THE CITY OF THORNTON
9500 CIVIC CENTER DRIVE
THORNTON, CO 80229-4326

Technical Specifications
For
Construction of

100TH AVENUE SIDEWALK IMPROVEMENTS

PROJECT NO. 21-78

FEBRUARY 2025

TECHNICAL SPECIFICATIONS

CITY OF THORNTON
100th Avenue Sidewalk Improvements
Project No. 21-78

The latest editions of the 2022 CDOT Standard Specifications for Road and Bridge Construction and Thornton Engineering Construction Standards and Specifications control construction of this project.

The following special provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and Plans.

PROJECT SPECIAL PROVISIONS

DIVISION 100 – GENERAL PROVISIONS

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REVISION OF SECTION 202 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

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REVISION OF SECTION 412 PORTLAND CEMENT CONCRETE PAVEMENT

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~~REVISION OF SECTION 514 PEDESTRIAN AND BIKEWAY RAILING~~

REVISION OF SECTION 602 REINFORCING STEEL

~~REVISION OF SECTION 603 CULVERTS AND SEWERS~~

REVISION OF SECTION 608 SIDEWALKS AND BIKEWAYS

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REVISION OF SECTION 613 TRAFFIC SIGNAL, LIGHTING, AND COMMUNICATION CONDUIT

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REVISION OF DIVISION 100
GENERAL PROVISIONS

Unless otherwise noted, all Division 100 General Provisions are deleted and replaced with the City of Thornton's Contract Documents included in Volume 1.

Any references to Division 100 in Divisions 200 through 700 are removed. The City of Thornton General and Special Provisions shall apply for any removed provisions.

Other General Provisions:

1. **The City's standard details are referenced on the Construction Plans and utilized for this project. Some of the details have been modified for the specific needs of this project. The Contractor shall use the City's standard details shown on the Construction Plans. Should a standard detail be required for construction of proposed improvements and that details is not shown on the Construction Plans, the Contractor shall obtain that standard detail from the City's website.**

1
REVISION OF SECTION 201
CLEARING AND GRUBBING

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

Subsection 201.01 shall include the following:

Any clearing, grubbing, and tree trimming/removal activities that occur between 1 April and 31 August requires a migratory bird nest check by a qualified biologist to make sure no occupied nests are affected by these activities. Work outside of this nesting season can occur without this check. The Contractor shall coordinate this work through the Engineer.

All trees and shrubs adjacent to and within the project limits shall be protected with the exception of those specified within the Plans to be removed.

Removal of small brush and trees with trunk diameter (caliper) less than 6-inches will not be measured and paid for separately but shall be included in the work.

Temporary easement areas shall not be cleared and grubbed unless absolutely necessary for construction purposes. Limits of clearing and grubbing shall be field verified by the Owner after field staking has been completed and prior to clearing and grubbing.

Subsection 201.02 shall include the following:

The Contractor shall make necessary arrangements for obtaining suitable disposal locations. If disposal will be at other than established dump sites, the City may require the Contractor to furnish written permission from the property owner on whose property the materials and debris will be placed.

In subsection 201.02 delete the 3rd, 4th, and 5th paragraphs and replace them with the following:

Surface objects and trees, stumps, roots, and other protruding obstructions not designated to remain shall be cleared and/or grubbed as required, to ensure complete removal; however, nonperishable, non-toxic objects which shall be a minimum of two (2) feet below subgrade may remain when such objects will not impede other subsurface operations.

Except in areas to be excavated, stump holes, and other holes from which obstructions are removed shall be backfilled with suitable material and compacted in accordance with subsection 203.06. Materials and debris shall be disposed of in a manner acceptable to the City.

Burning of any materials shall not be permitted without prior written approval of the City, the County Health Department, and Fire Department. If permitted, perishable material shall be burned under the constant care of the Contractor, at times and in a manner that will not endanger the surrounding vegetation, adjacent property, or objects designated to remain. Burning shall be done in accordance with applicable laws and ordinances.

2
REVISION OF SECTION 201
CLEARING AND GRUBBING

In subsection 201.02 delete the 7th paragraph and replace it with the following:

Branches of trees or shrubs shall be removed as directed by the City. Branches of trees extending over the road bed shall be trimmed to give a clear height of 16 feet above the road bed surface. Trimming shall be done by skilled workmen and in accordance with good tree pruning practices. Hedges shall be pulled or grubbed in such a manner as to assure complete and permanent removal.

In subsection 201.04 delete the 4th paragraph and replace it with the following:

If approved of by the City prior to the work, clearing and grubbing beyond the limits designated under this item will be paid for as Extra Work in accordance with Section 8 of the City of Thornton's General Conditions.

Subsection 201.04 shall include the following:

Trimming of tree and shrub branches is considered incidental to Clearing and Grubbing.

Payment will be made under:

Pay Item	Pay Unit
Clearing and Grubbing	Each

END OF SECTION REVISION

1
REVISION OF SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS

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

In Subsection 202.02 delete the 1st paragraph and replace it with the following:

The Contractor shall raze, remove, and dispose of foundations, signs, structures, fences, pavements, utilities, traffic signal materials, and other obstructions, which are designated for demolition within the project limits, except for utilities and for materials which are to be preserved or salvaged.

Subsection 202.02 shall include the following:

Where portions of structures are to be removed, the remaining portions shall be prepared to fit new construction. The work shall be done in accordance with plan details and in such a manner that materials to be left in place shall be protected from damage. Damage to portions of structures which are to remain in place shall be repaired at the expense of the Responsible Party. Reinforcing steel, projecting from the remaining structure, shall be cleaned and aligned to provide bond with new extension. Dowels shall be securely grouted with City-approved grout. Remaining structures are to be delineated in the as-built drawings.

Storm sewers, culverts, waterlines, and other conduits that are to be removed shall be saw-cut, completely removed, and disposed of off-site. Storm sewers, culverts, waterlines, and other conduits that are to be abandoned in place shall be saw-cut, and completely filled with flash or flow fill. All of the Contractor's costs, for removing and disposing of conduits or abandoning conduit pipes in place shall be included in the bid price for the particular item that requires removal and/or abandonment of structures and obstructions.

Subsection 202.03 shall include the following:

Millings:

Millings from the portions of the asphalt removal identified to be milled (aka: planed) will be considered property of the Contractor.

Hauling and disposal of the asphalt millings will not be measured and paid for separately, but shall be included in the work.

2
REVISION OF SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Subsection 202.04 shall include the following:

Removal of Traffic Signal Equipment:

Removal of Traffic Signal Equipment shall include removal and salvage of pedestrian indications, pedestal poles, footings (removed two feet below final grade), pull boxes, fiber optic location markers, all attachment hardware, attached signs, traffic signal controller and cabinet and all auxiliary equipment contained within the cabinet, all incidental equipment, except as noted on the plans, and backfill with suitable material and compacted in accordance with subsection 203.06, Existing foundations and pull boxes designated for removal shall be removed and backfilled with suitable material and compacted in accordance with subsection 203.06.

Removal of Pedestrian Push Button:

Removal of Pedestrian Push Button shall include removal and salvage of existing push buttons, signs, and attachment hardware, and removing and/or capping wires, and patching the resulting hole in the traffic signal pole in a manner acceptable to the City.

The Contractor shall contact the City for designation of salvable traffic signal equipment. All salvable material shall be removed, without unnecessary damage and delivered to the location provided by the City. The Contractor shall be held responsible for the safekeeping of all salvable materials during the period of the Contract until they are delivered to the City's location. The Contractor shall make good or replace at his own expense any such materials damaged, stolen, or otherwise lost prior to receipt by the City.

Subsection 202.11 shall include the following:

When specifically noted on the drawings, the Removal of Full Depth Asphalt Pavement shall include the removal of all aggregate base course material below the asphalt to subgrade soil. The removal of aggregate base course under existing asphalt shall be considered incidental to Removal of Full Depth Asphalt Pavement.

There will be no measurement and payment for saw cutting required for the removal of asphalt and concrete. Saw cutting shall be considered incidental to bid items which require saw cutting.

~~The Removal of Trees shall include tree stumps and roots by pre-approved methods by the City. Remove stumps and roots of removed plants to depths needed for installation of new plants and/or improvements. Fill voids left by stump/root removal with suitable material and compacted in accordance with subsection 203.06. The Contractor shall visit the site to view all trees that are designated to be removed and adjust bid price appropriately to account for all required work. Several trees have multiple trunks. Removal of trees with multiple trunks shall be considered removal of one tree.~~

Removal of concrete flatwork shall include: over excavation; moisture conditioning the over excavated soil; replacing and compacting the over excavated soil, providing suitable material if the over excavated soil is not suitable; disposal of unsuitable material; all in accordance with the soils report to provide a suitable base for fill and/or the pavement section.

Measurement for payment for Removal of Brick Column shall be per each brick column removed and accepted by the City in accordance with the Plans and Specifications. Removal of Brick Column shall include all materials required for a complete brick column, including but not limited to, removing brick, concrete, mortar, reinforcement, cap stone and foundation. The void left from removal of the column and foundation shall be filled with suitable material and compacted in accordance with subsection 203.06. This work and the suitable material required for filling and compacting the void is considered incidental to Removal of Brick Column. The Contractor shall visit the site to inspect the existing brick column structures to understand all elements required to remove the brick columns and adjust bid price accordingly.

Materials and debris shall be disposed of in a manner acceptable to the City.

Subsection 202.12 shall include the following:

Payment includes all labor, equipment, saw cutting, and materials necessary to complete the work. All costs associated with stockpiling, safekeeping, and delivering salvaged materials to the City of Thornton shall be included in the work.

No material or debris shall be disposed of within the project limits without the written permission of the City. The Contractor shall advise the City in writing of the intended disposal site before the disposal site is used; and provide documentation confirming the property owner's acceptance of such materials.

There will be no separate measurement or payment of removal of different types of fencing and gates. All types of fencing and gates shall be measured and paid for under pay item Removal of Fence.

Payment will be made under:

Pay Item	Pay Unit
Removal of Asphalt Full Depth	Square Yard
Removal of Asphalt Planning	Square Yard
Removal of Concrete	Lump Sum
Removal of Structures and Obstructions	Lump Sum
Removal of Ped Pole and Traffic Signal Pole	Lump Sum

END OF SECTION REVISION

1

SECTION 203
EXCAVATION AND EMBANKMENT

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

Subsection 203.03 shall include the following:

All fill material shall be free of vegetation, brush, sod and other deleterious substances and should not contain rocks, debris or lumps having a diameter of more than 4 inches.

~~**Subsection 203.05 (c) shall include the following:**~~

~~The bid item for Muck Excavation shall not be used without prior approval from the City.~~

Subsection 203.05(e) shall include the following:

Stripping shall not be completed outside of the limits of construction or limits of disturbance.

Subsection 203.06, 2nd paragraph shall include the following:

Excavated or removed asphalt mat shall not be used in embankments.

In Subsection 203.11 delete the 1st paragraph.

Subsection 203.11 shall include the following:

Earthwork will not be measured and paid for separately but shall be considered incidental to the item as required.

2
SECTION 203
EXCAVATION AND EMBANKMENT

In Subsection 203.11 delete subsections (a) and (b) and replace with the following:

Quantities for Unclassified Excavation and Embankment Complete in Place shall not be measured, but shall be the quantities designated in the Contract. The Contractor is responsible for verifying the quantities prior to completing their bid. If the Contractor believes that the quantities for Unclassified Excavation and Embankment required to complete the work are different than those presented in the Contract, then the Contractor shall adjust their bid prices accordingly.

Stripping will not be measured and paid separately but shall be considered incidental to the bid items for paving.

In Subsection 203.11 delete subsection (f) and replace with the following:

Proof Rolling will not be measured and paid for separately, it shall be included in the cost of the project.

Subsection 203.12 shall include the following:

Disposal of unsuitable material and importing suitable material will not be paid for and shall be considered incidental to the bid item for Muck Excavation. The bid item for Muck Excavation shall include but is not limited to excavation, haul, disposal of unsuitable material, importing suitable material, moisture conditioning, compaction, water, and all labor, materials, and equipment required to removal and replace unsuitable material.

Payment for Unclassified Excavation (Complete in Place) and Embankment Material (Complete in Place) shall be considered full compensation for all work necessary to complete the earthwork to the lines and grades shown on the Plans. No measurement for payment will be made for this work. This work shall include but is not limited to scarification, wetting and drying of soils to obtain optimum moisture content, compaction, testing, hauling, disposal of excess materials off the jobsite including dump fees. Directed changes will be estimated by the City and agreed to by the Contractor to be paid (or deducted) at the bid unit price.

Payment will be made under:

Pay Item	Pay Unit
Potholing	Hour

END OF SECTION REVISION

1
REVISION OF SECTION 208
EROSION CONTROL

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

Subsection 208.01 shall include the following:

The Contractor shall provide routine inspection and maintenance of final erosion control BMPs and temporary BMPs left on-site for one year after final acceptance of the project by the City. This work shall be completed in accordance with the requirements of this section.

After one year, the Contractor shall remove all temporary BMPs. Inspection reports shall be delivered to the City within 48 hours after each inspection. When maintenance is required, the Contractor shall notify the City 48 hours prior to completing maintenance. The Contractor shall anticipate 24 inspections (twice monthly).

Subsection 208.02 (l) shall include the following:

Pre-Fabricated Concrete Washout Structures are pre-manufactured watertight containers designated to contain liquid and solid waste from concrete washout. (Baby pools will not be permitted)

The Contractor shall submit details of the portable concrete washout structure for approval prior to construction. After use, the structure must be removed from the project site and disposed of at the Contractor's expense.

Subsection 208.05 (o) shall include the following:

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.

Subsection 208.11 shall include the following:

There will be no measurement and payment made for erosion control maintenance before final acceptance of the project.

There will be measurement and payment made for erosion control maintenance after final acceptance of the project under Erosion Control Maintenance (1-Year).

In subsection 208.11 delete the 1st paragraph and replace it with the following:

Erosion Control Management will not be measured and paid for separately but shall be considered incidental to the project regardless of the number of erosion control inspections required. Erosion Control Management shall include, but is not limited to, erosion control inspections, documentation, meeting participation, SWMP Administration, and the preparation of the SWMP notebook.

There will be no separate measurement or payment for maintenance of individual BMPs while under the Erosion Control Maintenance (1-year) pay item. Erosion Control Maintenance includes, but is not limited to, removal of sediment, and adjustment of erosion logs and/or silt fence.

In subsection 208.12 delete the 5th paragraph after the list of pay items.

2
REVISION OF SECTION 208
EROSION CONTROL

Section 208.12 shall include the following:

Erosion Control Management, Removal and Disposal of Sediment (Equipment), Removal and Disposal of Sediment (Labor), Sweeping and Trash Removal, Stabilized Staging Area, Stockpile Management, Dust Control, and Good Housekeeping Practices are required as part of the project SWMP and ESCP but will not be measured and paid for separately but shall be considered incidental to the project.

Payment will be made under:

Pay Item	Pay Unit
Stormwater and Erosion Control	Lump Sum

The cost of installing and maintaining Concrete Washout Structure(s) throughout the Project duration shall not be measured and paid for separately but shall be included in the work.

The Contractor shall be responsible for identifying and implementing all measures to prevent or minimize erosion and sedimentation both during and after construction.

Temporary erosion and sediment control measures as well as waste management measures that are required due to the Contractor's negligence, carelessness, or failure to install erosion controls as a part of the work, or as scheduled, shall be performed at the Contractor's expense.

Work to furnish, install, maintain, remove, and dispose of erosion and sediment control features shall not be measured and paid for separately but shall be included in the work.

END OF SECTION REVISION

1

REVISION OF SECTION 209
WATERING AND DUST PALLIATIVES

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

Subsection 209.02 shall include the following:

The Contractor is responsible for obtaining a legal source for water to complete the work as specified in the Contract Documents, including any necessary permits or fees.

Delete subsection 209.07 and 209.08 and replace with the following:

Water required for all work covered under the Contract will not be measured and paid for separately but shall be included in the work. Contractor shall obtain a water meter, for a refundable deposit, from the City of Thornton, which is to be used for site project watering.

END OF SECTION REVISION

1
REVISION OF SECTION 210
RESET STRUCTURES

Section 210 of the Standard Specifications is hereby revised for this project as follows:

Subsection 210.02 shall include the following:

Reset Survey Monument consists of removing survey monuments that are in conflict with the work and resetting them at their locations shown on the Right-of-Way Plans. Refer to Section 625.08 for more information on Reset Survey Monument.

Delete subsection 210.06 and replace it with the following:

Mailboxes complete with supporting structures are to be removed and temporarily reset at points near their original location to be accessible for mail delivery service.

The mailbox on this project has a brick column supporting structure. The intention is to remove the mailbox and brick column supporting structure and install a new mailbox and supporting structure in the new location. The work associated with removing the brick column supporting structure is included in the pay item Removal of Brick Column.

The Reset Mailbox pay item shall include installing a new mailbox and new Type 1 support structure in accordance with CDOT Standard Plan M-210. Reset Mailbox also includes installing a temporary mailbox near the original location for mail service during construction. Installing a new and temporary mailbox, including but not limited to a support post, base, mounting brackets, and hardware will not be measured or paid for separately but shall be included in the bid item for Reset Mailbox.

Delete subsection 210.07 and replace it with the following:

Signs and posts designated to be reset shall be removed, cleaned and reset at the designated locations. The work for Reset Ground Sign shall include all work necessary to provide the existing posts with break-away devices, where required, and shall include a new anchor and hardware and attaching the existing sign to a salvaged or new post. Sign anchors and posts shall meet the City of Thornton's Standard details 700-11 and 700-12 respectively. Should existing posts be damaged or not meet the City's current standards, a new post shall be used. New posts, anchors, and hardware will not be measured or paid separately, the cost shall be included in the Reset Ground Sign pay item.

Subsection 210.09 shall include the following:

Reset Traffic Controller and Cabinet shall include all of the Contractor's costs of whatsoever nature to complete the pay item in accordance with the Plans, City of Thornton's Traffic Technical Specifications, and the project Specifications by providing a traffic controller and cabinet in fully functional condition, including but not limited to removing the existing traffic controller and cabinet from the existing foundation, rewiring and connecting to new foundation, furnishing, transporting, and placing all materials per the Plans and Specifications and providing all other related and necessary labor, equipment, and materials required to complete the work to a condition accepted and approved by the City. Construction and payment for a new controller cabinet foundation shall be conducted in accordance with Section 614.

2
REVISION OF SECTION 210
RESET STRUCTURES

Subsection 210.10 shall include the following:

When the project includes planing prior to resurfacing, the Contractor shall first lower all valve boxes and manholes below the surface to be planed and then adjust them up to final grade after the paving operation is complete. This work will not be measured and paid for separately but shall be included in the work.

Prior to the final inspection, the Contractor shall thoroughly clean all valve boxes designated for cleaning. This work will not be measured and paid for separately but shall be included in the work.

The Contractor shall coordinate and conduct, with the Engineer and each Owner, a final inspection upon completion of construction. This inspection shall assure that all valve boxes and manholes are in compliance with these requirements. The Contractor shall obtain the Owner's written approval before accepting the work.

Subsection 210.12 shall include the following:

~~Reset Survey Monument shall include all work, equipment, and labor necessary to remove and replace the survey monument~~.

Reset Ground Sign will be measured and paid for each ground sign that is reset and accepted by the City. Footings, sign posts, anchors, sign panels, mounting and backing angles, and hardware will not be measured separately but shall be considered incidental to the unit price bid for Reset Ground Sign.

~~Reset Mailbox~~ will be measured and paid for each new permanent mailbox that is reset ~~and accepted~~ by the City, which ~~includes installing~~ a temporary mailbox for mail service ~~during~~ construction.

Reset Traffic Controller and Cabinet ~~will be~~ measured ~~and paid~~ for each complete controller and cabinet assembly reset ~~and accepted~~ by the City. Payment for construction ~~of the~~ foundation shall be made ~~under~~ the pay item Traffic Signal Controller Cabinet Foundation.

Subsection 210.13 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Reset Ground Sign	Lump Sum

END OF SECTION REVISION

1
REVISION OF SECTION 211
WATER CONTROL AND DEWATERING

Section 211 of the Standard Specifications is hereby added for this project as follows:

DESCRIPTION

211.01 The work of this section consists of controlling groundwater, site drainage, and storm flows during construction. Contractor is cautioned that the work might involve construction in and around drainage channels, local rivers, and areas of local drainage. These areas might be subject to frequent periodic inundation. The Contractor shall provide proper water control and dewatering to complete all work in dry conditions. The Contractor shall submit a water control and dewatering plan to the City for review and approval prior to construction.

MATERIALS

211.02 On-site materials may be used within the limits of construction to construct temporary dams and berms. Materials such as plastic sheeting, sandbags, and storm sewer pipe may also be used if desired by Contractor.

CONSTRUCTION REQUIREMENTS

211.03 **General** – For all excavation, Contractor shall provide suitable equipment and labor to remove water, and shall keep the excavation dewatered so that construction can be carried on under dewatered conditions. Water control shall be accomplished such that no damage is done to adjacent channel banks or structures. Contractor is responsible for investigating and becoming familiar with all site conditions that may affect the work including surface water, potential flooding conditions, level of groundwater and the time of year the work is to be done. All excavations made as part of dewatering operations shall be backfilled with the same type material as was removed and compacted to ninety five percent (95%) of Maximum Standard Proctor Density (ASTM D698) except where replacement by other materials and/or methods is required.

Contractor shall conduct operations in such a manner that storm or other waters may proceed uninterrupted along their existing drainage courses. By submitting a bid, Contractor acknowledges that Contractor has investigated the risk arising from such waters and has prepared his bid accordingly, and assumes all of said risk.

At no time during construction shall Contractor affect existing surface or subsurface drainage patterns of adjacent property. Any damage to adjacent property resulting from Contractor's alteration of surface or subsurface drainage patterns shall be repaired by Contractor at no additional cost to the City.

Contractor shall remove all temporary water control facilities when they are no longer needed or at the completion of the Project.

Pumps and generators used for dewatering and water control shall be quiet equipment enclosed in sound deadening devices.

2
REVISION OF SECTION 211
WATER CONTROL AND DEWATERING

211.04 **Surface Water Control** – Surface water control generally falls into the following categories:

- Normal low flows along the channel
- Storm/flood flows along the channel
- Flows from existing storm drain pipelines; and
- Local surface inflows not conveyed by pipelines

Contractor shall coordinate, evaluate, design, construct, and maintain temporary water conveyance systems. These systems shall not worsen flooding, alter major flow paths, or worsen flow characteristics during construction. Contractor is responsible to ensure that any such worsening of flooding does not occur. Contractor is solely responsible for determining the methods and adequacy of water control measures.

At a minimum, Contractor shall be responsible for diverting the quantity of surface flow around the construction area so that the excavations will remain free of surface water for the time it takes to install these materials, and the time required for curing of any concrete or grout. Contractor is cautioned that the minimum quantity of water to be diverted is for erosion control and construction purposes and not for general protection of the construction site. It shall be the Contractor's responsibility to determine the quantity of water which shall be diverted to protect the work from damage caused by storm water.

Contractor shall, at all times, maintain a flow path for all channels. Temporary structures such as berms, sandbags, pipeline diversions, etc., may be permitted for the control of channel flow, as long as such measures are not a major obstruction to flood flows, do not worsen flooding, or alter historic flow routes.

211.05 **Groundwater Control** – Contractor shall install adequate measures to maintain the level of groundwater below the foundation subgrade elevation and maintain sufficient bearing capacity for all structures, pipelines, earthwork, and rock work. Such measures may include, but are not limited to, installation of perimeter subdrains, pumping from drilled holes or by pumping from sumps excavated below the subgrade elevation. Dewatering from within the foundation excavations shall not be allowed. The foundation bearing surfaces are to be kept dewatered and stable until the structures or other types of work are complete and backfilled. Disturbance of foundation subgrade by the Contractor operations shall not be considered as originally unsuitable foundation subgrade and shall be repaired at the Contractor's expense. Any temporary dewatering trenches or well points shall be restored following dewatering operations to reduce permeability in those areas as approved by the City.

Any groundwater shall not leave the construction site and shall be handled in accordance with CDPHE's low risk discharge guidance policy.

METHOD OF MEASUREMENT

211.06 No separate measurement will be made for water control and dewatering. It is not measured and paid for separately, but included in the work.

BASIS OF PAYMENT

211.07 No separate payment will be made for water control and dewatering. It is considered incidental to other work to which it relates.

END OF SECTION REVISION

1

REVISION OF SECTION 212
SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

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

DESCRIPTION

This work shall consist of amending all seed and sodding areas with organic matter, inoculants, and a separate surface application of a biological nutrient.

MATERIALS

Mycorrhizae inoculant product for all seeded and planted areas. Mycorrhizal Innoculum AM120.

Biological nutrient (Biosol), all-purpose fertilizer 7-2-3. The biological nutrient shall be: 96% fungal biomas (dry mycelium), 1% water, and 3% potassium-magnesia.

Compost; A-1 organics compost or equal, must be produced at a composting facility meeting EPA 40 CFR 503.13 requirements.

PREPARATION

Existing soils in areas to be seeded shall be ripped and tilled prior to incorporating amendments. Areas with existing grasses and forbs shall be eradicated with applications of a systemic, non- selective herbicide such as glyphosate or approved equal and applied by a licensed applicator prior to ripping and tilling. Minimize tilling of soil within 8 ft of existing trees to avoid damaging root systems.

CONSTRUCTION REQUIREMENTS

Apply compost to all areas to be seeded at a rate of 6 cubic yards per 1000 square feet. Compost shall be worked thoroughly and evenly to an 8-inch depth.

Apply mycorrhizae inoculant to all seeded and planted area 20 lbs per acre. Thoroughly work into soil to an 8-inch depth per native seed guidelines on the following pages.

Apply biological nutrient after seeding and planting and before application of fabric and mulch; this includes all sod areas, native seeding, and tree planted areas. No fertilizer shall be applied for wetland seeded areas. Apply at a rate of 1500 lbs per acre to the soil surface; do not work into the soil. No other fertilizer is recommended. Apply prior to placing erosion control blankets.

2
REVISION OF SECTION 212
SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

Subsection 212.06 Native Seeding shall include the City of Thornton Natural Seed Areas Installation and Maintenance Standards as follows:

I. Seed Bed Preparation

1. After City approval of weed eradication (herbicide application as appropriate), the seedbed shall be ripped (plow, chisel, disc/harrow) and worked to minimum 18" depth. Compacted roadways or other areas, in the sole opinion of the Owner, shall be ripped to 24" depth. The seedbed shall be free of debris, including weeds, plant matter, rocks, clods and other impervious material over 1" in diameter. Seedbed shall be smooth and free of large clumps, fluffy yet firm, moist but not wet. When walking across the bed, a shoe imprint in the soil should not be deeper than 1". COT will approve results of seedbed preparation before addition of soil amendment and may approve a 'no till' seed bed preparation.
2. Preparing the seedbed should be timed with planting dates to conserve soil moisture and prevent wind and water erosion. Seeding data shall include a timeline that incorporates control of weed emergence and growth, including after incorporation of amendment to the bed. Seeding of irrigated grasses may occur throughout the growing season, but for best results, provide amended weed free seeding bed for Owner approval by April 15t, to incorporate a final weed kill. Seed irrigated warm season grasses by May 15th. Dryland seeding of non-irrigated warm and cool season grasses should occur between December 1 and May1. If seeding occurs outside this timeframe, an alternative maintenance plan must be approved by the City.

3. **Soil amendment:** Submit representative soil tests to City before ordering amendment. Submit all load tickets and seed tags.
   - **REQUIRED** Up to 3 cy/1000 SF 'Biocomp' Class 1 non-manure based compost, screened to 3/8" minus and free from stones, lumps, plants, roots, sticks, weed stolons, seeds, high salt content and other materials harmful to plant life; minimum 25% and maximum 35% organic matter measured on dry matter basis; pH range 6.0 to 7.0; EC electrical conductivity (soluble salts) of less than 2.0 mmhos/cc @1:5; carbon nitrogen C:N ratio 10-12 to 1 (Available at A-1 Organics, or approved equal); submit a one gallon sample with a laboratory analysis specific to the sample and dated within thirty days of date of submittal for approval at least 14 days prior to site delivery.
   - **PLUS** Combined total 1200 lb/Ac if high organic results up to 1800 lbs/Ac if low organic results
     - Biosol min 800lb/Ac topically applied after drilling and before mulching or mixed into hydro-mulch (Pawnee Buttes Seed Company, Rocky Mountain Bio Products, Arkansas Valley Seed, etc.)
     - Humate min 400 lb/Ac or ½ the amount/Ac Biosol
   - **OR** approved equal per soil test results

3
REVISION OF SECTION 212
SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

II. Planting

1. A site survey shall be provided showing finished grades installed as designed, prior to seeding operations.
    - City standards are 4:1 maximum slope unless divergence is authorized in writing. Slopes approved as 3:1 shall be covered with biodegradable erosion control blankets.
    - Prior to seeding, the project will be inspected for appropriate weed control, tilled/ripping of compacted areas, proper mixing of amendments, the finish rake for proper height at hard surfaces (walks, valve boxes, heads), hi/low areas, debris removal, etc.
    - Before planting, COT will approve results of incorporation of amendment into seedbed.
2. Provide the seed mix for City approval. In most cases, seeding rate for non-irrigated areas is minimum 18 lbs PLS/Ac or minimum 3 lbs PLS/1000sf. Seeding rate for irrigated areas is 30 lbs PLS/acre or minimum 3 lbs PLS/1000sf. If approved, double the rate for all broadcast seeding. Seed tags, certified copy of seed analysis and load tickets for soil amendment are required.
3. Seeding should take place immediately after soil preparation. Seed shall be evenly distributed over amended ground on a still day into a slightly moist seedbed, using an approved grass drill with double disc openers, packer wheels and (fluffy) seed boxes. As appropriate, drill equal quantity of seed ¼" deep in two directions at right angles to each other. Hand-broadcast methods shall be at double the seeding rate and shall be hand raked or otherwise covered with soil to a depth of ¼". Hydraulic seeding can only be used in areas not accessible for machine methods; seed and mulch shall not be applied in the same operation.
4. All dryland and irrigated seed areas shall be hydromulched with virgin wood fiber (not produced from paper or recycled material) in a separate application after drilling. Mix water, 2000 lbs/Ac of mat fiber mulch and 100 lbs/Ac of tackifier, or at manufacturer's recommended rates whichever is greater.
    - Hydraulic mulching shall not be performed in the presence of free surface water. In areas not able to be hydromulched, cover all seeded area with 100% biodegradable straw blankets with biodegradable blanket pins.
    - With prior approval, a weed and seed free wood straw mulch at 2 tons per acre may be applied to non-irrigated areas.
5. If irrigated, water seeded area frequently and lightly within 12 hours of seeding. Water enough to keep the soil moist but not so heavily as to cause soil washing and loss of the grass seed.
6. Germination during the growing season is expected within 3-6 weeks. Spot re-grading, reseeding and mulching shall immediately be required for areas of little or no germination and to repair areas damaged by erosion, wind, vandalism, fire or other causes.
7. Flower/forbes seed may be added to mixes where grasses will not be frequently mowed but shall not substitute for quantities of seed. Species that readily reseed themselves seem to work best.
8. Trees and shrubs in native include an 8' mulch ring. Mark shrub plant material locations with a colored steel stake.

REVISION OF SECTION 212
SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

III. Establishment

1. Keeping the seed moist is the key to germination and initial growth. The first season, water native seed the same amount sod requires, but at more frequent intervals. After the first season, grasses need minimum ¾"-1" water/week, generally between March 1st and November 1st to not go early dormant.
2. A healthy stand of irrigated native grass may take 2-4 years and non-irrigated 5-6 years to establish and receive Initial Acceptance.
   - Design the irrigation system for 'head-to-head' or appropriate coverage, using rotor and spray heads with matched precipitation rates. Trees and shrubs in seed areas require bubbler irrigation zoned separately from seeded areas.
   - Establishment irrigation means applying water a minimum 2 times/day until seed germinates to the three-leaf stage. After the three-leaf stage and until the grass is 3-4" tall, water 2 times/day with a total 3/10" water/day.
   - For the next two growing seasons (April-October), generally water 1" every two weeks. Adjust establishment irrigation inches by natural precipitation amounts. After two seasons, water is applied to create a landscape style, generally 1" water/month.

IV. Maintenance / Weed Control Before Initial Acceptance

1. Hand pulling of weeds is expected in the first 3-12 months. Inspect the planting area every 2-3 weeks for weed pressure.
2. Continue to remove all non-organic litter and debris larger than 2" in size, such as rocks, plastic, paper, metal and glass and dispose of off-site.
3. Appropriate herbicide applications to manage broadleaf and annual weeds is preferred over mowing and string trimming operations. No mowing the first year. Prairie dog management may be a necessary requirement.
   - Use selected herbicides throughout the growing season that are labeled for use with the seed mix species.
   - Apply herbicide with the written approval of the City and as recommended by a professional applicator. The use of a selective, pre-emergent herbicide or equivalent is required in areas infested with Cheatgrass (Bromus tectorum) and other annual weeds. Herbicide application for control of annual winter growing weeds usually occurs near August 15th and final application for perennial weeds near October 15th.
4. If mowing is approved, generally no seed mowing for the first year. Dryland seed could be mowed one to three times in the first year and irrigated seed about every three weeks but always just above the new seedlings and no closer than 8". Remove weeds by hand over 6-8" tall, generally once a month.
   - Mow grass with a flail, rotary type rotary (Bush Hog) mower, not a sickle blade mower, to a height of 8". The goal of mowing is to knock down weeds to decompose as vegetative litter and contribute organic matter.
     - Until establishment, dryland seed should be mowed when weeds reach 12-24". Mow weeds before annual seed set.
     - In irrigated areas, mowing is discouraged; hand weeding should be employed.
   - In addition to mowing, infestations of noxious or competitive weeds including Cheatgrass (Bromus tectorum) require spot spraying with an appropriate herbicide by a professional applicator.
   - Do not mow in the fall. Keep vegetation tall throughout the winter to discourage prairie dogs and increase wildlife and especially bird habitat with seed heads for food.
   - After weed eradication and grass establishment, mowing is not required more frequently than once every two years nor necessarily helpful for continued grass health.

REVISION OF SECTION 212
SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

V. City Acceptance Criteria for Seeded Area

1. **Substantial Completion** of a project may be issued before native seed establishment meets applicable contract specifications and City standards, but Initial Acceptance will not occur until establishment standards, in the sole opinion of the Owner, have been met.
2. **Initial Acceptance** may occur when the City has received and approved all product certifications and quantities and given written acknowledgement that the designated area has been prepared, seeded, mulched and maintained to meet the specification requirements. Seeded areas will be accepted upon the establishment of an even, uniform grass cover of the seed varieties planted. The result is based on a visual evaluation indicating a uniform ground cover of about 90% germination with no bare spots larger than 6" diameter and the area free of weeds and surface irregularities (no rills and gullies), as determined by Owner. Re-seed any areas where seed has not germinated within the total seeding area. Continue this procedure until a successful stand of grass is growing and accepted by the Owner.
   - Contractor shall maintain seeded area until Initial Acceptance. Seeded areas will not be accepted in parts, but the maintenance period shall extend until all areas meet minimum establishment requirements.
   - Re-grading, reseeding, re-mulching and weed control is required until Initial Acceptance for areas of little or no seed germination and to repair areas damaged by erosion, wind, vandalism, wildlife, fire or other causes. All reseeding and maintenance expenses are the responsibility of the Contractor until Initial Acceptance.
   - Initial Acceptance of seed establishment also requires meeting the Stormwater Discharge and Army Corps of Engineers permit obligations and requirements, as applicable.
3. **Final Acceptance** may occur one year after Initial Acceptance when the stand of grass displays uniform coverage at minimum three to five leaf stage of the seed mix planted (minimum 80% healthy grass coverage over any 10 square foot area and bare spots not exceeding 10” by 10”), with all species of the mix being well represented, minimal weeds present and the area free of surface irregularities (no rills & gullies), as determined by the City.
   - Final Acceptance of seeded area shall meet Stormwater Discharge and Army Corps of Engineers permit obligations and requirements, as applicable.
   - Any areas that do not comply with Final Acceptance criteria shall be reseeded by the Contractor in accordance with these specifications, using specified materials and methods.
   - Hydromulch may not be required by the City in reseeded areas.

VI. **City generic Preferred Seed Mixes** or as approved per site (no annual rye)

1. Pawnee Buttes Seed Inc or approved equal www.pawneebuttesseed.com
   - (taller) Native Prairie Mix After amendment, seed minimum 18 lbs (dryland) up to 30 lbs (irrigated) PLS/Acre or 6 lbs PLS/1000 SF.
     i. (29%/3.0 PLS) Blue Grama
     ii. (25%/4.8 PLS) Buffalograss
     iii. (5%/6.0 PLS) Green Needlegrass
     iv. (20%/5.4 PLS/) Sideoats Grama
     v. (20%/10.4 PLS) Western Wheatgrass
     vi. (1%/.36 PLS) Sand Dropseed
     vii. Flower Mix suggestions, additional per acre
        1. Prairie Coneflower 1 lb/acre
        2. Blue Flax 2 lb/acre
        3. Ratibida, Liatris, Ipomopsis, Cleome, Monarda fistulosa, Fireweed, etc.
   - (shorter) Native Lawn Mix After amendment, seed minimum 18 lbs (dryland) up to 30 lbs (irrigated) PLS/Acre or 6 lbs PLS/1000 sf (no annual rye; no chemical weed control first growing season).
     i. 90 % Buffalo
     ii. 10 % Blue Grama

METHOD OF MEASUREMENT

The quantity of native seeding will not be measured but shall be the quantity designated in the Contract, except that measurements will be made for revisions requested by the Owner, or for discrepancies of plus or minus five percent of the total quantity designated in the Contract. The quantity of native seeding shall include soil preparation, fertilizer, soil conditioner, soil amendment, water, and seed and hydromulch applied, completed, and accepted.

The Contractor shall furnish the Engineer with seed certifications and analysis, fertilizer analysis, delivery tickets, and bag weight tickets prior to placing any seed or fertilizer.

Any seed or fertilizer placed by the Contractor without the Owner's approval will not be paid for.

7
REVISION OF SECTION 212
SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

BASIS OF PAYMENT

The accepted quantity of native seeding 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
Native Seeding	Acre

Payment shall be made at the applicable contract unit price for the Native Seeding and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Native Seeding maintenance and weed control of the seeded areas will not be paid for separately but shall be included in the work.

Soil preparation, water, seed, fertilizer, hydromulching, and soil amendment, and soil conditioning incorporated into the seeding and sodding will not be paid for separately but shall be included in the work.

Adjusting or readjusting seeding or fertilizing equipment will not be paid for separately but shall be included in the work.

END OF SECTION REVISION

1
REVISION OF SECTION 213
MULCHING

Section 213 of the Standard Specifications is hereby revised for this project as follows:

Subsection 213.03, paragraph (a) shall include the following:

Mulch shall be applied and maintained in all areas of seeding.

Subsection 213.04 and 213.05 shall include the following:

No separate measurement and payment will be made for hydromulch or crimping of mulch, it shall be included in the cost for Native Seeding.

END OF SECTION REVISION

1
REVISION OF SECTION 216
SOIL RETENTION COVERING

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

In Subsection 216.07, 1st paragraph, delete the last sentence and replace with the following:

No separate measurement and payment will be made for soil retention blanket, it shall be included in the cost for Native Seeding.

Earth anchors will not be measured and paid for separately, but shall be included as incidental to the work.

END OF SECTION REVISION

1
REVISION OF SECTION 304
AGGREGATE BASE COURSE

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

Delete Subsection 304.02 and replace it with the following:

Aggregate base course materials shall be from a source approved by the City. The Contract shall provide a submittal including all material properties for review and approval prior to construction.

Materials for the base course shall be Aggregate Base Course (Class 6) as shown in subsection 703.03 – Aggregate for Bases.

The Aggregate Base Course (Class 6) shall meet the gradation requirements and have a resistance value of at least 78 when tested by the Hveem Stabilometer method.

Acceptance will be based on random samples taken from each lift.

Subsection 304.04 shall include the following:

Prior to placing aggregate base course, the subgrade shall be reconditioned and prepared in accordance with Section 306 of the Project Specifications.

Materials shall be placed on an approved subgrade which has been proof-rolled within the past 24 hours and found to be stable and non-yielding. Should weather conditions change, such as freezing, precipitation, etc., aggregate base materials shall not be placed until the subgrade is reapproved.

Delete Subsection 304.07 and replace it with the following:

Measurement shall be based on tons taken from the weight tickets provided to the City at time of delivery to the site.

Delete Subsection 304.08 and replace it with the following:

The accepted quantities of aggregate base course, of the class specified, will be paid for at the contract price bid per ton placed and compacted in accordance with the Plans and Specifications. Prepared subgrade will not be measured or paid separately, it is considered incidental to the work.

Payment will be made under:

Pay Item	Pay Unit
Aggregate Base Course (Class 6)	Ton

Water will not be measured and paid for separately but shall be included in the work.

Commercial mineral fillers, when used, shall be considered incidental to the bid item for Aggregate Base Course.

END OF SECTION REVISION

1
REVISION OF SECTION 306
RECONDITIONING

Section 306 of the Standard Specifications is hereby revised for this project as follows:

Delete Subsection 306.01 and replace it with the following:

This work consists of blading, shaping, wetting, compacting the subgrade with moisture and density control, and quality control.

Subsection 306.02 shall include the following:

Prior to paving or placing aggregate base course or geogrid, the subgrade shall be uniformly scarified, moisture conditioned, and compacted as specified in Section 508.2 of the City of Thornton's Standard Specifications. The upper 6-inches of subgrade for concrete sidewalk, curb ramps and stamped concrete shall be reconditioned. The upper 12-inches for concrete and asphalt pavement shall be reconditioned. The pavement subgrade should be thoroughly proof-rolled with a heavily loaded pneumatic tired vehicle. Areas that deform (rut or deflect) excessively under the wheel loads should be removed and replaced prior to paving. Proof-rolled areas should be paved within 48 hours or less. If precipitation occurs after the proof-roll and prior to paving, then the area should be dried and again be proof-rolled as necessary.

Quality control testing of the subgrade will be required for moisture content and density. Testing shall be completed on reconditioned subgrade for every 200 linear feet at a minimum. The Contractor shall notify the City a minimum of 24 hours in advance of placing any concrete so that bot parties may observe field testing. The City reserves the right to reject any payment for materials placed with less than 24 hours notice to the City.

The acceptance at any time of the materials by or on behalf of the City shall not bar the City from future rejection if they are subsequently found to be defective or inferior in quality or uniformity to the material specified.

Whenever the City rejects any material, such material shall be removed at once from the line of work at the Contractor's expense, and shall not be brought back. Work rejected by the City shall be replaced with approved work at the expense of the Contractor.

Subsection 306.04 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Reconditioning	Square Yard

Water used for reconditioning will not be measured and paid for separately but shall be included in the work.

Costs for quality control (QC) field testing and laboratory testing shall be borne by the Contractor and shall be included in the pay item Reconditioning.

END OF SECTION REVISION

1
REVISION OF SECTION 401
PLANT MIX PAVEMENTS – GENERAL

Section 401 of the Standard Specifications is hereby revised for this project as follows:

Subsection 401.01 shall include the following:

The City may require a pre-paving meeting of all parties involved in supply, haul, laydown inspection, quality control and quality acceptance of HMA. Areas of responsibility and contact names and numbers should be shared. A construction (joint) plan will be submitted at the pre-paving meeting.

In Subsection 401.02(a) delete the 5th paragraph and replace with the following:

The job-mix formula for Pavement shall be established by a testing laboratory approved by the Owner and at the Contractor's expense. Copies of all test data shall be provided to and approved by the Owner prior to construction.

Subsection 401.11 is deleted and replaced with the following:

When ordered by the Engineer or specified in the Contract, a tack coat shall be applied between pavement courses. Tack Coat will not be measured and paid for separately but shall be considered incidental to the project.

Subsection 401.16 shall include the following:

Removing Depressions:

Where local irregularities in the existing asphalt surface would otherwise result in a course more than 1-inch thicker than the nominal thickness after compaction, the surface shall be brought to uniform profile by placing a leveling course of Grade S bituminous pavement. Then thoroughly tamping or rolling until it conforms to the surrounding surface.

When the Contractor elects to conduct operations to eliminate depressions and place the surface course simultaneously, he shall furnish such additional spreading and compacting equipment as required to maintain the proper interval between the several operations, and only as approved by the Owner.

Subsection 401.22 shall include the following:

Costs associated with the pre-paving meeting shall be considered a part of the work and will not be paid for separately.

END OF SECTION REVISION

1
REVISION OF SECTION 403
HOT MIX ASPHALT

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

Subsection 403.02 shall include the following:
The design mix for hot mix asphalt shall conform to the following:

♦ Table 403-1

Property	Test Method	Value for Grading					
		SX(75)	S(75)	SX(50)	S(50)		Patching
Air Voids, percent at: N (design)	CPL 5115	3.5 – 4.5	3.5 – 4.5	3.5 – 4.5	3.5 – 4.5		3.5 – 4.5
Lab Compaction (Revolutions): N (design)	CPL 5115	75	75	50	50		75
Stability, minimum	CPL 5106	30	30	30	30		30
Aggregate Retained on the 4.75 mm (No. 4) Sieve for S, SX and SG, and on the 2.36mm (No. 8) Sieve for ST and SF with at least 2 Mechanically Induced fractured faces, % minimum*	CP 45	60	60	60	60		60
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman), minimum	CPL 5109 Method B	80	80	80	80		80
Minimum Dry Split Tensile Strength, kPa (psi)	CPL 5109 Method B	205 (30)	205 (30)	205 (30)	205 (30)		205 (30)
Grade of Asphalt Cement, Top Layer		PG 76-28		PG 58-28			PG 76-28
Grade of Asphalt Cement, Layers below Top			PG 64-22		PG 58-28		PG 64-22
Voids in the Mineral Aggregate (VMA) % minimum	CP 48	See Table 403-2	See Table 403-2	See Table 403-2	See Table 403-2		See Table 403-2
Voids Filled with Asphalt (VFA), %	AI MS-2	65-75	65-75	65-75	65-75		65-75
Dust to Asphalt Ratio Fine Gradation Coarse Gradation	CP 50	 0.6 – 1.2 0.8 – 1.6	 0.6 – 1.2 0.8 – 1.6	 0.6 – 1.2 0.8 – 1.6	 0.6 – 1.2 0.8 – 1.6		 0.6 - 1.2 0.8 – 1.6

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

2
REVISION OF SECTION 403
HOT MIX ASPHALT

Hot mix asphalt may contain up to 20% of recycled asphalt pavement. Recycled asphalt pavement shall meet requirements of Section 504.2 of the City of Thornton's Standards and Specifications.

All mix designs shall be run with a gyratory compaction angle of 1.25 degrees and properties must satisfy Table 403-1. Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum. CDOT will establish the production asphalt cement and volumetric targets based on the Contractor's mix design and the relationships shown between the hot mix asphalt mixture volumetric properties and asphalt cement contents on the Form 429. CDOT may select a different AC content other than the one shown at optimum on the Contractor's mix design in order to establish the production targets as contained on the Form 43. Historically, Air Voids adjustments typically result in asphalt cement increases from 0.1 to 0.5 percent. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

Table 403-2

	Minimum Voids in the Mineral Aggregate (VMA)			
Nominal Maximum Size*, mm (inches)	***Design Air Voids **			
	3.5%	**4.0%**	**4.5%**	**5.0%**
37.5 (1½)	11.6	11.7	11.8	N/A
25.0 (1)	12.6	12.7	12.8	
19.0 (¾)	13.6	13.7	13.8	
12.5 (½)	14.6	14.7	14.8	
9.5 (⅜)	15.6	15.7	15.8	
4.75 (No. 4)	16.6	16.7	16.8	16.9
	* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%. ** Interpolate specified VMA values for design air voids between those listed. *** Extrapolate specified VMA values for production air voids beyond those listed.			

The Contractor shall prepare a quality control plan outlining the steps taken to minimize segregation of HMA. This plan shall be submitted to the Engineer and approved prior to beginning the paving operations. When the Engineer determines that segregation is unacceptable, the paving shall stop and the cause of segregation shall be corrected before paving operations will be allowed to resume.

Hot mix asphalt for patching shall conform to the gradation requirements for Hot Mix Asphalt Grading SX for the top lift and Grading S for the bottom lifts.

A minimum of 1 percent hydrated lime by weight of the combined aggregate shall be added to the aggregate for all hot mix asphalt.

Acceptance samples shall be taken at the location specified in Method A of CP 41.

3
REVISION OF SECTION 403
HOT MIX ASPHALT

Subsection 403.03 shall include the following:

The Contractor shall construct the work such that all roadway pavement placed prior to the time paving operations end for the year, shall be completed to the full thickness required by the Plans. The Contractor's Progress Schedule shall show the methods to be used to comply with this requirement.

At locations where new Hot Mix Asphalt is to abut existing asphalt, saw cut the existing pavement a minimum of 1 foot back from the existing edge with a neat line and remove pavement. A tack coat shall be applied along the vertical abutting face of the existing asphalt.

A tack coat shall be applied to all milled surfaces prior to applying an asphalt pavement overlay. A tack coat shall be applied along the vertical face of all curb and gutter prior to asphalt paving.

At patches, compaction shall initially be completed along the outside edges of the patch, and then proceed from the low side to the high side of the patch. The new asphalt patch shall have a minimum compacted thickness equal to the existing pavement thickness and be level and well matched to the existing pavement.

The Contractor shall commence placing hot mix asphalt within 3 working days after the street has been milled, and within 1 working day after the subgrade has been proof rolled, weather permitting.

The Contractor shall collect the scale ticket on each load when it is delivered to the project site, and ensure that the information required in by the City is shown on each ticket.

The scale tickets shall be available on site for City to inspect.

Each day the Contractor shall provide to the Engineer envelopes which contain the previous day’s signed tickets and the following:

1. On each envelope: Project number, date of paving, type of material, daily total and cumulative total.
2. One of the following:

a) Two adding machine tape tabulations of the weight tickets with corresponding totals run and signed by different persons,
b) One signed adding machine tape tabulation of the weight tickets that has been checked and signed by a second person,
c) Signed check tape of computer scale tickets that have a cumulative total. These scale tickets must be consecutive and without voids adjustments.

3. A listing of any overweight loads on the envelope, including ticket numbers and amount over legal limit.

4. A comparison of the actual yield for each day’s placement to the theoretical yield. Theoretical yield shall be based on the actual area paved, the planned thickness, and the actual density of the mixture being placed. Any variance greater than +2.5% shall be indicated on the envelope and a written explanation included.

4
REVISION OF SECTION 403
HOT MIX ASPHALT

The Contractor shall provide a vehicle identification sheet that contains the following information for each vehicle:

1) Vehicle number
2) Length
3) Tare weight
4) Number of axles
5) Distance between extreme axles
6) All other information required to determine legal weight.
7) Legal weight limit.

Delete Subsection 403.05 and replace with the following:

403.05 The accepted quantities of hot mix asphalt will be paid for in accordance with subsection 401.22, at the contract unit price per ton for the bituminous mixture. Hot Mix Asphalt (Patching) will be measured and paid for by the square yard of each hot mix asphalt patched in accordance with the Plans and Specifications and accepted and approved by the City.

Payment will be made under:

Pay Item	Pay Unit
Hot Mix Asphalt (PG 64-22 Grading S 75)	Ton

Aggregate, asphalt recycling agent, asphalt cement, additives, hydrated lime, and all other work and materials necessary to complete each hot mix asphalt item will not be paid for separately, but shall be included in the unit price bid. When the pay item includes the PG binder grade, any change to the submitted mix design optimum asphalt cement content to establish production targets on the Form 43 will not be measured and paid for separately, but shall be included in the work. No additional compensation will be considered or paid for any additional asphalt cement, plant modifications and additional personnel required to produce the HMA as a result in a change to the mix design asphalt cement content.

Historically, typical asphalt cement increases reflected on the Form 43 are from 0.1 to 0.5 percent. However, the Contractor should anticipate the AC increases typical of his mixes. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

Asphalt cement, aggregate, asphalt recycling agent, additives, hydrated lime, aggregate base course, tack coat, subgrade reconditioning, and all other work and materials necessary to complete Hot Mix Asphalt (Patching) will not be measured and paid for separately, but shall be included work for Hot Mix Asphalt (Patching).

5
REVISION OF SECTION 403
HOT MIX ASPHALT

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

Tack Coat will not be paid for separately but shall be considered incidental to the work.

Temporary asphalt installation and removal required for sanitary sewer, waterline, and storm sewer patches will not be paid for separately but shall be considered incidental to the project.

Additional Hot Mix Asphalt required to bring the final surface to the noted finished grade elevations as a result of the variable milling as shown on the Construction Plans will not be measured and paid for separately, but shall be considered incidental to Hot Mix Asphalt

END OF SECTION REVISION

1

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

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

Delete Subsection 407.09 and replace with the following:

Prime Coat, Tack Coat, and Rejuvenating Agents will not be measured and paid for separately. The cost for these items shall be considered incidental to all bid items requiring Prime Coat, Tack Coat, and Rejuvenating Agents.

END OF SECTION REVISION

1

REVISION OF SECTION 412
PORTLAND CEMENT CONCRETE PAVEMENT

Section 412 of the Standard Specifications is hereby revised for this project as follows:

Subsection 412.01 is revised to include the following:

Quality control testing of the concrete will be required for this project. Concrete deliveries shall be tested for slump, air entrainment, and strength. Testing shall occur on the first truck of the delivery and then at 50 cubic yard increments for the remainder of the particular concrete pour.

The acceptance at any time of the materials by or on behalf of the City shall not bar the City from future rejection if they are subsequently found to be defective or inferior in quality or uniformity to the material specified.

Whenever the City rejects any material, such material shall be removed at once from the line of work at the Contractor's expense, and shall not be brought back. Work rejected by the City shall be replaced with approved work at the expense of the Contractor.

Subsection 412.03 is revised to include the following:

Concrete pavement shall include fibrous reinforcing in accordance with the following requirements.

Fibrous Reinforcing:

A. Fibrous reinforcing shall be used in Portland cement concrete used for curb, gutter, sidewalks, curb turn fillets, cross pans.

B. The following shall be submitted to the Engineer.

1. One copy of manufacturer's printed product data, clearly marked, indicating proposed fibrous concrete reinforcement materials. Printed data should state 1.5 lbs. of fiber to be added to each cubic yard of each type of concrete.

2. One copy of manufacturer's printed batching and mixing instructions.

3. One copy of a certificate prepared by the concrete supplier stating that the approved fibrous concrete reinforcement materials at the rate of 1.5 pounds per cubic yard were added to each batch of concrete delivered to the project site. Each certificate shall be accompanied by one (1) copy of each batch delivery ticket indicating amount of fibrous concrete reinforcement material added to each batch of concrete.

C. Fibrous concrete reinforcement shall consist of:

1. One hundred (100) percent virgin polypropylene fibrillated fibers specifically manufactured for use as concrete reinforcement, containing no reprocessed olefin materials. Fibrous concrete reinforcement shall be as manufactured by Fibermesh Company, 4019 Industry Drive, Chattanooga, Tennessee 37416, or approved equivalent. Substitutions may be considered at the discretion of the Engineer.

Subsection 412.17 shall include the following:

Roadway smoothness incentive for Portland Cement Concrete Pavement is not included in this project.

2
REVISION OF SECTION 412
PORTLAND CEMENT CONCRETE PAVEMENT

Subsection 412.23 shall be replaced with the following:

The quantities of Concrete Pavement furnished and placed will be the number of square yards completed and accepted.

Reinforcement including dowels, tie bars, and joint material will not be measured.

Curb and Gutter adjacent to concrete pavement will be measured and paid for in accordance with Section 609.

Subsection 412.24 shall be replaced with the following:

General. 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
Concrete Pavement	Linear Foot

The price per square yard of Concrete Pavement shall be full compensation for furnishing and placing all materials, including concrete, fibrous reinforcing, joints, dowels, tie bars, joint materials, texturing, sawing, finishing, and rumble strips.

Reinforcing steel shall be considered incidental to the unit price bid for Concrete Pavement.

Furnishing, installing, and monitoring vibrators and vibrator monitoring device will not be measured and paid for separately, but shall be included in the work for Concrete Pavement.

Incentive and Disincentive Payments (I/DP) will not be made for concrete pavement for this project.

Furnishing, calibrating and use of maturity meters, wire and other appurtenances including the molding, curing and breaking of cylinders for calibration and placement of calibration slabs will not be measured and paid for separately, but shall be included in the work.

Costs for quality control (QC) field and laboratory testing shall be borne by the Contractor and shall be included in the pay item Concrete Pavement.

END OF SECTION REVISION

1
REVISION OF SECTION 602
REINFORCING STEEL

Section 602 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 602.07 and replace it with the following:

Reinforcing steel will not be measured separately.

Delete subsection 602.08 and replace it with the following:

Reinforcing Steel for concrete structures will not be measured and paid for separately but shall be considered as incidental to the individual concrete work listed on the bid schedule.

END OF SECTION REVISION

1
REVISION OF SECTION 608
SIDEWALKS AND BIKEWAYS

Section 608 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 608.01 and replace it with the following:

This work consists of the construction of bituminous or concrete sidewalks, bikeways, curb ramps, colored stamped concrete pavements in accordance with these specifications and in conformity with the lines and grades shown on the Plans or established.

Quality control testing of the concrete will be required for this project. Concrete deliveries shall be tested for slump, air entrainment, and strength. Testing shall occur on the first truck of the delivery and then at 50 cubic yard increments for the remainder of the particular concrete pour.

The acceptance at any time of the materials by or on behalf of the City shall not bar the City from future rejection if they are subsequently found to be defective or inferior in quality or uniformity to the material specified.

Whenever the City rejects any material, such material shall be removed at once from the line of work at the Contractor's expense, and shall not be brought back. Work rejected by the City shall be replaced with approved work at the expense of the Contractor.

Delete subsection 608.02 and replace it with the following:

Materials shall meet the requirements specified in the following subsections:

Joint Fillers	705.01
Aggregate for Bases	703.03
Bed Course Materials	703.07

Concrete for sidewalks and curb ramps shall be CDOT class D, include fibrous reinforcing strands, and conform to the following minimum requirements:

Required Field Compressive Strength	4500 psi at 28 days
Nominal Sized Course Aggregate	3/4 –inches
Maximum Slump	4-inches
Air Content Range	5% to 8%
Water Cement Ratio	0.45

Concrete shall be mixed with approved fibrous reinforcing strands (or approved equal), at the rate of 1.5 pounds per cubic yard. Mixing, placing and finishing shall be performed according to manufacturer's recommendations. Fibrous reinforcing shall consist of one hundred percent (100%) virgin polypropylene fibrillated fibers specifically manufactured for use as concrete reinforcement, containing no reprocessed olefin materials. The Contractor shall provide a certificate for each batch of concrete delivered to the site prepared by the concrete supplier stating that the approved fibrous reinforcement materials were applied to the concrete at a rate of 1.5 pounds per cubic yard. Each certificate shall be accompanied by one (1) copy of each batch delivery ticket indicating amount of fibrous concrete reinforcement material added to each batch of concrete.

Sidewalk ramp detectable warning field shall be cast-in-place red East Jordan Iron Works or approved equal.

2
REVISION OF SECTION 608
SIDEWALKS AND BIKEWAYS

Subsection 608.03(c) shall include the following:

Prior to placing concrete for sidewalks, curb ramps, and colored stamped concrete, a minimum of 4 inches of class VI aggregate base course shall be placed in accordance with Section 304 of the Project Specifications.

Subsection 608.03(d) shall include the following:

Where identified on the Plans, concrete shall be color stained and have a stamped surface texture. The color shall be Solomon Desert Tan and the pattern shall be Old Granite Texture unless otherwise approved by the Owner.

Subsection 608.03(f) shall include the following:

Concrete shall not be left exposed for more than 2 hours between the time finishing is completed and commencement of curing treatment unless approved by the Owner.

It shall be the Contractor's responsibility to protect the concrete from the elements, vandalism, and physical damage. Any concrete showing any signs of exposure to precipitation, flowing water or freezing, or showing any signs of physical damage shall be removed and replaced by the Contractor at his expense.

Sections of concrete sidewalks, and curb and gutters which develop random cracking shall be removed and replaced, or repaired in a satisfactory manner approved by the Owner, at the Contractor’s expense.

Subsection 608.05 shall include the following:

Colored stamped concrete shall be measured by the square yard of finished surface. Fibrous reinforcement shall be not be measured and paid for separately but shall be included in the work.

Detectable warnings will be included in curb ramps and not measured separately. Materials and work for detectable warnings will not be measured and paid for separately but shall be included in the work.

3
REVISION OF SECTION 608
SIDEWALKS AND BIKEWAYS

Subsection 608.06 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Concrete Sidewalk	Square Yard
Concrete Curb Ramp	Each
Colored Stamped Concrete	Square Yard

Structural excavation and backfill will not be measured and paid separately but shall be included in the work.

Reinforcing steel will not be measured separately but shall be included in the work.

Bed course material will not be measured and paid for separately but shall be included in the work.

Joints of all types will not be measured and paid for separately but shall be included in the work.

Aggregate base course will be measured and paid for in accordance with Section 304.

Fibrous concrete reinforcement material will not be measured and paid for separately but shall be included in the work.

Detectable warnings shall be included in the curb ramp pay item and not measured separately. All materials, equipment, work for detectable warnings will not be measured and paid for separately but shall be included in the work.

Sections of the new concrete sidewalks, curb and gutters, and driveways which develop random cracking within one year warranty period shall be removed and replaced at the Contractor at his expense in a satisfactory manner approved by the City.

Costs for quality control (QC) field and laboratory testing shall be borne by the Contractor and shall be included in the pay items Concrete Sidewalk, Concrete Curb Ramp, and Stamped Concrete.

END OF SECTION REVISION

1
REVISION OF SECTION 609
CURB AND GUTTER

Section 609 of the Standard Specifications is hereby revised for this project as follows:

Subsection 608.09 shall include the following:

Quality control testing of the concrete will be required for this project. Concrete deliveries shall be tested for slump, air entrainment, and strength. Testing shall occur on the first truck of the delivery and then at 50 cubic yard increments for the remainder of the particular concrete pour.

The acceptance at any time of the materials by or on behalf of the City shall not bar the City from future rejection if they are subsequently found to be defective or inferior in quality or uniformity to the material specified.

Whenever the City rejects any material, such material shall be removed at once from the line of work at the Contractor's expense, and shall not be brought back. Work rejected by the City shall be replaced with approved work at the expense of the Contractor.

Delete subsection 609.02 and replace it with the following:

Except as provided below the materials used shall meet the requirements of the following subsections:

Bed Course Material	703.07
Joint Filler	705.01
Reinforcing Steel	709.01

Concrete for curb and gutter shall include fibrous reinforcing strands, and conform to the following minimum requirements:

Required Field Compressive Strength	4500 psi at 28 days
Nominal Sized Course Aggregate	3/4 –inches
Maximum Slump	4-inches
Air Content Range	5% to 8%
Water Cement Ratio	0.45

Concrete shall be mixed with approved fibrous reinforcing strands (or approved equal), at the rate of 1.5 pounds per cubic yard. Mixing, placing and finishing shall be performed according to manufacturer's recommendations. Fibrous reinforcing shall consist of one hundred percent (100%) virgin polypropylene fibrillated fibers specifically manufactured for use as concrete reinforcement, containing no reprocessed olefin materials. The Contractor shall provide a certificate for each batch of concrete delivered to the site prepared by the concrete supplier stating that the approved fibrous reinforcement materials were applied to the concrete at a rate of 1.5 pounds per cubic yard. Each certificate shall be accompanied by one (1) copy of each batch delivery ticket indicating amount of fibrous concrete reinforcement material added to each batch of concrete.

2
REVISION OF SECTION 609
CURB AND GUTTER

Subsection 609.03(f) is revised to include the following:

Concrete shall not be left exposed for more than 2 hours between the time finishing is completed and commencement of curing treatment unless approved by the Owner.

It shall be the Contractor's responsibility to protect the concrete from the elements, vandalism, and physical damage. Any concrete showing any signs of exposure to precipitation, flowing water or freezing, or showing any signs of physical damage, shall be removed and replaced by the Contractor at his expense.

Subsection 609.06 is revised to include the following:

Measurement and payment for curb and gutter, and concrete pavement at intersections shall be conducted in accordance with CDOT Standard Plan No. M-609-1.

Subsection 609.07 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
Curb and Gutter, Type 2 (Section II-B)	Linear Foot

Structural excavation and backfill will not be measured and paid separately but shall be included in the work.

Reinforcing steel and/or fiber mesh shall not be measured separately but shall be included in the work.

Bed course material will not be measured and paid for separately but shall be included in the work.

Sections of the new concrete sidewalks, curb and gutters, and driveways which develop random cracking within one year warranty period shall be removed and replaced at the Contractor at his expense in a satisfactory manner approved by the City.

Costs for quality control (QC) field and laboratory testing shall be borne by the Contractor and shall be included in the pay item Curb and Gutter.

END OF SECTION REVISION

1
REVISION OF SECTION 613
TRAFFIC SIGNAL, LIGHTING, AND COMMUNICATION CONDUIT

Section 613 of the Standard Specifications is hereby revised for this project to include the following:

General Requirements

Underground utility information shown on the plans is for information only. The Contractor is responsible for field locating and verifying utility information before starting installation of underground conduit runs and traffic signal pole foundations.

The Contractor shall cooperate with any other Contractor under contract with the Owner and with utility companies providing services to the City of Thornton while installing underground conduit runs.

Electrical conduit shall be installed in accordance with the applicable requirements described in the latest revision of the Colorado Department of Transportation Utility Manual, as amended.

All buried wiring included in this project shall be placed in a conduit. It will be the option of the Contractor, at his own expense, to use larger size conduit if desired. Where larger size conduit is used, it shall be for the entire length of the run from outlet to pull box or from pull box to pull box. No reducing coupling will be permitted in any conduit run. The Owner must approve increased sizes prior to installation.

Conduits shall be installed under existing pavement through use of directional boring operations. Conduits under pavement may be installed through use of open trench operations only where approved by the Owner.

Conduits shall be rigid plastic (PVC) or galvanized rigid steel (GRC) type conforming to the plans and these specifications. Conduit runs shown on the plans are tentative as to routing and may be changed as directed by the Owner to avoid underground obstructions. In the event of any change from the location shown on the plans, accurate records shall be incorporated into the as-built drawings, and all necessary details and as-built drawings submitted to the Owner before final payment is made.

Conduit installation shall include the installation of marking tape laid in the backfilled trench at a depth not more than 8 inches or less than 4 inches below finished grade. Heavy gauge polyethylene film (0.004 inch tape, with legend "Caution Buried Electric Line Below"), shall be used. Where tape length ends and conduit run continues, lapping of not less than 6 inches will be provided. No glue or adhesive will be allowed to join separate tape sections.

Nonmetallic Conduit (PVC)

Rigid PVC conduit shall be Schedule 40, Type 2 and shall be manufactured of high-impact PVC, and shall conform to industry and commercial standards No. CS-207-60. Each length of PVC conduit and the various PVC fittings (coupling, adapter, etc.) shall bear the label of Underwriter's Laboratories, Inc., or be approved by the Owner. The conduit shall be of the size or sizes shown on the plans or as indicated in these specifications.

Rigid PVC conduit ends shall be squared and trimmed after cutting to remove rough edges. All connections shall be of solvent weld type except where PVC is to be connected to a steel conduit, in which case the coupling or adapter shall be threaded on the steel conduit side.

Solvent weld joints shall be made in accordance with the PVC manufacturer's recommendations. Rigid PVC conduit shall only be used for underground installations; conduit used above ground shall be galvanized rigid steel.

Galvanized Rigid Conduit Steel (GRC)

Steel conduit and fittings shall be rigid galvanized steel and shall be uniformly and adequately zinc-coated by the hot-dipped process conforming to ASTM Designation A153. Joints shall be set up tight with squared ends. Fastenings shall be secured and of a type appropriate in design and dimensions for the particular applications. Couplings, connectors, and fittings shall be approved types specifically designed and manufactured for the purpose. Fittings shall be installed to provide a good electrical ground throughout the conduit system. The interior as well as the exterior of a 6-inch sample cut from a center of a standard length of conduit when tested in accordance with the applicable portion of ASTM Designation A239 shall not show a fixed deposit of copper after four one-minute immersions in the standard copper sulfate solution. The interior of the rigid conduit shall have a continuous coating of lacquer or enamel. Each length shall bear the label of Underwriter's Laboratories, Inc., and shall conform to appropriate articles of the Code. The contractor shall provide catalog information for review by the Owner prior to purchase and installation of GRC.

The end of metallic conduit shall be threaded and well-reamed to remove burrs and rough edges. Field cuts shall be made true and square so that the ends will butt or come together for the full circumference, thereof. Slip joints or running thread will not be permitted for coupling conduit. When a standard coupling cannot be used, weatherproofed threaded three-piece union shall be used. All three-piece unions must be threaded; non-threaded couplings shall not be accepted.

The threads on all conduits shall be well painted with a good quality lead or rust-preventive paint before couplings are made up. All couplings shall be tightened until the ends of the conduits are brought together so that a good electrical connection will be made throughout the entire length of the conduit run. Conduit stubs, caps, and exposed threads, as well as any point along the surface of the conduit that has been injured in handling or installation, shall be painted with good quality asphalt bituminous or other paint suitable for the purpose.

3
REVISION OF SECTION 613
TRAFFIC SIGNAL, LIGHTING, AND COMMUNICATION CONDUIT

Installation Methods

Conduit sizes and locations shall be as shown on the plans. Conduit shall be stubbed and capped for future uses where shown on the plans or where specified.

Existing empty underground conduit to be incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air. The Contractor shall search for such conduit in the general vicinity shown on the plans, and shall notify the Owner in advance as to when this operation will take place. The Owner may, at his option, be present to monitor the activity. The cost of such activity shall be incidental to the project. In the event that such conduit has been rendered inoperative prior to the signal installation, the Contractor shall notify the Owner and payment for new conduit shall be made as per the unit costs provided in the bid.

Conduits terminating in poles, cabinets, and pedestal bases shall extend a maximum of 3 inches and a minimum of 2 inches above the foundation vertically, and shall be sloped toward hand holes in poles or base opening where transformer bases are used. Conduit entering pull boxes shall terminate a minimum of 2 inches and a maximum of 3 inches above the bottom of the box.

Conduit ends shall be accomplished by a ninety (90) degree elbow with a minimum radius of forty-eight (48) degrees. Where two (2) or more conduits meet, all ninety (90) degree elbows shall be brought together in the center of the pull box or cabinet foundation. Conduit shall only enter through the bottom of a pull box. Galvanized rigid conduit terminations within pull boxes shall be fitted with an end coupling as well as insulating bushings to prevent chafing the wire.

Conduits required to be terminated, stubbed, and plugged shall be as shown on the plans and as directed by the Owner. Conduit ends shall be capped with standard conduit caps. The location of ends of conduit for future electrical circuits under curbs, gutters, sidewalks, or structures shall be marked by a "Y" at least 3 inches high, cut into the face of the curb, gutter, or structure directly above the conduit.

Ends of unused metal type conduit shall be threaded and shall be capped with standard pipe caps until conductors are in place. When caps are removed, the threaded ends shall be provided with conduit bushings. Ends of unused non-metallic type conduit shall be capped with a standard PVC cap until conductors are in place. Ends of conduit populated with wire shall be plugged with duct seal putty to prevent water infiltration and rodent infestation of the conduit.

Conduit installed outside of the traveled portion of the roadway and out of future roadway areas shall be laid as follows: maximum depth of 30 inches and a minimum depth of 24 inches.

Concrete replacement within intersection islands created by installation of conduit will not be paid for separately, but included in the unit price for conduit. Replacement of roadway, sidewalk, or native growth areas created by installation of conduit will not be paid for separately, but included in the unit price for conduit.

4
REVISION OF SECTION 613
TRAFFIC SIGNAL, LIGHTING, AND COMMUNICATION CONDUIT

All conduits, including conduits from the home run pull box to the controller cabinet, shall include 14-gauge copper stranded tracer wire for future locating of conduits. The sheathing for the tracer wire shall be purple in color. A minimum of two feet of slack tracer wire shall be left in each pull box and in the controller cabinet. At the end of each conduit run, the tracer wire shall be grounded at each traffic signal pole grounding lug.

Excavation and Backfilling

The excavations required for the installation of conduit shall be performed in such a manner as to avoid unnecessary damage to streets, sidewalks, landscaping and other improvements. Trenches shall not be excavated wider than necessary for the installation of the electrical appurtenances. Concrete removal limits shall be to the nearest pavement, sidewalk or curb and gutter control joint. Excavation shall not be performed until immediately before installation of conduits. The material from the excavation shall be placed in a position not to cause damage or obstruction to vehicular or pedestrian traffic or interfere with surface drainage.

Trenches outside the traveled portion of the roadway shall be backfilled with granular material as approved by the Owner, in six-inch lifts and each lift compacted. Off-street trenches in native soil areas shall be backfilled with native soil and shall be compacted and shaped to match the surrounding surface. Surface materials in native soil areas disturbed by excavation and backfilling operations shall be replaced in kind equal to or exceeding original conditions. This shall include replacement of sod in lawn areas or reseeding in native soil areas at no additional cost to the project as directed by the Owner.

Trenches within islands, under sidewalks, in parking lots or other trenches in paved areas outside the traveled portion of the roadway shall be backfilled with Class 6 granular aggregate base course material as approved by the Owner. The backfill shall be in 6-inch lifts and each lift compacted up to a point within 3 inches of existing grade.

Trenches within or across the roadway, bike paths, trails and sidewalks shall be backfilled with CDOT-approved structural backfill (flow-fill) within 3 inches of existing grade, except on concrete surfaces which shall be removed to the nearest control joint and replaced in kind to match existing thickness, grade and finish. The top 3 inches of all trenches in asphalt roadways or asphalt off-roadway areas shall be filled to match existing grade and surfacing materials with hot asphalt mix. All roadways shall be repaired within forty-eight hours of cutting the surface.

Excavations in the street or highway shall be performed in such a manner that not more than one traffic lane is restricted in either direction at any time, unless otherwise permitted by the Owner. A minimum of one lane of traffic in each direction shall be kept open for each direction.

Excavations at intersections being reconstructed or improved shall be performed and backfilled before other improvements are completed so as to not require the repair or replacement of newly installed sidewalks, curbs and gutters, pavement, or landscaping.

Prior to backfilling, the Owner shall have the opportunity to inspect the trench, conduit and tape placement.

5
REVISION OF SECTION 613
TRAFFIC SIGNAL, LIGHTING, AND COMMUNICATION CONDUIT

Measurement and Payment

Payment of conduit shall be by linear foot of conduit measured horizontally from centerline of pull box to centerline of pull box and/or centerline of pull box to centerline of controller cabinet. Elbow, vertical, and slack quantities shall be incidental to the horizontal dimension. The cost for conduit installations will include costs for all necessary items including but not limited to backfill, saw cutting, patching, jacking, drilling pits, removal of pavement, sidewalk, gutters and curbs, and their replacement in kind to match existing grade and other incidentals necessary to complete the conduit installation in place for acceptance.

Subsection 613.11 shall include the following:

Conduit for intersection wiring will be measured and paid for separately.

Subsection 613.12 shall include the following:

Payment will be made under:

Pay Item	Pay Unit
2 Inch Electrical Conduit	Linear Foot
3 Inch Electrical Conduit	Linear Foot

END OF SECTION REVISION

1
REVISION OF SECTION 613
PULL BOXES

Section 613 of the Standard Specifications is hereby revised for this project to include the following:

General

Pull box locations shown on the plans are approximate. The Contractor shall locate the exact location in the field and the Contractor shall have the Owner agree to the location prior to installation. Pull boxes for traffic signal conduit runs shall not be spaced more than 150 feet apart from each other unless approved by the Owner. It shall be the option of the Contractor, at his expense, to install additional pull boxes that he may desire to facilitate his work as approved by the Owner.

Pull boxes shall be constructed of an aggregate material consisting of sand and gravel bound together with a polymer and reinforced with continuous woven glass strands. The material shall have the following mechanical properties.

Compressive Strength	-	11,000 psi
Tensile Strength	-	1,700 psi
Flexural Strength	-	7,500 psi

Pull boxes used for loop detectors on sampling stations shall be a minimum of twelve (12) inches wide by sixteen (16) inches long by twelve (12) inches deep. Pull boxes used at junctions of roadway conduit crossing shall be a minimum of twenty (20) inches long by thirty-three (33) inches wide by fifteen (15) inches deep. Pull boxes used for traffic signal communication interconnect shall be a minimum of twenty-four (24) inches long by thirty-six (36) inches wide by twenty-four (24) inches deep. Pull boxes at the controller cabinet shall be a minimum of thirty (30) inches long by forty-eight (48) inches wide by twenty-four (24) inches deep. Use of two (2) pull boxes in place of the larger one shall not be permitted. Other sizes may be approved by the Owner.

Pull box lids shall have a non-skid surface with a minimum coefficient of friction of 0.5. Covers shall hold a minimum vertical test load of 8,000 pounds over a 10-inch x 10-inch surface with no physical damage or excess deflection. Covers shall have the words Traffic Signal embossed on them and be concrete gray color.

Lids for pull boxes sized thirty (30) inches long by forty-eight (48) inches wide by twenty-four (24) inches deep or larger shall consist of two pieces capable of being removed from the pull box independently. The configuration of the two-piece lid shall be such that access to the pull box is unobstructed when both pieces are removed.

Installation

Pull boxes shown in the vicinity of curbs and gutters shall be placed adjacent to the back of the curb. Pull boxes adjacent to standards shall be placed along the side of foundations as shown on the plans.

2
REVISION OF SECTION 613
PULL BOXES

The cover of the pull box shall be installed level with the finish grade. The cover of pull boxes located in sidewalks shall be installed level with the sidewalk. The bottom of all pull boxes shall rest on firm ground with 12 inches of three-quarters (3/4) inch to two (2) inch river run rock below the pull box for drainage. Pull boxes installed in a sidewalk must be tied into the sidewalk to prevent the boxes from being pushed down below the top of the sidewalk.

Pull boxes installed in dirt or landscaped areas shall have a twelve (12) inch wide by six (6) inch thick concrete collar placed around the top, level with the cover of the pull box and finish grade. All concrete collars shall be Portland cement concrete conforming to the applicable requirements for Class B as referenced in CDOTs Standard Specifications for Road and Bridge Construction (SSRBC).

Subsection 613.11 shall include the following:

New pull boxes will be measured and paid for per each complete pull box installed and approved by the City.

Subsection 613.12 shall include the following:

Payment for pull boxes will be for each box installed as outlined above. Payment for installation of pull boxes shall include all labor, materials, and equipment required to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Relocated Pull Box and Splicing	Each

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

END OF SECTION REVISION

1
REVISION OF SECTION 613
TRAFFIC SIGNAL POLES AND MAST ARMS

General - Standard Type Poles

Traffic signal poles, mast arms, luminaire arms, and extensions will be furnished by the Owner. Fifteen-foot pedestal poles, ten-foot pedestal poles, and four-foot pedestal poles shall be provided by the contractor in conformance with Owner specifications.

Poles and mast arms are furnished with anchor bolts; nuts; washers; bolt nut covers; pole caps; mitigation devices; and door covers by the Owner. The contractor shall furnish all anchor bolts; nuts; washers; bolt nut covers; pedestal bases; pole caps and door covers for the fifteen-foot, ten-foot, and pedestrian button poles.

Roadway clearance at end of signal mast arm shall be 21 feet from roadway with side slope of two to three percent to the mast arm / pole connection.

Traffic signal poles, mast arms, concrete foundations, and necessary hardware shall conform to the appropriate requirements of Sections 601, 613, 713, and 715 of SSRBC.

Standard Poles

Poles shall be straight, with a permissive variation not to exceed 1-inch measured at the midpoint of a 30-foot or longer pole, and not to exceed 3/4-inch measured at the midpoint of a pole shorter than 30 feet.

Standard poles with mast arms shall have a hand hole located opposite the mast arm connection.

The circumference of the poles and mast arms shall be circular. Angles along the circumference, or hexagonal, octagonal, square, or rectangular poles or mast arms shall not be permitted.

Ten-foot and fifteen-foot pedestal type signal poles shall be capable of supporting a signal head using a standard pole top mount.

Signal Mast Arms

Traffic signal mast arms will be furnished with end caps. If, while being installed, an arm needs to be shortened, the Contractor must fabricate and install a new end cap.

Luminaire Mast Arms

Luminaire mast arms furnished by the Owner will be of the single arching type. Typically, the length will be either 12 feet or 15 feet.

Pole Foundations

Contractor shall be responsible for all labor and materials required for foundation installation, including rebar cages. Foundations shall be Portland Cement concrete conforming to the applicable requirements of Class BZ, as referenced in the SSRBC.

The bottom of concrete foundations shall rest on firm ground. Foundations shall be poured monolithically. For poles or pedestals, the top 4 inches shall be poured after the pole or pedestal is in proper position. The exposed portions of the foundation shall be formed to present a neat appearance.

Tops of foundations except as noted on the plans, shall be finished to curb or sidewalk grade, or as indicated in the plans. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position and to proper height and shall be held in place by means of a template until the concrete sets.

Both forms and ground, which will be in contact with the concrete, shall be thoroughly moistened before placing concrete.

Where obstructions prevent construction of the planned foundation, the Contractor shall construct an effective foundation as directed by the Owner.

Traffic signal poles with mast arms greater than 70-feet shall use CDOT's 75-foot mast arm caisson specification per S-614-40 Typical Traffic Signal Installation Details for caisson diameter and depth only.

Mast arm poles shall be installed with the proper rake as recommended by the manufacturers of the poles so as to assure a substantially vertical set when the specified signal and lighting equipment is installed.

Anchor bolts for the mast arm poles will be supplied by the Owner to the Contractor. Anchor bolts shall conform to Subsection 715.02 of the SSRBC and shall be provided with two washers and two nuts and covers each. Plumbing the pole shall be accomplished by adjusting the nuts before the foundation is finished to final grade. Shims or other similar devices for plumbing or raking will be permitted only when approved by the Owner.

The excavation required for the installation of pole foundations shall be performed in such a manner as to avoid any unnecessary damage to streets, sidewalks, landscaping, utilities, and other improvements. Excavation shall be performed immediately before the installation of the concrete foundation. The material from the excavation shall be placed in a position that will not cause damage or obstruction to vehicular and pedestrian traffic or interfere with surface drainage.

Foundation holes excavated and not filled with concrete immediately shall be covered with a solid non-breaching surface covering and barricaded until concrete is poured. Foundation holes shall not be drilled more than 24 hours prior to placement of concrete without permission of the owner.

Protective Coatings for Signal Poles with Mast Arms and Pedestal Poles

Scope

Specification sections 4.4.2 through 4.4.11 are for the signal pole with mast arms being provided by the contractor and for the contractor's information when the signal pole with mast arms is Owner supplied. The specification is designed for the use of Valmont triglycidyl isocyanurate (TGIC) or super durable polyester powder (part number 250257 for mocha brown or 349235 for beige) or approved equivalent in conjunction with Valmont dark gray high build epoxy powder (part number 347380) or approved equivalent for the protection and finish of the tapered and non-tapered colored steel poles. Interior surfaces shall be prime painted by dip or spray.

General

To be acceptable, poles and component parts furnished on the project by the Contractor shall be in accordance with the terms and requirements set forth herein. Other comparable coating systems that comply with these specifications may be acceptable, subject to approval by the Owner. The Contractor shall be required to furnish the City with a notarized certificate of compliance from the pole manufacturer that guarantees that the coating system used is in conformance with these specifications and is free of defective workmanship.

Surface Preparation for Exterior Protective Coating Systems

Exterior surfaces of shaft and arm(s), and component parts shall be abrasive blasted in accordance with coating manufacturer's recommendations. Rolled-in mill scale, impurities, and non-metallics shall be removed. The lower interior portions of the shaft, from the base plate to the top of the handhole opening, shall receive the same treatment. Rough and sharp edges shall be rounded off. Weld splatter, flux, and slag around the base plate, handhole, arm connections and other areas of welding shall be removed. Drilling of holes and welding of tenons or hubs shall be done prior to abrasive blasting.

Requirement of Interior Protective Primer System

The interior surface of the pole shaft shall be thoroughly cleaned, dried, and free of mill scale, rust, oil, grease, and dirt, or other contaminants before interior primer is applied. Primer shall conform with Federal Specification TTP-645, yellow or red oxide. Minimum dry film thickness shall be two and one-half (2-1/2) mils.

Requirement of Exterior Protective Coating System

After abrasive blast, exterior steel surfaces shall hot dip galvanized in accordance with ASTM A123. All threaded holes shall be plugged prior to galvanizing. All holes shall be free of excess galvanizing. Galvanized steel surfaces shall be kept indoors and free from moisture and other foreign materials prior to prime painting. Prior to powder coating, poles, mast arms, and luminaire arms shall be brushblast to a uniform dull appearance from of any shine and preheat. Mechanically galvanized parts do not require brushblast.

After exterior steel surfaces have been galvanized, an epoxy prime coat consisting of Valmont dark gray high build epoxy powder (part number 347380) or approved equivalent shall be applied. A minimum dry film thickness for the high build epoxy powder of five (5) mils shall be required for the bottom eight (8) feet of the pole. A minimum dry film thickness of three (3) mils shall be required for the remaining surfaces of the pole above eight (8) feet and mast arms and luminaire arms. Metal cure temperature shall be 300 degrees Fahrenheit.

The color topcoat shall consist of two (2) coats of Valmont triglycidyl isocyanurate (TGIC) or super durable polyester powder (part number 250257 for mocha brown or 349235 for beige) or approved equivalent at a minimum of one and one-half (1.5) mils dry film thickness for a total minimum dry film thickness of three (3) mils. The total exterior coating system shall consist of a minimum of eight (8) milsdry film thickness for the bottom eight (8) feet of the pole and a minimum dry film thickness of six (6) mils for the remaining surfaces of the pole above eight (8) feet and mast arms and luminaire arms. The coating shall form a satin finish with lasting color, resistant to fumes, splash and spillage of acids and alkalis.

The primer and topcoat for exterior application shall be supplied by the same manufacturer to ensure a compatible protective coating system resistant to corrosion, abrasion and impact.

Color for finish topcoat shall conform to City requirements. Color shall meet Federal Standard 595C Colors (January 2008). Color number 10075, satin finish “Mocha Brown”, or Color 20227, semi-gloss finish “Beige”. Beige shall only be used if specified on the plans.

Application

The prime coat and color topcoat shall be strictly applied according to manufacturer's recommendation. The lower interior portion of the shaft, from the bottom of the base plate to the top of the handhole opening, shall receive the same application treatment. Surfaces shall be kept free of moisture, oil, grease and other organic matter until coated. Failure to do so will prevent proper adhesion and shall require the abrasive blast procedure to be repeated. Solvent wiping is not satisfactory as contamination may be spread and not be removed. Prior to applying top coat, repair any surface imperfections such as sags or runs by light sanding to obtain a uniform surface. Apply prime paint as necessary to any voids or areas having less than the required thickness. Powder application shall be with electrostatic spray equipment.

Drying and Curing Time

Drying time for the application of each primer coat and color topcoat application shall be per the coating manufacturer’s specifications.

Curing time after final color topcoat and prior to packaging, loading and shipment shall be per the coating manufacturer’s specifications to ensure complete dry-through time.

Wrapping and Packaging

Upon completion of the coating system, and prior to shipment, poles and arms shall have

protective wrapping with two (2) inch minimum overlap applied at contact points with cushioned dunnage during transport. This wrapping shall be cushioned material, be a minimum one-eighth (1/8) of an inch thick and twenty-four (24) inches wide, be applied at contact points, and extend a minimum of eighteen (18) inches on either side of dunnage locations at poles and arms. Minimum thickness of wrap shall be three-eighth (3/8) of an inch at contact points. Component parts shall be individually wrapped with heavy kraft paper and boxed for shipment.

Handling and Shipment

Poles, Mast Arms, and luminaire extensions and arms shall be handled in a manner that will preserve the overall appearance and prevent damage to the coating. The use of chains or cables for loading, unloading, shipping or installing is prohibited. Only 3/4-inch diameter or larger nonabrasive nylon rope or equivalent nylon belting will be used. Adequate hold-downs and appropriate blocking shall be utilized for shipping to prevent load movement and damage to the outer coating in transit. No handling should be allowed until dry-through condition has been achieved with the coating.

Delivery, Installation and Acceptance of Poles

Extra care will be taken not to damage the coating. Upon arrival of the poles at the delivery point, neither chains nor cables will be used for either unloading or installation of poles.

Mast arms shall not be installed to block visibility of existing span wire mounted signal heads. If pole locations require mast arms to be located in front of span wire mounted heads, the arm shall not be installed until the span wire, and signal heads are removed. The mast arm shall be pre-wired on the ground prior to completed installation to hasten installation time in this instance.

Procedure for Field Touch-Up

The Contractor will furnish extra paint, both primer and color coat, to satisfy the needs of field touch-up requirements in the event of minor physical damage to the coating from handling or transit. Damaged area must be clean and dry before repair application. Field touch-up will be at the direction of the Owner and the pole manufacturer or his authorized representative.

Warranty

A minimum three (3) year warranty (at no additional cost) shall be provided for the exterior protective coating system. The coating manufacturer shall warrant the coating to not be defectively manufactured and that the coating will prevent cracking, checking, blistering, flaking, peeling, or excessive chalking of the painted surface or excessive corrosion of the base metal on which the exterior protective coating system is applied for three years from date of application. The warranty shall not apply under conditions such as construction, physical or mechanical abuse, or falling objects and under conditions of normal wear and tear such as welding, civil disturbance, defacing, vandalism, fire, explosion, or catastrophe.

Owner Supply

Traffic signal poles, mast arms, luminaire extensions, and luminaire arms will be provided by the City of Thornton Traffic Engineering. No submittals are required.

Payment

Concrete replacement within intersection islands created by foundation installation will not be paid separately but included in the unit price for pole installation. Replacement of roadway, sidewalk, ADA ramps, or native growth areas created by installation of poles and foundations will not be paid separately but included in the unit price for pole installation. Concrete replacement shall consist of replacing entire concrete panels. ADA ramps replacements shall include a minimum of six feet of truncated domes.

Payment for the poles and mast arms supplied by the Owner will include installation of all conduit connections, mitigation devices, replacement of surface materials in kind to match existing grade, and pole foundation with all material in conformance with the Owner for a full operational signal. Backfill material and seeding will not be paid separately but included in the unit price for pole installation. Payment is for each pole and mast arm type.

Payment for all poles shall include furnishing and installation of the pole, foundation, conduit connections, replacement of surface materials in kind to match existing grade, anchor bolts, and pole painting as required and in conformance with the Owner for a fully operational signal.

Payment will be made under:

Pay Item	Pay Unit
Traffic Signal Pole, 40-foot Mast Arm	Each

END OF SECTION REVISION

1

REVISION OF SECTION 613
CONDUCTORS AND CABLES: SIGNAL WIRING

Section 613 of the Standard Specifications is hereby revised for this project to include the following:

General

Aerial cable shall be installed where specified on the plans and secured to messenger cable with cable ties or rings. No self-supported cable shall be installed unless that cable is specifically designed for this purpose. Drip loops shall be provided on all conductors where they enter pole weatherheads or signal heads.

Conductors shall be permanently identified as to function. Identification shall be placed on each conductor, or each group of conductors comprising a signal phase, in each pull box and near the end of terminated conductors.

Identification shall be by bands fastened to the conductors in such a manner that they will not move along the conductors.

All cables and conductors not shown on the plans as aerial cable or imbedded loop detector shall be installed in conduit unless installed in poles, pedestals, or mast arms.

Codes

Grounds and bonding wire, straps, and electrodes shall conform to NEC Article 250.

Wiring and splices shall conform to appropriate article of the Code. Wiring within cabinets, hand holes, junction boxes, etc., shall be neatly arranged and shall be laced.

Conductors shall be stranded, tinned copper wire, rated at 600 volts and individually insulated with heat stabilized polyethylene. Conductors and cable shall conform to IMSA Specification 19-1.

Bonding and Grounding

Metallic cable sheaths, conduit, metal poles, and pedestals shall be made mechanically and electrically secure to form a continuous system and shall be effectively grounded. Bonding and grounding jumpers shall be a bare copper wire or copper strap of the same cross sectional area, No. 8 AWG, for all systems. Sheath for detectors shall be grounded in control cabinet only. The other end of the sheath shall be taped, and left ungrounded.

Bonding of poles and pedestals shall be by means of connecting to the ground rod a bonding strap attached to an anchor bolt or a 3/16-inch or larger brass or bronze bolt installed in the lower portion of the shaft.

A ground electrode shall be installed at each control box. Each ground electrode shall be one-piece copper-weld rod of 5/8-inch diameter and eight-feet in length, driven to a depth of at least 8 feet below the surface of the ground (top of rod flush with ground or top of cabinet base).

The ground terminal of controller shall be connected to the ground rod with a No. 8 AWG bare copper wire with an approved ground rod clamp.

Wire Splices

Splices shall be made in the handholes or cabinet. No splices shall be allowed in pull boxes or conduit unless authorized by the Owner. Method of splicing must be approved by Owner.

Installation

Sufficient signal light conductors shall be provided to perform the functional operation of signal system. Nineteen (19) conductor cable shall be run to each signal pole. Seven (7) conductor cable shall be run from the handhole of each signal pole to each signal head. A minimum of three (3) spare conductors per through phase shall be provided throughout the signal light circuit. Additional conductors for service, interconnect, etc., shall be provided as noted on the plans.

Signal light conductors shall conform to the red-yellow-green color sequencing with different colored tracers for each phase provided.

All signal light cable conductors shall have individual terminal lugs for connection to terminal strips in cabinet.

Neutral conductors shall be individually landed on the neutral bus in the traffic signal controller cabinet. Grouping or splicing together of neural conductors prior to landing on the neutral bus shall not be permitted.

When conductors and cables are pulled into the conduit, the ends of all these conductors and cable shall be taped to exclude moisture and shall be so kept until the splices are made or terminal appliances attached. Ends of spare conductors shall be taped to exclude moisture.

Powdered soapstone, talc, or other approved lubricant shall be used in placing conductors in conduit.

Pull rope - (1/4 inch nylon rope) shall be installed in all new conduit and all existing conduit where a cable is added or an existing cable is replaced. At least two feet of pull rope shall be doubled back into the conduit at each termination.

Five feet of slack shall be left for each conductor at each support pole and two feet of slack at each pull box containing cable connections.

3
REVISION OF SECTION 613
CONDUCTORS AND CABLES: SIGNAL WIRING

At least two feet (2') of slack for both power feed and loop wire is to be provided in each pull box so that testing and splicing can be done outside the pull box.

Splicing of cable will not be permitted in the conduit or outside of pull boxes, standards, or at the hand hole location in pedestals unless authorized by the Owner.

Multi-conductor cable shall be spliced and insulated to provide a watertight joint to prevent absorption of moisture by the cable.

Three-pair Belden twisted cable shall be used for pedestrian push buttons. Each pair shall be individually twisted and shielded 18-gauge stranded wire. The cable shall have polyethylene outer insulation and shall conform to IMSA specification 50-2, Belden part # YC47326 or approved equal. The three pairs of conductors shall be colored white/black, red/black, and green/black. The white/black pair shall be used for eastbound and westbound pedestrian movements. The red/black pair shall be used for northbound and southbound pedestrian movements. The green/black pair shall be spare conductors.

The power feed for the traffic signal controller cabinet shall be continuous without splicing from the power source to the meter, from the meter to the circuit breaker, and from the circuit breaker to the traffic signal controller cabinet. A second power feed for the illuminated overhead signage and luminaires shall be continuous without splicing from the meter to the circuit breaker, and from the circuit breaker to the home run pull box. From the home run pull box, the power feed for the illuminated overhead signage and luminaires shall be split through the use of a URD submersible bus type connector, with separate conductors run to the base of each traffic signal pole. Additional URD submersible bus type connectors shall be used in successive pull boxes that serve more than one traffic signal pole. From the base of each traffic signal pole, the power feed shall be split, with separate conductors run to the luminaire and to the illuminated overhead signage. Daisy-chaining of the conductors shall not be permitted.

Meter

The Contractor shall install a meter housing as required for the project. Meter housing shall be a bare aluminum Myers Power Products Inc. MEUG3A-12 series, Milbank U5949 Cold Sequence Meter Main Pedestal, or approved equal. The anchor bolt and foundation design for the Myers Power Products Inc. MEUG3A-12 Series meter housing shall be per manufacturer's recommendation. Concrete for the foundation shall be Class BZ per Colorado Department of Transportation SSRBC, latest revision. The contractor shall coordinate with the relevant electrical service provider on the source and connection of the power feed, the installation of the meter in the meter housing, and the connection of the power feed to the meter. Within Xcel Energy territory, the contractor shall coordinate with Xcel Energy to obtain the MI rate for traffic signal electrical service and coordinate removal of existing equipment from the current rate. The contractor shall zip tie all doors on the meter housing that can be padlocked. Padlocks shall not be used.

4
REVISION OF SECTION 613
CONDUCTORS AND CABLES: SIGNAL WIRING

Subsection 613.12 is hereby revised to include the following:

Payment

Payment for intersection wiring will be for the entire signal intersection including wiring for power from the Xcel Energy or United Power approved location and installation of a meter.

Payment will be made under:

Pay Item	Pay Unit
Intersection Wiring	Lump Sum

END OF SECTION REVISION

1
REVISION OF SECTION 614
RECTANGULAR RAPID FLASH BEACON

Section 614 of the Standard Specifications shall include the following:

Description

This work consists of procurement and installation of the Rectangular Rapid Flash Beacons (RRFB) in accordance with the project plans, specifications, and 2009 MUTCD Interim Approval 21.

The beacons shall be powered by solar.

Materials and Equipment

The RRFB shall be Traffic & Parking Control Co., Inc. (TAPCO) Rectangular Rapid Flashing Beacon RRFB-XL2, solar powered, double-sided on 2.5" square posts. See manufacturer's materials and installation guide, and latest drawing no. 2TE-236.

The following shall be included in the installation of Rectangular Rapid Flash Beacon systems:

1. RRFB LED Signs
    a. Rectangular Rapid Flash Beacon LED
        i. Pedestrian Indication- Pole mount single RRFB below warning sign facing pedestrian movement to indicate sign actuation to pedestrians.
        ii. Vehicular Indication- Warning Sign with rectangular box having 2 RRFB's facing traffic and 1 RRFB facing pedestrians mounted below sign

2. Controls (Mounted within enclosure cabinet)
    a. One each Enclosure Cabinet– NEMA 3R Aluminum w/Traffic Key (pole mount).
    b. One each 12V DC 15 amp Programmable Timer. Timer shall be capable of timing crossing upon actuation and retiming crossing upon new actuation in the event that crossing cycle has not completed.
    c. One each 12V, 10 Amp DC Relay
    d. Two each Insulated Terminal Block (10 position each)
    e. One each 20 amp circuit breaker (must be provided as disconnect for system)

3. Pedestrian Push Buttons
    a. Push buttons shall be black Polara Bulldog push buttons.

Submittal and Construction Requirements

Contractor is required to submit shop drawings of RRFB system to the engineer for review and approval two weeks prior to purchasing equipment. RRFB system shall meet all American with Disability Act (ADA) requirements. All wiring, electrical connections, and controls shall conform to manufacturer recommendations.

Measurement and Payment

The RRFB enclosure cabinet, all associated controls, pedestrian indication RRFB's, sign panels, poles, and all other components necessary for a fully functional RRFB system, will not be paid for separately, but shall be included in the cost of the work.

2
REVISION OF SECTION 614
RECTANGULAR RAPID FLASH BEACON

Payment shall be made under:

Pay Item	Pay Unit
Rectangular Rapid Flash Beacon	Each

END OF SECTION REVISION

1
REVISION OF SECTION 614
PUSH BUTTON STATIONS

Section 614 of the Standard Specifications is hereby revised for this project to include the following:

General

Pedestrian detection is accomplished by the push button stations.

Pedestrian push buttons shall be of the direct push button contact type and shall be black Polara Bulldog BDL3-B or approved equal. The push buttons shall operate on a voltage not to exceed 18V AC. The assembly shall be of tamper-proof design and equipped with a push button instruction sign. Button frames shall be painted black and ADA approved.

The assembly shall be weatherproof and constructed so it shall be impossible to receive any electrical shock under any weather conditions.

The pedestrian push button instruction sign shall include informational text as shown in the detail sheets in the plans.

Sign dimensions shall conform to mounting frames as shown in the detail sheets in the plans.

Measurement and Payment

Measurement and payment will be for each Pedestrian Pole with Push Button Assembly installed and accepted by the City, and shall include all materials, labor and equipment necessary to construct a complete pedestrian pole and push button station including concrete footing and proper operation.

Measurement and payment will be for each Signal Push Button Pedestrian installed and accepted by the City, and shall include all materials, labor and equipment necessary to construct a complete signal push button station including proper operation.

Payment will be made under:

Pay Item	Pay Unit
Pedestrian Pole with Push Button Assembly	Each
Signal Push Button Pedestrian	Each

END OF SECTION REVISION

1
REVISION OF SECTION 614
GLOBAL POSITIONING SYSTEM

Section 614 of the Standard Specifications is hereby revised for this project to include the following:

General:

North American Datum 83 (NAD83) Colorado State Plane Central Zone coordinate system (grid) units in feet shall be provided for all roadway devices within the project limits. This shall include traffic signal controller cabinets, sign posts, pull boxes, water valve type pull boxes, traffic signal poles, pedestal poles, and street light poles. The elevation datum shall be based upon the North American Vertical Datum 1988 (NAVD 88).

Data Format

The GPS data collected shall be provided to the City in an AutoCAD drawing format using model space or using the GPS Device Installation form in Appendix C. The use of AutoCAD drawings or the GPS Device Installation Location form in Appendix C shall be at the discretion of the Traffic Engineer. If AutoCAD drawings are required, the drawings shall include a note describing how the coordinates were established along with the primary control points that were used. The AutoCAD information shall also be incorporated into the asbuilts for the project.

The horizontal and vertical positional accuracy of the data collected shall be within a tolerance of $\pm$ 0.3 feet.

Payment

GPS information gathering will not be measured or paid for separately, but shall be considered subsidiary to the pay item being installed. This work shall include all labor, materials, and equipment required to complete the work.

END OF SECTION REVISION

1

REVISION OF SECTION 625
CONSTRUCTION SURVEYING

Section 625 of the Standard Specifications is hereby revised for this project as follows:

Subsection 625.11 shall include the following:

All survey records generated shall be the property of the City of Thornton.

Upon completion of construction, new property pins associated with the Project shall be set indicating the new property corners and/or Right-of-way line.

Setting of new property pins will not be measured and paid for separately but will be included in the work.

Subsection 625.13 shall include the following:

Before granting Initial Acceptance, the following items shall be completed, reviewed and approved by the Engineer:

1. Verification that all Monuments and Stakes have been reset in accordance with sub-section 625.08
2. All Survey Records in accordance with sub-section 625.11

Payment will be made under:

Pay Item	Pay Unit
Construction Surveying	Lump Sum

END OF SECTION REVISION

1

REVISION OF SECTION 626
MOBILIZATION

Delete Section 626 of the Standard Specifications. Use the applicable sections of the City of Thornton, Contract Documents included herein.

MEASUREMENT AND PAYMENT

A. The Pay Item price for mobilization shall also include any "startup" or incidental costs necessary to begin the Work, including any necessary Construction Equipment, offices, buildings, Materials or Equipment, personnel that are to be located at the Project site in preparation for the Work, Bonds, Insurance, permits, and any other incidental expenses that cannot otherwise be attributed directly to the other Bid Proposal Pay Items.

B. Payments for mobilization shall be made on a monthly basis in accordance with the following formula:

Contract Amount Completed		Mobilization Paid
5%	=	25%
10%	=	50%
25%	=	60%
50%	=	100%

C. The overall Pay Item price for mobilization should not exceed ten percent (10%) of the original Contract Price. If the overall Pay Item price for mobilization exceeds ten percent (10%), and if Thornton does not reject the Bid, Thornton shall have the option of withholding payment of the amount exceeding ten percent (10%) of the Contract Price until the date of Final Payment. Payment will be made under:

Pay Item	Pay Unit
Mobilization	Lump Sum

END OF SECTION REVISION

1

REVISION OF SECTION 627
PAVEMENT MARKINGS

Section 627 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

This Work consists of furnishing and applying pavement marking in accordance with these specifications, the Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD), the Colorado supplement, thereto, and in conformity to the lines, dimensions, patterns, locations, and details shown on the Plans or established.

MATERIALS

In general, paint will not be used unless approved by the Owner. On existing pavement, Preformed Plastic Pavement Markings shall be used. On new pavement, Thermoplastic Pavement Markings shall be used.

1. Marking Paint

   Marking paint generally will not be approved for permanent markings. The use of pure acrylic high solids for hot application and quick dry to paint centerlines and edge lines on roads, crosswalks, stop zones, parking lots, storage zones, aisles, etc. as approved by the City of Thornton Project Manager shall contain no lead and comply with the EPA's voluntary 30/50 program, and meet the performance standards of federal specifications TT-P-1952. Prior to application, surfaces must be thoroughly dry and free from dirt, loose paint, oil, grease, and other contaminants. Paint may be thinned if necessary up to two (2)%, thin per manufacturer's recommendation. The paint shall be applied at air, surface, and product temperature above 50° F or per manufacturer's specifications.

% solids by weight	77.5 +/- 3%
Viscosity	80 - 90 K.U.
Sheen	Flat
Wet film per coat	14 – 16 mils
Dry film per coat	8.4 – 9.6 mils
Application rate	1 gal / 100 sf
Unit weight	14 lbs. / gal

2. Thermoplastic Marking

   A. Shall be in conformance with CDOT SSRBC Section 713.12.
   B. Application
      1. The pavement marking shall be applied to the pavement either to the right or left of the application unit, dependent upon roadway lane being used. The unit shall not occupy more than one lane of roadway while operating.
      2. The finished lines shall have well defined edges and be free of waviness. Tolerance shall be one (1) inch longitudinally and one fourth (¼) inch transversely. The minimum thickness of thermoplastic line shall be three thirty-secondths (3/32) inch at the edges, not less than one eighth (1/8) inch at the center. Measurements shall be taken as an average throughout any 10 foot section of the line. The material, when formed into traffic stripes, must be readily renewable by placing an overlay of new material directly over an old line of compatible material. Such new material shall bond itself to the old line in such a manner that no splitting or separation takes place. All of the equipment necessary to the preheating and application of the material shall be so designed that the temperature of the material can be controlled within the limits necessary to its pourability for good application.

3. The marking material as specified shall be installed at the manufacturer's recommended temperature.
4. At the time of installation of thermoplastic materials, the pavement shall be clean, dry, and free of laitance, oil, dirt, grease, paint, or other foreign contaminants. Pavement and ambient temperatures shall be at least 50° F.
5. An epoxy resin primer shall be applied to concrete surfaces prior to the application of the thermoplastic pavement marking. The epoxy resin primer shall be installed per the thermoplastic manufacturer recommendations.
6. The marking material shall not be applied until the epoxy resin primer reaches the tacky stage. An infrared heating device may be employed to shorten the curing time of the epoxy.
7. If the Development Engineering Manager determines that a new asphalt surface has become soiled, prior to placement of the pavement markings, a pavement primer will be required and preformed plastic pavement markings shall be applied as approved.
8. The epoxy resin primer material may be accepted at the job site on the basis of a manufacturer's certification, or a sample may be sent to the laboratory for testing, in which case three (3) weeks shall be allowed between sampling and intended use.

3. Reflectorized Glass Beads

A. A blended material consisting of spheres containing refractive indices of 1.50 and 1.65 and conforming to the following specifications:

1. Manufactured from high grade optical crown glass of a composition designed to be highly resistant to traffic wear and to the effects of weathering.

2. Colorless, clean and transparent.

B. Material
The reflectorizing glass beads shall conform to the following:
1. Refracture Index - When testing by the liquid immersion method at 77° F, 70% of the spheres shall have an average index of not less than 1.50, and 30% shall have an average index of not less than 1.65.

3

REVISION OF SECTION 627
PAVEMENT MARKINGS

1.50 Index Glass Beads

U.S. Standard Sieve Number	% Passing by Weight
20	95 – 100
30	75 - 95
50	9 - 32
80	0 - 15

1.65 Index Glass Beads

U.S. Standard Sieve Number	% Passing by Weight
50	100
80	90 – 100
100	75 - 90
200	0 - 5

CONSTRUCTION REQUIREMENTS

The Contractor shall field layout pavement markings for installation, via chalk or paint lines, for approval of owner prior to installation of material. Permanent pavement markings shall have an epoxy binder applied and be tape unless another material is approved in writing by the Traffic Engineer.

Pavement markings shall be so applied as to assure continuous uniformity in the dimensions of the stripe.

Laydown tolerances for each pavement marking shall be one (1) inch longitudinally and one quarter (1/4)-inch transversely.

Permanent pavement markings installed on new asphalt shall be inlaid and installed within four (4) hours of placement of the final lift of asphalt pavement. Pavement markings on existing and new concrete pavement shall be recessed in a one fourth (¼) inch groove not to exceed one half (½) inch wider nor two (2) inches longer than the tape being laid and shall be glued with an epoxy binder. Permanent pavement markings on existing asphalt shall have an epoxy binder applied and be tape.

The pavement marking shall be applied to the pavement either to the right or left of the application unit, dependent upon roadway lane being used. The unit shall not occupy more than one lane of roadway while operating.

4

REVISION OF SECTION 627
PAVEMENT MARKINGS

The finished lines shall have well defined edges and be free of waviness. Tolerance shall be one (1) inch longitudinally and one fourth (¼) inch transversely. The minimum thickness of thermoplastic line shall be three thirty-seconds (3/32) inch at the edges, not less than one eighth (1/8) inch at the center. Measurements shall be taken as an average throughout any 10-foot section of the line. The material, when formed into traffic stripes, must be readily renewable by placing an overlay of new material directly over an old line of compatible material. Such new material shall bond itself to the old line in such a manner that no splitting or separation takes place. All of the equipment necessary to the preheating and application of the material shall be so designed that the temperature of the material can be controlled within the limits necessary to its pourability for good application.

The marking material as specified shall be installed at the manufacturer's recommended temperature.

At the time of installation of thermoplastic materials, the pavement shall be clean, dry, and free of laitance, oil, dirt, grease, paint, or other foreign contaminants. Pavement and ambient temperatures shall be at least 50° F.

An epoxy resin primer shall be applied to concrete surfaces prior to the application of the thermoplastic pavement marking. The epoxy resin primer shall be installed per the thermoplastic manufacturer recommendations.

The marking material shall not be applied until the epoxy resin primer reaches the tacky stage. An infrared heating device may be employed to shorten the curing time of the epoxy.

If the City of Thornton Project Manager determines that a new asphalt surface has become soiled, prior to placement of the pavement markings, a pavement primer will be required and preformed plastic pavement markings shall be applied as approved.

The epoxy resin primer material may be accepted at the job site on the basis of a manufacturer's certification, or a sample may be sent to the laboratory for testing, in which case three (3) weeks shall be allowed between sampling and intended use.

5

REVISION OF SECTION 627
PAVEMENT MARKINGS

BASIS OF PAYMENT

Payment shall be made under:

Pay Item	Pay Unit
Thermoplastic Crosswalk Striping	Linear Foot

Removal of existing pavement markings is paid for under Removal of Asphalt.

END OF SECTION REVISION

1
REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL

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

Section 630.17 is deleted and replaced with the following:

Traffic control devices, flagging, traffic control inspection and traffic control management will not be measured. It shall be the Contractor's responsibility to prepare construction phasing plans and traffic control plans for the project. The Contractor shall submit a construction phasing plan and traffic control plan to the City for review and approval prior to construction.

Section 630.18 is deleted and replaced with the following:

Construction traffic control will be paid for on a lump sum basis. Payment for traffic control necessary to complete the work shall be full compensation for furnishing, erecting, cleaning, maintaining, resetting, repairing, replacing, moving, removing, and disposing of the construction traffic control devices. The lump sum payment will also include flagging, traffic control inspection and traffic control management.

The lump sum bid price shall be based on the Contractor's construction phasing plans and traffic control plans.

All construction traffic control devices that are not permanently incorporated into the project will remain the property of the Contractor.

Construction traffic control as determined by the approved project Traffic Control Plan (TCP), will be paid for as follows:

Contract Amount Completed		Traffic Control Paid
Upon First Utilization	=	25%
25%	=	50%
75%	=	90%
100%	=	100%

The percent of original contract amount earned will be determined by comparing the amount earned for bid items, other than traffic control devices and mobilization, with the original contract amount minus the amounts bid for traffic control devices and mobilization.

Payment shall be made under:

Pay Item	Pay Unit
Traffic Control	Lump Sum

Temporary pavement markings required for traffic control shall be considered incidental to the work required for "Traffic Control".

Removal of temporary pavement markings, when required, shall be considered incidental to the work required for Traffic Control.

Temporary asphalt required for Traffic Control will not be paid for separately but shall be considered incidental to the project.

END OF SECTION REVISION

1
TRAFFIC CONTROL PLAN – GENERAL

The key elements of the Contractor's method of handling traffic (MHT) are outlined in subsection 630.10(a). The components of the 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, Traffic Controls for Highway Construction, and Standard Plan S-630-2.

~~(3) Signing Plans~~

The Contractor shall provide, erect and maintain proper traffic control devices until the site is open to traffic. The Contractor shall submit a traffic control plan to the City of Thornton for approval prior to construction. Traffic control shall also include safety and control of pedestrians and bicyclists on the sidewalks and trails in and around the project site.

Unless otherwise approved by the Engineer, the Contractor's equipment shall follow normal and legal traffic movements. The Contractor's ingress and egress of the work area shall be accomplished with as little disruption to traffic as possible. Traffic control devices shall be removed by picking up the devices in a reverse sequence to that used for installation. This may require moving backwards through the work zone. When located behind barrier or at other locations shown on approved traffic control plans, equipment may operate in a direction opposite to adjacent traffic.

The responsibility under the Contract for all traffic control resides with the Contractor and any participation by law enforcement personnel in Contractor traffic control activities will be referenced in either the Special Provisions or General Notes of the Plans. Nothing in this Contract is intended to create an entitlement, on the part of the Contractor, to the services or participation of the law enforcement organization.

The flow of vehicular, pedestrian, and bicycle traffic on public streets and roadways shall be maintained at all times during construction in accordance with the rules, regulations, and conditions as set forth in the traffic control permit issued by the City of Thornton Project Manager. Signs, barricades, lights, and warning devices shall be constructed and used in accordance with the MUTCD and the Colorado supplement. The ATSSA Guide shall be strictly followed by the Responsible Party during the progress of the work.

The Responsible Party shall be responsible for the provision of a safe travel way on all streets, roadways sidewalks, and trails on and adjacent to the job site. The Responsible Party shall erect or cause erection of proper traffic control warning devices around all excavations, embankments, and obstructions and shall be responsible for the proper maintenance of said erected devices, in accordance with the traffic control permit and the MUTCD.

2
TRAFFIC CONTROL PLAN – GENERAL

The Responsible Party shall cause suitable warning lights to be provided and kept lighted at night or other times when visibility is limited. The Responsible Party shall provide flaggers and/or off-duty police protection as may be determined by the City of Thornton Project Manager for the protection of the public, as well as workers on the job site.

The Responsible Party shall coordinate with the Traffic Engineer so that arrangements may be made by the Responsible Party for detours, parking, and access to property adjacent to work, etc., 48 hours prior to their need. A minimum notification of one (1) week is required when detouring a street.

The Responsible Party shall not work within any portion of a street without receiving a Traffic Control Permit from the Traffic Engineer prior to such work. Full roadway closures will be reviewed on a case by case basis. The City reserves the right to refuse to allow full road closures. Requirements for such closures will be determined at the time of issuance of permit. The responsible party will be responsible for all public notices, public meetings, and requirements as outlined in the Traffic Control Permit.

No work shall be allowed at signalized intersections or on arterial roadways which impedes normal traffic flow from 5:00 a.m. to 8:30 a.m., and 3:30 p.m. to 7:00 p.m., except during emergencies or with prior approval of the Traffic Engineer. Failure to complete work within the traffic control permit may result in a “stop work” order.

The Responsible Party shall be responsible for all damages to the work due to failure to place barricades, signs, lights, flaggers, and other workers to protect it. Whenever evidence of such damage is found prior to acceptance, the Traffic Engineer may order the damaged portion immediately removed and replaced by the Responsible Party.

During the construction of this project, traffic shall use the present traveled roadway unless otherwise approved by the Traffic Engineer.

The Contractor shall not have construction equipment or materials in the lanes open to traffic at any time, unless approved by the Traffic Engineer.

During the resurfacing work, only one lane may be closed to traffic at any time unless approved by the Engineer. Traffic shall not be delayed for more than 5 minutes or as directed by the Traffic Engineer.

Except in cases of emergency, maintenance, or protection of work already completed, no work shall be allowed between the hours of 7 p.m. and 7 a.m.; nor on Saturday, Sunday, or legal holidays unless approved by Infrastructure Engineering in each case. When any inspector is required to work outside the hours of 7 a.m. to 4 p.m. on regular City business days, overtime shall be charged to the Responsible Party. However, such Inspectors shall remain employees of the City for all purposes. Requests for overtime shall be made to Infrastructure Engineering at least 48 hours in advance. Payment for such overtime work shall be made to the City prior to final acceptance.

3
TRAFFIC CONTROL PLAN – GENERAL

Due to lane closure and working time restrictions, the Contractor may utilize steel plates during utility relocation work and during storm sewer, sanitary sewer, and waterline system installations. Steel plates shall be temporarily placed over the open trench prior to opening the work area to traffic. The Contractor is responsible for designing the steel plates, including thickness, width, and secure connection to the existing pavement. The design must meet Load and Resistance Factor Design (LRFD) specifications, and shall include a PE stamp on the design.

When steel plates are used, the pavement area to be overlapped by the plate shall be planed to the depth of the plate to eliminate a vertical edge for traffic. The use of steel plates and detour pavement requires a Methods Statement, including an emergency action plan in the case of any material failures. In the case of failures, any lane closures taken outside of the Traffic Control Plan – General specification shall be treated as a working time violation.

All work associated with the usage of steel plates will not be measured and paid for separately but shall be included in the work.

All costs incidental to the foregoing requirements shall be included in the original contract price for Traffic control.

Unless otherwise authorized by the Engineer, one lane in each direction must be maintained on all affected roadways. No turn movement restrictions will be permitted.

END OF SECTION REVISION

1
UTILITIES

Known utilities within the limits of this project are:

UTILITY / ADDRESS	CONTACT / EMAIL	PHONE
Xcel Energy	Jeremy Hutaff Jeremy.D.Hutaff@xcelenergy.com	(303) 425-3823 (720) 308-4892 cell
Colorado Agricultural Ditch Company	Matt Stockton Matt.Stockton@thorntonco.gov	(720) 977-6511
Century Link 5325 Zuni Street Denver, CO 80221	Marina Gridinskaya Marina.Gridinskaya1@centurylink.com	(720) 578-3714 (720) 999-5578 cell
Comcast Cable 8000 E. Iliff Avenue Denver, CO 80231	Terry Herring Terry_Herring@comcast.com	(720) 951-3571
City of Thornton Traffic Operations 12450 Washington Street Thornton, CO 80241	Damien Durnen Damien.durnen@thorntonco.gov	(720) 977-6483
City of Thornton Infrastructure Engineering 12450 Washington Street Thornton, CO 80241	Dan Schiltz daniel.schiltz@thorntonco.gov	(720)-977-6226

The work described in these Plans and Specifications requires coordination between the Contractor and the utility companies in accordance with the City's General Conditions in conducting their respective operations as necessary to complete the utility work with minimum delay to the project.

The Contractor shall keep each utility company advised of any work being done to its facility or near its facility, so that the utility company can coordinate its inspections for final acceptance of the work with the Engineer.

The Contractor shall contact Xcel Energy Builder's Call Line at (1-800-628-2121) 30 days in advance of requiring connection to power sources to allow Xcel Energy adequate time for administration and processing of the new street lighting and billing. The Contractor shall be responsible for coordination of power source work to be performed by Xcel Energy. The Contractor shall contact the Xcel Energy Builder's Call Line to coordinate the power sources for the traffic signal work as shown on the Plans.

The Contractor shall at times be required to work in close proximity to dry utilities such as electric lines, gas lines, telephone lines, cable television lines, and miscellaneous fiber optic lines. This work may include locating the utilities, potholing utilities, careful excavation around utilities to create slack in the lines for minor vertical adjustments, and construction adjacent to utilities. This work shall be coordinated with the utility companies and shall be considered incidental to the work requiring the utility adjustments.

2
UTILITIES

Prior to excavating, Contractor shall positively locate (through potholing if necessary) all potential conflicts with existing underground utilities and proposed construction, as determined by the Contractor according to proposed methods and schedule for construction. Contractor shall modify construction methods to avoid existing underground facilities as needed, and as approved by the City. Note that the Utility Notification Center of Colorado (UNCC) marks only its members' facilities. Other facilities, such as ditches and drainage pipes may exist, and it is Contractor's responsibility to investigate, locate and protect such facilities.

If a need for utility work by either the Contractor or a utility company arises, the following shall apply:

Contractor shall be responsible for coordinating the adjustment of utilities on this project. Contractor shall keep each utility company advised of any work being performed in the vicinity of their facilities, so that each utility company can coordinate any needed locates, adjustments or inspections. Contractor shall provide the appropriate utility company ample notice, but not less than two (2) working days, prior to commencing activities in the vicinity of their facilities. Any additional work performed by the Contractor on behalf of the impacted utility company shall not be paid for by the City, but shall be paid by the utility company requiring the work, unless otherwise agreed to in writing by the City.

The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavation 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 day of notification, prior to commencing such operations. The Contractor shall contact the Utility Notification Center of Colorado (UNCC) at (8-1-1) or 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 excavating or grading.

The locations of utility facilities as shown on the Plans were obtained from the best available information. No warranty is made for the adequacy or accuracy of subsurface information provided. The Contractor shall cooperate with the utility owners in their relocation operations as provided in subsection 105.11 of the Standard Specifications for Road and Bridge Construction. No guarantee is made that utility conflicts will be resolved prior to construction activities and any delays resulting from utility relocation work shall be dealt with in accordance with subsection 108.08 of the Standard Specifications for Road and Bridge Construction as amended.

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

Refer to the Construction Plans for more information regarding utility work and coordination.

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APPENDICES

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APPENDIX “A”

SECTION 700 – CITY OF THORNTON TRAFFIC TECHNICAL SPECIFICATIONS

SEE ATTACHED TO THIS SOLICITATION

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APPENDIX “B”

SUBMITTALS

The Contractor shall submit for review and approval the following list of equipment and materials as required by the plans, prior to the Contractor ordering such materials. Submittals shall consist of product cut sheets and necessary supporting material and each item shall be identified by the trade name, size, and catalog number. Additional documentation may be requested at the discretion of the City.

Aggregate Base Course (Class 6)
Concrete Mix Design (Class B)
Concrete Mix Design (Class BZ)
Concrete Mix Design (Class D)
Conduit
Conduit Coupler
Construction Phasing & Traffic Control Plan
Fibrous Reinforcement
~~Hand Railing~~
Hot Mix Asphalt
Pedestrian Pole and Base
Pedestrian Push Button and Station (including instruction sign)
Pull Box
Soil Test Results
Water Control & Dewatering Plan
Wire (traffic signal conductors, pedestrian pushbutton. etc.)

APPENDIX “C”

GLOBAL POSITIONING SYSTEM (GPS) DEVICE INSTALLATION LOCATION

Date of GPS Locate:

_____

Item Being Located – “Device”, “Pull Box”, etc:

_____

Location of Item – “Street”, “Direction of Travel”, “Side of Street”, etc.:

_____

North American Datum:

Northing_____
(based on NAD83 Colorado State Plane Central Zone Coordinate System)

Easting_____
(based on NAD83 Colorado State Plane Central Zone Coordinate System)

Vertical_____
(based on NAVD 88)

Remarks (primary control points used and how coordinates were established):

_____

_____

_____

_____

_____