

ADDENDUM NO. 3
FRIAR'S BRANCH BASIN IMPROVEMENTS
CONTRACT NO. W-12-029-201

The following additions/changes shall be made to the Project Drawings:

I. Sheet Revisions

Revise CU001, CU002, and CU003 as indicated on the attached revised sheets.

II. Sheet Additions

Add sheets CU270 through CU286, CU615, and CU626 as attached.

The following additions/changes shall be made to the Project Manual:

I. Table of Contents (00 01 10)

Replace section with the attached revised table of contents.

II. Advertisement for Bids (00 11 16)

Replace section with the attached revised advertisement for bids.

Add the following organization to the plans holders list:

AGC of East Tennessee
101 West 21st Street
Chattanooga, TN 37408
423-267-1111

III. DBE Guidance Document

Append the attached Certified Disadvantaged Business Enterprises (DBE) List to the Project Manual. Remove DBE Form 6100-2, 6100-3, and 6100-4.

IV. Bid Form (00 41 00)

Revise as shown in the attached bid form.

V. Retainage TCAs

Replace the Retainage TCAs with the attached updated Retainage TCAs.

VI. Contractor Affidavit Regarding American Iron and Steel (AIS) (00 81 10)

Append the attached waiver request checklist and implementation and waiver process to the Project Manual.

VII. Summary of Work (01 11 10)

Replace section with the attached revised summary of work.

VIII. Measurement and Payment (01 22 00)

Add Section 1.15 as shown in attached measurement and payment specification.

IX. Temporary Bypass Pumping (01 51 43)

Section 2.01, paragraph A: Replace first sentence with "Bypass pumping systems shall have sufficient capacity to pump from negligible flows to 15,400 gallons per minute (GPM) peak flow for the Friar's Branch Interceptor."

X. Erosion and Sedimentation Control (01 57 13)

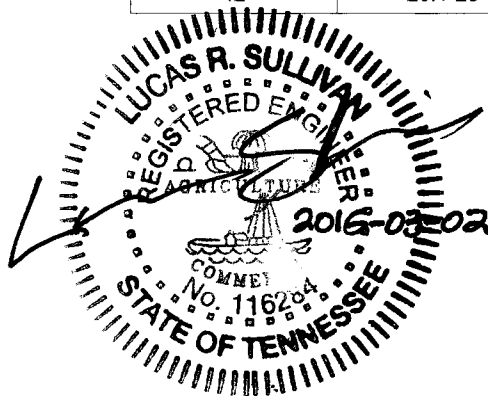
Remove Section 3.02, paragraph R.1.

XI. Cured-in-Place Pipe (33 01 30.73)

Section 2.04, paragraph 2: Replace the Minimum Acceptable CIPP Thickness table with the following table:

Pipe Diameter (Inches)	Depth to Invert (Feet)	Minimum Thickness (mm)
8	0-17	6.0
18	0-13.5	10.5
18	13.6-17	12.0
24	0-9.5	12.0
24	9.6-12.5	13.5
24	12.6-15.8	15.0
24	15.9-19.5	16.5
30	0-9.5	18.0
30	9.6-12	18.0
36	0-9.5	18.0
36	9.6-11.7	19.5
36	11.8-14	21.0
36	14.1-16	22.5
36	16.1-18	24.0
36	18.1-21	25.5
36	21.1-22.5	27.0
42	0-10	25.5
42	10.1-15	30.0
42	15.1-20	34.5
42	20.1-25	37.5

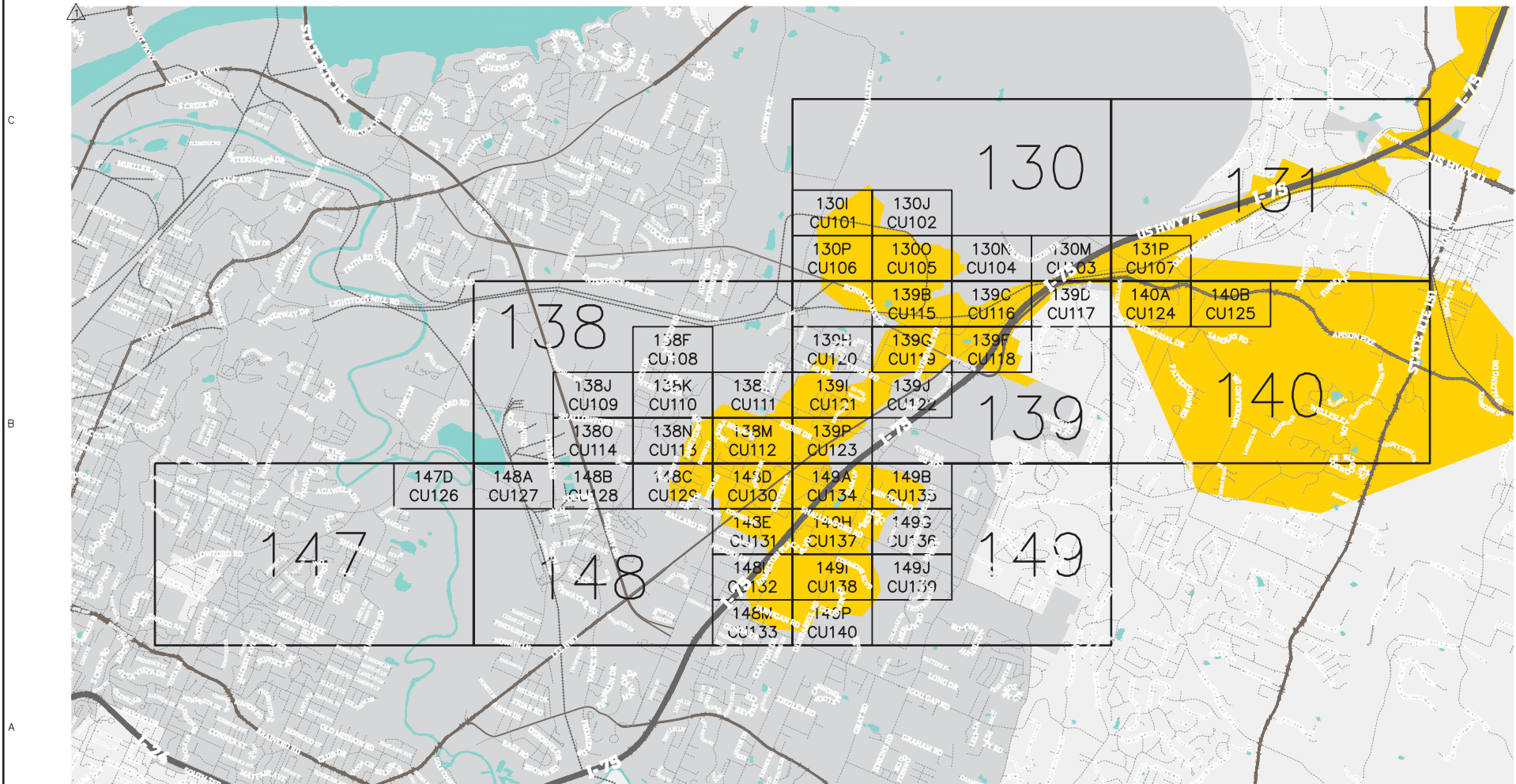
March 3, 2017



/s/ Justin C. Holland, Administrator
City of Chattanooga
Department of Public Works

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1		2		3		4		5		6		7			
SHEET INDEX				SHEET INDEX				SHEET INDEX				SHEET INDEX			
SHT. NO.	SHEET TITLE			SHT. NO.	SHEET TITLE			SHT. NO.	SHEET TITLE			SHT. NO.	SHEET TITLE		
—	COVER SHEET			CU132	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148L			CU236	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU503	CONCRETE CURB AND GUTTER (TYPE A)		
CU001	SHEET INDEX AND STANDARD DRAWINGS			CU133	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148M			CU237	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU504	CONCRETE CURB (RESIDENTIAL)		
CU002	DRAWING LEGEND AND STANDARD ABBREVIATIONS			CU134	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149A			CU238	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU505	CONCRETE CURB (RESIDENTIAL)		
CU003	GENERAL NOTES			CU135	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149B			CU239	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU506	PRIVATE DRIVEWAY APPROACH (RESIDENTIAL)		
CU101	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 130I			CU136	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149G			CU240	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU507	SANITARY AND STORM MANHOLE (PRECAST)		
CU102	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 130J			CU137	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149H			CU241	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU508	SANITARY AND STORM MANHOLE DETAILS		
CU103	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 130M			CU138	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149I			CU251	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 11			CU509	SANITARY AND STORM MANHOLE DETAILS		
CU104	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 130N			CU139	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149J			CU252	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 11			CU510	SANITARY AND STORM MANHOLE DETAILS		
CU105	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 130O			CU140	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 149P			CU253	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 11			CU511	SANITARY AND STORM MANHOLE DETAILS		
CU106	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 130P			CU201	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU254	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 11			CU512	SANITARY MANHOLE DROP CONNECTION		
CU107	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 131P			CU202	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU261	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU513	SANITARY SEWER SERVICE CONNECTION AND LATERAL DETAIL		
CU108	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138F			CU203	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU262	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU514	HIGHWAY CROSSING FOR SANITARY SEWER		
CU109	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138J			CU204	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU263	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU515	CREEK AND DITCH CROSSINGS FOR SANITARY SEWER		
CU110	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138K			CU205	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU264	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU516	TRENCH CHECK DAM		
CU111	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138L			CU206	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU265	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU517	TRENCH DETAILS AND BEDDING (SANITARY AND STORM SEWER)		
CU112	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138M			CU207	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU266	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU518	TRENCH DETAILS (CONCRETE PROTECTION)		
CU113	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138N			CU208	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU267	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 13			CU519	TRENCH DETAILS (CONCRETE PROTECTION)		
CU114	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 138O			CU209	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU271	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU520	SEWER SERVICE TAP (15—INCH OR LARGER SEWER MAIN)		
CU115	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139B			CU210	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU272	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU521	OIL SKIMMER		
CU116	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139C			CU211	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU273	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU522	STREETSCAPE UTILITY COLLAR DETAILS		
CU117	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139D			CU212	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU274	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU611	SANITARY SEWER PIPE REHABILITATION SCHEDULE —SUB—BASIN 8		
CU118	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139F			CU213	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU275	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU612	SANITARY SEWER PIPE REHABILITATION SCHEDULE —SUB—BASIN 9		
CU119	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139G			CU214	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU276	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU613	SANITARY SEWER PIPE REHABILITATION SCHEDULE —SUB—BASIN 11		
CU120	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139H			CU215	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU277	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU614	SANITARY SEWER PIPE REHABILITATION SCHEDULE —SUB—BASIN 13		
CU121	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139I			CU216	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU278	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU615	SANITARY SEWER PIPE REHABILITATION SCHEDULE —INTERCEPTOR		
CU122	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139J			CU217	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU279	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU621	SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE —SUB—BASIN 8		
CU123	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 139P			CU218	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU280	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU622	SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE —SUB—BASIN 8		
CU124	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 140A			CU219	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU281	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU623	SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE —SUB—BASIN 9		
CU125	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 140B			CU220	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU282	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU624	SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE —SUB—BASIN 11		
CU126	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 147D			CU221	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 8			CU283	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU625	SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE —SUB—BASIN 13		
CU127	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148A			CU231	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU284	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR			CU626	SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE —INTERCEPTOR		
CU128	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148B			CU232	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU285	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR						
CU129	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148C			CU233	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU286	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —INTERCEPTOR						
CU130	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148D			CU234	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU501	CONCRETE CURBS (6—INCH DETACHED AND GUTTER)						
CU131	SANITARY SEWER REHABILITATION PLAN —TAX MAP NO. 148E			CU235	SANITARY SEWER REHABILITATION LINE PLANS & PROFILES —SUB—BASIN 9			CU502	CONCRETE CURB AND GUTTER (TYPE A)						



A1 KEY MAP
SCALE: 1" = 40,000'



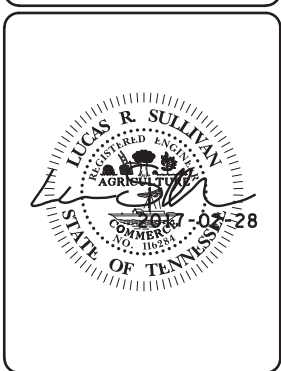
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City of Chattanooga
Department of Public Works
Waste Resources Division

SEAL
CHATTANOOGA
TENNESSEE

CONSENT DECREE PROGRAM
Friar's Branch Interceptor
and Basin Improvements

REV	DATE	DESCRIPTION
1	2017-02-28	ADDED INTERCEPTOR
CD	2016-11-30	CONST. DOCUMENTS

THIS LINE 1" IS 1" LONG WHEN PLOTTED FULL SCALE.		
THIS DRAWING MUST BE USED IN CONJUNCTION WITH APPLICABLE OR GOVERNING TECHNICAL SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS.		
PROJ. NO.	W-12-029-201	
DATE	2016-11-30	
DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVb
SHEET TITLE		

SHEET INDEX AND KEY MAP

SHEET NO. CU001

\\MINASEL01\CADD\PROJ\1735644--CHATTANOOGA\CAD\BASIN\90% DESIGN\1735644--WAT--CU003.DWG 2017-03-02 1:51:52 PM DEFAULT SETTINGS, PEN ASSIGNMENTS, PRINTER/PLOTTER COMMANDS, OVERLAY DRAFTING CONTROL DATA, REFERENCE FILE(S), LAYERS PLOTTED, PRODUCTION HOURS

	1	2	3	4	5	6	7	
	General Notes		General Notes (Cont.)		General Notes (Cont.)		General Notes (Cont.)	
	GRADING AND EXCAVATION							
E	1. WHERE SPECIFIED GRADING REQUIREMENTS ARE NOT SHOWN ON PLANS, CONTRACTOR SHALL GRADE TO DRAIN ALL AREAS WITHIN LIMITS OF CONSTRUCTION, OR OTHERWISE DISTURBED BY CONSTRUCTION, AND ALSO TO MATCH EXISTING, ADJACENT GROUND.		18. UTILITY OWNERS SHALL RESET AT THEIR OWN EXPENSE ALL POWER AND TELEPHONE LINES, UTILITY POLES, WATER AND GAS LINES, AND ALL OTHER FACILITIES, INCLUDING METERS, VALVES, PITS, ETC., CONFLICTING WITH PROPOSED IMPROVEMENTS WITHIN EXISTING RIGHT-OF-WAY. UTILITY OWNERS SHALL RELOCATE ALL POLES, METERS, VALVES, ETC. TO BEHIND SIDEWALK OR RIGHT-OF-WAY LINE.		43. CONTRACTOR SHALL PROVIDE PEDESTRIAN WALKWAYS THAT SEPARATE AND INSULATE PEDESTRIAN TRAFFIC FROM CONSTRUCTION SITE AND VEHICULAR TRAFFIC. WHERE POSSIBLE, CONTRACTOR SHALL PLACE WALKWAY ON SAME SIDE OF STREET AS CONSTRUCTION SITE. WHERE OVERHEAD DANGER EXISTS, CONTRACTOR SHALL PROVIDE COVERED WALKWAY.		68. CONTRACTOR SHALL COORDINATE ACCESSIBILITY WITH PROPERTY OWNERS AS REQUIRED FOR STAGING OF CONSTRUCTION. CONTRACTOR SHALL SUBMIT ACCESSIBILITY PLAN FOR APPROVAL BY ENGINEER.	
	2. CONTRACTOR SHALL PERFORM ALL NECESSARY STRIPPING OF SOIL ON SITE.				44. CONTRACTOR SHALL COORDINATE STREET CLOSURES AT LEAST TWO (2) WEEKS IN ADVANCE WITH CITY OF CHATTANOOGA POLICE DEPARTMENT, FIRE DEPARTMENT, SHERIFF'S DEPARTMENT, POST OFFICE, CITY TRAFFIC ENGINEER'S OFFICE, BOARD OF EDUCATION, AND ALL OTHER APPROPRIATE EMERGENCY RESPONSE AGENCIES. CONTRACTOR SHALL CONTACT ALL CONCERNED AUTHORITIES AND AGENCIES FORTY-EIGHT (48) HOURS PRIOR TO CLOSING STREETS OR OTHER TRAFFIC AREAS.		69. CONTRACTOR SHALL HAVE CITY'S DESIGN AND CONSTRUCTION STANDARDS, ONE SET OF APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS, AND ALL NECESSARY PERMITS IN HIS POSSESSION AT ALL TIMES.	
	3. CONTRACTOR SHALL SEED ALL NEWLY-GRADED EARTH AREAS NOT TO BE PAVED, RIP-RAPPED, OR STABILIZED IN ACCORDANCE WITH CITY OF CHATTANOOGA REGULATIONS. PRIOR TO SEEDING, CONTRACTOR SHALL PLACE FOUR-INCH (4") LAYER OF TOPSOIL IN ACCORDANCE WITH CITY OF CHATTANOOGA SPECIFICATIONS.		19. CONTRACTOR SHALL CONTACT ALL AFFECTED UTILITY OWNERS PRIOR TO SUBMITTING BID TO DETERMINE EXTENT OF DELAYS THAT UTILITY RELOCATIONS AND/OR ADJUSTMENTS HAVE UPON PROJECT SCHEDULING. ALL NEW AND TEMPORARY FACILITIES SHALL BE INSTALLED AROUND EXISTING UTILITY FACILITIES THAT SHALL REMAIN IN PLACE. CONTRACTOR SHALL RECEIVE NO ADDITIONAL COMPENSATION FOR DELAYS OR INCONVENIENCE CAUSED BY UTILITY ADJUSTMENTS.		45. CONTRACTOR SHALL REPLACE EXISTING PAVED DRIVEWAYS IN KIND TO TIE-IN POINT. EACH EXISTING UNPAVED DRIVEWAY SHALL RECEIVE FIVE-FEET (5') CONCRETE APRON BEHIND AND ADJACENT TO BACK CURB LINE AND CONTRACTOR SHALL THEN REPLACE DRIVEWAY IN KIND TO TIE-IN POINT.		70. CONTRACTOR SHALL WRITE AND DELIVER LETTERS TO EACH OF AFFECTED HOMEOWNERS AND BUSINESSES AT LEAST ONE (1) WEEK PRIOR TO CONSTRUCTION ACTIVITIES IMPACTING THEIR DAILY ACTIVITIES OR PROPERTY. LETTERS ARE INTENDED TO KEEP HOMEOWNERS AND BUSINESSES INFORMED OF CONSTRUCTION ACTIVITIES, SCHEDULING, AND INCONVENIENCES THAT MAY OCCUR. CONTRACTOR SHALL PROVIDE LETTERS IN BOTH ENGLISH AND SPANISH.	
	4. CONTRACTOR SHALL DISPOSE OF ALL UNSUITABLE AND/OR SURPLUS MATERIALS AS DIRECTED BY ENGINEER AT CONTRACTOR'S EXPENSE.		20. CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITY OWNERS AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO START OF CONSTRUCTION AND EXCAVATION NEAR UTILITIES OR INTERRUPTING ANY UTILITY SERVICES. CONTRACTOR SHALL ALSO NOTIFY AFFECTED UTILITY CUSTOMERS AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO INTERRUPTING CUSTOMERS' SERVICES. CONTRACTOR SHALL ADVISE RESIDENTS TO FILL THEIR TRAPS WITH WATER TO KEEP VAPORS AND/OR GASES FROM ENTERING HOMES. WHERE CONTRACTOR MIGHT INTERRUPT INDIVIDUAL SERVICES FOR MORE THAN TWELVE (12) HOURS, CONTRACTOR SHALL MAKE ARRANGEMENTS FOR PROVIDING TEMPORARY SERVICE SATISFACTORY TO THE AFFECTED CUSTOMERS. REPAIR OR REPLACEMENT OF UTILITY COMPONENTS SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF UTILITY OWNER. CONTRACTOR SHALL NOT RECEIVE SEPARATE PAYMENT FOR THESE ACTIVITIES AND CONTRACTOR SHALL INCLUDE COMPENSATION IN BID PRICE FOR OTHER CONSTRUCTION ITEMS.		46. BEFORE CONSTRUCTION BEGINS, CITY OF CHATTANOOGA DEPARTMENT OF PUBLIC WORKS SHALL SECURE ALL RIGHTS-OF-WAY AND EASEMENTS REQUIRED FOR COMPLETION OF PROJECT. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY PERMITS FOR CONSTRUCTION. EASEMENTS ARE RESUMED TO EXIST AT FIFTEEN FEET (15') ON EITHER SIDE OF CENTERLINE OF EXISTING SANITARY SEWERS IF NOT SHOWN ON PLANS. CONTRACTOR SHALL CONFINE CONSTRUCTION OPERATIONS WITHIN EXISTING EASEMENTS, RIGHT-OF-WAY, TEMPORARY CONSTRUCTION EASEMENTS, AND CITY PROPERTIES. IF CONTRACTOR DETERMINES ADDITIONAL SPACE IS REQUIRED ON PRIVATE PROPERTIES FOR CONSTRUCTION OPERATIONS, CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY EASEMENTS TO COMPLETE WORK. CONTRACTOR SHALL SUBMIT CONSTRUCTION ACCESS PLAN TO ENGINEER WITHIN THIRTY (30) DAYS OF NOTICE TO PROCEED.		71. DURING CLEANING OF SANITARY SEWER LINES, CONTRACTOR SHALL CAPTURE ALL DEBRIS OR RESIDUAL WASTE FROM CLEANING ACTIVITIES AT MANHOLE IMMEDIATELY DOWNSTREAM OF LINE(S) BEING CLEANED. CONTRACTOR SHALL NOT PERMIT MATERIAL WHICH MAY CAUSE PIPE BLOCKAGES, ACCUMULATIONS OF SAND IN WET WELLS, OR DAMAGE TO PUMPS TO PASS FROM MANHOLE SECTION TO MANHOLE SECTION. CONTRACTOR SHALL REMOVE AND DISPOSE OF RESIDUAL WASTES PROPERLY. UNDER NO CIRCUMSTANCES SHALL SEWAGE OR SOLIDS BE DUMPED INTO STREETS, CATCH BASINS, OR STORM DRAINS.	
	5. CONTRACTOR SHALL MAKE EXCAVATION ADJACENT TO PAVEMENT TO A NEAT LINE.		21. CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTIVE MEASURES TO SAFEGUARD EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION OF PROJECT. IF NECESSARY, CONTRACTOR SHALL FURNISH SPECIAL EQUIPMENT TO WORK AROUND UTILITIES. CONTRACTOR SHALL INCLUDE COSTS OF PROTECTING UTILITIES FROM DAMAGE AND FURNISHING SPECIAL EQUIPMENT IN BID PRICE FOR OTHER CONSTRUCTION ITEMS.		47. ENGINEER SHALL HAVE AUTHORITY TO DESIGNATE AND/OR LIMIT AREAS OF CONSTRUCTION.		72. CITY OF CHATTANOOGA TREE REMOVAL PERMIT AND ENDANGERED BAT FUNDING MAY BE REQUIRED IF TREES ARE REMOVED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PERMITTING AND FUNDING AT NO ADDITIONAL COST TO OWNER.	
	6. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ANY GROUNDWATER ENCOUNTERED DURING CONSTRUCTION OF ANY PORTION OF WORK IN ORDER TO ALLOW CONSTRUCTION OF IMPROVEMENTS SHOWN ON PLANS. CONTRACTOR SHALL PUMP, PIPE, REMOVE, AND DISPOSE OF GROUNDWATER IN A MANNER THAT DOES NOT CAUSE FLOODING OF EXISTING STREETS, EROSION ON ABUTTING PROPERTIES, OR WATER QUALITY DEGRADATIONS TO NEARBY WATER BODIES AND WETLANDS. CONTRACTOR SHALL NOT PLACE CONCRETE WHERE GROUNDWATER IS VISIBLE UNTIL GROUNDWATER TABLE HAS BEEN LOWERED BELOW PROPOSED IMPROVEMENTS. CONTRACTOR SHALL STABILIZE ANY UNSTABLE AREAS DUE TO GROUNDWATER AS DIRECTED BY CITY.		22. CONTRACTOR SHALL REPAIR ANY EXISTING STORM SEWER DAMAGED DURING CONSTRUCTION AS RAPIDLY AS POSSIBLE AND OWNER OF STORM SEWER FACILITY SHALL INSPECT REPAIRED FACILITY. ENGINEER SHALL DETERMINE WHETHER DAMAGE IS RESULT OF CONTRACTOR'S NEGLIGENCE OR OTHER UNAVOIDABLE CAUSE.		48. OWNER MAKES NO REPRESENTATIONS ABOUT SUB-SURFACE CONDITIONS THAT CONTRACTOR MAY ENCOUNTER WITHIN LIMITS OF PROJECT. CONTRACTOR IS RESPONSIBLE FOR VERIFYING CONDITIONS THROUGH ON-SITE INSPECTIONS, CORE DRILLINGS, OR OTHER METHODS. CONTRACTOR ASSUMES ALL RISK OF ENCOUNTERING AND CORRECTING UNFAVORABLE SUB-SURFACE CONDITIONS.			
D	EROSION/POLLUTION CONTROL		23. CONTRACTOR SHALL IMMEDIATELY NOTIFY UTILITY OWNER OF ANY SANITARY SEWER FACILITY DAMAGED DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR DAMAGED SANITARY SEWER FACILITY ACCORDING TO OWNER'S INSTRUCTIONS. ENGINEER SHALL DETERMINE WHETHER DAMAGE IS RESULT OF CONTRACTOR'S NEGLIGENCE OR OTHER UNAVOIDABLE CAUSE. ALL MANHOLE COMPONENTS REMOVED FOR ACCESS FOR CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY CONTRACTOR AT NO ADDITIONAL COST TO OWNER.		49. CONTRACTOR SHALL PROVIDE ALL FIELD LAYOUTS FOR APPROVAL BY ENGINEER.			
	7. CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO CONTROL EROSION AND WATER POLLUTION THROUGHOUT CONSTRUCTION PERIOD. CONTRACTOR SHALL PLACE ALL TEMPORARY EROSION CONTROL MEASURES BEFORE BEGINNING EARTH-MOVING OPERATIONS. CONTRACTOR SHALL HOLD CLEARING AND GRUBBING OPERATIONS TO A MINIMUM WIDTH NECESSARY TO ACCOMMODATE ROADWAY SLOPES. CONTRACTOR SHALL PROMPTLY STABILIZE EMBANKMENTS AND EXCAVATED AREAS TO MINIMIZE EROSION. CONTRACTOR SHALL USE BALED STRAW EROSION CHECKS AND SILT FENCING ALONG TOE OF FILL SLOPES, IN DITCHES, AND IN OTHER AREAS WHERE EROSION IS A PROBLEM AND SILT-LADEN RUNOFF MAY ENTER A STREAM OR ADJACENT PROPERTY.		24. CONTRACTOR SHALL FINISH ALL CUTS AND FILLS AND COMPACT FILLS PRIOR TO INSTALLATION OF SANITARY SEWER FACILITIES.		50. ALL SALVAGEABLE MATERIAL FROM EXISTING PIPING AND STRUCTURES SHALL REMAIN PROPERTY OF CITY OF CHATTANOOGA. CONTRACTOR SHALL CLEAN AND DELIVER MATERIAL TO OWNER AT LOCATION DESIGNATED BY ENGINEER.			
	8. CONTRACTOR SHALL LOCATE AND TREAT ANY STOCKPILED SOIL OR FILL MATERIAL IN A MANNER TO PREVENT IT FROM ENTERING STREAMS. CONTRACTOR SHALL NOT DISCHARGE EXCAVATED MATERIAL INTO STREAMS. CONTRACTOR SHALL DISPOSE OF ALL EXCAVATED MATERIAL IN LOCATION APPROVED BY ENGINEER AND ABOVE NORMAL HIGH-WATER ELEVATION.		25. ALL SANITARY SEWER CONSTRUCTION MUST BE PERFORMED BY LICENSED MUNICIPAL UTILITY CONTRACTOR (CLASSIFICATION MU).		51. CONTRACTOR SHALL REMOVE ALL UNSUITABLE MATERIAL AS DETERMINED BY ENGINEER OR THROUGH TESTING AND REPLACE WITH SUITABLE MATERIAL.			
	9. CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING EROSION CONTROL MEASURES IN ACCORDANCE WITH CITY OF CHATTANOOGA DEPARTMENT OF PUBLIC WORKS ENGINEERING/STORMWATER DIVISION BEST MANAGEMENT PRACTICES MANUAL, DEPARTMENT OF PUBLIC WORKS CITY ORDINANCE 9942, AS AMENDED, AND TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (T.D.E.C.) TENNESSEE EROSION AND SEDIMENT CONTROL HANDBOOK FOR ALL DRAINAGE PATTERNS CREATED AT VARIOUS STAGES OF CONSTRUCTION.		26. JURISDICTIONAL ENGINEER MUST APPROVE ALL TRANSITION JOINTS ON SANITARY SEWER PIPES OF DIFFERENT MATERIALS. CONTRACTOR SHALL USE APPROVED FITTINGS AND/OR ADAPTERS FOR JOINTS.		52. CONTRACTOR SHALL PROMPTLY REPAIR ANY AND ALL DAMAGES OCCURRING TO ANY EXISTING UTILITY ELEMENTS AND PLANT MATERIAL OR HARDSCAPE ELEMENTS TO REMAIN (E.G., CURBS, ROADS, WALLS, FENCES, TREES, SHRUBS, ETC.) OUTSIDE LIMITS OF PROJECT AS A RESULT OF CONSTRUCTION AT NO EXPENSE TO OWNER.			
C	10. EROSION CONTROL MEASURES DETAILED HEREON SHALL BE CONTINUED UNTIL PERMANENT VEGETATION IS SUFFICIENTLY ESTABLISHED ON PLANTED GRADES AND SLOPES TO BE AN EFFECTIVE EROSION DETERRENT. SEDIMENT REMOVED FROM CONTROL STRUCTURES SHALL BE EVENLY DISTRIBUTED UPSTREAM OF EROSION CONTROL MEASURES OR DISPOSED OF OFF-SITE. DISPOSED SEDIMENT SHALL BE PERMANENTLY GRASSED. CONTRACTOR SHALL PROVIDE PERMANENT GRASSING OF ALL CONTRACTOR-DISTURBED AREAS NOT COVERED BY PAVEMENT, STRUCTURES, STONE AGGREGATE, OR SIMILAR FEATURES.		27. CONTRACTOR SHALL INSTALL ALL PROPOSED SANITARY SEWER PIPES AND MANHOLES IN ACCORDANCE WITH CITY OF CHATTANOOGA STANDARD DETAILS AND SPECIFICATIONS.		53. CONTRACTOR SHALL MAINTAIN ALL EXISTING COMBINED CURB AND GUTTERS WHERE APPLICABLE.			
	11. CONTRACTOR SHALL PROVIDE TEMPORARY EROSION AND WATER CONTROL MEASURES (SUCH AS BERMS, SEDIMENT BASINS, SLOPE DRAINS, HAY BALES, AND SILT FENCES) AS DIRECTED BY ENGINEER. CONTRACTOR SHALL COORDINATE TEMPORARY MEASURES WITH PERMANENT EROSION CONTROL FEATURES TO ASSURE ECONOMICAL, EFFECTIVE, AND CONTINUOUS EROSION CONTROL THROUGHOUT PROJECT.		28. CONTRACTOR SHALL NOTIFY CITY OF CHATTANOOGA INSPECTOR AT +1 (423) 757-5120 PRIOR TO START OF SANITARY SEWER CONSTRUCTION.		54. CONTRACTOR SHALL REMOVE ALL ABANDONED STRUCTURES (E.G., CATCH BASINS, MANHOLES, FOUNDATIONS, ETC.), UTILITY FACILITIES, AND SIMILAR ITEMS WITHIN LIMITS OF PAVING TO A MINIMUM OF TWO FEET (2') BELOW TOP OF SUBGRADE. CONTRACTOR SHALL FILL REMAINING VOIDS WITH COMPACTED, CRUSHED STONE TO TOP OF SUBGRADE.			
	12. CONTRACTOR SHALL NOT USE EARTH OR OTHER ERODIBLE MATERIAL TO DIVERT STREAMFLOW OR CONSTRUCT COFFERDAMS. CONTRACTOR MAY USE CLEAN-CUT ROCK WITH FINES OR STEEL SHEETING FOR COFFERDAMS. CONTRACTOR SHALL PUMP WATER OR SEDIMENT INTO SEDIMENT BASINS ON BANKS OF STREAM.		29. CONTRACTOR SHALL INSTALL DUCTILE IRON (D.I.) PIPE FOR SANITARY SEWER LINES CROSSING WITHIN EIGHTEEN INCHES (18") ABOVE OR BELOW A STORM SEWER FACILITY. IF POLYVINYL CHLORIDE (P.V.C) IS SPECIFIED FOR SANITARY SEWER LINE, CONTRACTOR SHALL PROVIDE CONCRETE PROTECTION.		55. CONTRACTOR SHALL NOT REMOVE ANY FENCE OTHER THAN THAT NECESSARY FOR CONSTRUCTION OF PROJECT OR RELATED APPURTENANCES. CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AND REPLACE IN KIND ANY FENCE REMOVED FOR WORK. CONTRACTOR SHALL PROVIDE ADDITIONAL TEMPORARY SECURITY FENCING AS NEEDED TO MAINTAIN SECURITY IN PROJECT AREA AT ALL TIMES.			
	13. PRIOR TO ANY CONSTRUCTION, CONTRACTOR SHALL CONSTRUCT A STABILIZED CONSTRUCTION ENTRANCE AT EACH ENTRY TO OR EXIT FROM WORK AREAS LOCATED ADJACENT TO PUBLIC RIGHTS-OF-WAY (IF NEEDED AND IF SPACE IS AVAILABLE). CONTRACTOR SHALL MAINTAIN CONSTRUCTION EXITS IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD INTO PUBLIC RIGHTS-OF-WAY. IMMEDIATELY AFTER ESTABLISHMENT OF CONSTRUCTION EXITS, CONTRACTOR SHALL INSTALL ALL PERIMETER EROSION CONTROL DEVICES. CONTRACTOR SHALL KEEP ROADS AND DRIVES FREE OF DIRT AND DEBRIS AT ALL TIMES.		30. CONTRACTOR SHALL ENSURE WATER SERVICES CROSSING SANITARY SEWER LINES ARE AT LEAST EIGHTEEN INCHES (18") ABOVE TOP OF SEWER LINE WITHIN TEN FEET (10') OF POINT OF CROSSING. CONTRACTOR SHALL USE DUCTILE IRON (D.I.) PIPE AND MECHANICAL JOINTS FOR SANITARY SEWER LINE WITHIN TEN FEET (10') OF WATER SERVICE CROSSING.		56. CONTRACTOR SHALL PROVIDE NOTICE TO AFFECTED PROPERTY OWNERS ONE (1) WEEK IN ADVANCE OF CUTTING FENCES.			
B	14. CONTRACTOR SHALL PROVIDE ALL TIMBER MATS REQUIRED FOR ACCESS AT NO ADDITIONAL COST TO OWNER.		31. CONTRACTOR SHALL PROVIDE ANCHOR COLLARS FOR SANITARY SEWER LINES WITH SLOPES EXCEEDING EIGHTEEN PERCENT (18%) WITH SPACING AS SPECIFIED BY THE STATE OF TENNESSEE DESIGN CRITERIA FOR SEWAGE WORKS.		57. CONTRACTOR SHALL PROVIDE RECORD DRAWINGS OF PROJECT WITHIN THIRTY (30) DAYS AFTER SUBSTANTIAL COMPLETION OF WORK, TO BE DEFINED BY JURISDICTIONAL ENGINEER. ENGINEER RESERVES RIGHT TO WITHOLD RETAINER UNTIL RECEIPT OF RECORD DRAWINGS.			
	15. ALL EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE CHECKED DAILY AND ANY DEFICIENCIES NOTED WILL BE CORRECTED BY THE END OF EACH DAY. ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY AFTER ON-SITE INSPECTION BY ISSUING AUTHORITY. MAINTENANCE OF ALL SOIL AND EROSION CONTROL MEASURES AND PRACTICES, WHETHER TEMPORARY OR PERMANENT, SHALL BE AT ALL TIMES RESPONSIBILITY OF CONTRACTOR.		32. SERVICE LATERALS EXTENDING TO PROPERTY LINES SHALL EACH HAVE CLEANOUT LOCATED AT PROPERTY LINE.		58. IN EVENT OF CONFLICT BETWEEN THESE GENERAL NOTES, CONTRACT DRAWINGS, AND/OR SPECIFICATIONS, MOST RESTRICTIVE INTERPRETATION SHALL PREVAIL. CONTRACTOR SHALL OBTAIN FROM ENGINEER ANY CLARIFICATION OR INTERPRETATION OF GENERAL NOTES, CONTRACT DRAWINGS, AND/OR SPECIFICATIONS IN WRITING AND IN ADVANCE OF BEGINNING OF CONSTRUCTION.			
	16. CONTRACTOR SHALL ACCOMPLISH ALL VEGETATIVE STABILIZATION AS SOON AS CONSTRUCTION PERMITS. ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN FOURTEEN (14) DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING. CONTRACTOR SHALL PROVIDE PERMANENT GRASSING OF ALL DISTURBED AREAS. CONTRACTOR SHALL FOLLOW T.D.O.T., CITY, AND COUNTY VEGETATIVE AND PLANTING SCHEDULE GUIDELINES AND PROVIDE GRASSING TO MATCH EXISTING LAWN TYPE AND CONDITIONS.		33. CONTRACTOR SHALL CORE AND BOOT MANHOLES WITH NEW CONNECTIONS AND REFORM INVERTS.		59. CONTRACTOR SHALL USE CLASS "A" (4,000 P.S.I.) CONCRETE UNLESS OTHERWISE NOTED. CLASS "B" CONCRETE SHALL BE 3,000 P.S.I.			
	UTILITIES		34. CONTRACTOR SHALL RAISE TOPS OF ALL MANHOLES TO AT LEAST FLUSH WITH OR ABOVE FINISHED GRADES.		60. CONTRACTOR SHALL REPAIR PROPERLY AND IMMEDIATELY ANY DAMAGE INCURRED TO ANY EXISTING UTILITY ELEMENTS AND PLANT MATERIAL OR HARDSCAPE ELEMENTS TO REMAIN (E.G., CURBS, ROADS, WALLS, FENCES, TREES, SHRUBS, ETC.) AT NO EXPENSE TO OWNER.			
A	17. LOCATIONS OF EXISTING PUBLIC AND/OR PRIVATE FACILITIES AND UTILITIES AS SHOWN ON PLANS ARE TAKEN FROM EXISTING DATASETS AND ARE APPROXIMATE ONLY. TOPOGRAPHICAL AND SURFACE PROFILE INFORMATION IS APPROXIMATE AND NOT GUARANTEED. AERIAL IMAGERY PROVIDED IS FOR REFERENCE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD-VERIFYING LOCATION OF AND PROTECTING ALL EXISTING UTILITIES, INCLUDING THOSE NOT SHOWN OR SHOWN INCORRECTLY ON PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING ALL UNDERGROUND UTILITIES LOCATED AND MARKED PRIOR TO BEGINNING OF CONSTRUCTION. CONTACT LOCAL UNDERGROUND UTILITIES PROTECTION CENTER AT (800) 351-1111 FOR LOCATION ASSISTANCE. CONTRACTOR SHALL MAINTAIN ALL VERTICAL CLEARANCES AND UTILITY PROTECTION BETWEEN CROSSING CITY FACILITIES IN STRICT CONFORMANCE WITH CITY'S DESIGN AND CONSTRUCTION STANDARDS AND STANDARD DETAILS.		35. CONTRACTOR SHALL USE CONCRETE RINGS ("DOUGHNUTS") TO RAISE MANHOLES EIGHT INCHES (8") OR LESS. MANHOLES RAISED HIGHER THAN EIGHT INCHES (8") SHALL REQUIRE REMOVAL OF CONE SECTION AND PLACEMENT OF APPROPRIATELY-SIZED MANHOLE RISER. CONTRACTOR SHALL EITHER REINSTALL OR REPLACE CONE SECTION DEPENDING ON CONDITION.		61. COORDINATE DATA ON PLANS BASED ON NORTH AMERICAN DATUM (N.A.D.) OF 1983, TENNESSEE (HORIZONTAL DATA) AND NORTH AMERICAN VERTICAL DATUM (N.A.V.D.) OF 1988 (VERTICAL DATA).			
			36. CONTRACTOR SHALL TEST AND APPROVE ALL SEWER LINES AFTER INSTALLATION OF ALL OTHER UTILITIES.		62. CONTRACTOR SHALL VERIFY PROJECT LIMITS PRIOR TO COMMENCING WORK.			
			37. CONTRACTOR SHALL SUBMIT ALL PUBLIC SEWER EASEMENTS OBTAINED TO JURISDICTIONAL WASTEWATER AUTHORITY WITHIN THIRTY (30) DAYS OF COMPLETION OF PROJECT.		63. CONTRACTOR SHALL FIELD-VERIFY ALL LOCATIONS AND DISTANCES FOR POINT REPAIRS AND SERVICE LATERAL REINSTATEMENTS.			
			38. CONTRACTOR SHALL PROVIDE CLOSED-CIRCUIT TELEVISION (C.C.T.V.) INSPECTION OF ALL NEWLY-CONSTRUCTED SANITARY SEWERS AT REQUEST OF JURISDICTIONAL ENGINEER.		64. CONTRACTOR SHALL STOP CONSTRUCTION ACTIVITIES AND IMMEDIATELY NOTIFY OWNER UPON DISCOVERY OF DISCREPANCIES BETWEEN EXISTING SITE CONDITIONS AND CONDITIONS SHOWN IN PLANS. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATION.			
			TRAFFIC		65. CONTRACTOR SHALL USE DESIGNATED STAGING AREAS FOR CONTRACTOR'S EMPLOYEE PARKING, CONTRACTOR'S TRAILERS, AND ON-SITE STORAGE OF PROJECT MATERIALS ONLY.			
			39. CONTRACTOR SHALL SUBMIT PROJECT SCHEDULE TO CITY OF CHATTANOOGA WITHIN TEN (10) DAYS OF NOTICE OF AWARD OF PROJECT. CITY OF CHATTANOOGA TRAFFIC ENGINEERING DEPARTMENT SHALL PROVIDE WORK ZONE TRAFFIC CONTROL PLAN TO CONTRACTOR WITHIN FIVE (5) DAYS OF RECEIPT OF PROJECT SCHEDULE.		66. CONTRACTOR SHALL PROVIDE TEMPORARY SECURITY FENCING AS NECESSARY TO MAINTAIN SECURITY IN PROJECT AREA AT ALL TIMES.			
			40. CONTRACTOR SHALL MAINTAIN TRAFFIC AND PROVIDE TEMPORARY TRAFFIC CONTROL DEVICES IN COMPLIANCE WITH FEDERAL HIGHWAY ADMINISTRATION (F.H.W.A.) MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) DURING CONSTRUCTION. CONTRACTOR SHALL ALSO FURNISH AND INSTALL TEMPORARY TRAFFIC SIGNS AND PAVEMENT MARKINGS AS REQUIRED BY M.U.T.C.D. AND CITY OF CHATTANOOGA TRAFFIC ENGINEERING DEPARTMENT.		67. CONTRACTOR SHALL OBTAIN A STREET CUT PERMIT FROM RESPECTIVE OWNER FOR EACH LOCATION REQUIRING WORK ON PUBLIC ROADWAY.			
			41. CITY OF CHATTANOOGA SHALL PLACE PERMANENT TRAFFIC SIGNS AND PAVEMENT MARKINGS UNLESS OTHERWISE INDICATED ON PLANS.					
			42. CONTRACTOR SHALL MAINTAIN ALL BUSINESS, VEHICULAR, AND PEDESTRIAN ENTRANCES DURING CONSTRUCTION.					

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SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 138F

SCALE: 1" = 150'

TAX MAP NO. 138K – SEE SHEET NO. CU110



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City of Chattanooga
Department of Public Works
Waste Resources Division
CONSENT DECREE PROGRAM
Friar's Branch Interceptor
and Basin Improvements

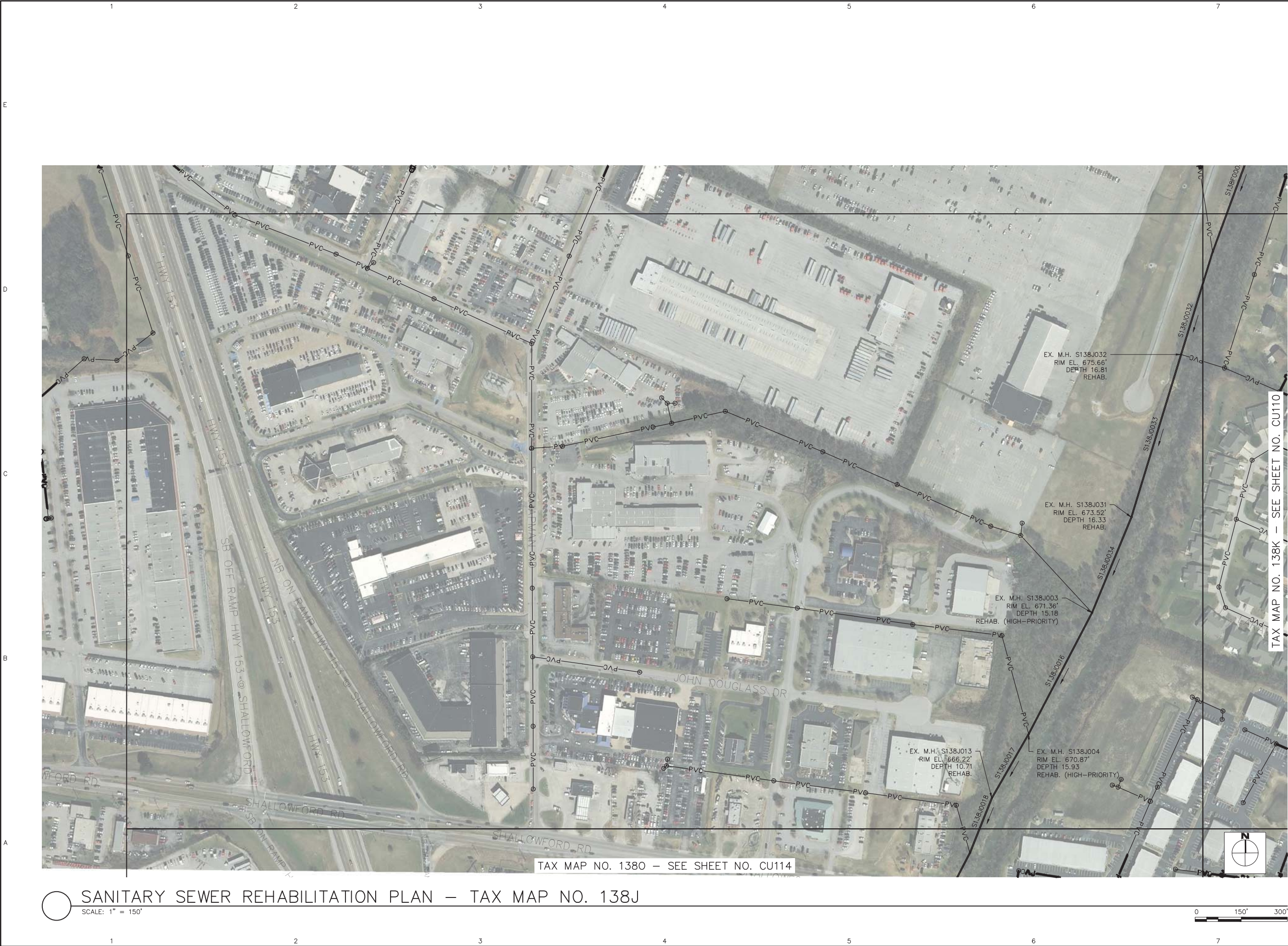


REV	DATE	DESCRIPTION
1	2017-02-28	ADDED INTERCEPTOR
CD	2016-11-30	CONST. DOCUMENTS

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DATE	2017-02-28	
DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVb

SHEET TITLE	
SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 138F	
SHEET NO.	CU108

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SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 138J

SCALE: 1" = 150'

TAX MAP NO. 1380 – SEE SHEET NO. CU114

TAX MAP NO. 138K – SEE SHEET NO. CU110

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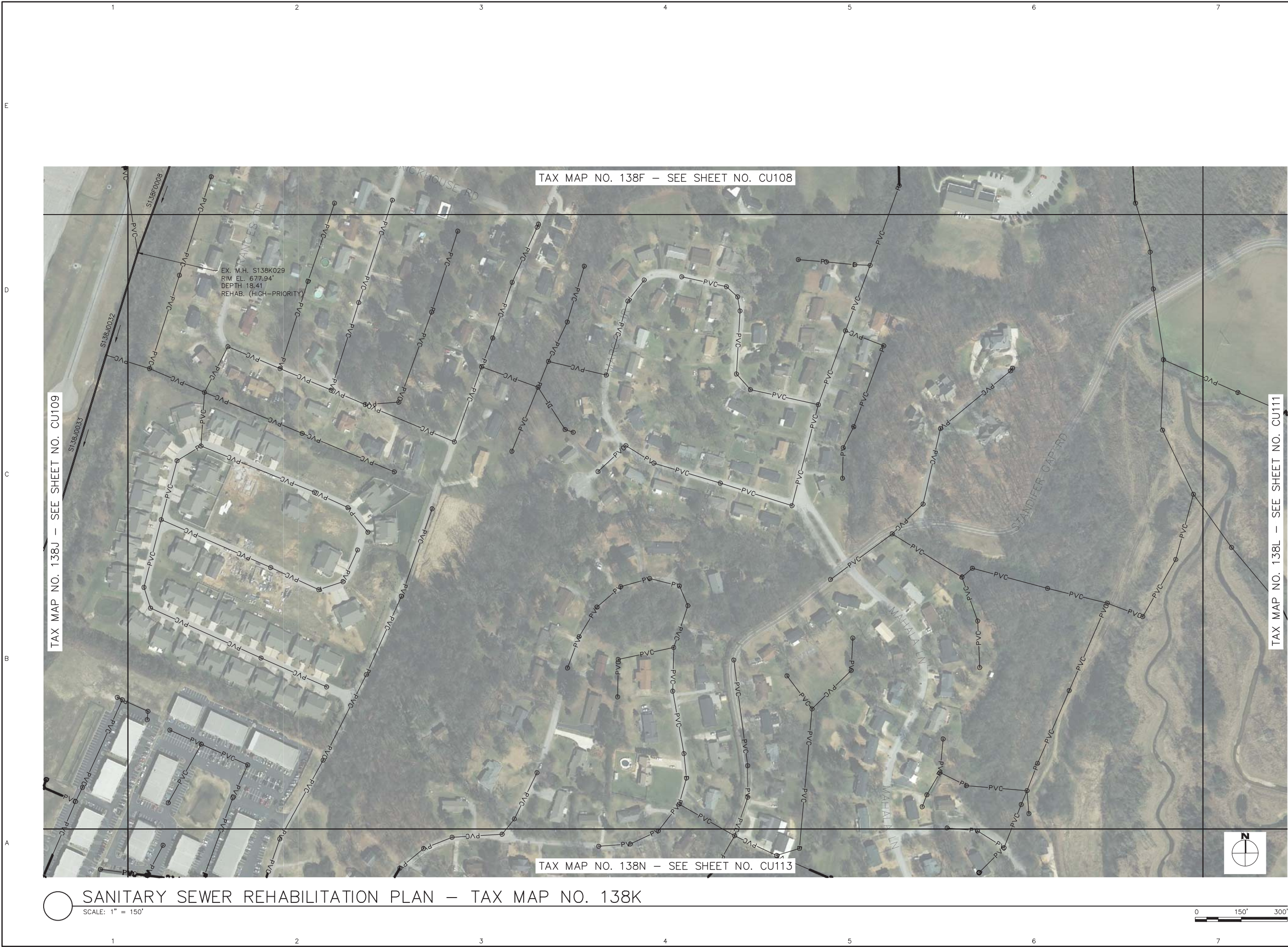
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SHEET TITLE
SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 138J

SHEET NO. CU109

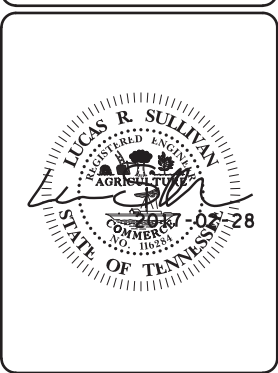
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SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 138K

SCALE: 1" = 150'

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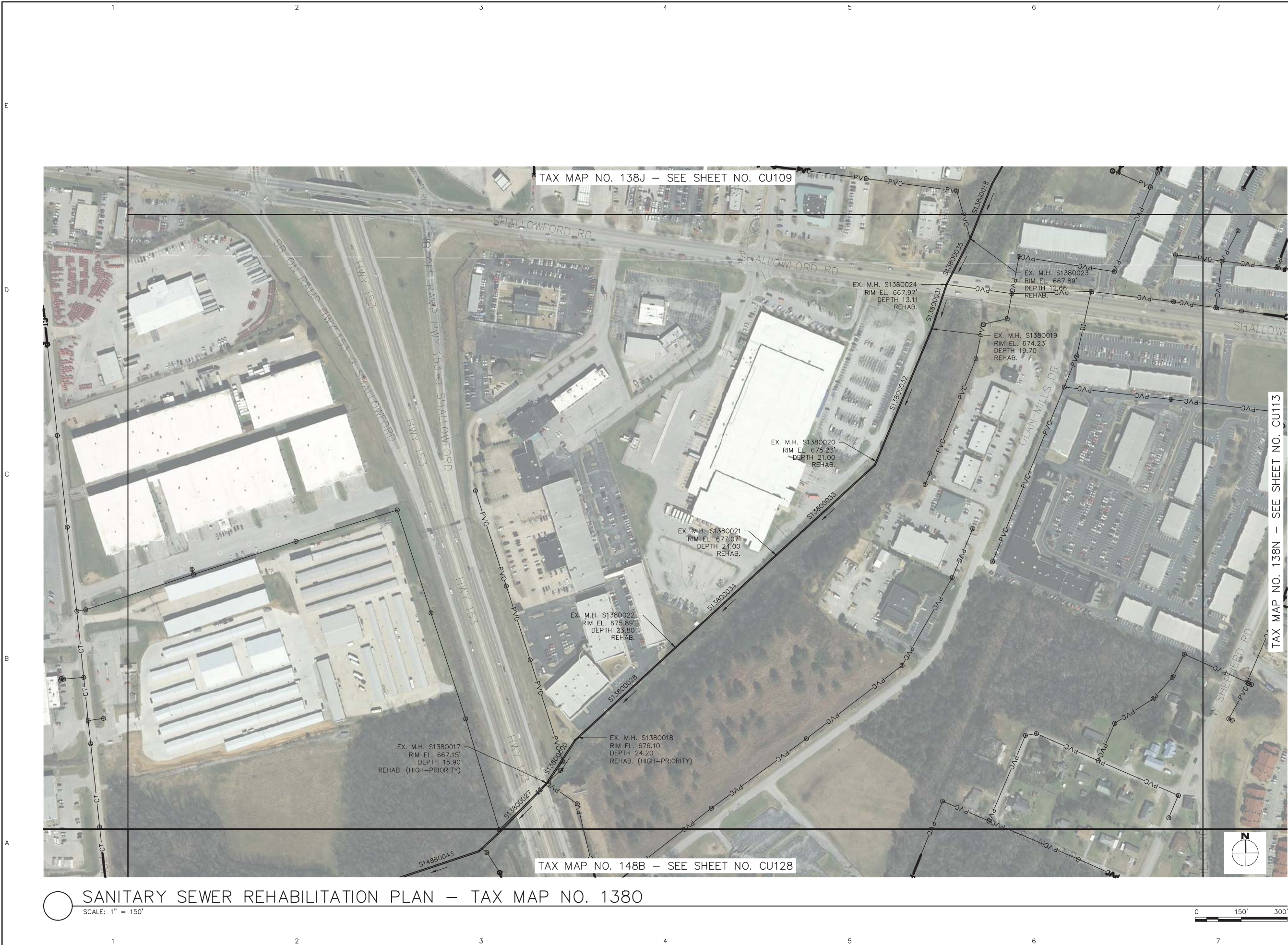
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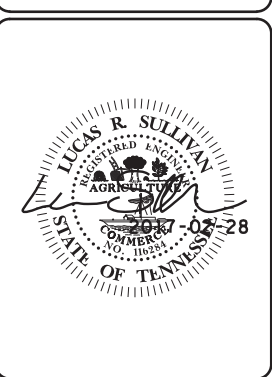
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SHEET TITLE	
SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 138K	
SHEET NO.	CU110

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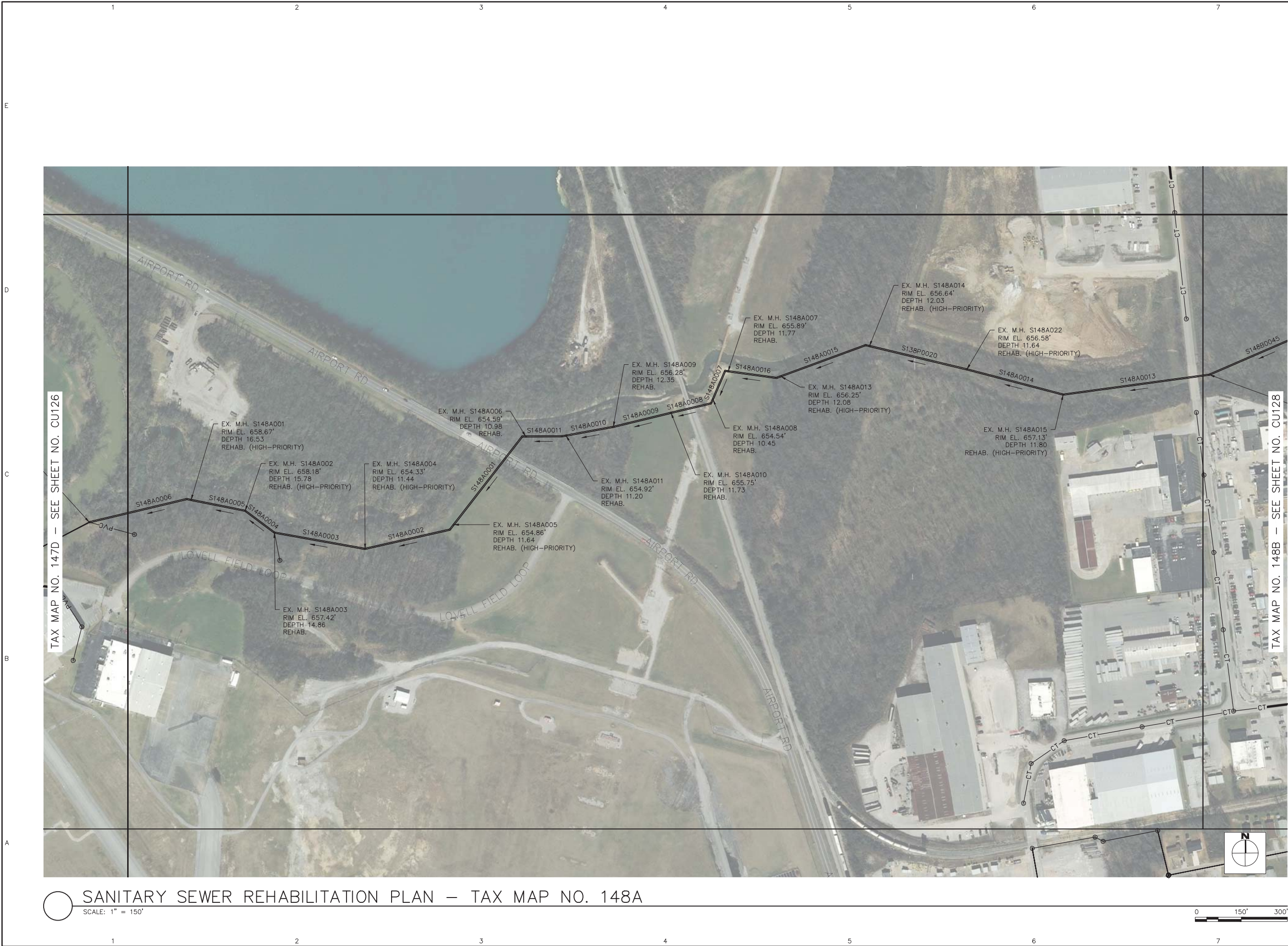
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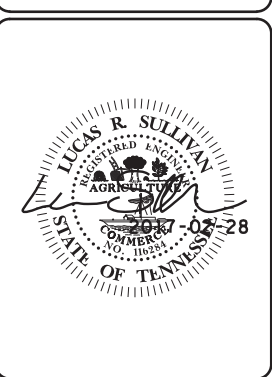
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SANITARY SEWER REHABILITATION PLAN - TAX MAP NO. 1380
SHEET NO. CU114

SHEET NO. CU126

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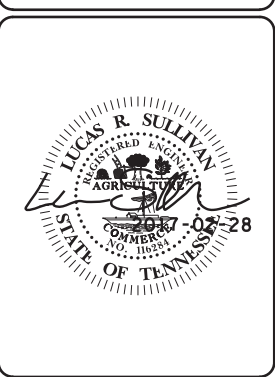
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 SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 148B
SCALE: 1" = 150'

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DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVb

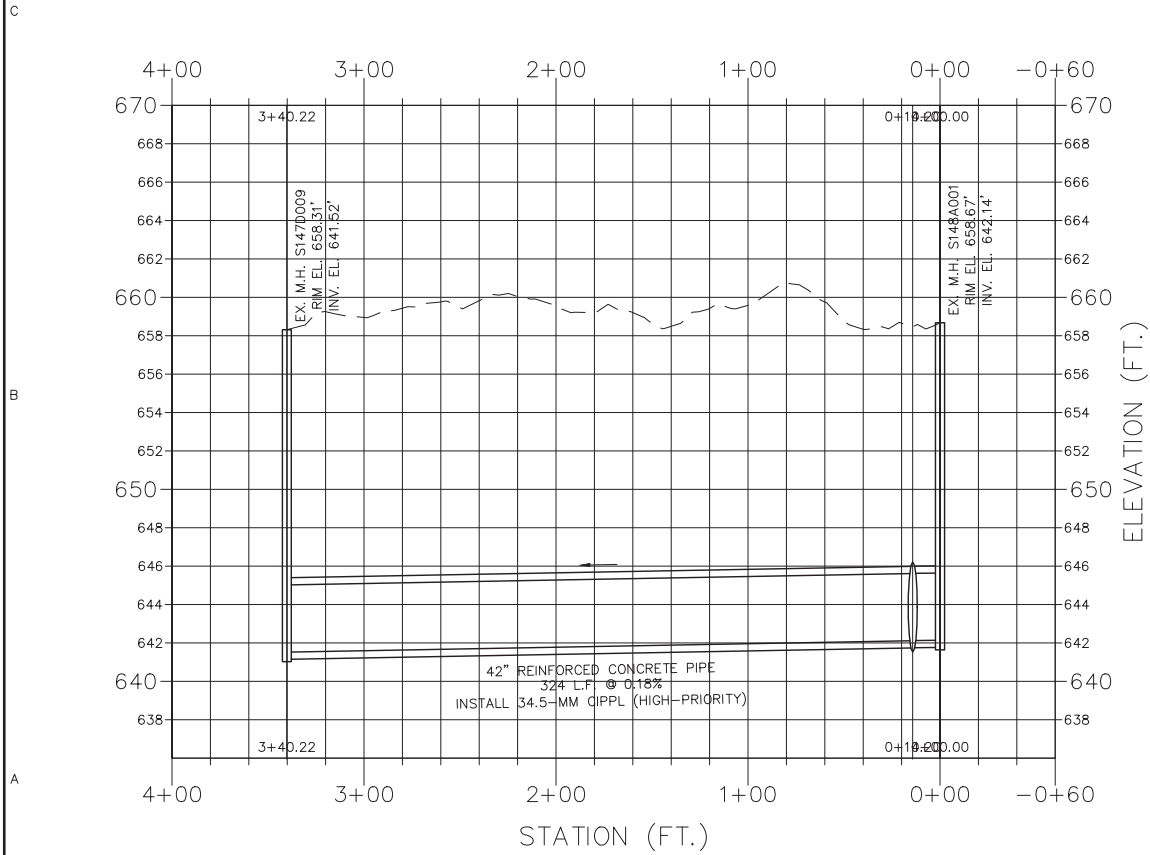
SHEET TITLE
SANITARY SEWER REHABILITATION PLAN – TAX MAP NO. 148B

SHEET NO. CU128

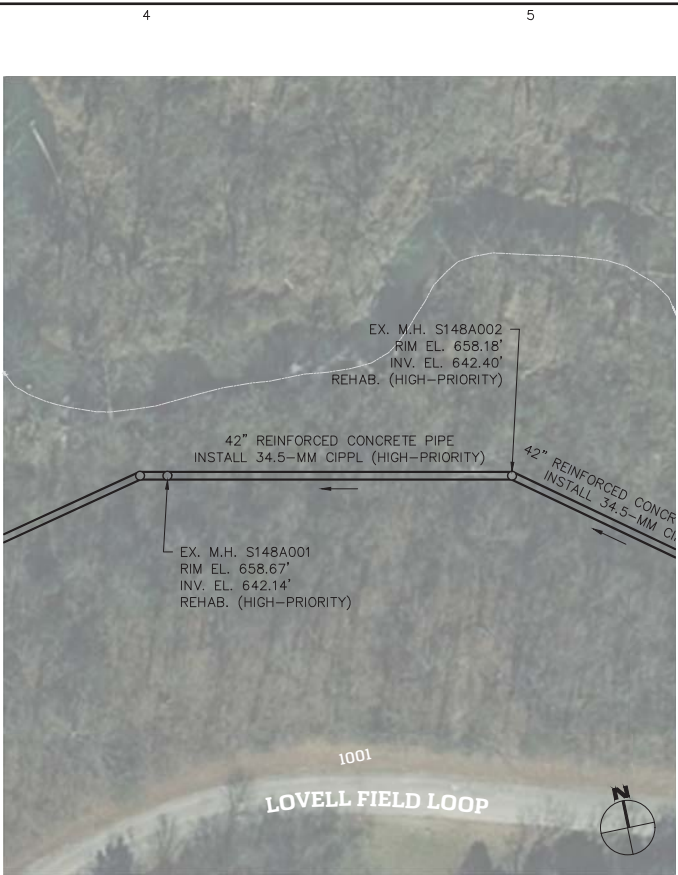
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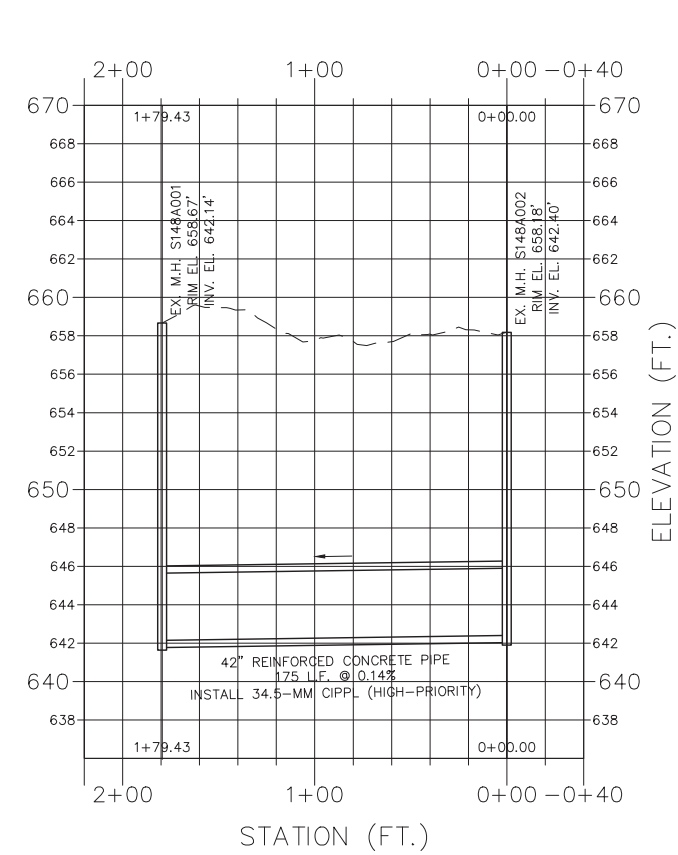
A1 S148A0006 REHABILITATION PLAN
SCALE: 1" = 50'



A1 S148A0006 REHABILITATION PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.



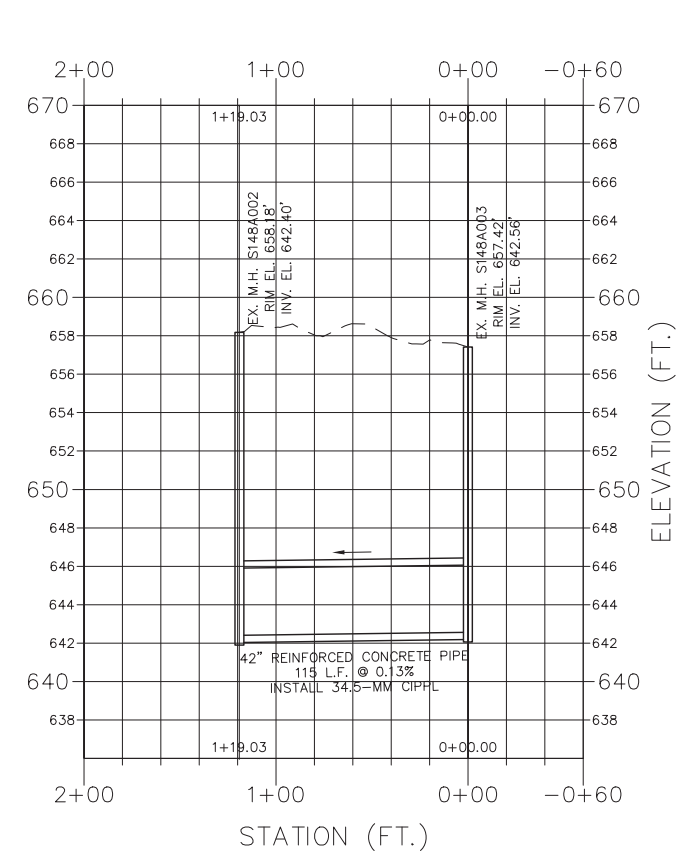
A4 S148A0005 REHAB. PLAN
SCALE: 1" = 50'



A4 S148A0005 REHAB. PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.



A6 S148A0004 REHAB. PLAN
SCALE: 1" = 50'



A6 S148A0004 REHAB. PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.

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1	2017-02-28	ADDED SHEET

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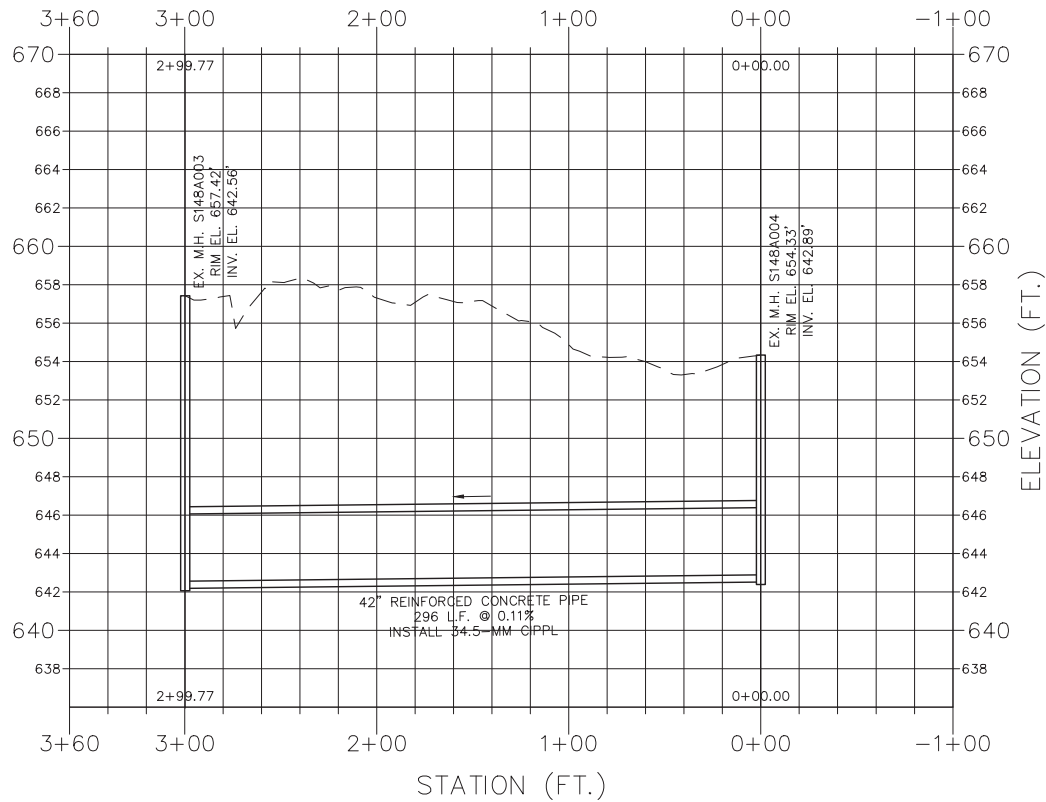
PROJ. NO.	W-12-029-201
DATE	2017-02-28
DISC. LEAD	TWR
DESIGNER	LRS
CHECKER	EVB

SHEET TITLE
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR
SHEET NO. CU271

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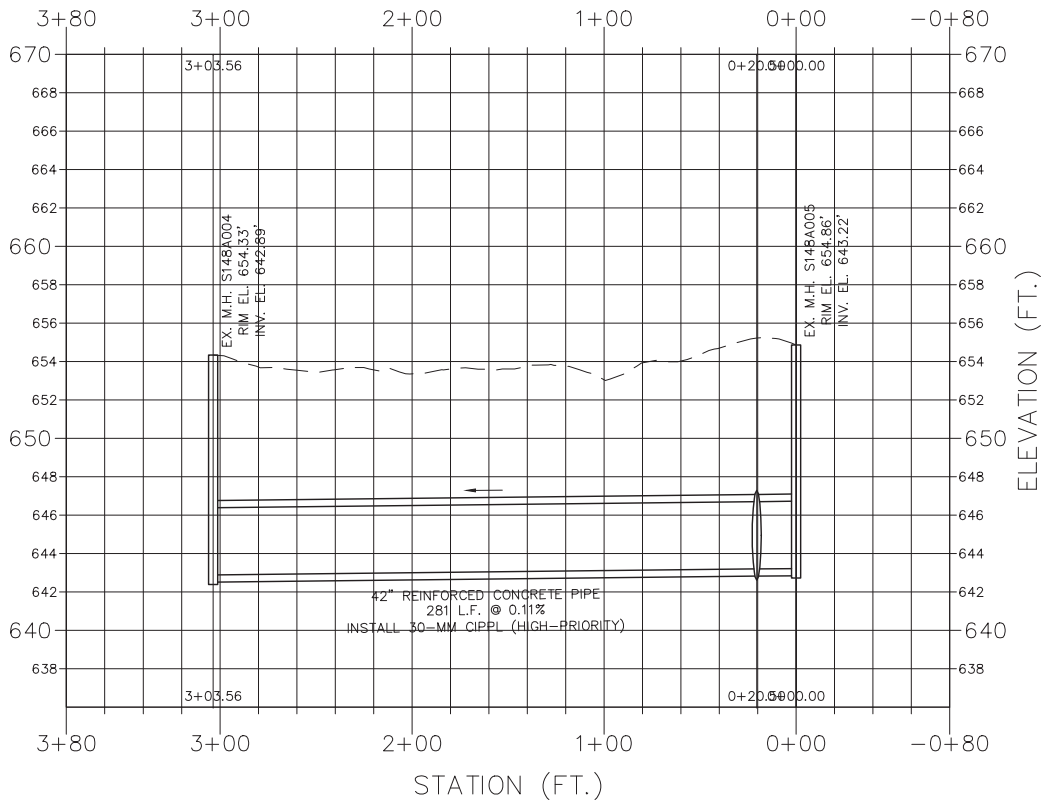
A2 S148A0003 REHABILITATION PLAN
SCALE: 1" = 50'



A2 S148A0003 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A5 S148A0002 REHABILITATION PLAN
SCALE: 1" = 50'



A5 S148A0002 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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PROJ. NO. W-12-029-201

DATE 2017-02-03

DISC. LEAD TWR

DESIGNER LRS

CHECKER EVB

SHEET TITLE

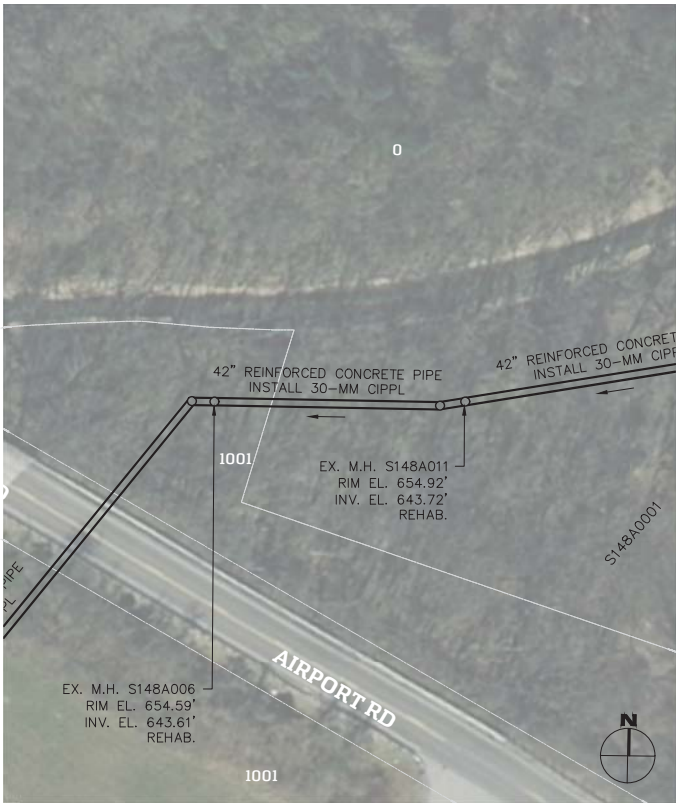
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU272

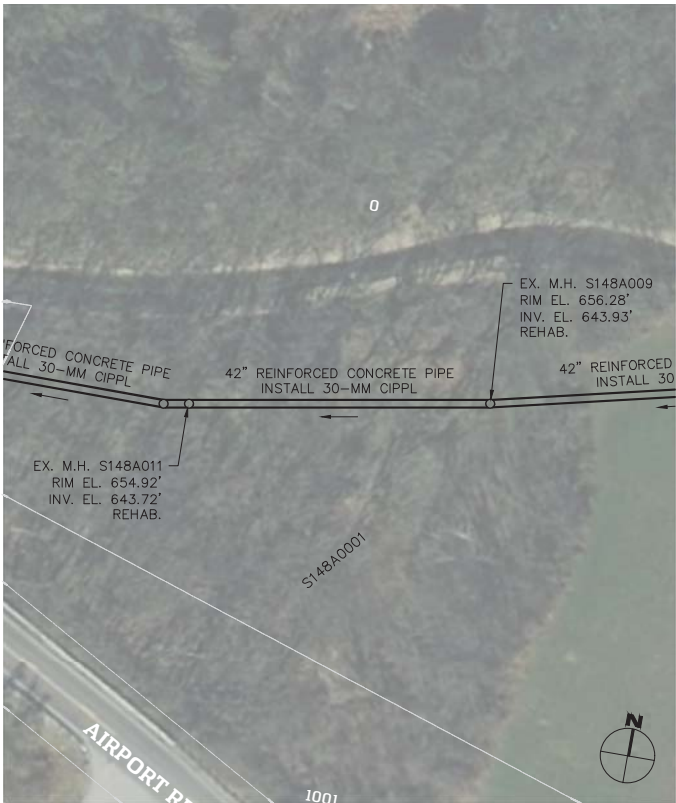
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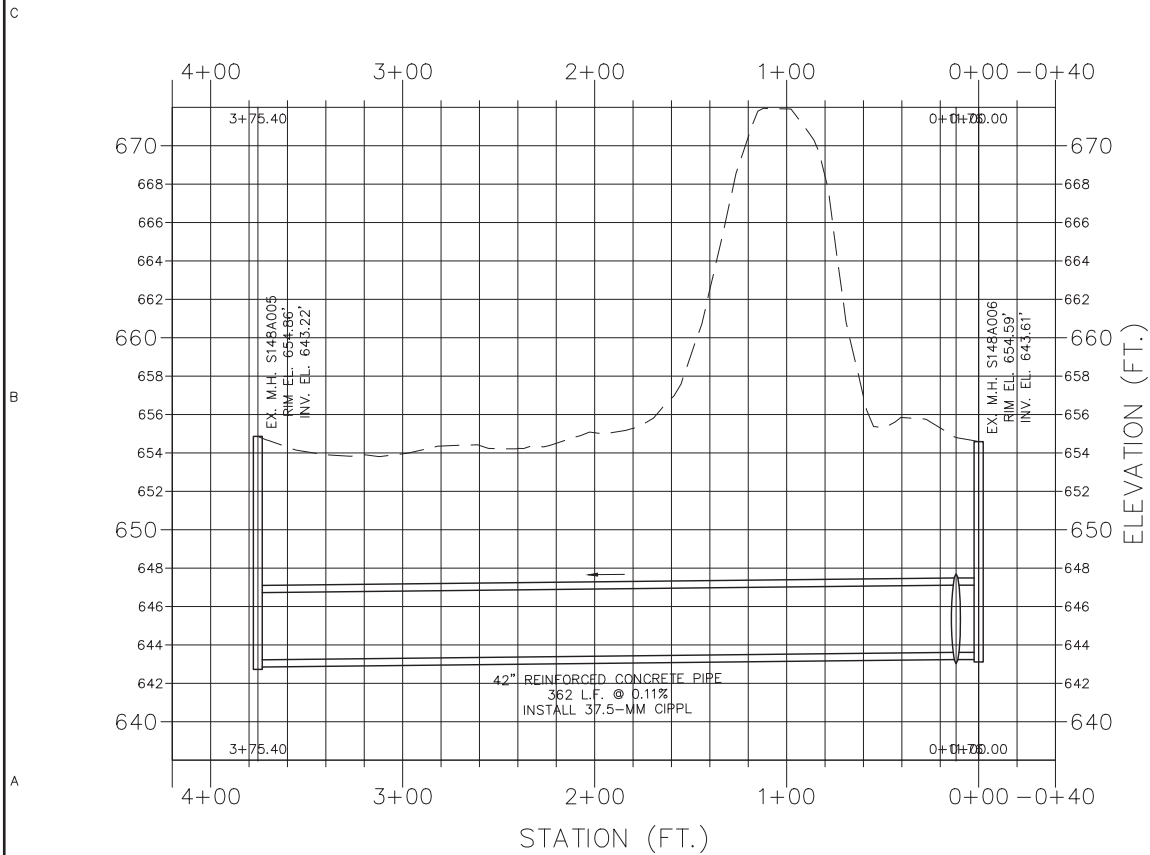
A1 S148A0001 REHABILITATION PLAN
SCALE: 1" = 50'



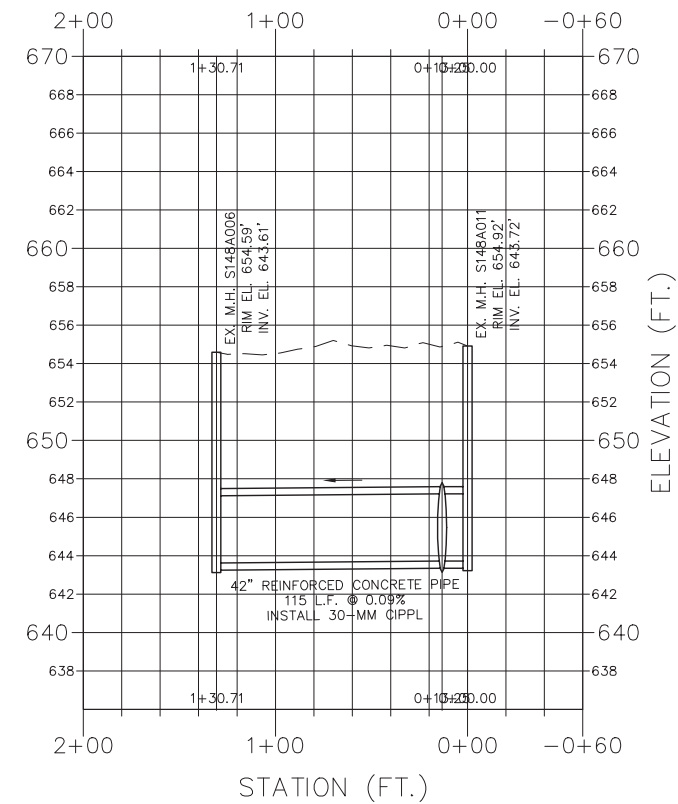
A4 S148A0011 REHAB. PLAN
SCALE: 1" = 50'



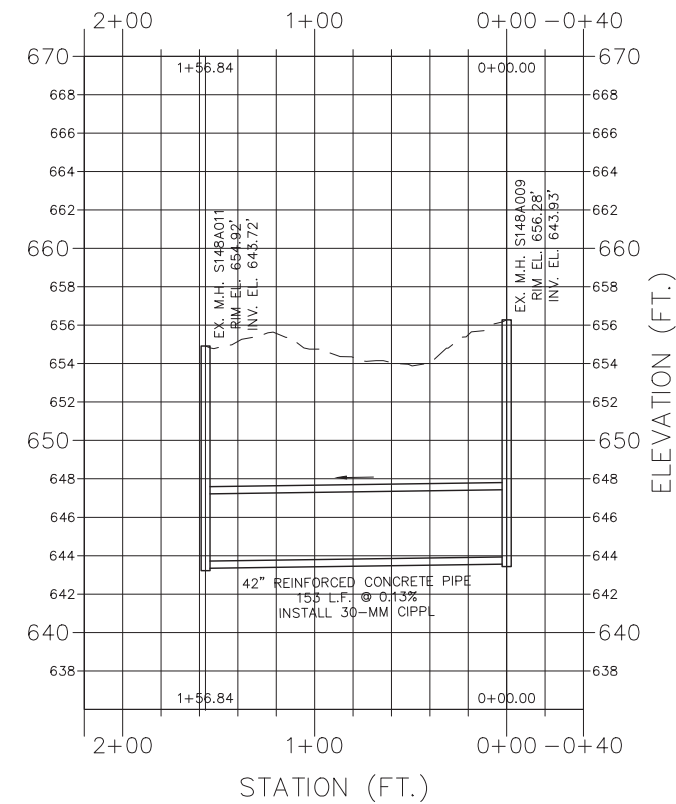
A6 S148A0010 REHAB. PLAN
SCALE: 1" = 50'



A1 S148A0001 REHABILITATION PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.



A4 S148A0011 REHAB. PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.



A6 S148A0010 REHAB. PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.

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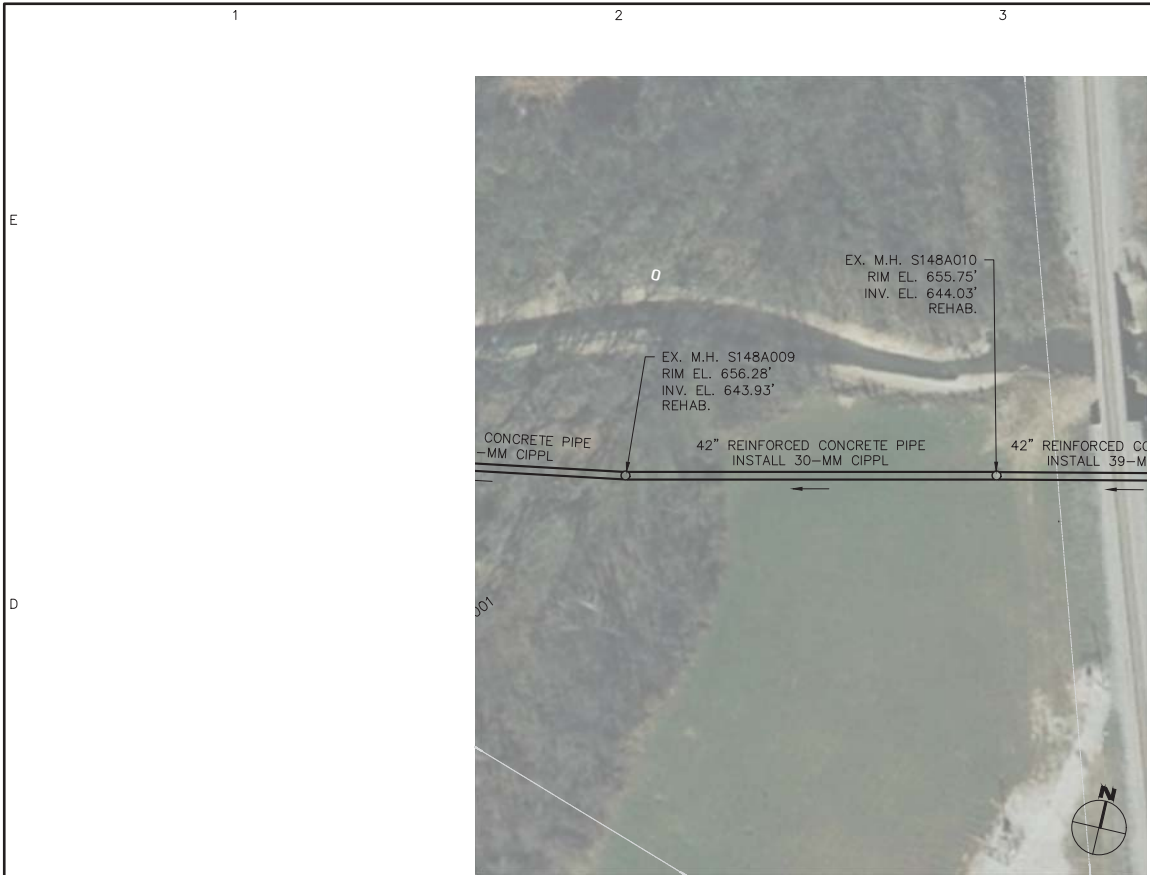
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TWR	LRS	EVB
SHEET TITLE		

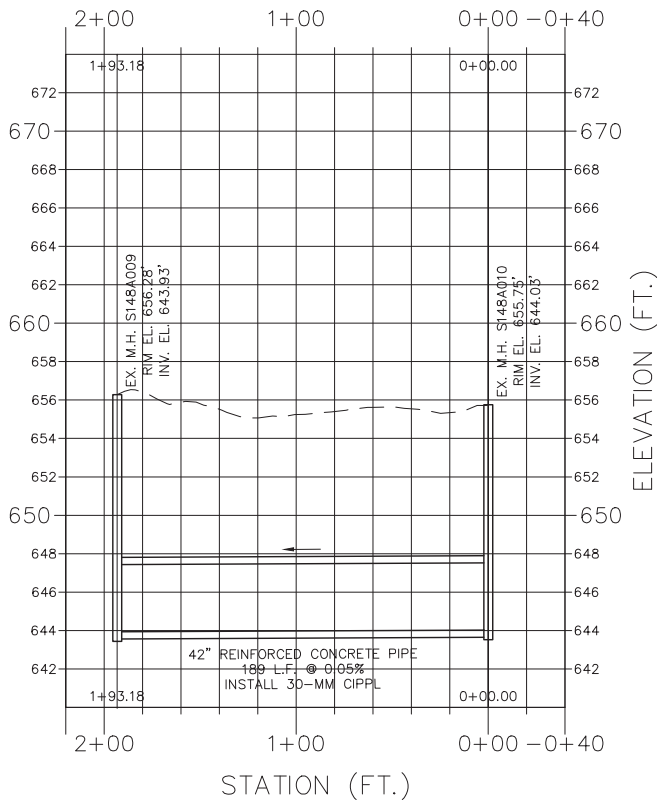
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SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU273

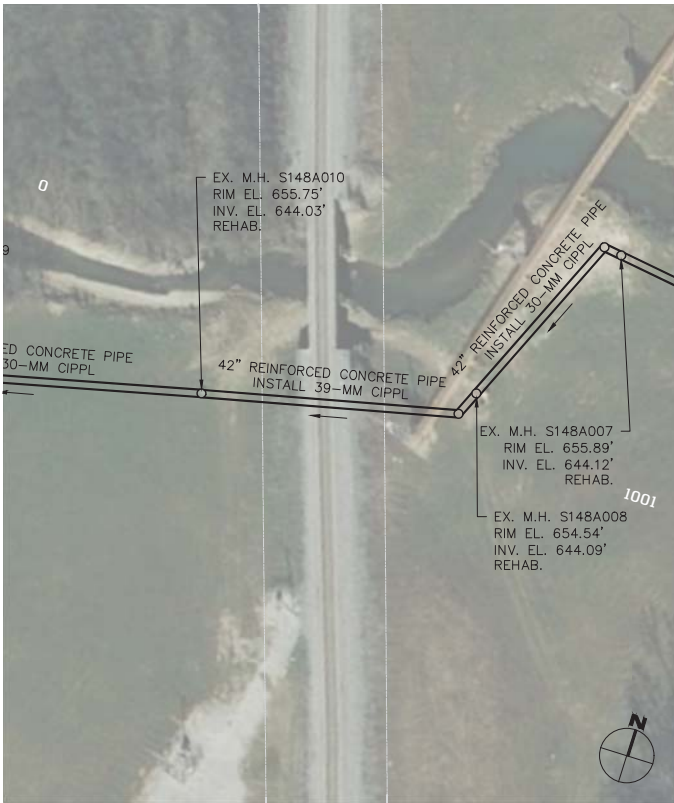
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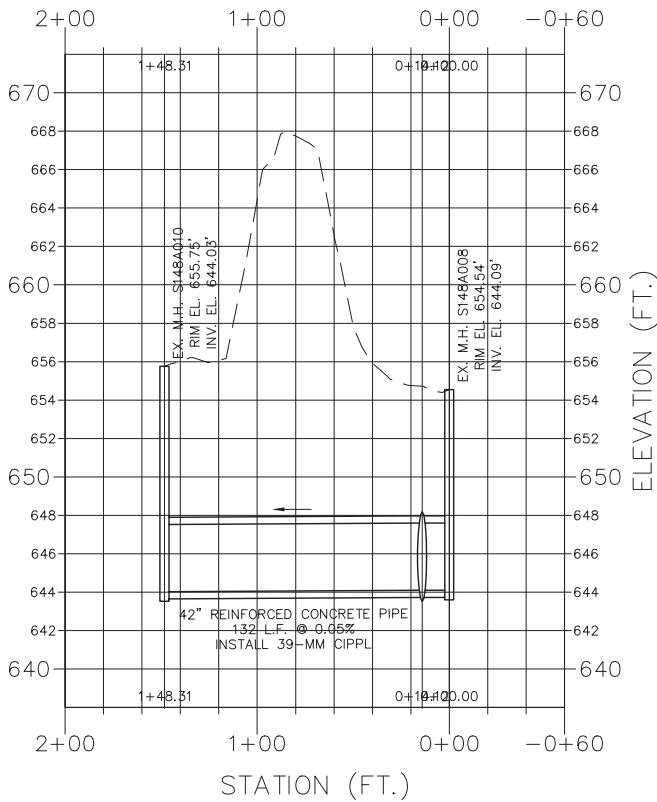
A2 S148A0009 REHAB. PLAN
SCALE: 1" = 50'



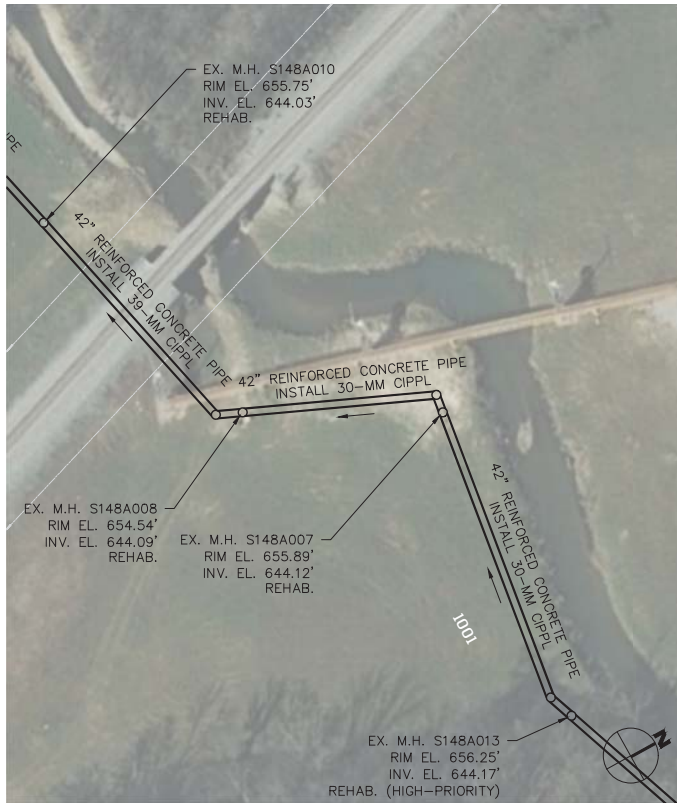
A2 S148A0009 REHAB. PROFILE
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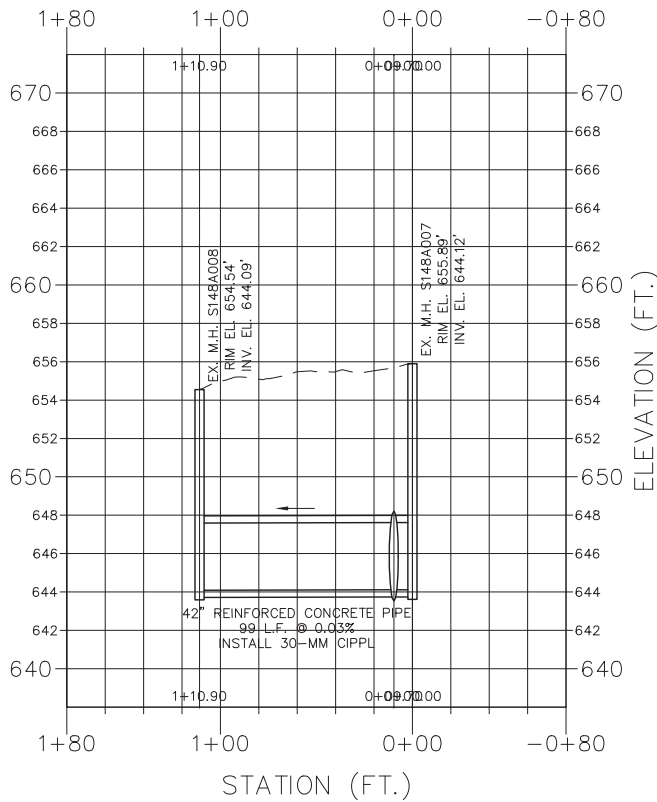
A4 S148A0008 REHAB. PLAN
SCALE: 1" = 50'



A4 S148A0008 REHAB. PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A6 S148A0007 REHAB. PLAN
SCALE: 1" = 50'



A6 S148A0007 REHAB. PROFILE
SCALE: Custom HORZ., 1" = 10' VERT.

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DATE	2017-02-28
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DESIGNER	LRS
CHECKER	EVb

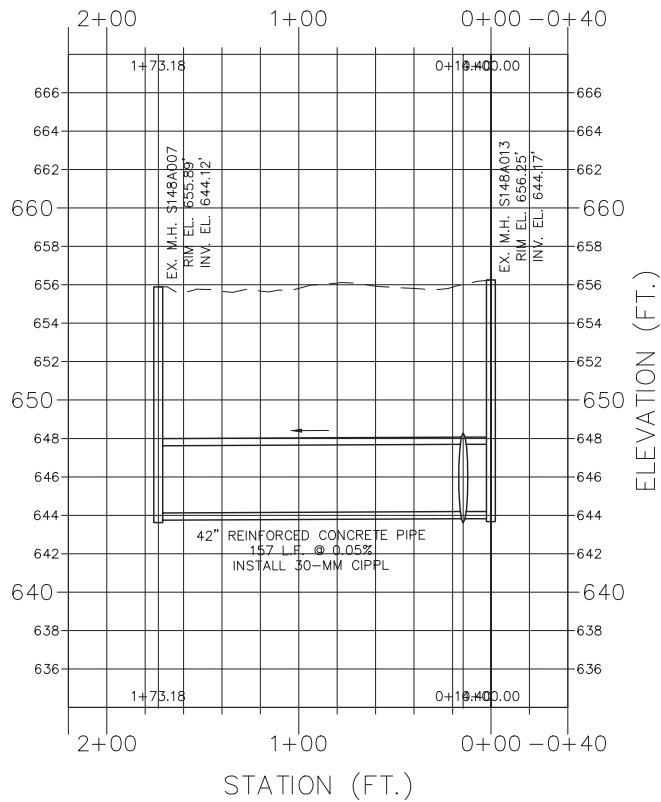
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SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU274

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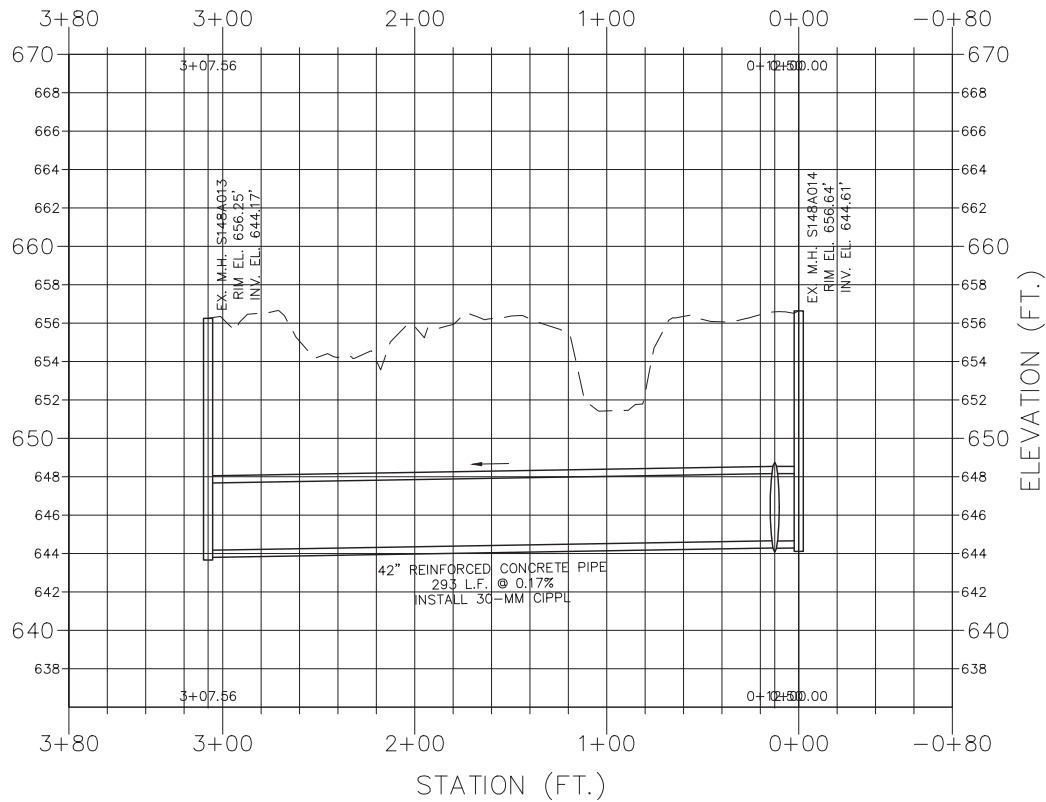
A3 S148A0016 REHAB. PLAN
SCALE: 1" = 50'



A3 S148A0016 REHAB. PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A5 S148A0015 REHABILITATION PLAN
SCALE: 1" = 50'



A5 S148A0015 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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TWR	LRS	EVb

SHEET TITLE
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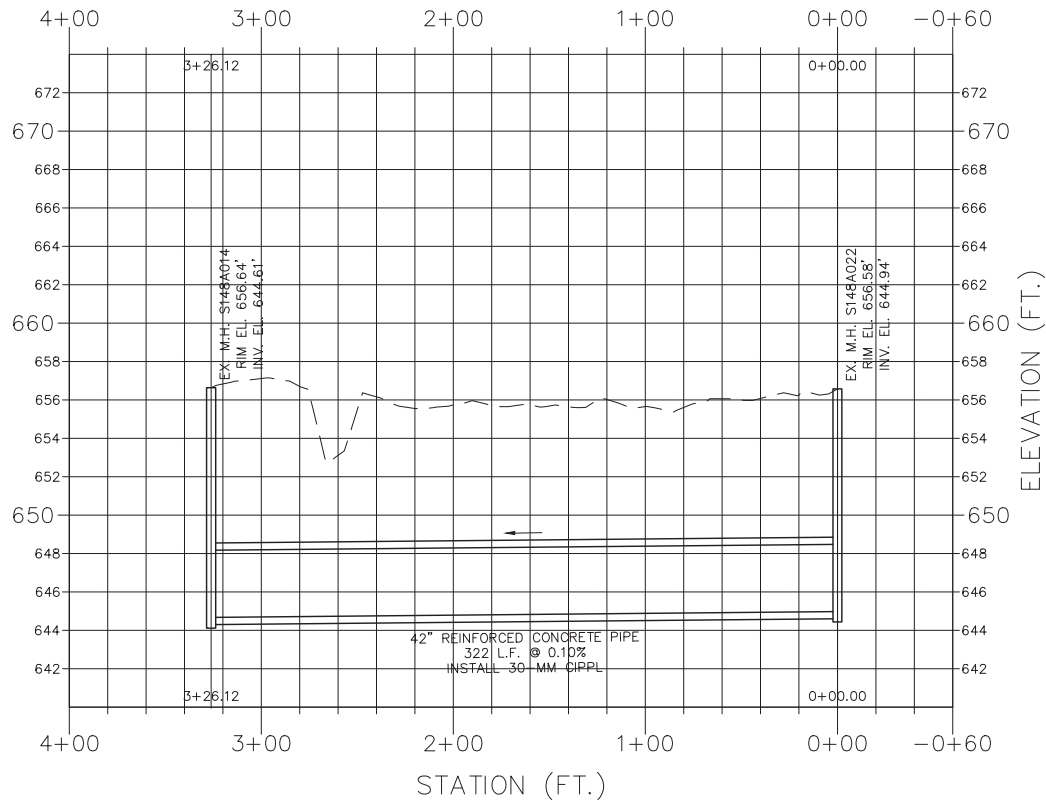
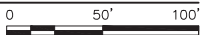
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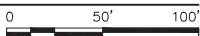
A2 S138P0020 REHABILITATION PLAN

SCALE: 1" = 50'



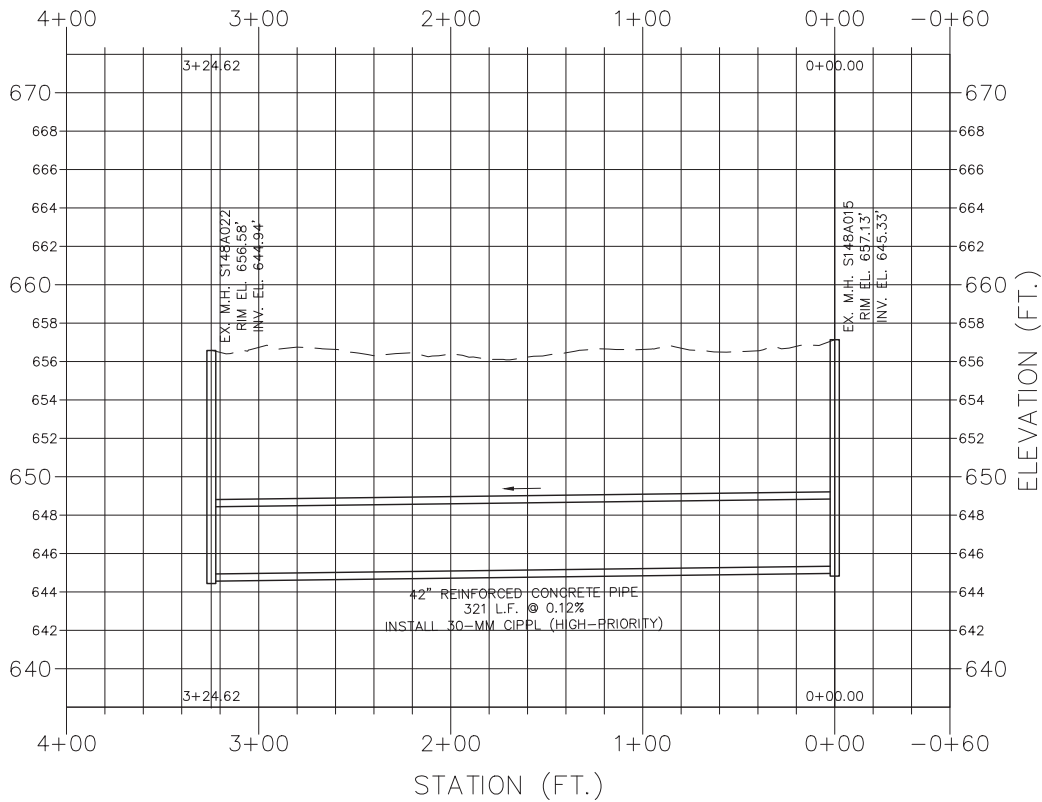
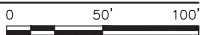
A2 S138P0020 REHABILITATION PROFILE

SCALE: 1" = 50' HORZ., 1" = 10' VERT.



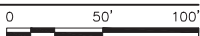
A5 S148A0014 REHABILITATION PLAN

SCALE: 1" = 50'



A5 S148A0014 REHABILITATION PROFILE

SCALE: 1" = 50' HORZ., 1" = 10' VERT.



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DATE	2017-02-28	
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TWR	LRS	EVb

SHEET TITLE
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU276

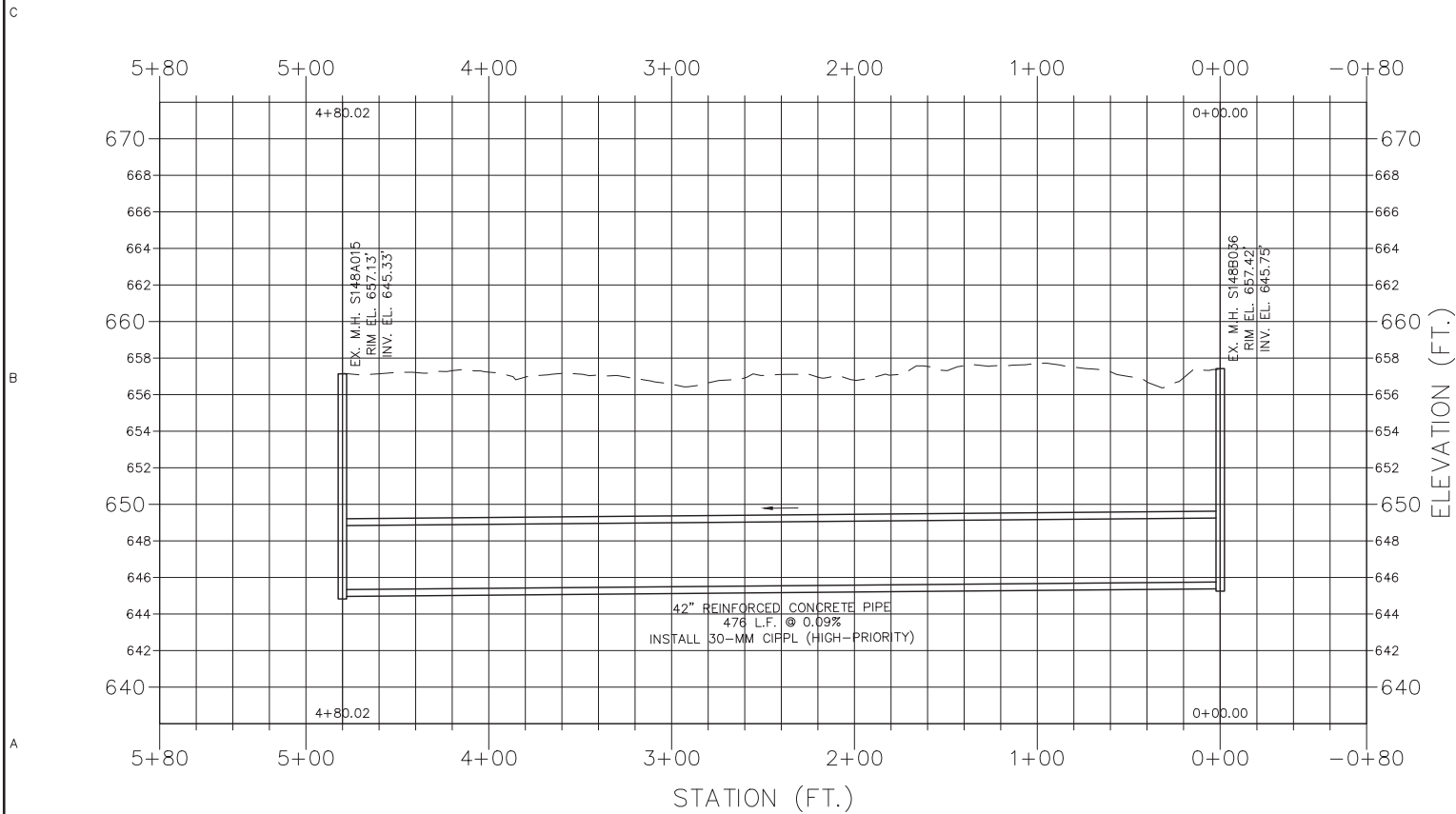
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A1 S148A0013 REHABILITATION PLAN

SCALE: 1" = 50'

0 50' 100'



A1 S148A0013 REHABILITATION PROFILE

SCALE: 1" = 50' HORZ., 1" = 10' VERT.

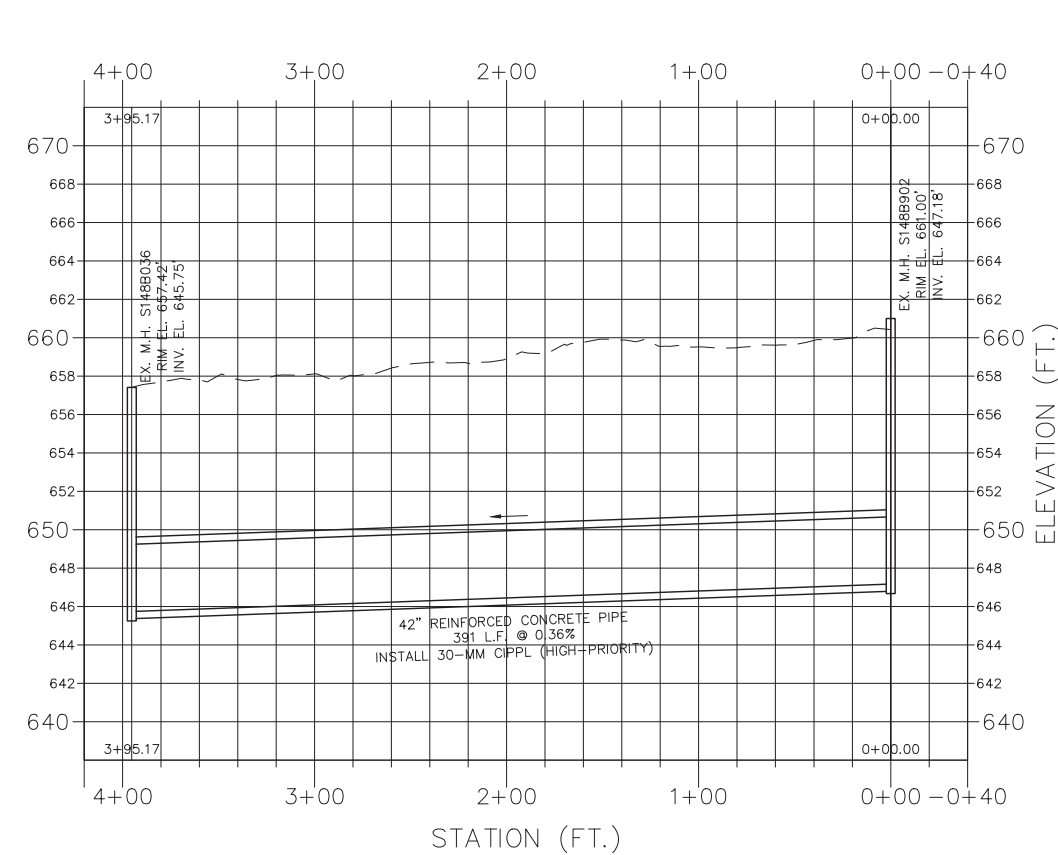
0 50' 100'



A5 S148B0045 REHABILITATION PLAN

SCALE: 1" = 50'

0 50' 100'



A5 S148B0045 REHABILITATION PROFILE

SCALE: 1" = 50' HORZ., 1" = 10' VERT.

0 50' 100'

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TWR	LRS	EVB

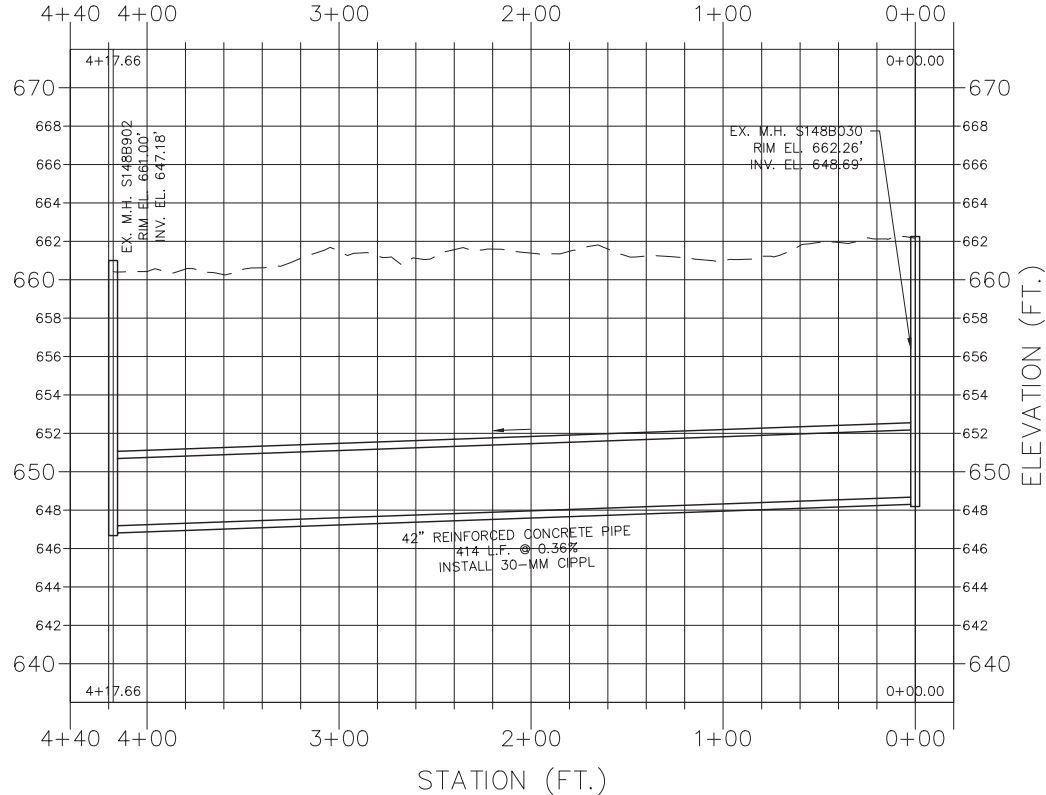
SHEET TITLE
**SANITARY SEWER
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INTERCEPTOR**

SHEET NO.
CU277

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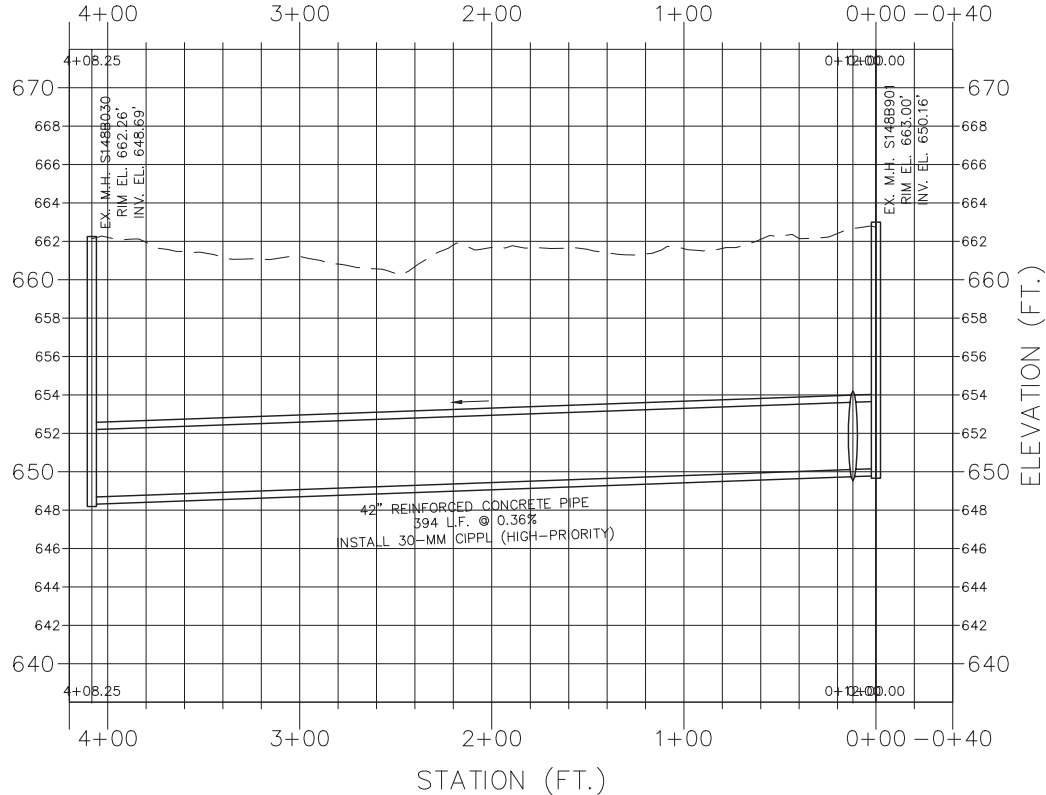
A2 S148B0044 REHABILITATION PLAN
SCALE: 1" = 50'



A2 S148B0044 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A5 S148B0043 REHABILITATION PLAN
SCALE: 1" = 50'



A5 S148B0043 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

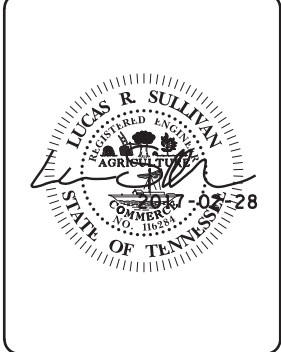
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PROJ. NO. W-12-029-201

DATE 2017-02-28

DISC. LEAD TWR

DESIGNER LRS

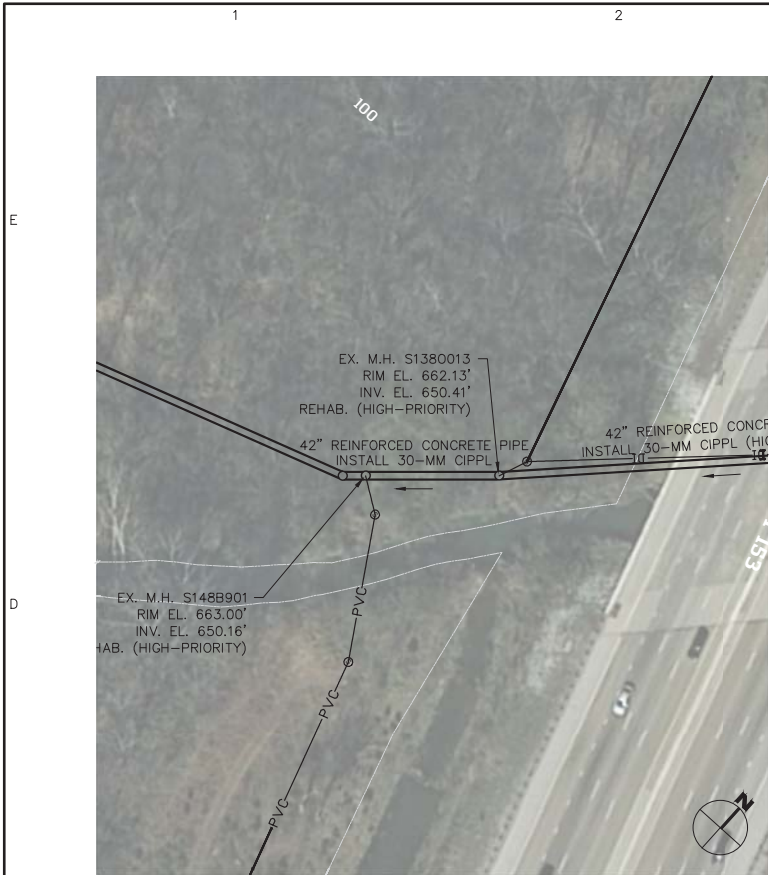
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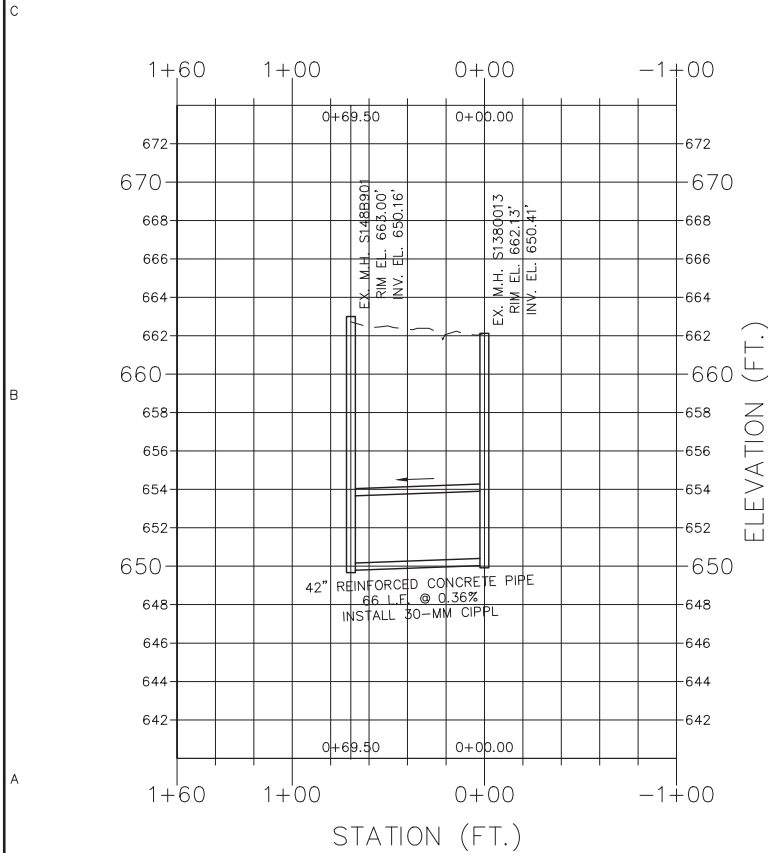
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU278

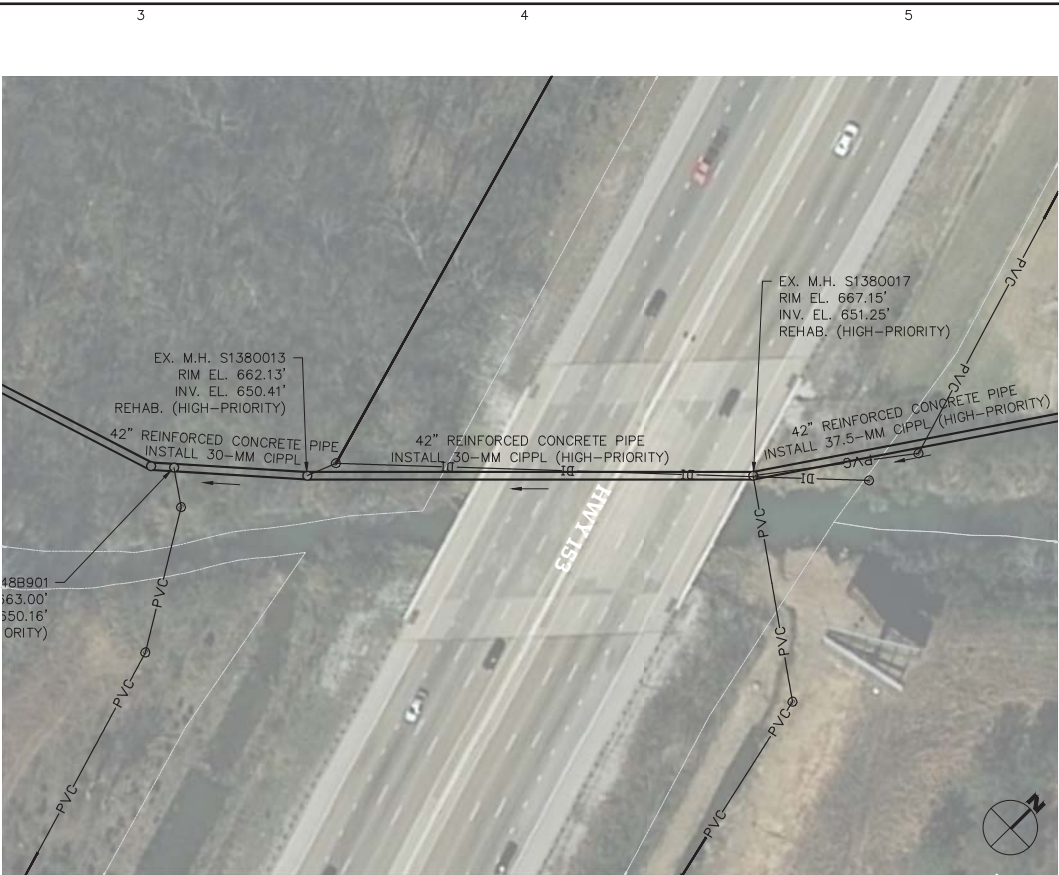
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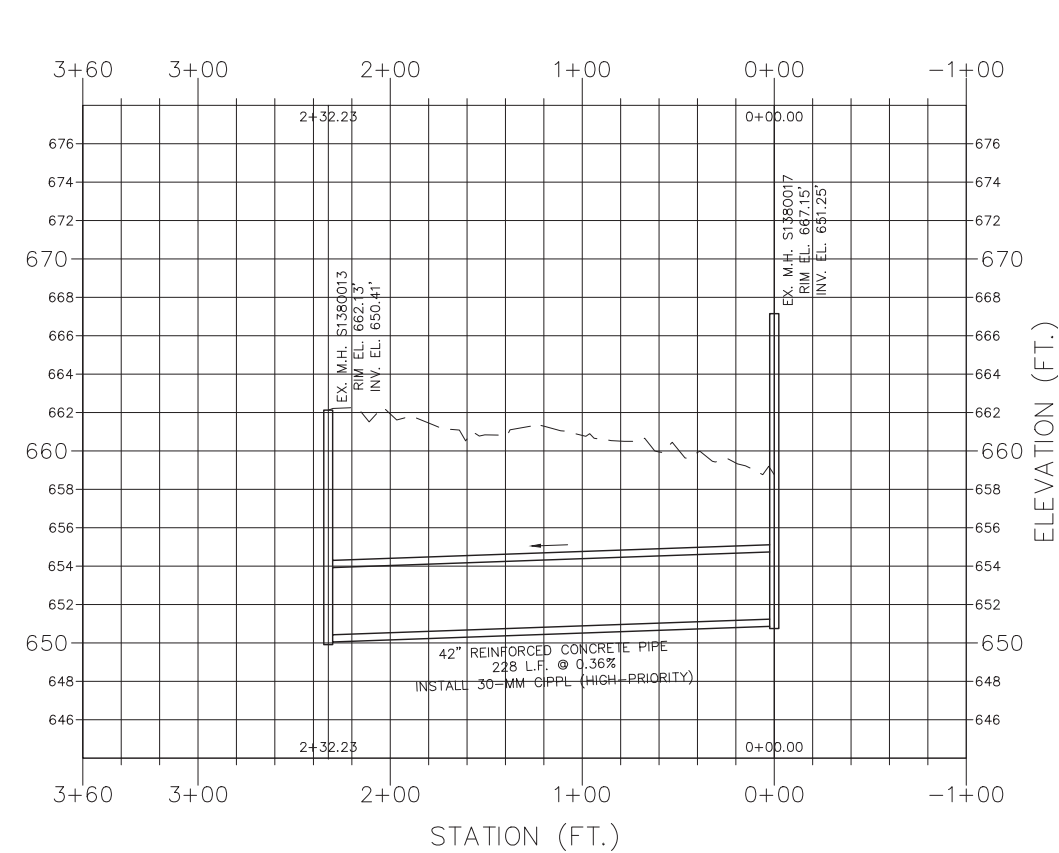
A1 S148B0506 REHAB. PLAN
SCALE: 1" = 50'



A1 S148B0506 REHAB. PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



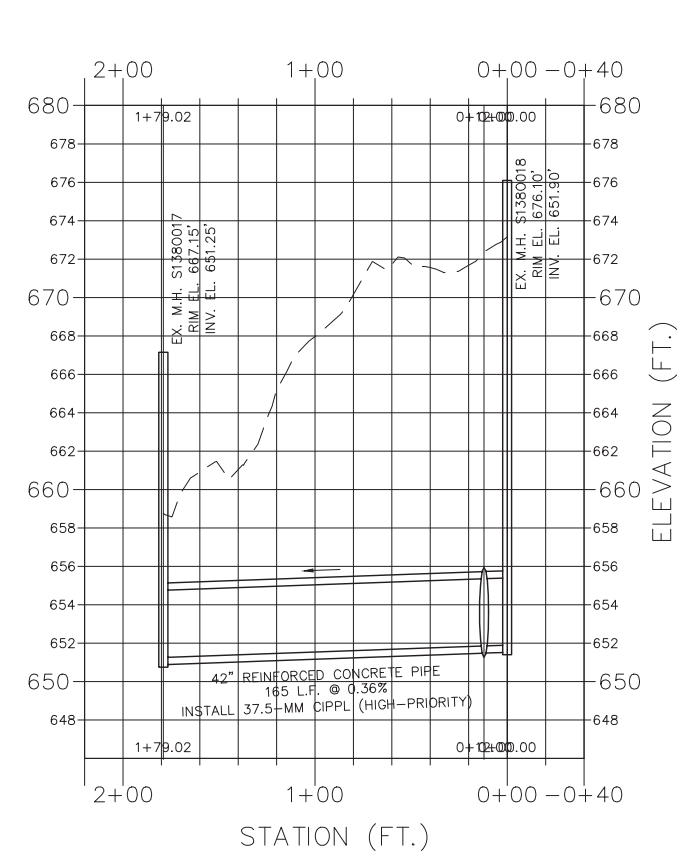
A3 S13800027 REHABILITATION PLAN
SCALE: 1" = 50'



A3 S13800027 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A6 S13800500 REHAB. PLAN
SCALE: 1" = 50'



A6 S13800500 REHAB. PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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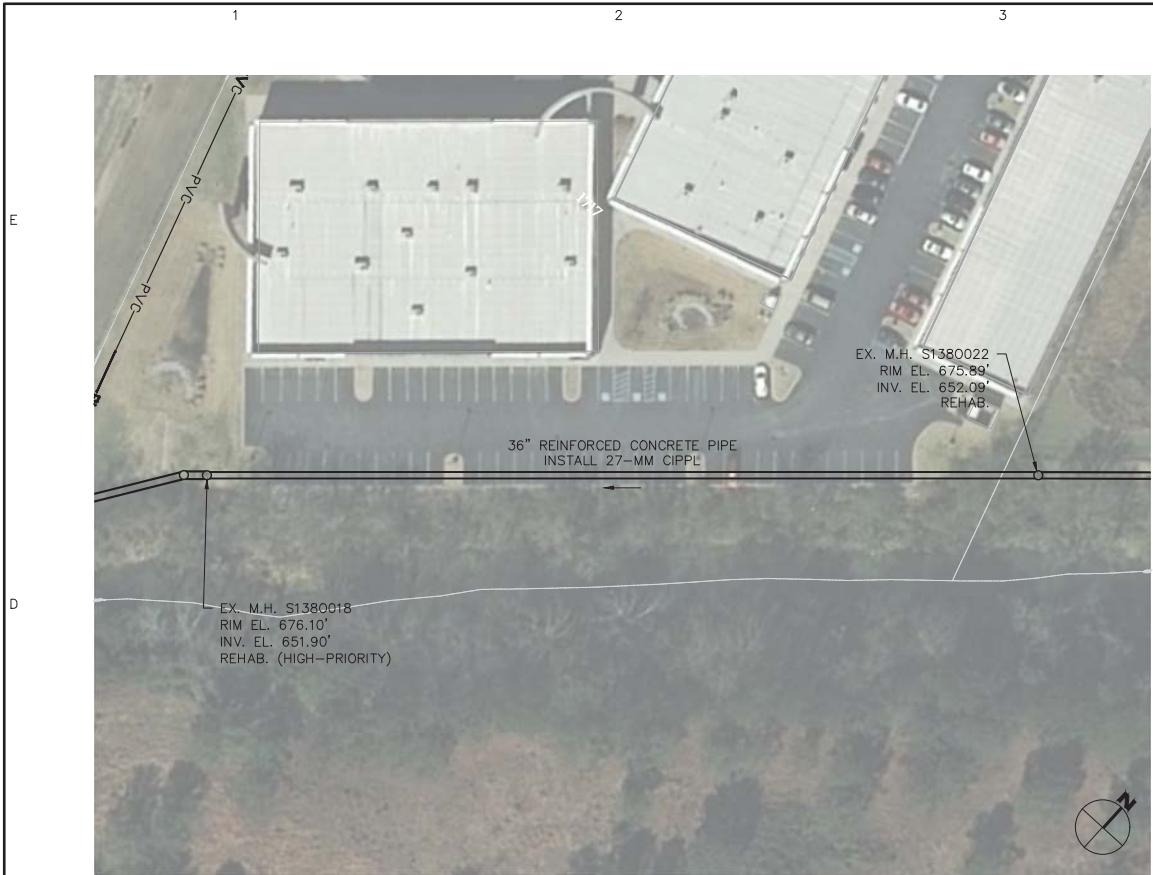
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TWR	LRS	EVb

SHEET TITLE

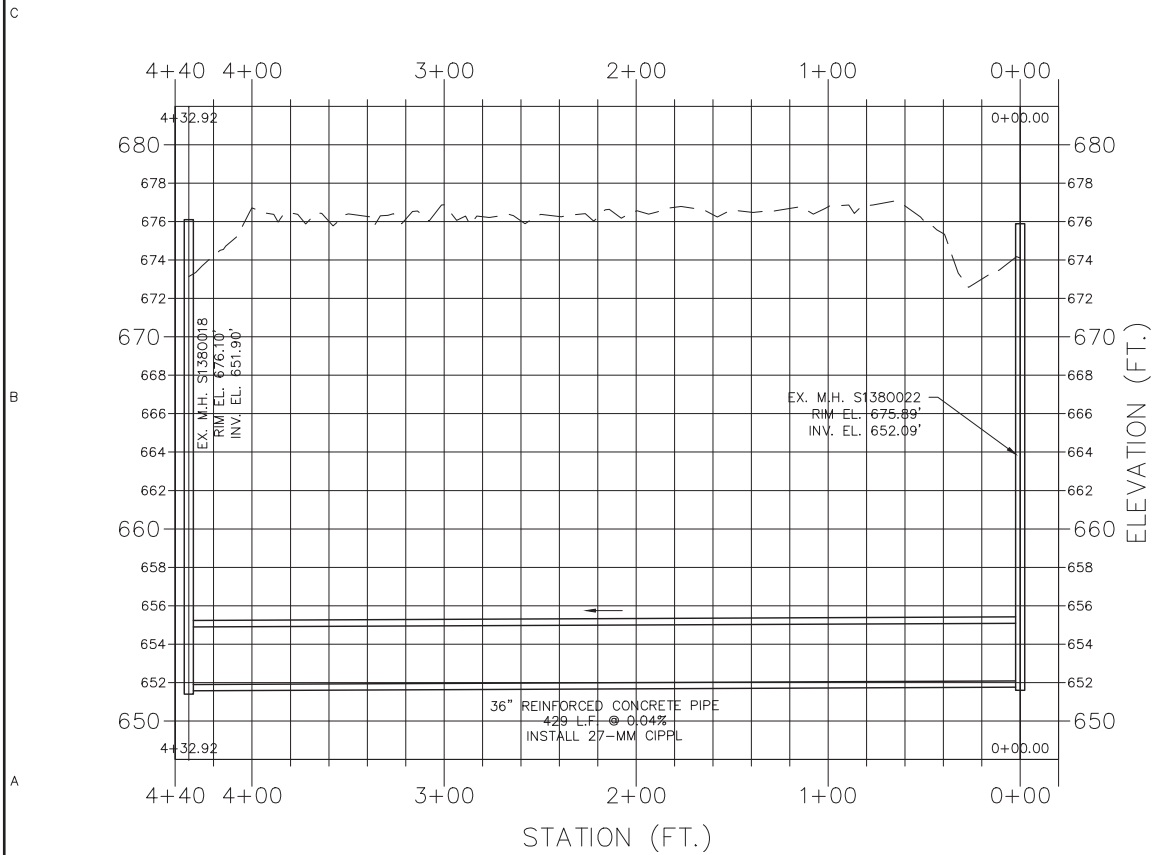
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU279

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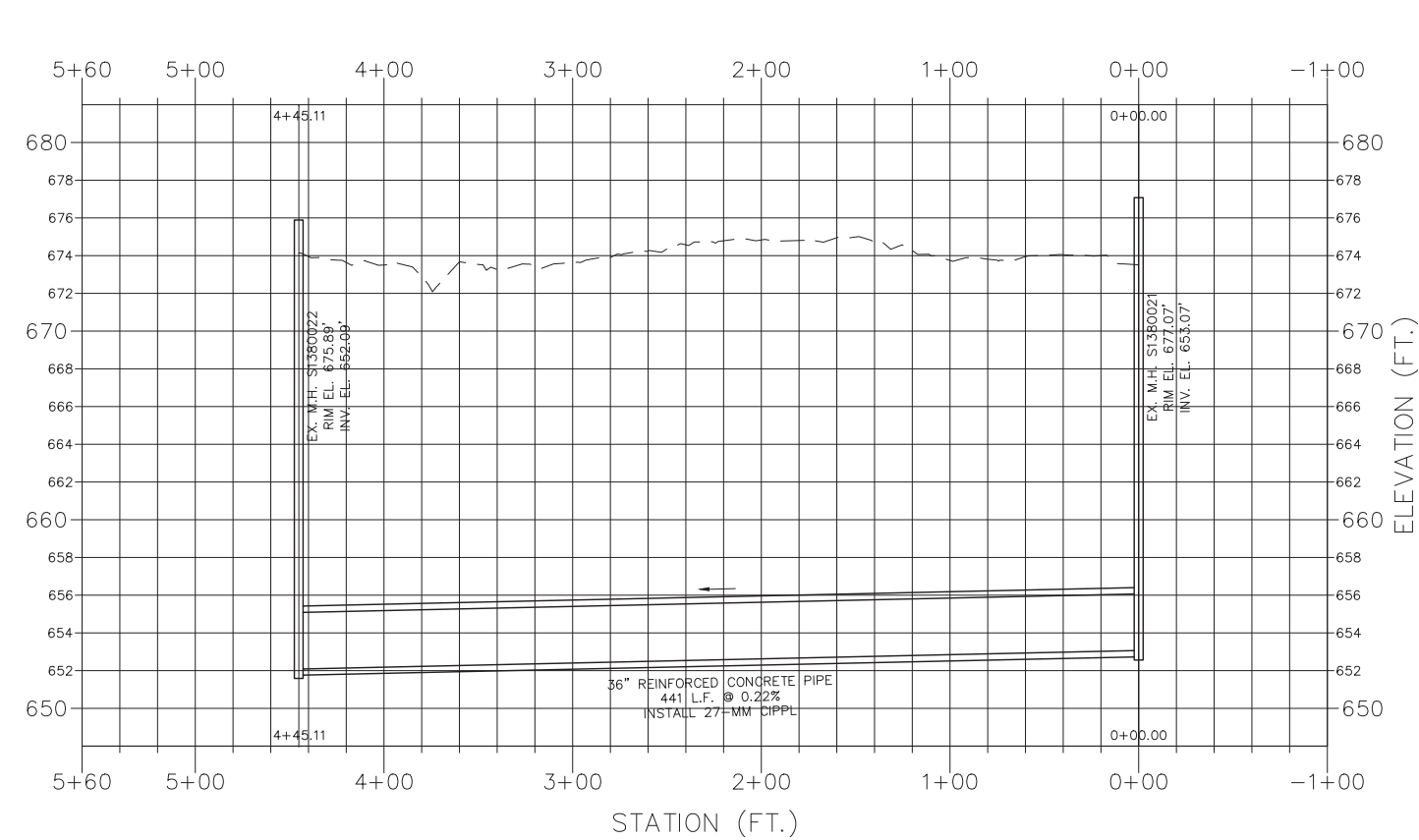
A1 S13800028 REHABILITATION PLAN
SCALE: 1" = 50'



A1 S13800028 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

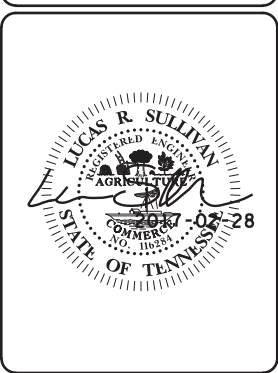


A4 S13800034 REHABILITATION PLAN
SCALE: 1" = 50'



A4 S13800034 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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Waste Resources Division
CONSENT DECREE PROGRAM
Friar's Branch Interceptor
and Basin Improvements

REV	DATE	DESCRIPTION
1	2017-02-28	ADDED SHEET

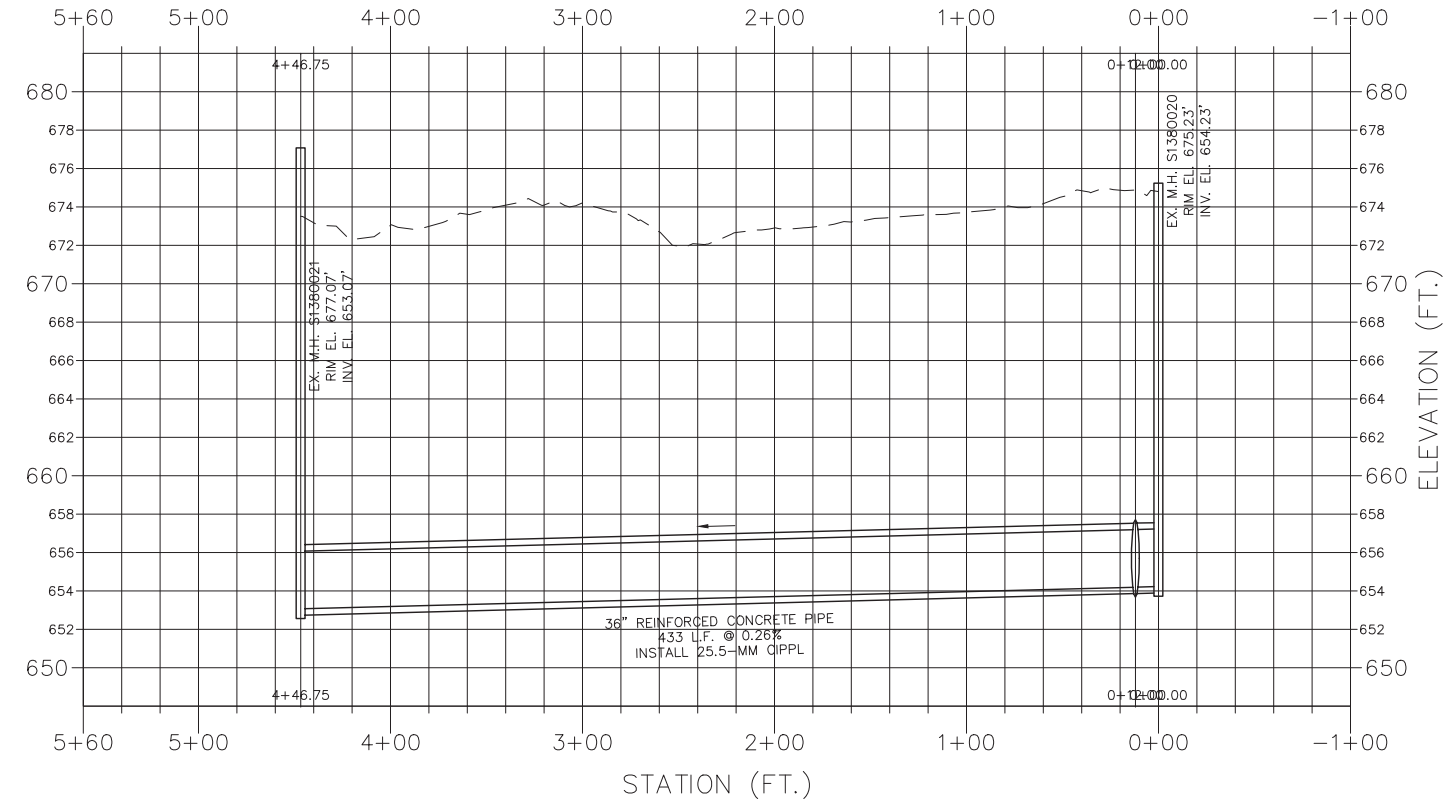
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THIS DRAWING MUST BE USED IN CONJUNCTION WITH APPLICABLE OR GOVERNING TECHNICAL SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS.		
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DATE	2017-02-28	
DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVb
SHEET TITLE		

SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR
SHEET NO. CU280

T:\PRA\1735644-CHATTANOOGA\WAT\INTERCEPTOR\1735644-WAT-CU28#DWG 2017-02-28 2:21:03 PM DEFAULT SETTINGS, PRINTER/PLOTTER COMMANDS, OVERLAY DRAFTING CONTROL DATA, REFERENCE FILE(S), LAYERS PLOTTED, PRODUCTION HOURS



A4 S13800033 REHABILITATION PLAN
SCALE: 1" = 50'



A4 S13800033 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVb

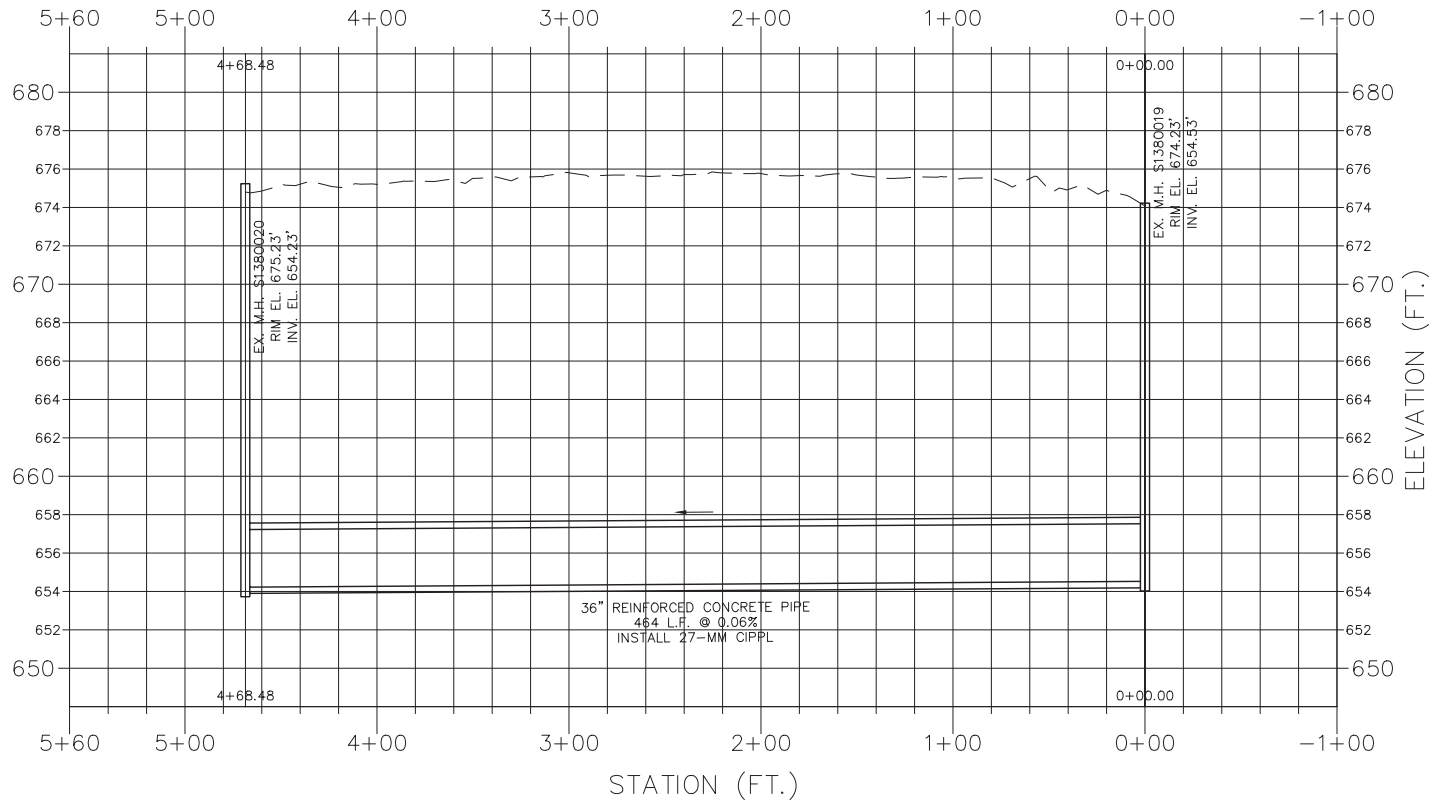
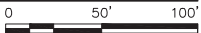
SHEET TITLE
**SANITARY SEWER
REHABILITATION
LINE PLANS &
PROFILES
INTERCEPTOR**

SHEET NO. CU281

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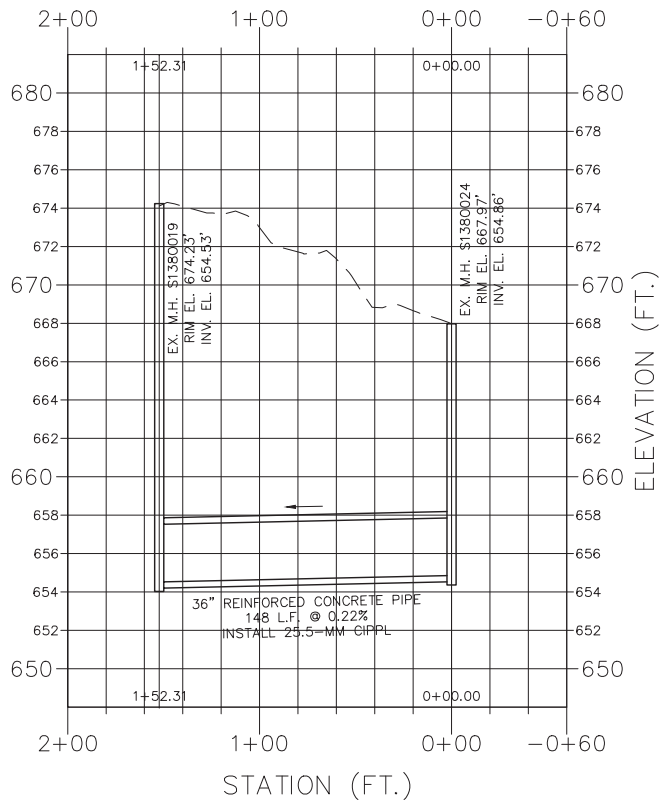
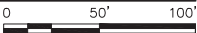
A2 S13800032 REHABILITATION PLAN
SCALE: 1" = 50'



A2 S13800032 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A6 S13800031 REHAB. PLAN
SCALE: 1" = 50'



A6 S13800031 REHAB. PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



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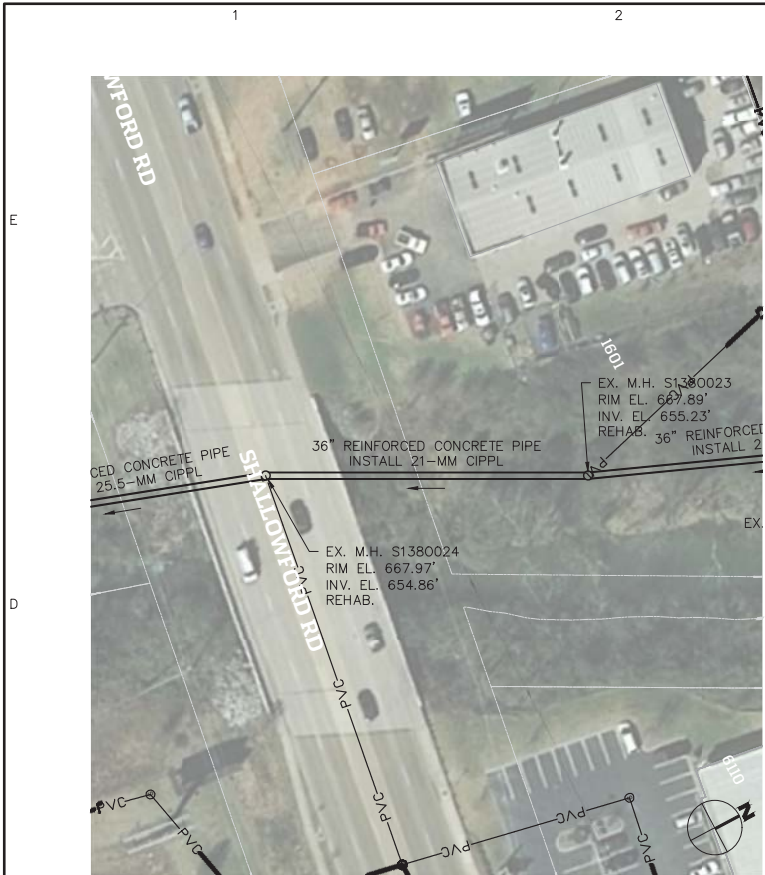
PROJ. NO. W-12-029-201
DATE 2017-02-28

DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVB

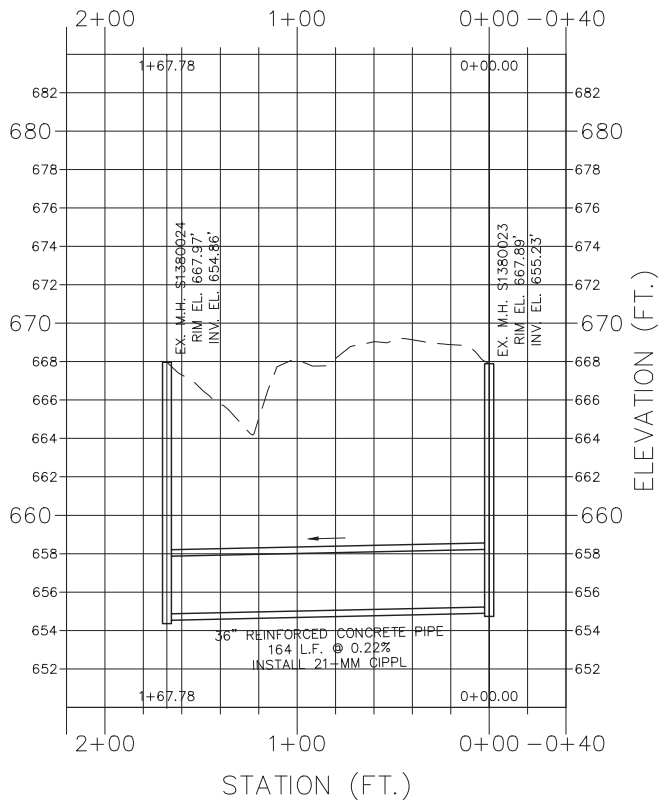
SHEET TITLE
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU282

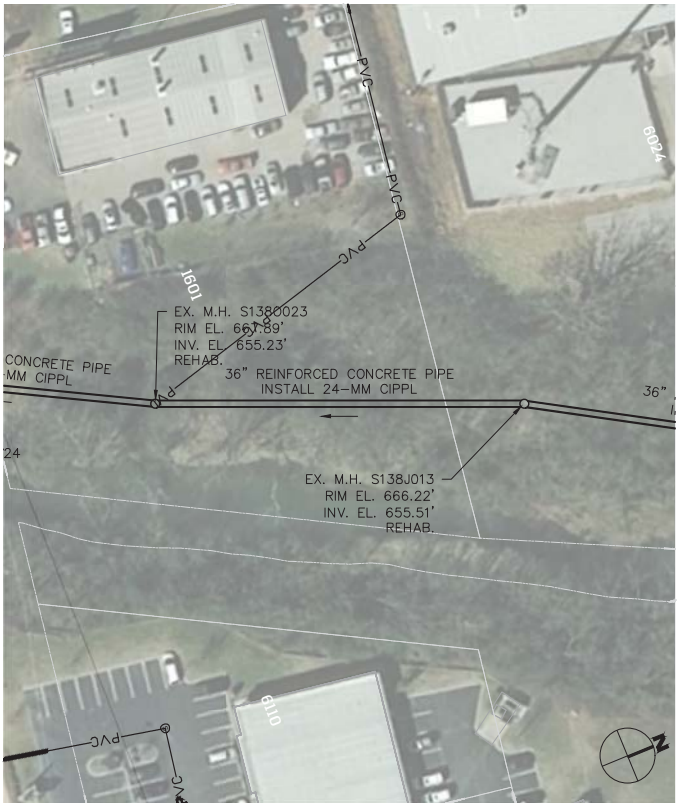
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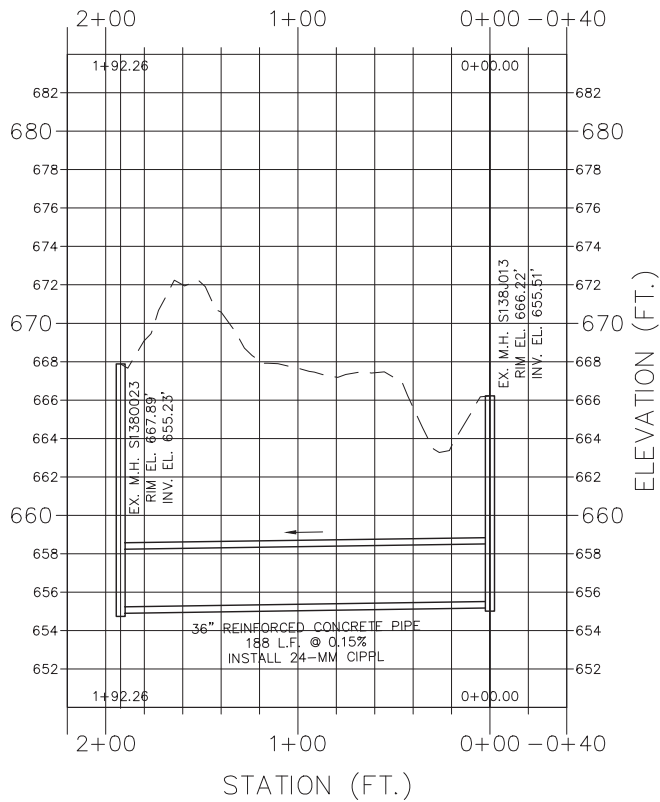
A1 S13800035 REHAB. PLAN
SCALE: 1" = 50'



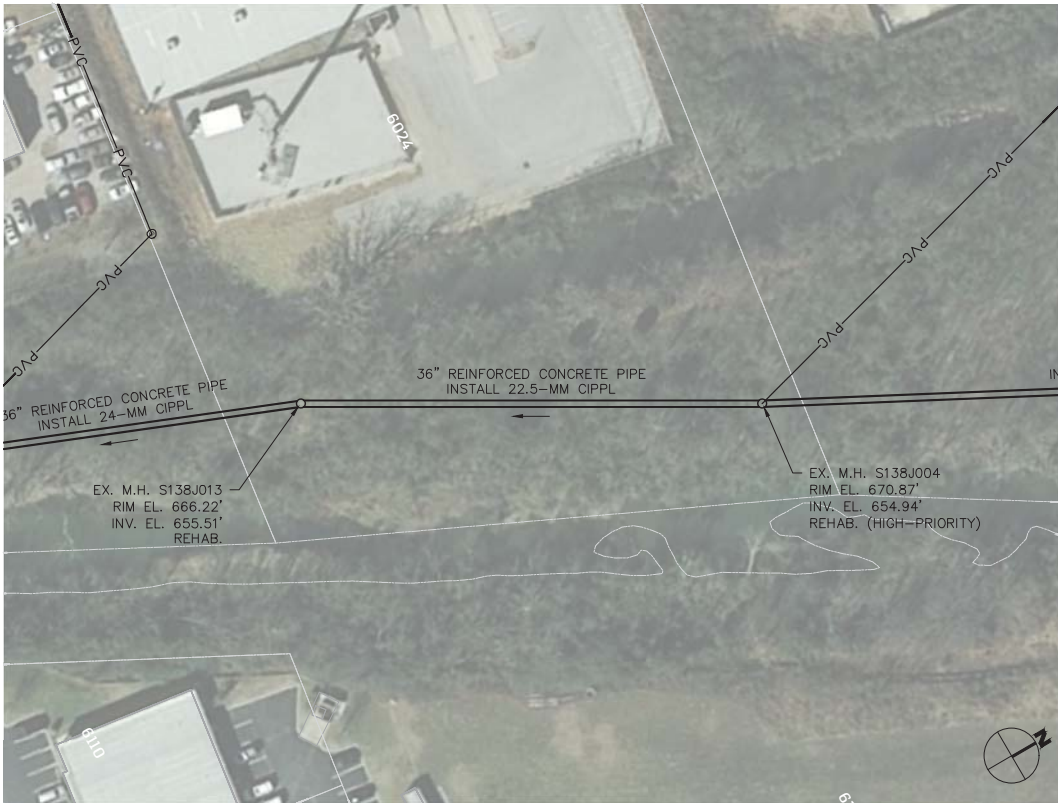
A1 S13800035 REHAB. PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.



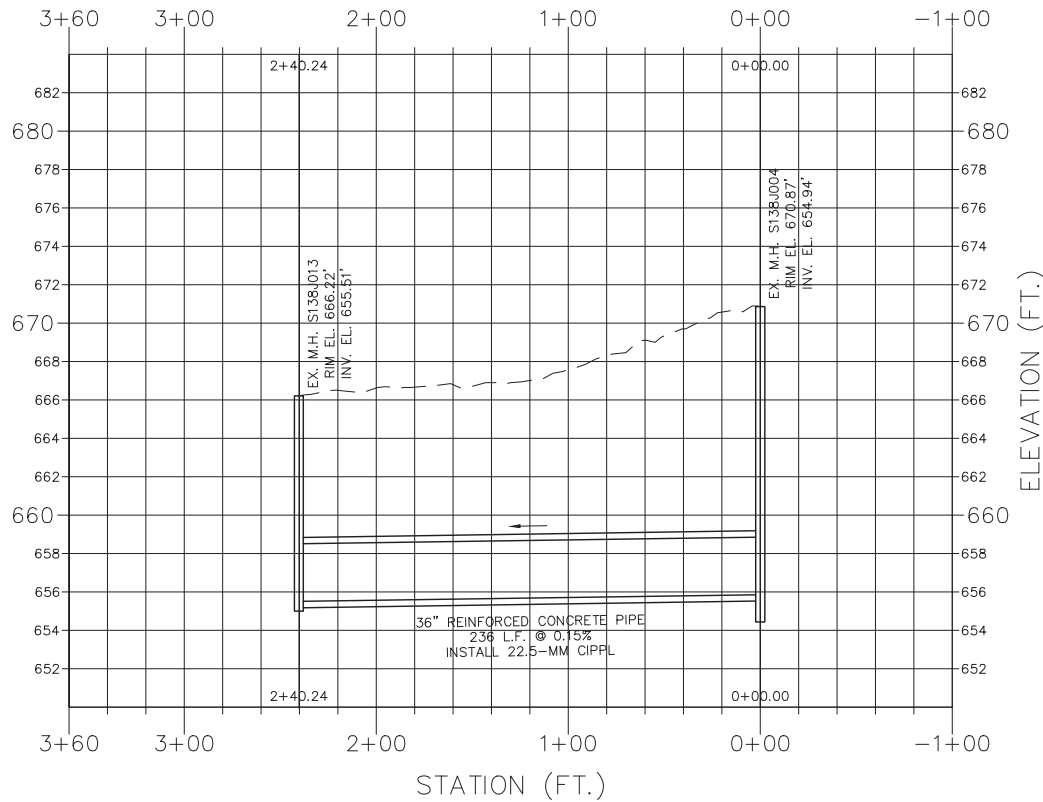
A3 S138J0018 REHAB. PLAN
SCALE: 1" = 50'



A3 S138J0018 REHAB. PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.



A5 S138J0017 REHABILITATION PLAN
SCALE: 1" = 50'



A5 S138J0017 REHABILITATION PROFILE
SCALE: 1" = 50' HORIZ., 1" = 10' VERT.

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DESIGNER	LRS
CHECKER	EVb

SHEET TITLE
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU283

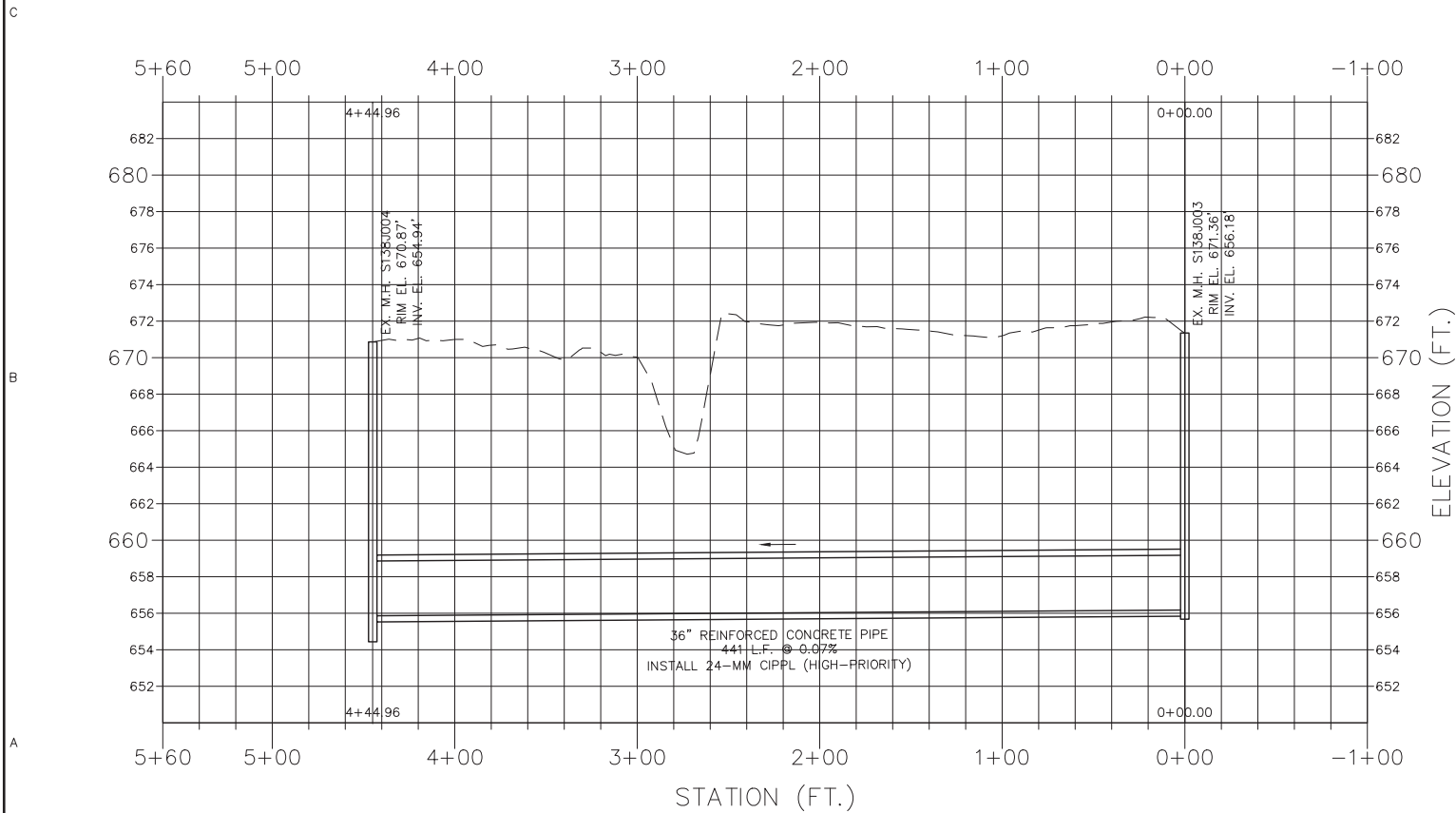
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A1 S138J0016 REHABILITATION PLAN

SCALE: 1" = 50'

0 50' 100'



A1 S138J0016 REHABILITATION PLAN

SCALE: 1" = 50' HORIZ., 1" = 10' VERT.

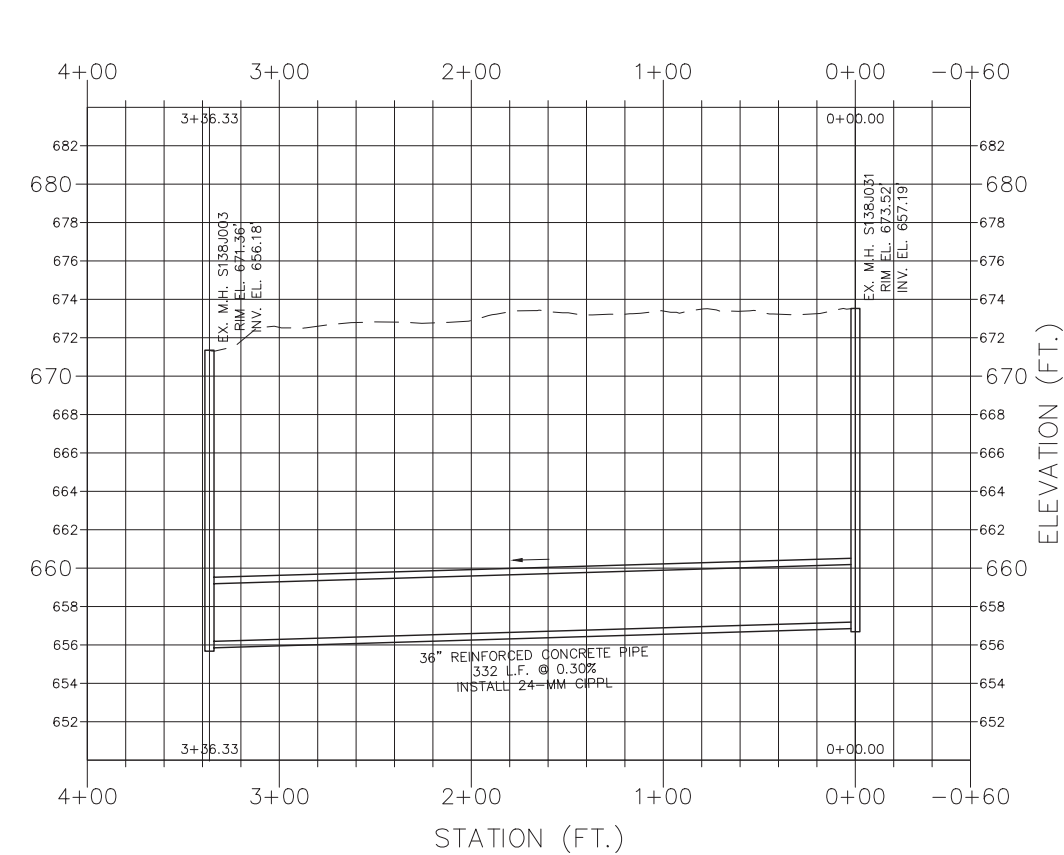
0 50' 100'



A5 S138J0034 REHABILITATION PLAN

SCALE: 1" = 50'

0 50' 100'



A5 S138J0034 REHABILITATION PROFILE

SCALE: 1" = 50' HORIZ., 1" = 10' VERT.

0 50' 100'

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DATE 2017-02-28

DISC. LEAD	DESIGNER	CHECKER
TWR	LRS	EVB

SHEET TITLE

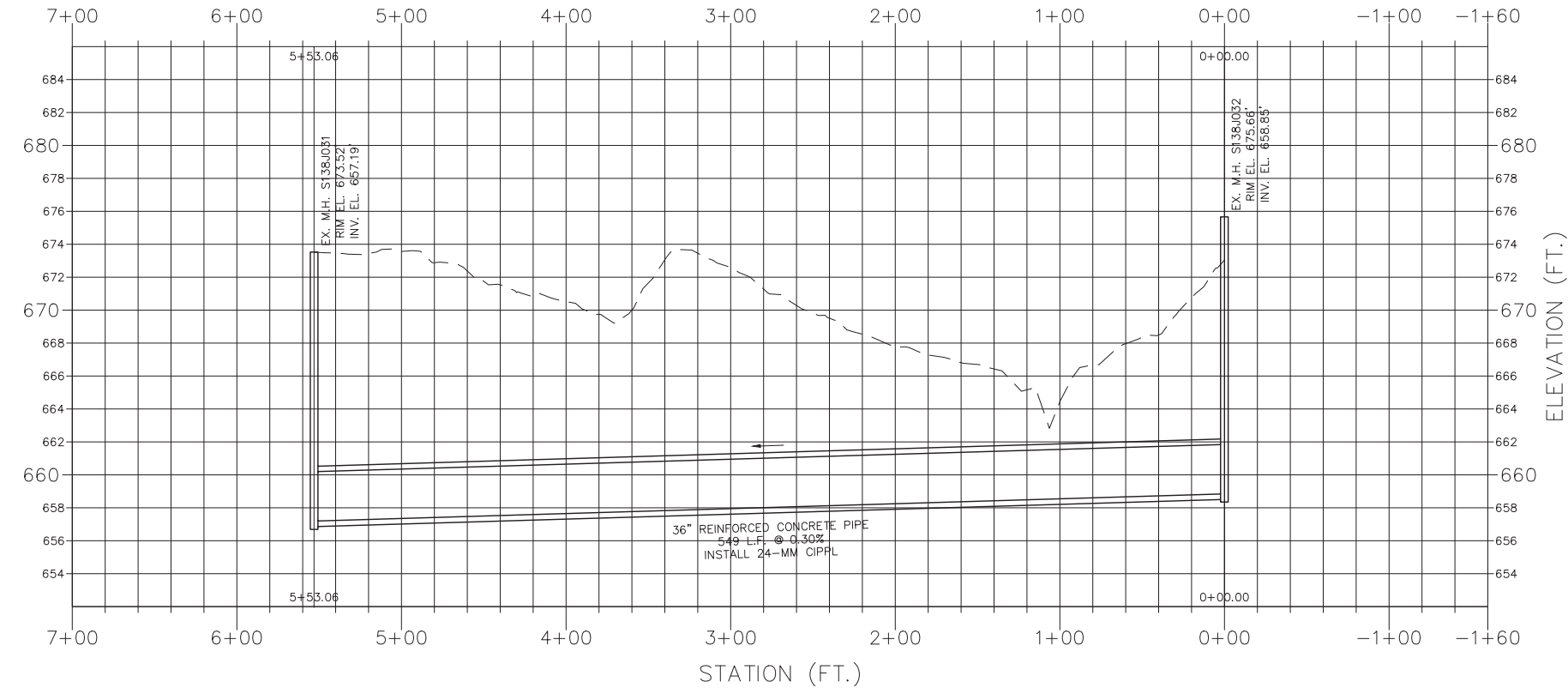
SANITARY SEWER REHABILITATION LINE PLANS & PROFILES INTERCEPTOR

SHEET NO. CU284

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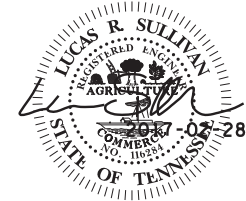


A3 S138J0033 REHABILITATION PLAN
SCALE: 1" = 50'



A3 S138J0033 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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DATE	2017-02-28	
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TWR	LRS	EVb
SHEET TITLE		

**SANITARY SEWER
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SHEET NO. CU285

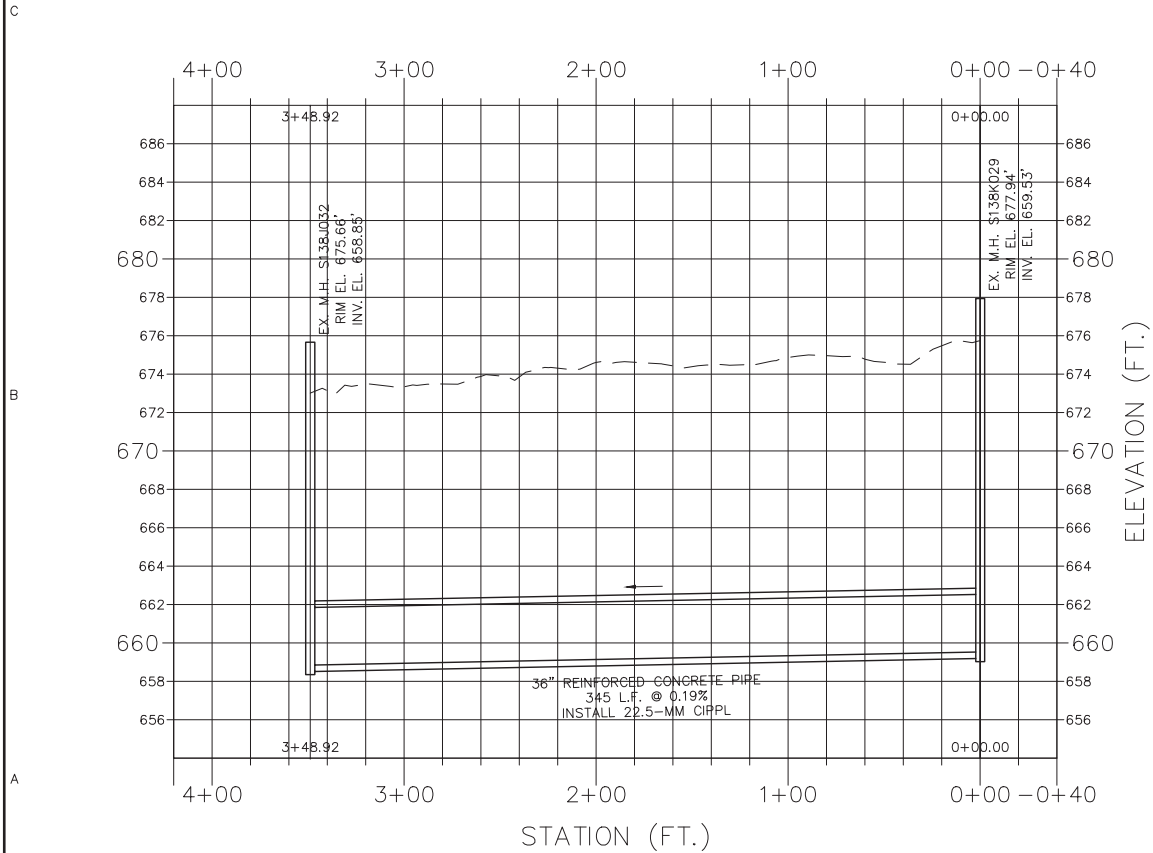
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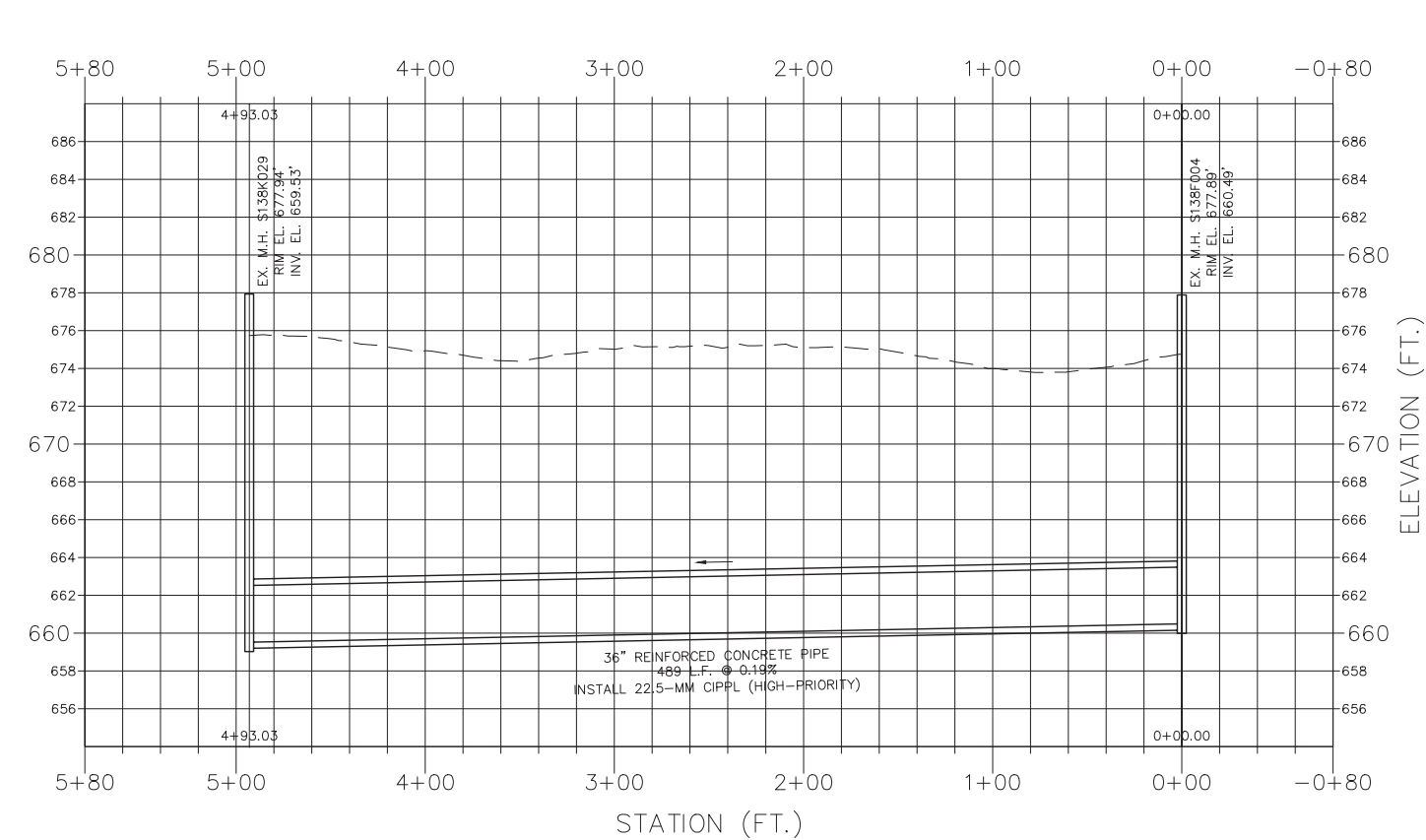
A1 S138J0032 REHABILITATION PLAN
SCALE: 1" = 50'



A4 S138F0008 REHABILITATION PLAN
SCALE: 1" = 50'

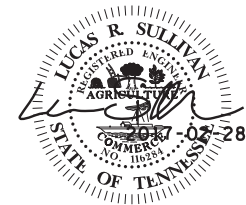


A1 S138J0032 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.



A4 S138F0008 REHABILITATION PROFILE
SCALE: 1" = 50' HORZ., 1" = 10' VERT.

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DISC. LEAD	TWR
DESIGNER	LRS
CHECKER	EVB

SHEET TITLE
**SANITARY SEWER
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SHEET NO. CU286

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AND OTHER CONTRACT DOCUMENTS.

PROJ. NO.	W-12-029-20
DATE	2017-02-2

DISC. LEAD	DESIGNER	CHECKER
TWR	IRS	FVR

SHEET TITLE

SANITARY SEWER PIPE REHABILITATION SCHEDULE – INTERCEPTOR

SHEET NO. CU615

T:\PRA\1735644-CHATTANOOGA\WAT\INTERCEPTOR\1735644-WAT-CU62.dwg 2017-02-28 1:44:20 PM DEFAULT SETTINGS, PEN ASSIGNMENTS, PRINTER/PLOTTER COMMANDS, OVERLAY DRAFTING CONTROL DATA, REFERENCE FILE(S), LAYERS PLOTTED, PRODUCTION HOURS

1	2	3	4	5	6	7
SANITARY SEWER STRUCTURE REHABILITATION SCHEDULE — INTERCEPTOR						
MANHOLE ID	TAX MAP PLAN SHEET NO.	RIM ELEV. (FT.)	DEPTH (FT.)	BARREL DIA. (IN.)	TRANSITION TYPE	COMMENTS
E	S138F004	CU108	677.89	17.40	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138J003	CU109	673.13	16.95	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138J004	CU109	671.79	15.93	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138J013	CU109	667.62	12.11	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138J031	CU109	673.30	16.11	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138J032	CU109	675.66	16.81	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138K029	CU110	677.94	18.41	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138O013	CU114	662.36	11.95	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138O017	CU114	667.15	15.90	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138O018	CU114	676.10	24.20	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S138O019	CU114	674.23	19.70	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138O020	CU114	675.23	21.00	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138O021	CU114	677.07	24.00	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138O022	CU114	675.89	23.80	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138O023	CU114	670.03	14.80	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S138O024	CU114	669.13	14.27	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S147D009	CU126	660.92	19.40	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A001	CU127	661.34	19.20	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A002	CU127	660.10	17.70	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A003	CU127	659.06	16.50	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A004	CU127	655.38	12.49	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A005	CU127	655.65	12.43	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A006	CU127	654.88	11.27	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A007	CU127	656.37	12.25	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A008	CU127	655.25	11.16	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A009	CU127	655.93	12.00	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A010	CU127	657.10	13.07	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A011	CU127	656.22	12.50	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS.
	S148A013	CU127	656.50	12.33	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A014	CU127	658.14	13.53	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A015	CU127	656.67	11.34	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148A022	CU127	657.23	12.29	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148B030	CU128	662.26	13.57	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148B036	CU128	658.23	12.48	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148B901	CU128	663.00	12.84	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.
	S148B902	CU128	661.00	13.82	48	INLINE TEE REMOVE STEPS AND APPLY TYPE 1 POLYMER RESIN-BASED LINING. RESET EXISTING FRAME AND COVER AND SEAL JOINTS. HIGH PRIORITY.

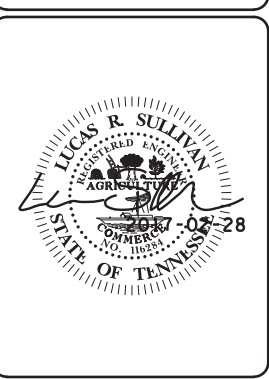
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DATE 2017-02-28

DISC. LEAD TWR

DESIGNER LRS

CHECKER EVB

SHEET TITLE

SANITARY SEWER MANHOLE REHABILITATION SCHEDULE — INTERCEPTOR

SHEET NO. CU626

PROJECT MANUAL

Friar's Branch Basin Improvements

CONTRACT NO. W-12-029-201



MAYOR AND CITY COUNCIL

Andy Berke, Mayor
Chip Henderson, Councilman
Jerry Mitchell, Vice-Chairman
Ken Smith, Councilman
Larry Grohn, Councilman
Russell Gilbert, Councilman
Carol B. Berz, Councilwoman
Chris Anderson, Councilman
Moses Freeman, Chairman
Yusuf Hakeem, Councilman

**CITY OF
CHATTANOOGA, TENNESSEE**

February 28, 2017

***PARSONS
BRINCKERHOFF***

SPECIFICATIONS

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**FRIAR'S BRANCH BASIN IMPROVEMENTS
CONTRACT NUMBER W-12-029-201**

CITY OF CHATTANOOGA, TENNESSEE

Sealed Bids for furnishing all materials, labor, tools, equipment and appurtenances necessary for the construction of the Friar's Branch Basin Improvements will be received at the City of Chattanooga at City Hall, Purchasing Department, Suite G13, 101 East 11th Street, Chattanooga, TN 37402, until 2:00 p.m., local time, on March 23, 2017, and then at said office publicly opened and read aloud.

A Pre-Bid Conference is scheduled for February 2, 2017 at 10:00 A.M. local time, in the Training Facility, Moccasin Bend Wastewater Treatment Plant, 455 Moccasin Bend Road, Chattanooga, TN 37405. Bidder attendance is encouraged but not mandatory.

The Project includes: the installation of approximately 22,630 feet of cured-in-place pipe lining (CIPPL) in gravity sanitary sewer mains, of which approximately 5,660 feet is 42-inch diameter, 4,760 feet is 36-inch diameter, 440 feet is 30-inch diameter, 4,380 feet is 24-inch diameter, 5,590 feet is 18-inch diameter, and 1,800 feet is 8-inch diameter, as well as pre-installation cleaning of all lines and pre- and post-installation closed-circuit television (CCTV) inspection of all lines; the installation of approximately 1,300 feet of CIPPL in sanitary sewer service laterals; the reinstatement of approximately 77 sanitary sewer service laterals by robotic means and 110 sanitary sewer service laterals by open-cut means; the rehabilitation of approximately 800 vertical feet of manholes utilizing cementitious lining and 2,290 vertical feet of manholes utilizing polymer resin-based lining; furnishing and installing approximately 113 chimney seal manhole inserts, 84 manhole inflow dish inserts, and 113 manhole frames and covers; the replacement of approximately 620 feet of 8-inch diameter gravity sanitary sewer mains via open-cut in the same trench; and approximately 71 point repairs, ranging in size from 8-inch to 24-inch diameter pipe.

The Instructions to Bidders, Bid, Contract Agreement, Drawings, Specifications and forms of Bid Bond, Performance Bond, Payment Bond and other Contract Documents may be examined at the following:

City of Chattanooga
Purchasing Department
101 E. 11th Street, Suite G13
Chattanooga, Tennessee 37402
423-643-7230

Parsons Brinckerhoff, Inc.
707 Georgia Avenue, Suite 201
Chattanooga, Tennessee 37402
+1 (423) 531-8010

Ms. Marilyn Robinson, Executive Director
Nashville Minority Business Office
1919 Charlotte Avenue, Suite 310
Nashville, TN 37203
(615) 255-0432

Copies of Contract Documents may be purchased from 8:00 am to 4:30 pm, Monday through Friday, at the office of the City of Chattanooga Purchasing Department, 101 East 11th Street, Suite G13, Chattanooga, TN 37402, phone (423) 643-7230, Fax (423) 643-7244. Cost of Contract Documents is \$100.00 per set. No part of the purchase price will be refunded.

Each Bid must be accompanied by a Bid Bond, prepared on the form of Bid Bond attached to the Contract Documents or a Surety Company's Standard Bid Bond, duly executed by the Bidder as principal and having as surety thereon a surety company licensed to do business in the State of Tennessee and listed as a certified company in the latest issue of U.S. Treasury Circular 570, in the amount of five percent of the Bid.

Disadvantaged Business Enterprises (DBE) Requirements

Any contract or contracts awarded by the Owner through this advertisement for bids will be funded by a State Revolving Fund (SRF) loan from the State of Tennessee. State and Federal funds will be involved in this Project and, as a result, Bidders must comply with the SRF Loan Program's Disadvantaged Business Enterprises (DBE) requirements, including contacting a minimum of 10 qualified DBE sub-contractors, professional service providers, vendors, and/or suppliers by certified mail to solicit bids. The apparent successful Bidder must submit to the Owner copies of the certified letters and return receipts prior to Contract award. Neither the State of Tennessee nor any of its departments, agencies, or employees is or will be a party to this Invitation for Bids or any resulting contract(s) awarded by the Owner.

Special Notice to Disadvantaged Business Enterprises (DBE) Firms

All qualified Disadvantaged Business Enterprises (DBE) firms desiring to bid as a General Contractor, sub-contractor, professional service provider, supplier, or equipment vendor are encouraged to contact Ms. Marilyn Robinson at the Nashville Minority Business Center office listed above to review bidding/contract documents. Qualified Disadvantaged Business Enterprises (DBE) firms may also contact City of Chattanooga Purchasing Department at the address above, in order to obtain a list of prospective bidding General Contractors or to obtain copies of bidding/contract documents.

Davis-Bacon Act and American Iron and Steel Requirements

This project is being funded by a State Revolving Fund loan on or after 2014 EPA Fiscal Year. The loan recipient must be in compliance with all applicable Davis-Bacon Act and American Iron and Steel requirements.

The allotted time for construction is 270 calendar days.

No bid may be withdrawn within 120 calendar days after the scheduled time for receipt of bids.

All bidders must be licensed and shall comply with all requirements of the State of Tennessee Contractor's Licensing Act.

Visit City website at: www.chattanooga.gov/general-services/purchasing/bidssolicitations for specific contract information.

The City of Chattanooga is an Equal Opportunity Employer.

Any contract or contracts awarded under this Advertisement for Bids are expected to be funded with local funds in addition to funds indicated elsewhere.

The Owner will in no way be liable for any costs incurred by any bidder in the preparation of its Bid in response to this Invitation to Bid.

The successful Bidder for this Contract will be required to furnish a satisfactory Performance Bond and Payment Bond each in the amount of 100 percent of the Bid.

The Owner reserves the right to reject any or all Bids, to waive informalities and to readvertise.

CITY OF CHATTANOOGA, TENNESSEE

RECOMMENDED FOR APPROVAL:

APPROVED:

William C. Payne, P.E.
City Engineer
Department of Public Works

Justin C. Holland
Administrator
Department of Public Works

END OF SECTION

Certified Disadvantaged Business Enterprises (DBE) List

Using Governor's Diversity Business Office and State DOT and CCR DBE Directories to Find Certified WBEs and MBEs

Here are the links:

<https://tn.diversitysoftware.com/FrontEnd/VendorSearchPublic.asp?TN=tn&XID=1215>

www.osdbu.dot.gov/DBEProgram/StateDOTDBESites.cfm

CCR can be used to search for SBA SDBs. Since the SBA SDB certification is considered acceptable under the EPA DBE Program, firms found using the following search criteria can count toward EPA MBE/WBE fair share objectives.

Access the CCR search page at www.bpn.gov/CCRSearch/Search.aspx

http://www.epa.gov/osbp/dbe_team.htm

**FRIAR'S BRANCH BASIN IMPROVEMENTS
CONTRACT NUMBER W-12-029-201**

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

City of Chattanooga, Tennessee
Purchasing Department
101 E. 11th Street, Suite G13
Chattanooga, Tennessee 37402

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for period of time after the Bid opening as stated in the Advertisement for Bids, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.

Addendum Date

_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in SC-4.02 as containing reliable "technical data," and (2) reports

and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

- E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- J. Where this Bid Form contains the provision for a bid based on a lump sum price, the Bidder shall be responsible for having prepared its own estimate of the quantities necessary for the satisfactory completion of the Work specified in these Contract Documents and for having based the lump sum price bid on its estimate of quantities.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
1.	8-Inch Sewer Cured-In-Place Rehabilitation				
a.	Pre-Installation Cleaning, Normal	1,615	LF	\$	\$
b.	Pre-Installation Cleaning, Heavy (add on)	179	LF	\$	\$
c.	6.0 mm CIPP (including bypass pumping)	1,794	LF	\$	\$
d.	Point Repair	60	EA	\$	\$
2.	18-Inch Sewer Cured-In-Place Rehabilitation				
a.	Pre-Installation Cleaning, Normal	5,320	LF	\$	\$
b.	Pre-Installation Cleaning, Heavy (add on)	615	LF	\$	\$
c.	13.5 mm CIPP	5,935	LF	\$	\$
d.	Point Repair	7	EA	\$	\$
e.	Bypass Pumping	1	LS	\$	\$
3.	24-Inch Sewer Cured-In-Place Rehabilitation				
a.	Pre-Installation Cleaning, Normal	3,650	LF	\$	\$
b.	Pre-Installation Cleaning, Heavy (add on)	445	LF	\$	\$
c.	16.5 mm CIPP	4,095	LF	\$	\$
d.	Point Repair	4	EA	\$	\$
e.	Bypass Pumping	1	LS	\$	\$
4.	30-Inch Sewer Cured-In-Place Rehabilitation				
a.	Pre-Installation Cleaning, Normal	430	LF	\$	\$
b.	Pre-Installation Cleaning, Heavy (add on)	50	LF	\$	\$
c.	18.0 mm CIPP	480	LF	\$	\$
d.	Bypass Pumping	1	LS	\$	\$
5.	36-inch Sewer Cured-In-Place Rehabilitation				
a.	Pre-Installation Cleaning, Normal	4,280	LF	\$	\$
b.	Pre-Installation Cleaning, Heavy (add on)	480	LF	\$	\$

Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
c.	21.0 mm CIPP	170	LF	\$	\$
d.	22.5 mm CIPP	1,090	LF	\$	\$
e.	24.0 mm CIPP	1,540	LF	\$	\$
f.	25.5 mm CIPP	610	LF	\$	\$
g.	27.0 mm CIPP	1,360	LF	\$	\$
h.	Bypass Pumping	1	LS	\$	\$
6.	42-inch Sewer Cured-In-Place Rehabilitation				
a.	Pre-Installation Cleaning, Normal	5,090	LF	\$	\$
b.	Pre-Installation Cleaning, Heavy (add on)	570	LF	\$	\$
c.	30.0 mm CIPP	4,030	LF	\$	\$
d.	34.5 mm CIPP	950	LF	\$	\$
e.	37.5 mm CIPP	560	LF	\$	\$
f.	39.0 mm CIPP	150	LF	\$	\$
g.	Bypass Pumping	1	LS	\$	\$
7.	Same Trench Sewer Replacement				
a.	Remove Existing 6-Inch Diameter Sewer and Replace with 8-Inch Diameter PVC Pipe Sewer	290	LF	\$	\$
b.	Remove Existing 8-Inch Diameter Sewer and Replace with 8-Inch Diameter Cast Iron Pipe Sewer	220	LF	\$	\$
c.	Remove Existing 8-Inch Diameter Sewer and Replace with 8-Inch Diameter PVC Pipe Sewer	860	LF	\$	\$
d.	Connect to Existing Manhole with 8-Inch Sewer	14	EA	\$	\$
e.	Connect to Existing Manhole with 24-Inch Sewer	20	EA	\$	\$
8.	Sewer CCTV Inspection				
a.	Pre-Installation — 8-Inch Sewer	5,705	LF	\$	\$
b.	Post-Installation — 8-Inch Sewer	5,705	LF	\$	\$
c.	Pre-Installation — 10-Inch Sewer	350	LF	\$	\$
d.	Post-Installation — 10-Inch Sewer	350	LF	\$	\$
e.	Pre-Installation — 18-Inch Sewer	5,898	LF	\$	\$
f.	Post-Installation — 18-Inch Sewer	5,898	LF	\$	\$

Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
g.	Pre-Installation — 24-Inch Sewer	4,765	LF	\$	\$
h.	Post-Installation — 24-Inch Sewer	4,765	LF	\$	\$
i.	Pre-Installation — 30-Inch Sewer	480	LF	\$	\$
j.	Post-Installation — 30-Inch Sewer	480	LF	\$	\$
k.	Pre-Installation — 36-Inch Sewer	4,760	LF	\$	\$
l.	Post-Installation — 36-Inch Sewer	4,760	LF	\$	\$
m.	Pre-Installation — 42-Inch Sewer	5,660	LF	\$	\$
n.	Post-Installation — 42-Inch Sewer	5,660	LF	\$	\$
9.	Service Lateral Rehabilitation				
a.	6-Inch CIPP Lateral Lining (up to 25 feet)	50	EA	\$	\$
b.	6-Inch CIPP Lateral Lining Beyond First 25 Feet	50	LF	\$	\$
c.	Service Lateral Reinstatement by Coring and Brushing on 8-Inch Sewer	32	EA	\$	\$
d.	Service Lateral Reinstatement by Coring and Brushing on 18-Inch Sewer	3	EA	\$	\$
e.	Service Lateral Reinstatement by Coring and Brushing on 36-Inch Sewer	1	EA	\$	\$
f.	Service Lateral Reinstatement by Coring and Brushing on 42-Inch Sewer	3	EA	\$	\$
g.	Service Lateral Reinstatement with Electrofusion Saddle on 8-Inch Sewer	13	EA	\$	\$
h.	Service Lateral Reinstatement with Electrofusion Saddle on 18-Inch Sewer	25	EA	\$	\$
i.	Service Lateral Reinstatement with Electrofusion Saddle on 24-Inch Sewer	4	EA	\$	\$
j.	Open Cut Replacement with 6-Inch PVC Pipe (0-Foot–8-Foot Cut)	1,300	LF	\$	\$
k.	Open Cut Replacement with 6-Inch PVC Pipe (8.1-Foot–12-Foot Cut)	1,300	LF	\$	\$
l.	Open Cut Replacement with 6-Inch PVC Pipe (12.1-Foot–16-Foot Cut)	225	LF	\$	\$
m.	New Clean-Out for Open Cut Replacement Laterals	110	EA	\$	\$

Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
10.	Manholes - Surface Rehabilitation				
a.	Replace Existing Frame and Cover with New Standard Frame and Cover	84	EA	\$	\$
b.	Replace Existing Frame and Cover with New Watertight Frame and Cover	64	EA	\$	\$
c.	Chimney Seal – Wide Width (10-Inch)	113	EA	\$	\$
d.	Chimney Seal – Extra-Wide Width (13-Inch)	35	EA	\$	\$
11.	Manholes - Subsurface Rehabilitation				
a.	Cementitious Lining in 4-Foot Diameter Manhole	798	VF	\$	\$
b.	Type 1 Polymer Resin-Based Lining in 4-Foot Diameter Manhole	1,786	VF	\$	\$
c.	Type 2 Polymer Resin-Based Lining in 4-Foot Diameter Manhole	499	VF	\$	\$
d.	Rebuild Bench and Invert in 4-Foot Diameter Manhole	84	EA	\$	\$
e.	Raise 4-Foot Diameter Manhole	15	EA	\$	\$
12.	New Precast Concrete Manhole				
a.	4-foot Diameter Base, Including Frame and Cover	1	EA	\$	\$
b.	Penetrations to Precast Manhole	2	EA	\$	\$
13.	Pavement Removal and Replacement				
a.	Asphalt	1,100	LF	\$	\$
b.	Concrete	1,100	LF	\$	\$
c.	Flowable Fill	1,500	CY	\$	\$
14.	Cash Allowances				
a.	Soil, Concrete and Materials Testing	Allowance			\$ 75,000.00
b.	Cured In Place Pipe Testing Laboratory Services	Allowance			\$ 75,000.00
c.	Construction Verification Surveying	Allowance			\$ 75,000.00
*** ADDITIONAL WORK IF ORDERED BY THE ENGINEER ***					
15.	Inflow Dish	84	EA	\$	\$
16.	Remove Protruding Service Lateral or Gasket				
a.	In 8-Inch Sewer	7	EA	\$	\$

Item No.	Description	Estimated Qty.	Unit	Unit Price	Total Price
c.	In 18-Inch Sewer	11	EA	\$	\$
17.	Trench Stabilization				
a.	Crushed Stone	100	CY	\$	\$
b.	Filter Fabric	2,500	SF	\$	\$
18.	Additional Point Repairs for Interceptor				
a.	36-inch Diameter	1	EA	\$	\$
b.	42-inch Diameter	1	EA	\$	\$

BID TOTAL, ITEMS 1 THROUGH 18, INCLUSIVE, THE AMOUNT OF _____

_____ DOLLARS (\$_____).

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
- A. Statement of Bidders Qualifications
 - B. Affidavit of No Collusion by Prime Bidder
 - C. Drug-Free Workplace Affidavit
 - D. Attestation Regarding Personnel Used in Contract Performance
 - E. Certification By Proposed Prime or Subcontractor Regarding Equal Employment Opportunity
 - F. Certification Regarding Debarment, Suspension and Other Responsibility Matters

ARTICLE 8 – DEFINED TERMS

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid submitted by:

An Individual

Name (typed or printed): _____

By: _____

(SEAL) _____

(Individual's signature)

Doing business as: _____

Attest: _____

(Notary)

Name (typed or printed): _____

A Partnership

Partnership _____

Name: _____

(SEAL) _____

By: _____

(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

Attest: _____

(Signature of another Partner)

Name (typed or printed): _____

A Corporation

Corporation _____

Name: _____

(SEAL) _____

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____

(Signature)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest: _____

(Signature of Corporate Secretary)

Name (typed or printed): _____

Date of Qualification to do business in Tennessee is _____

A Joint Venture

Name of Joint Venturer: _____

First Joint Venturer Name: _____

(SEAL)

By: _____
(Signature of first joint venture partner)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____

(SEAL)

By: _____
(Signature of second joint venture partner)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

All Bidders shall complete the following:

Bidder's Business address: _____

Phone: _____ Facsimile: _____

Primary Contact: _____

E-mail: _____

Submitted on _____, 201____.

State Contractor License No. _____.

This document was prepared in part from material (EJCDC C-410 Suggested Bid Form for Construction Contracts) which is copyrighted as indicated below:

Copyright © 2007 National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
(703) 548-3118
www.agc.org

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*** Current through the 2014 Regular Session and amendments approved at the November 4, 2014 General Election ***

Title 66 Property
Chapter 34 Prompt Pay Act
Part 1 General Provisions

Tenn. Code Ann. § 66-34-103 (2015)

66-34-103. Withholding of retainage -- Violations -- Penalties.

(a) All construction contracts on any project in this state, both public and private, may provide for the withholding of retainage; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

(b) The owner, whether public or private, shall release and pay all retainages for work completed pursuant to the terms of any contract to the prime contractor within ninety (90) days after completion of the work or within ninety (90) days after substantial completion of the project for work completed, whichever occurs first. As used in this subsection (b), work completed shall be construed to mean the completion of the scope of the work and all terms and conditions covered by the contract under which the retainage is being held. The prime contractor shall pay all retainages due any subcontractor within ten (10) days after receipt of the retainages from the owner. Any subcontractor receiving the retainage from the prime contractor shall pay to any subsubcontractor or material supplier all retainages due the subsubcontractor or material supplier within ten (10) days after receipt of the retainages.

(c) Any default in the making of the payments shall be subject to those remedies provided in this part.

(d) In the event that an owner or prime contractor withholds retainage that is for the use and benefit of the prime contractor or its subcontractors pursuant to § 66-34-104(a) and (b), neither the prime contractor nor any of its subcontractors shall be required to deposit additional retained funds into an escrow account in accordance with § 66-34-104(a) and (b).

(e) (1) It is an offense for a person, firm or corporation to fail to comply with subsection (a) or (b) or § 66-34-104(a).

(2) (A) A violation of this subsection (e) is a Class A misdemeanor, subject to a fine only of three thousand dollars (\$3,000).

(B) Each day a person, firm or corporation fails to comply with subsection (a) or (b) or § 66-34-104(a) is a separate violation of this subsection (e).

(C) Until the violation of this subsection (e) is remediated by compliance, the punishment for each violation shall be consecutive to all other such violations.

(3) In addition to the fine imposed pursuant to subdivisions (e)(2)(A) and (B), the court shall order restitution be made to the owner of the retained funds. In determining the appropriate amount of restitution, the formula stated in § 40-35-304 shall be used.

HISTORY: Acts 2007, ch. 201, § 3; 2008, ch. 804, § 3; 2012, ch. 609, § 1.

*** Current through the 2014 Regular Session and amendments approved at the November 4,
2014 General Election ***

Title 66 Property
Chapter 34 Prompt Pay Act
Part 1 General Provisions

Tenn. Code Ann. § 66-34-104 (2015)

**66-34-104. Retention of portion of contract price in escrow -- Applicability --
Mandatory compliance.**

(a) Whenever, in any contract for the improvement of real property, a certain amount or percentage of the contract price is retained, that retained amount shall be deposited in a separate, interest-bearing, escrow account with a third party which must be established upon the withholding of any retainage.

(b) As of the time of the withholding of the retained funds, the funds shall become the sole and separate property of the prime contractor or remote contractor to whom they are owed, subject to the rights of the person withholding the retainage in the event the prime contractor or remote contractor otherwise entitled to the funds defaults on or does not complete its contract.

(c) In the event that the party withholding the retained funds fails to deposit the funds into an escrow account as provided herein, such party shall be responsible for paying the owner of the retained funds an additional three hundred dollar (\$300) penalty per day for each and every day that such retained funds are not deposited into such escrow account.

(d) The party with the responsibility for depositing the retained amount in a separate, interest-bearing, escrow account with a third party shall have the affirmative duty to provide written notice that it has complied with the requirements of this section to any prime contractor upon withholding the amount of retained funds from each and every application for payment, including:

(1) Identification of the name of the financial institution with whom the escrow account has been established;

(2) Account number; and

(3) Amount of retained funds that are deposited in the escrow account with the third party.

(e) Upon satisfactory completion of the contract, to be evidenced by a written release by the owner or prime contractor owing the retainage, all funds accumulated in the escrow account together with all interest on the account shall be paid immediately to the prime contractor or remote contractor to whom the funds and interest are owed.

(f) In the event the owner or prime contractor, as applicable, fails or refuses to execute the release provided for in subsection (c), then the prime contractor or remote contractor, as applicable, may seek any remedy in a court of proper jurisdiction and the person holding the fund as escrow agent shall bear no liability for the nonpayment of the fund to the prime contractor or remote contractor; provided, however, that all claims, demands, disputes, controversies, and differences that may arise between the owner, prime contractor or prime

contractors, and remote contractor or remote contractors regarding the funds may be, upon written agreement of all parties concerned, settled by arbitration conducted pursuant to the Tennessee Uniform Arbitration Act, compiled in title 4, chapter 5, part 3, or the Federal Arbitration Act, 9 U.S.C. § 1, et seq., as may be applicable.

(g) In contracts to which the state or any department, board or agency of the state, including the University of Tennessee, is a party, interest shall be paid on the retained amounts at the same rate interest is paid on the funds of local governments participating in the local government investment pool established pursuant to § 9-4-704, for the contract period.

(h) The provisions of this section shall be applicable to the state, any department, board or agency of the state, including the University of Tennessee, and all counties and municipalities and all departments, boards or agencies of the counties and municipalities, including all school and education boards, and any other subdivision of the state.

(i) This section shall be applicable to all prime contracts and all subcontracts thereunder for the improvement of real property when the contract amount of such prime contract is five hundred thousand dollars (\$500,000) or greater, notwithstanding the amount of such subcontracts.

(j) Compliance with this section shall be mandatory, and may not be waived by contract.

(k) Failure to deposit the retained funds into an escrow account as provided herein, within seven (7) days' receipt of written notice regarding such failure, is a Class A misdemeanor.

HISTORY: Acts 1975, ch. 345, §§ 1-4; T.C.A., §§ 64-1148 -- 64-1151; Acts 1985, ch. 340, §§ 1, 2; 1986, ch. 551, § 9; 2007, ch. 189, § 43; 2007, ch. 201, §§ 1, 2; T.C.A. § 66-11-144; Acts 2008, ch. 804, §§ 1, 2; 2010, ch. 875, §§ 1, 2; 2012, ch. 609, §§ 2-5.

Tenn. Code Ann. § 66-34-203

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*** Current through the 2014 Regular Session and amendments approved at the November 4,
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Title 66 Property
Chapter 34 Prompt Pay Act
Part 2 Owner/Contractor Payment

Tenn. Code Ann. § 66-34-203 (2015)

66-34-203. Withholding of payment or retainage by owner.

Nothing in this chapter shall prevent the owner from reasonably withholding payment or a portion of a payment to the contractor; provided, that such withholding is in accordance with the provisions of the written contract between the owner and the contractor. The owner may also withhold a reasonable amount of retainage as specified in the written contract between the owner and the contractor; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

HISTORY: Acts 1991, ch. 45, § 1; 2007, ch. 201, § 4.

Appendix 1: Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
<p>General</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Time of delivery or availability — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor 		
<p>Cost Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers 		
<p>Availability Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: <ul style="list-style-type: none"> — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects? 		

Implementation

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the “Administrator”) finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out

the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

Project Coverage

1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

- 5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?**

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

- 6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?**

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

- 7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?**

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

- 8) What if a project has split funding from a non-SRF source?**

Many States intend to fund projects with “split” funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A “project” consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger

project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

- Lined or unlined pipes or fittings;
- Manhole Covers;
- Municipal Castings (defined in more detail below);
- Hydrants;
- Tanks;
- Flanges;
- Pipe clamps and restraints;
- Valves;
- Structural steel (defined in more detail below);
- Reinforced precast concrete; and
- Construction materials (defined in more detail below).

12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both questions is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the

material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of ‘municipal castings’?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

- Access Hatches;
- Ballast Screen;
- Benches (Iron or Steel);
- Bollards;
- Cast Bases;
- Cast Iron Hinged Hatches, Square and Rectangular;
- Cast Iron Riser Rings;
- Catch Basin Inlet;
- Cleanout/Monument Boxes;
- Construction Covers and Frames;
- Curb and Corner Guards;
- Curb Openings;
- Detectable Warning Plates;
- Downspout Shoes (Boot, Inlet);
- Drainage Grates, Frames and Curb Inlets;
- Inlets;
- Junction Boxes;
- Lampposts;
- Manhole Covers, Rings and Frames, Risers;

Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zeos. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and

data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Compliance

25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-

888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: <http://www.epa.gov/oig/hotline.htm>.

28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

Reasonably Available Quantity: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

Satisfactory Quality: The quality of iron or steel products, as specified in the project plans and designs.

Assistance Recipient: A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

Step-By-Step Waiver Process

Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to either of two email addresses. For CWSRF waiver requests, please send the application to: cwsrfwaiver@epa.gov. For DWSRF waiver requests, please send the application to: dwsrfwaiver@epa.gov.

Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA's website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: http://water.epa.gov/grants_funding/aisrequirement.cfm
2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.
3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

Part 1 General

1.01 Description

- A. The work to be performed under this Contract shall consist of furnishing all labor, materials, tools, equipment and incidentals and performing all work required to construct complete in place and ready to operate:

The installation of approximately 22,630 feet of cured-in-place pipe lining (CIPPL) in gravity sanitary sewer mains, of which approximately 5,660 feet is 42-inch diameter, 4,760 feet is 36-inch diameter, 440 feet is 30-inch diameter, 4,380 feet is 24-inch diameter, 5,590 feet is 18-inch diameter, and 1,800 feet is 8-inch diameter, as well as pre-installation cleaning of all lines and pre- and post-installation closed-circuit television (CCTV) inspection of all lines; the installation of approximately 1,300 feet of CIPPL in sanitary sewer service laterals; the reinstatement of approximately 77 sanitary sewer service laterals by robotic means and 110 sanitary sewer service laterals by open-cut means; the rehabilitation of approximately 800 vertical feet of manholes utilizing cementitious lining and 2,280 vertical feet of manholes utilizing polymer resin-based lining; furnishing and installing approximately 113 chimney seal manhole inserts, 84 manhole inflow dish inserts, and 113 manhole frames and covers; the replacement of approximately 620 feet of 8-inch diameter gravity sanitary sewer mains via open-cut in the same trench; and approximately 71 point repairs, ranging in size from 8-inch to 24-inch diameter pipe.

- B. All work described above shall be performed as shown on the Drawings and as specified.

1.02 Project Location

The equipment and materials to be furnished will be installed at the locations shown on the Drawings.

1.03 Quantities

The Owner reserves the right to alter the quantities of work to be performed or to extend or shorten the improvements at any time when and as found necessary, and the Contractor shall perform the work as altered, increased or decreased. Payment for such increased or decreased quantity will be made in accordance with the Instructions to Bidders. No allowance will be made for any change in anticipated profits nor shall such changes be considered as waiving or invalidating any conditions or provisions of the Contract and Bond.

1.04 Partial Owner Occupancy

The existing facilities to which these improvements are being made will continue operation during the period of construction. There shall not be any interruption in service. The Contractor is responsible for fines assessed due to his activities.

END OF SECTION

Part 1 General

1.01 Scope

- A. The Bid lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid.
- B. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid, and which are not specified in this section to be measured or to be included in one of the items listed in the Bid, shall be considered as incidental to the work. All costs thereof, including Contractor's overhead costs and profit, shall be considered as included in the lump sum or unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.
- C. Work includes furnishing all plant, labor, equipment, tools and materials, which are not furnished by the Owner and performing all operations required to complete the work satisfactorily, in place, as specified and as indicated on the Drawings and Specifications.

1.02 Descriptions

- A. Measurement of an item of work will be by the unit indicated in the Bid.
- B. Final payment quantities shall be determined from the documented field measurements. The precision of final payment quantities shall match the precision shown for that item in the Bid.
- C. Payment will include all necessary and incidental related work not specified to be included in any other item of work listed in the Bid.
- D. Unless otherwise stated in individual sections of the Specifications or in the Bid, no separate payment will be made for any item of work, materials, parts, equipment, supplies or related items required to perform and complete the work. The costs for all such items required shall be included in the price bid for item of which it is a part.
- E. Payment will be made by extending unit prices multiplied by quantities provided and then summing the extended prices to reflect actual work. Such price and payment shall constitute full compensation to the Contractor for furnishing all plant, labor, equipment, tools and materials not furnished by the Owner and for performing all operations required to provide to the Owner the entire Project, complete in place, as specified and as indicated on the Drawings.
- F. "Products" shall mean materials or equipment permanently incorporated into the work.

1.03 General

- A. No separate payment shall be made for clearing and constructing access roads to sewers.

- B. The cost of moving and reestablishing landscape features, including labor and materials, shall be included in the unit price bid for the item to which it pertains.
- C. No separate payment shall be made for the cost incurred to repair damaged property. This includes concrete or asphalt driveways, except where payment is authorized for Same Trench Sewer Replacement.
- D. Construction Along Highways, Streets and Roadways: No separate payment shall be made for traffic control or maintaining highways, streets, roadways and driveways.
- E. No additional payment will be made for replacement of defective materials.
- F. All costs related to the implementation of the easement and permit stipulations shall be included in the unit price bid for the item to which it pertains.
- G. No separate payment will be made for clean-up and testing. Any cost for labor, materials and equipment required for clean-up shall be included in the unit price bid for the item to which it pertains.
- H. No separate or additional payment will be made for any special or unique method, means, techniques or equipment necessary for the Contractor's compliance with these Specifications, regulatory requirements, permits, laws or regulations which govern this Project.
- I. No separate payment will be made for by-pass pumping.

1.04 Erosion and Sedimentation Control

- A. No separate payment shall be made for temporary and/or permanent erosion and sedimentation controls or replacement of landscaping disturbed by inspection, replacement or rehabilitation activities. All temporary and/or permanent erosion and sedimentation control costs shall be included in the unit price bid for the item to which it pertains.
- B. No payment will be made for any portion of the Project for which temporary erosion and sedimentation controls are not properly maintained.

1.05 Cleaning of Sewers

- A. Pre-Installation Cleaning of Pipelines
 - 1. Payment will be made at the unit price bid for each pipe diameter. Quantities shall be determined from field measurements verified in writing by the Engineer.
 - 2. Measurement for payment for sewers shall be from centerline of manhole to centerline of manhole.
 - 3. Payment will be based on the actual footage of pipe cleaned. Additional passes required to clean lines to the level specified in Section 33 01 30.14 will not be

counted for payment purposes. Unit prices shall include jetting in sewers both upstream and downstream.

4. The sewers to be cleaned convey sanitary sewage and/or or combined sewage. In many instances such sewers are subject to high flows, either continuously or in a periodically varying cycle, due to rainfall, infiltration, and/or pumping operations. The Contractor shall include in the unit price bid all costs for dealing with such variations, and where necessary, schedule the work to accommodate such variation in flows.
5. The cost of trapping, removing, hauling and disposing of the residual wastes captured during cleaning operations shall be included in the unit price bid.

B. Heavy Cleaning of Pipelines

1. The Contractor shall be paid for heavy cleaning on the basis of the distance loosened debris is moved to the nearest point of extrication from the sewer. Payment shall be calculated on a lineal foot basis and be paid in addition to the normal cleaning rate on the bid form.
2. Heavy cleaning must be pre-approved by the Engineer.

- C. Cleaning of service laterals will be considered as incidental costs with no separate payment being made.

1.06 Pre-Installation and Post-Installation Closed Circuit Television (CCTV) Inspection of Sewers and Service Laterals

- A. Payment will be made at the unit price bid for each pipe diameter and service lateral. Quantities shall be determined from field measurements verified in writing by the Engineer.
- B. Measurement for payment for sewers shall be from centerline of manhole to centerline of manhole. Measurement for payment for laterals shall be for lengths authorized by the Engineer.
- C. Payment will be based on the actual footage of pipe inspected and shall include all items necessary to perform the specified work and provide the specified work product.

1.07 Sewer Cured-In-Place Rehabilitation

- A. Payment will be made at the unit price bid for each diameter and CIPP thickness constructed. Quantities shall be determined from field measurements verified in writing by the Engineer. Post inspection videos conforming to Section 33 01 30.73 of these Specifications shall be submitted to and reviewed and approved by the Engineer prior to application for payment of the completed CIPP.
- B. Measurement shall be from centerline of manhole to centerline of manhole.
- C. No additional payment will be made for additional work items required to rehabilitate

and test the work to the level specified in Section 33 01 30.73.

1.08 Same Trench Sewer Replacement, Open Cut Lateral Replacement and Point Repairs

A. Existing Utilities and Obstructions

1. Horizontal Conflict: Payments for conflicts with existing utilities shall be made only where additional manholes and/or additional lengths of pipe are approved by the Engineer. Said payment shall be made at the unit prices in the Bid. No other payment will be made for any delay or extra cost encountered by the Contractor due to protection, avoidance or relocation of existing utilities, mains or services or changing the horizontal alignment of the sewer.
2. Vertical Conflict: Where authorized by the Engineer, payment for additional depth of cut required to avoid vertical conflicts shall be made at the unit prices bid for gravity sewer. No payment will be made for relocation of existing utilities.

B. Location and Grade: No separate payment shall be made for survey work performed by or for the Contractor in the establishment of reference points, bench marks, limits of right-of-way or easement, including their restoration, as well as centerline or baseline points.

C. Trench Excavation: No separate payment will be made for trench excavation. All costs shall be included in the unit price bid for the item to which it pertains at the appropriate depth.

D. Sheet piling, Bracing and Shoring: No separate payment will be made for providing any sheet piling, bracing and shoring.

E. Rock Excavation: No separate payment will be made for rock excavation. The cost of such work and all associated costs shall be included in the unit price for the item to which it pertains.

F. Dewatering Excavations: All costs of equipment, labor and materials required for dewatering shall be included in the price bid for the item to which it pertains.

G. Trench Stabilization

1. No payment for trench stabilization shall be authorized until after the trench has been dewatered. If the pipe is installed in an inadequately prepared trench bottom, the Engineer shall notify the Contractor in writing of the deficiency and will not authorize payment for that portion of that length of pipe which was improperly installed.
2. Payment for trench stabilization shall be made on the basis of the amount authorized and the unit price bid for Trench Stabilization. Payment shall include all costs for the removal and disposal of the unsuitable material and replacement with crushed stone. No additional payment will be made for material required for specified bedding.

3. Payment for filter fabric shall be at the unit price bid for Filter Fabric under trench stabilization. Payment shall include all costs for the placement of filter fabric.

H. Bedding and Haunching

1. The unit price bid for pipe for gravity sewer shall include excavation of the trench to the depth below the pipe necessary to provide specified bedding and to lay the sewer to grade.
2. No additional payment will be made for additional trench depth.
3. No separate payment will be made for material used to provide specified bedding. The cost of all bedding materials shall be included in the unit price bid for the item to which it relates, except for trench stabilization.
4. No additional payment will be made for improved bedding required to compensate for over excavation of the trench.

I. Initial Backfill

1. No separate payment shall be made for initial backfill.
2. No separate payment shall be made for drying out the initial backfill material in order to meet the compaction requirements.
3. No separate payment shall be made for the adding of moisture to the initial backfill materials in order to meet the compaction requirements.
4. No separate payment shall be made for providing select material if the insitu material cannot meet the compaction requirements.

J. Final Backfilling

1. No additional payment will be made for additional material when excavated materials are used.
2. No separate payment shall be made for drying out the final backfill material in order to meet the compaction requirements.
3. No separate payment shall be made for the adding of moisture to the final backfill materials in order to meet the compaction requirements.
4. No additional payment will be made for providing select material if the insitu material cannot meet the compaction requirements.

K. Additional Material: No separate payment will be made for additional earth or fill materials imported to the Project site.

L. No separate payment shall be made for detection tape or tracing wire.

- M. No payment will be made for cutting and beveling pipe.
- N. Concrete Encasement: Payment for concrete encasement shall be at the unit price in the bid.
- O. All costs associated with point repairs shall include locating the damaged segment, excavating, removing and replacing the segment with PVC pipe, labor and materials for connecting the new sewer with the existing sewer, backfilling, compacting, discarding the removed pipe and all necessary bypass pumping.
- P. Point Repairs: The unit price bid for Point Repairs shall include all costs for replacing up to twelve linear feet of existing sewer with PVC pipe. If the length of sewer to be repaired is greater than twelve feet, then payment will be authorized for an additional twelve foot increment. If additional length of 15, 12, 10 or 8-inch sewer must be replaced, then the unit prices bid for Same Trench Sewer Replacement will apply for all lengths greater than the first twelve feet. No consideration for additional compensation will be made for varying depths. Pipe and its installation shall conform to the requirements set forth for Same Trench Sewer Replacement.
- Q. Open Cut Service Lateral Replacement: Measurement for payment at the unit price for sewer service lateral shall be made from center of main sewer to end of authorized segment replacement. Payment shall also include locating existing service lines and determining requirements for the connection.

1.09 Service Lateral Rehabilitation

- A. Cured-In-Place (CIPP) Lateral Lining
 - 1. Payment will be based on the actual footage of pipe rehabilitated. Service lateral rehabilitation will be paid by a unit cost for the first 25 feet of each lateral plus a cost per linear foot for any footage beyond the initial 25 feet. Additional work items required to rehabilitate and test the lines to the level specified in Section 33 01 30.74 will not be counted for payment purposes. Post inspection videos conforming to Section 33 01 30.16 of these Specifications shall be submitted to and reviewed and approved by the Engineer prior to application for payment of the completed CIPP
 - 2. No separate payment will be made for installation of cleanouts on rehabilitated service laterals which were installed for the purpose of facilitating installation of the CIPP.
- B. Sewer Service Reinstatement – Coring and Brushing
 - 1. Payment for coring and brushing the service laterals shall be paid for at the appropriate unit price under Service Lateral Reinstatement Coring and Brushing in the bid. Measurement for payment shall be made on a unit quantity basis. Post inspection videos conforming to Section 33 01 30.16 of these Specifications shall be submitted to and reviewed and approved by the Engineer prior to application for payment of the completed Sewer Service Reinstatement.

- C. Remove Protruding Service Lateral: Payment for removal of protruding service laterals in sanitary sewer pipelines utilizing a remotely controlled robotic cutting device in order to facilitate installation of cured-in-place pipe rehabilitation will be made at the unit price bid for each pipe diameter and service lateral removed.
- D. Electrofusion Saddle Reinstatement of Sewer Services:
 - 1. Payment for reinstatement of existing sanitary sewer service lateral connections utilizing an electrofusion saddle will be made at the unit price bid and shall include all pipe bedding, backfill material, and annulus sealing material and necessary accessories. Price shall be full compensation for the installation of the connection to the HDPE host pipe, furnishing and placing of all materials, labor, tools, equipment, cleaning and preparation of host pipe to receive the new saddle, and any other necessary task to complete the Project.
 - 2. Video inspection of the host HDPE main and final installed saddle shall be paid under the conditions of Article 1.07. Post inspection videos conforming to Section 33 01 30.16 of these Specifications shall be submitted to and reviewed and approved by the Engineer prior to application for payment of the electrofusion saddle installation.

1.10 Subsurface Manhole Rehabilitation

- A. Payment will be made at the unit price bid for each manhole diameter and respective levels. Quantities shall be determined from field measurements verified in writing by the Engineer.
- B. Vertical depth measurement shall be to the actual dimension of the work.
- C. Payment will be based on the actual vertical footage of manhole rehabilitated. Additional setups required to rehabilitate manholes to the level specified in Section 33 01 30.83 will not be counted for payment purposes.
- D. Payment shall not be made for the installed cementitious lining until after:
 - 1. The manhole passes the vacuum test
 - 2. The final post-rehabilitation CCTV showing installed CIPP connecting to the manhole as specified elsewhere in the Specification.
- E. No separate payment will be made for grouting required to stop leaks or other purposes.
- F. Additional work items required to rehabilitate and test the lines to the level specified in Section 33 01 30.83 will not be counted for payment purposes.

1.11 Surface Manhole Rehabilitation

- A. Payment will be made at the unit price bid for each manhole rehabilitation bid item.

Quantities shall be determined from the number of each item installed or constructed and approved by the Engineer.

- B. Payment will be based on the actual type and quantity of manhole rehabilitation item installed or constructed. Additional setups required to rehabilitate manholes to the level specified in Section 33 01 30.84 will not be counted for payment purposes.

1.12 Precast Concrete Manhole Replacement

- A. Measurement for payment at the unit price for manholes shall be made on a unit quantity basis.
- B. Payment for precast concrete manhole replacement shall include two penetrations for influent and effluent pipelines regardless of diameter. Payment for additional penetrations shall be made from the unit price for penetrations to precast concrete manholes.
- C. No separate or additional payment will be made for testing, bedding, connecting pipes to manholes, constructing invert, plugging abandoned pipes, risers or frame and cover.

1.13 Removing and Replacing Pavement

- A. Payment for removing and replacing pavement will be made as a separate item based on the measured quantity replaced at the unit price in the Bid. The unit price bid shall include all costs associated with removing and replacing pavement, including providing select backfill if necessary, traffic control and temporary measures for maintaining traffic. Only those lengths of pavement replacement associated with Same Trench Sewer Replacement or Open Cut Service Lateral Replacement will be eligible for payment.
- B. Payment for removing and replacing pavement will be made only for that length for which the pipeline is constructed underneath the pavement as shown on the Drawings.
- C. Payment for soils testing shall be made from the "soils and concrete testing" cash allowance. No payment shall be made for tests that fail to verify required results.
- D. No additional payment will be made for removing and replacing damaged adjacent pavement.
- E. Costs for removal and replacement of sidewalks and curb and gutter shall be included in the unit price bid for the item to which it pertains.

1.14 Clean-Up

No payment will be made for any portion of the Project for which clean-up and restoration has not been completed, to the satisfaction of the Engineer and Owner.

1.15 Cash Allowances

- A. General

1. The Contractor shall include in the Bid Total all allowances stated in the Contract Documents. These allowances shall cover the net cost of the services provided by a firm selected by the Owner. The Contractor's handling costs, labor, overhead, profit and other expenses contemplated for the original allowance shall be included in the items to which they pertain and not in allowances.
 2. No payment will be made for nonproductive time on the part of testing personnel due to the Contractor's failure to properly coordinate testing activities with the work schedule or the Contractor's problems with maintaining equipment in good working condition. The Contractor shall make all necessary excavations and shall supply any samples of materials necessary for conducting compaction, density tests, concrete tests, cured-in-place pipe samples and any other samples required for testing.
 3. No payment shall be provided for services that fail to verify required results.
- B. Should the net cost be more or less than the specified amount of the allowance, the Contract will be adjusted accordingly by change order. The amount of change order will not recognize any changes in handling costs at the site, labor, overhead, profit and other expenses caused by the adjustment to the allowance.
- C. Documentation
1. Submit copies of the invoices with each periodic payment request from the firm providing the services.
 2. Submit results of services provided which verify required results.
- D. Schedule of Cash Allowances
1. Soil, Concrete and Materials Testing: Allow the amount provided in the Bid for the services of a geotechnical engineering firm and testing laboratory to verify soils conditions including trench excavation and backfill, and similar issues and for the testing of concrete cylinders for poured in place concrete and testing physical properties of manhole lining materials.
 2. Cured-In-Place Pipe Testing Laboratory Services: Allow the amount provided in the Bid for the services of a laboratory testing firm and testing laboratory, when ordered by the Engineer to verify physical properties of the cured in place pipe materials.
 3. Construction Verification Surveying
 - a. Allow the amount provided in the Bid for construction surveying by an independent surveying firm, selected by the Owner, to perform horizontal and vertical alignment checks at the discretion of the Engineer.
 - b. This allowance is solely for the use of the Engineer for verification of the Contractor's reference points, centerlines and work performed. The presence of this cash allowance in no way relieves the Contractor of the

responsibility of installing reference points, centerlines, temporary bench marks or verifying that the work has been performed accurately.

1.15 Additional Work

- A. Additional Point Repairs for Interceptor: The unit price bid for Additional Point Repairs for Interceptor shall include all costs for replacing up to six linear feet of existing 36" to 42" sewer at a depth of 15 to 20 feet with reinforced concrete pipe. All costs associated with point repairs shall include locating the damaged segment, excavating, removing and replacing the segment with reinforced concrete pipe, labor and materials for connecting the new sewer with the existing sewer, backfilling, compacting, discarding the removed pipe and all necessary bypass pumping. Pipe and its installation shall conform to the requirements set forth for Same Trench Sewer Replacement.

END OF SECTION

Part 1 General

1.01 Scope

- A. This Section covers furnishing, maintaining, and operating a temporary bypass pumping system during construction. The Contractor shall furnish all materials, labor, equipment, power, maintenance, etc., to implement a temporary pumping and control system for the purpose of diverting the existing flow around the work area.
- B. Design and installation of these systems shall be the Contractor's responsibility subject to Engineer's approval as specified.

1.02 General

The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a Specialty Contractor (Firm) who can demonstrate to the Engineer that it specializes in the design and operation of temporary bypass pumping systems. The Firm shall provide at least five references of projects of a similar size and complexity as this Project performed by his company within the past three years. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

1.03 Submittals

- A. The Contractor shall prepare with the Firm a specific, detailed description of the proposed pumping system(s) required for each location and submit it along with the Firm's references within one month following Notice to Proceed.
- B. The Contractor shall submit detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows in accordance with the submittal section. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, pump and drive control selection and design, materials and all other incidental items necessary and/or required to insure proper protection of the facilities. The plan shall include but not be limited to details of the following:
 - 1. Staging areas for pumps.
 - 2. Sewer or structure plugging method and types of plugs.
 - 3. Number, size, material, location and method of installation of suction piping.
 - 4. Number, size, material, method of installation and location of installation of discharge piping.
 - 5. Bypass pump sizes, capacity, and number of each size to be on site and power requirements.

Temporary Bypass Pumping

6. Motor control package design, including wiring diagrams, voltage and amperage requirements, control logic description.
7. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
8. Standby power provisions.
9. Thrust and restraint block sizes and locations if applicable.
10. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill.
11. Any temporary pipe supports and anchoring required.
12. Design plans and access provisions to bypass pumping and generator fueling locations indicated on the Drawings.
13. Calculations for selection of bypass pumping pipe size.
14. Schedule for installation and maintenance of bypass pumping lines.
15. Continuous monitoring, operating and emergency response plan.

Part 2 Products

2.01 Design and Performance Requirements

- A. Bypass pumping systems shall have sufficient capacity to pump from negligible flows to 10,000 gallons per minute (GPM) peak flow for the Friar's Branch Interceptor. The Contractor shall provide all pumps of adequate size to handle the flow events and temporary piping to ensure that the total flow can be safely diverted around the work area.
- B. Contractor shall have adequate standby equipment available onsite and ready for immediate operation and use in the event of an emergency or breakdown.
- C. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- D. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
- E. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

- F. The Contractor shall protect water resources wetlands and other natural resources.
- G. The Contractor shall provide standby power to all electric pumping units in the event of power loss.

2.02 Equipment

- A. 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. The pumps may be electric or diesel powered. All pumps used must be constructed to handle low flow events for long periods of time to accommodate the cyclical nature of the wastewater plant flows.
- B. The Contractor shall provide the necessary stop/start and variable speed controls for each pump. The motor controls shall use a PLC based level control system with a submersible level transducer to initiate start and stop signals to the motor controls.
- C. Discharge piping systems shall be constructed of restrained joint type piping. Joints shall allow no leakage. Standard aluminum irrigation piping is not acceptable.

Part 3 Execution

3.01 Field Quality Control and Maintenance

- A. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping prior to actual operation.
- B. The Contractor shall inspect the bypass pumping system every two hours to ensure that the system is working correctly.
- C. The Contractor shall ensure that the temporary pumping system is properly maintained and that a responsible operator shall be on hand at all times when pumps are operating.
- D. The Contractor shall submit a plan for the replacement of malfunctioning equipment.
- E. Spare parts for pumps and piping shall be kept on site as required.
- F. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

3.02 Installation and Operation

- A. The Contractor shall install the bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner and the Engineer. Routing of bypass pipelines shall not impede pump station traffic flow.
- B. The Contractor shall protect the temporary pumping station and piping from damage

Temporary Bypass Pumping

during construction.

- C. Contractor shall provide all fuel and power for the temporary pumping facility. Contractor shall make arrangements for a power meter and pay all associated fees.

END OF SECTION

Part 1 General

1.01 Scope

- A. The work specified in this Section consists of providing and maintaining temporary and permanent erosion and sedimentation controls as shown on the Drawings. This Section also specifies the subsequent removal of temporary erosion and sedimentation controls.
- B. Temporary and permanent erosion and sedimentation controls include grassing and mulching of disturbed areas and structural barriers at those locations which will ensure that erosion during construction will be maintained within acceptable limits. Acceptable limits are as established by the Tennessee Water Quality Control Act of 1977, as amended, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations and laws of local and municipal authorities having jurisdiction. For installation and maintenance guidance, refer to the Tennessee Erosion and Sediment Control Handbook, latest edition.
- C. Land disturbance activity shall not commence until the Land Disturbance Permit and all required stream crossing permits have been issued.
- D. Land disturbance permit shall be obtained and paid for by the Contractor.

1.02 Submittals

- A. Submit product data in accordance with the requirements of Section 01 33 23 of these Specifications.
- B. Prior to any construction activity, the Contractor shall submit, for the Engineer's approval, a schedule for the accomplishment of temporary and permanent erosion and sedimentation control work. No work shall be started until the erosion and sedimentation control schedule and methods of operation have been approved by the Engineer.

1.03 Quality Assurance

- A. The temporary and permanent erosion and sedimentation control measures shown on the Drawings are minimum requirements. Any additional erosion and sedimentation control measures required by the Contractor's means, methods, techniques and sequence of operation will be installed by the Contractor at no additional cost to the Owner.
- B. Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated in these Specifications. Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.
- C. Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Tennessee Water Quality Control Act of 1977, as amended, local ordinances, other permits, local enforcing agency guidelines

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and these Specifications.

D. Basic Principles

1. Coordinate the land disturbance activities to fit the topography, soil types and conditions.
2. Minimize the disturbed area and the duration of exposure to erosive elements.
3. Provide temporary or permanent stabilization to disturbed areas immediately after rough grading is complete.
4. Safely convey run-off from the site to a stable outlet to prevent flooding and damage to downstream facilities resulting from increased runoff from the site.
5. Retain sediment on-site that was generated on-site.
6. Minimize encroachment upon watercourses.

E. Implementation

1. The Contractor is solely responsible for the control of erosion within the Project site and the prevention of sedimentation from leaving the Project site or entering waterways.
2. The Contractor shall install temporary and permanent erosion and sedimentation controls which will ensure that runoff from the disturbed area of the Project site shall pass through a filter system before exiting the Project site.
3. The Contractor shall provide temporary and permanent erosion and sedimentation control measures to prevent silt and sediment from entering the waterways. The Contractor will obtain a Land Disturbance Permit that allows encroachments on the 60 foot vegetative buffer in specific areas. The Contractor shall exercise extreme care during land disturbance operations within the 60 foot vegetative buffer to prevent degradation of the stream.
4. The Contractor shall limit land disturbance activity to those areas shown on the Drawings.
5. The Contractor shall maintain erosion and sedimentation control measures within disturbed areas on the entire site at no additional cost to the Owner until the acceptance of the Project. Maintenance shall include mulching, re-seeding, clean-out of sediment barriers and sediment ponds, replacement of washed-out or undermined rip rap and erosion control materials, to the satisfaction of the Engineer.
6. All fines imposed for improper erosion and sedimentation control shall be paid by the Contractor.
7. The Contractor shall use all means necessary to control dust on and near the work and all off-site borrow areas, in accordance to the Tennessee Erosion and

Sediment Control Handbook, latest edition. The Contractor should thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of work on the site.

Part 2 Products

2.01 Sediment Barriers

A. Silt Fence

1. Type A silt fence shall meet the requirements of Tennessee Erosion and Sediment Control Handbook, latest edition. Posts shall be 4 feet in length and can either be made of steel, soft wood or oak. Steel posts shall be 1.3lb./ft. minimum. Soft wood post shall be 3" diameter or 2" x 4". Oak posts shall be 1.5" x 1.5". Fasteners for wood posts shall be wire staples or nails. Wire staples are to have a minimum 17 gauge, 3/4" crown width, and a 1/2" leg length. Nails are to have a minimum 14 gauge, 3/4" button head, and a 1" length.
2. Type C silt fence is a combination of Type A silt fence fabric with woven wire reinforcement. Type C silt fence woven wire reinforcement shall meet the requirements of Tennessee Erosion and Sediment Control Handbook, latest edition. Posts shall be 4 feet in length and shall be made of steel. Steel posts shall be 1.3lb./ft. minimum.
3. Silt fence fabric shall meet the requirements of the Tennessee Erosion and Sediment Control Handbook, latest edition.

2.02 Storm Drain Inlet Protection

- A. Silt Fence Inlet Protection: Type C Silt fence supported by steel posts shall be used. See Silt Fence this Part.

B. Baffle Box Inlet Protection:

1. Shall be constructed of 2" x 4" boards spaced a maximum of 1 inch apart or of plywood with weep holes 2 inches in diameter.
2. Gravel: 1/2 to 3/4 inch gravel (#57 washed stone).
3. Type C filter fabric wrapping: See Silt Fence this Part.

C. Block and Gravel Inlet Protection

1. Concrete Masonry Block.
2. Gravel: 1/2 to 3/4 inch gravel (#57 washed stone).
3. Hardware cloth or comparable wire mesh with 1/2 inch openings.

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D. Gravel Drop Protection

1. Gravel: 1/2 to 3/4 inch gravel (#57 washed stone).

E. Sod Inlet Protection

1. 1' wide strips of sod. See Section 02934 for correct placement and planting schedules.

2.03 Check Dams

A. Stone Check Dams

1. Stone check dams shall be constructed of graded size 2-10 inch stone.
2. The geotextile shall be in accordance with AASHTO M288 Section 7.3, Separation Requirements, Table 3.

B. Rock Check Dams

1. Stone sizing: The stone size shall be determined by the design criteria established in the Rip Rap section - Tennessee Erosion and Sediment Control Handbook, latest edition. The rock dam can be faced with smaller stone on the upstream side for additional filtering effect.
2. Geotextile: Geotextiles shall be used as a separator between the graded stone, the soil base, and the abutments. The geotextile shall be specified in accordance with AASHTO M288 Section 7.5, Permanent Erosion Control Recommendations.

2.04 Construction Exit

- A. Stone: Use sound, tough, durable stone resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Aggregate size shall be TDOT #1 or #2 stone (1.5 to 3.5-inch stone).

- B. Geotextile: The geotextile underliner must be placed the full length and width of the entrance. Geotextile selection shall be based on AASHTO M288-98 specification:

1. For subgrades with a CBR greater than or equal to 3 or shear strength greater than 90 kPa, geotextile must meet requirements of section AASHTO M288 Section 7.3, Separation Requirements.
2. For subgrades with a CBR between 1 and 3 or sheer strength between 30 and 90 kPa, geotextile must meet requirements of AASHTO M288 Section 7.4, Stabilization Requirements.

2.05 Rip Rap

- A. Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and water.

Slabby or shaley pieces will not be acceptable. Sizes are shown in the Drawings for each design requiring rip rap construction. The following classifications shall be used in the construction of slope or channels as shown on the Drawings:

1. Graded Rip Rap - durable, dense, specifically selected and graded, quarried stone, placed to prevent erosion. Sizes shall be in accordance to the Tennessee Erosion and Sediment Control Handbook, latest edition.
2. Filter Bedding Stone - stone generally less than 6 inches in size, that may be placed under graded rip rap stone in a layer or combination of layers, designed and installed in such a manner as to prevent loss of underlying soil or finer materials because of moving water. Sizes shall be in accordance to the Tennessee Erosion and Sediment Control Handbook, latest edition.
3. Surge Stone - a quarry run ungraded, unscreened material which may or may not have fines.

2.06 Gabions

- A. Gabions shall be large, multi-celled, rectangular wire mesh boxes filled with 4 to 8-inch size pieces of stone to prevent erosion, scour or sloughing of an embankment. Gabions shall have the following features:
 1. Hexagonal mesh pattern, which under stress will deform but not break.
 2. Triple twist, which will make the mesh non-raveling.
 3. Reinforcing wires woven into each corner, which will increase the strength at the stress points and help the gabion retain its shape during and after filling.
 4. A diaphragm securely attached to the base, which will prevent the shifting of the stone and at the same time, reinforce the gabion.
- B. The wire mesh shall have an opening of approximately 3 x 4-inches and shall be a minimum 12 gauge. Wire mesh shall be galvanized.
- C. Gabion baskets shall be 12 feet long x 3 feet high with four cells.
- D. Geotextile: Geotextiles shall be used behind all gabion structures. Geotextiles shall be in accordance with AASHTO M288 Section 7.5, Permanent Erosion Control Requirements.

2.07 Polyacrylamide (PAM)

- A. Polyacrylamide (PAM) additives are permissible as a supplement to existing Best Management Practices and are not to be relied on as the only method for erosion control.
- B. If the Contractor intends to use PAM additives, they shall provide adequate documentation and testing to show the polymer type and dosing has been matched to

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the soil type found in the work area. Testing and documentation shall be prepared by the manufacturer of the polymer or other licensed soil professional.

- C. PAM products include, but are not limited to, additives to the soil, hydro-seeder, treated mat, treated checks dams, bars or logs. Due to the different nature of products, manufacturer's directions shall be provided to the Engineer prior to their use. Toxicology reports shall be supplied with all submittal data prior to use.
- D. PAM products shall conform to the following guidelines:
 - 1. Only the anionic form of PAM shall be used. Cationic PAM is toxic and shall NOT be used.
 - 2. PAM and PAM mixtures shall be environmentally benign, harmless to fish, wildlife, and plants. PAM and PAM mixtures shall be noncombustible.
 - 3. Anionic PAM, in pure form, shall have less than or equal to 0.05% acrylamide monomer by weight, as established by the Food and Drug Administration and the Environmental Protection Agency.
 - 4. To maintain less than or equal to 0.05% of acrylamide monomer, the maximum application rate of PAM, in pure form, shall not exceed 200 pounds/acre/year. Do not over apply PAM. Excessive application of PAM can lower infiltration rate or suspend solids in water, rather than promoting settling.
 - 5. Users of anionic PAM shall obtain and follow all Material Safety Data Sheet requirements and manufacturer's recommendations.
 - 6. Additives such as fertilizers, solubility promoters or inhibitors, etc. to PAM shall be non-toxic.
 - 7. The manufacturer or supplier shall provide written application methods for PAM and PAM mixtures. The application method shall insure uniform coverage to the target and avoid drift to non-target areas including waters of the state. The manufacturer or supplier shall also provide written instructions to insure proper safety, storage, and mixing of the product.
 - 8. Gel bars or logs of anionic PAM mixtures may be used in ditch systems. This application shall meet the same testing requirement as anionic PAM emulsions and powders.
 - 9. To prevent exceeding the acrylamide monomer limit in the event of a spill, the anionic PAM in pure form shall not exceed 200 pounds/batch at 0.05% acrylamide monomer (AMD) or 400 pounds/batch at 0.025% AMD.

2.08 Erosion Control Matting and Blankets

- A. All blanket and matting materials shall be in accordance to the Tennessee Erosion and Sediment Control Handbook, latest edition.

- B. Temporary Erosion Control Blankets: Use in concentrated flow areas, all slopes steeper than 3:1 and with a height of ten feet or greater, and cuts and fills within stream buffers, shall be stabilized with the appropriate erosion control matting or blankets.
1. Straw blankets: Shall consist of weed-free straw from agricultural crops formed into a blanket. Blankets shall have a top side of photodegradable plastic mesh with a maximum mesh size of 5/16 x 5/16 inch sewn to the straw with biodegradable thread that is appropriate for slopes. The blanket shall have a minimum thickness of 3/8 inch and minimum dry weight of 0.5 pounds per square yard.
 2. Excelsior blankets: Shall consist of curled wood excelsior (80% of fibers are six inches or longer) formed into a blanket. The blanket shall have clear markings indicating the top side of the blanket and be smolder resistant. Blankets shall have photodegradable plastic mesh having a maximum mesh size of 1- 1/2½ x 3 inches. The blanket shall have a minimum thickness of 1/4 of an inch and a minimum dry weight of 0.8 pounds per square yard. Slopes require excelsior matting with the top side of the blanket covered in the plastic mesh, and for waterways, both sides of the blanket require plastic mesh.
 3. Coconut fiber blankets: Shall consist of 100% coconut fiber formed into a blanket. The minimum thickness of the blanket shall be 1/4 of an inch with a minimum dry weight of 0.5 pounds per square yard. Blankets shall have photodegradable plastic mesh, with a maximum mesh size of 5/8 x 5/8 inch and sewn to the fiber with a breakdown resistant synthetic yarn. Plastic mesh is required on both sides of the blanket if used in waterways. A maximum of two inches is allowable for the stitch pattern and row spacing.
 4. Wood fiber blankets: Shall consist of reprocessed wood fibers that does not possess or contain any growth or germination inhibiting factors. The blanket shall have a photodegradable plastic mesh, with a maximum mesh size of 5/8 x 3/4 inch, securely bonded to the top of the mat. The blanket shall have a minimum dry weight of 0.35 pounds per square yard. A maximum of two inches is allowable for the stitch pattern and row spacing. This practice shall be applied only to slopes.
 5. Jute Mesh: To be applied to slopes. Jute mesh with a 48 inch width shall show between 76 and 80 warpings and a one yard length shall show between 39 to 43 weftings. The woven mesh shall be at least 45 inches wide. Yarn shall have a unit weight of at least 0.9 pounds per square yard, but not more than 1.5 pounds per square yard.
- C. Permanent Matting: Use in concentrated flow areas, all slopes steeper than 3:1 and with a height of ten feet or greater, and cuts and fills within stream buffers, shall be stabilized with the appropriate erosion control matting or blankets.
1. Permanent matting shall consist of a lofty web of mechanically or melt bonded polymer nettings, monofilaments or fibers which are entangled to form a strong and dimensionally stable matrix. Polymer welding, thermal or polymer fusion, or the placement of fibers between two high strength, bi-axially oriented nets bound securely together by parallel lock stitching with polyolefin, nylon or polyester threads are all appropriate bonding methods. Mats shall maintain their shape

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before, during, and after installation, under dry or water saturated conditions. Mats must be stabilized against ultraviolet degradation and shall be inert to chemicals normally encountered in a natural soil environment.

2. The mat shall conform to the following physical properties:

<u>Property</u>	<u>Minimum Value</u>
Thickness	0.5 inch
Weight	0.6 PSY
Roll Width	38 inches
Tensile Strength	
Length (50% elongation)	15 lbs./in.
Length (ultimate)	20 lbs./in.
Width (50% elongation)	5 lbs./in.
Width (ultimate)	10 lbs./in.
(ASTM D 1682-6" strip)	
Ultraviolet Stability	80%
(1,000 hrs. in an Atlas ARC Weatherometer, ASTM G 23, Type D in accordance with ASTM D 822)	

D. Stapling and Anchoring Materials:

1. Temporary Blankets: Staples shall be used to anchor temporary blankets. U-shaped wire (11 gauge or greater) staples with legs at least 6 inches in length and a crown of one inch or appropriate biodegradable staples can be used. Staples shall be of sufficient thickness for soil penetration without undue distortion.
2. Permanent Matting: Sound wood stakes, 1 x 3 inches stock sawn in a triangular shape, shall be used. Depending on the compaction of the soil, select stakes with a length from 12 to 18 inches. U-shaped staples shall be 11 gauge steel or greater, with legs at a minimum of 8 inches length with a 2 inch crown.

2.09 Channel Stabilization

- A. Vegetated Lining: Vegetated lining shall be designed to resist erosion when the channel is flowing at the 25-year frequency discharge. Temporary erosion control blankets or sod shall be used on all channels and concentrated flow areas to aid in the establishment of the vegetated lining. If a vegetated lining is desired in a channel with velocities between 5- 10 ft./sec., permanent soil reinforcement matting shall be used.
- B. Rock Rip- Rap Lining: Rock rip rap shall be designed to resist displacement when the channel is flowing at the 25-year frequency discharge. Rock rip rap lining should be used when channel velocities are between 5 and 10 ft./sec.
- C. Concrete Lining

1. Concrete shall be constructed in accordance with the plan and details in the Drawings.
2. A separation geotextile should be placed under concrete linings to prevent undermining in the event of stress cracks due to settlement of the base material. Geotextiles shall be in accordance with AASHTO M288 Section 7.5, Permanent Erosion Control Requirements.

2.10 Downdrain Structures

A. Temporary Downdrain:

1. Pipe: Design the slope drain using heavy-duty, flexible materials such as non-perforated, corrugated plastic pipe or specially designed flexible tubing. Use reinforced, hold-down grommets or stakes to anchor the pipe at intervals not to exceed 10 feet with the outlet end securely fastened in place. The pipe must extend beyond the toe of the slope.
2. Filter Ring: A stone filter ring shall be placed at the inlet for added sediment filtering capacity.
3. Storm Drain Outlet Protection: Rock rip rap shall be placed at the outlet for energy dissipation. A Tee outlet, flared end section, or other suitable device may be used in conjunction with the rip rap for additional protection.

B. Permanent Downdrain:

1. Pipe: Design the slope drain using heavy-duty, flexible materials such as non-perforated, corrugated plastic or steel pipe or specially designed flexible tubing. Use reinforced, hold-down grommets or stakes to anchor the pipe at intervals not to exceed 10 feet with the outlet end securely fastened in place. The pipe must extend beyond the toe of the slope.
2. Paved Flume: The paved flume may have a parabolic, rectangular or trapezoidal cross-section and shall consist of reinforced concrete or asphalt paving.
3. Filter Ring: A stone filter ring shall be placed at the inlet for added sediment filtering capacity.
4. Storm Drain Outlet Protection: Rock rip rap shall be placed at the outlet for energy dissipation. A Tee outlet, flared end section, or other suitable device may be used in conjunction with the rip rap for additional protection.

2.11 Filter Ring

A. Stone sizing:

1. When utilized at inlets with diameters less than 12 inches, the filter ring shall be constructed of TDOT Class A-3 stone no smaller than 2-6 inches (15 - 30 lbs.).

2. When utilized at pipes with diameters greater than 12 inches, the filter ring shall be constructed of TDOT Class A-1 stone no smaller than 2-15 inches (50 - 100 lbs.).
3. For added sediment filtering capabilities the upstream side of the rip- rap can be faced with TDOT #57 stone, minimum stone size of $\frac{3}{4}$ inch.

2.12 Temporary Sediment Basin

Temporary Sediment Basins shall be constructed in accordance with the plan and details shown in the Drawings.

2.13 Temporary Stream Crossing

Temporary Stream Crossing shall be constructed in accordance with the plan and details shown in the Drawings. Temporary crossings shall not be used on streams with drainage areas greater than one square mile and shall be constructed as a culvert crossing, as shown in the Drawings.

2.14 Storm Drain Outlet Protection

- A. Stone size: Stone size as indicated for each outlet in the Storm Drain Outlet Protection detail shown in the Drawings.
- B. Geotextile: Geotextiles shall be used as a separator between the graded stone, the soil base, and the abutments. The geotextile shall be specified in accordance with AASHTO M288-96 Section 7.5, Permanent Erosion Control Recommendations.
- C. Stone quality: Select stone for rip rap from field stone or quarry stone. The stone should be hard, angular, and highly weather-resistant. The specific gravity of the individual stones should be at least 2.5.

2.15 Gradient Treatment

- A. Contour Furrow: Contour furrows may be used for slopes which are 3:1 (H:V) or less..
- B. Serrated Slope: A serrated slope may be used for slopes which are 2:1 (H:V) or less.
- C. Stepped Slope: Graded areas steeper than 3:1 (H:V), which will not be mowed, should preferably have a stepped slope.
- D. Terraced Slope: Should be used on most slopes which are longer than those allowed for other methods.

2.16 Temporary Mulching

- A. Dry straw or hay: Shall be applied at a depth of 2 to 4 inches providing complete soil coverage. Material shall be clean, seed-free cereal hay or straw.
- B. Wood waste (chips, sawdust or bark): Shall be applied at a depth of 2 to 3 inches. Organic material from the clearing stage of development should remain on site, be chipped, and applied as mulch.
- C. Mulch Binder: Mulch on slopes exceeding 3 (horizontal) to 1 (vertical) shall be held in place by the use of a mulch binder, as approved by the Engineer. The mulch binder shall be non-toxic to plant and animal life and shall be approved by the Engineer.

2.17 Temporary Grassing

- A. Grassing materials shall meet the requirements of the Tennessee Erosion and Sediment Control Handbook, latest edition, section that includes "Disturbed Area Stabilization (With Temporary Vegetation)".
- B. Seed rate, fertilization, lime application and other requirements shall be provided as shown on the Drawings.
- C. Water: Water shall be free of excess and harmful chemicals, organisms and substances which may be harmful to plant growth or obnoxious to traffic. Salt or brackish water shall not be used. Water shall be furnished by the Contractor.

2.18 Permanent Grassing and Sodding

As specified elsewhere in these Specifications.

2.19 Turbidity Curtain

- A. Barriers shall be a bright color (yellow or "international" orange are recommended) that will attract the attention of nearby boaters.
- B. The curtain fabric shall meet the following minimum requirements:

PHYSICAL PROPERTY	REQUIREMENT
THICKNESS, MILS	45
WEIGHT/OZ.SQ.YD:	
TYPE I	18
TYPE II	18 OR 22
TYPE III	22
GRAB TENSILE STRENGTH, LBS.	300
UV INHIBITOR	MUST BE INCLUDED

- C. Seams in the fabric shall be vulcanized, welded, or sewn, and shall develop the full strength of the fabric.

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- D. Flotation devices shall be flexible, buoyant units, contained in an individual flotation sleeve or collar attached to the curtain. Buoyancy provided by the flotation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches above the water surface.
- E. Load lines shall be fabricated into the bottom of all floating turbidity curtains. When installing in moving waters, load lines shall also be fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable, and shall have a break strength in excess of 10,000 pounds. The supplemental (bottom) load line shall consist of a chain incorporated into the bottom hem of the curtain, with sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connecting to load lines in adjacent sections for calm water installation.
- F. External anchors may consist of wooden or metal stakes (2- x 4-inch or 2.5-inch minimum diameter wood, or 1.33 pounds/linear foot steel) when installing in calm waters; when installing in moving waters, bottom anchors must be used.
- G. Bottom anchors shall be sufficient to hold the curtain in the same position relative to the bottom of the watercourse, without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type), or may be weighted (mushroom type), and shall be attached to a floating anchor buoy via an anchor line. The anchor line shall run from the buoy to the top load line of the curtain. When installing in moving waters, these lines shall contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down, and shall be checked regularly to make sure they do not become entangled with debris. As previously noted, anchor spacing will vary with current velocity and potential wind and wave action; manufacturer's recommendations should be followed.

2.20 Sediment Traps

- A. The area under the embankment should be cleared, grubbed, and stripped of any vegetation and root mat.
- B. Fill material for the embankment should be free of roots or other woody vegetation, organic material, large stones, and other objectionable material.

Part 3 Execution

3.01 General

- A. Temporary and permanent erosion and sedimentation control measures shall prevent erosion and prevent sediment from exiting the site. If, in the opinion of the Engineer, the Contractor's temporary erosion and sedimentation control measures are inadequate, the Contractor shall provide additional maintenance for existing measures or additional devices to control erosion and sedimentation on the site at no additional cost to the Owner.
- B. All erosion and sedimentation control devices and structures shall be inspected by the

Qualified Personnel as defined in Section 01 57 23 of the Specifications at least once a week and within 24 hours of the end of a storm that is 0.5 inches or greater. Any device or structure found to be damaged will be repaired or replaced by the end of the day.

- C. All erosion and sedimentation control measures and devices shall be constructed and maintained as indicated on the Drawings or specified herein until adequate permanent disturbed area stabilization has been provided and accepted by the Engineer. Once adequate permanent stabilization has been provided and accepted by the Engineer, all temporary erosion and sedimentation control structures and devices shall be removed.

3.02 Installation and Maintenance of Erosion and Sediment Controls

A. Sediment Barriers

1. Sediment barriers shall include, but are not necessarily limited to silt fences and any device which prevents sediment from exiting the disturbed area.
2. Sediment barriers shall not be used in any flowing stream, creek or river.
3. Sediment barriers shall be installed as shown on the Drawings and as directed by the Engineer.
4. Along stream buffers and other sensitive areas, two rows of Type C silt fence or one row of Type C silt fence backed by hay bales shall be used.
5. Sediment barriers shall be maintained to ensure the depth of impounded sediment is no more than one-half of the original height of the barrier or as directed by the Engineer. Torn, damaged, destroyed or washed-out barriers shall be repaired, reinforced or replaced with new material and installed as shown on the Drawings and as directed by the Engineer.
6. Sediment Barrier Removal
 - a. Sediment barrier shall be removed once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required as directed by the Engineer.
 - b. Accumulated sediment shall be removed from the barrier and spread over the site.
 - c. All non-biodegradable parts of the barrier shall be disposed of properly.
 - d. The disturbed area created by barrier removal shall be permanently stabilized.

B. Storm Drain Inlet Protection

1. Inlet Sediment Traps shall include, but are not necessarily limited to, Silt Fence Inlet Protection, Baffle Box, Block and Gravel Inlet Protection, Gravel Inlet Protection, Sod Inlet Protection and any device which traps sediment and prevents

it from exiting the disturbed area.

2. Inlet Sediment Traps shall be installed as shown on the Drawings and as directed by the Engineer.
3. For each Inlet Sediment Traps type the following installation guidelines shall be used:
 - a. Silt Fence Inlet Protection: Type C silt fence supported by steel posts shall be used. The stakes shall be spaced evenly around the perimeter of the inlet a maximum of 3 feet apart, and securely driven into the ground, approximately 18 inches deep. The fabric shall be entrenched 12 inches and backfilled with crushed stone or compacted soil. Fabric and wire shall be securely fastened to the posts, and fabric ends must be overlapped a minimum of 18 inches or wrapped together around a post to provide a continuous fabric barrier around the inlet.
 - b. Baffle Box: The baffle box shall be constructed of 2" x 4" boards spaced a maximum of 1 inch apart or of plywood with weep holes 2 inches in diameter. The weep holes shall be placed approximately 6 inches on center vertically and horizontally. Gravel shall be placed outside the box, all around the inlet, to a depth of 2 to 4 inches. The entire box is wrapped in Type C filter fabric that shall be entrenched 12 inches and backfilled.
 - c. Block and Gravel Inlet Protection: One block is placed on each side of the structure on its side in the bottom row to allow pool drainage. The foundation should be excavated at least 2 inches below the crest of the storm drain. The bottom row of blocks are is placed against the edge of the storm drain for lateral support and to avoid washouts when overflow occurs. If needed, lateral support may be given to subsequent rows by placing 2" x 4" wood studs through block openings. Hardware cloth or comparable wire mesh with 1/2 inch openings shall be fitted over all block openings to hold gravel in place. Clean gravel should be placed 2 inches below the top of the block on a 2:1 slope or flatter and smoothed to an even grade.
 - d. Gravel Inlet Protection: Stone and gravel are used to trap sediment. The slope toward the inlet shall be no steeper than 3:1. A minimum 1 foot wide level stone area shall be left between the structure and around the inlet to prevent gravel from entering the inlet. On the slope toward the inlet, stone 3 inches in diameter and larger should be used. On the slope away from the inlet, 1/2 to 3/4 inch gravel (#57 washed stone) should be used at a minimum thickness of 1 foot.
 - e. Sod Inlet Protection: The sod shall be placed to form a turf mat covering the soil for a distance of 4 feet from each side of the inlet structure. Sod strips shall be staggered so that adjacent strip ends are not aligned.
5. The trap shall be inspected daily and after each rain and repairs made as needed. Sediment shall be removed when the sediment has accumulated to one-half the height of the trap. Sediment shall be removed from curb inlet protection immediately. For excavated inlet sediment traps, sediment shall be removed

when one-half of the sediment storage capacity has been lost to sediment accumulation. Sod inlet protection shall be maintained as specified for Permanent Sodding.

6. Sediment Barrier Removal

- a. Sediment barrier shall be removed once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required as directed by the Engineer.
- b. Accumulated sediment shall be removed from the barrier and removed from the site.
- c. All non-biodegradable parts of the barrier shall be disposed of properly.
- d. The disturbed area created by barrier removal shall be permanently stabilized.

C. Check and Rock Dams

1. Check and rock dams shall not be used in any flowing stream, creek or river.
2. Check and rock dams shall be installed as shown on the Drawings and as directed by the Engineer.
3. Stone check dams: Mechanical or hand placement shall be required to insure complete coverage of entire width of ditch or swale and that center of dam is lower than edges.
4. Rock dams: Mechanical or hand placement will be required to insure that the rock dam extends completely across the channel and securely ties into both channel banks. The center of the dam must be no less than six inches lower than the lowest side, to serve as a type of weir. Gabions can be installed to serve as rock filter dams, but should follow recommended sizing and installation specifications. Refer to Gabions in this specification.
5. Height: The center of the check dam must be at least 9 inches lower than outer edges. Dam height should be 2 feet maximum measured to center of check dam.
6. Side Slopes: Side slopes shall be 2:1 or flatter.
7. Spacing: Two or more check dams in series shall be used for drainage areas greater than one acre. Maximum spacing between dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
8. A geotextile should be used as a separator between the graded stone and the soil base and abutments. The geotextile shall be placed immediately adjacent to the subgrade without any voids and extend five feet beyond the downstream toe of the dam to prevent scour.

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9. Check and rock dams shall be maintained to ensure the depth of impounded sediment is no more than one-half of the original height of the check dam or as directed by the Engineer. Damaged, destroyed or washed-out check dams shall be repaired, reinforced or replaced with new material and installed as shown on the Drawings and as directed by the Engineer.
10. Check and Rock Dams removal
 - a. Check and rock dams shall be removed [shall remain] once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required as directed by the Engineer.
 - b. Accumulated sediment shall be removed from the check and rock dams when it reaches a depth of one-half of the original height of the dam and removed from the site.
 - c. All non-biodegradable parts of the barrier shall be disposed of properly.
 - d. The disturbed area created by check or rock dam removal shall be permanently stabilized.

D. Construction Exit

1. Construction exit(s) shall be placed as shown on the Drawings and as directed by the Engineer. A construction exit shall be located at any point traffic will be leaving a disturbed area to a public right-of-way, street, alley, sidewalk or parking area.
2. Placement of Construction Exit Material: The ground surface upon which the construction exit material is to be placed shall be prepared to a smooth condition free from obstructions, depressions or debris. The geotextile underliner shall be placed to provide a minimum number of overlaps and a minimum width of one foot of overlap at each joint. The stone shall be placed with its top elevation conforming to the surrounding roadway elevations. The stone shall be dropped no more than three feet during construction.
3. Construction Exit Maintenance: The Contractor shall regularly maintain the exit with the top dressing of stone to prevent tracking or flow of soil onto public rights-of-way and paved surfaces as directed by the Engineer. This shall require periodic top dressing with 1.5-3.5 inch stone, as conditions demand.
4. Construction Exit Removal: Construction exit(s) shall be removed and properly disposed of when the disturbed area has been properly stabilized, the tracking or flow of soil onto public rights-of-way or paved surfaces has ceased and as directed by the Engineer.

E. Rip Rap

1. Rip rap shall be placed as shown on the Drawings and as directed by the Engineer. Rip rap shall be placed at all points where natural vegetation is disturbed on the banks of streams or drainage ditches. Compact backfill and place rip rap to prevent subsequent settlement and erosion. This requirement applies equally to

construction alongside a stream or drainage ditch as well as crossing a stream or drainage ditch.

2. When trenching across a stream or drainage ditch, place rip rap over the entire disturbed area upstream and downstream of the trench excavation. Place rip rap across creek bottom, across creek banks and extend rip rap placement five feet beyond the top of each creek bank.
3. Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers. Unless at creek banks or otherwise shown or specified, rip rap shall begin in a toe ditch constructed in original ground around the toe of the fill or the cut slope. The toe ditch shall be two feet deep in original ground, and the side next to the fill or cut shall have that same slope. After the rip rap is placed, the toe ditch shall be backfilled and the excess dirt spread neatly within the construction easement or on the site.
4. Placement of Plastic Filter Fabric
 - a. Plastic filter fabric shall be placed under all rip rap unless shown or specified otherwise.
 - b. Filter fabric shall not be placed under rip rap on stream or drainage ditch crossings.
 - c. The surface to receive filter fabric shall be prepared to a smooth condition free from obstructions, depressions and debris. The filter fabric shall be installed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The fabric shall be placed to provide a minimum width of one foot of overlap at each joint. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed loosely to avoid stretching and tearing during placement of the stone. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Contaminated fabric or fabric damaged during installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no additional cost to the Owner.
5. Placement of Rip Rap: Rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. Rip rap shall be placed with its top elevation conforming with the finished grade or the natural existing slope of the stream bank and stream bottom. The stone shall be dropped no more than three feet during construction.
 - a. Stone Rip Rap: Stone rip rap shall be placed to provide a uniform surface to the thickness shown on the Drawings. The thickness tolerance for the course shall be -3-inches and +6-inches.

F. Gabions

1. Where, in the opinion of the Engineer, the slope of the banks of the stream is too steep to support rip rap, gabions shall be provided, in lieu of rip rap.
2. Gabions shall be assembled according to the manufacturer's recommendations. Laterally adjoining gabions shall be wired together by vertical edges. Vertically adjoining gabions shall be wired together along the front and back edges. Rip rap size for gabion construction shall be large enough not to fall out of gabions, but small enough to form three layers. Gabions shall be placed over a 6-inch layer of soil, crushed stone or sand overlaying a filter fabric.

G. Polyacrylamide (PAM)

1. Application rates shall conform to manufacturer's guidelines for application.
2. Maintenance will consist of reapplying anionic PAM to disturbed areas including high use traffic areas which interfere in the performance of this practice.

H. Erosion Control Matting and Blankets

1. Erosion Control Matting and Blankets be placed as shown on the Drawings and as directed by the Engineer.
2. After the site has been shaped and graded to the approved design, prepare a friable seedbed relatively free from clods and rocks more than one inch in diameter, and any foreign material that will prevent contact of the soil stabilization mat with the soil surface. Surface must be smooth to ensure proper contact of blankets or matting to the soil surface. If necessary, redirect any runoff from the ditch or slope during installation.
3. Follow manufacturer's recommendations and follow details as shown on the Drawings for laying and stapling.
4. All erosion control blankets and matting should be inspected periodically following installation, particularly after rainstorms to check for erosion and undermining. Any dislocation or failure should be repaired immediately. If washouts or breakage occurs, reinstall the material after repairing damage to the slope or ditch. Continue to monitor these areas until they become permanently stabilized.

I. Channel Stabilization

1. Where needed, all trees, brush, stumps and other objectionable materials shall be removed so they will not interfere with the construction or proper functioning of the channel.
2. Where possible, trees will be left standing, and stumps will not be removed.
3. Excavation shall be at the locations and grades shown on the Drawings. The lining shall not compromise the capacity of the channel, e.g. the emergency

spillway shall be over-excavated so that the lining will be flush with the slope surface.

4. The geotextile shall be placed on a smooth graded surface. The geotextile shall be placed in such a manner that it will not excessively stretch or tear upon placement of the overlying materials. Care should be taken to place the geotextile in intimate contact with the soil such that no void spaces exist between the underlying soil and the geotextile.
5. Construction plans will specifically detail the location and handling of spoils. Spoil material resulting from clearing, grubbing and channel excavation shall be disposed of in a manner which will:
 - a. not cause an increase in flood stage,
 - b. minimize overbank wash,
 - c. not cause an adverse effect on the environmental integrity of the area,
 - d. provide for the free flow of water between the channel and flood plain unless the valley routing and water surface profile are based on continuous dikes being installed,
 - e. leave the right-of-way in the best condition feasible, and
 - f. improve the aesthetic appearance of the site to the extent feasible.
6. Channel linings shall be established or installed immediately after construction or as soon as weather conditions permit.
7. Structures shall be installed according to lines and grades shown on the plan. The foundation for structures shall be cleared of all undesirable materials prior to the installation of the structures.
8. Materials used in construction shall be of permanency commensurate with the design frequency and life expectancy of the facility.
9. Earthfill, when used as a part of the structures, shall be placed according to the installation requirements for sediment basin embankments.
10. Construction operations shall be carried out in such a manner that erosion and air and water pollution will be minimized. State and local laws concerning pollution abatement shall be complied with.
11. Vegetation shall be established on all disturbed areas immediately after construction. If weather conditions cause a delay in establishing vegetation, the area shall be mulched in accordance with the standard for mulching.
12. All temporary access roads or travelways shall be appropriately closed to exclude traffic.

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13. Trees and other fallen natural vegetation not causing a deterrent to stream flow should be left for the purpose of habitat.

J. Downdrain Structures

1. Place slope drains on undisturbed soil or well compacted fill at locations and elevations shown on the Drawings.
2. Slightly slope the section of pipe under the dike toward its outlet.
3. Hand tamp the soil under and around the entrance section in lifts not to exceed 6 inches.
4. Ensure that fill over the drain at the top of the slope has minimum dimensions of 1.5 ft. depth, 4 ft. top width, and 3:1 side slopes.
5. Ensure that all slope drain connections are watertight.
6. Ensure that all fill material is well-compacted. Securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart.
7. Place the drain slightly diagonally across the slope, extending the drain beyond the toe of the slope. Curve the outlet uphill and adequately protect the outlet from erosion.
8. If the drain is conveying sediment-laden runoff, direct all flows into a sediment trap or sediment basin.
9. Make the settled, compacted dike ridge no less than one foot above the top of the pipe at every point.
10. Immediately stabilize all disturbed areas following construction.
11. Install Storm Drain Outlet Protection as specified in this Part.
12. Maintenance: Inspect the slope drain and supporting diversion after every rainfall and promptly make necessary repairs. When the protected area has been permanently stabilized and the permanent stormwater disposal system is fully functional, temporary measures may be removed, materials disposed of properly, and all disturbed areas stabilized appropriately.

K. Filter Ring

1. Filter Rings be placed as shown on the Drawings and as directed by the Engineer.
2. The filter ring shall be constructed at a height no less than two feet from grade.
3. Mechanical or hand placement of stone shall be required to uniformly surround the structure to be supplemented. Refer to Rip Rap, within this specification, for rock rip rap specifications.

4. When utilized below a storm drain outlet, it shall be placed such that it does not create a condition causing water to back-up into the storm drain and inhibit the function of the storm drain system.
5. Maintenance: The filter ring must be kept clear of trash and debris. This will require continuous monitoring and maintenance, which includes sediment removal when one-half full. Structures are temporary and should be removed when the land-disturbing project has been stabilized.

L. Temporary Sediment Basin

1. Site Preparation: Areas under the embankment and under structural works shall be cleared, grubbed, and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed and disposed of by approved methods. In order to facilitate clean-out or restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush and trees.
2. Cut-off Trench: A cut-off trench will be excavated along the centerline of earth fill embankments. The minimum depth shall be 2 feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be 4 feet, but wide enough to permit operation of compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for the embankment. The trench shall be drained during the backfilling and compaction operations.
3. Embankment: The fill material shall be taken from approved areas shown on the Drawings. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall be placed in the downstream section of the embankment. Areas on which fills are to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Fill material shall be placed in six-inch to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 5 percent higher than the design height to allow for settlement.
4. Principal Spillway: The riser shall be securely attached to the pipe or pipe stub by welding the full circumference making a watertight structural connection. The pipe stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between pipe sections must be achieved by approved watertight band assemblies. The pipe and riser shall be placed on a firm, smooth foundation of impervious soil as the embankment is constructed. Breaching the embankment is unacceptable. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collar. The fill material around the pipe spillway shall be placed in four inch layers and compacted under and around the pipe to at least the same density as the adjacent

embankment. Care must be taken not to raise the pipe from firm contact with its foundation when compacting under the pipe haunches. A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment.

5. **Emergency Spillway:** The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of ± 0.2 feet. If the emergency spillway requires erosion protection other than vegetation, the lining shall not compromise the capacity of the emergency spillway, e.g. the emergency spillway shall be over-excavated so that the lining will be flush with the slope surface.
6. **Vegetative Treatment:** Stabilize the embankment and all other disturbed areas in accordance with the appropriate permanent vegetative measure, see Specification 02933 Permanent Seeding, immediately following construction. In no case shall the embankment remain unstabilized for more than seven days.
7. **Erosion and Pollution Control:** Construction operations will be carried out in such a manner that erosion and water pollution will be minimized. State and local law concerning pollution abatement shall be complied with.
8. **Maintenance:** Repair all damages caused by soil erosion or construction equipment at or before the end of each working day. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser. Sediment shall not enter adjacent streams or drainage ways during sediment removal or disposal. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.
9. **Final Disposal:** When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the embankment and trapped sediment must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded and backfilled.

M. Temporary Stream Crossing

1. All Crossings:
 - a. Clearing of the stream bed and banks shall be kept to a minimum.
 - b. All surface water from the construction site shall be diverted onto undisturbed areas adjoining the stream. Line unstable stream banks with rip rap or otherwise appropriately stabilize them.
 - c. The structure shall be removed as soon as it is no longer necessary for Project construction.

- d. Upon removal of the structure, the stream shall immediately be restored to its original cross-section and properly stabilized.
- 2. Temporary Bridge Crossing:
 - a. The temporary bridge shall be constructed at or above bank elevation to prevent the entrapment of floating materials and debris.
 - b. Abutments shall be placed parallel to and on stable banks.
 - c. Bridges shall be constructed to span the entire channel. If the channel width exceeds eight feet (as measured from the tops of the banks), a footing, pier or bridge support may be constructed within the waterway.
 - d. Bridges shall be securely anchored at only one end using steel cable or chain. Large trees, large boulders, or driven steel anchors can serve as anchors.
- 3. Temporary Culvert Crossing:
 - a. The invert elevation of the culvert shall be installed on the natural streambed grade.
 - b. The culvert(s) shall extend a minimum of one foot beyond the upstream and downstream toe of the aggregate placed around the culvert. In no case shall the culvert exceed 40 feet in length.
 - c. The culvert(s) shall be covered with a minimum of one foot of aggregate. If multiple culverts are used, they shall be separated by a minimum of 12 inches of compacted aggregate fill.
- 4. Maintenance: The structure shall be inspected after every rainfall and at least once a week, whether it has rained or not, and all damages repaired immediately. The structure shall be removed immediately after construction is finished, and the streambed and banks must be stabilized.

N. Storm Drain Outlet Protection

- 1. Ensure that the subgrade for the filter and rip rap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the rip rap thickness.
- 2. The rip rap and gravel filter must conform to the specified grading limits shown in the plans.
- 3. Geotextile must meet design requirements and be properly protected from punching or tearing during installation. Repair any damage by removing the rip rap and placing another piece of filter fabric over the damaged area. All connecting joints should overlap a minimum of 1 foot. If the damage is extensive,

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replace the entire filter fabric.

4. Rip rap may be placed by equipment, but take care to avoid damaging the filter.
5. The minimum thickness of the rip rap should be 1.5 times the maximum stone diameter.
6. Construct the apron on zero grade with no overfall at the end. Make the top of the rip rap at the downstream end level with the receiving area or slightly below it.
7. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.
8. Immediately after construction, stabilize all disturbed areas with vegetation.
9. Filter: Install a filter to prevent soil movement through the openings in the rip rap. The filter should consist of a graded gravel layer or a synthetic filter cloth.
10. Maintenance: Inspect rip rap outlet structures after heavy rains to see if any erosion around or below the rip rap has taken place or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

O. Gradient Treatment

1. Contour Furrow: The maximum distance between furrows should be 40 feet, and the maximum slope length should be 200 feet. Refer to the Tennessee Erosion and Sediment Control Handbook, latest edition for detailed example of a contour furrow.
2. Serrated Slope: Bladed equipment will be needed to make numerous passes along a slope, beginning at the top and working downward. The maximum slope length should be 100 feet. Refer to the Tennessee Erosion and Sediment Control Handbook, latest edition for detailed example of a serrated slope.
3. Stepped Slope: Construct stepped slope as shown in the detailed example in the Tennessee Erosion and Sediment Control Handbook, latest edition. Steps should be wide enough to work with standard earth moving equipment. Preferably the horizontal distance should be at least 1.5 times the vertical cut distance. Slightly grade the horizontal bench inwards (e.g. back towards the top of slope). Do not make individual vertical cuts more than 24 inches high in soft materials or more than 36 inches high in rocky materials.
4. Terraced Slope: Designed drainage channels are located in the slope at regular intervals and have a regular cross-section including slope and depth requirements. Locate intersecting channels to convey storm water to the bottom of the slope. The maximum slope height between terraces shall be 30 feet for cut slopes and 25 feet for fill slopes. Terrace widths should be at least 6 feet wide. Refer to the Tennessee Erosion and Sediment Control Handbook, latest edition for detailed example of a terraced slope.

5. Seeding: Roughened areas shall be seeded and mulched as soon as possible to obtain optimum seed germination and seeding growth. Refer to Specifications for temporary mulching and vegetation in this Specification.

P. Temporary Mulching

1. When mulch is used without seeding, mulch shall be applied to provide full coverage of the exposed area. Mulch shall be applied as follows:
 - a. Dry straw or hay mulch and wood chips shall be applied uniformly by hand or by mechanical equipment.
 - b. If the area will eventually be covered with perennial vegetation, 20-30 pounds of nitrogen per acre in addition to the normal amount shall be applied to offset the uptake of nitrogen caused by the decomposition of the organic mulches.
 - c. Apply mulch binder on exposed areas, where indicated on the Drawings or as instructed by the Engineer.
2. Anchoring Mulch:
 - a. Straw or hay mulch can be pressed into the soil with a disk harrow with the disk set straight or with a special "packer disk." Disks may be smooth or serrated and should be 20 inches or more in diameter and 8 to 12 inches apart. The edges of the disk should be dull enough not to cut the mulch but to press it into the soil leaving much of it in an erect position.
 - b. Straw or hay mulch shall be anchored immediately after application.
 - c. Straw or hay mulch spread with special blower-type equipment may be anchored with emulsified asphalt (Grade AE-5 or SS-1). The asphalt emulsion shall be sprayed onto the mulch as it is ejected from the machine. Use 100 gallons of emulsified asphalt and 100 gallons of water per ton of mulch.
 - d. For straw or hay mulch, plastic mesh or netting with mesh no larger than one inch by one inch shall be installed according to manufacturer's specifications.
 - e. Netting of the appropriate size shall be used to anchor wood waste. Openings of the netting shall not be larger than the average size of the wood waste chips.

Q. Temporary Grassing

1. Seed Bed Preparation:
 - a. When a hydraulic seeder is used, seedbed preparation is not required.
 - b. When using conventional or hand seeding, seedbed preparation is not

required if the soil material is loose and not sealed by rainfall.

- c. When soil has been sealed by rainfall or consists of smooth cut slopes, the soil shall be pitted, trenched or otherwise scarified to provide a place for seed to lodge and germinate.
2. Select a grass or grass-legume mixture suitable to the area and season of the year.
3. Seed shall be applied uniformly by hand, cyclone seeder, drill, culti-packer-seeder, or hydraulic seeder (slurry including seed and fertilizer). Drill or cultipacker seeders should normally place seed one-quarter to one-half inch deep. Appropriate depth of planting is ten times the seed diameter.
4. Soil should be "raked" lightly to cover seed with soil if seeded by hand.
5. Irrigation: During times of drought, water shall be applied at a rate not causing runoff and erosion. The soil shall be thoroughly wetted to a depth that will insure germination of the seed. Subsequent applications should be made when needed.
6. Temporary Stabilization: Temporary stabilization shall be provided as shown on the Drawings and conforming to these Specifications to control erosion on the site. Temporary stabilization shall be provided to any area which will not receive permanent stabilization within the next 7 calendar days.

R. Permanent Grassing and Sodding

1. Permanent Stabilization:
 - a. Permanent stabilization shall be provided as shown on the Drawings and conforming to these Specifications to control erosion on the site. Permanent stabilization shall be provided to all areas of land disturbance within seven calendar days of the completion of land disturbance for any area greater than 0.25 acre.
 - b. Grass or sod removed or damaged in residential areas shall be replanted with the same variety within seven calendar days of the completion of work in any area.
 - c. Where permanent stabilization cannot be immediately established because of an inappropriate season, the Contractor shall provide temporary stabilization. The Contractor shall return to the site at the appropriate season to provide permanent stabilization in areas that received only temporary stabilization.

S. Turbidity Curtains

1. Installation:
 - a. In calm waters, such as lakes and ponds, set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then

tow out the curtain in the furled condition and attach it to these stakes or anchor points. Following this, any additional stakes or buoyed anchors required to maintain the desired location of the curtain shall be set, and these anchor points made fast to the curtain. Only then shall the furling lines be loosened to let the curtain skirt drop.

- b. In rivers or in other moving water, set all the curtain anchor points. Care must be taken, prior to putting the furled curtain into the water, to ensure that anchor points are of sufficient holding power to retain the curtain under the existing current conditions. Anchor buoys shall be employed on all anchors to prevent the current from submerging the flotation at the anchor points. If the moving water into which the curtain is being installed is tidal and will subject the curtain to currents in both directions as the tide changes, provide anchors on both sides of the curtain. Once the anchors are secure, the furled curtain shall be secured first to the anchor point that is farthest upstream, then attached sequentially to each downstream anchor point in turn until the entire curtain is in position. At this point, and before unfurling, the "lay" of the curtain shall be assessed and any necessary adjustments made to the anchors. Finally, when the location is ascertained to be as desired, the furling lines shall be loosened to allow the skirt to drop.
 - c. Attach anchor lines to the flotation device, not to the bottom of the curtain.
2. Removal:
- a. Protect the silt curtain skirt from damage by furling the curtain before it is removed from the water.
 - b. The site selected to bring the curtain ashore should be free of sharp rocks, broken cement, debris, etc., so as to minimize damage when hauling the curtain over the area.
 - c. If the curtain has a deep skirt and no furling system, it shall be protected by running a small boat with a crew installing furling lines along its length before attempting to remove the curtain from the water.
3. Maintenance:
- a. The Contractor is responsible for maintenance of the turbidity curtain for the duration of the Project in order to ensure the continuous protection of the watercourse.
 - b. Should repairs to the geotextile fabric become necessary, there are repair kits available from the manufacturer, and their instructions shall be followed to ensure the adequacy of the repair.
 - c. When the curtain is no longer required, as determined by the Engineer, the curtain and related components shall be removed in such a manner as to minimize turbidity. Remaining sediment shall be sufficiently settled before removing the curtain. Sediment shall be removed and the original depth (or plan elevation) restored. Any spoils shall be taken to an upland area and

be stabilized.

T. Sediment Traps

1. Installation:

- a. The embankment should be compacted in 6-inch layers by traversing with construction equipment.
- b. All cut and fill slopes should be 2:1 or less (except for excavated, wet storage area which may be at a maximum 1:1. grade).
- c. Construction operations should be carried out in such a manner that erosion during construction of the structure is minimized.
- d. The earthen embankment should be seeded with temporary or permanent seeding immediately after installation.

2. Removal: The structure should be removed and the area stabilized when the upslope drainage area has been stabilized.

3. Maintenance:

- a. Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design volume of the wet storage. Sediment removal from the basin should be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems.
- b. Maintenance needs identified in inspections or by other means should be accomplished before the next storm event if possible, but in no case more than seven days after the need is identified.

3.03 Clean-Up

- A. Dispose of all excess erosion and sedimentation control materials in a manner satisfactory to the Engineer.
- B. All temporary erosion control measures shall be removed after final stabilization of the site has occurred, unless otherwise noted on the Drawings or instructed by the Engineer.
- C. Final clean-up shall be performed in accordance with the requirements of Section 01 74 00 of these Specifications.

END OF SECTION

Part 1 General

1.01 Scope

- A. Furnish all labor, material and equipment to provide for the reconstruction of existing sewer pipes using an approved Cured-In-Place Pipe (CIPP) method by forming a new pipe within an existing pipe. See Section 33 01 30.74 for Lateral Rehabilitation by CIPP.
- B. The sewer reconstruction shall be accomplished by the installation of a thermosetting resin-impregnated flexible felt-fiber tube coated on one side with an impermeable plastic which is installed into the existing sewer utilizing hydrostatic head. Curing is accomplished by circulating hot water throughout the length of the inverted tube to cure the resin into a hard, impermeable pipe with the plastic coating on the interior surface of the newly formed pipe. The CIPP shall extend the full length of the original pipe segment and shall provide a structurally sound, joint-less, close fitting and corrosion resistant cured-in-place pipe.
- C. The work performed under this Section of the Specifications is deemed to be Specialty Contractor Work and is subject to the provisions of Section 00 72 00 General Conditions, Article 6.06, Paragraph (I).
- D. The deterioration of sewers is an on-going process. In the event pre-construction inspections reveal the sewers to be in substantially different conditions than those in the design requirements specified herein, the Contractor shall submit a changed site condition notice and request such changes in liner thickness, supporting such requests with the appropriate design data satisfactory to the Engineer.

1.02 Reference Standards

Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. The latest revisions of all standards in effect on the date of advertisement are applicable. Where differences exist, or any latitude is either inferred or interpreted between this Specification and referenced product/process standards, this Specification shall govern.

1.03 Quality Assurance

- A. In order to establish minimum product quality and Installer capability, the following minimum requirements shall be met. The purpose for these submittals is to allow the Owner/Engineer the opportunity to conduct a complete, thorough and objective evaluation of proposed CIPP products and the Installing Contractor and to determine if the submitted products and Installer meet all experience, quality and utility standards required by the Specifications.
- B. CIPP System Manufacturer: The CIPP system must have a minimum proven performance record of 1,000,000 linear feet installed of the exact name-brand product bid in the United States, with a minimum of 20,000 linear feet in diameters 24-inch or

Cured-In-Place Pipe (CIPP)

larger over the last five years. In addition, a minimum of 10,000 linear feet of 36-inch diameter or larger, of the exact name brand product must have been installed in the United States. Documentation shall be submitted with the Bid in accordance with the Instructions to Bidders.

- C. Contractor/Installer Experience: The Installing Contractor for the cured-in-place reconstruction of sewers must have a minimum of five years of experience using the exact named product proposed and, have installed at least 300,000 linear feet of the exact named proposed product including at least 20,000 feet of 24-inch diameter or larger cured-in-place product. Documentation along with contact names and telephone numbers from the last ten projects shall be submitted with the Bid in accordance with the Instructions to Bidders.
- D. On Site Field Superintendent: The Qualifying Superintendent must have a minimum of five years of experience with cured-in-place pipe products. In addition, the Qualifying Superintendent must have supervised jobs in which at least 20,000 feet of pipe has been reconstructed using the exact named product proposed including a minimum of 5,000 feet of 24-inch diameter or larger cured-in-place product. The Contractor shall submit information to document this with the Bid in accordance with the Instructions to Bidders. The superintendent for the Project shall be on-site during all phases of the work involving any pre and post-installation video inspection, sewer cleaning or insertion and processing of the CIPP.
- E. Resin Class
 - 1. The Contractor shall designate a wet-out facility and shall provide wet-out liner tubes from this designated facility only. Multiple facilities to supply wet-out liner tubes for the duration of this Contract may not be used without prior approval of the Engineer.
 - 2. The Contractor shall place a sampling valve in-line at a point in the resin/catalyst mixing stage so that a sample of non-catalyzed resin may be taken. A second sampling valve shall be placed in-line at a point after the resin/catalyst mixing stage, but prior to catalyzed resin injection into the liner so that a resin sample may be taken. Both sampling valves shall be left in place for the duration of the Contract.
 - 3. The Engineer shall have the right to inspect the designated wet-out facility and draw samples from one or both sampling valves without prior notice to the Contractor for the duration of the Contract.
 - 4. Infrared Analysis
 - a. The Engineer reserves the right to subject resin samples to an infrared analysis (IR) Scan. This standard analytical test involves shining a beam of light in the infrared frequency region through a thin sample of subject resin. The frequency of light is then varied across the infrared spectrum. Chemical functional groups present in the resin being analyzed will absorb infrared light as specific frequencies and with characteristic absorption intensities.

- b. A spectrum created from the measurement of light transmitted through the sample across the range of infrared frequencies shall be used to determine the resin's chemical fingerprint. For Standard Polyester, an overlaid IR spectrum of Reichhold PolyLite® 33420 shall be used as a baseline comparison for the purpose of a test under this contract. For Enhanced Polyester resin, an overlaid IR spectrum of Reichhold PolyLite® 33420-E shall be used as a baseline comparison for the purpose of a test under this contract.
- c. The Engineer may perform random Infrared Scans (IR Scans) and/or Composite Burn-offs to ensure resin quality and consistency throughout the duration of the Contract and shall be responsible for the cost of IR testing.

1.04 Submittals

- A. Submit shop drawings in accordance with the requirements of Section 01 33 23 of these Specifications. Specific submittal information shall include the following:
 - 1. The Contractor shall furnish submittal data establishing the structural capabilities, chemical composition, and other mechanical properties of the liner system proposed.
 - 2. The Contractor shall furnish the proposed liner thickness for each pipe size and depth categories, along with a certification, signed and sealed by an engineer registered in the state that the Project is located, to the effect that the proposed liner thicknesses were calculated based on the parameters specified in Article 2.04 of this section of the Specifications and the site specific external loads. In no case will the proposed liner thicknesses be less than those specified in Article 2.04 of this section of the Specifications. The Standard Dimension Ratio (SDR) is the ratio of the outside diameter (OD) of the pipe to its minimum wall thickness. All CIPP wall thicknesses, SDRs by diameters, and depth ranges corresponding to the requirements of the Contract Documents, must be submitted to the Engineer for approval prior to installation.
 - 3. The Contractor shall furnish copies of the manufacturer's brochures giving a complete description of the product proposed, its physical and chemical composition, the same for the thermosetting resin or epoxy hardener.
 - 4. Pre- and post-installation videos and logs per Article 3.03 shall be submitted during the course of work.
 - 5. Catalyst system and resin/catalyst ratio.
 - 6. The proposed curing schedules and process shall be approved by the resin manufacturer in writing. Cure schedules shall include specific information on curing procedures, "post exothermic cooking times" duration and "cool down" procedures – all to be approved by the resin manufacturer in writing.
 - 7. The Contractor shall submit a Certificate of Authenticity from the resin manufacturer for each shipment to the wet-out facility to include the date of

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manufacture and Heat Distortion Temperature. This information shall be submitted before the manufacture or installation of any CIPP.

- B. The manufacturer shall submit written certification that the lining system complies with all applicable requirements of these Specifications.
- C. The Contractor shall submit its proposed plan for ensuring that the finished and installed CIPP meets the minimum thickness requirements. The plan shall include detailed inversion procedures to reduce stretching and resin loss and to minimize shrinkage.

1.05 Warranty

The Contractor shall warrant all work and materials installed under this Contract for five years from the date of final acceptance. All CIPP liners shall have a minimum design and service life of 50 years. The date of final acceptance shall be the date final payment is made to the Contractor.

Part 2 Products

2.01 Resins

- A. The resin for CIPP installed under this Contract shall be a Standard Polyester Resin or Enhanced Polyester Resin unless otherwise directed by the Engineer due to site-specific field conditions and/or design requirements.
- B. Standard Polyester Resins
 - 1. The resin used shall be a corrosion resistant isophthalic polyester specifically designed for the CIPP being installed. Only premium, virgin, non-recycled resin shall be used. The resin shall be manufactured under ISO 9001 certified procedures.
 - 2. The resin shall have been tested according to ASTM D2990, D5813, and F1216 by accredited, third-party testing facilities. Results of these tests shall be made available to Engineer upon request.
 - 3. The resin vendor must be able to reference the corrosion scale with the resin itself having a heat deflection temperature greater than 212 degrees Fahrenheit.
- C. Enhanced Polyester Resins
 - 1. The resin used shall be a corrosion resistant enhanced thixotropic, medium reactivity, high viscosity, and rigid, chemical resistant isophthalic resin. These resins contain a mineral filler to enhance mechanical properties and are specifically formulated for use in the cured-in-place pipe (CIPP) industry.
 - 2. The resin shall have physical and chemical properties equal to those of Reichhold PolyLite® 33420-E and shall have been tested according to ASTM D 2990, D 5813 and F 1216 by accredited third party testing facilities. Results of

these tests shall be made available to the Engineer upon request.

3. The resin must be manufactured under ISO 9001 certified procedures. The resin vendor must be able to reference the corrosion scale with the resin itself having a heat deflection temperature greater than 224 degrees Fahrenheit. Only premium, non-recycled resins will be accepted.
- D. Resins shall be shipped directly from the resin manufacturer's facility to the CIPP wet-out facility. Resins shall not be sent to any intermediate mixing facility. Copies of the shipping documents from the resin manufacturer shall be submitted to the Engineer indicating dates of shipment, originating and receiving locations.

2.02 Catalyst Systems

- A. The catalyst system shall be made up of a primary catalyst and a secondary catalyst. The primary catalyst shall be added at a maximum of 1% of the resin volume by weight unless otherwise approved by the Engineer. The secondary catalyst shall be added at a maximum of 0.5% of the resin volume by weight unless otherwise approved by the Engineer.
- B. Resins, catalysts and resin/catalyst mix ratios shall not be changed or altered during this Contract unless specifically approved by the Engineer in writing.

2.03 Liner Tube

- A. The tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216.
- B. The acceptable liner tube shall be constructed under ISO 9001 certified procedures. Proper certification shall be provided prior to the manufacture or installation of any CIPP.
- C. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular shaped pipe sections.
- D. The wet-out tube shall have a uniform thickness that when compressed at installation pressures shall meet or exceed design thickness.
- E. The tube shall be manufactured to a size that when installed shall tightly fit the internal circumference and length of the original pipe. In the event that under-sized pipe is present, liner tube shall be manufactured so that overlap folds or wrinkles do not occur. Allowances shall be made for circumferential stretching during inversion.
- F. The outside layer of the tube, before installation, shall have an impermeable polyurethane or polyethylene plastic coating. This coating shall be an impermeable, flexible membrane that shall contain the resin and facilitate monitoring of resin saturation during resin impregnation. This coating shall form the inner layer of the finished pipe and is required for enhancement of corrosion resistance, flow and abrasion properties.
- G. The tube shall be homogeneous across the entire wall thickness containing no

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intermediate or encapsulated layers. No material may be included in the tube that may cause de-lamination in the cured liner, and no dry or unsaturated areas or layer shall be evident.

- H. The wall color of the interior liner surface after installation shall be such that a clear, detailed inspection with closed-circuit television equipment may be conducted.
- I. The outside of the tube shall be marked for distance at regular intervals not to exceed 10 feet. The tube shall be stamped with the manufacturer's name or identifying symbol in regular intervals not to exceed 20 feet.
- J. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance between manhole sections of the segment to be lined unless otherwise specified. The line lengths shall be verified in the field before impregnation of the tube with resin.

2.04 CIPP Design

A. Liner Thickness

- 1. The CIPP thickness shall be designed in accordance with the applicable provisions of ASTM F 1216 and D 2412 for "fully deteriorated gravity pipe conditions" and the following design conditions:
 - a. AASHTO HS20-44 Live Load, whether under streets or not. The live load will vary based on depth of pipe.
 - b. A dead load based on the depth of pipe shown on the Drawings and a soil modulus of elasticity of 1,000 psi, soil weight of 120 pounds per cubic foot and a coefficient of friction of $Ku'=0.130r$.
 - c. Short-term flexural modulus and long-term modulus when tested in accordance with ASTM D790.
 - i. Standard Polyester: 250,000 psi and 125,000 psi, respectively
 - ii. Enhanced Polyester: 400,000 psi and 200,000 psi, respectively
 - d. Minimum Flexural Stress of 4,500 psi, when tested in accordance with ASTM D790.
 - e. Safety factor of 2.0.
 - f. Groundwater height at the ground surface.
 - g. Maximum pipe ovality of 2%.
 - h. Poisson ratio of 0.3.

- i. Enhancement factor (K) of 7.
- j. Service temperature range shall be 40 to 140 degrees F.
- k. Maximum long-term deflection shall be 5%.
- l. Any and all other site specific external loads. It is the Contractor's responsibility to determine the site specific external loads.

2. Minimum Acceptable CIPP Thickness

Pipe Diameter (Inches)	Depth to Invert (Feet)	Minimum Thickness (mm)
8	0-17	6.0
18	0-13.5	10.5
18	13.6-17	12.0
24	0-9.5	12.0
24	9.6-12.5	13.5
24	12.6-15.8	15.0
24	15.9-19.5	16.5
30	0-9.5	18.0
30	9.6-12	18.0
36	0-9.5	18.0
36	9.6-11.7	19.5
36	11.8-14	21.0
36	14.1-16	22.5
36	16.1-18	24.0
36	18.1-21	25.5
36	21.1-22.5	27.0
42	0-10	25.5
42	10.1-15	30.0
42	15.1-20	34.5
42	20.1-25	37.5

- 3. The liner thickness shall be the greater of the calculated thickness to meet the design requirements of Paragraph 1 above or the minimum acceptable pipe thickness from Paragraph 2 above. If calculations require a thicker wall, round to the next higher multiple of 1.5 mm currently in manufacture.
 - 4. All references to liner thickness shall be defined as total thickness after installation and after curing is complete.
- B. The finished CIPP shall provide a uniform smooth interior wall surface with a Manning "n" coefficient of 0.011.

Part 3 Execution

3.01 General

- A. All reconstruction of existing gravity sewers using an approved CIPP product and installer shall be performed in strict accordance with this Specification and ASTM F1216.
- B. Pull-in and inflate methods of CIPP installations (reference ASTM F1743) will not be acceptable without written approval by the Engineer.
- C. The Contractor shall carry out his operations in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements involving work on an elevated platform and entry into a confined space and the operation of high-pressure air/steam equipment.
- D. The Contractor shall be responsible for obtaining water necessary for cleaning, inversion and other work items requiring water. The Contractor shall be responsible for obtaining a hydrant use permit from Tennessee American Water
- E. The Contractor shall be responsible for locating and access to all manholes.
- F. All surfaces, which have been damaged by the Contractor's operations, shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of the Contractor's operations. Suitable materials and methods, acceptable to the Engineer, shall be used for such restoration. The restoration of existing property or structures shall be performed as promptly as practicable and shall not be left until the end of the construction period. The cost for correcting damages resulting from the Contractor's actions shall be the responsibility of the Contractor.
- G. The tube shall be fabricated to a size that, when installed, will neatly fit the internal circumference of the conduit(s) designated for CIPP. Allowance shall be made for the circumferential stretching during insertion of the tube.
- H. The Contractor shall be responsible for determining the minimum length to effectively span the distance from the manhole to manhole and shall verify the length of the fabric tube in the field before the tube is either cut to length or wet-out with resin. The tube may run through one or more manholes with the approval of the Engineer.
- I. Protruding Service Connections: When service connections protrude into the existing pipe, the Contractor shall remove the protruding portion of the service connection to be flush with the inside pipe wall or to the satisfaction of the Engineer. Removal of the protruding portion of the service connection shall be accomplished using a television camera and internal cutting device, which shall not damage the collection line or the portion of the service line to remain in place. This work shall be accomplished prior to the installation of the CIPP.
- J. Traffic Control: The Contractor shall be responsible for traffic control during the course of each phase of the Work. Prior to beginning Work, Contractor shall submit a traffic control plan for each section of Work for the review and approval. It is the intent that this Work is to be accomplished with as little disturbance to traffic, private property, and the public as is reasonably possible, consistent with timely completion

thereof. The traffic control plan shall reflect such requirements where applicable. Signs, signals, and detours shall conform to the local and state requirements for streets and highways. The Contractor shall have and maintain on site a sufficient supply of traffic cones and other traffic signaling devices, including trained and properly equipped flagmen, to safely control all traffic through the work zone(s). Road closures and / or detours will require advance scheduling and prior approval by the Engineer.

3.02 Daily Work Schedule

Insofar as is possible, Work shall be so scheduled that the lining of the pipe, curing of the tube, and the reinstatement of service connections can be accomplished in a single working day or shift. Prior approval must be obtained from the Engineer if work is to be performed at night or on weekends to minimize traffic disturbance. At the end of each working day, temporary tie connections shall be made between the relined section of pipe and the existing system and the plug in the upstream manhole removed, but not before the section being lined has been properly cured in accordance with the manufacturer's instructions and all service connections are reinstated. In some instances, it may be necessary to bypass effluent from service connections.

3.03 By-Pass Pumping

- A. The installation methodology contemplated requires the temporary blocking and back-ups of sewers and sewage. Contractor shall be responsible to limit the extent and duration of such blockages and back-ups so that overflows and spillage onto public or private property and into storm sewers, waterways, and streets does not occur. In the event that such spillage or overflows do occur during the course of or as a result of the Work, the Contractor performing the Work shall immediately eliminate the spillage or overflow and, as necessary, remove the blockage and eliminate the back-up. On elimination of the spillage or overflow, the Contractor is to clean up and disinfect the area. Work to stop or contain such events is to be deemed emergency in nature and sufficient justification for total mobilization of resources, the use of overtime or double time, and any other reasonable measures to assure correction of the problem without delay. Damages arising from blockages, back-ups, spillage, or overflows of sewage during the course of the Work or because of the Work shall be the sole responsibility of the Contractor.
- B. Sewage flow shall be pumped around segments during the installation and testing of cured-in-place pipe, the televising of sewers and lateral service reinstatement.
- C. Pumping equipment shall have the capacity to convey 100% of peak flows around the construction area. The flow shall be intercepted at the upstream end of the construction area and shall be pumped through temporary piping of adequate size. The flow shall be discharged into a manhole on the downstream side of the construction area, thus by-passing the sewer segment(s) under construction. The Contractor shall be required to contact all residential and commercial customers whose service lines connect to the sewer main being bypassed and inform them that they will be temporarily out of service. The Contractor shall also advise those customers against water usage until the mainline is back in service. After completing the necessary work on the main line to allow its reuse, the Contractor shall advise

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those customers that the sewer main is back in service. The Contractor shall maintain a high degree of professionalism, both in workmanship and appearance, at all times. Should a condition arise that the Contractor cannot restore service within 12 hours of service interruption; the Contractor shall make provisions for pumping all flows within the service interruption area at no cost to the Owner.

- D. Open channels or trenches shall not be used to convey flow.
- E. A standby pump of the same capacity shall be required on site.
- F. The Contractor is responsible for paying all fines imposed for overflows or spills during construction.

3.04 Preliminary Installation Requirements

- A. Contractor shall notify the Engineer prior to beginning cleaning activities and pre-construction closed-circuit televising (CCTV) inspection. Contractor shall plan cleaning and pre-construction CCTV inspection activities far enough in advance of CIPP lining activities to allow Engineer time to review any critical damage reports that may develop from the CCTV inspection results.
- B. Prior to CIPP installation, the pipe shall be cleaned to the satisfaction of the Engineer in accordance with Section 33 01 30.14 of these Specifications.
- C. Debris Disposal: All debris cleaned from the pipe shall be removed and disposed of at a location determined by the Contractor and approved by the Engineer. Debris shall not be allowed to wash into any other pipe segment either upstream or downstream from the pipe segment being cleaned. All waste disposal at the Owner's Wastewater Treatment Plant shall meet the requirements set forth by the Owner including dewatering of waste prior to disposal.
- D. Pre-Installation CCTV Video Inspection: The section of sewer designated for CIPP shall to be televised its full length using a remote television camera in accordance with Section 33 01 30.16 of these Specifications and shall be submitted to the Engineer for review.

3.05 Resin Impregnation of the CIPP Tube (Wet-Out)

The Contractor shall designate a location where the tube shall be impregnated or "wet out" with resin, using distribution rollers and a vacuum impregnation system to thoroughly saturate the tube's felt fiber prior to installation in the field. The impregnated tube shall be free of pinholes, resin voids and other defects. If the cured-in-place pipe is impregnated at the manufacturing plant, it shall be delivered to the job site in a refrigerated truck, and remain refrigerated (below 45° Fahrenheit or as specified by the resin manufacturer) prior to installation to prevent premature curing. The flexible tube shall be vacuum impregnated with resin under controlled conditions or by such other means provided such means can assure thorough resin impregnation to the full satisfaction of the Engineer. The volume of resin used shall be sufficient to fill all voids in the tube material at normal or required thickness and diameter. The volume of resin shall be adjusted by adding seven to ten percent excess resin for the

change in resin volume due to polymerization and allow for any migration of resin into the cracks and joints in the original pipe.

3.06 Inversion of CIPP

- A. The preferred method of installation and cure for CIPP shall be inversion using hydrostatic head (water column) pressure and curing with heated, circulated water. The use of pressurized air inversion/steam cure will be considered on a case-by-case basis only. The Contractor shall submit a written request for the use of pressurized air/steam in sewer segments where the Contractor feels that the utilization of pressurized air/steam will be beneficial to the Owner. The Contractor shall not assume in any case that the use of pressurized air/steam is acceptable to the Owner without prior written authorization from the Owner. The impregnated tube shall be inverted through an existing manhole or other approved access point utilizing a hydrostatic water column until it has fully traversed the designated line length and the inversion face breaches the destination manhole or termination point. Contractor must have written approval from the Engineer prior to using pressurized air for inversion. The fluid column shall have been adjusted and maintained to be sufficient to cause the impregnated tube to hold tight against the existing pipe wall, produce dimples at side connections, and flared ends at the manholes. Lubricant during inversion shall be used as necessary in accordance with the CIPP manufacturer's recommendations. The lubricant used should be a nontoxic, oil-based product that has no detrimental effects on the tube, heating source and pump system, will not support the growth of bacteria, and will not adversely affect the fluid to be transported. Lubricant shall be used in processes with permeable coatings. Thermocouples shall be placed at the top and bottom interface of termination manhole which is furthest from the heat source for monitoring temperature during the cure cycle. Care should be taken during tube installation not to over-stress the fabric fiber and to minimize longitudinal stretch, resin loss and thinning of the liner wall.
- B. Before the inversion begins, the tube manufacturer shall submit to the Contractor, and the Contractor to the Engineer, the minimum pressure required to hold the tube tight against the host pipe and the maximum allowable pressure so as not to damage the tube.
- C. When using pressurized air, particular attention should be given to the maintenance of the minimum required "finished and installed" thickness of the CIPP.
- D. Once the inversion has started, pressure shall be maintained between the minimum and maximum pressures until the inversion has been accomplished.

3.07 Curing

- A. Using Circulated Water
 - 1. A suitable source of heat and water recirculation equipment is required to circulate heated water throughout the pipe. The equipment shall be capable of delivering hot water throughout the inverted tube to uniformly raise the temperature required to affect a cure of the resin.

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2. Initial cure will occur during temperature heat-up and is completed when exposed portions of the new pipe appear to be hard and sound and the thermocouples indicate that the temperature is of a magnitude to realize an exothermic or cure in the resin. After initial cure is reached, the temperature should be raised to the post-cure temperature recommended by the resin manufacturer. Post-cure temperature should be held for a period as recommended by the resin manufacturer, during which time the recirculation of the water and cycling of the heat source to maintain the temperature continues.
3. Prior to any inversion, the Contractor shall provide a Post-Cure Hold Time and Temperature Table. This table shall indicate the minimum time and temperature the inverted tube will be held at in order to achieve desired physical properties. The resin manufacturer shall certify both the time and temperatures presented in the table.
4. Curing must take into account the existing pipe material, the resin system, and the ground conditions (temperature, moisture level, and thermal conductivity of the soil).

3.09 Cool-Down

Cool-down of the cured pipe liner shall be in accordance with the manufacturer's recommendations. Care should be taken during the cool-down process so as to minimize shrinkage of the CIPP.

3.10 Termination and Sealing at Manhole Outlets

- A. Termination of the cured-in-place pipe at the manhole shall be completed by trimming the inverted pipe end back in accordance with the CIPP manufacturer's recommendations and to the satisfaction of the Engineer
- B. No annular space shall be visible between the CIPP and manhole wall. If, in the judgment of the Engineer the CIPP does not fit tightly against the sewer main at its termination point(s), the void between the host pipe and the CIPP shall be sealed by filling it with a resin/epoxy mixture compatible with the CIPP approved by the Engineer or by utilizing manhole end seals or hydro-tite gaskets, all at no additional cost to the Owner.

3.11 Testing of CIPP

- A. The Contractor shall prepare CIPP Acceptance Tests for each CIPP line segment during the duration of this Contract. The Engineer may, at its discretion, direct the Contractor to collect samples of the cured CIPP. The samples shall be for laboratory determination of flexural strength, flexural modulus and wall thickness for each test sample. These three individual analyses shall comprise one completed test. All samples shall be collected per the sampling protocols set forth in ASTM F1216.

- B. For each line segment from the point most distant from the heat source, the Contractor shall remove one restrained sample of the installed liner at least 12 inches in length for testing. For sewers 15 inches and larger, plate samples may be taken and cured in the same water as the installed CIPP. For each sample taken, the Contractor shall cut and deliver a 12 inch in length representative sample (taken at least 2 inches from the end of the specimen) to the Engineer. The sample delivered to the Engineer shall be clearly labeled with the date of installation and sewer segment and removed from any restraining mold. The samples shall be taken in the presence of the Engineer. The Engineer may return such samples to the Contractor for disposal.
- C. The tests shall be used to verify that the installed CIPP meets these Specifications. CIPP thickness shall be measured in accordance with ASTM D5813. Flexural properties shall be determined per ASTM D790. The Contractor shall label and date all samples and deliver the samples directly to the Engineer. All testing shall be performed by an independent, ASTM-certified testing laboratory of Engineer's designation. Payment to the Contractor shall be withheld pending the Engineer's acceptance of the CIPP test results. The Laboratory costs will be paid in accordance with the terms and conditions of Cash Allowances specified elsewhere.
- D. Any liner that does not meet the specified strength and/or thickness requirements, regardless of the amount below the specified requirements, shall be corrected by the Contractor in a manner approved by the Engineer at no additional cost to the Owner. The Engineer's decision on how to correct deficient CIPP installations shall be final. Options for correcting deficient liners that may be considered by the Engineer include removing the liner and re-lining the sewer, or excavating and replacing the sewer from manhole to manhole, or providing the Owner with a credit. The primary option that will be considered will be to re-line the sewer. Credits will only be authorized for CIPP that does not meet required thickness. If a credit is acceptable to the Owner, the credit shall be calculated by multiplying the bid price by the percent that the liner thickness is below the required installed thickness as follows:
- $$\text{Credit} = (1 - \text{Installed CIPP thickness/required CIPP thickness}) \times \text{bid price}$$
- E. The Contractor shall not assume a credit will be acceptable to the Owner in any case.

3.12 Lateral Service Reconnection - Internal

- A. After the CIPP has been cured, the existing service connections and laterals shall be reinstated. In general, reinstatement of service connections and laterals shall be accomplished internally, without surface excavation, using a remote control cutting device equipped with a television monitor. Reopened services shall be wire brushed to the satisfaction of the Engineer. In some cases, remote reinstatement may not be possible. In these instances, reconnection by excavation as specified below is acceptable. All connections must be reinstated by at least 95-percent of the original opening. Holes cut outside the lateral opening or oversized cutting (more than 100%) must be repaired at the Contractor's expense. Particular attention shall be given to the lower quadrant of the opening to ensure that no accumulation of solids or debris will occur at the service tie-in.

- B. All capped or factory plugged service connections shall not be opened unless otherwise directed by the Engineer.

3.13 Lateral Service Reconnection By Excavation

- A. General: Sewer lateral house connections accomplished by excavation shall be connected to the pipe by dual-strap saddles. The Contractor shall connect existing sewer house lateral service pipe to the saddle using a flexible coupling. After connection to the saddle, the sewer house connection pipe shall have a slope toward the newly lined sewer equal to the pre-existing on the lateral pipe or a minimum of two percent.
- B. Execution
 - 1. The Contractor shall excavate the area of the lateral connection so that the host pipe and existing connection is exposed. The host pipe shall be broken back or removed in such a manner that the new CIPP liner is exposed without causing damage to the liner.
 - 2. An appropriately sized hole acceptable to the Engineer shall be cut into the CIPP using a circular hole cutter. Hanging or loose cuttings shall be removed so that the newly opened hole is smoothed around its edges.
 - 3. A sealant compatible with CIPP and acceptable to the Engineer shall be liberally applied around the newly cut hole to form a watertight seal between the CIPP liner and PVC pipe saddle used to make the connection.
 - 4. A dual-strap PVC pipe saddle acceptable to the Engineer shall be secured to the CIPP in accordance with the manufacturer's recommendations.
 - 5. Before the service lateral pipe is connected to the saddle, the Contractor shall hand wipe a hydrogen sulfide resistant composite epoxy resin mixture inside the saddle where the saddle and CIPP surfaces meet to ensure a watertight seal.
 - 6. The Contractor shall connect the lateral service pipe to the saddle according to the manufacturer's recommendations and in a manner acceptable to the Engineer.

3.14 Final Acceptance

- A. Post-installation videos shall be conducted and submitted to the Engineer in accordance with Section 33 01 30.16 of these Specifications. The finished CIPP shall be continuous over the length of pipe between two manholes and shall be an impermeable, joint-less conduit, free from visual defects such as foreign inclusions, dry spots, pin holes, lifts, or delamination.
- B. Wrinkles in the CIPP (other than minor, longitudinal pressure wrinkles) will not be acceptable. The Engineer shall determine as to the acceptability of pressure wrinkling with that decision being final.

- C. After curing of the resin is completed, the hardened CIPP shall extend from manhole to manhole of the section designated providing a structurally sound, corrosion-resistant, watertight conduit that excludes exfiltration and infiltration, is tight-fitting within the existing pipe, and is free of voids or annular spaces between the CIPP and the existing pipe walls. K-Factor for tightness shall equal 7.0 or greater. All terminations into manhole walls shall be watertight at the time of final inspection. No annular space shall be visible between the CIPP and manhole wall.
- D. The finished pipe must be such that when the thermosetting resin cures, the total wall thickness will be a homogeneous, monolithic felt and resin composite matrix that will be chemically resistant to withstand internal exposure to domestic sewage. When cured, the CIPP must form a mechanical bond with the host pipe.

3.15 Customer Notifications

- A. The Contractor shall contact all residential and commercial customers whose service is to be interrupted by rehabilitation work or who may be affected by upstream or downstream rehabilitations. The customer shall be informed that they will be temporarily out of service. This notification shall be made a minimum of 24 hours prior to beginning rehabilitation work. See the Drawings and Section 01 35 00 Unique Requirements regarding any additional notification requirements.
- B. For all residences the Contractor shall leave a door hanger detailing the service outage and providing contact information. Door hanger samples shall be submitted to the Engineer for review and approval. The Contractor shall also advise those customers against water usage until the mainline and lateral are back in service. After completing the necessary work on the main line and lateral to allow their reuse, the Contractor shall advise those customers that the sewer is back in service. Should a condition arise that the Contractor cannot restore service within 12 hours of service interruption; the Contractor shall make provisions for pumping all flows within the service interruption area at no cost to the Owner.
- C. All customer notification documentation and procedures shall meet the requirements of the Owner.

END OF SECTION