SECTION 02520
TELEVISION INSPECTION OF SANITARY SEWER LINES

PART I: GENERAL

1.1 GENERAL REQUIREMENTS
- A. Post-installation television inspection.
- B. Existing installation television inspection.

1.2 MEASUREMENT AND PAYMENT
- A. Unit Prices:
  1. No payment will be made for cleaning and television inspection of new gravity sanitary sewer lines under this Section. Include payment in unit price for work requiring cleaning and television inspection.
  2. Payment for television inspection of existing gravity sanitary sewer will be on a linear foot basis. Measurement will be taken along centerline of pipe from centerline to centerline of manholes.
  3. Payment shall be full compensation for all material, equipment and labor required for complete abandonment grouting, including air venting, testing, temporary plugs, PVC pipes and incidentals.
  4. No separate payment shall be made for television inspection that is required in Section 02525 – Acceptance Testing for Gravity Sanitary Sewer Lines.
  5. Refer to Section 01270 – Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum):
  1. If Contract is Stipulated Price Contract, payment for Work in this Section is included in Total Stipulated Price.

1.3 REFERENCES
- A. CFTS – City of Friendswood Technical Standards.

1.4 SUBMITTALS
- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. The Contractor shall submit the following:
  1. Manufacturers brochures and specifications for TV equipment.
  2. Recording media shall be DVD.
  3. Test report and project summary.

PART II: PRODUCTS

2.1 RECORDING DEVICE
- A. Recording device shall be high quality color recording device capable of

recording DVD's.

B. The following information shall be available as follows:
   1. Each DVD media shall be permanently labeled with the following information:
      a. Project Name
      b. Project Number
      c. Manhole to Manhole Designation
      d. Name of the Contractor
      e. Date Televised
   2. The following information shall be recorded and visible on screen for ten seconds (10 Sec) immediately before the start of televising each line segment:
      a. Project Name
      b. Project Number
      c. Upstream Manhole Designation
      d. Downstream Manhole Designation
      e. Pipe Material
      f. Pipe Size
      g. Name of the Contractor
      h. Date Televised
      i. Street and/or Easement Location
   3. A continuous uninterrupted recording of distance from the insertion manhole shall be visible at the lower left corner of the screen at all times during inspection.
   4. The following information shall be provided in a hard copy report to accompany each DVD media:
      a. Project Name
      b. Project Number
      c. Name of the Contractor
      d. Date Televised
      e. Street and/or Easement Location
      f. Upstream Manhole Designation
      g. Downstream Manhole Designation
      h. Pipe Material
      i. Pipe Diameter
      j. Location of Service Connections

C. When the reports and DVD media are complete they shall be given to the Project Manager. DVD media and reports shall become the property of the City of Friendswood.

2.2 CLOSED CIRCUIT TELEVISION CAMERA

A. Television inspection cameras shall be required to adhere to the following specifications:
   1. Camera must be equipped with rotating head capable of ninety degree (90°) rotation from horizontal and three hundred sixty degree (360°) rotation about its centerline.

2. Minimum Camera Resolution: Four Hundred (400) vertical lines and four hundred sixty (460) horizontal lines.
3. Camera Lens: Not less than two hundred seventy-five degree (275°) viewing angle with automatic or remote focus and iris controls.
4. Focal Distance: Adjustable through range of six inches (6 In) to infinity.
5. Camera shall be intrinsically safe and operative in one hundred percent (100%) humidity conditions.
6. Lighting Intensity: Remote controlled and adjusted to minimize reflective glare.
7. Lighting and Camera Quality: Provide clear in-focus picture of the entire inside periphery of line being televised.
8. Camera must have height adjustment so that the camera lens is always centered at one-half (1/2) the diameter of the pipe.

B. Footage Counter: Camera shall have an accurate footage counter which displays on the monitor the exact distance from the starting manhole.

C. Camera shall be self-propelled.

PART III: EXECUTION

3.1 PREPARATION

A. Pipes to be inspected shall be cleaned as specified in Section 02530 – Sanitary Sewer Line Cleaning. Pipes shall be televised immediately following the cleaning of the pipes done in accordance with Section 02530 – Sanitary Sewer Line Cleaning.

B. If the depth of flow exceeds the specifications listed in TABLE 4.1 – MAXIMUM DEPTH OF FLOW in this Section, then bypass pumping shall be required at no additional cost to the City.

C. Move camera through the pipe from upstream manhole to downstream manhole stopping when necessary to permit proper documentation of pipe conditions. Upon entrance and exit of manholes, the camera shall pan to demonstrate that debris has been removed. At no time shall the camera be pulled at a rate faster than thirty feet per minute (30 Ft/Min). Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the documentation of pipe conditions to move the camera through the pipe. **Under no circumstances shall the camera be tethered to a hydraulically propelled or high-velocity jet cleaning device while the cleaning device is on.**

D. If the television camera will not pass through an entire section, set up equipment so that inspection can be performed from the opposite manhole. If the camera still cannot pass through the section, then the obstruction shall be cleared by cleaning, removal or point repair as directed by the Project Manager at no additional cost to the City and

reinspected.

E. Measurement for location of defects shall be aboveground by means of a meter device. Marking the cable, or similar method, which would require the interpolation of the depth of the manhole shall not be allowed. Check accuracy of the distance meter by use of a walking meter, roll-a-tape or other suitable device. The accuracy shall be satisfactory to the Project Manager.

F. The camera image shall be down the center axis of the pipe when the camera is in motion. The contractor is required to provide a three hundred sixty degree (360°) radial view of the pipe interior using a camera with pan and tilt capabilities for eight inch (8 In) diameter pipe and larger.

G. Points of interest shall also be digitally recorded and shall include, but not limited to, defective joints, ovality, debris, sediments, cracked pipes, holes, blockages, bellies and service connections.

3.2 DOCUMENTATION AND REPORTING

A. Television Inspection Logs: Develop and keep printed location records that clearly show the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition record any other points of significance or concern and other discernible features.

B. Photographs: Take digital photographs or digital DVD stills of any defect or points of interest recorded on the inspection report.

C. Each report on each segment shall use the Television Inspection Codes in Tables 4.2 to 4.12. The final report shall also give a total value of the section pipe that has been inspected.

D. Provide the City with two (2) copies of each DVD and two (2) copies of each report.

E. The Project Manager shall review the DVD media and documentation to ensure compliance listed in this specification.

PART IV: TABLES

4.1 – MAXIMUM DEPTH OF FLOW

Nominal Pipe Diameter	**Maximum Depth of Flow**
6” to 10”	1 inch
12” to 14”	2 inches
15” to 24”	3 inches
Over 24”	4 inches

4.2 TELEVISION INSPECTION CODES – LOCATION

LOCATION	CODE
Alley, Good Access	A
Alley, Poor Access	B
Easement, Good Access	C
Easement, Poor Access	D
Open Area, Good Access	E
Open Area, Poor Access	F
Parking Lot, Good Access	G
Parking Lot, Poor Access	H
ROW, Light Traffic	I
ROW, Medium Traffic	J
ROW, Heavy Traffic	K
Street, Light Traffic	L
Street, Medium Traffic	M
Street, Heavy Traffic	N

4.3 TELEVISION INSPECTION CODES – SURFACE COVER

SURFACE COVER	CODE
Asphalt Street	A
Concrete Street	B
Sidewalk	C
Trees/Shrubs	D
Close to Fence	E
Open Area	F
Moveable Structure	G
Unmovable Structure	H
Overhead Utilities	I
Pipe Above Ground	J

4.4 TELEVISION INSPECTION CODES – PIPE TYPE

SURFACE COVER	CODE
Cast Iron Pipe	CIP
Corrugated Metal Pipe	CMP
Concrete Pipe Poured in Place	CON
Cured in Place Pipe	CPP
Ductile Iron Pipe	DIP
Fiberglass Reinforced Pipe	FRP
High Density Polyethylene Pipe	HDP
Plastic Lined Concrete Pipe	PLP
Polyvinylchloride Pipe	PVC
Reinforced Concrete Pipe	RCP
Vitrified Clay Pipe	VCP

4.5 TELEVISION INSPECTION CODES – ALIGNMENT

Description	CODE
Begin 1/4 Pipe of Water	A
Begin 1/2 Pipe of Water	B
Begin Camera Underwater	C
End Camera Underwater	D
End 1/2 Pipe of Water	E
End 1/4 Pipe of Water	F

4.6 TELEVISION INSPECTION CODES – CRACKS

DESCRIPTION[1]	CODE	VALUE
< 1/2" W, < 1/2' L	A	1
< 1/2" W, < 1' – 2' L	B	2
< 1/2" W, > 2' L	C	3
> 1/2" W, < 1/2' L	D	4
> 1/2" W, < 1' – 2' L	E	5
> 1/2" W, > 2' L	F	6
Hole in Pipe – Small	G	7
Pipe Missing < 60°	H	8
Pipe Missing > 60°	I	9

[1]Use prefix of RC for Radial Cracks and LC for Longitudinal cracks.

4.7 TELEVISION INSPECTION CODES – JOINTS

DESCRIPTION	CODE	VALUE
Dropped Joint > 90% Clear	A	3
Dropped Joint 80% – 90% Clear	B	6
Dropped Joint < 80% Clear	C	9
Shifted Joint > 90% Clear	D	3
Shifted Joint 80% – 90% Clear	E	6
Shifted < 80% Clear	F	9
Withdrawn Joint 2" – 3"	G	1
Withdrawn Joint 3" – 4"	H	2
Withdrawn Joint > 4"	I	3
Visible Gasket	J	0
Leaking at Joint	K	0
Broken Joint – Light	L	2
Broken Joint – Medium	M	4
Broken Joint – Heavy	N	6

4.8 TELEVISION INSPECTION CODES - LATERALS

DESCRIPTION	CODE	VALUE
Private Service 0” – 1”	A	1
Private Service 1” – 2”	B	2
Private Service 2” – 3”	C	3
Private Service 3” – 4”	D	4
Private Service 0 > 4”	E	5
Defective Service Connection	F	6
Dead/Unused Service	G	7
Factory Service	H	8
Plumber Service	I	0

4.9 TELEVISION INSPECTION CODES - ROOTS

DESCRIPTION	CODE	VALUE
Roots, Light	A	1
Roots, Medium	B	2
Roots, Heavy	C	3

4.10 TELEVISION INSPECTION CODES - DEBRIS

DESCRIPTION	CODE	VALUE
Debris, Light	A	1
Debris, Medium	B	2
Debris, Heavy	C	3
Grease, Light	D	4
Greasy, Medium	E	5
Grease, Heavy	F	6

4.11 TELEVISION INSPECTION CODES – INFLOW/INFILTRATION

DESCRIPTION	CODE	VALUE
I/I – Light (0-1 GPM)	A	3
I/I – Medium (1-5 GPM)	B	6
I/I – Heavy (>5 GPM)	C	9
I/I – Some Evidence	D	2
I/I – Considerable Evidence	E	4
I/I – Great Evidence	F	6
I/I – No Evidence	G	0

4.12 TELEVISION INSPECTION CODES – STRUCTURAL

DESCRIPTION	CODE	VALUE
Line Deterioration, Light	A	3
Line Deterioration, Medium	B	6
Line Deterioration, Heavy	C	9
Line Deterioration, None	D	0
Oval < 5%	E	3
Oval > 5% and <10%	F	6
Oval > 10%	G	9
Collapsed	H	9
Pipe Deterioration, Light	I	0
Pipe Deterioration, Medium	J	0
Pipe Deterioration, Heavy	K	0
Pipe Deterioration, None	L	0
At Manhole	M	0

END OF SECTION