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Section IX - Measurement and Payment

MP-1 **SCOPE**

This section covers methods of measurement and payment for items of work under this contract.

MP-2 **GENERAL**

The total bid price for each section of the contract shall cover all work required by the Contract Documents. All costs in connection with the proper and successful completion of the work including furnishing all materials, equipment, supplies, appurtenances and performing all necessary labor and supervision to fully complete the work, shall be included in the unit and lump sum prices bid. All work not specifically set forth as a pay item in the Bid Form shall be considered as incidental and all costs in connection therewith shall be included in the unit price(s) bid per linear foot of main line sewer.

MP-3 **ESTIMATED QUANTITIES**

All Estimated Quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only as a basis for estimating the probable cost of the work and for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. The CONTRACTOR agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts thereof.

MP-4 **MEASUREMENT DEFINITIONS**

MP-4.01 **Trench Excavation**

The width of excavation, including rock excavation, to be used in the determination of pay quantities shall be as shown in the Typical Trench Details, unless additional width is authorized by the DISTRICT. Trench excavation at manholes shall be based on a square measuring six feet plus nominal manhole inside diameter, unless additional excavation is authorized by the DISTRICT.

MP-4.02 **Sanitary Sewer Installation**

The unit prices for sewer pipe and related appurtenances shall include the following work, and no separate payment for these items will be made:

- (a) Site Preparation (including clearing and grubbing)
- (b) Removal and Storage of Topsoil

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- (c) By-Pass Pumping
- (d) Common Excavation and Trench Backfilling and Compaction
- (e) Sheet piling, Shoring and Bracing
- (f) Dewatering Excavated Areas
- (g) Waste Material Disposal
- (h) Air, Mandrel and Vacuum Testing
- (i) Restoration of Surface (including structures, landscaping, etc.)
- (j) Seeding and Mulching
- (k) Connection of Existing Sewer Main or Service to new Manhole
- (l) Pipe embedment material (PVC- to springline, DIP - per detail)
- (m) Replacement of pavement markings with like material
- (n) Renewing traffic signal underpavement wiring
- (o) Removal of existing sewer line
- (p) Removal and disposal of pavement
- (q) Verification of size and location of existing underground utilities
- (r) Pre-blast and post blast survey
- (s) Traffic control in accordance with the requirements of NCDOT and the Manual on Uniform Traffic Control Devices.

MP-5 WORK ITEMS

MP-5.01 Mobilization

All work covered by this section will be paid for at the contract lump sum price for "Mobilization". The lump sum bid price shall not exceed 3% of the total project bid.

Partial payments for the item of "Mobilization" will be made with the first and second partial pay estimates paid on the contract, and will be made at the rate of 50% of the lump sum price for "Mobilization" on each of these partial pay estimates.

MP-5.02 Sanitary Sewer Line Installation

Method of Measurement

The quantity of Sanitary Sewer Pipe to be paid for will be the actual number of linear feet of sanitary sewer line by pipe type which has been properly incorporated into the completed and accepted work. Pipe length shall be measured by actual linear feet in place measured along the pipe center line with no deduction for wyes or tees. **Horizontal measurements through manholes shall be excluded.** Depth of cut shall be measured from original ground surface to pipe invert.

Basis of Payment

The quantity of Sanitary Sewer line will be paid for at the contract unit price

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for each type and size of pipe as shown in the Bid Schedule. Price and payment shall constitute full compensation for furnishing all equipment, tools, labor and materials to complete the work as specified, including site preparation, trench excavation, placement and compaction of backfill, landscaping, and all related items for complete installation. The stone embedment material is to be included in the price of the sewerline itself, including stone to the springline of PVC Pipe.

MP-5.03 Manhole Installation

Method of Measurement

The quantity of Manholes to be paid for will be the actual number of manholes, including frame and cover, complete with all appurtenances, installed and accepted. Manholes will be counted according to manhole type, either "Standard" or "Drop". Manholes with multiple drop connections shall be counted as one (1) drop manhole in the Bid Schedule. Additional compensation may be provided for manholes which exceed 6 feet in depth (invert out to top of cover).

Basis of Payment

The quantity of Manholes will be paid for at the contract unit price for each manhole, complete including but not limited to all foundation preparation, installation, backfill and compaction, concrete, pipe connections, boots, construction of invert, installation of frame and cover, landscaping and all related construction to complete the work as specified.

MP-5.04 Additional Manhole Depth

Method of Measurement

Additional manhole depth shall be measured when the manhole depth exceeds 6 feet, based on the elevation difference between "Invert Out" and the top of cover. Measurement shall be by the vertical foot, to the nearest 0.1 foot, for all depth exceeding 6 feet.

Basis of Payment

The quantity of Additional Manhole Depth will be paid for at the contract unit price per vertical foot. Price and payment shall constitute full compensation for all work covered by this section, including furnishing all equipment, labor, and materials to complete the work.

MP-5.05 Wyes

Method of Measurement

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The quantity of Wyes to be paid for shall be the actual number, by type and size, installed in the main sewer line complete and accepted.

Basis of Payment

The quantity of Wyes shall be paid for at the contract unit price for each, complete including but not limited to excavation, preparation, installation, backfill, and compaction, and all related construction to complete the work as specified.

MP-5.06 Clean-out Assembly

Method of Measurement

The quantity of Clean-out Assemblies to be paid for shall be the actual number of clean-out assemblies, by size, complete with all appurtenances, installed and accepted, per the MSD Detail.

Basis of Payment

The quantity of Clean-out Assemblies shall be paid for at the contract unit price for each size clean-out assembly installed, complete but not limited to excavation, preparation, installation, backfill, compaction, and all related construction, and shall include the sanitary service wye, vertical section of pipe and fittings, hub and cap, cast iron box, and reconnection of existing service or plug (whichever is applicable). See MSD Detail.

MP-5.07 Plug and Abandon Sewer

Method of Measurement

The quantity of Plug and Abandon Sewer Line shall be the actual number of plugs for lines 6 inches or greater, regardless of depth or existing pipe material, installed complete and accepted. Plugging lines less than 6 inches are considered incidental.

Basis of Payment

The quantity of Plug and Abandon Sewer Line shall be paid for at the contract unit price for each plug installed or each mainline bisected, complete including but not limited to excavation, preparation, installation of masonry plug, backfill, compaction, and all related construction.

MP-5.08 Abandon Manhole, Including Plugs

Method of Measurement

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The quantity of Abandon Manhole Including Plugs shall be the actual number of existing manholes, outside of the excavated trench, which are abandoned and approved, except that water meter box manhole abandonment shall be considered incidental to sewer construction and no separate payment shall be made therefore.

Basis of Payment

The quantity of Abandon Manhole, Including Plugs shall be paid for at the contract unit price for each existing manhole, outside the excavated trench area, which is abandoned per the specifications, including but not limited to removal and disposal of the frame and cover, installation of plugs in all main lines and service lines, placing fill material in manhole up to 3 feet from ground level, break-up and removal of top 3 feet of manhole, backfilling, compaction, and restoration of area, and all related construction.

MP-5.10 **Connect to an Existing Manhole**

Method of Measurement

The quantity of Connect to an Existing Manhole shall be the actual number of connections of the proposed sewer line to an existing manhole, installed complete and accepted, including collars if required. This shall also include the re-working of the invert to accommodate the proposed sewer line.

Basis of Payment

The quantity of Connect to an Existing Manhole shall be paid for at the contract unit price for each connection of a proposed sewer line to an existing manhole, including but not limited to excavation, coring a hole in the manhole, modification of the invert channel(s), insertion of flexible boot(s), connection of the sewer line, backfill, compaction, restoration of surfaces, and all related construction.

MP-5.11 **Miscellaneous Concrete**

Method of Measurement

The quantity of Miscellaneous Concrete material to be paid for shall be the actual cubic yards of approved concrete material, measured to the nearest 1/10 cubic yard, which has been properly incorporated, as per the plans and specifications into the completed and accepted work. No deductions will be made for openings less than 1 square foot, for volume of reinforcing steel, or fillets less than 4 square inches. Concrete shall be Class A unless directed otherwise by the ENGINEER.

Basis of Payment

Payment for Miscellaneous Concrete shall be based on the actual number of cubic yards of Miscellaneous Concrete installed complete and accepted, including but not limited to hauling, placing, forming, shaping, and all other related construction.

MP-5.12 Pipe Embedment Material

Method of Measurement

The quantity of Pipe Embedment Material to be paid for shall be the actual amount of material, by cubic yards, to the nearest 1/10 cubic yard, which has been properly placed, compacted and incorporated into the completed and accepted work, as approved by ENGINEER. Length shall be determined by the ENGINEER; Width shall be as described in Section **MP-4.01** "Trench Excavation"; Depth shall be as approved by the ENGINEER or as shown on the Detail Sheets.

Basis of Payment

The quantity of Pipe Embedment Material shall be paid for at the contract unit price per cubic yard installed, complete including, but not limited to, hauling, placing, compaction, and other related construction.

MP-5.13 Compacted Aggregate Base Course

Method of Measurement

The quantity of compacted aggregate base course to be paid for shall be the actual cubic yardage, to the nearest 1/10 cubic yard, which has been properly placed, compacted, and incorporated into the completed and accepted work.

For new construction, the quantities shall be computed from the allowable width and required thickness as shown on the plans and the actual horizontal length measured in place. For replacement, the quantities shall be computed from the approved trench width, the required thickness, and the actual horizontal length measured in place.

Basis of Payment

The quantity of compacted aggregate base course shall be paid for at the contract unit price per cubic yard installed, complete including but not limited to hauling, subgrade compaction, placing, compaction, shaping, and other related construction.

MP-5.14 Select Backfill Material

Method of Measurement

The quantity of Select Backfill Material to be paid for shall be the actual cubic yards, to the nearest 1/10 cubic yard of approved select backfill material which has been properly incorporated, as per plans and specifications into the completed and accepted work. When existing trench materials are unsuitable for use as backfill material, or cannot be dewatered to an acceptable material on site, the ENGINEER will authorize payment for "Select Backfill Material". When authorized in writing by the ENGINEER, select backfill materials will be measured for payment. Basis of depth shall be as requested by the ENGINEER. Trench width shall be measured as described in Section **MP-4.01** "Trench Excavation".

Basis of Payment

The quantity of Select Backfill Material shall be paid for at the contract unit price for each cubic yard, complete including but not limited to providing select backfill material, including all excavation, hauling, furnishing, placing and compacting of backfill material, and all other related construction.

MP-5.15 Rock Excavation

Method of Measurement

The quantity of Rock Excavation to be paid for will be by cubic yard measured in place by the average end area method for rock excavation, based upon measurements made prior to and following excavation. Basis of cut shall be as shown on DISTRICT Standard Details, basis of depth shall be as determined by the ENGINEER. Trench width shall be measured as described under Section **MP-4.01** "Trench Excavation".

Basis of Payment

The quantity of rock removed shall be paid for at the Contract unit price per cubic yard for rock excavation. Such price and payment will be compensation for all work covered by this section including but not limited to permits, drilling, explosives, loading of drill holes, blasting, removal and disposal of rock.

MP-5.18 Erosion Control

Method of Measurement

The quantity of Erosion Control methods and devices as listed in bid schedule or shown on Plans to be paid for shall be that quantity as listed, properly installed and accepted.

Basis of Payment

The quantity of the Erosion Control methods and devices as listed in bid schedule or shown on Plans shall be paid for at the contract unit price installed complete, including but not limited to installation, maintenance, removal and disposal of accumulated silt, and final removal of silt fence and restoration of surface. Payment of this item shall include upkeep and maintenance for duration of project.

MP-5.19 Gravel Surface Repair

Method of Measurement

The quantity of Gravel Surface Repair to be paid for shall be the actual cubic yardage, by stone size and type, to the nearest 1/10 cubic yard, which has been properly placed, compacted, and incorporated into the completed and accepted work.

For new construction, the quantities shall be computed from the allowable width and required thickness as shown on the plans and the actual horizontal length measured in place. For replacement, the quantities shall be computed from the approved trench width, the required thickness, and the actual horizontal length measured in place. Trench width shall be measured as described in Section **MP- 4.01** "Trench Excavation".

Gravel Surfaces requiring repair/replacement as a result of equipment travel, material storage, or other actions by the CONTRACTOR outside the allowable trench widths shall not be included in the gravel surface repair pay item, and shall be repaired/replaced at the CONTRACTOR's expense.

Basis of Payment

The quantity of Gravel Surface Repair shall be paid for at the contract unit price per cubic yard installed, complete including but not limited to hauling, subgrade compaction, placing, compaction, shaping, and other related construction.

MP-5.20 Service Line Exploratory Dig

Method of Measurement

The quantity of Exploratory digs paid for shall be the actual number of attempts, authorized by the ENGINEER, to locate service lines that are not obvious or cannot be otherwise located by conventional means. Said work shall include the excavation of a pit by machine assisted by hand digging to locate existing sanitary sewers to be connected to the proposed system.

Basis of Payment

The number of digs shall be paid for at the contract unit price for each dig regardless of the actual size of the dig. When trenching across a property to locate a service, a dig shall be granted for each 10 feet of excavation. The unit price for each dig shall include but not be limited to excavation, traffic control, backfill, compaction and surface restoration as approved by the ENGINEER.

MP-5.21 Bituminous Pavement Repair and Resurfacing

Method of Measurement

The quantity of Bituminous Pavement Repair, and Bituminous Pavement Resurfacing, (as applicable) to be paid for shall be the square yards of surface area, to the nearest 1/10 square yard. The quantities for repair shall be computed based on the allowable trench width of 4 feet, unless additional width is authorized by the ENGINEER, and the actual horizontal length measured in place. The quantities for resurfacing shall be computed based on existing road widths and required taper as applicable.

Where pavement, driveways, or other asphalt surfacing of whatever nature have been removed by the CONTRACTOR beyond the limits called for in the Plans and Specifications or as set by the ENGINEER, or have been damaged through negligence or carelessness of the CONTRACTOR's forces, they shall be replaced in accordance with these specifications at the CONTRACTOR's expense.

Basis of Payment

The quantity of Bituminous Pavement Repair, and Bituminous Pavement Resurfacing shall be paid for at the contract unit price per square yard at the depth as specified on Plans. The contract price shall be full compensation for Bituminous Pavement Repair and Bituminous Pavement Resurfacing complete, including but not limited to pavement cutting, binder, hauling, tack coat, spreading, compaction, re-striping, replacing traffic control devices, and all related construction.

MP-5.25 Hand Placed Asphalt Curb

Method of Measurement

The quantity of Hand Placed Asphalt Curb to be paid for shall be the actual number of linear feet installed as measured along the centerline of the curb top, and accepted into the completed Work .

Basis of Payment

Payment for Hand Placed Asphalt Curb will be paid for at the contract unit price per linear foot including but not limited to all labor, traffic control, materials, preparation, asphalt hauling, placing and finishing work, complete to the satisfaction of the ENGINEER.

MP-5.26 Sidewalk Replacement

Method of Measurement

The quantity of sidewalk replacement to be paid for shall be the number of square yards properly installed and accepted.

Basis of Payment

The quantity of concrete sidewalk replacement shall be paid for at the contract unit price per square yard installed complete, including but not limited to installation, excavation, form work, backfill, compaction, restoration of surfaces and all related items as required.

MP-5.27 Pavement Milling

Method of Measurement

The quantity of Pavement Milling to be paid for shall be the square yards of surface area, to the nearest 1/10 square yard. The quantities shall be computed from the allowable width shown and the actual horizontal length measured in place. Additional width may be allowed when approved in writing by the ENGINEER.

Where pavement, driveways, or other asphalt surfacing of whatever nature have been removed by the CONTRACTOR beyond the limits called for in the Plans and Specifications or as set by the ENGINEER, or have been damaged through negligence or carelessness of the CONTRACTOR's forces, they shall be replaced in accordance with these specifications at the CONTRACTOR's expense.

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Where pavement, driveways, or other asphalt surfacing are removed within the construction limits as specified and with the consent of the DISTRICT, they shall be replaced in accordance with the applicable requirements of these specifications and shall be paid for in the manner specified herein.

Basis of Payment

The quantity of Pavement Milling shall be paid at the contract unit price per square yard, for the depth specified in the bid schedule. The contract price shall be full compensation for pavement milling, complete including, but not limited to, hauling, milling equipment, and all related construction

MP-5.30 Replacement of Existing Property Monument Disturbed by Construction

Method of Measurement

The quantity of replacement of existing property monument disturbed by construction shall be per each. See Technical Specifications Item X, paragraph 10.03 for further definition.

Basis of Payment

The quantity of “property monuments” to be paid for shall be paid for at the contract unit price per each property monument disturbed by construction. See Technical Specifications Item X, paragraph 10.03 for further definition.

MP-5.38 Drainage Swale and Drainage Ditch

Method of Measurement

The quantity of Drainage Swale and Ditch to be paid for shall be the number of linear feet properly installed and accepted.

Basis of Payment

The quantity of Drainage Swale and Ditch shall be paid for at the contract unit price per linear foot installed complete, including but not limited to installation, excavation, form work, backfill, compaction, restoration of surfaces and all related items as required.