SECTION 33 3000 – FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein. Review specific project requirements with NU during the design phase.

B. This Section includes:

1. Pipe and fittings.
2. Non-pressure and pressure couplings.
3. Expansion joints and deflection fittings.
4. Backwater valves.
5. Cleanouts.
6. Encasement for piping.
7. Manholes.

C. Related Sections:

1. Section 22 0000 “Common Work Results for Plumbing”

1.3 DEFINITIONS:

1. DIP: Ductile Iron Pipe
2. PVC: Polyvinyl chloride plastic pipe

1.4 REGULATORY REQUIREMENTS: COMPLY WITH THE METROPOLITAN WATER RECLAMATION DISTRICT

A. (MWRD) requirements, including inspections prior to and during work.

1.5 PERFORMANCE REQUIREMENTS:

A. Pressure pipe pressure ratings: At least equal to system operating pressure, but not less than 150 psig.

1.6 PROJECT CONDITIONS:

A. Site Information: Architect-Engineer shall coordinate site survey, research public utility records, and verify existing utility locations with NU representatives. Locate existing structures and piping to be closed and abandoned.

B. Coordinate the Interruption of Existing Sanitary Sewerage Service with NU. Interruption of service to facilities occupied by NU or others is only permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify NU no fewer than fourteen (14) days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without NU's written permission.

PART 2 - PRODUCTS

2.1 PRODUCTS: THE FOLLOWING PRODUCTS AND MATERIALS INDICATE NU PREFERENCES. REVIEW SPECIFIC PROJECT REQUIREMENTS WITH NU DURING THE DESIGN PHASE OF THE PROJECT.

A. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings:

1. Pipe and Fittings: ASTM A 74, service class.
2. Gaskets: ASTM C 564, rubber.
3. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

B. Ductile-Iron Pipe and Fittings:

1. Push-on-Joint Piping:

a. Pipe: AWWA C151 ANSI A21.51, cement lined with bituminous coating per AWWA C104 ANSI 21.4 thickness class 50 52 55 56 per AWWA C150 ANSI A 21.50.
b. Standard Fittings: AWWA C110, ductile or gray iron.
c. Gaskets: AWWA C111 ANSI 21.11, rubber, of shape matching pipe and fittings.

2. Mechanical-Joint Piping:

a. Pipe: AWWA C151 ANSI A21.51, with bolt holes in bell.
b. Standard Fittings: AWWA C110, ductile or gray iron, with bolt holes in bell.
c. Compact Fittings: AWWA C153, with bolt holes in bells.
d. Glands: Cast or ductile iron; with bolt holes and high-strength, cast-iron or high-strength, low-alloy steel bolts and nuts.
e. Gaskets: AWWA C111, ANSI A21.11 rubber, of shape matching pipe, fittings, and glands.

C. PVC Pipe and Fittings:

1. PVC Type PSM Sewer Piping, 15-inch and smaller:

a. Pipe: ASTM D 3034, SDR 26 PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
b. Fittings: ASTM D 3034, PVC with bell ends.
c. Gaskets: ASTM F 477, elastomeric seals.

2. PVC Type PSM Sewer Piping,18-inch and larger:

    a. Pipe: ASTM F 679, T-1 wall thickness, bell and spigot for gasketed joints.
    b. Fittings: ASTM F679
    c. Gaskets: ASTM F 477, elastomeric seals.

3. PVC Pressure Piping:

    a. Pipe: AWWA C900, Class 150 Class 200 PVC pipe with bell-and spigot ends for gasketed joints.
    b. Fittings: AWWA C900, Class 150 Class 200 PVC pipe with bell ends.
    c. Gaskets: ASTM F 477, elastomeric seals.
    d. Ductile-Iron, Compact Fittings: AWWA C153, for push-on joints.
    e. Gaskets for Ductile-Iron Fittings: AWWA C111, rubber.

D. Non-Pressure-Type Transition Couplings:

1. Comply with ASTMC 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.
2. Sleeve Materials:

    a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
    b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 926, PVC.
    c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

E. Unshielded, Flexible Couplings: Elastomeric sleeve with stainless steel corrosion-resistant-metal tension band and tightening mechanism on each end.

F. Shielded, Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant stainless steel outer shield and corrosion-resistant stainless steel tension band and tightening mechanism on each end.

G. Pressure-Type Pipe Couplings:

1. Metal, bolted, mechanical joint sleeve, reducing or transition coupling, for joining underground pressure piping. Include 200-psig minimum pressure rating and ends of same sizes as piping to be joined.

    a. Gasket Material: Natural or synthetic rubber.
    b. Metal Component Finish: Corrosion-resistant coating or material.

H. Ductile-Iron Deflection Fittings: Compound coupling fitting with ball joint, flexing section, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include rating for 250-psig minimum working pressure and for up to 15 degrees of deflection.

I. Backwater Valves:

1. Cast-Iron Backwater Valves: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.
2. PVC Backwater Valves: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

J. Cleanouts:

1. Cast-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.

    a. Top-Loading Classifications: Heavy Duty.
    b. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

K. Encasement for Piping:

1. Standard: ASTM A 674 or AWWA C105.
2. Material: polyethylene film of 0.008-inch (0.20-mm) minimum thickness.
3. Form: Sheet or tube.
4. Color: Black or natural.

    a. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

5. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
6. Riser Sections: Of length to provide depth indicated.
7. Top Section: Eccentric-cone type unless flat-slab-top type is required; with top of cone of size that matches grade rings.
8. Section Joint Sealant: ASTM C 443 rubber gasket.
9. Resilient Pipe Connectors: ASTM C 923 rubber boot, cast or fitted into manhole walls, for each pipe connection. Boot shall result in a water tight connection conforming to the performance requirements of ASTM C 443.
10. Steps: Cast Iron steps conforming to the performance standards of ASTM C 478. Omit steps if total depth from floor of manhole to finished grade is less than 48. Cast or anchor steps into sidewalls at 16-inch intervals inches.
11. Grade (Adjusting) Rings: Reinforced-concrete rings, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Maximum per Drawings.

L. Manhole Frames and Covers: Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."

1. Material: ASTM A 48, Class 35 gray ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

M. Manhole-Cover Inserts: Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.

1. Type: Solid.

N. External Chimney Seal: Rubber sleeves shall be extruded from a high grade rubber compound meeting the applicable requirements of ASTM C923. Sleeves shall be double or triple pleated

with a minimum unexpanded vertical height of 8 inches, a minimum thickness of 3/16 inch, capable of expanding not less than 2 inches vertically when installed.

1. Screws, bolts and nuts: Stainless steel, ASTM F-593 and 594 Type 304.
2. Expansion Bands shall be16 gauge thickness, 1-3/4 inches wide and made of stainless steel meeting the requirements of ASTM A240, Type 304.

O. Protective Coatings: One- or two-coat, coal-tar epoxy; 15-mil minimum thickness, unless otherwise indicated; factory or field applied to the exterior and interior surfaces.

P. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
2. Invert Slope: 1 percent through manhole.
3. Benches: Concrete, sloped to drain into channel.
4. Slope: 8 percent.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 UTILITY LOCATION

A. Prior to any utility installation work commencing, Contractor shall call JULIE / one-call Illinois locate.

3.3 INSPECTIONS

A. Inspect and report on the interior of piping to determine whether line displacement or other damage has occurred. Inspection should occur after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Contractor shall submit separate report for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Contractor shall replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Contractor shall reinspect and repeat procedure until results are satisfactory.

3.4 PREPARATION

A. Sanitary sewer pipes:

1. Refer to Section 31 20 00, Earth Moving, requirements.
2. For all rigid pipe installations, the width of the trench at the top of the pipe shall not exceed the outside pipe diameter, including bells, plus the clear width on each side of the pipe as listed in Table 33 30 00-1:

Table 33 30 00-1	
Pipe Size (in)	Maximum Clear Width (in)
6 – 24	12
27 – 54	15
60 and over	24

3. For all non-rigid pipe installations, the minimum trench width shall be per the pipe manufacturer's recommendations, but at no time shall the width be less than that specified in ASTM D2321.
4. The length of trench or tunnel open at any one time shall conform to the limits approved by NU. In general, not more than 100 feet of trench shall be opened in advance of the completed work.
5. Where the sewer pipes are built upon the surface of the ground, the surface shall be grubbed and cleared of all stumps, grass, muck, or other vegetable matter.
6. Pipes shall not be constructed on frozen ground.

B. Manholes:

1. Refer to Section 31 20 00, Earth Moving requirements.

3.5 SANITARY SEWER PIPE INSTALLATION

A. Pipe shall be laid accurately to the line and grade designated on the Contract Drawings. Pipe shall be carefully centered so that when laid it will form a sewer with close fitting joints and a uniform invert.

B. All pipe shall begin and end with pipe ends as normally fabricated by the manufacturers. If field cutting pipe is required, cutting shall be performed by the use of tools or equipment that will provide a neat perpendicular cut with a beveled end without structural damage to the pipe wall or damage to coatings or fillers.

C. For Ductile Iron pipes:

1. Installation of ductile iron pipes shall conform to AWWA C600 unless otherwise noted on Contract Documents.
2. Remove and replace defective pieces.
3. Clear of all debris and dirt before installing and keep clean until accepted.
4. For push-on joints, clean bell of excess tar or other obstruction and wipe out before inserting next pipe spigot. Shove pipe into place until properly seated and hold securely until joint completed.

5. Temporary Plugs: When pipe laying not in progress, close open ends of pipe with temporary watertight plugs. If water in trench, do not remove plug until danger of water entering pipe passed.
6. Appurtenances: Set fittings and appurtenances as indicated on Contract Drawings.
7. Polyethylene wrapping: All buried ductile iron piping shall be polyethylene wrapped in accordance with pipe manufacturer's written instruction.

D. For PVC pipes:

1. Installation of all sizes of PVC pipe shall conform to ASTM D2321 unless otherwise noted on Contract Documents.
2. Factory made fittings must be used on all house connections or other connections. Bedding material for house connections (sanitary sewer house laterals) shall be equal to that of the main sewer. Risers in deep or unstable trenches shall be embedded in Class I materials only. Brackets or anchors shall be used to hold end caps or plugs in place on sanitary sewers and house laterals for the purpose of withstanding air testing pressures. Caps or plugs shall not be chemically-welded in place.
3. Remove and replace defective pieces.
4. Clear of all debris and dirt before installing and keep clean until accepted.

E. Joining pipes:

1. Before joining pipe with a coupling or bell end, all surfaces of the portions of the pipe to be joined and all surfaces of factory made jointing materials shall be clean and dry. Lubricants, primers, adhesives, solvents, bolts, etc. shall have been manufactured specifically for their intended use and shall be used as recommended by the pipe and/or pipe joint manufacturer. The jointing materials shall be fitted and adjusted or applied in such a manner as to obtain a close fitting joint and to obtain the degree of water tightness required.
2. Where the joining of pipes of different materials is required or approved, this work shall be done utilizing special adapters and couplers manufactured specifically for this purpose. The adapters and couplers shall be installed and securely attached to both pipe barrels according to manufacturers' recommendations.
3. As soon as possible after a joint is made, sufficient backfill materials shall be placed along each side of the pipe to support the pipe in its final position.
4. Where a pipe stub or run of pipe is to be temporarily terminated for future extension, the end of the pipe shall be sealed using an approved removable plug.

F. Where required by the Contract Drawings, flexible pipe shall be elongated by increasing its vertical diameter by five percent. The vertical elongation shall be maintained by horizontal wire struts that shall be left in place until the embankment is completed. The struts shall be removed as directed by NU.

G. Install Tracer Wire per 22 0000 "Common Work Results for Plumbing".

3.6 PRECAST CONCRETE MANHOLE INSTALLATION

A. CONTRACTOR shall submit to NU the following:

1. Manufacturer's name and address
2. Detailed shop drawings
3. Material specifications

B. Approval will be based on complete inspection of manufacturer's plant, method of manufacture, samples of materials to be used and inspection and testing of actual units to be used.

C. Excavation and backfill shall be in accordance with Section 31 20 00, Earth Moving.

D. The manhole bottom shall have a uniform bearing on a minimum of three inches of compacted #57 stone. Unsuitable material shall be removed and replaced as specified in Section 31 20 00, Earth Moving.

E. Adequate precautions shall be taken to prevent concrete and/or mortar from freezing. Any material incorporated in these items having a temperature of 40 degrees F or less shall not be placed until heated for a period sufficient to ensure a temperature of 50 degrees F to 80 degrees F throughout the entire mass of the material. Refer to Section 03 30 00, Cast-in-Place Concrete for additional requirements.

F. Standard manhole steps shall be set in the cones of precast manholes as indicated on the Contract Drawings. Where the ordinance grade is below the grade of an unimproved street, the last precast section shall be built to correspond with the ordinance grade, and the manhole casting and cover set to existing grade by use of a brick chimney and/or grade rings. The inside diameter of the precast section shall be not less than 26 inches nor more than 28 inches.

G. All manholes shall be thoroughly bonded or securely connected to the barrel of the sewer, and all connections with pipes neatly made without projections or voids. Unless otherwise noted on the Contract Drawings, all pipe connected to precast concrete manholes shall be sealed by use of a resilient manhole connector meeting the requirements of ASTM C923.

H. When manholes are completed, they shall be cleared of scaffolding, centering or forms and cleaned of surplus mortar or other foreign materials.

I. Manholes on sanitary sewers shall be tested by CONTRACTOR. Testing shall be performed in accordance with ASTM C1244.

3.7 REPAIR/RESTORATION

A. All surfaces affected by the construction work shall be permanently restored according to Section 01 74 00, Cleaning.

B. Before Final Completion, CONTRACTOR shall clean up the Work area in accordance with Section 01 74 00, Cleaning.

3.8 FIELD TESTING

A. General:

1. Remove all dirt, dust, oil, grease and other foreign material before initiating testing and acceptance procedures.
2. Perform leakage tests and measurements according to applicable standards.
3. Contractor shall test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
4. Contractor shall not enclose, cover, or put into service before inspection and approval.
5. Contractor shall test completed piping systems according to requirements of authorities having jurisdiction.

6. Contractor shall schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
7. Contractor shall submit separate report for each test.

A. Low Pressure Air Test:

1. All sewers, manholes or other structures and appurtenances which are to be used for sanitary sewage shall at all times be water tight and not permit the infiltration of water into, or the exfiltration of sewage therefrom. All such sewers shall be subject to an air leakage test to be performed by CONTRACTOR, under the direct observation of NU, unless otherwise noted. No request by CONTRACTOR for waiver of the test will be considered. The cost of all air-leakage testing shall be included in the unit price bid for the pipe.
2. The air test shall be performed within a reasonable time after completion of the sewer, or sections of a large portion of the sewer installation, before the Substantial Completion. CONTRACTOR shall verify that the sewers, manholes, etc. are substantially complete and reasonably clean prior to performing the test.
3. The testing procedure and criteria shall be in accordance with UNI-B-6, ASTM C828 (clay pipe – for pipe up to 42-inch diameter), C924 (concrete pipe and ductile iron pipe – for pipe sizes up to 24-inch diameter), or F1417 (plastic pipe), as applicable, and Table 33 30 00-2 which shows the minimum test time in minutes per 100 feet of pipe for each nominal pipe size for a 1.0 psi pressure drop from 3.5 to 2.5 psi. Testing procedures and criteria for PVC pipe shall be in accordance with ASTM D3212. All sanitary sewer manholes shall be tested in accordance with ASTM C1244.

Table 33 30 00-2

Nominal Pipe Size (in)	Time, T (min/100 ft)	Nominal Pipe Size (in)	Time, T (min/100 ft)
3	0.2	21	3.0
4	0.3	24	3.6
6	0.7	27	4.2
8	1.2	30	4.8
10	1.5	33	5.4
12	1.8	36	6.0
15	2.1	39	6.6
18	2.4	42	7.3

4. If the sewer fails to meet the minimum test times shown in Table 33 30 00-2, NU may order CONTRACTOR to expose and repair as required joints or any section in the test, backfill, and restore the surface. Such additional work shall be at CONTRACTOR's expense. Following the repairs, the sewer shall be retested until the minimum test time is equaled or exceeded.
5. In the event that the pipe fails to meet the test requirements, no payment to exceed 75 percent of the price bid for the pipe items shall be made until the sewer(s) satisfactorily passes the low pressure air test. Passing an air test or making repairs and passing an air test does not release CONTRACTOR from the responsibility of repair or replacement of sewers and appurtenances during the Warranty Period.

B. Individual Joint Test:

1. For CCFRPM pipe 48-inch diameter or larger, individual joint testing shall conform with ASTM C1103.

2. For reinforced concrete pipe 27-inch diameter or larger, individual joint testing shall conform with ASTM C1103.

C. Hydrostatic Tests: Contractor shall test sanitary sewerage according to requirements of authorities having jurisdiction and per Exfiltration and Infiltration Method Procedures per the Standard Specifications for Water and Sewer Construction in Illinois latest edition where no separate written standards exist.

D. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than 1-1/2 times the maximum system operating pressure, but not less than 150 psig.

E. Ductile-Iron Piping: Test according to AWWA C600, "Hydraulic Testing" Section.

F. PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.

G. Manholes: Perform hydraulic test according to ASTM C 969.

H. Leaks and loss in test pressure constitute defects that must be repaired.

I. Deflection Tests:

1. All sewers constructed using non-rigid pipe materials shall be subject to a pipe deflection test, regardless of the pipe stiffness, to be performed by CONTRACTOR, under the direct supervision of NU. No request by CONTRACTOR for waiver of the test will be considered. The cost of performing the deflection testing shall be included in the unit price bid for the pipe.
2. The deflection test will be performed at the end of the Warranty Period before release of the retainer or bond.
3. The test shall consist of pulling a mandrel (Go/No Go) device through the sewer by hand. No mechanical pulling devices shall be used. The mandrel shall be either the full circle or 9-arm type and conform to the dimensions noted in Table 33 30 00-3. No sewer will be accepted if the pipe deflection at any point is in excess of 5 percent of its average inside diameter as noted in Table 33 30 00-3, where T-1 equals Cell Classification 12454C and T-2 equals Cell Classification 12364C.

Table 33 30 00-3

	ASTM D-3034		ASTM D-2680		ASTM F-679	
Minimal Pipe Size (in)	Average I.D. (in)	5% Deflec-tion Mandrel (in)	Average I.D. (in)	5% Deflec-tion Mandrel (in)	Average I.D. (in)	5% Deflec-tion Mandrel (in)
6	5.893	5.598				
8	7.891	7.496	7.75	7.35		
10	9.864	9.371	9.75	9.25		
12	11.737	11.150	11.75	11.16		
15	14.374	13.655	14.75	14.01		
					T-1	
18					18.165	17.257
21					21.415	20.344

24					24.092	22.887
27					27.152	25.794
					T-2	
18					18.202	17.292
21					21.459	20.386
24					24.142	22.935
27					27.208	25.848

4. All portions of sewer found to exceed this limit shall be replaced or repaired by CONTRACTOR promptly in a manner satisfactory to NU. After a period of at least 60 days after backfilling the repaired area(s), the sewer shall again be tested for deflection. This procedure shall be repeated as necessary until the maximum pipe deflection is 5 percent or less. CONTRACTOR shall bear the total cost of all repairs or replacement, including surface restoration in accordance with Section 01 74 00, Cleaning.

J. Closed Caption Television (CCTV) Inspection:

1. All sewers, manholes, inlets and other appurtenances shall be subject to CCTV and visual inspections, to be performed by CONTRACTOR, prior to Substantial Completion of the sewer items. No request by CONTRACTOR for waiver of the inspections will be considered.
2. The CCTV inspections shall be performed after completion of the sewer items, before the Substantial Completion and release of the retainer or bond. CONTRACTOR shall verify that the sewers and manholes are substantially complete and reasonably clean prior to performing the inspection.
3. CCTV inspections shall be performed in accordance with National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), latest edition.
4. All pipe, manholes, and appurtenances found to be defective shall be replaced or repaired by CONTRACTOR promptly in a manner satisfactory to NU. CONTRACTOR shall bear the total cost of all repairs or replacement, including surface restoration.
5. Passing the CCTV inspection or making repairs and passing the CCTV inspection does not release CONTRACTOR from the responsibility of repair or replacement of sewers and appurtenances during the Warranty Period.
6. Submit the following information to the City prior to Substantial Completion:

    a. Database file with inspection event and defect records in Microsoft Access (.MDB) (Granite native export database, PACP 4.2 schema-compliant database, or accepted equal)
    b. Video file: MPEG (.mpg) or Windows Media file (.wmv). One video file per pipe inspection.
    c. Inspection report: One report in Adobe Acrobat PDF format per pipe inspection. Report should include:

        1) Inspection header info (who, what, where, when)
        2) Defect log
        3) Photos of defects

    d. Defect photos: screen captures from the video (.jpg)
    e. Use the “Asset IDs” provided in the plans when referencing “start manhole,” “end manhole,” and “pipe segment” in the inspection database and filenames.

3.9 FIELD PAINTING/COATINGS

A. Repair any shop painting/coatings damaged during storage or installation to NU's satisfaction.

3.10 ADJUSTING

A. Coordinate with NU for any field adjustments. NU reserves the right to reject any field adjustments.

3.11 PROTECTION

A. Protect sanitary sewers from damage throughout storage, installation, testing, and Final Completion.

3.12 REPLACEMENT

A. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 33 3000