


DESIGN AGENCY

EUTHENICS 

8235 Mohawk Dr. | Cleveland, OH 44136

DESIGNER

ESM

REVIEWER

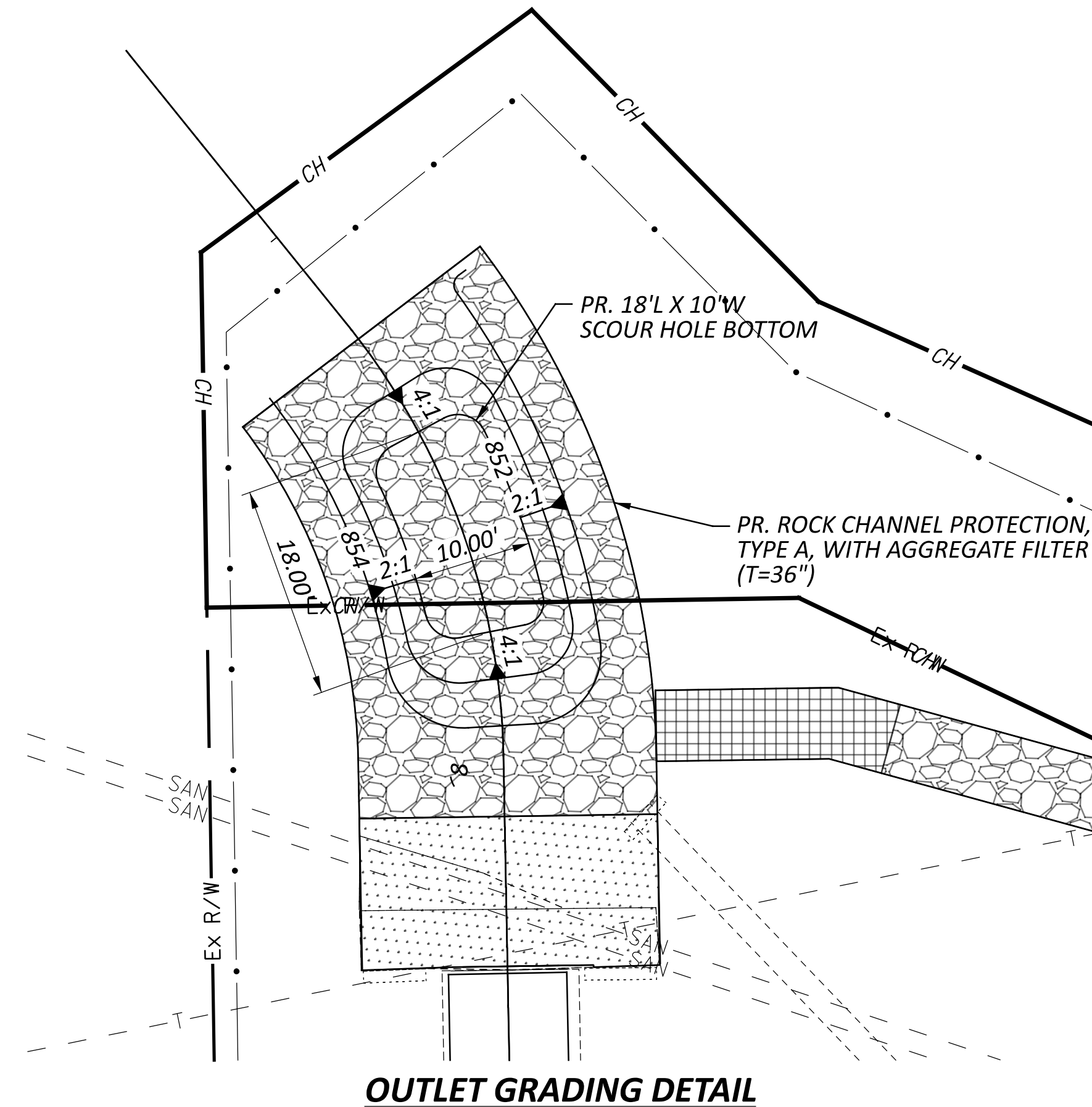
JLN 05/30/24

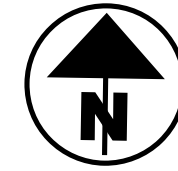
PROJECT ID

116837

SHEET	TOTAL
P.14	17

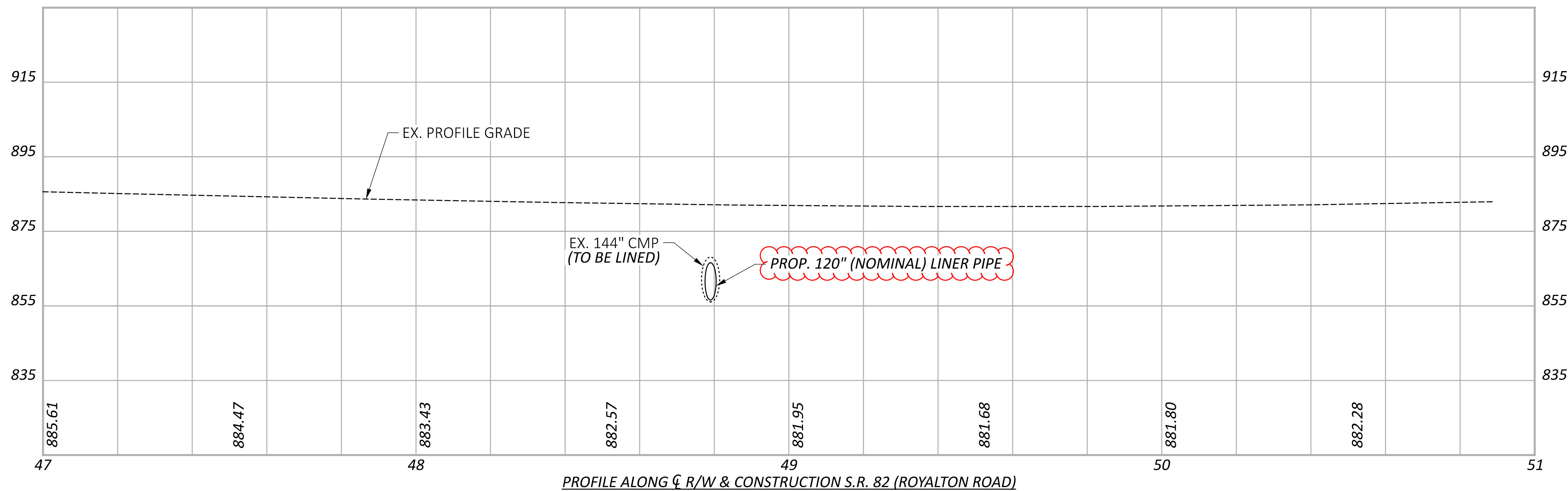
CULVERT PLAN AND PROFILE
S.R. 82 OVER BAKER CREEK





HYDRAULIC DATA

DRAINAGE AREA = 2.15 SQ. MILES
Q (25) = 735 CFS V (25) = 14 FT/S HW (25) = 866.57
Q (100) = 780 CFS V (100) = 14 FT/S HW (100) = 867.01
pH = 8.3 ABRASION LEVEL = 4



EXISTING STRUCTURE		<div>SFN</div> <div>1806971</div> <div>DESIGN AGENCY</div> <div><div>EUTHENICS</div><div>8235 Mohawk Dr. Cleveland, OH 44138</div></div>	
TYPE: CORRUGATED METAL PIPE CULVERT			
SPAN: 12'-0"			
ROADWAY: 63'-4" F/F CURB			
LOADING: NOT KNOWN			
SKEW: 0°			
WEARING SURFACE: NONE			
APPROACH SLABS: NONE			
ALIGNMENT: TANGENT			
CROWN: VARIES			
STRUCTURE FILE NUMBER: 1806971			
DATE BUILT: 1987			
DISPOSITION: TO BE REHABILITATED			
PROPOSED STRUCTURE			
TYPE: LINER PIPE PER ODOT CMS SPECIFICATIONS 707.35, 707.75, OR 707.85, AS WELL AS PER ODOT SUPPLEMENTAL SPECIFICATION 837, INSTALLED WITHIN EXISTING STRUCTURE AND BACKFILLED WITH GROUT			
SPAN: 10'-0" (NOMINAL)			
ROADWAY: 63'-4" F/F CURB			
LOADING: HL93 AND 60 PSF FUTURE WEARING SURFACE			
SKEW: 0°			
WEARING SURFACE: NONE			
APPROACH SLABS: NONE			
ALIGNMENT: TANGENT			
CROWN: VARIES			
COORDINATES: LATITUDE 41°18'44" N			
LONGITUDE 81°51'35" W			
		<div>DESIGNER</div> <div>COM</div>	
		<div>CHECKER</div> <div>JLN</div>	
		<div>REVIEWER</div> <div>LAB 03/15/24</div>	
		<div>PROJECT ID</div> <div>116837</div>	
		<div>SUBSET</div> <div>1</div>	
		<div>TOTAL</div> <div>3</div>	
		<div>SHEET</div> <div>P.15</div>	
		<div>TOTAL</div> <div>17</div>	

STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS

REFER TO THE FOLLOWING STANDARD BRIDGE DRAWING(S):

N/A

AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATION(S):

800 DATED 07/19/2024
837 DATED 01/19/2024

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO THE 8TH EDITION OF THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, INCLUDING ALL REVISIONS AND INTERIM SPECIFICATIONS, AND THE ODOT BRIDGE DESIGN MANUAL, 2020 AND QUARTERLY UPDATES.

DESIGN LOADING

DESIGN LOADING INCLUDES:
VEHICULAR LIVE LOAD: HL-93

ALONG WITH THE SHOP DRAWINGS, THE CONTRACTOR MUST PROVIDE CALCULATIONS STAMPED BY AN OHIO REGISTERED PROFESSIONAL ENGINEER THAT CONFIRM THE STRUCTURAL DESIGN OF THE PROPOSED LINER PIPE.

EXISTING STRUCTURE VERIFICATION

DETAILS AND DIMENSIONS SHOWN ON THESE PLANS PERTAINING TO THE EXISTING STRUCTURE HAVE BEEN OBTAINED FROM PLANS OF THE EXISTING STRUCTURE AND FROM FIELD OBSERVATIONS AND MEASUREMENTS. CONSEQUENTLY, THEY ARE INDICATIVE OF THE EXISTING STRUCTURE AND THE PROPOSED WORK BUT THEY SHALL BE CONSIDERED TENTATIVE AND APPROXIMATE. THE CONTRACTOR IS REFERRED TO C&MS, SECTIONS 102.05 AND 105.02. BASE CONTRACT BID PRICES UPON A RECOGNITION OF THE UNCERTAINTIES DESCRIBED ABOVE AND UPON A PREBID EXAMINATION OF THE EXISTING STRUCTURE. HOWEVER, THE DEPARTMENT WILL PAY FOR ALL PROJECT WORK BASED UPON ACTUAL DETAILS AND DIMENSIONS THAT HAVE BEEN VERIFIED IN THE FIELD.

ITEM 511 - CLASS QC1 CONCRETE, MISC.: BEVELED INLET ROUNDING

THE BEVELED INLET ROUNDING SHALL BE INSTALLED AS DETAILED ON SHEET P.17. ALL WELDED WIRE MESH AND DOWELS REQUIRED, SHOWN ON SHEET P.17, SHALL BE INCLUDED IN THE PAYMENT FOR THIS ITEM. THE COST OF ALL ABOVE DESCRIBED ITEMS, WORK, AND INCIDENTALS TO CONSTRUCT THE BEVELED INLET ROUNDING AS DETAILED IN THESE PLANS SHALL BE INCLUDED FOR PAYMENT OF THIS ITEM.

ITEM 202 - REMOVAL MISC.: CONCRETE RIPRAP

THIS ITEM SHALL CONSIST OF THE REMOVAL OF THE EXISTING CONCRETE RIPRAP AT THE OUTLET OF THE EXISTING 144" CMP CULVERT. ALL LABOR, MATERIAL, EQUIPMENT, AND INCIDENTALS NEEDED TO COMPLETE THIS WORK SHALL BE INCLUDED IN THE CONTRACT BID PRICE FOR ITEM 202 - REMOVAL MISC.: CONCRETE RIPRAP.

ITEM 837 - LINER PIPE, AS PER PLAN

THE PROPOSED STRUCTURE TYPE SHALL BE A 10' (NOMINAL) DIAMETER CONDUIT, TYPE A, CAPABLE OF BEING ASSEMBLED WITHIN THE EXISTING CULVERT AS DETAILED IN THESE PLANS. THE PROPOSED STRUCTURE SHALL BE DESIGNED FOR HL-93 LOADING AND ASSUME THE EXISTING STRUCTURE PROVIDES NO STRUCTURAL CAPACITY.

THE PROPOSED STRUCTURE TYPE SHALL PROVIDE THE IMPROVED INLET CONDITION AS SPECIFIED IN THE DETAILS ON SHEET 17. AN OHIO REGISTERED PROFESSIONAL ENGINEER SHALL CONFIRM THAT THE PROPOSED STRUCTURE TYPE MEETS THE HYDRAULIC DATA LISTED ON SHEET 15.

MATERIAL:
CONDUIT SHALL CONFORM TO ODOT C&MS 707.35, 707.75, OR 707.85, AS WELL AS SUPPLEMENTAL SPECIFICATION 837.

INSTALLATION:
THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS INCLUDING ASSEMBLY DRAWINGS AND METHODS, DEWATERING METHODS, BULKHEAD, AND BLOCKING DETAILS TO THE ENGINEER FOR REVIEW. THE CONTRACTOR MAY PUSH OR PULL ASSEMBLED LINER SECTIONS INTO PLACE IF NECESSARY PER THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL UTILIZE METHODS THAT FACILITATE PLACEMENT OF THE LINER SECTIONS WHILE MINIMIZING DAMAGE TO THE LINER PIPE. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE DETAILS AND LOCATIONS OF ANY LATERAL CONNECTIONS, GROUT PORTS, FITTINGS, BLOCKING, AND BLOCKING HARDWARE FOR APPROVAL. A GROUTING METHOD AND CULVERT INSTALLATION PROCEDURE SHALL ALSO BE SUBMITTED FOR APPROVAL.

CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING: SIZE, TYPE, AND LOCATIONS OF ANY LATERAL CONNECTIONS; DEFLECTIONS/DAMAGE TO THE EXISTING STRUCTURES; AND HORIZONTAL AND VERTICAL DEFLECTIONS TO THE OVERALL STRUCTURE ALIGNMENT.

ALL NECESSARY REPAIRS/REMOVALS TO THE EXISTING CULVERT TO PROVIDE CLEARANCE FOR THE PROPOSED LINER/GROUT SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM. CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT AS NEEDED TO MAINTAIN STRUCTURAL INTEGRITY AT ALL TIMES.

FIELD CUTTING OF LINER PIPE SHALL BE AS MINIMAL AS REQUIRED TO PERMIT CONNECTION OF LATERALS AND PERMIT INSTALLATION OF THE LINER PIPE, AND SHALL NOT COMPROMISE THE STRUCTURAL CAPACITY OF THE LINER. ANY LATERAL CONNECTIONS SHALL BE INCLUDED IN THE BID UNIT PRICE FOR THIS ITEM.

CONTRACTOR SHALL PROVIDE SHOP FABRICATED TRANSITION LINER SECTIONS TO ACCOMODATE DEFLECTIONS IN THE HORIZONTAL OR VERTICAL ALIGNMENT OF THE EXISTING STRUCTURE.

ALL VENTILIATION NEEDED FOR THE PERFORMANCE OF THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM.

THE COSTS OF ALL ABOVE DESCRIBED ITEMS, WORK, AND INCIDENTALS TO CONSTRUCT THE LINER AS DETAILED IN THESE PLANS SHALL BE INCLUDED FOR PAYMENT OF THIS ITEM.

ITEM 837 - BACKFILL FOR LINER PIPE, AS PER PLAN

THE BACKFILL FOR THE LINER PIPE, HENCEFORTH REFERRED TO AS GROUT, IS FOR FILLING THE SPACE BETWEEN THE EXISTING CONDUIT AND PROPOSED LINER. AFTER INSTALLATION OF THE LINER, BUT PRIOR TO GROUTING, BULKHEADING AND VENTING SHALL BE CONSTRUCTED. A WATERTIGHT, CEMENTITIOUS BULKHEAD (OR COLLAR) SHALL BE FORMED BETWEEN THE HOST STRUCTURE AND THE LINER PIPE AT EACH END AND SHALL BE SUFFICIENT TO RESIST GROUT PRESSURES OR HYDROSTATIC WATER PRESSURE WITHIN THE ANNULAR SPACE.

THE GROUT SHALL BE PLACED IN CONTROLLED LIFTS IN ACCORDANCE WITH THE SUBMITTED STAGED GROUTING PLAN. EACH LIFT SHALL BE ALLOWED TO ACHIEVE INITIAL SET BEFORE THE SUBSEQUENT LIFT CAN BE PLACED. ADDITIONALLY, THE CONTRACTOR TOGETHER WITH THE ENGINEER SHALL SOUND THE AREA OF EACH LIFT ONCE IT HAS ACHIEVED INITIAL SET TO ENSURE THAT THE GAP BETWEEN THE EXISTING STRUCTURE AND PROPOSED LINER PIPE HAS BEEN COMPLETELY FILLED. ANY VOIDS DETECTED BY THE SOUNDING SHALL BE CORRECTED BY PLACING ADDITIONAL GROUT BEFORE PROCEEDING WITH PLACEMENT OF THE SUBSEQUENT LIFT.

IF PORTS ARE USED TO PUMP GROUT THROUGH THE LINER PIPE, THEY SHALL BE SHOP INSTALLED. IF FIELD-INSTALLED PORTS ARE REQUIRED, THEY SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS AND SHALL NOT COMPROMISE THE STRUCTURAL CAPACITY OF THE LINER.

THE MATERIALS SHALL BE MIXED IN EQUIPMENT OF SUFFICIENT SIZE AND CAPACITY TO PROVIDE THE DESIRED AMOUNT OF GROUT MATERIAL FOR EACH GROUTING STAGE. THE EQUIPMENT SHALL BE CAPABLE OF MIXING THE GROUT AT DENSITIES REQUIRED FOR THE APPROVED PROCEDURE AND SHALL ALSO BE CAPABLE OF CHANGING DENSITY AS DICTATED BY FIELD CONDITIONS AT ANY TIME DURING THE GROUTING OPERATION.

THE MIX DESIGN(S) SHALL BE DEVELOPED TO COMPLETELY FILL THE ANNULAR SPACE, AND SHALL ADDRESS THE FOLLOWING CONSIDERATIONS: SIZE OF ANNULAR VOID, VOIDS (BASED ON SIZE AND ACCESS) IN THE SURROUNDING STRUCTURE ENVELOPE, ABSENCE OR PRESENCE OF GROUNDWATER, SUFFICIENT STRENGTH AND DURABILITY TO PREVENT MOVEMENT OF THE LINER PLATE, PROVISIONS FOR ADEQUATE RETARDATION AND SHRINKAGE OF LESS THAN 1 PERCENT BY VOLUME. GROUT SHALL BE MIXED IN SMALL QUANTITIES AS NEEDED, AND SHALL NOT BE RE-TEMPERED OR USED AFTER IT HAS BEGUN TO SET.

THE GAUGED PUMPING PRESSURE SHALL NOT EXCEED THE LINER PIPE MANUFACTURER'S APPROVED RECOMMENDATIONS. PUMPING EQUIPMENT SHALL BE OF SIZE SUFFICIENT TO INJECT GROUT AT VELOCITY AND PRESSURE RELATIVE TO THE SIZE OF THE ANNULAR SPACE. GAUGES TO MONITOR GROUT PRESSURE SHALL BE ATTACHED IMMEDIATELY ADJACENT TO EACH INJECTION PORT. THE GAUGE SHALL CONFORM TO AN ACCURACY OF NOT MORE THAN ONE-HALF PERCENT ERROR OVER THE FULL RANGE OF THE GAUGE. THE RANGE OF THE GAUGE SHALL BE NOT MORE THAN 100 PERCENT GREATER THAN THE DESIGN GROUT PRESSURE. PRESSURE GAUGES SHALL BE INSTRUMENT OIL FILLED AND ATTACHED TO A SADDLE TYPE DIAPHRAGM SEAL (GAUGE SAVER) TO PREVENT CLOGGING WITH GROUT. ALL GAUGES SHALL BE CERTIFIED AND CALIBRATED IN ACCORDANCE WITH ANSI B40 GRADE 2A.

PRE-CONSTRUCTION MEETING:
THE PIPE LINER MANUFACTURER MUST PROVIDE A REPRESENTATIVE TO CONDUCT A PRE-CONSTRUCTION MEETING THAT COVERS ALL ASPECTS OF THE LINING AND GROUTING PROCESS AND SAID PERSON MUST BE AN OHIO REGISTERED PROFESSIONAL ENGINEER. HE OR SHE MUST ALSO BE ON SITE DURING GROUTING OPERATIONS.

EXPERIENCE:

THE LINER PIPE MANUFACTURER SHALL SHOW EXTERNAL PROOF THAT THEIR EMPLOYEE WHO WILL CONDUCT THE PRE-CONSTRUCTION MEETING SHALL HAVE PARTICIPATED IN THE SUCCESSFUL RELINE OF AT LEAST TEN (10) STRUCTURES ON PREVIOUS PROJECTS.

SUBMITTALS REQUIREMENTS:

THE CONTRACTOR SHALL SUBMIT THE FOLLOWING TO THE ENGINEER AT LEAST TEN (10) WORKING DAYS PRIOR TO COMMENCING THE LINER PIPE INSTALLATION:

STRUCTURAL DESIGN CALCULATIONS FOR THE LINER PIPE FOLLOWING SECTION 12 OF THE AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES USING THE LRFD METHOD VERIFYING CAPACITY SIGNED BY A LICENSED PROFESSIONAL ENGINEER. THESE CALCULATIONS SHALL ASSUME THE EXISTING STRUCTURE HAS FAILED AND CONTRIBUTES NO STRENGTH TO THE PROPOSED LINER.

WRITTEN VERIFICATION BY THE LINER MANUFACTURER THAT THE LINING AND GROUTING PLAN CONFORMS WITH ALL PROVISIONS, CAUTIONS, AND RESTRICTIONS OF THESE SPECIFICATIONS, CONTRACT PLANS, AND MANUFACTURER REQUIREMENTS.

THE COSTS OF ALL ABOVE MENTIONED ITEMS, TEMPORARY FORMS/BULKHEADS, AND TEMPORARY SUPPORTS REQUIRED TO CONSTRUCT THE LINER BACKFILL AS DETAILED IN THESE PLANS SHALL BE INCLUDED FOR PAYMENT OF THIS ITEM.

ITEM 503 - COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

PROVISIONS OF CMS ITEM 503 SHALL APPLY EXCEPT AS MODIFIED HEREIN. THE REPAIR SITE IS LOCATED IN AN EXISTING CULVERT WHICH EXPERIENCES SIGNIFICANT FLOW DURING WET WEATHER. ALL FLOW FROM WET WEATHER EVENTS MUST BE PERMITTED TO PASS THROUGH THE WORK OPERATIONS. THE CONTRACTOR SHALL HAVE PROVISIONS AND PROCEDURES IN PLACE TO DISMANTLE OR PROTECT THE WORK DURING WET WEATHER. CONTRACTOR SHALL SCHEDULE LINER INSTALLATION ONLY DURING DRY WEATHER PERIODS AND DURING MONTHS WITH THE LOWEST POTENTIAL WET WEATHER EVENTS TO MITIGATE INSTALLATION INTERRUPTIONS. NO ADDITIONAL PAYMENT WILL BE MADE FOR ANY INTERRUPTION OF, OR DAMAGE TO, THE WORK DUE TO WET WEATHER FLOWS.

THE CONTRACTOR SHALL SCHEDULE LINER INSTALLATION DURING MONTHS WITH THE LOWEST NORMAL FLOW AND LOWEST POTENTIAL FOR OUTFALLS CAUSED BY RAIN EVENTS TO MITIGATE INSTALLATION INTERRUPTIONS.

MONTHLY MEAN FLOWS, AS ESTIMATED BY USGS STREAMSTATS, ARE AS FOLLOWS.

JANUARY: 2.5 CFS	JULY: 0.8 CFS
FEBRUARY: 4.0 CFS	AUGUST: 0.4 CFS
MARCH: 4.5 CFS	SEPTEMBER: 0.3 CFS
APRIL: 3.8 CFS	OCTOBER: 1.0 CFS
MAY: 2.7 CFS	NOVEMBER: 1.8 CFS
JUNE: 1.3 CFS	DECEMBER: 3.0 CFS

THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER SITE SPECIFIC BYPASS PUMPING PROCEDURES PRIOR TO ORDERING MATERIAL.

ALL MATERIALS, LABOR, SUBMITTALS, AND INCIDENTALS REQUIRED FOR THE PERFORMANCE OF WORK AS DETAILED HEREIN AND IN THESE PLANS SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR ITEM 503 - COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN.

STRUCTURE NOTES
CULVERT NO. CUY-82-00.93
BAKER CREEK UNDER S.R. 82

SFN 1806971	
DESIGN AGENCY EUTHENICS 8235 Mahawk Dr. Cleveland, OH 44135	
DESIGNER COM	CHECKER JLN
REVIEWER LAB 03/15/24	
PROJECT ID 116837	
SUBSET 2	TOTAL 3
SHEET P.16	TOTAL 17

