
2.1 – MEASUREMENT AND PAYMENT

(Last Revised 02/2017)

SELECTED LINKS TO SECTIONS WITHIN THIS SPECIFICATION

[Base Course & Paving](#)

[C&G, Driveways, Sidewalks](#)

[Earthwork](#)

[Miscellaneous Items, Common to All Items](#)

[Sanitary Sewer](#)

[Street Lighting](#)

[Storm Drainage](#)

[Traffic Signals](#)

[Trenching, Backfilling & Compaction](#)

[Water Service Connections](#)

Measurements for purposes of payment shall be in accordance with the unit quantities stated in the proposal as defined below. Whenever units of measure, (i.e. linear feet, each, and similar units of measurement) are mentioned in a proposal, it shall be interpreted to mean the unit installed in accordance with the plans and specifications, and ready for use. Prices for the following bid items shall include all labor, materials, tools, equipment, and other incidentals necessary to complete the work as shown on the plans and in accordance with The City of Fairfax Manual of Specifications and Standard Details.

2.1.1 TRENCHING, BACKFILLING & COMPACTION OF UTILITIES

A. Bedding Stone:

Measurement: Bedding stone for pipe bedding will be measured by the cubic feet of pipe bedding material placed in the trench in accordance with Fairfax Water Standard Details. Cubic feet of bedding material calculated will be converted to tons using the weight of 145 pounds per cubic feet.

Payment: Bedding stone will be paid for at the contract unit price per ton for placement of stone, complete in place.

B. Compacted Aggregate Backfill:

Measurement: Compacted aggregate backfill will be measured by the ton.

Payment: Compacted aggregate backfill will be paid for at the contract unit price per ton for aggregate backfill and shall include all materials, equipment, and labor required to furnish and compact, complete in place, VDOT No. 21A stone in the locations designated by the City Engineer.

C. Coarse Granular Aggregate Backfill:

Measurement: Coarse granular aggregate backfill will be measured by the ton.

Payment: Coarse granular aggregate backfill will be paid for at the contract unit price per ton for aggregate backfill and shall include all materials, equipment, and labor required to furnish and consolidate, complete in place, VDOT No. 57 stone in the locations designated by the City Engineer.

D. Excavation and Backfill:

Measurement and Payment: In accordance with Section 2.3 – *Trenching, Backfilling, and Compaction of Utilities*, all excavation and backfill shall be included in the cost of the other items bid – not a pay item.

E. Exploratory Excavation

Measurement: Such excavation, where ordered by the City Engineer will be measured by the cubic yard.

Payment: The cost of such excavation, where ordered by the City Engineer, will be paid at the contract unit price bid, per cubic yard.

F. Foundation Stone:

Measurement: Foundation stone for pipelines will be measured by the cubic feet of foundation stone placed in the trench in accordance with Fairfax Water Standard Details. Trench width shall also be measured in accordance with Fairfax Water Standard Details. Cubic feet of foundation stone material placed will be converted to tons using the weight of 145 pounds per cubic feet.

Payment: Foundation stone will be paid for at the contract unit price for foundation stone by the ton. Price shall include removal and disposal of unusable material and placement of stone, complete in place.

G. Pavement Cut and Removal, Asphalt Concrete:

Measurement: Asphalt concrete pavement cut and removed will be measured in square yards regardless of the existing pavement depth. Refer to **Standard Details 401.07 and 401.08** for calculation of pavement removal dimensions for utility trench patches.

Payment: Asphalt concrete pavement cut and removed will be paid for at the contract unit price per square yard for bituminous pavement cut and removed, including all material, equipment, and labor to saw cut pavement, remove and dispose of surplus material.

H. Pavement Cut and Removal, Unreinforced Concrete:

Measurement: Unreinforced concrete pavement cut and removed will be measured in square yards regardless of the existing pavement depth. Refer to **Standard Details 401.07 and 401.08** for calculation of pavement removal dimensions for utility trench patches.

Payment: Unreinforced concrete pavement cut and removed will be paid for at the contract unit price per square yard for unreinforced concrete pavement cut and removed, including all material, equipment, and labor to saw cut pavement, remove and dispose of surplus material.

I. Pavement Cut and Removal, Reinforced Concrete:

Measurement: Reinforced concrete pavement cut and removed will be measured in square yards regardless of the existing pavement depth. Refer to **Standard Details 401.07 and 401.08** for calculation of pavement removal dimensions for utility trench

patches.

Payment: Reinforced concrete pavement cut and removed will be paid for at the contract unit price per square yard for reinforced concrete pavement cut and removed, including all material, equipment, and labor to saw cut pavement, remove and dispose of surplus material.

J. Trench (Select) Borrow Backfill:

Measurement: Trench borrow will be measured by the cubic yard of material removed from the trench, limiting the trench width to a maximum of the pipe outside diameter plus 2 feet.

Payment: Trench borrow will be paid for at the contract unit price by the cubic yard and shall include all material, equipment, and labor to furnish, haul, place, and compact the approved material, complete in place, in the locations as designated on the drawings or as approved by the City Engineer.

K. Trench Rock:

Measurement: Trench rock excavation will be measured by the City Engineer or his representative in its original position, after which the rock shall be excavated to the depth specified by the City Engineer and then measured by the cubic yard. Refer to Fairfax Water Standard Details for allowable width of rock removal in trench. Rock excavation shall consist of the removal and satisfactory disposal of all materials, which in the opinion of the Engineer, cannot be excavated except by drilling, blasting, "jack hammering or hoe ramming." No payment shall be made for rock removal by ripping. It shall consist of undecomposed stone, hard enough to ring under hammer. All boulders containing a volume of more than one-half cubic yard will be classified as rock.

Payment: Trench rock excavation will be paid for at the contract unit price per cubic yard for rock excavation and shall include all labor, materials, and equipment to excavate and dispose of rock off site.

L. Trench Patching for New Pipe Installation – Permanent and Temporary:

See Section 2.7 - *Base Course & Paving*.

2.1.2 SANITARY SEWER

A. Appurtenances:

Measurement: Wye Branches, tees, bends, etc. will be measured by the number of units installed of each size.

Payment: Wye branches, tees, bends, etc. will be paid for at the contract unit price per each, complete in place for each size.

B. Bedding Stone, Granular:

Measurement: Stone for bedding, when required, is considered to be incidental to the cost of the pipe.

Payment: Not a pay item.

C. Bored and jacked Sewer pipe:

Measurement: Bored and jacked sewer pipe of the type and diameter specified will be measured by the linear foot that is installed by the boring and jacking method.

Payment: Bored and jacked sewer pipe will be paid for at the contract unit prices per linear foot per diameter per type of pipe bored and shall include any and all excavation, including the boring pit, any backfill, dewatering, etc., complete in place. However, the bore shall be paid one time on a linear foot basis and no extra compensation will be paid for failures and the subsequent withdrawal and re-jacking attempts. Lines off either on grade or alignment shall be rejected or corrected in a manner approved by the City Engineer.

D. Building Connections/Service Laterals:

Measurement: Measurement of building connections shall be made on a per service basis regardless of service pipe material or length.

Payment: Payment for service laterals shall be at the contract unit price bid, per service, for the sized indicated and shall include bends, wyes, saddles (if applicable), adapters, long sweep elbows, cleanout riser and plugs, and other incidentals as necessary, curb/gutter and sidewalk replacement (if necessary) complete in place as shown on **Standard Details 4.12 and 4.13**. Any temporary pumps required to bypass sewer around work areas shall be provided at no additional cost.

E. Encasement Pipe (bored):

Measurement: Steel casing pipe of the wall thickness and diameter specified will be measured by the linear foot of steel casing pipe installed.

Payment: Steel casing pipe will be paid for at the contract unit prices per linear foot per diameter per thickness for steel casing pipe bored, complete in place. However, the bore shall be paid one time on a linear foot basis and no extra compensation will be paid for failures and the subsequent withdrawal and re-jacking attempts. Lines either off on grade or alignment shall be rejected or corrected in a manner approved by the City Engineer. Carrier pipe shall be paid for separately.

Encasement of sewer lines by the dry bore and jacking method shall include any and all excavation, including the boring pit, any backfill, the encasement pipe, bore, jacking, spiders, drain pipe, french drain, the end seals, dewatering, clean up, restoration and any other work required for a complete in place installation.

F. Encasement Pipe (open cut):

Measurement: Steel casing pipe of the wall thickness and diameter specified will be measured by the linear feet of steel casing pipe installed.

Payment: Steel casing pipe will be paid for at the contract unit prices per linear foot per diameter per thickness for steel casing pipe installed by the open cut method, complete in place. Carrier pipe shall be paid for separately.

Encasement of sewer lines by the open cut method shall include any and all

excavation, including, any backfill, the encasement pipe, spiders, drain pipe, french drain, the end seals, dewatering, clean up, restoration and any other work required for a complete in place installation.

G. Fernco Couplings:

Measurement: Fernco couplings will be measured on an each basis of the size required.

Payment: Fernco couplings will be paid for at the contract unit price per each of the size required. Price shall include all labor, equipment, and materials to install the coupling, complete in place.

H. Machine Core Existing Manholes:

Measurement: Machine core of existing manholes will be measured on an each basis.

Payment: Machine core of existing manholes will be paid for at the contract unit price per each. Price shall include all labor, equipment, and materials to machine core drill and install the neoprene flexible boot and adjustable band, complete in place.

I. Manhole Abandonment:

Measurement: Manhole abandonment will be measured on an each basis.

Payment: Manhole abandonment will be paid for at the contract unit price per each, complete in place in accordance with Section 2.5 – *Sanitary Sewer*.

J. Manholes – Standard and Drop:

Measurement: Manholes shall be measured on an each basis for a basic 6-foot deep manhole inclusive of frame and cover and base. For all depths in excess of 6 feet, manholes shall be measured by the vertical foot of depth of the manhole constructed in 2-foot increments (e.g. 0 to 6', 6'-1" to 8'-0", 8'-1" to 10'-0", etc.). For the purpose of determining the additional depth of manhole to be paid for at the unit price bid per vertical foot, manholes shall be measured from the invert of the pipe outlet to the top of the concrete casting and recorded to the nearest 1/10 of a foot.

Where more than one type or size (diameter) designation is shown on the drawings, or called for in the special provisions, each shall be covered by a separate bid item of the following form:

- 1) Type (or Size) Manhole, per each.
- 2) Additional Depth of Manhole, per vertical foot.
- 3) Drop Manhole Connection, per vertical foot.

Payment: Manholes shall be paid for at the contract unit price bid for a 6-foot deep manhole on an each basis plus a unit price per vertical foot for all depths in excess of 6 feet deep in 2-foot increments (e.g. 0 to 6', 6'-1" to 8'-0", 8'-1" to 10'-0", etc.), plus a unit price per vertical foot for each drop manhole connection, where they occur. Price shall include furnishing and constructing manholes complete-in-place including excavation, connection to existing sewers if necessary, complete invert forming, if

necessary, in accordance with the standards and drawings, rubber boots, bedding stone, furnishing and bolting castings to cone, gaskets, parging interior joints, vent pipe if required (see **Standard Detail 4.14**), grade adjustment and grade rings, if applicable, vacuum testing, backfill and compaction complete in every detail. See **Standard Details 4.02, 4.03, 4.05, and 4.07**.

K. Manholes – Doghouse:

Measurement: Manholes shall be measured on an each basis for a basic 6-foot deep manhole inclusive of frame and cover and a base constructed in accordance with **Standard Detail 4.06**. For all depths in excess of 6 feet, manholes shall be measured by the vertical foot of depth of the manhole constructed in 2-foot increments (e.g. 0 to 6', 6'-1" to 8'-0", 8'-1" to 10'-0", etc.). For the purpose of determining the additional depth of manhole to be paid for at the unit price bid per vertical foot, manholes shall be measured from the invert of the pipe outlet to the top of the concrete casting and recorded to the nearest 1/10 of a foot.

Where more than one type or size (diameter) designation is shown on the drawings, or called for in the special provisions, each shall be covered by a separate bid item of the following form:

- 1) Type (or Size) Manhole, per each.
- 2) Additional Depth of Manhole, per vertical foot.
- 3) Drop Manhole Connection, per vertical foot.

Payment: Doghouse manholes shall be paid for at the contract unit price bid for a 6 foot deep manhole on an each basis plus a unit price per vertical foot for all depths in excess of 6 feet deep, in 2-foot increments (e.g. 0 to 6', 6'-1" to 8'-0", 8'-1" to 10'-0", etc.), plus a unit price per vertical foot for each drop manhole connection, where they occur. Price shall include furnishing and constructing manholes complete-in-place including excavation, base construction, complete invert forming, if necessary, in accordance with the standards and drawings, rubber boots if applicable, bedding stone, furnishing and bolting castings to cone if applicable, gaskets, parging interior joints, vent pipe if required (see **Standard Detail 4.14**), grade adjustment and grade rings, if applicable, vacuum testing, backfill and compaction complete in every detail. See **Standard Detail 4.07**.

L. Manhole Frames and Covers – Standard and Waterproof:

Measurement: Manhole frames and covers will be measured on an each basis.

Payment: Manhole frames and covers will be paid for at the contract unit price per each, complete in place, as shown on **Standard Details 4.09, 4.10, and 4.11**.

M. Measurement of Sewer Pipe

Measurement: Sewer pipe shall be measured from center to center of manholes and depth of cut from invert to original ground line at centerline. No deductions in length will be made for branches and appurtenances along the line. The original ground line must be determined by the Contractor immediately prior to any trench excavation. It is the Contractor's responsibility to provide this information to the City within 24 hours of the beginning of the trench excavation activities.

Payment: Payment will be made at the contract unit prices bid per linear foot as

stated in the proposal for the type of pipe specified and shall include trench excavation (excluding rock and select fill), shoring or use of trench box, installation, pumping, backfilling, compaction, testing of failed trenches, disposal of excess material, pressure testing, and cleanup complete in place. Payment may be reduced for lines deviating from design grade.

N. Service Saddles on Existing Lines:

Measurement: Service saddles for taps placed on existing lines will be measured on an each basis per size installed. See **Standard Detail 4.13**.

Payment: Service saddles for taps placed on existing lines will be paid for at the contract unit price per each, complete in place. Any temporary pumps required to by-pass sewer around work areas shall be provided at no additional cost.

O. Tunneling:

Measurement: Tunneling will be measured by the linear feet of tunnel installed.

Payment: Tunneling will be paid for at the contract unit price per linear foot for diameter installed. Lines either off on grade or alignment shall be rejected or corrected in a manner approved by the City Engineer.

The tunneling method shall include any and all excavation, including the boring pit, any backfill, steel liner plates and bolts, ventilation system for workers, lagging, spiders, grout plugs, sand-cement grouting of voids, steel drain pipe, french drain, concrete paved invert, the ends seals, dewatering, clean up, restoration and any other work required for a complete in place installation.

2.1.3 WATER SERVICE CONNECTIONS

A. Public water distribution systems shall conform to the design and construction requirements of Fairfax Water, which are not outlined in this document. Fairfax Water is the approving authority for all water design and specifications and must provide final approval for design.

B. Water Service Connection – ¾” and 1” (open cut):

Measurement: Water service and pipe will be measured on an each basis regardless of service pipe material or length.

Payment: Water service assemblies will be paid for at the contract unit price per size indicated on drawings, in terms of one complete assembly, and shall include excavations, backfilling, testing, chlorinating, bacteriological testing, tap, corporation stop, angle valve, dual check valve/adapter, iron yoke and service pipe, complete in place. Expansion wheel, meter, box and lid to be furnished by City of Fairfax with expansion wheel and meter to be installed by City of Fairfax. If replacing an existing meter box, cost shall include removal and disposal of the old meter box and assembly. Cost for either circumstance shall be included in other items bid.

C. Water Service Connection – ¾” and 1” (by Jacking or Boring):

Measurement: Measurement of jacked water services shall be made on a per service basis regardless of service pipe material or length.

Payment: Water service assemblies will be paid for at the contract unit price per size indicated on drawings, in terms of one complete assembly, and shall include all equipment, labor, and materials for installation, making tap, running or punching service line, backfilling, testing, chlorinating, bacteriological testing, tap, corporation stop and service pipe, complete in place. Angle valve, dual check valve/adapter, iron yoke, expansion wheel, meter, box and lid to be furnished and installed by City of Fairfax. If replacing an existing meter box, cost shall include removal and disposal of the old meter box and assembly. Cost for either circumstance shall be included in other items bid.

D. Water Service Connection – 1 1/2” and 2” (open cut):

Measurement: Measurement of water services shall be made on a per service basis regardless of service pipe material or length.

Payment: Water service assemblies will be paid for at the contract unit price per size indicated on drawings, in terms of one complete assembly, and shall include excavations, backfilling, testing, chlorinating, bacteriological testing, meter setter, tap, corporation stop and service pipe, complete in place. Expansion wheel, meter, box and lid to be furnished by City of Fairfax with expansion wheel and meter to be installed by City of Fairfax. If replacing an existing meter box, cost shall include removal and disposal of the old meter box and assembly. Cost for either circumstance shall be included in other items bid.

E. Water Service Connection – 1 1/2” and 2” (by Jacking and Boring):

Measurement: Measurement of jacked water services shall be made on a per service basis regardless of service pipe material or length.

Payment: Water service assemblies will be paid for at the contract unit price per size indicated on drawings, in terms of one complete assembly, and shall include all equipment, labor, and materials for installation, making tap, running or punching service line, excavations, backfilling, testing, chlorinating, bacteriological testing, meter setter, tap, corporation stop and service pipe, complete in place. Expansion wheel, meter, box and lid to be furnished and installed by City of Fairfax. If replacing an existing meter box, cost shall include removal and disposal of the old meter box and assembly. Cost for either circumstance shall be included in other items bid.

2.1.4 STORM DRAINAGE

A. Endwalls, VDOT standard:

Measurement: Endwalls, VDOT standard, will be measured on an each basis.

Payment: Head/endwalls will be paid for at the contract unit price per each of the size and type indicated on the drawings and shall include all equipment, labor, materials for installation, excavation, weep holes, shoring removal and replacement, curing, finishing, backfill, sealing and mortaring, complete in place.

B. Flared End Section, VDOT standard:

Measurement: Flared end section, VDOT standard, will be measured on an each basis.

Payment: Flared end section, VDOT standard, will be paid for at the contract unit price per each of the size indicated on the drawings and shall include all equipment, labor, materials for installation, excavation, backfill, sealing and mortaring, complete in place.

C. Manholes - Standard:

Measurement: Standard manholes will be measured by the vertical foot of manhole constructed. Manholes shall be measured from the lowest point of the invert to the top of the concrete casting and recorded to the nearest ½-foot.

Payment: Standard manholes will be paid for at the contract unit price per vertical foot, complete in place, including excavation. Price shall include complete invert pouring and forming of concrete in accordance with the standards and drawings, bedding stone, adjusting ring, frames, covers, gaskets, backfill, and compaction.

D. Manhole Abandonment:

Measurement: Manhole abandonment will be measured on an each basis.

Payment: Manhole abandonment will be paid for at the contract unit price per each, complete in place, in accordance with Section 2.5 – *Sanitary Sewer*.

E. Precast Drop Inlets and Bases, VDOT standard:

Measurement: Precast Drop Inlets, VDOT standard, will be measured on an each basis and shall include the following base /manhole heights and inlet lengths based on the particular style of inlet as stated below:

| | |
|---------------------------|------|
| DI-1, Standard inlet top, | H=2' |
| DI-2A, L=2.5', | H=2' |
| DI-2B, L=4', | H=2' |
| DI-2C, L=6', | H=2' |
| DI-3A, L=2.5', | H=2' |
| DI-3B, L=4', | H=2' |
| DI-3C, L=6', | H=2' |
| DI-7, Standard inlet top, | H=2' |

Measurement of extra length for inlets will be in linear foot.

Measurement of extra height for the base/manhole will be in vertical foot.

Payment: Precast drop inlets, VDOT standard, will be paid for at the contract unit price per each plus a separate payment for extra inlet lengths and base/manhole heights greater than those defined in the above measurement description. Price shall include all labor, material, and equipment necessary for installation, pouring of concrete invert, invert forming, and mortaring of required components, complete in place.

F. Rip Rap, Dry:

Measurement: Dry rip rap will be measured by the cubic yard.

Payment: Dry rip rap will be paid for at the contract unit price per cubic yard of the

size as indicated on the drawings and shall include all materials (including geotextile fabric), labor, and equipment necessary for a complete in place installation.

G. Rip Rap, Grouted:

Measurement: Grouted rip rap will be measured by the cubic yard.

Payment: Grouted rip rap will be paid for at the contract unit price per cubic yard of the size as indicated on the drawings, with the top 6 inches grouted, and shall include all materials (including geo-textile fabric), labor, and equipment necessary for a complete in place installation.

H. Storm Pipe, Reinforced and Plain Concrete:

Measurement: Storm pipe will be measured from the exact beginning of the pipe to the end of the pipe for the size and class pipe specified.

Payment: Storm pipe will be paid for at the contract unit price per linear foot for pipe of the wall thickness, class, and pipe size specified, complete in place. This price shall include pipe, trench excavation (excluding rock), stone bedding if specified, shoring or use of trench box, installation, pumping, joint compound, backfilling, compaction, and disposal of excess material.

I. Storm Pipe, Corrugated Aluminum Pipe:

Measurement: Storm pipe will be measured from the exact beginning of the pipe to the end of the pipe for the size and type pipe specified.

Payment: Storm pipe will be paid for at the contract unit price per linear foot for pipe of the wall thickness and/or gauge, coating, material, and pipe size specified, complete in place. This price shall include pipe, bands, gaskets, cutting and trimming, trench excavation (excluding rock and select fill), stone bedding if specified, paved invert (if applicable), shoring or use of trench box, bracing crown (if required) installation, pumping, backfilling, compaction, and disposal of excess material.

2.1.5 EARTHWORK

A. Geotextile Stabilization Fabric

Measurement: Geotextile stabilization fabric will be measured in square yards based on surface measurements of type material specified and installed. Material waste will not be included measurement.

Payment: Geotextile stabilization fabric will be paid for at the contract unit price bid in square yards for the type of material specified on the plans or by the City Engineer and shall include all labor, equipment, and materials, lapping, seaming if applicable, waste disposal, etc. necessary for a complete in place installation.

B. Offsite Borrow:

Measurement: Off-site borrow will be measured in its original position by cross sectioning the area excavated for borrow. The number of cubic yards will be computed from cross section measurements by the average end method. When it is

impractical to measure the borrow, and if approved by the City Engineer, vehicular measurements will be made in accordance with Section 109.01 of the VDOT *Road and Bridge Specifications*.

Payment: Off-site borrow will be paid at the contract unit price per cubic yard for material placed, compacted, and complete in place, including all excavation, loading, hauling, erosion control of borrow source, placement, spreading and compaction of borrow material.

- C. **Onsite Borrow:** Material obtained from the site by cut and fill areas or other areas onsite that are designated to be used as borrow material is not a pay item for material but payment will be made by regular excavation.

D. **Regular Excavation:**

Measurement: Regular excavation will be measured in its original position by cross sectioning the excavation area. The number of cubic yards will be computed from cross section measurements by the average end method. When it is impractical to measure by cross-section method, other acceptable methods, involving three-dimensional measurements may be used if approved by the City Engineer.

In cut sections, excavation of topsoil and root mat and material down to a point of 1 foot below elevation of the top of earthwork or to the depth specified on the plans will be measured as regular excavation. When areas of unsuitable material are shown on the plans, excavation down to a point of 1 foot below the elevation of such material shown on the plans will be measured as regular excavation.

In fill sections, excavation of topsoil and root mat and material down to an elevation of 1 foot below the bottom of topsoil and root mat will be measured as regular excavation. When areas of unsuitable material are shown on the plans, excavation down to a point 1 foot below the elevations of such material shown on the plans will be measured at regular excavation.

Payment: Regular excavation will be paid at the contract unit price per cubic yard of excavation and shall include all labor, equipment, and material required, complete in place, including all excavation, loading, moving of cut and fill material, placement, spreading and compaction of material.

E. **Rock Excavation:**

Measurement: Rock excavation will be measured by the City Engineer or his representative in its original position, after which the rock shall be excavated to the depth specified by the City Engineer and then measured by the cubic yard. Rock excavation shall consist of the removal and satisfactory disposal of all materials, which in the opinion of the Engineer, cannot be excavated except by drilling, blasting, "jack hammering or hoe ramming." No payment shall be made for rock removal by ripping. It shall consist of undecomposed stone, hard enough to ring under hammer. All boulders containing a volume of more than 1/2 cubic yard will be classified as rock.

Payment: Rock excavation will be paid for at the contract unit price per cubic yard for rock excavation and shall include all labor, materials, and equipment to excavate and dispose of rock off site.

F. Undercut Excavation:

Measurement: The material shown on the plans as undercut excavation or determined by the City Engineer to be unsuitable and designated as undercut excavation and not included in regular excavation will be measured by cross sectioning the undercut area. The number of cubic yards will be computed by average end method. When it is impractical to measure by cross-section method because of erratic locations of isolated deposits, other acceptable methods, involving three-dimensional measurements may be used if approved by the City Engineer.

When unsuitable material must be removed from an area of the project where undercut is not shown on the plans, unsuitable material removed after reaching an elevation 1 foot below the top of the earthwork in cut sections and 1 foot below the bottom of topsoil and root mat in fill sections will be measured as undercut excavation. Unsuitable material removed after reaching an elevation 1 foot below the top of earthwork in cut sections, or 1 foot below the elevation of such material shown on the plans, or 1 foot below original ground in fill sections where topsoil and root mat are not required to be removed, will be measured as undercut excavation.

Payment: Undercut excavations will be paid for at the contract unit price per cubic yard for undercut excavation and shall include all labor, equipment, and material required, complete in place, including all excavation and disposal of material.

G. Unclassified Excavation for Widening of Pavement:

Measurement: Unclassified excavation for widening of pavement along existing paved areas and removal of existing paved areas will consist of the removal and satisfactory disposal of all materials except solid rock and concrete structures necessary for the construction of street widening projects including sidewalk and curb and gutter projects. Measurement will be made by cross sectioning the widened area. The number of cubic yards will be computed by average end method.

No payment for materials removed without authorization from the City Engineer or beyond the lines and grades set by the City Engineer.

Payment: Unclassified excavation for pavement widening will be paid for at the contract unit price per cubic yard for unclassified excavation for widening of pavement. The price shall include all labor, equipment, and materials, including sawing or cutting the existing pavement or concrete, excavation of and disposal of material, preparing the grade, etc., complete in place.

H. Unclassified Excavation for Removal of Existing Concrete Structures:

Measurement: Unclassified excavation for removal of existing concrete structures shall consist of the removal and satisfactory disposal of all materials in concrete structures that may be designated for removal by the City Engineer or shown to be removed on plans. These structures shall include sidewalks, steps, retaining walls, concrete pavement, and other minor structures; measured by the cubic yard in terms of material removed from its original positions. No payment for materials removed without authorization from the City Engineer or beyond the lines and grades set by the City Engineer.

Payment: Unclassified excavation for removal of existing concrete structures will be paid for at the contract unit price per cubic yard for unclassified excavation for the

type listed. The price shall include all labor, equipment, and materials necessary to remove and dispose of, off site, any required structures, complete in place, including sawing or cutting the existing concrete if required.

I. **Other: Other items shall be paid for as stated in the Proposal.**

2.1.6 BASE COURSE & PAVING

A. **Adjusting Manholes and Valves for Resurfacing:**

Measurement: Manhole and valve box adjusting will be measured on an each basis for the type of structure adjusted.

Payment: Manhole and valve box adjusting by the method of removing and adjusting the frame and cover. When possible, manholes shall be adjusted as shown on **Standard Detail 401.06**. Manhole and valve box adjustments will be paid for at the contract unit price per each for adjusting manholes and valves, and shall include all labor, equipment, and materials (inclusive of concrete grade rings for manholes or adjusting rings as applicable), feathering asphalt to castings if necessary, etc. for a complete in place installation.

B. **Aggregate Base Coarse:**

Measurement: Aggregate base coarse will be measured in square yards of the thickness as shown on the plans (or in tons, only if approved by the Public Works Director). When the ton unit is specified, the quantity shall be determined on scales equipped with a dial and an automatic printer, all of which have been approved and sealed in accordance with Section 109.01 of the VDOT *Road and Bridge Specifications*.

Payment: Aggregate base coarse will be paid at the contract unit price bid for square yards of a specified depth as shown on the plans or unit price bid per ton for Type I, size 21A or 21B aggregate base. Price shall include all material, equipment and labor required to furnish and install the stone, complete in place.

C. **Aggregate Stone (Type 1) for Shoulder Restoration after Paving:**

Measurement: Shoulder stone for restoration after paving will be measured by the cubic feet as shown on the plans or as directed by the Public Works Director. Cubic feet of stone material placed will be converted to tons using the weight of 145 pounds per cubic feet.

Payment: Shoulder stone for restoration after paving will be paid for at the contract unit price by the ton. Price shall include all labor, equipment, and materials necessary for furnishing and placing of stone, complete in place.

D. **Asphalt Concrete Curb:**

Measurement: Asphalt concrete curb will be measured in by the linear foot.

Payment: Asphalt concrete curb will be paid for at the contract unit price bid in linear foot for the VDOT type MC-3C and shall include all labor, equipment, and materials necessary for a complete in place installation.

E. Asphalt Concrete Pavement:

Measurement: Asphalt concrete pavement shall be measured in tons of the type specified as evidenced by plant delivery tickets. For all overlays, field measurements and calculations will be made also for use as a comparison between estimated and actual tonnage used. If quantity differences are found, without justification, measurement will be based on field measurement basis. Measurement for new roadways will be based on plan quantities and field measurement, not tonnage tickets.

Payment: Asphalt concrete pavement will be paid for at the contract unit price bid per ton for the type of Asphalt concrete specified. This price shall be full compensation for asphalt concrete pavement, complete in place, including all materials, labor, tools, equipment, tack coat, maintenance of traffic, and all other incidentals necessary. Adjusting manholes, cleanouts, valve boxes, etc. will be paid separately at the bid price for each when adjusted by the Contractor.

F. Asphalt Concrete Paved Flumes, Walks, etc.:

Measurement: Asphalt concrete paved flumes, walks, etc. will be measured in square yards for a depth of 4 inches.

Payment: Asphalt concrete paved flumes, walks, etc. will be paid for at the contract unit price bid in square yards for a depth of 4 inches and shall be installed in accordance with applicable VDOT details and specifications, including all labor, equipment, and materials necessary for a complete in place installation.

G. Emulsified Asphalt Slurry Seal Surfaces:

Measurement: Emulsified asphalt slurry seal will be measured in square yards based on surface measurements

Payment: Emulsified asphalt slurry seal will be paid for at the contract unit price bid in square yards for the type of seal specified and shall include all labor, equipment, and materials necessary, complete in place.

H. Foundation Stone:

Measurement: Foundation stone for roadways will be measured by the cubic feet of foundation stone placed. Cubic feet of foundation stone material placed will be converted to tons using the weight of 145 pounds per cubic feet.

Payment: Foundation stone, if approved by the Public Works Director, will be paid for at the contract unit price for foundation stone by the ton. Price shall include removal and disposal of unusable material and placement of stone, complete in place.

I. Lime Stabilization:

Measurement: Lime treated soils will be measured in square yards of material with thickness as shown on the plans or as directed by the Public Works Director.

Payment: Lime treated soils will be paid at the contract unit price bid for square yards with thickness as shown on the plans or as directed by the Public Works

Director. This price shall include all material, equipment, and labor required, subgrade preparation, furnishing lime or lime and fly-ash, aggregate if specified, water, mixing, grading, and compaction of soils, finishing, and curing, etc. complete.

J. Manhole Adjusting Rings for Resurfacing:

Measurement: Manhole adjusting rings will be measured on an each basis for the type of ring installed.

Payment: Manhole adjusting rings, as shown on **Standard Detail 401.06**, will be paid on an each basis for the type of ring installed at the contract unit price and shall include all labor, material, and equipment necessary to place inserting ring in existing frame, complete in place, including countersinking holes and installation of epoxy.

K. Manhole and Valve Box Replacement for Resurfacing:

Measurement: Manhole and valve box replacement will be measured on an each basis for the type of frame installed.

Payment: Manhole and valve box replacement for resurfacing will be paid on an each basis for the type of frame installed at the contract unit price and shall include all labor, material, and equipment necessary to remove and install a new frame, complete in place. Refer to **Standard Details 4.02 and 4.03** for installation.

L. Prime Coat:

Measurement: Liquid asphalt material will be measured by the gallon and cover aggregate by the ton.

Payment: Liquid asphalt material will be paid for at the contract unit price bid per gallon. Cover stone will be paid for at the contract unit price bid per ton. This price shall include all labor, equipment, and materials to furnish, install, and maintenance of the treatment until surface course is applied, complete in place.

M. Portland Cement Treated Aggregate:

Measurement: Portland cement treated aggregate will be measured in square yards of material with thickness as shown on the plans or as directed by the Public Works Director.

Payment: Portland cement treated aggregate will be paid at the contract unit price bid for square yards with thickness as shown on the plans or as directed by the Public Works Director. This price shall include all material, equipment, and labor required to furnish and install the Portland cement treated aggregate, complete in place.

N. Pavement Repair or Street Rehab: This item shall cover pavement repair in areas where it becomes necessary to remove and replace the existing pavement in failed areas or areas where patching is required as part of roadway work or in locations as otherwise requested by the Public Works Director.

Measurement: Work and materials for pavement repair will be measured in the following manner.

- 1) **Unclassified excavation for pavement repair** will be measured in cubic yards of pavement, temporary maintenance stone, or other unclassified material removed.
- 2) **Aggregate base stone for pavement repair** will be measured in square yards, generally 6 inches deep, but thickness shall be as shown on the plans or as directed by the Public Works Director.
- 3) **Aggregate base stone for surface treated pavement repair** will be measured in square yards, generally 10 inches deep, but thickness shall be as shown on the plans or as directed by the Public Works Director.
- 4) **Asphalt base for pavement repair** will be measured in square yards, generally 5 inches deep, but thickness shall be as shown on the plans or as directed by the Public Works Director.
- 5) **Asphalt surface for pavement repair** will be measured in square yards with thickness as shown on the plans or as directed by the Public Works Director.
- 6) **Surface treatment for surface treated pavement repair** will be measured in square yards.
- 7) **Temporary pavement repair** will be measured in terms of square yards consisting of a combination of material as defined in these specifications.

Payment: Work and materials for pavement repair will be paid for in the following manner.

- 1) **Unclassified excavation for pavement repair** will be paid for at the contract unit bid price per cubic yard. This price shall include all labor, equipment, and material to sawcut, excavate, remove and dispose of material, and all work and grading to prepare the surface for paving, complete in place.
- 2) **Aggregate base stone for pavement repair** will be paid for at the contract unit price bid per square yard (6 inches deep) for Type I aggregate base. This price shall include all labor, equipment, and material necessary to furnish and install the stone, complete in place.
- 3) **Aggregate base stone for surface treated pavement repair** will be paid for at the contract unit price bid per square yard (10 inches deep) for Type I aggregate base. This price shall include all labor, equipment, and material necessary to furnish and install the stone, complete in place.
- 4) **Asphalt base for pavement repair** will be paid for at the contract unit price bid per square yard (5 inches deep) for the type of base mix as shown on the plans or as directed by the Public Works Director. This price shall include all labor, materials, and equipment, including tack, necessary to furnish and install the asphalt, complete in place.
- 5) **Asphalt surface for pavement repair** will be paid for at the contract unit price bid per square yard for a particular thickness and type as shown on the plans or as directed by the Public Works Director. This price shall include all labor, materials, and equipment, including tack, necessary to furnish and install the

asphalt, complete in place.

- 6) **Surface treatment for surface treated pavement repair** will be paid for at the contract unit price bid per square yard for surface treatment for pavement repair. This price shall be full compensation for one prime coat and two seal coats, complete in place.
- 7) **Temporary pavement repair** will be paid for at the contract unit price bid per square yard for temporary pavement repair. This price shall include 6 inches of aggregate stone, seal coat, and cold patch, as defined in these specifications and all labor, materials and equipment necessary, complete in place.

O. Pavement Profiling:

Measurement: Pavement profiling will be measured in square yards for each 1-inch depth of material profiled and removed.

Payment: Pavement profiling will be paid for at the contract unit price bid per square yards per 1-inch depth and shall include all labor, materials, and equipment necessary to remove and dispose of the material, complete in place.

P. Pavement Profiling - Milling:

Measurement: Pavement profiling will be measured in square yards for each 1-inch depth of material profiled and removed.

Payment: Pavement profiling will be paid for at the contract unit price bid per square yards per 1-inch depth and shall include all labor, materials, and equipment necessary to remove and dispose of the material, complete in place.

Q. Petro-mat:

Measurement: Petro-mat will be measured in square yards based on surface measurements of material installed.

Payment: Petro-mat will be paid for at the contract unit price bid in square yards for the type of material specified in these specifications and shall include all labor, equipment, and materials necessary for a complete in place installation.

R. Seal Coat:

Measurement: Liquid asphalt material will be measured by the gallon and cover aggregate by the ton.

Payment: Liquid asphalt material will be paid for at the contract unit price bid per gallon. Cover stone will be paid for at the contract unit price bid per ton. This price shall include all labor, equipment, and materials to furnish and install, complete in place.

S. Tack Coat: (Not a pay item, incidental to other items bid)

T. Trench Patching for New Pipe Installation - Permanent and Temporary:

Measurement: Trench patching will be measured in square yards per patch type.

Refer to **Standard Details 401.07 and 401.08** for calculation of widths, measurement will be made based on minimum dimensions shown.

Payment: Trench patching will be paid for at the contract unit price bid in square yards per patch type as shown in **Standard Details 401.07 and 401.08** and shall include all labor, materials, and equipment necessary to install the patch, complete in place. Pavement cut and removed for this item will be paid for separately, see trenching section of these specifications.

U. **Other: Other items shall be paid for as stated in the Proposal.**

2.1.7 CURB & GUTTER, DRIVEWAYS, SIDEWALKS, AND MISCELLANEOUS CONCRETE ITEMS

A. Concrete Curb and Gutter, VDOT Standard – CG-6:

Measurement: New concrete curb and gutter, VDOT standard, CG-6 will be measured per linear foot along the face of the curb for the entire length of the work including portion of curb shaped for handicap ramps and through driveways.

Payment: New concrete curb and gutter, VDOT standard, CG-6 will be paid for at the contract unit price per linear foot and shall include all labor, equipment, and material for excavation, formwork, stone bedding, backfilling, expansion material, finishing, curing, etc. for a complete in place installation as shown on the **VDOT Road and Bridge Standards, Detail CG-6** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

B. Concrete Curb, VDOT CG-2:

Measurement: VDOT standard concrete curb, CG-2 will be measured in linear feet along the face of the curb for the entire length of the work including portion of curb shaped for handicap ramps and through driveways.

Payment: VDOT standard concrete curb, CG-2 will be paid for at the contract unit price per linear foot and shall include all labor, equipment, and material for excavation, formwork, stone bedding, backfilling, expansion material, finishing, curing, etc. for a complete in place installation as shown on the **VDOT Road and Bridge Standards, Detail CG-2** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

C. Concrete Sidewalk (New), 4 inches thick:

Measurement: New sidewalk, 4 inches thick will be measured in square yards of finished concrete.

Payment: New sidewalk, 4 inches thick will be paid for at the contract unit price bid per square yard at a depth of 4 inches. This price shall include all labor, equipment, and material for excavation, backfilling, stone bedding, expansion material, formwork, finishing, curing, etc. for a complete in place installation, as shown on **Standard Detail 404.01** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

D. Concrete Sidewalk (Replacement), 4 inches thick:

Measurement: Replacement of sidewalk, 4 inches thick will be measured in square yards of finished concrete.

Payment: Replacement of sidewalk, 4 inches thick will be paid for at the contract unit price bid per square yard at a depth of 4 inches. This price shall include all labor, equipment, and material for excavation, removal and disposal of existing sidewalk, backfilling, stone bedding, expansion material, formwork, finishing, curing, etc. for a complete in place installation as shown on **Standard Detail 404.01** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

E. Concrete Driveways, Entrances, and Sidewalks (New), 7 inches thick:

Measurement: New concrete driveways, entrances, and sidewalks, 7 inches thick will be measured in square yards of finished concrete.

Driveways formed in conjunction with standard curb, and curb and gutter, shall be measured in square yards as follows:

- 1) In length from face to face of the curb at the back edge of the driveway.
- 2) In width from the back edge of the driveway to the back edge of the curb extended.

Payment: New concrete driveways, entrances, and sidewalks, 7 inches thick will be paid for at the contract unit price bid per square yard at a depth of 7 inches. This price shall include all labor, equipment, and material for excavation, backfilling, stone bedding, expansion material, formwork, finishing, curing, etc. for a complete in place installation, as shown on **Standard Details 404.03, 404.04, 404.05, and 404.06** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

F. Concrete Driveways, Entrances, and Sidewalks (Replacement), 7 inches thick:

Measurement: Replacement of concrete driveways, entrances, and sidewalks, 7 inches thick will be measured in square yards of finished concrete.

Driveways formed in conjunction with standard curb, and curb and gutter, shall be measured in square yards as follows:

- 1) In length from face to face of the curb at the back edge of the driveway.
- 2) In width from the back edge of the driveway to the back edge of the curb extended.

Payment: Replacement of concrete driveways, entrances, and sidewalk, 7 inches thick will be paid for at the contract unit price bid per square yard at depth of 7 inches. This price shall include all labor, equipment, and material for excavation, removal and disposal of existing concrete, backfilling, stone bedding, expansion material, formwork, finishing, curing, etc. for a complete in place installation as shown on **Standard Details 404.03, 404.04, 404.05, and 404.06** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

G. Concrete Handicap Ramp:

Measurement: Concrete handicap ramps will be measured in square yards of finished concrete with a thickness of 4 inches.

Payment: Concrete handicap ramps will be paid for at the contract unit price bid per square yard at a depth of 4 inches. This price shall include all labor, equipment, and material for excavation, removal and disposal of existing concrete, backfilling, stone bedding, expansion material, formwork, finishing, detectable warning surface, coloring, curing, etc. for a complete in place installation and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

H. Concrete Paved Ditches, VDOT PG-2A, PG-4, PG-5:

Measurement: Concrete paved ditches, VDOT PG-2A, PG-4, and PG-5 will be measured per square yard of paved ditch based on measurements as defined on applicable details.

Payment: Concrete paved ditches, VDOT PG-2A, PG-4, and PG-5 will be paid for at the contract unit price per square yard and shall include all labor, equipment, and material for excavation, formwork, stone bedding, backfilling, expansion material, finishing, curing, etc. for a complete in place installation as shown on the **VDOT Road and Bridge Standards, Details PG-2A, PG-4, and PG-5** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

I. Facedown Concrete Curb/Sidewalk:

Measurement: Facedown concrete curb will be measured in linear feet along the face of the curb including handicap ramps but excluding driveway openings. Facedown curb is not a pay item through a driveway opening. The sidewalk portion of this line item will be measured in square yards for 4 inches thick sidewalk.

Payment: Facedown concrete curb will be paid in linear foot the contract unit price for 6"X12" face down curb. The sidewalk portion of this item will be paid for as 4 inches thick sidewalk. Both line item prices shall include all labor, equipment, and material for excavation, formwork, stone bedding, backfilling, expansion material, finishing, curing, etc. for a complete in place installation as shown on the **Standard Detail 404.04** and installed at the locations as shown on the construction drawings and/or as directed by the Public Works Director.

J. Formed Concrete for Retaining Walls, Headwalls, Piers, Steps, and other misc. Concrete Structures:

Measurement: Formed concrete for retaining walls, headwalls, piers, steps, and other misc. concrete structures will be measured by the cubic yard and class as specified on the drawings or applicable details.

Payment: Formed concrete for retaining walls, headwalls, piers, steps, and other misc. concrete structures will be paid for at the contract unit price bid per cubic yard for concrete, complete in place. Weep holes, water stops, etc. will be included in the

price of concrete for retaining walls. All backfilling will be included in bid price for concrete. Payment will be made only for the quantities and dimensions as shown on drawings or applicable details.

The only additional pay items for retaining walls will be:

- 1) Excavation -will be measured and paid for in cubic yards at the unit price bid for regular excavation.
- 2) Porous backfill material – will be measured and paid for in tons as coarse granular aggregate backfill.
- 3) Rebar – will be measured and paid for in pounds as Reinforcing steel bars.

No payment will be made for excavation or any other structures. The only additional pay item for other structures will be reinforcing steel bars.

K. Foundation Stone:

Measurement: Foundation stone, as ordered by the Public Works Director, will be measured by the cubic feet of foundation stone placed. Cubic feet of foundation stone material placed will be converted to tons using the weight of 145 pounds per cubic feet.

Payment: Foundation stone, if approved by the Public Works Director, will be paid for at the contract unit price for foundation stone by the ton. Price shall include removal and disposal of unusable material and placement of stone, complete in place.

L. Handrail, VDOT Detail HR-1:

Measurement: VDOT handrail, HR-1 will be measured in linear foot.

Payment: VDOT handrail, HR-1 will be paid for at the contract unit price per linear foot and shall include all labor, equipment, and materials to install the handrail as shown on the **VDOT Road and Bridge Standards, Detail HR-1**, complete in place.

M. Precast Concrete Parking Blocks:

Measurement: Precast concrete parking blocks will be measured on an each basis.

Payment: Precast concrete parking blocks will be paid for at the contract unit price per each and shall include all labor, equipment, and materials to install the parking block, complete in place.

N. Reinforcing Steel Bars:

Measurement: Reinforcing steel will be measured in pounds of reinforcing by the quantities as shown on the drawings or applicable details.

Payment: Reinforcing steel bars will be paid for at the contract unit price bid per pound and shall include all labor, equipment, and materials to install the bars, complete in place. Payment will be made only for the quantities and dimensions as shown on the drawings or applicable details.

O. Reinforcing Steel Wire Mesh:

Measurement: Reinforcing steel wire mesh will be measured in square yards of 6x6, W1.4 x W1.4 material placed.

Payment: Reinforcing steel wire mesh will be paid for at the contract unit price per square yards of 6x6, 1 W1.4 x W1.4 and shall include all labor, equipment, and materials to install the wire mesh as shown on the drawings or applicable details, complete in place.

P. Tree Well in Sidewalk:

Measurement: Tree wells will be measured on an each basis.

Payment: Tree wells will be paid for at the contract unit price per each and shall include all labor, equipment, and materials to install the tree well as shown on the **Standard Detail 404.02**, complete in place.

Q. Unformed Concrete for Footings, Collars, etc. (poured without forms):

Measurement: Unformed Concrete for footings, collars, etc. will be measured by the cubic yard and class as specified on the drawings or applicable details.

Payment: Unformed Concrete for footings, collars, etc. will be paid for at the contract unit price per cubic yard and class for unformed concrete for footings, collars, etc. and shall include all labor, equipment, and material to place the concrete for a specific item, complete in place. Payment will be made only for the quantities and dimensions as shown on drawings or applicable details.

2.1.8 TRAFFIC SIGNALS

A. Trenching

Measurement: Trenching shall be measured by the linear foot along the centerline of the trench.

Payment: Trenching will be paid for at the contract unit price per linear foot and shall include all labor, equipment, materials, erosion and sediment control, excavation, direct boring, supporting existing utilities, backfilling, compaction, standard bedding and all incidentals to providing a complete conduit installation.

B. Electrical Conduit

Measurement: Electrical conduit of the size and number specified will be measured by the linear foot along the centerline of the conduit from end to end. When more than one conduit of the size or sizes specified is placed in a single trench, measurement will be the total number of linear feet of all conduits in the trench.

Payment: Electrical conduit will be paid for at the contract unit price per linear foot and shall include all labor, equipment, materials and installation of all conduit, bends, elbows, couplings, bushings, duct seal and other incidental hardware to provide completion of conduit run as specified on plan.

C. Junction Boxes

Measurement: Junction boxes will be measured by each box of the type specified and erected in place as shown on plan

Payment: Junction boxes will be paid for at the contract unit price stated in the proposal per each and shall include all labor, equipment, materials, the items of pre-fabricated box, washed gravel and miscellaneous hardware as specified or directed by the Traffic Engineer.

D. Foundation

Measurement: Foundations shall be measured on an each basis for each type specified.

Payment: Foundations will be paid for at the contract unit price stated in the proposal per each for each type specified and shall include all labor, equipment and materials necessary for the installation of the concrete forms, reinforcement bars, anchorage system, conduits, furnishing and placing concrete, curing, finishing and removal of forms.

E. Loop Detector

Measurement: Loop detector stub outs shall be measured by the linear foot of each 1-inch conduit from the roadway to the adjacent junction box as specified in item B, *Electrical Conduit* of this Section. Loop detector wires shall be measured by the linear foot of loop detector wires.

Payment: Loop detectors will be paid for at the contract unit price stated in the proposal and shall include all labor, equipment, and materials necessary including slotting of the roadway, placement of loop wires, the sealing of the slots and all incidentals to provide a complete wire installation.

2.1.9 STREET LIGHTING

A. Trenching

Measurement: Trenching will be measured by the linear foot along the centerline of the trench or the direct bore of conduit run.

Payment: Trenching will be paid for at the contract unit price per linear foot and shall include all labor, equipment, material, erosion and sediment control, excavation, supporting existing utilities, removal, and abandoning of existing conduit and junction boxes, backfill, compaction, standard bedding and all incidentals to providing a complete conduit installation.

B. Conduit

Measurement: Schedule 40 PVC and rigid galvanized steel conduit of the size specified will be measured by the linear foot along the centerline of the conduit from end to end.

Payment: Electrical conduit will be paid for at the contract unit price per linear foot

and shall include all labor, equipment, materials and the installation of all conduit, bends, elbows, couplings, bushings, fittings, grounding, duct seal, and other incidental hardware to provide complete installation of the conduit run as specified on plan.

C. Junction Boxes

Measurement: Junction boxes will be measured by each box of the type specified and erected in place as shown on plans.

Payment: Junction boxes will be paid for at the contract unit price stated in the proposal per each and shall include all labor, equipment, materials, the items of pre-fabricated box, washed gravel and miscellaneous hardware as specified or directed by the City of Fairfax Engineer.

2.1.10 ITEMS MISCELLANEOUS TO ALL SECTIONS

A. Clearing and Grubbing, Lightly Wooded Areas:

Measurement: Clearing and grubbing, lightly wooded areas will be measured by the acre. Width shall not exceed width as defined in the disturbing and construction limits criteria of sewer, water, and storm construction. Lightly wooded areas shall be defined as areas where the prevalent vegetation consists of trees less than 12 inches in diameter.

Payment: Clearing and grubbing, lightly wooded areas will be paid for at the contract unit price per acre and shall include all material, equipment, and labor required to clear and grub lightly wooded areas in accordance with these specifications. The price shall also include the removal and disposal of items that cannot be mulched or built into brush piles.

B. Clearing and Grubbing, Heavily Wooded Areas:

Measurement: Clearing and grubbing, heavily wooded areas will be measured by the acre. Width shall not exceed width as defined in the disturbing and construction limits criteria of sewer, water, and storm construction. Heavily wooded areas shall be defined as areas where the prevalent vegetation consists of trees 12 inches or greater in diameter.

Payment: Clearing and grubbing, heavily wooded areas will be paid for at the contract unit price per acre and shall include all material, equipment, and labor required to clear and grub heavily wooded areas in accordance with these specifications. The price shall also include the removal and disposal of items that cannot be mulched or built into brush piles.

C. Construction Entrance for Erosion Control, (VDOT #1 stone):

Measurement: Construction entrance for erosion control will be measured by the ton of VDOT #1 stone. Calculation shall be based on the length X width X depth of the entrance, as specified in the Erosion & Sediment Control Handbook, and converted to tons.

Payment: Construction entrance for erosion control will be paid for at the contract

unit price per ton and shall include all materials (including Geotextile fabric), labor, and equipment necessary for a complete in place installation.

D. Drop Inlet Silt Trap:

Measurement: Drop inlet silt trap for erosion control will be measured on an each basis.

Payment: Drop inlet silt trap for erosion control will be paid for at the contract unit price per each and shall include all material, labor, and equipment necessary for a complete in place installation. The price shall also include the removal and disposal of the trap upon stabilization of ground cover.

E. Flowable Fill Concrete:

Measurement: Flowable fill will be measured by the cubic yard of concrete placed.

Payment: Flowable fill will be paid for at the contract unit price, complete in place, and shall include all materials, labor and equipment to place the concrete in locations as directed by the City Engineer or designated on the plans. This price shall also include any excavation and blocking or forming required.

F. Miscellaneous Unformed Concrete:

Measurement: Miscellaneous Unformed Concrete will be measured by the cubic yard and class as specified on the drawings.

Payment: Miscellaneous Unformed Concrete will be paid for at the contract unit price per cubic yard for unformed concrete for reaction anchor blocks, collars, footings, and so forth complete and in place, including all material, equipment, and labor, to place the concrete in the locations shown on the construction drawings and/or as directed by the City Engineer. Payment will be made only for the quantities and dimensions as shown on drawings or applicable details.

G. Miscellaneous Formed Concrete:

Measurement: Miscellaneous Formed Concrete will be measured by the cubic yard and class as specified on the drawings.

Payment: Miscellaneous Formed Concrete will be paid for at the contract unit price per cubic yard for formed concrete placed that is designated to be paid for as "formed concrete", complete and in place, including all material, equipment, and labor, to place the concrete in the locations shown on the construction drawings and/or as directed by the City Engineer. Payment will be made only for the quantities and dimensions as shown on drawings or applicable details.

H. Riprap (Dry):

Measurement: Dry Riprap will be measured by the ton.

Payment: Dry Riprap will be paid for at the contract unit price per ton of the size as indicated on the drawings and shall include all materials (including geotextile fabric), labor, and equipment necessary for a complete in place installation.

I. Riprap (Grouted):

Measurement: Grouted Riprap will be measured by the ton.

Payment: Grouted Riprap will be paid for at the contract unit price per ton of the size as indicated on the drawings, with the top 6 inches grouted and shall include all materials (including geotextile fabric), labor, and equipment necessary for a complete in place installation.

J. Seeding and Fine Grading:

Measurement: Seeding and fine grading will be measured in square yards of area seeded. Seeding and fine grading shall be provided as described section in Section 2.8 – *Seeding, Sodding & Ground Cover*. Extra compensation will not be made for additional seeding beyond all limits of construction as defined in applicable section.

Payment: Seeding and fine grading will be paid for at the contract unit price per square yard for seeding and fine grading as described in Section 2.8 – *Seeding, Sodding & Ground Cover*. No compensation will be made for reseeding, if required.

K. Seeding and Grading, (Pasture and Wooded Areas):

Measurement: Seeding and grading pasture and wooded areas will be measured in square yards of area seeded. Seeding and fine grading shall be provided as described in Section 2.8 – *Seeding, Sodding & Ground Cover*. Extra compensation will not be made for additional seeding beyond all limits of construction as defined in applicable section.

Payment: Seeding and grading will be paid at the contract unit price per square yard for seeding and fine grading as described in Section 2.8 – *Seeding, Sodding & Ground Cover*. No compensation will be made for reseeding, if required.

L. Silt Fence Barrier:

Measurement: Silt fence barrier for erosion control will be measured by the linear foot.

Payment: Silt fence barrier for erosion control will be paid for at the contract unit price per linear foot and shall include all material, labor, and equipment necessary for a complete in place installation. The price shall also include the removal and disposal of silt fence upon stabilization of ground cover.

M. Soil Stabilization Mat, VDOT EC-2:

Measurement: VDOT EC-2 will be measured by the square yard.

Payment: VDOT EC-2 will be paid for at the contract unit price per square yard and shall include all material, labor, and equipment necessary for a complete in place installation.

N. Straw Bale Barrier:

Measurement: Straw bale barrier for erosion control will be measured by the linear

foot.

Payment: Straw bale barrier for erosion control will be paid for at the contract unit price per linear foot and shall include all material, labor, and equipment necessary for a complete in place installation. The price shall also include the removal and disposal of straw bales upon stabilization of ground cover.

O. Temporary Access or Haul Roads:

Measurement: Any grading or excavation required for equipment travel during the course of construction as well as erosion control, removal, restoration, seeding and ground cover, shall be included in other items bid.

Payment: Included in other items bid. Not a pay item.

P. Traffic Control: (Not a pay item, incidental to other items bid)

END OF SECTION 2.1

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