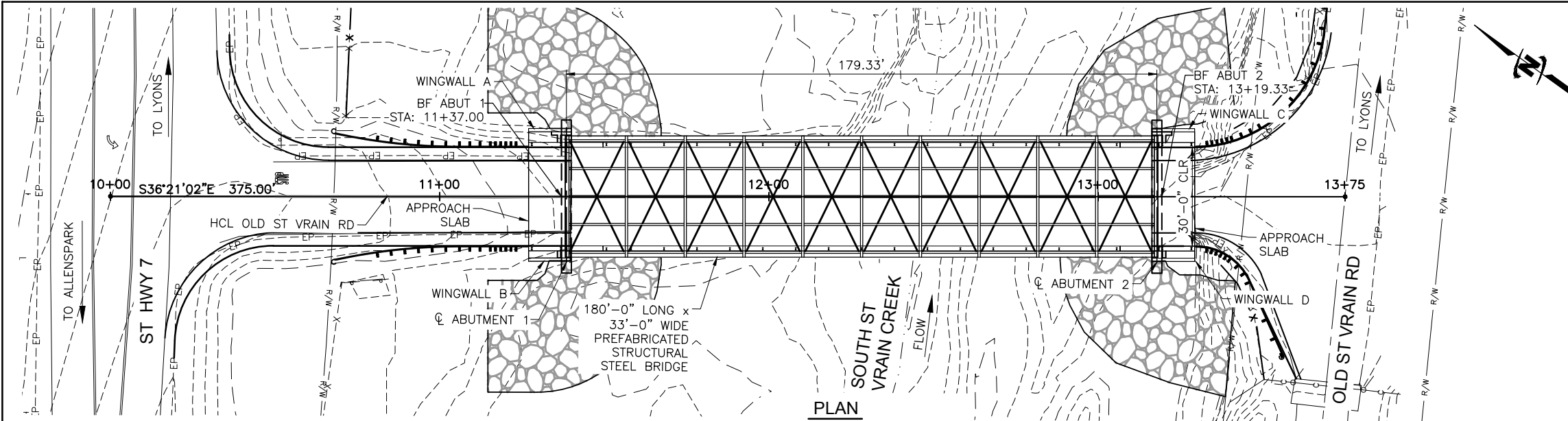


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Creation Date: 5/4/17	Initials: AB	(R-1)					JUB	J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	No Revisions:
Last Modification Date: 5/8/17	Initials: AB	(R-2)				Revised:	Detailer: AB		Drawing Number S-601
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Drawing File Name: 87-15-018_S-601.dwg		(R-4)							
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET		(R-5)							

- NOTES:**
1. SIZE OF STEEL MEMBERS TO BE DETERMINED BY PREFABRICATED BRIDGE MANUFACTURER.
 2. SEE DRAWINGS S-615 & S-616 FOR BRIDGE RAIL TYPE 10M DETAILS.
 3. SEE DRAWING S-612 FOR CIP CONCRETE DECK DETAILS AND REINFORCEMENT LAYOUT.
 4. SEE DRAWING S-615 FOR BRIDGE RAIL TRANSITION.
 5. STRUCTURAL CONCRETE COATING TO BE INCLUDED ON THE FACE OF THE WINGWALLS & ABUTMENTS, TO 1'-0" BELOW FINISHED GRADE.
 6. BRIDGE WILL PASS THE 50-YEAR DESIGN FLOOD WITH ZERO FREEBOARD. THE 100-YEAR DESIGN FLOOD WILL HIT BOTTOM CHORD OF BRIDGE WITHOUT OVER TOPPING THE ROADWAY. SEE DRAWING S-604 FOR HYDRAULIC DATA.



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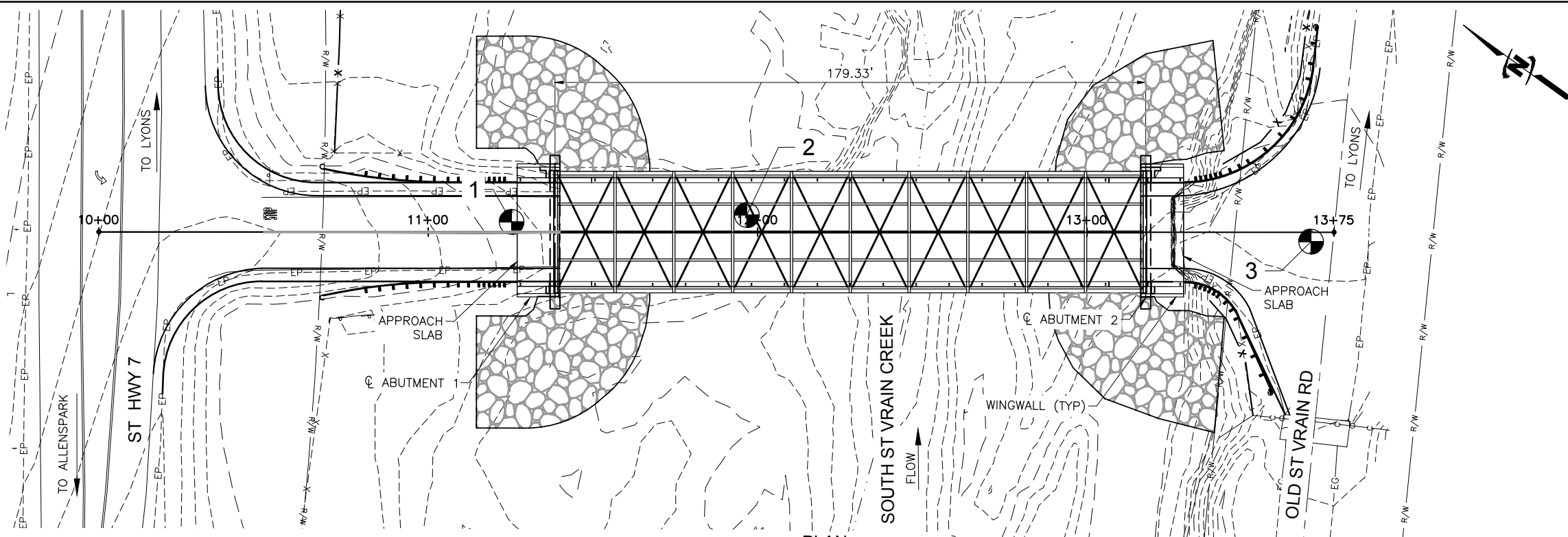


JUB
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Building D, Suite 200
Fort Collins, CO 80525
Phone: 970.377.3602

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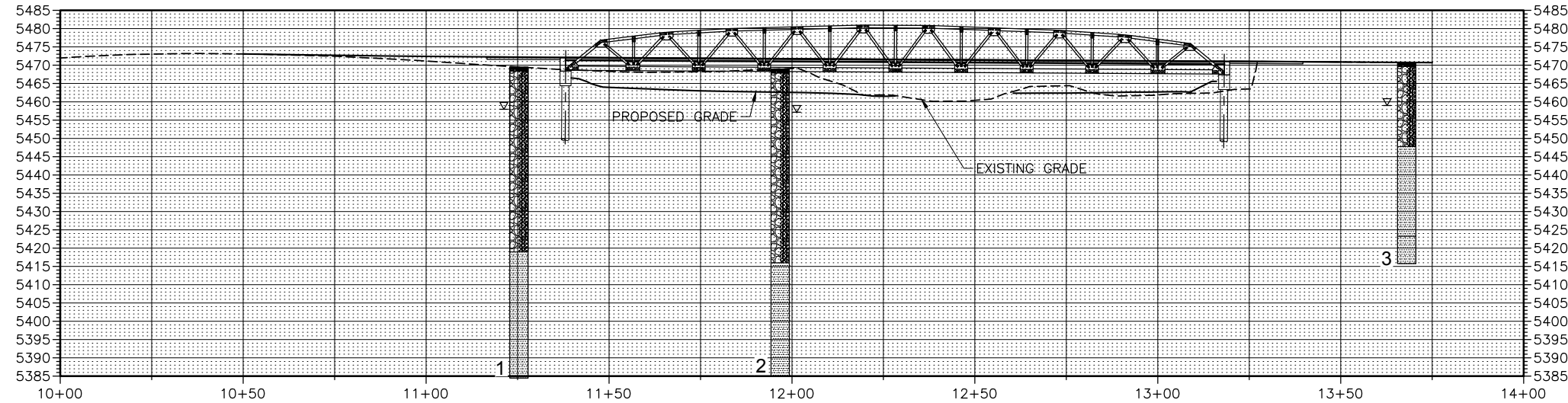
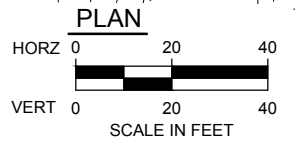
SOUTH ST. VRAIN BRIDGE GENERAL LAYOUT	
Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 2 of 18

Project No./Code	
/	
Drawing Number S-602	
Sheet Number 23	



LEGEND

ASPHALT	
SAND AND GRAVEL	
POORLY GRADED GRAVEL w/ SILT, SAND, COBBLES AND BOULDERS	
SEDIMENTARY BEDROCK—SANDSTONE	
WATER INITIALLY ENCOUNTERED	
TEST HOLE LOCATION	



NOTE:
 1. REFER TO GEOTECHNICAL REPORT ENTITLED: "ST VRAIN BRIDGE REPLACEMENT" PREPARED BY TERRACON CONSULTANTS, INC., DATED: JUNE 16, 2016, FOR ADDITIONAL PAVEMENT BORES AND GEOTECHNICAL INFORMATION.

ELEVATION



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Drawing File Name: 87-15-018_S-603.dwg	
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET	

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(R-2)			
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(R-4)			
(R-5)			



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 Fort Collins, CO 80525
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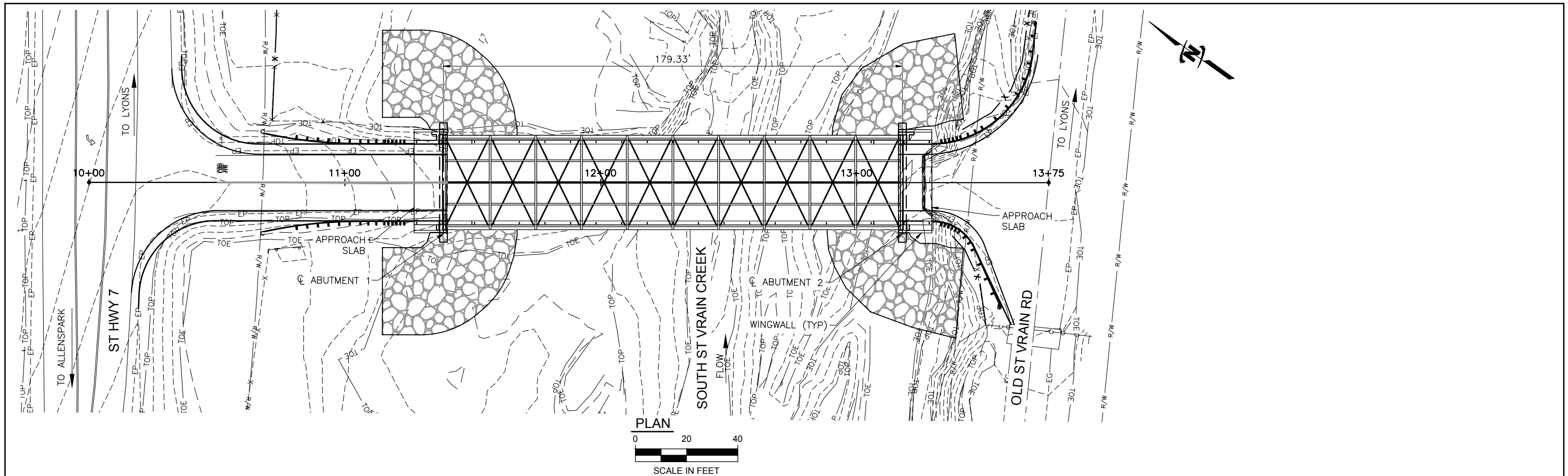
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**SOUTH ST. VRAIN BRIDGE
 ENGINEERING GEOLOGY**

Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 3 of 18

Project No.

TD-SEPT12C14
Drawing Number S-603
Sheet Number 24



Proposed Hydraulic Data at Old St. Vrain Road Access Bridge Over South St. Vrain Creek

Recurrence Interval (year)	Q Total (cfs) ¹	Q at Bridge (cfs)	Q Overtopping (cfs)	Velocity at Bridge (fps)	Velocity at XS 1600 (fps)	WSEL at XS 1600 (ft NAVD88)	Pier Scour
10	1535	1535	-	7.6	8.4	5464.9	N/A
25	3029	3029	-	8.7	9.3	5466.6	N/A
50	4715	4715	-	8.2	10.7	5467.5	N/A
100	6916	6916	-	9.4	11.1	5468.6	N/A
200	8800	8800	-	9.3	8.3	5471.0	N/A
500	14092	11815	2277	12.5	7.2	5475.0	N/A

¹Source of hydrology: "Hydrologic Evaluation of the St. Vrain Watershed Post September 2013 Flood Event", JACOBS, Final August 2014.

Pre-Project and Post Project Bridge Hydraulic Information²

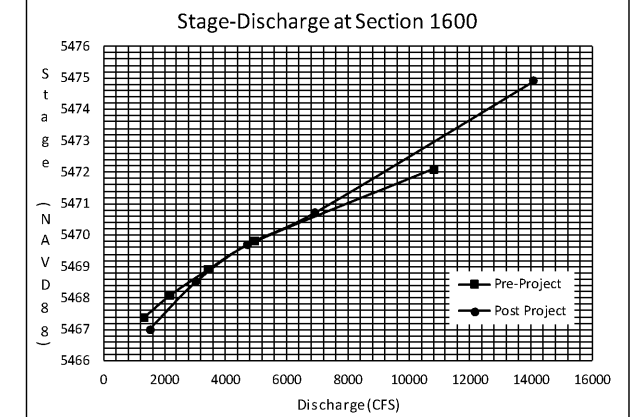
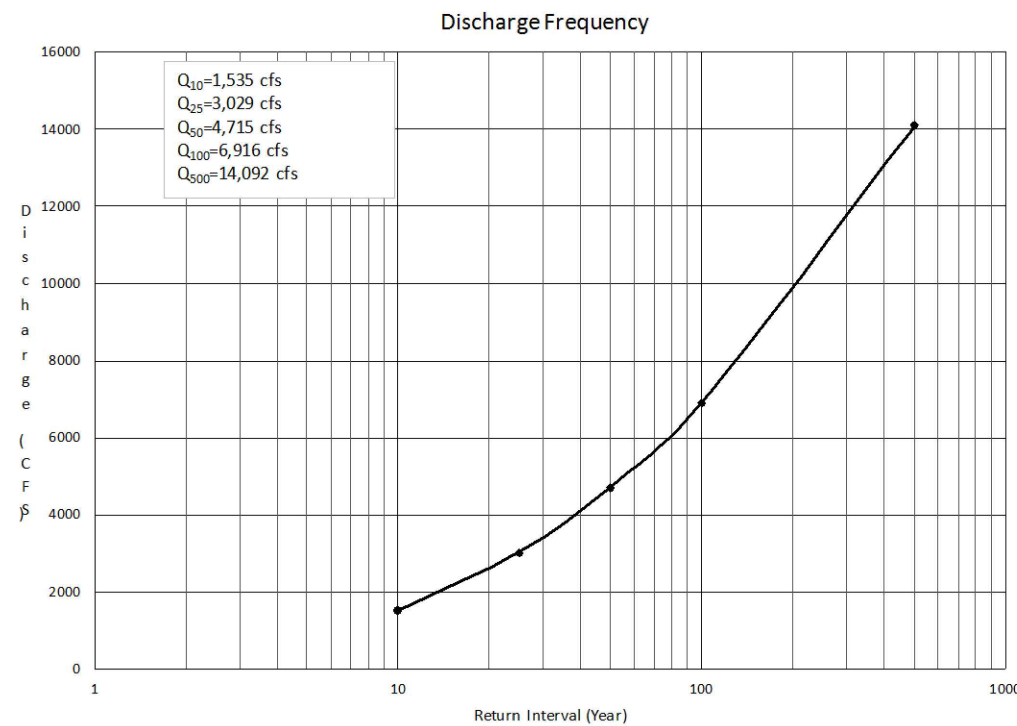
Project Condition	Discharge Description ³	Recurrence Interval (years)	Q (cfs)	Velocity at Bridge (fps)	EGL at Upstream Bridge Face (ft)	WSEL at Upstream Bridge Face (ft)	Minimum Low Chord (ft)	Freeboard ⁴ (ft)
Pre- ⁵	Hydraulic Design	25	3029	6.5	5469.8	5469.0	N/A	N/A
Post				8.7	5466.2	5465.4	5467.6	1.4
Pre- ⁵	Scour Design	50	4715	6.9	5470.7	5469.7	N/A	N/A
Post				8.2	5467.6	5466.6	5467.6	0.5
Pre- ⁵	Scour Design Check	100	6916	6.9	5470.7	5469.7	N/A	N/A
Post				9.4	5469.0	5467.7	5467.6	-0.7

²Refer to Anderson Consulting Engineers, Inc. Hydraulic Analysis "Old St. Vrain Road Access Bridge: (100% FOR) Hydraulic Design, Boulder County, Colorado", Dated February 13, 2017.

³Refer to HEC-18 (FHWA 2012) page 2.1 for guidance in selecting design discharges.

⁴Values shown are for actual proposed bridge freeboard using water surfaces from upstream cross section 1550. According to CDOT standards the required minimum freeboard is 1.4 feet for 25-year design discharge.

⁵Pre-project represents Post September 2013 Flood hydraulic conditions where the old bridge has been destroyed with Phase 1 Hydrology (CDOT 2014).



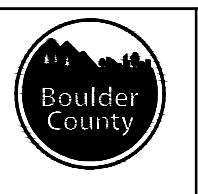
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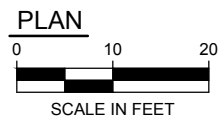
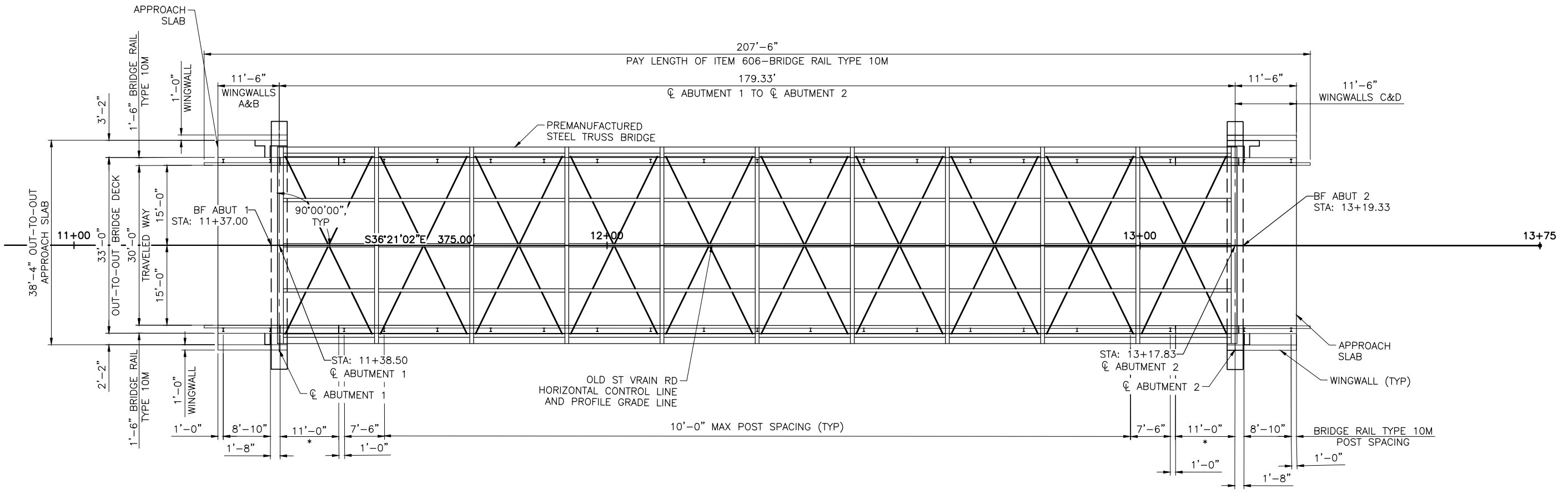
SOUTH ST. VRAIN BRIDGE HYDRAULIC INFO

Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 4 of 18

Project No. TD-SEPT12C14

Drawing Number S-604

Sheet Number 25



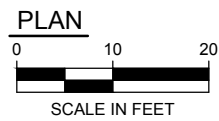
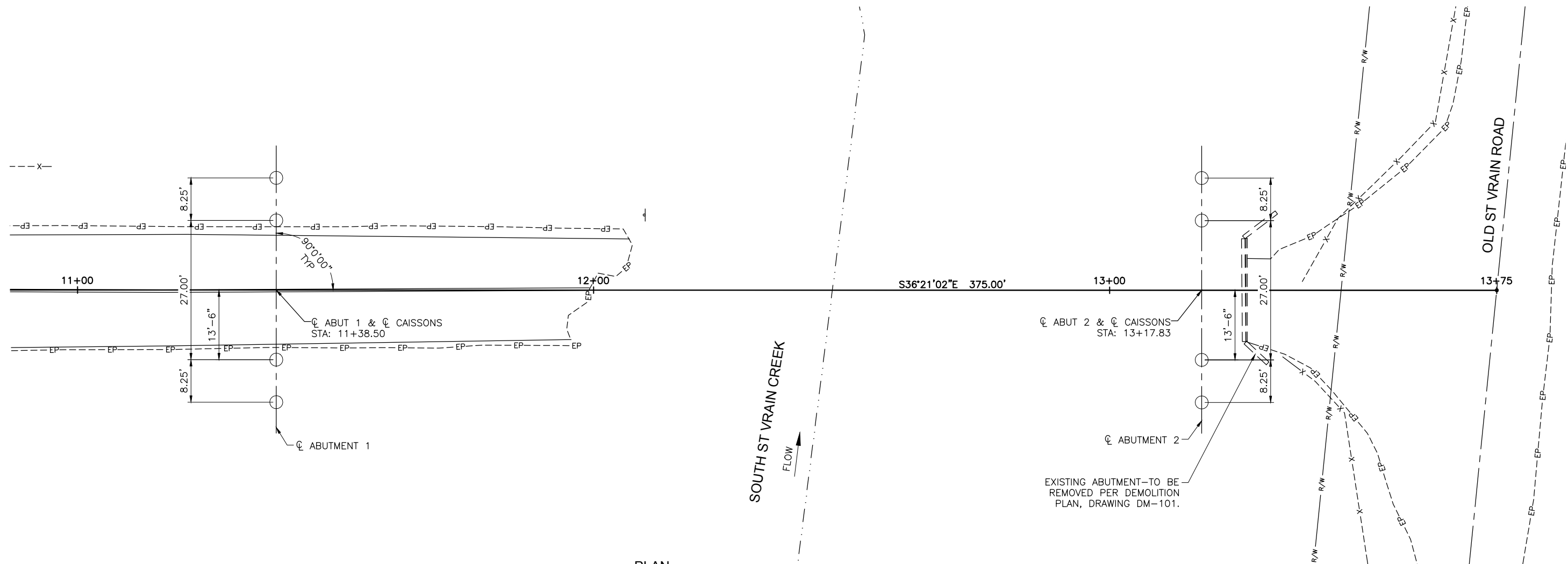
* MONUMENT-SEE DRAWING S-617

- NOTES:**
1. DIMENSIONS SHOWN ARE MEASURED HORIZONTALLY AND DO NOT REFLECT VERTICAL CHANGES DUE TO GRADE OR TERRAIN.
 2. FOR C.I.P. CONCRETE DECK DETAILS SEE DRAWING S-612.
 3. FOR BRIDGE RAIL DETAILS SEE DRAWINGS S-615 & S-616.



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(R-5)																															



- NOTES:**
1. DIMENSIONS SHOWN ARE MEASURED HORIZONTALLY AND DO NOT REFLECT VERTICAL CHANGES DUE TO GRADE OR TERRAIN.
 2. CONTRACTOR SHALL CONSTRUCT THE DRILLED CAISSON IN AN ALTERNATING SEQUENCE. DIRECTLY ADJACENT CAISSONS SHALL NOT BE DRILLED AND CONSTRUCTED AT THE SAME TIME.

LOCATION	CAISSON DIAMETER	TOP OF CAISSON ELEVATION	ESTIMATED BEDROCK ELEVATION	ESTIMATED TIP ELEVATION	MIN PENETRATION INTO BEDROCK (FT)	MAX FACTORED LOAD (KIPS)	MAX UNFACTORED LOAD (KIPS)
ABUT 1	30"	5461.00	5419.00	5401.50	12.0	476	334
ABUT 2	30"	5458.00	5448.00	5436.00	12.0	476	334



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Drawing File Name: 87-15-018_S-606.dwg	
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET	

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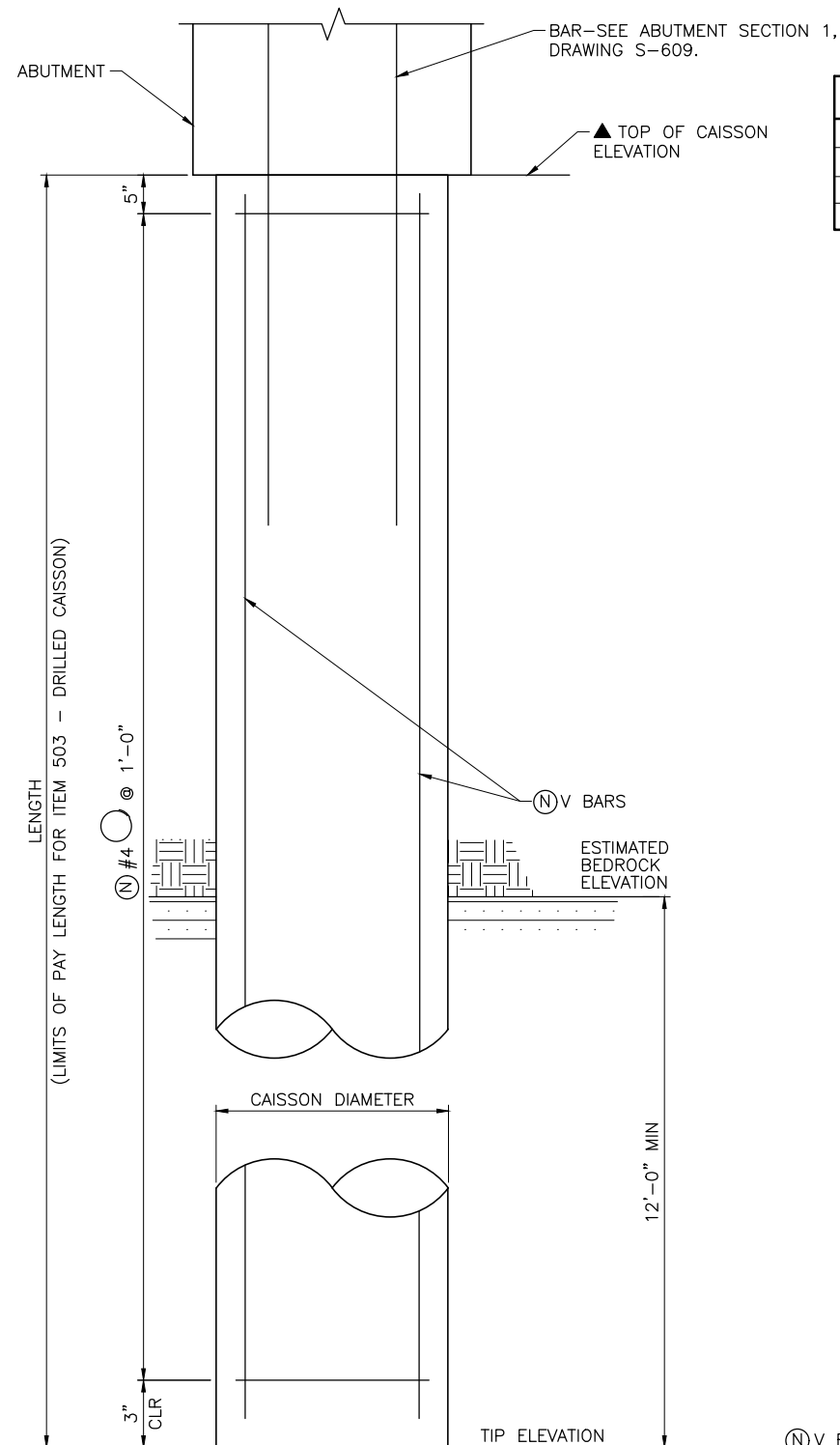


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SOUTH ST. VRAIN BRIDGE FOUNDATION LAYOUT	
Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 6 of 18

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TD-SEPT12C14	
Drawing Number S-606	
Sheet Number 27	



LOCATION	▲ TOP OF CAISSON ELEVATION	LENGTH	CAISSON DIAMETER	TOTAL V BARS	SIZE V BARS
ABUT 1	5461.00	59.5 FT	30"	10	#11
ABUT 2	5458.00	22.0 FT	30"	10	#11

ELEVATIONS SHOWN SHALL BE VERIFIED AT TIME OF CONSTRUCTION BY THE ENGINEER.

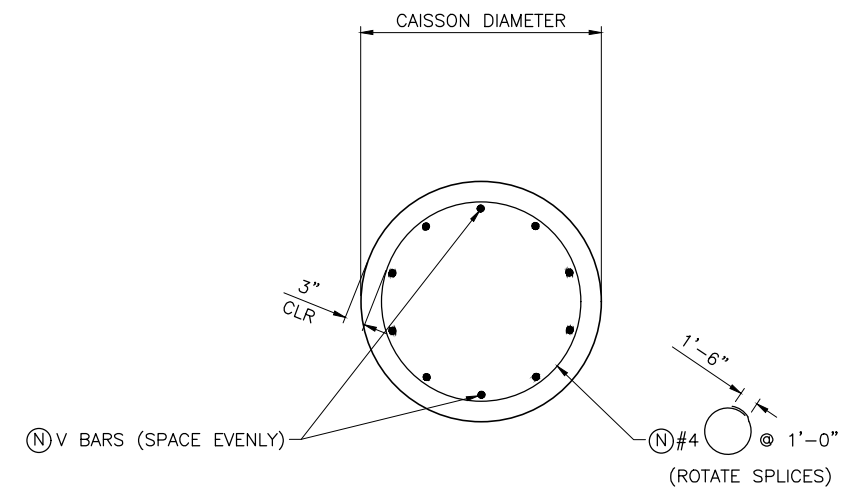
FOR INFORMATION ONLY

QUANTITIES (ONE CAISSON)		
LOCATION	CONCRETE CLASS BZ (CY)	REINFORCING STEEL (LB)
ABUT 1	10.8	3527
ABUT 2	4.0	1304

CAISSON CONCRETE SHALL BE CONCRETE CLASS BZ.

NOTES:

- FOUNDATION ELEVATIONS SHALL BE VERIFIED AT TIME OF CONSTRUCTION BY THE GEOTECHNICAL ENGINEER.
- EXTEND THE REQUIRED REINFORCING STEEL CAGE TO THE BOTTOM OF THE HOLE FOR THOSE CAISSONS EXCAVATED MORE THAN 2'-0" BEYOND ESTIMATED TIP ELEVATION. IF IT IS NECESSARY TO EXTEND THE CAGE, THE VERTICAL BARS CAN BE LAP SPLICED WITH BLACK REINFORCING BARS OF THE SAME GRADE AND SIZE OF BAR.
- CAISSON CONCRETE SHALL BE CLASS BZ.
- TEMPORARY CASING SHALL BE INSTALLED THROUGH WATER BEARING SOIL LAYERS INTO BEDROCK TO PREVENT WATER INFILTRATION. TEMPORARY CASING WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK FOR ITEM 503, DRILLED CAISSON.
- DRILLED CAISSONS SHALL UTILIZE SKIN FRICTION TO RESIST VERTICAL LOADS FOR THE PORTIONS LOCATED IN UNDISTURBED AND UNWEATHERED BEDROCK.
- PLACE CAISSON REINFORCEMENT AS SHOWN TO FACILITATE PLACEMENT OF COLUMN REINFORCEMENT.
- PLACE COLUMN REINFORCEMENT AS SHOWN TO FACILITATE PLACEMENT OF ABUTMENT CAP REINFORCEMENT.
- CONTRACTOR SHALL PROVIDE CSL TESTING ON EACH CAISSON IN ACCORDANCE WITH SECTION 503 OF THE STANDARD SPECIAL PROVISIONS. CSL TESTING WILL BE PAID FOR UNDER BID ITEM 503 - CSL TESTING, AND WILL INCLUDE THE COST OF FURNISHING AND PLACING THE CSL TUBES.



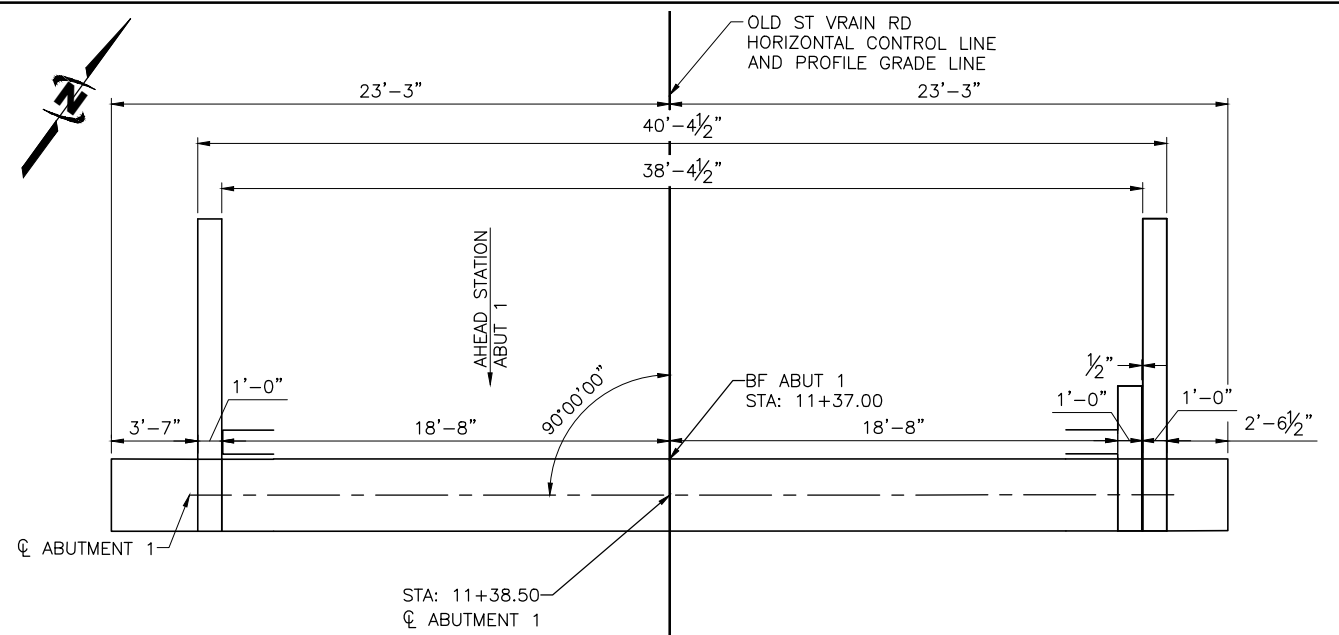
ELEVATION

SECTION

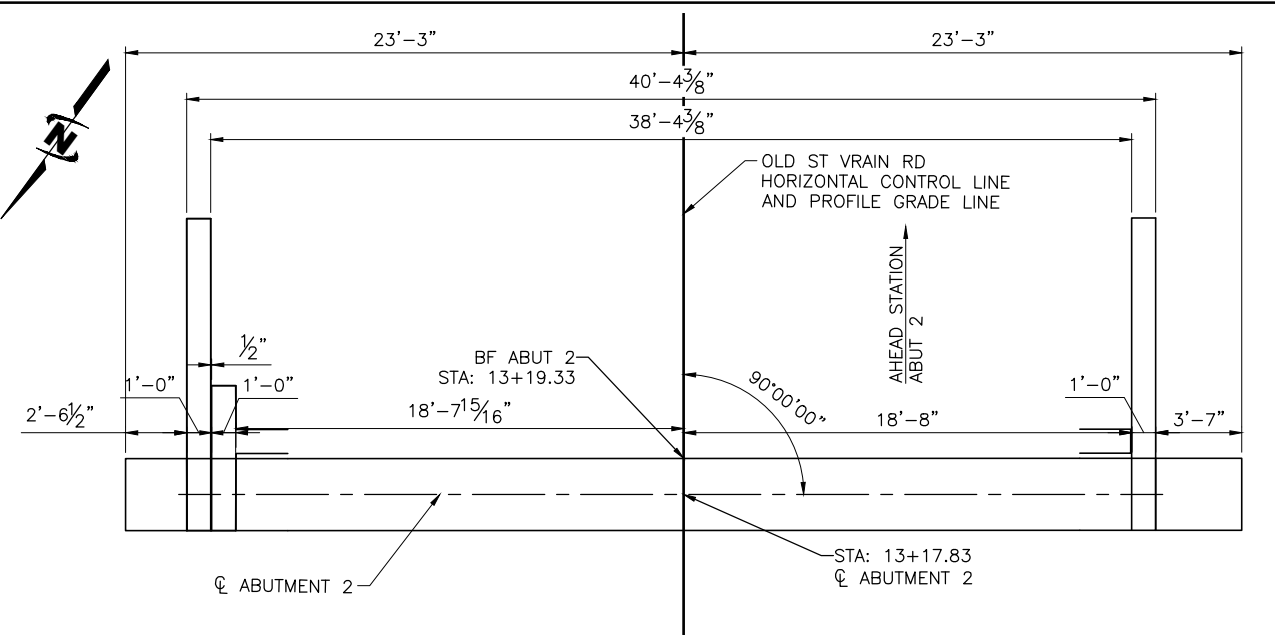


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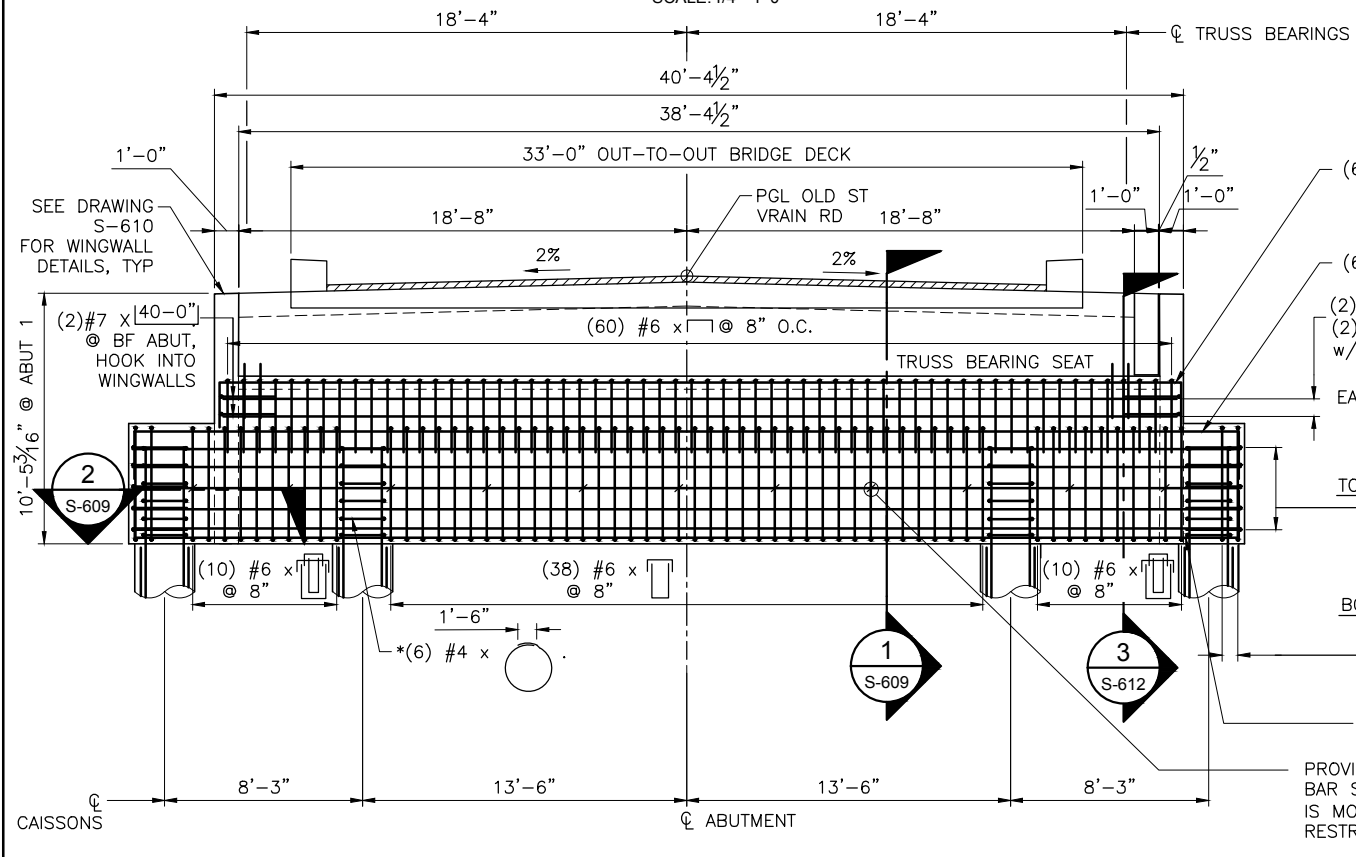
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Last Modification Date: 5/8/17	Initials: AB	R-2		Revised:		Detailer: AB				Sheet Number 28	
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet		R-3		Void:		Sheet Subset: STRUCT PLANS	Subset Sheet: 7	of 18			
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ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET		R-5									



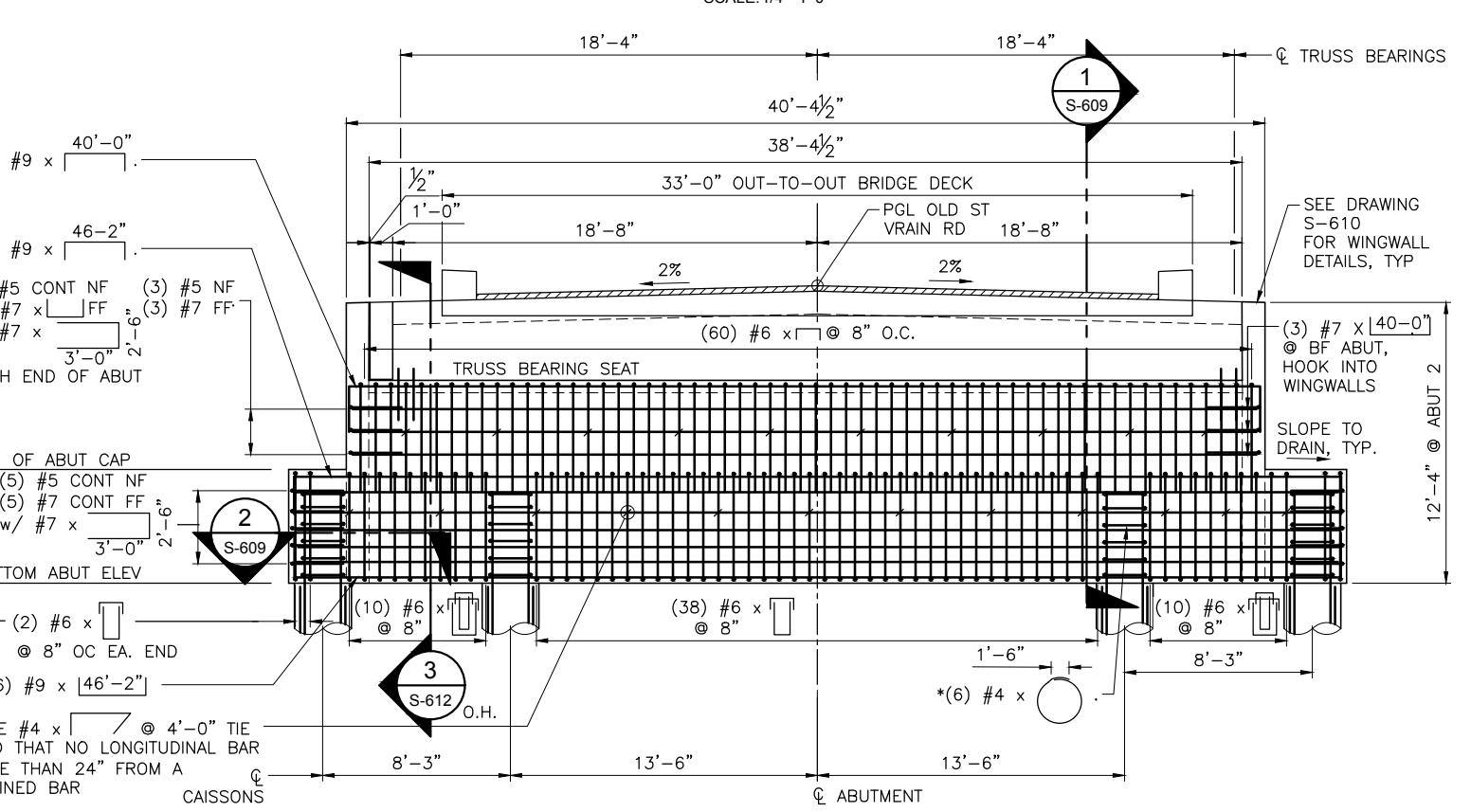
PLAN - ABUTMENT 1
SCALE: 1/4"=1'-0"



PLAN - ABUTMENT 2
SCALE: 1/4"=1'-0"



ELEVATION - ABUTMENT 1
SCALE: 1/4"=1'-0"
(LOOKING BACK STATION)



ELEVATION - ABUTMENT 2
SCALE: 1/4"=1'-0"
(LOOKING AHEAD STATION)

NOTE:
* SPACE EVENLY IN ABUTMENT (ROTATE SPLICES) TYP. ALL CAISSONS.
** TRUSS SUPERSTRUCTURE NOT SHOWN FOR CLARITY.

ELEVATIONS			
	TRUSS BEARING SEAT	TOP OF ABUTMENT CAP	BOTTOM ABUTMENT
ABUTMENT 1	5467.98	5466.00	5461.00
ABUTMENT 2	5466.91	5463.00	5458.00



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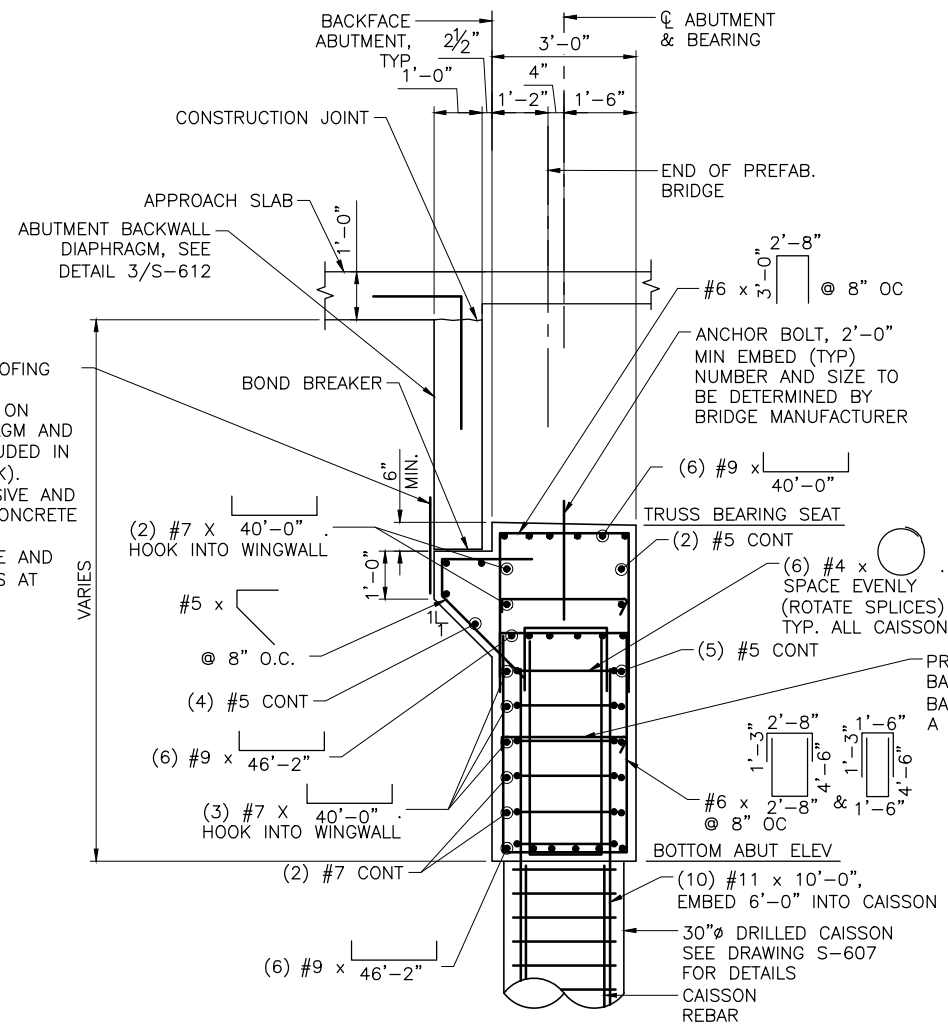
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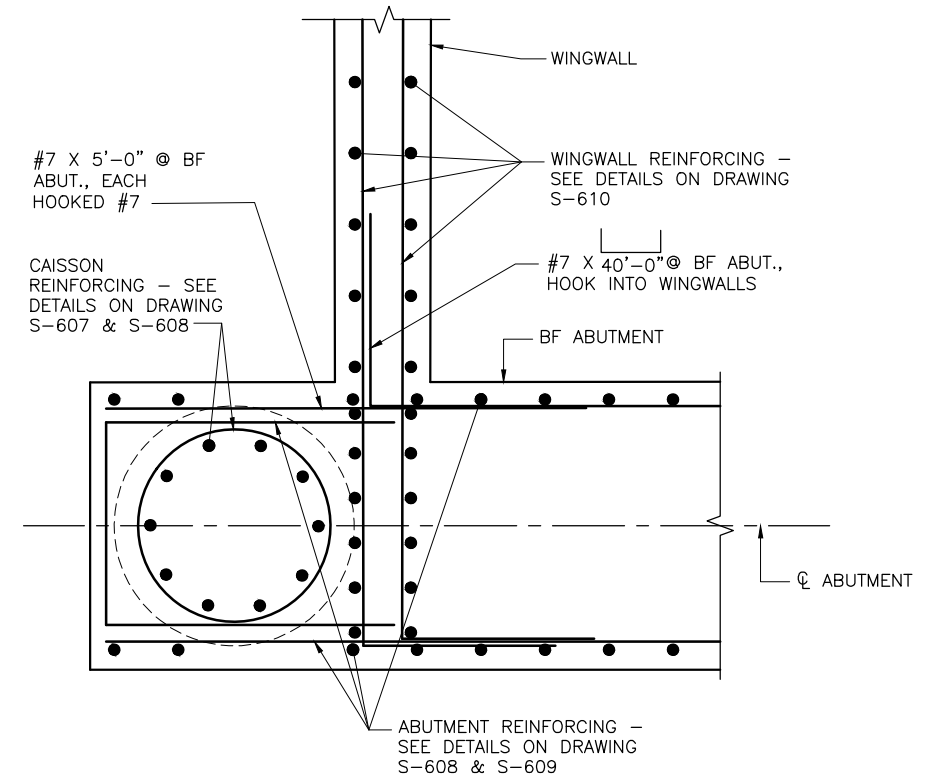
SOUTH ST. VRRAIN BRIDGE ABUTMENT PLAN & ELEV	
Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 8 of 18

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TD-SEPT12C14	Drawing Number S-608
	Sheet Number 29

2'-0" WIDE WATER-PROOFING MEMBRANE, CONTINUOUS-CENTERED ON JOINT BETWEEN DIAPHRAGM AND ABUTMENT (TO BE INCLUDED IN THE COST OF THE WORK). APPLY APPROVED ADHESIVE AND ATTACH TOP HALF TO CONCRETE DIAPHRAM w/ 1/4" THICK GALVANIZED STEEL PLATE AND 1/4" Ø CONCRETE SCREWS AT 1'-0" O.C.



1 SECTION THRU TRUSS BEARING SEAT
 S-608 SCALE: 1/2" = 1'-0"
 (ABUTMENT 1 SHOWN, ABUTMENT 2 SIMILAR.)



2 SECTION AT WINGWALL
 S-608 SCALE: 1" = 1'-0"

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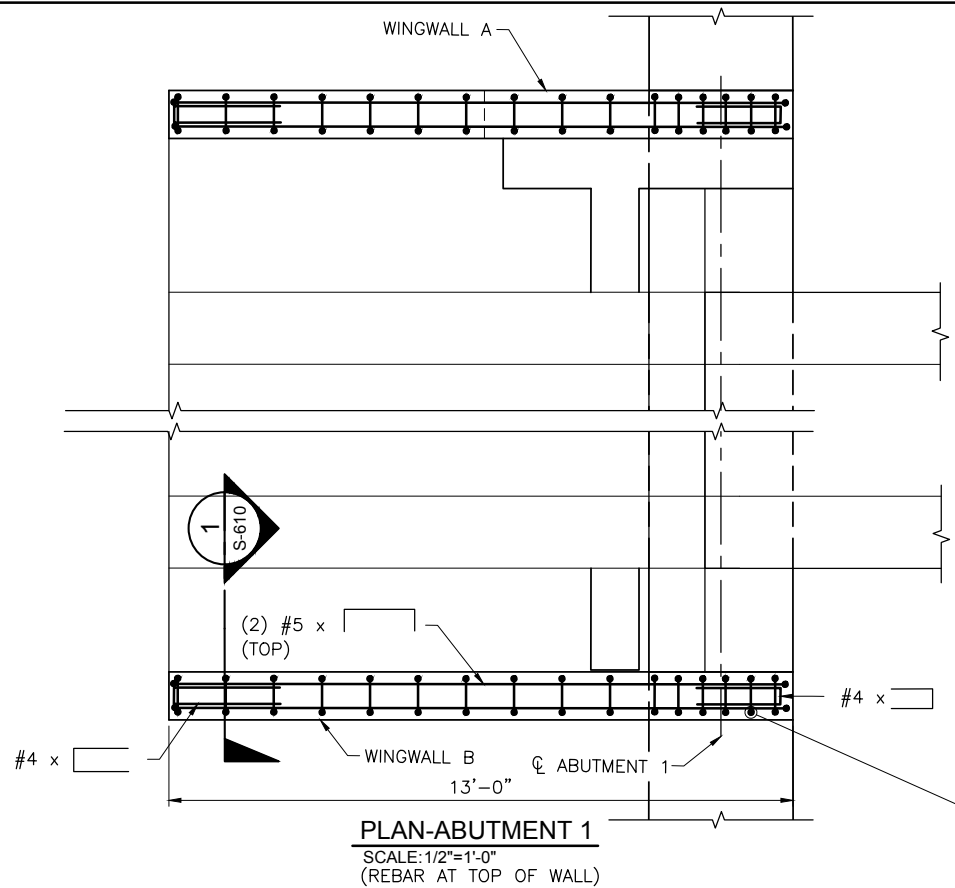


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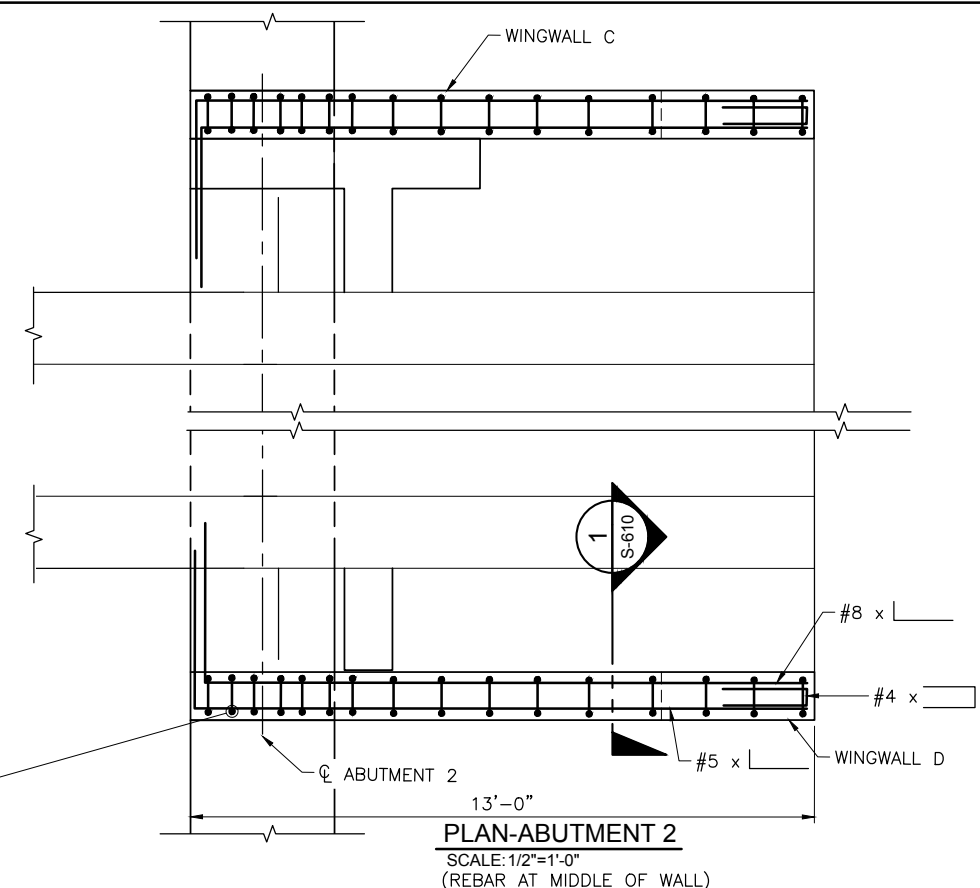
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Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 9 of 18

Project No.	
TD-SEPT12C14	
Drawing Number S-609	
Sheet Number 30	

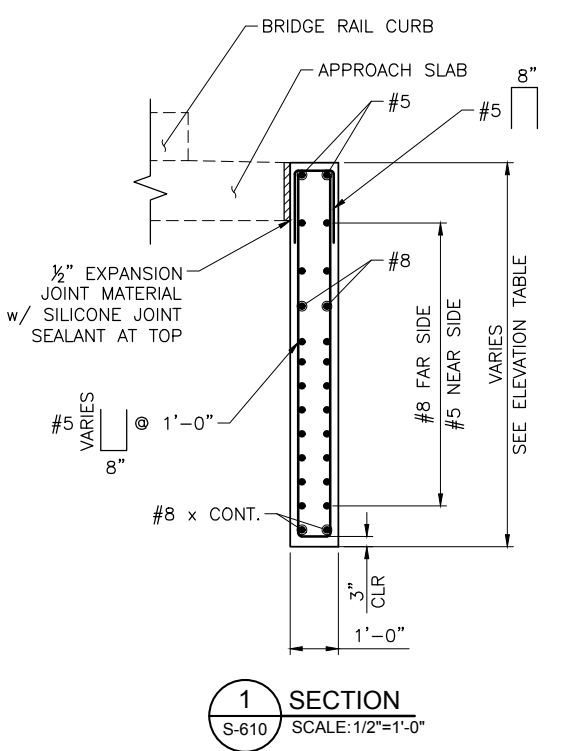


PLAN-ABUTMENT 1
SCALE: 1/2"=1'-0"
(REBAR AT TOP OF WALL)

SEE ELEVATION FOR STIRRUP SIZES AND SPACING



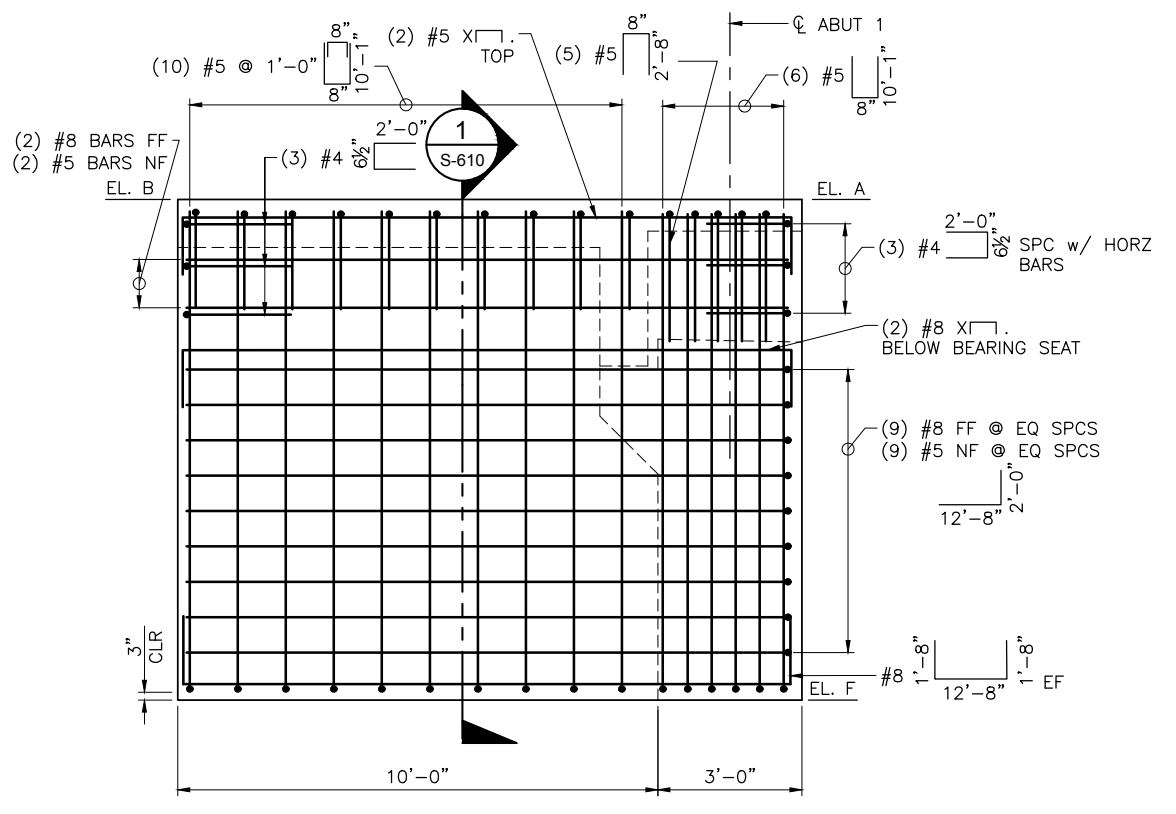
PLAN-ABUTMENT 2
SCALE: 1/2"=1'-0"
(REBAR AT MIDDLE OF WALL)



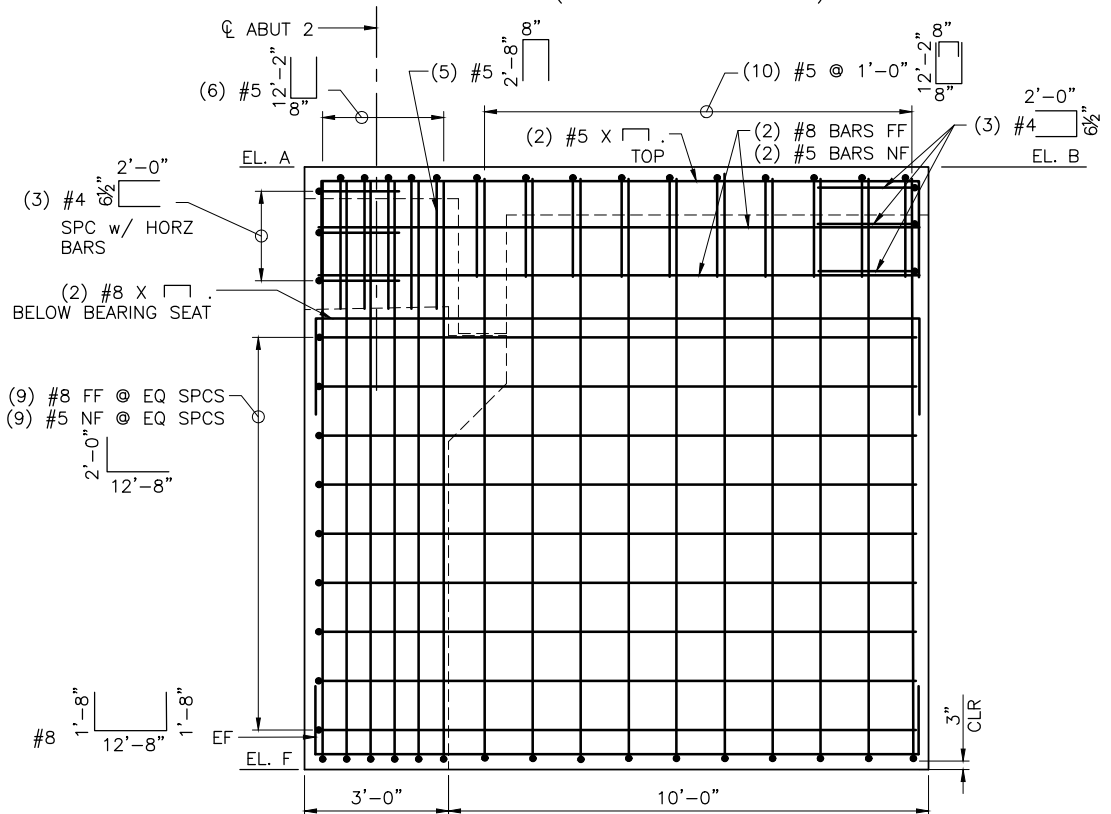
SECTION 1
SCALE: 1/2"=1'-0"

WINGWALL ELEVATION TABLE		
POINT	WINGWALL A & B	WINGWALL C & D
EL. A	5471.43	5470.55
EL. B	5471.59	5470.37
EL. F	5461.00	5458.00

NOTE:
ABUTMENT REBAR NOT SHOWN FOR CLARITY



ELEVATION-ABUTMENT 1
SCALE: 1/2"=1'-0"



ELEVATION-ABUTMENT 2
SCALE: 1/2"=1'-0"



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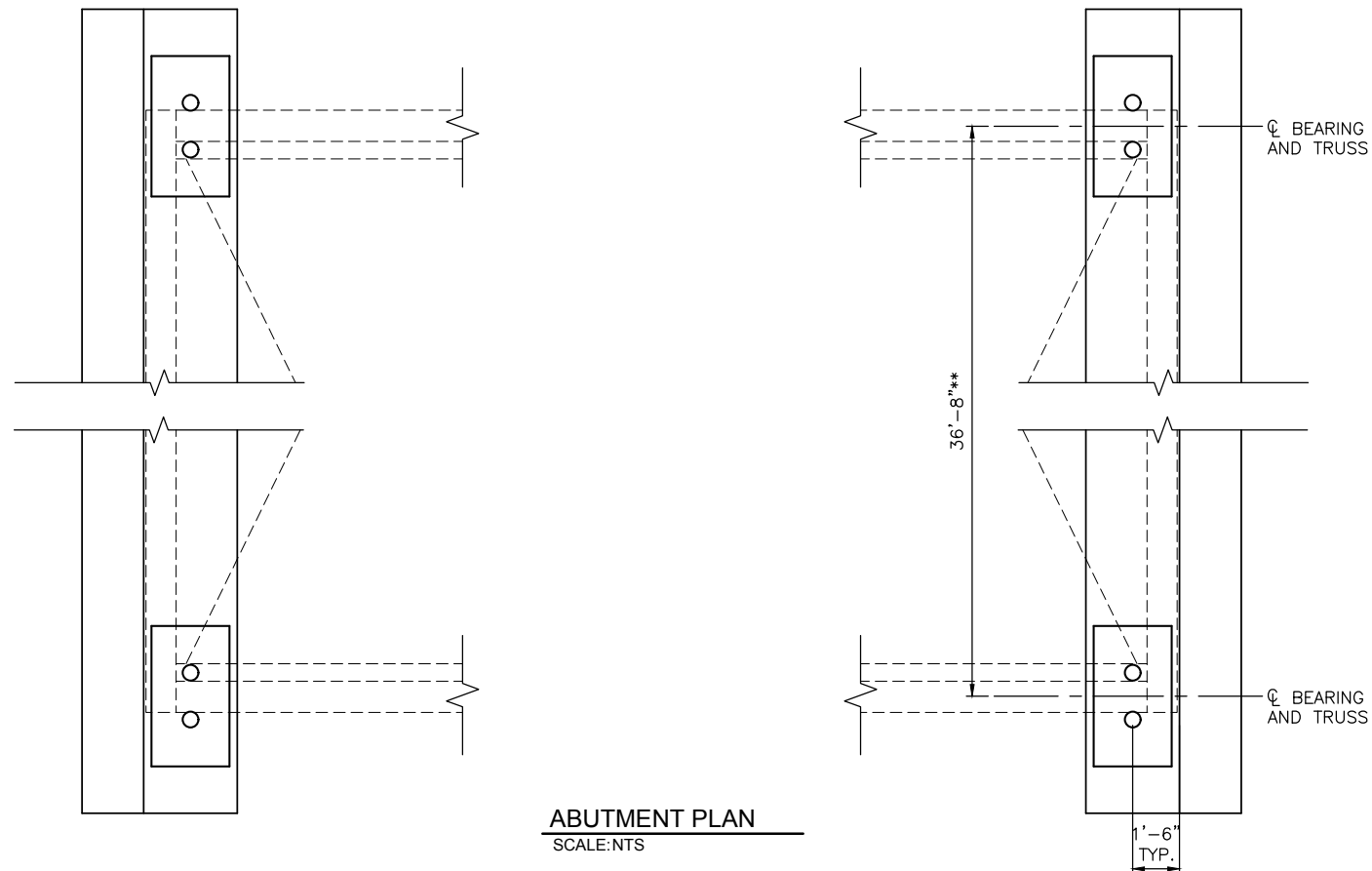


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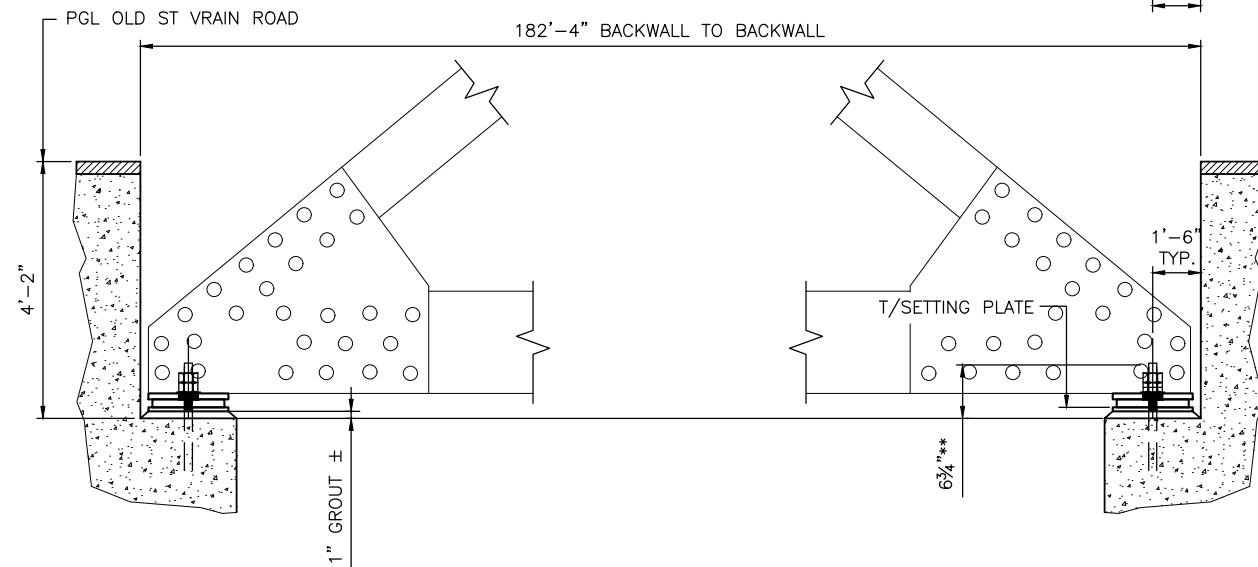
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SOUTH ST. VRAIN BRIDGE WINGWALL DETAILS	
Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
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TD-SEPT12C14	
Drawing Number S-610	
Sheet Number 31	



ABUTMENT PLAN
SCALE: NTS



ABUTMENT SECTION
SCALE: NTS

ABUTMENT REACTIONS (EXPANSION END)	
VERTICAL DEAD LOAD	634 KIPS
VERTICAL LIVE LOAD	252 KIPS
HORIZONTAL WIND LOAD*	40.5 KIPS
HORIZONTAL STREAM LOAD*	6 KIPS
HORIZONTAL SEISMIC LOAD*	23.8 KIPS
LONGITUDINAL SEISMIC LOAD	23.8 KIPS

ABUTMENT REACTIONS (EXPANSION END)	
VERTICAL DEAD LOAD	634 KIPS
VERTICAL LIVE LOAD	252 KIPS
HORIZONTAL WIND LOAD*	40.5 KIPS
HORIZONTAL STREAM LOAD*	6 KIPS
HORIZONTAL SEISMIC LOAD*	23.8 KIPS
LONGITUDINAL SEISMIC LOAD	23.8 KIPS

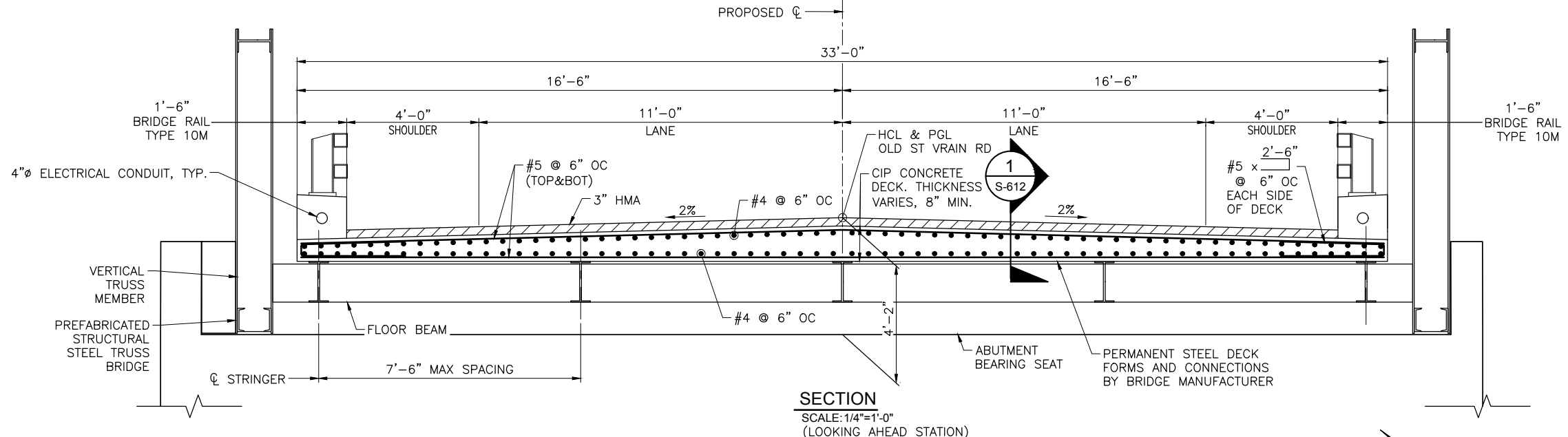
- NOTES:**
- CONTRACTOR SHALL NOT BUILD ABUTMENTS UNTIL THE SUPERSTRUCTURE (TRUSS) SHOP DRAWINGS ARE APPROVED. CONTRACTOR TO VERIFY DIMENSIONS AND CHECK ASSUMED DEAD LOADS.
 - PREFABRICATED STRUCTURAL STEEL BRIDGE MANUFACTURER SHALL PROVIDE DETAILS TO TRANSFER HORIZONTAL DEBRIS LOADING (75 KIPS PER ABUTMENT) FROM EACH END OF STEEL TRUSS TO A CONCRETE DIAPHRAGM AND BUMPER SHOWN IN DETAILS 3 & 4 ON DRAWING NUMBER S-612.
 - ELASTOMERIC BEARING PADS SHALL BE PLACED LEVEL. BASE PLATES ON STEEL TRUSS SHALL BE DESIGNED TO ACCOMMODATE SLOPE OF BRIDGE AND LEVEL BEARING PADS.
- * TRANSVERSE TO BRIDGE.
** ASSUMED FOR THIS BRIDGE. MANUFACTURER TO SPECIFY.



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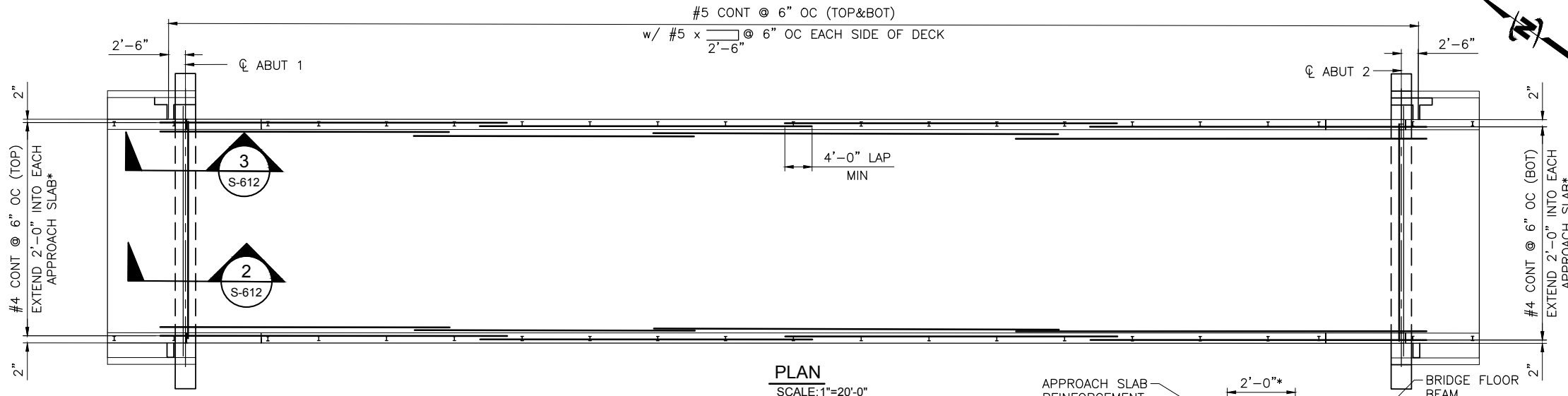
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Computer File Information		Index of Revisions			 JUB J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	AD SET		SOUTH ST. VRAIN BRIDGE BEARING DEVICE DETAILS		Project No.	
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Last Modification Date: 5/4/17	Initials: AB	(R-2)			Revised:	Designer: KA	BR-84S-001-SSV1-FLOOD		Sheet Number 32		
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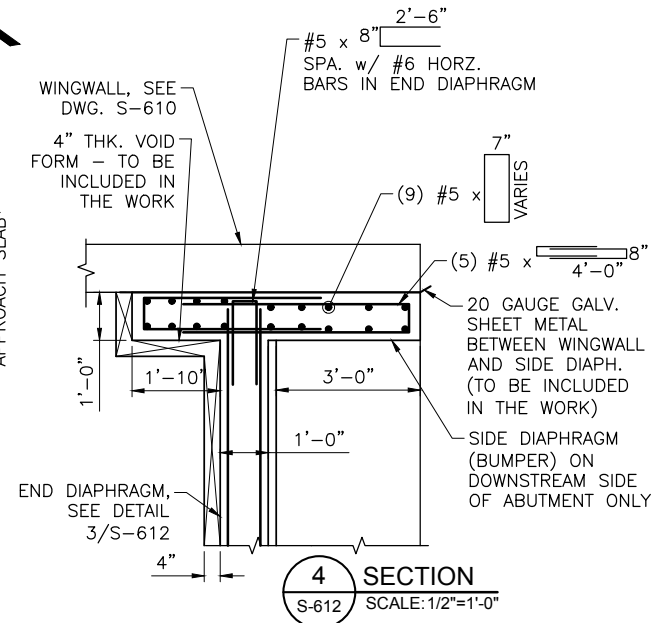


SECTION 1
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(LOOKING AHEAD STATION)

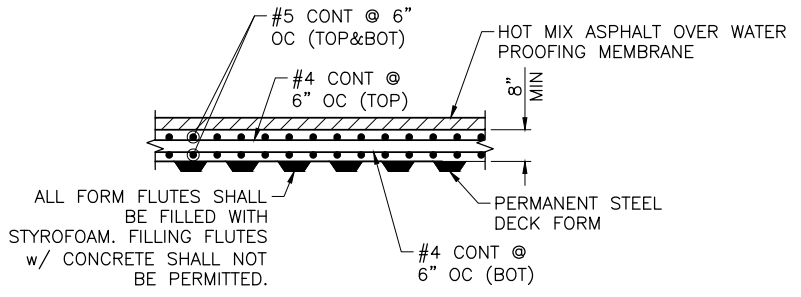
- NOTES:**
- NON-COMPOSITE DECK SHOWN. BRIDGE FABRICATOR MAY ELECT TO USE COMPOSITE DECK. IF SO, HEADED ANCHOR SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN ITEM 509 PREFABRICATED STRUCTURAL STEEL BRIDGE.
 - CONCRETE SHALL BE CONCRETE CLASS D (BRIDGE).
 - MINIMUM SPLICE LENGTH FOR #4 BAR IS 4'-0"
 - DO NOT SPLICE TRANSVERSE #5 BARS.
 - STAGGER SPLICES IN ADJACENT LINES.
 - TRUSS STRUCTURE IS SHOWN SCHEMATICALLY ONLY. MANUFACTURER TO DEVELOP TRUSS DETAILS.



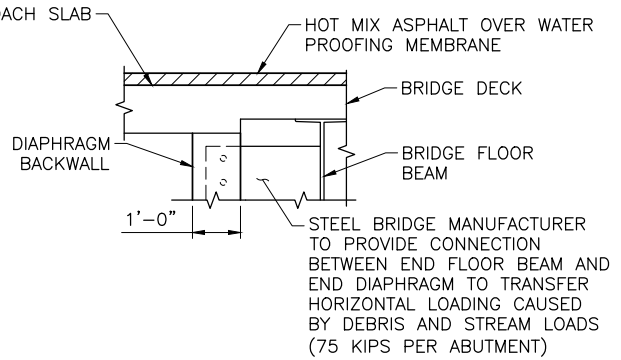
PLAN 1
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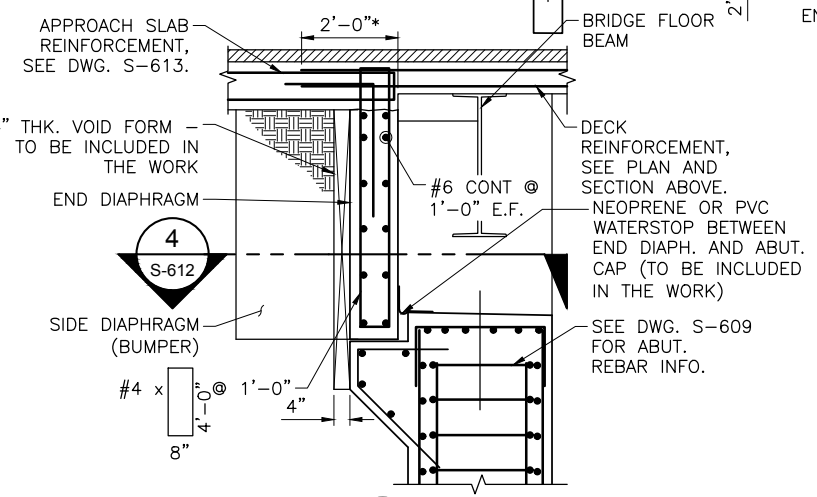
SECTION 4
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SECTION 1
SCALE: 1/2"=1'-0"



SECTION 2
SCALE: 1/2"=1'-0"



SECTION 3
SCALE: 1/2"=1'-0"



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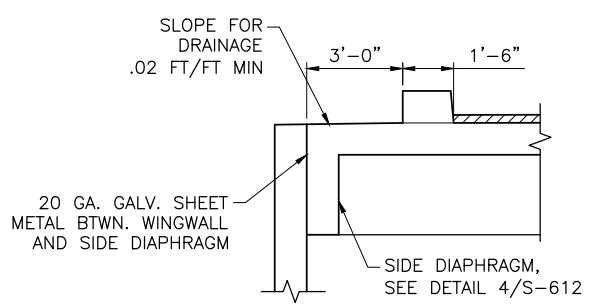
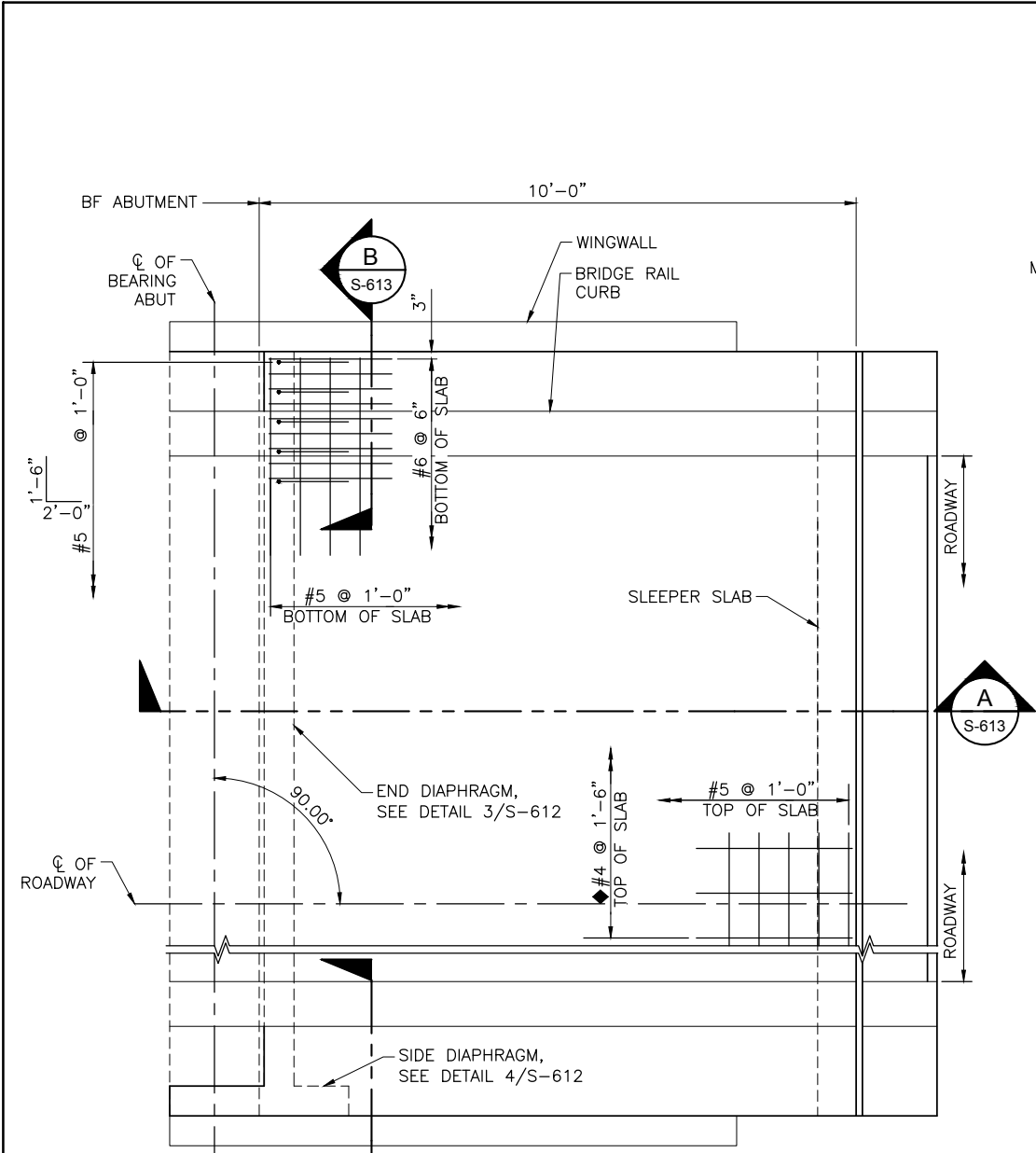


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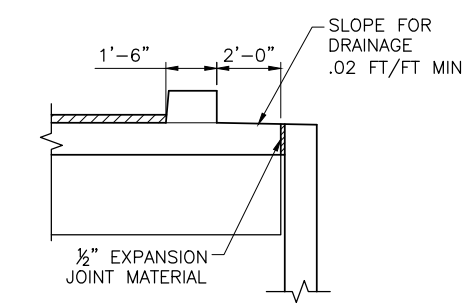
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Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
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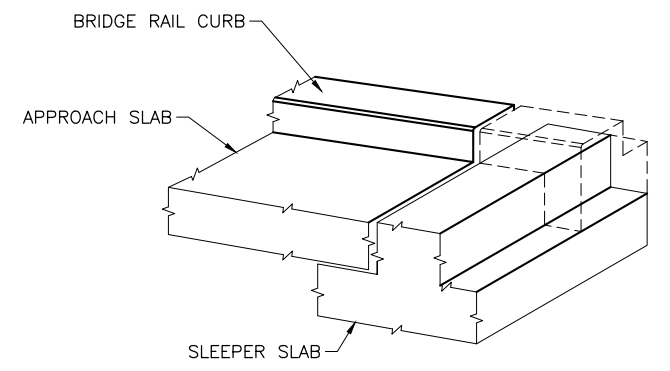
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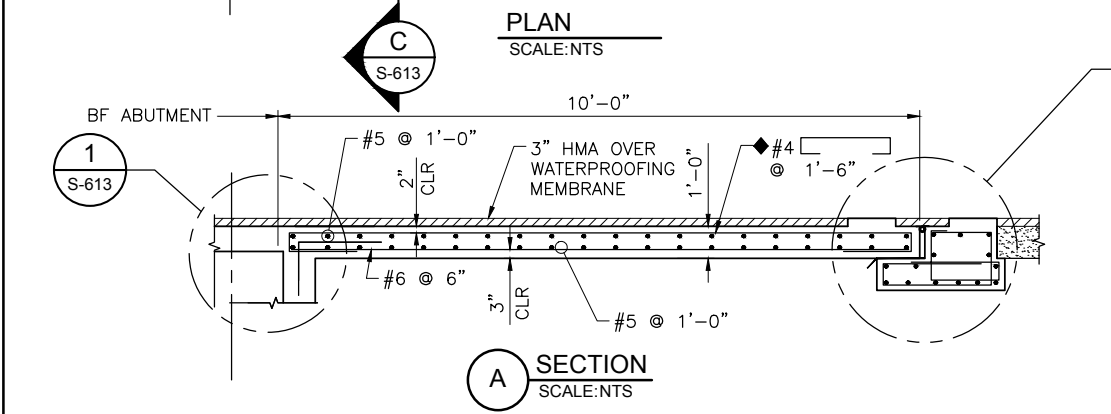
C SECTION AT DOWNSTREAM WINGWALL
SCALE:NTS



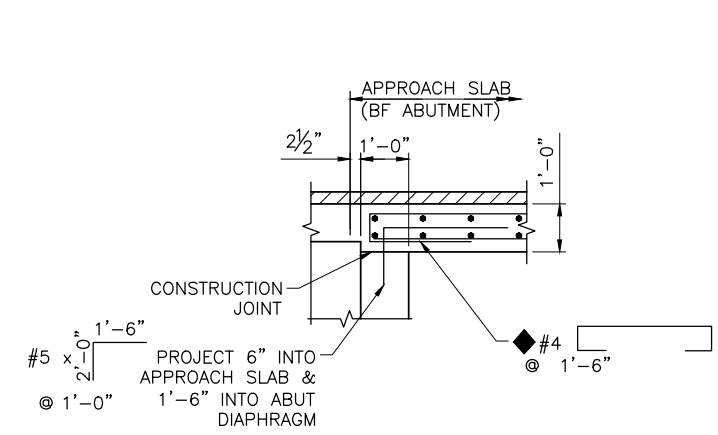
B SECTION AT UPSTREAM WINGWALL
SCALE:NTS



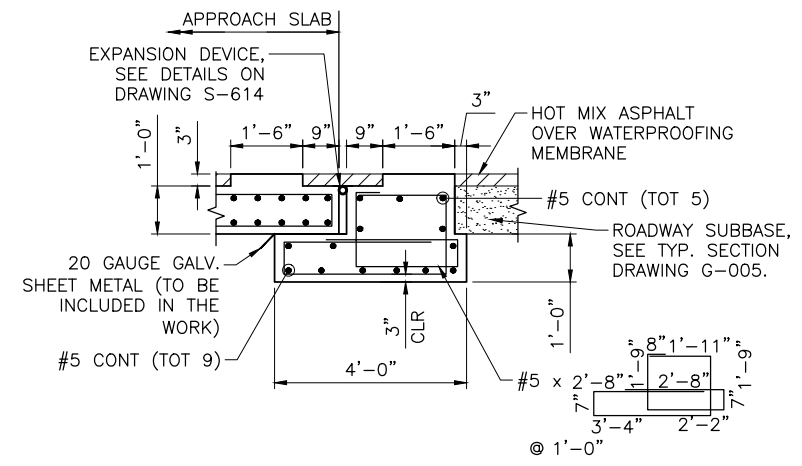
ISOMETRIC VIEW (TYPE 10 RAILS)



A SECTION
SCALE:NTS



1 DETAIL
SCALE:NTS



2 DETAIL
SCALE:NTS

NOTES:
 CONCRETE CLASS D (BRIDGE) SHALL BE USED FOR APPROACH SLABS.
 1/2" EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPEC M213.
 APPROACH SLAB CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE SPECIFICATIONS FOR BRIDGE DECK CONCRETE IN SUBSECTION 601.
 FOR EXPANSION DEVICE DETAILS SEE DRAWING NO. S-614.
 FOR CURB AND RAIL DETAILS SEE DRAWING NO. S-615 & S-616.

◆ CONTRACTOR MAY USE 7"
1'-0"



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SOUTH ST. VRAIN BRIDGE APPROACH SLAB DETAILS	
Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
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Drawing Number S-613	
Sheet Number 34	

DESIGN DATA:

	ABUTMENT 1	ABUTMENT 2
◆ JOINT OPENING "A"	1"	1"
★ PREDICTED HORIZONTAL MOVEMENT	3/4"	3/4"

◆ JOINT OPENING "A" FOR THE NEW STRUCTURE WAS DETERMINED BASED ON PREDICTED MOVEMENTS FROM SHRINKAGE, CREEP, AND TEMPERATURE CHANGES.

★ THE MAXIMUM PREDICTED HORIZONTAL JOINT MOVEMENT IS BASED ON A TEMPERATURE DROP OF 60°F FOR CONCRETE GIRDERS AND 80°F FOR STEEL GIRDERS.

BRIDGING PLATE SIZES:

"A"	THICKNESS	WIDTH	MINIMUM LENGTH
0"-1"	1/4"	5"	4'-0"

AT THESE STRUCTURES:

TEMPERATURE EXTREMES:
 COLD FOR MOUNTAINS
 HOT FOR PLAINS

TRUCK TRAFFIC:
 ≥ 2500 ADTT FOR HIGH TRUCK TRAFFIC
 < 2500ADIT FOR MODERATE TRUCK TRAFFIC

STOP AND GO TRAFFIC:
 COMMON FOR CONTROLLED INTERSECTIONS
 UNCOMMON FOR EVERYTHING ELSE

ACCEPTABLE EXPANSION DEVICE ALTERNATES

ALL ASPHALTIC PLUG JOINT MATERIALS NEED A CERTIFIED TEST REPORT (CTR) FROM AN INDEPENDENT LABORATORY SHOWING PASSING TEST RESULTS ON ALL REFERENCED TESTS WITHIN THE MOST RECENT ASTM D 6297 USING GRANITE BLOCKS FOR EACH LOT OF MATERIAL TO BE INCLUDED ON THE APPROVED PRODUCTS LIST (APL).

A LIST OF CURRENT PRE-APPROVED LOT NUMBERS, SUPPLIERS, AND THE PROCEDURE TO REGISTER NEW SUPPLIERS CAN BE FOUND ON CDOT APPROVED PRODUCTS LIST WEB SITE AT:

[HTTP://APPS.COLORADODOT.INFO/APL/APLSEARCH.CFM](http://apps.coloradodot.info/apl/aplsearch.cfm)

NOTES:

THE PLUG JOINT SYSTEM SHALL INCLUDE ALL LABOR AND MATERIALS TO INSTALL THE EXPANSION JOINT ACCORDING TO THE MANUFACTURER'S DIRECTIONS AND ACCORDING TO THESE PLANS.

THE BLOCKOUT SHALL BE FORMED OR CUT TO FULL DEPTH AND GROUND TO PROVIDE A UNIFORM BEARING SURFACE FOR THE BRIDGING PLATE.

BRIDGING PLATES SHALL NOT ROCK ON THEIR SUPPORTS PRIOR TO PLACING PLUG JOINT MATERIAL.

THE BRIDGING PLATES SHALL BE A36 STEEL AS SHOWN ON THE TABLE A OR EQUIVALENT APPROVED BY THE ENGINEER. IT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS. ALL BRIDGING PLATES SHALL HAVE LOCATOR PINS OR BARS FOR CENTRALIZERS.

THE BACKER ROD SHALL BE SECURED AND SEALED ACCORDING TO THE MANUFACTURER'S DIRECTIONS.

THE JOINT BONDING AGENT SHALL BE THE TYPE RECOMMENDED BY THE MANUFACTURER FOR THE JOINT SYSTEM BEING INSTALLED. IT SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

ALL SURFACES IN JOINT OPENING SHALL BE CLEANED ACCORDING TO THE MANUFACTURER'S DIRECTIONS.

THE JOINTS SHALL BE INSTALLED AND COMPACTED ACCORDING TO THE MANUFACTURER'S PROCEDURES. THE FINISHED JOINT, AFTER COMPACTING AND SEALING, SHALL BE FLUSH WITH THE TOP OF THE ADJACENT WEARING SURFACE.

A REPRESENTATIVE OF THE MANUFACTURER SHALL BE ON SITE PRIOR TO AND DURING INSTALLATION OF THE PLUG JOINTS AND SHALL APPROVE THE METHODS AND MATERIALS BEFORE WORK COMMENCES.

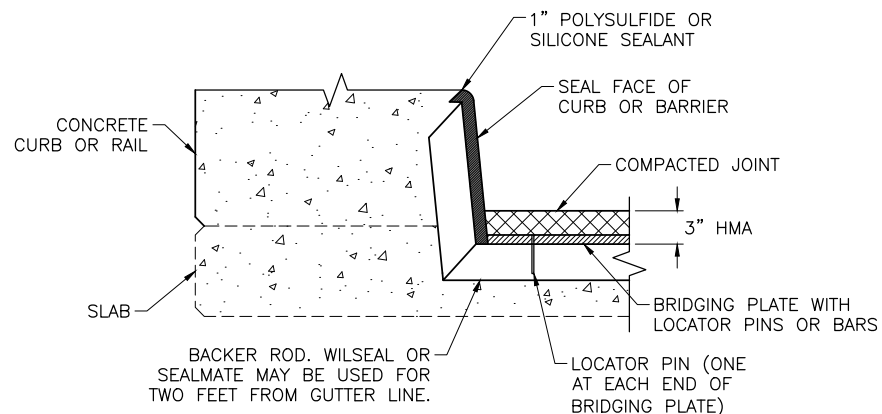
THE ASPHALTIC BINDER SHALL NOT BE OVERHEATED, EITHER BY ABSOLUTE TEMPERATURE LIMITS OF THE MATERIAL, OR BY EXTENDED TIME AT A LOWER HIGH TEMPERATURE. MATERIAL THAT IS OVERHEATED SHALL BE DISCARDED.

FOR CONSTRUCTION REQUIREMENTS SEE SECTION 518.08 OF STANDARD SPECIFICATIONS.

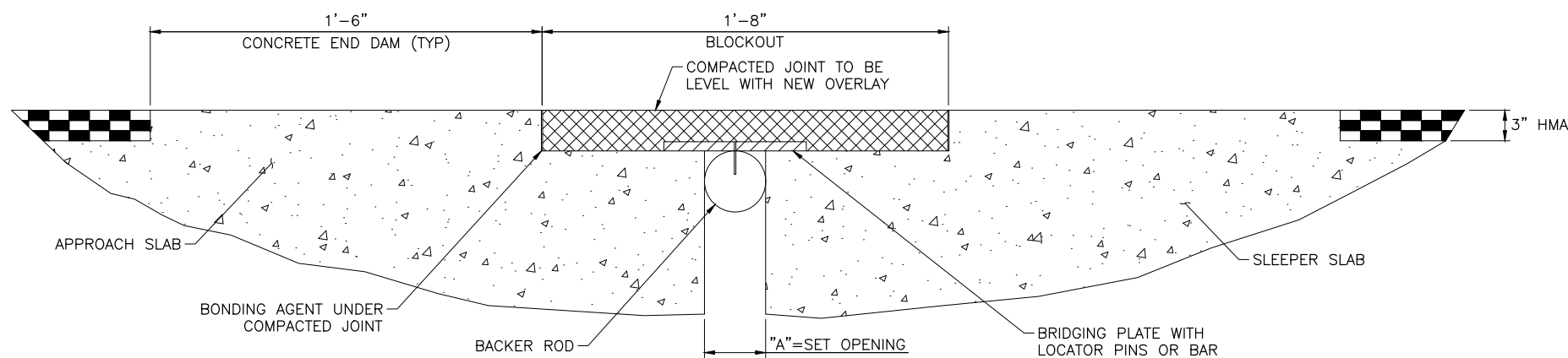
SEAL TOP OF CURB AS DIRECTED BY THE ENGINEER.

SEALING THE FACE OF THE CURB OR BARRIER WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE INCLUDED IN THE WORK.

FOR INFORMATION ONLY: IT IS ESTIMATED THAT 12.5 CU. FT. OF COMPACTED JOINT MATERIAL IS REQUIRED PER ABUTMENT.



SECTION THROUGH CURB
ALONG EXPANSION DEVICE-NTS



NEW EXPANSION JOINT DETAIL WITH END DAMS

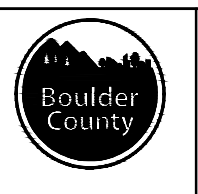


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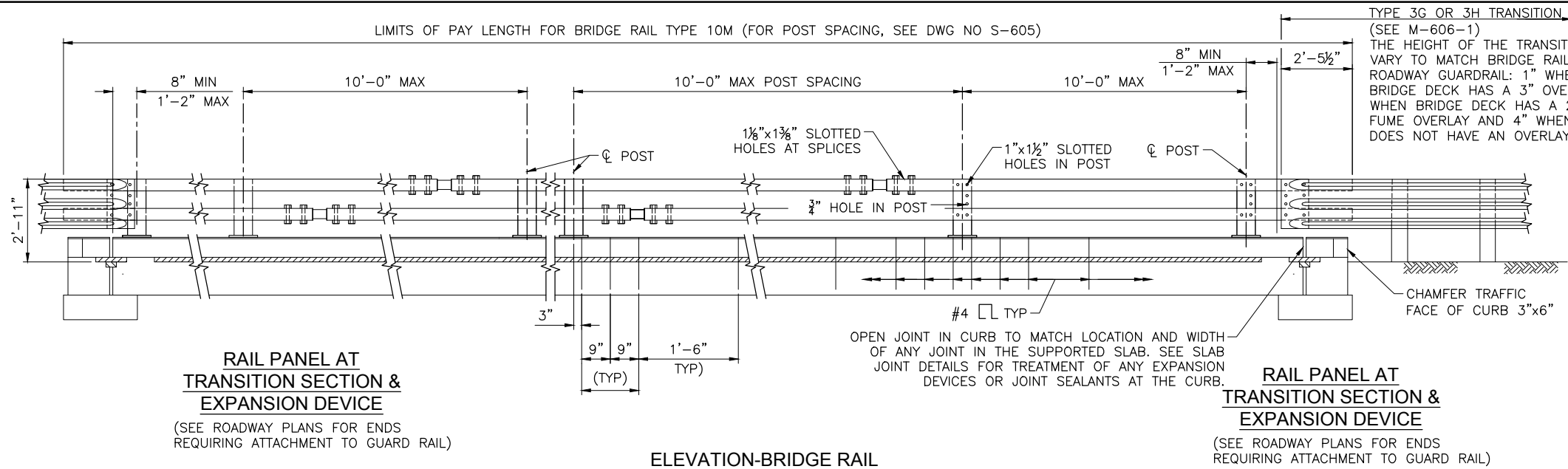


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SOUTH ST. VRAIN BRIDGE EXPANSION DEVICE DETAILS	
Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
Sheet Subset: STRUCT PLANS	Subset Sheet: 14 of 18

Project No.	
TD-SEPT12C14	
Drawing Number S-614	
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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.
 ALL EXPOSED STEEL SHALL BE POWDER COATED PER SECTION 522 WITH THE FEDERAL AID STANDARD COLOR NO. 20122. ALL COLORS SHALL BE APPROVED BY THE ENGINEER PRIOR TO FABRICATION.

ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509. CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS SHALL 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 NEED NOT BE GALVANIZED.

THE TUBES SHALL BE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.

TUBES SHALL BE CONTINUOUS OVER 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 10'-0" POST SPACINGS MAY BE REDUCED (6'-8" MIN.) IN ORDER TO MAINTAIN DIMENSIONS FROM THE END OF THE RAIL AND EXPANSION JOINTS.

PAYMENT WILL BE MADE UNDER ITEM 606, BRIDGE RAIL TYPE 10M FOR ALL POSTS, POST ANCHORS, BASE PLATES, BACKING PLATES, ANCHOR BOLTS, MISCELLANEOUS BOLTS, NUTS, WASHERS, TUBES, TUBE SPLICES, END PLATES, CURB CONCRETE (CLASS D), CURB REINFORCING STEEL, AND REFLECTOR TABS.

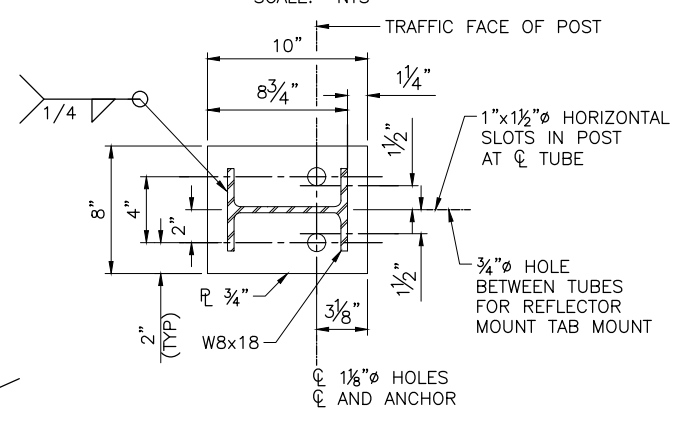
PRIOR TO FABRICATION OF THIS ITEM, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105, SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.

STRUCTURAL STEEL:
 AASHTO M-183 (ASTM A-36) $f_y = 36,000$ PSI
 AASHTO M-223 (ASTM A-572) $f_y = 50,000$ PSI
 COLD FORMED ASTM A-500 GRADE 50 $f_y = 36,000$ PSI
 FOR ADDITIONAL DETAILS SEE DWG S-616 AND S-617

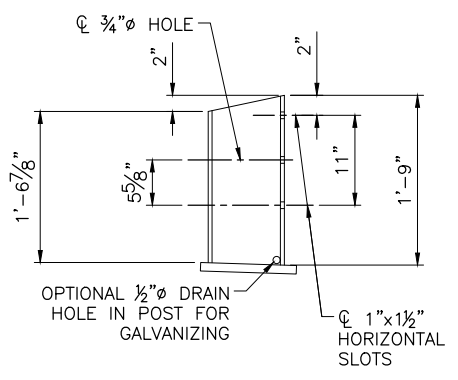
INFORMATION ONLY

DESCRIPTION	UNIT	PER LIN FT
STRUCTURAL STEEL (GALVANIZED)	LB	4.51
CONCRETE CLASS D	CU YD	0.06
REINFORCING STEEL (EPOXY COATED)	LB	6.60

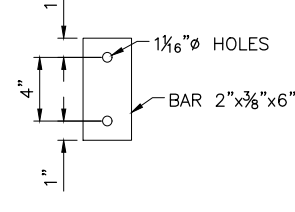
ELEVATION-BRIDGE RAIL
 SCALE: NTS



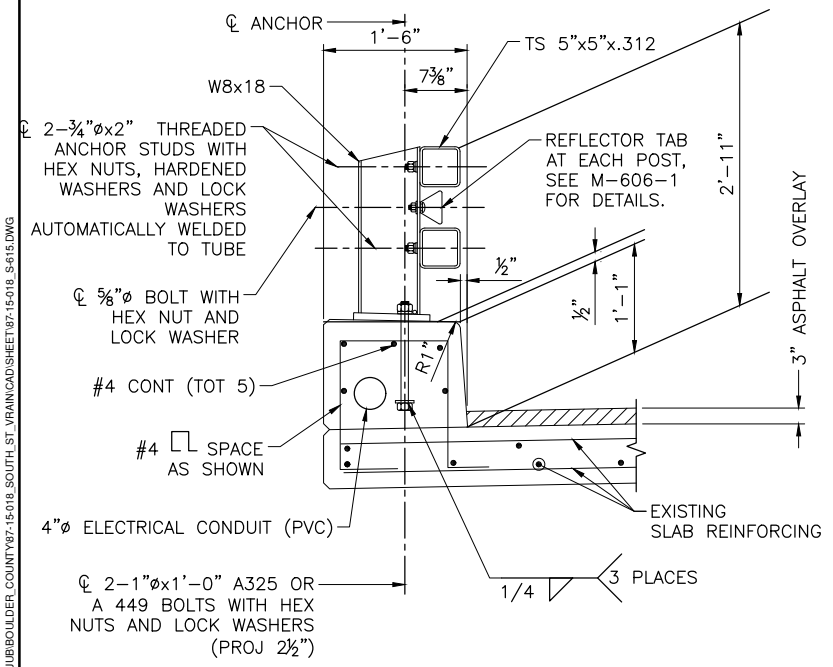
PLAN-POST DETAIL
 SCALE 1"=1'-0"



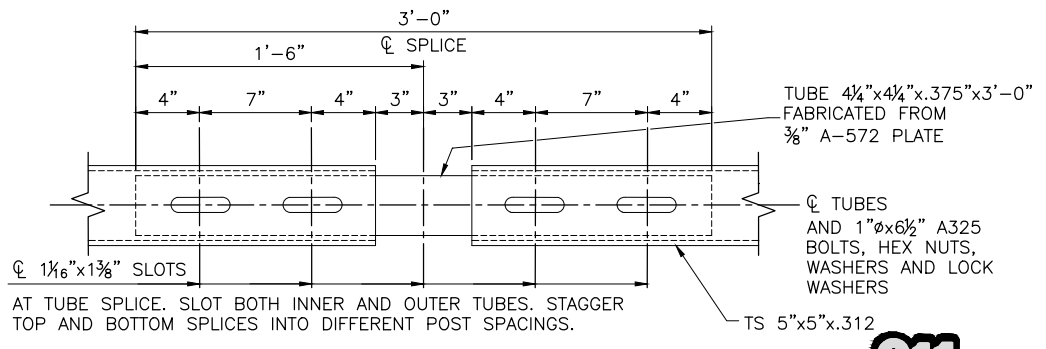
ELEVATION
 SCALE: NTS



ANCHOR DETAIL
 SCALE: NTS



SECTION
 USED WHEN PLACED ON CONCRETE SLAB
 SCALE 1/2"=1'-0"



PLAN-TUBE SPLICE
 SCALE 1"=1'-0"



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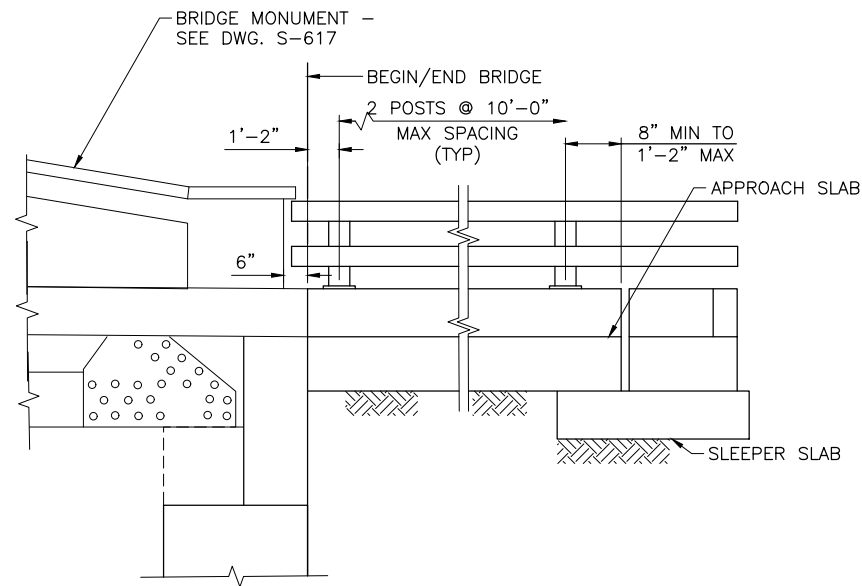
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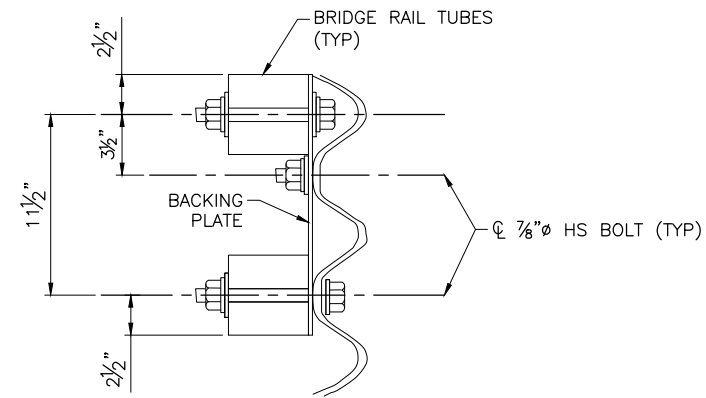
SOUTH ST. VRAIN BRIDGE
 BRIDGE RAIL TYPE 10M

Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
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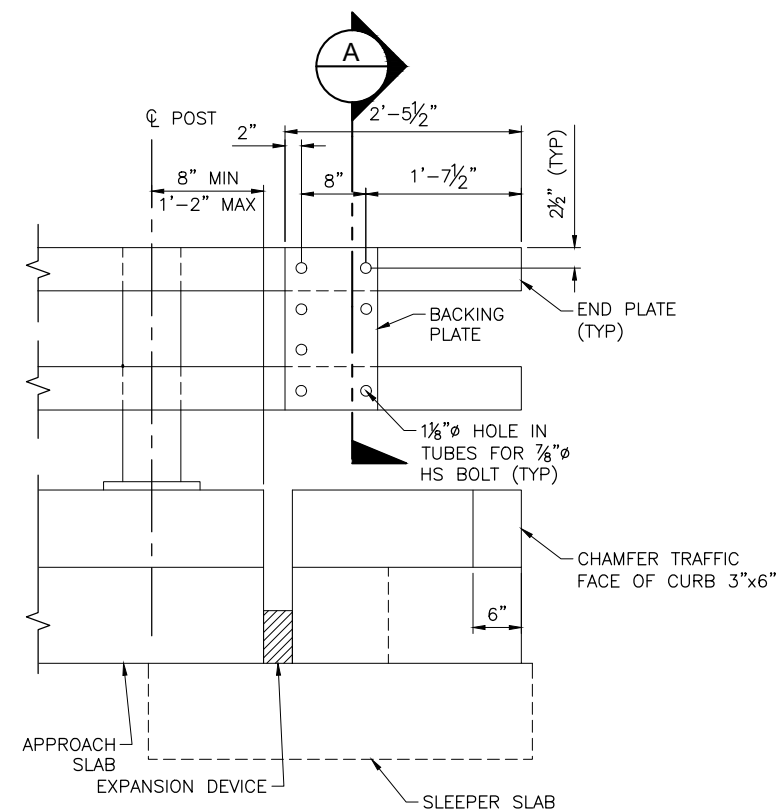
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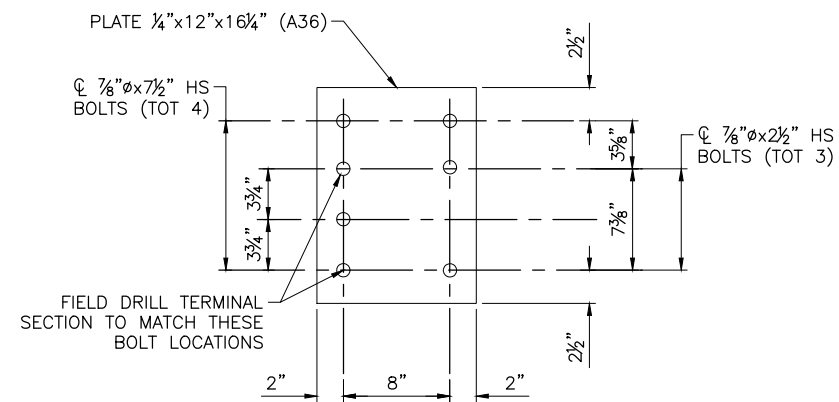
BRIDGE RAIL ON APPROACH SLAB



SECTION - A

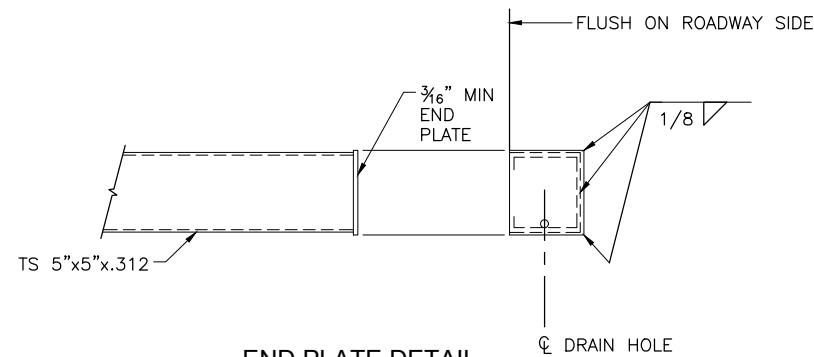


RAIL TUBE DETAILS
(USE WITH BRIDGE RAIL TYPE 10M)
THREE BEAM NOT SHOWN

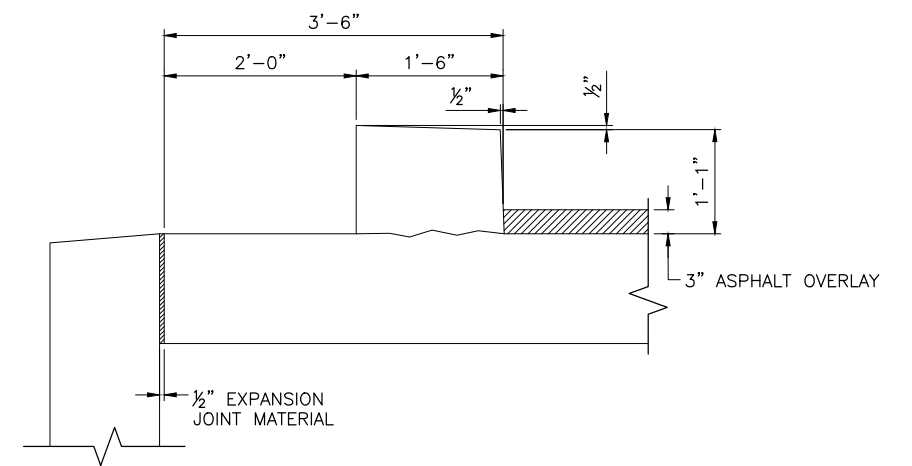


BACKING PLATE

HOLES ARE 1 1/8" Ø FOR 7/8" Ø BOLTS WITH HEX NUTS, 2 PLATE WASHERS AND 1 LOCK WASHER



END PLATE DETAIL



SECTION

NOTE: DETAILS NOT TO SCALE



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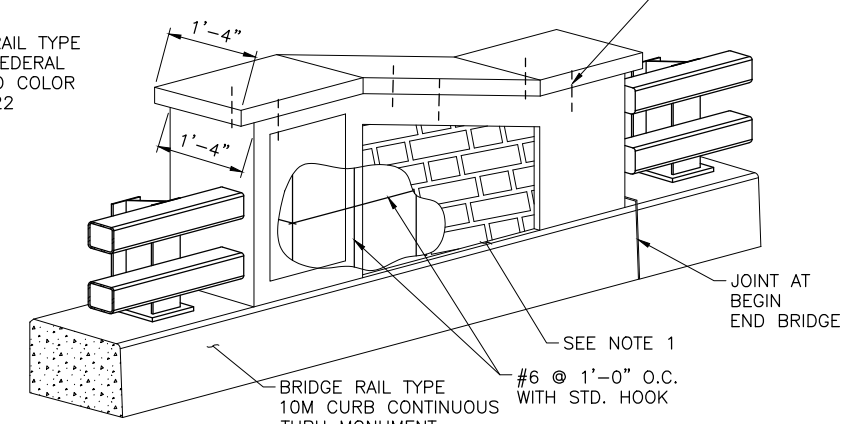
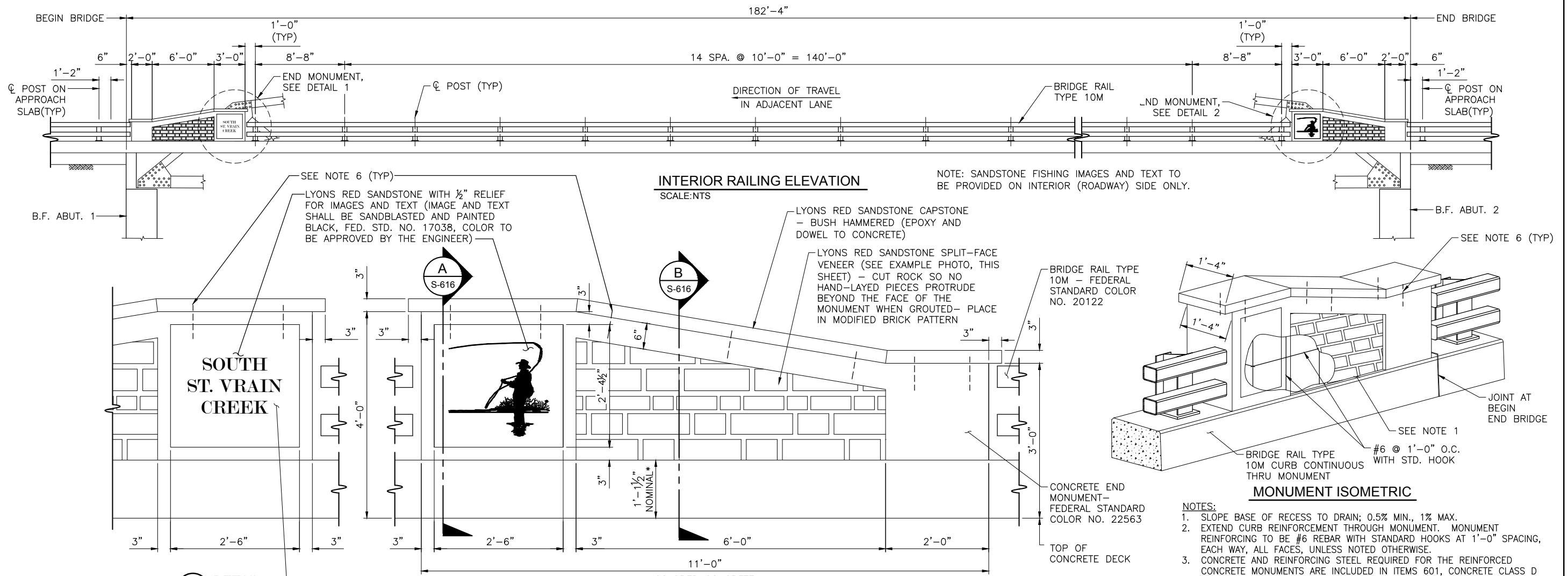
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**SOUTH ST. VRAIN BRIDGE
BRIDGE RAIL DETAILS**

Designer: KA	BR-84S-001-SSV1-FLOOD
Detailer: AB	
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Drawing Number S-616
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- NOTES:**
- SLOPE BASE OF RECESS TO DRAIN; 0.5% MIN., 1% MAX.
 - EXTEND CURB REINFORCEMENT THROUGH MONUMENT. MONUMENT REINFORCING TO BE #6 REBAR WITH STANDARD HOOKS AT 1'-0" SPACING, EACH WAY, ALL FACES, UNLESS NOTED OTHERWISE.
 - CONCRETE AND REINFORCING STEEL REQUIRED FOR THE REINFORCED CONCRETE MONUMENTS ARE INCLUDED IN ITEMS 601, CONCRETE CLASS D (BRIDGE) AND 602, REINFORCING STEEL (EPOXY COATED) RESPECTIVELY.
 - PROVIDE 2" MINIMUM CONCRETE COVER OVER REINFORCEMENT.
 - LYONS RED SANDSTONE CAPSTONE AND IMAGE/TEXT PANELS, LYONS RED SANDSTONE VENEER, FORM LINER, DOWELS, MEDALLIONS AND GROUT SHALL BE PAID FOR AS PART OF ITEM 601 ARCHITECTURAL FEATURES.
 - #4 REINFORCEMENT STEEL - REINFORCEMENT STEEL SHALL EXTEND 1" OUT OF MONUMENT INTO SANDSTONE CAP. DRILL BOTTOM OF SANDSTONE CAP, 1" DEEP AND EPOXY SANDSTONE CAP. (7) EACH PER END MONUMENT. COST TO BE INCIDENTAL TO WORK.
 - ALL STEEL REINFORCEMENT SHOWN ON THIS SHEET IS EPOXY COATED.
 - ALL COLORS SHALL BE APPROVED BY THE ENGINEER PRIOR TO FABRICATION/INSTALLATION.
 - SANDSTONE SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.

1 DETAIL SCALE: NTS
3 INCH TALL LETTERS, "MODERN NO. 20" FONT

2 DETAIL SCALE: NTS



LYONS RED SANDSTONE SPLIT-FACE EXAMPLE SCALE: NTS



IMAGE ON SOUTHEAST CORNER SCALE: NTS

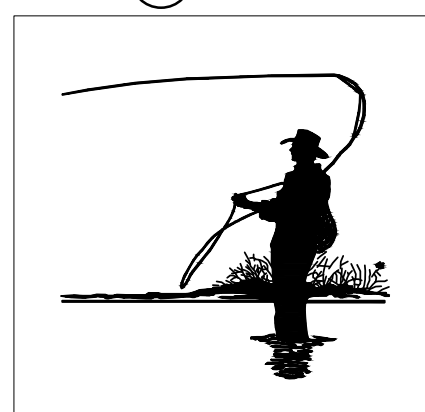
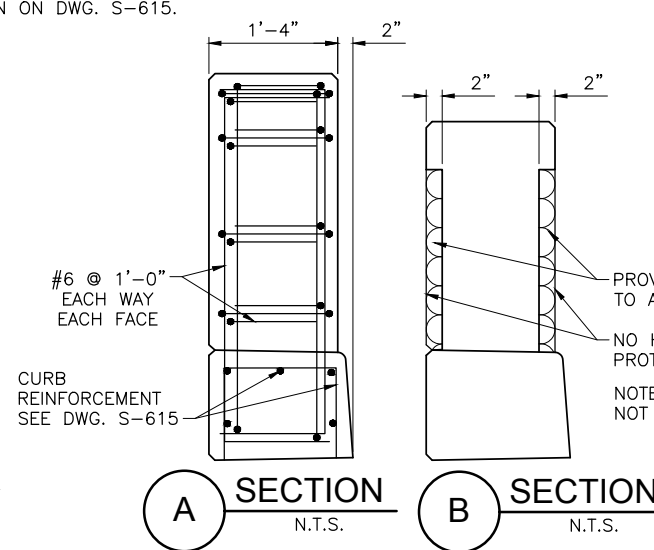


IMAGE ON NORTHWEST CORNER SCALE: NTS



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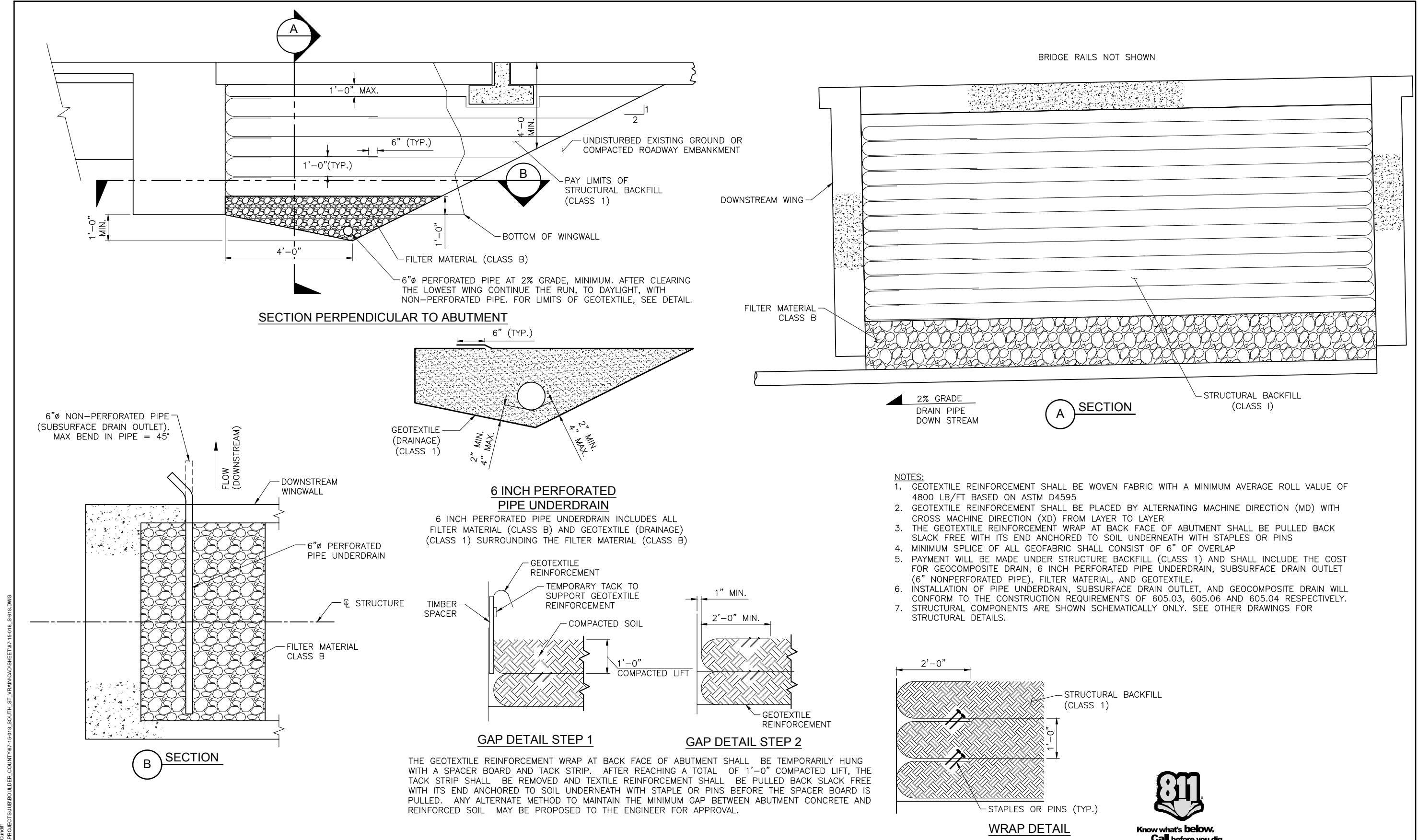
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Designer:	KA
Detailer:	AB
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- NOTES:**
1. GEOTEXTILE REINFORCEMENT SHALL BE WOVEN FABRIC WITH A MINIMUM AVERAGE ROLL VALUE OF 4800 LB/FT BASED ON ASTM D4595
 2. GEOTEXTILE REINFORCEMENT SHALL BE PLACED BY ALTERNATING MACHINE DIRECTION (MD) WITH CROSS MACHINE DIRECTION (XD) FROM LAYER TO LAYER
 3. THE GEOTEXTILE REINFORCEMENT WRAP AT BACK FACE OF ABUTMENT SHALL BE PULLED BACK SLACK FREE WITH ITS END ANCHORED TO SOIL UNDERNEATH WITH STAPLES OR PINS
 4. MINIMUM SPLICE OF ALL GEOTEXTILE SHALL CONSIST OF 6" OF OVERLAP
 5. PAYMENT WILL BE MADE UNDER STRUCTURE BACKFILL (CLASS 1) AND SHALL INCLUDE THE COST FOR GEOCOMPOSITE DRAIN, 6 INCH PERFORATED PIPE UNDERDRAIN, SUBSURFACE DRAIN OUTLET (6" NONPERFORATED PIPE), FILTER MATERIAL, AND GEOTEXTILE.
 6. INSTALLATION OF PIPE UNDERDRAIN, SUBSURFACE DRAIN OUTLET, AND GEOCOMPOSITE DRAIN WILL CONFORM TO THE CONSTRUCTION REQUIREMENTS OF 605.03, 605.06 AND 605.04 RESPECTIVELY.
 7. STRUCTURAL COMPONENTS ARE SHOWN SCHEMATICALLY ONLY. SEE OTHER DRAWINGS FOR STRUCTURAL DETAILS.

THE GEOTEXTILE REINFORCEMENT WRAP AT BACK FACE OF ABUTMENT SHALL BE TEMPORARILY HUNG WITH A SPACER BOARD AND TACK STRIP. AFTER REACHING A TOTAL OF 1'-0" COMPACTED LIFT, THE TACK STRIP SHALL BE REMOVED AND TEXTILE REINFORCEMENT SHALL BE PULLED BACK SLACK FREE WITH ITS END ANCHORED TO SOIL UNDERNEATH WITH STAPLE OR PINS BEFORE THE SPACER BOARD IS PULLED. ANY ALTERNATE METHOD TO MAINTAIN THE MINIMUM GAP BETWEEN ABUTMENT CONCRETE AND REINFORCED SOIL MAY BE PROPOSED TO THE ENGINEER FOR APPROVAL.



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AD SET	SOUTH ST. VRAIN BRIDGE		Project No.
No Revisions:	MECHANICALLY STABILIZED BACKFILL		TD-SEPT12C14
Revised:	Designer: KA	BR-84S-001-SSV1-FLOOD	Drawing Number S-618
Void:	Detailer: AB		Sheet Number 39
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1. Site Description

For Information Only to fulfill the CDPS-SCP (Colorado Discharge Permit System - Stormwater Construction Permit). Update to reflect current project site conditions. The contractor shall proceed with this permit activity as soon as they deem necessary following the Notice of Award. No contract delays or extensions will be granted to the contractor for failure to develop the required Stormwater Management Plan (SWMP) and obtain the required state permit in a timeframe necessary to begin the work as specified in the contract.

Project Site Description And Embankment Stabilization Upstream And Downstream Of The Bridge: The flood of September 2013 destroyed the Old St. Vrain Road bridge over South St. Vrain Creek. The creek channel is generally in the location as it was prior to the flood. This project shall consist of replacing the structure. Improvements will occur approximately 125' north of the bridge and 50' south. The north and south abutments will be armored with riprap.

- A. Proposed Sequencing For Major Activities: This project will begin with the placement of erosion control items specified within this document. Construction is expected to begin Summer 2017 and last into the Winter of 2017.
- B. Acres of Disturbance:
 - 1. Total area of construction site: 2.84 acres
 - 2. Total area of disturbance: 2.84 acres
 - 3. Acres of Seeding: 1.78 acres
- C. Existing Soil Data: Information is based on the Geotechnical Engineering Report prepared by Terracon, June 16, 2016; Terracon Project Number 21155048.
Existing Soil: Native soil consists of sand and gravel and poorly graded gravel with silt, sand, cobbles and boulders.
Bore Location & Depth of Bedrock: five bores were taken with bedrock consisting of sandstone that was encountered at depths ranging from 23' to 53' below the ground surface.
The USDA soil texture classification is as follows: loam and gravelly sand.
- D. Existing Vegetation, Including Percent Cover: The existing vegetation consists primarily of riparian vegetation with undeveloped land in the surrounding areas. Sparse trees and shrubs are found along both banks of South St. Vrain Creek. Vegetation along the roadsides includes some range grasses and shrubs.
Percent existing Cover= 50%
- E. Potential Pollutants Sources: See First Construction Activities under Potential Pollutant Sources. The ECS shall prepare a list of all potential pollutants and their locations in accordance with CDOT Standard Specifications for Road and Bridge Construction subsection 107.25.
- F. Receiving Water:
 - 1. Outfall locations: South St. Vrain Creek
 - 2. Names of receiving water(s) on site and the ultimate receiving water: South St. Vrain Creek and St. Vrain Creek.
 - 3. Distance ultimate receiving water is from project: 1.7 miles
- G. Allowable Non-Stormwater Discharges: Sawcutting anticipated on project
1. Groundwater and stormwater dewatering: Discharges to the groundwater from construction dewatering activities may be authorized provided that:
 - a. The source is groundwater and/or groundwater combined with stormwater that does not contain pollutants.
 - b. The source and BMP's are identified in the SWMP.
 - c. Discharges do not leave the site as surface runoff or to surface waters.
 2. If discharges do not meet the above criteria, a separate permit from the Department of Health will be required. Contaminated groundwater requiring coverage under a separate permit may include groundwater contaminated with pollutants from a landfill, mining activities, industrial pollutant plumes, underground storage tank, etc.
- H. Environmental Impacts:
 - 1. Wetland Impacts: YES
 - 2. Stream Impacts: YES
 - 3. Threatened and Endangered Species: Preble's Meadow Jumping Mouse potential to occur.

2. Site Map Components: See SWMP Site Maps

Pre-construction:

- A. Project Construction Potential Site Boundaries
- B. All Areas Of Ground Surface Disturbance
- C. Areas Of Cut And Fill
- D. Location Of All Structural BMP's Identified In The SWMP
- E. Location Of Non-Structural BMP's As Applicable In The SWMP
- F. Springs, Streams, Wetlands And Other Surface Water
- G. Protection Of Trees, Shrubs, Cultural Resources And Mature Vegetation
- H. Areas Used For Storing and Stockpiling of Materials, Staging Areas (field trailer, fueling, etc.) and Batch Plants

3. SWMP Administrator For Design:

Jeff Temple
4745 Boardwalk Drive, Building D, Suite 200
Fort Collins, CO 80525
(970) 377-3602

4. Stormwater Management Controls First Construction Activities

The contractor shall perform the following:

A. Designate A SWMP Administrator/Erosion Control Supervisor (To be filled out at time of construction; designate the individual(s) responsible for implementing, maintaining and revising SWMP, including the title and contact information. The activities and responsibilities of the administrator shall address all aspects of the project's SWMP.)

Name/Title:

Contact information:

B. Potential Pollutant Sources

Evaluate, identify, and describe all potential sources of pollutant at the site in accordance with CDOT Standard Specifications for Road and Bridge Construction subsection 107.25 and place in the SWMP notebook. All BMP's related to potential pollutants shall be shown on the SWMP site map by the contractor's ECS.

C. Best Management Practices (BMPS) For Stormwater Pollution Prevention

Phased BMP Implementation

During Design: "BMP as Designed" boxes are marked when used in the SWMP. During construction: the ECS shall update the "In use on site" boxes to match which BMPs are currently in use on site. Clearly describe the relationship between the phases of construction and the implementation of BMP controls.

STRUCTURAL BMPs that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:

BMP	Type of Control	BMP As Designed	In Use On Site	First Construction Activities	During Construction	Interim/Final Stabilization
Earth Berm/Diversion	Erosion			X	X	
Silt Fence	Sediment	X		X	X	
Embankment Protector	Erosion	X			X	X
Dewatering	Sediment	X		X	X	
Temporary Stream Crossing	Erosion			X	X	
Other						

Computer File Information

Creation Date: 5/5/17	Initials: DW	(R-1)
Last Modification Date: 5/5/17	Initials: RCUNDIFF	(R-2)
Full Path: F:\Projects\JUB\Boulder County\87-15-018_South_St_Vrain\CAD\Sheet		(R-3)
Drawing File Name: 87-15-018_SW-701.dwg		(R-4)
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET		(R-5)

Index of Revisions

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(R-5)		



AD SET

No Revisions: mm/dd/yy
Revised: mm/dd/yy
Void: mm/dd/yy

SOUTH ST. VRAIN BRIDGE

STORMWATER MANAGEMENT PLAN NOTES	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: SWMP	Subset Sheet: 1 of 6

Project No.

TD-SEPT12C14
Drawing Number SW-701
Sheet Number 40



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NON-STRUCTURAL BMPs that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:

BMP	Type Of Control	BMP As Designed	In Use On Site	First Construction Activities	During Construction	Interim/Final Stabilization
Surface Roughening/Grading Techniques	Erosion	X			X	
Seeding Permanent	Erosion	X				X
Mulch Tackifier (Spray-on Mulch Blanket)	Erosion	X			X	X
Soil Binder	Erosion				X	
Soil Retention Blanket	Erosion	X			X	X
Protection of Trees	Erosion	X		X	X	
Preservation of Mature Vegetation	Erosion	X		X	X	X
Other						

*Check dams may be rock, erosion logs, silt dike, silt berm, etc. as indicated in the narratives and SWMP site map. Erosion control devices are used to limit the amount of soil loss on site. Sediment control devices are designed to capture sediment on the project site. Construction control are BMPs related to construction access and staging. BMP locations are indicated on the SWMP site map.

NARRATIVES

SURFACE ROUGHENING

Grading techniques shall be used for both interim and temporary stabilization of all disturbance areas and to minimize the potential for wind and water erosion. All areas that have been cleared and grubbed shall be left in a roughened state in addition to having any necessary temporary BMPs in place until final grading and paving is complete.

FENCE (PLASTIC)

Prior to construction commencing, orange plastic fence shall be placed around staging areas to prevent encroachment of construction traffic and sediment into other areas. Fence (plastic) in combination with erosion logs shall be placed adjacent to the wetlands; erosion logs shall be placed between the plastic fence and disturbance area. Logs shall be placed to direct flows away from or filter water running into wetland areas. Fence (plastic) shall be used in areas indicated in the plans to protect mature trees and/or existing landscaping.

SILT FENCE

Silt fence is a temporary vertical barrier of filter fabric attached to and supported by posts and entrenched into the ground. The purpose of silt fence is to intercept sediment from disturbed areas during construction operations and to filter sheet flow. Typically used along the toe of fills and adjacent to streams. The silt fence shall be installed prior to construction activities and removed after final stabilization. They shall be used as initial and interim BMPs.

CONCRETE WASHOUT STRUCTURE

Waste generated from concrete activities shall not be allowed to flow into drainage ways, inlets, or receiving waters. Concrete waste shall be placed in a temporary concrete washout facility. Temporary concrete washout facilities shall be located 50 horizontal feet or greater from drainage ways, inlets, and receiving waters. This facility shall be used as an interim BMP.

VEHICLE TRACKING PAD

A vehicle tracking pad is used to reduce the amount of mud tracked onto paved public roads by vehicles or runoff leaving the construction site. It is comprised of a stabilized layer of aggregate underlined with a geotextile and located where traffic enters or exits the construction site. This shall be used as an initial and interim BMP.

PERMANENT SEEDING

Seeding is used to control runoff and erosion on disturbed areas. Drill seeding shall occur on slopes flatter than 3:1 and shall occur on the contour of the slope. Completed areas (any portion of a slope that is at final grade) shall be seeded within 48 hours during seeding seasons. Seeded areas shall be inspected frequently for areas of failure. Slopes that are too steep for drill seeding shall be raked or harrowed prior to seed being broadcast. Seed shall be broadcast at double the rate and raked into the surface. Seeding in ditch lines shall follow the contour, drill rows running down a ditch line shall not be allowed.

*BMP DETAILS AND NARRATIVES NOT COVERED BY THE SWMP OR STANDARD PLAN M-208-1 SHALL BE ADDED TO THE SWMP NOTEBOOK BY THE ECS.

D. OFFSITE DRAINAGE (RUN ON WATER)

1. Describe and record BMPs on the SWMP site map that has been implemented to address off site run-on water in accordance with subsection 208.03.

E. VEHICLE TRACKING PAD/VEHICLE TRACKING CONTROL

1. BMPs shall be implemented in accordance with subsection 208.04.

F. PERIMETER CONTROL

1. Perimeter control shall be established as the first item on the SWMP to prevent the potential for pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state waters.
2. Perimeter control may consist of vegetation buffers, berms, silt fence, erosion logs, existing landforms, or other BMPs as approved.
3. Perimeter control shall be in accordance with subsection 208.04.

5. During Construction

RESPONSIBILITIES OF THE SWMP ADMINISTRATOR/EROSION CONTROL SUPERVISOR DURING CONSTRUCTION

The SWMP should be considered a "living document" that is continuously reviewed and modified. During construction, the following items shall be added, updated, or amended as needed by the SWMP Administrator/Erosion Control Supervisor (ECS) in accordance with Section 208.

During construction, indicate how items that have not been addressed during design are being handled in construction. If items are covered in the template or other sections of the SWMP notebook indicate below what section the discussion takes place.

A. STOCKPILE MANAGEMENT – shall be done in accordance with subsection 107.25 and 208.07

B. CONCRETE WASHOUT – Concrete wash out water or waste from field laboratories and paving equipment shall be contained in accordance with subsection 208.05.

C. SAW CUTTING – shall be done in accordance with subsection 107.25, 208.04, 208.05

D. STREET CLEANING – shall be done in accordance with subsection 208.04

6. Inspections

A. Inspections shall be in accordance with subsection 208.03 (c).

7. BMP Maintenance

A. Maintenance shall be in accordance with subsection 208.04 (f).

8. Record Keeping

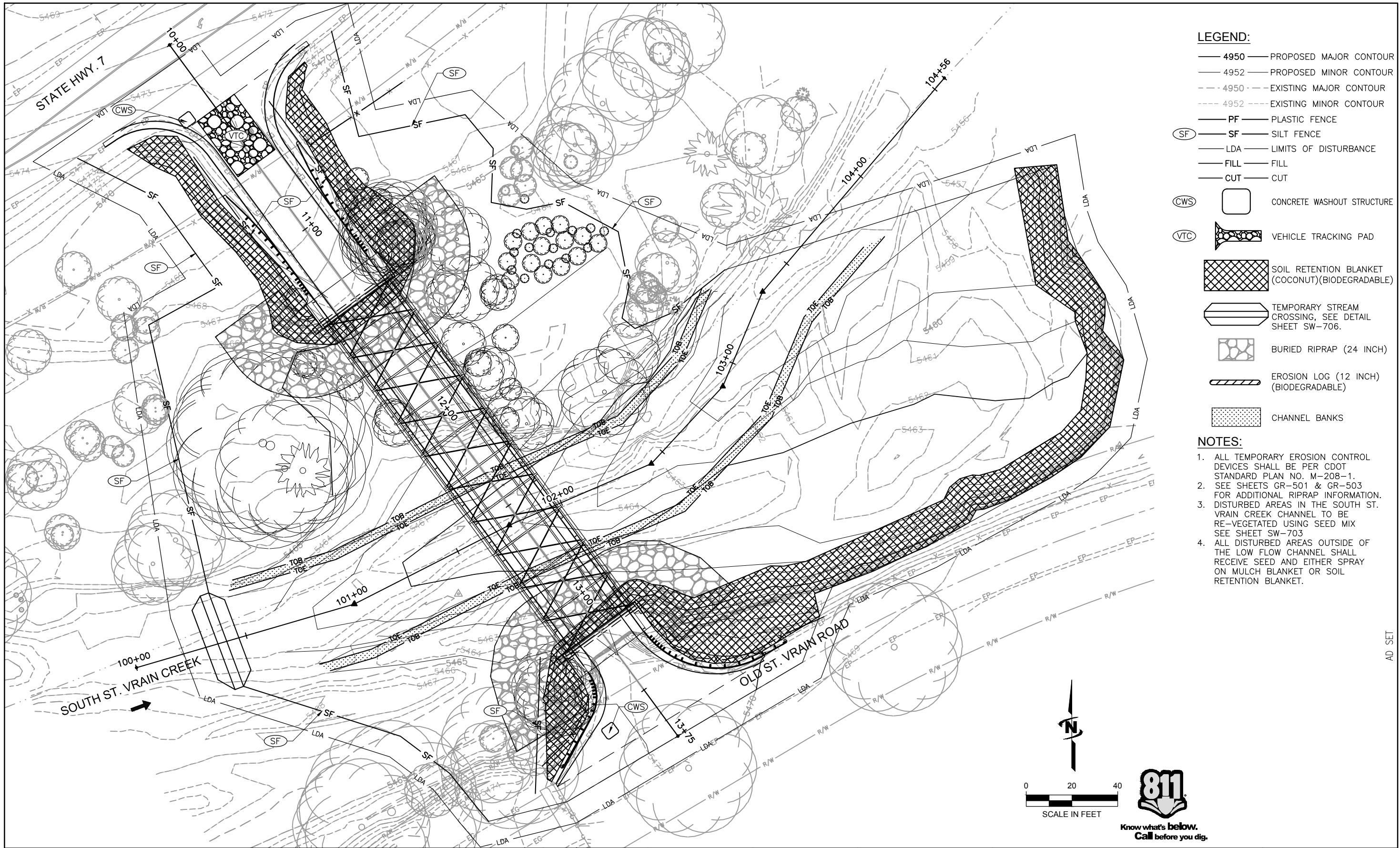
A. Records shall be kept in accordance with subsection 208.03 (c).



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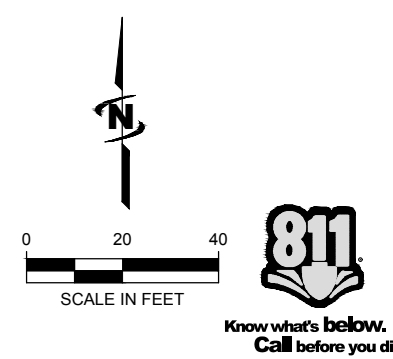
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Computer File Information		Index of Revisions		Boulder County	 JUB J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	AD SET		SOUTH ST. VRAIN BRIDGE		Project No.
Creation Date: 12/11/15	Initials: DW	(R-1)					No Revisions: mm/dd/yy	STORMWATER MANAGEMENT PLAN NOTES		TD-SEPT12C14
Last Modification Date: 12/21/16	Initials: RCUNDIFF	(R-2)			Revised: mm/dd/yy	Designer:	J. TEMPLE			Drawing Number SW-702
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet		(R-3)			Void: mm/dd/yy	Detailer:	D. WOOD			Sheet Number 41
Drawing File Name: 87-15-018_SW-702.dwg		(R-4)			Sheet Subset: SWMP		Subset Sheet: 2 of 6			
ACAD Ver. ACAD 2013	Scale: AS SHOWN	Units: FEET	(R-5)							



- LEGEND:**
- 4950 — PROPOSED MAJOR CONTOUR
 - 4952 — PROPOSED MINOR CONTOUR
 - - - 4950 - - - EXISTING MAJOR CONTOUR
 - - - 4952 - - - EXISTING MINOR CONTOUR
 - PF — PLASTIC FENCE
 - (SF) — SF — SILT FENCE
 - LDA — LIMITS OF DISTURBANCE
 - FILL — FILL
 - CUT — CUT
 - (CWS) [Symbol] CONCRETE WASHOUT STRUCTURE
 - (VTC) [Symbol] VEHICLE TRACKING PAD
 - [Symbol] SOIL RETENTION BLANKET (COCONUT)(BIODEGRADABLE)
 - [Symbol] TEMPORARY STREAM CROSSING, SEE DETAIL SHEET SW-706.
 - [Symbol] BURIED RIPRAP (24 INCH)
 - [Symbol] EROSION LOG (12 INCH) (BIODEGRADABLE)
 - [Symbol] CHANNEL BANKS

- NOTES:**
1. ALL TEMPORARY EROSION CONTROL DEVICES SHALL BE PER CDOT STANDARD PLAN NO. M-208-1.
 2. SEE SHEETS GR-501 & GR-503 FOR ADDITIONAL RIPRAP INFORMATION.
 3. DISTURBED AREAS IN THE SOUTH ST. VRAIN CREEK CHANNEL TO BE RE-VEGETATED USING SEED MIX SEE SHEET SW-703
 4. ALL DISTURBED AREAS OUTSIDE OF THE LOW FLOW CHANNEL SHALL RECEIVE SEED AND EITHER SPRAY ON MULCH BLANKET OR SOIL RETENTION BLANKET.



Computer File Information	
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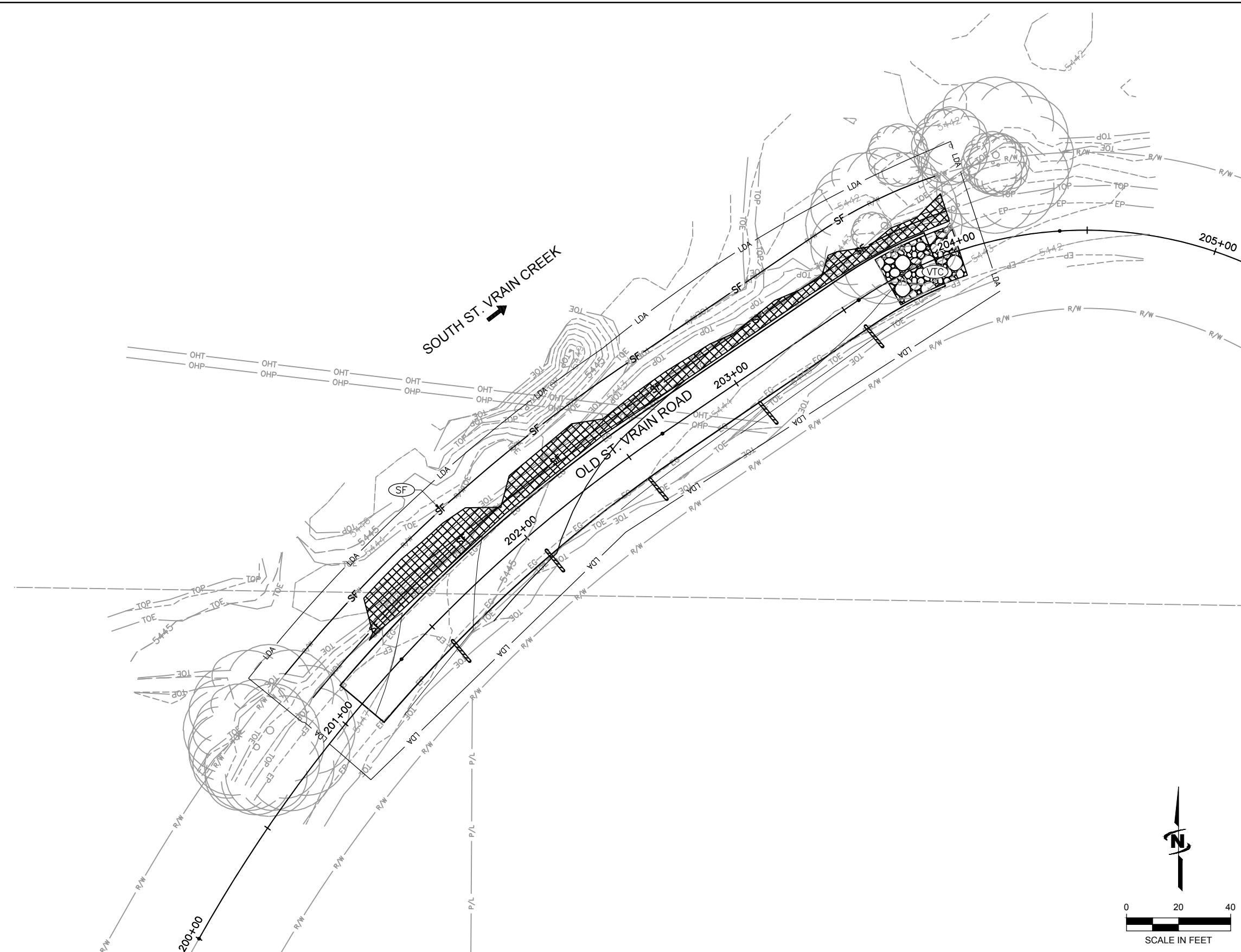
JUB
 J-U-B ENGINEERS, INC.
 4745 Boardwalk Drive
 Building D, Suite 200
 Fort Collins, CO 80525
 Phone: 970.377.3602

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SOUTH ST. VRAIN BRIDGE STORMWATER MANAGEMENT PLAN	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: SWMP	Subset Sheet: 4 of 6

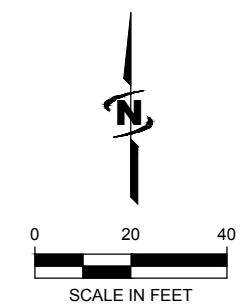
Project No.
TD-SEPT12C14
Drawing Number SW-704
Sheet Number 43

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- LEGEND:**
- 4950 — PROPOSED MAJOR CONTOUR
 - 4952 — PROPOSED MINOR CONTOUR
 - - - 4950 - - - EXISTING MAJOR CONTOUR
 - - - 4952 - - - EXISTING MINOR CONTOUR
 - PF — PLASTIC FENCE
 - (SF) — SF — SILT FENCE
 - LDA — LIMITS OF DISTURBANCE
 - FILL — FILL
 - CUT — CUT
 - CONCRETE WASHOUT STRUCTURE
 - ▤ VEHICLE TRACKING PAD
 - ▧ SOIL RETENTION BLANKET (COCONUT)(BIODEGRADABLE)
 - ▨ TEMPORARY STREAM CROSSING, SEE DETAIL SHEET SW-706.
 - ▩ BURIED RIPRAP (24 INCH)
 - EROSION LOG (12 INCH) (BIODEGRADABLE)
 - CHANNEL BANKS

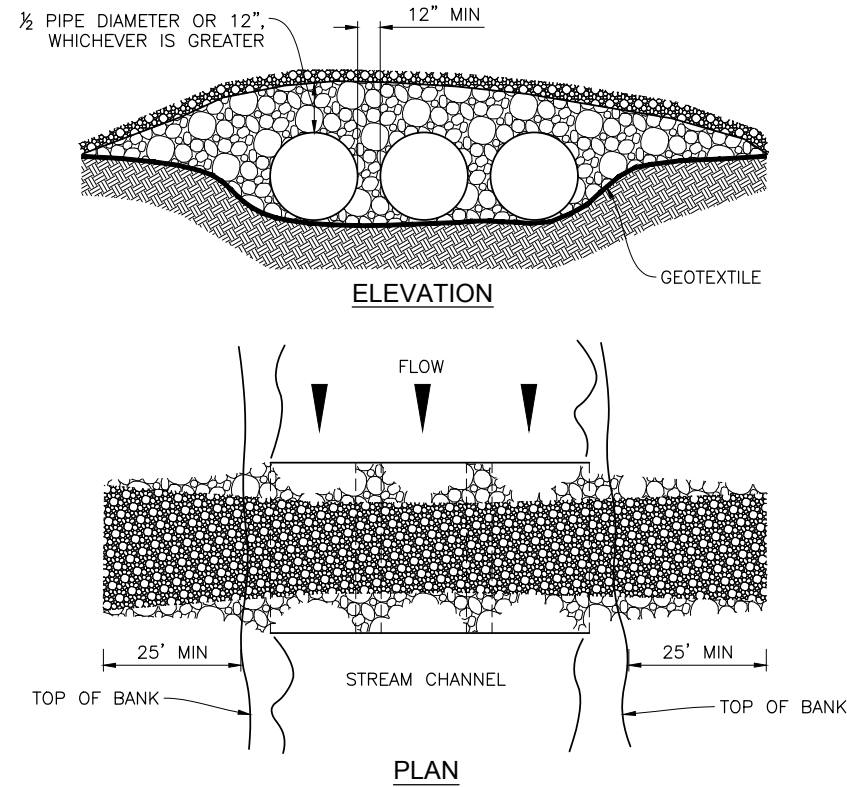
- NOTES:**
1. ALL TEMPORARY EROSION CONTROL DEVICES SHALL BE PER CDOT STANDARD PLAN NO. M-208-1.
 2. SEE SHEETS GR-501 & GR-503 FOR ADDITIONAL RIPRAP INFORMATION.
 3. DISTURBED AREAS IN THE SOUTH ST. VRAIN CREEK CHANNEL TO BE RE-VEGETATED USING SEED MIX SEE SHEET SW-703
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Computer File Information		Index of Revisions			 JUB J-U-B ENGINEERS, INC. 4745 Boardwalk Drive Building D, Suite 200 Fort Collins, CO 80525 Phone: 970.377.3602	AD SET		SOUTH ST. VRAIN BRIDGE		Project No.	
Creation Date: 5/3/17 Initials: DW						No Revisions: mm/dd/yy		STORMWATER MANAGEMENT PLAN			
Last Modification Date: 5/3/17 Initials: RCUNDIFF						Revised: mm/dd/yy		Designer: J. TEMPLE			
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet						Void: mm/dd/yy		Detailer: D. WOOD			
Drawing File Name: 87-15-018_SW-705.dwg						Sheet Subset: SWMP		Subset Sheet: 5 of 6		Drawing Number SW-705	
ACAD Ver. ACAD 2013 Scale: AS SHOWN Units: FEET										Sheet Number 44	

- IF THE CONTRACTOR ELECTS TO CONSTRUCT A TEMPORARY CROSSING OF THE CREEK, THIS DETAIL SHALL BE USED.
- SEPARATE PAYMENT WILL NOT BE MADE FOR RELOCATION OR REPLACEMENT OF THE TEMPORARY CREEK CROSSINGS. PAYMENT FOR TEMPORARY CREEK CROSSING SHALL ONLY BE MADE ONCE.
- THE CONTRACTOR SHALL COORDINATE THE LOCATION AND DESIGN OF THE CROSSING WITH BOULDER COUNTY AND RECEIVE APPROVAL FROM THE COUNTY PRIOR TO CONSTRUCTING THE TEMPORARY CROSSING.
- THE HYDRAULIC OPENING SHALL BE DETERMINED BY THE CONTRACTOR, BUT SHALL BE ABLE TO PASS NO LESS THAN 200 CFS.
- TABLES OF HISTORIC DAILY MEAN FLOWS FROM THE LYONS STREAM GAGE IS SHOWN BELOW.



THE TEMPORARY CROSSING MUST BE LOCATED WITHIN 150' UPSTREAM OF THE PROPOSED BRIDGE STRUCTURE.

April to September

Discharge Range (cfs)	Occurrences (Days)	% Occurrence	Cumulative % Occurrence
0-250	14567	66.7%	66.7%
250-500	4800	22.0%	88.7%
500-600	901	4.1%	92.8%
600-700	572	2.6%	95.4%
700-800	345	1.6%	97.0%
800-900	239	1.1%	98.1%
900-1000	178	0.8%	98.9%
1000-1250	141	0.6%	99.6%
1250-1500	63	0.3%	99.9%
1500-2120	32	0.1%	100.0%
>2120	0		
Total	21838	100.0%	

Note: The Lyons Gage (USGS 06724000) is downstream of the South St. Vrain Creek and the North St. Vrain Creek Confluence and is missing data from 11/1/1903 to 6/30/1904.

October to March

Discharge Range (cfs)	Occurrences (Days)	% Occurrence	Cumulative % Occurrence
0-20	13272	62.5%	62.5%
20-30	4254	20.0%	82.6%
30-40	1596	7.5%	90.1%
40-50	772	3.6%	93.7%
50-60	511	2.4%	96.1%
60-70	282	1.3%	97.5%
70-80	145	0.7%	98.2%
80-90	148	0.7%	98.9%
90-100	84	0.4%	99.3%
100-428	159	0.7%	100.0%
>428	0		
Total	21223	100.0%	

Note: The Lyons Gage (USGS 06724000) is downstream of the South St. Vrain Creek and the North St. Vrain Creek Confluence and is missing data from 11/1/1903 to 6/30/1904.

DESIGN GUIDELINES

DESIGN

- TEMPORARY BRIDGES SHALL BE OF WOOD, METAL, OR OTHER APPROPRIATE MATERIAL. PIPES CAN BE OF REINFORCED CONCRETE, CORRUGATED METAL, OR PLASTIC.
- TEMPORARY CROSSINGS SHOULD BE PERPENDICULAR TO THE STREAM.
- WHEN PIPES ARE USED, AGGREGATE SHOULD BE USED TO FORM THE CROSSING. DEPTH OF THE STONE COVER OVER THE PIPE SHALL BE EQUAL TO HALF THE PIPE DIAMETER, AND IN NO CASE LESS THAN 12 INCHES.
- MINIMUM PIPE DIAMETER SHALL BE 36".
- IF MULTIPLE PIPES ARE USED, THEY MUST BE SEPARATED BY A DISTANCE EQUAL TO HALF THE DIAMETER OF THE PIPES. MINIMUM SEPARATION SHALL BE 1 FOOT AND MAXIMUM SEPARATION SHALL BE 3 FEET. AGGREGATE SHALL BE PLACED BETWEEN THE PIPES.

CONSTRUCTION

- BRIDGES SHALL BE CONSTRUCTED TO SPAN THE ENTIRE CHANNEL AT OR ABOVE BANK ELEVATION AND SHALL BE SECURELY ANCHORED USING STEEL CABLE OR CHAIN.
- WHEN USING PIPES, THE INVERT ELEVATION OF THE PIPE SHALL BE INSTALLED ON THE NATURAL STREAMBED GRADE. A GEOTEXTILE SHALL BE PLACED ON THE STREAMBED AND STREAMBANKS PRIOR TO PLACING THE PIPE AND AGGREGATE. THE GEOTEXTILE SHOULD EXTEND 12 INCHES BEYOND THE END OF THE CULVERT.
- THE PIPE LENGTH SHALL NOT EXCEED 40 FEET, AND SHALL EXTEND AT LEAST 1 FOOT BEYOND THE UPSTREAM AND DOWNSTREAM TOE OF THE AGGREGATE AROUND THE PIPE.
- THE CONSTRUCTION OF ANY SPECIFIC CROSSING METHOD SHALL NOT CAUSE A SIGNIFICANT WATER-LEVEL DIFFERENCE BETWEEN UPSTREAM AND DOWNSTREAM WATER SURFACE ELEVATIONS. CONSTRUCTION SHALL ALSO NOT DISTURB OR CREATE A BARRIER IN THE STREAM CHANNEL DURING FISH SPAWNING AND MIGRATION PERIODS.

REMOVAL

- AFTER REMOVAL OF THE TEMPORARY CROSSING, THE CONTRACTOR MUST BRING THE CHANNEL BACK TO AS GOOD, OR BETTER, CONDITION AS EXISTING CONDITIONS.
- BOULDER COUNTY MUST APPROVE AND MONITOR THE REMOVAL PROCESS.
- REMOVAL OF A TEMPORARY STREAM CROSSING SHALL CONSIST OF REMOVING THE TEMPORARY STRUCTURE FROM THE STREAM CHANNEL, REMOVAL OF ALL CONSTRUCTION MATERIAL, RESTORATION OF THE ORIGINAL STREAM CHANNEL CROSS SECTION, AND PROTECTION OF THE STREAM BANKS FROM EROSION. ALL REMOVED MATERIALS SHALL BE STORED OUTSIDE THE WATERWAY FLOODPLAIN.
- ALL TEMPORARY CROSSINGS SHALL BE REMOVED WITHIN 7 CALENDAR DAYS AFTER THE STRUCTURE IS NO LONGER NEEDED.
- REMOVAL OF TEMPORARY STREAM CROSSINGS SHALL BE PERFORMED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE STREAM CHANNEL.

MAINTENANCE AND INSPECTION

- WEEKLY INSPECTIONS SHALL BE PERFORMED TO ENSURE THAT THE CULVERTS, STREAMBEDS, AND STREAMBANKS ARE NOT DAMAGED, AND THAT SEDIMENT IS NOT ENTERING THE STREAM OR BLOCKING FISH PASSAGE OR MIGRATION. INSPECTIONS SHALL ALSO BE PERFORMED AFTER EACH STORM EVENT AND DAMAGES SHALL BE REPAIRED IMMEDIATELY. AN ASSESSMENT OF THE FOUNDATION SHALL BE PERFORMED DURING THE INSPECTION AND THE LOST AGGREGATE SHALL BE REPLACED.
- TRAPPED SEDIMENT OR DEBRIS SHALL BE ROUTINELY REMOVED AND DISPOSED OF PROPERLY.



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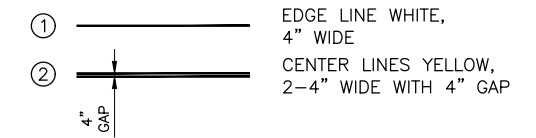
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SOUTH ST. VRAIN BRIDGE STREAM CROSSING DETAIL			
Designer:	J. TEMPLE		
Detailer:	D. WOOD		
Sheet Subset:	SWMP	Subset Sheet:	6 of 6

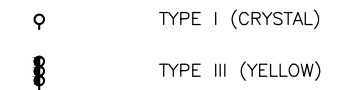
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TD-SEPT12C14 /	
Drawing Number	SW-706
Sheet Number	45

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STRIPING LEGEND:



DELINEATOR LEGEND:



NOTE: DELINEATORS TO BE PLACED PER CDOT STD PLAN S-612-1

SIGNING, STRIPING NOTES & TRAFFIC CONTROL NOTES:

- ALL EXISTING MARKINGS THAT CONFLICT WITH PROPOSED CONSTRUCTION TRAFFIC CONTROL SHALL BE OBLITERATED AND INCLUDED IN THE COST OF TRAFFIC CONTROL.
- ALL NEW SIGNS SHALL HAVE A MINIMUM THICKNESS OF 0.100".
- UNLESS OTHERWISE SPECIFIED, EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RESET TO EXISTING LOCATION.
- SIGN POSTS SHALL BE 2"x2" GALVANIZED PERFORATED SQUARE STEEL TUBING (14 GAUGE). SIGN POST BASES SHALL BE 2 1/4"x2 1/4" (12 GAUGE) (3-FT IN LENGTH) GALVANIZED PERFORATED SQUARE STEEL TUBING. BASES SHALL BE INCLUDED IN THE COST OF SIGN POSTS. TOP OF BASE SHALL BE 3"+ ABOVE FINISHED GRADE.
- THE SIGN POST SHALL BE INSTALLED 4" INTO THE BASE AND BOLTED BOTH WAYS.
- SIGN POST LOCATIONS SHALL BE APPROVED BY THE ENGINEER AND ROAD MAINTENANCE SIGN SHOP REPRESENTATIVE PRIOR TO INSTALLATION.
- CONTRACTOR SHALL VERIFY STRIPING LAYOUT WITH THE ENGINEER PRIOR TO STRIPING.
- ALL BRIDGE APPROACH GUARDRAIL AND ASSOCIATED BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND POWDER COATED. FABRICATOR TO SUBMIT TO ENGINEER (3) 6" SQUARE (MIN.) PAINT SAMPLES. COLOR TO MATCH TYPE 10M BRIDGE RAIL.
- ALL FINAL PAVEMENT STRIPING SHALL BE EPOXY. PER CDOT STANDARD SPECIFICATIONS.
- ALL WHITE PAVEMENT MARKING SHALL BE PREFORMED THERMOPLASTIC.
- IT IS ANTICIPATED THAT EIGHT (8) DELINEATORS (TYPE I) ON SOUTH ST. VRAIN BRIDGE, PER S-612-1, WILL BE USED.
- THE CONTRACTOR WILL BE REQUIRED TO PREPARE AND MAINTAIN AN MHT FOR SHT-7. MAJOR MATERIAL DELIVERY, SUCH AS THE BRIDGE, SHALL BE APPROVED IN ADVANCE BY CDOT.

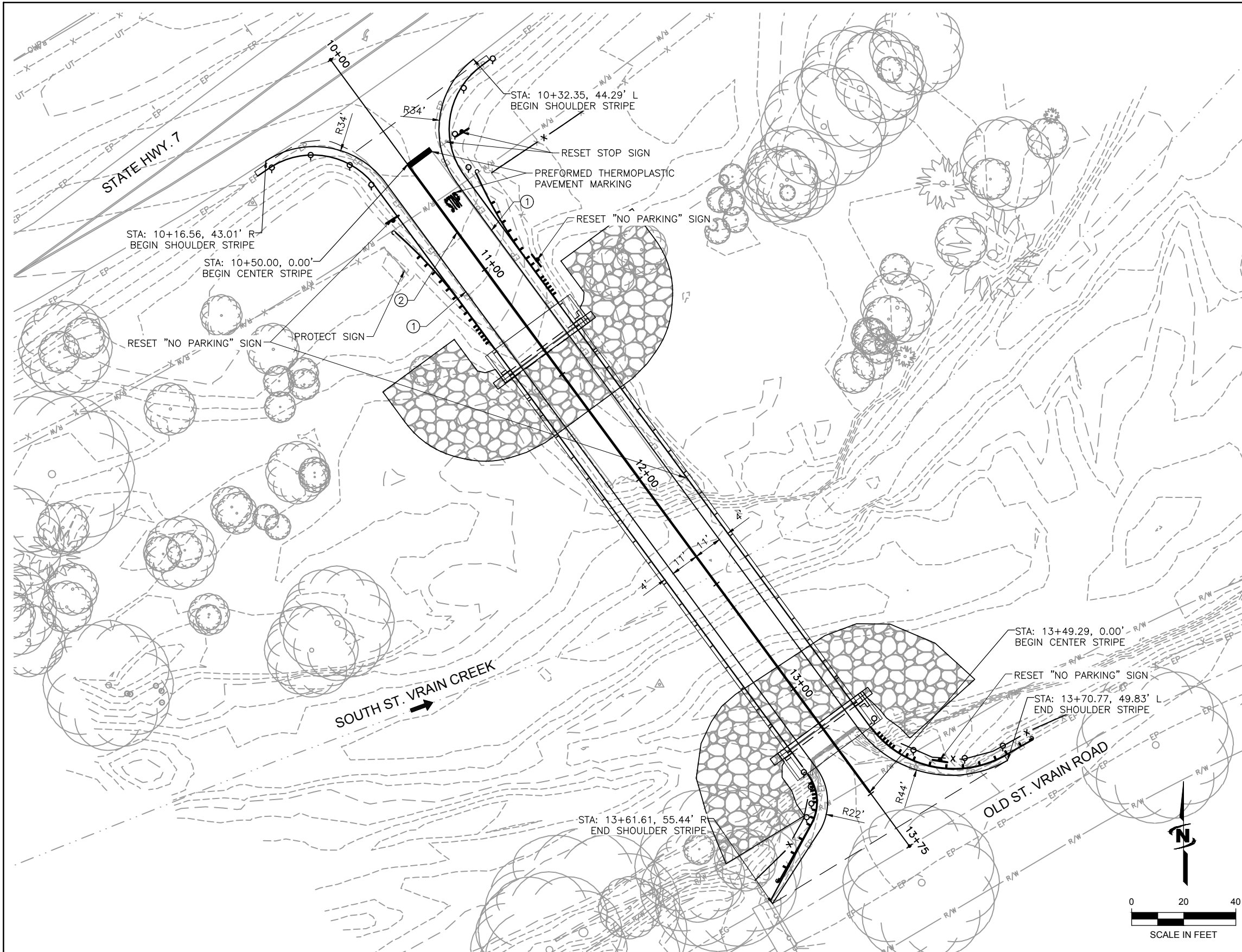
TABULATION OF PAVEMENT MARKINGS					
LOCATION	DESCRIPTION	EPOXY PAVEMENT MARKING (LF)		PREFORMED THERMOPLASTIC PAVEMENT MARKING (SF)	
		CENTER	EDGE	WORD-SYMBOL	XWALK-STOPLINE
		DOUBLE YELLOW SOLID	WHITE SOLID		
		4 INCH	4 INCH		
STA: 10+50 TO STA 13+50	LEFT				
STA: 10+50 TO STA 13+50	CENTER	300			
STA: 10+50 TO STA 13+50	RIGHT		390		
STA: 10+50.52	LEFT				20
STA: 10+72.11	LEFT			13	
TOTAL (SF)				13	20
TOTAL (LF)		600	767		
TOTAL (GAL)		2	3		



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STRIPING LEGEND:

- ① ——— EDGE LINE WHITE, 4" WIDE
- ② ——— CENTER LINES YELLOW, 2-4" WIDE WITH 4" GAP

DELINEATOR LEGEND:

- ♀ TYPE I (CRYSTAL)
- ♂ TYPE III (YELLOW)

NOTE: DELINEATORS TO BE PLACED PER CDOT STD PLAN S-612-1

SIGNING, STRIPING NOTES & TRAFFIC CONTROL NOTES:

1. ALL EXISTING MARKINGS THAT CONFLICT WITH PROPOSED CONSTRUCTION TRAFFIC CONTROL SHALL BE OBLITERATED AND INCLUDED IN THE COST OF TRAFFIC CONTROL.
2. ALL NEW SIGNS SHALL HAVE A MINIMUM THICKNESS OF 0.100".
3. UNLESS OTHERWISE SPECIFIED, EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RESET TO EXISTING LOCATION.
4. SIGN POSTS SHALL BE 2"x2" GALVANIZED PERFORATED SQUARE STEEL TUBING (14 GAUGE). SIGN POST BASES SHALL BE 2 1/4"x2 1/4" (12 GAUGE) (3-FT IN LENGTH) GALVANIZED PERFORATED SQUARE STEEL TUBING. BASES SHALL BE INCLUDED IN THE COST OF SIGN POSTS. TOP OF BASE SHALL BE 3"+ ABOVE FINISHED GRADE.
5. THE SIGN POST SHALL BE INSTALLED 4" INTO THE BASE AND BOLTED BOTH WAYS.
6. SIGN POST LOCATIONS SHALL BE APPROVED BY THE ENGINEER AND ROAD MAINTENANCE SIGN SHOP REPRESENTATIVE PRIOR TO INSTALLATION.
7. CONTRACTOR SHALL VERIFY STRIPING LAYOUT WITH THE ENGINEER PRIOR TO STRIPING.
8. ALL BRIDGE APPROACH GUARDRAIL AND ASSOCIATED BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND POWDER COATED. FABRICATOR TO SUBMIT TO ENGINEER (3) 6" SQUARE (MIN.) PAINT SAMPLES. COLOR TO MATCH TYPE 10M BRIDGE RAIL.
9. ALL FINAL PAVEMENT STRIPING SHALL BE EPOXY. PER CDOT STANDARD SPECIFICATIONS.
10. ALL WHITE PAVEMENT MARKING SHALL BE PREFORMED THERMOPLASTIC.
11. IT IS ANTICIPATED THAT EIGHT (8) DELINEATORS (TYPE I) ON SOUTH ST. VRAIN BRIDGE, PER S-612-1, WILL BE USED.
12. THE CONTRACTOR WILL BE REQUIRED TO PREPARE AND MAINTAIN AN MHT FOR SHT-7. MAJOR MATERIAL DELIVERY, SUCH AS THE BRIDGE, SHALL BE APPROVED IN ADVANCE BY CDOT.

AD SET

Computer File Information	
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Drawing File Name: 87-15-018_SN-801.dwg	
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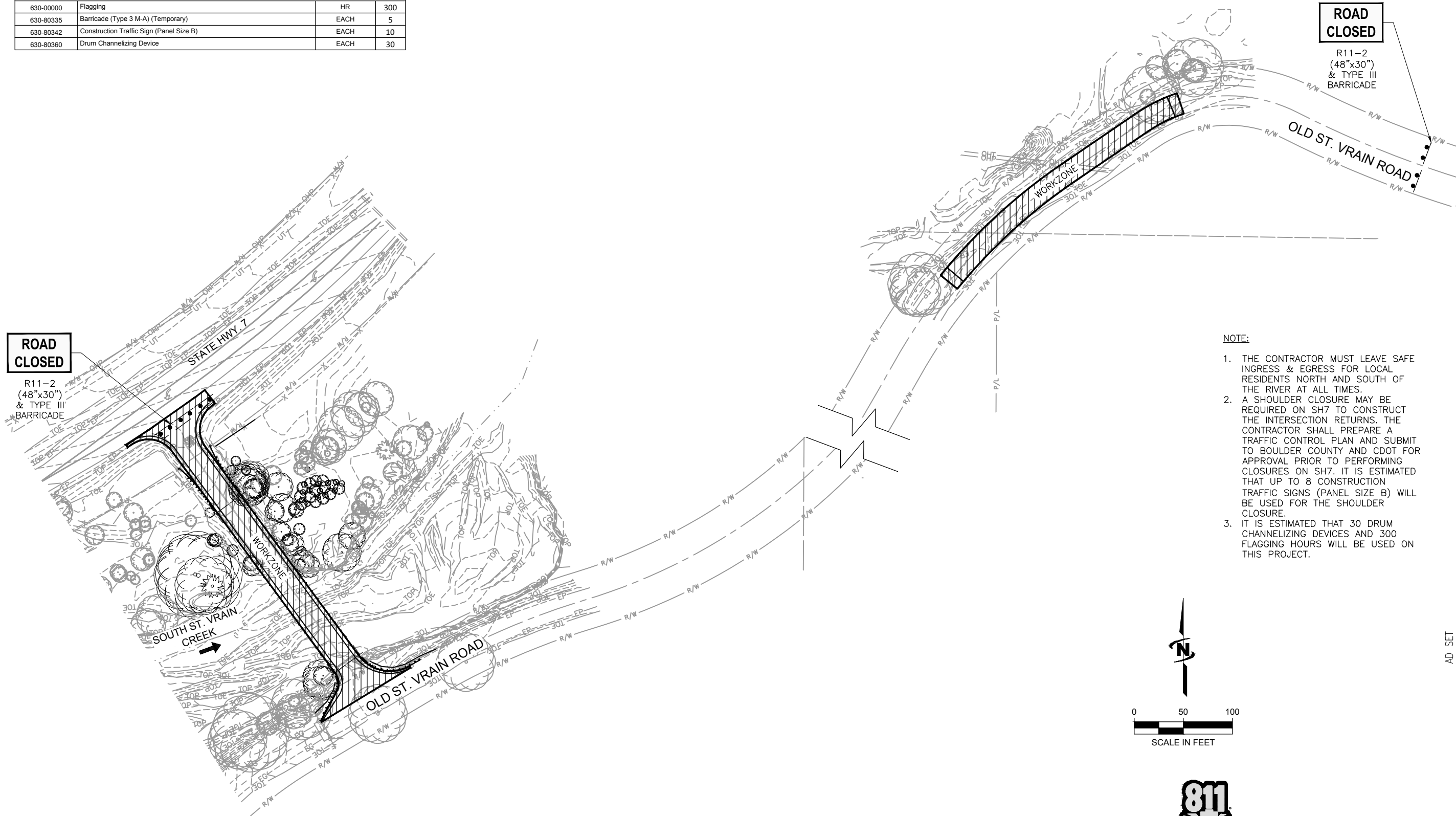
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No Revisions: mm/dd/yy	
Revised: mm/dd/yy	
Void: mm/dd/yy	

SOUTH ST. VRAIN BRIDGE SIGNING & STRIPING PLAN	
Designer: J. TEMPLE	
Detailer: D. WOOD	
Sheet Subset: Traffic Control	Subset Sheet: 2 of 2

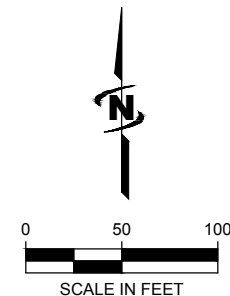
Project No.	TD-SEPT12C14
Drawing Number	SN-802
Sheet Number	47



TABULATION OF TRAFFIC CONTROL ITEMS			
630-00000	Flagging	HR	300
630-80335	Barricade (Type 3 M-A) (Temporary)	EACH	5
630-80342	Construction Traffic Sign (Panel Size B)	EACH	10
630-80360	Drum Channelizing Device	EACH	30



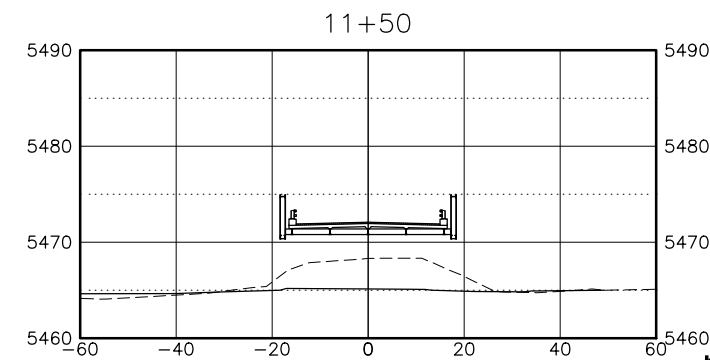
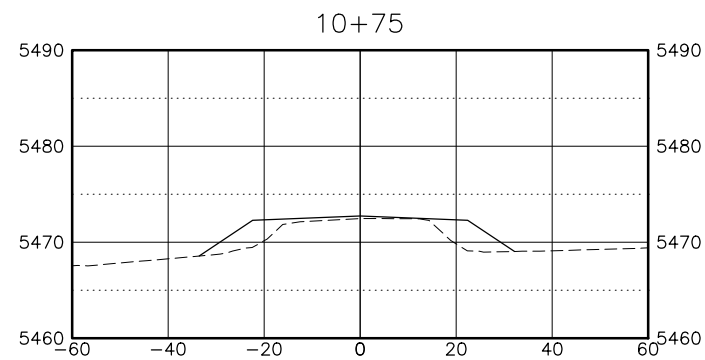
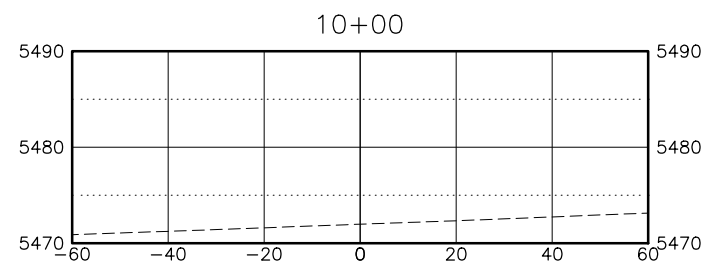
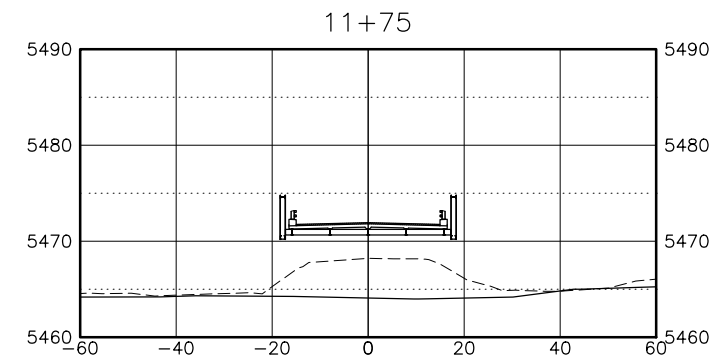
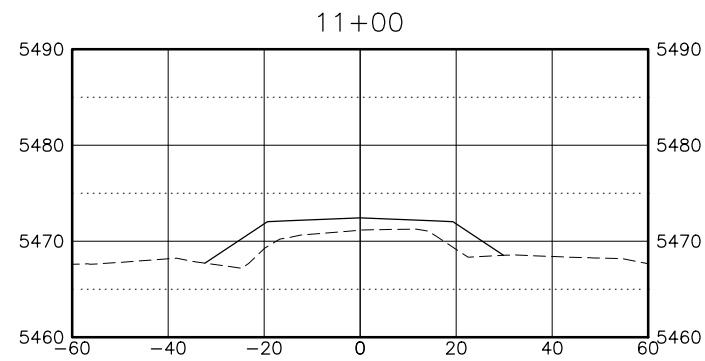
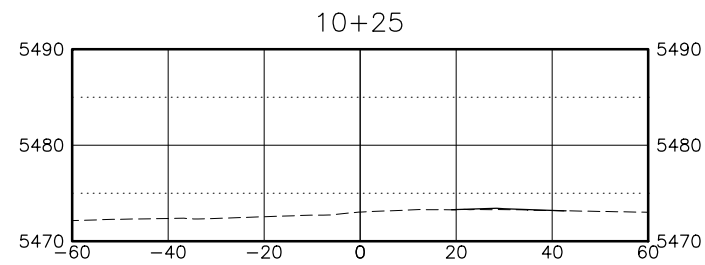
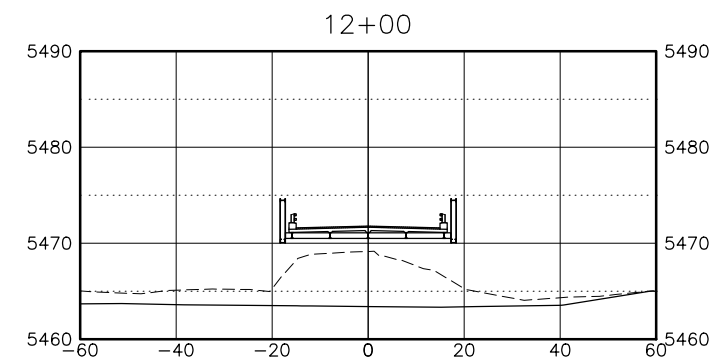
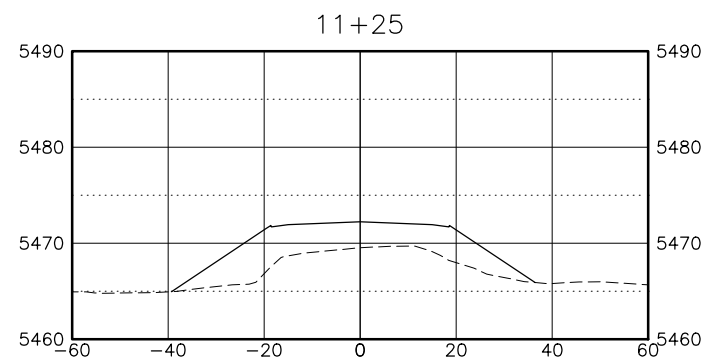
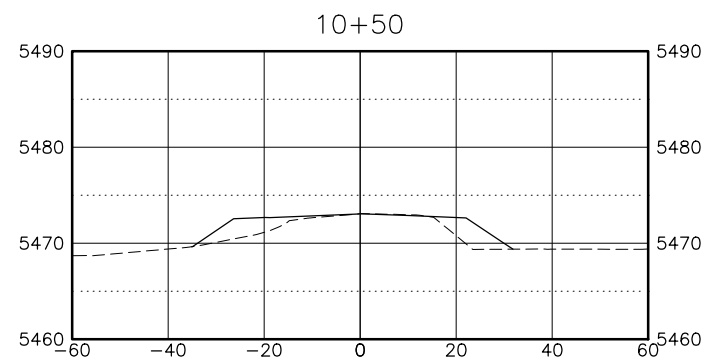
- NOTE:**
1. THE CONTRACTOR MUST LEAVE SAFE INGRESS & EGRESS FOR LOCAL RESIDENTS NORTH AND SOUTH OF THE RIVER AT ALL TIMES.
 2. A SHOULDER CLOSURE MAY BE REQUIRED ON SH7 TO CONSTRUCT THE INTERSECTION RETURNS. THE CONTRACTOR SHALL PREPARE A TRAFFIC CONTROL PLAN AND SUBMIT TO BOULDER COUNTY AND CDOT FOR APPROVAL PRIOR TO PERFORMING CLOSURES ON SH7. IT IS ESTIMATED THAT UP TO 8 CONSTRUCTION TRAFFIC SIGNS (PANEL SIZE B) WILL BE USED FOR THE SHOULDER CLOSURE.
 3. IT IS ESTIMATED THAT 30 DRUM CHANNELIZING DEVICES AND 300 FLAGGING HOURS WILL BE USED ON THIS PROJECT.



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Creation Date: 5/3/17	Initials: DW					No Revisions: mm/dd/yy	Designer: J. TEMPLE Detailer: D. WOOD	TD-SEPT12C14		Drawing Number SN-803			
Last Modification Date: 5/3/17	Initials: RCUNDIFF					Revised: mm/dd/yy		Sheet Subset: Traffic Control		Subset Sheet: 1 of 1		Sheet Number 48	
Full Path: F:\Projects\JUB\Boulder_County\87-15-018_South_St_Vrain\CAD\Sheet						Void: mm/dd/yy							
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Drawing File Name: 87-15-018_XS_1001.dwg	
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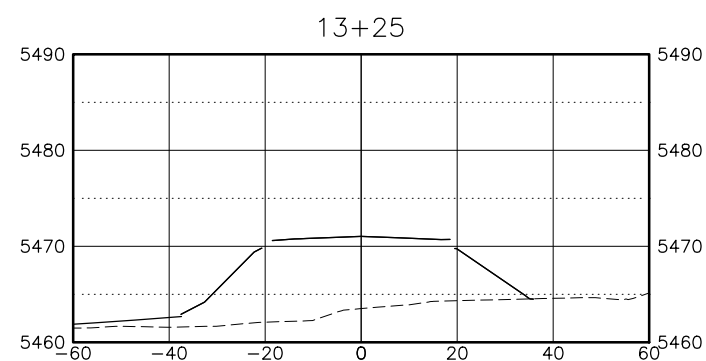
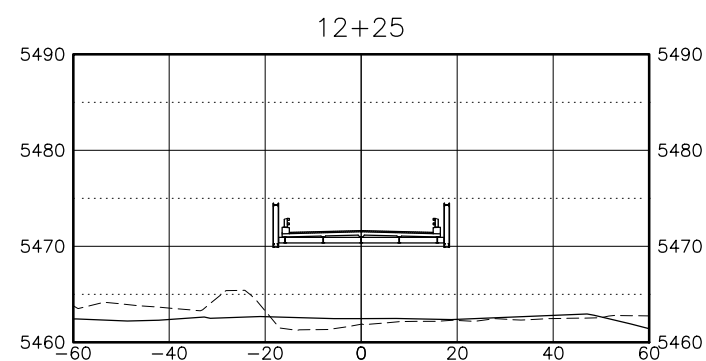
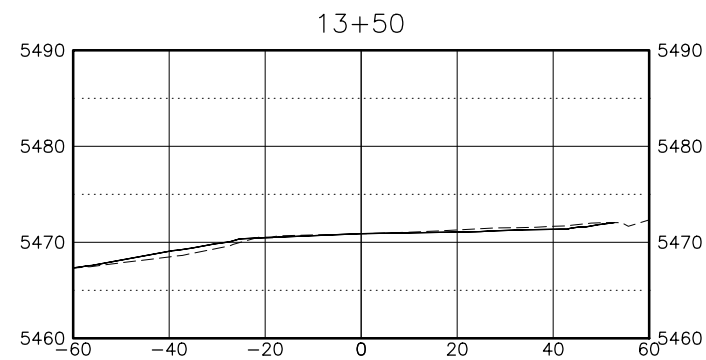
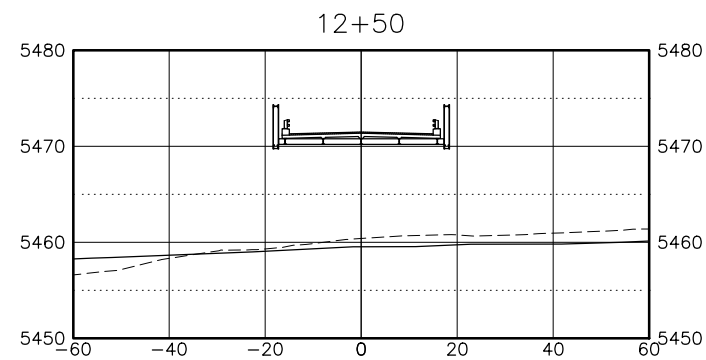
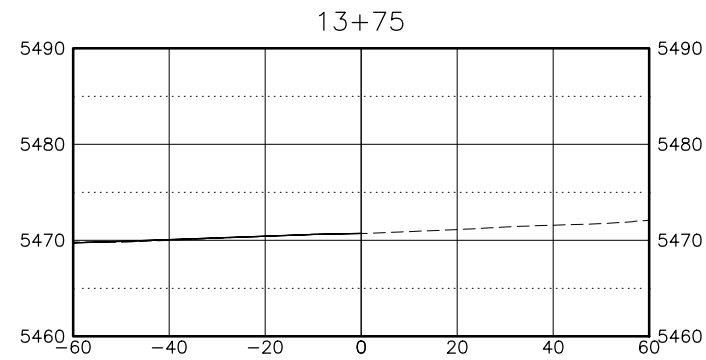
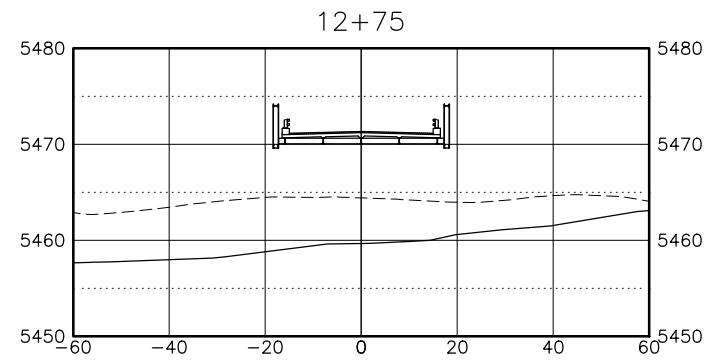
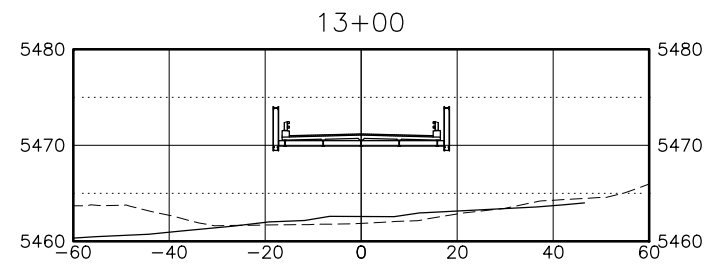


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SOUTH ST. VRAIN BRIDGE CROSS SECTIONS	
Designer: J. TEMPLE	
Detailer: R. CUNDIFF	
Sheet Subset: Cross Sections	Subset Sheet: 1 of 3

Project No.	TD-SEPT12C14
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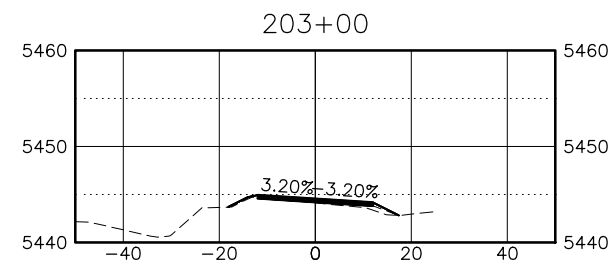
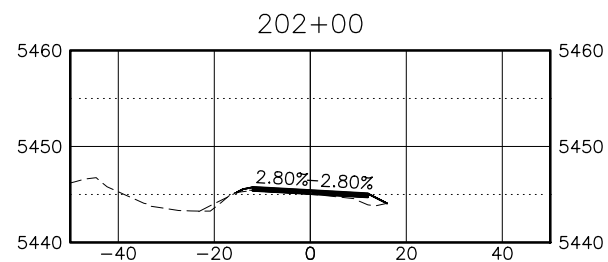
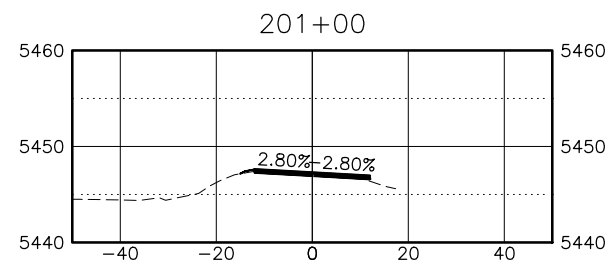
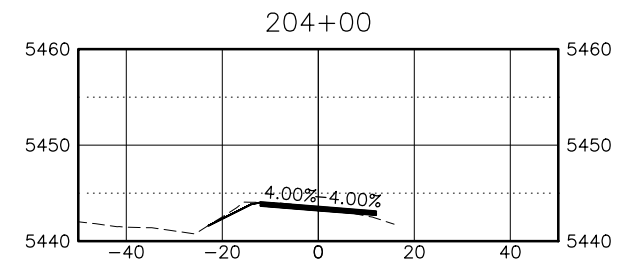
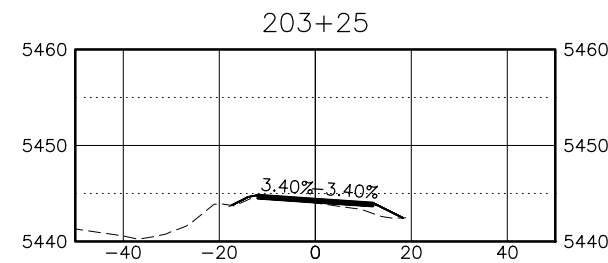
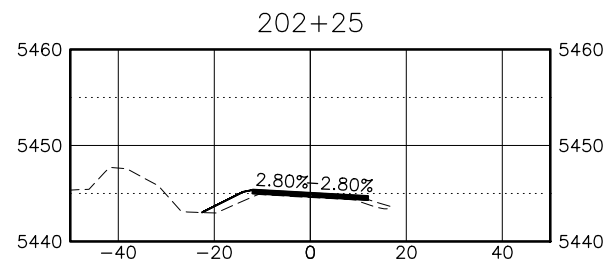
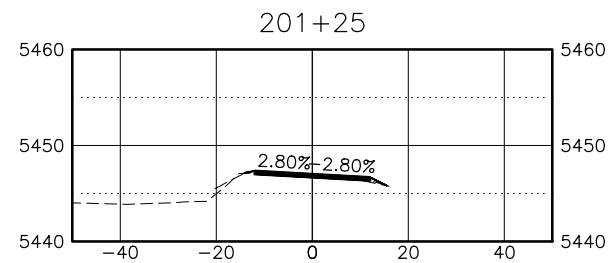
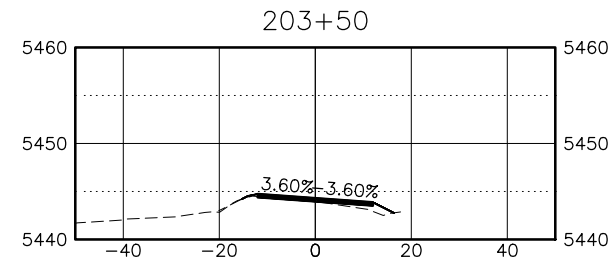
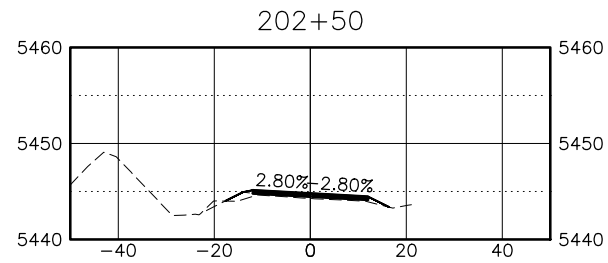
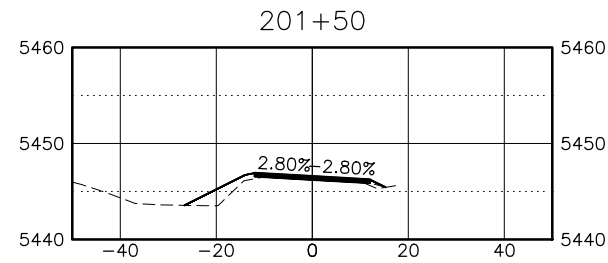
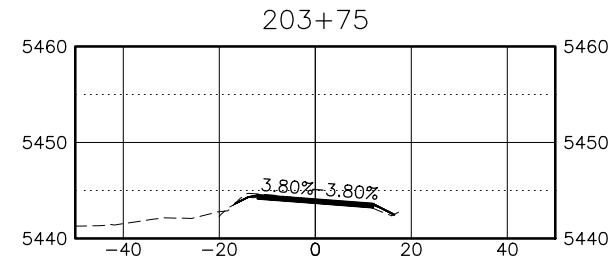
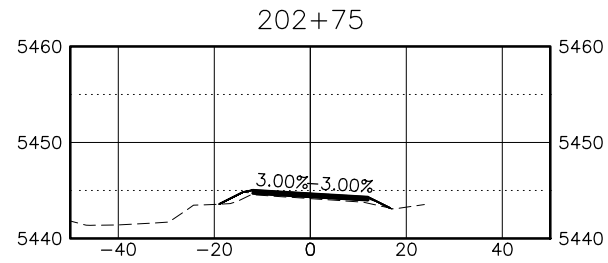
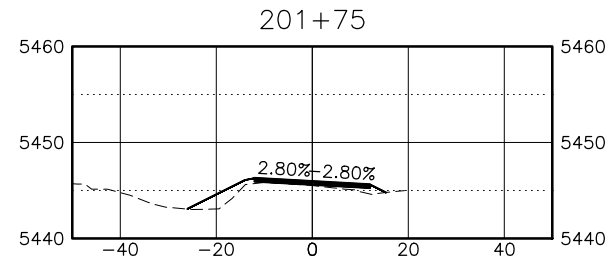
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AD SET	SOUTH ST. VRAIN BRIDGE CROSS SECTIONS	Project No.
No Revisions: mm/dd/yy	Designer: J. TEMPLE	TD-SEPT12C14
Revised: mm/dd/yy	Detailer: R. CUNDIFF	Drawing Number XS-1002
Void: mm/dd/yy	Sheet Subset: Cross Sections	Subset Sheet: 2 of 3
		Sheet Number 50

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OLD ST. VRAIN ROAD CROSS SECTIONS	
Designer: J. TEMPLE	
Detailer: R. CUNDIFF	
Sheet Subset: Cross Sections	Subset Sheet: 3 of 3

Project No. TD-SEPT12C14
Drawing Number XS-1003
Sheet Number 51