SHEET NUM.												PART.		ITEM	ITEM	GRAND	UNIT	DESCRIPTION	SEE SHEET NO.
10	11	12	13	15	17	18	19	20-21	22-29	30	55	01/IMS/BR	02/NHS/BR		EXT	TOTAL			
																		ROADWAY	
												LS	LS	201	11000	LS		CLEARING AND GRUBBING	
						80						80		202	35100	80	FT	PIPE REMOVED, 24" AND UNDER	
						100						100		202	38200	100	FT	GUARDRAIL REMOVED FOR REUSE	
						1						1		202	58100	1	EACH	CATCH BASIN REMOVED	
									1,352			1,352		203	10000	1,352	CY	EXCAVATION	
						10			1,622	152		1,632	152	203	20000	1,784	CY	EMBANKMENT	
						100						100		606	16000	100	FT	GUARDRAIL REBUILT	
												100	100	607	23004	200	FT	FENCE REBUILT, TYPE CLT	5
									1,400			1,400		863	00300	1,400	SY	GEOGRID, TYPE P3	
																		EROSION CONTROL	
											8		8	601	11000	8	SY	RIPRAP, TYPE D	
								156		115		156	115	601	20000	271	SY	CRUSHED AGGREGATE SLOPE PROTECTION	
									281			281		601	34000	281	CY	ROCK CHANNEL PROTECTION, TYPE A WITHOUT FILTER	
								45				45		601	34100	45	CY	ROCK CHANNEL PROTECTION, TYPE B WITHOUT FILTER	
										35			35	601	34200	35	CY	ROCK CHANNEL PROTECTION, TYPE C WITHOUT FILTER	
					1	1	1	1		1		3	2	659	00100	5	EACH	SOIL ANALYSIS TEST	5
					444	333	211	697		28		1,241	472	659	00300	1,713	CY	TOPSOIL	
					4,000	3,000	1,900	6,278		250		11,178	4,250	659	10000	15,428	SY	SEEDING AND MULCHING	
					200	150	95	314		13		559	213	659	14000	772	SY	REPAIR SEEDING AND MULCHING	
					200	150	95	314		13		559	213	659	15000	772	SY	INTER-SEEDING	
					0.56	0.42	0.27	0.88		0.03		1.57	0.59	659	20000	2.16	TON	COMMERCIAL FERTILIZER	
					0.83	0.62	0.39	1.3		0.05		2.31	0.88	659	31000	3.19	ACRE	LIME	
					21.6	16.2	10.3	33.9		1.4		60.4	23	659	35000	83.4	MGAL	WATER	
					27	20	13	42		2		75	29	659	40000	104	MSF	MOWING	
												LS	LS	832	15000	LS		STORM WATER POLLUTION PREVENTION PLAN	
												LS	LS	832	15002	LS		STORM WATER POLLUTION PREVENTION INSPECTIONS	
												LS	LS	832	15010	LS		STORM WATER POLLUTION PREVENTION INSPECTION SOFTWARE	
												43,883.5	43,883.5	832	30000	87,767	EACH	EROSION CONTROL	
																		DRAINAGE	
						11						11		611	05900	11	FT	15" CONDUIT, TYPE B	
						80						80		611	08900	80	FT	21" CONDUIT, TYPE B	
								20				20		611	11200	20	FT	24" CONDUIT, TYPE F	
						1						1		611	98300	1	EACH	CATCH BASIN, NO. 5	
						1						1		611	99574	1	EACH	MANHOLE, NO. 3	
																		STRUCTURE 20 FOOT SPAN AND UNDER (SITE 1 - SFN 1800159)	
																		STRUCTURE 20 FOOT SPAN AND UNDER (SITE 2 - SFN 1800183)	
																		STRUCTURE 20 FOOT SPAN AND UNDER (SITE 3 - SFN 1809407)	
																		STRUCTURE 20 FOOT SPAN AND UNDER (SITE 4 - SFN 1812769)	
																		STRUCTURE 20 FOOT SPAN AND UNDER (SITE 5 - SFN 2800241)	
																		MAINTENANCE OF TRAFFIC	
												48	32	614	11110	80	HOUR	LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR ASSISTANCE	
	2	1										3	3	614	12380	6	EACH	WORK ZONE IMPACT ATTENUATOR, 24" WIDE HAZARDS, (UNIDIRECTIONAL)	
		1		2								1	2	614	12384	3	EACH	WORK ZONE IMPACT ATTENUATOR, 24" WIDE HAZARDS, (BIDIRECTIONAL)	
	2	2	2	2								6	4	614	12500	10	EACH	REPLACEMENT SIGN	
	26	11	12	4								49	21	614	13310	70	EACH	BARRIER REFLECTOR, TYPE 1 (1 WAY)	
	26	11	12	4								49	21	614	13350	70	EACH	OBJECT MARKER, ONE WAY (1 WAY)	
												54	36	614	18601	90	SNMT	PORTABLE CHANGEABLE MESSAGE SIGN, AS PER PLAN	9
					0.06								0.06	614	21000	0.06	MILE	WORK ZONE CENTER LINE, CLASS I	
					0.19								0.19	614	22010	0.19	MILE	WORK ZONE EDGE LINE, CLASS I, 6"	
					30								30	614	26000	30	FT	WORK ZONE STOP LINE, CLASS I	
												LS	LS	615	10000	LS		ROADS FOR MAINTAINING TRAFFIC	
												3	2	616	10000	5	MGAL	WATER	8
	1,100	410	470	110								1,980	710	622	41100	2,690	FT	PORTABLE BARRIER, UNANCHORED	
																		INCIDENTALS	
												LS	LS	614	11000	LS		MAINTAINING TRAFFIC	
												6	6	619	16010	12	MNTH	FIELD OFFICE, TYPE B	
												LS	LS	623	10000	LS		CONSTRUCTION LAYOUT STAKES AND SURVEYING	
												LS	LS	624	10000	LS		MOBILIZATION	
												11,250	3,750	SPECIAL	69098000	15,000	EACH	SPECIAL - NEORSD CSO FLOW EVENT, AS PER PLAN	6

CALCULATED RAP CHECKED XXX

GENERAL

CUY-90-18.22/VAR

TOTAL SUMMARY - ALL SITES

DRAINAGE

REVIEW OF DRAINAGE FACILITIES

BEFORE ANY WORK IS STARTED ON THE PROJECT AND AGAIN BEFORE FINAL ACCEPTANCE BY THE STATE, REPRESENTATIVES OF THE STATE AND THE CONTRACTOR, ALONG WITH LOCAL REPRESENTATIVES, SHALL MAKE AN INSPECTION OF ALL EXISTING SEWERS WHICH ARE TO REMAIN IN SERVICE AND WHICH MAY BE AFFECTED BY THE WORK. THE CONDITION OF THE EXISTING CONDUITS AND THEIR APPURTENANCE SHALL BE DETERMINED FROM FIELD OBSERVATIONS. RECORDS OF THE INSPECTION SHALL BE KEPT IN WRITING BY THE STATE.

ALL NEW CONDUITS, INLETS, CATCH BASINS, AND MANHOLES CONSTRUCTED AS A PART OF THE PROJECT SHALL BE FREE OF ALL FOREIGN MATTER AND IN A CLEAN CONDITION BEFORE THE PROJECT WILL BE ACCEPTED BY THE STATE.

ALL EXISTING SEWERS INSPECTED INITIALLY BY THE ABOVE MENTIONED PARTIES SHALL BE MAINTAINED AND LEFT IN A CONDITION REASONABLY COMPARABLE TO THAT DETERMINED BY THE ORIGINAL INSPECTION. ANY CHANGE IN THE CONDITIONS RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE CORRECTED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER.

PAYMENT FOR ALL OPERATIONS DESCRIBED ABOVE SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE PERTINENT 611 CONDUIT ITEMS.

EROSION CONTROL

SEEDING AND MULCHING

THE FOLLOWING QUANTITIES ARE PROVIDED TO PROMOTE GROWTH AND CARE OF PERMANENT SEEDED AREAS:

659, SOIL ANALYSIS TEST
5 EACH

659, TOPSOIL
1,713 CU. YD.

659, SEEDING AND MULCHING
15,428 SQ. YD.

659, REPAIR SEEDING AND MULCHING
772 SQ. YD.

659, INTER-SEEDING
772 SQ. YD.

659, COMMERCIAL FERTILIZER
2.16 TON

659, LIME
3.19 ACRES

659, WATER
83.4 M. GAL.

659, MOWING
104 M. SQ.FT.

SEEDING AND MULCHING SHALL BE APPLIED TO ALL AREAS OF EXPOSED SOIL BETWEEN THE RIGHT-OF-WAY LINES, AND WITHIN THE CONSTRUCTION LIMITS FOR AREAS OUTSIDE THE RIGHT-OF-WAY LINES COVERED BY WORK AGREEMENT OR SLOPE EASEMENT. QUANTITY CALCULATIONS FOR SEEDING AND MULCHING ARE BASED ON THESE LIMITS.

ITEM 690 - SPECIAL, NEORSD CSO FLOW EVENT, AS PER PLAN

THIS WORK SHALL INCLUDE SITE SPECIFIC DEMOBILIZATION AND REMOBILIZATION OF EQUIPMENT AND MATERIAL (IF FEASIBLE) IN ADVANCE OF A NEORSD CSO FLOW EVENT IMPACTING SUCH SITES. THE REMOVAL OF ALL LABOR, EQUIPMENT, AND MATERIAL REQUIRED WILL BE TRACKED VIA CMS 109.05.C AND COMPENSATED ACCORDINGLY. ONLY THE WORK FOR THE SITE-SPECIFIC DEMOBILIZATION AND REMOBILIZATION WILL BE TRACKED. IDLE TIME WILL NOT TRACKED FOR THE DURATION BETWEEN THE SITE-SPECIFIC DEMOBILIZATION AND REMOBILIZATION PERIODS. THE FIXED AMOUNT SHOWN IN THE PROPOSAL IS INCLUDED (AS ANY OTHER BID ITEMS) IN THE TOTAL BID AMOUNT. THIS FIXED AMOUNT IS THE DEPARTMENT'S ESTIMATE OF THE TOTAL COST OF EQUIPMENT AND MATERIAL REMOVAL REQUIRED TO BE PERFORMED. IF THE FLOW EVENT SITE SPECIFIC DEMOBILIZATION AND REMOBILIZATION EXCEEDS THIS AMOUNT, THE WORK WILL STILL BE PAID AS TRACKED AS NECESSARY. THE PAYMENT DUE WILL BE DEDUCTED FROM 690E98000 SPECIAL, NEORSD CSO FLOW EVENT, AS PER PLAN.

CALCULATED MTG
CHECKED SJP

GENERAL NOTES

CUY-90-18.22/VAR

STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS

REFER TO THE FOLLOWING ODOT STANDARD DRAWING(S):

MH-1.1 DATED 01/15/2016
MH-1.2 DATED 01/15/2016
MH-1.3 DATED 01/18/2013

AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATION(S):

800 DATED 04/16/2021
837 DATED 07/19/2019

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 8TH EDITION, INCLUDING ALL REVISIONS AND INTERIM SPECIFICATIONS, AND THE ODOT BRIDGE DESIGN MANUAL, 2019 AND QUARTERLY UPDATES.

DESIGN LOADING

DESIGN LOADING: HL-93

FUTURE WEARING SURFACE (FWS) OF 0.060 KIPS/SQ.FT.

DESIGN DATA

CONCRETE CLASS QC1
-COMPRESSIVE STRENGTH 4.0 KSI (HEADWALL)

REINFORCING STEEL
-MINIMUM YIELD STRENGTH 60 KSI

EXISTING STRUCTURE VERIFICATION

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 CMS SECTIONS 102.05, 105.02 AND 513.04.

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 WHICH HAVE BEEN VERIFIED IN THE FIELD.

ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

THIS WORK CONSISTS OF THE REMOVAL OF EXISTING MANHOLES, PORTIONS OF THE EXISTING CMP AS NEEDED FOR ACCESS, AND ANY OTHER PORTIONS OF THE EXISTING STRUCTURE NECESSARY TO FACILITATE INSTALLATION OF THE PLATE LINER.

PERFORM WORK CAREFULLY DURING REMOVALS TO PROTECT PORTIONS OF SUCH SYSTEMS THAT ARE TO BE SALVAGED AND INCORPORATED INTO THE PROPOSED STRUCTURE. THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE RAM TYPE OF EQUIPMENT IS PROHIBITED. SUBMIT CONSTRUCTION PLANS ACCORDING TO CMS 501.05. ANY DAMAGE TO PORTIONS OF THE EXISTING STRUCTURE TO REMAIN SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST.

MEASUREMENT & PAYMENT: THE DEPARTMENT WILL MEASURE THE QUANTITY OF REMOVALS ON A LUMP SUM BASIS. THE DEPARTMENT WILL PAY FOR THE ACCEPTED QUANTITIES OF REMOVALS AT THE CONTRACT PRICE FOR ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN.

ITEM 503 - COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

PROVISIONS OF CMS ITEM 503 SHALL APPLY EXCEPT AS MODIFIED HEREIN:

LAKE BACKWATER

A BACKWATER CONDITION CONDITION EXISTS AT THIS LOCATION, AND THE DEPTH OF STANDING WATER IN THE CULVERT WILL VARY WITH THE LAKE (ERIE) LEVEL. THE DEWATERING AND CONSTRUCTION SEQUENCE AS DETAILED IN THESE PLANS IS FOR REFERENCE ONLY AND NOT TO SCALE; CONTRACTOR MEANS AND METHODS WILL VARY. THE CONTRACTOR SHALL SUBMIT SITE SPECIFIC DEWATERING PROCEDURES PRIOR TO ORDERING MATERIAL. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD). HISTORIC LAKE LEVELS ARE VIEWABLE AT THE TIDES AND CURRENTS SECTION OF THE NATIONAL OCEANIC AND ATMOSPHERIC (NOAA) WEBSITE:

https://tidesandcurrents.noaa.gov/map/

SITE SURCHARGE

WITH HIGH LAKE LEVELS, A WET WEATHER EVENT MAY LEAD TO SEWER SURCHARGING SINCE THE CULVERT WILL BE OPEN. THE CONTRACTOR SHALL PROVIDE PROVISIONS AND PROCEDURES FOR SITE CLEANUP IF A SURCHAGE EVENT OCCURS.

BYPASS PUMPING

THE REPAIR SITE IS LOCATED IN AN EXISTING CULVERT WHICH EXPERIENCES SIGNIFICANT COMBINED SEWER FLOW DURING WET WEATHER. ALL FLOW FROM WET WEATHER EVENTS MUST BE PERMITTED TO PASS THROUGH THE WORK OPERATIONS BY USING PIPE PLUGS WHICH ARE READILY REMOVABLE. 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.

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. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD).

THE DEWATERING/BYPASS AND CONSTRUCTION SEQUENCE IN THESE PLANS IS NOT TO SCALE AND FOR REFERENCE ONLY; THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER SITE SPECIFIC DEWATERING AND BYPASS PUMPING PROCEDURES PRIOR TO ORDERING MATERIAL.

THE BYPASS PUMP FOR SITES 1-4 SHALL BE DESIGNED TO PROVIDE A MINIMUM DISCHARGE FOR A FLOW RATE OF 7.5 CFS. THESE FLOW RATES ARE BASED ON MINIMUM PRECIPITATION WITHIN THE DRAINAGE CATCHMENT AREAS.

DESIGN AND CONSTRUCT INFLATABLE WEIRS TO A MINIMUM ELEVATION 2.5 FEET ABOVE THE UPSTREAM INVERT AND A MINIMUM ELEVATION 1 FOOT ABOVE 573 (CURRENT LAKE WATER ELEVATION) AT THE OUTLET FOR SITES 1-3. DESIGN AND CONSTRUCT INFLATABLE WEIR TO A MINIMUM ELEVATION 2.5 FOOT ABOVE THE UPSTREAM INVERT FOR SITE 4. THE CONTRACTOR SHALL COORDINATE WITH NEORSD ABOUT CSO FLOW EVENTS AND REMOVE THE CONSTRUCTION EQUIPMENT BEFORE EACH CSO FLOW EVENT OCCURS. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR HEIGHT FOR SITES 1-4, THE DEPARTMENT WILL REIMBURSE THE CONTRACTOR FOR ANY RESULTING DAMAGE TO THE WORK PROTECTED BY THE WEIR/COFFERDAM PROVIDED THE CONTRACTOR HAS EXERCISED NORMAL DUE DILIGENCE. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR/COFFERDAM HEIGHT FOR SITES 1-4 AND CAUSES A DELAY TO THE PROJECT, THE DEPARTMENT WILL GRANT THE CONTRACTOR AN EXCUSABLE, NON-COMPENSABLE DELAY IN ACCORDANCE WITH 108.06.B. ALL MATERIAL, LABOR, AND EQUIPMENT REQUIRED FOR THE REMOVAL OF EQUIPMENT PRIOR TO THE CSO FLOW EVENT AND STORMS CAUSING FLASH FLOODING WILL BE COMPENSATED PER 690E98000 SPECIAL, NEORSD CSO FLOW EVENT, AS PER PLAN

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.

ITEM 837 - LINER PIPE, AS PER PLAN

THE PROPOSED STRUCTURE TYPE SHALL BE A FLANGED, GALVANIZED STEEL, TUNNEL LINER PLATE PIPE ARCH CONFORMING TO THE GEOMETRY SHOWN ON SHEET 6/7 AND CAPABLE OF BEING ASSEMBLED WITHIN THE EXISTING STRUCTURE AS DETAILED IN THESE PLANS. THE PROPOSED STRUCTURE SHALL BE DESIGNED FOR HL-93 LOADING WITH 60 PSF FUTURE WEARING SURFACE AND ASSUME THE EXISTING STRUCTURE PROVIDES NO STRUCTURAL CAPACITY. VENDOR TO PROVIDE GAUGE THICKNESS.

MATERIAL:

LINER PLATES SHALL BE FABRICATED FROM BLACK STEEL PLATES CONFORMING TO ASTM SPECIFICATION A 1011. PLATES SHALL BE OF THE GAGE SHOWN ON THE PLANS AND SHALL BE CURVED TO SUIT THE TUNNEL CROSS SECTION SHOWN. PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123, EXCEPT THAT THE ZINC SHALL BE APPLIED AT A RATE OF 2.0 OUNCES PER SQUARE FOOT TOTAL FOR BOTH SIDES.

ALL PLATES SHALL BE PUNCHED FOR BOLTING ON BOTH LONGITUDINAL AND CIRCUMFERENTIAL SEAMS AND SHALL BE SO FABRICATED AS TO PERMIT COMPLETE ERECTION FROM THE INSIDE OF THE EXISTING STRUCTURE. THE LONGITUDINAL SEAM SHALL BE OF THE LAPPED TYPE, WITH AN OFFSET EQUAL TO THE GAGE OF METAL FOR THE FULL WIDTH OF PLATE TO ALLOW THE CROSS SECTION OF THE PLATE TO BE CONTINUOUS THROUGH THE SEAM. CIRCUMFERENTIAL BOLT HOLE SPACING SHALL BE 6-1/4".

GROUT HOLES, ADJUSTING RODS, ANTI-FLOTATION DEVICES, BASE CHANNELS, AND SKID RAILS SHALL BE IN ACCORDANCE WITH THE LINER MANUFACTURER'S RECOMMENDATIONS. GROUT PORT/VENT LOCATIONS IN THE ROADWAY ARE PERMISSIBLE BUT SHOULD BE CONFIGURED TO MINIMIZE IMPACT TO TRAFFIC.

BOLTS AND NUTS:

BOLTS AND NUTS SHALL BE 5/8" IN DIAMETER AND LENGTH AS RECOMMENDED BY THE MANUFACTURER. BOLTS SHALL CONFORM TO ASTM A 449, TYPE 1 OR ASTM A 307. FOR LONGITUDINAL SEAMS, BOLTS SHALL BE A 449, TYPE 1, FOR PLATE THICKNESS EQUAL TO OR GREATER THAN 0.209. FOR PLATE THICKNESS LESS THAN .209, THE BOLTS SHALL BE A 307, GRADE A. ALL CIRCUMFERENTIAL BOLTS MAY BE A 307, GRADE A. NUTS SHALL CONFORM TO ASTM A 563, GRADE A, HEX.

GALVANIZING WHEN REQUIRED SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM B-695, CLASS 50.

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED	DRAWN	REVIEWED	DATE
RAP	RAP	HVH	09/18/20
CHECKED	REVISED	STRUCTURE FILE NUMBER	
RY		1800159	

STRUCTURE NOTES
SITE 1 - BRIDGE NO. CUY-2-1688
EAST 26TH STREET STORM SEWER

CUY-90-18.22/VAR
PID No. 92069

INSTALLATION:

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS INCLUDING ASSEMBLY DRAWINGS, ARCH ASSEMBLY 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 PLATE OR ITS GALVANIZED ZINC COATING. THE CONTRACTOR SHALL TOUCH UP ANY DAMAGE TO THE GALVANIZED ZINC COATING CAUSED BY HANDLING OR ASSEMBLY. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE DETAILS AND LOCATIONS OF LATERAL CONNECTIONS, GROUT PORTS, FITTINGS, BLOCKING, AND BLOCKING HARDWARE FOR APPROVAL. A GROUTING METHOD AND CULVERT INSTALLATION PROCEDURE SHALL ALSO BE SUBMITTED FOR APPROVAL. LINER PLATE SHALL BE ASSEMBLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. LONGITUDINAL SEAMS SHALL BE STAGGERED BETWEEN RINGS.

CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING: SIZE, TYPE, AND LOCATIONS OF ALL 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 SHALL BE AS MINIMAL AS REQUIRED TO PERMIT CONNECTION OF LATERALS AND SHALL NOT COMPROMIZE THE STRUCTURAL CAPACITY OF THE LINER. GALVANIZING SHALL BE TOUCHED UP FOR ANY CUT EDGES. LARGER LATERAL CONNECTIONS MAY WARRANT USE OF HEAVIER GAUGE PLATE OR OTHER REINFORCEMENT AND SHALL BE DESIGNED BY PLATE VENDOR. ALL 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 STRUCTURES.

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

THE COSTS OF ALL ABOVE DECRIBED 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 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 ARCH 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 STEEL 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.

IF ANY PORTION OF THE EXISTING STRUCTURE SLAB IS REMOVED FOR CONTRACTOR ACCESS, THE GROUT SHALL BE FILLED TO THE ORIGINAL SLAB TOP ELEVATION.

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 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 BACKILL FOR THE LINER PIPE, HENCEFORTH REFERRED TO AS GROUT, IS FOR FILLING THE ANNULAR 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 ARCH LINER AT EACH END OF THE ARCH AND SHALL PROVIDE LONG TERM DURABILITY. BULKHEAD DESIGNS SHALL BE SUFFICIENT TO RESIST GROUT PRESSURES OR HYDROSTATIC WATER PRESSURE WITHIN THE ANNULAR SPACE.

THE GAUGED PUMPING PRESSURE SHALL NOT EXCEED THE ARCH LINER 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 ARCH 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 A REGISTERED PROFESSION ENGINEER. HE OR SHE MUST ALSO BE ON SITE DURING GROUTING OPERATIONS.

EXPERIENCE:

THE ARCH LINER 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 10 STRUCTURES OF THIS TYPE AND SIZE 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.

CALC:	RAP	DATE:	8/21/2020
CHECKED:	RY	DATE:	8/28/2020

ESTIMATED QUANTITIES (CUY-002-1688)

ITEM	EXTENSION	TOTAL	UNIT	DESCRIPTION	ABUT.	PIERS	SUPER.	GEN.	SEE SHEET
202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN				LS	2/6
203	35110	72	CY	GRANULAR MATERIAL, TYPE B				72	
503	11101	LS		COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN				LS	2/6
503	21100	72	CY	UNCLASSIFIED EXCAVATION				72	
611	96560	440	FT	CONDUIT, FIELD PAVING OF PIPE				440	
611	99575	2	EACH	MANHOLE, NO. 3, AS PER PLAN				2	6/6
837	10001	440	FT	LINER PIPE, AS PER PLAN				440	2/6
837	21001	440	FT	BACKFILL FOR LINER PIPE, AS PER PLAN				440	3/6

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED	DRAWN	REVIEWED	DATE
RAP	RAP	HVH	09/18/20

CHECKED: RY
REVISED
STRUCTURE FILE NUMBER 1800159

STRUCTURE NOTES
SITE 1 - BRIDGE NO. CUY-002-1688
EAST 26TH STREET STORM SEWER

CUY-90-18.22/VAR
PID No. 92069

3/6

33/63

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STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS

REFER TO THE FOLLOWING ODOT STANDARD DRAWING(S):

MH-1.1 DATED 01/15/2016
MH-1.2 DATED 01/15/2016
MH-1.3 DATED 01/18/2013

AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATION(S):

800 DATED 04/16/2021
837 DATED 07/19/2019

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 8TH EDITION, INCLUDING ALL REVISIONS AND INTERIM SPECIFICATIONS, AND THE ODOT BRIDGE DESIGN MANUAL, 2019 AND QUARTERLY UPDATES.

DESIGN LOADING

DESIGN LOADING: HL-93

FUTURE WEARING SURFACE (FWS) OF 0.060 KIPS/SQ.FT.

DESIGN DATA

CONCRETE CLASS QC1
-COMPRESSIVE STRENGTH 4.0 KSI (HEADWALL)

REINFORCING STEEL
-MINIMUM YIELD STRENGTH 60 KSI

EXISTING STRUCTURE VERIFICATION

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 CMS SECTIONS 102.05, 105.02 AND 513.04.

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 WHICH HAVE BEEN VERIFIED IN THE FIELD.

ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

THIS WORK CONSISTS OF THE REMOVAL OF EXISTING MANHOLES, PORTIONS OF THE EXISTING CMP AS NEEDED FOR ACCESS, AND ANY OTHER PORTIONS OF THE EXISTING STRUCTURE NECESSARY TO FACILITATE INSTALLATION OF THE PLATE LINER.

PERFORM WORK CAREFULLY DURING REMOVALS TO PROTECT PORTIONS OF SUCH SYSTEMS THAT ARE TO BE SALVAGED AND INCORPORATED INTO THE PROPOSED STRUCTURE. THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE RAM TYPE OF EQUIPMENT IS PROHIBITED. SUBMIT CONSTRUCTION PLANS ACCORDING TO CMS 501.05. ANY DAMAGE TO PORTIONS OF THE EXISTING STRUCTURE TO REMAIN SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST.

MEASUREMENT & PAYMENT: THE DEPARTMENT WILL MEASURE THE QUANTITY OF REMOVALS ON A LUMP SUM BASIS. THE DEPARTMENT WILL PAY FOR THE ACCEPTED QUANTITIES OF REMOVALS AT THE CONTRACT PRICE FOR ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN.

ITEM 503 - COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

PROVISIONS OF CMS ITEM 503 SHALL APPLY EXCEPT AS MODIFIED HEREIN:

LAKE BACKWATER

A BACKWATER CONDITION CONDITION EXISTS AT THIS LOCATION, AND THE DEPTH OF STANDING WATER IN THE CULVERT WILL VARY WITH THE LAKE (ERIE) LEVEL. THE DEWATERING AND CONSTRUCTION SEQUENCE AS DETAILED IN THESE PLANS IS FOR REFERENCE ONLY AND NOT TO SCALE; CONTRACTOR MEANS AND METHODS WILL VARY. THE CONTRACTOR SHALL SUBMIT SITE SPECIFIC DEWATERING PROCEDURES PRIOR TO ORDERING MATERIAL. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD). HISTORIC LAKE LEVELS ARE VIEWABLE AT THE TIDES AND CURRENTS SECTION OF THE NATIONAL OCEANIC AND ATMOSPHERIC (NOAA) WEBSITE:

https://tidesandcurrents.noaa.gov/map/

SITE SURCHARGE

WITH HIGH LAKE LEVELS, A WET WEATHER EVENT MAY LEAD TO SEWER SURCHARGING SINCE THE CULVERT WILL BE OPEN. THE CONTRACTOR SHALL PROVIDE PROVISIONS AND PROCEDURES FOR SITE CLEANUP IF A SURCHAGE EVENT OCCURS.

BYPASS PUMPING

THE REPAIR SITE IS LOCATED IN AN EXISTING CULVERT WHICH EXPERIENCES SIGNIFICANT COMBINED SEWER FLOW DURING WET WEATHER. ALL FLOW FROM WET WEATHER EVENTS MUST BE PERMITTED TO PASS THROUGH THE WORK OPERATIONS BY USING PIPE PLUGS WHICH ARE READILY REMOVABLE. 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.

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. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD).

THE DEWATERING/BYPASS AND CONSTRUCTION SEQUENCE IN THESE PLANS IS NOT TO SCALE AND FOR REFERENCE ONLY; THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER SITE SPECIFIC DEWATERING AND BYPASS PUMPING PROCEDURES PRIOR TO ORDERING MATERIAL.

THE BYPASS PUMP FOR SITES 1-4 SHALL BE DESIGNED TO PROVIDE A MINIMUM DISCHARGE FOR A FLOW RATE OF 7.5 CFS. THESE FLOW RATES ARE BASED ON MINIMUM PRECIPITATION WITHIN THE DRAINAGE CATCHMENT AREAS.

DESIGN AND CONSTRUCT INFLATABLE WEIRS TO A MINIMUM ELEVATION 2.5 FEET ABOVE THE UPSTREAM INVERT AND A MINIMUM ELEVATION 1 FOOT ABOVE 573 (CURRENT LAKE WATER ELEVATION) AT THE OUTLET FOR SITES 1-3. DESIGN AND CONSTRUCT INFLATABLE WEIR TO A MINIMUM ELEVATION 2.5 FOOT ABOVE THE UPSTREAM INVERT FOR SITE 4. THE CONTRACTOR SHALL COORDINATE WITH NEORSD ABOUT CSO FLOW EVENTS AND REMOVE THE CONSTRUCTION EQUIPMENT BEFORE EACH CSO FLOW EVENT OCCURS. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR HEIGHT FOR SITES 1-4, THE DEPARTMENT WILL REIMBURSE THE CONTRACTOR FOR ANY RESULTING DAMAGE TO THE WORK PROTECTED BY THE WEIR/COFFERDAM PROVIDED THE CONTRACTOR HAS EXERCISED NORMAL DUE DILIGENCE. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR/COFFERDAM HEIGHT FOR SITES 1-4 AND CAUSES A DELAY TO THE PROJECT, THE DEPARTMENT WILL GRANT THE CONTRACTOR AN EXCUSABLE, NON-COMPENSABLE DELAY IN ACCORDANCE WITH 108.06.B. ALL MATERIAL, LABOR, AND EQUIPMENT REQUIRED FOR THE REMOVAL OF EQUIPMENT PRIOR TO THE CSO FLOW EVENT AND STORMS CAUSING FLASH FLOODING WILL BE COMPENSATED PER 690E98000 SPECIAL, NEORSD CSO FLOW EVENT, AS PER PLAN

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.

ITEM 837 - LINER PIPE, AS PER PLAN

THE PROPOSED STRUCTURE TYPE SHALL BE A FLANGED, GALVANIZED STEEL, TUNNEL LINER PLATE PIPE ARCH CONFORMING TO THE GEOMETRY SHOWN ON SHEET 6/7 AND CAPABLE OF BEING ASSEMBLED WITHIN THE EXISTING STRUCTURE AS DETAILED IN THESE PLANS. THE PROPOSED STRUCTURE SHALL BE DESIGNED FOR HL-93 LOADING WITH 60 PSF FUTURE WEARING SURFACE AND ASSUME THE EXISTING STRUCTURE PROVIDES NO STRUCTURAL CAPACITY. VENDOR TO PROVIDE GAUGE THICKNESS.

MATERIAL:

LINER PLATES SHALL BE FABRICATED FROM BLACK STEEL PLATES CONFORMING TO ASTM SPECIFICATION A 1011. PLATES SHALL BE OF THE GAGE SHOWN ON THE PLANS AND SHALL BE CURVED TO SUIT THE TUNNEL CROSS SECTION SHOWN. PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123, EXCEPT THAT THE ZINC SHALL BE APPLIED AT A RATE OF 2.0 OUNCES PER SQUARE FOOT TOTAL FOR BOTH SIDES.

ALL PLATES SHALL BE PUNCHED FOR BOLTING ON BOTH LONGITUDINAL AND CIRCUMFERENTIAL SEAMS AND SHALL BE SO FABRICATED AS TO PERMIT COMPLETE ERECTION FROM THE INSIDE OF THE EXISTING STRUCTURE. THE LONGITUDINAL SEAM SHALL BE OF THE LAPPED TYPE, WITH AN OFFSET EQUAL TO THE GAGE OF METAL FOR THE FULL WIDTH OF PLATE TO ALLOW THE CROSS SECTION OF THE PLATE TO BE CONTINUOUS THROUGH THE SEAM. CIRCUMFERENTIAL BOLT HOLE SPACING SHALL BE 6-1/4".

GROUT HOLES, ADJUSTING RODS, ANTI-FLOTATION DEVICES, BASE CHANNELS, AND SKID RAILS SHALL BE IN ACCORDANCE WITH THE LINER MANUFACTURER'S RECOMMENDATIONS. GROUT PORT/VENT LOCATIONS IN THE ROADWAY ARE PERMISSIBLE BUT SHOULD BE CONFIGURED TO MINIMIZE IMPACT TO TRAFFIC.

BOLTS AND NUTS:

BOLTS AND NUTS SHALL BE 5/8" IN DIAMETER AND LENGTH AS RECOMMENDED BY THE MANUFACTURER. BOLTS SHALL CONFORM TO ASTM A 449, TYPE 1 OR ASTM A 307. FOR LONGITUDINAL SEAMS, BOLTS SHALL BE A 449, TYPE 1, FOR PLATE THICKNESS EQUAL TO OR GREATER THAN 0.209. FOR PLATE THICKNESS LESS THAN .209, THE BOLTS SHALL BE A 307, GRADE A. ALL CIRCUMFERENTIAL BOLTS MAY BE A 307, GRADE A. NUTS SHALL CONFORM TO ASTM A 563, GRADE A, HEX.

GALVANIZING WHEN REQUIRED SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM B-695, CLASS 50.

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED	DRAWN	REVIEWED	DATE
RAP	RAP	HVH	09/18/20
CHECKED	REVISED	STRUCTURE FILE NUMBER	
RY		1800183	

STRUCTURE NOTES
SITE 2 - BRIDGE NO. CUY-90-1822
EAST 33RD STREET STORM SEWER

CUY-90-18.22/VAR
PID No. 92069

INSTALLATION:

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS INCLUDING ASSEMBLY DRAWINGS, ARCH ASSEMBLY 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 PLATE OR ITS GALVANIZED ZINC COATING. THE CONTRACTOR SHALL TOUCH UP ANY DAMAGE TO THE GALVANIZED ZINC COATING CAUSED BY HANDLING OR ASSEMBLY. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE DETAILS AND LOCATIONS OF LATERAL CONNECTIONS, GROUT PORTS, FITTINGS, BLOCKING, AND BLOCKING HARDWARE FOR APPROVAL. A GROUTING METHOD AND CULVERT INSTALLATION PROCEDURE SHALL ALSO BE SUBMITTED FOR APPROVAL. LINER PLATE SHALL BE ASSEMBLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. LONGITUDINAL SEAMS SHALL BE STAGGERED BETWEEN RINGS.

CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING: SIZE, TYPE, AND LOCATIONS OF ALL 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 SHALL BE AS MINIMAL AS REQUIRED TO PERMIT CONNECTION OF LATERALS AND SHALL NOT COMPROMIZE THE STRUCTURAL CAPACITY OF THE LINER. GALVANIZING SHALL BE TOUCHED UP FOR ANY CUT EDGES. LARGER LATERAL CONNECTIONS MAY WARRANT USE OF HEAVIER GAUGE PLATE OR OTHER REINFORCEMENT AND SHALL BE DESIGNED BY PLATE VENDOR. ALL 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 STRUCTURES.

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

THE COSTS OF ALL ABOVE DECRIBED 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 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 ARCH 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 STEEL 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.

IF ANY PORTION OF THE EXISTING STRUCTURE SLAB IS REMOVED FOR CONTRACTOR ACCESS, THE GROUT SHALL BE FILLED TO THE ORIGINAL SLAB TOP ELEVATION.

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 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 BACKILL FOR THE LINER PIPE, HENCEFORTH REFERRED TO AS GROUT, IS FOR FILLING THE ANNULAR 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 ARCH LINER AT EACH END OF THE ARCH AND SHALL PROVIDE LONG TERM DURABILITY. BULKHEAD DESIGNS SHALL BE SUFFICIENT TO RESIST GROUT PRESSURES OR HYDROSTATIC WATER PRESSURE WITHIN THE ANNULAR SPACE.

THE GAUGED PUMPING PRESSURE SHALL NOT EXCEED THE ARCH LINER 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 ARCH 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 A REGISTERED PROFESSION ENGINEER. HE OR SHE MUST ALSO BE ON SITE DURING GROUTING OPERATIONS.

EXPERIENCE:

THE ARCH LINER 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 10 STRUCTURES OF THIS TYPE AND SIZE 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.

CALC:	RAP	DATE:	8/13/2020
CHECKED:	RY	DATE:	8/28/2020

ESTIMATED QUANTITIES (CUY-090-1822)

ITEM	EXTENSION	TOTAL	UNIT	DESCRIPTION	ABUT.	PIERS	SUPER.	GEN.	SEE SHEET
202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN				LS	2/6
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503	21100	59	CY	UNCLASSIFIED EXCAVATION				59	
611	96560	480	FT	CONDUIT, FIELD PAVING OF PIPE				480	
611	99575	2	EACH	MANHOLE, NO. 3, AS PER PLAN				2	6/6
837	10001	480	FT	LINER PIPE, AS PER PLAN				480	2/6
837	21001	480	FT	BACKFILL FOR LINER PIPE, AS PER PLAN				480	3/6

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED	DRAWN	REVIEWED	DATE
RAP	RAP	HVH	09/18/20

CHECKED RY | REVISED | STRUCTURE FILE NUMBER 1800183

STRUCTURE NOTES
SITE 2 - BRIDGE NO. CUY-90-1822
EAST 33RD STREET STORM SEWER

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3 / 6

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STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS

REFER TO THE FOLLOWING ODOT STANDARD DRAWING(S):

MH-1.1 DATED 01/15/2016
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AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATION(S):

800 DATED 04/16/2021
837 DATED 07/19/2019

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DESIGN LOADING

DESIGN LOADING: HL-93

FUTURE WEARING SURFACE (FWS) OF 0.060 KIPS/SQ.FT.

DESIGN DATA

CONCRETE CLASS QC1
-COMPRESSIVE STRENGTH 4.0 KSI (HEADWALL)

REINFORCING STEEL
-MINIMUM YIELD STRENGTH 60 KSI

EXISTING STRUCTURE VERIFICATION

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 CMS SECTIONS 102.05, 105.02 AND 513.04.

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ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

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PERFORM WORK CAREFULLY DURING REMOVALS TO PROTECT PORTIONS OF SUCH SYSTEMS THAT ARE TO BE SALVAGED AND INCORPORATED INTO THE PROPOSED STRUCTURE. THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE RAM TYPE OF EQUIPMENT IS PROHIBITED. SUBMIT CONSTRUCTION PLANS ACCORDING TO CMS 501.05. ANY DAMAGE TO PORTIONS OF THE EXISTING STRUCTURE TO REMAIN SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST.

MEASUREMENT & PAYMENT: THE DEPARTMENT WILL MEASURE THE QUANTITY OF REMOVALS ON A LUMP SUM BASIS. THE DEPARTMENT WILL PAY FOR THE ACCEPTED QUANTITIES OF REMOVALS AT THE CONTRACT PRICE FOR ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN.

ITEM 503 - COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

PROVISIONS OF CMS ITEM 503 SHALL APPLY EXCEPT AS MODIFIED HEREIN:

LAKE BACKWATER

A BACKWATER CONDITION CONDITION EXISTS AT THIS LOCATION, AND THE DEPTH OF STANDING WATER IN THE CULVERT WILL VARY WITH THE LAKE (ERIE) LEVEL. THE DEWATERING AND CONSTRUCTION SEQUENCE AS DETAILED IN THESE PLANS IS FOR REFERENCE ONLY AND NOT TO SCALE; CONTRACTOR MEANS AND METHODS WILL VARY. THE CONTRACTOR SHALL SUBMIT SITE SPECIFIC DEWATERING PROCEDURES PRIOR TO ORDERING MATERIAL. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD). HISTORIC LAKE LEVELS ARE VIEWABLE AT THE TIDES AND CURRENTS SECTION OF THE NATIONAL OCEANIC AND ATMOSPHERIC (NOAA) WEBSITE:

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SITE SURCHARGE

WITH HIGH LAKE LEVELS, A WET WEATHER EVENT MAY LEAD TO SEWER SURCHARGING SINCE THE CULVERT WILL BE OPEN. THE CONTRACTOR SHALL PROVIDE PROVISIONS AND PROCEDURES FOR SITE CLEANUP IF A SURCHAGE EVENT OCCURS.

BYPASS PUMPING

THE REPAIR SITE IS LOCATED IN AN EXISTING CULVERT WHICH EXPERIENCES SIGNIFICANT COMBINED SEWER FLOW DURING WET WEATHER. ALL FLOW FROM WET WEATHER EVENTS MUST BE PERMITTED TO PASS THROUGH THE WORK OPERATIONS BY USING PIPE PLUGS WHICH ARE READILY REMOVABLE. 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.

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. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD).

THE DEWATERING/BYPASS AND CONSTRUCTION SEQUENCE IN THESE PLANS IS NOT TO SCALE AND FOR REFERENCE ONLY; THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER SITE SPECIFIC DEWATERING AND BYPASS PUMPING PROCEDURES PRIOR TO ORDERING MATERIAL.

THE BYPASS PUMP FOR SITES 1-4 SHALL BE DESIGNED TO PROVIDE A MINIMUM DISCHARGE FOR A FLOW RATE OF 7.5 CFS. THESE FLOW RATES ARE BASED ON MINIMUM PRECIPITATION WITHIN THE DRAINAGE CATCHMENT AREAS.

DESIGN AND CONSTRUCT INFLATABLE WEIRS TO A MINIMUM ELEVATION 2.5 FEET ABOVE THE UPSTREAM INVERT AND A MINIMUM ELEVATION 1 FOOT ABOVE 573 (CURRENT LAKE WATER ELEVATION) AT THE OUTLET FOR SITES 1-3. DESIGN AND CONSTRUCT INFLATABLE WEIR TO A MINIMUM ELEVATION 2.5 FOOT ABOVE THE UPSTREAM INVERT FOR SITE 4. THE CONTRACTOR SHALL COORDINATE WITH NEORSD ABOUT CSO FLOW EVENTS AND REMOVE THE CONSTRUCTION EQUIPMENT BEFORE EACH CSO FLOW EVENT OCCURS. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR HEIGHT FOR SITES 1-4, THE DEPARTMENT WILL REIMBURSE THE CONTRACTOR FOR ANY RESULTING DAMAGE TO THE WORK PROTECTED BY THE WEIR/COFFERDAM PROVIDED THE CONTRACTOR HAS EXERCISED NORMAL DUE DILIGENCE. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR/COFFERDAM HEIGHT FOR SITES 1-4 AND CAUSES A DELAY TO THE PROJECT, THE DEPARTMENT WILL GRANT THE CONTRACTOR AN EXCUSABLE, NON-COMPENSABLE DELAY IN ACCORDANCE WITH 108.06.B. ALL MATERIAL, LABOR, AND EQUIPMENT REQUIRED FOR THE REMOVAL OF EQUIPMENT PRIOR TO THE CSO FLOW EVENT AND STORMS CAUSING FLASH FLOODING WILL BE COMPENSATED PER 690E98000 SPECIAL, NEORSD CSO FLOW EVENT, AS PER PLAN

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.

ITEM 837 - LINER PIPE, AS PER PLAN

THE PROPOSED STRUCTURE TYPE SHALL BE A FLANGED, GALVANIZED STEEL, TUNNEL LINER PLATE PIPE ARCH CONFORMING TO THE GEOMETRY SHOWN ON SHEET 6/7 AND CAPABLE OF BEING ASSEMBLED WITHIN THE EXISTING STRUCTURE AS DETAILED IN THESE PLANS. THE PROPOSED STRUCTURE SHALL BE DESIGNED FOR HL-93 LOADING WITH 60 PSF FUTURE WEARING SURFACE AND ASSUME THE EXISTING STRUCTURE PROVIDES NO STRUCTURAL CAPACITY. VENDOR TO PROVIDE GAUGE THICKNESS.

MATERIAL:

LINER PLATES SHALL BE FABRICATED FROM BLACK STEEL PLATES CONFORMING TO ASTM SPECIFICATION A 1011. PLATES SHALL BE OF THE GAGE SHOWN ON THE PLANS AND SHALL BE CURVED TO SUIT THE TUNNEL CROSS SECTION SHOWN. PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123, EXCEPT THAT THE ZINC SHALL BE APPLIED AT A RATE OF 2.0 OUNCES PER SQUARE FOOT TOTAL FOR BOTH SIDES.

ALL PLATES SHALL BE PUNCHED FOR BOLTING ON BOTH LONGITUDINAL AND CIRCUMFERENTIAL SEAMS AND SHALL BE SO FABRICATED AS TO PERMIT COMPLETE ERECTION FROM THE INSIDE OF THE EXISTING STRUCTURE. THE LONGITUDINAL SEAM SHALL BE OF THE LAPPED TYPE, WITH AN OFFSET EQUAL TO THE GAGE OF METAL FOR THE FULL WIDTH OF PLATE TO ALLOW THE CROSS SECTION OF THE PLATE TO BE CONTINUOUS THROUGH THE SEAM. CIRCUMFERENTIAL BOLT HOLE SPACING SHALL BE 6-1/4".

GROUT HOLES, ADJUSTING RODS, ANTI-FLOTATION DEVICES, BASE CHANNELS, AND SKID RAILS SHALL BE IN ACCORDANCE WITH THE LINER MANUFACTURER'S RECOMMENDATIONS. GROUT PORT/VENT LOCATIONS IN THE ROADWAY ARE PERMISSIBLE BUT SHOULD BE CONFIGURED TO MINIMIZE IMPACT TO TRAFFIC.

BOLTS AND NUTS:

BOLTS AND NUTS SHALL BE 5/8" IN DIAMETER AND LENGTH AS RECOMMENDED BY THE MANUFACTURER. BOLTS SHALL CONFORM TO ASTM A 449, TYPE 1 OR ASTM A 307. FOR LONGITUDINAL SEAMS, BOLTS SHALL BE A 449, TYPE 1, FOR PLATE THICKNESS EQUAL TO OR GREATER THAN 0.209. FOR PLATE THICKNESS LESS THAN .209, THE BOLTS SHALL BE A 307, GRADE A. ALL CIRCUMFERENTIAL BOLTS MAY BE A 307, GRADE A. NUTS SHALL CONFORM TO ASTM A 563, GRADE A, HEX.

GALVANIZING WHEN REQUIRED SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM B-695, CLASS 50.

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED	DRAWN	REVIEWED	DATE
RAP	RAP	HVH	09/18/20
CHECKED	REVISED	STRUCTURE FILE NUMBER	
RY		1809407	

STRUCTURE NOTES
SITE 3 - BRIDGE NO. CUY-90-1999
ADDISON ROAD STORM SEWER

CUY-90-18.22/VAR
PID No. 92069

INSTALLATION:

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS INCLUDING ASSEMBLY DRAWINGS, ARCH ASSEMBLY 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 PLATE OR ITS GALVANIZED ZINC COATING. THE CONTRACTOR SHALL TOUCH UP ANY DAMAGE TO THE GALVANIZED ZINC COATING CAUSED BY HANDLING OR ASSEMBLY. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE DETAILS AND LOCATIONS OF LATERAL CONNECTIONS, GROUT PORTS, FITTINGS, BLOCKING, AND BLOCKING HARDWARE FOR APPROVAL. A GROUTING METHOD AND CULVERT INSTALLATION PROCEDURE SHALL ALSO BE SUBMITTED FOR APPROVAL. LINER PLATE SHALL BE ASSEMBLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. LONGITUDINAL SEAMS SHALL BE STAGGERED BETWEEN RINGS.

CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING: SIZE, TYPE, AND LOCATIONS OF ALL 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 SHALL BE AS MINIMAL AS REQUIRED TO PERMIT CONNECTION OF LATERALS AND SHALL NOT COMPROMIZE THE STRUCTURAL CAPACITY OF THE LINER. GALVANIZING SHALL BE TOUCHED UP FOR ANY CUT EDGES. LARGER LATERAL CONNECTIONS MAY WARRANT USE OF HEAVIER GAUGE PLATE OR OTHER REINFORCEMENT AND SHALL BE DESIGNED BY PLATE VENDOR. ALL 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 STRUCTURES.

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

THE COSTS OF ALL ABOVE DECRIBED 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 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 ARCH 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 STEEL 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.

IF ANY PORTION OF THE EXISTING STRUCTURE SLAB IS REMOVED FOR CONTRACTOR ACCESS, THE GROUT SHALL BE FILLED TO THE ORIGINAL SLAB TOP ELEVATION.

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 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 BACKILL FOR THE LINER PIPE, HENCEFORTH REFERRED TO AS GROUT, IS FOR FILLING THE ANNULAR 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 ARCH LINER AT EACH END OF THE ARCH AND SHALL PROVIDE LONG TERM DURABILITY. BULKHEAD DESIGNS SHALL BE SUFFICIENT TO RESIST GROUT PRESSURES OR HYDROSTATIC WATER PRESSURE WITHIN THE ANNULAR SPACE.

THE GAUGED PUMPING PRESSURE SHALL NOT EXCEED THE ARCH LINER 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 ARCH 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 A REGISTERED PROFESSION ENGINEER. HE OR SHE MUST ALSO BE ON SITE DURING GROUTING OPERATIONS.

EXPERIENCE:

THE ARCH LINER 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 10 STRUCTURES OF THIS TYPE AND SIZE 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.

CALC:	RAP	DATE:	8/21/2020
CHECKED:	RY	DATE:	8/28/2020

ESTIMATED QUANTITIES (CUY-090-1999)

ITEM	EXTENSION	TOTAL	UNIT	DESCRIPTION	ABUT.	PIERS	SUPER.	GEN.	SEE SHEET
202	11201	LS		PORTIONS OF STRUCTURE REMOVED, AS PER PLAN				LS	2/6
203	35110	36	CY	GRANULAR MATERIAL, TYPE B				36	
503	11101	LS		COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN				LS	2/6
503	21100	36	CY	UNCLASSIFIED EXCAVATION				36	
611	99575	2	EACH	MANHOLE, NO. 3, AS PER PLAN				2	6/6
837	10001	405	FT	LINER PIPE, AS PER PLAN				405	2/6
837	21001	405	FT	BACKFILL FOR LINER PIPE, AS PER PLAN				405	3/6

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED RAP | DRAWN RAP | CHECKED RY | REVIEWED HVH | DATE 09/18/20 | REVISED | STRUCTURE FILE NUMBER 1809407

STRUCTURE NOTES
SITE 3 - BRIDGE NO. CUY-90-1999
ADDISON ROAD STORM SEWER

CUY-90-18.22/VAR
PID No. 92069

3 / 6

45 / 63

STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS

REFER TO THE FOLLOWING STANDARD BRIDGE DRAWING(S):

HW-1.1 DATED (REVISED) 07/20/2018

AND TO THE FOLLOWING SUPPLEMENTAL SPECIFICATION(S):

800 DATED 04/16/2021
837 DATED 07/19/2019

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 8TH EDITION, INCLUDING ALL REVISIONS AND INTERIM SPECIFICATIONS, AND THE ODOT BRIDGE DESIGN MANUAL, 2019 AND QUARTERLY UPDATES.

DESIGN LOADING

DESIGN LOADING: HL-93

FUTURE WEARING SURFACE (FWS) OF 0.060 KIPS/SQ.FT.

DESIGN DATA

CONCRETE CLASS QC1
-COMPRESSIVE STRENGTH 4.0 KSI (HEADWALL)

REINFORCING STEEL
-MINIMUM YIELD STRENGTH 60 KSI

EXISTING STRUCTURE VERIFICATION

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 CMS SECTIONS 102.05, 105.02 AND 513.04.

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 WHICH HAVE BEEN VERIFIED IN THE FIELD.

ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

THIS WORK CONSISTS OF THE REMOVAL OF THE EAST HEADWALL, A PORTION OF THE EXISTING CMP, AND ANY OTHER PORTIONS OF THE EXISTING STRUCTURE NECESSARY TO FACILITATE INSTALLATION OF THE PLATE LINER.

PERFORM WORK CAREFULLY DURING REMOVALS TO PROTECT PORTIONS OF SUCH SYSTEMS THAT ARE TO BE SALVAGED AND INCORPORATED INTO THE PROPOSED STRUCTURE. THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE RAM TYPE OF EQUIPMENT IS PROHIBITED. SUBMIT CONSTRUCTION PLANS ACCORDING TO CMS 501.05. ANY DAMAGE TO PORTIONS OF THE EXISTING STRUCTURE TO REMAIN SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST.

MEASUREMENT & PAYMENT: THE DEPARTMENT WILL MEASURE THE QUANTITY OF REMOVALS ON A LUMP SUM BASIS. THE DEPARTMENT WILL PAY FOR THE ACCEPTED QUANTITIES OF REMOVALS AT THE CONTRACT PRICE FOR ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN.

FOUNDATION BEARING RESISTANCE

_(1)_ FOOTINGS, AS DESIGNED, PRODUCE A MAXIMUM SERVICE LOAD PRESSURE OF _(2)_ KIPS PER SQUARE FOOT AND A MAXIMUM STRENGTH LOAD PRESSURE OF _(2)_ KIPS PER SQUARE FOOT. THE FACTORED BEARING RESISTANCE IS _(3)_ KIPS PER SQUARE FOOT.

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 BY USING PIPE PLUGS WHICH ARE READILY REMOVABLE. 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.

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. CONTRACTOR SHALL COORDINATE ALL WORK WITH NORTHEAST OHIO REGIONAL SEWER DISTRICT (NEORSD).

THE DEWATERING/BYPASS AND CONSTRUCTION SEQUENCE IN THESE PLANS IS NOT TO SCALE AND FOR REFERENCE ONLY; THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER SITE SPECIFIC BYPASS PUMPING PROCEDURES PRIOR TO ORDERING MATERIAL.

THE BYPASS PUMP FOR SITES 1-4 SHALL BE DESIGNED TO PROVIDE A MINIMUM DISCHARGE FOR A FLOW RATE OF 7.5 CFS. THESE FLOW RATES ARE BASED ON MINIMUM PRECIPITATION WITHIN THE DRAINAGE CATCHMENT AREAS. DESIGN AND CONSTRUCT INFLATABLE WEIRS TO A MINIMUM ELEVATION 2.5 FEET ABOVE THE UPSTREAM INVERT AND A MINIMUM ELEVATION 1 FOOT ABOVE 573 (CURRENT LAKE WATER ELEVATION) AT THE OUTLET FOR SITES 1-3. DESIGN AND CONSTRUCT INFLATABLE WEIR TO A MINIMUM ELEVATION 2.5 FOOT ABOVE THE UPSTREAM INVERT FOR SITE 4. THE CONTRACTOR SHALL COORDINATE WITH NEORSD ABOUT CSO FLOW EVENTS AND REMOVE THE CONSTRUCTION EQUIPMENT BEFORE EACH CSO FLOW EVENT OCCURS. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR HEIGHT FOR SITES 1-4, THE DEPARTMENT WILL REIMBURSE THE CONTRACTOR FOR ANY RESULTING DAMAGE TO THE WORK PROTECTED BY THE WEIR/COFFERDAM PROVIDED THE CONTRACTOR HAS EXERCISED NORMAL DUE DILIGENCE. IF THE ACTUAL WATER ELEVATION EXCEEDS THE MINIMUM REQUIRED WEIR/COFFERDAM HEIGHT FOR SITES 1-4 AND CAUSES A DELAY TO THE PROJECT, THE DEPARTMENT WILL GRANT THE CONTRACTOR AN EXCUSABLE, NON-COMPENSABLE DELAY IN ACCORDANCE WITH 108.06.B. ALL MATERIAL, LABOR, AND EQUIPMENT REQUIRED FOR THE REMOVAL OF EQUIPMENT PRIOR TO THE CSO FLOW EVENT AND STORMS CAUSING FLASH FLOODING WILL BE COMPENSATED PER 690E98000 SPECIAL, NEORSD CSO FLOW EVENT, AS PER PLAN.

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.

ITEM 511 - CLASS QC1 CONCRETE, HEADWALL, AS PER PLAN

PROVISIONS OF CMS ITEM 511 EXCEPT AS MODIFIED HEREIN. HEADWALL CONCRETE BID UNIT PRICE SHALL INCLUDE THE COST OF REINFORCEMENT AS DETAILED ON SHEET 9/9.

ITEM 837 - LINER PIPE, AS PER PLAN

THE PROPOSED STRUCTURE TYPE SHALL BE A FLANGED, GALVANIZED STEEL, TUNNEL LINER PLATE PIPE ARCH CONFORMING TO THE GEOMETRY SHOWN ON SHEET 7/9 AND CAPABLE OF BEING ASSEMBLED WITHIN THE EXISTING STRUCTURE AS DETAILED IN THESE PLANS. THE PROPOSED STRUCTURE SHALL BE DESIGNED FOR HL-93 LOADING WITH 60 PSF FUTURE WEARING SURFACE AND ASSUME THE EXISTING STRUCTURE PROVIDES NO STRUCTURAL CAPACITY. VENDOR TO PROVIDE GAUGE THICKNESS.

MATERIAL:

LINER PLATES SHALL BE FABRICATED FROM BLACK STEEL PLATES CONFORMING TO ASTM SPECIFICATION A 1011. PLATES SHALL BE OF THE GAGE SHOWN ON THE PLANS AND SHALL BE CURVED TO SUIT THE TUNNEL CROSS SECTION SHOWN. PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123, EXCEPT THAT THE ZINC SHALL BE APPLIED AT A RATE OF 2.0 OUNCES PER SQUARE FOOT TOTAL FOR BOTH SIDES.

ALL PLATES SHALL BE PUNCHED FOR BOLTING ON BOTH LONGITUDINAL AND CIRCUMFERENTIAL SEAMS AND SHALL BE SO FABRICATED AS TO PERMIT COMPLETE ERECTION FROM THE INSIDE OF THE EXISTING STRUCTURE. THE LONGITUDINAL SEAM SHALL BE OF THE LAPPED TYPE, WITH AN OFFSET EQUAL TO THE GAGE OF METAL FOR THE FULL WIDTH OF PLATE TO ALLOW THE CROSS SECTION OF THE PLATE TO BE CONTINUOUS THROUGH THE SEAM. CIRCUMFERENTIAL BOLT HOLE SPACING SHALL BE 6-1/4".

GROUT HOLES, ADJUSTING RODS, ANTI-FLOTATION DEVICES, BASE CHANNELS, AND SKID RAILS SHALL BE IN ACCORDANCE WITH THE LINER MANUFACTURER'S RECOMMENDATIONS. GROUT PORT/VENT LOCATIONS IN THE ROADWAY ARE PERMISSIBLE BUT SHOULD BE CONFIGURED TO MINIMIZE IMPACT TO TRAFFIC.

BOLTS AND NUTS:

BOLTS AND NUTS SHALL BE 5/8" IN DIAMETER AND LENGTH AS RECOMMENDED BY THE MANUFACTURER. BOLTS SHALL CONFORM TO ASTM A 449, TYPE 1 OR ASTM A 307. FOR LONGITUDINAL SEAMS, BOLTS SHALL BE A 449, TYPE 1, FOR PLATE THICKNESS EQUAL TO OR GREATER THAN 0.209. FOR PLATE THICKNESS LESS THAN .209, THE BOLTS SHALL BE A 307, GRADE A. ALL CIRCUMFERENTIAL BOLTS MAY BE A 307, GRADE A. NUTS SHALL CONFORM TO ASTM A 563, GRADE A, HEX.

GALVANIZING WHEN REQUIRED SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM B-695, CLASS 50.

INSTALLATION:

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS INCLUDING ASSEMBLY DRAWINGS, ARCH ASSEMBLY 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 PLATE OR ITS GALVANIZED ZINC COATING. THE CONTRACTOR SHALL TOUCH UP ANY DAMAGE TO THE GALVANIZED ZINC COATING CAUSED BY HANDLING OR ASSEMBLY. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE DETAILS AND LOCATIONS OF LATERAL CONNECTIONS, GROUT PORTS, FITTINGS, BLOCKING, AND BLOCKING HARDWARE FOR APPROVAL. A GROUTING METHOD AND CULVERT INSTALLATION PROCEDURE SHALL ALSO BE SUBMITTED FOR APPROVAL. LINER PLATE SHALL BE ASSEMBLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. LONGITUDINAL SEAMS SHALL BE STAGGERED BETWEEN RINGS.

CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING: SIZE, TYPE, AND LOCATIONS OF ALL 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 SHALL BE AS MINIMAL AS REQUIRED TO PERMIT CONNECTION OF LATERALS AND SHALL NOT COMPROMIZE THE STRUCTURAL CAPACITY OF THE LINER. GALVANIZING SHALL BE TOUCHED UP FOR ANY CUT EDGES. LARGER LATERAL CONNECTIONS MAY WARRANT USE OF HEAVIER GAUGE PLATE OR OTHER REINFORCEMENT AND SHALL BE DESIGNED BY PLATE VENDOR. ALL 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 STRUCTURES.

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

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

DESIGN AGENCY
KS Associates Inc.
260 BURNS ROAD, ELYRIA, OHIO 44035

DESIGNED	DRAWN	REVIEWED	DATE
RAP	RAP	HVH	09/18/20
CHECKED	REVISED	STRUCTURE FILE NUMBER	
RY		1812769	

STRUCTURE NOTES
SITE 4 - BRIDGE NO. CUY-480-1628
STORM CULVERT BY WB EXIT RAMP TO SR 17

CUY-90-18.22/VAR
PID No. 92069