

SECTION 01500 TRAFFIC MAINTENANCE AND PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work of this Section consists of maintaining traffic and protecting the public from damage to persons and property within the limits of and for the duration of this contract.
- B. Maintain traffic over a reasonably smooth traveled way marked by signs, delineators, guiding devices and other acceptable methods in conformance with the New York State Manual of Uniform Traffic Control Devices (MUTCD).

1.02 APPLICABILITY

- A. The Work of this Section shall be required in all areas within the project limits that will be open to vehicular traffic.

1.03 RESPONSIBILITY

- A. Assume responsibility for conducting operations in a manner to insure the safety and convenience of all travelers and adjoining property owners within the limits of and for the duration of the contract.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Comply with the requirements of DOT Section 700 Materials as they apply to the various materials required for the Work of this Section.

PART 3 - EXECUTION

3.01 GENERAL

- A. Remove construction equipment and materials from roadway and parking areas during non-working hours or provide protection in a manner that will not constitute a traffic hazard.

- B. Conduct and schedule the Work in a manner that will minimize the time during which the traveling public will be exposed to hazards.
- C. Do not park employee's personal vehicles within the work area in a manner that will constitute a traffic hazard.
- D. Provide a traveled way suitable for two lanes of moving traffic. Keep traveled way reasonably smooth and hard at all times.
- E. Keep the traveled way of all roadways and parking areas utilized for hauling materials to or from this project free of foreign objects that may fall or drop from transporting vehicles.
- F. Correct dusty conditions resulting from the Work by the use of calcium chloride and/or water. Distribute water uniformly by the use of suitable spray heads or spray bar. The Owner's Representative, in his sole discretion, may require the application of water for dust control. Apply water at the intervals and locations as needed or ordered by the Owner's Representative.
- G. Whenever it becomes necessary to maintain traffic on one lane, provide adequate traffic controls on the section of roadway on which vehicle traffic will be maintained. Provide competent flaggers or traffic signals at locations as needed per the MUTCD, or which the Owner's Representative, in his sole discretion, may require, to adequately and continuously control one lane traffic.
- H. Provide a sufficient number of competent flaggers in areas where construction operations are in potential conflict with vehicular traffic. Flaggers shall wear orange or fluorescent green hats or caps and vests in conformance with the MUTCD.
- I. Maintain safe and adequate ingress and egress to and from intersecting highways, residences and commercial establishments.
- J. The Contractor is not responsible for removal of snow and ice from pavements or traveled ways open to vehicular traffic.
- K. Maintain existing and new drainage structures, culverts and ditches to adequately drain the traveled way.
- L. Provide, maintain, move and remove delineation and guiding devices to properly delineate a safe and reasonable roadway. Delineate areas on which it is unsafe to travel.

- M. Delineate drop-offs less than 6 inches by providing approved delineators at intervals of not more than 200 feet. Where the drop off is between 6 inches and 18 inches, the spacing between delineators shall not be more than 100 feet. Where the drop off is greater than 18 inches, a continuous delineation consisting of 2 inch or wider brightly colored flexible tape shall be used in addition to individual delineators provided they are properly painted and reflectorized in accordance with the MUTCD.
- N. Maintain existing signs, markers, delineators and their supports. Where necessary, relocate existing signs in conformance with the MUTCD. Replace signs lost or damaged as a result of contract operations.

3.02 CONSTRUCTION SIGNS

- A. Provide, maintain, move and remove reflectorized construction signs in accordance with the requirements of the MUTCD.

3.03 CONSTRUCTION BARRICADES

- A. Provide, maintain, move and remove lighted construction barricades in accordance with the requirements of the MUTCD.

3.04 PAVEMENT DELINEATION

- A. Provide pavement delineation in accordance with the MUTCD on any course of asphalt concrete upon which traffic will be maintained.

3.05 OPENING ROADWAY TO TRAFFIC PRIOR TO CONTRACT ACCEPTANCE

- A. Maintain and protect traffic on any portion of pavement or structure ordered in writing by the Owner or as shown on the drawings to be opened to traffic prior to contract acceptance.

3.06 REMOVAL OF TRAFFIC CONTROL DEVICES

- A. Promptly remove all delineators, signs, barricades and pavement workings when in the opinion of the Owner's Representative their presence constitutes a hazard or inconvenience to the traveling public.
- B. Remove all remaining traffic control devices upon completion of the Work of this contract unless otherwise ordered in writing by the Owner's Representative.

END OF SECTION 01500

02700 CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SEWER LINES

PART 1 - GENERAL

1.01 WORK INCLUDED

This section covers the television inspection of sanitary sewer lines.

- A. The inspection of each line shall be by a closed circuit television (CCTV) camera especially designed to accurately show the condition of a line from the interior and with the ability to pinpoint the locations of line faults and necessary repairs.
- B. The term "sewer line joint" means the junction of two adjacent lengths of sewer pipe.
- C. The term "manhole section" as used in these specifications shall mean the run of pipe between two manholes.

1.02 RELATED WORK

- A. Section 02720 - Pipeline Cleaning
- B. Section 02710 - Sewer Flow Control

1.03 SUBMITTALS

- A. The Contractor shall submit to the Town Engineer for review and approval the manufacturer's brochures and specifications for the proposed CCTV monitoring and recording equipment. All CCTV inspections shall be performed and recorded with Pipeline Assessment & Certification Program (PACP) certified software.

1.04 INSPECTION

- A. The manhole section being inspected shall be suitably isolated from the remainder of the sewer line as necessary per Section 02710, and then cleaned per Section 02720. Immediately upon cleaning the manhole section, it shall be visually inspected on a monitor connected to the CCTV camera to determine the condition of existing service connections, the general condition of the line and any defects.
- B. CCTV inspection shall be done one manhole section at a time and the flow in the manhole section being inspected shall be suitably controlled. The Contractor shall make all provisions for pumping or bypassing the flow around the manhole section and performing any needed coordination with municipal staff for such pumping or bypass. The cost of the work for such pumping or bypass shall be incidental to the CCTV inspection.

- C. Maximum Depth of Flow for CCTV Inspection:
The entire circumference of the pipe (360 degrees) shall be viewable to the satisfaction of the Engineer. The Contractor shall dewater the pipe as necessary to allow the required visibility.
- D. Telephone or other suitable means of communications shall be set up between the two winches, the pumping unit and the monitor control station.
- E. The camera shall be moved through the line in either direction at a uniform slow rate not to exceed 30 feet per minute, by means of cable winches, CCTV cables, powered CCTV units or similar devices that do not obstruct the camera view or interfere with proper documentation of the sewer pipe condition. Under no circumstances shall the camera be tethered to a hydraulically propelled or high-velocity jet cleaning device while the cleaning device is on.
- F. The camera shall stop at each service connection and provide a view up the service line.
- G. Service connection and defect locations shall be indicated by means of a signal device connected to the video camera and shall be marked on the ground surface above each service connection and defect. Measurement to locate the connections and defects by marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed.

PART 2 - PRODUCTS

2.01 TELEVISION INSPECTION EQUIPMENT

- A. The camera equipment (including television camera and integral light) and monitoring equipment shall be specifically designed and constructed to perform the work as specified. The camera equipment shall be operative in conditions of 100% humidity and shall be waterproof. The camera equipment shall be small enough to pass through a 6 inch diameter sewer pipe. The camera equipment shall include a self contained lighting system capable of producing enough light to produce clear, bright, sharp pictures on the monitor. The lighting level and camera quality shall be suitable to allow a clear, in focus picture for a minimum of 6 linear feet ahead of the camera and to show the entire inside periphery of the sewer pipe. Picture quality and definition shall be to the satisfaction of the Town Engineering Department; otherwise, the equipment shall be removed from the line and replaced with suitable equipment.
- B. The monitor shall be located within a temperature controlled monitoring station that will comfortably accommodate three people to watch the sewer line inspection. The monitor shall have a 12 inch minimum (measured diagonally) viewing screen. The

Town Wastewater Collection Superintendent and Town Engineer shall have access to view the television monitor at all times.

PART 3 - EXECUTION

3.01 TELEVISION INSPECTION BY THE CONTRACTOR

- A. The Contractor shall furnish videos of each manhole section inspected and provide recordings of the video inspections to the Engineering Department for review and comments. The video media shall be CD or DVD format. Software used in viewing the video shall be provided to the Town by the Contractor if necessary.
- B. The following information shall be visible onscreen before the start of video recording each manhole section, and shall be included on the recorded video images:
 - 1. Project Name
 - 2. Name of Contractor
 - 3. Date Recorded
 - 4. Street or Easement Location
 - 5. Upstream Manhole #ID Designation
 - 6. Downstream Manhole #ID Designation
 - 7. Pipe Material
 - 8. Pipe Diameter
 - 9. Direction of movement (Downstream or Upstream)
- C. An uninterrupted display of distance from the insertion manhole wall or center shall be visible at all times during inspection, and shall be included on the recorded video images.
- D. Each video media recording shall be permanently labeled on the disc back to show the following information:
 - 1. Project Name
 - 2. Name of Contractor
 - 3. Date Recorded
 - 4. Street or Easement Location
 - 5. Upstream Manhole #ID Designation
 - 6. Downstream Manhole #ID Designation
 - 7. Pipe Material
 - 8. Pipe Diameter
 - 9. Direction of movement (Downstream or Upstream)
- E. If any video recording is of such poor quality that the Engineering Department is unable to evaluate the condition of the manhole or to locate service connections, the Contractor will be required to re-record the manhole section and provide a new video recording of that manhole section with acceptable quality.

- F. All video recordings shall become the property of the Town of Poughkeepsie and will be retained by the Engineering Department.
- G. The following information shall be provided in hard copy to accompany each video media:
1. Project Name
 2. Name of Contractor
 3. Date Recorded
 4. Street or Easement Location
 5. Upstream Manhole #/ID Designation
 6. Downstream Manhole #/ID Designation
 7. Pipe Material
 8. Pipe Diameter
 9. Direction of movement (Downstream or Upstream)
 10. Location of Service Connections
 11. Location of Defects and/or finished repairs

END OF SECTION 02700

SECTION 02710 SEWER FLOW CONTROL

PART 1 - GENERAL

1.01 DEFINITIONS:

- A. The term "sewer line joint" as used in these specifications shall mean the junction of two adjacent lengths of sewer pipe.
- B. The term "manhole section" as used in these specifications shall mean the run of pipe between two manholes.
- C. "Sewer flow control" is a set of methods to adjust the flow in the sewerage system to allow for inspection, maintenance, repair or replacement in the subject manhole section. This can be accomplished by either blocking or plugging the incoming line to restrict flow in the work area or by the use of pumps to bypass the flow around the work area until the work is completed.

1.02 SCOPE OF WORK:

- A. The Contractor shall be required to furnish all materials, labor, equipment, power, maintenance, etc. to implement the necessary flow control system and control the flow thru or around the work area for the duration of the work.
- B. The design and installation of the necessary systems as well as the operation of the temporary pumping systems (if necessary) shall be the Contractor's responsibility.
- C. If bypass pumping or pump station shut down is required, the Contractor shall coordinate with Franco Zani, the Town of Poughkeepsie Wastewater Collection Superintendent (see Section IX Phone Numbers).
- D. Flow control will be required to conduct inspection or other maintenance/rehabilitation operations when the existing flow in the lines is above the following levels:

1. Maximum Depth of Flow for CCTV Inspection:

The entire circumference of the pipe (360 degrees) shall be viewable to the satisfaction of the Engineer. Contractor shall dewater the pipe as necessary to allow the required visibility.

2. Maximum Depth of Flow for Joint Sealing:

6" - 12" Pipe 40% of pipe diameter i.e. 2.4" (2 13/32") to 4.8" (4 13/16")
14" - 24" Pipe 45% of pipe diameter i.e. 6.3" (6 5/8") to 10.8" (10 13/16")
>24" Pipe 50% of pipe diameter i.e. min 12"

E. Public notification and coordination with the homeowners shall be identified in the submittals and accomplished according to the following:

1. At least 7 days prior to any work, shutdown of service, or reduction in service to any manhole section, the Contractor shall go door-to-door to distribute a homeowner information leaflet, approved by the Town Engineering Department, describing the work to be performed and the conditions and restrictions of homeowner sewer service.
- 2.. Prior to 7:00 a.m. on the day the service is to be shutdown or reduced, the Contractor shall notify the Town of Poughkeepsie Wastewater Collection Department (see Section IX Phone Numbers) of the location of the manhole section in which service is to be shutdown or reduced.
3. On the day the service is to be shutdown or reduced, prior to commencing the work, the Contractor shall knock on the doors of all properties potentially impacted by the work and personally notify the occupants

1.03 SUBMITTALS:

If requested by the Town Engineer, the Contractor shall submit his Flow Control Plan a minimum of 48 hours (not including Saturdays, Sundays or Holidays) prior to controlling flows. The Flow Control Plan shall include following information:

1. Estimate of peak flow to be controlled
2. Detailed procedures for handling peak estimated flow
3. Schedule for controlling flow
4. Listing of equipment needed for flow control
5. Operation plan
6. Emergency procedures
7. Permits to close roads or lanes if necessary
8. Drawing of plug, bypass pump and pipeline locations (if bypass pumping is required)
9. Bypass pump sizes, capacities, number of each size to be onsite (including standby equipment) and power requirements (if bypass pumping is required)
10. Bypass pipeline sizes and material types (if bypass pumping is required)

1.04 FLOW CONTROL PRECAUTIONS:

Whenever flows in a sewer line are blocked or plugged, sufficient precautions shall be taken to protect the upstream sewer lines from damage that might be inflicted by excessive sewer surcharging. Further precautions shall be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

In situations where flow is running through an open trench during a sewer repair or replacement, the Contractor shall take precautions to ensure that debris, bedding/backfill material, sediment, etc. do not enter into the sewer system possibly causing damage to downstream pump stations or treatment facilities. In the event debris, bedding/backfill material, sediment, etc. does enter the downstream sewer system due to accident or Contractor negligence, the Contractor shall be responsible for cleaning and videoing the downstream system, and the Contractor shall also be responsible for repairing any damage to any downstream pump station equipment or treatment facilities, at no additional cost to the Town.

1.05 PLUGGING OR BLOCKING:

- A. Each sewer line plug shall be marked with a permanent Contractor identification. Each sewer line plug shall have a tag line attached to it that extends outside of the manhole or wet well in case of air line rupture to restrain the plug. Each sewer line plug air line shall have a tag line attached to it that extends outside of the manhole or wet well in case of air line rupture.
- B. Plugs shall be so designed that all or any portion of the flow can be released.
- A. During CCTV inspection and sealing operations, flow shall be reduced to within the limits specified in Paragraph 1.02. The Contractor shall use bypass pumping if the work cannot be scheduled or cannot be completed at a time when flow is within the flow levels specified by Section 1.02.
- B. Plugs shall be inserted into the line upstream of the manhole section being inspected or repaired. Where necessary, plugs shall also be installed into any storm sewer pipe connected to a sanitary sewer manhole.
- C. After the cleaning, inspection and repairs have been completed and restricting the flow is no longer needed, the flow shall be restored to normal. Flow shall be restored by removing the plugs in an order that permits flow to slowly return to normal without surcharging or causing other major disturbances downstream.
- D. Temporary plugs shall be removed and the flow restored to normal at the end of each working day. If downstream work is not or cannot be completed during the workday then the Contractor shall be required to provide, operate, and maintain bypass pumping system on a 24 hour basis.

1.06 PERFORMANCE REQUIREMENTS:

- A. It is essential that the sewer service have no interruption through the duration of the Work. If the storage capacity of the upstream line is not adequate to store the flow during the duration of the work or if the line is to be shut down for a period greater than 8 hours, then the Contractor shall provide adequate bypass pumping so that there is no interruption in the flow throughout the duration of the work. Therefore, Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units) as necessary to intercept the flow before it impacts the work area, carry it past the work area and return it to the existing sewer system downstream of the work.

- B. Discharge of sewage into the construction trench, private or public property, gutters, streets, sidewalks or storm sewers shall not be permitted.

1.07 FLOW ELIMINATION:

- A. If the flow needs to be completely eliminated due to cleaning or unforeseen circumstances, the elimination may be accomplished by temporary shutdown of pump stations where possible, or by plugging upstream sewers and pumping of flows, if required. Temporary shutdown of pump stations shall be done by the Town of Poughkeepsie Wastewater Collection Dept only.
- B. All requests of the Contractor to eliminate or adjust the flow within the system shall be made in writing to the Town Sewer Department. The Town and Contractor recognize and acknowledge that the elimination and/or adjustment of the flow are a cooperative effort and that the time and effort required achieving the desired flow varies. The Contractor shall not be allowed, due, or paid any additional compensation, whatsoever, for Contractor's work, effort, time, material, labor, rentals, equipment, expenses, etc., during, as a result of, or arising from the elimination or adjustment of the flow.

1.08 PUMPING AND BYPASSING:

- A. The Contractor shall obtain approval and secure all permits for placement of temporary bypass pumping system and pipeline within public rights-of-way.
- B. Bypass pumping may be required whenever pump stations are shut down or flow in gravity sewer lines are restricted or blocked. The Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow around the pump station, restriction, blockage, or other structure in which work is to be performed. Temporary shutdowns shall be performed by Town of Poughkeepsie Wastewater Collection Dept only. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of a rainfall. Electric pumps or diesel silent pack pumps shall be used. No other type of pump will be acceptable without prior approval of the Town of Poughkeepsie Wastewater Collection Department
- C. The Contractor shall be responsible for furnishing the necessary equipment, power, labor, and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, all equipment shall be operated in a manner to keep the pump noise at a minimum, and in accordance with the Town of Poughkeepsie noise ordinance.
- D. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.

- E. Bypass pumping shall not damage private or public property, or create a nuisance or public menace. Pumped sewage shall be in an enclosed pipe that is adequately protected from traffic, and shall be redirected into sanitary sewer system or alternatively into an enclosed tank for hauling to the wastewater treatment plant. Dumping or free flow of sewage on private or public property, gutters, streets, sidewalks, or into storm sewers is prohibited. Dumping of storm water may be discharged at a downstream location, as approved by the Engineer.

- E. The Contractor shall make all arrangements for bypass pumping during the times when the main is shut down for any reason. The Contractor shall also perform the work during a low-flow period whenever possible.

- F. The Contractor shall furnish, install, and maintain power, primary and standby pumps, equipment, and bypass piping required to maintain existing flows and services.
 - 1. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
 - 2. The Contractor shall provide the necessary stop/start controls for each pump.
 - 3. The Contractor shall include one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line and isolated from the primary system by a valve.
 - 4. In order to prevent the accidental spillage of sewage flows, all discharge systems shall be temporarily constructed of a secure, tight, leak free discharge pipe. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed.

- H. The Contractor shall be responsible for continuity of sewer service to each facility connected to the section of sewer main during the execution of the work, and shall also bypass the main sewer flow around the pipe to be replaced, or into adjacent sewers.

- I. The pumps and the bypass lines shall be of adequate capacity and size to handle all flows without backup to private property.

1.09 FIELD QUALITY CONTROL AND MAINTENANCE:

- A. Testing: The Contractor shall perform leakage tests of the bypass pumping discharge piping using clean water prior to operation.

- B. Inspection: The Contractor shall inspect the bypass-pumping system no less than once every 2 hours to ensure that the system is working correctly.

- C. Maintenance of Service: The Contractor shall ensure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

1.10 CLEANING:

- A. Before the bypass pumping system is dismantled, either to be moved to the next section or at the completion of the work, the Contractor shall discharge all sewage remaining in the bypass discharge pipeline and pumping equipment into the working sanitary sewer. Storm water is to be discharged at a downstream location, as approved by the Town Engineer.
- B. Upon completion of the bypass pumping operation, disturbed areas shall be cleaned and restored to their original condition. This restoration should restore the sites to a condition which is at least equal to or better than the condition which existed prior to the start of the work.

1.11 LIABILITY:

- A. The Contractor shall be responsible for damages to private or public property that may result from the sewer flow control operations. The Contractor shall be responsible for any violations of laws, regulations or permits and shall indemnify and hold the Owner harmless for any and all damages, including but not limited to, fines, penalties and law suits which arise from such violations.

1.12 MEASUREMENT:

- A. Costs of bypass pumping, when needed, shall be included in the Contract Amount and shall be considered incidental to the work, unless a specific bid item is provided in the bid form.
- B. If a pay item for bypass pumping is included in the Contract, measurement will be as follows:
 - 1. Bypass Pumping Greater than 16" up to 36": Measurement for this item shall be per each manhole section bypassed.
 - 2. Bypass Pumping (Capacity): Measurement for this item shall be per each set-up for an initial operation period of eight (8) hours. Measurement for any operation beyond the initial eight (8) hour period shall be on an hourly basis.

END OF SECTION 02710

SECTION 02720 CLEANING SEWER SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The work covered in this section consists of cleaning sewer lines and manholes prior to the internal television inspection(s) for new or existing wastewater systems.
- B. Gravity Main and Sewer Lateral Cleaning:
The intent of gravity main cleaning is to remove debris that may be causing a reduction in flow capacity, potential sewer backups, or that limits the ability to evaluate the structural condition of the pipe segment. On all sewers, CONTRACTOR shall perform sewer cleaning work to an acceptable level as necessary to perform a thorough television inspection of the sewer. An acceptable level is defined as the removal of all debris, or enough debris to restore a minimum of 95 percent of the internal pipe diameter throughout the pipe segment being cleaned. If the pipe condition is such that cleaning may cause a potential collapse, then the pipe shall be television monitored without attempting to clean it to the 95 percent condition, pending approval by the Town of Poughkeepsie Sewer Department.
- C. Water for Cleaning:
The CONTRACTOR shall coordinate with the Town of Poughkeepsie Water Department to obtain water to be used during the course of cleaning directly from a fire hydrant.
- D. Recovering Equipment:
The CONTRACTOR will be responsible for recovering any equipment that becomes lodged or lost in the pipeline including, but not limited to, any cost associated with required evacuation, restoration of roads and easements, repairs to pipes and manholes as needed to restore the pipeline and appurtenances to their original conditions. Video documentation of pre-removal conditions (See Section 02700) will apply prior to any excavation.

1.02 CLEANING EQUIPMENT

- A. Hydraulically Propelled Equipment:
The equipment used shall be of a movable dam type and shall be constructed so that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. Special

precautions to prevent flooding of the sewers and public or private property shall be taken at all times.

B. High-Velocity Jet (Hydro-Cleaning) Equipment:

All high-velocity sewer-cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size mains. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tanks, auxiliary engines, pumps, and hydraulically driven hose reel.

C. Mechanically Powered Equipment:

Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe shall not be used. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specially heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

D. Vacuum machines may be used for removal of materials from manholes when other cleaning equipment is used to dislodge and transport material to the access point.

E. Combination Cleaner:

For cleaning small and large diameter sewer, the CONTRACTOR may use a combination high volume water and solids separation system. Water volume of up to 250 gpm at 2000 psi shall be used to move solids to the downstream manhole in high flow conditions. The separation system shall dewater solids to 95 percent (passing a paint filter test) and transfer the solids to a haul truck for transport to a sewage treatment plant, approved landfill, or other location specified by the Town of Poughkeepsie Sewer Department. Sewer water shall be filtered to a point where it can be used in the pump for continuous cleaning. No by-passing of sewer flows will be necessary. The unit shall be capable of 24-hour operation and the unit shall not be removed from the manhole until a pipe section is fully cleaned.

1.03 SUBMITTALS

- A. A daily log shall be maintained to record the location of the manholes and sewer lines cleaned, lengths of the lines cleaned, method of cleaning, line sizes and volume and type of debris moved. Observations shall be recorded on a cleaning report form.
- B. Weigh tickets and disposal manifests from licensed disposal facility shall be provided for all solids waste disposed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. The equipment shall remove dirt, grease, rocks, sand, and other materials and obstructions from the sewer mains, laterals and manholes.
- B. A high velocity sewer cleaner shall be used for the majority of the cleaning work. Other equipment, such as bucket machines, rod machines, hydraulic root cutters, vacuum trucks and balling equipment, appropriate to the need, shall be available.

3.02 CLEANING PRECAUTIONS

- A. All necessary precautions shall be taken to protect the sewer from damage during all cleaning and preparation operations. Precautions shall also be taken to insure that no damage is caused to public or private property adjacent to or served by the sewer or its branches. The CONTRACTOR shall pay for and restore, at no additional costs to the Town, any damage caused to public or private property because of such cleaning and preparation operations.
- B. Satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, precautions shall be taken to insure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. When possible, the flow of sewage in the sewer shall be utilized to provide the necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant. All requirements shall be met when accessing a fire hydrant including but not limited to meters, backflow preventers and properly trained personnel. It shall be the CONTRACTOR'S responsibility to meet all state and local requirements. See also Paragraph 1.01 C above.

3.03 CLEANING

- A. If cleaning of an entire sewer section cannot be successfully performed from one manhole, the equipment shall be set up on an adjacent manhole and cleaning attempted again.

- B. All sludge, dirt, sand, rocks and other solid or semi solid materials resulting from the cleaning operation shall be removed from the downstream manhole of the section being cleaned. The CONTRACTOR shall not be responsible for removing mortar or other material that is securely attached to the pipe walls or joints.
- B. Waste materials shall be disposed of from the site at least once at the end of each workday. The CONTRACTOR will be responsible for the disposal of materials removed from the sewer system. All sewer cleaning efforts shall require documentation of all quantities and types of materials removed during cleaning.
- C. The designated sewer manhole sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment approved by The Town of Poughkeepsie Sewer Department. Cleaning shall consist of normal hydraulic jet cleaning to facilitate the internal CCTV inspection.
 - 1. Types of cleaning of sanitary sewers
 - a. Light cleaning consists of a maximum of one pass of the jet nozzle. Light cleaning of laterals will consist of flushing water into a cleanout.
 - b. Medium cleaning consists of two to four passes of the jet nozzle. Medium cleaning of laterals will consist of one to four passes with a jet nozzle.
 - c. Heavy cleaning consists of five or more passes of the jet nozzle when
 - 2. Selection of the equipment used shall be based on the condition of the manhole section at the time the work commences. The equipment and methods selected shall be satisfactory to the Town of Poughkeepsie Sewer Department. The equipment shall be capable of removing dirt, grease, rocks, sand, debris, other materials and obstructions from the sewer lines and manholes.
 - 3. The intent of preparatory cleaning is to provide sufficient cleaning to ensure camera passage so that the internal conditions of the pipeline can be fully assessed.
 - 4. If the Town of Poughkeepsie Sewer Department establishes that a particular section of the pipeline cannot be adequately cleaned due to broken, collapsed, or void areas, then inspection will be attempted up to the obstruction.
- D. If results of the cleaning are favorable, the CONTRACTOR shall proceed with the CCTV inspection.

3.04 ROOT REMOVAL

- A. Roots shall be removed in the designated sections and manholes where root intrusion is a problem and where authorized by the Town of Poughkeepsie

Sewer Department. Special attention should be used during the cleaning operation to assure almost complete removal of roots from the pipe joints. Any roots that could prevent the proper application of chemical sealants, or could prevent the proper seating and application of cured-in-place liners shall be removed. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines, winches using root cutters, porcupines and equipment such as high-velocity jet cleaners. Chemical root treatment shall be used before or following the root removal operation, depending on the manufacturer's recommendation. The CONTRACTOR shall capture and remove all roots from the line.

3.05 MATERIAL REMOVAL AND DISPOSAL

- A. All solid or semisolid materials dislodged during cleaning operations, such as sludge, dirt, sand, rocks, grease or roots, shall be removed at the downstream manhole of the section being cleaned. Passing dislodged materials into a sewer segment downstream of the sewer segment being cleaned shall not be permitted, and the CONTRACTOR shall provide appropriate screening to stop materials passing into downstream sewers. In the event that dislodged materials are passed into downstream sewers, as observed or detected by The Town of Poughkeepsie Sewer Department or any third party, the CONTRACTOR shall be responsible for cleaning the affected downstream sewers in their entirety, at no additional cost to the Town.
- B. The CONTRACTOR shall have all proper permits required for debris transport. These materials shall be removed from the site at the end of each workday, and shall be disposed of in a lawful manner by CONTRACTOR. The Town of Poughkeepsie Arlington Wastewater Treatment Plant on Sand Dock Road can be used for disposal. Copies of records of all disposals shall be furnished to the Engineering Department, indicating disposal site, date, amount and a brief description of material disposed. Disposal manifests from the licensed disposal facility shall be submitted with invoices.
- C. The CONTRACTOR shall keep his haul route and work area(s) neat, clean, and reasonably free of odor, and shall bear all responsibility for the cleanup of any spill.

3.06 ACCEPTANCE OF CLEANING OPERATION

- A. Acceptance of sanitary sewer cleaning shall be made upon the successful completion of the television inspection and shall be to the satisfaction of the Engineering Department. If television inspection shows the cleaning to be unsatisfactory, the CONTRACTOR shall be required to re-clean and re-inspect the sewer line at no additional cost to the Town until the cleaning is shown to be satisfactory.

- B. In addition, on all sanitary sewers which have sags or dips to an extent that the television camera lens becomes submerged during the television inspection, the CONTRACTOR shall remove the water from the pipe to allow the full circumferential view of the pipe interior and identification of pipe defects, cracks, holes and the location of service connections.

END OF SECTION 02720

SECTION 02765 CURED-IN-PLACE PIPE LINING (CIPPL)

1.0 GENERAL

1.1 Description

1. Provide all materials, equipment, labor and incidentals for the installation and confirmation of proper installation of cured-in-place pipe lining (CIPPL) within the sewer main, as shown on the location area maps.

2. The sewer main CIPPL process shall consist of inserting a resin-impregnated flexible tube into an existing sewer, expanding the tube out against the sewer pipe and curing the tube to form a pipe liner.

3. The CIPPL shall cure into a hard, impermeable liner of the specified thickness and form a structurally sound liner pipe with a uniformly smooth interior.

1.2. Reference Standards: Comply with applicable provisions and recommendations of the following:

ASTM F 1216 Standard Practice for Rehabilitation of Existing Pipelines and conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials

ASTM F2019: Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

1.3. Warranty: All lining work shall be fully guaranteed by the CONTRACTOR for a period of 1 year from the date of Final Acceptance unless otherwise stipulated in writing by the OWNER prior to the date of Conditional Acceptance. During this period, all serious defects discovered by the ENGINEER shall be removed and replaced by the CONTRACTOR in a satisfactory manner at no cost to the OWNER.

2.0 PRODUCTS

2.1 Design Requirements

1. The CIPPL lining shall be a resin-impregnated flexible tube which is inserted into the sewer to be rehabilitated and cured-in-place by an acceptable curing method. The tube may have a suitable polyurethane membrane coating for protection of the interior surface and to provide a uniform, smooth flow surface and may be removed after installation and curing is completed. The resin shall be a liquid thermosetting resin and shall be suitable for the design conditions as well as the curing process.

2. The required structural CIPPL wall thickness shall be based, as a minimum in accordance with ASTM F2019, Appendix X1, Design Considerations for a fully deteriorated or partially deteriorated host pipe, for a circular host pipe with 10% ovality or less

3. The liner thickness of each pipe segment shall be determined by the CONTRACTOR and submitted for ENGINEER'S approval.

4. Installed thickness of the CIPPL shall be calculated and submitted for ENGINEER'S approval.

5. Curing shall be accomplished by utilizing hot water under hydrostatic pressure, steam pressure or ultraviolet curing in accordance with the manufacturer's recommended cure schedule. When cured, the liner shall form a continuous, tight fitting, hard, impermeable liner that is chemically resistant to chemicals found in domestic sewage.

6. The liner shall be fabricated to a size that when cured will tightly fit the sewer being rehabilitated. Allowance for longitudinal and circumferential expansion shall be taken into account when sizing and installing the liner. Field verify all dimensions prior to delivery of the liner. The allowable contact tolerance between the liner and host pipe is 1.0 mm. In cases where any space or gap between the outside surface of the liner and the inside surface of the existing pipe exceeds 1.0mm, the liner will be deemed deficient and corrective action will be required as determined by the ENGINEER. Where irregularities of the existing pipe exist such as offset joints, protrusions, bumps, fluctuating pipe diameter, and deformations the irregularities remain after the sewer has been prepared in accordance with the Contract Documents, exception to the contact tolerance will be allowed in the irregularity zone. The exception shall not present an obstruction to sewage flow.

9. The length of the pipes as specified herein are approximate. The CONTRACTOR will field verify all lengths prior to construction. The liner shall be able to seal the inlet and outlet of each manhole/structure.

2.2 Flexible Tube

1. The tube shall consist of one or more layers of fiberglass laminate or semi-flexible textiles that meets the ASTM requirements of Section 1.1 B.

2. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the CIPPL. No dry or unsaturated layers shall be present.

2.3 Resin

1. The liquid thermosetting resin shall saturate the tube and produce a properly cured liner which is resistant to abrasion due to solids, grit, and sand.
2. Polyester, vinyl ester, or epoxy resin and catalyst system shall comply with the following requirements and that when properly cured meets the requirements of ASTM F1216.

2.4 Hydrophilic Seals

1. The hydrophilic water stop end seals shall be placed at each end per manufacture's specifications and be watertight.
2. Hydrophilic Seal Manufacturer: Greenstreak, Inc.; Hydrotite, or approved equal.

3.0 EXECUTION

3.1 Preparation

1. Review OWNER's television inspection logs and/or conduct additional inspection of the pipes as deemed necessary by CONTRACTOR to plan rehabilitation work. Determine the location of all active service connections prior to lining. Dye test to verify all active service connections, if necessary. The CONTRACTOR shall not reopen taps that are not active.
2. Clean pipes prior to Pre-Construction Inspection, such that the pipes are free of roots, grease, sand, rocks, sludge, tuberculation (to a tolerance of 0.25 inches projection) and other debris.
3. Remove protruding taps and seal material prior to Pre-Construction Inspection.
4. Conduct Pre-Construction Inspection. Submit and obtain ENGINEER'S approval of Pre-Construction Inspection. Inspect and confirm the inside diameter, alignment and condition of each segment to be lined. Use the data and information collected from this inspection to verify the size of the liner and refine the installation techniques. If unknown physical conditions in the work area are uncovered during the investigation that materially differ from those ordinarily encountered, notify the ENGINEER.
5. As required, provide for continuous flow around the section of pipe that is to be lined. The pump and bypass lines shall be of adequate capacity and size to handle the flow of the sewers. The proposed bypassing system shall be reviewed in advance by the ENGINEER. The review of the bypassing system by the ENGINEER shall in no way relieve the CONTRACTOR of his responsibility and liability.
6. A pre-lining CCTV inspection immediately prior to CIPPL lining to demonstrate that the pipe is clean and free of roots, grease, sand, rocks, sludge, PACP Runners or Gushers, pockets of water, or structural impediments that would affect long-term viability of the

pipe liner. Obtain ENGINEER's verbal approval of the acceptability of the existing pipe condition prior to installation of the CIPPL.

3.2 Bypass Pumping

1. Maintain commercial and residential sewer service during the installation process, if necessary to properly complete the work, the CONTRACTOR may interrupt flow from services. The CONTRACTOR has the sole responsibility of notifying the public of the work to be done. Each home or business connected to the sewer must be informed via written notice a day prior (24 hours) to work being commenced. The CONTRACTOR must also leave contact information so the public may call with questions or concerns about the project. Upon completion of the work, immediately reinstate all services and notify the property owner(s) that service is again available. The CONTRACTOR also assumes all responsibility for blockages, back-ups or damages caused to public or private property as a result of the interruption of service caused by the CONTRACTOR'S actions.

2. Bypass pumping systems shall be used and operated in accordance with Specification 02710. The bypass pumping system capacity must be sized to meet all potential flows. The CONTRACTOR will be held solely responsible for any damage caused by flooding and will take care to avoid this occurrence. The system must be kept in service for each section until that section is completed and ready to return to service. The CONTRACTOR is responsible for all installation, operation, and maintenance of the system. Manpower, fuel, and necessary utilities required by the systems must be provided and paid for by the CONTRACTOR. Bypass sewage from individual laterals if needed.

3.3 CIPPL Installation

1. Hydrophilic Water Stops: Insert continuous hydrophilic water stops at each manhole opening, centered within the intersection of the host pipe and the manhole wall. If defects in the host pipe near the manhole are such that the end seal will not form a watertight seal between the liner and host pipe, apply hydraulic cement to the defects in the host pipe to provide a smooth surface to receive the end seal.

2. Provide a finished CIPPL that is continuous and free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, delamination, and wrinkles at any location totaling more than 5% of host pipe inside diameter.

3. Service Connections: Reopen all of the existing active service connections in each length of sewer immediately following installation of the liner. Reopen active service connections from inside the sewer by means of a remote controlled, CCTV assisted cutting device appropriate for the liner material and the rehabilitated sewer pipe. Each active service connection shall be cut completely open and shall have smooth edges with no protruding material capable of hindering flow or catching and holding solids contained

in the flow stream. If the service connection cannot be fully reopened due to time constraints, open each service connection to a minimum of 75% before the end of each working day.

4. Inactive Service Connections: Do not reopen capped or inactive lateral connections. The ENGINEER will determine locations of inactive service connections.

3.4 Trimming at Manholes

1. Neatly and smoothly trim the finished ends of the liner to within two inches of host pipe end. Do not leave any rough edges that may catch debris. Do not leave any portion of CIPPL within the manhole channel.

2. Provide a smooth transition between the existing manhole channel invert and the effluent liner using cement grout or other approved material to prevent settling of sediments or debris from catching on the liner.

3.5 Post-Installation Inspection of Completed Work

1. Provide Post-construction Inspection video documentation showing completed work. Perform post-construction inspection upon completion of lining work.

2. Correct all defects discovered during the television inspection before Acceptance. After the defects are corrected, repeat the post-construction Inspection for that sewer line.

3.6 Final Cleanup: Upon completion of rehabilitation work and testing, clean and restore project area affected by the Work.

3.7 CIPPL Acceptance

1. Acceptance of the CIPPL shall be based on:

- a. Compliance with the required CIPPL physical properties and thickness.
- b. Observed groundwater infiltration of the liner is zero.
- c. All active service connections are open and clear.
- d. There is no evidence of excessive wrinkles, splits, cracks, breaks, lifts, kinks, scalds, blisters, delamination, crazing or other defects in the liner.

2. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the OWNER. The CONTRACTOR shall be responsible for costs of additional testing required to confirm compliance with these requirements. Obtain approval of the ENGINEER for method of repair, which may require field or workshop demonstration.

3. For liners with defects, if the CONTRACTOR elects to excavate and repair defects in the liner, cut and remove the defective section of liner plus the host pipe to a minimum

of two feet beyond each end of the defective liner. Use SDR 26 PVC to replace the removed liner and host pipe. Align invert of point repair with invert of CIPPL. On either side of the proposed repair, carefully remove the host pipe from around the existing sound liner to expose a minimum of five inches of sound liner or as needed for repair coupling. Use stainless steel shielded flexible repair couplings to connect the new PVC directly to the sound liner. Provide repair couplings custom-fabricated specifically to fit the outside diameter of the host pipe and CIPPL to assure a watertight connection. Haunch all exposed liner and new PVC pipe to the spring line with pipe bedding material. Cover with concrete all exposed liner and repair couplings a minimum of six inches on either side of the pipe from the spring line to six inches above the pipe. Place pipe bedding, as approved by the ENGINEER a minimum of eight inches on either side of the pipe from spring line of new PVC pipe to eight inches above the pipe.

4. If the CONTRACTOR elects to repair defects in the liner using trenchless methods, remove the defective sections of liner for the full circumference to a minimum of six inches beyond each end of the defective liner or as approved by the ENGINEER. Install a cured-in-place point repair that matches or exceeds the short and long-term material properties of the existing liner and must have the appropriate thickness to withstand the criteria for that particular liner. A minimum of twelve inches of overlap is required on either end of the repair, with hydrophilic bands placed six inches from either end of the repair (i.e., centered on each overlap). Should the proposed cured-in-place point repair and hydrophilic end seals reduce the inside diameter of pipe to an unacceptable diameter, the OWNER retains the right to require alternative materials for the repair or to have the CONTRACTOR perform an excavated repair, at no additional cost to the OWNER.

4.0 Warranty

1. Unless otherwise agreed upon prior to bid, the Contractor shall warrant the liner for a period of one year. During the warranty period, any workmanship or material defects which affect the integrity of strength of the repair shall be repaired at the Contractor's expense in a manner mutually agreed upon by the Owner and the Contractor.
2. Correct all defects discovered during the warranty period at no additional compensation. After the defects are corrected, inspect the sewer again at no additional compensation.
3. The OWNER retains the right to either demand corrective action to address the additional defects or to offer the CONTRACTOR a further negotiated reduction in the value of the liner. The CONTRACTOR retains the right to correct the defective liner at any point during the bond and warranty period and receive full payment for the liner. The acceptability of all repairs and the finished value of liner after said repairs continue to be solely the ENGINEER's determination.

END OF SECTION 02765