BELFORD AVENUE OVER HAPPY CANYON CREEK

The Colorado Department of Transportation's Standard Specifications for Road and Bridge Construction, dated 2011, controls construction of this project. The following Special Provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans. When Specifications or Special Provisions contain both English units and SI units, the English units apply and are the specification requirement.

PROJECT SPECIAL PROVISIONS

COLORADO
DEPARTMENT OF TRANSPORTATION

STANDARD SPECIAL PROVISIONS

Description	Date	No. of Pages
Revision of Section 101 and 630 – Construction Zone Traffic Control	(April 30, 2015)	2
Revision of Section 102 – Contents of Proposal Forms	(April 9, 2015)	1
Revision of Section 105 – Construction Surveying	(July 31, 2014)	1
Revision of Section 105 – Disputes and Claims for Contract Adjustments	(August 11, 2016)	33
Revision of 106 – Buy America Requirements	(November 6, 2014)	1
Revision of 106 – Certificates of Compliance and Certified Test Reports	(February 3, 2011)	1
Revision of Section 106 – Material Sources	(October 31, 2013)	1
Revision of Section 106 – Supplier List	(January 30, 2014)	1
Revision of Section 107 – Responsibility for Damage Claims, Insurance Types, and Coverage Limits	(February 3, 2011)	1
Revision of Section 107 – Warning Lights for Work Vehicles and Equipment	(January 30, 2014)	1
Revision of Section 107 – Water Quality Control (Contractor Obtained Stormwater Permit)	(March 29, 2016)	6
Revision of Section 108 – Delay and Extension of Contract Time	(April 30, 2015)	2
Revision of Section 108 – Holiday Weekend	(February 18, 2016)	1
Revision of Section 108 – Liquidated Damages	(October 29, 2015)	1
Revision of Section 108 – Notice to Proceed	(July 31, 2014)	1
Revision of Section 108 – Project Schedule	(July 31, 2014)	6
Revision of Section 108 – Subletting of Contract	(January 31, 2013)	1
Revision of Section 109 – Compensation for Compensable Delays	(May 5, 2011)	1
Revision of Section 109 – Measurement of Quantities	(February 3, 2011)	1
Revision of Section 109 – Measurement of Water	(January 6, 2012)	1
Revision of Section 109 – Prompt Payment	(January 31, 2013)	1
Revision of Section 109 – Scales	(October 29, 2015)	1
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 203 – Imported Material for Structure Backfill	(July 19, 2012)	2
Revision of Section 206 – Structure Backfill (Flow-Fill)	(April 26, 2012)	2
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

Description	Date	No. of Pages
Revision of Sections 206 and 601 – Maturity Meters and Concrete Form and Falsework Removal	(December 18, 2015)	3
Revision of Section 208 – Erosion Control	(September 22, 2016)	23
Revision of Section 212 – Seed	(April 26, 2012)	1
Revision of Section 216 – Soil Retention Covering	(July 16, 2015)	6
Revision of Section 250 – Environmental, Health and Safety Management	(January 15, 2015)	14
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 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 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 618 – Prestressed Concrete	(April 26, 2012)	24
Revision of Section 625 – Construction Surveying	(February 18, 2016)	1
Revision of Section 702 – Bituminous Materials	(March 29, 2016)	11
Revision of Section 703 – Aggregates for Hot Mix Asphalt	(November 1, 2012)	2
Revision of Section 703 – Concrete Aggregates	(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
Affirmative Action Requirements – Equal Employment Opportunity	(February 3, 2011)	10

REVISION OF SECTION 201
CLEARING AND GRUBBING

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

201.1 DESCRIPTION

Subsection 201.01 is hereby revised to include the following:

This work consists of removal and disposal of trash of any kind within the limits of the right of way, easement areas, and other areas shown in the contract or required by the work. These items shall be removed and disposed of by the Contractor during construction and prior to final acceptance of the project.

201.02 CONSTRUCTION REQUIREMENTS

Subsection 201.02 is hereby revised to include the following:

The Contractor shall remove and dispose of all visible abandoned utility appurtenances that are located within the work area or right of way and abandoned as a result of this project. These items shall not be disposed of within the project limits. Removal of utility appurtenances shall not be measured and paid for separately, but shall be included in the work for Item 201, Clearing and Grubbing.

The Contractor shall not remove any shrubs or trees within the project limits without prior written approval from the Engineer. All trees and shrubs adjacent to the Project limits, unless otherwise noted, shall be protected. The Contractor shall mark all trees and shrubs that are required to be removed and shall obtain written approval from the Engineer prior to beginning the work. Removal of trees and/or shrubs shall not be measured and paid for separately, but shall be included in the work for Item 201, Clearing and Grubbing.

The Contractor shall remove any temporary concrete barriers and fence posts within the limits of the right of way, easement areas, and other areas shown in the contract or required by the work. These items shall be removed and disposed of by the Contractor during construction and prior to final acceptance of the project. Removal and disposal of temporary concrete barriers and fence posts shall not be measured and paid for separately, but shall be included in the work for Item 201, Clearing and Grubbing.

REVISION OF SECTION 201
CLEARING AND GRUBBING
- Continued -

201.04 BASIS OF PAYMENT

Subsection 201.04 is hereby revised as follows:

Payment will be made under:

Pay Item	**Pay Unit**
Clearing and Grubbing	Lump Sum

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT

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

203.02 DESCRIPTION - EXCAVATION

Subsection 203.02 (c) shall include the following:

(c) Material that is free of organics but has excessive moisture shall not be classified as unsuitable for embankment material due to the presence of excessive water. It shall be the Contractor's responsibility to satisfy the moisture condition specified in the Contract Documents for embankment material. The classification of material as unsuitable for embankment material shall be made by the Engineer.

In Subsection 203.02, add the following subsection:

(g) *Subgrade* is defined as follows:
- Top of embankment material in areas not receiving aggregate base course
- Bottom of aggregate base course where designated

203.03 EMBANKMENT

Subsection 203.03 (a) Item 1. Soil Embankment is hereby revised to include the following:

Embankment material for the roadway prism including approach embankments shall consist of approved material from on-site excavations.

The Contractor shall utilize stockpiled material that will be placed in the proximate vicinity of the proposed staging area.

The "Approved Material" to be placed under the Aggregate Base Course (Class 6) for Summerset Lane shall consist of clays, sands, sandstone or siltstone meeting the following criteria:

Percentage Passing No. 200 Sieve	Less than 80 percent
Plasticity Index	Less than 20
Swell Index at 200 psf (Denver Swell Test)	Less than 2 percent
Dry Unit Weight	100 pcf minimum

The material shall be free of debris, organic matter, deleterious material, and frozen material. The material shall consist of predominantly fine-grained material.

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT
- Continued -

If additional embankment is required, the Town will provide a total of two (2) compliance tests for the proposed Contractor's import source(s). Any testing required beyond the provided two (2) compliance tests provided shall be completed by the Contractor as directed by the Town. Any additional testing will not be paid for separately, but shall be included in the work.

203.05 CONSTRUCTION REQUIREMENTS - EXCAVATION

In Subsection 203.05, (g) *Potholing*, add the following to the second paragraph:

Records of the potholed and surveyed utilities shall be submitted to the Engineer.

203.07 CONSTRUCTION OF EMBANKMENT AND TREATMENT OF CUT AREAS WITH MOISTURE AND DENSITY CONTROL

Subsection 203.07 shall include the following:

The amount of water to be used in compacting the roadway subgrade shall range from optimum to 2 percentage points above optimum as determined by ASTM D1557 – 95%.

203.08 CONSTRUCTION OF EMBANKMENTS WITHOUT MOISTURE AND DENSITY CONTROL

Subsection 203.08 shall include the following:

203.08 Proof Rolling. Proof rolling with pneumatic tire equipment will be required as directed by the Engineer. A minimum axle load of 18 kips per axle will be required. 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 any failures again corrected at the Contractor's expense.

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT
- Continued -

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 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.

203.13 METHOD OF MEASUREMENT

Subsection 203.13 shall include the following:

Items paid for by volume will not be remeasured but 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 on the plans in an amount of at least plus or minus fifteen percent (15%) of the plan quantity.

Proof rolling will not be measured and paid for separately, but shall be included in the work.

The Contractor shall be responsible for verifying existing cross sections prior to construction and identifying any discrepancies and shall notify the Engineer. Failure to do so indicates acceptance of the existing ground line as shown in the cross sections and quantities.

The shrinkage factor shown on the plans is an approximation, and it is the Contractor's responsibility to construct the project to the lines and grades as shown on the plans. Additional embankment and excavation may be necessary and shall include import, export or hauling required to complete the work. This additional work will not be paid for separately but shall be included in the cost of the Embankment Material (Complete-in-place).

The Contractor shall notify the Engineer of areas of concern where muck excavation and/or over-excavation may be warranted. The limits of removal for muck excavation and over-excavation shall be based on limits defined by the Engineer. The Contractor shall request in writing and obtain written approval of the limits of muck excavation and over-excavation from the Engineer prior to commencing the work. Any muck excavation or over excavation completed without prior written approval of the Engineer shall not be measured and paid for. **Muck shall not be defined as soil with excessive moisture for material that would otherwise be acceptable fill if dried.**

REVISION OF SECTION 203
EXCAVATION AND EMBANKMENT
- Continued -

The contract unit price for Embankment Material (Complete-in-place) shall be full compensation for all work necessary to complete the item including construction of embankments, unclassified excavation, compaction, moisture control, compaction of bases of cuts and fills, proof rolling, haul, and exporting excess material.

203.14 BASIS OF PAYMENT

Subsection 203.14 shall include the following:

Payment for Muck Excavation shall include but is not limited to all excavation, transportation, drying/wetting, grading, furnishing and placing imported material, compaction and disposal of unsuitable or excess material onsite. Payment shall be made at the applicable contract unit price for Muck Excavation, which shall include full compensation for all labor, equipment, supervision, tools, materials, transportation, and all other appurtenant items to complete the work. Any additional excavation and backfill made by the Contractor below or above the design subgrade elevation, without the prior acceptance of the Engineer will be at the responsibility and expense of the Contractor.

REVISION OF SECTION 206
EXCAVATION AND BACKFILL FOR STRUCTURES

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

206.01 DESCRIPTION

Subsection 206.01 is hereby revised to include the following:

The Contractor should anticipate the need to accommodate water flowing into and out of the project site during construction and shall provide a dry, stable condition. Any equipment or excavation required for dewatering shall be located within the project limits as defined by the project boundary defined on the plans.

206.06 METHOD OF MEASUREMENT

Delete Subsection 206.06 (b) and replace with the following:

(b) For pipes and inlets, materials excavated will not be measured for payment, but shall be included in the bid price for the pipe and inlet.

206.07 BASIS OF PAYMENT

Subsection 206.07 is hereby revised to include the following:

Structure excavation and backfill for culverts, conduits, end sections, check dams, inlets, manholes, riprap and grouted riprap installation shall not be measured and paid for separately, but shall be included in the work. Structure excavation and backfill shall be done in accordance with the CDOT, M & S Standards, (dated July 2012, as revised) and as detailed in the plans (when applicable).

No separate measurement and payment will be made for work, equipment and materials, including rock stabilization, diversions, erosion bales, pumping and well-points, required to control the surface and subsurface water within the project limits and in the area of culverts and pipes being removed or installed.

If ground water is encountered, the Contractor shall submit a dewatering plan to the Town at least one week prior to beginning the work. The Contractor shall procure all permits necessary to complete this work.

REVISION OF SECTION 207
TOPSOIL

Section 207 of the Standard Specifications is hereby revised for this project as follows:

207.01 DESCRIPTION

Subsection 207.01 is hereby revised to include the following:

This work consists of removing existing on-site topsoil material, stockpiling the existing topsoil material and redistributing the existing topsoil material onto the regraded slopes at a minimum depth of 4 inches. The topsoil material shall be generally evenly distributed throughout the project limits for the areas to be seeded and mulched. Any excess topsoil generated from this project shall be the placed at the direction of the Engineer.

207.04 METHOD OF MEASUREMENT

Subsection 207.04 is hereby revised to include the following:

Topsoil will not be remeasured, but payment shall be based on the quantity identified in the bid tabulation, unless the quantity of Topsoil is significantly changed during construction by an approved Change Order.

Haul required to redistribute stockpiled topsoil uniformly throughout the project limits shall not be measured and paid for separately, but shall be included in the work.

207.05 BASIS OF PAYMENT

Subsection 207.05 is hereby revised to include the following:

The contract unit price for topsoil shall be full compensation for all work necessary to complete the item including removing existing on-site topsoil material, stockpiling the existing topsoil material, haul, and redistributing the existing topsoil material onto the regraded slopes. Excess topsoil shall be uniformly re-distributed over the slopes requiring topsoil.

Payment will be made under:

Pay Item	**Pay Unit**
Topsoil	Cubic Yard

REVISION OF SECTION 208
EROSION CONTROL

Section 208 of the Standard Specifications is hereby revised for this project as follows:

208.04 (f) BEST MANAGEMENT PRACTICES FOR STORMWATER - Maintenance

Subsection 208.04 (f) is revised to include the following:

Debris control and removal shall be completed to the requirements as set forth by the Removal and Disposal of Sediment.

208.12 BASIS OF PAYMENT

Subsection 208.12 is revised to include the following:

Work to furnish, install, maintain, remove, and dispose of erosion and sediment control features specified in the Contract will be paid for at the contract unit price.

Payment will be made under:

Pay Item	**Pay Unit**
Clean Culvert	Each
Inlet Protection	Linear Foot
Reinforced Rock Berm for Culvert	Each
Reinforced Rock Berm	Linear Foot
Concrete Washout Structure	Each
Portable Toilet Protection	Each
Vehicle Tracking Control	Each
Stabilized Staging Area (6 Inch)	Square Yard
Check Dam	Each
Siltfence	Linear Foot
Diversion Ditch	Linear Foot
Sediment Control Log (12 Inch)	Linear Foot
Erosion Control Supervisor	Day
Erosion Control Blanket (Straw)	Square Yard

The Contractor is responsible for removal of temporary erosion control features as directed by the Engineer. The Contractor shall anticipate this removal work to likely occur at the end of construction. Any remobilization expenses to remove erosion control features and perform general maintenance activities, will not be measured and paid separately, but shall be included in the Contract Unit Price for the items listed above.

REVISION OF SECTION 209
WATERING AND DUST PALLIATIVES

Section 209 of the Standard Specifications is hereby revised for this project as follows:

209.05 DUST PALLIATIVE

Subsection 209.05 is hereby revised to include the following:

The Contractor shall apply water as a dust palliative as directed by the Engineer. It is the Contractor's responsibility to obtain the necessary water needed for this project and provide the necessary on-site storage in order to meet the requirements deemed necessary by the Engineer.

209.08 BASIS OF PAYMENT

Subsection 209.08 is hereby revised to include the following:

Water required for all items of work, including dust palliative, will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 212
SEEDING

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

212.02 MATERIALS – SEED, FERTILIZER, AND SOD

In Subsection 212.02 (a) is hereby revised to include the following:

The Contractor shall refer to the Town of Parker Construction Best Management Practices (CBMP) for the required seed mix and seeding rate for this project. ***The Contractor shall utilize Seed Mix No. 2 from the CBMP.*** Seeding shall be performed according to the Town of Parker CBMP details and text.

REVISION OF SECTION 304
AGGREGATE BASE COURSE

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

304.02 AGGREGATE

Subsection 304.02 is hereby revised to include the following:

The minimum allowable R-value for Aggregate Base Course shall be 78. The specific gravity for the aggregates shall be greater than 2.0 at the source. The use of crushed reclaimed concrete material may be substituted for natural aggregate for use in roadbed stabilization upon review and written approval of the Engineer. Aggregate base course for use in shouldering and all-weather surfaces shall be natural and approved by the Town of Parker.

304.07 METHOD OF MEASUREMENT

Subsection 304.07 is hereby revised to include the following:

The measurement of Aggregate Base Course (Class 6) installed for the project will be based on the volume of the Aggregate Base Course as identified in the plans. No separate measurement or payment will be made for processing and distributing the Aggregate Base Course as directed.

304.08 BASIS OF PAYMENT

Subsection 304.08 is hereby revised to include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Aggregate Base Course (Class 6)	Cubic Yard

The contract unit price shall be full compensation for all labor, equipment and material needed to complete the work, (including furnish, placement, compaction, fine grading, stockpile and redistribute as required during construction and to remove and incorporate this material into the roadway embankment and maintenance access).

REVISION OF SECTION 501
STEEL SHEET PILING

Section 501 of the Standard Specifications is revised as follows:

Subsection 501.03 shall be modified to include the following:

Steel Sheet Piling includes the installation of the steel sheet piling and trimming of the sheet pile to the lines and grades shown on the Contract Drawings.

Steel sheet piles required for the project shall be the type and weight shown on the Contract Drawings. Sheet piling shall be constructed with a weathering finish.

Steel sheet piling shall meet the requirements of ASTM A328, (grade 50). Steel corners, tees, wyes, and crosses (as required) shall meet the requirements of ASTM A328 or ASTM A690.

Steel sheet piling shall be new and unspliced material throughout, unless otherwise reviewed and accepted by the Project Engineer. Steel sheet piles and special fabricated shapes shall be of a design that ensures continuous interlock throughout the entire length when in place. All fabricated connections shall be made with the use of angles or bent plates, as necessary, and shall be adequately welded or connected with high strength bolts as accepted by the Project Engineer. Additional length beyond those indicated on the Contract Drawings may be required to provide for trimming of tops of sheet piling.

The interlocks between steel sheet pile sections shall be configured such that the average width of the annular space between all contact points of the interlocks shall be a maximum of one-eighth (1/8) inch, as determined by the project engineer. Steel sheet piles and interlocks shall not have excessive kinks, camber or twist that would prevent the pile from reasonably free sliding to grade.

If handling holes are provided, they shall be two (2) standard two and nine-sixteenth (2-9/16) inch diameter handling holes located six (6) inches from one end. The holes shall be plugged by welding a piece of steel over the hole prior to installing any riprap, backfill or grout. The plated hole shall be watertight.

Do not subject piles to damage by impact bending stresses in transporting to and storing piles onsite. Store and handle piles such that corrosion protection coating will not be damaged.

Sheet pile installation shall not be started until the earthwork in the areas where the piles are to be driven has been completed to the extent that the grade elevation is at no more than twelve (12) inches above or below the top of the piling elevation as indicated on the Contract Drawings.

REVISION OF SECTION 501
STEEL SHEET PILING
- Continued –

Any fill along the alignment of the sheet pile must be in place to sub-grade elevations and compacted prior to driving the sheet pile. Fill material (except riprap, boulders, bedding and grout) is not to be placed around the sheet pile after the sheet pile is in place.

All welding or gas cutting shall be in accordance with the current standards of the American Welding Society.

Steel sheet piling shall be driven to the depths shown on the Contract Drawings or to virtual refusal. Virtual refusal is defined as ten (10) blows per inch with an approved pile hammer. A pile hammer shall be used determine virtual refusal. The hammer shall be operating at the manufacture's recommended stroke and speed when virtual refusal is measured.

Steel sheet piling shall be assembled before driving and then driven as a continuous wall, progressively in stages to keep the piles aligned correctly and minimize the danger of breaking the interlock between the sheets. Steel sheet piling shall be driven to form a tight bulkhead. A driving head shall be used and any piling which is damaged in driving or which has broken interlocks between sections shall be pulled and replaced at the Contractors expense.

The alignment of the sheet pile shall be driven to form a relatively straight line between the termini points shown of the Contract Drawings. Horizontal deviation of any point from a straight line connecting the two ends of the wall section shall be a maximum of six (6) inches. Each individual sheet pile sections shall be driven vertical, within a horizontal tolerance of two percent (2%) of any vertical length measured along the pile.

Tops of sheet pile sections shall be within a tolerance of one (1) inch from plan elevations. The Contractor shall not be paid for excess sheet pile trimmed off the end of the pile to meet final grade. Sheet pile cut off greater than 10 square feet will not be paid for.

The Contractor shall brace and or provide soil grading as necessary during construction operations to provide lateral stability for the sheet pile wall. The sheet pile wall has been designed the soil grades of the final configuration denoted on the Contract Drawings only. Other temporary configurations during the construction period shall not be allowed.

Care shall be taken during driving to keep from causing deformations of the top of the piles, splitting of section, or breaking of the interlock between sections. Care shall also be taken during driving to prevent and correct any tendency of steel sheet piles to twist or get out of plumb.

Steel Z piling shall be driven with the ball-end leading. Proper care and planning shall be used to allow for this construction procedure in both immediate and possible future walls.

STEEL SHEET PILING
- Continued –

Alternate Z piles shall be reversed end for end for proper interlocking in the "normal" position. Piles shall also be aligned properly to maintain a "normal" driving width.

For sheet piles driven into the native soils, pre-drilled soils, or excavated soils a vibratory driver may be used if the required depth is obtained. For sheet piles being driven into bedrock, an approved hammer utilizing a minimum hammer energy of 19,000 foot-pounds per square inch of steel section shall be used to obtain the required depth or virtual refusal. The hammer shall be clearly marked so that it can be identified at the job site.

Steel sheet pile that is full length as shown on the Contract Drawings and is required to be driven below the specified cutoff elevation shall be spliced with additional steel sheet piling with a full penetration butt weld.

Subsection 501.06 shall include the following:

Pay Item	**Pay Unit**
Steel Sheet Piling (Type II)	Square Foot

REVISION OF SECTION 506
GROUTED RIPRAP

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

DESCRIPTION

Subsection 506.01 is hereby revised to include the following:

This work shall consist of installing grouted riprap at the locations shown on the Contract Drawings.

MATERIALS

Subsection 506.02 is hereby revised to include the following:

The materials used shall conform to the following:

For riprap sizes designated in the Contract Drawings, the minimum dimension of 18 Inch Grouted Boulders shall be 24 inches in accordance with Urban Drainage & Flood Control District classifications. Prior to any riprap placement, the Contractor shall provide the Project Engineer samples of all specified materials and submit certified laboratory test certificates for all items required in this section.

Rhyolite rock shall not be used for any grouted riprap and shall be free of any calcite intrusions.

Each load of riprap shall conform to the dimensions specified on the Contract Drawings. Control of gradation will be by visual inspection by the Project Engineer. In the event the Project Engineer determines the riprap to be unacceptable, the Project Engineer will pick two random truckloads to be dumped and checked for gradation.

Mechanical equipment and labor needed to assist in checking gradation shall be provided by the Contractor at no additional cost to the project if the riprap does not meet the specified gradation. If the riprap does meet the gradation specified, the project will pay for the equipment and labor required for checking.

The color of the riprap shall be gray with gray/blue hues or other approved color and match the color of the grout.

The Contractor shall submit a mix design in writing to the Project Engineer for approval prior to placement of any grout. All grout shall have a minimum twenty-eight (28) day compressive strength equal to 3,200 psi. One cubic yard of grout shall contain a minimum of six (6) sacks of Type II Portland cement. A maximum of 25% Type F Fly Ash may be substituted for the Portland cement. Aggregate for the grout shall consist of 70% natural sand (fines) and 30% 3/8-inch rock (coarse). Slump shall be four (4) inches

REVISION OF SECTION 506
GROUTED RIPRAP
- Continued –

to six (6) inches. Grout shall contain on and on-half (1-1/2) pounds of Fibermesh, or approved equivalent, per cubic yard of grout.

Air entrainment shall be 5.5% - 7.5%.

The specific gravity of the riprap shall be two and one-half (2½) or greater. The specific gravity shall be according to the bulk-saturated, surface-dry basis, AASHTO T85.

The bulk density for the riprap shall be 1.3 ton/cy or greater.

The riprap shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96. The riprap shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate. The riprap shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.

CONSTRUCTION REQUIREMENTS

Subsection 506.03 is hereby revised to include the following:

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

The subgrade to receive riprap shall be excavated and any unstable material shall be removed. Riprap shall be placed on subgrade without granular bedding unless approved by the Project Engineer. Material approved by the Project Engineer 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) to re-establish the subgrade of the riprap. Unstable material shall be removed from the project site and disposed of by the Contractor. Removal and replacement of unstable material shall only be completed at the direction of the Project Engineer and shall be paid for under Muck Excavation.

Subgrade shall be excavated a minimum of 6” to a maximum of 12” behind the riprap. Backfill behind the riprap shall be compacted to ninety-five percent (95%) Maximum Standard Proctor Density (ASTM D698). Care shall be taken during compaction to avoid disturbing and or damaging the integrity of the riprap edge.

REVISION OF SECTION 506
GROUTED RIPRAP
- Continued –

Finished grades and subgrade for riprap shall be determined from the height of each boulder used.

The top of all riprap shall be as indicated in the Contract Drawings. The boulders shall be carefully picked and arranges so that adjacent rock surfaces match within two (2) inches in top elevation and two (2) inches along the vertical exposed face or channel side of rock. Riprap shall be placed such that adjacent riprap "touch" each other and voids don not exceed four (4) inches. It is the intent of construction to minimize voids and grout placed between boulders.

The Contractor shall, if deemed necessary, support the boulders from falling over before and during the placement of grout, backfill, and completing compaction work on either side of the boulder. Smaller rocks or riprap shall be "chinked in" to fill all voids behind the riprap. Smaller rocks shall also be used to "chink in" gas larger than four (4) inches. Placement shall be approved by the Project Engineer prior to grouting.

Prior to placing the grout, any type of debris, fines, smaller rock, or silt shall be removed from around or under and on the riprap.

Dewatering shall be implemented to guarantee that the grout will not be placed in water and for a period of twenty-four (24) hours after the grout has been placed. Keep boulder receiving grout wet at all times prior to receiving grout.

The concrete grout shall be placed by injection methods by pumping under low pressure, through a two (2") inch maximum diameter hose to ensure complete penetration of the grout in to the void area as detailed on the Contract Drawings. The grout mix shall be stiffened and other measures taken to retain the grout between the boulders. Grout placement shall begin at the bottom of the lowest boulder and proceed upward to ensure no air voids exist between the grout, subbase, and riprap.

Grout shall be placed up to a height of one-half (1/2) of the diameter of the top row of boulders or as directed by the Project Engineer and shall be placed in the voids and behind the boulders and not on the surface of the rocks. A "pencil" vibrator shall be used to made sure all voids are filled between the boulders from the subgrade and around the boulders to a depth as shown of the Contract Drawings. The "pencil" vibrator may be used to smooth the appearance of the surface, but the Contractor shall use a wood float to smooth and grade the grout around the riprap. Grout between boulders shall be recessed on-third (1/3) the diameter of the riprap on the side facing the channel.

REVISION OF SECTION 506
GROUTED RIPRAP
- Continued –

Grout shall be troweled out and finished to minimize visibility. Clean and was any spillage before the grout sets so the visual surfaces of boulders will be free of grout to provide a clean natural appearance, or if washing does not clean off grout residue, the Contractor shall wash off any grout residue with muriatic acid and water, using a brush to scrub off the residue.

Grout shall receive cold or hot weather protection in accordance with the Standard Specifications.

METHOD OF MEASUREMENT

Subsection 506.04 is hereby revised to include the following:

No separate measurement for payment will be made for any labor, equipment, and materials required for this item. The price will include all of Contractor's costs including, but not limited to:

- Excavating, removing and replacing material
- Backfilling and compacting
- Preparing/stabilizing foundation and bedding
- Placing Riprap
- Placing grout and vibrating
- Furnishing and installing weep drains inclusive of pipe, filter material and fabric
- Cleaning up
- Providing all other related and necessary labor, equipment, and materials

BASIS OF PAYMENT

Subsection 506.05 is hereby revised to include the following:

The accepted quantities measured as provided above will be paid for at the contract unit price per cubic yard for each of the pay items listed below that appear in the bid schedule. 18 Inch Grouted Boulders shall be paid for as Grouted Riprap (24 Inch).

Payment will be made under:

Pay Item	**Pay Unit**
Grouted Riprap (24 Inch)	Cubic Yard

REVISION OF SECTION 506
SOIL RIPRAP

Section 506 of the Standard Specifications is revised as follows:

Subsection 506.02 shall be modified to include the following:

Existing riprap removed during construction may be reused for "soil riprap" if it is free from deleterious materials and satisfies the specifications herein as determined by the Engineer.

Soil Riprap includes excavation, grading, and installation of Soil Riprap and Geotextile (Erosion Control) (Class 1) and shall be installed at the locations shown on the Contract Drawings.

Subsection 506.03 shall be modified to include:

Elevation tolerance for the soil riprap shall be 0.10 feet. Thickness of soil riprap shall be no less than thickness shown and no more than 2-inches greater than the thickness shown.

Adjacent stockpiles of riprap and soil shall be created and minimizing done at the stockpile location, not at the locater where soil riprap is to be placed.

Mix thirty-five percent (35%) soil by volume with stockpiled riprap, using additional moisture and control procedures that ensure a homogenous mixture; where the soil fills the inherent voids in the riprap without displacing riprap.

With prior approval of the Project Engineer, layering the riprap and soil instead of premixing may be allowed in the native soil is granular.

Place a first layer of smaller soil 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 planted riprap and create a smooth plane. The mixture shall be consolidated by large vibratory equipment or backhoe bucket to create a tight, dense interlocking mass.

The soil shall be further wetted to encourage void filling with soil. Any large voids shall be filled with rock and small voids filled with soil. Excessively thick zones of soil prone to washing away shall not be created, no thicknesses greater than six (6) inches. For buried soil riprap, the top surface shall be covered with six (6) inches of topsoil such that no rock points are protruding.

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 seeding.

The Contractor shall install a test section of at least 60 square feet of soil riprap for the review and approval of the Engineer prior to installation of the remaining soil riprap.

REVISION OF SECTION 506
SOIL RIPRAP
- Continued -

Subsection 506.04 shall be modified to include:

Excavation, grading, mixing and installation for soil riprap and soil material used in riprap voids shall not be paid for separately but will be considered part of the work.

Subsection 506.05 shall include the following:

Pay Item	**Pay Unit**
Soil Riprap (12 inch)	Cubic Yard

REVISION OF SECTION 514
PEDESTRIAN RAILING (STEEL)

Section 514 of the Standard Specifications is hereby deleted in its entirety and replaced with the following:

514.01 DESCRIPTION

This work shall consist of furnishing all equipment, labor, fabrication and materials to do all work necessary to construct the Pedestrian Railing (Steel) as indicated on the Drawings and as specified herein.

514.02 MATERIALS

Steel shall conform to the requirements of Section 509 and the following:

1. Tubes shall conform to the requirements of ASTM A-500 Grade B.
2. Steel pipe shall conform to ASTM A53 Grade B.
3. Steel plates and bars shall comply with the requirements of ASTM A36.
4. Zinc coating shall conform to the requirements of ASTM A123, A153, A385 and A386.

Welding shall conform to the American Welding Society Structural Weld Code - Steel D1.1.

Shop Drawings: Shop drawings shall be submitted to the Engineer in accordance with Sections 101 and 105 for all metal railing fabrications, showing sizes and thickness of all members, types of materials, methods of connection and assembly, complete dimensions, clearances, anchorage, relationship to surrounding work by other trades, shop paint and protective coatings, and other pertinent details of fabrication and installation. The submittal shall include:

1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, openings, size and type of fasteners and any accessories.
2. Include erection drawings, elevations, applicable details and field dimensions.
3. Indicate welded connection using standard AWS welding symbols. Indicate net weld lengths.

Fabrication shall not begin until Engineer's approval of submittals has been completed.

Steel elements shall be coated in accordance with Revision of Section 522 – Duplex Coating System.

REVISION OF SECTION 514
PEDESTRIAN RAILING (STEEL)
- Continued -

514.06 CONSTRUCTION REQUIREMENTS

Materials shall be carefully handled and stored under cover in manner to prevent deformation and damage to the materials and to shop finishes, and to prevent rusting and the accumulation of foreign matter on the metal work. All such work shall be repaired and cleaned both prior to and after erection.

Work shall be erected square, plumb and true, accurately fitted, and with tight joints and intersections. All anchors, inserts and other members to be set into the concrete parapet wall shall be furnished loose by this trade to be built-into the concrete by those trades as the work progresses. Later cutting or drilling shall be avoided wherever possible.

Materials shall be new stock, free from defects impairing strength, durability or appearance, and of best commercial quality for each intended purpose.

All steel members, hardware, and fasteners shall be fabricated of structural steel conforming to the ASTM designations herein. All embedded plates with anchor studs shall be hot-dip galvanized steel bar.

Connections shall be continuous-welded type for rigid construction, with weld ground smooth. Welding shall conform to applicable requirements of AWSW D1.1.

Provide all anchors, bolts, sockets, sleeves, and other parts required for securing each item of work. Furnish required anchors, bolts, and other items required for installation in concrete.

Exposed fastenings shall be of the same material and finish as the metal to which applied, unless otherwise noted.

Metal surfaces shall be cleaned and free from mill scale, flake, rust and rust pitting; well formed and finished to shaped and size, true to details with straight, sharp lines and angles and smooth surfaces. Curved work shall be to true radii. Exposed sheared edges shall be eased.

Weld all permanent connections. Weld shall be continuous on all exposed surfaces; exposed weld shall be ground flush and smooth with voids filled with metallic filling compound. Tack welding will be permitted where specifically called for. Do not use screws or bolts, unless specifically indicated or welding is not possible. Where used, bolt heads shall be countersunk, screwed up right and threads nicked to prevent loosening.

Fastening shall be concealed where practical, unless otherwise indicated. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to weather shall be formed to exclude water.

REVISION OF SECTION 514
PEDESTRIAN RAILING (STEEL)
- Continued -

Pedestrian rail shall be rigidly braced and secured to surrounding construction, and shall be tight and free of rattle, vibration, or noticeable deflection during and after construction.

Electrolytic Isolation: Where dissimilar metals are to come into contact with one another, isolate by application of a heavy coat of bituminous paint on contact surfaces in addition to shop coat specified above. Do not permit the bituminous paint in any way to remain on surfaces to be exposed or to receive sealant.

Rail shall be of Architectural Quality. Exceptional care shall be taken in welding and grinding, filing and surface sanding to provide truly smooth, clean, neat, and flush construction throughout, free of all surface defects and defacements.

Rail which is improperly located, or is not true to line and plumb within tolerances or as indicated, shall be removed and replaced at no additional cost to the project.

Repair damaged components and finishes as recommended by the manufacturer and as indicated herein.

514.07 METHOD OF MEASUREMENT

Pedestrian Railing (Steel) will not be measured and paid for separately, but shall be included in the cost of Bridge Rail (Special).

ADDITION OF SECTION 519
MANUFACTURED STONE VENEER

Section 519 is hereby added to the Standard Specifications for this project as follows:

519.01 DESCRIPTION

This work shall consist of furnishing and installing manufactured stone veneer in accordance with these specifications and in conformity with the details shown on the plans, and/or as directed by the Engineer.

519.02 MATERIALS

Materials shall meet the following requirements:

Masonry Cement	ASTM C91
Portland Cement	ASTM C150
Masonry Mortar (Type N)	ASTM C270

Mortars for placement of the manufactured stone veneer shall be colored. The color shall be Davis Colors' "Kahlua" (No. 677). The cement shall be mixed with the color pigment in accordance with the manufacturer's recommendations.

519.03 STONE VENEER

Stone veneer products shall be precast, artificial stone similar in color and texture to natural stone, manufactured from portland cement, aggregate and mineral oxide pigments. The following manufacturer is pre-approved to supply manufactured stone veneer for use on this project:

Manufacturer	**Style**	**Color**
Coronado Stone Products www.coronado.com	Country Castle	Sunset Blend

Supplied locally by: Western Stone & Tile
107 Wilcox St, Ste 104
Castle Rock, Colorado 80104
(303) 343-6600

ADDITION OF SECTION 519
MANUFACTURED STONE VENEER
- Continued -

519.04 SUBMITTALS

The Contractor shall submit the following for review and written approval by the Engineer prior to construction of the manufactured stone veneer:

(1) Descriptive brochures and samples for all materials to be incorporated into the work; with approval by the Engineer prior to constructing the test panel.

(2) Manufacturer's installation instructions.

(3) The Contractor shall erect a 3 ft. x 4 ft. sample panel at job site, at a location as directed by the Engineer. The sample panel shall illustrate the field pattern of stone, field cutting of units where required, and the color and tooling of mortar joints.

519.05 CONSTRUCTION REQUIREMENTS

Concrete surfaces to receive stone veneer shall be thoroughly examined to ensure that the surface contains no releasing agents (form oil). If it does contain release agents, the surface shall be washed thoroughly using high-pressure water or cleaned with an approved mechanical method.

Mortar and other moisture sensitive materials shall be stored in protected enclosures and handled by methods that avoid exposure to moisture. The Contractor shall protect materials from rain, moisture, and freezing temperatures prior to, during, and for 48 hours after completion of work.

Masonry mortar ingredients shall be thoroughly mixed, in quantities needed for immediate use in accordance with ASTM C270, Type N. Anti-freeze compounds to lower the freezing point of the mortar shall not be used.

Application of the stone veneer shall be in accordance with manufacturer's installation instructions and recommendations.

The height of manufactured stone veneer varies depending upon location (inside of bridge rail, or outside of the bridge rail). Contractor shall plan work to minimize jobsite cutting. Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking unit corners or edges.

Control joints and expansion joints shall be provided where indicated on plans or as recommended by system manufacturer. Control joints, where specified or required, shall be sized to match adjacent mortar joints in exposed stone units.

ADDITION OF SECTION 519
MANUFACTURED STONE VENEER
- Continued -

519.06 MANUFACTURER'S REPRESENTATIVE

The Contractor shall arrange for a technical representative from the stone veneer manufacturer to be available and present during construction of the stone veneer. The representative shall provide all necessary instructions and guidelines to construct the stone veneer in accordance with these specifications and the manufacturer's requirements. Upon completion of the work, the technical representative shall certify in writing to the Engineer that the manufactured stone veneer has been constructed in accordance with the manufacturer's product specific requirements.

519.07 METHOD OF MEASUREMENT

Manufactured stone veneer will be measured by the square foot as shown on the plans. Payment will be full compensation for all work and materials required to furnish and install the stone veneer.

519.08 BASIS OF PAYMENT

The accepted quantity of Manufactured Stone Veneer will paid for at the contract unit price per square foot.

Payment shall be made under:

Pay Item	**Pay Unit**
Manufactured Stone Veneer	Square Foot

Payment will be full compensation for all material and labor to complete the work item.

SECTION 522
DUPLEX COATING SYSTEM

Section 522 of the standard specifications is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

522.01 This work consists of hot dip galvanizing and duplex coating steel elements of the bridge rail.

MATERIALS AND CONSTRUCTION REQUIREMENTS

522.02

(a) *General*. The Contractor shall provide, install, and repair if necessary, all steel items that are prepared and coated in conformance with this Section. All repair and replacement of the finished coating necessary for final acceptance shall be at the Contractor's expense.

Steel products to be galvanized and coated shall be cleaned of weld spatter and bevel finished at exposed corners, edges and points. Areas having welds, cuts, bores, notches, or grooves shall also be beveled unless otherwise noted in the Contract or directed by the Engineer. Bevel work shall produce a uniform, smooth finish for galvanizing. Bevel size to be used is based on steel thickness and other criteria as follows:

Steel Thickness/Type	Bevel Size (inches)
Less than ½" thick	1/32" to 1/16"
Over ½" thick	1/16" to 1/8"
Bores, notches & grooves	root face of 1/32" to 1/16"

Welds shall be cleaned and finished per AWS standards.

All coating measurements shall be taken with a Type 2 fixed probe Dry Film Thickness (DFT) gauge. The gauge shall be calibrated, and measurements shall be taken, according to the Society for Protective Coatings (SSPC) Standard PA-2.

(b) *Galvanizing*. Galvanizing shall be done in accordance with the Contract requirements and AASHTO M 111 (ASTM A123) for the type of material being galvanized, except that items shall only be quenched with ambient air. Chromate treatment of any type will not be permitted. Zinc-phosphate pretreatment or acrylic passivation pretreatments shall be as described in (d) below.

The Contractor shall submit a certificate of compliance (COC), conforming to subsection 106.12, confirming that all materials meet or exceed the galvanizing requirements described herein.

SECTION 522
DUPLEX COATING SYSTEM
- Continued -

All galvanized surfaces shall be free from drips, slag or surface irregularities.

Spot areas not requiring galvanizing shall be marked and cleanly patched with material that prevents galvanization but does not weaken the adjacent spelter coating. Repair of patched areas shall be achieved by metallizing as described in (c) below.

Prior to galvanizing, the Contractor's galvanizer shall notify the Engineer in writing that the galvanized order is chromate free and air quenched. Products not certified chromate free by the Contractor's galvanizer shall be tested prior to galvanizing. The Contractor shall provide the Engineer with certification from an independent ASTM accredited laboratory listing all individual items that test chromate free. Testing shall comply with ASTM D-2092 Appendix X2. Test results shall be provided to the Engineer prior to galvanizing.

(c) *Repair of Galvanized Products*. Uncoated areas or damaged coating exceeding applicable specification limits shall be re-galvanized to meet the original specification requirements. Cuts made after galvanizing shall be ground, beveled, and smoothed before repair. Damaged galvanized areas shall be re-galvanized or metallized.

Re-galvanizing shall conform to ASTM A-780, Annex A1. Metalizing shall conform to ASTM A-780, Annex A3, except that minor repair areas shall be cleaned per SSPC method SP-3. SSPC Method SP-2 may be used to clean difficult access areas. Thickness of the repair coat shall match adjacent galvanizing, as measured by a calibrated DFT gauge.

Coating imperfections such as burring, runs or drips, high spots, heavy dross, or ash inclusion shall be removed and cleaned at the Contractor's expense. Areas of re-work falling below zinc thickness limits shall be repaired at the Contractor's expense.

Printed Technical Data Sheets (PTDS) shall be provided to the Engineer for repair materials used.

(d) *Preparing Galvanized Surfaces for Coating*. Products shall be inspected for shipping and handling damage before surface preparation begins. Damage shall be reported to the Contractor's galvanizer and to the Engineer prior to repair. The Engineer will determine whether damaged items are to be repaired or replaced. Minor repair of galvanizing shall conform to (c) above, and shall be at the Contractor's expense.

The Contractor shall prepare each surface to be coated so that it has a slightly roughened profile without removing over 1.0 mil of the galvanized coating. Minimum ASTM zinc thickness specifications shall still apply after preparation.

Surfaces of fasteners to be coated shall be lightly brushed or sanded in a manner that will remove the least amount of zinc.

SECTION 522
DUPLEX COATING SYSTEM
-Continued-

Surfaces that become soiled after pretreatment shall be cleaned prior to coating by low pressure, mild detergent wash and rinse. Stained or oiled surfaces may also be mildly scrubbed with a soft bristle nylon brush. Stubborn stains may be mildly scrubbed with a mix of 1 - 2 percent ammonia solution and thoroughly rinsed. Wash and rinse pressure shall not exceed 100 psi at 185° F temperature.

Surface preparation work shall be done according to one of the following methods:

1. *Zinc-Phosphate Pretreatment*. This treatment may be used only on new galvanizing less than 48 hours of age.

   Items shall be immersed in a bath of acidic zinc-phosphate solution for 3 - 6 minutes, rinsed with clean water, and dried. The first epoxy coat shall be applied within 48 hours after immersion treatment.

   If treated items are shipped to a different coating facility they shall be rewashed, rinsed and dried to remove surface soiling. The first epoxy coat must still be applied within 48 hours after immersion treatment.

2. *Acrylic Passivation Pretreatment*. This treatment may be used only on fresh hot galvanizing or new galvanizing less than 48 hours of age. Only chrome-free solutions shall be used, applied by a method that ensures complete coverage of all surfaces to be coated. The Contractor shall provide the Engineer with treatment dates for each item and the PTDS for the solutions used.

   The Contractor's galvanizer may apply solution to fresh hot galvanizing that is less than 6 hours of age, still clean, and dry and that has cooled to treatment application temperature guidelines.

   If newly galvanized items are shipped to another treatment facility they shall be washed, rinsed and dried to remove surface soiling. The solution shall then be applied and cured according to the supplier's instructions.

   Fully cured and treated items shall be rewashed, rinsed, and dried again just before coating. Items not coated within 100 days of treatment shall be abrasive blasted in conformance with subsection (d) 3.

3. *Abrasive Blasting*. This treatment may be used on galvanized items of any age if beveling requirements as listed in the third and fourth paragraphs of subsection (a) have been met.

SECTION 522
DUPLEX COATING SYSTEM
-Continued-

The Contractor shall notify the Engineer in writing at least five working days before blasting begins. Zinc thickness shall be measured and recorded immediately after blasting and provided to the Engineer within 48 hours of blasting. Thickness limits and measurement frequency shall comply with the original applicable ASTM specification. Blast operations shall reasonably conform to ASTM Standard Practice D-6386, Subsection 5.4.1 except for small areas falling below required zinc thickness. These areas shall be repaired in accordance with subsection (c). No single area shall exceed 2 inches at its largest width or 12 inches at its longest dimension. The total repair area shall not exceed 1 percent of the coatable surface of the item; if limits are exceeded or zinc thickness is below the specification requirement, the item shall be re-galvanized in conformance with the original specification.

The Contractor shall measure and record the size, location and repair method used for all repairs. This information shall be included on the report of thickness measurements.

The first epoxy coat shall be applied within 24 hours of abrasive blasting. Items shall be cleaned free of blast debris before coating. Compressed air used to clean items shall be free of oil, residue, oil and other harmful contaminants.

Thickness measurement is not required after surface preparation work has been completed.

(e) *Coating and Paint Systems*. Prepared items shall be coated with a two or three coat system described in this subsection. Alternative coating systems shall be pre-approved in writing by the Engineer. Manufacturer's PTDS for each coating type shall state test values for ASTM requirements of this subsection. Prior to product use the coating supplier shall provide the PTDS and certify to the Engineer in writing that all furnished coating materials meet applicable requirements of this subsection.

Faying surfaces shall not be painted unless written approval is given by the Engineer. All shop fabrication, including welds and attachments, shall be completed prior to coating unless otherwise specified in the Contract or directed in writing by the Engineer.

Inorganic zinc coatings shall not be used. Combined DFT of all coats applied over the galvanizing shall range from 6.5 to 10 mils with a topcoat DFT of 3 mils minimum. Dried color of the base coat and topcoat shall be visually contrasting. Finished color shall not vary more than 4 ΔE^*_{ab} units from the specified color determined in accordance with ASTM D 2244. A 3" x 3" plate shall be used as a test sample for Engineer approval prior to coating of all railing elements.

Volatile Organic Compound (VOC) levels shall not exceed 3.5 pounds per gallon for each applied coat. Dry films shall contain less than 1 percent lead and other toxic heavy metals. The zinc concentration of each epoxy coat shall not exceed 40 percent. Top coats shall have a semi-gloss value of 50-75.

SECTION 522
DUPLEX COATING SYSTEM
-Continued-

All coatings shall be able to withstand temperatures up to 180° F without sag, blister, or peel damage. Topcoat formulation shall provide weathering, chemical, and ultraviolet (UV) resistance. All coatings shall meet the following ASTM requirements as amended:

(1) Corrosion Weathering. ASTM D-5894, minimum 6-cycles of exposure:
Corrosion rating of 8 or higher according to ASTM D-1654.
Blistering rating of 8 or higher according to ASTM D-714.

(2) Impact Resistance. ASTM D-2794, 30 day test:
Epoxies – Minimum 40 inch-pounds
All Topcoats – Minimum 90 inch-pounds

(3) Adhesion Testing. ASTM D-4541, 30 day test, Minimum 500 psi for either: Method B - flat surface or Method E - curved surface.

(4) Abrasion Resistance. ASTM D-4060, 30 day test: Maximum 90 mg loss after 1000 cycles with a CS10 or CS17 wheel.

(5) Flexibility. ASTM D-522, 30 day test - Method B: Epoxies shall pass a 180 degree bend over a ¾ inch mandrel. All Topcoats shall pass a 180 degree bend over a 3/8 inch mandrel.

Each coat shall be applied uniformly to provide an appearance free of laps, streaks, sags, drips, pinholes, and other discontinuities; all such defects shall be repaired prior to product shipment.

The Contractor's coater shall measure the DFT of each applied coat according to SSPC, Guide PA-2, except that measurements shall be taken with a calibrated Type 2 fixed probe gauge. Thickness records shall be provided to the Engineer prior to project shipment. The following two coating systems do not require pre-approval:

1. Powder Coating. The Contractor's coater shall oven preheat the articles to abate out-gassing potential. The Contractor's coater shall use compatible materials and coating processes to obtain proper coat to coat adhesion.

   The epoxy powder base coat shall measure 2 to 6 mils DFT and be applied by electrostatic or airstatic spray. The powder formulation shall be a non-hybrid epoxy of anti-gassing grade.

   The powder topcoat shall be electrostatic or airstatic spray applied and measure 3 to 6 mils DFT. The powder formulation shall be a non-acrylic, high-build, aliphatic-based, enhanced polyester or urethane polyester of anti-gassing grade.

2. Liquid Coating. The Contractor's coater shall apply coats by conventional or airless spray according to the supplier's guidelines. Minimal striping at difficult work areas is permissible. The Contractor's Coater shall use proper work methods and compatible materials to obtain proper coat adhesion. Thinning of paints shall be done according to the manufacturer's instructions so that thinned products conform to the solids content and VOC limits of this subsection.

   The epoxy base coat shall measure 2 to 6 mils DFT. Paint shall be a low-blush epoxy polyamide, or a low-blush cycloaliphatic bisphenol-A polyamine. Minimum solids by weight of all epoxies used shall be 68 percent.

   The topcoat shall measure 3 to 6 mils DFT. Paint shall be an aliphatic-based urethane polyester or aliphatic-based polyurea urethane. Specially formulated aliphatic-based polyaspartic polyureas may also be used over compatible epoxy bases.

(f) *Repair of Coated Products*. The Contractor shall repair damage from shipment, installation, field welding, or other activity during the construction. Damage shall be reported to the Engineer prior to repair. Repairs shall be as directed by the Engineer.

Significant repair procedures require written submittal of a proposed repair process from the Contractor. The Engineer shall approve the proposal in writing before repairs begin. Significant repairs are classified as:

(1) Any damaged area to the base coat material over 1 square inch
(2) Total repair areas exceeding 5 percent of the coating per item
(3) Any single topcoat repair area over 64 square inches

Minor and touchup repair of topcoats shall be done as follows:

A UV rated, aliphatic-based liquid topcoat paint shall be used. The paint shall be compatible with the existing topcoat material and closely match existing color. The paint shall meet the requirements of subsection (e). The paint supplier shall provide the Engineer with PTDS for the products used.

Single areas smaller than 8 square inches requiring repair shall be scuffed with 220 grit sandpaper or equivalent scuff material. Larger areas up to 64 square inches may be cleaned according to SSPC, Method SP-2. All border areas at the undamaged topcoat shall be scuffed with 220 grit material.

SECTION 522
DUPLEX COATING SYSTEM
-Continued)

Cleaned, scuffed areas shall be bordered and coated by airless or conventional spray. Work areas shall be adequately shielded to contain errant spray. Fresh repair areas shall be protected as necessary during the initial cure. Repair thickness shall reasonably match the adjacent coating.

The repair coat shall provide an appearance free of sags, runs, streaks, drips, pinholes, or other discontinuities. Spray can paint repair shall not be used**.**

(g) *Conditions for Final Acceptance of Coating.* Within six weeks immediately prior to final project acceptance, the Engineer will conduct a final inspection of the coating. The Contractor's Superintendent shall also attend the inspection. Before final project acceptance, the Contractor shall repair the following defects found during the inspection:

a. Peeling on any portion of the coatings.
b. Blistering on any portion of the coatings.
c. Color fading below a 35 gloss rating, in accordance with ASTM D523.
d. Mottling defects that exceed 3 percent of the topcoat surface.
e. Visible cracking of the topcoat material.
f. Visible rusting discoloration on the coating.
g. Sag or other evidence of coating adhesion loss.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Duplex Coating System will not be measured and paid for separately, but shall be included in the cost of Bridge Rail (Special).

REVISION OF SECTION 606
BRIDGE RAIL (SPECIAL)

Section 606 of the Standard Specifications is hereby revised for this project as follows:

606.01 DESCRIPTION

Section 606.01 is hereby revised to include the following:

This work shall include the construction of concrete bridge railing for the bridge structure in conformance with the details, lines, grades and locations shown on the plans.

606.05 METHOD OF MEASUREMENT

Section 606.05 is hereby revised to include the following:

Bridge Rail (Special) will be measured and paid for by the linear foot. Measurement will be along the outside face of the bridge rail from end to end of the railing.

606.06 BASIS OF PAYMENT

Section 606.06 is hereby revised to include the following:

The accepted quantity will be paid for at the contract unit price per unit of measurement for the pay item listed below, and shall include all concrete, reinforcing steel and all other work and material necessary to complete the item.

Pedestrian Railing (Steel), as specified by Revision of Section 514, Pedestrian Railing, will be included in the cost of this item.

Manufactured Stone Veneer, as specified by Revision of Section 519, Manufactured Stone Veneer, will be paid for separately.

Payment will be made under:

Pay Item	**Pay Unit**
Bridge Rail (Special)	Linear Foot

Payment will be full compensation for all materials, equipment and labor necessary to furnish and install the Bridge Rail (Special).

REVISION OF SECTION 607
FENCES

Section 607 of the Standard Specifications is hereby revised for this project as follows:

607.01 DESCRIPTION

Subsection 607.01 is hereby revised to include the following:

This work includes the installation of construction fence to define the limits of work as shown in the plans and to delineate and protect areas that are not to be disturbed.

607.03 CONSTRUCTION REQUIREMENTS

Subsection 607.03 is hereby revised to include the following:

The Contractor shall install construction fence in accordance to the Town of Parker's Construction Best Management Practices (CBMP) details and as detailed in the plans prior to clearing and grubbing.

607.04 METHOD OF MEASUREMENT

Subsection 607.04 is hereby revised to include the following:

All fence fabric types and special instructions as indicated within these plans and specifications shall be included in this measurement as full compensation. No separate measurement and payment will be made for wire gates, end posts, corner posts, line brace posts, fabric types, or special instructions as indicated on the plans.

607.05 BASIS OF PAYMENT

Subsection 607.05 is hereby revised to include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Construction Fence	Linear Foot

Payment for the above pay items shall be full compensation for all work and materials to complete the item.

REVISION OF SECTION 613
LUMINAIRE (SPECIAL)

Section 613 of the Standard Specifications is hereby revised for this project as follows:

613.01 DESCRIPTION

Section 613.01 is hereby revised to include the following:

This work shall include furnishing and installing Niland Company Luminaires on the proposed bridge, as shown in the plans.

613.03 CONSTRUCTION REQUIREMENTS

Section 613.03 is hereby revised to include the following:

All work shall be in accordance with the supplier's recommendations.

613.11 METHOD OF MEASUREMENT

Section 613.11 is hereby revised to include the following:

Luminaire (Special) will be measured by the actual number installed and accepted.

613.12 BASIS OF PAYMENT

Section 613.12 is hereby revised to include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Luminaire (Special)	Each

Payment will be full compensation for all materials, equipment and labor necessary to furnish and install the Luminaire (Special).

REVISION OF SECTION 625
CONSTRUCTION SURVEYING

Subsection 625 of the Standard Specifications shall include the following:

625.11 SURVEY RECORDS

Subsection 625.11 shall include the following:

The Contractor shall maintain on the project a current set of storm sewer "*as constructed*" plans. Upon completion of the work, the "*as constructed*" plans shall be turned over to the Engineer.

These "*as constructed*" plans shall show the actual location of pipe, correct lengths of pipe, inlets, manholes, invert and rim elevations, and other work items on modified plan sheets. All modifications shall also be shown on the "*As Constructed*" plans. Locations will be indicated by ties to property lines. Location ties shall be to an accuracy of within 0.5 inches.

Locations will be indicated by ties to features easily identified in the field, such as curb lines, edge of pavement, pole lines, etc. Location ties shall be of an accuracy suitable to field locate pipes in the future, typically ± 12 inches.

"*As constructed*" plans for storm sewer work shall be sealed by a Colorado Registered Professional Engineer (P.E.) or Professional Land Surveyor (L.S.).

625.13 BASIS OF PAYMENT

Subsection 625.13 shall include the following:

Payment for the above requirements will not be made separately, but shall be included in the contract unit price bid for construction surveying.

REVISION OF SECTION 626
MOBILIZATION

Section 626 of the Standard Specifications is hereby revised for this project as follows:

626.01 DESCRIPTION

Subsection 626.01 is hereby revised to include the following:

Multiple mobilizations are anticipated for several items including but not limited to grading, paving, top soil, and erosion control.

No separate measurement and payment shall be made for mobilization(s) required for utility relocations and phasing required to complete the work.

FORCE ACCOUNT ITEMS

DESCRIPTION

This Special Provision contains the Town'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.

Item No.	Force Account Item	Quantity	Est. Amount
F/A 01	Minor Contract Revisions	F/A	$ 50,000
F/A 02	Erosion Control	F/A	$ 10,000

Force Account Descriptions:

F/A 01 Minor Contract Revisions – This work consists of minor work authorized and approved by the Engineer, which is not included in the Contract drawings or specifications, and is necessary to accomplish the scope of work of this Contract.

F/A 02 Erosion Control – This work is for additional items at the request of the Engineer beyond what is described in the project plans and specifications.

UTILITIES

The known utilities within the limits of this project are:

Jarod Baylie
Parker Water and Sanitation District 303-841-4627

The work described in these plans and specifications will require full cooperation between the Contractor and the utility companies 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. The Contractor shall be responsible for coordinating the adjustment and/or relocation of all utilities on this project, per the plans and specifications, and as directed by the Engineer. Also, in accordance with the plans and specifications, and as directed by the Engineer, the Contractor shall keep the utility company(s) advised of any work being done to their facility, so that the utility company(s) can coordinate their inspections for final acceptance of the work with the Engineer.

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

NOTE:

The contractor will be required to provide written notice to each utility company, with a copy to the Engineer, 7 days prior to any utility work expected to be coordinated with construction unless otherwise noted.

GENERAL:

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. Contact the Utility Notification Center of Colorado (UNCC) at phone number 1-800-922-1987, to have locations of UNCC registered lines marked by member companies. All other underground facilities shall be located by contacting the respective company. Utility service laterals shall also be located prior to beginning excavation or grading.

The location of utility facilities as shown on the plan and profile sheets, and herein described, were 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.

SPECIAL NOTICE TO CONTRACTORS

1. SCOPE

1.1 It is the intent of this chapter to provide guidelines to the Contractor or Subcontractor, so that they can properly present their materials for inclusion at the construction project.

1.2 The Contractor shall follow the procedures listed below to ensure the proper inspection, sampling, testing and certification of materials and products incorporated into all construction projects.

1.3 The words "Prequalification of Bidders" (102.01 Standard Specifications) has occasionally been confused with "Prequalification of Manufacturers / Supplier" or with "Pre-Approval of Products or Materials". These terms are not interchangeable.

1.4 Two information sources that can provide assistance and clarification are: Business Center - Project Bidding (http://www.dot.state.co.us/BusinessCenter/ Bidding/) and Design Support – Manuals (http://www.dot.state.co.us/DevelopProjects/DesignSupport/).

2. PROVIDE NOTIFICATION OF MATERIALS SOURCES AND SUPPLIERS.

2.1 In accordance with subsection 106.01 of the Standard Specifications:

The Contractor shall submit a list of material sources and suppliers to the Engineer. The list shall include company name and address, item to be supplied, and contact person where material can be inspected.

3. DESIGNATED PRODUCTS AND ASSEMBLIES.

3.1 The majority of materials submitted for inclusion on CDOT projects will fall within one of four levels of product acceptance for the sampling and testing. CDOT always retains the right through its Quality Assurance (QA) Program to obtain samples for additional testing and require supplemental documentation.

3.2 If the material or product is not referenced within the four levels of product acceptance then the materials or products must be fabricated or supplied in accordance with the requirements of the applicable Colorado Department of Transportation specifications, plans, and standards. Examples of materials and products not found in the following four levels are Aggregate Base Course, Hot Bituminous Pavement, and Concrete.

SPECIAL NOTICE TO CONTRACTORS
- Continued -

A. PRE-INSPECTED:

Pre-Inspection is when representatives from the Colorado Department of Transportation visit a manufacturer's facility to perform an initial review of the company's quality control plan and employee certifications, as well as subsequent inspection visitations during the manufacturing of the product.

Products needing Pre-Inspection:

Bearing Devices (Type III) - Bridge[A]
Expansion Device - Bridge[A] (0-6", through, 0-24")
Prestressed Concrete Units - Bridge[A]
Structural Steel - Bridge[A]

B. CERTIFIED TEST REPORT (CTR):

The Certified Test Report level of acceptance is when a manufacturer is required to submit actual test results performed on the material being provided. A CTR shall contain the actual results of tests for the chemical analysis, heat treatment, and/or mechanical properties of the drawing and/or specification. The contract will designate products and assemblies that can be incorporated in the work, if accompanied by Certified Test Reports. The word preceding the Test Report may vary between different industries, such as Certified, Mill, Metallurgical, and Laboratory.

In accordance with Subsection 106.10 of the Standard Specifications and the requirements of this document, the report shall include:

1) The Department's project number
2) Manufacturer's name
3) Address of manufacturing facility
4) Laboratory name & address
5) Name of product or assembly
6) Complete description of the material
7) Model, catalog, stock no. (if applicable)
8) Lot, heat, or batch number identifying the material delivered
9) Date(s) of the laboratory testing
10) All test results are required to verify that the material furnished conforms to all applicable Department specifications. Test results shall be from tests conducted on samples taken from the same lot, heat, or batch.

SPECIAL NOTICE TO CONTRACTORS
- Continued -

The Certified Test Reports must be an original document, not a facsimile, with an original signature (including corporate title) by 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 tested, and the samples have passed all specified tests. One copy of the Certified Test Report shall be furnished to the Engineer at the time of material delivery. Failure to comply may result in delays to the project and/or rejection of the materials. Products or assemblies furnished on the basis of CTRs may be sampled and tested by the Department. If it is determined that the material does not meet the applicable specifications, the material may be rejected or may be accepted according to Subsection 105.03 of the Standard Specifications.

Below is a partial list of products or categories that require a Certified Test Report:

Bearing Devices (Type III) - Bridge[A]
Cribbing
Mechanical Fasteners (Field) [A]
Glass Beads (for pavement marking)
Overhead Sign Structures [A]
Top Soil
Traffic Signal Structures [A]

C. CERTIFICATE OF COMPLIANCE (COC):

The Certificate of Compliance level of acceptance is when a manufacturer is required to submit a document certifying that the material being provided meets all required Department specifications. A COC shall contain a reference to the actual tests for the chemical analysis, heat treatment, and/or mechanical properties of the drawing and/or specification. The contract will designate products and assemblies that can be incorporated in the work, if accompanied by Certificates of Compliance.

In accordance with Subsection 106.09 of the Standard Specifications and the requirements of this document, the certificate shall include:

1) The Department's project number
2) Manufacturer's name
3) Address of manufacturing facility
4) Laboratory name & address
5) Name of product or assembly
6) Complete description of the material

SPECIAL NOTICE TO CONTRACTORS
- Continued -

7) Model, catalog, stock no. (if applicable)
8) Lot, heat, or batch number identifying the material delivered
9) Date(s) of the laboratory testing
10) Listing of all applicable specifications required by the Department for this particular product or assembly. Certificates shall reference the actual tests conducted on samples taken from the same lot, heat, or batch.

The Certificate of Compliance must be an original document, not a facsimile, with an original signature (including corporate title) by 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 tested, and the samples have passed all specified tests. One copy of the Certificate of Compliance shall be furnished to the Engineer at the time of material delivery. Failure to comply may result in delays to the project and/or rejection of the materials. Products or assemblies furnished on the basis of COCs may be sampled and tested by the Department. If it is determined that the material does not meet the applicable specifications, the material may be rejected or may be accepted according to Subsection 105.03 of the Standard Specifications. (An example of what is required on a Certificate of Compliance is on page 11 of this chapter.)

Below is a partial list of products or categories that require a Certificate of Compliance:

Note 2: If the Plans do not specifically reference a Certified Test Report (Mill Test Report) and the product category is not depicted on the Approved Products List within the Pre-Approved level of acceptance, then a COC will be required.

Bearing Devices (Type I, II, IV and V [A B])
Bridge Deck Forms, Permanent Steel [A]
Bridge Rail, Steel [A]
Concrete Box Culverts, Precast
Dampproofing, Asphalt
Dust Palliative - Asphaltic – Magnesium Chloride
Emulsified Asphalt for Tack Coat
Erosion Bales [D]
Expansion Joint Material, Preformed Filler
Flumes (all types)
Gabions and Slope Mattress
Gaskets
Guard Rail - End Anchors
Guard Rail Metal [A]

SPECIAL NOTICE TO CONTRACTORS
- Continued -

Guard Rail Posts - Metal [A]
Guard Rail - Precast
Guard Rail Posts - Timber Blocks and Posts [A]
Hay [D]
Headgates
Inlets, Grates and Frames (Prefab)
Interior Insulation
Lighting
Light Standards, High Mast
Light Standards, Metal
Luminaires (Inclusive)
Manholes, Rings and Covers (Prefab)
MC-70 - Prime Coat (Liquid Asphalt)
MSE Wall - Elements[A,C]
Pedestrian Bridge [A]
Piling [A]
Pipes - all material compositions
Rest Area Materials
Seed [C]
Sign Panels
Sprinkler System(s)
Steel Sign Posts
Structural Plate Structures [A]
Structural Steel Galvanized [A]
Steel Sheet Piling [A]
Straw [D]
Treated Timber
Wood Cellulose Mulch

D. PRE-APPROVED:

The Pre-Approved level of acceptance is when a manufacturer is required to submit all relevant documentation on their product in advance of any specific project. A primary requirement to be considered for the Approved Products List (APL) is that the material retains a very high level of uniformity and consistency in its production quality.

The submittal of Certified Test Reports, Certificates of Compliance, product literature, etc., as well as product samples for evaluation combine all previous levels of acceptance into one.

SPECIAL NOTICE TO CONTRACTORS
- Continued -

In accordance with CDOT's Procedural Directive 3.1, a manufacturer's product is evaluated within CDOT to determine its acceptability on CDOT construction projects, as defined by CDOT specifications, plans and standards. For additional information on the APL or the web site contact the Product Evaluation Coordinator within the Central Laboratory at 303-757-9421.

Note 3: Web Site Address, Internal to CDOT:
http://internal/infoexchg/organizations.htm

Web Site Address, External to CDOT:
http://www.dot.state.co.us/APL/

Note 4:

A A Mill Test Report shall be included.

B A Certified Test Report(s) on components must accompany the material or product.

C A Certified Test Report shall be included.

D The Contractor may obtain a current list of Weed Free Forage Crop Producers by contacting the Colorado Department of Agriculture at (303) 239-4149.

DISCLAIMER: The Colorado Department of Transportation (CDOT) does not have the obligation to use any of the products listed in the Approved Products List (APL). \The APL simply documents that the listed products have been tested, evaluated, and/or examined under CDOT standards, and were found to be acceptable to be used in CDOT projects. The product shall be removed from the APL if Product Performance comments indicate field performance that is unacceptable to CDOT quality standards or if the product varies from the data as originally submitted. Additional disclaimer information can be found within the APL web site.