



**DENVER**  
**THE MILE HIGH CITY**

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# Measurement and Payment

November 20, 2009

City and County of Denver - Public Works  
Engineering Division - Wastewater Management

# Measurement and Payment

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- 2-1.1a Remove Combination Concrete Curb, Gutter and Sidewalk (2'8")**
- 2-1.1b Remove Combination Concrete Curb, Gutter and Sidewalk (3'11")**
- 2-1.2a Remove 6" Concrete Curb and/or Gutter**
- 2-1.2b Remove 9" Concrete Curb and/or Gutter**
- 2-1.3 Remove Concrete Curb Head**
- 2-1.4 Remove Handicap Concrete Curb Ramp**
- 2-1.5 Remove Concrete Median Strip**
- 2-2.1 Remove Concrete Sidewalk**
- 2-2.1a Remove Concrete Sidewalk/Bike Path**
- 2-2.2 Remove Concrete Driveway Paving**
- 2-2.4 Remove Concrete Channel Paving**
- 2-2.5 Remove Miscellaneous Concrete Flatwork**

The measurement for payment of this item will be the total number of linear feet or square feet of existing concrete curb and gutter, combination concrete curb and gutter, concrete curb head, concrete handicap curb ramp, concrete median strip, concrete sidewalk, concrete bike path, concrete driveway pavement, concrete slab, concrete alley return, concrete alley paving, concrete channel paving or any other type of miscellaneous concrete flatwork as specified in the Contract Documents or designated by the Project Construction Engineer to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for concrete flatwork removed or damaged due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear foot or square foot removal of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, concrete sawing or otherwise effectively cutting the concrete item smoothly and squarely in a manner satisfactory to the Project Construction Engineer; excavation and overexcavation; removal and disposal of unsuitable material, existing flatwork and/or any reinforcing materials per the requirements set forth in the Contract Documents; and all other related and necessary materials, work, and equipment required to remove this item in accordance with the Contract Documents.*

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### **2-2.6 Remove and Replace Flagstone Curb Head**

### **2-2.7 Remove and Replace Flagstone Walk**

The measurement for payment of this item will be the total number of linear feet of Flagstone Curb Head or the total square feet of flagstone walk required to be removed or placed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for flagstone removed and replaced due to negligent or unauthorized operations by the Contractor.

*The unit price bid per linear foot or square foot removal and replacement of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, sawing or otherwise effectively cutting the flagstone item smoothly and squarely in a manner satisfactory to the Project Construction Engineer; excavation and over excavation; removal and disposal of unsuitable material; storing on site for reuse; placement and/or replacement of flagstone; furnishing of new flagstone or equivalent stone as necessary; cutting, shaping, leveling, grouting, spacing; bedding, supply and placement of select subgrade material or select fill as necessary, compaction, and all other related and necessary materials, work, and equipment required to remove and replace this item in accordance with the Contract Documents.*

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### **2-2.8 Remove Asphalt Walk**

The measurement and payment of this item will be the total number of linear feet of asphalt walk required to be removed, and/or removed and replaced for the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for asphalt walk removal or replacement required due to negligent or unauthorized operations by the Contractor.

*The unit price bid per linear foot removal, removal and replacement, or placement of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, grading and shaping; placement of bedding; excavation and overexcavation; removal and disposal of unsuitable material; placement and/or replacement; furnishing of asphalt; leveling and compaction, and all other related and necessary materials, work, and equipment required to remove this item in accordance with the Contract Documents.*

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### **2-3 Remove Concrete Wheel Stops**

The measurement for payment of this item will be the total number existing wheel stops required to be removed or placed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for wheel stops removed and replaced due to negligent or unauthorized operations by the Contractor.

*The unit price bid per wheel stop removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, sawing or otherwise effectively removing the wheel stop in a manner satisfactory to the Project Construction Engineer; excavation and overexcavation; removal and disposal of unsuitable material; storing on site for reuse; placement of replacement; furnishing of new wheel stops; cutting, leveling, grouting, spacing; bedding, compaction, and all other related and necessary materials, work, and equipment required to remove this item in accordance with the Contract Documents.*

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### **2-3.1 Remove Concrete Alley Gutter**

### **2-3.2 Remove Concrete Alley Returns**

### **2-3.3 Remove Concrete Alley Paving**

### **2-3.4 Remove Concrete Street Intersection Gutter (Crossspan) and/Or Valley Gutter**

### **2-3.5 Remove Concrete Street Paving**

The measurement for payment of this item will be the total number of square feet of concrete required to be removed for construction of the proposed sewer; provided, however, no payment will be made for damaged material required to be removed due to negligence or unauthorized operations by the Contractor or any Subcontractors.

*The unit price bid per square foot for removing this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: concrete sawing and otherwise effectively cutting the existing concrete smoothly and squarely in a manner satisfactory to the Project Construction Engineer; removal and disposal of concrete, asphalt, and/or any reinforcing materials, including removal of the square radius beyond the lip of the standard two-foot gutter; furnishing additional base material; subgrade preparation and compaction; rotomilling within the effective removal limits; and all other related and necessary materials, work, and equipment required to accomplish the removal of this item in accordance with the Contract Documents.*

*In addition to the above listed items, the unit price bid per square foot removal of concrete street intersection gutter and/or valley gutter shall include repaving of the street within the effective removal limits to a point not less than 2-inches below the new finished street grade (matching cross street crowns to within 2-inches of finished street grade to the satisfaction of the Project Construction Engineer), including surrounding areas damaged during removal. The effective removal limits encompass the surface area shown on the Project Paving Schematic included within the Contract Documents. This area varies based on location within the project. The additional 2-inches of paving within the effective removal limits, as well as all required rotomilling and asphalt placement outside the limits will be paid for using bid items provided for elsewhere in the Contract Documents. No separate measurement or payment will be made for additional paving materials or rotomilling necessary for adherence to this item, all such costs will be included in the square foot price for removal.*

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### **2-4 Remove Concrete Steps**

The measurement for payment of this item will be the total number of square feet of concrete steps required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for concrete steps removed and replaced due to negligent or unauthorized operations by the Contractor.

*The unit price bid per square foot of concrete steps, which shall be quantified by the width of the stairs multiplied by the summation of each stair hypotenuse (the hypotenuse of the rise and run of each stair). The unit price shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, sawing or otherwise effectively removing the steps in a manner satisfactory to the Project Construction Engineer; excavation and overexcavation; removal of any foundation concrete; removal and disposal of unsuitable material; backfilling of foundation with suitable bedding, compaction, and all other related and necessary materials, work, and equipment required to remove this item in accordance with the Contract Documents.*

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## **2-5 Remove Concrete Retaining Wall**

The measurement for payment of this item will be the total number of linear feet of retaining wall, including attached railing and/or fence required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for retaining wall removal required due to negligent or unauthorized operations by the Contractor.

*The unit price bid per linear foot of retaining wall removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, sawing or otherwise effectively removing the wall in a manner satisfactory to the Project Construction Engineer; excavation and overexcavation; removal of any foundation concrete; removal of tie backs, drainage pipe; removal and disposal of fence and/or railings; removal and disposal of unsuitable material; removal of brick, wood, cinder block, steel sheeting, or rock walls; backfilling of foundation with suitable bedding, compaction, and all other related and necessary materials, work, and equipment required to remove this item in accordance with the Contract Documents.*

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## **2-6 Remove Concrete Headwall**

No partial measurement for payment will be made for this item, removal and payment will be based upon complete removal of the concrete headwall and/or attached railing and/or fence to the satisfaction of the Project Construction Engineer or to the requirements of the Contract Documents; provided, however, no measurement for payment will be made for retaining wall removal required due to negligent or unauthorized operations by the Contractor.

*The unit price bid per lump sum concrete headwall removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: effectively removing the wall in a manner satisfactory to the Project Construction Engineer; excavation and overexcavation; removal of any foundation concrete; removal of tie backs, drainage pipe; removal and disposal of unsuitable material; removal of brick, wood, cinder block, steel sheeting, or rock headwalls; removal and disposal of fence and/or railings; backfilling of foundation with suitable bedding, compaction, and all other related and necessary materials, work, and equipment required to remove this item in accordance with the Contract Documents.*

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## **2-11 Remove or Abandon Existing Pipe and Box Culverts**

### **8-4 Remove Existing Waterline**

The measurement and payment for this item will be the total number of linear feet of existing pipe, flared end sections, box culvert, and/or waterline of the dimensions specified, required to be removed or abandoned for construction of the proposed sewer and/or appurtenances; however, no payment will be made for pipe removed or abandoned due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear foot of removal or abandonment shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; care and diversion of drainage courses; removal of pipe, cone sections and sewer appurtenances as necessary to complete the removal or abandonment as specified in the Contract Documents including removal and disposal of the existing conduit and appurtenances (per State and Local requirements where applicable for lines containing asbestos); hauling and disposal of construction debris, unsuitable material and contaminated materials at the Denver Arapahoe Disposal Site (DADS); removal of pavement, sod and other surfacing materials; excavation, including exploratory excavation; diversion, cutting and plugging of pipe, as necessary, per the*

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*Contract Documents, any additional labor, equipment and materials required to disconnect the existing facility as required by the owner, salvaging of pipe when directed by the Project Construction Engineer or when specified in the Contract Documents, placing of the salvaged pipe on the job site in a location designated by the Project Construction Engineer; reforming and reshaping of manhole inverts as required; backfilling to final grade with approved backfill material; filling of abandoned pipe with an approved CLSM or alternately approved product, per the requirements set forth in the Detail and Technical Specifications; compaction of materials as necessary; paving, curb, gutter, sidewalk, landscaping and any other surface restoration required due to removal of associated items; coordination with utility owner as required and all other related and necessary materials, work, and equipment required to complete removal or abandonment in accordance with the Contract Documents.*

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### **2-11.8 Remove Abandoned Steam Pipe With Asbestos Lining (<24" Diameter)**

The measurement for payment of this item will be the total number of linear feet of pipe required to be removed and transported to an approved disposal site for construction of the proposed sewer; provided, however, no payment will be made for removal due to negligence or unauthorized operations by the Contractor or any Subcontractors.

The removal of abandoned steam pipe with asbestos lining shall comply with Colorado State Regulation No. 8, Part B, which incorporates the Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) Regulations for Asbestos (40 CFR Part 61). More specifically, the removal activity must comply with § III.S.4. (Other Non-friable Asbestos-Containing Materials) and if at a quantity above trigger levels (§I.B.104) are also subject to § III.E. (State Notifications) of the stated regulation. If during abatement, the asbestos cement product becomes friable, the project activity shall meet and conform with all the requirements in sections I (Definitions), II (Certification Requirements), and III (Abatement, Renovation and Demolition Projects) of the stated regulation. All abatement projects involving asbestos products are subject to Occupation Safety and Health Administration (OSHA) Standards for Asbestos (29 CFR Parts 1910.1001 and 1926.1101). Transportation of asbestos-containing waste materials is regulated by the Colorado Department of Transportation (CDOT). All expenses incurred to comply with the above noted items shall be borne by the Contractor.

*The unit price bid per linear foot for removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; care and diversion of drainage courses; removal of pipe, insulating materials and appurtenances; removal of pavement, sod, and other surfacing materials; excavation, including exploratory excavation; coordination and interaction with abandoned facility owner to ensure that a chain of custody is maintained; hauling and disposal of construction debris, excess excavated material, damaged materials and asbestos contaminated materials at the Denver Arapahoe Disposal Site (DADS) unless otherwise specified or required by State regulations; backfilling and compaction to final grade with an approved backfill material; and all other related and necessary materials, work and equipment required to remove the existing abandoned steam pipe with asbestos lining in accordance with the Contract Documents.*

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- 2-12.1 Remove Existing Sanitary Manhole**
- 2-12.2 Remove Existing Storm Manhole**
- 2-12.3 Abandon Existing Sanitary Manhole**
- 2-12.4 Abandon Existing Storm Manhole**
- 2-12.7 Remove Existing Structure**
- 2-13.1 Remove Existing Storm Inlet**
- 2-13.2 Remove Existing Special Storm Inlet**

The measurement for payment of this item will be the total number of manholes, inlets or structures required to be removed or abandoned for construction of the proposed sewer and/or appurtenances; however, no payment will be made for structures removed due to negligence or unauthorized operations by the Contractor.

*The unit price bid per manhole, inlet or structure removal and/or abandonment shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, overexcavation, exploratory excavation; care and diversion of drainage courses; removal of brick, grate, ring and cover, manhole barrel sections, concrete and any related reinforcing materials, unsuitable material, reducers, etc. to a minimum of 2 foot below finish grade; removal of pavement and sod; cutting and plugging of associated pipe per the Contract Documents, or as required by the Project Construction Engineer; salvaging of ring and cover or grates when so designated by the Project Construction Engineer; storing of all salvaged materials on the job site at a location designated by the Project Construction Engineer; disposal of unsuitable material; placement of approved backfill material and/or Controlled Low Strength Material to final grade elevation, compaction; removal and replacement of paving, curb, gutter, sidewalk, landscaping and any other surface restoration required due to removal of associated item, unless specifically provided for elsewhere in the Contract Documents; and all other related and necessary materials, work, and equipment required to remove, abandon and/or salvage the existing structure in accordance with the Contract Documents.*

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- 2-12.5 Rehabilitate Existing Sanitary Manhole**
  - 2-12.6 Rehabilitate Existing Storm Manhole**

The measurement for payment of this item will be the total number of vertical feet for individual manholes or structures, of the specified diameter, requiring rehabilitation for construction of the proposed sewer facilities, complete, in place, in a manner satisfactory to the Project Construction Engineer, provided, however, no payment will be made for manholes or structures required to be rehabilitated due to negligence or unauthorized operations by the Contractor.

*The price bid per vertical foot of rehabilitation of manholes and/or structures shall include all of the Contractor's costs of whatsoever nature. The price bid for rehabilitation shall include but not be limited to: furnishing, transporting, installing, setting up of all equipment and all materials and labor necessary to clean the manhole to be rehabilitated; furnishing labor and equipment required to by-pass pump, furnishing water for cleaning; furnishing energy required for power equipment; supplying all materials and equipment necessary to line the entire interior of manhole; reconstruction of the invert, bench, manhole steps and joints in accordance with the Contract Documents; concrete sawing or otherwise effectively cutting the manhole smoothly and squarely in a manner satisfactory to the Project Construction Engineer; furnishing, transporting and installing manhole liner, concrete, reinforcement, brick, mortar, plastic joints sealant and grout, steps and other miscellaneous items as required to rehabilitate the specified manholes and/or structure; removal and disposal of unsuitable material;*

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replacement with material as approved by the Project Construction Engineer; flagging, barricading, traffic control; and all other related and necessary materials, work, and equipment required for complete rehabilitation of the manhole or structure in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.

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**2-14 Remove Riprap**

**2-15 Remove Gabions**

The measurement for payment of this item will be the total number of cubic yards of riprap, gabions or other rock materials required to be removed for construction of the proposed sewer and/or appurtenances; provide, however no measurement for payment will be made for rock required to be removed due to negligence or unauthorized operations by the Contractor.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid for removal shall include; excavation, backfilling, removal and disposal of unsuitable material, compaction and all other related and necessary materials, work, and equipment required to remove the riprap or gabions in accordance with the Contract Documents.*

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**2-16.1 Remove Chain Link Fence**

**2-16.2 Remove Wood Fence**

**2-16.3a Remove Single Swing Gate**

**2-16.3b Remove Double Swing Gate**

**2-16.4 Remove Security Fence**

**2-18 Remove Permanent Barricades**

**2-21 Remove Guard Rail**

The measurement for payment of this item will be the total number of linear feet of wood fence, chain link fence, security fencing, gate work, guard rail, or the number of barricades required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for items required to be removed due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear foot of removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: removal and disposal of materials to include: concrete bases, rails, posts, pickets, wire, fabric, slats, w-beams, nails, nuts, bolts, fencing, etc.; removal and salvage of materials if determined to be reusable by the Project Construction Engineer; filling post holes, backfilling and regrading as necessary to promote drainage and eliminate safety hazards; and all other related and necessary materials, work and equipment required to complete the removal in accordance with the Contract Documents.*

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**2-17.1 Remove and Replace/Relocate Utility Poles**

**2-17.2 Temporary Utility Pole**

**2-17-3 Remove and Replace/Relocate Sign**

The measurement and payment of this item will be the total number of utility poles and/or signs required to be removed and/or removed and relocated or replaced, and the total number of temporary poles placed and removed, for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for poles removed due to unauthorized operations of the Contractor.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: coordination with the utility owner; adherence to rules and procedures set*

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*forth by utility owners; scheduling relocates as required to insure that no time is lost for the project; excavation; removal and storage of poles and/or signs; replacement with new pole and/or signs if necessary; bedding, select fills, backfilling and compaction; removal and replacement of guy wires; drilling, casings; installation of new foundations to utility owner or Project Construction Engineers requirements as necessary; disposal of all trash and construction unsuitable material associated with this bid item; and all other related and necessary materials, labor and equipment required to complete the construction in accordance with the Contract Documents.*

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### **2-19 Remove Existing Culvert**

The measurement for payment of this item will be the total number of linear feet of concrete culvert or concrete channel required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for removal of culvert due to negligence or unauthorized operations by the Contractor.

*The linear foot price bid for culvert removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, including overexcavation to remove unsuitable foundation material; removal and disposal of all culvert materials including pipe, wood, concrete, reinforcing; backfilling and compaction; and all other related and necessary materials, work and equipment required to remove the culvert in accordance with the Contract Documents.*

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### **2-20 Remove Trolley Tracks**

The measurement for payment of this item will be the actual number of linear feet per pair of trolley or street car tracks required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no payment will be made for track removal outside the limits of the trench or for track removed due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear foot removal of this item shall include all of the Contractor's costs of whatsoever nature. The linear foot price bid (per pair of rails) shall include: removal of paving over the tracks, cutting of rails, removal of ties, fasteners, spikes, special joints; removal of special bedding under the tracks such as concrete, gravel, etc; disposal of all unsuitable material; backfilling and compaction; and all other related and necessary materials, work and equipment required for removal of this item in accordance with the Contract Documents.*

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### **2-22 Remove Parking Lot Trench Drain**

The measurement for payment of this item removal will be the actual number of linear feet of trench drain required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no payment will be made for trench drain removed due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear foot removal of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, removal of concrete, unsuitable material, grates, backfilling and compaction; and all other related and necessary materials, work and equipment required for removal of this item in accordance with the Contract Documents.*

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## **2-23 Remove Decorative Landscaping**

No quantity measurement will be made for any of the work and materials required to remove and replace this item. Payment will be based upon completion of the work in accordance with the Contract Documents; provided, however, no payment will be made for removing and replacing decorative landscaping required to be replaced due to negligent or unauthorized operations by the Contractor.

*The lump sum bid price shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; removal and replacement of concrete, rock; removal and replacement of plants; disposal of excess excavated materials; topsoil, fertilizer, water, storage and all other related and necessary materials, work and equipment, required to replace the decorative landscaping in accordance with the Contract Documents.*

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## **2-24 Remove and Replace Bus Stop**

The measurement and payment of this item will be the total number of bus stops to be removed and replaced for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for bus stops removed and/or replaced due to unauthorized operations by the Contractor.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: coordination with the Regional Transportation District (RTD); adherence to the rules and procedures set forth by RTD; scheduling all necessary relocations and utility disconnections/reconnections, as required, to insure that no time is lost on the project; excavation, removal and disposal of materials as necessary; removal, storage, and replacement of poles, signs, benches, shelters, trash cans, guy wires and all other appurtenances associated with the bus stop; installation and removal of temporary bus stops, as required by RTD; removal and replacement of concrete bus pads, pavement, subgrade material, curb, gutter and sidewalk, landscaping materials and all other items required to complete construction of the proposed sewer and/or appurtenance and replace the bus stop in the same or better condition upon completion; and all other related and necessary materials, labor and equipment required to complete the construction in accordance with the Contract Documents.*

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## **3-2 Hauling of Contaminated Materials to Denver/Arapahoe Disposal Site (DADS)**

The measurement for payment of this item will be the number of tons of contaminated material required to be hauled off to the Denver/Arapahoe Disposal Site for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for hauling of non-contaminated materials and contaminated materials not authorized by the Project Construction Engineer.

*The unit price bid per ton of contaminated material disposal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; loading; disposal of debris; acquisition of all required permits; all special personnel and equipment required to haul the construction debris to DADS; laboratory testing as required; and all other related and necessary materials, work, and equipment required for removal of this item in accordance with the Contract Documents.*

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## **3-3 Hazardous Waste Disposal**

The measurement for payment of this item will be the total number of tons of hazardous waste required to be removed and hauled off, for construction of the proposed sewer and/or

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appurtenances; provided, however, no measurement for payment will be made for removal and disposals not authorized by the Project Construction Engineer.

*The unit price bid per ton of Hazardous Waste disposal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: all required permits and fees; excavation, loading, hauling and backfilling; disposal of hazardous waste as required by State and Federal regulations; and all other related and necessary materials, work, and equipment required for hazardous waste disposal in accordance with the Contract Documents.*

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### **3-4 Rock Excavation**

The measurement for payment of this item will be the total number of cubic yards of rock required to be removed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for rock excavation beyond the maximum prescribed trench width or for depths exceeding 12 inches below the pipe nor for excavation due to negligence or unauthorized operations by the Contractor.

*The unit price bid per cubic yard of rock excavation shall include all of the Contractor's costs of whatsoever nature required to perform the excavation and to replace the void area with granular bedding and/or any other material specifically approved by the Project Construction Engineer. The price bid shall include: excavation, blasting, removal and disposal of rock unsuitable material; furnishing, placing and compacting the approved backfill material required to fill the void area; and all other related and necessary materials, work, and equipment required to excavate the rock in accordance with the Contract Documents.*

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### **3-5 Muck Excavation**

The measurement and payment for this item will be the total number of tons of muck required to be excavated and disposed of; provided, however, no measurement for payment will be made for any excavation of material that does not meet the definition of muck as described in the technical specifications or as determined by the Project Construction Engineer. Measurement for muck excavation will be made only to the limits specifically determined by the Project Construction Engineer.

*The unit price bid per ton of muck removal shall include all of the Contractor's costs of whatsoever nature: The price bid shall include: excavation, removal and disposal of muck; dewatering; furnishing, placing and compacting of approved backfill materials in void areas left by the excavation; and all other related and necessary materials, work, and equipment required to remove the muck in accordance with the Contract Documents or as directed by the Project Construction Engineer.*

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### **3-6 Construct, Repair, or Stabilize Embankments**

The measurement and payment for this item will be the total number of cubic yards of embankment materials required for construction of the proposed sewer and/or appurtenances; provided, however, no payment will be made for embankment materials not authorized by the Project Construction Engineer.

*The unit price bid per cubic yard of embankment construction shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, haul, furnishing and placement of embankment materials, geotextiles, soils, compaction, placement of riprap, concrete, grouting, grading; and all other related and necessary materials, work, and equipment required to construct the embankment in accordance with the Contract Documents.*

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## **3-7 Material Management/Health & Safety Plan**

No quantity measurement will be made of any of the work and materials required for this item in construction of the proposed sewer and/or appurtenances; payment will be based upon completion of the work in accordance with the Contract Documents.

*The lump sum payment for materials management and health and safety plans shall include all of the Contractor's costs of whatsoever nature. The lump sum price bid shall include: facilities coordination for health and safety; coordination for testing and disposal of materials; management of on-site treatment, storage and disposal; implementation and coordination of Federal and Municipal Rules and Regulations as required by the respective agencies and municipalities; monitoring of the health and safety plan; contaminant testing as required; and all other related and necessary materials, work and equipment required to complete this item in accordance with the Contract Documents.*

*At the option of the Project Construction Engineer, one third of this item may be paid to the Contractor at the time of the first monthly progress payment, the second third may be paid at the next monthly progress payment and the last third may be paid at the final monthly progress payment, or at the discretion of the Project Construction Engineer.*

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## **3-8 Unclassified Excavation**

The accepted quantities will be paid for at the contract unit price for unclassified excavation. The measurement for payment of this item will be the number of cubic yards of material required to be removed for construction, excluding demolition and removal items specified elsewhere. All material encountered will be paid for as unclassified excavation. Measurement of this item will be based on survey data obtained by the CCD Survey Group as detailed in the technical specification. The quantity will not include any material excavated below the grades shown on the plans.

*The unit price per cubic yard of material shall be total compensation for all labor, equipment, materials and incidentals required to excavate materials, loading, hauling (on-site and off-site to DADS), stockpiling, placement as subgrade and/or topsoil, placement for embankments, water conditioning, compaction to specified limits. Embankment construction will not be measured separately but will be included in the unclassified excavation cost.*

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## **5-1 Structural Fill**

### **5-2a Subgrade Material (Select Backfill)**

### **5-2b Topsoil**

### **5-4 Crusher Fines**

### **5-5 Recycled Concrete**

### **5-8 Crushed Gravel Base Course (CDOT Class 6 Road Base)**

The measurement for payment of this item will be the number of tons of structural fill, subgrade material, topsoil, crusher fines, and/or recycled concrete placed and accepted for construction of the proposed facilities and/or appurtenances. No measurement for payment will be made for materials that are placed without specific written approval of the Project Construction Engineer. In addition, no payment will be made for: placement outside the specified trench width (unless otherwise noted in the Contract Documents), placement due to cave-ins, and placement due to negligent or unauthorized activities by the Contractor. This

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item shall follow the requirements set forth in Section 5.0 of the Detail and Technical Specifications.

All delivery trucks shall be plainly numbered and all records of gross, tare and net weights (determined by use of a certified scale) shall be kept in detail and furnished to the Project Construction Engineer upon request. These records will be used for payment purposes, and may be reviewed by the Project Construction Engineer at any time.

*The unit price bid per ton of classified material shall include all of the Contractor's costs of whatsoever nature. The price bid shall include; excavation and preparation of subgrade; removal and disposal of all unsuitable materials; furnishing of approved materials, transporting, weighing at a certified scale as required for payment placing, addition of water as necessary and compacting the classified material; finish grading; and all other related and necessary materials, work, labor and equipment required to complete the site preparation and placement of the classified material in accordance with the Contract Documents.*

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### 5-3 Overexcavation And Replacement With Select Backfill Material

The measurement and payment for this item will be the total number of tons for overexcavation and replacement with select backfill material (and/or stabilization materials consisting of 1-1/2 inch angular aggregate as approved by the Project Construction Engineer) required to construct the proposed facilities and/or appurtenances; provided, however, no measurement for payment will be made for overexcavation and replacement required due to negligence or unauthorized activities by the Contractor. The measurement for overexcavation and replacement shall start at the proposed pipe subgrade, extend downward as required to produce a stable subbase for the pipe and extend a maximum trench width as defined in the most recent addition of the Standard Detail drawings. This area shall be defined as the stabilization zone.

Payment will be solely based on the tons of approved select material imported and installed within the stabilization zone defined above. Select material must conform to the requirements set forth in Section 5.0 of the Detail and Technical Specifications. The Contractor must obtain approved submittals for all select materials used under this item from the Project Construction Engineer, to ensure that the material proposed for use meets the field conditions and intended use. All delivery trucks shall be plainly numbered and all records of gross, tare and net weights (determined by use of a certified scale) shall be kept in detail and furnished to the Project Construction Engineer upon request. These records will be used for payment purposes, and may be reviewed by the Project Construction Engineer at any time.

All hauling and disposal of construction or contaminated materials generated due to construction activities must be managed in strict conformance with the Detail and Technical Specifications.

*The unit price bid per ton of overexcavation and replacement shall include all of the Contractor's costs of whatsoever nature. The unit price bid shall include: trench protection, overexcavation, removal and disposal of material within the stabilization zone, removal and disposal of unsuitable material, hauling and disposal at the Denver Arapahoe Disposal Site (DADS); furnishing of approved materials, transporting, weighing at a certified scale as required for payment; compaction and installation of approved select materials; dewatering as necessary to allow installation and stabilization of select materials; furnishing and installation of geotextiles or filter fabrics as required in the Contract Documents, and all other related and necessary materials, work, labor and equipment required to complete the removal in accordance with the Contract Documents.*

## Measurement and Payment

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### **5-7 Controlled Low Strength Material (CLSM)**

The measurement and payment for this item will be the total number of cubic yards of Controlled Low Strength Material, controlled density fill, etc. approved for construction of the proposed facilities and/or appurtenances; provided, however, no measurement for payment will be made for materials required due to careless or unauthorized activities by the Contractor.

*The unit price bid per cubic yard shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing and hauling; placement, as directed by the Project Construction Engineer; maintaining the mixture to the requirements provided for within the Contract Documents; protection of existing facilities; and all other related and necessary materials, work, and equipment required to furnish the material in accordance with the Contract Documents.*

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### **8-1.1 Dip AWWA C151, Class 50 Water Line**

### **8-1.3 PVC AWWA C900, Class 200 and Class 150 Water Line**

The measurement and payment of each specific size of waterline pipe, except segments as may be otherwise provided for in the Contract Documents, will be the actual number of linear feet of pipe required to be removed and relocated or installed, complete, in place, as measured along the centerline of the waterline pipe from given station to given station, from center of valve to center of valve or from center of manhole to center of manhole with deductions made for the internal diameter or dimensions of manholes, structures and/or valves; provided, however, no measurement for payment will be made for pipe removed or damaged due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear foot for the construction of each section of waterline shall include all of the Contractor's costs of whatsoever nature for the complete construction of the pipeline in accordance with the requirements of the Board of Water Commissioners of Denver. The price bid shall include: The bid item shall include: trench sloping, benching, bracing, shoring and/or sheeting for pipe and associated appurtenances to assure safe working conditions; removal and disposal of the existing conduit and appurtenances (per State and Local requirements where applicable for lines containing asbestos), including valves, water meter's, stop boxes, fire hydrants, pressure regulating devices, restraints, and fittings; furnishing and installing required waterline pipe, fittings, appurtenances, temporary facilities and blow offs; tapping and/or connecting to mainlines, service lines, or structures; cutting and/or plugging of all abandoned facilities crossed during construction; furnishing and installing special fittings and restraints, including: transitional pipe sections required to properly connect different types of pipe and/or any other special fittings not specifically provided for elsewhere in the Contract Documents; joints and jointing materials, including: grout, mortar, gaskets, seals, bolts, connecting bands, and other miscellaneous items as required to construct the specific pipe section; removal and disposal of asphalt, millings, roadway surfacing materials, sod, surfacing materials, stumps, brush and prior to excavation; excavation, including exploratory excavation, as required by the Project Construction Engineer; over-excavation to remove unsuitable foundation material and replacement with granular or other approved select materials; constructing the specified bedding including the furnishing, placing, and compaction of sand, gravel, rock and controlled low strength materials, as required by the Denver Water Board; supply and installation of protective coatings or wrappings, locate wires and boxes; backfilling to include furnishing, transporting, and placement of any additional suitable backfill material required (except for those classified backfill materials provided for elsewhere in the Contract Documents); compaction and backfilling as specified (no additional or separate payment will be made for excess excavated material used as backfill or select material*

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*elsewhere on the project); restoration of ground surface to its original condition; grading and leveling; care and diversion of drainage courses; pumping and provision of facilities for diversion of flows; trench dewatering; protection, adjustment and/or reconnection of aboveground and underground utilities and service connections, replacement of hydrant laterals and assemblies damaged during crossing, reconnection of water services; coordination of gas service and electric relocates; crossing of existing and abandoned utilities; hauling and disposal of construction debris, excess excavated material, damaged materials and contaminated materials at the Denver Arapahoe Disposal Site (DADS), recycle and salvage of materials as necessary; saw cutting and/or rotomilling within mainline (B<sub>f</sub> extents) and lateral trench extents prior to excavation; removal and replacement and/or relocation of signs, and pipe bollards; providing for additional traffic control, to include barricades, detours and flagmen unless provided for elsewhere in the Contract Documents; removal and replacement of all traffic signal and/or activated loops; valve operation tests, pipe chlorination, clear water tests, pressure tests, locate wire testing; and all other related and necessary materials, labor and equipment required to construct a complete operable pipeline in accordance with the Contract Documents and in accordance with the Denver Water Board Standards.*

*In addition to the above, the unit price bid per linear foot for slip lining, bursting, jacking, tunneling, boring and/or micro tunneling shall include the following: installation of jacking, tunneling and/or boring pits and related equipment; launching and access pits; automated spoil transportation systems; hoists; signal systems, safety equipment; sealing materials, grout, sand casings, skids and end seals as approved by the Project Construction Engineer and as required by the Denver Water Board, filling of all annular spaces and any other necessary labor; purchase, delivery and installation of all equipment and materials required to install the pipe segment and/or associated casing per the Contract Documents; heating and butt fusion jointing; removal and replacement of existing waterlines, valves, hydrants, vaults, restraints, sod, seeding, sprinkler systems, trees, bushes, shrubs, bike path, curb, gutter, sidewalk, pavement, asphalt base course, asphalt wearing surface, and any other surface restoration and/or removal/replacement required within the areas impacted due to these operations.*

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### **8-1.2 Install Water Valve, Water Meter and Stop Box**

The measurement and payment for this item will be the total number of water valves, water meters and stop boxes required to be installed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for items required to be installed due to negligent or unauthorized operations by the Contractor.

*The unit price bid for installation of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, backfilling and compaction; removal and disposal of the existing water valve, water meter and/or stop box; installation of the item in accordance with the requirements of the Denver Water Board; supply and installation of all components required to complete the work, including stop(curbs) boxes; removal and disposal of pavement and unsuitable material; and all other related and necessary materials, labor, and equipment required for removal and replacement of each item in accordance with the Contract Documents, and in accordance with Denver Water Board Standards.*

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### **8-2 Remove Fire Hydrant Assembly**

The measurement and payment for this item will be the total number of fire hydrants required to be removed for construction of the proposed sewer and/or appurtenances; provided,

## Measurement and Payment

however, no payment will be made for hydrants replaced due to negligent or unauthorized operations by the Contractor.

*The unit price bid for removal of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; removal and disposal(or recycling as applicable) of hydrant, fittings, restraints, valves and appurtenances; backfilling and compaction; removal and disposal of pavement and unsuitable material; and all other related materials, work, and equipment required for removal of this item in accordance to the Contract Documents, and in accordance to the Denver Water Board Standards.*

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### **8-3 Install Fire Hydrant Assembly**

The measurement and payment for this item will be the total number of fire hydrants required to be placed for construction of the proposed sewer and/or appurtenances; provided, however, no payment will be made for hydrants installed without authorization by the Project Construction Engineer or due to negligent operations of the Contractor.

*The unit price bid for placement of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; furnishing, installation and assembly of all materials including but not limited to: hydrant, risers, fittings, restraints, valves and appurtenances; backfilling and compaction; removal and disposal of pavement and unsuitable material; operation tests, chlorination tests, clear water tests, pressure tests, and all other related and necessary materials, work, and equipment required for installation of the fire hydrant assembly in accordance with Denver Water Board Standards.*

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- 12-1.1 Vertical 6" Concrete Curb and Gutter**
  - 12-1.4 Vertical 9" Concrete Curb and Gutter**
  - 12-1.5 Combination Concrete Curb, Gutter and Sidewalk (2'-8")**
  - 12-1.6 Combination Concrete Curb, Gutter and Sidewalk (3'-11")**
  - 12-1.7 6" Concrete Curb Head**
  - 12-1.8 Handicap Concrete Curb Ramp**
  - 12-2.1 Concrete Sidewalk**
  - 12-2.2 Reinforced Concrete Sidewalk**
  - 12-2.3 Concrete Bike Path**
  - 12-2.4 Miscellaneous Concrete Flatwork**
  - 12-3 Concrete Valley Gutter (all sizes)**
  - 12-4.1 Concrete Street Intersection Gutter (Crossspan)**
  - 12-4.2 Concrete Street Intersection Gutter with Slot**
  - 12-4.3 Special Precast Concrete Intersection Gutter**
  - 12-5.1 Concrete Driveway Paving**
  - 12-5.2 Concrete Apron**
  - 12-5.3 Concrete Bus Pad**
  - 12-5.4 Concrete Alley Gutters**
  - 12-5.5 Concrete Alley Paving**
  - 12-5.6 Concrete Alley Returns**
  - 12-5.7 Concrete Street Paving**
  - 12-6 Concrete Median Strip**
  - 12-8 Concrete Steps**

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The measurement and payment for installation of this item will be the total number of linear feet for: combination curb and gutter, curb head, combination curb gutter and sidewalk, or the total number of square feet for: median strips, sidewalk, bike path, driveway pavement, street paving, crosspans, handicap curb ramps, alley paving, alley gutters, alley returns, single or double flare aprons, bus pads, valley gutter, concrete steps or any other type of miscellaneous concrete flatwork placed and accepted; provided, however, no measurement and payment will be made for flatwork placed due to careless or unauthorized operations by the Contractor.

All concrete ingredients and additives must be combined and mixed at the batch plant prior to transport. Onsite additions to the concrete mix, of any type, will not be allowed without prior authorization of the Project Construction Engineer.

*The unit price bid per square foot of concrete steps shall be quantified by the width of the stairs multiplied by the summation of each stair hypotenuse (the hypotenuse of the rise and run of each stair). The unit price bid per linear foot or square foot placement of these items shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: sawcutting and/or rotomilling surrounding surface to allow placement, removal of pavement or roadway surfacing; concrete sawing, furnishing and placing the concrete; forming, finishing and curing compounds; contraction and expansion joints where required by Project Construction Engineer, including partial depth sawcuts; joint sealing compounds; reinforcing as required and specified; concrete additives including, but not limited to: set retarders, accelerators, polypropylene fibrillated fibers, etc. as directed and approved by Project Construction Engineer; edging the concrete surface; furnishing, transporting, installing and compaction of materials required for a stable sub-base; removal and disposal of unsuitable subgrade materials (including frost), replacement with suitable backfill as necessary; backfilling and pavement around new flatwork; protection from freezing and vandalism; and all other related and necessary materials, work and equipment required to construct this item in accordance with the Contract Documents.*

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- 12-7 Non-reinforced Concrete Median Barrier**
  - 12-9 Concrete Headwall**
  - 12-10 Concrete Lined Ditches**
  - 12-11 Concrete Planters**
  - 12-12 Concrete Cradle for Class "A" Bedding**
  - 12-13 Concrete Encasement around Pipe**
  - 12-14 Concrete Cut-Off Wall**

The measurement for payment of bulk concrete items such as median barriers, cradles, encasements, cut off walls, lined ditches, planters, etc. will be the total number of cubic yards of concrete required for construction or the lump sum payment for headwalls as required for construction of the proposed sewer and/or appurtenance; provided, however, no payment will be made for any item replaced due to negligent or unauthorized operations by the Contractor.

*The unit price bid per lump sum or per cubic yard for this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing, transporting, and installing concrete materials, steel reinforcement; excavation and overexcavation; forming and curing compounds; finishing and edging of concrete; winter protection; backfilling and compaction; installation and furnishing of all fence and/or railing; and all other related and necessary materials, work and equipment required to construct this item in accordance with the Contract Documents.*

## Measurement and Payment

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- 16-1 Security Fence**
- 16-2a Single Swing Gate**
- 16-2b Double Swing Gate**
- 16-3 Chain Link Fence**
- 16-4 Wood Fence**
- 16-5 Single Steel Post Guardrail**
- 16-6 Single Wood Post Guardrail**
- 16-7 Permanent Barricades**
- 16-8 Hand Railing**

The measurement and payment for this item will be the total number of linear feet of security fence, chain link fence, wood fence, guardrail, hand railing, and permanent barricades or the total number of swing gates required to be placed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for fence work required to be placed due to negligence or unauthorized operations by the Contractor.

*The unit price bid per lineal foot or per item placement shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing and placement of new fencing materials to the height specified in the Contract Documents, including rails, posts, pickets, hardware, locks, paints, special treatments, concrete for posts, single swing gates, double swing gates, steel posts for guard rail, guard rail, wood posts; replacement of electric outlets, security wire (barbed, razor, etc.) and all other related and necessary materials, work and equipment required to construct the fence work in accordance with the Contract Documents.*

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### **20-1 Asphalt Temporary Patching**

The measurement for payment of this item will be the actual number of square yards per inch of thickness of asphalt concrete temporary patching mix placed complete in place, after the area has been properly backfilled and compacted, as required for the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for asphalt concrete temporary mix placed in areas not specifically approved by the Project Construction Engineer, or required due to careless or unauthorized operation by the Contractor.

The asphalt concrete temporary mix may consist of either hot or cold asphalt concrete surface material. Unless otherwise specified in the Contract Documents, the minimum thickness of asphalt concrete temporary patching mix required is one inch (1"). Included in the unit price bid of asphalt concrete temporary patching is maintenance of the temporary patch, which shall consist of regrading, recompacting, and renewing the material at sufficient intervals of time to ensure a smooth, dust/mud free driving and/or walking surface. This item shall conform with the Contract Documents.

*The unit price bid per square yard per inch of thickness of asphalt concrete temporary patching mix shall include all of the Contractor's costs of whatsoever nature for the complete construction of the sewer, appurtenances, or items otherwise provided for elsewhere in the Contract Documents. The price bid shall include: all preparatory work for placement to grade, removal of temporary asphalt mix; disposal of unsuitable material; street sweeping; hauling, rolling, and compaction; stripping of trench backfill or street subgrade to the required elevation and preparation for placement of permanent asphalt paving materials; temporary striping as required; and all other related and necessary materials, work and equipment required to furnish and place the asphalt concrete temporary mix smoothly and squarely in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.*

# Measurement and Payment

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## 20-2 Asphalt Overlay

The measurement for payment of this item will be the actual number of square yards per inch thickness of hot mix asphalt pavement overlay, in place, complete, and accepted by the Project Construction Engineer, as required for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for this pay item placed in areas not specifically approved by the Project Construction Engineer, nor required due to careless or unauthorized operation by the Contractor.

Unless otherwise directed by the Project Construction Engineer or indicated in the Contract Documents, the hot mix asphalt pavement overlay shall be placed at a minimum of two-inch (2") thickness. The surface area measurement for this pay item will include the width over the pipe trench (8' minimum width or pipe  $b_d$ , whichever is larger) plus a two foot (2') width on either side of the pipe trench that is rotomilled to a depth of 2" on either side as required by the Project Construction Engineer. This item will also be used to pay for a 2" thick overlay of intersections or part of intersections that are rebuilt due to removal of crossspans or other appurtenances; and for any use or application as required by the Project Construction Engineer. This item shall be completed in strict conformance with the Contract Documents.

*The unit price bid per square yard per inch of thickness of hot mix asphalt pavement overlay shall include all of the Contractor's costs of whatsoever nature for the complete construction of the proposed sewer, appurtenances, or items otherwise provided for elsewhere in the Contract Documents. The price bid shall include: obtaining all necessary permits; paying any associated fees; saw cutting or milling the existing pavement smoothly and squarely in a manner satisfactory to the Project Construction Engineer to assure a smooth joint (ripping and wheel-cutting is not permitted); loading, hauling, and disposal of unsuitable material if the unsuitable material is being hauled to any other site than Denver/Arapahoe Disposal Site (DADS); asphalt tack coat; fresh asphalt hauling, placing, rolling, and compaction; street sweeping and clean up; traffic control not provided for elsewhere in this Contract Documents; temporary striping as required; and all other necessary materials, work, and equipment required for placement of the hot mix asphalt pavement overlay in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.*

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## 20-3 Asphalt Trench Paving

The measurement for payment of this item will be the actual number of square yards per inch thickness of hot mix asphalt trench pavement, in place, complete, and accepted by the Project Construction Engineer, as required for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for hot mix asphalt trench pavement placed in areas not specifically approved by the Project Construction Engineer, nor required due to careless or unauthorized operation by the Contractor.

Unless otherwise directed by the Project Construction Engineer, the hot mix asphalt trench paving shall be placed to a depth specified in the Contract Documents. The surface area measurement for this pay item will only be the width over the pipe trench (8' minimum or pipe  $b_d$ , whichever is larger). Asphalt trench paving over storm inlet connector pipes can be at a width less than 8' if approved by the Project Construction Engineer.

*The unit price bid per square yard per inch of thickness of hot mix asphalt trench pavement shall include all of the Contractor's costs of whatsoever nature for the complete construction of the proposed sewer, appurtenances, or items otherwise provided for elsewhere in the Contract Documents. The price bid shall include: obtaining all necessary permits; paying any associated fees; saw cutting or milling the existing pavement smoothly and squarely in a manner satisfactory to the Project Construction Engineer to assure a smooth joint (ripping and*

## Measurement and Payment

*wheel-cutting is not permitted); loading, hauling, removal, and disposal of unsuitable material and excess excavated material; subgrade preparation, backfilling and compaction of subgrade to include furnishing, transporting and placement of any additional suitable backfill material required; asphalt tack coat; fresh asphalt hauling, placing, rolling, and compaction; street sweeping and clean up; traffic control not provided for elsewhere in the Contract Documents; temporary striping as required; and all other necessary materials, work, and equipment required for placement of the hot mix asphalt trench pavement in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.*

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### **20-4 Rotomilling**

The measurement for payment of rotomill work will be the actual number of square yards per inch thickness of asphalt or concrete material rotomilled to the specified depth as accepted by the Project Construction Engineer and as required for the proposed sewer and/or appurtenances; provided however, no measurement for payment will be made for asphalt or concrete rotomilled not in accordance with the Project Construction Engineers directions, or required due to careless or unauthorized operations by the Contractor. No measurement for payment will be made for rotomilling within the designated pipe trench width (8' minimum or pipe  $b_d$ , whichever is larger), or for rotomilling, cutting and/or removal within the designated pipe trench and/or lateral trenches. These costs shall be included in the unit price bid for the related pipe, structures, or appurtenances provided for elsewhere in the Contract Documents. In addition, no measurement for payment will be made for rotomilling other miscellaneous areas where sewer pipe, flatwork, or appurtenances are to be constructed and paid for elsewhere in the Contract Documents. Removal of pavement in these situations is included in the pay item for the particular pipe, sections of flatwork, or appurtenances and will not be paid for under this pay item.

*The unit price bid per square yard per inch thickness of rotomill work shall include all of the Contractor's work of whatsoever nature for the complete construction of the proposed sewer, appurtenances, or items provided for elsewhere in the Contract Documents. The price bid shall include: obtaining all necessary permits; paying any associated fees; loading; hauling, removal and disposal of unsuitable material, millings and excess excavated material; traffic control not provided for elsewhere in the Contract Documents; street sweeping; surface preparation; and all other necessary materials, work, and equipment required for rotomilling in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.*

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### **20-5 Asphalt Patch**

The measurement for payment of this item will be the actual number of square yards per inch thickness of hot mix asphalt used for asphalt patching purposes, complete, in place and accepted by the Project Construction Engineer; provided, however, no measurement for payment will be made for asphalt patching placed in areas not specifically approved by the Project Construction Engineer, or required due to careless or unauthorized operations by the Contractor.

This pay item will be used to pay for asphalt material used outside the limits established in Pay Items 20-2 and 20-3. This pay item will be used to pay for replacement of street paving outside the normal specified trench limits in areas deemed necessary by the Project Construction Engineer.

*The unit price bid per square yard per inch of thickness of hot mix asphalt patching shall include all of the Contractor's costs of whatsoever nature. The price bid shall include:*

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*obtaining all necessary permits; paying any associated fees; saw cutting or milling the existing pavement smoothly and squarely in a manner satisfactory to the Project Construction Engineer to assure a smooth joint (ripping and wheel-cutting is not permitted); loading, hauling, removal and disposal of existing asphalt pavement, rotomillings, unsuitable material and/or excess excavated material; subgrade preparation, backfilling and compaction of subgrade to include furnishing, transporting and placement of any additional suitable backfill material required; asphaltic tack coat; fresh asphalt hauling, placing, rolling, and compaction; street sweeping and clean up; traffic control not provided for elsewhere in the Contract Documents; temporary striping as required; and all other necessary materials, work, and equipment required for placement of the hot mix asphalt trench pavement in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.*

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### **20-6 Placement (Only) For Recycled Asphalt**

The measurement for payment of this item will be the actual number of square yards per inch thickness of recycled asphalt pavement placed, complete, in place, and accepted by the Project Construction Engineer, as required for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment will be made for recycled asphalt pavement placed in areas not specifically approved by the Project Construction Engineer, or required due to careless or unauthorized operations by the Contractor, or pavement damage caused by the Contractor's equipment or method of operation.

*The unit price bid per square yard per inch of recycled asphalt shall include all of the Contractor's costs of whatsoever nature for the complete construction of the proposed sewer, appurtenances, or items otherwise provided for elsewhere in the Contract Documents. The price bid shall include: obtaining all necessary permits and paying all associated fees; saw cutting to achieve a smooth joint; asphalt tack coat; asphalt hauling, placement, rolling, and compaction; disposal of unsuitable material; street sweeping and cleanup; and all necessary materials, work, and equipment required to furnish and place the recycled asphalt pavement smoothly and squarely in a manner satisfactory to the Project Construction Engineer in accordance with the Contract Documents.*

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### **20-7 Install Asphalt Path**

The measurement and payment for this item will be the actual number of square yards per inch thickness of hot mix asphalt placed to the dimensions shown in the Contract Documents or as directed by the Project Construction Engineer, complete, in place, accepted, and as required for construction of the proposed sewer and/or appurtenances; provided, however no measurement for payment will be made for asphalt path placed in areas not specifically approved by the Project Construction Engineer or required due to careless or unauthorized operations by the Contractor.

*The unit price bid per square yard per inch of hot mix asphalt shall include all of the Contractor's costs of whatsoever nature for the complete construction of the proposed sewer, appurtenances, or items otherwise provided for elsewhere in the Contract Documents. The price bid shall include: obtaining all necessary permits and paying all associated fees; saw cutting to achieve a straight joint; weed removal, grubbing, subgrade preparation, removal and disposal of unsuitable material and excess excavated material, placement of select subgrade material as necessary, compaction, installation of weed block fabric; asphalt tack coat; asphalt hauling, placement, rolling, and compaction; permanent striping as required; disposal of unsuitable material; street sweeping and cleanup; and all necessary materials, work, and equipment required to furnish and place the hot mix asphalt path smoothly and squarely in a*

## Measurement and Payment

*manner satisfactory to the Project Construction Engineer in accordance with the Contract Documents.*

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### **20-8 Asphalt Curb Head**

The measurement for payment of this item will be the total number of linear feet of asphalt curb head required to be placed for construction of the proposed sewer and/or appurtenances; provided, however, no measurement for payment for asphalt curb will be made for curb head required to be placed due to negligence or unauthorized operations by the Contractor.

*The unit price bid for placement of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: asphalt hauling, placement, rolling, compaction, shaping; excavation, backfilling and compaction; stabilizing the subbase; establishing grade; providing all labor, equipment and materials required to place asphalt curb as required and specified in the Contract Documents; disposal of excess or unsuitable materials including asphalt, concrete, landscaping materials etc; saw cutting, milling; street sweeping and clean up; traffic control not provided for elsewhere in the Contract Documents; asphalt tack coat; replacement and reestablishment of landscaping, sod, seed, irrigation systems and/or any other items impacted during placement of this item; and all other related and necessary materials work and equipment required to place this item in accordance with the Contract Documents or at the direction of the Project Construction Engineer.*

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### **20-9a Saw Cut Asphalt/Concrete (0-150 LF)**

The measurement and payment for saw cutting from 0-150 linear feet will be the actual number of linear feet up to 8-inches of depth of asphalt or concrete that is saw cut and accepted; however, no measurement for payment will be made due to negligent or unauthorized operations by the Contractor.

*The unit price bid will be the actual number of linear feet of asphalt or concrete that is saw cut to the full depth and shall include all of the Contractor's costs of whatsoever nature. The unit price bid shall include but not be limited to: mobilization, traffic control, surface preparation, clean up and disposal of debris, protection of utilities, street cut and occupancy permits, and all other related and necessary materials, work and equipment required to complete the saw cut as directed by the Project Manager and in accordance with the Contract Documents.*

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### **20-9b Saw Cut Asphalt/Concrete (>150 LF)**

The measurement and payment for saw cutting distances greater than 150 lineal feet will be the actual number of linear feet up to 8-inches of depth of asphalt or concrete that is saw cut and accepted; however, no measurement for payment will be made due to negligent or unauthorized operations by the Contractor.

*The unit price bid will be the actual number of linear feet of asphalt or concrete that is saw cut to the full depth and shall include all of the Contractor's of whatsoever nature. The unit price bid shall include but not be limited to: mobilization, traffic control, surface preparation, clean up and disposal of debris, protection of utilities, street cut and occupancy permits, and all other related and necessary materials, work and equipment required to complete the saw cut as directed by the Project Manager and in accordance with the Contract Documents.*

# Measurement and Payment

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## **21-1 Concrete Pavement**

The measurement and payment for this item will be the actual number of square feet of concrete placed and accepted; provided, however, no measurement for payment will be made for concrete pavement outside of the prescribed trench width or other dimensions as shown in the Contract Documents. Pavement required to be replaced due to careless or unauthorized operations by the Contractor will not be included in the amount computed for payment.

All concrete ingredients and additives must be combined and mixed at the batch plant prior to transport. Onsite additions, to the concrete mix, of any type will not be allowed without prior authorization of the Project Construction Engineer.

*The unit price bid per square foot of pavement shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: forming, reinforcing chairs or supports as required by the Project Construction Engineer, concrete, reinforcement, doweling; excavation; disposal of unsuitable material; curing compounds; contraction and expansion joints where required by Project Construction Engineer, including partial depth sawcuts; joint sealing compounds; reinforcing as required and specified; concrete additives including, but not limited to; set retarders, accelerators, polypropylene fibrillated fibers, etc. as directed and approved by Project Construction Engineer; finishing and edging; furnishing, transporting, installing, and compaction of all materials required for a stable subbase; removal and disposal of excess subgrade materials; and all other related and necessary materials, work and equipment required to construct the pavement in accordance with the Contract Documents.*

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## **22-1 Earthwork**

The measurement and payment for this item will be the total number of square yards of material to be removed and/or filled for construction as shown in the plans. The measurement for payment of this item will be based on the actual surface area within the footprint of the proposed embankment prior to construction activities.

*The unit bid price per square yard of earthwork shall include: all labor, equipment, material, subcontractors and incidentals required to perform earthwork as identified within the contract documents; clearing and grubbing; excavation; loading, hauling and disposal of excess excavated material and debris, stockpiling as necessary; hauling, procurement, placement and compaction of embankment materials as required; grading; diversion of water courses and/or dewatering operations as necessary; compaction to specified limits; excavation below the grades shown on plans to remove unsuitable foundation material, replacement of unsuitable foundation materials with suitable select materials; and all other materials, work and equipment required to complete the construction in accordance with the contract documents.*

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## **27-1 Steel Sheet Piling**

The measurement and payment for this item will be the actual vertical feet of steel sheet piling sections installed, accepted, and left in place up to one foot above the top of the new sewer pipe and/or appurtenance; provided, however, no measurement for payment will be made for steel sheet piling placed due to careless or unauthorized operations by the Contractor.

*The unit bid price per linear foot of steel sheet piling shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: placement, excavation, materials, diversion of water courses, welding where required, backfilling and compaction, cutting of the steel sheeting smoothly and squarely in a manner satisfactory to the Project Construction Engineer.*

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## Measurement and Payment

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- 30-1 Riprap**
- 30-2 Grouted Rip Rap**
- 30-2a Grouted Boulders (2-Foot Diameter)**
- 30-2b Grouted Boulders (3-Foot Diameter)**
- 30-2c Grouted Boulders (5-Foot Diameter)**
- 30-2k Boulder (4-Foot Diameter)**
- 30-2l Boulder (5-Foot Diameter)**
- 30-3 Rock Filled Gabions**
- 30-4 Derrick Stone/Riprap Outfall**

The measurement for payment of this item will be the total number of square yards of riprap, soil riprap, grouted riprap, grouted boulders and/or derrick stone, or the total number of boulders, or the total number of tons used for rock filled gabions required to be furnished and placed on site for construction of the proposed sewer and/or appurtenances; provided, no measurement for payment will be made for items installed due to careless or unauthorized operations by the Contractor.

*The unit price bid per square yard of riprap, soil riprap, grouted riprap, grouted boulders and derrick stone, shall be quantified based on the area of the installed surface directly parallel with the ground. The unit price bid per square yard, per ton, or per boulder shall include: clearing and grubbing; excavation; preparation of bedding/subgrade areas to include over excavation, furnishing, transporting, installing and compaction of all materials required for a stable sub-base and as shown in the details; removal and disposal of excess excavated materials; diversion of water courses and/or dewatering operations as necessary; supply and installation of filter and/or stabilization materials; filter and riprap drains; drain materials; concrete and/or grout; grouting of riprap or boulders; placing of riprap or boulders to the elevations shown on the Contract Documents or as directed by the Project Construction Engineer; mattress units and materials for rock filled gabions; overexcavation and replacement with suitable materials; hauling and placing of all materials; and all other materials, work and equipment required to complete construction in accordance with the Contract Documents.*

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- 30-2e 36" Grouted Boulder Edge**
  - 30-2f 48" Grouted Boulder Edge**

The measurement and payment of this item will be the total linear feet of boulder edge required to be furnished and placed on site for construction of the proposed channel; provided, no measurement for payment will be made for items installed due to careless or unauthorized operations by the Contractor.

*The unit price bid per linear foot of boulder edge shall be quantified based on the length of installed boulder along the proposed channel edge. The unit price bid per linear foot of boulder shall include: excavation; preparation of bedding/subgrade areas to include over-excavation as necessary; clearing and grubbing; furnishing, transporting, installing and compaction of all materials (bedding, rip rap, rock, or select fill) required for a stable sub-base and as shown in details; removal and disposal of excess excavated materials; diversion of water courses and/or dewatering operations as necessary placing of boulders to the elevations shown on the Contract Documents or as directed by the Project Construction Engineer; grouting of boulders as shown in the details; installation of weep holes as required; hauling and placing of all materials; and all other materials, work and equipment required to complete construction in accordance with the Contract Documents.*

## Measurement and Payment

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- 34-2 C-76 RCP**
- 34-3 C-361 RCP**
- 34-4 C-506 ARCH Pipe**
- 34-5 C-507 RCP**
- 34-6.1 Box Culvert - Cast-In-Place**
- 34-6.2 Box Culvert - Precast**
- 34-7.1 PVC Pipe**
- 34-7.2 PVC Slipliner Pipe**
- 34-7.3 PVC Pipe with Steel Casing**
- 34-8.1 HDPE SDR 17 Sewer Pipe By Bursting (PE 345434E)**
- 34-9.1 ASTM A746 D.I. Pipe**
- 34-10.1 Aluminized Steel Pipe**
- 34-11.1 PVC Pipe by Jacking/Boring With Steel Casing**
- 34-11.2 C-76 RCP, Class V by Jacking**
- 34-11.3 HDPE SDR 17 Sewer Pipe By Jacking/Boring With Steel Casing (PE 345434E)**

The measurement and payment of each specific size or type of pipe, except segments as may be otherwise provided for in the Contract Documents, will be the actual number of linear feet of sewer pipe installed, complete, in place, as measured along the centerline of the pipe from inside face of manhole to inside face of manhole, from inside face of manhole to given station, from given station to given station, or from center of manhole to center of manhole with deductions made for the internal diameter or dimensions of manholes and/or structures. Where special fittings have been specified and provided for elsewhere in the Contract Documents, deductions will be made for their lengths.

*The unit price bid per linear foot for the construction of each section of pipeline shall include all of the Contractor's costs of whatsoever nature for the complete construction of the pipeline, exclusive of manholes, appurtenances, or items otherwise provided for in the Contract Documents. The bid item shall include: trench sloping, benching, bracing, shoring and/or sheeting for pipe and associated appurtenances to assure safe working conditions; furnishing, transporting and installing all pipe and materials; tapping and/or connecting to mainline pipes, structures, stub outs or block outs; concrete coring; plugging of all abandoned lines crossed during construction; furnishing and installing special fittings, including: trash racks, concrete pipe plugs as required, transitional pipe sections required to properly connect different classes of pipe without a manhole or structure and any other special fittings not provided for elsewhere in the Contract Documents; joints and jointing materials, including: grout, mortar, gaskets, seals, bolts, concrete collars, connecting bands, and other miscellaneous items as required to construct the specific pipe joint; saw cutting and/or rotomilling within mainline (B<sub>f</sub> extents) and lateral trench extents prior to excavation; removal and disposal of pavement millings, sod, surfacing materials, stumps, brush and unsuitable material prior to excavation; excavation, including exploratory excavation, as required by the Project Construction Engineer; over-excavation to remove unsuitable foundation material and replacement with granular or other approved select materials; constructing the specified bedding including the furnishing, placing, and compaction of sand, gravel and rock as required for class B bedding or approved substitution; supply and installation of protective coatings or wrappings; backfilling to include furnishing, transporting, and placement of any additional suitable backfill material required (except for those classified backfill materials provided for elsewhere in the Contract Documents); compaction and backfilling as specified, no additional or separate payment will be made for excess excavated material used as backfill or select material elsewhere on the project; restoration of ground surface to its original condition; grading and leveling; care and diversion of drainage courses; pumping and provision of facilities for*

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*diversion of flows; trench dewatering; protection and adjustment of aboveground and underground utilities and service connections or laterals, including water service reconnections and adjustments; adjustment and reconnection of sanitary sewer services from mainline sewer to a point where proper connection and drainage can be achieved, unless provided for elsewhere in the Contract Documents; removal and replacement of hydrant laterals and assemblies damaged or relocated during crossing; coordination of gas service and electric relocates; crossing of existing and abandoned utilities; cutting and/or plugging of abandoned or crossed lines where indicated in the Contract Documents, or as directed by the Project Construction Engineer; hauling and disposal of construction debris, excess excavated material, damaged materials, unsuitable materials and manifested contaminated materials at the Denver Arapahoe Disposal Site (DADS), recycle and salvage of materials as necessary; removal and replacement and/or relocation of signs, and pipe bollards; providing for additional traffic control, to include barricades, detours and flagmen unless provided for elsewhere in the Contract Documents; removal and replacement of all traffic signal and/or activated loops; and all other related and necessary materials, labor and equipment required to construct a complete operable pipeline in accordance with the Contract Documents.*

*In addition to the above, the unit price bid per linear foot for slip lining, bursting, jacking, tunneling, boring and/or micro tunneling shall include the following: installation of jacking, tunneling and/or boring pits and related equipment; launching and access pits; steel joint rings on reinforced concrete pipe; automated spoil transportation systems; hoists; signal systems, safety equipment; sealing materials, joint cushions, reaction thrust blocks, grout, sand casings, skids and end seals as approved by the Project Construction Engineer, filling of all annular spaces and any other necessary labor; purchase, delivery and installation of all equipment and materials required to install the pipe segment and/or associated casing per the Contract Documents; heating and butt fusion jointing; removal and replacement of existing waterlines, valves, hydrants, vaults, restraints, sod, seeding, sprinkler systems, trees, bushes, shrubs, bike path, curb, gutter, sidewalk, pavement, asphalt base course, asphalt wearing surface, and any other surface restoration and/or removal/replacement required within the areas impacted due to these operations.*

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### **34-12.1 4' Diameter Precast Manhole**

### **34-12.2 5' Diameter Precast Manhole**

### **34-12.3 6' Diameter Precast Manhole**

The measurement and payment for manholes shall be the total number of individual manholes, complete, in place required for construction of the proposed sewer and /or appurtenances.

*The unit price bid per manhole structure shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing, transporting and installation of all materials, excavation including overexcavation to remove unsuitable foundation material and replacement with suitable material; sheeting and/or bracing; forming; cast-in-place or precast bases; concrete; steel reinforcement; precast barrel sections, flat tops and cones; brick, mortar, plastic joint sealant and grout; manhole steps, rings, cover, cast iron riser rings as specified by the Project Construction Engineer; construction and shaping of the manhole base invert as shown in the standard details, and to incorporate lateral connections and flows into the main channel; water stop gaskets, all boots and bands; cutting and plugging of existing sewer lines as required; reconnection of existing lateral sewer lines to new structure as required, including pipe, couplings and all other materials, equipment and labor required to complete proper reconnection; core drilling into structure as necessary; construction of stub-outs or block-outs; elimination of infiltration; removal and replacement of pavement, base course, sub-base material, sod and other surfacing materials; backfill and compaction; and all*

## Measurement and Payment

*other related and necessary materials, work and equipment required to construct the manholes, complete in accordance with the Contract Documents.*

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### **34-12.4 Type B Manhole**

### **34-12.5 Type P Manhole**

### **34-12.6 Outfall Structure**

### **34-12.7 Special Structure**

The measurement and payment for cast in place manholes and/or structures shall be the total number of manholes or structures, complete, in place, required for construction of the proposed sewer and/or appurtenances.

*The unit price bid per manhole and/or structure shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing, transporting and installation of all materials, excavation (including overexcavation to remove unsuitable foundation material and replacement with suitable material); sheeting and/or bracing; forming; concrete; steel reinforcement; precast barrel sections, flat tops and cones; brick, mortar, plastic joint sealant and grout; manhole rings, covers and cast iron riser rings as specified by the Project Construction Engineer; construction and shaping of the manhole base invert as shown in the Details and Technical Specifications, and to incorporate lateral connections and flows into the main channel; beveling and shaping of entrance/exit as required; cutting and plugging of existing sewer lines as required; reconnection of existing lateral sewer lines to new structure as required, including pipe, couplings and all other materials, equipment and labor required to complete proper reconnection; core drilling into structure as necessary; construction of stub-outs or block-outs; construction of waterproof joints; installation of water stop gaskets, boots and bands; elimination of infiltration; removal and replacement of pavement, base course, sub-base material, sod, decorative landscaping and other surfacing materials; backfill and compaction; and all other related and necessary materials, work and equipment required to construct the manholes and/or structures, complete, in accordance with the Contract Documents.*

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### **34-12.8 Uncover and Raise (Adjust) Manhole**

The measurement and payment for this item will be the number of vertical feet of manhole height required to be located, uncovered, and raised for construction of the proposed sewer and/or appurtenances as required in the Contract Documents, by the Project Construction Engineer or as determined via video inspection. Payment will be based upon completion of the work to a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents. No measurement for payment will be made for manhole adjustments required due to negligence or unauthorized operations by the Contractor.

*The unit bid for completion of this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: locating, including electronic sensing if needed; excavation and overexcavation; removal and disposal of unsuitable material and excess excavated materials; backfill with approved materials; compaction; furnishing and transporting of all materials and equipment; cutting or adjusting of the manhole in a manner satisfactory to the Project Construction Engineer; furnishing and placement of concrete, brick, mortar, concrete risers, concrete barrels, flat tops, cones, rings, covers, cast iron risers, plastic joint sealant, grout, manhole steps and all other related and necessary materials, work and equipment required to adjust manholes in accordance with the Contract Documents.*

# Measurement and Payment

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## **34-13.1 Pipe Outside Drop**

The measurement for payment of this item will be the total number of outside sanitary drops of the specified diameter required for construction of the proposed sewer facilities; provided, however, no measurement for payment will be made for outside drops not approved by the Project Construction Engineer.

*The unit price bid per outside drop shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: pipe and fittings, including additional pipe and/or materials necessary to connect the existing sewer to drop; concrete encasement and reinforcement; excavation and backfill; trench supporting; reshaping of inverts and benches to the top of the highest incoming pipe; reconnection of sidelines; forming and steel reinforcement; and all other related and necessary materials, work and equipment required to construct the outside drop in accordance with the Contract Documents.*

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## **34-14.1 RCP, Class III Precast Elbow**

## **34-14.2 RCP, Class V Precast Elbow**

## **34-14.3 RCP Flared End Section with Trash Rack**

## **34-14.4 Concrete Collars**

## **34-14.5 Flap Gate/Storm Control**

The measurement for payment of each specific size or type of special fitting shall be the total number of fittings required for construction of the proposed sewer and/or appurtenances.

*The price bid per special fitting shall include all of the contractor's costs of whatsoever nature. The price bid shall include: furnishing, transporting and installing all pipe specials and materials; joints and jointing materials; fasteners and tie downs; pipe collars and closures; bolts, grout, mortar, O-rings, connecting bands; excavation and compaction; shoring and backfilling; removal and disposal of unsuitable material and construction debris; adaptable trash racks for flared end sections; flap gates, assembly and installation; and all other related and necessary materials, work and equipment required to furnish and install these items in accordance with the Contract Documents.*

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## **34-15.1 Sewer Tap Location and Verification**

The measurement for payment of this item will be the actual number of sewer service connections (sewer taps) required to be located and determined to be active; provided, however, no payment will be made due to negligence or unauthorized operations by the Contractor and only those sections specifically authorized by the Project Construction Engineer shall be measured for payment.

*The unit price bid for verification of active sewer taps shall include all of the Contractor's costs of whatsoever nature for the complete verification and location of each active sewer tap. The price bid shall include: furnishing and setting up all equipment required for location and/or verification of active sewer taps; labor; energy supply required for all equipment; permits and fees; coordination with locators (IUG and/or related utility companies); advance coordination and planning with facility owner to ensure access to mainline sewer; location (vertically and horizontally) and verification of active and capped sewer taps by digging, vacuuming, sensing, electronic locators, televising, dye testing, smoke tracing, and/or any other means necessary to ensure tap location, verification and adequate elevation for connection to sewer main per the Contract Documents; excavation, backfill, compaction; temporary and/or permanent paving; removal and replacement of curb, gutter, sidewalk, sod, sprinkler lines, etc. damaged during*

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*location and verification; removal and disposal of unsuitable material and construction debris; and all other related and necessary materials, work, and equipment required to complete this item in accordance with the Contract Documents.*

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### **34-15.2 Reconnect Sewer Services (Taps)**

The measurement and payment for each service connection, reconnection and/or adjustment shall be the total number of connections, reconnections and/or adjustments required for construction of the proposed sewer and/or appurtenance.

*The price bid for this item of work shall include all of the Contractor's costs of whatsoever nature. The price bid shall include; locating and verifying of service connections unless provided for elsewhere in the Contract Documents; furnishing and installing all pipe, fittings and materials; disconnecting/reconnecting and plugging existing services; plugging all necessary lines; construction of new services from mainline sewer to a point where proper connection and drainage can be achieved; chasing sewer taps from point of crossing or conflict with mainline to a point where proper relocation/reconnection can be attained; removal and replacement of sod, curb, gutter, and pavement outside mainline trench extents and all other surface items within effected areas; crossing of existing and abandoned facilities; excavation and backfill; bedding and compaction; temporary pumping; extension of building sewers where required; and all other related and necessary materials, work, and equipment required to construct the service connection or reconnection in accordance with the Contract Documents.*

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### **34-15.3 Utility Exploratory Investigation**

The measurement for payment of this item will be the actual number of field locations or verifications required for construction of the proposed sewer and/or appurtenances.

*The unit price bid per location or verification shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing of all equipment required for location or verification of storm , sanitary or any other utility as requested by the Project Construction Engineer; acquisition of all permits; coordinating with locaters (Inter Utility Group); excavation and backfill, including Controlled Low Strength Materials as required; paving ,patching and compaction; location of the utility by digging, vacuuming , sensing, or employment of other methods in utility location and/or verification; and all other related and necessary materials, work, and equipment required for location or verification of the sewer or utility as required in the Contract Documents or as directed by the Project Construction Engineer.*

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### **34-16.1 #14 Storm Inlet**

### **34-16.2 Single #16 Storm Inlet**

### **34-16.3 Double #16 Storm Inlet**

### **34-16.4 Triple #16 Storm Inlet**

### **34-16.5 Parking Lot Trench Drain**

The measurement for payment of each specific size and/or type of inlet will be the individual structure, complete, in place in accordance with the Contract Documents.

*The unit price bid per inlet structure shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing, transporting, and installing all materials; excavation, including overexcavation to remove unsuitable foundation materials; concrete, pipe collars, reinforcement steel, mortar and grout; manhole lids, rings, covers, grates, frames and curb boxes; open throat construction; galvanized steel rods; manhole steps; concrete ribbed deflectors; backfilling and compaction; removal and replacement of pavement, base*

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*coarse, sub-base materials, sod, decorative landscaping and any other surfacing materials; constructing and shaping of the base and invert; replacement of curb, gutter and sidewalk between the transitions as stipulated on the Details; and all other related and necessary materials, work, and equipment required to construct the storm inlet in accordance with the Contract Documents.*

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### **34-16.8 Adjust Existing Inlet Structure**

The measurement and payment for this bid item will be the actual number of existing inlet structures (excluding flagstone curb head) adjusted. Payment will be based upon completion of the work to a manner satisfactory to the Project Manager and in accordance with the Contract Documents. No measurement for payment will be made for existing inlet structure adjustments due to negligence or unauthorized operations by the Contractor.

*The unit price bid will be the actual number of existing inlet structures (Inlet Grates, Frames, Beams, Curb Boxes, etc.), excluding flagstone curb head, adjusted. The unit price bid will include but shall not be limited to: mobilization; raising, lowering, moving, adding and/or removing of concrete, masonry, brick, mortar, concrete risers, inlet grates, plastic joint sealant, grout and all other related and necessary materials, work and equipment required to adjust inlet structures in accordance with the Contract Document; resetting of grates; replacement of curb, gutter and sidewalk between the inlet transitions as stipulated in the Details; traffic control; surface preparation and compaction as necessary; obtaining of a street occupancy permits and street cut permits; locating, including electronic sensing if needed; removal and disposal of construction debris; furnishing and transporting of all materials and equipment; and all other related and necessary materials, work and equipment required for the adjustment of the existing inlet structure.*

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### **34-17.1 Pre-Video Inspection of Sewer Pipe**

### **34-17.2 Cleaning of Sanitary Sewer Pipe**

### **34-18.2 Cleaning of Storm Sewer Pipe**

The measurement for payment of this item will be the actual number of linear feet of sewer line cleaned and/or pre-video inspected as measured along the centerline of the pipe from inside face of manhole to inside face of manhole, from inside face of manhole to given station, from given station to given station, or from center of manhole to center of manhole with deductions made for the diameter of structures and appurtenances. Only those sections specifically authorized by the Project Construction Engineer or noted in the Contract Documents will be measured for payment.

*The unit price bid per linear foot of sewer line cleaning and/or pre-video inspection shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing and setting up of all equipment, labor, and materials necessary to clean and perform pre-video inspection of the sewer, including an explosion-proof television camera, as necessary; recording all information on USB Plug and Play device (flash drive or hard drive) for review by City; submittal of video in MP4 format and logs in .pdf format, both of which must be submitted in accordance to the naming convention required within the applicable Detail and Technical specification section.*

*By-pass pumping and/or diversion of sewer flows around the section of pipe to be cleaned and to another sewer line accepted by the Project Construction Engineer to receive such bypass; supplying of energy required to operate all bypass equipment; temporary installation of bypass piping under the pavement of cross streets, or raised transitional crossings as may be required per the approved traffic control plan; repaving of street cuts after completion of bypassing;*

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*removal and replacement of manhole rings, covers, steps and cone sections as necessary to permit bypassing; furnishing of water for jetting; providing power for de-rooting equipment and other types of machinery; removal of all foreign material from the sewer line; storage of cleaning sediment on the job site in containers or other approved methods, sediment laboratory testing as necessary, maintenance of stored materials during the waiting time for laboratory test results on the sediment, disposal of sediment according to Local, Federal and State environmental requirements; all inspection and cleaning of manholes; removal and disposal of unsuitable material and construction debris; and all other related and necessary equipment, work, and materials required to accomplish this item in accordance with the Contract Documents.*

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### **34-17.3 Sanitary Sewer By-Pass Pumping**

#### **34-18.3 Storm Sewer By-Pass**

The measurement for payment of this item will be the actual number of linear feet of sewer line to be by-passed as measured along the centerline of the pipe from center of manhole to center of manhole. Only those sections specifically authorized by the Project Construction Engineer will be bypassed and measured for payment.

*The unit price bid per linear foot for this item shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing and setting up of all equipment, labor, and materials required to pump or divert sewer flows around the section of pipe being lined, repaired, reconstructed, or constructed to another sewer line accepted by the Project Construction Engineer to receive such bypass; supplying of energy required to operate all bypass equipment; temporary installation of bypass piping under the pavement of cross streets, or raised transitional crossings as may be required per the approved traffic control plan; repaving of streets after completion of bypassing; removal and replacement of manhole rings, covers, steps and cone sections as necessary to permit bypassing; cleanup and removal of unsuitable material; and all other related and necessary equipment, work, and materials required to complete the sewage bypassing as required in the Contract Documents or as directed by the Project Construction Engineer.*

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### **34-17.4 Cured-in-Place-Pipe**

The measurement for payment of this item will be the actual number of linear feet of cured-in-place pipe installed, measured along the centerline of the pipe from center of manhole to center of manhole, from center of manhole to given station, from given station to given station, or from center of structure to center of structure.

*The unit price bid per linear foot of the Cured-In-Place-Pipe shall include all of the Contractor's costs of whatsoever nature. The price bid shall include, but is not limited to: furnishing all equipment, materials, and labor necessary to complete post video engineering inspection of the sewer being rehabilitated including an explosion-proof television camera, as necessary; recording all information on USB Plug and Play device (flash drive or hard drive) for review by City; submittal of video in MP4 format and logs in .pdf format, both of which must be submitted in accordance to the naming convention required within the applicable Detail and Technical specification section; determine, identify and locate all active and inactive (capped) sewer taps, including dye testing, linear footage from center of manhole (stationing) electronic sensing, smoke tracing or use of any other means necessary to verify the active taps; determination of extended services or taps requiring trimming; locating, identifying and reporting structurally deficient pipe sections for replacement or point repair, completion of additional pre-installation inspections and sewer cleaning as necessary prior to CIPP installation; supply energy for all equipment; obtain permits for the inspection and*

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*covering any related fees; furnishing and setting up all equipment and labor necessary to clean the sewer; furnishing of water for jetting; providing power for de-rooting equipment and other types of machinery; removal of all foreign material from the sewer line that will prevent installation of internal linings; storage of cleaning sediment on the job site in containers or other approved methods; maintaining storage during the waiting time for laboratory test results on the sediment; disposal of sediment according to Local, Federal, and State environmental requirements; all inspection and cleaning of manholes; removal and disposal of unsuitable material and construction debris; furnishing and setting up all equipment, materials, and labor necessary for the construction process; furnishing water, steam and energy required for the rehabilitation process; furnishing, installing and applying the Cured-In-Place-Pipe Material; curing and trimming; providing access to the City and County of Denver, or their designee, for the purpose of obtaining samples of installed material for onsite and laboratory testing; incidentals referenced in other sections of the Specifications; and all other related and necessary materials, work, and equipment required to complete this item in accordance with the Contract Documents.*

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### **34-17.5 Grinding**

The measurement for payment of this item will be the actual number of linear feet of sewer line approved for grinding as measured along the center line of the pipe from center of manhole to center of manhole, from center of manhole to given station, or from given station to given station. Only those sections specifically designated by the Project Construction Engineer will be smoothed and “ground” and measured for payment. Payment for grinding will not be made due to negligence or unauthorized operations by the Contractor.

*The unit price bid per linear feet of sewer line grinding shall include all of the Contractor’s costs of whatsoever nature. The price bid shall include: removal of roots, protruding objects, chemical deposits, unsuitable material or any other materials as directed by the Project Construction Engineer prior to placement of any liner; grinding via mechanical, chemical or other approved methods; furnishing and setting up of all equipment and labor necessary to inspect the line to be rehabilitated; video inspection of the line to locate and identify live sewer taps and to locate taps that require trimming; recording of the video inspection on tape; removal of all materials from the pipe walls that will prevent the proper installation of cured-in-place or formed-in-place plastic liners; furnishing of water and power for de-rooting equipment; storing of cleaning sediments on the job site in containers or other Federal or locally approved storage methods; maintaining of stored materials during the time required to obtain laboratory tests; transporting of the sediment for disposal to a landfill upon receipt of laboratory tests results showing that all tests meet Federal and local standards for normal disposal, payment of disposal and landfill fees, if the material is being hauled to any site other than Denver/Arapahoe Disposal Site (DADS); cleaning and inspection of manholes; and all other related and necessary materials, work and equipment required to complete this item in accordance with the Contract Documents.*

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### **34-17.6a Sanitary Sewer Service Reactivation for CIPP**

### **34-17.6b Storm Sewer Service Reactivation for CIPP**

The measurement for payment of this item will be the actual number of sewer service taps required to be reactivated as determined to be active during the pre-video inspection study. No measurement for payment will be made for taps which are opened/reactivated and have not been determined to be active. The Contractor shall accept all responsibility to provide residents, businesses, etc. with an established and reconnected sewer service. No measurement

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will be made for sewer service reactivations due to negligent or unauthorized operations by the Contractor.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing and setting up of all equipment and labor necessary to locate and reactivate active services; cutting of CIPP material and linings, coatings and/or coverings required to open active sewer services; removal and disposal of all unsuitable material; notification of residents and business upon reactivation; and all other related and necessary materials, work and equipment required to complete this item in accordance with the Contract Documents or at the direction of the Project Construction Engineer.*

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### **34-17.7 Extended Tap Cutting**

The measurement and payment for this item will be the actual number of approved extended taps or services that would have to be cut or otherwise repaired for construction of the proposed sewer and or appurtenances. No measurement will be made for extended tap cutting required due to negligent or unauthorized operations by the Contractor.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing of all equipment and labor required to cut the extended tap; cutting of the tap to a smooth and hydraulically functional opening; furnishing of power for all equipment; video-inspection and locating of the extended tap; removal and disposal of materials; and all other related and necessary materials, work and equipment required to complete this item in accordance with the Contract Documents or at the direction of the Project Construction Engineer.*

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### **34-17.8 Explosion Proof Television Camera**

No measurement for payment will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the completion of the work in accordance with the Contract Documents.

The areas/extents within the Contract Documents requiring the use of explosion proof equipment shall be determined by the Contractor. Damage and repair to the sanitary system and surrounding areas due to misuse of equipment, faulty equipment or negligence are the responsibility of the Contractor.

*The lump sum price bid for Explosion Proof Television Camera shall include all of the Contractor's costs of whatsoever nature. The lump sum price bid shall include: furnishing, installing, and activating the camera; all labor of whatsoever nature to the various areas of construction, and all other related and necessary materials, work, and equipment required to accomplish this item in a manner satisfactory to the Project Construction Engineer and in accordance with the Contract Documents.*

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### **40-1 Seeding and Mulching**

The measurement and payment for this item will be the total number of square feet of seed, mulch and required soil amendment placed for construction of the proposed sewer and or appurtenances; however, no measurement will be made for seed and mulch placed due to negligent or unauthorized operations by the Contractor.

*The unit price bid per square foot of seed and mulch placed shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing, transporting and placing of seed, mulch, erosion control fabric, blankets or protective coverings; protection and care of stockpiled seed and mulch; preparation, fertilization and soil amendment;*

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*furnishing of new seed and mulch of like quality to replace any improperly maintained seed and mulch; watering, raking and rolling the ground surface after placement of seed and mulch; placement of erosion blanket on all slopes greater than 3:1; and all other related and necessary materials, work and equipment required to furnish and place the seed and mulch, complete, in accordance with the Contract Documents.*

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### **40-2 Seeding**

The measurement and payment for this item will be the total number of square feet of seed to be placed for construction of the proposed sewer and/or appurtenances; however, no measurement for payment will be made for seeding required due to negligent or unauthorized operations by the Contractor.

*The unit per square foot of seed placed shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: preparation of soils, ripping and tilling, cleaning, fertilization, leveling to the elevations specified in the Contract Documents; furnishing of seed as specified in the Contract Documents; placing of the seed, wetting, and compaction; erosion control fabric, blankets, or protective coverings as required; watering; reseeding and/or replacement of any improperly maintained seed; and all other related and necessary materials, work, and equipment required to place the seed in accordance with the Contract Documents.*

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### **40-3 Sodding**

The measurement and payment for this item will be the total number of square feet of sod required to be placed for construction of the proposed sewer and/or appurtenances; provided, however no measurement will be made for sod placed due to negligent or unauthorized operations by the Contractor.

*The unit price bid per square foot shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: preparation and cleaning of the ground surface; furnishing of sod as specified in the Contract Documents or to the same quality as the existing sod; replacement of any improperly maintained sod; proper placement of the sod; watering, rolling and compaction; clean up and disposal of unsuitable material; and all other related and necessary materials, work and equipment required to place the sod in accordance with the Contract Documents.*

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### **40-4 Sprinkler System**

#### **40-5 Relocate Sprinkler System**

The measurement and payment for this item will be the total number of linear feet of sprinkler system required to be placed for construction of the proposed sewer and/or appurtenances; provided, however no measurement will be made for sprinkler placed due to negligent or unauthorized operations by the Contractor.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation, furnishing of materials, protection and installing pipework and heads; adjusting heads; backfilling, grading, installing and adjusting valves; and all other related and necessary materials, work, and equipment required to install the sprinkler system in accordance with the Contract Documents or as directed by the Project Construction Engineer.*

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### **40-6 Decorative Landscaping**

## Measurement and Payment

No quantity measurement will be made for any of the work and materials required to remove and replace this item. Payment will be based upon completion of the work in accordance with the Contract Documents; provided, however, no payment will be made for removing and replacing decorative landscaping required to be replaced due to negligent or unauthorized operations by the Contractor.

*The lump sum bid price shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: excavation; removal and replacement of concrete, rock; removal and replacement of plants, mulch, support systems and retaining structures; disposal of excess excavated materials; topsoil, fertilizer, water, storage and all other related and necessary materials, work and equipment, required to replace the decorative landscaping in accordance with the Contract Documents.*

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### **40-7 Remove Trees (>6" Diameter)**

### **40-8 Remove Bushes**

The measurement for payment of this item will be the total number of trees, bushes, shrubs or landscaping units, required to be removed for construction of the proposed sewer as specified in the Contract Documents and directed by the Project Construction Engineer; provided, however, no measurement for payment will be made for items removed which are less than six (6) inches in diameter at a height of one (1) foot above the existing ground.

*The unit price bid per tree, bush, shrub or specified landscaping item removal shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: removal of a sufficient length of the root system to insure that the tree, bush, shrub or landscaping unit will not continue to grow; disposal of all materials removed; acquisition of all permits required for removal; backfilling with soil material approved by the Project Construction Engineer; and all other related and necessary materials, work and equipment required to remove trees in accordance with the Contract Documents.*

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### **40-9 Remove and Transplant Trees (>6" Diameter)**

### **40-10 Replace Bushes and/or Shrubs**

The measurement for payment of this item will be the total number of trees required to be removed and transplanted and/or the total number of shrubs and/or bushes required to be replaced for construction of the proposed sewer; provided, however, no measurement for payment will be made for trees required to be removed and transplanted, or shrubs and/or bushes required to be replaced due to negligent or unauthorized operations by the Contractor.

*The unit price bid per tree removal and transplant or shrub and/or bush replacement shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: removal, storing, planting, replanting or replacing, puddling, backfilling, and all other related and necessary materials, work and equipment required to remove and transplant the tree or replace the shrub and/or bush in accordance with the Contract Documents.*

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### **40-11 Replace Green Ash Tree (2" Caliper)**

### **40-12 Replace Tree (>6" Diameter)**

The measurement for payment for tree planting or replanting will be the total number of trees required to be placed per plans and due to construction of the proposed sewer; provided, however, no measurement for payment will be made for trees planted due to negligent or unauthorized operations by the Contractor.

## Measurement and Payment

*The unit price bid per tree placement or replacement shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: removal, storing, replanting or replacing, backfilling, staking and supporting devices; formed wells and/or cages; insulating wrap; protection from animals; watering and care throughout the warranty period; and all other related and necessary materials, work and equipment required to plant and replant the tree in accordance with the Contract Documents.*

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### **40-13 Shade Trees (> 2" Caliper)**

### **40-14 Ornamental Trees (> 2" Caliper)**

The measurement for payment for tree planting will be the total number of trees required to be placed per plans and due to construction of the work; provided, however, no measurement for payment will be made for trees planted due to negligent or unauthorized operations by the Contractor.

*The unit price bid per tree placement shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: delivery, temporary protection, storage, planting, backfilling, staking and temporary support devices; formed wells and/or cages; insulating wrap; protection from animals; watering and care throughout the warranty period; and all other related and necessary materials, work and equipment required to plant the tree in accordance with the Contract Documents.*

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### **40-15 Landscape Improvements**

No quantity measurement will be made for any of the work and materials required for this item in construction of the proposed landscape and irrigation improvements. Payment will be based upon completion of the work in accordance with the Contract Documents; provided, however, no payment will be made for any work performed due to negligent or unauthorized operations by the Contractor.

*The lump sum bid price shall include all of the Contractor's costs of whatsoever nature. The price bid shall include all of the work and equipment, and all other related and necessary materials, required to construct all of the proposed landscape and irrigation improvements shown on the landscape/irrigation plans, in accordance with the Contract Documents.*

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### **41-1 Traffic Control**

No quantity measurement will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the completion of the work in accordance with the Contract Documents.

*The lump sum price for Traffic Control shall include all of the Contractor's costs of whatsoever nature. The lump sum bid price shall include: furnishing, installing, moving, maintaining and removing all temporary traffic signs, barricades, channeling devices, warning lights, delineators, and any other equipment or personnel as required by the latest revision of the "Manual on Uniform Traffic Control Devices for Streets and Highways", and the requirements set forth by the City and County of Denver, Transportation Engineering Division; all signs, emergency replacements, warning lights, variable message boards, traffic cones, and barricades; approved traffic maintenance plans as required; concrete median barriers as required; lane markings and temporary stripping; flagging and notification of property owners; traffic control management; furnishing, installing, adjusting, maintaining and removing all special signs required to direct pedestrians and/or vehicles to businesses or parking facilities disrupted due to construction activities; additional traffic control and safety*

## Measurement and Payment

*devices as required by the Project Construction Engineer; and all other related and necessary materials, work, and equipment required to accomplish this item in accordance with the Contract Documents.*

*At the option of the Project Construction Engineer, one third of the lump sum price for this item may be paid to the Contractor upon satisfactory completion of and/or incorporation of proper controls, the second third may be paid upon fifty percent completion of the work as determined by the percent of work completed on the day of progress, and the last third may be paid to the Contractor at the last progress payment or at the discretion of the Project Construction Engineer.*

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### **41-2 Rerouting and Construction of Bike Path**

No quantity measurement will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the completion of the work in accordance with the Contract Documents.

*The lump sum price bid for rerouting and construction of bike paths shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: furnishing, installing, moving, maintaining and removing all temporary traffic signs, barricades, channelization devices, warning lights, delineators, bike path signage and any other equipment or personnel required for safe conductance and detouring of bike path personnel off and around the designated construction zone in a safe and professional manner; construction of safety fence, including placement of concrete barriers; coordination with Parks and/or Traffic personnel; obtaining of necessary permits and paying associated fees; water control; placement of rock or pavement for temporary bike path; and all other related and necessary materials, work, and equipment required to accomplish this item in accordance with the Contract Documents or the direction of the Project Construction Engineer.*

*At the option of the Project Construction Engineer, one third of the lump sum price for this item may be paid to the Contractor upon satisfactory completion of and/or incorporation of proper controls, the second third may be paid upon fifty percent completion of the work as determined by the percent of work completed on the day of progress payment, and the last third may be paid to the Contractor at the last progress payment or at the discretion of the Project Construction Engineer.*

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### **42-1 Railroad Control**

No measurement will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the percent completion of the work in accordance with the Contract Documents.

The City and County of Denver will obtain all necessary license agreements and acquire all railroad protective liability insurance policies necessary to complete construction. In the event that the contractor is required to obtain any of these agreements or liability policies, the City and County of Denver will reimburse the contractor for all such costs. Unless noted elsewhere in the Contract Documents, the costs associated with removal and replacement of railroad facilities shall not be the responsibility of the Contractor.

*The lump sum price for Railroad Control shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: acquisition of additional insurance required by the railroad company to work within railroad right-of-ways, or as otherwise noted within the license agreement; payment of railroad flagging and inspection fees; detouring, railroad traffic control, as required; furnishing of approved base materials, as required to bring the subgrade up to ballast elevation; adhering to the conditions of permits, easements, and*

## Measurement and Payment

railroad agreements; notification of the railroad and the public of proposed work; arrangements with the railroad for use of railroad property not covered under permits, easements, or railroad agreements; coordination with the railroad and its sub tiers for removal and replacement of the track and its related facilities; railroad safety training for all personnel working within the railroad right-of-way; and all other related and necessary materials, work and equipment required to accomplish this item in accordance with the Contract Documents or as directed by the Project Construction Engineer.

At the option of the Project Construction Engineer, one third of the lump sum price for this item may be paid to the Contractor upon satisfactory completion of and/or incorporation of proper controls, the second third may be paid upon fifty percent completion of the work as determined by the percent of work completed on the day of progress payment, and the last third may be paid to the Contractor at the last progress payment or at the discretion of the Project Construction Engineer.

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### 43-1 Storm Water Management Plans (SWMPs)

No quantity measurement will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the completion of the work in accordance with the Contract Documents.

*The lump sum price for the Storm Water Management Plans shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: implementing measures per Best Management Practices (BMPs); obtaining all permits and paying any associated fees (i.e. NPDES, etc.); coordination with State and Local agencies as required to setup all required SWMP's for the project; furnishing, installing and removing erosion control materials required by the Contractor's SWMP's; protection of existing flow lines, inlets and manholes; construction and design of special erosion control plans for emergency situations that develop during construction or unexpected weather conditions; providing filter fabric, bales, stakes, rock, filter material, silt fence, gabions, wire mesh, temporary berms, temporary diversions, temporary slope drains, check dams, geotextile protection, sediment traps and basins; clearing and grubbing for placement of SWMP control features, etc.; flushing, jetting and/or removal of construction debris from existing systems as required by the Project Construction Engineer; stabilization of the work area by seeding and/or mulching during and after construction; disposal of work materials; maintenance of all erosion control features and seeded areas, so they function properly during construction; testing of sediment and disposal as required; and all other related and necessary materials, work and equipment required to accomplish this item in accordance with the Contract Documents.*

*At the option of the Project Construction Engineer, one third of the lump sum price for this item may be paid to the Contractor upon satisfactory completion of and/or incorporation of proper controls, the second third may be paid upon fifty percent completion of the work as determined by the percent of work completed on the day of progress payment and the last third may be paid to the Contractor at the time of final progress payment or at the discretion of the Project Construction Engineer.*

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### 44-1 Dewatering

No quantity measurement will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the completion of the work in accordance with the Contract Documents.

*The lump sum price for dewatering shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: pumping and bypass pumping; furnishing of all equipment*

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*and manpower; furnishing and installing erosion control materials; obtaining all required discharge permits and paying associated fees; excavation, haul, backfill; installation of caissons, pump pits, piping and drainage courses; disposal of excess and contaminated water; water testing; and all other related and necessary materials, work and equipment required to accomplish this item in accordance with the Contract Documents.*

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### **44-2 Water Treatment**

The measurement and payment for this item will be the total number of gallons of contaminated water required to be treated during the execution of the Contract Documents or as determined by the Project Construction Engineer during construction.

*The unit price bid for treatment of contaminated water shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: pumping and bypass pumping; sampling and/or water testing; furnishing of all labor, equipment and materials for treatment of contaminated water on site; furnishing and installing of erosion control materials; obtaining all required discharge permits and paying of associated fees; installation of caissons, pumps, pump pits and drainage courses; disposal of excess and contaminated water; excavation, haul, backfill; and all other related and necessary materials and equipment required to accomplish this item in accordance with the Contract Documents.*

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### **45-1 Laboratory Testing**

The measurement for payment of this item will be the actual number of laboratory tests required for completion of this project and/or installation of related appurtenances.

*The unit price bid shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: delivery and transport to the testing lab; furnishing of written results to the Project Construction Engineer; testing on end products of sediment required in sewer line cleaning, water quality, soils or other types of laboratory tests as required by the Project Construction Engineer; tests shall determine materials composition, concentrations of chemicals, or contaminants present, Atterberg soils limits, soil stress, permeability, volatile organic compounds; testing of CIPP pipe as outlined in the Technical Specifications; and all other related and necessary materials, work and equipment required to complete this item in accordance with the Contract Documents and as directed by the Project Construction Engineer.*

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### **46-1 Pavement Marking (Paint)**

### **46-2 Epoxy Pavement Marking**

### **46-3 Thermoplastic Pavement Marking**

### **46-4 Preformed Plastic Pavement Marking**

### **46-5 Pavement Marking Tape**

The measurement for payment of this item will be the total number of gallons, linear feet or square feet of pavement marking material required to accomplish this aspect of the construction and payment will be based upon completion of the work in accordance with the Contract Documents.

*The unit price per gallon, per linear foot, or per square foot shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: pavement marking plans when required, furnishing of paint, marking tape, thermoplastic and methyl methacrylate*

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*materials, furnishing of all equipment required for application of all pavement marking materials, sandblasting and high pressure cleaning to remove all dirt, laitance, and curing compound residues, and all other related and necessary materials, work and equipment for pavement marking as required in the Contract Documents or as required by the Project Construction Engineer.*

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### **50-1 Mobilization**

No quantity measurement will be made for any of the work and materials required to accomplish this aspect of the construction project and payment will be based upon the completion of the work in accordance with the Contract Documents

*The lump sum cost shall include all of the Contractor's costs of whatsoever nature. The price bid shall include: mobilization; demobilization; transporting all equipment and materials; temporary sanitary facilities; complete setup, removal, repair, coordination and payment of fees associated with temporary staging facilities; project signs; obtaining groundwater discharge permits and all additional permits required by state and local agencies, necessary to complete construction per the Contract Documents; loading, hauling and disposal of all construction related debris and excess excavated material not provided for elsewhere in the Contract Documents; advance coordination and scheduling with all affected utility companies, railroads, businesses, and homeowners, night and weekend work as necessary; any labor of whatsoever nature required in various areas of construction site as necessary to complete the work in accordance with the Contract Documents.*

At the option of the Project Construction Engineer, one quarter of the lump sum price for mobilization may be paid to the Contractor at the time of the first monthly progress payment, the second quarter may be paid at the time of the second monthly progress payment, and the third quarter may be paid to the Contractor at the time of the third monthly progress payment, or at the discretion of the Project Construction Engineer. The total payment for this bid item shall not exceed seventy-five percent (75%) of the lump sum price during construction. The remaining twenty-five percent (25%) shall be paid after final site cleanup, completion of all punch list items and demobilization from site.

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### **50-1a Emergency Mobilization**

No quantity measurement will be made for any of the work and materials required to accomplish this aspect of the construction and payment will be based upon the completion of the work in accordance with the Contract Documents. The required time for mobilization to site shall be five (5) hours from official written notification.

*The measurement for payment of this item will be the actual number of emergency mobilizations required to complete the work in accordance with the Contract Documents and shall include all of the Contractor's costs of whatsoever nature. Each individual site response officially requested by the Project Manager shall be considered one emergency mobilization. The price bid shall include: emergency mobilization; demobilization; transporting all equipment and materials; temporary sanitary facilities; complete setup, removal, repair, coordination and payment of fees associated with temporary staging facilities; obtaining groundwater discharge permits and all additional permits required by state and local agencies, necessary to complete construction per the Contract Documents; loading, hauling and disposal of all construction related debris and excess excavated material not provided for elsewhere in the Contract Documents; advance coordination and scheduling with all affected utility companies, railroads, businesses, and homeowners, night and weekend work as necessary; any*

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*labor of whatsoever nature required in various areas of construction site as necessary to complete the work in accordance with the Contract Documents.*

At the option of the Project Construction Engineer, one quarter of the lump sum price for mobilization may be paid to the Contractor at the time of the first monthly progress payment, the second quarter may be paid at the time of the second monthly progress payment, and the third quarter may be paid to the Contractor at the time of the third monthly progress payment, or at the discretion of the Project Construction Engineer. The total payment for this bid item shall not exceed seventy-five percent (75%) of the lump sum price during construction. The remaining twenty-five percent (25%) shall be paid after final site cleanup, completion of all punch list items and demobilization from site.

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