THE CITY OF WILLOUGHBY
LAKESHORE EAST EQUALIZATION BASIN PHASE I
LAKE COUNTY, OHIO

CITY OF WILLOUGHBY OFFICIALS:

MAYOR	ROBERT FIALA
SERVICE DIRECTOR	RICH PALMISANO
FINANCE DIRECTOR	CHER HOFFMAN
LAW DIRECTOR	MIKE LUCAS

CITY OF EASTLAKE OFFICIALS:

MAYOR	JIM OVERSTREET
SERVICE DIRECTOR	ROBERT GORENTZ
FINANCE DIRECTOR	CAROL-ANN SCHINDEL, CPA

CITY OF WILLOUGHBY COUNCIL:

WARD 1	KRISTIE SIEVERS
WARD 2	KEN J. KARY
WARD 3 / VICE PRESIDENT	JOHN TOMASELLI
WARD 4 / PRESIDENT OF COUNCIL	ROBERT E. CARR
WARD 5	MIKE L. MERHAR
WARD 6	DANIEL J. GARRY
COUNCIL AT LARGE	DANIEL J. ANDERSON

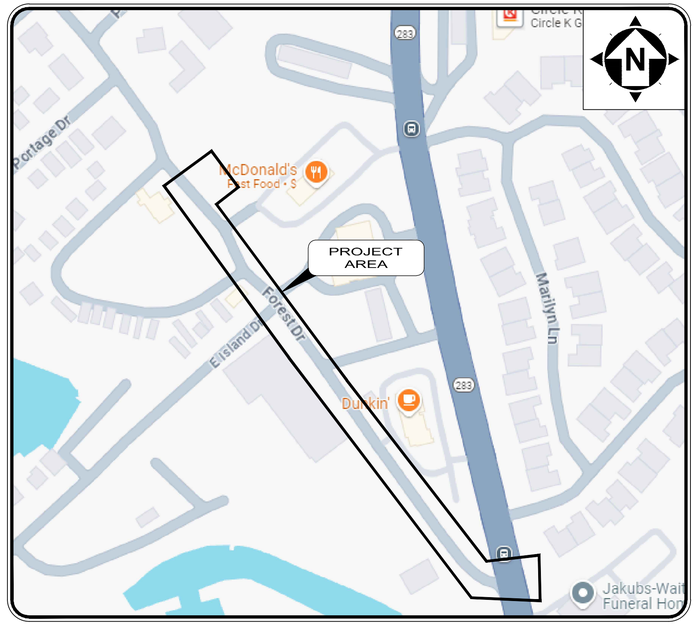
CITY OF EASTLAKE COUNCIL:

WARD 1 / PRESIDENT OF COUNCIL	JAMES OVERSTREET
WARD 2 / VICE PRESIDENT	JOHN MEYERS
WARD 3	JASON KASUNICK
WARD 4	DANYIELL KOSTELNIK
COUNCIL AT LARGE	ANGELA R. SCHMIDT
COUNCIL AT LARGE	CHRIS KRAJNYAK
COUNCIL AT LARGE	MICHAEL D. SEMICK

OHIO811.org Before You Dig

1. UNDERGROUND BUILDING SERVICE UTILITY LINES ARE NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, MAINTAINING AND REPLACING AS NECESSARY TO ENSURE CONTINUAL SERVICE TO BUILDINGS.
2. THE CONTRACTOR IS RESPONSIBLE TO CALL OHIO UTILITIES PROTECTION SERVICE @ 1-800-362-2764, THREE WORKING DAYS PRIOR TO CONSTRUCTION.

MAY 2025



LOCATION MAP
NOT TO SCALE

ENGINEER:

VERDANTAS, LLC
8150 STERLING COURT
MENTOR, OHIO 44060

verdantas

ENGINEER'S PROJECT No.230264

RYAN SCHUSTER, P.E. — P.E. No. 72755 — 5/20/2025 DATE

STATE OF OHIO · RYAN S. SCHUSTER 72755 · REGISTERED PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	AS NOTED
DESIGNED BY:	CAS
DRAWN BY:	CAS
CHECKED BY:	RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

GENERAL - 00 SERIES
COVER SHEET

PROJECT NO. 230264
DISCIPLINE: GENERAL
SHEET NAME: 00-G-01
SHEET 1 OF 28

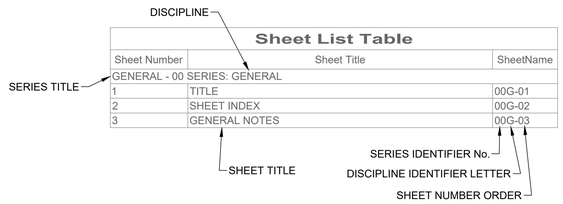
SERIES INFORMATION:

SERIES No:	DESCRIPTION:
00	GENERAL
01	SITE IMPROVEMENTS
10	EQUALIZATION TANK
20	SITE STRUCTURES
SD	STANDARD DETAILS
M	MECHANICAL
E	ELECTRICAL
Y	INSTRUMENTATION

DISCIPLINE INFORMATION:

IDENTIFIER:	DISCIPLINE:
G	GENERAL
C	CIVIL
A	ARCHITECTURAL
S	STRUCTURAL
D	PROCESS
M	MECHANICAL (PLUMBING & HVAC)
E	ELECTRICAL
Y	INSTRUMENTATION

INDEX EXPLAINATION:



GENERAL SYMBOLOGY NOTES:

1. THIS IS A STANDARD SHEET SHOWING COMMONLY USED SYMBOLOGY.
2. ALL SYMBOLS ARE NOT NECESSARILY USED ON THIS PROJECT.
3. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE NEW IMPROVEMENTS SO AS TO HIGHLIGHT SPECIFIC TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.
4. SYMBOLOGY OR DIAGRAMMATICAL LEGENDS MAY BE SHOWN ON INDIVIDUAL SHEETS FOR SCHEDULES, DIAGRAMS, DETAILS, SCHEMATICS OR EQUIPMENT.

DRAWING CODED NOTE TYPES:

1. CT CONTRACTUAL NOTES ARE DEPICTED WITH A HEXAGON, SQUARE, CIRCLE OR TRIANGLE. ALL OTHER EXISTING WRITTEN CALLOUTS SHOWN ON THE REUSED SCANNED PLANS, SECTIONS & DETAILS ARE FOR EXISTING CONDITIONS AND REFERENCE ONLY, MANY OF THOSE NOTES FROM THE SCANNED DRAWINGS PERTAIN TO PREVIOUS WORK DONE.

PLAN REVISIONS:

A REVISION DESCRIPTION

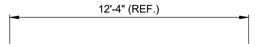
B REVISION DESCRIPTION

DEMOLITION CODED NOTES:

1 DEMOLITION DESCRIPTION

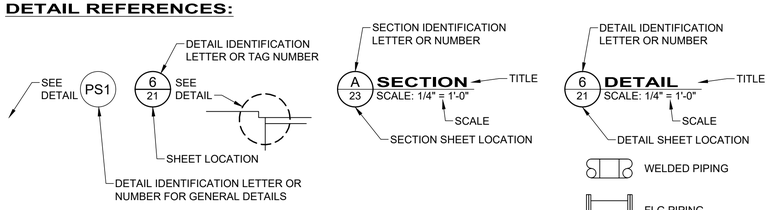
2 DEMOLITION DESCRIPTION

REFERENCE DIMENSION:

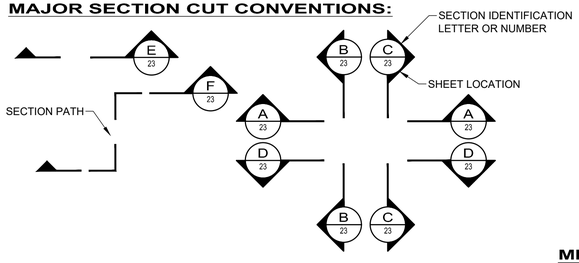


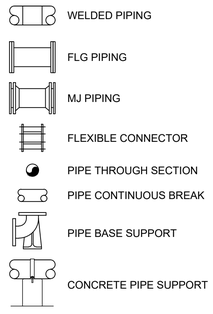
REFERENCE DIMENSIONS ARE GIVEN FOR INFORMATION ONLY. THEY ARE CALCULATED DIMENSIONS NOT INTENDED TO BE USED WITHOUT FIELD VERIFICATION AND ARE USEFUL IN SHOWING INTENDED DESIGN.

DETAIL REFERENCES:

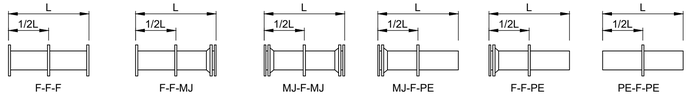


MAJOR SECTION CUT CONVENTIONS:





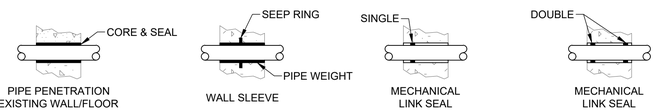
MISC PIPE SYMBOLOGY



NOTE:

WALL CASTINGS REQUIRING BELL ENDS IN LIEU OF MJ SHALL BE NOTED AS "B", ALL FLANGED (F) AND MECHANICAL JOINT (MJ) FLUSH WITH WALL ARE TO BE DRILLED, AND TAPPED FOR STUDS.

CAST IRON WALL CASTING ABBREVIATIONS



PIPE THROUGH WALLS & FLOORS

VALVE OPERATOR ID:

CH = CHAIN
EM = ELECTRIC MOTOR
ES = EXTENSION STEM
FB = FLOOR BOX
FS = FLOOR STAND
GE = GEAR
HC = HYDRAULIC CYLINDER
HW = HANDWHEEL
LE = LEVER
LW = "L" WRENCH
ON = OPERATING NUT
PC = PNEUMATIC CYLINDER
PD = PNEUMATIC DIAPHRAGM
TW = "T" WRENCH
VB = VALVE BOX

PIPE END JOINT ID:

BE = BELL
CM = COMPRESSION
F = FLARED
FL = FLANGED
GR = GROOVED
LU = LUG
MJ = MECHANICAL JOINT
NPT = NATIONAL PIPE THREAD
RJ = RESTRAINED JOINT
S = SOLDERED
SJ = SLIP JOINT (PUSH ON)
SW = SOLVENT WELDED
TH = THREADED
WE = WELDED

PIPE MATERIAL ID:

BR = BRASS
BS = BLACK STEEL
BZ = BRONZE
CI = GRAY CAST IRON
CU = COPPER
CS = CAST IRON
CT = CARBON STEEL TUBING
DIP = DUCTILE IRON PIPE
DR = DIAMETER RATIO
FRP = FIBERGLASS REINFORCED PLASTIC
GS = GALVANIZED STEEL
HDPE = HIGH-DENSITY POLYETHYLENE PIPE
PVC = POLYVINYL CHLORIDE PIPE
SS = STAINLESS STEEL
STL = STEEL PIPE
SDR = STANDARD DIAMETER RATIO
SCH = SCHEDULE

VALVE ID:

AC = AIR CHECK VALVE
AN = ANGLE VALVE
AR = AIR RELEASE VALVE
AV = AIR & VACUUM VALVE
BA = BALL VALVE
BFV = BUTTERFLY VALVE
BK = BACKPRESSURE VALVE
BP = BACKFLOW PREVENTER
CV = CHECK VALVE
CO = C0NE VALVE
GV = GATE VALVE
GL = GLOBE VALVE
KG = KNIFE GATE VALVE
KN = KNIFE VALVE
MV = MUD VALVE
PD = PLUG DRAIN VALVE
PF = PRESSURE RELIEF
PG = PRESSURE REGULATOR
PI = PINCH VALVE
PV = PLUG VALVE
PRV = PRESSURE REDUCING VALVE
PT = PRESSURE TEMPERATURE RELIEF
RF = RATE-OF-FLOW CONTROLLER
SV = SOLENOID VALVE
SU = SURGE VALVE
TE = TELESCOPING VALVE
TM = TEMPERATURE CONTROL VALVE

EQUIPMENT ID:

AC = AIR COMPRESSOR
AER = AERATOR
B = BLOWER
BFP = BELT FILTER PRESS
CLS = CLASSIFIER
C = COMMUNITOR
CMP = COMPACTOR
CFD = CHEMICAL FEEDER
CNV = CONVERYOR
CNT = CENTRIGUGE
CC = CALIBRATION CYLINDER
CFD = CHEMICAL FEEDER
CP = CONTROL PANEL
CR = CRANE
D = DECANTER
DR = DRIVE
DFL = DISC FILTER
F = FAN
FL = FILTER
FM = FLOW METER
GBT = GRAVITY BELT THICKENER
GR = GRINDER
GEN = GENERATOR
HB = HOSE BIB
M = MOTOR
MX = MIXER
P = PUMP
PS = PUMP STATION
SMP = SAMPLER
SCR = SCREEN

GATE ABBREVIATIONS:

BG - BULKHEAD GATE
SG - SLIDE GATE
SP - STOP PLATE
SL - STOP LOG
ALUM - ALUMINUM
SS - STAINLESS STEEL
CI - CAST IRON
POLY - POLYMER
B/C - BOTTOM OF CHANNEL
T/C - TOP OF CHANNEL
A - HEIGHT
B - WIDTH

SHEET LIST TABLE

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	N/A
DESIGNED BY:	CAS
DRAWN BY:	CAS
CHECKED BY:	RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

GENERAL - 00 SERIES

SHEET INDEX AND LEGENDS

PROJECT NO.
230264

DISCIPLINE
GENERAL

SHEET NAME
00-G-02

SHEET 2 OF 28

EXISTING SYMBOLS

SANITARY MANHOLE	
SANITARY CLEANOUT	
SANITARY LINE CAP	
SANITARY LINE PAINT MARKING	
SANITARY STRUCTURE NUMBER	
SANITARY VENT PIPE	
STORM MANHOLE (SOLID LID)	
STORM MANHOLE (OPEN GRATE)	
CURB INLET	
CURB INLET (DOUBLE)	
CATCH BASIN	
CATCH BASIN (ROUND LID)	
CATCH BASIN (DOME)	
CATCH BASIN (SIDE INLET)	
DRAIN	
DOWNSPOUT	
STORM CLEANOUT	
STORM LINE CAP	
STORM ENDWALL	
STORM HEADWALL	
STORM LINE PAINT MARKING	
STORM STRUCTURE NUMBER	
ROCK CHANNEL PROTECTION	
SURFACE DRAINAGE FLOW	
STORM FLOOD ROUTING ARROW	
FIRE HYDRANT	
WATER SIAMESE CONNECTION	
WATER VALVE	
WATER VALVE BOX	
WATER METER	
WATER METER PIT	
WATER LINE REDUCER	
WATER LINE CAP	
WATER LINE PLUG	
WATER WELL	
WATER LINE PAINT MARKING	
WATER LINE MARKER	
POST INDICATOR VALVE	
WATER MANHOLE	
WATER CORPORATION STOP	
WATER FLUSHING ASSEMBLY	
WATER FIXTURE	
WATER FITTING (TEE)	
WATER FITTING (CROSS)	
WATER FITTING (45° WYE)	
WATER FITTING (11.25°)	
WATER FITTING (22.50°)	
WATER FITTING (45°)	
WATER FITTING (90°)	
IRRIGATION SPRINKLER HEAD	
IRRIGATION CONTROL BOX	
IRRIGATION BOX	
STEAM MANHOLE	
STEAM VENT	
COMBINED SEWER MANHOLE	
GAS LIGHT POST (YARD)	
GAS MANHOLE	
GAS VALVE	
GAS VALVE BOX	
GAS_____	
GAS METER	
GAS REGULATOR	
GAS VENT PIPE	
GAS LINE MARKER	
GAS LINE PAINT MARKING	
GAS LINE FIXTURE	
GAS_____	
ELECTRIC LIGHT POST (YARD)	
ELECTRIC MANHOLE	
ELECTRIC PULL BOX	
ELECTRIC CONTROL BOX	
ELECTRIC JUNCTION BOX	
ELECTRIC VAULT BOX	
ELECTRIC METER	
ELECTRIC PEDESTAL	
ELECTRIC RISER BOX	
ELECTRIC TRANSFORMER	
ELECTRIC HVAC UNIT	
ELECTRIC GROUND LIGHT	
ELECTRIC LINE PAINT MARKING	
CABLE TV MANHOLE	
CABLE TV PEDESTAL	
CABLE TV SATELLITE DISH	
CABLE TV PAINT MARKING	

EXISTING SYMBOLS

TELEPHONE MANHOLE	
TELEPHONE PULL BOX	
TELEPHONE PEDESTAL	
TELEPHONE RISER BOX	
TELEPHONE LINE PAINT MARKING	
TELEPHONE PAY PHONE	
FIBER OPTIC CABLE MANHOLE	
FIBER OPTIC CABLE PAINT MARKING	
FIBER OPTIC CABLE MARKER	
TRAFFIC CONTROL MANHOLE	
TRAFFIC CONTROL BOX	
TRAFFIC CONTROL PAINT MARKING	
TRAFFIC PULL BOX	
TRAFFIC SIGNAL PEDESTAL	
UNKNOWN, PULL BOX	
UNKNOWN, CLEANOUT	
UNKNOWN, MANHOLE	
UNKNOWN, VALVE	
UNKNOWN, PEDESTAL	
UNKNOWN, UTILITY END NOT LOCATED	
MONITORING WELL	
TEST WELL	
WATER WELL	
SOIL BORING	
SWAMP	
POLE, ELECTRIC	
POLE, TELEPHONE	
POLE, LIGHT	
POLE, LIGHT, DECORATIVE	
POLE, LIGHT-OVERHEAD	
POLE, CABLE TV	
POLE, UTILITY	
POLE, GENERAL	
POLE, TRAFFIC CONTROL	
POLE, GUY	
POLE, BRACE	
POLE, ELECTRIC/TELEPHONE	
POLE, ELECTRIC W/LIGHT	
POLE, ELECTRIC/CABLE TV	
POLE, ELEC./TELE./LIGHT	
POLE, ELEC./TELE./CABLE TV	
POLE, ELEC./TELE./LIGHT/CABLE TV	
POLE, TELEPHONE/LIGHT	
POLE, TELEPHONE/CABLE TV	
POLE, TELEPHONE/LIGHT/CABLE TV	
POLE, CABLE TV W/LIGHT	
POLE, GUY WIRE	
SIGN	
SIGN, DOUBLE SIDED	
SIGN, DUAL POST	
SIGN, RAILROAD	
POST	
BOLLARD	
DELINEATOR POST	
PARKING BUMPER BLOCK	
HANDICAP PARKING SYMBOL	
HANDICAP PARKING SYMBOL	
HANDICAP DETECTABLE WARNING	
MAILBOX	
PAPERBOX	
PARKING METER	
GRAVE HEADSTONE	
EX. BARBEQUE GRILL	
VACUUM	
FUEL PUMP	
FLAG POLE	
RAISED PAVEMENT MARKER	
GUARDRAIL, CENTER POST	
GUARDRAIL, TERMINAL POST	
GUARDRAIL, BOTTOM POST	
GUARDRAIL, TOP POST	
FENCE POST	
PICNIC TABLE	
BENCH	
DECIDUOUS TREE	
EVERGREEN TREE	
STUMP	
BUSH	

EXISTING SYMBOLS

PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, BICYCLE LANE	
PVMT. MARKING, SYMBOL	
PVMT. MARKING WORD, BICYCLE	
PVMT. MARKING WORD, LANE	
PVMT. MARKING WORD, ONLY	
PVMT. MARKING WORD, RAILROAD	
PVMT. MARKING WORD, SCHOOL	
IRON PIN FOUND	
SOLID IRON PIN FOUND	
IRON PIPE FOUND	
DRILL HOLE FOUND	
CHISELED "X" FOUND	
MONUMENT BOX FOUND	
MONUMENT CONCRETE FOUND	
MONUMENT RIGHT-OF-WAY FOUND	
PK NAIL FOUND	
MAG NAIL FOUND	
SPIKE FOUND	
HUB FOUND	
AXLE FOUND	
WOOD POST FOUND	
CORNER STONE FOUND	
AERIAL TARGET FOUND	
GPS CONTROL FOUND	
BENCHMARK FOUND	

PROPOSED SYMBOLS

SANITARY MANHOLE	S
SANITARY MANHOLE, ADJUST	
SANITARY CLEANOUT	
SANITARY LINE CAP	
SANITARY STRUCTURE NUMBER	00
SANITARY VENT PIPE	V
STORM MANHOLE (SOLID GRATE)	D
STORM MANHOLE (OPEN GRATE)	D
STORM MANHOLE, ADJUST	
CURB INLET	
CURB INLET (DOUBLE)	
CURB INLET, ADJUST	
CURB INLET (DOUBLE), ADJUST	
CATCH BASIN	
CATCH BASIN (SOLID)	
CATCH BASIN, ADJUST	
CATCH BASIN (SIDE INLET)	
DRAIN	
DOWNSPOUT	
STORM CLEANOUT	
STORM LINE CAP	
STORM HEADWALL	
STORM STRUCTURE NUMBER	00
ROCK CHANNEL PROTECTION	
SURFACE DRAINAGE FLOW	
SURFACE DRAINAGE FLOW	
STORM FLOOD ROUTING ARROW	
FIRE HYDRANT	
FIRE HYDRANT, ADJUST	
WATER SIAMESE CONNECTION	
WATER VALVE	
WATER VALVE BOX	
WATER METER	WM
WATER LINE REDUCER	
WATER LINE CAP	
WATER LINE PLUG	
WATER WELL	
WATER LINE MARKER	
POST INDICATOR VALVE	PIV
WATER MANHOLE	W
WATER CORPORATION STOP	
WATER FLUSHING ASSEMBLY	
WATER FITTING (TEE)	
WATER FITTING (CROSS)	
WATER FITTING (45° WYE)	
WATER FITTING (11.25°)	
WATER FITTING (22.50°)	
WATER FITTING (45°)	
WATER FITTING (90°)	
IRRIGATION SPRINKLER HEAD	
IRRIGATION CONTROL BOX	IRR
WATER METER	WM
GAS LIGHT POST (YARD)	
GAS MANHOLE	G
GAS MANHOLE	
GAS VALVE	
GAS METER	GM
GAS REGULATOR	GR
GAS VENT PIPE	V
ELECTRIC LIGHT (GROUND)	
ELECTRIC LIGHT POST (YARD)	
ELECTRIC MANHOLE	E
ELECTRIC MANHOLE, ADJUST	
ELECTRIC PULL BOX	PB
ELECTRIC CONTROL BOX	CTL
ELECTRIC JUNCTION BOX	JCT
ELECTRIC VAULT BOX	VLT
ELECTRIC METER	EM
ELECTRIC PEDESTAL	EP
ELECTRIC TRANSFORMER	TR
ELECTRIC AIR CONDITION UNIT	AC
POLE, ELECTRIC	P
POLE, TELEPHONE	T
POLE, LIGHT	L
POLE, LIGHT, DECORATIVE	
POLE, LIGHT-OVERHEAD	
POLE, CABLE TV	C
POLE, UTILITY	U
POLE, GENERAL	

PROPOSED SYMBOLS

POLE, TRAFFIC CONTROL	P
POLE, GUY	G
POLE, BRACE	B
POLE, ELECTRIC/TELEPHONE	P
POLE, ELECTRIC W/LIGHT	P
POLE, ELECTRIC/CABLE TV	P
POLE, ELEC./TELE./LIGHT	P
POLE, ELEC./TELE./CABLE TV	P
POLE, ELEC./TELE./LIGHT/CABLE	P
POLE, TELEPHONE/LIGHT	T
POLE, TELEPHONE/CABLE TV	T
POLE, TELE./LIGHT/CABLE TV	T
POLE, CABLE TV W/LIGHT	C
POLE, FLAG	
GUY WIRE	
POST, SIGN (SINGLE SIDED)	
POST, SIGN (DOUBLE SIDED)	
POST, SIGN (DUAL POST)	
POST (GENERAL)	
BOLLARD	
DELINEATOR POST	
FENCE POST	
PARKING COUNT	00
PARKING BUMPER BLOCK	
HANDICAP PARKING SYMBOL	
HANDICAP DETECTABLE WARNING	
MAILBOX	MB
PAPERBOX	PB
PARKING METER	
STREET SIGN	
TELEPHONE MANHOLE	T
TELEPHONE MANHOLE (ADJ)	
TELEPHONE PEDESTAL	TP
CABLE MANHOLE	C
CABLE MANHOLE (ADJUSTED)	
CABLE PEDESTAL	CP
CABLE SATELLITE	
TRAFFIC CONTROL MANHOLE	TR
TRAFFIC CONT. MANHOLE (ADJ)	
TRAFFIC CONTROL BOX	TRAF
TRAFFIC PULL BOX	PB
TRAFFIC SIGNAL PEDESTAL	TP
INLET PROTECTION	
STRAW BALE CHECK DAM	
TREE (DECIDUOUS)	
TREE (EVERGREEN)	
BUSH	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, LANE ARROW	
PVMT. MARKING, BICYCLE	
PVMT. MARKING, CHEVRON	
PVMT. MARKING, ONE WAY	ONE WAY DO NOT ENTER
PVMT. MARKING WORD, LANE	
PVMT. MARKING WORD, ONLY	ONLY
PVMT. MARKING WORD, RAILROAD	
PVMT. MARKING WORD, SCHOOL	SCHOOL

ABBREVIATIONS

ABANDONED	ABAN.
ADJUST	ADJ.
AGGREGATE	AGG.
ASBESTOS PIPE	ASB.
ASPHALT	ASPH.
BACK TO BACK	B/B
BASEMENT FLOOR ELEVATION	BFE
BETWEEN	BTW.
BOTTOM OF CURB ELEVATION	BC
BOTTOM OF FOOTING ELEVATION	FTG.
BOTTOM OF WALL ELEVATION	BWE
BUILDING	BLDG.
BULKHEAD	BHD.
CABLE TELEVISION	CATV
CAST IRON PIPE	CIP
CATCH BASIN	CB
CENTERLINE	C/L
CENTER TO CENTER	C/C
CHAIN LINK FENCE	CLF
CHEMICAL STABILIZATION	CHEM. STABL.
CONCENTRIC	CON.
CONCRETE	CONC.
CONNECTION	CONN.
CONTROL JOINT	CJ
COPPER PIPE	COP.
CORRUGATED METAL PIPE	CMP
DEMOLITION	DEMO.
DEPRESSED	DEP.
DOWNSPOUT	DS
DROP MANHOLE	DMH
DUCTILE IRON PIPE	DIP
DUMPSTER	DUMP.
ECCENTRIC	ECC.
EDGE OF PAVEMENT ELEVATION	EP
ELECTRIC	ELEC.
ENCLOSURE	ENCL.
EXISTING	EX.
FACE TO FACE	F/F
FINISHED FLOOR ELEVATION	FFE
FIRE HYDRANT	FH
FOUNDATION	FNDN.
FULL DEPTH RECLAMATION	FDR
FUTURE	FUT.
GAS	G
GALVANIZED PIPE	GP
GRADE BREAK ELEVATION	GB
GRAVEL	GVL.
GROUND ELEVATION	GND.
GUTTER ELEVATION	GUT.
HANDICAP (E.G. ACCESSIBLE)	HC
HIGH-DENSITY POLYETHYLENE PIPE	HDPE
HIGH POINT ELEVATION	HP
HORIZONTAL	HOR.
INSTALL	INSTL.
IRRIGATION	IRR.
JOINT	JT
JOINT FILLER	JF
JUNCTION	JCT.
KNOCKOUT	KO
LATERAL	LAT.
LOW POINT ELEVATION	LP
MAINTAIN	MAINT.
MATERIAL	MATL.
MOUNTED	MTD.
MISCELLANEOUS	MISC.
NOT TO SCALE	N.T.S.
ORNAMENTAL	ORN.
OUT TO OUT	O/O
OVERHEAD	OH
OXYGEN LINE	O
PARKING	PKG.
PAVEMENT	PVMT.
PEDESTAL	PED.
PERFORATE	PERF.
PIPE INVERT ELEVATION	INV.
POLYVINYL CHLORIDE PIPE	PVC
PREFORMED JOINT FILLER	PJF
PROPOSED	PR.
PULL BOX	PB
RAILROAD	RR
REINFORCED	REINF.
REINFORCED CONCRETE PIPE	RCP
REMOVE	RMV.
RETAINING WALL	RET.WALL

ABBREVIATIONS

ROOF LEADER	RL
SALVAGE	SALV.
SANITARY SEWER	SAN.
SERVICE	SERV.
SLEEVE	SLV.
STABILIZATION	STABL.
STEAM PIPE	STEA.
STEEL PIPE	STL.
STORM SEWER	STM.
SUMP PUMP	SP
TELEPHONE	TEL.
TEMPORARY	TEMP.
THICKENED	THK.
TOP OF CURB ELEVATION	TC
TOP OF HEADWALL ELEVATION	THW
TOP OF STRUCTURE ELEVATION	RIM
TOP OF WALL ELEVATION	TW
TRENCH DRAIN	TD
TYPICAL	TYP.
UNDERDRAIN	UD
UNDERGROUND	UG
VERTICAL	VERT.
VITRIFIED CLAY PIPE	VCP
WATER MAIN	W.
WINDOW ELEVATION	WIN.
WIRE MESH	WM
WOOD	WD.
YARD HYDRANT	YH

STATE OF OHIO
RYAN S. SCHUSTER
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NO	REVISION	DATE

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ISSUE DATE: 5/20/2025
SCALE: N/A
DESIGNED BY: ELE
DRAWN BY: ELE
CHECKED BY: RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

GENERAL - 00 SERIES

SITE LEGEND

PROJECT NO.
230264

DISCIPLINE
GENERAL

SHEET NAME
00-G-03

SHEET 3 OF 28

GENERAL

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW THE PLANS AND TECHNICAL SPECIFICATIONS, VISIT THE PROJECT SITE AND NOTIFY IN WRITING THE PROJECT ENGINEER OF ANY DISCREPANCIES IN THE PLANS OR SPECIFICATIONS PRIOR TO CONSTRUCTION.
2. ANY REVISIONS TO THE ACCEPTED CONSTRUCTION PLANS SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION IN THE FIELD.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A CURRENT SET OF "AS BUILT" DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION LAYOUT AND SHALL NOTIFY ENGINEER IN WRITING OF ANY DISCREPANCIES.
5. NO WORK MAY COMMENCE WITHOUT AN EXECUTED NOTICE TO PROCEED.
6. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH OSHA SAFETY REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF ALL VISITORS, EMPLOYEES AND WORKERS ON THE CONSTRUCTION SITE.
7. THE CONTRACTOR SHALL CONSTRUCT THIS PROJECT IN COMPLIANCE WITH FEDERAL, STATE AND LOCAL BUILDING CODES.
8. ALL SEDIMENT AND EROSION CONTROL PRACTICES SHALL BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCE, IN THEIR PROPER SEQUENCE, AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
9. ANY DISTURBED AREAS NOT SCHEDULED FOR CONSTRUCTION ACTIVITIES WITHIN SEVEN DAYS OF DISTURBANCE SHALL BE TEMPORARILY STABILIZED.
10. ALL POLLUTANTS OTHER THAN SEDIMENT THAT OCCUR ON-SITE DURING CONSTRUCTION SHALL BE HANDLED AND LEGALLY DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORM OR SURFACE WATERS. POLLUTANTS OF CONCERN INCLUDE, BUT ARE NOT LIMITED TO, FUELS, LUBRICANTS, SOLVENTS, CONCRETE BI-PRODUCTS AND CONSTRUCTION MATERIALS.
11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE SECURITY OF ALL STORED MATERIALS ON OWNER'S SITE.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BARRICADING AND/OR FENCING AREAS THAT ARE DEEMED UNSAFE BY OWNER, ENGINEER.
13. THE CONTRACTOR SHALL COORDINATE WITH OWNER THE STORAGE OF STORED MATERIALS AND REMOVED EXISTING EQUIPMENT TO BE RETAINED.
14. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN PEDESTRIAN, LOCAL ROADWAY AND DRIVEWAY ACCESS AT ALL TIMES.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION SIGNING AND TRAFFIC CONTROL AS DIRECTED BY THE LOCAL MUNICIPALITY. ALL SIGNS AND MATERIAL USED SHALL CONFORM TO THE SPECIFICATIONS SET FORTH IN THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
16. THE CONTRACTOR SHALL PROVIDE A PRE-CONSTRUCTION VIDEO TAPE SURVEY OF THE ENTIRE PROJECT AREA. ALL COSTS ASSOCIATED FOR THIS WORK, INCLUDING THE VIDEO TAPE SURVEY, SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR MOBILIZATION, AS PER PLAN.
17. THE CONTRACTOR IS RESPONSIBLE FOR SECURING THE SITE AT ALL TIMES DURING WORK. SITE SHALL BE SECURE EVEN AT TIMES OF NO WORK.
18. ROOF DRAINS, FOUNDATION DRAINS, AND OTHER CLEAN WATER CONNECTIONS TO THE SANITARY SEWER SYSTEM ARE PROHIBITED.
19. THE PROJECT IS FEDERALLY FUNDED AND MUST FOLLOW FEDERAL PROCUREMENT AND PREVAILING WAGE REQUIREMENTS. THE CONTRACTOR IS SOLELY RESPONSIBLE TO MEET THESE REQUIREMENTS AS DETAILED IN THE BID AND CONTRACT DOCUMENTS.

UNDERGROUND UTILITIES

1. THE CONTRACTOR SHALL NOTIFY UTILITY COMPANIES AT LEAST THREE (3) WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS AND LEGAL HOLIDAYS, PRIOR TO CONSTRUCTION TO HAVE UTILITIES STAKED, MARKED OR OTHERWISE DESIGNATED IN THE CONSTRUCTION AREA IN SUCH A MANNER OR LOCATING SHALL BE COORDINATED TO STAY APPROXIMATELY THREE (3) DAYS AHEAD OF THE PLANNED CONSTRUCTION.
2. THE CONTRACTOR SHALL EXPOSE ALL UTILITIES OR STRUCTURES PRIOR TO CONSTRUCTION TO VERIFY THE VERTICAL AND HORIZONTAL LOCATION OF THE UTILITY OR STRUCTURE AND ITS EFFECT ON THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE UTILITY OWNER.
3. OSHA STANDARDS PROHIBITING CRANE OR BACKHOE OPERATIONS WITHIN SET DISTANCES OF ENERGIZED PRIMARY CONDUCTORS SHALL BE OBSERVED. TEMPORARY RELOCATION OF ELECTRICAL UTILITIES, INCLUDING RESTRAINT POLES, RELOCATION OF POLES AND RUBBER COVERING OF ENERGIZED CONDUCTORS MAY BE REQUIRED. THE COORDINATION AND COST OF THESE SERVICES IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR MAY RESTRAIN POLES IF THE METHOD OF SUPPORT HAS BEEN SUBMITTED TO AND APPROVED BY THE UTILITY OWNER.
4. THE CONTRACTORS SHALL EXPOSE BY PRE-EXCAVATING ALL UTILITIES OR STRUCTURES PRIOR TO CONSTRUCTION TO VERIFY THE VERTICAL AND HORIZONTAL EFFECT ON THE PROPOSED CONSTRUCTION, AND SHALL MAKE ADJUSTMENTS IN ELEVATIONS AS DIRECTED BY THE ENGINEER TO PROVIDE SUFFICIENT CLEARANCE BETWEEN THE PROPOSED AND EXISTING UTILITIES.

EXISTING UTILITIES

1. THE LOCATIONS OF THE UNDERGROUND UTILITIES ARE PLOTTED ACCORDING TO THE INFORMATION FURNISHED BY THE UTILITIES CONCERNED AND THE CITY DOES NOT GUARANTEE THE ACCURACY THEREOF. CONTRACTOR TO CALL OUPS (1-800-362-2764) "48 HOURS BEFORE YOU DIG" AND CALL OIL & GAS PRODUCERS PROTECTIVE (1-800-925-0988). CONTRACTOR ALSO TO COORDINATE HIS WORK WITH THE DOMINION EAST OHIO GAS COMPANY, THE ILLUMINATING COMPANY, AMERITECH COMPANY AND CABLE TV FOR GAS LINE AND/OR POLE RELOCATION.
2. IN THE EVENT OF DAMAGE TO EXISTING PUBLIC AND/OR PRIVATE UTILITIES, THE AGENCY CONCERNED SHALL BE NOTIFIED IMMEDIATELY AND ALL REPAIR WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE RESPECTIVE AGENCY AT NO ADDITIONAL EXPENSE TO THE CITY INCLUDING ANY INSPECTION FEES OR MAINTENANCE CREWS. CABLE (CEI, AT&T & TV) RELOCATION AND SUPPORT.
3. WHERE EXISTING POWER OR TELEPHONE POLES ARE IN CLOSE PROXIMITY TO WORK, THE CONTRACTOR SHALL COORDINATE HIS WORK EFFORTS WITH THOSE OF THE UTILITY COMPANIES SUCH THAT THEIR EXISTING FACILITIES CAN BE MAINTAINED AND PROTECTED DURING THE TIME WORK IS GOING ON ADJACENT TO THE POLE. THE COST FOR ANY REQUIRED PROTECTION OR RELOCATION OF EXISTING POWER OR TELEPHONE POLES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND NOT BE THE RESPONSIBILITY OF THE CITY.
4. WHERE EXCAVATION CROSSES EXISTING UTILITIES, THE CONTRACTOR SHALL USE EXCAVATION TECHNIQUES AND EQUIPMENT TO EXPOSE SUCH CROSSINGS PRIOR TO INSTALLATION OF THE RELIEF SEWER.

THE UTILITY OWNERSHIPS ARE AS FOLLOWS:

DEPARTMENT OF PUBLIC SERVICES
35150 LAKESHORE BOULEVARD
EASTLAKE, OHIO 44095
PHONE: (440) 951-2200
KEVIN KOSTELNIK

THE ILLUMINATING COMPANY
6896 MILLER RD. - SUITE 101
BRECKSVILLE, OHIO 44141
PHONE: (440) 546-8748

AT&T
13630 LORAIN AVE.
CLEVELAND, OHIO 44111
PHONE: (216) 476-6142

LAKE COUNTY UTILITIES DEPARTMENT
105 MAIN STREET
PAINESVILLE, OHIO 44077
PHONE: (440) 350-2652
RANDALL J. ROTHLISBERGER

DOMINION EAST OHIO GAS
320 SPRINGSIDE DRIVE
SUITE 320
AKRON, OHIO 44333
PHONE: (330) 664-2409

TIME WARNER CABLE
1100 E. 222ND ST.
EUCLID, OHIO 44117
PHONE: (216) 531-6188

PROTECTION OF EXISTING UTILITIES AND PIPES

1. THE CONTRACTOR SHALL BE REQUIRED, AT HIS EXPENSE, TO DO EVERYTHING NECESSARY TO PROTECT, SUPPORT AND SUSTAIN ALL SANITARY SEWERS, STORM DRAINS, WATER, PROCESS OR GAS PIPES, SERVICE PIPES, ELECTRIC LIGHTS, POWER AND TELEPHONE POLES, CONDUIT AND OTHER FIXTURES LAID ACROSS OR ALONG THE SITE OF THE WORK. THE ENGINEER AS WELL AS THE COMPANY OR CORPORATION OWNING SAID PIPES, POLES OR CONDUITS MUST BE NOTIFIED OF THE SAME BY THE CONTRACTOR, BEFORE ANY SUCH FIXTURES ARE REMOVED OR DISTURBED. IN CASE ANY OF THE SAID SEWER, DRAIN, GAS, PROCESS OR WATER PIPES, SERVICE PIPES, ELECTRIC LIGHT, POWER AND TELEPHONE POLES, CONDUITS OR OTHER FIXTURES, IN OR OUTSIDE THE CONSTRUCTION LIMITS, ARE DAMAGED THEY SHALL BE REPAIRED BY THE AUTHORITIES HAVING CONTROL OF THE SAME AND THE EXPENSE OF SAID REPAIRS SHALL BE DEDUCTED FROM THE MONIES WHICH ARE DUE OR TO BECOME DUE THE CONTRACTOR UNDER THIS CONTRACT.
2. SHOULD IT BECOME NECESSARY TO CHANGE THE POSITION OR TEMPORARILY REMOVE ANY STORM DRAIN, SANITARY SEWER, ELECTRIC CONDUITS, WATER PIPES, GAS PIPES, PROCESS OR OTHER PIPES OR WIRES IN ORDER TO PERMIT THE CONTRACTOR TO USE A PARTICULAR METHOD OF CONSTRUCTION OR IN ORDER TO CLEAR THE STRUCTURES BEING BUILT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF THE LOCATION AND CIRCUMSTANCES IMMEDIATELY
3. NO SURFACE, GROUND OR TRENCH WATER SHALL BE ALLOWED TO FLOW INTO EXISTING SANITARY SEWERS.
4. CONTRACTOR SHALL MAINTAIN FLOW THROUGH THE EXISTING BYPASS AS IS PRACTICAL. WHERE WORK IS PARTIALLY COMPLETE NECESSITATING TRENCH ABANDONMENT IN THE EVENT OF STORM EVENT CONTRACTOR SHALL STABILIZE EXCAVATION AND PROTECT THE UNFINISHED WORK. CONTRACTOR SHALL SUBMIT SUCH A PLAN FOR ENGINEER REVIEW.

EXCAVATION AND COMPACTION REQUIREMENT

1. THE SOIL BORING REPORT IS AVAILABLE FOR REVIEW.
2. THE OWNER AND ENGINEER DO NOT GUARANTEE THE SUITABILITY OR SUGGEST THAT THE EXISTING EXCAVATED MATERIAL IN ITS PRESENT STATE WILL CONSIST OF THE PROPER MOISTURE CONTENT TO ACHIEVE THE REQUIRED COMPACTION ON WITHOUT DRYING OR ADDING WATER TO THE MATERIAL UPON REQUEST THE OWNER WILL PROVIDE ACCESS TO THE SITE FOR THE CONTRACTOR TO CONDUCT SUCH INVESTIGATIONS AND TESTS DEEMED NECESSARY TO MAKE HIS DETERMINATION, ALL EXCAVATION, TRENCHING, AND COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH 310000.
3. THE ENGINEER SHALL DETERMINE THE DEPTH OF THE COMPACTED LAYERS OF BACKFILL ACCORDING TO THE COMPACTION EQUIPMENT BEING USED BY THE CONTRACTOR. THEY MAY ORDER THE REMOVAL, REFILLING, RECOMPACTION AND RETESTING OF ALL BACKFILL NOT MEETING THE REQUIREMENTS OF THE CONTRACT.

MATERIAL DISPOSAL AND TEMPORARY SURFACES

1. THE REMOVAL AND DISPOSAL OF ALL SURPLUS EXCAVATED MATERIAL AND CONSTRUCTION DEBRIS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR THE DISPOSAL OF ALL CONSTRUCTION DEBRIS SHALL BE AT AN APPROVED LANDFILL THE DISPOSAL OF ALL "CLEAN" WASTE MATERIAL SHALL BE AT APPROVED LANDFILL, AND/OR OTHER SITES APPROVED BY THE OWNER AND ENGINEER, THE DISPOSAL OF EXISTING PIPELINE AND TANK SEDIMENTS AND WASTEWATER SLUDGE SHALL BE AT AN APPROVED LANDFILL. THE CONTRACTOR SHALL OBTAIN ALL APPROVAL, PERMITS, LICENSES, ETC. FROM LOCAL STATE AND FEDERAL AGENCIES AND/OR PRIVATE LANDOWNERS. THE CONTRACTOR SHALL FURNISH THE ENGINEER A COPY OF ALL APPROVALS OR WRITTEN PERMISSION PRIOR TO DISPOSING OF ANY WASTE AT SAID SITE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE RESTORATION OF ALL MATERIAL WASTE AND TEMPORARY STORAGE AREAS USED IN THE COURSE OF THIS CONTRACT. THE RESTORATION WORK SHALL INCLUDE CLEANUP, SHAPING AND GRADING AND ESTABLISHMENT OF VEGETATIVE COVER BY SEEDING AND MULCHING IN ACCORDANCE WITH O D.O.T. SPEC FICTION NO. 559 THE FINAL GRADING OF WASTE AREAS SHALL BE PROPERLY SLOPED TO PROVIDE DRAINAGE RUNOFF.
3. TEMPORARY SURFACES WHERE EXCAVATION IS LOCATED IN STREETS, DRIVES AND PARKING AREAS SHALL BE FURNISHED AND PLACED BY THE CONTRACTOR (PER TEMPORARY SURFACE DETAIL) AND SHALL BE FULLY MAINTAINED TO MINIMIZE INCONVENIENCE TO THE PUBLIC AT NO ADDITIONAL COST TO THE OWNER.
4. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL UNUSED EXCAVATIONS SO THAT THE ORIGINAL SITE CONTOURS ARE PRESERVED UNLESS NOTED OTHERWISE. WASTING ON SITE SHALL NOT BE ANTICIPATED.
5. DUMP BITES MUST BE APPROVED BY THE OWNER AND THE ENGINEER

MONUMENTS, PROPERTY CORNERS AND BENCH MARKS

1. MONUMENTS, PROPERTY CORNER MARKERS AND BENCH MARKS SHALL NOT BE DISTURBED BY THE CONTRACTOR. IN THE EVENT THAT IT IS NECESSARY TO REMOVE MONUMENTS, PROPERTY CORNER MARKERS OR BENCH MARKS FOR THE CONSTRUCTION OF THE WORK, THE CONTRACTOR SHALL HAVE A REGISTERED LAND SURVEYOR PROPERLY REFERENCE THE POINTS AND SHALL HAVE SAME RESET AFTER THE CONSTRUCTION HAS PASSED THE AREA.

CLEARING AND GRUBBING

1. THE CONTRACTOR SHALL INCLUDE ALL NECESSARY PRECAUTIONS TO PROTECT AND SAVE ALL TREES WHICH ARE ADJACENT TO THE LINE OF WORK AND SHALL REMOVE ONLY THOSE TREES WHICH ARE DESIGNATED FOR REMOVAL ON THE PLANS OR DIRECTED BY THE ENGINEER. TREE ROOTS AND OVERHANGING BRANCHES SHALL BE CUT, EXCEPT WITH SPECIAL PERMISSION OF THE ENGINEER. WHEN REQUIRED, THE CUTTING OF ROOTS AND BRANCHES SHALL BE DONE IN A MANNER TO LEAVE A SMOOTH END WITHOUT SPLITTING OR CRUSHING. THE CUT END SHALL BE NEATLY TRIMMED. ALL DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN EXPENSE TO THE SATISFACTION OF THE ENGINEER. WHERE MISCELLANEOUS SMALL TREES AND SHRUBS ARE NOTED TO BE REMOVED AND RESET, THE COST OF SUCH WORK SHALL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT.
2. IF THE PROJECT IS LOCATED WITHIN THE RANGE OF THE FEDERALLY-ENDANGERED INDIANA BAT (MYOTIS SODALIS) AND TREES MUST BE CUT, THIS MUST OCCUR BETWEEN SEPTEMBER 30 AND APRIL 1. INDIANA BATS ARE HIGHLY-DEPENDENT UPON TREES INCLUDING DEAD AND DYING TREES OF SPECIES WITH EXFOLIATING BARK, CREVICES, OR CAVITIES IN UPLAND AREAS OR RIPARIAN CORRIDORS AND LIVING TREES OF THE SPECIES LISTED ABOVE WITH EXFOLIATING BARK, CAVITIES, OR HOLLOW AREAS FORMED FROM BROKEN BRANCHES OR TOPS. IF SUITABLE TREES MUST BE CUT DURING THE PROHIBITED TIME PERIOD, A NET SURVEY MUST BE CONDUCTED TO DETERMINE THE PRESENCE OR ABSENCE OF INDIANA BATE PRIOR TO CUTTING.

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NO	REVISION	DATE

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DRAWN BY:	CAS
CHECKED BY:	RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

GENERAL - 00 SERIES

GENERAL NOTES

PROJECT NO.
230264

DISCIPLINE
GENERAL

SHEET NAME
00-G-04

SHEET 4 OF 28

TREES/VEGETATION PROTECTION

1. TREE REMOVAL WILL BE LIMITED TO THAT NECESSARY FOR CONSTRUCTION AND WILL BE LIMITED FURTHER TO THE PERMANENT EASEMENT WHENEVER POSSIBLE.
2. SOIL AND OTHER MATERIAL WILL NOT BE STORED NEXT TO OR WITHIN THE DRIP-LINE OF TREES.

USE OF ROADS

1. ALL PROJECT VEHICLES, INCLUDING THOSE HAULING EQUIPMENT AND/OR MATERIALS TO OR FROM THE SITE SHALL UTILIZE STATE ROUTES ONLY. THE USE OF LOCAL ROADS BY THE CONTRACTOR IS PROHIBITED.

EXCAVATION PUMPING AND DEWATERING

1. CONVEY ANY TURBID WATER REMOVED FROM EXCAVATIONS IN A CLOSED CONDUIT TO A SETTLING POND OR FILTERING DEVICE, BEFORE RELEASE FROM THE CONSTRUCTION SITE OR ASSOCIATED DISTURBED AREAS. DO NOT USE TRENCH EXCAVATIONS AS TEMPORARY DRAINAGE CHANNELS.
2. PRIOR TO INSTALLING GROUNDWATER DEWATERING WELLS, CONTACT THE OHIO DEPARTMENT OF NATURAL RESOURCES, DIVISION OF WATER (614-265-6740) FOR REPORTING REQUIREMENTS AND ABANDONMENT OF DEWATERING WELLS.
3. GROUNDWATER WHICH DOES NOT CONTAIN SEDIMENT OR OTHER POLLUTANTS IS NOT REQUIRED TO BE TREATED PRIOR TO DISCHARGE FROM THE CONSTRUCTION SITE. SEDIMENT FREE WATER SHALL NOT BE DIRECTED TO THE CONSTRUCTION STORM WATER TREATMENT SYSTEM.
4. DISCHARGE SEDIMENT FREE GROUNDWATER TO STABILIZED SITES, SUCH AS UNCUT GRASSED SWALES, STREAMS OR STORM SEWERS. DO NOT DISCHARGE FLOWS ONTO DISTURBED AREAS, EXPOSED SOILS IN DRAINAGES OR STREAM BANKS, OR ANY OTHER SITE WHERE THE FLOW COULD CAUSE EROSION.
5. WRITTEN PERMISSION OF THE PROPERTY OWNER AND THE CONSENT OF THE ENGINEER MUST BE OBTAINED TO RUN WELL POINT OR PUMP DISCHARGE LINES THROUGH PRIVATE PROPERTY, PUBLIC PROPERTY OR RIGHTS-OF-WAY.

PROHIBITED CONSTRUCTION ACTIVITIES

1. THE USE OF EXPLOSIVES WITHIN CITY LIMITS, UNLESS A PERMIT IS ISSUED BY THE CITY.
2. PUMPING OF SEDIMENT-LADEN WATER FROM TRENCHES OR OTHER EXCAVATIONS DIRECTLY INTO ANY SURFACE WATERS, STREAM CORRIDORS, OR STORM SEWERS; ALL SUCH WATER WILL BE PROPERLY FILTERED OR SETTLED TO REMOVE SILT PRIOR TO RELEASE.
3. DISCHARGING POLLUTANTS SUCH AS CHEMICALS, FUELS, LUBRICANTS, BITUMINOUS MATERIALS, RAW SEWAGE, OR ANY OTHER HARMFUL WASTE INTO OR ALONGSIDE OF RIVERS, STREAMS, IMPOUNDMENTS OR INTO NATURAL OR MAN-MADE CHANNELS LEADING THERETO:
4. OPEN BURNING OF PROJECT DEBRIS WITHOUT A PERMIT.
5. STORING CONSTRUCTION EQUIPMENT AND VEHICLES AND/OR STOCKPILING CONSTRUCTION MATERIALS ON PROPERTY, PUBLIC OR PRIVATE, NOT PREVIOUSLY SPECIFIED ON THE PLANS BY THE ENGINEER FOR SUCH PURPOSES;
6. RUNNING WELL POINT OR PUMP DISCHARGE LINES THROUGH PRIVATE OR PUBLIC PROPERTY AND RIGHTS-OF-WAY WITHOUT PERMISSION OF THE PROPERTY OWNER AND THE CONSENT OF THE ENGINEER;
7. OPERATION ENTAILING THE USE OF VIBRATORY HAMMERS OR COMPACTORS OUTSIDE THE THE HOURS OF 8:00 AM AND 5:00 PM OR OUTSIDE THE HOURS ALLOWED BY LOCAL ORDINANCES OR REGULATIONS;
8. CLOSING OFF CLEAR ACCESS TO ANY PUBLIC ALLEY, STREET, ROAD, AVENUE OR BOULEVARD WITHOUT THE PRIOR CONSENT OF MUNICIPAL OFFICIALS AND THE ENGINEER AND CLOSING CLEAR ACCESS:

   - BY FIRE PROTECTION EQUIPMENT AND EMERGENCY VEHICLES;

   - BY THE PUBLIC TO ANY COMMERCIAL OR PROFESSIONAL PLACE OF BUSINESS, QUASI-PUBLIC OR PUBLIC ESTABLISHMENT, OR PLACE OF RESIDENCE

   - BY VEHICLES TO DRIVEWAYS WITHOUT THE PROVISION OF ALTERNATIVE MEANS OF BUILDING INGRESS AND EGRESS.

SANITARY BYPASS PUMPING

1. BYPASS PUMPING SHALL BE PROVIDED WHENEVER FLOW IN ANY SEWER IS DISRUPTED BY THE CONSTRUCTION OF NEW SEWER REPLACEMENTS, LATERALS, MANHOLES, OR ASSOCIATED ACTIVITIES.
2. CONTRACTOR SHALL PROVIDE A DETAILED BYPASS PUMPING PLAN AND SCHEDULE TO THE CITY FOR REVIEW PRIOR TO BEGINNING ANY WORK.
3. BYPASS PUMPING IS REQUIRED WHENEVER FLOW IN ANY SEWER IS DISRUPTED BY THE CONSTRUCTION OR REPLACEMENT OF NEW SEWER SEGMENTS, LATERALS, MANHOLES,OR ASSOCIATED ACTIVITIES. BYPASSING OF SEWERS MUST PROVIDE FOR POTENTIAL FLOWS THAT MAY TYPICALLY BE EXPECTED DURING THE SEASON THAT THE WORK IS IN PROGRESS, INCLUDING RAINFALL AND PEAK FLOW EVENTS.
4. METERING OF FLOWS HAS NOT BEEN PERFORMED. THE CONTRACTOR MAY ASSUME FULL PIPE CONDITIONS FOR SIZING BYPASS PUMPING REQUIREMENTS.
5. BECAUSE OF THE HIGH FLOWS POSSIBLE IN THESE SEWERS, THE CONTRACTOR SHALL HAVE A CONTINGENCY PLAN TO PREVENT DAMAGE DURING HIGH FLOWS. THE CITY WILL NOT BE RESPONSIBLE FOR DAMAGES DUE TO HIGH FLOWS.
6. CONTRACTOR SHALL REVIEW AND COORDINATE WITH THE MAINTENANCE OF TRAFFIC PLANS PRIOR TO SUBMITTING THE BYPASS PUMPING PLAN.
7. PUMPS SHALL BE FULL AUTOMATIC, SELF PRIMING PUMPS. PUMPS AND GENERATORS, IF APPLICABLE, SHALL BE CRITICALLY SILENCED. ALL SUCTION AND DISCHARGE PIPING SHALL BE FREE OF LEAKS.
8. ACCESS TO ALL RESIDENCES AND BUSINESSES SHALL BE MAINTAINED AT ALL TIMES, INCLUDING ACCESS FOR MAIL, SCHOOL, POLICE, FIRE, AND EMERGENCY VEHICLES.
9. PRIOR TO NOTIFICATION OF SHORT DURATION INTERRUPTIONS TO SERVICE SHALL BE COORDINATED A MINIMUM OF 48 HOURS IN ADVANCE, EXCLUDING WEEKENDS AND HOLIDAYS, WITH THE CITY AND ALL AFFECTED RESIDENTS AND BUSINESSES.

SANITARY SEWER NOTES

1. SANITARY SEWERS SHALL MAINTAIN A MINIMUM OF 18" VERTICAL AND 10' HORIZONTAL FROM ANY WATER MAIN.
2. SANITARY SEWER MUST BE A MINIMUM OF 4' HORIZONTALLY, MEASURED EDGE-TO-EDGE, FROM STORM SEWERS AND GAS LINES AND MUST MAINTAIN A MINIMUM 18" VERTICAL CLEARANCE AT ANY UTILITY LINE.
3. SANITARY SEWER AND MANHOLE TESTING REQUIREMENTS:
   - LEAKAGE TESTING SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH SPECIFICATION SECTION 013319 AND RSFW 33.93 AND 33.94.
   - DEFLECTION TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 013319 AND RSFW 33.85.
   - MANHOLES SHALL BE VACUUM TESTED IN ACCORDANCE WITH SPECIFICATION SECTION 013319 AND RSFW 34.7.
4. TRENCHING, BEDDING, AND BACKFILL SPECIFICATIONS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 333100 AND CONSTRUCTION DETAILS.
5. SANITARY SEWER FOR OPEN CUT SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 331100.
6. CONTRACTOR SHALL INSTALL DROP STRUCTURES IF INVERTS ARE MODIFIED AND PIPE INLET INVERT ABOVE THE MANHOLE INVERT IS 24" OR GREATER.
7. WHEN EMPTY DURING CONSTRUCTION, THE STRUCTURES MAY BECOME BUOYANT. IN THE EVENT THAT THE EXCAVATIONS BECOME FLOODED, THE STRUCTURES MUST BE FILLED WITH WATER TO PREVENT FLOTATION OR THE EXCAVATION IS TO BE KEPT DEWATERED.

MAINTENANCE OF TRAFFIC

1. IT IS THE CONTRACTORS RESPONSIBILITY TO MAINTAIN PEDESTRIAN AND LOCAL ROADWAY ACCESS AT ALL TIMES. THE CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY STONE DRIVES WITH A MATERIAL WHICH IS APPROVED IN WRITING BY THE ENGINEER. THE CONTRACTOR SHALL INSTALL TEMPORARY TRENCH TOPPING(SEE DETAIL) IN ALL ROADS AS PART OF THE BACKFILLING OPERATION. THE TEMPORARY PAVEMENT AND STONE DRIVES SHALL BE MAINTAINED TO THE SATISFACTION OF THE ENGINEER. COST FOR ALL MATERIALS, LABOR AND EQUIPMENT FOR CONSTRUCTION MAINTENANCE AND SUBSEQUENT REMOVAL SHALL BE INCLUDED IN THE UNIT PRICES FOR ALL ITEMS OF THE PROPOSAL.
2. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE "OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES". AS A MINIMUM THE CONTRACTOR SHALL SUBMIT A PROPOSED TRAFFIC CONTROL PLAN FOR REVIEW AND ACCEPTANCE BY THE ENGINEER PRIOR TO BEGINNING WORK.
3. ACCESS MUST BE MAINTAINED FOR RESIDENCES, EMERGENCY VEHICLES AND PEDESTRIANS, INCLUDING PERSONS WITH DISABILITIES, AT ALL TIMES.
4. AT ALL EXCAVATION LOCATIONS THE CONTRACTOR SHALL PROVIDE SUITABLE FLASHERS, BARRICADES, AND TRAFFIC CONTROL DEVICES AS DEEMED NECESSARY BY THE ENGINEER AND IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
5. THE CONTRACTOR SHALL PHASE CONSTRUCTION SUCH THAT AT A MINIMUM, ONE ACCESS LANE IS AVAILABLE FOR LOCAL VEHICULAR TRAFFIC. THE PAVEMENT SURFACE SHALL HAVE A UNIFORM SURFACE TO THE SATISFACTION OF THE OWNER. THE SAME ACCESS SHALL BE MAINTAINED TO ALL DRIVEWAYS. ALL OTHER AREAS SHALL BE CLOSED TO TRAFFIC WITH SIGNS AND BARRICADES TO ODOT STANDARDS. THE SURFACES SHALL CONSIST OF THE FOLLOWING MATERIALS:
   - EXISTING PAVEMENT SURFACE.
   - ODOT 304 LIMESTONE TEMPORARY TRENCH TOPPING

NOISE CONTROL AND AIR POLLUTION PRACTICES AND REQUIREMENTS

1. CONSTRUCTION ACTIVITIES WILL BE LIMITED TO WEEKDAY DAYTIME HOURS, UNLESS APPROVED IN ADVANCE BY THE OWNER.
2. CONSTRUCTION EQUIPMENT WILL BE PROVIDED WITH INTAKE SILENCERS AND MUFFLERS, AS REQUIRED BY SAFETY STANDARDS.
3. PERIODICALLY CHECK EQUIPMENT AND MACHINERY FOR PROPER TUNING TO MINIMIZE EXHAUST EMISSIONS AND NOISE.
4. ALL CONSTRUCTION VEHICLES SHOULD BE EQUIPPED WITH PROPER EMISSIONS CONTROL EQUIPMENT.
5. UNPAVED AREAS WILL BE WET DOWN (AS NECESSARY) DAILY OR AS NECESSARY DURING CONSTRUCTION TO MINIMIZE DUST GENERATION.
6. STREET SWEEPING WILL BE REQUIRED ON A WEEKLY BASIS FOR DUST CONTROL. NO SEPARATE PAYMENT SHALL BE MADE.

EROSION AND SEDIMENT CONTROL

1. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING AN APPROVED EROSION CONTROL AND STORMWATER POLLUTION CONTROL PLAN FOR ALL IMPROVEMENTS. THIS SHALL INCLUDE SUBMITTAL OF A NOTICE OF INTENT PERMIT TO OHIO EPA. THIS SHALL BE INCLUDED AS A PART OF THE WORK DETAILED WITHIN THE CONTRACT AND NO ADDITIONAL PAYMENT SHALL BE MADE.
2. ALL MATERIALS TO BE DISPOSED OF OFF-SITE MUST BE DISPOSED OF IN AN ENVIRONMENTALLY SOUND MANNER IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS AT A SITE APPROVED BY THE ENGINEER. NO EXCESS MATERIALS ARE TO BE DISPOSED OF IN ANY WETLAND, FLOODPLAIN, SURFACE WATER, OR OTHER ENVIRONMENTALLY SENSITIVE AREAS. EROSION CONTROL MEASURES AT THE DISPOSAL SITE MUST BE INSTALLED AND MAINTAINED UNTIL DISPOSAL IS COMPLETE AND THE DISPOSAL SITE IS PERMANENTLY STABILIZED. GIVING EXCAVATED SOIL AWAY DOES NOT RELIEVE THE CONTRACTOR OR ENGINEER OF THIS RESPONSIBILITY.
3. PROPERLY INSTALL EROSION CONTROLS (E.G., SILT FENCES, STRAW BALES, ETC.) ON SLOPES, ALONG STREAMS AND DRAINAGE WAYS, AROUND DRAINAGE STRUCTURES, WETLANDS AND ANYWHERE ELSE THAT EXPOSED SOIL COULD RUN OFF. ALL SEDIMENT CONTROL MEASURES SHALL BE IN PLACE PRIOR TO STARTING CONSTRUCTION.
4. NO MORE THAN 200 FEET OF TRENCH SHALL BE OPEN AT ANY GIVEN TIME. TRENCH OPENING, PIPE LAYING, AND BACKFILLING SHOULD OCCUR SO AS TO MINIMIZE THE AMOUNT OF DISTURBED AREA.

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

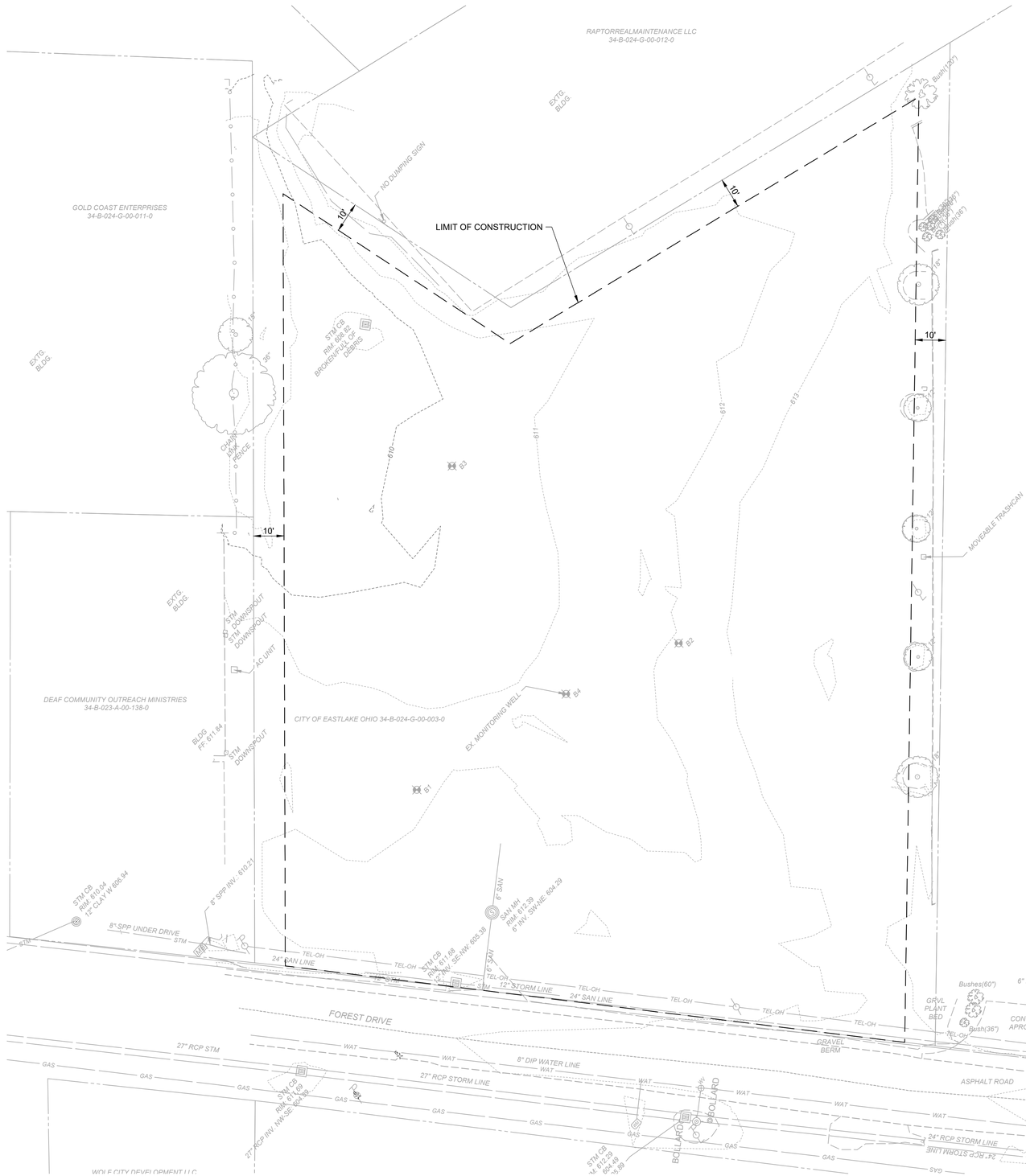
NO	REVISION	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	N/A
DESIGNED BY:	CAS
DRAWN BY:	CAS
CHECKED BY:	RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

GENERAL - 00 SERIES
GENERAL NOTES

PROJECT NO.
230264
DISCIPLINE
GENERAL
SHEET NAME
00-G-05
SHEET 5 OF 28



PLAN VIEW

20 0' 20

SCALE: 1" = 20'

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED
PROFESSIONAL ENGINEER

verdantas

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MENTOR, OHIO 44060
(440) 951-9000

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CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY — WILLOUGHBY, OHIO

SITE IMPROVEMENT - 01 SERIES

EXISTING SITE PLAN

PROJECT NO.	
230264	
DISCIPLINE	
CIVIL	
SHEET NAME	
01-C-01	
SHEET	OF
6	28

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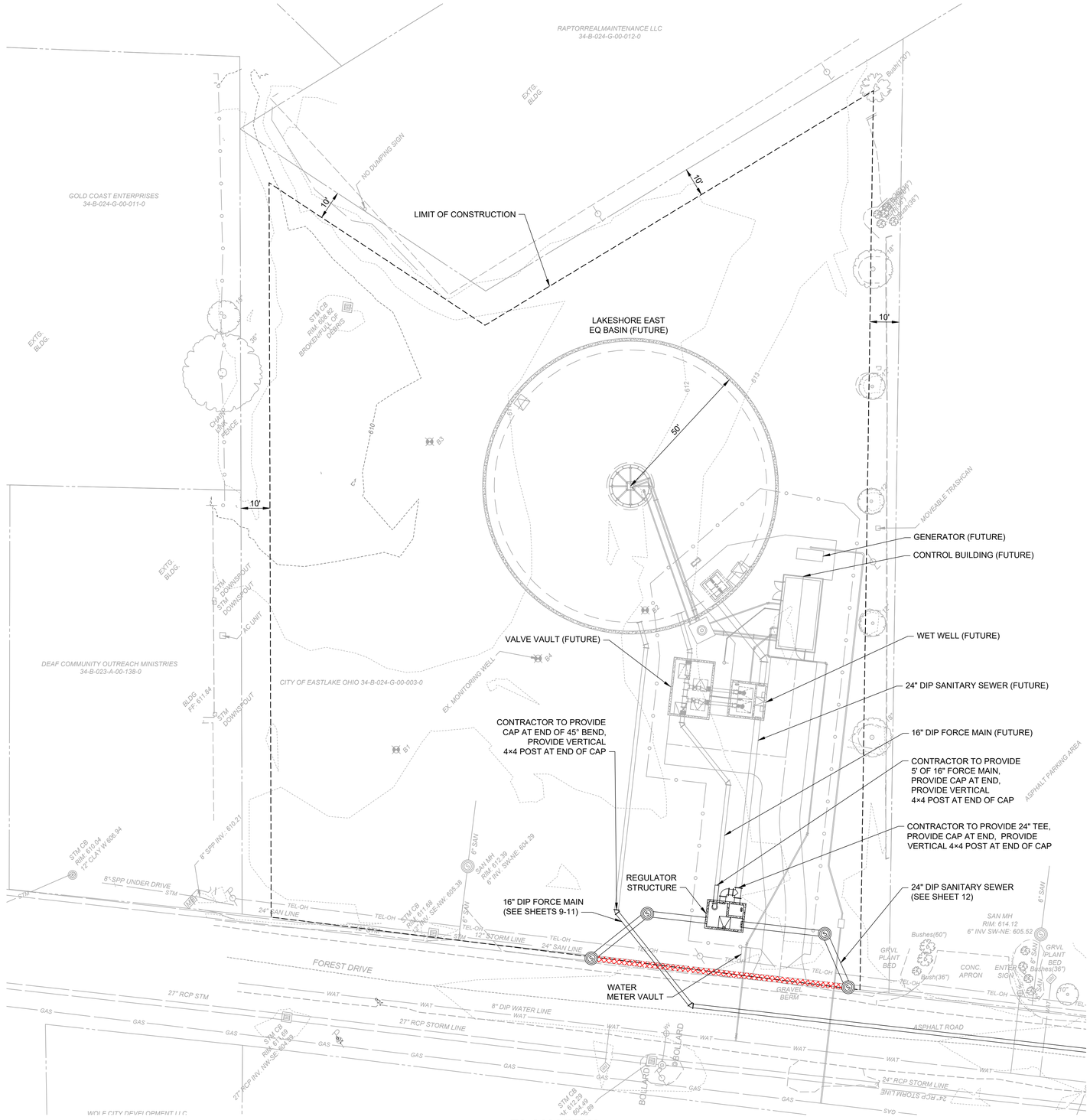

PLAN VIEW

LEGEND

ABANDON IN PLACE

20 0' 20

SCALE: 1" = 20'

verdantas

8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED PROFESSIONAL ENGINEER

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CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I

WILLOUGHBY, OHIO

LAKE COUNTY

SITE IMPROVEMENT - 01 SERIES

PROPOSED UTILITY PLAN

PROJECT NO.	230264
DISCIPLINE	CIVIL
SHEET NAME	01-C-02
SHEET	7
OF	28

PLAN VIEW

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8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED PROFESSIONAL ENGINEER

NO	REVISION	DATE

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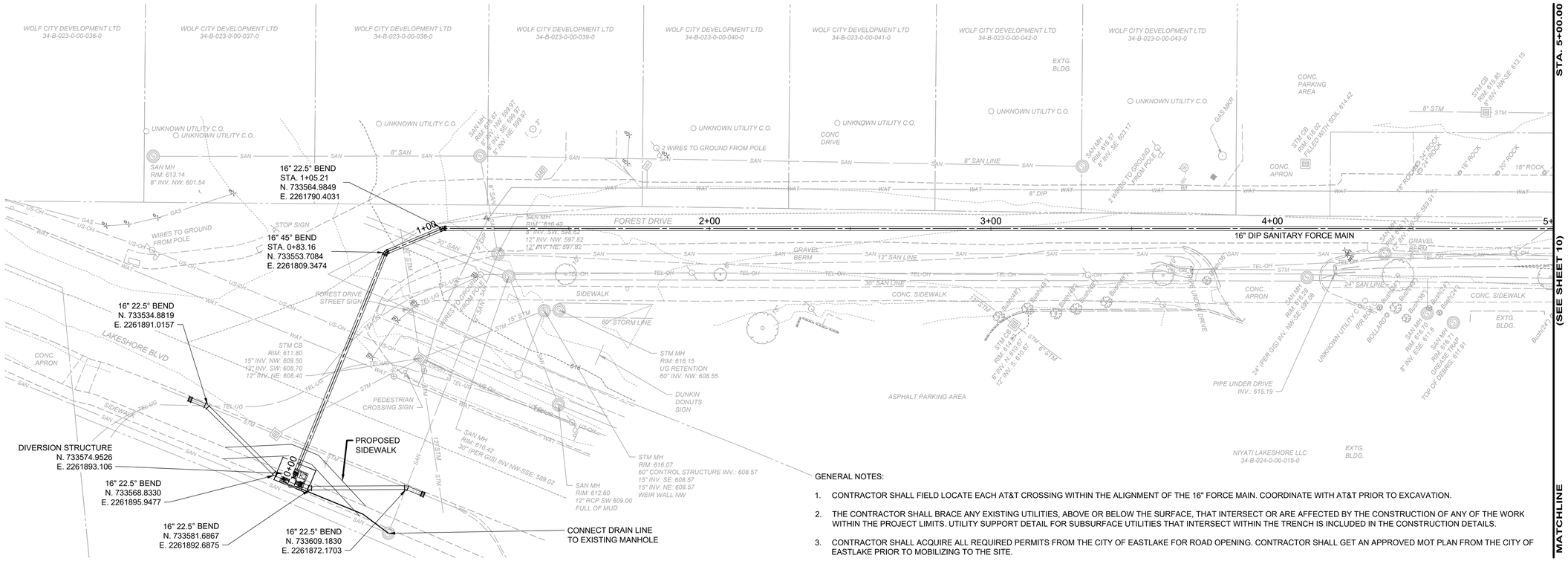
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I

LAKE COUNTY WILLOUGHBY, OHIO

SITE IMPROVEMENT - 01 SERIES

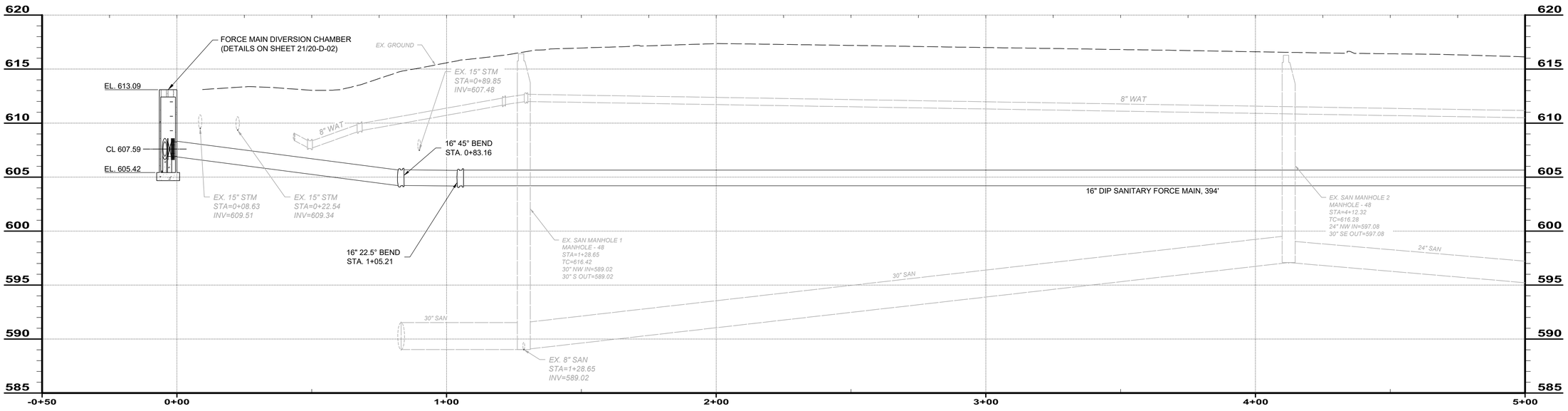
PROPOSED SITE PLAN

PROJECT NO.	230264
DISCIPLINE	CIVIL
SHEET NAME	01-C-03
SHEET	8
OF	28



GENERAL NOTES:

1. CONTRACTOR SHALL FIELD LOCATE EACH AT&T CROSSING WITHIN THE ALIGNMENT OF THE 16" FORCE MAIN. COORDINATE WITH AT&T PRIOR TO EXCAVATION.
2. THE CONTRACTOR SHALL BRACE ANY EXISTING UTILITIES, ABOVE OR BELOW THE SURFACE, THAT INTERSECT OR ARE AFFECTED BY THE CONSTRUCTION OF ANY OF THE WORK WITHIN THE PROJECT LIMITS. UTILITY SUPPORT DETAIL FOR SUBSURFACE UTILITIES THAT INTERSECT WITHIN THE TRENCH IS INCLUDED IN THE CONSTRUCTION DETAILS.
3. CONTRACTOR SHALL ACQUIRE ALL REQUIRED PERMITS FROM THE CITY OF EASTLAKE FOR ROAD OPENING. CONTRACTOR SHALL GET AN APPROVED MOT PLAN FROM THE CITY OF EASTLAKE PRIOR TO MOBILIZING TO THE SITE.
4. FORCE MAIN SHALL BE CONSTRUCTED FLAT OR SLOPED DOWNWARD TO THE TANK TO ALLOW FOR DRAINING OF THE FORCE MAIN AWAY FROM THE DIVERSION STRUCTURE.
5. CONTRACTOR SHALL FILL TRENCH ACROSS LAKESHORE BOULEVARD WITH FLOWABLE FILL, FLUSH WITH EXISTING PAVEMENT. LIMITS OF FLOWABLE FILL IS WITHIN THE RIGHT-OF-WAY OF LAKESHORE BOULEVARD.



16" FORCE MAIN 0+00 - 5+00 (PHASE I)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

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STATE OF OHIO
RYAN S. SCHUSTER
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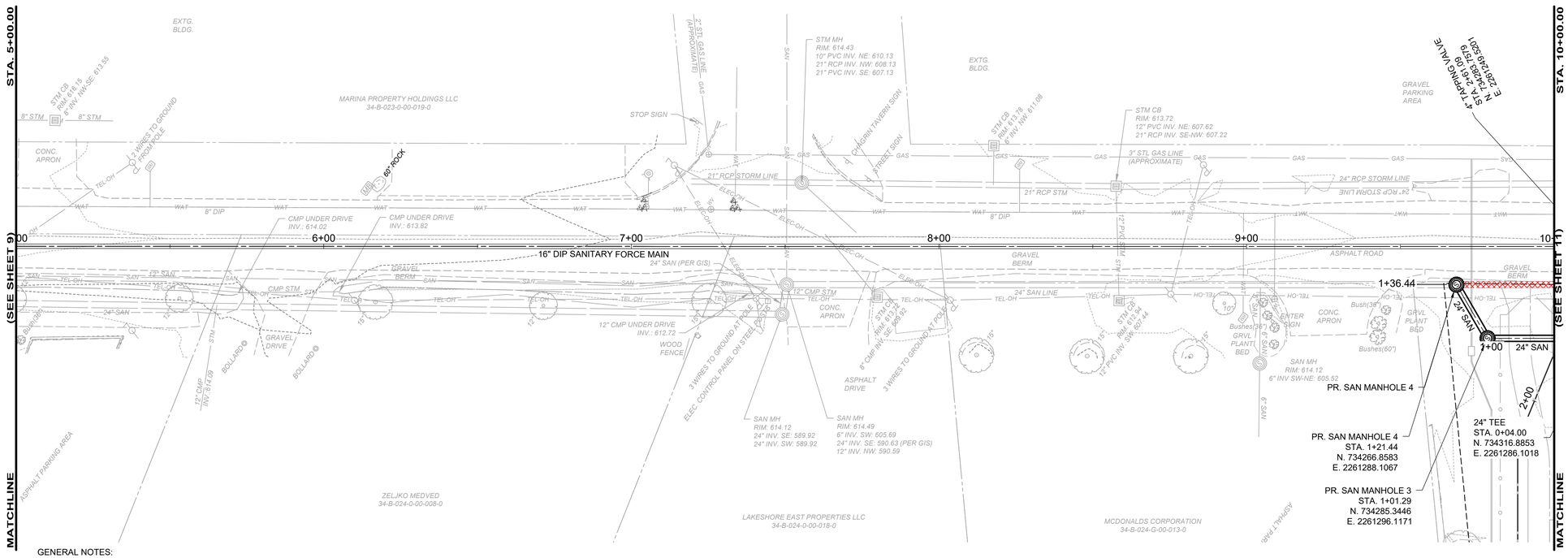
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

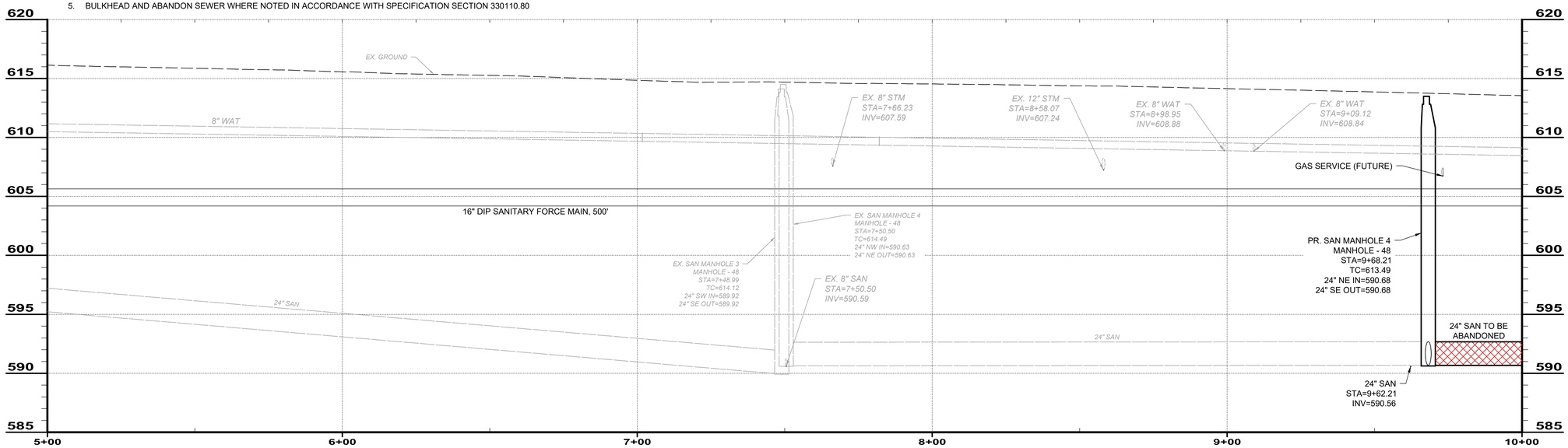
SITE IMPROVEMENT - 01 SERIES
16" FORCE MAIN PLAN & PROFILE STA 0+00 - 5+00

PROJECT NO.	230264
DISCIPLINE	CIVIL
SHEET NAME	01-C-04
SHEET	9
OF	28



GENERAL NOTES:

1. THE CONTRACTOR SHALL BRACE ANY EXISTING UTILITIES, ABOVE OR BELOW THE SURFACE, THAT INTERSECT OR ARE AFFECTED BY THE CONSTRUCTION OF ANY OF THE WORK WITHIN THE PROJECT LIMITS. UTILITY SUPPORT DETAIL FOR SUBSURFACE UTILITIES THAT INTERSECT WITHIN THE TRENCH IS INCLUDED IN THE CONSTRUCTION DETAILS.
2. CONTRACTOR SHALL ACQUIRE ALL REQUIRED PERMITS FROM THE CITY OF EASTLAKE FOR ROAD OPENING. CONTRACTOR SHALL GET AN APPROVED MOT PLAN FROM THE CITY OF EASTLAKE PRIOR TO MOBILIZING TO THE SITE.
3. WORK ALONG LAKESHORE BOULEVARD AND FOREST DRIVE SHALL BE COMPLETED BY SEPTEMBER 30, 2025. TRENCHES SHALL BE PAVED PER TEMPORARY ROAD DETAILS.
4. FORCE MAIN SHALL BE CONSTRUCTED FLAT OR SLOPED TO THE TANK TO ALLOW FOR DRAINING OF THE FORCE MAIN.
5. BULKHEAD AND ABANDON SEWER WHERE NOTED IN ACCORDANCE WITH SPECIFICATION SECTION 330110.80



16" FORCE MAIN 5+00 - 10+00 (PHASE I)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

STATE OF OHIO
RYAN S. SCHUSTER
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8150 STERLING COURT
MENTOR, OHIO 44060
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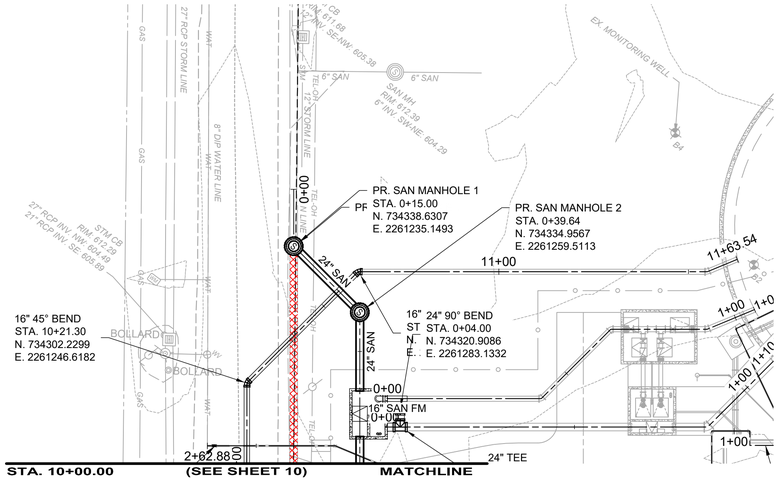
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

SITE IMPROVEMENT - 01 SERIES

16" FORCE MAIN PLAN & PROFILE STA 5+00 - 10+00

PROJECT NO. 230264
DISCIPLINE CIVIL
SHEET NAME 01-C-05
SHEET 10 OF 28

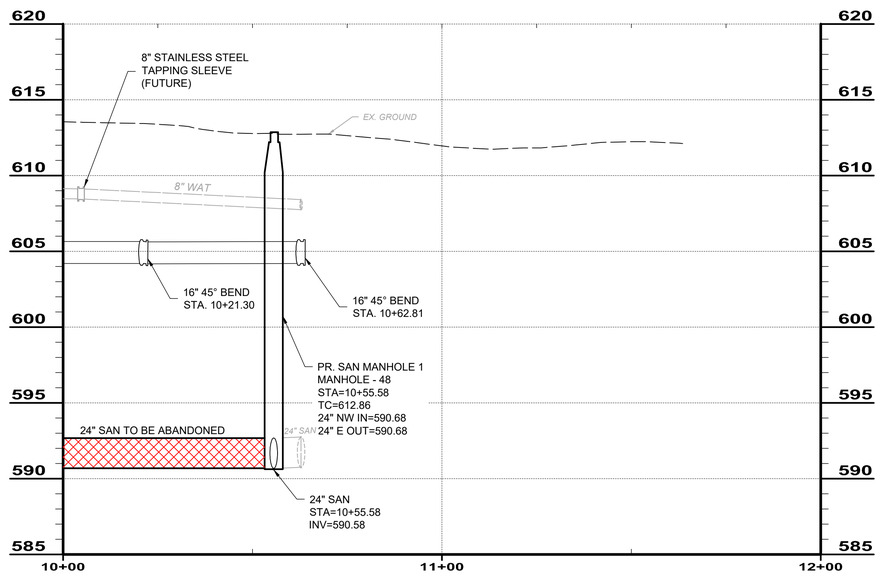


LEGEND

ABANDON IN PLACE

GENERAL NOTES:

1. THE CONTRACTOR SHALL BRACE ANY EXISTING UTILITIES, ABOVE OR BELOW THE SURFACE, THAT INTERSECT OR ARE AFFECTED BY THE CONSTRUCTION OF ANY OF THE WORK WITHIN THE PROJECT LIMITS. UTILITY SUPPORT DETAIL FOR SUBSURFACE UTILITIES THAT INTERSECT WITHIN THE TRENCH IS INCLUDED IN THE CONSTRUCTION DETAILS.
2. CONTRACTOR SHALL ACQUIRE ALL REQUIRED PERMITS FROM THE CITY OF EASTLAKE FOR ROAD OPENING. CONTRACTOR SHALL GET AN APPROVED MOT PLAN FROM THE CITY OF EASTLAKE PRIOR TO MOBILIZING TO THE SITE.
3. FORCE MAIN SHALL BE CONSTRUCTED FLAT OR SLOPED TO THE TANK TO ALLOW FOR DRAINING OF THE FORCE MAIN.



16" FORCE MAIN 10+00 - 12+00 (PHASE I)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

STATE OF OHIO
RYAN S. SCHUSTER
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CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

SITE IMPROVEMENT - 01 SERIES

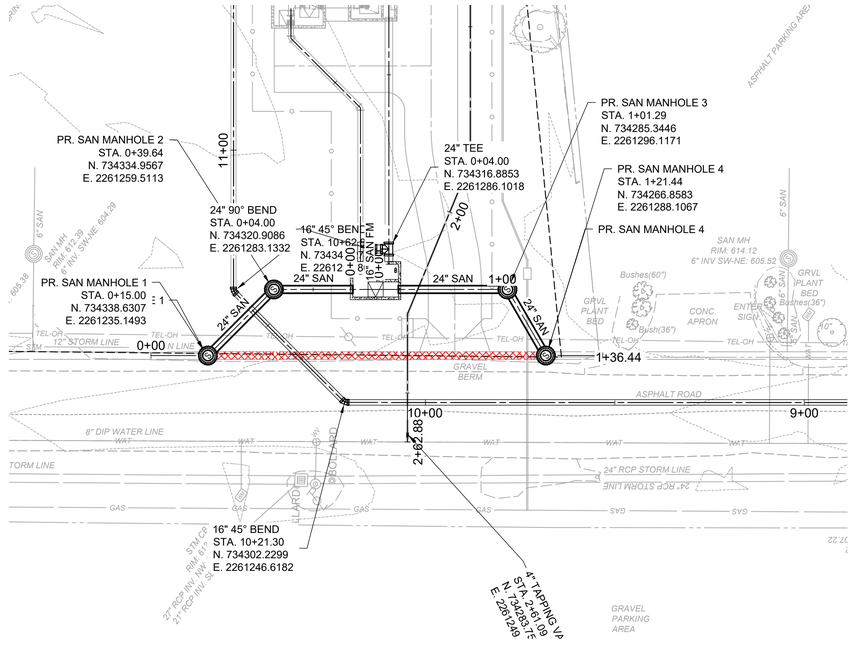
16" FORCE MAIN PLAN & PROFILE STA 10+00 - 12+00

PROJECT NO. 230264
DISCIPLINE CIVIL
SHEET NAME 01-C-06
SHEET 11 OF 28

GENERAL NOTES:

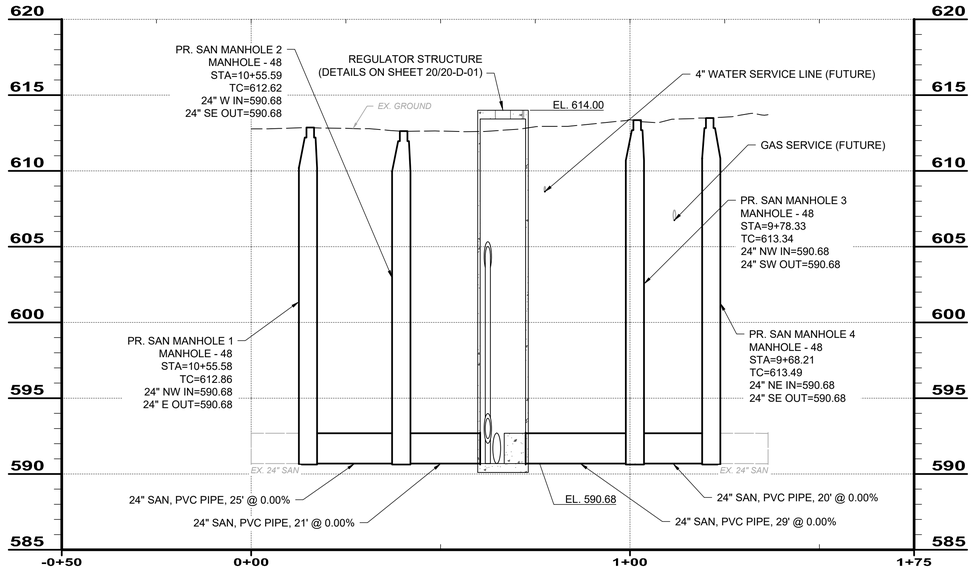
1. CONTRACTOR SHALL REPLACE UP TO 10' OF EXISTING 24" IN EITHER DIRECTION OF THE PROPOSED DIVERSION CHAMBER WITH NEW, 24" PVC OR PP PIPE THAT IS IN ACCORDANCE WITH SPECIFICATION 331100. THIS SHALL INCLUDE USING A FLEXIBLE, WATERTIGHT COUPLING TO JOIN THE EXISTING 24" TO THE NEW 24" SEWER.

2. THE CONTRACTOR SHALL BRACE ANY EXISTING UTILITIES, ABOVE OR BELOW THE SURFACE, THAT INTERSECT OR ARE AFFECTED BY THE CONSTRUCTION OF ANY OF THE WORK WITHIN THE PROJECT LIMITS. UTILITY SUPPORT DETAIL FOR SUBSURFACE UTILITIES THAT INTERSECT WITHIN THE TRENCH IS INCLUDED IN THE CONSTRUCTION DETAILS.



LEGEND

ABANDON IN PLACE



24" SANITARY SEWER REALIGNMENT (PHASE I)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED
PROFESSIONAL ENGINEER

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8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

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DRAWN BY:	CAS
CHECKED BY:	RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

SITE IMPROVEMENT - 01 SERIES

24" SANITARY SEWER REALIGNMENT PLAN & PROFILE

PROJECT NO.
230264

DISCIPLINE
CIVIL

SHEET NAME
01-C-07

SHEET 12 OF 28

GENERAL:

1. THE GENERAL NOTES AND TYPICAL DETAILS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY. THE WORK SHALL BE IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS, CONSTRUCTION SPECIFICATIONS AND THE LATEST EDITION OF THE APPLICABLE LOCAL AND STATE BUILDING CODES.
   A. WHERE CONFLICT IS FOUND TO EXIST BETWEEN THE SPECIFICATIONS AND THESE NOTES, THE REQUIREMENTS OF THE SPECIFICATIONS SHALL GOVERN.
   B. ALL WORK SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF THE OHIO BUILDING CODE LATEST EDITION) OR THESE DOCUMENTS - WHICHEVER IS MORE STRINGENT.

2. THESE NOTES ARE GENERAL REQUIREMENTS. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

3. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREINAFTER FOR USE ON THIS PROJECT.

4. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE CONTRACTOR SHALL CONTACT THE ARCHITECT/ENGINEER FOR CLARIFICATION.

5. TYPICAL DETAILS MAY NOT NECESSARILY BE CUT ON THE PLANS BUT APPLY UNLESS NOTED OTHERWISE.

6. SHOP DRAWINGS PREPARED BY SUPPLIERS AND SUBCONTRACTORS SHALL BE REVIEWED AND APPROVED BY THE GENERAL CONTRACTOR PRIOR TO SUBMISSION TO THE ENGINEER/ARCHITECT.

7. SHOP DRAWINGS PREPARED BY THE CONTRACTORS, SUPPLIERS, ETC., WILL BE REVIEWED BY THE ENGINEER/ARCHITECT ONLY FOR CONFORMANCE WITH DESIGN CONCEPT. NO WORK AFFECTED BY THE SHOP DRAWINGS SHALL BE STARTED WITHOUT SUCH REVIEW.

8. THE GENERAL CONTRACTOR SHALL COORDINATE ALL REVISIONS, CORRECTIONS, AND COMMENTS INDICATED ON THE SHOP DRAWINGS BY THE ARCHITECT/ENGINEER.

9. ALL DIMENSIONS AND ELEVATIONS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE VERIFIED BY THE CONTRACTOR AND SHALL CONFORM TO THOSE SHOWN ON THE ARCHITECTURAL DRAWINGS. DIMENSIONS AND ELEVATIONS MARKED "REF" ARE FOR REFERENCE ONLY AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO USING THEM FOR ANY CONSTRUCTION.

10. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.

11. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

12. ALL REQUIRED MATERIAL TESTING SHALL BE PERFORMED AT THE EXPENSE OF CONTRACTOR AND PERFORMED BY AN APPROVED TESTING AGENCY OR LABORATORY. TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

13. THE OWNER SHALL EMPLOY A TESTING AGENCY TO PERFORM SPECIAL INSPECTIONS. CONTRACTOR SHALL ADHERE TO THE STRUCTURAL QUALITY ASSURANCE PLAN AS PER SECTION 17 OF THE IBC 2018. THE CONTRACTOR SHALL COORDINATE WITH THE SPECIAL INSPECTOR.

14. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY WORK THAT IS DAMAGED OR IS NON-COMPLIANT IN ACCORDANCE WITH THE GOVERNING CODE OR AS INDICATED IN THE CONTRACT DOCUMENTS OR AS DEMEANED BY THE BUILDING OFFICIAL, ARCHITECT OR ENGINEER OF RECORD.

15. ALL STRUCTURES ARE DESIGNED TO BE STABLE AND SELF-SUPPORTING AT THE COMPLETION OF CONSTRUCTION. CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR THE DESIGN, ADEQUACY, AND SAFETY OF ERECTION BRACING, SHORING, AND TEMPORARY SUPPORTS OF THE STRUCTURE SO THAT IT WILL BE STABLE DURING ALL STAGES OF CONSTRUCTION. THE STRUCTURE IS DESIGNED FOR A COMPLETED CONDITION ONLY AND THEREFORE MAY REQUIRE ADDITIONAL SUPPORT TO MAINTAIN STABILITY BEFORE COMPLETION. PROVIDE TEMPORARY SHORING FOR EXISTING CONSTRUCTION UNTIL NEW CONSTRUCTION IS IN PLACE AND PROPERLY ANCHORED IN FINAL FORM.

16. BELOW GRADE CAST-IN-PLACE CONCRETE STRUCTURES SHALL NOT BE BACKFILLED UNTIL THE CONCRETE BASE SLAB, WALLS AND STRUCTURAL SLAB HAVE REACHED A 28 DAY CONCRETE STRENGTH (F'C = 4.5 KSI).
   A. EXCEPTION, TALL BELOW GRADE STRUCTURES MAY BE PARTIALLY BACKFILLED AFTER THE CONCRETE BASE SLAB AND WALLS HAVE REACHED A 28 DAY CONCRETE STRENGTH (F'C = 4.5 KSI). BACKFILL SHALL HELD BELOW THE TOP OF WALL BY AT LEAST TWICE THE WIDTH OR TWICE THE LENGTH OF THE LARGER DISTANCE. THE REMAINDER OF THE STRUCTURES SHALL NOT BE BACKFILLED UNTIL THE CONCRETE STRUCTURAL SLAB HAVE REACHED A 28 DAY CONCRETE STRENGTH (F'C = 4.5 KSI).

17. CAST-IN-PLACE CONCRETE STRUCTURAL SLAB(S) SHALL BE SHORED UNTIL THE STRUCTURAL SLAB HAS REACHED A 28 DAY CONCRETE STRENGTH (F'C = 4.5 KSI).

18. SHORING LOADS FOR EXISTING STRUCTURE ARE SHOWN IN THE DOCUMENTS. SHORING SHALL BE DESIGNED AND CERTIFIED BY AN ENGINEER LICENSED IN THE STATE OF OHIO.

19. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.

21. COORDINATE WITH THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR MISCELLANEOUS STEEL ITEMS, LINTELS, METAL PAN STAIRS, SIZE AND LOCATION OF FLOOR SLOPES, DEPRESSED AREAS, FINISH FILLS, CHAMFERS, GROOVES, RAILING SLEEVES, ROOF EDGES, INSERTS, ETC.

22. COORDINATE WITH CIVIL, MECHANICAL, PROCESS, AND ELECTRICAL DRAWINGS FOR PIPE SLEEVES, FLOOR DRAINS, ROOF DRAINS, INSERTS, HANGERS, TRENCHES, PITS, WALL AND SLAB OPENINGS, CONDUIT RUNS IN WALLS AND SLABS, SIZE AND LOCATION OF MACHINE OR EQUIPMENT SUPPORTS, BASE AND ANCHOR BOLTS, RAILING, ETC. THE CONTRACTOR SHALL PROVIDE THESE OPENINGS IN ACCORDANCE WITH THE OTHER CONTRACT DRAWINGS. REINFORCEMENT AROUND OPENINGS FOR NEW WALLS AND SLABS SHALL BE PER THE STANDARD DETAILS. UNLESS OTHERWISE SHOWN, SEE STANDARD DETAILS FOR CONSTRUCTION OF OPENINGS IN EXISTING WALLS AND SLABS.

23. COORDINATE WITH SITE, ARCHITECTURAL, ELECTRICAL, MECHANICAL, AND CIVIL DRAWINGS FOR RETAINING WALLS, PADS, PAVEMENT AND OTHER SITE STRUCTURES.

24. EARTHWORK, FOUNDATION DRAINS, WATERPROOFING, PERIMETER INSULATION, MASONRY AND OTHER REQUIRED NON-STRUCTURAL ITEMS ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS. COORDINATE WITH CIVIL/SITE AND ARCHITECTURAL DRAWINGS.

25. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITIES WITH THE OWNER TO AVOID SYSTEM/OPERATION INTERRUPTIONS.

26. MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK SHALL BE STORED AT OWNER'S DESIGNATED LOCATIONS.

27. THE CONTRACTOR SHALL AT ALL TIMES KEEP THE WORK AREA AND SURROUNDING PREMISES FREE OF WASTE, SURPLUS MATERIALS, RUBBISH, AND DEBRIS RESULTING FROM THE WORK.

28. ALL CONTRACTORS SHALL CONFORM TO THE SAFETY REQUIREMENTS OF THE OWNER, AIA DOCUMENTS A201, OSHA SAFETY AND HEALTH STANDARDS, OWNERS SAFETY REGULATIONS, AND ANY OTHER LOCAL AUTHORITY IN CONNECTION WITH THE PROJECT. ALL EXCAVATIONS SHALL BE PROPERLY SHORED IN ACCORDANCE WITH OSHA STANDARDS AND REQUIREMENTS. ENGINEER DOES NOT ASSUME ANY RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY.

29. LIVE LOAD SIGNS SHALL BE PROVIDED IN AREAS DESIGNATED BY THE ARCHITECT, ENGINEER OR REQUIRED BY THE BUILDING OFFICIAL. SIGNS SHALL BE AS REQUIRED IN THE SPECIFICATIONS.

30. SLOPE DRAINAGE SURFACES UNIFORMLY TO DRAIN. SLOPE SHALL BE 1/8" TO ¼" PER FOOT EXCEPT WHERE NOTED OTHERWISE ON THE PLANS .

31. NO SUBSTITUTIONS OF MATERIAL WILL BE ALLOWED WITHOUT WRITTEN PERMISSION FROM THE ENGINEER.

GOVERNING CODES AND STANDARDS:

THE FOLLOWING CODES AND STANDARDS SHALL BE UTILIZED BY THE CONTRACTOR TO ESTABLISH MINIMUM LEVELS OF QUALITY AND CONSTRUCTION TECHNIQUES. UNLESS NOTED OTHERWISE, REFERENCE THE BUILDING CODE AND/OR ASCE FOR THE REFERENCED STANDARD'S EDITION.

OBC	- OHIO BUILDING CODE, 2018 EDITION (OBC) AND THE INTERNATIONAL BUILDING CODE, (IBC) 2018 EDITION, LOCALLY AMENDED. THE ABOVE SHALL GOVERN EXCEPT WHERE OTHER APPLICABLE CODES OR CONTRACT PROVISIONS ARE MORE RESTRICTIVE.
IEBC	- INTERNATIONAL EXISTING BUILDING CODE, 2018 EDITION
ASCE 7	- MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, 2016 EDITION
ACI 318	- BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
ACI 350	- CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES
ACI 350.3	- SEISMIC DESIGN OF LIQUID-CONTAINING CONCRETE STRUCTURES
ACI 350.1	- TIGHTNESS TESTING OF ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES
ACI 301	- SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS
ACI 302	- RECOMMENDED PRACTICE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION
ACI 544	- GUIDE FOR SPECIFYING, PROPORTIONING, MIXING, PLACING, AND FINISHING STEEL FIBER REINFORCED CONCRETE
ACI 347	- GUIDE TO FORMWORK FOR CONCRETE
ACI 345R	- HOT WEATHER CONCRETING
ACI 306R	- COLD WEATHER CONCRETING
ACI 207	- GUIDE TO MASS CONCRETE
ACI 211.1	- SELECTING PROPORTIONS FOR NORMAL, HEAVY WEIGHT AND MASS CONCRETE
ACI 217.4R	- COOLING AND INSULATING SYSTEMS FOR MASS
ACI SP-66	- ACI DETAILING MANUAL
PCA	- DESIGN AND CONTROL OF CONCRETE MIXTURES
MSP-2	- MANUAL OF STANDARD PRACTICE
MNL 120	- PRECAST/PRESTRESSED CONCRETE INSTITUTE DESIGN HANDBOOK
PCI	- DESIGN HANDBOOK FOR PRECAST AND PRESTRESSED CONCRETE
AISC 360	- LOAD AND RESISTANCE FACTOR DESIGN SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS
AISC 341	- SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS
AISC DESIGN GUIDE 27	- STRUCTURAL STAINLESS STEEL
ADM1	- ALUMINUM DESIGN MANUAL
AWS D1.1	- STRUCTURAL WELDING CODE - STEEL
AWS D1.2	- STRUCTURAL WELDING CODE - ALUMINUM
AWS D1.3	- STRUCTURAL WELDING CODE - SHEET STEEL
AWS D1.4	- STRUCTURAL WELDING CODE - REINFORCING STEEL
AWS D1.6	- STRUCTURAL WELDING CODE - STAINLESS STEEL
AWS D1.8	- STRUCTURAL WELDING CODE - SEISMIC SUPPLEMENT
NAAMM MGB 531	- METAL BAR GRATING MANUAL
NAAMM MGB 532	- HEAVY DUTY METAL BAR GRATING MANUAL

SUBMITTALS

1. SHOP DRAWINGS AND SUBMITTALS
   A. REPRODUCTION OF STRUCTURAL DRAWINGS FOR SHOP DRAWINGS IS NOT PERMITTED.
   B. ELECTRONIC DRAWING FILES WILL NOT BE PROVIDED TO THE CONTRACTOR.
   C. REVIEW OF SHOP DRAWINGS WILL BE FOR CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS REGARDING ARRANGEMENT AND SIZES OF MEMBERS AND THE CONTRACTOR'S INTERPRETATION OF THE DESIGN LOADS, IF APPLICABLE, AND CONSTRUCTION DOCUMENT DETAILS. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF THE FULL RESPONSIBILITY TO COMPLY WITH THE CONSTRUCTION DOCUMENTS.

2. SUBMITTALS
   A. THE STRUCTURAL QUALITY ASSURANCE PLAN AND SPECIFICATIONS IDENTIFY THE REQUIRED SUBMITTALS. PRIOR TO (OR WITH) THE FIRST SUBMITTAL, CONTRACTOR SHALL SUBMIT A LIST OF ALL REQUIRED SUBMITTALS FOR ENGINEER'S REVIEW.

3. DEFERRED SUBMITTALS
   A. DEFERRED SUBMITTALS INCLUDE THOSE PORTIONS OF THE PROJECT THAT ARE FURNISHED BY THE CONTRACTOR AND DESIGNED BY SOMEONE OTHER THAN THE ENGINEER OF RECORD AND ARE SUBMITTED AT THE TIME OF THE APPLICATION. DEFERRED SUBMITTALS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL PRIOR TO FABRICATION AND INSTALLATION.
   B. SUBMITTAL DOCUMENTS FOR DEFERRED SUBMITTALS:
      a. SHALL BE INCLUDED IN THE CONTRACTOR'S SCOPE OF SERVICES AND SHALL BE SEALED BY AN ENGINEER LICENSED IN THE PROJECT STATE. DESIGN OF DEFERRED SUBMITTALS SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE INDICATED ABOVE.
      b. SHALL BE SUBMITTED TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE WHO SHALL REVIEW AND FORWARD THEM TO THE BUILDING OFFICIAL WITH A NOTATION INDICATING THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND THAT THEY HAVE BEEN FOUND IN GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING. DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THE DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL.
      c. SUBMITTAL DOCUMENTS MAY ALSO INCLUDE SUBSTANTIATING CALCULATIONS, WHEN REQUIRED.
   C. THE FOLLOWING SHALL BE CONSIDERED DEFERRED SUBMITTALS:
      a. TEMPORARY/PERMANENT SHORING AND UNDERPINNING
      b. AGGREGATE PIER SOIL REINFORCEMENT
      c. GROUND IMPROVEMENT METHODS
      d. STRUCTURAL PRECAST CONCRETE
      e. ARCHITECTURAL PRECAST CONCRETE
      f. ENGINEERED BRICK LINTELS
      g. STEEL CONNECTIONS - SEE "STRUCTURAL STEEL" SECTION
      h. COLD-FORMED METAL FRAMING
      i. PREFABRICATED COLD-FORMED STEEL TRUSSES
      j. STEEL STAIRS AND HANDRAILS
      k. SHOP-FABRICATED WOOD TRUSSES
      l. CURTAIN WALL/WINDOW WALL SYSTEMS
      m. SKYLIGHTS
      n. METAL BUILDING SYSTEM
      o. ELEVATORS
      p. SLOTTED CHANNEL STRUT FRAMING (E.G. UNISTRUT)
      q. SEISMIC ANCHORAGE AND BRACING OF MPE EQUIPMENT

DESIGN LOADS:

1. LIVE LOADS:

(REDUCIBLE PER GOVERNING CODE)	UNIFORM (PSF)	CONCENTRATED (LBS)
A. ROOF		
1. TYPICAL AREA	20	300
2. HVAC MECHANICAL EQUIPMENT AREAS	150	2,000
B. FIRST FLOOR	100	2,000
C. ELECTRICAL CONTROL ROOM	250	3,000
D. PROCESS AREA		
1. SLAB-ON-GRADE	400	3,000
2. STRUCTURAL FLOOR	300	3,000
3. ELECTRICAL AND CONTROL ROOM FLOOR	300	3,000
4. ELEVATED GRATING FLOORS (FOOT TRAFFIC ONLY)	100	2,000
5. NON-EGRESS WALKWAYS/CATWALKS	100	2,000
E. TRUCK ACCESS AREAS	AASHTO HL93 LOADING	

USE AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES FOR IMPACT FORCES DUE TO MOVING WHEEL LOADS

2. SNOW LOADS:

RISK CATEGORY	III
GROUND SNOW LOAD, P_g	30 PSF
FLAT ROOF SNOW LOAD, P_f	23 PSF
SNOW EXPOSURE FACTOR, C_e	1.0
SNOW LOAD IMPORTANCE FACTOR, I_s	1.1
THERMAL FACTOR, C_t	1.0

3. WIND LOADS

ULTIMATE DESIGN WIND SPEED (3-SECOND GUST), MPH	116
RISK CATEGORY	III
WIND EXPOSURE	C
INTERNAL PRESSURE COEFFICIENT (ENCLOSED)	±0.18
COMPONENTS AND CLADDING WIND EXPOSURE	C

DESIGN WIND PRESSURE FOR COMPONENTS AND CLADDING SHALL BE COMPUTED PER GOVERNING BUILDING CODE

4. EARTHQUAKE DESIGN DATA:

OCCUPANCY RISK CATEGORY	III
SEISMIC IMPORTANCE FACTOR, I_e	1.25
MAPPED SPECTRAL RESPONSE ACCELERATIONS	S_s = 0.156 S_1 = 0.049
SITE CLASS	D
DESIGN SPECTRAL RESPONSE ACCELERATIONS	S_{ds} = 0.167 S_{d1} = 0.079

DESIGN SPECTRAL RESPONSE ACCELERATIONS	S_{ds} = 0.167 S_{d1} = 0.079

SEISMIC DESIGN CATEGORY	B
BASIC SEISMIC REINFORCING SYSTEM:	ORDINARY PRECAST SHEAR WALLS (ASSUMED)*
SEISMIC RESPONSE COEFFICIENT	C_s = TO BE DETERMINED*
RESPONSE MODIFICATION COEFFICIENT	R = 3*
ANALYSIS PROCEDURE USED:	EQUIVALENT LATERAL FORCE (ASSUMED)*

* TO BE DETERMINED BY DELEGATED DESIGN ENGINEER

FOUNDATIONS:

1. FOUNDATION DESIGN IS BASED ON RECOMMENDATIONS IN THE GEOTECHNICAL REPORT NO. 230264, PREPARED BY CT CONSULTANTS, INC., DATED SEPTEMBER 14, 2023. CONTRACTOR SHALL REVIEW GEOTECHNICAL REPORT PRIOR TO CONSTRUCTION AND ADHERE TO THE RECOMMENDATIONS.

2. FOUNDATIONS ARE DESIGNED TO BEAR ON UNDISTURBED NATURAL SOILS OR PROPERLY COMPACTED ENGINEERED FILL WITH A GROSS ALLOWABLE BEARING CAPACITY OF 2750 PSF. SEE GEOTECHNICAL REPORT.
   A. OTHER SOIL LOADING AND BEARING CHARACTERISTICS ARE DESCRIBED IN THE REPORT. BEARING CAPACITY OF DEEP FOUNDATIONS, SEE NOTES SPECIFIC TO THE DEEP FOUNDATION SYSTEM.
   B. REFERENCE GEOTECHNICAL REPORT FOR FROST DEPTH (OR FROST DEPTH IS 40"). EXTERIOR FOOTINGS SHALL BEAR AT FROST DEPTH, OR DOWN TO ACCEPTABLE SOILS, WHICHEVER IS DEEPER.

3. TOPSOIL, FILL, AND/OR OTHER DELETERIOUS MATERIALS ENCOUNTERED DURING THE SITE PREPARATION MUST BE REMOVED AND REPLACED WITH SELECT ENGINEERED FILL COMPACTED TO 95% PER ASTM D698 (STANDARD PROCTOR) AND MEETING THE SPECIFIED DESIGN BEARING CAPACITY. (SEE GEOTECHNICAL REPORT FOR MORE INFORMATION).

4. OWNER SHALL EMPLOY A SOILS TESTING LABORATORY APPROVED BY THE ENGINEER TO PERFORM TESTING SERVICES AS REQUIRED BY THE SPECIFICATIONS AND TO INSPECT ALL BEARING SURFACES OF SLABS AND FOUNDATIONS.

5. NOTIFY ENGINEER IF FOUNDATION CONDITIONS ENCOUNTERED DIFFER FROM SOILS EXPLORATION INFORMATION MADE AVAILABLE TO THE CONTRACTOR.

6. EXCAVATIONS FOR FOUNDATIONS SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF REINFORCING STEEL AND CONCRETE. UNDERCUT UNSUITABLE SOILS AND BACKFILL AS DIRECTED BY THE GEOTECHNICAL ENGINEER.

7. REMOVE ALL EXISTING PAVEMENT, STRUCTURES AND FOUNDATIONS, AND TOPSOIL, UNSUITABLE FILLS AND ORGANIC SOILS ENCOUNTERED WITHIN AND BELOW THE AREA TO BE OCCUPIED BY SLABS ON GRADE AND FOUNDATIONS. THESE MATERIALS SHALL NOT BE USED FOR FILL WITHIN OR ADJACENT TO THE BUILDING. AFTER EXCAVATING THE EXPOSED NATURAL SOIL SHALL BE THOROUGHLY COMPACTED PRIOR TO PLACEMENT OF FILL OR AS DIRECTED BY THE GEOTECHNICAL REPORT.

8. BACKFILL AND BACKFILL PLACEMENT SHALL BE AS PER THE GEOTECHNICAL ENGINEERS RECOMMENDATIONS. IN LIEU OF GEOTECHNICAL ENGINEERS RECOMMENDATIONS BACKFILL SHALL BE CLEAN, CRUSHED STONE (#57 STONE) OR SELECT ENGINEERED FILL AND SHALL BE PLACED IN MAXIMUM 8" LIFTS AND COMPACT AS PER THE GEOTECHNICAL.

9. CONTRACTOR SHALL KEEP ALL FREE-STANDING WATER OUT OF EXCAVATIONS. CONTRACTOR SHALL PROVIDE DEWATERING MEASURES AS NECESSARY PRIOR TO PLACING CONCRETE. WATER SHOULD BE REMOVED FROM THE FOUNDATION BOTTOMS BEFORE CONCRETE OR REINFORCING STEEL IS PLACE.

10. CHANGES IN ELEVATION OF WALL FOOTING SHALL BE MADE IN STEPS NOT MORE THAN 2'-0" HIGH AND AT LEAST 4'-0" APART, UNLESS DETAILED OTHERWISE. SEE TYPICAL FOOTING STEP DETAIL.

11. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE TEMPORARY SHORING, BRACING, UNDERPINNING, AND OTHER MEASURES NECESSARY TO INSURE STABILITY AND SAFETY DURING ERECTION AND CONSTRUCTION AND TO PREVENT MOVEMENT OF SOIL THAT COULD DAMAGE EXISTING STRUCTURES, PAVEMENT, UTILITIES, ETC.

12. CENTER FOOTINGS UNDER COLUMNS AND WALLS UNLESS NOTED.

13. THE DIFFERENCE IN ELEVATION OF THE BACKFILL ON THE INSIDE AND OUTSIDE OF WALLS SHALL NOT EXCEED TWO FEET UNTIL THE FIRST FLOOR STRUCTURE SUPPORTING THE WALLS IS IN PLACE, UNLESS THE WALL IS BRACED TO PREVENT MOVEMENT.

14. UNLESS NOTED OTHERWISE ON THE CIVIL/SITE DRAWINGS, PROVIDE A MINIMUM 2% GRADE WITHIN 10-FEET OF THE PERIMETER OF THE FOUNDATION SYSTEM TO ALLOW SURFACE WATER TO DRAIN AWAY.

15. DO NOT PLACE FILL OR CONCRETE ON FROZEN GROUND.

REINFORCEMENT

1. ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED SHALL BE IN ACCORDANCE WITH MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI-315, LATEST EDITION) AND MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (CRSI, LATEST EDITION). REINFORCING STEEL SHALL NOT BE HEATED OR WELDED AND MUST BE DRY AND FREE OF CONTAMINANTS SUCH AS RUST, DIRT, GREASE, AND PROTECTIVE COATINGS.

2. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60. ALL REINFORCING USED IN SEISMIC DESIGN CATEGORY (SDC) D AND HIGHER OR REINFORCING TO BE WELDED SHALL CONFORM TO ASTM A706 GRADE 60.
   REINFORCING STEEL SHALL NOT BE HEATED OR WELDED AND MUST BE DRY AND FREE OF CONTAMINANTS SUCH AS RUST, DIRT, GREASE, AND PROTECTIVE COATINGS.

3. WHERE GRADE BEAMS OR STRIP FOOTINGS INTERSECT COLUMN FOUNDATIONS, EXTEND GRADE BEAM OR STRIP FOOTING REINFORCEMENT CONTINUOUSLY THROUGH THE COLUMN FOUNDATION.

4. ALL WELDED WIRE REINFORCING SHALL CONFORM TO ASTM A185, A1064 PROVIDED IN FLAT SHEETS.

5. PROVIDE DOWELS FROM FOUNDATIONS TO MATCH COLUMN, PIER AND WALL VERTICAL REINFORCING. WHERE SHOWN, PROVIDE DOWELS OUT OF WALLS TO MATCH SLAB REINFORCING. PROVIDE ADEQUATE BOLSTERS, HI-CHAIRS, SUPPORT BARS, ETC., TO MAINTAIN SPECIFIED CLEARANCES FOR THE ENTIRE LENGTH OF ALL REINFORCING BARS. SUPPORTS THAT BEAR DIRECTLY ON EXPOSED SURFACES SHALL BE A CRSI CLASS 1. STRUCTURAL SLABS SHALL UTILIZE A CRSI CLASS 2 SUPPORTS.

6. ALL DEVELOPMENT AND SPLICE LENGTHS SHALL BE PER ACI 318 WITH CLEAR SPACING GREATER OR EQUAL TO 3 BAR DIAMETER. PROVIDE CLASS "B" TENSION LAP SPLICE OR FULL MECHANICAL SPLICE (ACI 318, SECT. 25.4.2) FOR ALL REINFORCING STEEL IN WALLS, COLUMNS, AND SLABS. SEE LAP SCHEDULE ON SHEET SD-S-02 FOR LAP LENGTHS, UNO.

7. LAP SPLICES SHALL NOT BE MADE AT POINTS OF MAXIMUM STRESS AS DETERMINED BY THE ENGINEER. LAP SPLICES FOR CONTINUOUS SLAB OR LONGITUDINAL BEAM BARS, WITH DOUBLE MAT OF REINFORCING, SHALL BE LOCATED IN THE MIDDLE 1/3 OF THE SPAN FOR TOP BARS AND CENTERED OVER THE SUPPORT FOR THE BOTTOM BARS. LAP SPLICE IN BEAMS, CONTINUOUS SLABS AND WALLS SHALL BE STAGGERED. CENTERLINE OF STAGGERS SHALL BE A MINIMUM OF A SPLICE LENGTH APART.

8. A TOP BAR IS A HORIZONTAL BAR WHERE MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST DIRECTLY BELOW THE BAR. HORIZONTAL WALL BARS ARE CONSIDERED TOP BARS. FOR EPOXY-COATED REINFORCEMENT, MULTIPLY THE TABULATED VALUES BY 1.5 FOR 'REGULAR BARS' AND 1.3 FOR 'TOP BARS'.

9. SUBMIT REINFORCING SHOP DRAWINGS FOR REVIEW. AT A MINIMUM, THESE DRAWINGS SHALL SHOW THE GENERAL PLACEMENT OF REINFORCING, CONSTRUCTION JOINTS, CONTROL JOINTS, EXPANSION JOINTS, CONCRETE MEMBER DIMENSIONS, DOWELS, BAR LENGTHS, SPLICE LENGTH, AND REINFORCING BEND TABLES.

10. TACK WELDING OR WELDING OF REBAR SHALL NOT BE PERMITTED UNLESS OTHERWISE CALLED FOR OR APPROVED BY THE ENGINEER. IF APPROVED, REINFORCING MAY BE WELDED IN ACCORDANCE WITH AWS SPECIFICATION D1.4. ALL REINFORCING TO BE WELDED SHALL CONFORM TO ASTM A706.

11. IN ADDITION TO NORMAL ACCESSORIES USED TO HOLD REINFORCING STEEL FIRMLY IN POSITION, EXTRA ACCESSORY BARS SHALL BE USED AS FOLLOWS:
   A. IN SLABS, #5 RAISER BARS AT 36" ON CENTER MAXIMUM TO SUPPORT TOP REINFORCING STEEL.
   B. IN WALLS WITH TWO CURTAINS, #3 U OR Z-SHAPE SPACERS AT 6'-0 " ON CENTER EACH WAY.

12. CONCRETE CONSTRUCTION SHALL BE REINFORCED CONCRETE EXCEPT WHERE PLAIN CONCRETE IS INDICATED ON THE DRAWINGS. UNLESS OTHERWISE NOTED, MINIMUM REINFORCING STEEL SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING SCHEDULES:

SLAB THICKNESS	SIZE	SPACING E.W.	LOCATION
4"	#3	12"	CENTERED
5"	#4	12"	CENTERED
6"	#4	12"	CENTERED
8"	#4	12"	T & B
9"	#4	12"	T & B
10"	#4	12"	T & B
12"	#5	12"	T & B

WALL THICKNESS	SIZE	SPACING E.W.	LOCATION
6"	#4	12"	CENTERED
8"	#5	12"	CENTERED
10"	#4	12"	E F
12"	#5	12"	E F
14"	#5	12"	E F
16"	#6	12"	E F
18"	#6	12"	E F

MASS CONCRETE SHALL BE REINFORCED WITH #6 @ 12" E.W. MINIMUM IN ALL FACES. HIGHER MINIMUM STEEL IS PROVIDED IN WATER CONTAINING STRUCTURES.

14. ALL HOOKS SHALL BE ACI STANDARD HOOKS UNLESS DIMENSIONED OTHERWISE. BARS ENDING IN RIGHT ANGLE BENDS OR HOOKS SHALL CONFORM TO THE REQUIREMENTS OF ACI 318, SECT. 25.3. IN CASES WHERE REINFORCING BARS CANNOT BE EXTENDED AS REQUIRED TO PROVIDE SPECIFIED DEVELOPMENT LENGTH DUE TO AN ADJACENT STRUCTURE, EXTEND AS FAR AS POSSIBLE AND END IN STANDARD HOOKS.

15. LAP SPLICE WELDED WIRE FABRIC ONE SPACE PLUS 2 INCHES AT EDGES AND ENDS AND PROVIDE ADDITIONAL REINFORCING WHERE SHOWN ON DRAWINGS. PLACE MESH 2 INCHES FROM TOP OF SLAB FOR SLABS ON GROUND AND 1 INCH FROM TOP OF SUPPORTED SLABS UNLESS NOTED OTHERWISE.

16. FIBER REINFORCING SHALL CONFORM TO ASTM C1116. FIBER REINFORCEMENT SHALL BE MACRO FIBER UNIFORMLY DISPERSED IN THE CONCRETE MIXTURE PER THE MANUFACTURER'S RECOMMENDATION, BUT NOT LESS THAN A RATE OF 4.0 lb/Cu Yd AND 1.5 INCHES LONG.

CAST-IN-PLACE CONCRETE:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH ACI 318 AND ACI 350.

2. CONCRETE SHALL HAVE THE FOLLOWING 28-DAY COMPRESSIVE STRENGTHS:
   CAST-IN-PLACE CONCRETE: 4,500 PSI
   FILL CONCRETE: 1,500 PSI

3. USE 6% ±1.5%, ENTRAINED AIR PER ASTM C260 FOR ALL CONCRETE EXPOSED TO WEATHER.

4. ADMIXTURES SHALL CONTAIN NO MORE THAN 0.05% CHLORIDE IONS BY WEIGHT OF CEMENT WHEN TESTED IN ACCORDANCE WITH AASHTO T260.

5. CONCRETE SHALL BE PROPORTIONED, BATCHED, MIXED, PLACED, CONSOLIDATED, AND CURED IN ACCORDANCE WITH ACI 301,304,308,309 AND 318. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED IN ACCORDANCE WITH ACI 304 AND ACI 309.

6. CONTRACTOR SHALL KEEP A COPY OF "FIELD REFERENCE MANUAL: STANDARD SPECIFICATIONS FOR STRUCTURAL CONCRETE ACI 301 WITH SELECTED ACI REFERENCES", (ACI PUBLICATION SP-15) AT THE PROJECT FIELD OFFICE.

7. ALL REINFORCING DETAILS SHALL CONFORM TO THE ACI DETAILING MANUAL, SP-66, UNLESS DETAILED OTHERWISE ON THE STRUCTURAL DRAWINGS.

8. SUBMIT FOR APPROVAL CONCRETE MIX DESIGN AND CERTIFICATION OF CONCRETE MATERIALS CONFORMING TO THE FOLLOWING EXPOSURE CATEGORIES:

CATEGORY	FOOTINGS, INTERIOR SLAB-ON-GRADE NON-AIR ENTRAINED CLASS:	PIERS, WALLS, EXTERIOR SLABS AIR ENTRAINED CLASS:
FREEZE AND THAWING	F0	F3
SULFATE	S1	S1
IN CONTACT WITH WATER	W1	W1
CORROSION PROTECTION	C2	C2

9. THE CONTRACTOR SHALL EMPLOY A TESTING LABORATORY APPROVED BY THE ENGINEER/ARCHITECT TO PERFORM THE TESTING SPECIFIED PER PARAGRAPH 1.6.4 OF ACI 301. THE TESTING LABORATORY SHALL MEET THE REQUIREMENTS OF ASTM E329. TESTING SHALL BE MADE BY AN ACI CONCRETE FIELD-TESTING TECHNICIAN GRADE 1 OR APPROVED EQUIVALENT. A TECHNICIAN GRADE 1 SHALL BE PRESENT DURING ALL CONCRETE PLACEMENT.

10. ALL SLABS SHALL BE POURED MONOLITHICALLY, EXCEPT FOR THE REQUIRED CONSTRUCTION JOINTS, CONTROL JOINTS, AND/OR EXPANSION JOINTS.

11. PROVIDE PERIMETER INSULATION AGAINST EXTERIOR FOUNDATION WALLS AND GRADE BEAMS AND UNDER THE SLAB ADJACENT TO THE EXTERIOR OF THE BUILDING AS SHOWN ON THE ARCHITECTURAL DRAWINGS.

12. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CORNERS OF SLABS UNLESS OTHERWISE INDICATED ON THE ARCHITECTURAL DRAWINGS. MINIMUM CLEARANCES FOR REINFORCING STEEL SHALL BE MAINTAINED. CHAMFERS SHALL EXTEND 2'-0", MINIMUM, BELOW GRADE.

13. CURE ALL CONCRETE FOR A MINIMUM 7-DAYS. APPLY CURING COMPOUND AT THE MAXIMUM COVERAGE RATE OF 300 SQUARE FEET PER GALLON. USE PRODUCT IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. SEE SPECIFICATIONS.

14. DO NOT BACKFILL WATERHOLDING STRUCTURES UNTIL THE CONCRETE HAS REACHED A 28-DAY CONCRETE STRENGTH.

15. CONTRACTOR SHALL PROVIDE BONDING AGENT TO ALL SURFACES BETWEEN EXISTING AND FRESH CONCRETE. BONDING AGENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. PRIOR TO APPLICATION OF BONDING AGENT, THE EXISTING CONCRETE BASE SURFACE SHALL BE THOROUGHLY CLEANED TO REMOVE ANY GREASE, OIL OR OTHER CONTAMINANTS THAT MAY PREVENT ADEQUATE BOND TO THE EXISTING CONCRETE. REMOVE WEAK OR DETERIORATED CONCRETE.

16. THE CONCRETE INTERFACE OF ALL CONSTRUCTION JOINTS SHALL BE ROUGHEN TO 1/4", MINIMUM, AMPLITUDE. PRIOR TO CASTING AGAINST THE GREEN CONCRETE, APPLY BONDING AGENT (OR GREEN CONCRETE SHALL BE SATURATED SURFACE DRY. WET GREEN CONCRETE FOR A MINIMUM OF 8". REMOVE ANY STANDING WATER).

17. CONTRACTOR SHALL SUBMIT PROPOSED LOCATIONS OF CONSTRUCTION JOINTS NOT INDICATED ON THE DRAWINGS FOR REVIEW BY THE ENGINEER/ARCHITECT.

18. ALUMINUM OR DISSIMILAR METALS IN CONTACT WITH CONCRETE SHALL BE COATED WITH GRAY EPOXY PRIMER, EPOXY PRIMER SHALL BE PRE-APPROVED BY THE ENGINEER.

19. FORMWORK, FOR ALL CONCRETE THAT WILL BE EXPOSED IN THE COMPLETED STRUCTURE, SHALL BE CONSTRUCTED FROM A METAL OR SUITABLE SURFACE PLYWOOD THAT WILL PRODUCE AN ACCEPTABLY SMOOTH SURFACE. SEE SPECIFICATIONS.

20. PITCH CONCRETE SLABS TO FLOOR DRAINS, SUMP PITS, OR STORM SEWER INLETS, COORDINATE WITH MECHANICAL, CIVIL OR ARCHITECTURAL DRAWINGS. SLOPE EXPOSED EXTERIOR SLABS TO SHED WATER. INTERIOR BASE SLABS, WITHOUT DRAINS OR SUMP PITS, SHALL BE MONLITHICALLY SLOPED TOWARD WALL WHERE PRIMARY ENTRY HATCH IS LOCATED.

21. FORM TIES SHALL BE FACTORY-FABRICATED SNAP-OFF GLASS-FIBER-REINFORCED PLASTIC OR METAL FORM TIES DESIGNED TO RESIST LATERAL PRESSURE DURING CONCRETE PLACEMENT. FORM TIES SHALL HAVE PLASTIC CONE AND, WHEN USED IN AN ENVIRONMENTAL STRUCTURE, HAVE A WATERSTOP LOCATED AT THE CENTER. FORM TIE UNITS, AFTER BREAKBACK, SHALL BE AT LEAST 1 INCH FROM THE FACE OF THE CONCRETE SURFACE.

22. CONCRETE EMBEDS AND PENETRATIONS - PIPES AND CONDUITS EMBEDDED IN OR PASSING THROUGH STRUCTURAL ELEMENTS SHALL CONFORM TO ACI 318-6.3

STATE OF OHIO
BART STROBEL
90274
REGISTERED
PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	AS NOTED
DESIGNED BY:	BAS
DRAWN BY:	TLM
CHECKED BY:	BF

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO
SITE STRUCTURES - 20 SERIES
GENERAL NOTES

PROJECT NO. 230264
DISCIPLINE STRUCTURAL
SHEET NAME 20-S-01

23. CONCRETE PROTECTION (CLEAR COVER) FOR REINFORCEMENT BARS SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE:
   A. FOOTINGS AND FOUNDATION MATS CAST ON GROUND:
      - 3 INCHES, BOTTOM AND UNFORMED EDGES
      - 2 INCHES, FORMED EDGES
      - 2 INCHES, EXPOSED TO EARTH, WATER OR WEATHER
      - 2 INCHES, BOTTOM, ON CONCRETE MUDMAT
   B. CONCRETE IN CONTACT WITH SEWAGE OR WATER:
      - SLABS AND WALLS
      - 2 INCHES
      - COLUMNS AND BEAMS
      - 2-1/2 INCHES, PRINCIPAL REINFORCEMENT
      - 2 INCHES, STIRRUPS & TIES
   C. CONCRETE IN CONTACT WITH GROUND OR WEATHER:
      - SLABS AND WALLS
      - 2 INCHES
      - COLUMNS AND BEAMS
      - 2-1/2 INCHES, PRINCIPAL REINFORCEMENT
      - 2 INCHES, STIRRUPS & TIES
   D. CONCRETE NOT TO BE EXPOSED TO GROUND, WEATHER OR LIQUID
      - SLABS AND WALLS
      - 3/4 INCHES, BARS GREATER THAN #5
      - 1/2 INCHES, BARS #5 OR LESS
      - COLUMNS AND BEAMS
      - 1-1/2 INCHES, PRINCIPAL REINFORCEMENT
   E. 1 INCHES, STIRRUPS & TIES

24. ANCHOR BOLTS SHALL BE ASTM F1554-55 UNLESS OTHERWISE NOTED. EMBEDMENT, EDGE DISTANCES AND ALLOWABLE LOADS SHALL CONFORM TO IBC TABLE 1912.2 OR AS NOTED ON THE DRAWINGS. CONFORM TO ADDITIONAL REQUIREMENTS IN SPECIFICATION 05 SECTION AS APPLICABLE.

25. PROVIDE ANCHORAGE INSERTS WHERE SHOWN ON CONCRETE WALLS AND CONCRETE CEILINGS IN GALLERIES, PIPE CHASES, TUNNELS AND AS REQUIRED BY PROCESS, MECHANICAL, AND ELECTRICAL INSTALLATIONS.

26. ENVIRONMENTAL STRUCTURES SHALL HAVE WATERSTOPS AT CONCRETE JOINTS. WATERSTOPS SHALL BE CONTINUOUS AND LOCATED AT ALL JOINTS.
   A. WATERSTOPS SHALL BE PVC, UNLESS NOTED OTHERWISE.
   B. PVC WATERSTOP INTERSECTIONS SHALL BE ASSEMBLED AND BONDED IN THE FACTORY. DO NOT MAKE INTERSECTIONS IN THE FIELD.
   C. PVC WATERSTOPS SHALL BE PROPERLY SUPPORTED AND WIRED TO REINFORCING TO REMAIN STRAIGHT AND TRUE. HEAT SPLICE ALL JOINTS PER MANUFACTURER'S RECOMMENDATIONS.
   D. WATERSTOP FOR CONSTRUCTION JOINTS SHALL BE PVC SERRATED TYPE WITHOUT CENTER BULB, NOT LESS THAN 6" WIDTH AND 3/8" THICK, UNO.
   E. WATERSTOP FOR EXPANSION JOINTS SHALL BE PVC SERRATED TYPE, WITH CENTER BULB NOT LESS THAN 9" WIDTH AND 3/8" THICK, UNO.
   F. NON-PVC WATERSTOPS FOR NON-MOVING JOINTS SHALL BE USED IN APPROVED APPLICATIONS.
   G. NON-PVC WATERSTOPS SHALL BE A HYDROPHILIC RUBBER STRIP THAT IS ADHERED TO THE SMOOTH CONCRETE SURFACE. THE WATERSTOP SHALL BE LOCATED BETWEEN REINFORCING MATS OR LOCATED WHT 3”, MINIMUM, OF CLEAR CONCRETE COVER. INSTALL AND UTILIZE PER MANUFACTURER’S RECOMMENDATIONS.

27. PROVIDE A MASS CONCRETE TEMPERATURE CONTROL PLANS. THE PROGRAM SHALL MANAGE CURING HEAT FROM HYDRATION FOR MASS CONCRETE THAT WILL MINIMIZE VOLUME AND PROVIDE ACCEPTABLE STRENGTH AND CRACK CONTROL. THE PLAN SHALL INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   A. A COPY OF THE APPROVED MIX DESIGN AND PROPOSED MODIFICATIONS TO MIXES IF FIELD TEMPERATURES EXCEED ALLOWABLE LIMITS.
   B. PROPORTIONS OF FINE AND COARSE AGGREGATES MAY BE ADJUSTED TO PRODUCE THE DESIRED WORKABILITY WITH A SOMEWHAT HIGHER PROPORTION OF FINE AGGREGATE THAN WOULD BE USED FOR NORMAL CONDITIONS.
   C. IDENTIFYING THE MASS CONCRETE ELEMENTS AND SHOWING THE LOCATIONS OF TEMPERATURE MONITORING DEVICES.
   D. CORRECTIVE ACTION, IN THE FIELD, IF THE TEMPERATURE DIFFERENTIAL EXCEEDS THE MASS PLAN PREVENTATIVE TEMPERATURE

WATERTIGHT STRUCTURES:

1. WATERSTOPS SHALL BE PVC, UNLESS NOTED OTHERWISE. WATERSTOPS SHALL BE CONTINUOUS AND LOCATED AT ALL JOINTS. CONTROL JOINTS SHALL HAVE A BULB TYPE WATERSTOP. ALL PVC WATERSTOP INTERSECTIONS SHALL BE ASSEMBLED AND BONDED IN THE FACTORY. DO NOT MAKE INTERSECTIONS IN THE FIELD.

2. THE ALLOWABLE LEAKAGE RATE OF STRUCTURES SHOULD NOT EXCEED 0.1% OF THE WATER VOLUME IN 24 HOURS, AFTER ABSORPTION AND STABILIZATION. VISIBLE LEAKAGE AND DAMPNESS WILL NOT BE ACCEPTABLE. THE WATERTIGHTNESS TEST SHALL BE PERFORMED FOLLOWING THE RECOMMENDATIONS GIVEN IN ACI-350.1.

   A. THE STRUCTURES SHALL BE CONSTRUCTED WITH ALL WALL OPENINGS SEALED TO PREVENT LOSS OF WATER. BACKFILL OR WATERPROOFING SHALL BE PLACED AGAINST OR APPLIED TO THE WALLS AFTER THE TIME OF TESTING SO THAT VISIBLE LEAKAGE MAY BE OBSERVED.

   B. THE TEST SHALL COMMENCE THREE (3) DAYS AFTER THE STRUCTURES ARE FILLED TO HIGH WATER ELEVATION TO ALLOW FOR STABILIZATION. CONCRETE SHALL BE AT SPECIFIED DESIGN STRENGTH.

   C. THE TEST WILL BE CONTINUED FOR A PERIOD OF TIME SUFFICIENT TO PRODUCE AT LEAST A THREE-EIGHTHS INCH DROP IN THE WATER SURFACE BASED ON THE LEAKAGE OCCURRING AT THE MAXIMUM ALLOWABLE RATE GIVEN ABOVE. THE TEST DURATION FOR EACH STRUCTURE IS CALCULATED TO BE THE NUMBER OF DAYS WITH A WATER ELEVATION GIVEN ABOVE. TEST RESULTS TO BE CORRECTED FOR OBSERVATIONS FOR THE GAIN OF WATER DUE TO PRECIPITATION OR THE LOSS OF WATER DUE TO EVAPORATION. A PARTIALLY FILLED, CALIBRATED, TRANSPARENT, FLOATING, OPEN CONTAINER SHALL BE POSITIONED IN THE CONTAINMENT STRUCTURE. THE CONTAINER SHALL BE POSITIONED AWAY FROM THE SIDES OF THE STRUCTURE AND ANY OVERHEAD MEMBERS THAT MAY SHIELD OR SHADE THE CONTAINER. THE CONTAINER SHOULD HAVE SUFFICIENT FREEBOARD TO ACCOMMODATE THE PRECIPITATION FROM NORMAL RAINFALL AND NOT BE OVERTOPPED BY WAVES GENERATED BY THE WIND.

   D. IF THE LEAKAGE RATE AT THE END OF THE TEST PERIOD IS DETERMINED TO EXCEED THE ALLOWABLE RATE, THE STRUCTURE SHALL BE CONSIDERED TO HAVE FAILED THE TEST. ALSO, IF WATER IS OBSERVED FLOWING FROM THE STRUCTURE OR IF MOISTURE OTHER THAN FROM PRECIPITATION OR CONDENSATION CAN BE TRANSFERRED TO THE DRY HAND FROM EXTERIOR SURFACES, THE STRUCTURE WILL HAVE FAILED THE TEST.

   E. THE CONTRACTOR SHALL MAKE NECESSARY REPAIRS TO THE STRUCTURE IN ACCORDANCE WITH SECTION 033000 OF THE SPECIFICATIONS USING PROPER REPAIR MATERIALS AND PROCEDURES. THE REPAIRS MAY INCLUDE EPOXY INJECTION OR CHEMICAL INJECTION WITH A MOISTURE REACTIVE HYDROPHILIC POLYURETHANE FOAM GROUT. THE CONTRACTOR'S PROPOSED REPAIR METHODS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY REPAIR WORK.

   F. AFTER ACCEPTABLE REPAIRS ARE MADE, THE STRUCTURE MUST BE FILLED WITH WATER AND TESTED FOR WATERTIGHTNESS A SECOND TIME. THE STRUCTURE MUST PASS THE TEST BEFORE FINAL WORK AND ANY WATERPROOFING MAY PROCEED.

   G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE REPAIRS TO MAKE THE STRUCTURE WATERTIGHT AND ACCEPTABLE TO THE ENGINEER.

   H. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE FILLING AND DEWATERING OF THE STRUCTURE. THE CONTRACTOR MAY OBTAIN WATER FROM THE PLANT EFFLUENT SYSTEM. THE CONTRACTOR SHALL SUPPLY ALL EQUIPMENT, HOSES, LABORS TO FILL AND DEWATER THE TANK. DEWATERING CAN BE ACCOMPLISHED BY DRAINING THE TANK THROUGH PROCESS DRAIN PIPES IF INSTALLED.

BUOYANT STRUCTURES:

1. WHEN EMPTY DURING CONSTRUCTION, THE STRUCTURES MAY BECOME BUOYANT. IN THE EVENT THAT THE EXCAVATIONS BECOME FLOODED, THE STRUCTURES MUST BE FILLED WITH WATER TO PREVENT FLOTATION OR THE EXCAVATION IS TO BE KEPT DEWATERED.

2. THE STRUCTURES ARE DESIGNED TO RESIST BUOYANCY WHEN COMPLETE AND EMPTY.

POST-TENSIONED CONCRETE:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 318 AND THE POST TENSIONED INSTITUTE'S "POST-TENSIONING MANUAL, SIXTH EDITION," OR ANY MORE STRINGENT REQUIREMENTS PRESENTED BY THE AUTHORITY HAVING JURISDICTION.

2. CONTRACTOR SHALL ENGAGE A QUALIFIED PROFESSIONAL ENGINEER TO DESIGN THE POST-TENSION STRUCTURE INCLUDING THE POST-TENSION STRUCTURAL ITEMS, CAST-IN-PLACE STRUCTURAL ITEMS, STRUCTURAL PRECAST ITEMS, METAL STRUCTURAL ITEMS, AND OTHER STRUCTURAL ITEMS. THE ENGINEER SHALL DESIGN A WHOLE AND COMPLETE STRUCTURE. THE DELEGATED ENGINEER SHALL DETERMINE LATERAL AND VERTICAL LOADS BASED ON THE SITE CONDITIONS, SOIL PROPERTIES, WIND LOADING, AND SEISMIC LOADING.

3. CONTRACTOR SHALL ENGAGE A QUALIFIED PROFESSIONAL ENGINEER TO DESIGN THE POST-TENSION REINFORCEMENT ALONG WITH THE MILD REINFORCEMENT INCLUDING CONSTRUCTION JOINT, POUR STRIP, AND PUNCHING SHEAR REQUIREMENTS. THE DELEGATED POST-TENSION ENGINEER SHALL DETERMINE LATERAL AND VERTICAL LOADS BASED ON THE SITE CONDITIONS, SOIL PROPERTIES, WIND LOADING, AND SEISMIC LOADING.

4. IF PROVIDED, POST-TENSION IS AS INDICATED ON THE DRAWINGS. IT IS THE RESPONSIBILITY OF THE POST TENSION SUPPLIER TO PROVIDE POST-TENSION PLACEMENT DRAWINGS THAT COMPLY WITH THESE DRAWINGS.

5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY AN ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED. DRAWINGS AND CALCULATIONS SHALL BE FOR A WHOLE AND COMPLETE STRUCTURE. REFER TO OTHER SECTIONS OF THE GENERAL NOTES, AS NEEDED.

6. SHOP DRAWINGS SHALL INCLUDE, BUT NOT BE LIMITED TO, TENDON LAYOUTS AND PROFILES, STRESSING AND FIXED END ANCHORAGE DETAILS, STRESSING SEQUENCE, EFFECTIVE FORCE PER TENDON, OPENINGS, AND OTHER RELATED DETAILS. CALCULATIONS OF AFFECTIVE TENDON FORCES SHALL INCLUDE ALL SHORT AND LONG TERM LOSSES, AND BE SUBMITTED TO ARCHITECT/STRUCTURAL ENGINEER FOR REVIEW. PLEASE SEE SPECIFICATIONS.

7. THE CONTRACTOR SHALL COORDINATE THE SHOP DRAWINGS BETWEEN THE REINFORCING STEEL FABRICATOR AND THE POST-TENSIONING FABRICATOR PRIOR TO SUBMITTING TO STRUCTURAL ENGINEER FOR REVIEW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL FIELD CONDITIONS AND DIMENSIONS.

8. POST-TENSION INSTALLER SHALL HAVE A FULL TIME PROJECT SUPERINTENDENT WHO HAS SUCCESSFULLY COMPLETED PTI'S LEVEL 1 FIELD FUNDAMENTALS COURSE OR EQUIVALENT VERIFIABLE EXPERIENCE AND KNOWLEDGE ACCEPTABLE TO ARCHITECT.

9. SPECIAL INSPECTOR PERFORMING FIELD INSPECTIONS AND MEASURING ELONGATION SHALL HAVE SUCCESSFULLY COMPLETED PTI'S LEVEL 1 FIELD FUNDAMENTALS COURSE OR EQUIVALENT VERIFIABLE EXPERIENCE AND KNOWLEDGE ACCEPTABLE TO ARCHITECT.

10. TENDONS SHALL BE MANUFACTURED AND DELIVERED IN SEQUENCE AND QUANTITY TO AVOID LENGTHY JOB SITE STORAGE. TENDONS SHALL BE PROTECTED FROM CORROSION AT ALL TIMES BY AN APPROVED SHEATHING AND COATING. SHEATHING SHALL HAVE TENSILE STRENGTH AND RESISTANCE SUFFICIENT TO RESIST DAMAGE AND DETERIORATION DURING TRANSPORT, STORAGE AT JOB SITE, AND INSTALLATION, AND SHALL BE CAPABLE OF PREVENTING THE PENETRATION OF CEMENT PASTE. TEARS IN SHEATHING SHALL BE REPAIRED BY A SYSTEM APPROVED BY THE ENGINEER OF RECORD. THE COATING SHALL NOT BECOME BRITTLE OR FLUID, AND SHALL BE CHEMICALLY STABLE, NON-REACTIVE, NON-CORROSIVE, AND IMPERVIOUS TO MOISTURE.

11. FOR CONCRETE AND NON-PRESTRESSED STEEL BARS, SEE CONCRETE AND REINFORCEMENT SECTION OF THESE NOTES.

12. THE SPECIAL INSPECTOR (THRESHOLD INSPECTOR) AND ARCHITECT SHALL BE NOTIFIED 48 HOURS IN ADVANCE BEFORE CONCRETE IS PLACED. CONCRETE SHALL NOT BE PLACED UNTIL PLACEMENT OF TENDONS AND NON-PRESTRESSED STEEL REINFORCEMENT HAS BEEN INSPECTED BY THE SPECIAL INSPECTOR (THRESHOLD INSPECTOR).

13. THE CONTRACTOR SHALL SUPERVISE ALL TENDON STRESSING OPERATIONS AND RECORD TENDON FORCES AND ELONGATIONS UNDER THE OBSERVATION OF THE SPECIAL INSPECTOR (THRESHOLD INSPECTOR).

14. THE MINIMUM CONCRETE COVER SHALL FOLLOW THE REQUIREMENTS OF ACI 318, UNLESS NOTED OTHERWISE.

15. THE CONTRACTOR SHALL TAKE MEASURES TO ENSURE COMPLETE CONSOLIDATION AND DENSIFICATION OF CONCRETE, PARTICULARLY BEHIND ALL POST-TENSIONING ANCHOR POINTS.

16. CONTRACTOR SHALL NOT CUT STRAND TAILS OR COVER ANCHORAGES UNTIL STRESSING RECORDS HAVE BEEN REVIEWED AND APPROVED BY ARCHITECT.

PRECAST CONCRETE:

1. ALL PRECAST MEMBERS SHALL BE DESIGNED AND FABRICATED IN ACCORDANCE WITH ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;" ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE;" PCI 116-13, "MANUAL FOR QUALITY CONTROL FOR PLANTS AND PRODUCTION OF PRECAST PRESTRESSED PRODUCTS;" AND PCI 135-00, "TOLERANCE MANUAL FOR PRECAST AND PRESTRESSED CONCRETE CONSTRUCTION;" AND "THE PCI DESIGN HANDBOOK."

2. THE MANUFACTURER OF THE PRECAST CONCRETE MEMBERS SHALL BE CERTIFIED BY THE “PRECAST CONCRETE INSTITUTE” (PCI) BY THE BID DATE. THE CERTIFICATION GROUP SHALL BE GROUP “C” FOR STRUCTURAL MEMBERS.

3. PRECAST CONCRETE MEMBERS SHALL CONFORM TO THE APPLICABLE “CONCRETE AND REINFORCEMENT” NOTES.

4. THE FIELD ERECTION CREW FOR PRECAST MEMBERS SHALL BE QUALIFIED BY PCI'S CERTIFICATE OF COMPLIANCE TO ERECT CATEGORY S1- SIMPLE STRUCTURAL SYSTEMS.

5. CONTRACTOR SHALL ENGAGE A QUALIFIED PROFESSIONAL ENGINEER TO DESIGN THE PRECAST STRUCTURE INCLUDING THE PRECAST STRUCTURAL ITEMS, CAST-IN-PLACE STRUCTURAL ITEMS, METAL STRUCTURAL ITEMS, AND OTHER STRUCTURAL ITEMS. THE ENGINEER SHALL DESIGN A WHOLE AND COMPLETE STRUCTURE. THE DELEGATED ENGINEER SHALL DETERMINE LATERAL AND VERTICAL LOADS BASED ON THE SITE CONDITIONS, SOIL PROPERTIES, WIND LOADING, AND SEISMIC LOADING.

6. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY AN ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED. DRAWINGS AND CALCULATIONS SHALL BE FOR A WHOLE AND COMPLETE STRUCTURE. REFER TO OTHER SECTIONS OF THE GENERAL NOTES, AS NEEDED.

7. PRECAST MANUFACTURER SHALL SUBMIT SHOP DRAWINGS WITH DESIGN CALCULATIONS SIGNED AND SEALED BY A REGISTERED ENGINEER IN THE STATE OF THE PROJECT FOR REVIEW PRIOR TO MANUFACTURING. SHOP DRAWINGS SHALL BE PREPARED IN ACCORDANCE WITH THE PCI “DRAFTING HANDBOOK - PRECAST AND PRESTRESSED CONCRETE, SECOND EDITION, MNL-119-90.”

8. SHOP DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR WITH ARCHITECTURAL, MECHANICAL, PLUMBING AND OTHER DRAWINGS AS REQUIRED FOR EQUIPMENT WEIGHTS, PADS, OPENINGS, CONSTRUCTION JOINTS AND OTHER DETAILS PRIOR TO SUBMITTAL TO THE ARCHITECT/ENGINEER FOR REVIEW.

9. PRECAST CONCRETE MEMBERS SHALL BE DESIGNED AND CONSTRUCTED UTILIZING THE FOLLOWING MATERIALS, UNLESS NOTED OTHERWISE:
   A. CONCRETE:
      - COMPRESSIVE STRENGTH AT 28 DAYS: 5,000 PSI
      - COMPRESSIVE STRENGTH AT RELEASE: 3,500 PSI
      - TILT-UP WALL PANELS: 3,000 PSI AT LIFTING; 5,000 PSI AT 28 DAYS
   B. REINFORCING STEEL:
      - DEFORMED BARS: ASTM A615, GRADE 60; ASTM A706, GRADE 60 FOR REINFORCING TO BE WELDED; ASTM A996, GRADE 60 FOR RAIL/AXLE STEEL
      - TENDONS: ASTM A416, GRADE 250

10. PRECAST MANUFACTURER SHALL PROVIDE 3/4 INCH MINIMUM COVER FOR ALL REINFORCING STEEL.

11. PRECAST MANUFACTURER SHALL PROVIDE CAST-IN-PLACE ANCHORS, INSERTS, ETC., WITH SUFFICIENT ANCHORAGE AND EMBEDMENT FOR THE SPECIFIED DESIGN REQUIREMENTS. AIR RELIEF HOLES SHALL BE PROVIDED IN THE HORIZONTAL SURFACES OF ALL CAST-IN PLATES AND ANGLES OVER 3" IN WIDTH WHEN SUCH SURFACES ARE ABOVE THE BOTTOM OF THE PRECAST MEMBER IN THE CASTING POSITION.

12. PRECAST CONCRETE SLABS AND TEES SHALL HAVE A MINIMUM BEARING SURFACE OF 3” ON ALL SUPPORTING ELEMENTS, UNLESS NOTED OTHERWISE.

10. ELASTOMERIC MATERIALS OF A STRUCTURAL (NON-COMMERCIAL) GRADE CONFORMING TO THE REQUIREMENTS OF SECTION 18, DIVISION 2, OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 17TH EDITION HAVING A MINIMUM DUROMETER HARDNESS OF 70 SHOULD BE USED UNDER BEARING SURFACES OF PRECAST FLOOR AND ROOF PLANKS. ALL MATERIAL SHALL BE NEW WITH NO RECLAIMED MATERIAL INCORPORATED IN THE FINISHED BEARING PAD.

11. PRECAST INSTALLER SHALL SET UNITS LEVEL AND SQUARE, KEEPING UNITS TIGHT AND IN PROPER ALIGNMENT WITH SUPPORTS. MAXIMUM DIFFERENTIAL CAMBER BETWEEN ADJACENT ELEMENTS SHALL NOT EXCEED 1/4” PER 10'-0” OF LENGTH BUT NOT GREATER THAN 3/4”. CONTRACTOR SHALL TAKE ALL MEASURES NECESSARY TO CONFORM TO THESE TOLERANCES INCLUDING, BUT NOT LIMITED TO THE ADJUSTMENT OF BEARING HEIGHTS.

12. PRECAST CONCRETE SLABS AND TEES SHALL HAVE A MINIMUM BEARING SURFACE OF 3” ON ALL SUPPORTING ELEMENTS, UNLESS NOTED OTHERWISE.

13. PRECAST INSTALLER SHALL WELD MEMBERS TO SUPPORTS, AS SHOWN ON THE DRAWINGS. ALL WELDS SHALL BE PERFORMED IN ACCORDANCE WITH AWS D1.1.

14. PRECAST MANUFACTURER SHALL PROVIDE STANDARD SHEAR CONNECTORS IN THE FLANGES OF PRECAST TEES AS SHOWN ON DETAILS. FIELD WELD AS INDICATED IN ACCORDANCE WITH AWS D1.1 SECTION 7.

15. REINFORCING STEEL THAT MAY BE SHOWN IN DETAILS IS FOR IN-PLACE CONDITION. ALL INSERTS, BRACES, STRONGBACKS AND OTHER REQUIRED ACCESSORIES SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR, AND SHALL BE LOCATED IN ACCORDANCE WITH THE RECOMMENDATIONS OF RICHMOND BULLETIN NO. 8, "PRODUCTS FOR PRECAST/PRESTRESSED CONCRETE CONSTRUCTION." THE CONTRACTOR IS ALSO RESPONSIBLE FOR PROVIDING SPECIAL REINFORCING ELEMENTS THAT MAY BE REQUIRED TO PREVENT FLEXURAL CRACKS FROM OCCURRING IN THE PANELS DURING LIFTING AND HANDLING OPERATIONS.

16. THE CONTRACTOR SHALL GROUT PRECAST MEMBERS AS OUTLINED BELOW:
   A. BETWEEN SLAB EDGES: FILL GROUT KEYS FULL AND STRIKE OFF FLUSH WITH TOP SURFACE. REMOVE ANY GROUT WHICH SEEPS THROUGH TO UNDERSIDE OF UNITS BEFORE IT HARDENS. CLEAN EXCESS FROM FACES AND FLOORS BELOW.
   B. AT SLAB ENDS: WHERE END GROUTING IS SHOWN ON THE DRAWINGS, PROVIDE SUITABLE END CAP OR DAM IN VOIDS.

17. PRECAST MANUFACTURER/DESIGNER AND CONTRACTOR SHALL COORDINATE WITH OTHER TRADES IN PERMITTING THE INSERTION OF ANCHORS, HANGERS, ELECTRICAL OUTLETS, ETC.

18. PRECAST MANUFACTURER AND GENERAL TRADES CONTRACTOR SHALL COORDINATE SIZE AND LOCATION OF ALL HOLES AND OPENINGS REQUIRED THROUGH THE HOLLOW CORE SLABS WITH THE TRADES REQUIRING THE OPENINGS.

19. NOT ALL HOLES AND OPENINGS ARE SHOWN ON THE STRUCTURAL DRAWINGS. THOSE WHICH ARE SHOWN SHALL BE CAST-IN OR CUT-IN BY THE MANUFACTURER. ALL OPENINGS LARGER THAN ONE SLAB WIDTH ARE TO BE FRAMED WITH CONCRETE OR STRUCTURAL STEEL HEADERS, DESIGNED AND PROVIDED BY THE MANUFACTURER. ADJACENT UNITS SHALL BE DESIGNED TO SUPPORT THE ADDITIONAL LOAD.

20. OPENINGS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE FIELD CUT BY THE GENERAL TRADES CONTRACTOR AT THE EXPENSE OF THE TRADE REQUIRING THE OPENING. THE MANUFACTURER, HOWEVER, IS RESPONSIBLE FOR DESIGNING THE AFFECTED HOLLOW CORE PLANKS TO ACCOMMODATE THESE OPENINGS BY PROVIDING NECESSARY ADDITIONAL REINFORCING IN UNIT WITH OPENING AND IN ADJACENT UNITS. FIELD CUT HOLES MAY BE DRILLED OR CUT AND TRIMMED WITH A CHISEL. CUT OUTLINE OF HOLE THROUGH LOWER PORTION OF SLAB FROM UNDERSIDE, AFTER WHICH THE TOPSIDE MAY BE REMOVED FROM ABOVE. DO NOT CUT PRESTRESSING STRANDS WITHOUT APPROVAL OF THE MANUFACTURER AND THE ARCHITECT.

STRUCTURAL STEEL:

1. STEEL SHALL BE FABRICATED BY A FABRICATOR HAVING AN AISC QUALITY CERTIFICATION CATEGORY: "STANDARD FOR STEEL BUILDING STRUCTURES (STD)."

2. STRUCTURAL STEEL WORK SHALL CONFORM TO THE "STEEL CONSTRUCTION MANUAL, AISC 360."

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF MEMBERS AND CONNECTIONS FOR ANY PORTION OF THE STRUCTURE NOT INDICATED ON THE PLANS. ALL SPECIAL CONDITIONS AND CONNECTIONS SHALL BE CAREFULLY AND COMPLETELY DETAILED AND SUBMITTED FOR APPROVAL.

4. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND SIZE OF ALL OPENINGS FOR MECHANICAL EQUIPMENT WITH THE MECHANICAL CONTRACTOR PRIOR TO FABRICATION OF MATERIALS.

5. ANY STEEL SHOWN ON DRAWINGS FOR SUPPORTING OR CONNECTING MECHANICAL, ELECTRICAL, OR PLUMBING EQUIPMENT IS FOR BID PURPOSES ONLY. CONTRACTOR SHALL COORDINATE EXACT SIZE AND LOCATION PRIOR TO PROCEEDING WITH CONSTRUCTION.

6. UNLESS SHOWN ON STRUCTURAL DRAWINGS, CONTRACTOR SHALL NOT CUT ANY HOLES IN STRUCTURAL STEEL MEMBERS WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.

7. ALL STEEL BEAMS SHALL BE FABRICATED AND ERECTED WITH THE NATURAL CAMBER (WITHIN THE MILL TOLERANCE) LOCATED ABOVE THE HORIZONTAL CENTERLINE BETWEEN THE END CONNECTIONS.

8. THE STEEL FRAME AS DESIGNED IS A NON-SELF SUPPORTING STEEL FRAME. CONTRACTOR SHALL COORDINATE THE ERECTION WITH THE INSTALLATION OF OTHER BUILDING ELEMENTS REQUIRED FOR THE STRUCTURES STABILITY. THESE ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO, SLABS, METAL DECK, MASONRY WALLS, AND CONCRETE WALLS.

9. STEEL SHALL CONFORM TO THE FOLLOWING UNLESS OTHERWISE NOTED:
   A. W-SHAPES: ASTM A992
   B. ANGLES, PLATES, RODS, ETC: ASTM A36
   C. CHANNELS: ASTM A36 (A572, GRADE 50)
   D. PIPES: ASTM A53, GRADE B
   E. STRUCTURAL TUBING:
      ROUND - ASTM A500, GRADE B, 42 KSI
      SQUARE & RECTANGULAR, ASTM A500, GRADE B, 46 KSI
   F. ANCHOR RODS: ASTM F1554, GRADE 36
   G. SHEAR STUD CONNECTORS: ASTM A108

10. WELDED CONNECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY, AWS D1.1. WELDING ELECTRODE MATERIAL SHALL BE E70XX.

11. WELDING OF SHEAR STUD CONNECTORS SHALL CONFORM TO AWS D1.1 SECTION 7.

12. ALL WELDED CONNECTIONS SHALL BE DESIGNED TO BE FULLY EQUIVALENT IN STRENGTH TO BOLTED CONNECTIONS FOR THE SAME SIZE BEAM.

13. MINIMUM WELDS, WHERE NOT SHOWN ON DRAWINGS, SHALL BE 3/16 INCH FILLET WELD, ALL AROUND.

14. IN GENERAL, IT IS THE INTENT OF THESE PLANS AND SPECIFICATIONS THAT ALL SHOP CONNECTIONS BE WELDED OR BOLTED AND ALL FIELD CONNECTIONS BE BOLTED EXCEPT WHERE NOTED OTHERWISE.

15. ALL CONNECTIONS SHALL BE MADE WITH 3/4-INCH ASTM A325 BOLTS TIGHTENED TO SNUG-TIGHT CONDITION UNLESS OTHERWISE NOTED.

16. ALL CONNECTIONS NOT DETAILED ON THE DRAWINGS SHALL BE DESIGNED AND DETAILED BY THE FABRICATOR UTILIZING THE REQUIREMENTS IN AISC 360, AND THE CONTRACT DOCUMENTS. THE FABRICATOR SHALL USE LOAD AND RESISTANCE FACTOR DESIGN, ALLOWABLE STRESS DESIGN METHODOLOGY TO COMPLETE ALL CONNECTION DESIGNS INCLUDING THE FOLLOWING GUIDELINES.
   A. DETAIL ALL BOLTED CONNECTIONS AS BEARING TYPE CONNECTIONS WITH THREADS IN THE SHEAR PLANE, EXCEPT THE FOLLOWING CONNECTIONS, WHICH SHALL BE DESIGNED AS SLIP-CRITICAL CONNECTIONS:
      - ALL CONNECTIONS IN DIRECT TENSION.
      - THE WEB SHEAR CONNECTION OF ALL MOMENT CONNECTIONS.
      - ALL BEAM OR GIRDER CONNECTIONS USING OVERSIZED HOLES OR LONG SLOTS.
      - ANY CONNECTION NOTED ON THE CONTRACT DRAWINGS AS SLIP-CRITICAL CONNECTION.
   B. NON-COMPOSITE BEAM CONNECTIONS SHALL BE DESIGNED TO DEVELOP 55% OF THE LOAD CAPACITY OF THE MEMBER AS TABULATED IN BEAM TABLE 3-6, PART 3, OF THE AISC "MANUAL OF STEEL CONSTRUCTION", UNLESS THE REACTION IS SHOWN ON THE DRAWINGS.
   C. COMPOSITE BEAM CONNECTIONS SHALL BE DESIGNED TO DEVELOP 75% OF THE LOAD CAPACITY OF THE MEMBER AS TABULATED IN THE BEAM TABLES, BUT NOT LESS THAN THE STANDARD "V/n" VALUE (MAXIMUM END REACTION FOR 3-1/2" BEARING AS SHOWN IN BEAM TABLE 3-6, PART 3, OF THE AISC "MANUAL OF STEEL CONSTRUCTION", UNLESS THE REACTION IS SHOWN ON THE DRAWINGS.

17. IN NO CASE SHALL THE MINIMUM NUMBER OF ROWS OF BOLTS FOR THE GIVEN BEAM SIZE BE LESS THAN THAT WHICH IS SHOWN IN TABLE 10-1, PART 10, OF THE AISC "MANUAL OF STEEL CONSTRUCTION".

18. ALL SHELF ANGLES AND LINTELS IN EXTERIOR WALLS, INCLUDING BEARING PLATES AND ANCHOR RODS, SHALL BE GALVANIZED AFTER FABRICATION.

19. ALL STEEL AND CORRESPONDING CONNECTIONS EXPOSED TO WEATHER SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 AND A153, RESPECTIVELY.

20. ALL STEEL, AND ANCHOR RODS THAT WILL BE GALVANIZED, ENCASED IN CONCRETE, OR RECEIVE SPRAYED ON FIREPROOFING SHALL NOT BE PAINTED.

21. PROVIDE 3/8-INCH DIAMETER WEEP HOLES AT BASE OF HSS AND PIPE COLUMNS AND IN BOTTOM OF CAPPED HSS BEAMS.

22. PROVIDE 1/4" MIN CLOSURE PLATES TO ALL HOLLOW STRUCTURAL SECTIONS WITH A 1/4" FILLET WELD ALL AROUND.

23. SET COLUMN BASE PLATES UPON NON-METALLIC, SHRINK RESISTANT GROUT CONFORMING TO ASTM C1107.

24. PROVIDE HARDENED STEEL WASHERS CONFORMING TO ASTM F436 AND HEAVY HEX NUTS ON ANCHOR RODS.

25. STEEL THAT EXTENDS BELOW GRADE SHALL BE ENCASED IN CONCRETE WITH A MINIMUM OF 3-INCHES OF CLEAR COVER.

26. CONNECTIONS FOR BRACING SHALL DEVELOP THE TENSILE CAPACITY OF THE BRACING MEMBER.

27. ALL STEEL COLUMNS AND BEAMS ARE TO RECEIVE SPRAYED FIREPROOFING TO ACHIEVE THE RESTRAINED FIRE RESISTANCE RATING AS SPECIFIED IN THE ARCHITECTURAL DRAWINGS.

ALUMINUM:

1. ALUMINUM MEMBERS SHALL BE FABRICATED, TRANSPORTED, AND ERECTED PER THE ALUMINUM DESIGN MANUAL BY THE ALUMINUM ASSOCIATION, INC.

2. ALUMINUM MEMBERS SHALL BE CUT BY SHEARING, SAWING, NIBBLING, ROUTING, ARC CUTTING, LASER OR ABRASIVE WATER JET. OXYGEN CUT SHALL BE PROHIBITED.

3. CONTRACTOR SHALL NOT WELD ALUMINUM MEMBERS WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER OF RECORD.

4. ALUMINUM MEMBERS SHALL CONFORM TO THE FOLLOWING UNLESS OTHERWISE NOTED:
   A. PLATES: ALUMINUM ALLOY 6061-T6, ASTM B209
      - MINIMUM TENSILE STRESS = 42 KSI
      - MINIMUM YIELD STRESS = 35 KSI
   B. TUBING: ALUMINUM ALLOY 6061-T6, ASTM B308
      - MINIMUM TENSILE STRESS = 42 KSI
      - MINIMUM YIELD STRESS = 35 KSI
   C. SOLID BAR: ALUMINUM ALLOY 6061-T651, ASTM B211
      - MINIMUM TENSILE STRESS = 38 KSI
      - MINIMUM YIELD STRESS = 35 KSI
   D. BOLTS: ALUMINUM ALLOY 2024-T4, ASTM F468 OR STAINLESS STEEL, ASTM F593

5. WHERE ALUMINUM IS IN CONTACT WITH OR FASTENED TO STEEL, WOOD, FIBERBOARD, CONCRETE OR MASONRY, A COMPATIBLE, NONPOROUS ISOLATOR BETWEEN THE ALUMINUM AND OTHER MATERIAL SHALL BE SUPPLIED.

6. A COMPATIBLE, NONPOROUS ISOLATER SHALL CONSIST OF EITHER A HEAVY COATING OF ALKALI RESISTANT BITUMINOUS PAINT OR AN APPROVED ALTERNATIVE METHOD.

7. ALUMINIZED, HOT-DIP GALVANIZED OR ELECTRO-GALVANIZED STEEL IN CONTACT WITH ALUMINUM NEED NOT BE PAINTED.

8. ALL BOLTS SHALL BE INSTALLED TO A SNUG-TIGHT CONDITION, UNLESS NOTED OTHERWISE.

9. ALL BOLTS SHALL BE PROVIDED WITH LOCK WASHERS, PALNUTS, OR LOCK NUTS.

POST-INSTALLED FASTENERS:

1. POST-INSTALLED ANCHORS SHALL BE USED ONLY WHERE SPECIFIED ON THE STRUCTURAL DRAWINGS.

2. ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION IS REQUIRED FOR ALL INSTALLERS OF ADHESIVE ANCHORS IN HORIZONTAL OR UPWARDLY INCLINED ORIENTATION. THIS CERTIFICATION CAN BE OBTAINED THROUGH ACI OR APPROVED EQUIVALENT.

3. FASTENERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, AS INCLUDED IN THE ANCHOR PACKAGING IN COORDINATION WITH INFORMATION HEREIN. THE STRUCTURAL ENGINEER SHALL BE NOTIFIED IF CONFLICTS EXIST BETWEEN THE MANUFACTURER’S PRINTED INSTALLATION INSTRUCTIONS AND THE REQUIREMENTS HEREIN.

4. REINFORCEMENT STEEL SHALL NOT BE CUT. PRIOR TO DRILLING THE CONCRETE, THE REINFORCING SHALL BE LOCATED WITH A MAGNETIC BAR LOCATOR. POST-INSTALLED BOLTS AND FASTENERS SHALL BE INSTALLED TO MISS REINFORCEMENT STEEL IN CONCRETE. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS.

5. DRILL HOLES USING ROTARY PERCUSSION DRILL WITH A DEPTH GAGE. DO NOT DRILL THROUGH FULL THICKNESS OF CONCRETE. USE OF A DIAMOND CORE BIT WITH ROUGHENING TOOL FOR ANCHOR HOLES MUST BE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO DRILLING. UNLESS OTHERWISE SHOWN IN THE DRAWINGS, ALL HOLES SHALL BE DRILLED PERPENDICULAR TO THE CONCRETE SURFACE. CLEAN HOLES IN ACCORDANCE WITH THE MANUFACTURER’S PRINTED INSTALLATION INSTRUCTIONS. IF CONCRETE IS DAMP, BLOW DRY HOLE WITH OIL-FREE COMPRESSED AIR. CLEAN HOLE WITH WATER ONLY IF RECOMMENDED BY MANUFACTURER. ADHESIVE ANCHORS MAY NOT BE SET IF WATER IS SEEPING INTO HOLE AND THE STRUCTURAL ENGINEER. OF RECORD SHALL BE NOTIFIED.

6. ANCHOR SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE SUBMITTED AND APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO USE. CONTRACTOR SHALL PROVIDE DOCUMENTATION DEMONSTRATING THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF MEETING THE PERFORMANCE OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED BY THEIR HAVING AN ICC ESR SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE FOR ITS USE, LOAD RESISTANCE, INSTALLATION CATEGORY, AND AVAILABILITY OF COMPREHENSIVE INSTALLATION INSTRUCTIONS. ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE, INSTALLATION TEMPERATURE, MOISTURE CONDITION OF CONCRETE, AND DRILLING METHODS.

7. THE CONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER’S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL ANCHOR PRODUCTS SPECIFIED. THE STRUCTURAL ENGINEER OF RECORD MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL PERSONNEL WHO INSTALL ANCHORS ARE TRAINED PRIOR TO THE COMMENCEMENT OF ANCHOR INSTALLATION.

8. ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS. CONTRACTOR SHALL CONTACT STRUCTURAL ENGINEER SHOULD THE LAYOUT OF THE ANCHOR, EMBEDMENT, SPACING OR EDGE DISTANCES, IS MODIFIED.

STATE OF OHIO
BART STROBEL
90274
REGISTERED
PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	AS NOTED
DESIGNED BY:	BAS
DRAWN BY:	TLM
CHECKED BY:	BF

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO
SITE STRUCTURES - 20 SERIES
GENERAL NOTES

PROJECT NO. 230264
DISCIPLINE STRUCTURAL
SHEET NAME 20-S-02

9. EXCEPT WHERE INDICATED ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES:

   A. ANCHORAGE TO CONCRETE:
      - ADHESIVE ANCHORS:
        1. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HIT-Z ROD
        2. HILTI HIT-HY 200 SAFE SET SYSTEM INSTALLED USING HILTI HOLLOW DRILL BIT AND VACUUM WITH HAS-V-36 GRADE 36 THREADED ROD
        3. HILTI HIT-RE 500v3 SAFE SET SYSTEM INSTALLED USING HILTI HOLLOW DRILL BIT AND VACUUM WITH HAS THREADED ROD
        4. SIMPSON SET-XP WITH ASTM A36 THREADED ROD
        5. SIMPSON SET-XP INSTALLED USING SIMPSON SPEED CLEAN DXS SYSTEM WITH ASTM A36 THREADED ROD
        6. APPROVED EQUAL
      - MECHANICAL ANCHORS:
        1. HILTI KWIK HUS-EZ (KH-EZ), KH-EZ CRC, KH-EZ SS316, KH-EZ C, KH-EZ E, KH-EZ I, AND KH-EZ P SCREW ANCHOR SAFE SET SYSTEM INSTALLED USING HOLLOW DRILL BIT AND VACUUM
        2. HILTI KWIK BOLT-1 EXPANSION ANCHOR
        3. HILTI KWIK BOLT-TZ2 EXPANSION ANCHOR
        4. SIMPSON TITEN HD SCREW ANCHOR
        5. SIMPSON STRONG-BOLT 2 WEDGE ANCHOR
        6. APPROVED EQUAL
      - REBAR DOWELING INTO CONCRETE:
        1. HILTI HIT-HY 200 SAFE SET SYSTEM INSTALLED USING HILTI HOLLOW DRILL BIT AND VACUUM WITH CONTINUSLY DEFORMED REBAR
        2. HILTI HIT-HY 500v3 SAFE SET SYSTEM INSTALLED USING HILTI HOLLOW DRILL BIT AND VACUUM WITH CONTINUOUSLY DEFORMED REBAR
        3. SIMPSON SET-XP WITH CONTINUOUSLY DEFORMED REBAR
        4. SIMPSON SET-XP INSTALLED USING SIMPSON SPEED CLEAN DXS SYSTEM WITH CONTINUOUSLY DEFORMED REBAR
        5. APPROVED EQUAL
   B. ANCHORAGE TO SOLID GROUTED MASONRY:
      - ADHESIVE ANCHORS:
        1. HILTI HIT-HY 270 SAFE SET SYSTEM INSTALLED USING HILTI HOLLOW DRILL BIT AND VACUUM WITH HILTI HAS CONTINUOUSLY THREADEDED ROD OR DEFORMED REBAR.
        2. SIMPSON SET-XP WITH ASTM A36 THREADED ROD OR CONTINUOUSLY DEFORMED REBAR
        3. SIMPSON SET-XP INSTALLED USING SIMPSON SPEED CLEAN DXS SYSTEM WITH ASTM A36 THREADED ROD OR CONTINUOUSLY DEFORMED REBAR
        4. APPROVED EQUAL
      - MECHANICAL ANCHORS USE:
        1. HILTI KWIK BOLT-1 EXPANSION ANCHOR
        2. HILTI KWIK BOLT-TZ2 EXPANSION ANCHOR
        3. HILTI KH-EZ, KH-EZ CRC, KH-EZ SS316, KH-EZ C, AND KH-EZ P SCREW ANCHORS
        4. SIMPSON STRONG-BOLT 2 WEDGE ANCHOR
        5. SIMPSON WEDGE-ALL WEDGE ANCHOR
        6. APPROVED EQUAL
   C. ANCHORAGE TO HOLLOW / MULTI-WYTHE MASONRY:
      - ADHESIVE ANCHORS USE:
        1. HILTI HIT-HY 270 SAFE SET SYSTEM INSTALLED USING THE APPROPRIATE SIZE SCREEN TUBE PER THE ADHESIVE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS AND A HILTI HOLLOW DRILL BIT AND VACUUM WITH HILTI HAS CONTINUOUSLY THREADEDED ROD OR DEFORMED REBAR.
           SIMPSON SET-XP THE APPROPRIATE SIZE SCREEN TUBE PER THE ADHESIVE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS WITH ASTM A36 THREADED ROD
        2. SIMPSON SET-XP INSTALLED USING SIMPSON SPEED CLEAN DXS SYSTEM WITH ASTM A36 THREADED ROD
        3. APPROVED EQUAL

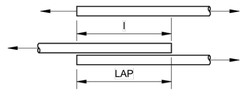
SPECIAL INSPECTIONS:
PER THE IBC SECTION 1705, SPECIAL INSPECTIONS ARE REQUIRED FOR THE FOLLOWING ITEMS:

1. DUTIES AND RESPONSIBILITIES OF THE SPECIAL INSPECTOR:
   A. THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK DESIGNATED TO ASSURE IT IS CONSTRUCTED IN CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS.
   B. THE SPECIAL INSPECTOR SHALL SUBMIT INSPECTION REPORTS AND TESTS TO THE BUILDING OFFICIAL AND REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE.
   C. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THE DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK.
   D. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND TESTS, AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS OR TESTS, SHALL BE SUBMITTED WITHIN THE AGREED UPON TIME TO THE BUILDING OFFICIAL PRIOR TO THE START ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
   E. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A STATEMENT OF RESPONSIBILITY ACKNOWLEDGING THE AWARENESS OF THE SPECIAL INSPECTION REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS.

2. STRUCTURAL STEEL:
   A. PRIOR TO WELDING:
      - WELDER QUALIFICATION RECORDS AND CONTINUITY RECORDS. (PERIODIC)
      - WELDING PROCEDURE SPECIFICATION (WPS) AVAILABLE. (CONTINUOUS)
      - MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE. (CONTINUOUS)
      - MATERIAL IDENTIFICATION –TYPE/GRADE (PERIODIC)
      - WELDER IDENTIFICATION SYSTEM MAINTAINED BY FABRICATOR OR ERECTOR TO IDENTIFY WHICH WELDER HAS WELDED A JOINT OR MEMBER. (PERIODIC)
      - FIT UP OF GROOVE WELDS INCLUDING JOINT GEOMETRY (PERIODIC)
        A. JOINT PREPARATIONS
        B. DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL)
        C. CLEANLINESS (CONDITION OF STEEL SURFACES)
        D. TACKING (TACK WELD QUALITY AND LOCATION)
        E. BACKING TYPE AND FIT, IF APPLICABLE.
      - FIT UP OF COMPLETE JOINT PENETRATION WELDS OF HSS T-, Y- AND K- JOINTS WITHOUT BACKING INCLUDING JOINT GEOMETRY (PERIODIC)
        A. JOINT PREPARATIONS
        B. DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL)
        C. CLEANLINESS (CONDITION OF STEEL SURFACES)
        D. TACKING (TACK WELD QUALITY AND LOCATION)
      - CONFIGURATION AND FINISH OF ACCESS HOLES (PERIODIC)
      - FIT UP OF FILLET WELDS (PERIODIC)
        A. DIMENSIONS (ALIGNMENT, GAPS AT ROOT)
        B. CLEANLINESS (CONDITION OF STEEL SURFACES)
        C. TACKING (TACK WELD QUALITY AND LOCATION)
      - CHECK WELDING EQUIPMENT
   B. DURING WELDING
      - CONTROL AND HANDLING OF WELDING CONSUMABLES (PERIODIC)
        A. PACKAGING
        B. EXPOSURE CONTROL
      - NO WELDING OVER CRACKED TACK WELDS (PERIODIC)
      - ENVIRONMENTAL CONDITIONS (PERIODIC)
        A. WIND SPEED WITHIN LIMITS
        B. PRECIPITATION AND TEMPERATURE
      - WPS FOLLOWED (PERIODIC)
        A. SETTINGS ON WELDING EQUIPMENT
        B. TRAVEL SPEED
        C. SELECTED WELDING MATERIALS
        D. SHIELDING GAS TYPE/FLOW RATE
        E. PREHEAT APPLIED
        F. INTERPASS TEMPERATURE MAINTAINED (MIN/MAX)
        G. PROPER POSITION (F, V, H, OH)
      - WELDING TECHNIQUES (PERIODIC)
        A. INTERPASS AND FINAL CLEANING
        B. EACH PASS WITHIN PROFILE LIMITATIONS
        C. EACH PASS MEETS QUALITY REQUIREMENTS
      - PLACEMENT AND INSTALLATION OF STEEL HEADED STUDS. (CONTINUOUS).
   C. AFTER WELDING:
      - WELDS CLEANED (PERIODIC)
      - SIZE, LENGTH AND LOCATION OF WELDS (CONTINUOUS)
      - WELDS MEET VISUAL ACCEPTANCE CRITERIA (CONTINUOUS)
        a. CRACK PROHIBITION
        b. WELD/BASE-METAL FUSION
        c. CRATER CROSS-SECTION
        d. WELD PROFILES
        e. WELD SIZE
        f. UNDERCUT POROSITY
      - ARC STRIKES (CONTINUOUS)
      - k-AREA (CONTINUOUS)
      - WELD ACCESS HOLES IN ROLLED HEAVY SHAPES AND BUILT-UP HEAVY SHAPES (CONTINUOUS)
      - BACKING REMOVED AND WELD TABS REMOVED, IF REQUIRED (CONTINUOUS)
      - REPAIR ACTIVITIES (CONTINUOUS)
      - DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER (CONTINUOUS)
      - NO PROHIBITED WELDS HAVE BEEN ADDED WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD (PERIODIC)
   D. PRIOR TO BOLTING:
      - MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS (CONTINUOUS)
      - FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS (PERIODIC)
      - CORRECT FASTENER SELECTED FOR THE JOINT DETAIL INCLUDING GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE (PERIODIC)
      - CORRECT BOLTING PROCEDURE SELECTED FOR JOINT DETAIL (PERIODIC)
      - CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS (PERIODIC)
      - PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED. (PERIODIC)
      - PRTOECTED STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS (PERIODIC)
   E. DURING BOLTING:
      - FASTENER ASSEMBLIES PLACED IN ALL HOLES AND WASHERS AND NUTS ARE POSITIONED AS REQUIRED. (PERIODIC)
      - JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRE-TENSIONING OPERATION (PERIODIC)
      - FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING. (PERIODIC)
      - FASTENERS ARE PRE-TENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES. (PERIODIC)
   F. AFTER BOLTING:
      - DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS. (CONTINUOUS)
   G. INSPECTION OF GALVANIZED STRUCTURAL STEEL MAIN MEMBERS AND EXPOSED CORNERS OF RECTANGULAR HSS FOR CRACKS SUBSEQUENT TO GALVANIZING (PERIODIC)
   H. SPECIAL INSPECTIONS ARE NOT REQUIRED FOR WORK DONE ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTIONS. APPROVAL SHALL BE BASED UPON REVIEW OF THE FABRICATOR'S WRITTEN PROCEDURAL AND QUALITY CONTROL MANUALS AND PERIODIC AUDITING OF FABRICATION PRACTICES BY A BOARD RECOGNIZED INDUSTRY TRADE ASSOCIATION CERTIFICATION PROGRAM OR A BOARD RECOGNIZED FABRICATOR INSPECTION AGENCY.

3. CONCRETE:
   A. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT. (PERIODIC)
   B. REINFORCING BAR WELDING:
      - VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706. (PERIODIC)
      - INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16" (PERIODIC)
      - INSPECT ALL OTHER WELDS (CONTINUOUS)
   C. INSPECT ANCHORS CAST IN CONCRETE (PERIODIC)
   D. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS:
      - ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. (CONTINOUS)
      - MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED ABOVE. (PERIODIC)
   E. VERIFY USE OF REQUIRED MIX DESIGN. (PERIODIC)
   F. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE. (CONTINUOUS)
   G. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES. (CONTINUOUS)
   H. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES. (PERIODIC)
   I. INSPECT PRESTRESSED CONCRETE FOR:
      - APPLICATION OF PRESTRESSING FORCES. (CONTINUOUS)
      - GROUTING OF BONDED PRESTRESSING TENDONS. (CONTINUOUS)
   J. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS. (PERIODIC)
   K. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS. (PERIODIC)
   L. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED. (PERIODIC)
   M. NO INSPECTION IS REQUIRED FOR SLABS-ON-GRADE.

4. SOILS:
   A. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY. (PERIODIC)
   B. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL. (PERIODIC)
   C. PERFORM CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS. (PERIODIC)
   D. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL. (CONTINUOUS)
   E. PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT THE SITE HAS BEEN PROPERLY PREPARED. (PERIODIC)



LAP TABLE (f'_c = 4,500 PSI)

BAR SIZE	LAP CLASS	UNCOATED BARS			
		TOP BARS		OTHER BARS	
		CASE 1	CASE 2	CASE 1	CASE 2
#3	A	18	26	14	20
	B	23	34	18	26
#4	A	23	35	18	27
	B	30	45	23	35
#5	A	29	44	23	34
	B	38	56	29	44
#6	A	35	53	27	40
	B	45	68	35	53
#7	A	51	87	39	59
	B	66	100	51	77
#8	A	58	88	45	67
	B	76	114	58	88

NOTES:
1. TABULATED VALUES ARE BASED ON A MINIMUM YIELD STRENGTH OF 60,000 PSI. LENGTHS ARE IN INCHES.
2. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL MEMBER, CONCRETE COVER, AND OC SPACING OF THE BARS ARE DEFINED AS:
   BEAMS AND COLUMNS
   - CASE 1: CONCRETE COVER AT LEAST 1.0d_b AND OC SPACING AT LEAST 2.0 d_b
   - CASE 2: CONCRETE COVER LESS THAN 1.0d_b OR OC SPACING AT LESS THAN 2.0 d_b

   OTHER BARS
   - CASE 1: CONCRETE COVER AT LEAST 1.0d_b AND OC SPACING AT LEAST 3.0 d_b
   - CASE 2: CONCRETE COVER LESS THAN 1.0d_b OR OC SPACING AT LESS THAN 3.0 d_b
3. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.

STRUCTURAL DRAWING ABBREVIATIONS

ADDL	ADDITIONAL
ADJ	ADJACENT
AESS	ARCH EXPOSED STRUCTURAL STEEL
ALT	ALTERNATE
&	AND
APPROX	APPROXIMATELY
ARCH	ARCHITECT or ARCHITECTURAL
@	AT or SPACING
B/	BOTTOM OF
BL	BUILDING LINE
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BRDG	BRIDGING
BRG	BEARING
BTWN	BETWEEN
BOT	BOTTOM
CANT	CANTILEVER
CL	CENTERLINE
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CTR	CENTER
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CJ	CONTROL/CONSTRUCTION JOINT
CMU	CONCRETE MASONRY UNIT
CONT	CONTINUOUS
CUFT	CUBIC FEET
CY	CUBIC YARDS
DBL	DOUBLE
DBA	DEFORMED BAR ANCHOR
DEG or °	DEGREE
DEMO	DEMOLITION
DET	DETAIL
DF	DOUGLAS FIR LARCH
DIAG	DIAGONAL
DIA or ø	DIAMETER
DIM	DIMENSION
DO	DITTO
DN	DOWN
DP	DEEP
DWG	DRAWING
DWL	DOWEL
EA	EACH
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EMBED	EMBEDDED, EMBEDMENT
EQ	EQUAL
EQUIP	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
EX	EXISTING
EXIST	EXISTING
(E)	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FAB	FABRICATE
FDN	FOUNDATION
FV	FIELD VERIFY
FIN	FINISH
FLG	FLANGE
FLR	FLOOR
FS	FARSIDE
FT	FOOT, FEET
FTG	FOOTING
GA	GAGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERAL
GLB	GLUE LAMINATED BEAM
GR	GRADE
GYP BD	GYPSUM BOARD
HC	HOLLOW CORE
HORIZ	HORIZONTAL
HP	HIGH POINT
HS	HIGH STRENGTH
HT	HEIGHT
HVY	HEAVY
ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCH
INFO	INFORMATION
INT	INTERIOR
INV	INVERT
JST	JOIST
JT	JOINT
K	KIPS
KSF	KIPS PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH
L	ANGLE
LBS	POUNDS
LF	LINEAL FEET
LG	LONG
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LONG	LONGITUDINAL
LP	LOW POINT
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
LT WT	LIGHT WEIGHT
MANUF	MANUFACTURER
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MK	MARK
MO	MASONRY OPENING
MTL	METAL
NO or #	NUMBER
NOM	NOMINAL
NS	NEARSIDE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
O/OOUT	TO OUT
OPNG	OPENING
OPP	OPPOSITE
PAF	POWDER ACTUATED FASTENERS
PAR	PARALLEL
PC	PRECAST
PERP	PERPENDICULAR
PL	PLATE
PLF	POUNDS PER LINEAL FOOT
PLYWD	PLY WOOD
PREFAB	PREFABRICATED
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POST TENSIONED
PTFE	POLYTETRAFLUOROETHYLENE
PTR	PRESSURE TREATED
QL	SEISMIC LOAD
QTY	QUANTITY
RAD	RADIUS
REF	REFERENCE
REINF	REINFORCEMENT, REINFORCING, REINFORCED
REQD	REQUIRED
SCHED	SCHEDULE
SECT	SECTION
SER	STRUCTURAL ENGINEER OF RECORD
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SOG	SLAB-ON-GRADE
SPA	SPACING
SPEC(S)	SPECIFICATION(S)
SPF	SPRUCE PINE FIR
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STIFF	STIFFENER
STL	STEEL
STR	STRUCTURAL
STRUCT	STRUCTURAL
SUP	SUPPORT
SYM	SYMMETRICAL
SYP	SOUTHERN YELLOW PINE
T	TOP
T/	TOP OF
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TEMP	TEMPERATURE STEEL
THD	THREAD
THK	THICK
THRU	THROUGH
TOL	TOLERANCE
TRANS	TRANSVERSE
TYP	TYPICAL
UN or UNO	UNLESS NOTED (OTHERWISE)
VERT	VERTICAL
VIF	VERIFY IN FIELD
w/	WITH
w/o	WITHOUT
WD	WOOD
WP	WORKPOINT
WT	WEIGHT
WWF	WELDED WIRE FABRIC

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

STATE OF OHIO
BART STROBEL
90274
REGISTERED
PROFESSIONAL ENGINEER

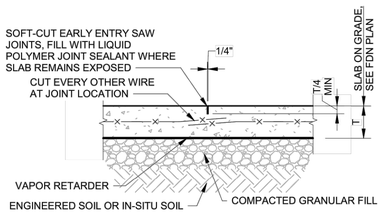
NO	REVISION	DATE

ISSUED FOR: BID
ISSUE DATE: 5/20/2025
SCALE: AS NOTED
DESIGNED BY: BAS
DRAWN BY: TLM
CHECKED BY: BF

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

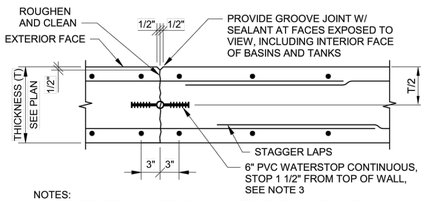
SITE STRUCTURES - 20 SERIES
GENERAL NOTES

PROJECT NO.
230264
DISCIPLINE
STRUCTURAL
SHEET NAME
20-S-03
SHEET 15 OF 28



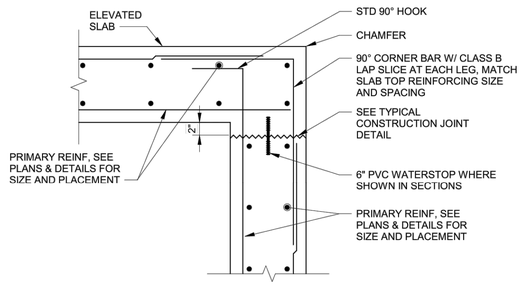
NOTES:
1. JOINTS TO BE LOCATED ON COLUMN CENTER LINES AND AT INTERMEDIATE LOCATIONS AS REQUIRED TO MAINTAIN A MAXIMUM SPACING OF (30 x SLAB THICKNESS) L/12 IN EACH DIRECTION, UNO.
2. PROVIDE TOOLED JOINTS IN FRESH CONCRETE EACH SIDE OF WALLS WHERE SLAB POURS THRU DOORWAYS.

1 CONTROL JOINT DETAIL
SDS-04 NTS

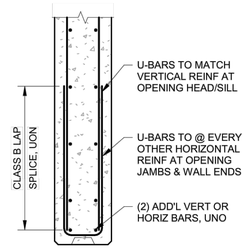


NOTES:
1. CONSTRUCTION JOINT FOR WALLS, STRUCTURAL SLABS, AND BASE SLAB OF WATER HOLDING STRUCTURE.
2. ALL REINFORCING SHALL BE CONTINUOUS THROUGH JOINT.
3. WATERSTOP REQUIRED AT LIQUID HOLDING BASINS AND TANKS, AND BELOW GRADE WALLS, UNO.
4. PROVIDE CONTROL JOINTS OR CONSTRUCTION JOINTS IN WALLS AT THE LESSER OF 25' OR 1.5x WALL HEIGHT.
5. JOINT LOCATION AND DETAILS SHALL BE APPROVED BY ARCHITECT AND STRUCTURAL ENGINEER

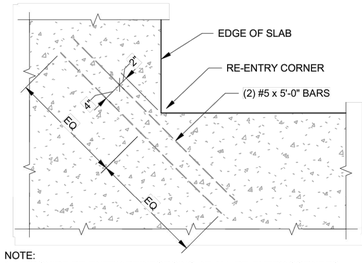
2 CONTRUCTION JOINT
SDS-04 NTS



3 WALL TO ELEVATED SLAB INTERSECTION
SDS-04 NTS

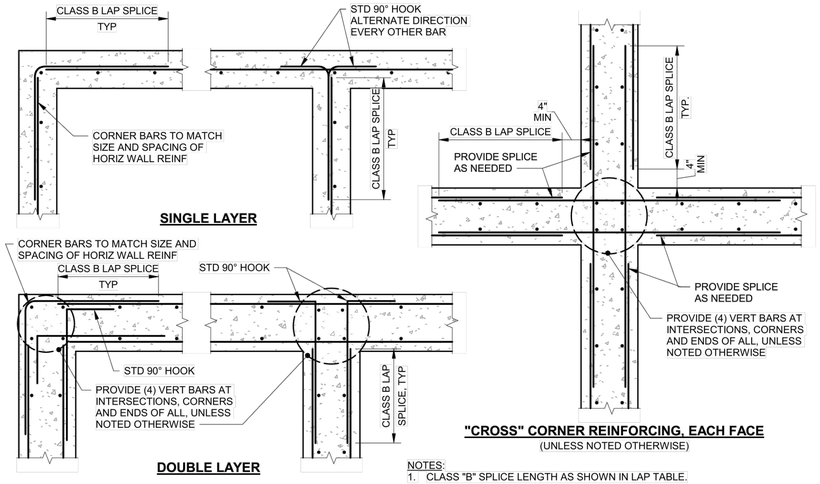


4 WALL END AND HEAD/SILL/JAMB OF OPENINGS
SDS-04 NTS



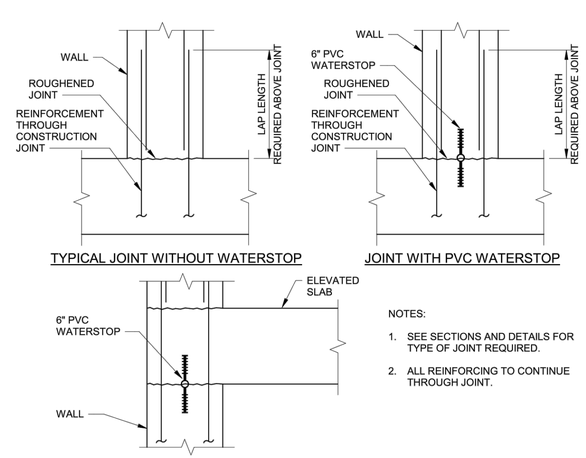
NOTE:
1. PROVIDE RE-ENTRY REINFORCING AT ALL RE-ENTRY CORNERS.
2. PROVIDE STD HOOK IS AT INTERFACE.
3. PROVIDE REINFORCING AS SHOWN AT ALL CORNERS IN SLAB.

5 CONCRETE REINF AT RE-ENTRANT CORNERS DETAIL
SDS-04 NTS



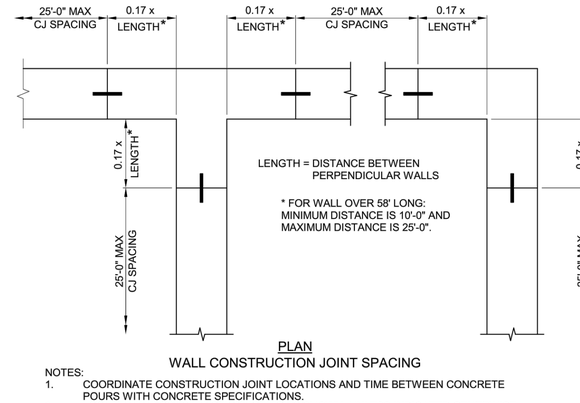
NOTES:
1. CLASS "B" SPLICE LENGTH AS SHOWN IN LAP TABLE.

6 CONCRETE WALL CORNER DETAILS
SDS-04 NTS



NOTES:
1. SEE SECTIONS AND DETAILS FOR TYPE OF JOINT REQUIRED.
2. ALL REINFORCING TO CONTINUE THROUGH JOINT.

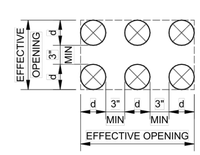
7 HORIZONTAL WALL JOINT
SDS-04 NTS



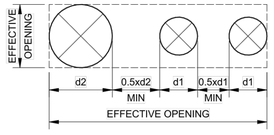
PLAN
WALL CONSTRUCTION JOINT SPACING

NOTES:
1. COORDINATE CONSTRUCTION JOINT LOCATIONS AND TIME BETWEEN CONCRETE POURS WITH CONCRETE SPECIFICATIONS.
2. LOCATE WALL CONSTRUCTION JOINTS AS SHOWN, UNLESS INDICATED OTHERWISE.

8 WALL CONSTRUCTION JOINT SPACING
SDS-04 NTS



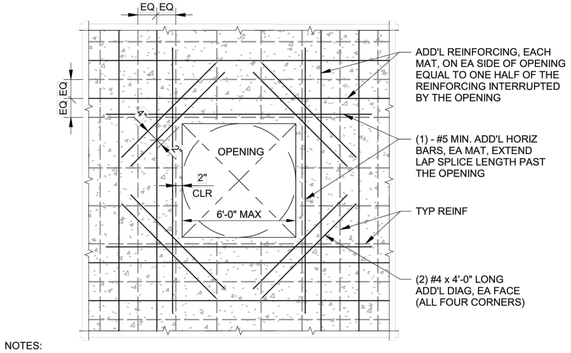
MULTIPLE SLEEVES < 8" DIA



MULTIPLE SLEEVES > 8" DIA

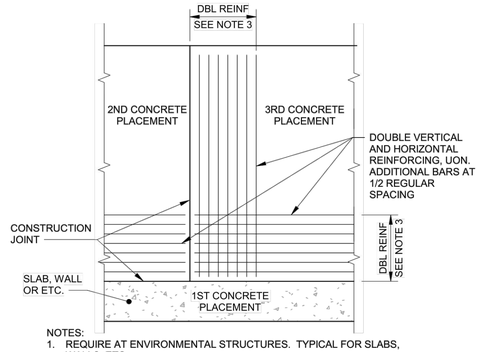
NOTES:
1. OPENINGS SMALLER THAN 16"x16" AND INDIVIDUAL PIPE SLEEVES ≤ 16"ø REQUIRE NO ADDITIONAL REINFORCING STEEL. WORK THE REINF STEEL AROUND THE SLEEVES.
2. RECTANGULAR OPENING SHOWN; ADDITIONAL REINFORCING STEEL AROUND INDIVIDUAL ROUND OPENINGS > 16"ø SIMILAR.
3. SPACE GROUPED SLEEVES PER DETAILS "1" & "2" ABOVE AND TREAT AS A SINGLE EFFECTIVE RECTANGULAR OPENING. PROVIDE ADDITIONAL REINFORCING STEEL AROUND EFFECTIVE OPENING (AS SHOWN FOR SINGLE OPNG) AND INSTALL REQUIRED HORIZONTAL AND VERT REINF STEEL UNINTERRUPTED BETWEEN SLEEVES.
4. COORDINATE ALL OPENING SIZE & LOCATION WITH ARCH, MECH, ELEC & PLUMBING REQUIREMENTS.

9 OPENINGS IN CONCRETE WALL WITH MULTIPLE SLEEVES
SDS-04 NTS



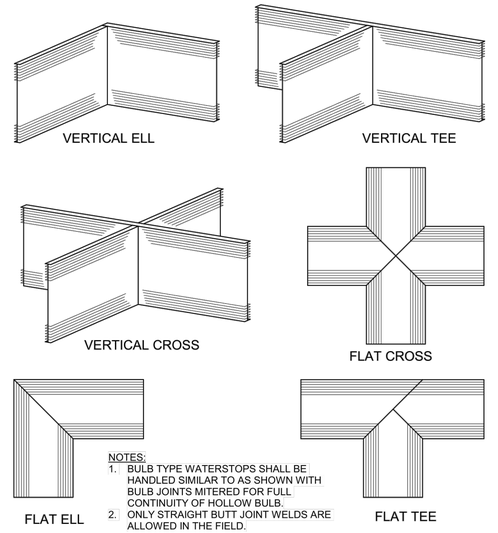
NOTES:
1. PROVIDE ADDITIONAL REINFORCING, AT EACH MAT, ON EACH SIDE OF OPENING EQUAL TO ONE HALF OF THE REINFORCING INTERRUPTED BY THE OPENING, PROVIDE AT LEAST (2) ADDITIONAL BARS ON EACH SIDE.
2. ADDITIONAL REINFORCING SHALL EXTEND BEYOND THE OPENING, AT LEAST, THE WIDTH OF THE OPENING (PERDENDICULAR TO THE BAR) PLUS A DEVELOPMENT LENGTH.
3. ADDITIONAL REINFORCING SHALL MATCH EXISTING REINFORCING SIZE AND SPACING. ADDITIONAL REINFORCING SHALL BE LOCATED AT MID-SPACING OF TYPICAL MAT REINFORCING.
4. APPLIES TO OPENINGS UP TO 6'-0" MAXIMUM DIMENSION IN ANY DIRECTION, UNLESS OTHERWISE NOTED. OPENINGS LESS THEN 12" DO NOT REQUIRE ADDITIONAL REINFORCING. ADDITIONAL REINFORCEMENT MAY BE OMITTED WHERE OPENING IS FRAMED BY BEAMS OR WALLS. RE-ENTRY REINFORCING IS REQUIRED
5. REINFORCING THAT IS PERPENDICULAR TO THE OPENING LARGER THEN 3'-0", SHALL TERMINATE AT THE OPENING WITH A STANDARD 90 DEGREE OR 180 DEGREE HOOK, UNO.
6. OPENINGS ARE NOT ALL SHOWN ON STRUCTURAL DRAWINGS. PROVIDE OPENINGS IN ACCORDANCE WITH ARCHITECTURAL, MECHANICAL, PLUMPING, ELECTRICAL, CIVIL, AND OTHER CONTRACT DRAWINGS.
7. OPENINGS SPACED CLOSER THAN THE MINIMUM SPACING SHALL BE REINFORCED AS A SINGLE OPENING.
8. OPENINGS LARGER THAN ALLOWED ON THIS DETAIL REQUIRE CONSULTATION WITH THE SER.

10 REINF AT ROUND OR SQUARE OPENINGS
SDS-04 NTS



NOTES:
1. REQUIRE AT ENVIRONMENTAL STRUCTURES. TYPICAL FOR SLABS, WALLS, ETC.
2. PLACEMENT OF CONCRETE AGAINST EXSTING CONCRETE SHALL INCLUDE ADDITIONAL REINFORCING. MATCH TYPICAL REINFORCING SIZE AND SPACING. LOCATION REINFORCING AT 1/2 SPACING OF TYPICAL SPACING. PROVIDE DOWELS TO MATCH REINFORCING.
3. 2x WALL THICKNESS, 12" MINIMUM, 36" MAXIMUM, U.N.O.

11 ADDITIONAL REINFORCEMENT
SDS-04 NTS



NOTES:
1. BULB TYPE WATERSTOPS SHALL BE HANDLED SIMILAR TO AS SHOWN WITH BULB JOINTS MITERED FOR FULL CONTINUITY OF HOLLOW BULB.
2. ONLY STRAIGHT BUTT JOINT WELDS ARE ALLOWED IN THE FIELD.

12 SHOP FABRICATED WATERSTOP
SDS-04 NTS

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

STATE OF OHIO — BART STROBEL 90274 — REGISTERED PROFESSIONAL ENGINEER

NO	REVISION	DATE

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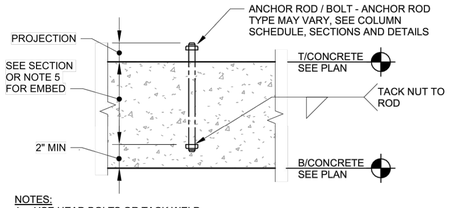
DRAWN BY:	TLM
CHECKED BY:	BF

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY — WILLOUGHBY, OHIO

SITE STRUCTURES - 20 SERIES

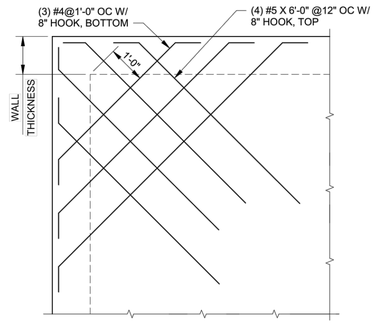
STANDARD DETAILS

PROJECT NO. 230264
DISCIPLINE: STRUCTURAL
SHEET NAME: 20-S-04
SHEET 16 OF 28



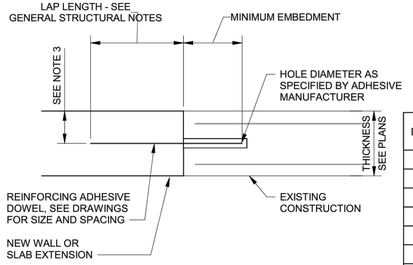
NOTES:
1. USE HEAD BOLTS OR TACK WELD
2. COORDINATE PROJECTION WITH EQUIPMENT SUPPLIER UNLESS NOTED OTHERWISE
3. DO NOT USE 'J' BOLTS. 'J' BOLTS ARE NOT ACCEPTABLE
4. ANCHOR BOLTS TO BE STAINLESS STEEL UNLESS NOTED OTHERWISE
5. PROVIDE 12" MINIMUM ANCHOR EMBED FOR PEMB COLUMNS AND MAIN FRAMES

1 ANCHOR BOLT DETAIL
SDS-05 NTS

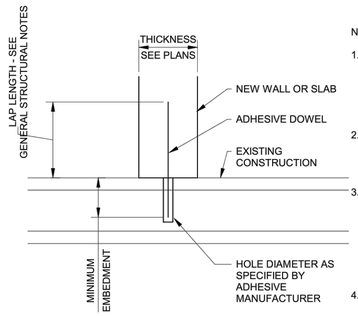


NOTE:
ADDITIONAL CORNER BARS REQUIRED FOR ALL CORNERS OF STRUCTURAL SLABS THAT ARE LARGER THEN 10'-0".

2 OUTSIDE CORNER REINFORCING
SDS-05 NTS



DOWEL SIZE	MINIMUM EMBEDMENT
#3	5"
#4	7"
#5	8"
#6	10"
#7	12"
#8	14"
#9	16"



NOTES:
1. EMBEDMENT LENGTH IS BASED ON DOWELS SET WITH HILTI HIT-RE 500-V3 ADHESIVE ANCHOR SYSTEM. SUBMIT ICC EVALUATION SERVICE REPORT (ES REPORT) IF ALTERNATE PRODUCT IS PROPOSED.
2. INSTALL DOWELS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND ICC ES REPORT ESR-3814.
3. LOCATE DOWELS CENTERED IN WALL OR SLAB UNLESS NOTED OTHERWISE ON DRAWINGS. WHERE 2 ROWS OF DOWELS ARE INDICATED, STAGGER SPACING AND LOCATE ALTERNATING DOWELS AT MINIMUM EDGE DISTANCE FROM OPPOSITE FACES.
4. SPECIAL INSPECTION IS REQUIRED FOR ADHESIVE DOWEL INSTALLATION.

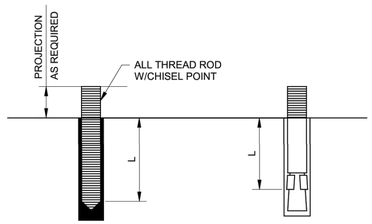
3 REBAR DOWELS SET WITH ADHESIVE
SDS-05 NTS

NOT USED

6 EQ TANK TEARDROP COLUMN BASE
SDS-05 NTS

NOT USED

8 EXTERIOR EQUIPMENT PAD DETAIL
SDS-05 NTS

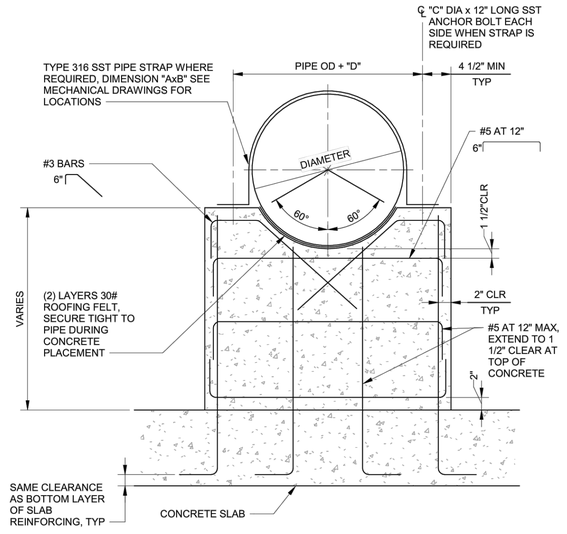


ADHESIVE ANCHOR EXPANSION ANCHOR

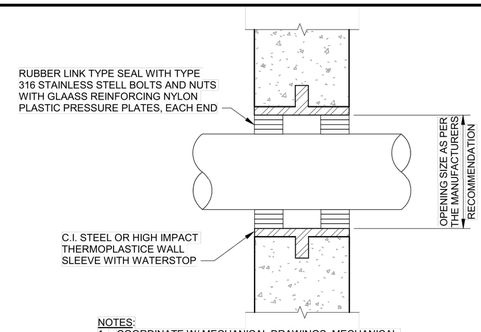
MINIMUM EMBEDMENT LENGTH, L		
DIAMETER	ADHESIVE ANCHOR	EXPANSION ANCHOR
3/8"	4 1/2"	3 1/2"
1/2"	6"	4 3/4"
5/8"	7 1/2"	5 1/2"
3/4"	9"	6 1/2"
7/8"	10 1/2"	-
1"	12"	-

NOTES:
1. CONFORM TO ICC EVALUATION SERVICE REPORT (ES REPORT) REQUIREMENTS AND MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION.
2. PROVIDE TYPE 316 STAINLESS STEEL ALL-THREAD ROD MATERIAL.
3. PROVIDE HOLE DIAMETER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.
4. EXPANSION ANCHOR SHALL BE STAINLESS STEEL ANCHORS.
5. EXPANSION ANCHOR EMBEDMENT LENGTHS ARE BASED ON HILTI KWIK BOLT TZ STAINLESS STEEL ANCHORS. SUBMIT ICC EVALUATION SERVICE REPORT (ES REPORT) FOR ALTERNATE PRODUCTS.
6. ADHESIVE ANCHOR EMBEDMENT LENGTHS ARE BASED ON HILTI HIT-RE 500-V3 ADHESIVE. SUBMIT ICC ES REPORT FOR ALTERNATE PRODUCTS.

4 CONCRETE ANCHORS
SDS-05 NTS



9 PIPE SADDLE SUPPORT
SDS-05 NTS



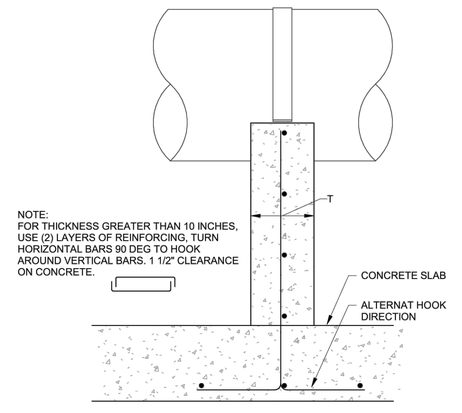
NOTES:
1. COORDINATE W/ MECHANICAL DRAWINGS. MECHANICAL DRAWINGS TAKE PRECEDENCE.
2. FOR EXISTING CONCRETE, PROVIDE CORED HOLE IN LIEU OF SLEEVE. DO NOT CORE WITHOUT PRIOR WRITEN APPROVAL FROM THE ENGINEER

COMPRESSIVE RUBBER LINK TYPE

5 PIPE SLEEVE THRU CONCRETE WALL DETAIL
SDS-05 NTS

NOTE:
PIPE SHALL BE CENTERED IN CONCRETE BASE

7 MEDIUM DUTY GUARD POST
SDS-05 NTS



PIPE SIZE	DIMENSIONS					
	A	B	C	D	T	U
6" - 12"	1/4"	2"	3/4"	3"	8"	3/16"
14" - 18"	1/4"	4"	3/4"	3"	9"	1/4"
20" - 36"	3/8"	5"	3/4"	3"	10"	3/8"
42" - 54"	3/8"	6"	1"	4"	12"	3/8"
60" - 72"	3/8"	6"	1 1/8"	5"	16"	1/2"

10 PIPE SADDLE SUPPORT SECTION
SDS-05 NTS

STATE OF OHIO PROFESSIONAL ENGINEER REGISTERED
BART STROBEL 90274
verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

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CITY OF WILLOUGHBY
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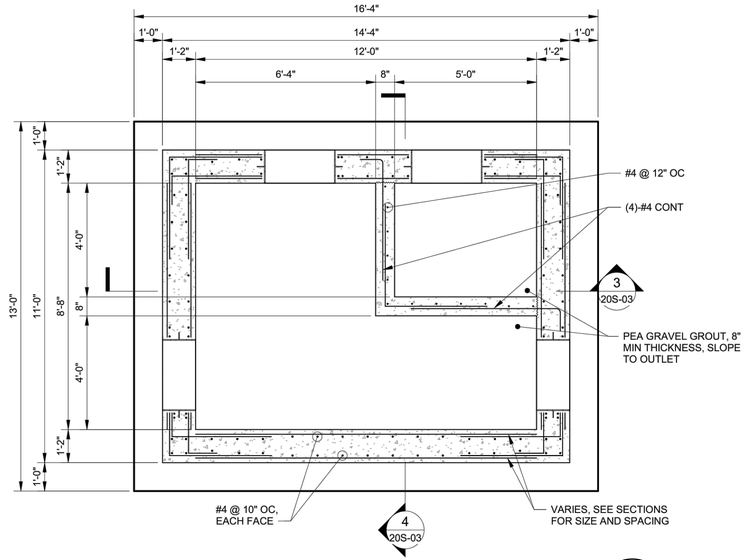
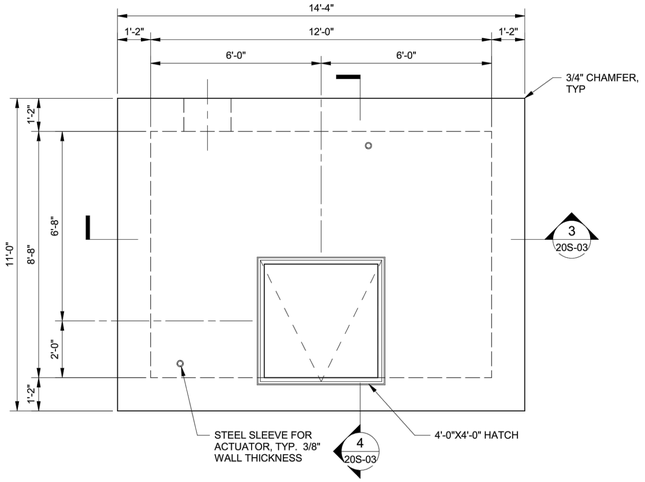
LAKE COUNTY

SITE STRUCTURES - 20 SERIES
STANDARD DETAILS

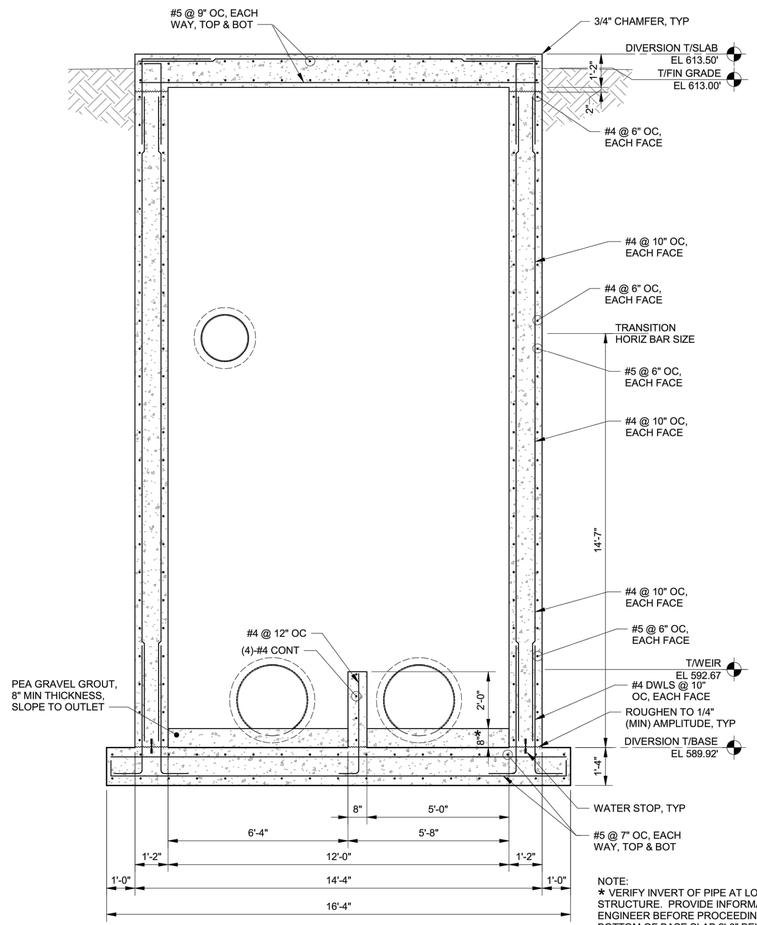
PROJECT NO.
230264
DISCIPLINE
STRUCTURAL
SHEET NAME
20-S-05
SHEET 17 OF 28



1 20S-03 BASE SLAB
3/8" = 1'-0"

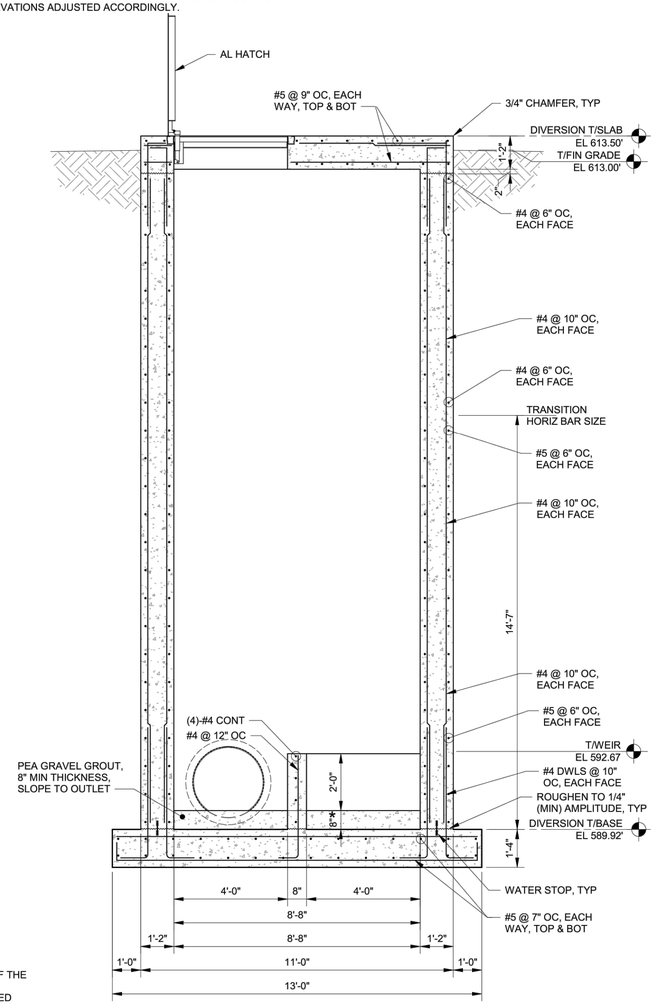


2 20S-03 TOP SLAB
3/8" = 1'-0"



NOTE:
* VERIFY INVERT OF PIPE AT LOCATION OF THE STRUCTURE. PROVIDE INFORMATION TO ENGINEER BEFORE PROCEEDING. LOCATED BOTTOM OF BASE SLAB 2'-0" BELOW INVERT AND LOCATE TOP OF WEIR 2'-0" ABOVE INVERT.

3 20S-03 SECTION
3/8" = 1'-0"



4 20S-03 SECTION
3/8" = 1'-0"

DIVERSION PLAN NOTES:

1. SEE SHEETS SD-S-01 THRU SD-S-04 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET SD-S-05 AND SD-S-06 FOR TYPICAL DETAILS.
3. COORDINATE DIMENSIONS NOT SHOWN WITH PROCESS MECHANICAL AND CIVIL DRAWINGS. DIMENSIONS SHALL CONFORM TO THE PROCESS DRAWINGS.
4. COORDINATE LOCATION AND SIZE OF PENETRATIONS AND OPENINGS WITH PROCESS. MECHANICAL, ELECTRICAL, AND CIVIL DRAWINGS, TYP. OPENING SHALL BE PER PROCESS MECHANICAL AND CIVIL STANDARDS FOR SIZE AND SEALING REQUIREMENTS.
5. TOP OF GRADE SHALL BE 6" BELOW THE STRUCTURE,UNO, TO PREVENT STORM WATER SETTIMENT FROM IMPACTING THE HATCH DRAIN CHANNELS.
6. TOP OF STRUCTURAL SLAB ELEVATION SHALL BE AS INDICATED ON PLAN AND SECTIONS, UNO.
7. TOP OF WALL ELEVATION SHALL BE AS INDICATED ON PLAN AND SECTIONS, UNO.
8. TOP OF BASE SLAB ELEVATION SHALL BE AS INDICATED ON PLAN AND SECTIONS, UNO.
9. BOTTOM OF FOOTING DETAILS SHOWN ARE BASED UPON FOUNDATIONS BEARING ON MATERIALS AS LISTED IN FOUNDATION GENERAL NOTES. BEARING ELEVATIONS HAVE BEEN ESTABLISHED FROM THE GRADING PLAN AND SOILS REPORT. FOUNDATION BEARING SURFACES MUST BE INSPECTED AND APPROVED IN ACCORDANCE WITH FOUNDATION GENERAL NOTES AND BOTTOM OF FOOTING ELEVATIONS ADJUSTED ACCORDINGLY.
10. ADDITIONAL BASE MATERIAL, ALL SLABS AND FOOTINGS SHALL BEAR ON, AT LEAST, 6" COMPACTED ENGINEERED GRANULAR MATERIAL.
11. PROVIDE STANDARD HOOKS AS SHOWN
12. PROVIDE WATERSTOPS AT ALL CONSTRUCTION JOINTS. WATERSTOPS NOT REQUIRED WITHIN 12" FROM TOP OF GRADE OR AT WEIR WALL JOINTS
13. REINFORCING FOR WEIR WALL SHALL DOWEL INTO WETWELL WALLS AND BASE SLAB.
14. HATCHES SHALL BE ALUMINUM WITH RECESSED HASPS AND REMOVABLE HANDLES. HATCHES WITHIN FENCED AREAS SHALL HAVE A 300 PSF LOAD RATING. HATCHES WITHIN ROW SHALL HAVE AN HS-20/RL-93 LOAD RATING.
15. CHAMFER AT TOP SLAB SHALL RUN DOWN VERTICAL EXTERIOR CORNER TO, AT LEAST 12" BELOW GRADE.
16. CONTRACTOR SHALL EXERCISE EXTREME CAUTION SO AS NOT TO UNDERMINE, DISTURB, DAMAGE OR, IN ANY WAY, CAUSE UNDESIRABLE MOVEMENT, CRACKING, AND/OR SETTLEMENT OF THE ADJACENT STRUCTURES OR CONSTRUCTION.
17. DO NOT ALLOW GROUND WATER TO ACCUMULATE WITHIN EXCAVATION. STRUCTURE REQURES SOILS WEIGHT TO RESIST BUOYANCY.
18. PROVIDE RE-ENTRY REINFORCING AT ALL RE-ENTRY CORNERS.

STATE OF OHIO
BART STROBEL
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(440) 951-9000

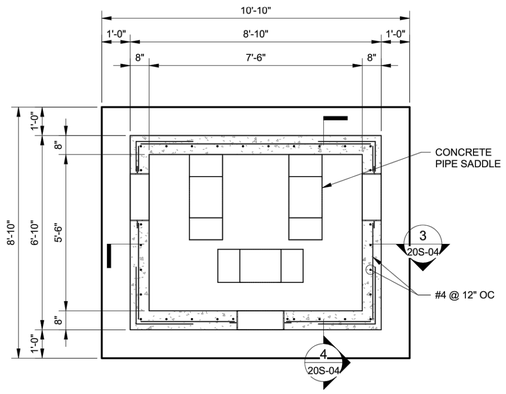
NO	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	AS NOTED
DESIGNED BY:	BAS
DRAWN BY:	TLM
CHECKED BY:	BF

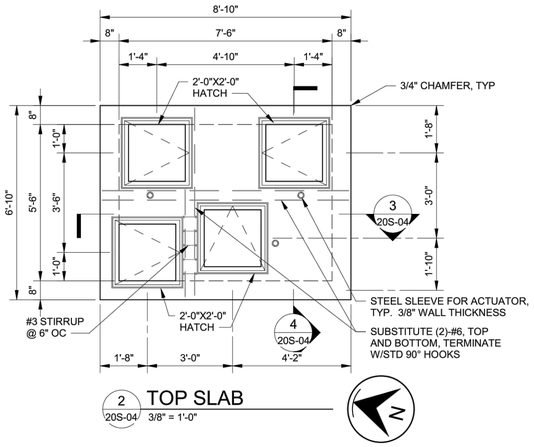
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

SITE STRUCTURES - 20 SERIES
REGULATOR STRUCTURE

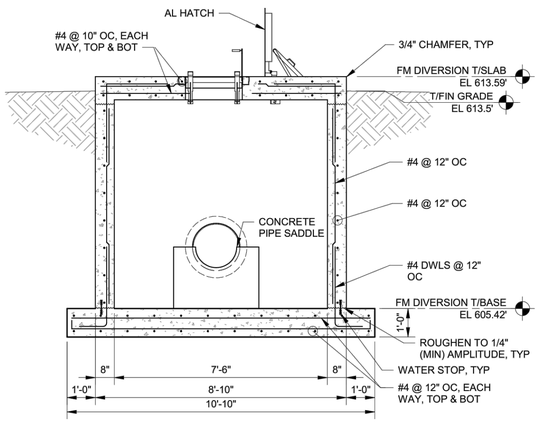
PROJECT NO.
230264
DISCIPLINE
STRUCTURAL
SHEET NAME
20-S-06
SHEET 18 OF 28



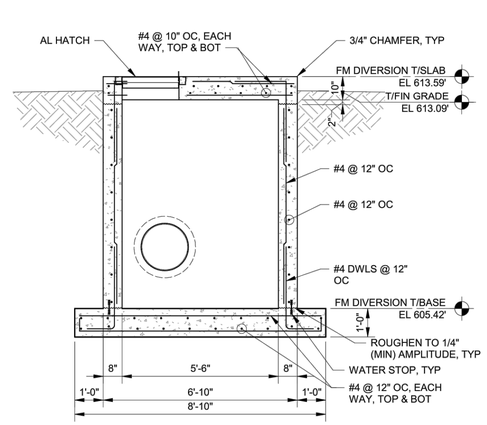
1 20S-04 BASE SLAB 3/8" = 1'-0"



2 20S-04 TOP SLAB 3/8" = 1'-0"



3 20S-04 SECTION 3/8" = 1'-0"



4 20S-04 SECTION 3/8" = 1'-0"

FM DIVERSION PLAN NOTES:

1. SEE SHEETS SD-S-01 THRU SD-S-04 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET SD-S-05 AND SD-S-06 FOR TYPICAL DETAILS.
3. COORDINATE DIMENSIONS NOT SHOWN WITH PROCESS MECHANICAL AND CIVIL DRAWINGS. DIMENSIONS SHALL CONFORM TO THE PROCESS DRAWINGS.
4. COORDINATE LOCATION AND SIZE OF PENETRATIONS AND OPENINGS WITH PROCESS. MECHANICAL, ELECTRICAL, AND CIVIL DRAWINGS, TYP. OPENING SHALL BE PER PROCESS MECHANICAL AND CIVIL STANDARDS FOR SIZE AND SEALING REQUIREMENTS.
5. TOP OF GRADE SHALL BE 6" BELOW THE STRUCTURE,UNO, TO PREVENT STORM WATER SETTIMENT FROM IMPACTING THE HATCH DRAIN CHANNELS.
6. TOP OF STRUCTURAL SLAB ELEVATION SHALL BE AS INDICATED ON PLAN AND SECTIONS, UNO.
7. TOP OF WALL ELEVATION SHALL BE AS INDICATED ON PLAN AND SECTIONS, UNO.
8. TOP OF BASE SLAB ELEVATION SHALL BE AS INDICATED ON PLAN AND SECTIONS, UNO.
9. BOTTOM OF FOOTING DETAILS SHOWN ARE BASED UPON FOUNDATIONS BEARING ON MATERIALS AS LISTED IN FOUNDATION GENERAL NOTES. BEARING ELEVATIONS HAVE BEEN ESTABLISHED FROM THE GRADING PLAN AND SOILS REPORT. FOUNDATION BEARING SURFACES MUST BE INSPECTED AND APPROVED IN ACCORDANCE WITH FOUNDATION GENERAL NOTES AND BOTTOM OF FOOTING ELEVATIONS ADJUSTED ACCORDINGLY.
10. ADDITIONAL BASE MATERIAL, ALL SLABS AND FOOTINGS SHALL BEAR ON, AT LEAST, 6" COMPACTED ENGINEERED GRANULAR MATERIAL.
11. PROVIDE STANDARD HOOKS AS SHOWN
12. PROVIDE WATERSTOPS AT ALL CONSTRUCTION JOINTS. WATERSTOPS NOT REQUIRED WITHIN 12" FROM TOP OF GRADE OR AT WEIR WALL JOINTS
13. HATCHES SHALL BE ALUMINUM WITH RECESSED HASPS AND REMOVABLE HANDLES. HATCHES WITHIN FENCED AREAS SHALL HAVE A 300 PSF LOAD RATING. HATCHES WITHIN ROW SHALL HAVE AN HS-20/RL-93 LOAD RATING.
14. CHAMFER AT TOP SLAB SHALL RUN DOWN VERTICAL EXTERIOR CORNER TO, AT LEAST 12" BELOW GRADE.
15. CONTRACTOR SHALL EXERCISE EXTREME CAUTION SO AS NOT TO UNDERMINE, DISTURB, DAMAGE OR, IN ANY WAY, CAUSE UNDESIRABLE MOVEMENT, CRACKING, AND/OR SETTLEMENT OF THE ADJACENT STRUCTURES OR CONSTRUCTION.
16. PROVIDE RE-ENTRY REINFORCING AT ALL RE-ENTRY CORNERS.
17. REFERENCE DETAIL 6 AND 7 ON 20S-02 FOR STIRRUP AND REINFORCE ARRANGEMENT AT NARROW STRIP BETWEEN HATCHES.

STATE OF OHIO
BART STROBEL
90274
REGISTERED
PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE

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CITY OF WILLOUGHBY
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PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

SITE STRUCTURES - 20 SERIES
DIVERSION STRUCTURE

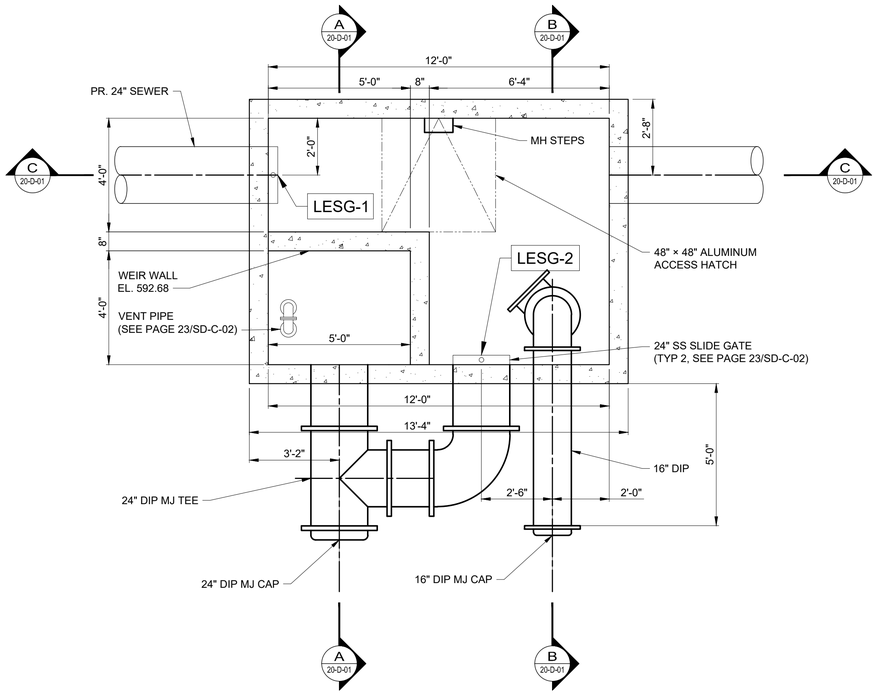
PROJECT NO.
230264
DISCIPLINE
STRUCTURAL
SHEET NAME
20-S-07
SHEET 19 OF 28

VALVE SCHEDULE						
TAG #	TYPE	SIZE	END TYPE	OPERATOR	SERVICE	REMARKS
LEPV-5	PV	16"	FL	EM	DIVERSION STRUCTURE	
LEPV-6	PV	16"	FL	EM	DIVERSION STRUCTURE	
LEPV-7	PV	16"	FL	EM	DIVERSION STRUCTURE	

GATE SCHEDULE						
TAG #	TYPE	HEIGHT	WIDTH	OPERATOR	SERVICE	REMARKS
LESG-1	SG	24"	24"	EM	REGULATOR STRUCTURE	
LESG-2	SG	24"	24"	EM	REGULATOR STRUCTURE	

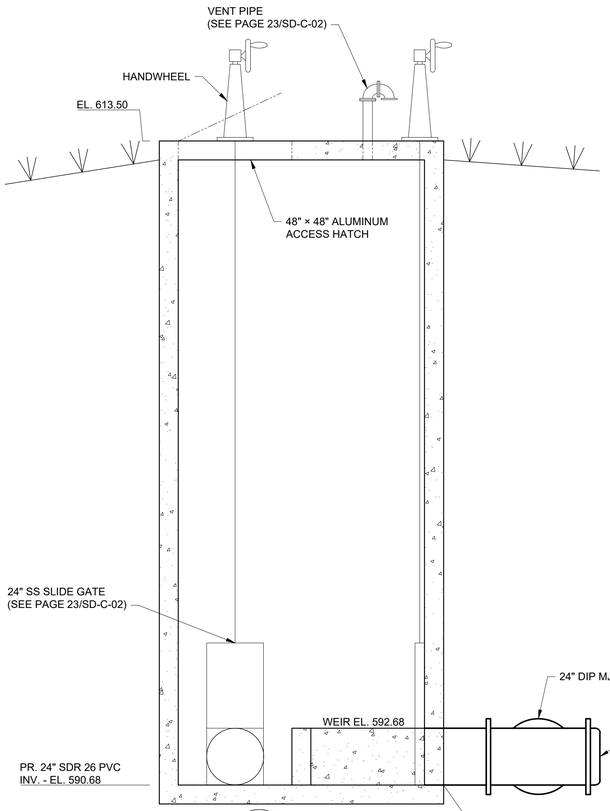
NOTES:

1. 16-INCH BASE ELBOW SHALL BE ROTATED TOWARDS LESG-1.
2. CONTRACTOR SHALL PROVIDE GROUTED FLOOR OF THE REGULATOR STRUCTURE TO CHANNELIZE FLOW THROUGH THE STRUCTURE.

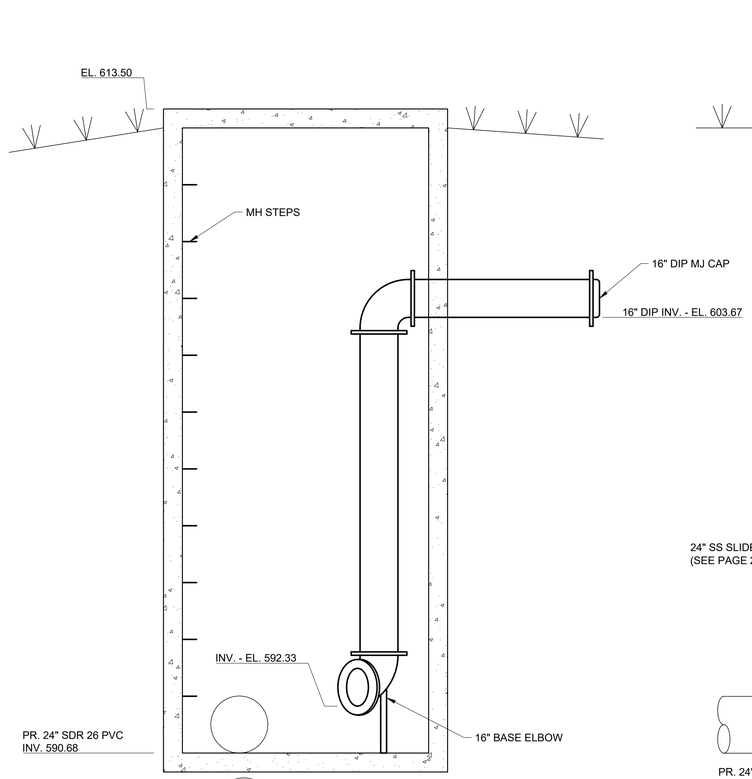


REGULATOR STRUCTURE (EL. 600.00)

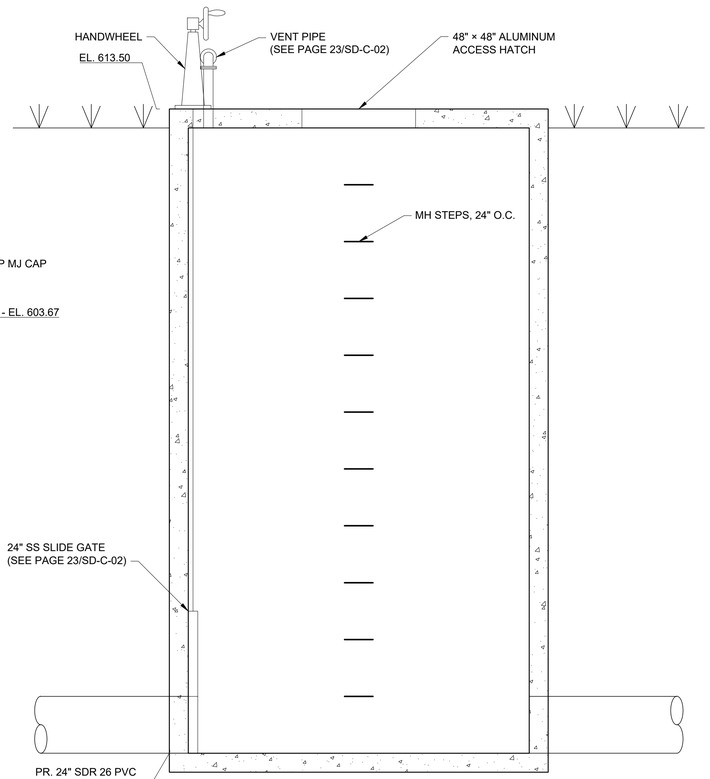
SCALE: 3/8" = 1'-0"'



A 20-D-01 **SECTION** SCALE: 3/8" = 1'-0"



B 20-D-01 **SECTION** SCALE: 3/8" = 1'-0"



C 20-D-01 **SECTION** SCALE: 3/8" = 1'-0"

RYAN S. SCHUSTER 72755 REGISTERED PROFESSIONAL ENGINEER
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MENTOR, OHIO 44060
(440) 951-9000

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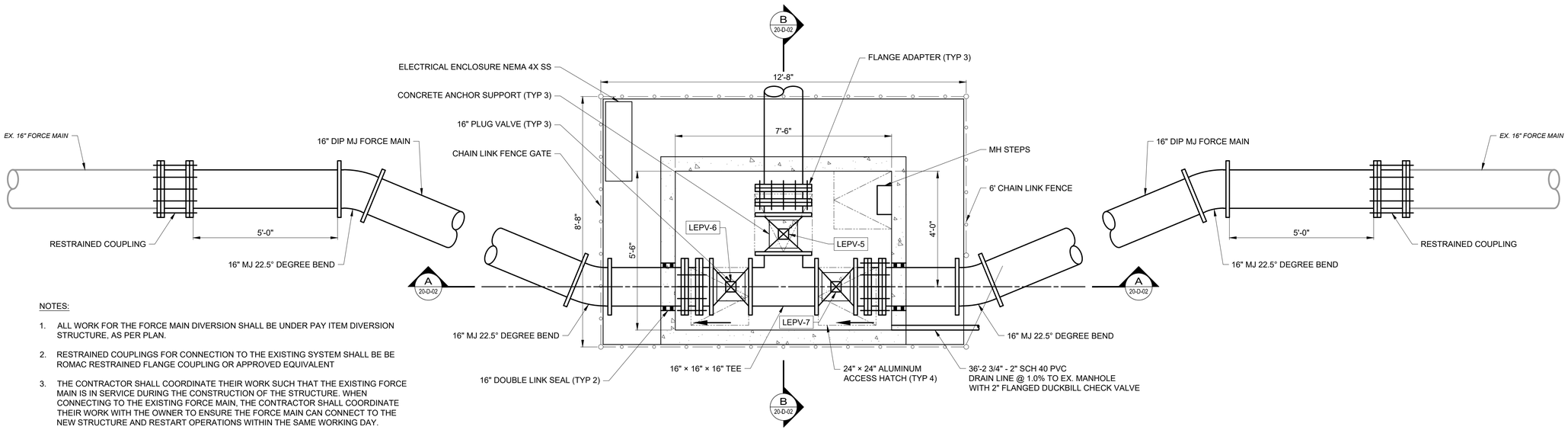
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

SITE STRUCTURES - 20 SERIES

REGULATOR STRUCTURE DETAILS

PROJECT NO.	
230264	
DISCIPLINE	
PROCESS	
SHEET NAME	
20-D-01	
SHEET	OF
20	28

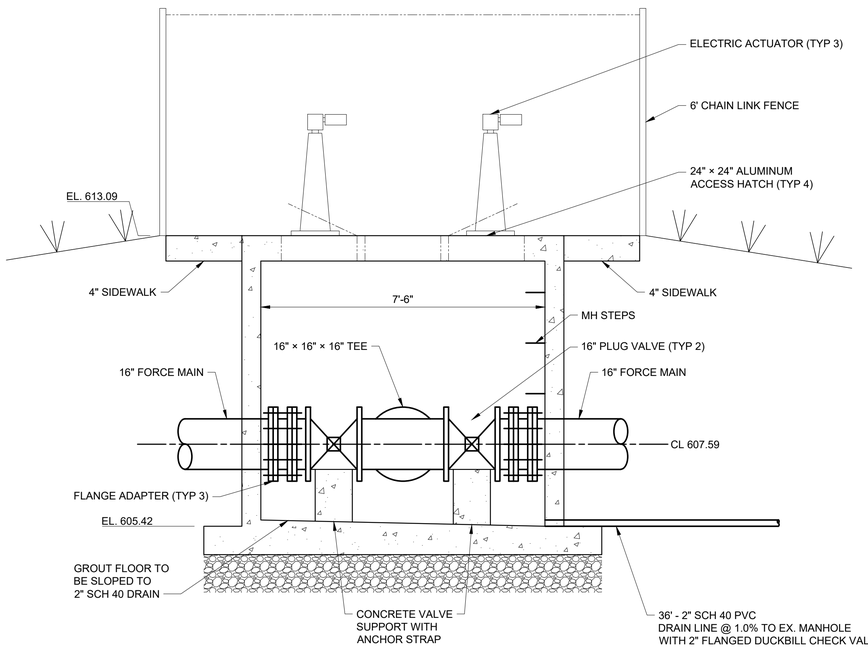


FORCE MAIN DIVERSION STRUCTURE (PLAN VIEW)

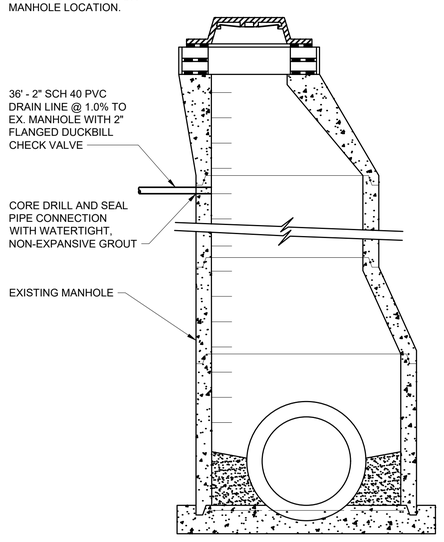
SCALE: 1/2" = 1'-0"

NOTES:

1. ALL WORK FOR THE FORCE MAIN DIVERSION SHALL BE UNDER PAY ITEM DIVERSION STRUCTURE, AS PER PLAN.
2. RESTRAINED COUPLINGS FOR CONNECTION TO THE EXISTING SYSTEM SHALL BE BE ROMAC RESTRAINED FLANGE COUPLING OR APPROVED EQUIVALENT
3. THE CONTRACTOR SHALL COORDINATE THEIR WORK SUCH THAT THE EXISTING FORCE MAIN IS IN SERVICE DURING THE CONSTRUCTION OF THE STRUCTURE. WHEN CONNECTING TO THE EXISTING FORCE MAIN, THE CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE OWNER TO ENSURE THE FORCE MAIN CAN CONNECT TO THE NEW STRUCTURE AND RESTART OPERATIONS WITHIN THE SAME WORKING DAY.
4. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND ELEVATION OF THE EXISTING FORCE MAIN TO CONFIRM THE ELEVATION OF THE FORCE MAIN WITHIN THE DIVERSION STRUCTURE. THE TOP OF THE DIVERSION STRUCTURE SHALL BE CONSTRUCTED 6" ABOVE EXISTING GRADE, WITH GRADE SLOPED AWAY FROM THE TOP OF THE STRUCTURE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND OWNER FOR ANY REQUIRED ELEVATION CHANGES OF THE STRUCTURE.

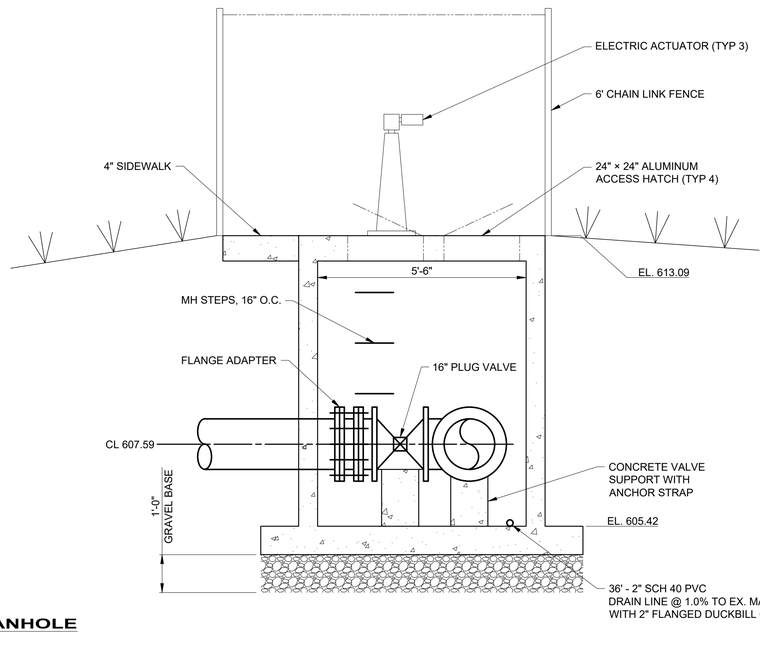


A 20-D-02 **SECTION**
SCALE: 1/2" = 1'-0"



DRAIN LINE CONNECTION INTO EX. MANHOLE

SCALE: NOT TO SCALE



B 20-D-02 **SECTION**
SCALE: 1/2" = 1'-0"

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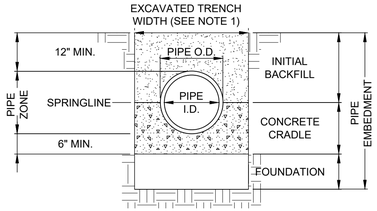
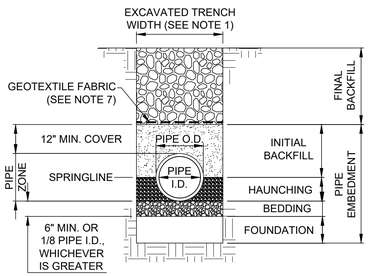
SITE STRUCTURES - 20 SERIES

FORCE MAIN DIVERSION STRUCTURE DETAILS

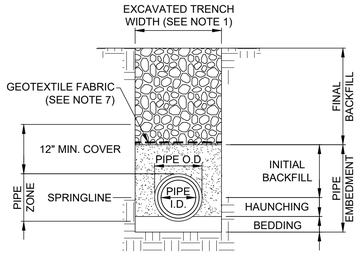
PROJECT NO.	
230264	
DISCIPLINE	
PROCESS	
SHEET NAME	
20-D-02	
SHEET	OF
21	28



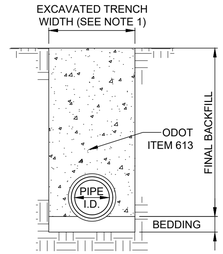
CLASS `A` PIPE EMBEDMENT



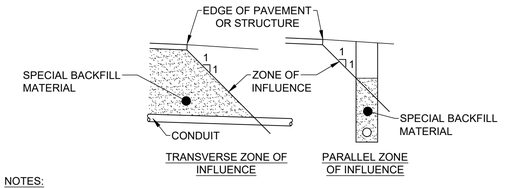
CLASS `B` PIPE EMBEDMENT



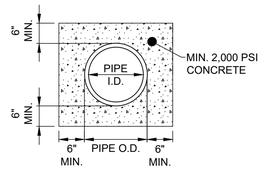
CLASS `C` PIPE EMBEDMENT



CLASS `D` PIPE EMBEDMENT



TRANSVERSE ZONE OF INFLUENCE — PARALLEL ZONE OF INFLUENCE



TYPICAL PIPE ENCASEMENT

NOTES:

1. MAXIMUM EXCAVATED TRENCH WIDTH: THE MAXIMUM EXCAVATED TRENCH WIDTH FROM THE BOTTOM OF THE TRENCH TO 12" OVER THE TOP OF THE PIPE (WITHIN PIPE EMBEDMENT) SHALL BE O.D. + 24" FOR ALL PIPES UP TO AND INCLUDING 24" I.D. + 30" FOR PIPE FROM 24" I.D. TO 54" I.D. AND O.D. + 48" FOR PIPES SIZES 60" I.D. AND OVER.

2. FOUNDATION: REQUIRED FOR THIS PROJECT. AS PER THE GEOTECHNICAL REPORT, THE CONTRACTOR SHALL EXCAVATE AND REMOVE AN ADDITIONAL 12" OF MATERIAL AND REPLACE WITH A LAYER OF 6" OF AASHTO NO. 1 AND NO. 2 CRUSHED LIMESTONE, FOLLOWED BY A LAYER OF 6" OF AASHTO NO. 57 GRANULAR LIMESTONE.

3. PIPE EMBEDMENT:

   CLASS A: CLASS A PIPE EMBEDMENT SHALL BE USED FOR ALL PIPING UNDER PAVEMENT OR STRUCTURES WITH LESS THAN 12 INCHES OF PIPE COVER TO THE SUBGRADE. THE CONCRETE CRADLE SHALL BE IN ACCORDANCE WITH ODOT ITEM 499, CLASS "C". THE INITIAL BACKFILL SHALL BE AASHTO NO. 57 LIMESTONE GRANULAR PIPE EMBEDMENT.

   CLASS B: CLASS B PIPE EMBEDMENT SHALL BE USED FOR ALL PIPING UNLESS OTHERWISE NOTED ON THE PLANS OR AUTHORIZED BY THE ENGINEER. THE HAUNCHING SHALL BE AASHTO NO. 57 LIMESTONE GRANULAR PIPE EMBEDMENT. IN ALL AREAS UNDER PAVEMENT, STRUCTURES OR WITHIN THE ZONE OF INFLUENCE, THE INITIAL BACKFILL SHALL BE AASHTO NO. 57 LIMESTONE GRANULAR PIPE EMBEDMENT. IN ALL AREAS OUTSIDE OF PAVEMENT, STRUCTURES OR THE ZONE OF INFLUENCE, THE INITIAL BACKFILL SHALL BE SUITABLE ON-SITE MATERIAL APPROVED BY THE ENGINEER FOR ONLY REINFORCED CONCRETE PIPE AND DUCTILE IRON PIPE. THE INITIAL BACKFILL FOR ALL OTHER PIPES SHALL BE AASHTO NO. 57 LIMESTONE GRANULAR PIPE EMBEDMENT.

   CLASS C: CLASS C PIPE EMBEDMENT SHALL ONLY BE USED FOR DUCTILE IRON WATER MAIN, DUCTILE IRON FORCE MAINS OR AS AUTHORIZED BY THE ENGINEER. THE PIPE EMBEDMENT SHALL BE AASHTO NO. 57 LIMESTONE GRANULAR PIPE EMBEDMENT IN ALL AREAS UNDER PAVEMENT, STRUCTURES OR WITHIN THE ZONE OF INFLUENCE. THE PIPE EMBEDMENT SHALL BE SUITABLE ON-SITE MATERIAL APPROVED BY THE ENGINEER IN ALL AREAS OUTSIDE OF PAVEMENT, STRUCTURES OR THE ZONE OF INFLUENCE. WHERE ROCK OR SHALE IS ENCOUNTERED, A MINIMUM 6-INCHES OF AASHTO NO. 57 LIMESTONE GRANULAR PIPE BEDDING OR SAND BEDDING SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

   CLASS D: CLASS D PIPE EMBEDMENT SHALL BE USED FOR ALL WORK WITHIN THE RIGHT-OF-WAY OF LAKESHORE BOULEVARD. THE BEDDING SHALL BE AASHTO NO. 57 LIMESTONE GRANULAR PIPE BEDDING. THE BACKFILL SHALL BE ODOT ITEM 613 LOW STRENGTH MORTAR BACKFILL.

4. FINAL BACKFILL: IN ALL AREAS UNDER PAVEMENT, STRUCTURES OR WITHIN THE ZONE OF INFLUENCE THE FINAL BACKFILL SHALL BE SPECIAL BACKFILL MATERIAL. IN ALL AREAS OUTSIDE OF PAVEMENT, STRUCTURES OR THE ZONE OF INFLUENCE, THE FINAL BACKFILL SHALL BE SUITABLE ON-SITE MATERIAL APPROVED BY THE ENGINEER. LSM SHALL BE USED IN PLACE OF SPECIAL BACKFILL MATERIAL WHEN TOP OF PIPE IS WITHIN 5' OF PAVEMENT OR WITHIN CITY RIGHT-OF-WAY OR UNLESS INDICATED ON DRAWINGS

5. SPECIFICATIONS: ALL TRENCHING, PIPE EMBEDMENT AND BACKFILL MATERIALS SHALL BE IN ACCORDANCE WITH SPECIFICATION 310000 - EARTHWORK.

6. CLAY TRENCH DAMS: CLAY TRENCH DAMS SHALL BE REQUIRED FOR EACH LATERAL, UPSTREAM OF EVERY MANHOLE, AS SHOWN ON THE DRAWINGS, AND AS DIRECTED BY THE ENGINEER.

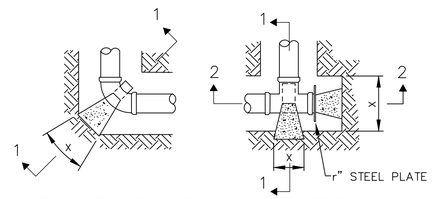
7. GEOTEXTILE FABRIC: INSTALL A GEOTEXTILE FABRIC IN ACCORDANCE WITH ODOT 712.09, TYPE A, AFTER ALL INITIAL BACKFILL CONSISTING OF AASHTO NO. 57 LIMESTONE GRANULAR PIPE EMBEDMENT.

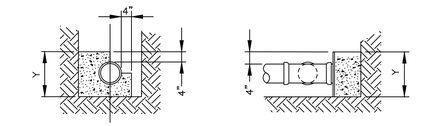
8. TYPICAL PIPE ENCASEMENT, AS PER PLAN OR AS DIRECTED BY THE ENGINEER.

TRENCHING, BEDDING, AND BACKFILL DETAIL

NOT TO SCALE

SIZING SCHEDULE	BEARING FACE (X Y) IN SQ. FT. / CONCRETE VOLUME IN CU. FT.					
PIPE SIZE	22½° BEND SOIL BEARING CAPACITY			45° BEND SOIL BEARING CAPACITY		
	1000 P.S.F.	3000 P.S.F.	5000 P.S.F.	1000 P.S.F.	3000 P.S.F.	5000 P.S.F.
4	1.40 / 0.14	0.46 / 0.09	0.26 / 0.06	2.70 / 0.12	0.90 / 0.06	0.54 / 0.06
6	2.80 / 1.15	0.93 / 0.10	0.56 / 0.07	5.50 / 0.15	1.83 / 0.10	1.10 / 0.07
8	4.80 / 0.20	1.60 / 0.13	0.96 / 0.09	9.60 / 0.23	3.20 / 0.15	1.92 / 0.09
10	7.90 / 0.53	2.63 / 0.34	1.96 / 0.22	15.70 / 0.34	5.23 / 0.20	3.14 / 0.13
12	11.30 / 0.62	3.76 / 0.40	2.26 / 0.26	22.30 / 0.75	7.43 / 0.49	4.46 / 0.32
14	15.30 / 0.74	5.10 / 0.48	3.06 / 0.31	30.20 / 0.98	10.06 / 0.64	6.04 / 0.42
16	19.80 / 1.17	6.60 / 0.76	3.96 / 0.49	39.10 / 1.21	13.03 / 0.79	7.82 / 0.51
	90° BEND SOIL BEARING CAPACITY			TEE OR DEAD END SOIL BEARING CAPACITY		
	1000 P.S.F.	3000 P.S.F.	5000 P.S.F.	1000 P.S.F.	3000 P.S.F.	5000 P.S.F.
4	4.90 / 0.14	1.63 / 0.09	0.96 / 0.06	3.50 / 0.12	1.16 / 0.06	0.70 / 0.06
6	10.20 / 0.22	3.40 / 0.14	2.04 / 0.09	7.20 / 0.17	2.40 / 0.11	1.44 / 0.07
8	17.70 / 0.35	5.54 / 0.23	3.54 / 0.15	12.50 / 0.25	4.16 / 0.16	2.50 / 0.14
10	28.90 / 0.54	9.60 / 0.35	5.76 / 0.23	20.40 / 0.38	6.80 / 0.25	4.06 / 0.16
12	41.10 / 1.31	13.70 / 0.85	8.22 / 0.55	29.10 / 0.97	9.70 / 0.63	5.82 / 0.42
14	55.80 / 1.70	18.60 / 1.11	11.16 / 0.72	39.50 / 1.22	13.16 / 0.79	7.90 / 0.51
16	72.20 / 2.14	24.06 / 1.39	14.44 / 0.90	51.10 / 1.54	17.03 / 1.00	10.22 / 0.65



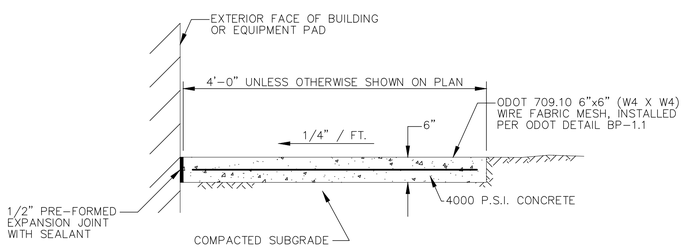


ALL CONCRETE BLOCKING MUST HAVE ITS ENTIRE FACE (X & Y) BEARING SURFACE AGAINST UNDISTURBED SOIL AND ALL VERTICAL NON-BEARING SURFACES SHALL BE FORMED SO AS TO KEEP CONCRETE FROM JOINTS. BLOCKING DESIGN BASED ON COMBINED WORKING PRESSURE PLUS WATER HAMMER OF 240 PSI AND FOR BEARING CAPACITY FOR SAND – 1000 PSF, SAND AND GRAVEL – 3000 PSF, SHALE – 5000 PSF.

11/88

THRUST BLOCKING DETAIL

SD-4-6

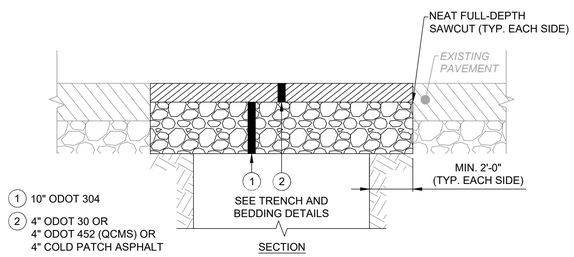


TYPICAL SIDEWALK DETAIL

8/89 N.T.S. SD-5-22

NOTES:

SIDEWALK SHALL BE SLOPED 1/4" /FT. SLOPE SHALL BE SLOPED AWAY FROM BUILDINGS AND EQUIPMENT PADS.



NOTES:

1. THIS DETAIL IS TO ONLY BE UTILIZED FOR TEMPORARY REPLACEMENT OF ROADWAY FOR FOREST DRIVE.

2. EXISTING UNSUITABLE SUBBASE MATERIAL (IF ANY) SHALL BE REPLACED, AS DIRECTED BY ENGINEER.

3. CONTRACTOR TO MAINTAIN EX. ROAD CROSS-SLOPE.

TEMPORARY ROAD DETAIL

NOT TO SCALE

STATE OF OHIO
RYAN S. SCHUSTER
72755
REGISTERED
PROFESSIONAL ENGINEER

verdantas
8150 STERLING COURT
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(440) 951-9000

NO	REVISION	DATE

ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	AS NOTED
DESIGNED BY:	ELE
DRAWN BY:	ELE
CHECKED BY:	RSS

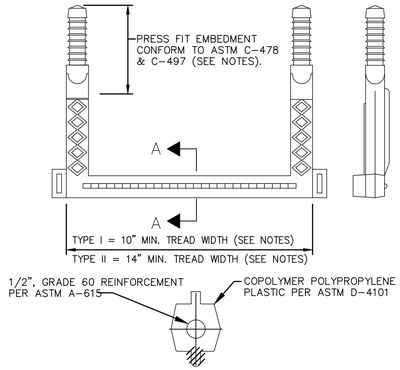
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

STANDARD DETAILS - SD SERIES

STANDARD DETAILS

PROJECT NO.	
230264	
DISCIPLINE	
CIVIL	
SHEET NAME	
SD-C-01	
SHEET	OF
22	28

H:\2023\230264\DWG\SHEETS\PHASE I\SD_230264 - PROCESS PHASE I.DWG - 22 STANDARD DETAILS - 5/20/2025 9:37:46 AM - CORY SCOTT



SECTION A – A

NOTES:

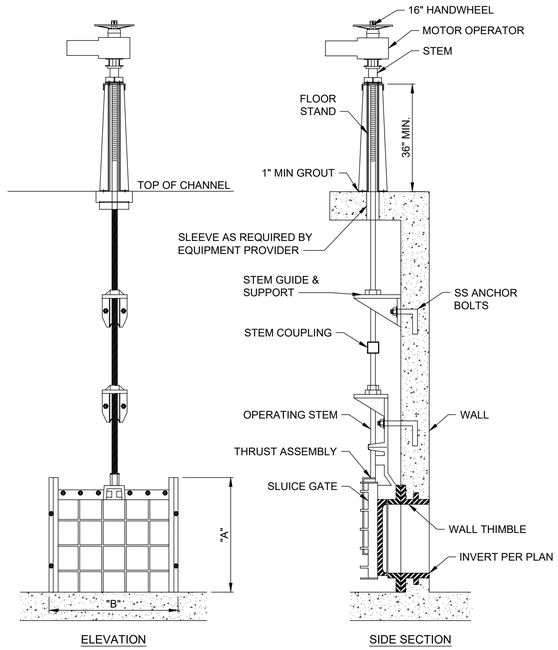
1.) USE TYPE I STEP FOR MANHOLES OR CIRCULAR STRUCTURES OF 5'–0" DIA. OR LESS – USE 16" C/C SPACING.

2.) USE TYPE II STEP FOR FLAT WALL STRUCTURES SUCH AS VAULTS, WELLS, ETC. OR CIRCULAR STRUCTURES OVER 5'–0" DIA. – USE 12" C/C SPACING.

3.) MOUNTING REQUIREMENTS SHALL BE IN ACCORDANCE WITH MFR'S RECOMMENDATIONS.

TYPICAL MANHOLE STEP DETAIL

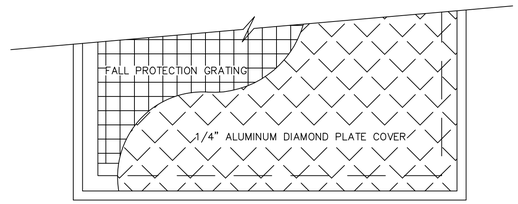
7/91 (N.T.S.) SD-3-27E



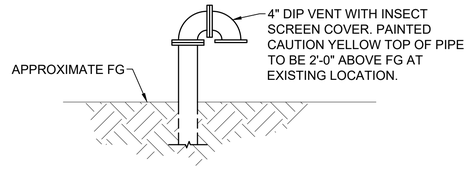
ELEVATION SIDE SECTION

SLIDE GATE DETAIL

NOT TO SCALE



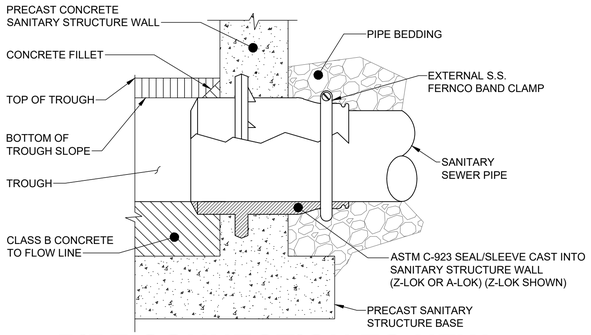
PARTIAL PLAN



VENT PIPE DETAIL

NOT TO SCALE

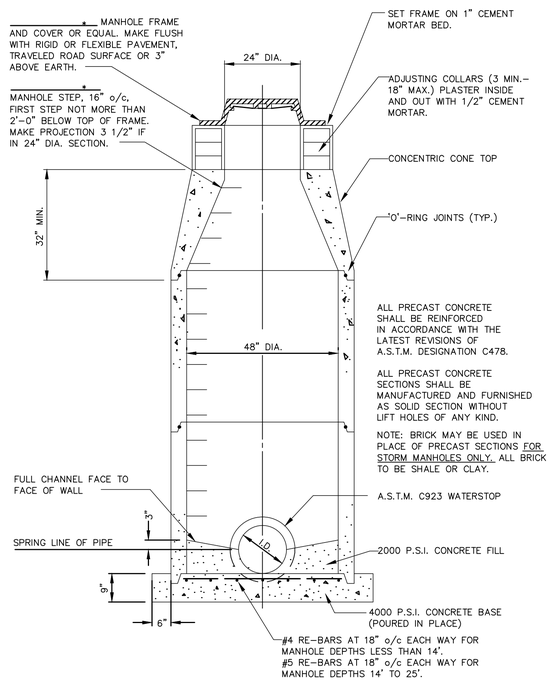
* DENOTES DESIGNER SPECIFICATION REQUIRED.



PIPE CONNECTION TO NEW STRUCTURE DETAIL

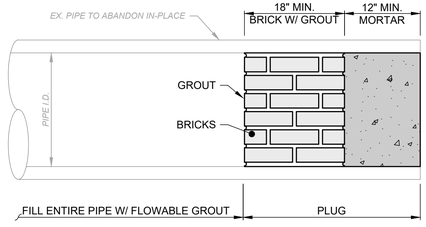
NOT TO SCALE

CONTRACTOR SHALL REFER TO MANUFACTURER DETAILS AND SPECIFICATIONS FOR SPECIFIC REQUIREMENTS NOT EXPLICITLY NOTED ON THESE DETAILS FOR INSTALLING NEW PIPE INTO AN EXISTING OR NEW PRE-CAST CONCRETE STRUCTURE.

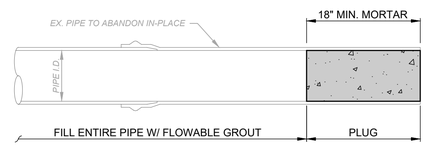


STANDARD TYPE "A" CONCENTRIC MANHOLE

12/14 (24" I.D. OR LESS) SD-3-1



10" DIA. PIPE & LARGER



8" DIA. PIPE & SMALLER

PIPE BULKHEAD DETAIL

SCALE: NONE

RYAN S. SCHUSTER 72755 REGISTERED PROFESSIONAL ENGINEER STATE OF OHIO

verdantas

8150 STERLING COURT
MENTOR, OHIO 44060
(440) 951-9000

NO	REVISION	DATE
1	ADDENDUM 1 ADDED DETAILS	3/4/25

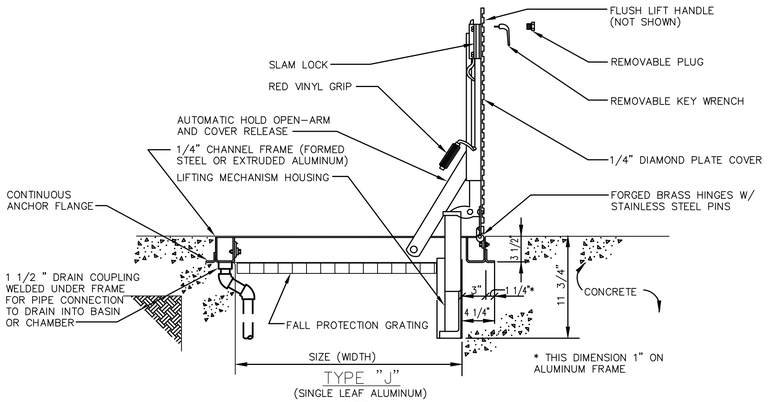
ISSUED FOR:	BID
ISSUE DATE:	5/20/2025
SCALE:	AS NOTED
DESIGNED BY:	ELE
DRAWN BY:	ELE
CHECKED BY:	RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

STANDARD DETAILS - SD SERIES

STANDARD DETAILS

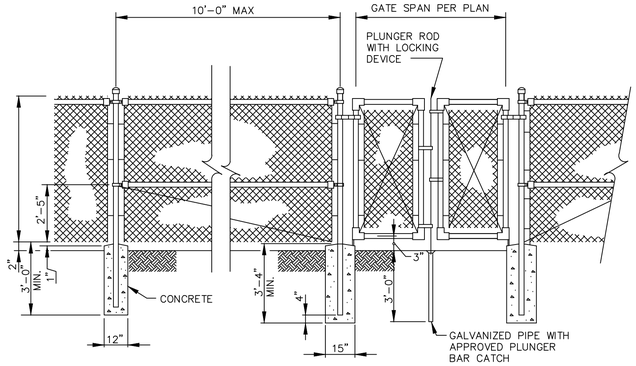
PROJECT NO. 230264
DISCIPLINE CIVIL
SHEET NAME SD-C-02
SHEET 23 OF 28

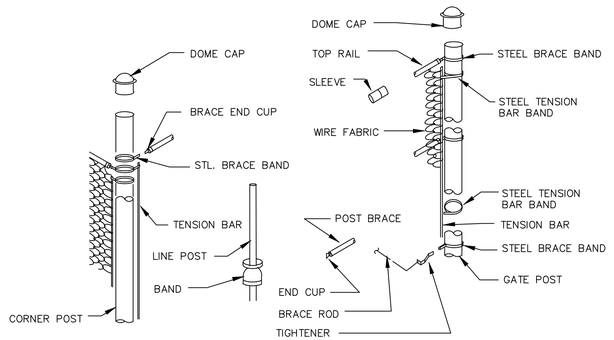


FLOOR ACCESS DOOR TYPES

11/88 SD-7-22

NOTE:
PROVIDE SAFETY CHAIN OR OTHER FALL PROTECTION SYSTEM W/ ALL ACCESS HATCHES

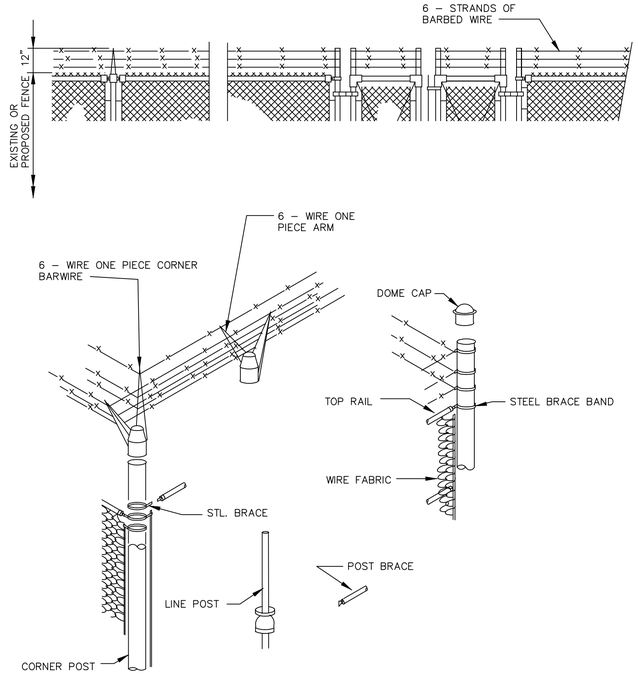




TYPICAL FENCE ASSEMBLY

11/88 SD-6-6

NOTES:
1. ALL FENCE COMPONENTS SHALL BE AS CALLED OUT IN SPEC SECTION T02833 - CHAIN LINK FENCING AND GATES ALUMINUM COATED STEEL).



BARBED WIRE DETAIL

11/88 SD-6-7

STATE OF OHIO
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MENTOR, OHIO 44060
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NO	REVISION	DATE
1	ADDENDUM 1 ADDED DETAILS	3/4/25

ISSUED FOR: BID
ISSUE DATE: 5/20/2025
SCALE: AS NOTED
DESIGNED BY: ELE
DRAWN BY: ELE
CHECKED BY: RSS

CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

STANDARD DETAILS - SD SERIES
STANDARD DETAILS

PROJECT NO. 230264
DISCIPLINE CIVIL
SHEET NAME SD-C-03
SHEET 24 OF 28

ELECTRICAL SYMBOLS - PLAN:

- HOME RUN TO PANEL
- MOTOR
- MOTOR CONTROLLER
- FUSIBLE SAFETY SWITCH
- NON-FUSIBLE DISCONNECT SWITCH
- SIMPLEX RECEPTACLE, EXPLOSION PROOF
- DUPLEX RECEPTACLE
- QUADPLEX RECEPTACLE
- DATA PORT, RJ45
- SPECIAL RECEPTACLE, NEMA TYPE NOTED
- SINGLE-POLE SWITCH, "3" INDICATES 3-WAY, "OS" INDICATES OCCUPANCY SENSING
- DRY-TYPE TRANSFORMER
- PUSHBUTTON STATION
- LOUVER OPERATOR
- JUNCTION BOX
- SOLENOID VALVE
- LIMIT SWITCH
- FLOW: SWITCH, SENSOR, TRANSMITTER W / DISPLAY
- LEVEL: SWITCH, SENSOR, TRANSMITTER W / DISPLAY
- PRESSURE: SWITCH, SENSOR, TRANSMITTER W / DISPLAY
- TEMPERATURE: SWITCH, SENSOR, TRANSMITTER W / DISPLAY
- OTHER SENSOR / INDICATING TRANSMITTER AS NOTED
- HAZARDOUS AREA LIGHT FIXTURE
- OUTDOOR CANOPY LIGHT FIXTURE
- EXTERIOR WALL-PACK LIGHT FIXTURE
- HIGH BAY LIGHT FIXTURE
- LINEAR LED LIGHT FIXTURE
- EXIT SIGN
- EMERGENCY REMOTE HEAD
- EMERGENCY WALL-PACK
- FIRE ALARM PULL STATION, STROBE, HORN-STROBE
- FIRE ALARM AREA SMOKE DETECTOR

ELECTRIC SYMBOLS - UTILITIES:

EX:	PR:	
AC	AC	AIR CONDITIONING UNIT
CB	CB	ELECTRIC CONTROL BOX
JB	JB	ELECTRIC JUNCTION BOX
PB	PB	ELECTRIC PULL BOX
RI	RI	ELECTRIC RISER BOX
VLT	VLT	ELECTRIC VAULT BOX
		ELECTRIC LIGHT - GROUND
		ELECTRIC LIGHT - POST
E	E	ELECTRIC MARKER POST
EM	EM	ELECTRIC METER
E	E	ELECTRIC MANHOLE - 48"
		ELECTRIC MANHOLE - 48" - ADJUST
E	E	ELECTRIC MANHOLE - LID
E		ELECTRIC PAINT MARK
EP	EP	ELECTRIC PEDESTAL
TR	TR	ELECTRIC TRANSFORMER

SINGLE LINE, ELEMENTARY, & INTERCONNECTION DIAGRAMS (ONLY) SYMBOLOGY:

- 30A 3P — DISCONNECT SWITCH - AMP RATING
- 30A 3P — FUSE - AMP RATING
- 30A [S] — CIRCUIT BREAKER - AMP RATING
- 30A 3P — CIRCUIT BREAKER - AMP RATING
- 40 — MOTOR W / HORSEPOWER INDICATED
- AM — AMMETER
- VM — VOLT METER
- PF — POWER FACTOR METER
- GF — GROUND FAULT RELAY
- TRANSFORMER
- CR — RELAY COIL
- TR — TIMING RELAY COIL
- MS — MOTOR STARTER COIL
- ETM — ELAPSED TIME TOTALIZER
- G — GROUNDING BUS
- SPD — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- N.O. LIMIT SWITCH
- N.O. FLOW SWITCH
- N.O. LEVEL SWITCH
- N.O. PRESSURE SWITCH
- N.O. TEMPERATURE SWITCH
- N.O. TIME DELAY AFTER ENERGIZATION
- N.C. TIME DELAY AFTER ENERGIZATION
- N.C. TIME DELAY AFTER DE-ENERGIZATION
- N.O. TIME DELAY AFTER DE-ENERGIZATION
- N.O. SWITCH (GENERAL)
- START PUSHBUTTON NORMALLY OPEN
- STOP PUSHBUTTON NORMALLY CLOSED
- CONTACT - NORMALLY OPEN
- CONTACT - NORMALLY CLOSED
- SOLENOID COIL
- G — PILOT LIGHT - PUSH TO TEST (COLOR)
- GROUND
- CAPACITOR
- X0 / 0X — 2 POSITION SELECTOR SWITCH
- X00 / 00X — 3 POSITION SELECTOR SWITCH
- EQUIPMENT FIELD TERMINAL

ELECTRICAL LINE SYMBOLOGY:

PROPOSED:

- CONDUIT AND WIRE RUN EXPOSED
- CONDUIT AND WIRE BELOW GRADE
- ELEC — ELEC — ELECTRIC LINE
- ELEC-OH — ELEC-OH — ELECTRIC LINE - OVERHEAD
- ELEC-UG — ELEC-UG — ELECTRIC LINE - UNDERGROUND
- ELEC — ELEC — ELEC — ELEC SERVICE
- ELEC-OH — ELEC-OH — ELEC-OH — ELEC SERVICE - OVERHEAD
- ELEC-UG — ELEC-UG — ELEC-UG — ELEC SERVICE - UNDERGROUND
- LIGHT-OH — LIGHT-OH — LIGHT-OH — ELEC LIGHTING - OVERHEAD
- LIGHT-UG — LIGHT-UG — LIGHT-UG — ELEC LIGHTING - UNDERGROUND

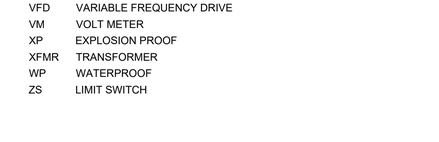
EXISTING:

- ELEC — ELEC — *ELECTRIC LINE*
- ELEC-ABAN — ELEC-ABAN — ELEC-ABAN — *ELECTRIC LINE - ABANDONED*
- ELEC-OH — ELEC-OH — *ELECTRIC LINE - OVERHEAD*
- ELEC-UG — ELEC-UG — *ELECTRIC LINE - UNDERGROUND*
- ELEC — ELEC — ELEC — ELEC — *ELECTRIC SERVICE*
- ELEC-OH — ELEC-OH — ELEC-OH — *ELECTRIC SERVICE - OVERHEAD*
- ELEC-UG — ELEC-UG — ELEC-UG — *ELECTRIC SERVICE - UNDERGROUND*
- LIGHT-OH — LIGHT-OH — LIGHT-OH — *ELECTRIC LIGHTING - OVERHEAD*
- LIGHT-UG — LIGHT-UG — LIGHT-UG — *ELECTRIC LIGHTING - UNDERGROUND*
- *ELECTRIC DUCT*

ELECTRICAL CODED NOTES:

1 NEW WORK - NOTE 1	1 DEMOLITION - NOTE 1	1 REVISION - NOTE 1
2 NEW WORK - NOTE 1	2 DEMOLITION - NOTE 2	2 REVISION - NOTE 2
3 NEW WORK - NOTE 1	3 DEMOLITION - NOTE 3	3 REVISION - NOTE 3

ELECTRICAL DETAIL REFERENCE:



ABBREVIATIONS:

A	AMPS
AF	AMPERE FRAME
AI	ANALOG INPUT (PLC)
AL	ALUMINUM
AM	AMMETER
AO	ANALOG OUTPUT (PLC)
AP	ALARM PANEL
AT	AMPERE TRIP
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CJB	CONTROL JUNCTION BOX
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CORROSION RESISTANT
CS	CONTROL STATION
CT	CURRENT TRANSFORMER
CU	COPPER
DB	DUCT BANK
DI	DIGITAL INPUT (PLC)
DO	DIGITAL OUTPUT (PLC)
EAG	ELECTRICALLY ACTUATED GATE
EAV	ELECTRICALLY ACTUATED VALVE
EF	EXHAUST FAN
ESPB	EMERGENCY STOP PUSHBUTTON (MAINTAINED)
ETT	ELAPSED TIME TOTALIZER
EWD	ELEMENTARY WIRING DIAGRAM
FDS	FUSED DISCONNECT SWITCH
FLA	FULL LOAD AMPERES
FS	FLOW SWITCH
FVC	FULL VOLTAGE CONTACTOR
FVNR-1	FULL VOLTAGE NON-REVERSING STARTER SIZE 1
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GFR	GROUND FAULT RELAY
HOA	HAND/OFF/AUTO SELECTOR SWITCH
HP	HORSEPOWER
HT	HIGH TORQUE SWITCH
HTR	HEATER
Hz	HERTZ
IAW	IN ACCORDANCE WITH
ICP	INSTRUMENTATION & CONTROL PANEL
IPP	INSTRUMENT POWER PANEL
JB	JUNCTION BOX
JBC	JUNCTION BOX-CONTROL
JBM	JUNCTION BOX-METERING
JBP	JUNCTION BOX-POWER
kCM	KILO (1000) CIRCULAR MILL
kVA	KILOVOLT AMPERES
kVAR	KILOVOLT AMPERES-REACTIVE
kW	KILOWATT
LA	LIGHTNING ARRESTOR
LGT	LIGHT
LOR	LOCAL/OFF/REMOTE SELECTOR SWITCH
LP	LIGHTING PANEL
LS	LEVEL SWITCH
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
MJB	METERING JUNCTION BOX
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MFR ASSOC.
NEU	NEUTRAL
NFDS	NON-FUSED DISCONNECT SWITCH
OCSS	OPEN/CLOSE SELECTOR SWITCH
OL	OVERLOAD
OOSS	ON/OFF SELECTOR SWITCH
OS	OCCUPANCY SENSING
OT	OVER TORQUE SWITCH
P	POLE
PB	PUSHBUTTON
PBC	PULLBOX-CONTROL
PBM	PULLBOX-METERING
PBP	PULLBOX-POWER
PC	PHOTO CONTROL
PF	POWER FACTOR
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PJB	POWER JUNCTION BOX
PP	POWER PANEL
PRI	PRIMARY
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
R	RELAY
RCP	REINFORCED CONCRETE PIPE
RL	RUN LIGHT
SCP	SURGE CONTROL PANEL
SCR	SILICON-CONTROLLED RECTIFIER
SEC	SECONDARY
SF	SUPPLY FAN
SHLD	SHIELDED
SP	SHEAR PIN SWITCH
SPK	SPEAKER
SS	SELECTOR SWITCH OR STAINLESS STEEL
SSOR	SOLID STATE OVERLOAD RELAY
SSPB	START/STOP PUSHBUTTON
SSS	SOLID STATE STARTER
STD	STANDARD
STP	SHIELDED TWISTED PAIR
STR	STARTER
SV	SOLENOID VALVE
SW	SWITCH
T	TELEPHONE
TB	TERMINAL BOARD
TC	TIME CLOCK
TD	TRENCH DUCT
TEB	TELEPHONE EQUIPMENT BACKBOARD
TEMP	TEMPERATURE
TOR	THERMAL OVERLOAD RELAY
TR	TIMING RELAY
TSTAT	THERMOSTAT
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTP	UNSHIELDED TWISTED PAIR
V	VOLTS
VC	VOLUME CONTROL
VFD	VARIABLE FREQUENCY DRIVE
VM	VOLT METER
XP	EXPLOSION PROOF
XFMR	TRANSFORMER
WP	WATERPROOF
ZS	LIMIT SWITCH

ELECTRICAL GENERAL NOTES:

1. ALL ELECTRICAL EQUIPMENT AND MATERIALS WILL BE SELECTED AND INSTALLED IN COMPLIANCE WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL FIRE CODES, INCLUDING BUT NOT LIMITED TO ALL PERTINENT NFPA REGULATIONS. IT IS THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO ENSURE COMPLIANCE WITH THESE CODES.
2. DO NOT INSTALL DEVICES SCALED FROM THESE DRAWINGS. ALL DEVICES SHALL BE INSTALLED AT LOCATIONS SHOWN IN THE APPROVED CONDUIT/DEVICE LAYOUT DRAWINGS AND WITH DIMENSIONS TAKEN IN THE FIELD.
3. ELECTRICIAN TO VISIT SITE AND VERIFY ALL EXISTING CONDITIONS PRIOR TO BID.
4. NO DUCTWORK OR PIPING TO BE RUN ABOVE ELECTRICAL PANELS OR THROUGH ELECTRICAL EQUIPMENT ROOMS. ELECTRICIAN SHALL COORDINATE WITH ALL TRADES FOR EQUIPMENT LAYOUTS PRIOR TO ROUGH-IN OF ALL SYSTEMS.
5. MANUFACTURERS AND CATALOG NUMBERS SHOWN IN THE LIGHT FIXTURE SCHEDULE ARE PROVIDED TO INDICATE DESIRED LIGHT FIXTURE CHARACTERISTICS. IT IS THE INTENT OF THE DOCUMENTS TO ALLOW ALTERNATE MANUFACTURERS TO PROVIDE LIGHTING PRODUCTS FOR THE PROJECT, AS LONG AS PROPOSED ALTERNATES PROVIDE THE SAME GENERAL DESIGN AND LIGHTING CHARACTERISTICS AS NOTED IN THE LIGHT FIXTURE DESCRIPTION.
6. ELECTRICIAN TO CONFIRM LOCATIONS OF ALL ELECTRICAL EQUIPMENT AND ELECTRICAL CHARACTERISTICS OF PROCESS EQUIPMENT PROVIDED BY OTHER TRADES PRIOR TO INSTALLING ROUGH-INS AS SHOWN ON THE ELECTRICAL PLANS. ALL SHOP DRAWING REQUIREMENTS WILL BE CONSIDERED AS THE MEANS AND METHODS OF INSTALLATION.
7. THIS PROJECT INVOLVES WORK AT AN INDUSTRIAL FACILITY AND THE CONTRACTOR IS EXPECTED TO PROVIDE CRAFTSMANSHIP REFLECTING THE NATURE OF THE FACILITY. CONDUITS IN PROCESS AREAS ARE TO BE SURFACE MOUNTED RIGID GALVANIZED STEEL (RGS). IN CLASSIFIED AREAS SEAL ALL CONDUITS TO RESTRICT THE PASSAGE OF GASSES AND VAPORS, AND ARRANGE SEALING FITTING DRAINS IN CONDUIT SYSTEMS TO PREVENT ACCUMULATION OF CONDENSATE ABOVE SEALS. ALL CONDUITS ENTERING OR LEAVING A MOTOR CONTROL CENTER, CONTROL PANEL, VALVE ACTUATOR, INSTRUMENT, A BUILDING, OR A PANELBOARD SHALL BE MADE WATERTIGHT USING AN INFLATABLE SEALED BLADDER DUCT SEALING SYSTEM, RAYCHEM 'RAYFLATE' DUCT SEALING SYSTEM RDSS OR APPROVED EQUAL. ALL HARDWARE IS TO BE STAINLESS STEEL UNLESS OTHERWISE DIRECTED.

   ALL ENCLOSURES ARE TO BE RATED AS FOLLOWS (UON):

   - OUTDOORS: NEMA 4X (STAINLESS STEEL)
   - CLASSIFIED AREAS: NEMA 7
   - INDOORS (CORROSIVE AREAS): NEMA 4X (STAINLESS STEEL)
   - INDOORS (CONTROLLED ENVIRONMENT) NEMA 12
8. ELECTRICIAN SHALL REVIEW ALL OTHER TRADES' CONSTRUCTION DOCUMENTS AND/OR COORDINATE WITH OTHER TRADES AND VERIFY IF THERE ARE ANY ADDITIONAL ELECTRICAL REQUIREMENTS NOT SHOWN ON ELECTRICAL DRAWINGS. COST FOR WORK SHOWN ON OTHER TRADES' DRAWINGS SHALL BE INCLUDED IN BASE BID. ALL FIELD WIRING AND TERMINATIONS OF PROCESS EQUIPMENT AND INSTRUMENTATION AND CONTROLS SHALL BE THE RESPONSIBILITY OF THE ELECTRICIAN. ALL CABLES AND WIRES PROVIDED BY VENDORS SHALL BE INSTALLED AND TERMINATED BY THE ELECTRICIAN. WIRE ALL MISCELLANEOUS POWER AND CONTROLS AS REQUIRED TO PROVIDE A COMPLETE FUNCTIONING SYSTEM
9. A 4-20mA SIGNAL IS AN ANALOG SIGNAL USED TO TRANSMIT DATA (LEVEL, FLOW, ETC.) FOR PROCESS CONTROLS. THE ELECTRICIAN SHALL PROVIDE, INSTALL, AND TERMINATE SHIELDED TWISTED PAIRS (STP) WIRING IN RIGID GALVANIZED STEEL CONDUIT (RGS). RGS IS USED IN AN ATTEMPT TO REDUCE THE DISTORTION AFFECT FROM EMI AND RFI. BELOW GRADE CONDUITS SHALL BE PVC SCHED-40. PARALLEL RUNS OF DATA CONDUITS AND POWER CONDUITS SHALL BE SEPARATED BY 2 FEET. THE STP SHIELD SHALL BE GROUNDED AT THE CONTROL PANEL ONLY (DO NOT GROUND AT BOTH ENDS).
10. THE ELECTRICIAN SHALL BE RESPONSIBLE FOR LAYOUT AND COORDINATION OF OPENINGS AND CHASES AND SHALL PERFORM ALL CUTTING AND PATCHING AS REQUIRED TO INSTALL THEIR WORK. ALL CONCRETE HOUSE KEEPING PADS SHALL BE FRAMED AND POURED BY THE ELECTRICIAN. PADS SHALL HAVE A 45 DEGREE, 1" CHAMFER AROUND UPPER EDGE.
11. THE ELECTRICIAN SHALL INSTALL & DISTRIBUTE TEMPORARY POWER SERVICE FOR THE DURATION OF THIS PROJECT AS DEFINED IN DIVISION 1 SPECIFICATIONS. ALL COSTS ASSOCIATED WITH THE INSTALLATION, DISTRIBUTION AND MAINTENANCE OF THE TEMPORARY POWER IS THE RESPONSIBILITY OF THE ELECTRICIAN. THERE SHALL BE 480/277V,3PH,4W; 208/120V,3PH,4W; AND 120/240V,1PH,3W POWER AVAILABLE AT ALL LOCATIONS OF CONSTRUCTION AS DIRECTED IN FIELD AND AS SPECIFIED. ALL TEMPORARY EQUIPMENT, CONDUITS & CONDUCTORS SHALL BE COMPLETELY REMOVED AT COMPLETION OF PROJECT.
12. ALL ELECTRICAL EQUIPMENT, DEVICES, LIGHTING FIXTURES, CONDUIT, AND WIRING SHOWN ON THE ELECTRICAL DRAWINGS IS NEW UNLESS CLEARLY CALLED OUT AS EXISTING. ALL EXISTING ELECTRICAL EQUIPMENT THAT IS CALLED OUT TO BE REUSED SHALL BE INSPECTED IN THE FIELD BY THE ELECTRICIAN AND THE CONSTRUCTION MANAGER TO DETERMINE ITS CONDITION PRIOR TO STARTING ANY WORK. PROVIDE DOCUMENTATION TO OWNER INDICATING CONDITION OF THE EXISTING EQUIPMENT, AND REUSE EXISTING EQUIPMENT ONLY IF ALL PARTIES AGREE THE CONDITION IS ACCEPTABLE. ALL EXISTING EQUIPMENT DETERMINED TO BE UNUSABLE SHALL BE REPLACED WITH LIKE KIND AS DIRECTED BY THE OWNER. ANY OF THE OWNERS EQUIPMENT DETERMINED TO BE REUSED THAT IS DAMAGED BY ANY CONTRACTOR DURING SWITCHOVER SHALL BE REPLACED BY THAT CONTRACTOR. ALL EXISTING EQUIPMENT IS THE PROPERTY OF THE OWNER (NOT THE CONTRACTOR) AND SHALL BE TREATED ACCORDINGLY.
13. THE ELECTRICIAN SHALL BE HELD RESPONSIBLE TO ENSURE ALL CONTROLLERS TO BE INSTALLED ARE CAPABLE OF LOCKOUT / TAGOUT PRIOR TO INSTALLATION.
14. CONFORM TO THE NEC, OSHA, FIRE MARSHAL, BUILDING DEPARTMENT AND OTHER APPLICABLE CODES AND REGULATIONS. OBTAIN PERMITS, PAY ALL FEES, AND ARRANGE FOR REQUIRED INSPECTIONS.
15. ALL LIGHTING AND RECEPTACLE WIRING TO BE #12 XHHW WITH EQUIPMENT GROUND IN 3/4" C UNLESS OTHERWISE NOTED.
16. DO NOT MOUNT ANY LIGHT FIXTURE DIRECTLY OVER PIPING OR EQUIPMENT THAT WILL INTERFERE WITH NORMAL LIGHTING DISTRIBUTION.
17. SIZE JUNCTION BOXES AS REQUIRED PER NEC. PROVIDE BARRIER TYPE TERMINAL STRIPS, AND ALL WIRING TO BE IN CONDUIT.
18. SIZE PULL BOXES (PB) AS REQUIRED PER NEC.
19. PROVIDE SEPARATE PB'S FOR CONTROL AND POWER.
20. MOTOR OVERLOAD SETTING SHALL BE FIELD SELECTED PER MOTOR NAME PLATE CURRENT AND INSTALLED ACCORDINGLY.
21. MOUNT LOCAL CONTROLS AND SERVICE DISCONNECTS ON WALL NEAREST EQUIPMENT WHERE POSSIBLE. (MAXIMUM 60" ABOVE FINISHED FLOOR OR FINAL GRADE, MAXIMUM LATERAL DISTANCE FROM WALL TO EQUIPMENT - 10 FEET).
22. ALL FEEDERS RUN BELOW GRADE SHALL BE RUN IN PVC CONDUIT AT MINIMUM 3'-0" BELOW FINISHED GRADE, TRANSITION TO ABOVE GRADE SHALL BE MADE USING FACTORY PVC COATED RIGID STEEL CONDUIT SWEEPS.

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5/15/2025

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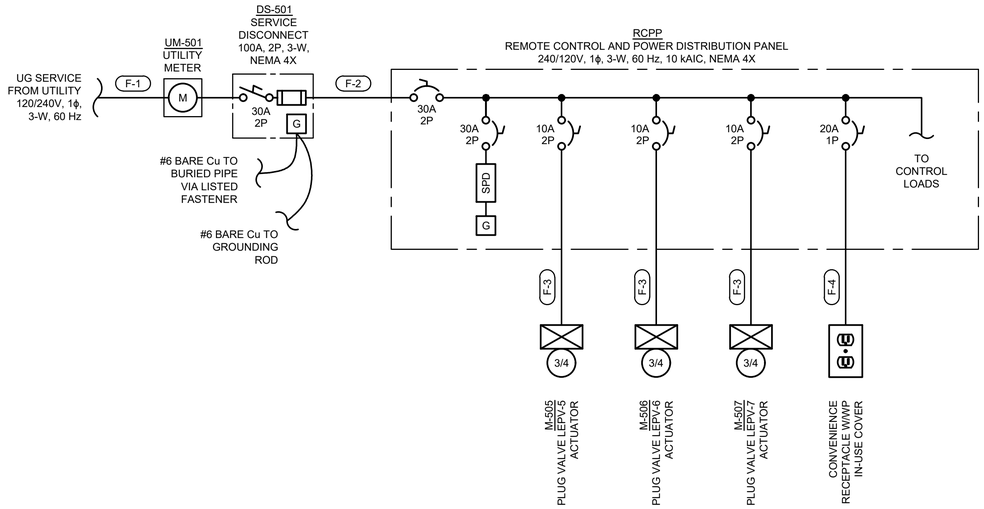
SCALE:	AS NOTED
DESIGNED BY:	JPB
DRAWN BY:	JPB
CHECKED BY:	RSS

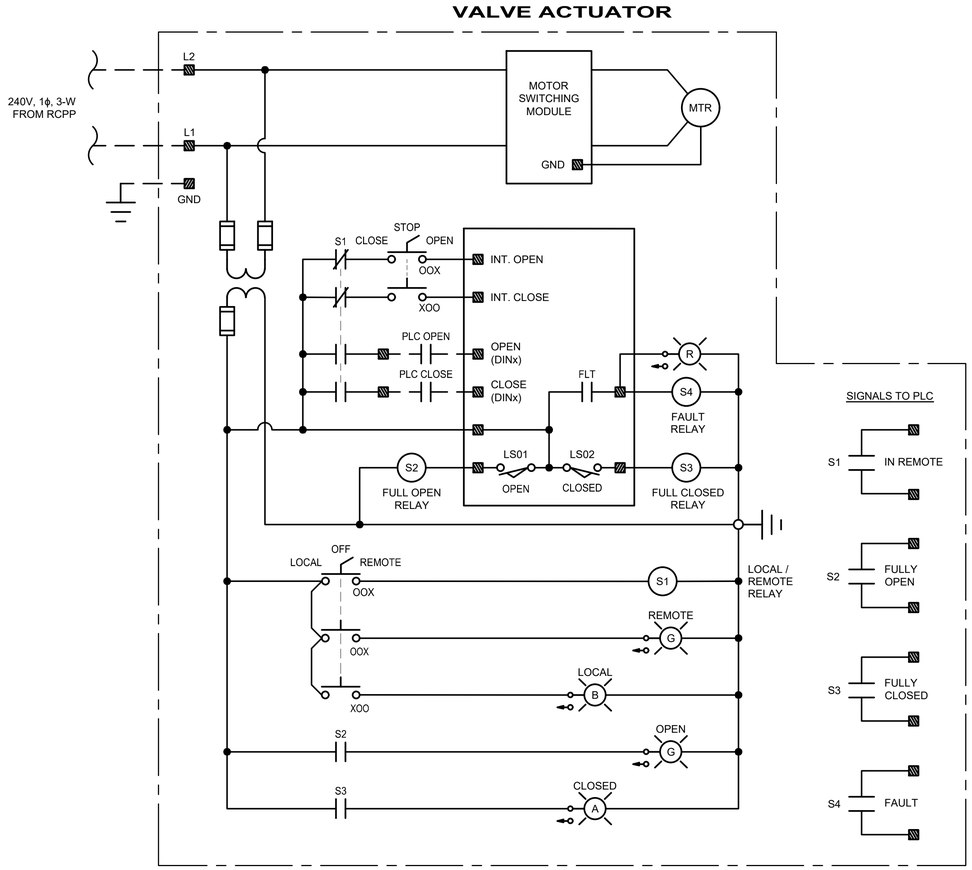
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE II
WILLOUGHBY, OHIO
LAKE COUNTY

ELECTRICAL - E SERIES
ELECTRICAL LEGEND & GENERAL NOTES

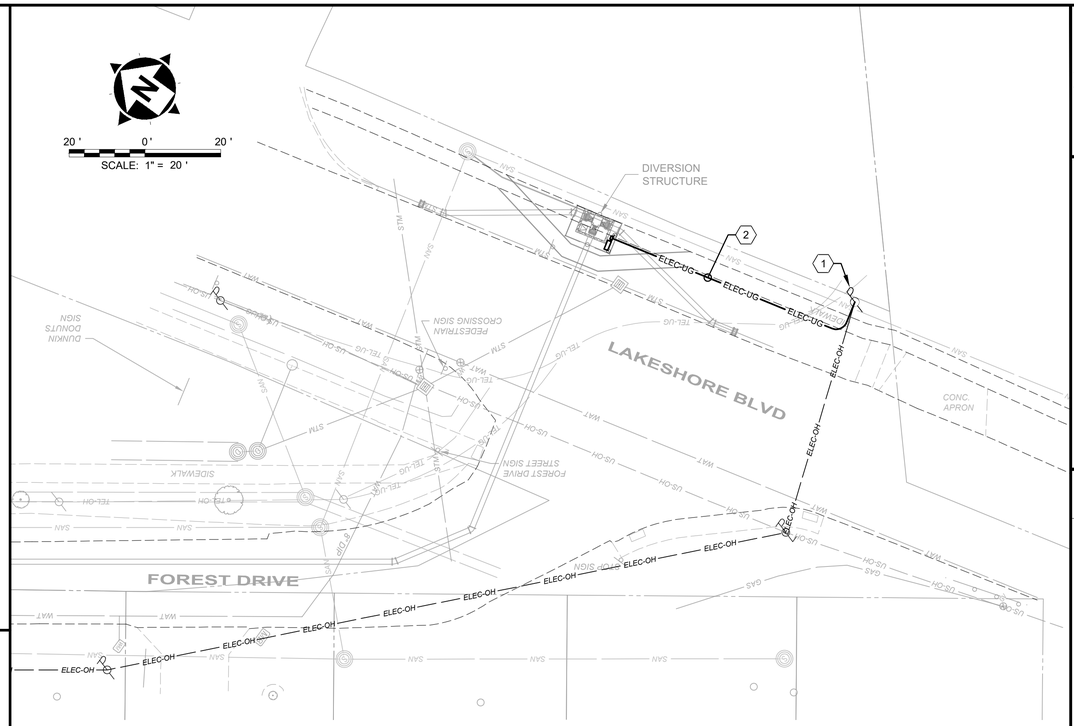
PROJECT NO.
230264
DISCIPLINE
ELECTRICAL
SHEET NAME
01-E-01
SHEET 25 OF 28



LAKESHORE BLVD DIVERSION STRUCTURE ELECTRICAL DISTRIBUTION DIAGRAM



TYPICAL PLUG VALVE ACTUATOR CONTROL DIAGRAM



DIVERSION STRUCTURE ELECTRICAL SITE PLAN

GENERAL NOTES:

1. ELECTRICAL UTILITY OF RECORD IS THE ILLUMINATING COMPANY, A FIRSTENERGY COMPANY. ALL SERVICE EQUIPMENT AND INSTALLATION MEANS & METHODS TO MEET THEIR REQUIREMENTS.
2. PROPOSED UNDERGROUND SERVICE DUCT BANKS TO UTILIZE 36" SWEEPS, MINIMUM; ALL OTHERS TO UTILIZE 24" SWEEPS, MINIMUM.
3. ALL DUCT BANKS SHOWN ARE DIAGRAMMATIC AND SHOULD NOT BE USED SOLELY FOR INSTALLATION. SEE DETAIL DRAWINGS FOR FULL ACCOUNTING OF DUCT BANK CONDUIT & CONDUCTORS.

(X) CODED NOTES:

1. EXISTING POWER POLE, UTILITY TO INSTALL TRANSFORMER FOR 240-120V / 1ϕ / 2-W / 100A SERVICE. INSTALL 20' AERIAL CONDUIT WITH WEATHERCAP & SEAL, TRANSITION TO UNDERGROUND CONDUIT RUNNING PARALLEL TO LAKESHORE BLVD. ROADWAY.
2. ELECTRICAL SERVICE FEEDER, CONTRACTOR TO INSTALL 1-1/4" SCH-40 PVC CONDUIT, UTILITY TO INSTALL (3) #3 CONDUCTORS. SEE SHEET 01-E-05 FOR DIVERSION STRUCTURE DETAILS.

POWER & CONTROL FEEDER SCHEDULE

TAG	EQUIPMENT	POWER SOURCE	CONDUCTOR SIZE + GND	CONTROL WIRE DESTINATION	CONTROL WIRES
F-1	DIVERSION STRUCTURE SERVICE DISCONNECT, DS-501	UTILITY TRANSFORMER	(2) #3 + (1) #3 NEU IN 2"C	N/A	N/A
F-2	REMOTE CONTROL & POWER DISTRIBUTION PANEL, RCPP	DS-501	(2) #10 + (1) #10 NEU+(1) #8 GND IN 3/4"C	N/A	N/A
F-3 (TYP OF 3)	DIVERSION STRUCTURE PLUG VALVE ACTUATORS - M-505, M-506, M-507	RCPP	(2) #12 + (1) #12 GND IN 3/4"C	N/A	(16) #14 IN 3/4"C
F-4	CONVENIENCE RECEPTACLE	RCPP	(2) #12 + (1) #12 GND IN 3/4"C	N/A	N/A

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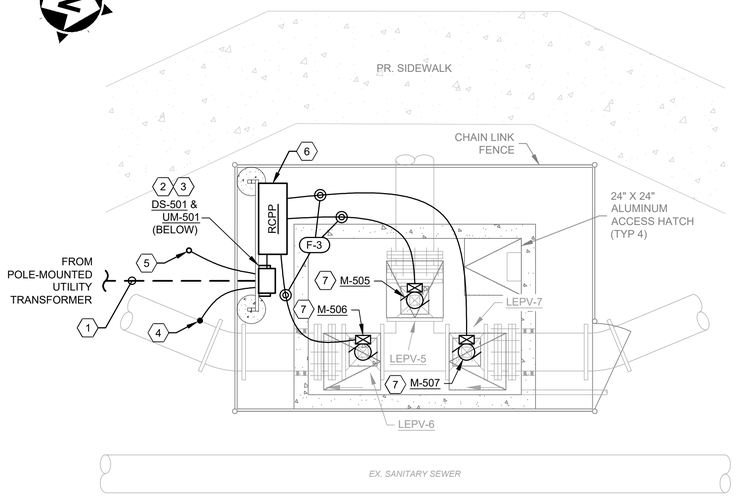
CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
WILLOUGHBY, OHIO
LAKE COUNTY

ELECTRICAL - E SERIES

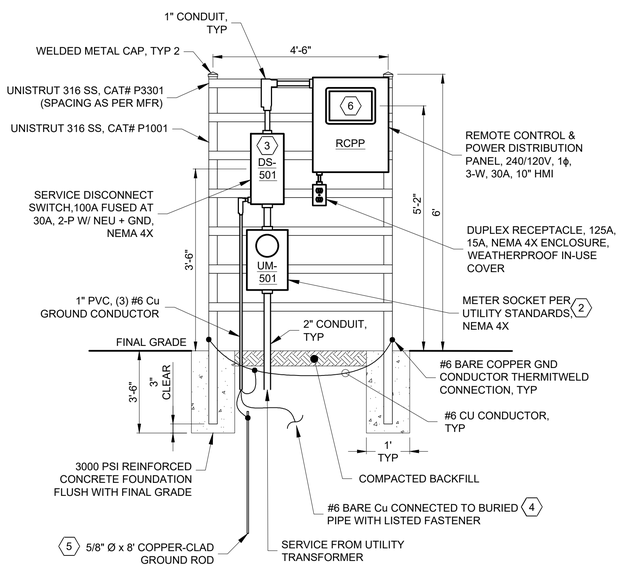
DIVERSION STRUCTURE SITE PLAN, DIAGRAMS & SCHEDULE

PROJECT NO. 230264
DISCIPLINE ELECTRICAL
SHEET NAME 01-E-02
SHEET 26 OF 28



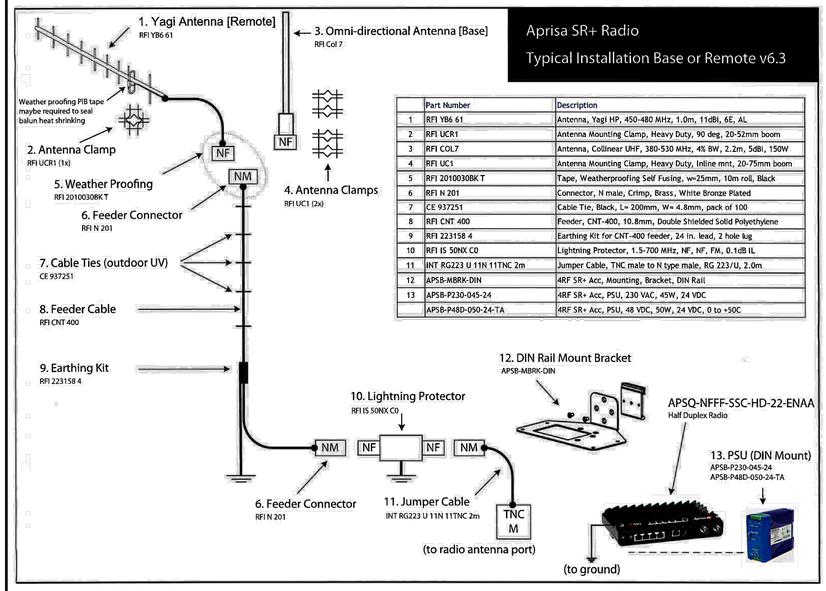
LAKESHORE BLVD. DIVERSION STRUCTURE PLAN

SCALE: 3/8" = 1'-0"



DIVERSION STRUCTURE ELECTRICAL BACKBOARD DETAIL

NOT TO SCALE



	Part Number	Description
1	RFI YB6 61	Antenna, Yagi HP, 450-480 MHz, 1.0m, 11dBi, 6E, AL
2	RFI UCR1	Antenna Mounting Clamp, Heavy Duty, 90 deg, 20-52mm boom
3	RFI COL7	Antenna, Collinear UHF, 380-530 MHz, 4% BW, 2.2m, 5dBi, 150W
4	RFI UC1	Antenna Mounting Clamp, Heavy Duty, Inline mnt, 20-75mm boom
5	RFI 20100308K T	Tape, Weatherproofing Self Fusing, w=25mm, 10m roll, Black
6	RFI N 201	Connector, N male, Crimp, Brass, White Bronze Plated
7	CE 937251	Cable Tie, Black, L= 200mm, W= 4.8mm, pack of 100
8	RFI CNT 400	Feeder, CNT-400, 10.8mm, Double Shielded Solid Polyethylene
9	RFI 223158 4	Earthing Kit for CNT-400 feeder, 24 in. lead, 2 hole lug
10	RFI IS 50NX C0	Lightning Protector, 1.5-700 MHz, NF, NF, FW, 0.1dB IL
11	INT RG223 U 11N 11TNC 2m	Jumper Cable, TNC male to N type male, RG 223/U, 2.0m
12	APSB-MBRK-DIN	4RF SR+ Acc, Mounting, Bracket, DIN Rail
13	APSB-P230-045-24	4RF SR+ Acc, PSU, 230 VAC, 45W, 24 VDC
	APSB-P48D-050-24-TA	4RF SR+ Acc, PSU, 48 VDC, 50W, 24 VDC, 0 to +50C

RADIO COMMINICATIONS EQUIPMENT SETUP DETAIL

NOT TO SCALE

CODED NOTES:

1. UNDERGROUND SERVICE FEEDER "F-40", 240/120V, 1ϕ, 3-W, (2) #1 + (1) #1 NEU IN 1-1/2"C. CONDUIT AND AERIAL WITH WEATHER HEAD INSTALLED BY CONTRACTOR, CONDUCTORS INSTALLED BY UTILITY. SEE SITE PLAN ON SHEET #26, 01-E-02 FOR UTILITY POLE LOCATION.
2. ELECTRICAL METERING SOCKET PER UTILITY REQUIREMENTS "UM-501", 240V, 100A, NEMA 4X, INSTALLED ON BACKBOARD BELOW SERVICE DISCONNECT. SEE DETAILS THIS SHEET.
3. SERVICE DISCONNECT SWITCH "DS-501", 240V, 100A, 2-P W/ NEU + GND, FUSED AT 30A, NEMA 4X ENCLOSURE. INSTALL ON BACKBOARD PER DETAILS ON THIS SHEET.
4. ELECTRICAL SERVICE GROUNDING ELECTRODE CONNECTION, #6 BARE COPPER FASTENED TO BURIED PIPE VIA LISTED CONNECTOR AND BONDED TO GROUND BUS INSIDE DS-501.
5. 5/8" Ø x 8' LG COPPER-CLAD STEEL GROUNDING ROD DRIVEN TO 36" BELOW FINISHED GRADE, MIN. AND BONDED TO GROUND BUS INSIDE DS-501 VIA EXOTHERMIC WELD TO #6 BARE COPPER CONDUCTOR.
6. REMOTE CONTROL & POWER DISTRIBUTION PANEL "RCPP". PROVIDED BY SYSTEMS INTEGRATOR, INSTALLED BY CONTRACTOR. ACCEPTS 120/240V, 1ϕ, 3-W VIA "F-2". CONTAINS POWER DISTRIBUTION CIRCUIT BREAKERS AND CONTROL COMPONENTS FOR ALL FIELD DEVICES. SEE TYPICAL VALVE CONTROL DIAGRAM ON SHEET #26, 01-E-02FOR WIRING REQUIREMENTS.
   - 6.1. PHASE 1: DOES NOT CONTAIN, BUT HAS INTERNAL & EXTERNAL SPACE TO ACCOMMODATE RADIO MODEM, ANTENNA, AND ALL REQUIRED APPURTENANCES. SEE EQUIPMENT DETAILS & BOM THIS SHEET.
   - 6.2. PHASE 2: CONTRACTOR TO INSTALL MODEM & APPURTENANCES, COMMUNICATIONS WITH EQ BASIN PLC TO ENABLE REMOTE CONTROL & MONITORING CONFIGURED BY CLIENT.
7. PLUG VALVE ACTUATOR, 240V, 1ϕ, 60 Hz, 3/4 HP, 6.9 FLA. SEE FEEDER "F-3" IN SCHEDULE ON THIS SHEET FOR POWER & CONTROL CONDUITS & CONDUCTORS.

GENERAL NOTES:

1. ELECTRICAL UTILITY OF RECORD IS THE ILLUMINATING COMPANY, A FIRSTENERGY COMPANY. ALL SERVICE EQUIPMENT AND INSTALLATION MEANS & METHODS TO MEET THEIR REQUIREMENTS.
2. PROPOSED UNDERGROUND SERVICE DUCT BANKS TO UTILIZE 36" SWEEPS, MINIMUM; ALL OTHERS TO UTILIZE 24" SWEEPS, MINIMUM.
3. ALL UNDERGROUND CONDUIT TO BE SCH-40 PVC, 1-1/4" MINIMUM. ALL EXPOSED CONDUIT TO BE SS OR FLEXIBLE NON-METALLIC. WHEREVER CONDUIT TRANSITIONS TO ABOVE GRADE, UTILIZE A SS 90° SWEEP.
4. ALL DUCT BANKS SHOWN ARE DIAGRAMMATIC AND SHOULD NOT BE USED SOLELY FOR INSTALLATION. SEE DETAIL DRAWINGS FOR FULL ACCOUNTING OF DUCT BANK CONDUIT & CONDUCTORS.
5. HAZARDOUS AREA CLASSIFICATIONS:
   - 5.1. VALVE VAULT INTERIOR: CLASS I, DIVISION 2

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CITY OF WILLOUGHBY
LAKESHORE EAST EQ BASIN
PHASE I
LAKE COUNTY WILLOUGHBY, OHIO

ELECTRICAL - E SERIES

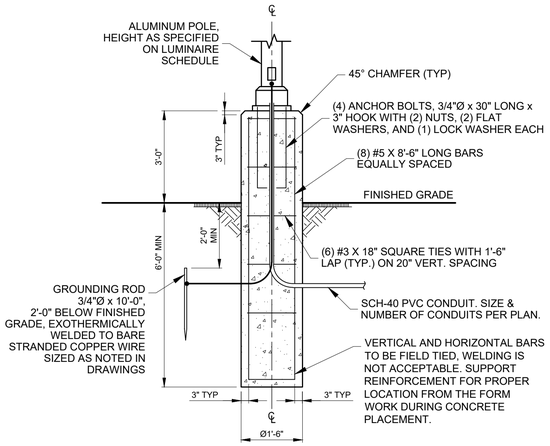
DIVERSION STRUCTURE ELECTRICAL PLAN & DETAILS

PROJECT NO. 230264

DISCIPLINE: ELECTRICAL

SHEET NAME: 01-E-03

SHEET 27 OF 28



TYPICAL BASE

NOTES:

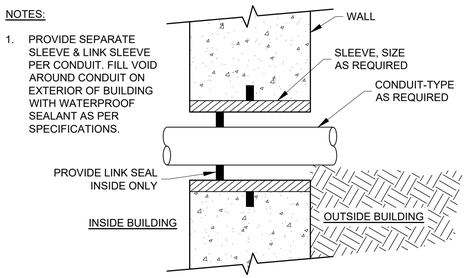
1. 3500 PSI MIN 28 DAY COMPRESSIVE STRENGTH CONCRETE WITH GRADE 60 REINFORCING STEEL.

TYPICAL LIGHT STANDARD BASE DETAIL FOR AREAS SUBJECT TO VEHICULAR IMPACT

NOT TO SCALE

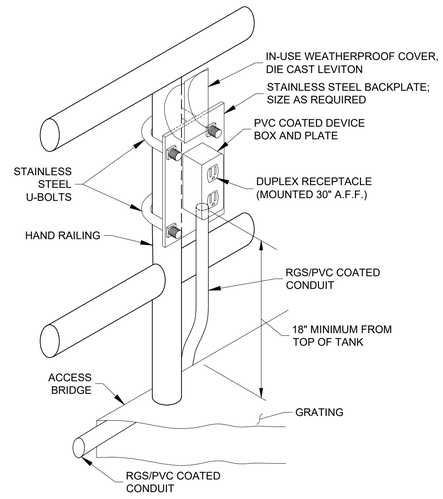
NOTES:

1. PROVIDE SEPARATE SLEEVE & LINK SLEEVE PER CONDUIT. FILL VOID AROUND CONDUIT ON EXTERIOR OF BUILDING WITH WATERPROOF SEALANT AS PER SPECIFICATIONS.



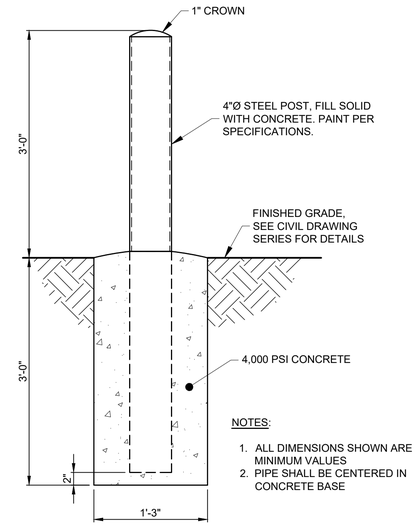
UNDERGROUND CONDUIT WALL PENETRATION BELOW GRADE TO INSIDE BUILDING/STRUCTURE

NOT TO SCALE



HANDRAIL RECEPTACLE MOUNTING DETAIL

NOT TO SCALE

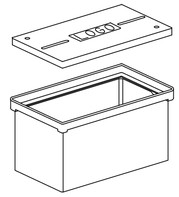


NOTES:

1. ALL DIMENSIONS SHOWN ARE MINIMUM VALUES
2. PIPE SHALL BE CENTERED IN CONCRETE BASE

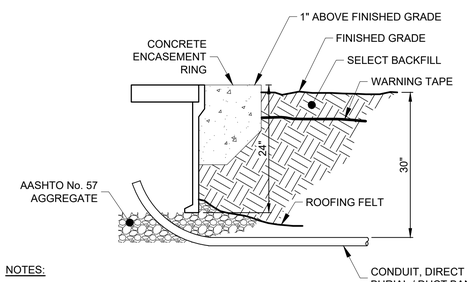
TYPICAL BOLLARD INSTALLATION DETAIL

NOT TO SCALE



TYPICAL HANDHOLE

NOT TO SCALE



NOTES:

1. WARNING TAPE SHALL BE LOCATED 12" BELOW GRADE.
2. AN AASHTO No. 57 AGGREGATE DRAINAGE BED IS REQUIRED UNDER ALL ELECTRICAL HANDHOLES. THE DRAINAGE BED SHALL BE EQUAL TO THE HANDHOLE BASE DIMENSIONS PLUS 12" DEPTH.
3. THE ENCASEMENT RING SHALL BE 1" ABOVE FINISHED GRADE.
4. THE HANDHOLE COVER SHALL BE GRAY IN COLOR AND EMBOSSED WITH "ELECTRIC" OR "COMMUNICATIONS". THE COVER SHALL BE HEAVY DUTY TYPE WITH A DESIGN LOAD EQUAL OR EXCEEDING 15,000 LBS OVER A 10" SQUARE.

HANDHOLE (TYP) FOR NON-ROADWAY APPLICATIONS

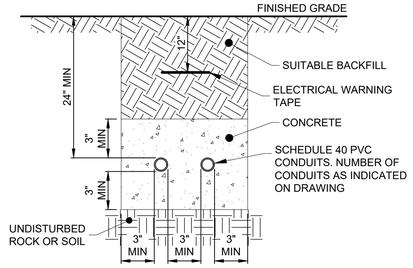
NOT TO SCALE

PLAN VIEW

SECTION VIEW

GENERATOR PAD DETAIL

NOT TO SCALE



ELECTRICAL TRENCH DETAIL

NOT TO SCALE

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ELECTRICAL - E SERIES

STANDARD ELECTRICAL DETAILS

PROJECT NO.
230264

DISCIPLINE
ELECTRICAL

SHEET NAME
01-E-04

SHEET 28 OF 28