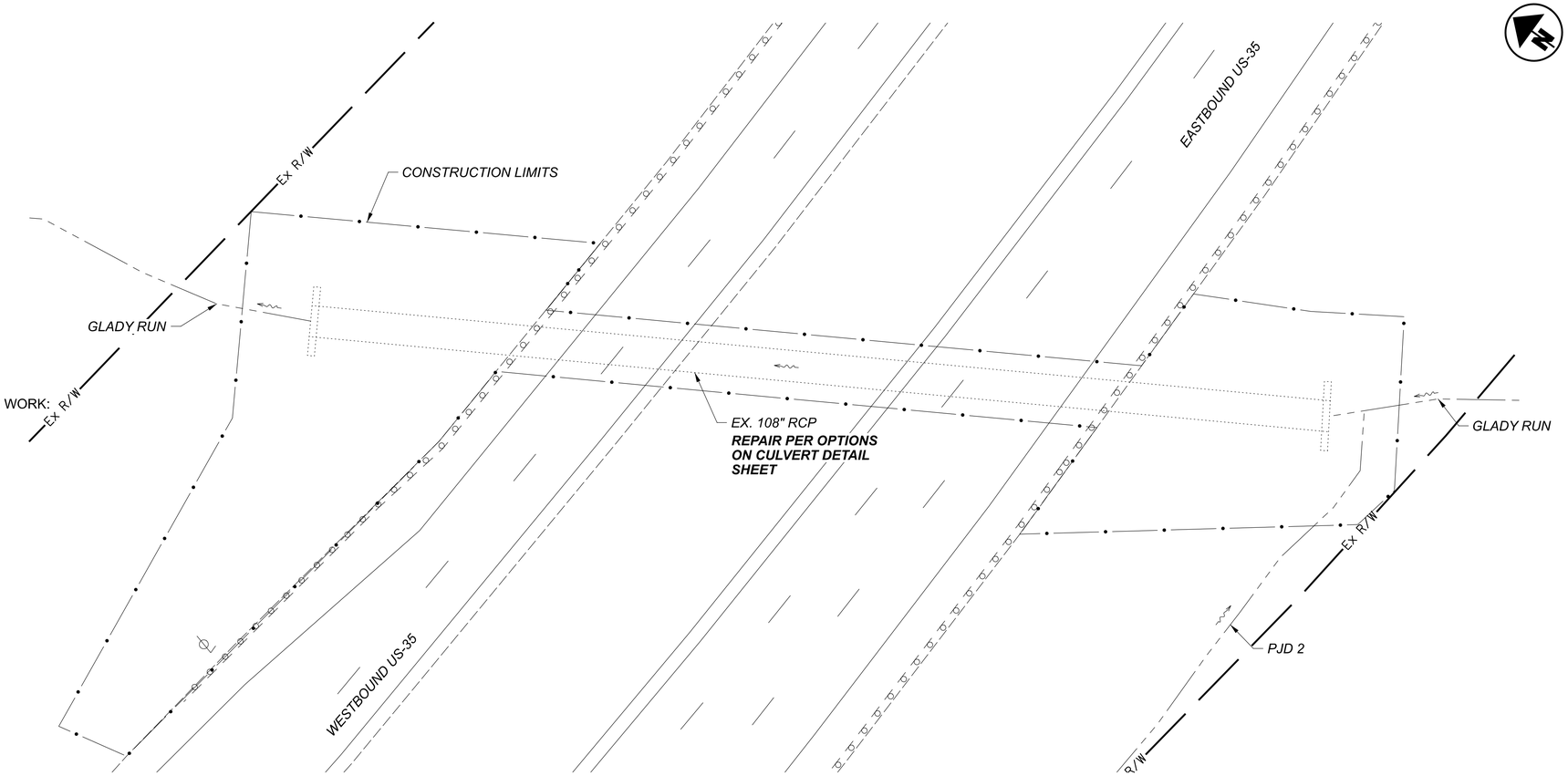
EXISTING STRUCTURE	
TYPE:	CONCRETE
SIZE:	108", 300' LONG
SKEW:	30°30'31.7"
ALIGNMENT:	TANGENT
SFN:	2900639
DATE BUILT:	1989
CONDITION:	FAIR
LATITUDE:	39.661655
LONGITUDE:	-83.945604
STREAM NAME:	GLADY RUN
OHWM:	924.2
STREAM NAME:	PJD 2
OHWM:	924.5
EX. CULVERT INVERT:	922.7

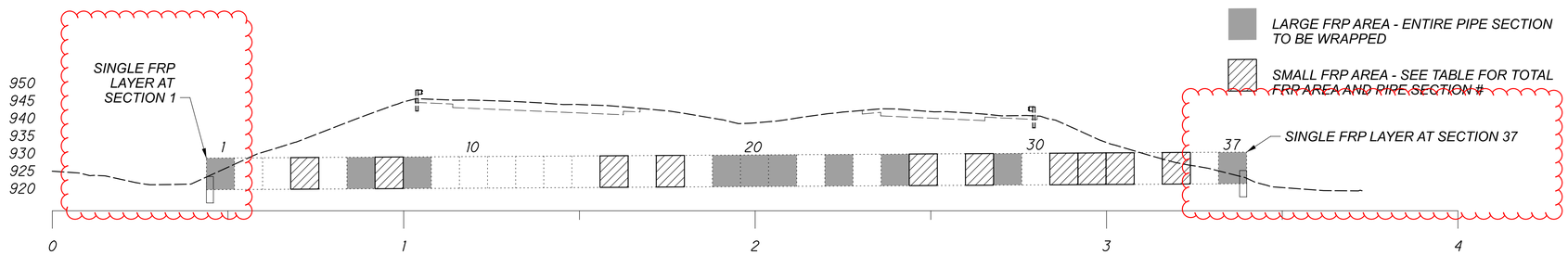
REHABILITATE CULVERT GRE-35-10.42 BY PERFORMING THE FOLLOWING WORK:

1. CLEAN CULVERT INTERIOR OF SEDIMENT AND DEBRIS.
2. REPAIR CULVERT PER OPTIONS ON CULVERT DETAIL SHEET.



OPTION A - FRP AND TROWELABLE MORTAR REPAIR AREA TABLE

Section - From Outlet	Size L	Size W	Deteriorated Area (SS 843)	FRP Area
1	2 ft	2 ft	4 sf	226 sf
4	3 ft	3 ft	9 sf	49 sf
6	4 ft	3 ft	12 sf	226 sf
	2 ft	2 ft	4 sf	
7	1 ft	1 ft	1 sf	25 sf
8	4 ft	4 ft	16 sf	226 sf
15	1 ft	1 ft	1 sf	
17	1 ft	3 ft	3 sf	35 sf
	1 ft	1 ft	1 sf	25 sf
19	8 ft	6 ft	48 sf	226 sf
20	2 ft	7 ft	14 sf	226 sf
21	3 ft	4 ft	12 sf	226 sf
23	2 ft	8 ft	16 sf	226 sf
25	8 ft	8 ft	64 sf	226 sf
26	1 ft	4 ft	4 sf	40 sf
28	1 ft	2 ft	2 sf	30 sf
	2 ft	2 ft	4 sf	36 sf
29	2 ft	2 ft	4 sf	226 sf
	3 ft	6 ft	18 sf	
31	1 ft	4 ft	4 sf	40 sf
32	1 ft	3 ft	3 sf	35 sf
33	2 ft	3 ft	6 sf	42 sf
35	2 ft	3 ft	6 sf	42 sf
37	1 ft	8 ft	8 sf	226 sf
	1 ft	1 ft	1 sf	
total =			265 sf	2661 sf
Total 843 (carried to sheet 5) =			65 sf	
Total 843, APP (carried to sheet 5) =			200 sf	



HORIZONTAL SCALE IN FEET
0 10 20 40

GRE-35-10.42
CULVERT PLAN & PROFILE

DESIGN AGENCY

DESIGNER MLB
REVIEWER TRB 03-17-23
PROJECT ID 115575
SHEET 04 TOTAL 06

GRE-35-10.42

OPTION A: CARBON FIBER REINFORCED POLYMER (FRP)

1. SMALL AREA REPAIR: SMALL AREAS OF SPALLED CONCRETE SHALL BE REPAIRED WITH TROWELABLE MORTAR PER SS 843. "SMALL AREAS" ARE DEFINED AS THOSE AREAS ESTIMATED TO BE LESS THAN 10 SF. ONCE TROWEABLE MORTAR HAS CURED PER MANUFACTURER'S SPECIFICATIONS, INSTALL ONE PLY OF PROTECTIVE FRP PER PN 519 ORIENTED CIRCUMFERENTIALLY. THIS PROTECTIVE FRP SHALL EXTEND 2 FT PAST THE LIMITS OF DETERIORATION IN EACH DIRECTION.
2. LARGE AREA REPAIR: LARGE AREAS OF SPALLED CONCRETE SHALL BE REPAIRED WITH TROWELABLE MORTAR PER SS 843, AS PER PLAN (SEE NOTE ON THIS SHEET). "LARGE AREAS" ARE DEFINED AS THOSE AREAS ESTIMATED TO BE MORE THAN 10 SF. ONCE TROWEABLE MORTAR HAS CURED PER MANUFACTURER'S SPECIFICATIONS, INSTALL 2 LAYERS OF FRP AROUND THE ENTIRE PERIMIETER OF THE EXISTING CONCRETE PIPE SECTION EXCEPT WHERE NOTED ON SHEET 4 (SEE NOTE 3).
3. INSTALL ONE PLY OF FRP PER PN 519 AROUND ENTIRE PERIMETER OF EXISTING CONCRETE PIPE ON FIRST AND LAST SECTIONS OF CULVERT AS INDICATED ON SHEET 4.
4. COAT ALL FRP WITH AN EPOXY URETHAN SEALER PER CSM 512. COLOR SHALL BE FEDERAL COLOR 17778. EXTEND THE SEALER 6" PAST THE LIMITS OF THE FRP.
5. SEE PROFILE ON CULVERT PLAN SHEET FOR LOCATIONS OF SMALL AND LARGE REPAIRS PER OPTION A.
6. PERFORM A POST-INSTALLATION VIDEO SURVEY OF THE PIPE AND PROVIDE A COPY OF THE VIDEO TO THE ENGINEER AS DESCRIBED IN SS902 SECTION 902.01 C.
7. QUANTITIES OF FRP PROVIDED IN THESE PLANS REPRESENTS ONLY THE AREA OF DETERIORATION IN NEED OF REPAIR. ACTUAL QUANTITY OF FRP WILL INCLUDE ALL REQUIREMENTS AS STATED IN THESE NOTES.

OPTION B: SS 833

1. SPRAYLINE THE ENTIRE CIRCUMFERENCE OF THE EXISTING 108" CULVERT PER SS 833, AS PER PLAN (SEE NOTE ON THIS SHEET).
2. WATER TABLE WITHIN THE EMBANKMENT SHALL BE ASSUMED TO BE AT THE ROADWAY SURFACE.

OPTION C: EXPAND IN PLACE INTEGRATION

1. LINE THE ENTIRE INTERIOR CIRCUMFERENCE OF THE CULVERT WITH EXPAND-IN-PLACE INTEGRATION (EIPI).
2. THE WATER TABLE WITHIN THE EMBANKMENT SHALL BE ASSUMED TO BE AT THE ROADWAY SURFACE.

SS 843 - PATCHING CONCRETE STRUCTURES WITH TROWELABLE MORTAR, AS PER PLAN

PROVISIONS FOR SS 843 SHALL BE FOLLOWED EXCEPT MODIFIED HEREIN. FOR SECTION 843.4, REMOVAL OF CONCRETE, POWER TOOLS SHALL BE PROHIBITED AND ONLY CONRETE THAT WILL REQUIRE REMOVAL IS THAT WHICH CAN BE REMOVED WITH A HAND TOOL. EXCAVATION OF DETERIORATED OR UNSOUND CONRETE AROUND EXPOSED REINFORCING STEEL IS NOT REQUIRED.

SS 833 - CONDUIT RENEWAL USING SPRAY APPLIED STRUCTURAL LINER, AS PER PLAN

PROVISIONS FOR SS 833 SHALL BE FOLLOWED EXCEPT MODIFIED HEREIN. THE MAXIMUM SPRAYLINER THICKNESS SHALL BE 2.0 INCHES. SIGNED AND STAMPED CALCULATIONS BY A PROFESSIONAL ENGINEER ARE STILL REQUIRED. MATERIALS REQUIRED A THICKNESS THAT EXCEEDS 2.0 INCHES WILL REDUCE THE HYDRAULIC CAPACITY OF THE PIPE BEYOND ACCEPTANCE AND ARE THEREFORE NOT ALLOWED.

THE AREAS OF LOOSE CONCRETE WITHIN THE PIPE SHALL BE REMOVED WITH HAND HELD TOOLS. THE USE OF POWER TOOLS SHALL BE PROHIBITED AND THE ONLY CONCRETE THAT WILL REQUIRE REMOVAL IS THAT WHICH CAN BE REMOVED WITH HAND TOOLS. AREAS WHERE REBAR IS EXPOSED AND/OR THE CONCRETE HAS BEEN REMOVED SHALL BE CLEANED PRIOR TO THE APPLICATION OF THE SPRAYLINER. CLEANING SHALL PRECEDE APPLICATION OF THE SPRAYLINER BY NOT MORE THAN 24 HOURS. THE SURFACE TO BE PATCHED SHALL BE CLEANED BY ABRASIVE BLASTING FOLLOWED BY AN AIR BLAST. BLASTING ABRASIVES CONTAINING MORE THAN 1% FREE SILICA WILL NOT BE ALLOWED. EXPOSED REINFORCING AND STRUCTURAL STEEL SHALL BE CLEANED TO REMOVE ALL LOOSE AND BUILT-UP RUST, ASPHALT RESIDUE, AND ALL OTHER CONTAMINANTS DETRIMENTAL TO ACHIEVING AN ADEQUATE BOND. THE SURFACE SHALL BE FREE OF SPALLS, LAITANCE AND ALL TRACES OF FOREIGN MATERIAL. EXPOSED PORTIONS OF EXISTING REINFORCING STEEL SHALL BE TREATED WITH A CORROSION INHIBITOR. THE PREPARATORY WORK SHALL BE INCIDENTAL TO SS 833.

ITEM 611 – CONDUIT MISC.: EXPAND-IN-PLACE GLASS-FIBER LINER PIPE

INSTALL AN EXPAND-IN-PLACE GLASS-FIBER LINER PIPE THAT IS BONDED TO THE INTERIOR SURFACE OF THE CONCRETE HOST PIPE TO BE REHABILITATED. ENSURE THE LINER PIPE FITS TIGHTLY AND CONFORMS TO THE SHAPE OF THE EXISTING PIPE WHEN THE EXPANSION IS COMPLETE. GLASS ALL SEAMS AND JOINTS A MINIMUM THICKNESS EQUAL TO THE DESIGN THICKNESS TO PRODUCE A CONTINUOUS JOINT-LESS LINER THAT IS IMPERVIOUS TO INFILTRATION AND EXFILTRATION.

PROVIDE CALCULATIONS PERFORMED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER. DESIGN THE PIPE AS A STATE III LINER THAT INDEPENDENTLY SUPPORTS THE DEAD LOAD, LIVE LOAD, AND HYDRAULIC LOAD PER ASCE MOP 145, DESIGN OF CLOSE-FIT LINERS. USE A DESIGN SERVICE LIFE OF 75 YEARS. INCLUDE A LOAD RATING ANALYSIS, IF REQUIRED, PER THE BRIDGE DESIGN MANUAL SECTION 900 TO THE DISTRICT BRIDGE ENGINEER.

PROVIDE LINER PIPE CONFORMING TO 707.75.

PROVIDE A 2-PART BONDING SYSTEM CONSISTING OF A PRIMER AND BONDING AGENT, BOTH SOURCED FROM THE SAME PRODUCER, DESIGNED TO WORK IN CONJUCTION TO BOND THE LINER PIPE TO THE CONCRETE HOST PIPE. FILL VOIDS WITH GROUT COMPATIBLE WITH THE 2-PART BONDING SYSTEM WHERE THEY EXIST BETWEEN THE LINER AND HOST PIPE DUE TO DETERIORATION OF THE HOST PIPE (SPALLING, JOINT SEPARATION / MISALIGNMENT) AND FULL CONTACT CANNOT BE ACHIEVED.

CURED BONDING AGENT PROPERTIES

TENSILE STRENGTH	1700 PSI (MINIMUM)
ELONGATION	480% (MAXIMUM)
MODULUS (100%)	430PSI (MINIMUM)

INSTALL LINER PIPE AND BONDING SYSTEM AS PER THE DIRECTION OF THE MANUFACTURER USING ONLY MANUFACTURER CERTIFIED PERSONNEL.

CLEAN AND REMOVE DEBRIS FROM THE HOST PIPE PRIOR TO INSTALLING THE LINER PIPE. DEWATER PIPE AND BYPASS FLOW DURING INSTALLATION. RESTORE ACTIVE SERVICE CONNECTIONS AFTER INSTALLATION OF THE LINER PIPE. PERFORM A POST-INSTALLATION VIDEO SURVEY OF THE PIPE AND PROVIDE A COPY OF THE VIDEO TO THE ENGINEER AS DESCRIBED IN SS902 SECTION 902.01 C.

PAYMENT FOR THE ABOVE WORK IS INCLUDED IN THE CONTRACT PRICE FOR ITEM 611, CONDUIT MISC.: EXPAND-IN-PLACE GLASS-FIBER LINER PIPE 108", FOOT

ESTIMATED QUANTITIES (TOTALS CARRIED TO GENERAL SUMMARY)

ITEM	QUANTITY	UNIT	DESCRIPTION
			STRUCTURE 20 FOOT SPAN AND UNDER (GRE-35-10.42) OPTION A: FRP
512	444	SY	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)
519	2661	SF	COMPOSITE FIBER WRAP SYSTEM
843	65	SF	PATCHING CONCRETE STRUCTURES WITH TROWELABLE MORTAR
843	200	SF	PATCHING CONCRETE STRUCTURES WITH TROWELABLE MORTAR, AS PER PLAN
			STRUCTURE 20 FOOT SPAN AND UNDER (GRE-35-10.42) OPTION B: SS 833
833	296	FT	CONDUIT RENEWAL USING SPRAY APPLIED STRUCTURAL LINER, ROUND CONDUIT, AS PER PLAN
			STRUCTURE 20 FOOT SPAN AND UNDER (GRE-35-10.42) OPTION C: EIPI
611	296	FT	CONDUIT, MISC.: 108" EXPAND IN PLACE INTEGRATION TECHNOLOGY LINER PIPE

GRE-35-10.42

MODEL: Sheet PAPERSIZE: 34x22 (in.) DATE: 12/8/2023 TIME: 10:17:52 AM USER: mbailey5
pw:\\ohiodot-pw.bentley.com:ohiodot-pw-02\Documents\01 Active Projects\District 08\Greene\115575\400-Engineering\Drainage\Sheets\115575_DC001.dgn

CULVERT DETAILS AND NOTES

DESIGN AGENCY

DESIGNER MLB

REVIEWER TRB 03-17-23

PROJECT ID 115575

SHEET 05 TOTAL 06