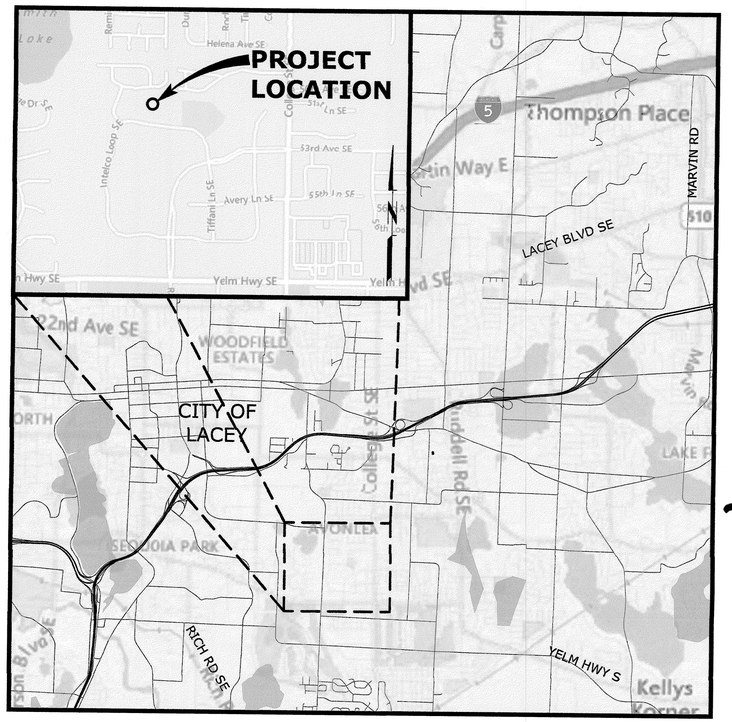
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

FEBRUARY 2022

ISSUED FOR CONSTRUCTION

SECTION: 32 TOWNSHIP: 18N RANGE: 1W
ADDRESS: 4504B INTELCO LOOP SE, LACEY, WA 98503

INDEX OF DRAWINGS



VICINITY MAP
SCALE: 1"=1/2 MILE

CITY OF LACEY OFFICIALS

MAYOR:
ANDY RYDER

DEPUTY MAYOR:
CYNTHIA PRATT

COUNCIL MEMBERS:
LENNY GREENSTEIN
MICHAEL STEADMAN
CAROLYN COX
ED KUNKEL
MALCOLM MILLER

CITY MANAGER:
SCOTT SPENCE

CITY ATTORNEY:
DAVE SCHNEIDER

CITY ENGINEER:
ROGER SCHOESSEL, P.E.

DIRECTOR OF PUBLIC WORKS:
SCOTT EGGER, P.E.

APPROVED FOR CONSTRUCTION — DATE 4/4/22

murraysmith
1145 BROADWAY
TACOMA, WA 98402

811 Know what's below. Call before you dig.

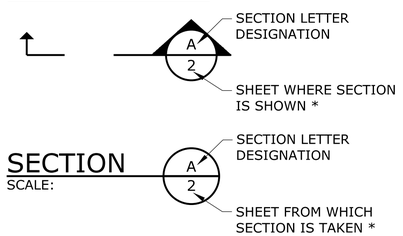
D-19-32

PIPE SYMBOLS

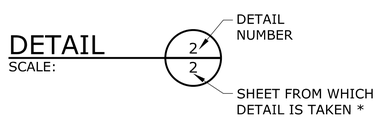
PLANT	SCHEMATIC	
		WELDED JOINT
		FLANGED JOINT
		GROOVED END JOINT
		MECHANICAL JOINT
		PUSH-ON JOINT (RUBBER GASKET)
		FLANGED COUPLING ADAPTER
		DOUBLE BALL FLEXIBLE EXTENSION COUPLING
		FLEXIBLE COUPLING W/THRUST RING
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		UNION
		BLIND FLANGE
		CAP
		LONG SLEEVE
		FLEXIBLE COUPLING
		CAPPED END OR PLUGGED END
		FITTING

SECTION AND DETAIL DESIGNATIONS

SECTION DESIGNATIONS



DETAIL DESIGNATIONS



* NOTE: IF PLAN AND SECTION FOR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON THE SAME DRAWING, DRAWING NUMBER IS REPLACED WITH A DASH.

TOPOGRAPHIC LEGEND

	EXISTING	PROPOSED
WATERLINE	10"W	12"DI W
ELECTRICITY	E	E
GAS	4"G	4"G
TELEPHONE/TELEMETRY	T	T
CABLE TELEVISION	CATV	CATV
SANITARY SEWER LINE	8"SS	8"SS
SANITARY SEWER FORCE MAIN	6"FM	6"FM
STORM DRAIN	8"SD	8"SD
CULVERT		12"D
ABANDON PIPE		
DRAINAGE DITCH		
BARBWIRE FENCE		
CHAIN LINK FENCE		
TEMPORARY SILT FENCE		
GUARDRAIL		
ROCK WALL		
TREE/BUSH LINE		
CENTERLINE		
EASEMENT/PROPERTY LINE		
RIGHT-OF-WAY		
EDGE OF PAVEMENT/AC		
EDGE OF GRAVEL		
CURB		
SIDEWALK	S/W	S/W
STRUCTURE OR FACILITY		
CONTOUR MINOR		
CONTOUR MAJOR	200	200
MANHOLE		
CLEAN-OUT		
CATCH BASIN/FIELD INLET		
THRUST BLOCK		
VALVE		
AIR INJECTION ASSEMBLY		
BLOW-OFF ASSEMBLY		
AIR RELEASE ASSEMBLY		
FIRE HYDRANT ASSEMBLY		
WATER METER		
PULL BOX/JUNCTION BOX		
UTILITY POLE		
GUY WIRE		
LIGHT POST		
MAIL BOX		
SIGN		
BENCHMARK		
TREE DECIDUOUS		
TREE CONIFEROUS		
TREE TO BE REMOVED		
SURFACE ELEVATION	+ 176.63	+ 176.63

VALVE SYMBOLS

PLANT	SCHEMATIC	
		GATE VALVE
		GLOBE VALVE
		BALL VALVE
		BALANCING VALVE
		DIAPHRAGM VALVE
		PLUG VALVE (TOP)
		PLUG VALVE (SIDE)
		3-WAY PLUG VALVE
		SWING CHECK VALVE
		DOUBLE CHECK ASSEMBLY
		BALL SWING CHECK
		SILENT CHECK VALVE
		PRESSURE REDUCING VALVE
		ALTITUDE CONTROL VALVE
	S	SOLENOID VALVE
		RELIEF VALVE
		NEEDLE VALVE
		HOSE VALVE
		REDUCED PRESSURE BACKFLOW PREVENTER W/GATE VALVES
		HOSE BIBB

MISCELLANEOUS PIPING SYMBOLS

	STRAINER
	SIGHT GLASS
	PRESSURE GAUGE W/COCK
S	PRESSURE SWITCH W/COCK
M	METER
SP	SLIP ON JOINT PIPE
R	RESTRAINED JOINT PIPE

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED

BAW DRAWN

YQ CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 43686 REGISTERED PROFESSIONAL ENGINEER

Matthew L Hickey

murraysmith

Shaping our community together

CITY OF LACEY

CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

SYMBOLS AND LEGEND

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET G-2

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@	AT
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
AB	ANCHOR BOLT
ABAN (D)	ABANDON (ED)
ABS	ACRYLONITRILE BUTADIENE STYRENE
ABV	ABOVE
AC	ASPHALTIC CONCRETE
ACP	ASPHALTIC CONCRETE PAVING
ADJ	ADJUSTABLE
ADJC	ADJACENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHR	ANCHOR
AL	ALUMINUM
ALT	ALTERNATE
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
APPVD	APPROVED
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ARCH	ARCHITECTURAL
ARV	AIR RELEASE VALVE
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASSN	ASSOCIATION
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
ATM	ATMOSPHERE
AUTO	AUTOMATIC
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE
AWWA	AMERICAN WATER WORKS ASSOCIATION
B&S	BELL & SPIGOT
BC	BOLT CIRCLE
BD	BOARD
BETW	BETWEEN
BF	BOTH FACE
BFD	BACKFLOW PREVENTION DEVICE
BFILL	BACK FILL
BFV	BUTTERFLY VALVE
BHP	BRAKE HORSEPOWER
BKGD	BACKGROUND
BLDG	BUILDING
BLK	BLOCK
BLVD	BOULEVARD
BM	BENCH MARK / BEAM
BMP	BEST MANAGEMENT PRACTICE
BO	BLOWOFF
BOC	BACK OF CURB
BS	BOTH SIDES
BSMT	BASEMENT
BTF	BOTTOM FACE
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE
BW	BOTH WAYS
C	CELSIUS
C TO C	CENTER TO CENTER
CARV	COMBINATION AIR RELEASE VALVE
CATV	CABLE TELEVISION
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CCW	COUNTER CLOCKWISE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHAN	CHANNEL
CHEM	CHEMICAL
CHFR	CHAMFER
CHKV	CHECK VALVE
CI	CAST IRON
CIP	CAST IRON PIPE
CIPC	CAST IN PLACE CONCRETE
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CL or ℄	CENTER LINE
CL2	CHLORINE
CLG	CEILING
CLJ	CONTROL JOINT
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CND	CONDUIT
CO	CLEANOUT
COL	COLUMN
COMB	COMBINATION
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS / CONTINUATION
CONTR	CONTRACT (OR)
COORD	COORDINATE
COP	COPPER
CORP	CORPORATION
CORR	CORRUGATED
CP	CONTROL POINT
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
CR	CRUSHED ROCK
CS	COMBINED SEWER
CSP	CONCRETE SEWER PIPE
CT	COURT
CTR	CENTER
CU	CUBIC
CULV	CULVERT
CV	CONTROL VALVE
CW	CLOCKWISE / COLD WATER
CY	CUBIC YARDS
CYL	CYLINDER LOCK
D	DRAIN
DBFEJ	DOUBLE BALL FLEXIBLE EXPANSION JOINT
DC	DIRECT CURRENT
DEFL	DEFLECTION
DET	DETAIL
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DIR	DIRECTION
DIST	DISTANCE
DN	DOWN
DR	DRIVE
DS	DOWNSPOUT
DWG	DRAWING
DWL	DOWEL
DWV	DRAIN WASTE AND VENT
DWY	DRIVEWAY
EA	EACH
ECC	ECCENTRIC
EF	EACH FACE
EL	ELEVATION
ELB	ELBOW
ELEC	ELECTRICAL
ENCL	ENCLOSURE
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQL SP	EQUALLY SPACED
EQUIP	EQUIPMENT
EW	EACH WAY
EXC	EXCAVATE
EXIST	EXISTING
EXIST GR	EXISTING GRADE
EXP	EXPANSION
EXP BT	EXPANSION BOLT
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
F	FAHRENHEIT
F TO F	FACE TO FACE
FAB	FABRICATE
FB	FLAT BAR
FCA	FLANGED COUPLING ADAPTER
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDN	FOUNDATION
FEXT	FIRE EXTINGUISHER
FF	FAR FACE
FGL	FIBERGLASS
FH	FIRE HYDRANT
FIN FL	FINISH FLOOR
FIN GR	FINISH GRADE
FIPT	FEMALE IRON PIPE THREAD
FITG	FITTING
FL	FLOOR LINE
FLEX	FLEXIBLE
FLG	FLANGE
FLL	FLOW LINE
FLR	FLOOR
FM	FORCE MAIN
FO	FIBER OPTIC
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET / FOOT
FTG	FOOTING
FUT	FUTURE
FXTR	FIXTURE
G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GROOVED COUPLING
GFA	GROOVED FLANGE ADAPTER
GI	GALVANIZED IRON
GIP	GALVANIZED IRON PIPE
GJ	GRIP JOINT
GL	GLASS
GLV	GLOBE VALVE
GND	GROUND
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPS	GALLONS PER SECOND
GR	GRADE
GR LN	GRADE LINE
GRTG	GRATING
GV	GATE VALVE
GRVL	GRAVEL
GYP	GYPSUM
HB	HOSE BIBB
HC	HOLLOW CORE
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HDWE	HARDWARE
HGR	HANGER
HGT	HEIGHT
HH	HANDHOLD
HM	HOLLOW METAL
HNDRL	HAND RAIL
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HIGH PRESSURE / HORSEPOWER
HPG	HIGH PRESSURE GAS
HPT	HIGH POINT
HR	HOUR
HSB	HIGH STRENGTH BOLT
HV	HOSE VALVE
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HWL	HIGH WATER LINE
HWY	HIGHWAY
HYD	HYDRANT
HYDR	HYDRAULIC
I&C	INSTRUMENTATION & CONTROL
IAW	IN ACCORDANCE WITH
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IF	INSIDE FACE
IMPVT	IMPROVEMENT
IN	INCH
INCC	INCLUDE (D) (ING)
INFL	INFLUENT
INJ	INJECTION
INSTL	INSTALLATION / INSTALL
INSUL	INSULATION
INTER	INTERCEPTOR
INTR	INTERIOR
INV	INVERT
IP	IRON PIPE
IPT	IRON PIPE THREAD
IR	IRON ROD
IRRIG	IRRIGATION
JT	JOINT
JUNC	JUNCTION
KPL	KICK PLATE
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWY	KEYWAY
L	LENGTH OF CURVE
LAB	LABORATORY
LAV	LAVATORY
LB	POUND
LF	LINEAL FOOT
LIN	LINEAL / LINEAR
LN	LANE
LOC	LOCATION
LONG	LONGITUDINAL
LP	LOW PRESSURE
LPT	LOW POINT
LRG	LARGE
LS	LONG SLEEVE / LUMP SUM
LT	LEFT
LVL	LEVEL
LWL	LOW WATER LINE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MCP	MASTER CONTROL PANEL
MECH	MECHANICAL
MET	METAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MIPT	MALE IRON PIPE THREAD
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MON	MONUMENT / MONOLITHIC
MOT	MOTOR
MP	MILEPOST
MSL	MEAN SEA LEVEL
MTD	MOUNTED
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NF	NEAR FACE
NIC	NOT IN CONTRACT
NO / NO.	NORMALLY OPEN / NUMBER
NOM	NOMINAL
NORM	NORMAL
NRS	NON-RISING STEM
NTS	NOT TO SCALE
O TO O	OUT TO OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OF	OVERFLOW / OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
ORIG	ORIGINAL
OVHD	OVERHEAD
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVE
PCVC	POINT OF CURVATURE ON VERTICAL CURVE
PE	PLAIN END
PERF	PERFORATED
PERM	PERMANENT
PERP	PERPENDICULAR
PG	PRESSURE GAUGE
PH	PIPE HANGER
PI	POINT OF INTERSECTION
PIVC	POINT OF INTERSECTION ON VERTICAL CURVE
PL or ¤	PROPERTY LINE / PLATE / PLASTIC
PLBG	PLUMBING
PNL	PANEL
POC	POINT OF CURVATURE
POLY	POLYETHYLENE
POT	POINT OF TANGENCY
PP	POWER POLE
PRC	POINT OF REVERSE CURVATURE
PRCST	PRECAST
PREP	PREPARATION
PRESS	PRESSURE
PRKG	PARKING
PROP	PROPERTY
PRV	PRESSURE REDUCING VALVE
PS	PUMP STATION
PSIG	POUNDS PER SQUARE INCH GAGE
PSL	PIPE SLEEVE
PSPT	PIPE SUPPORT
PT	POINT OF TANGENCY
PTVC	POINT OF TANGENCY ON VERTICAL CURVE
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PWR	POWER
QTY	QUANTITY
RAD	RADIUS
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD / ROOF DRAIN
RDCR	REDUCER
REF	REFERENCE
REINF	REINFORCE (D) (ING) (MENT)
REQ'D	REQUIRED
RESTR	RESTRAINED
RFCA	RESTRAINED FLANGE COUPLING ADAPTER
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
ROW or R/W	RIGHT OF WAY
RPBPD	REDUCED PRESSURE BACKFLOW PREVENTION DEVICE
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RST	REINFORCING STEEL
RT	RIGHT
SALV	SALVAGE
SAN	SANITARY
SC	SOLID CORE
SCHED	SCHEDULE
SD	STORM DRAIN
SDL	SADDLE
SDR	STANDARD DIMENSION RATIO
SECT	SECTION
SHLDR	SHOULDER
SHT	SHEET
SIM	SIMILAR
SLP	SLOPE
SLV	SLEEVE
SOLN	SOLUTION
SP	SOIL PIPE / SEWER PIPE
SPCL	SPECIAL
SPEC (S)	SPECIFICATION (S)
SPG	SPACING
SPL	SPOOL
SPRT	SUPPORT
SQ	SQUARE
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SQ YD	SQUARE YARD
SS	SANITARY SEWER
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRAIGHT
STRUCT	STRUCTURE / STRUCTURAL
SUBMG	SUBMERGED
SUCT	SUCTION
SV	SOLENOID VALVE
S/W	SIDEWALK
SWD	SIDEWATER DEPTH
SWGR	SWITCH GEAR
SYMM	SYMMETRICAL
SYS	SYSTEM
T or TEL	TELEPHONE
T&B	TOP & BOTTOM
TAN	TANGENCY
TB	THRUST BLOCK
TBM	TEMPORARY BENCH MARK
TC	TOP OF CONCRETE / TOP OF CURB
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE / TEMPORARY
T&G	TONGUE & GROOVE
THK	THICKNESS
THRD	THREAD(ED)
THRU	THROUGH
TP	TEST PIT/TOP OF PAVEMENT/TURNING POINT
TRANS	TRANSITION
TSP	TRI-SODIUM PHOSPHATE
TST	TOP OF STEEL
TW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UN	UNION
UON	UNLESS OTHERWISE NOTED
USGS	UNITED STATES GEOLOGIC SURVEY
V	VENT / VOLT
VAC	VACUUM
VB	VACUUM BREAKER
VBOX	VALVE BOX
VC	VERTICAL CURVE
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VCP	VITRIFIED CLAY PIPE
VTR	VENT THROUGH ROOF
W	WATER
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL
WD	WOOD
WF	WIDE FLANGE
WH	WALL HYDRANT
WHTR	WATER HEATER
WI	WROUGHT IRON
WM	WATER METER
WP	WORKING POINT / WATERPROOFING
WS	WATER SERVICE
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WT	WEIGHT
WTP	WATER TREATMENT PLANT
WTRT	WATERTIGHT
WWF	WELDED WIRE FABRIC
WWTF	WASTEWATER TREATMENT FACILITY
WWTP	WASTEWATER TREATMENT PLANT
X SECT	CROSS SECTION
XFMR	TRANSFORMER
YD	YARD DRAIN/YARD
YH	YARD HYDRANT
YR	YEAR
ZN	ZINC

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED

BAW DRAWN

YQ CHECKED

MATTHEW L HICKEY STATE OF WASHINGTON 49686 REGISTERED PROFESSIONAL ENGINEER

Matthew L Hickey

murraysmith

Shaping our community together

CITY OF LACEY

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

ABBREVIATIONS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET G-3

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K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-G.dwg G-3 9/30/2021 5:23 PM HCM 23.0s (LMS Tech)

GENERAL NOTES

1. CONTRACTOR SHALL ADHERE TO THE CITY OF LACEY DEVELOPMENT GUIDELINES & PUBLIC WORKS STANDARDS FOR WATER AND STORM DRAINAGE CONSTRUCTION.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. THE CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. ALL LOCATOR SERVICES SHOULD BE CONDUCTED PRIOR TO ANY CONSTRUCTION OR SUBSURFACE EXPLORATION.
4. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES TO DETERMINE THEIR EXACT HORIZONTAL AND VERTICAL LOCATIONS IN ACCORDANCE WITH WSDOT SPECIFICATION 7-08.3(1).
5. LINEAL FOOTAGE OF PIPING SHOWN ON THE DRAWING REFERS TO THE HORIZONTAL LENGTHS.
6. PRIOR TO BACKFILL ALL PIPES AND APPURTENANCES SHALL BE INSPECTED BY THE CONSTRUCTION INSPECTOR. APPROVAL SHALL NOTE RELIEVE THE CONTRACTOR FOR CORRECTION OF ANY DEFICIENCIES AND/OR FAILURES AS DETERMINED BY SUBSEQUENT TESTING AND INSPECTION.
7. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS NECESSARY TO OBTAIN SUFFICIENT WATER, POWER, AND LIGHTING FOR CONSTRUCTION PURPOSES.
8. RESTRAIN ALL DUCTILE IRON PIPING, MECHANICAL JOINT VALVES, TEES, BENDS, COUPLINGS, AND FITTINGS.
9. CONTRACTOR SHALL NOT REMOVE ANY TREES UNLESS INDICATED ON PLANS OR DIRECTED BY ENGINEER.

LACEY

11/09/2018
DATE OF SURVEY

VERTICAL DATUM NGVD 29

CITY OF LACEY BM#645
CITY OF LACEY 2" SURFACE
MONUMENT AT THE INTERSECTION OF
SLEATER-KINNEY & 12TH AVE SE
ELEV.=202.68

The Topographic Survey depicts the physical features that were visible at the time of the survey. The City of Lacey is not responsible for the location of underground utilities that are marked or not marked in the field by other utility providers. All feature locations should be independently verified prior to design or construction.

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED
BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49686 REGISTERED PROFESSIONAL ENGINEER
Matthew L Hickey

murraysmith

Shaping our community together
CITY OF LACEY

**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

GENERAL AND SURVEY NOTES

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
G-4
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K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-G.dwg G-4 9/30/2021 5:23 PM HCM 23.0s (LMS Tech)

WATER NOTES

1. WATER MAINS UP TO 10" SHALL BE AWWA C900 DR14 OR DUCTILE IRON STANDARD THICKNESS CLASS 52.

2. GATE VALVES SHALL BE RESILIENT WEDGE, NRS (NON RISING STEM) WITH O-RING SEALS. VALVE ENDS SHALL BE MECHANICAL JOINT OR ANSI FLANGES. VALVES SHALL CONFORM TO AWWA C-515 LATEST REVISION. VALVES SHALL BE MUELLER, M & H, KENNEDY, CLOW R/W, WATEROUS SERIES 2500, EJ FLOWMASTER OR AMERICAN AVK.

3. EXISTING VALVES SHALL BE OPERATED BY CITY EMPLOYEES ONLY.

4. HYDRANTS SHALL BE CITY APPROVED AS SPECIFIED ON THE HYDRANT DETAILS AND SHALL BE BAGGED UNTIL THE SYSTEM IS APPROVED.

5. THE CONTRACTOR WITH THE ASSISTANCE OF THE CITY INSPECTOR SHALL INSTALL, CHLORINATE AND FILL THE WATER MAIN. TESTING SHALL INCLUDE THE MAIN, VALVES, SERVICE LINES AND APPURTENANCES. AFTER TESTING IS COMPLETED, THE NEWLY CONSTRUCTED SYSTEM SHALL BE FLUSHED. AFTER FLUSHING CHLORINATED WATER FROM DISINFECTED LINES, THE CITY SHALL MEASURE CHLORINE RESIDENTIAL TO VERIFY THAT FLUSHING IS COMPLETE. THIS WILL BE COMPLETED PRIOR TO THE CITY TAKING MICROBIOLOGICAL SAMPLES.

6. ALL PIPE AND SERVICES SHALL BE INSTALLED WITH CONTINUOUS TRACER TAPE INSTALLED 12" TO 18" UNDER THE FINAL GROUND SURFACE. THE MARKER SHALL BE PLASTIC NON-BIODEGRADABLE, METAL CORE BACKING MARKED "WATER" WHICH CAN BE DETECTED BY A STANDARD METAL DETECTOR. TAPE SHALL BE 3 INCH WIDE TERRA TAPE "D" OR APPROVED EQUAL. IN ADDITION TO TRACER TAPE, INSTALL DIRECT BURY, U.S.E. 12 GAUGE BLUE COATED COPPER WIRE, WRAPPED AROUND OR TAPED TO THE PIPE, AS SHOWN ON CITY STANDARD DRAWINGS. LOW VOLTAGE GREASE-TYPE SPLICE KITS SHALL BE USED ON TRACER WIRE. AFTER THE WIRE NUT IS USED TO CONNECT THE WIRE TOGETHER AN OVERHAND KNOT SHALL BE TIED JUST OUTSIDE THE GREASE KIT TO PREVENT IT FROM COMING APART. CONTINUITY TESTING OF THE WIRE WILL BE DONE BY THE CITY.

7. ALL SERVICE LINE LOCATIONS SHALL BE MARKED ON THE TOP OR FACE OF THE CURB WITH AN EMBOSSED "W" 3 INCHES HIGH AND 1/4 INCH INTO CONCRETE.

8. THE CITY WILL BE GIVEN 72 HOURS NOTICE PRIOR TO SCHEDULING A SHUTDOWN. WHERE CONNECTIONS REQUIRE "FIELD VERIFICATION", CONNECTION POINTS SHALL BE EXPOSED BY THE CONTRACTOR AND FITTINGS VERIFIED 72 HOURS PRIOR TO DISTRIBUTING SHUT-DOWN NOTICES.

9. SEPARATION BETWEEN WATER AND SEWER SHALL BE MAINTAINED PER ECY STANDARDS.

10. AT ANY CONNECTION TO AN EXISTING LINE WHERE A NEW VALVE IS NOT INSTALLED, THE EXISTING VALVE MUST BE PRESSURE TESTED TO CITY STANDARDS PRIOR TO CONNECTION. IF AN EXISTING VALVE FAILS TO PASS THE TEST, THE CONTRACTOR SHALL MAKE THE NECESSARY PROVISIONS TO TEST THE NEW LINE PRIOR TO CONNECTION TO THE EXISTING SYSTEM OR INSTALL A NEW VALVE.

11. THE MINIMUM BURIAL DEPTH OF ALL WATER LINES SHALL BE 42 INCHES. THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF 18 INCHES OF VERTICAL SEPARATION BETWEEN SANITARY SEWERS/RECLAIMED WATER AND WATER MAINS. TO ACCOMMODATE CROSSINGS, THE MINIMUM COVER FOR WATER MAIN OF 42 INCHES MAY BE REDUCED TO 30 INCHES UPON APPROVAL BY THE CITY TO PROVIDE FOR AS MUCH VERTICAL SEPARATION AS POSSIBLE. WHEN A REDUCED DEPTH IS ALLOWED, DUCTILE IRON PIPING AND/OR CASINGS MAY BE REQUIRED.

12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION AND DEPTH OF THE EXISTING MAIN AND PROVIDE THE FITTINGS REQUIRED TO MAKE THE CONNECTIONS TO THE EXISTING MAIN.

13. THE CONTRACTOR SHALL INSTALL A TEMPORARY 2 INCH BRASS BLOW OFF FOR FLUSHING AND SAMPLING ON THE EXISTING AND/OR NEW WATER MAIN. THE BLOW OFF SHALL BE CONSTRUCTED WITH A STANDARD 2 INCH TAPPING SADDLE AND FORD BRASS CORPORATION STOP WITH 2 INCH BRASS PIPE EXTENDED UP TO FINISHED GRADE. WHEN FLUSHING AND SAMPLING ARE COMPLETED, THE 2 INCH PIPE SHALL BE REMOVED. THE CORPORATION STOP SHALL BE SHUT OFF AND CAPPED TIGHT WITH A THREADED BRASS CAP.

14. WHEN AN EXISTING CITY WATER MAIN IS TO BE ABANDONED, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND ABANDON THE EXISTING MAIN. IT SHALL ALSO BE THE DEVELOPER'S RESPONSIBILITY TO INSTALL AND TRANSFER EXISTING WATER SERVICES TO THE NEW MAIN.

15. SAND SHALL BE PLACED AROUND AND UNDER SERVICE LINES AND METER BOXES BY HAND TO A HEIGHT OF 6 INCHES ABOVE AND 6 INCHES BELOW THE LINE(S) AND BOXES.

16. METERS 3 INCHES OR LARGER IN SIZE MUST BE ORDERED FROM CITY UTILITY BILLING BY THE CONTRACTOR A MINIMUM OF 10 WEEKS IN ADVANCE OF INSTALLATION.

17 ALL VALVE BOX, BLOW-OFF AND MANHOLE LIDS SHALL BE CLEAN AND CLEAR OF ASPHALT OR CONCRETE BEFORE SCHEDULING A WALK THROUGH.

18. THE WATER MAIN AND APPURTENANCES AND SERVICE CONNECTIONS TO THE METER SETTER SHALL BE TESTED IN SECTIONS OF CONVENIENT LENGTHS UNDER A HYDROSTATIC PRESSURE EQUAL TO 150 PSI IN EXCESS OF THAT UNDER WHICH IT WILL OPERATE. IN NO CASE SHALL THE TEST PRESSURE BE LESS THAN 225 PSI.

19. ALL WATER MAINS AND SERVICE LINES SHALL BE BEDDED PER CITY STANDARD DRAWING 6-26 AND MEETING THE PIPE BEDDING SPECIFICATION CHART REQUIREMENTS.

20. ALL BRASS PIPE AND FITTINGS SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA AND COMPLY WITH PUBLIC LAW 111-380 (REDUCTION OF LEAD IN DRINKING WATER ACT). IMPORTED BRASS PIPE AND FITTINGS SHALL NOT BE PERMITTED.

21. WHEN USING A HYDRANT METER TO FILL A TANKER TRUCK OR PORTABLE TANK OF ANY KIND, AN APPROVED PERMANENTLY INSTALLED AIR GAP OF AT LEAST TWO TIMES THE INSIDE DIAMETER OF THE FILL PIPE IS REQUIRED. ANY AIR GAP ON TANKER TRUCKS OR PORTABLE TANKS USED WITHIN THE CITY OF LACEY WATER SYSTEM MUST BE INSPECTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER (BAT) AND A TYPICAL BACKFLOW PREVENTION TEST REPORT SUBMITTED TO THE LACEY CROSS-CONNECTION SPECIALIST.

DRAINAGE NOTES

1. ALL APPROVALS AND PERMITS REQUIRED BY THE CITY OF LACEY SHALL BE OBTAINED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. A GRADING PERMIT FOR STORM POND CONSTRUCTION MAY BE REQUIRED.

2. STORM DRAIN PIPE SHALL BE ON THE WSDOT QUALIFIED PRODUCTS LIST FOR THE SPECIFICATION LISTED BELOW:
   A. PLAIN CONCRETE STORM SEWER PIPE OR REINFORCED CONCRETE STORM SEWER PIPE PER WSDOT STANDARD SPECIFICATION 9-05.7.
   B. SOLID WALL PVC STORM SEWER PIPE PER WSDOT STANDARD SPECIFICATION 9-05.12(1).
   C. DUCTILE IRON SEWER PIPE PER WSDOT STANDARD SPECIFICATION 9-05.13.
   D. HANCOR BLUE SEAL™ AND ADVANCED DRAINAGE SYSTEMS (ADS/HANCOR) N-12 HDPE AND (ADS/HANCOR) SANITITE UP TO 36" IN DIAMETER PER WSDOT STANDARD SPECIFICATIONS 9-05.20 AND 9-05.24.
   E. CONTECH DUROMAXX STEEL RIB REINFORCED POLYETHYLENE PIPE, IN DIAMETERS FROM 24 INCH TO 60 INCH PER WSDOT STANDARD SPECIFICATION 9-05.22.

3. ALL STORM DRAINAGE SYSTEMS SHALL BE AIR TESTED AT 4 PSI EXCEPT CONCRETE PIPE WHICH SHALL BE TESTED PER WSDOT/APWA STANDARD FOR CONCRETE STORM PIPE. ALL FLEXIBLE PIPE SHALL BE MANDREL TESTED PER WSDOT/APWA STANDARDS. TESTING SHALL BE DONE BY THE CONTRACTOR.

4. TESTING OF THE STORM SEWER SHALL INCLUDE VIDEO TAPING OF THE MAIN BY THE CONTRACTOR. IMMEDIATELY PRIOR TO VIDEO TAPING, ENOUGH WATER SHALL BE RUN DOWN THE LINE SO IT COMES OUT THE LOWER CATCHBASIN. A COPY OF THE VIDEO TAPE SHALL BE SUBMITTED TO THE CITY OF LACEY. ACCEPTANCE OF THE LINE WILL NOT BE MADE UNTIL AFTER THE TAPE HAS BEEN REVIEWED AND APPROVED BY THE CITY. TESTING SHALL TAKE PLACE AFTER ALL UNDERGROUND UTILITIES ARE INSTALLED AND COMPACTION OF THE ROADWAY SUBGRADE IS COMPLETE.

5. SPECIAL STRUCTURES AND OUTLET CONTROLS SHALL BE INSTALLED PER PLANS AND MANUFACTURERS' RECOMMENDATIONS.

6. ALL DISTURBED AREAS SHALL BE STABILIZED IN ACCORDANCE WITH THE, CORE REQUIREMENT 2 OF THE CITY OF LACEY 2016 STORMWATER DESIGN MANUAL. FOR SITES WHERE VEGETATION HAS BEEN PLANTED THROUGH HYDROSEEDING, THE FINANCIAL GUARANTEE WILL NOT BE RELEASED UNTIL THE VEGETATION HAS BEEN THOROUGHLY ESTABLISHED.

7. WHERE CONNECTIONS REQUIRE "FIELD VERIFICATIONS", CONNECTION POINTS WILL BE EXPOSED BY CONTRACTOR AND FITTINGS VERIFIED 48 HOURS PRIOR TO DISTRIBUTING SHUT-DOWN NOTICES.

8. ALL CATCH BASINS SHALL HAVE PADS PER LACEY STANDARD DETAIL.

9. ANY CHANGES TO THE DESIGN SHALL FIRST BE REVIEWED AND APPROVED BY THE PROJECT ENGINEER AND THE CITY OF LACEY.

10. ALL STORM PIPE SHALL BE A MINIMUM OF 12 INCH DIAMETER FOR MAINS AND CROSSINGS. WHEN PRIVATE STORMWATER (I.E. ROOF, LOT OR FOOTING DRAINS) CANNOT BE INFILTRATED ON INDIVIDUAL LOTS, THE MINIMUM STANDARD PIPING CONNECTION TO THE PUBLIC SYSTEM SHALL BE 8 INCH PVC. THE 8 INCH MAIN USED FOR CONNECTION SHALL BEGIN AT THE RIGHT-OF-WAY, THE CONNECTION TO THE CATCH BASIN OR MANHOLE SHALL BE CORED.

11. ALL STORM MAINS AND RETENTION/DETENTION AREAS SHALL BE STAKED FOR GRADE AND ALIGNMENT BY AN ENGINEERING OR SURVEY FIRM LICENSED TO PERFORM SUCH WORK.

12. THE MINIMUM STAKING OF STORM SEWER SYSTEMS SHALL BE AS FOLLOWS:
   A. STAKE LOCATION OF ALL CATCH BASINS, MANHOLES AND OTHER FIXTURES FOR GRADE AND ALIGNMENT.
   B. STAKE LOCATION, SIZE, AND DEPTH OF RETENTION/DETENTION FACILITY.
   C. STAKE FINISHED GRADE OF ALL STORMWATER FEATURES, INCLUDING BUT NOT LIMITED TO CATCH BASIN/MANHOLE RIM ELEVATIONS, OVERFLOW STRUCTURES, WEIRS, AND INVERT ELEVATIONS OF ALL PIPES IN CATCH BASINS, MANHOLES, AND PIPES THAT DAYLIGHT.

13. PIPE MATERIALS USED FOR STORMWATER CONVEYANCE SHALL BE AS APPROVED BY THE JURISDICTION. PIPE SIZE, SLOPE, COVER, ETC., SHALL BE AS SPECIFIED IN THE CITY OF LACEY DEVELOPMENT GUIDELINES AND PUBLIC WORKS STANDARDS.

14. ALL DRIVEWAY CULVERTS SHALL BE OF SUFFICIENT LENGTH TO PROVIDE A MINIMUM 3:1 SLOPE FROM THE EDGE OF THE DRIVEWAY TO THE BOTTOM OF THE DITCH. CULVERTS SHALL HAVE BEVELED END SECTIONS TO MATCH THE SIDE SLOPE.

15. THE STORM DRAINAGE SYSTEM SHALL BE CONSTRUCTED ACCORDING TO APPROVED PLANS ON FILE WITH THE JURISDICTION. ANY MATERIAL DEVIATION FROM THE APPROVED PLANS WILL REQUIRE WRITTEN APPROVAL FROM THE JURISDICTION.

16. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED OR SIMILARLY STABILIZED TO THE SATISFACTION OF THE JURISDICTION. FOR SITES WHERE GRASS HAS BEEN PLANTED THROUGH HYDROSEEDING, THE PERFORMANCE BOND WILL NOT BE RELEASED UNTIL THE GRASS HAS BEEN THOROUGHLY ESTABLISHED, UNLESS OTHERWISE APPROVED BY THE JURISDICTION.

17. ALL BUILDING DOWNSPOUTS ON COMMERCIAL SITES SHALL BE CONNECTED TO THE STORM DRAINAGE SYSTEM, UNLESS OTHERWISE APPROVED BY THE JURISDICTION.

18. ALL EROSION CONTROL AND STORMWATER FACILITIES SHALL BE REGULARLY INSPECTED AND MAINTAINED BY THE CONTRACTOR DURING THE CONSTRUCTION PHASE OF THE DEVELOPMENT PROJECT.

19. NO FINAL CUT OR FILL SLOPE SHALL EXCEED TWO (2) HORIZONTAL TO ONE (1) VERTICAL WITHOUT STABILIZATION BY ROCKERY OR BY A STRUCTURAL RETAINING WALL.

20. THE PROJECT ENGINEER SHALL VERIFY THE LOCATIONS, WIDTHS, THICKNESSES, AND ELEVATIONS OF ALL EXISTING PAVEMENTS AND STRUCTURES, INCLUDING UTILITIES AND OTHER FRONTAGE IMPROVEMENTS, THAT ARE TO INTERFACE WITH NEW WORK, PROVIDE ALL TRIMMING, CUTTING, SAW CUTTING, GRADING, LEVELING, SLOPING, COATING, AND OTHER WORK, INCLUDING MATERIALS AS NECESSARY TO CAUSE THE INTERFACE WITH EXISTING WORKS TO BE PROPER, WITHOUT CONFLICT, ACCEPTABLE TO THE ENGINEER AND THE JURISDICTION, COMPLETE IN PLACE, AND READY TO USE.

21. COMPACTION OF ALL FILL AREAS SHALL BE PER CURRENT APWA SPECIFICATIONS. FILL SHALL BE PROVIDED IN 6" MAXIMUM LIFTS AND SHALL BE COMPACTED TO 95 PERCENT OF ITS MAXIMUM RELATIVE DENSITY.

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED
BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49688 REGISTERED PROFESSIONAL ENGINEER
Matthew L Hickey

murraysmith

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CITY OF LACEY

CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

WATER AND DRAINAGE NOTES

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET G-5

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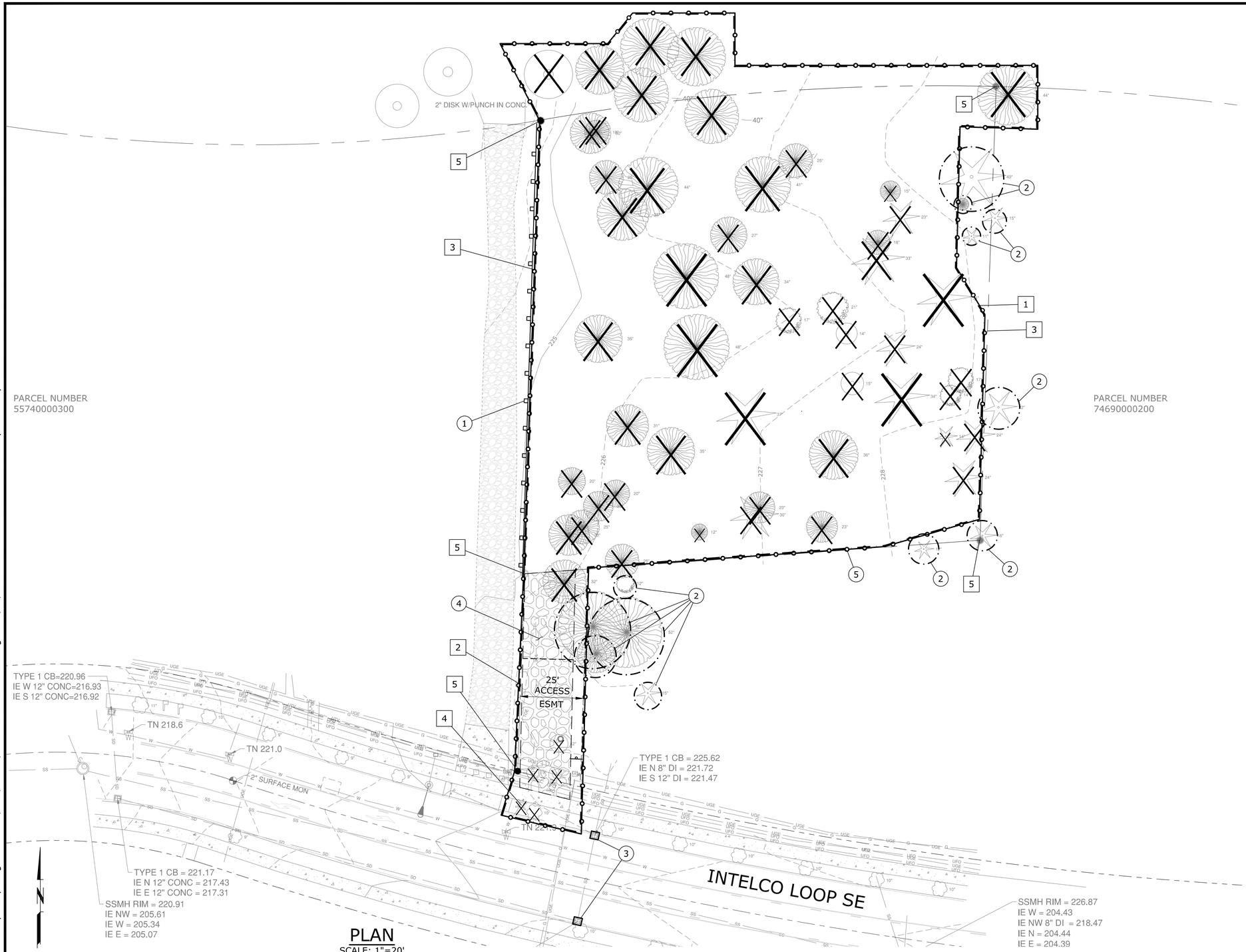

PLAN
SCALE: 1"=20'

SECTION: 32 TOWNSHIP: 18N RANGE: 1W

DEMOLITION KEY NOTES:

1. CLEARING AND GRADING LIMITS
2. EXIST ACCESS AND UTILITY EASEMENT
3. PROPERTY LINE
4. REMOVE EXIST FH PER SPECS
5. PROTECT PROPERTY CORNER

NOTE:

1. EXISTING 100-YEAR STORM RUNOFF = 0.233 CFS.
2. TREES AND DEBRIS TO BE CLEARED ON NORTHERN ADJACENT PROPERTY FOR A ONE-TIME ONLY EVENT PER ARBORIST RECOMMENDATION.
3. TREE REMOVAL AND PROTECTION PER SPECIFICATIONS.
4. REMOVE ANY EXISTING LANDSCAPE BRACING AND POSTS WHERE TREES ARE REMOVED.

ESC KEY NOTES:

1. HIGH VISIBILITY SILT FENCE PER CITY OF LACEY 2016 STORMWATER MANUAL, BMP FIGURE 5.20, SEE SHT C-2
2. INSTALL TREE PROTECTION FENCE PER CITY OF LACEY URBAN FOREST MANAGEMENT, SEE SHT C-2
3. STORM DRAIN PROTECTION PER WSDOT STANDARD PLAN I-40.20-00, SEE SHT C-2
4. STABILIZED CONSTRUCTION ENTRANCE PER PER CITY OF LACEY 2016 STORMWATER MANUAL, BMP FIGURE 5.10, SEE SHT C-2
5. HIGH VISIBILITY CONSTRUCTION FENCE PER WSDOT STANDARD PLAN I-10.10.01, SEE SHT C-3

TOTAL TREES TO BE REMOVED: 77

SWPPS NOTES:

1. ALL POLLUTANTS, INCLUDING WASTE MATERIALS, THAT OCCUR ONSITE SHALL BE HANDLED AND DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORMWATER
2. MAINTENANCE AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES INVOLVING OIL CHANGES, SOLVENT AND DE-GREASING CLEANING OPERATIONS, FUEL TANK DRAIN DOWN AND REMOVAL, AND OTHER ACTIVITIES WHICH MAY RESULT IN DISCHARGE OR SPILLAGE OF POLLUTANTS TO THE GROUND OR INTO STORMWATER RUNOFF MUST BE CONDUCTED USING SPILL PREVENTION MEASURES, SUCH AS DRIP PANS. CONTAMINATED SURFACES SHALL BE CLEANED IMMEDIATELY FOLLOWING ANY DISCHARGE OR SPILL INCIDENT. EMERGENCY REPAIRS MAY BE PERFORMED ONSITE USING TEMPORARY PLASTIC PLACED BENEATH AND, IF RAINING, OVER THE VEHICLE.
3. EROSION CONTROL MEASURES SHALL BE TAKEN BY THE CONTRACTOR DURING CONSTRUCTION TO PREVENT THE MITIGATION OF SILT AND DEBRIS. EROSION CONTROL BEST MANAGEMENT PRACTICES SHALL BE IN COMPLIANCE WITH THESE CONTRACT DOCUMENTS AND WITH THE CITY OF LACEY 2016 STORMWATER DESIGN MANUAL.
4. THE TEMPORARY EROSION CONTROL SYSTEM SHALL BE INSTALLED PRIOR TO ALL OTHER CONSTRUCTION AND SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL CLEARING AND/OR CONSTRUCTION IS COMPLETED, PERMANENT DRAINAGE FACILITIES ARE OPERATIONAL AND THE POTENTIAL FOR EROSION HAS PASSED.

- HIGH VISIBILITY SILT FENCE
- HIGH VISIBILITY CONSTRUCTION FENCE
- TREE PROTECTION
- TREE REMOVAL
- CLEARING AND GRADING LIMITS
- CONSTRUCTION ENTRANCE

NO.	DATE	BY	REVISION

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MWH DESIGNED
BAW DRAWN
YQ CHECKED

Matthew L. Hicks
STATE OF WASHINGTON
49686
REGISTERED PROFESSIONAL ENGINEER

murraysmith

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CITY OF LACEY

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

EXISTING CONDITIONS, EROSION SEDIMENTATION CONTROL AND DEMOLITION PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

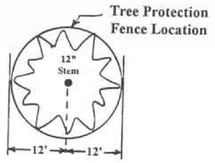
SHEET
C-1
6 of 63

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-C-DEMO.dwg C-1 9/16/2021 9:30 AM TABATHA.DYE 23.0s (LMS Tech)

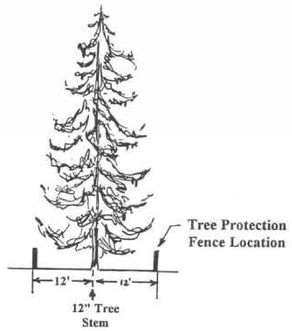
TREE ROOT PROTECTION ZONES

The root protection zone (RPZ) for Pacific Northwest native trees extends a distance of one (1) foot for every inch of tree diameter, measured 4.5' above the ground line. For example, the RPZ for a 12" diameter tree has a radius of 12' measured from the center of the tree stem. Ornamental or other high value or large trees should have the RPZ determined on a case by case basis.

TOP VIEW



SIDE VIEW



TREE ROOT PROTECTION ZONES
SCALE: NTS
1
C-1

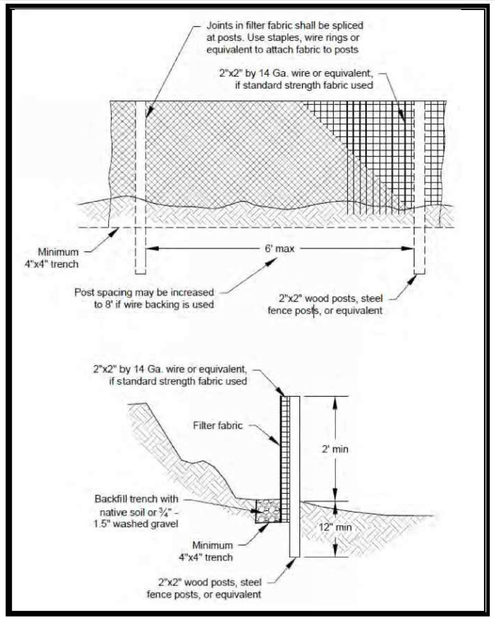


Figure 5.20. Silt Fence.

HIGH VISIBILITY SILT FENCE
SCALE: NTS
2
C-1

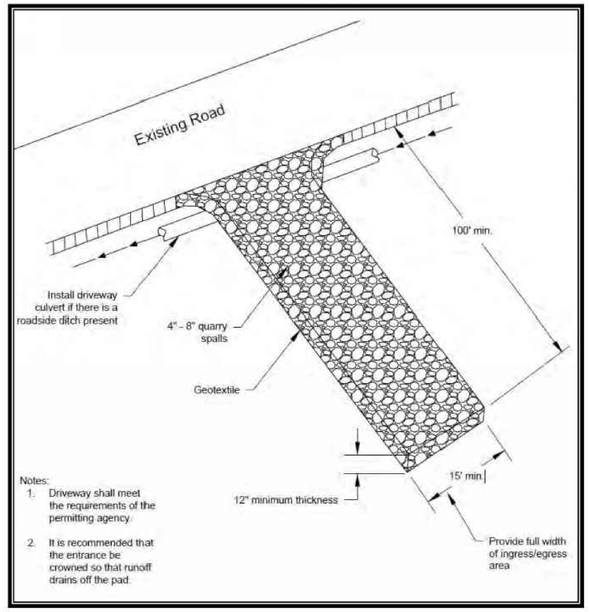
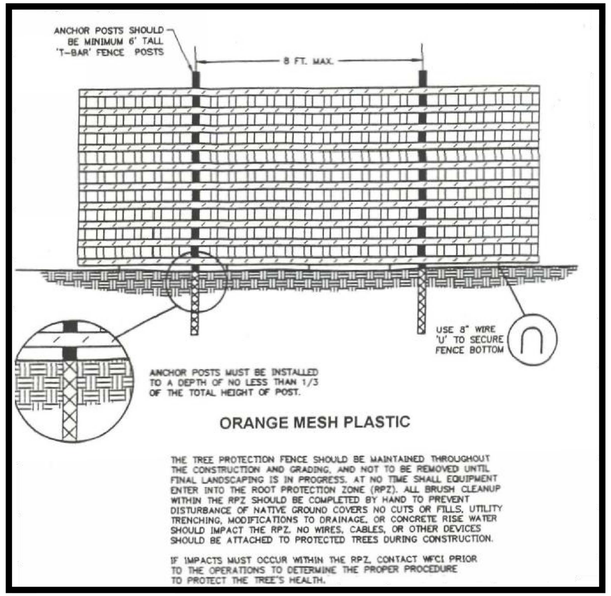


Figure 5.1. Stabilized Construction Entrance.

STABILIZED CONSTRUCTION ENTRANCE
SCALE: NTS
3
C-1



TREE PROTECTION FENCE DETAIL
SCALE: NTS
4
C-1

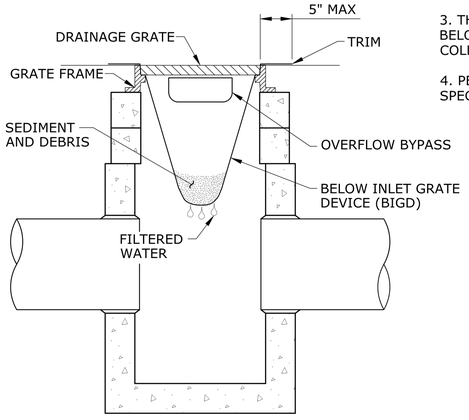
NOTES:

1. SIZE THE STORM DRAIN INLET PROTECTION FOR THE STORM WATER STRUCTURE IT WILL SERVICE.

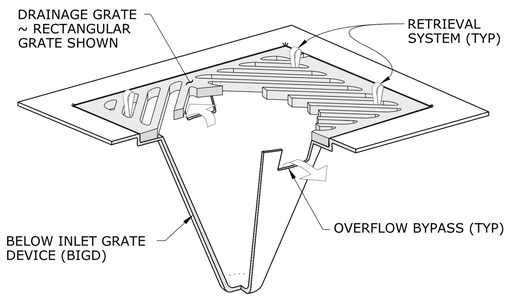
2. THE STORM DRAIN INLET PROTECTION SHALL HAVE A BUILT-IN HIGH-FLOW RELIEF SYSTEM (OVERFLOW BYPASS).

3. THE RETRIEVAL SYSTEM MUST ALLOW REMOVAL OF THE BELOW INLET GRADE DEVICE WITHOUT SPILLING THE COLLECTED MATERIAL.

4. PERFORM MAINTENANCE IN ACCORDANCE WITH SPECIFICATION SECTION 02370.



SECTION VIEW



ISOMETRIC VIEW

STORM DRAIN INLET PROTECTION
WSDOT STANDARD PLAN I-40.20-00
SCALE: NTS
5
C-1

EROSION CONTROL BMPS

MEASURE	DOE BMP
PRESERVING NATURAL VEGETATION	C101
CONSTRUCTION FENCE	C103
GRAVEL CONSTRUCTION ENTRANCE	C105
CONSTRUCTION ROAD STABILIZATION	C107
TEMPORARY AND PERMANENT SEEDING	C120
MULCHING	C121
PLASTIC COVERING	C123
DUST CONTROL	C140
GRASS-LINED CHANNELS	C201
LEVEL SPREADER	C206
CHECK DAM	C207
GEOTEXTILE-ENCASED CHECK DAM	C208
OUTLET PROTECTION	C209
STORM DRAIN INLET PROTECTION	C220
HIGH VISIBILITY SILT FENCE	C233

NO.	DATE	BY	REVISION

NOTICE
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MWH DESIGNED
BAW DRAWN
YQ CHECKED

Matthew L Hickey
STATE OF WASHINGTON
49686
REGISTERED PROFESSIONAL ENGINEER

murraysmith

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**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

EROSION CONTROL AND DEMOLITION DETAILS - 1

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
C-2
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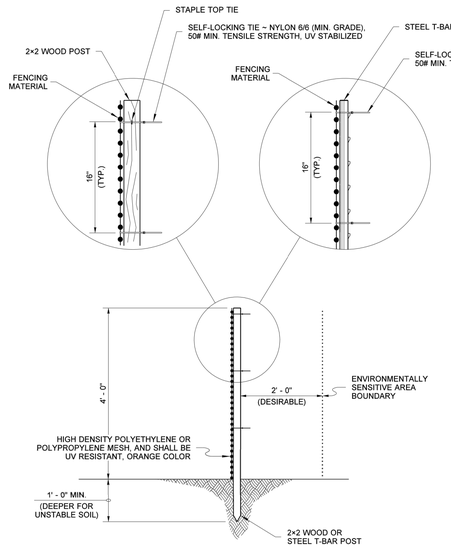
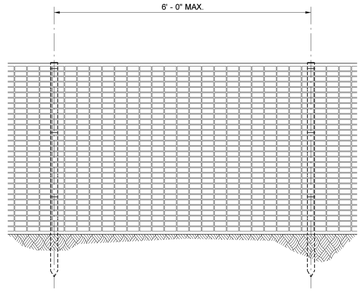
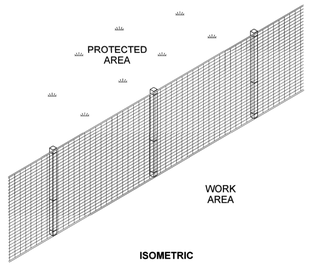
DRAWN BY: BILL BERENS



TYPICAL SECTION



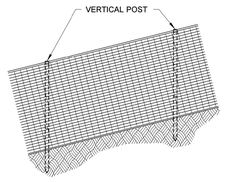
ELEVATION



ISOMETRIC

NOTE

1. Post shall have sufficient strength and durability to support the fence through the life of the project.



ELEVATION

FENCE ON SLOPE

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
MARK W. MAURER
CERTIFICATE NO. 000598

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pasco Bakotich III STATE DESIGN ENGINEER — *08-11-09* DATE

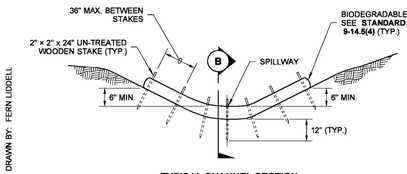
Washington State Department of Transportation

HIGH VISIBILITY CONSTRUCTION FENCE
WSDOT STANDARD PLAN I-10.10.01

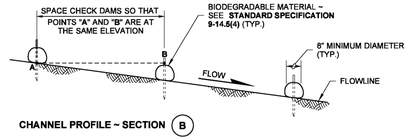
SCALE: NTS

1 / C-1

DRAWN BY: FERN LIDDELL



TYPICAL CHANNEL SECTION



CHANNEL PROFILE ~ SECTION (B)

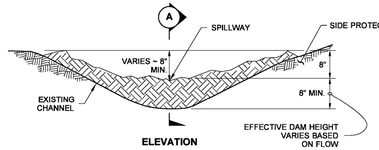
BIODEGRADABLE CHECK DAM

BIODEGRADABLE CHECK DAM NOTE

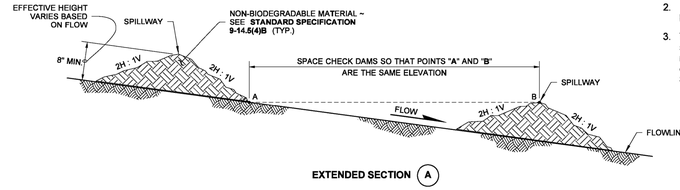
1. Biodegradable Check Dams may need additional or modified staking to prevent undercutting or scouring.

GENERAL NOTES

1. Check Dams shall meet the requirements of **Standard Specifications 8-01.3(6) and 9-14.5(4).**
2. In channels, install the sloped ends of the Check Dam a minimum of 8" higher than the spillway to ensure water flows over the dam and not around it.
3. Perform maintenance in accordance with **Standard Specification 8-01.3(15).**
4. Remove Check Dams in accordance with **Standard Specification 8-01.3(16).**



ELEVATION



EXTENDED SECTION (A)

NON-BIODEGRADABLE CHECK DAM

NON-BIODEGRADABLE CHECK DAM NOTES

1. Non-Biodegradable Manufactured Check Dam devices approved for use under **Standard Specification 9-14.5(4)** shall be installed per manufacturer's recommendations and shall perform in accordance with **Standard Specification 8-01.3(6).**
2. Rock Check Dams shall be placed outside of the clear zone or behind traffic barrier.
3. To ensure adequate damming time, Rock Check Dams used as sediment control may need to be enhanced with plastic that meets the requirements of **Standard Specification 9-14.5(3)** or fabric that meets the geotextile requirements of **Standard Specification 9-33.2(1), Table 6.**

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
Sandra L. Salisbury
SANDRA L. SALISBURY
LICENSE NO. 660
DATE: June 6, 2013

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

CHECK DAMS ON CHANNELS

STANDARD PLAN I-50.20-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pasco Bakotich III STATE DESIGN ENGINEER — *6/10/13* DATE

Washington State Department of Transportation

CHECK DAMS ON CHANNELS
WSDOT STANDARD PLAN I-50.20.01

SCALE: NTS

2 / C-1

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-C-DEMO.dwg C-3 9/16/2021 9:30 AM TABATHA.DYE 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER
Matthew L. Hickey

murraysmith

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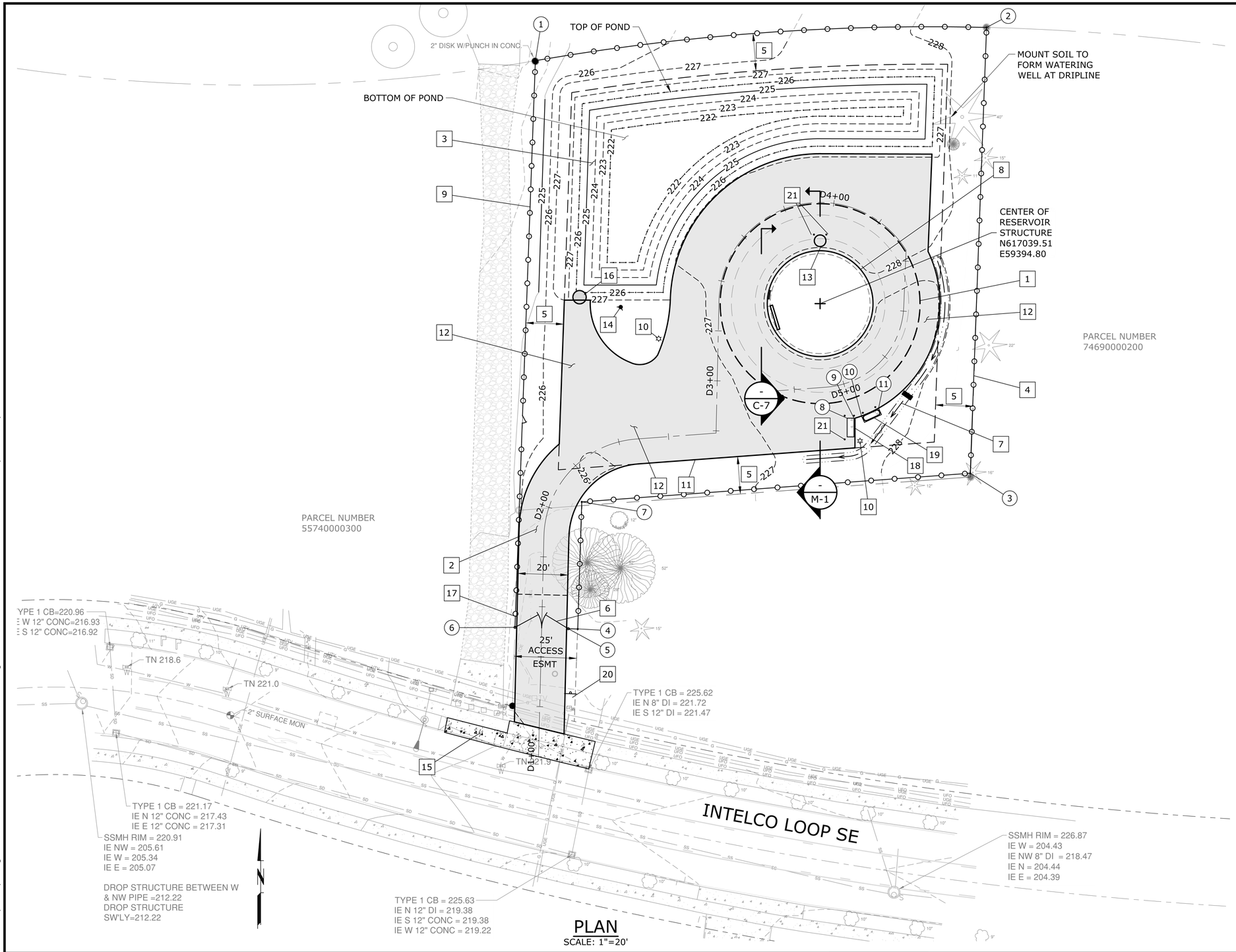
CITY OF LACEY

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

EROSION CONTROL AND DEMOLITION DETAILS - 2

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-3



PLAN
SCALE: 1"=20'

SECTION: 32 TOWNSHIP: 18N RANGE: 1W

SITE LAYOUT KEY NOTES:

1. 1.25 MG ELEVATED RESERVOIR, INSIDE DIA PER TANK MFR, SEE SHT C-8
2. AC PAVEMENT ACCESS ROAD, W/ REVERSE CROWN, SEE DET 2, SHT C-9
3. STORMWATER DETENTION POND, SEE SHT C-13
4. 6' TALL CHAIN LINK FENCE, SEE DET 2, SHT C-7, TYP ALL SIDES OF PROPERTY AND PARTIAL ACCESS ROAD
5. 15' WIDE BUILDING SETBACK AND LEVEL 1 LANDSCAPING BUFFER, SEE LANDSCAPING SHEETS
6. 6' TALL, 20' WIDE DOUBLE SWING SECURITY GATE, SEE DET 3, SHT C-7
7. GRASS-LINED DRAINAGE DITCH, SEE DET 4, SHT C-14
8. 1.25 MG ELEVATED RESERVOIR BASE COLUMN, OD DIA PER TANK MFR, SEE SHT C-8
9. PROPERTY LINE, TYP
10. LIGHT POLE PER CITY OF LACEY STD DWG NO. 4-17.04, SEE DET 5, SHT C-8
11. HMA PARKING AREA, REFER TO SHT C-5
12. RESERVOIR ASPHALT ROAD, SEE TYPICAL SECTION DET 1, SHT C-9
13. OVERFLOW, AIR GAP/DECHLORINATION MH, SEE DET 2, SHT M-9
14. FH ASSY PER CITY OF LACEY STD DWG NO. 6-8, SEE SHT C-12
15. CEMENT CONC DRIVEWAY PER CITY OF LACEY STD DWG NO 4-7, SHT C-7
16. CONTROL STRUCTURE, SEE DET 1, SHT C-13, DETENTION POND
17. 6' TALL, 3" WIDE PERSONNEL GATE, SEE DET 4, SHT C-7
18. EMERGENCY GENERATOR, ON CONCRETE PAD, SEE DET 3, SHT C-9
19. 50 GAL PROPANE TANK ON CONCRETE PAD, SEE DET 3, SHT C-9
20. ACCESS SIGN, SEE DET 6, SHT C-14
21. BOLLARD (TYP OF 7), SEE DET 7, SHT C-14

SITE LAYOUT POINTS

PT NO.	DESCRIPTION	NORTHING	EASTING
1	NW FENCE POST	N617136.73	E59280.84
2	NE FENCE POST	N617150.04	E59461.43
3	SE FENCE POST	N616971.65	E59454.90
4	SW FENCE POST	N616909.32	E59297.79
5	GATE POST	N616909.45	E59293.99
6	GATE POST	N616909.98	E59272.67
7	S FENCE POST	N616960.19	E59299.40
8	NW CORNER OF GENERATOR PAD	N616993.67	E59405.63
9	NE CORNER OF GENERATOR PAD	N616993.67	E59408.37
10	NW CORNER OF PROPOANE TANK PAD	N616994.49	E59411.41
11	NE CORNER OF PROPANE TANK PAD	N616997.62	E59418.21

NO.	DATE	BY	REVISION

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YQ CHECKED

Matthew L Hickey
STATE OF WASHINGTON
MATTHEW L HICKEY
19668
REGISTERED PROFESSIONAL ENGINEER

murraysmith

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CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

SITE LAYOUT PLAN - RESERVOIR

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-4
9 of 63

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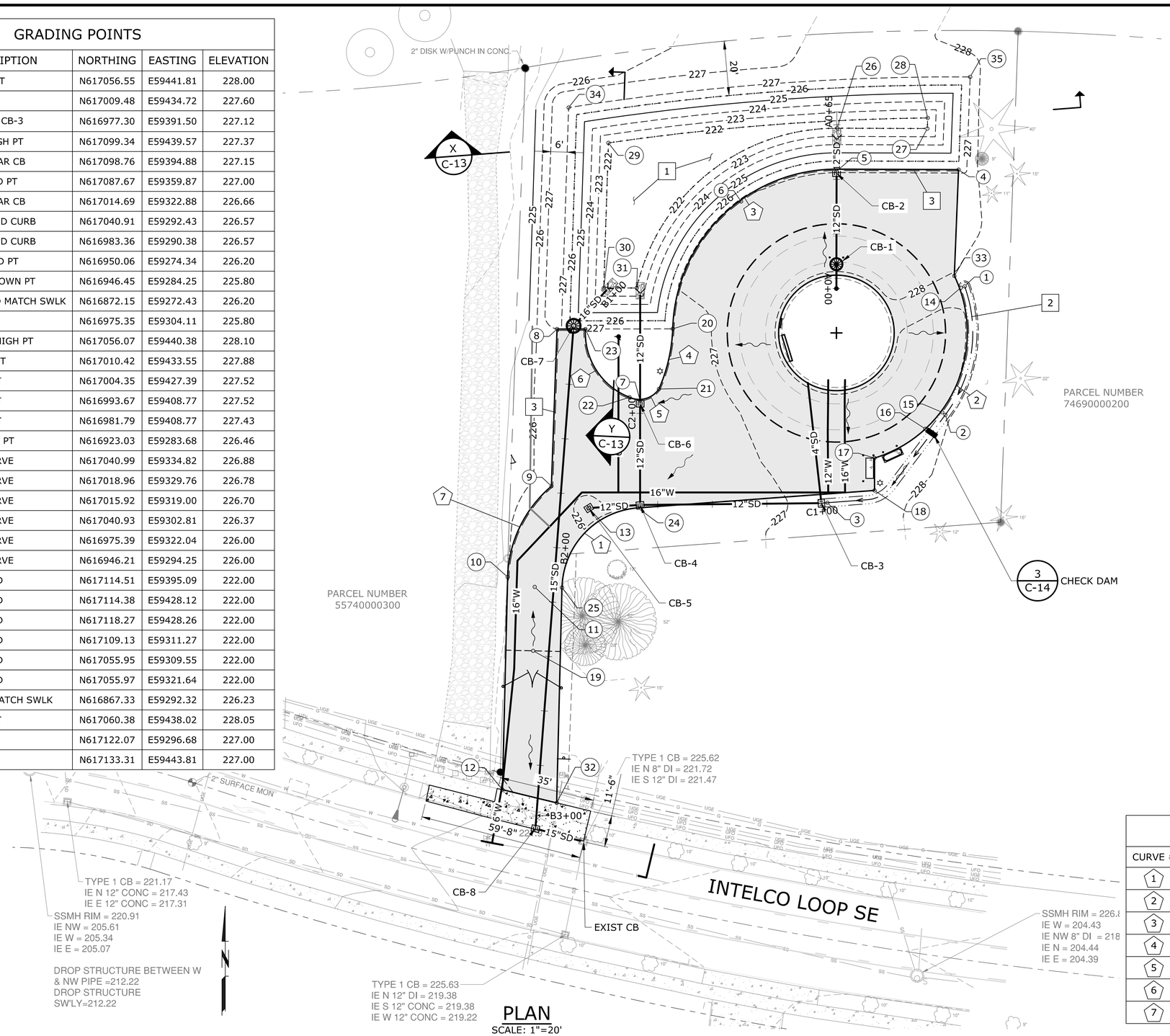
GRADING POINTS

PT NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
1	DITCH HIGH PT	N617056.55	E59441.81	228.00
2	DITCH MID PT	N617009.48	E59434.72	227.60
3	DITCH END @ CB-3	N616977.30	E59391.50	227.12
4	THK EDGE HIGH PT	N617099.34	E59439.57	227.37
5	THK EDGE NEAR CB	N617098.76	E59394.88	227.15
6	THK EDGE MID PT	N617087.67	E59359.87	227.00
7	THK EDGE NEAR CB	N617014.69	E59322.88	226.66
8	TOP OF ROLLED CURB	N617040.91	E59292.43	226.57
9	TOP OF ROLLED CURB	N616983.36	E59290.38	226.57
10	THK EDGE END PT	N616950.06	E59274.34	226.20
11	REVERSED CROWN PT	N616946.45	E59284.25	225.80
12	ACCESS ROAD MATCH SWLK	N616872.15	E59272.43	226.20
13	CB-4 RIM	N616975.35	E59304.11	225.80
14	DITCH EDGE HIGH PT	N617056.07	E59440.38	228.10
15	DITCH EDGE PT	N617010.42	E59433.55	227.88
16	PVMT EDGE PT	N617004.35	E59427.39	227.52
17	PVMT EDGE PT	N616993.67	E59408.77	227.52
18	PVMT EDGE PT	N616981.79	E59408.77	227.43
19	GRADE BREAK PT	N616923.03	E59283.68	226.46
20	POINT ON CURVE	N617040.99	E59334.82	226.88
21	POINT ON CURVE	N617018.96	E59329.76	226.78
22	POINT ON CURVE	N617015.92	E59319.00	226.70
23	POINT ON CURVE	N617040.93	E59302.81	226.37
24	POINT ON CURVE	N616975.39	E59322.04	226.00
25	POINT ON CURVE	N616946.21	E59294.25	226.00
26	BOTT OF POND	N617114.51	E59395.09	222.00
27	BOTT OF POND	N617114.38	E59428.12	222.00
28	BOTT OF POND	N617118.27	E59428.26	222.00
29	BOTT OF POND	N617109.13	E59311.27	222.00
30	BOTT OF POND	N617055.95	E59309.55	222.00
31	BOTT OF POND	N617055.97	E59321.64	222.00
32	ACCESS RD MATCH SWLK	N616867.33	E59292.32	226.23
33	PVMT EDGE PT	N617060.38	E59438.02	228.05
34	TOP OF POND	N617122.07	E59296.68	227.00
35	TOP OF POND	N617133.31	E59443.81	227.00



PLAN
SCALE: 1"=20'

SECTION: 32 TOWNSHIP: 18N RANGE: 1W

SITE GRADING KEY NOTES:

1. STORM DETENTION POND
2. GRASS-LINED DRAINAGE DITCH, SEE DET 4, SHT C-14
3. HMA THICKENED EDGE OF APPROXIMATELY 196 FT, SEE DET 1, SHT C-7

STORM DRAINAGE SCHEDULE:

CB-1 AIR GAP/DECHLORINATION MH
STA A0+09
N617064.67, E59394.81
FURNISH & INSTALL:
CB-1, TYPE 2 CB SEE DET 2, SHT M-9

CB-2 STA A0+41
N617096.47, E59394.87
FURNISH & INSTALL:
CB-2, TYPE 1 CB, SEE DET 5, SHT C-14

CB-3 STA C1+00
N616977.13, E59389.32
FURNISH & INSTALL:
CB-3, TYPE 1 CB, SEE DET 5, SHT C-14

CB-4 STA C1+66
N616976.47, E59322.87
FURNISH & INSTALL:
CB-4, TYPE 1 CB, SEE DET 5, SHT C-14

CB-5 STA C1+66, 18'LT
N616975.35, E59304.11
FURNISH & INSTALL:
CB-5, TYPE 1 CB, SEE DET 5, SHT C-14

CB-6 STA C2+04
N617013.52, E59322.88
FURNISH & INSTALL:
CB-6, TYPE 1 CB, SEE DET 5, SHT C-14

CB-7 STA B1+18
N617042.10, E59298.52
FURNISH & INSTALL:
CB-7, TYPE 2 (54")
CONTROL STRUCTURE, SEE DET 1, SHT C-13

CB-8 STA B3+03
N616857.88, E59284.53
FURNISH & INSTALL:
CB-8, TYPE 1 CB, SEE DET 5, SHT C-14

EXIST CB STA B3+22
N616853.37, E59302.19
FURNISH & INSTALL:
CONNECT TO EXIST. CB, TYPE 1

NOTE:

1. SEE SHEET C-6 FOR STORM DRAIN PIPING PROFILES.

EDGE OF PAVEMENT CURVE TABLE DATA

CURVE #	PC LOCATION	PT LOCATION	RADIUS	LENGTH	DELTA
1	N616946.21, E59294.25	N616975.39, E59322.04	30.00'	44.18'	84°22'47"
2	N616993.67, E59408.77	N617060.38, E59438.02	47.95'	82.73'	98°50'35"
3	N617096.79, E59376.97	N617077.14, E59348.08	60.00'	35.45'	33°51'10"
4	N617040.99, E59334.82	N617018.96, E59329.76	60.79'	22.74'	21°25'58"
5	N617018.96, E59329.76	N617015.14, E59322.86	8.64'	8.18'	54°18'21"
6	N617015.92, E59319.00	N617040.93, E59302.81	25.33'	31.85'	72°03'17"
7	N616983.36, E59290.38	N616950.06, E59274.34	45.00'	38.08'	48°29'13"

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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BAW DRAWN
YQ CHECKED

Matthew L Hicks
STATE OF WASHINGTON
MATTHEW L HICKS
49686
REGISTERED PROFESSIONAL ENGINEER

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**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

SITE GRADING, DRAINAGE AND STORM DRAIN PIPING PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-5
10 of 63

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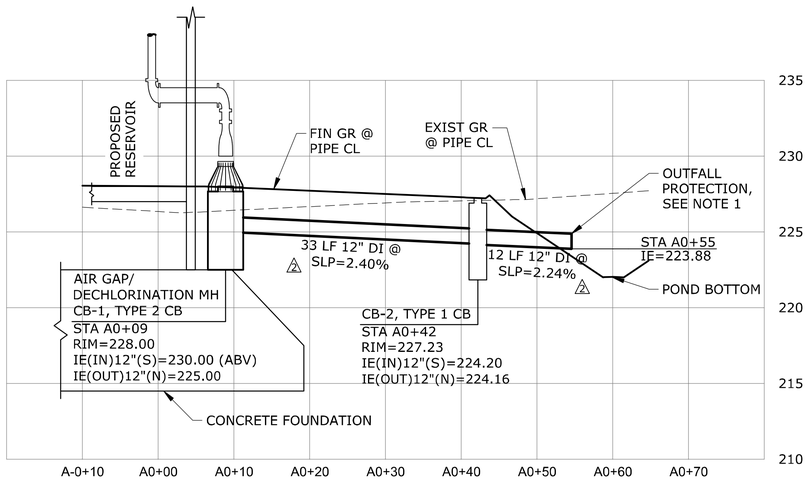
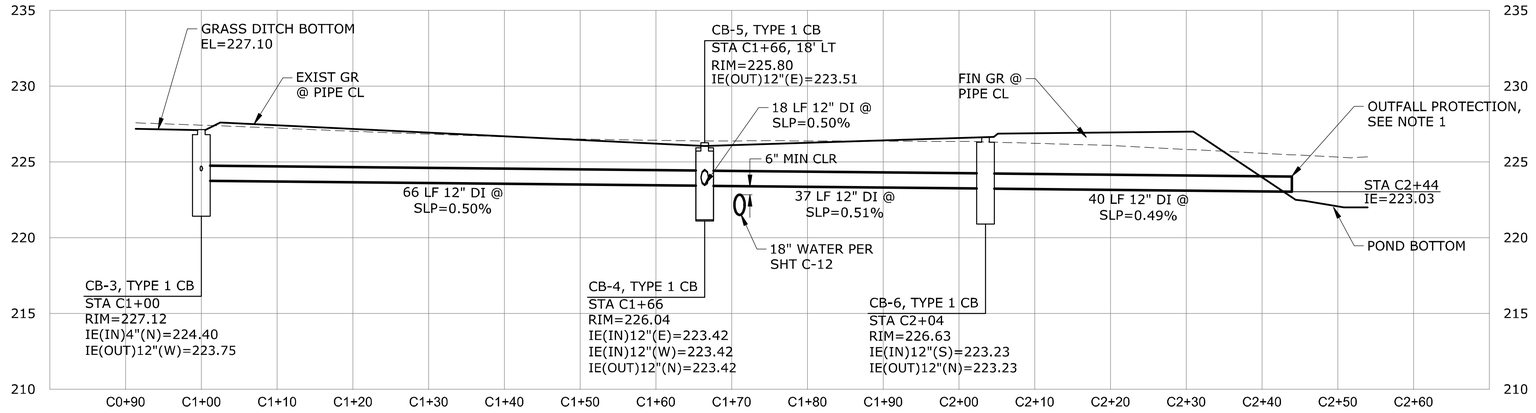


12'' STORM DRAIN OVERFLOW PROFILE - 'A'

SCALE: 1"=10' HORIZ; 1"=5' VERT



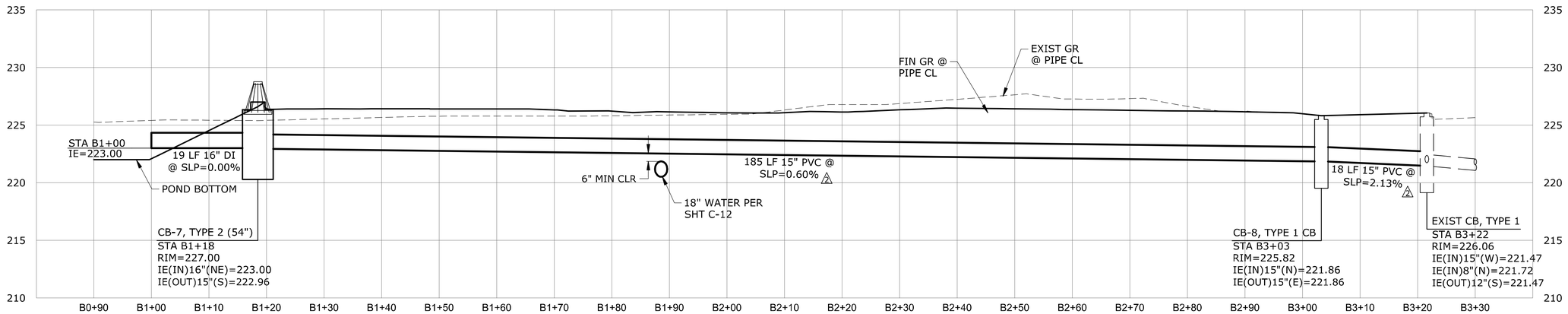
12'' STORM DRAIN PROFILE - 'C'

SCALE: 1"=10' HORIZ; 1"=5' VERT

NOTE:

1. OUTFALL PROTECTION SHALL BE ROCK LINING OF DIMENSION OF 7' WIDE MIN, 8' LONG MIN, WITH GRADATION AS FOLLOWS:

   A. PASSING 8-IN SQUARE SIEVE: 100%
   B. PASSING 3-IN SQUARE SIEVE: 40 T0 60% MAX
   C. PASSING 0.75-IN SQUARE SIEVE: 0 TO 10% MAX



15'' STORM DRAIN PROFILE - 'B'

SCALE: 1"=10' HORIZ; 1"=5' VERT

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4

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BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER
Digitally signed by Matt Hickey
Date: 2022.01.24 15:08:06 -08'00'

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CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

STORM DRAIN PIPING PROFILES

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-6

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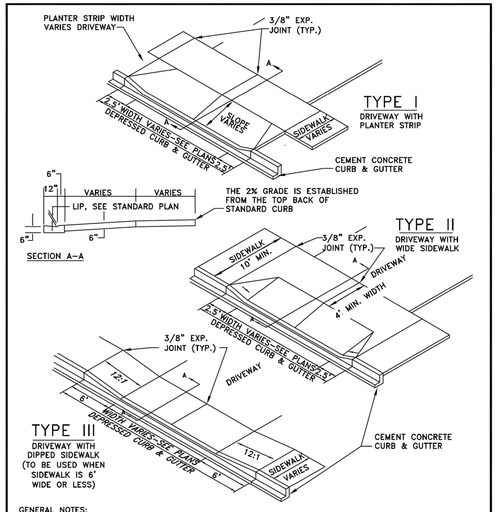


GENERAL NOTES:
1. FORMS SHALL BE OF WOOD OR METAL AND SHALL EXTEND FOR THE FULL DEPTH OF THE CONCRETE, SEE SECTION 8-14.3(2).
2. ALL FORMS SHALL BE STRAIGHT, FREE FROM WARP AND OF SUFFICIENT STRENGTH TO RESIST THE PRESSURE OF THE CONCRETE WITHOUT SPRING.
3. WHERE D/W EXCEEDS 16' WIDTH A 2" DEEP EXPANSION JOINT SHALL BE PLACED TRANSVERSLY, CENTERED IN WALK.
4. FORM AND SUBGRADE INSPECTION ARE REQUIRED BEFORE POURING CONCRETE.
5. DRIVEWAYS SHALL BE 6" THICK. MIN. SIDEWALK AND DRIVEWAY APRON SHALL BE 6" THICK MIN. THROUGH DRIVEWAY SECTION.
6. SIDEWALK CROSS SLOPE 1% MIN. TO MAX. 2%.

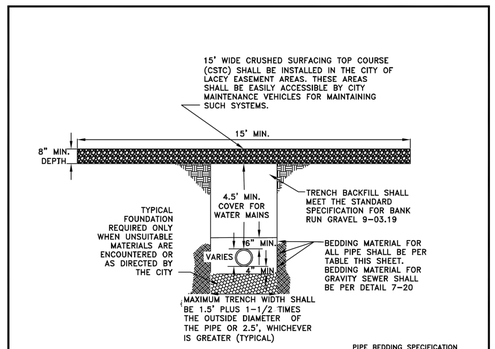
DG4-7.0WG

CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS

CEMENT CONCRETE DRIVEWAY

APPROVED CITY ENGINEER	DWG. NO.
	4-7

DES.	DWN.	CKD.	DATE
WHO	WHO	MAH	8/27/09



PIPE BEDDING SPECIFICATION

SIEVE SIZE	PERCENT PASSING
3/4" SQUARE	100
3/8" SQUARE	70-100
U.S. NO.4	55-100
U.S. NO. 10	35-95
U.S. NO. 20	20-80
U.S. NO. 40	10-55
U.S. NO. 100	0-10
U.S. NO. 200	0-03

GENERAL NOTES:
1. BEDDING MATERIAL SHALL BE PER THE CHART ON THIS SHEET.
2. COMPACTION: BEDDING SHALL BE COMPACTED TO 95% MIN. AS DETERMINED BY ASTM D1557. BACKFILL SHALL BE COMPACTED TO 90% MIN. IN UNPAVED AREAS AND 95% MIN. IN PAVED OR SHOULDER AREAS AS DETERMINED BY ASTMD 1557.
3. ALL MATERIALS, WORKMANSHIP AND INSTALLATION SHALL BE IN CONFORMANCE WITH THE WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AS AMENDED BY THE CITY OF LACEY STANDARDS.
4. KEEP TRENCH BOTTOM COMPACTED WITH UNIFORM GRADE. A BELL JOINT SHALL BE REQUIRED AT EACH JOINT FOR PROPER SUPPORT. NO TEMPORARY SUPPORTS, I.E. BLOCKS, WILL BE ALLOWED TO SUPPORT PIPE. TRENCH BOTTOM SHALL BE TO GRADE PRIOR TO PIPE INSTALLATION.

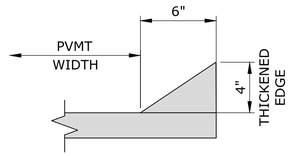
DG4-8.4.DWG

CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS

TRENCH RESTORATION FOR UNPAVED AREAS

APPROVED CITY ENGINEER	DWG. NO.
	4-8.4

DES.	DWN	CKD	DATE
WHO	WHO	RAS	8/27/09

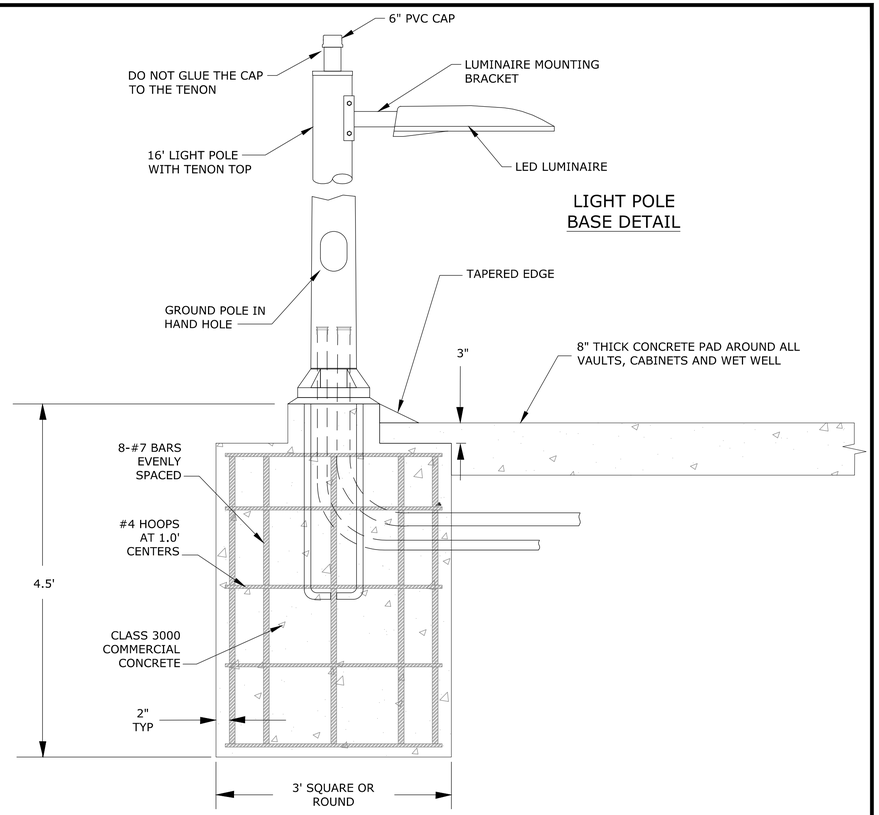


WITH EXISTING EDGE

NOTE:

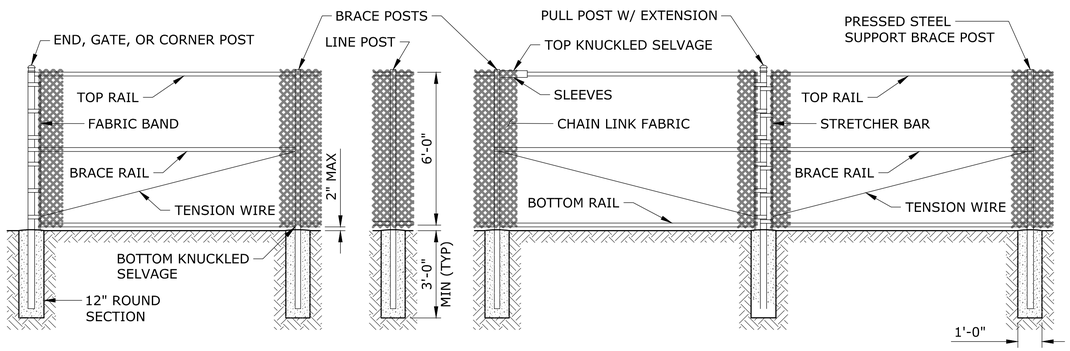
1. RAISED PORTION SHALL BE HOT MIX ASPHALT CONSTRUCTED INTEGRALLY WITH PAVEMENT.

HMA THICKENED EDGE (1 / C-5)
SCALE: NTS



GENERAL NOTES:
1. THE FOUNDATION IS DESIGNED FOR 2000 PSF AVERAGE SOIL LATERAL BEARING PRESSURE.
2. BOLT PATTERN PER MANUFACTURER'S SPECIFICATIONS.
3. FOR DETAILS NOT SHOWN USE MANUFACTURER'S SPECIFICATIONS AND DETAILS.

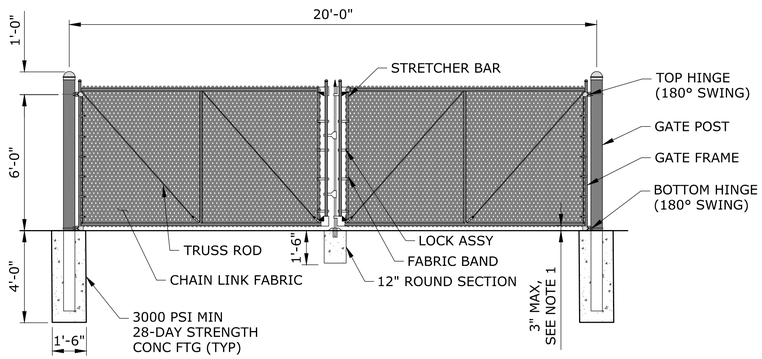
LIGHT POLE (5 / C-4)
SCALE: NTS



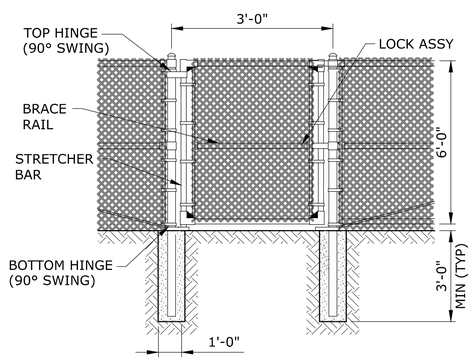
CHAIN LINK FENCE (2 / C-4)
SCALE: NTS

NOTE:

1. THE SECURITY GATE SHALL BE CUSTOM FABRICATED TO FIT THE SLOPE OF THE DRIVEWAY. THE CLEARANCE BETWEEN THE BOTTOM RAIL AND THE DRIVEWAY SHALL NOT EXCEED 3 INCHES.



CHAIN LINK SECURITY GATE (3 / C-4)
SCALE: NTS



CHAIN LINK PERSONNEL GATE (4 / C-4)
SCALE: NTS

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Matthew L Hicks
STATE OF WASHINGTON 49688 REGISTERED PROFESSIONAL ENGINEER

murraysmith

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**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT
#PW 2019-32**

SITE PLAN AND GRADING DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-7

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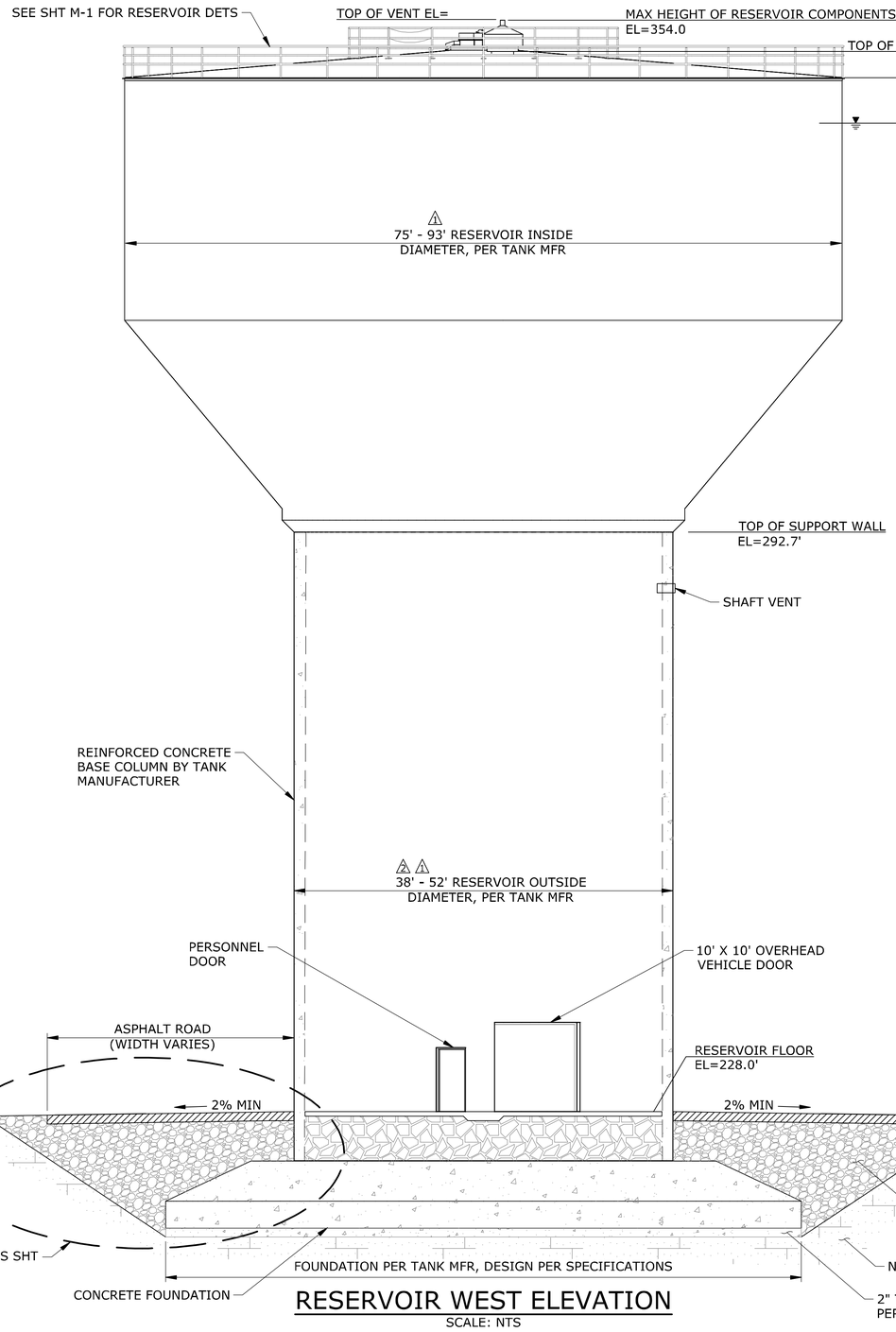
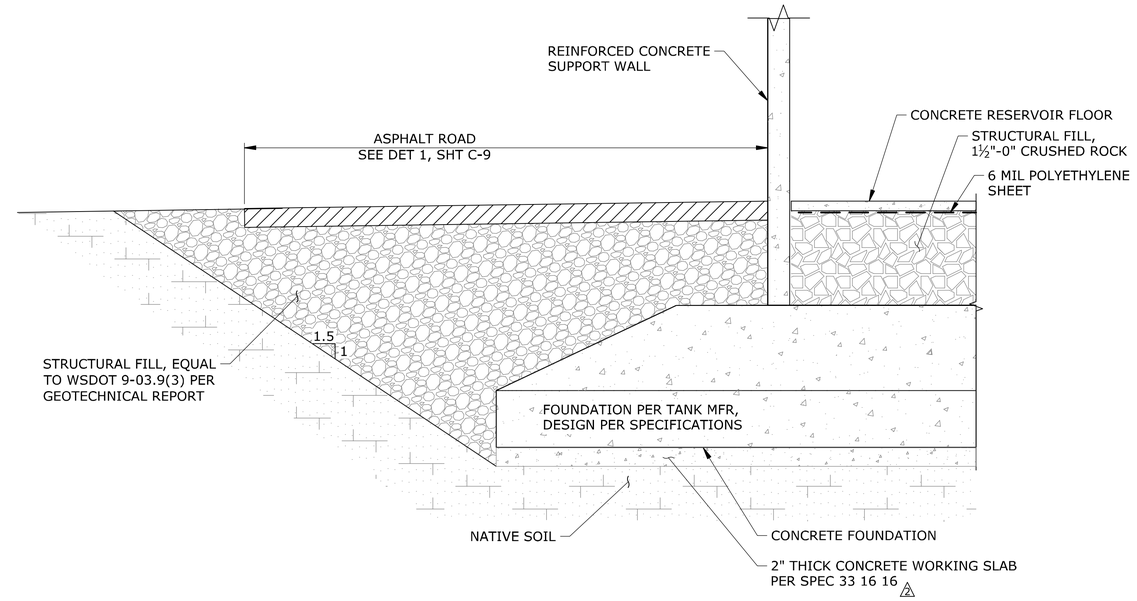


RESERVOIR WEST ELEVATION

SCALE: NTS



RESERVOIR SUBGRADE DETAIL 1/-

SCALE: 1/4" = 1'-0"

NOTE:

1. PRELIMINARY DESIGN FOR BIDDING PURPOSES. CONTRACTOR TO PROVIDE FINAL DESIGN OF COMPOSITE ELEVATED TANK AND FOUNDATION.

2. THE CONTRACTOR SHALL COORDINATE ALL DESIGN ASPECTS WITH THE FINAL PROPOSED BASE COLUMN AND RESERVOIR DIAMETER FOR A FULLY INTEGRATED DESIGN.

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4
1	12/23/21	MLH	ADDENDUM 1

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED
BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER
Digitally signed by Matt Hickey
Date: 2022.01.24 08:28:02

murraysmith

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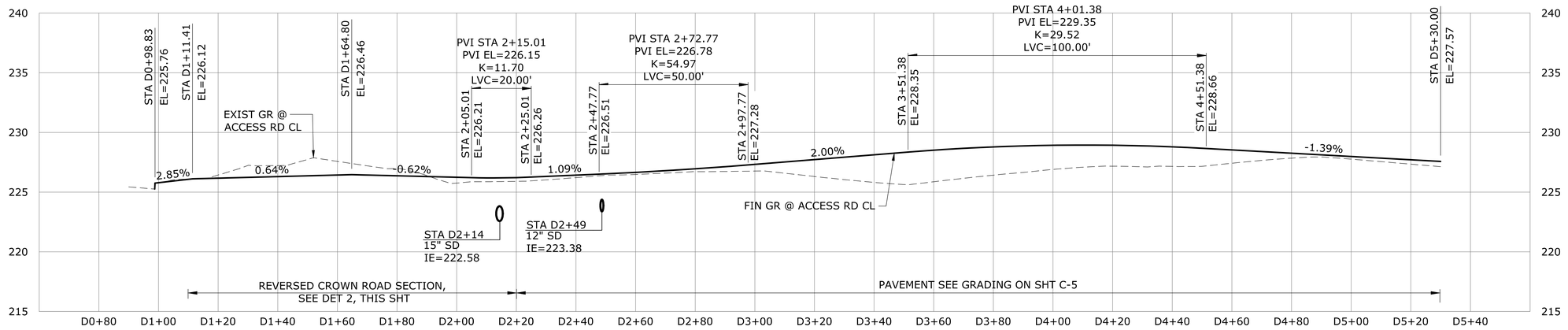
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

FOUNDATION AND RESERVOIR ELEVATION VIEW

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

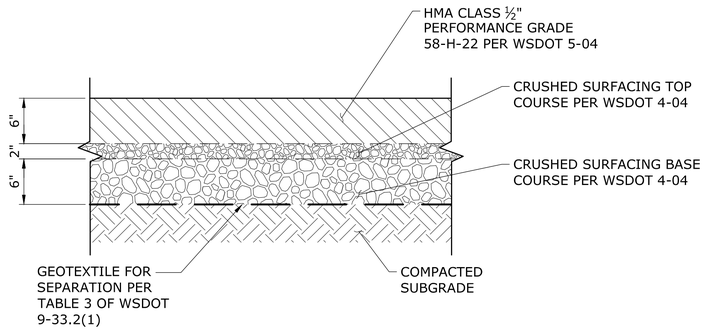
SHEET C-8

13 of 63



TANK ACCESS ROAD PROFILE

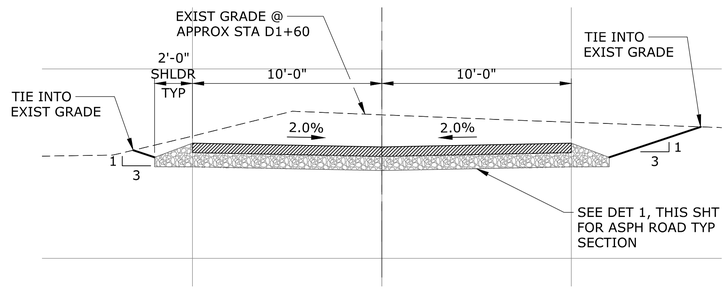
SCALE: 1"=20' HORIZ; 1"=5' VERT



RESERVOIR ASPHALT ROAD TYPICAL SECTION

SCALE: NTS

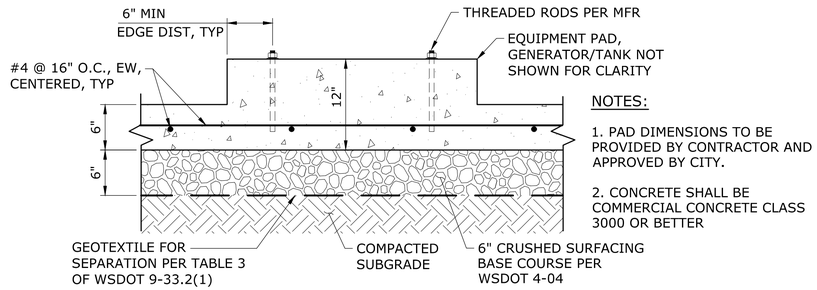
1 / C-3



REVERSED CROWN ACCESS ROAD DETAIL

SCALE: NTS

2 / C-3



GENERATOR/PROPANE TANK CONCRETE PAD DETAIL

SCALE: NTS

3 / C-3

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

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BAW DRAWN

YQ CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49686 REGISTERED PROFESSIONAL ENGINEER

Matthew L Hickey

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

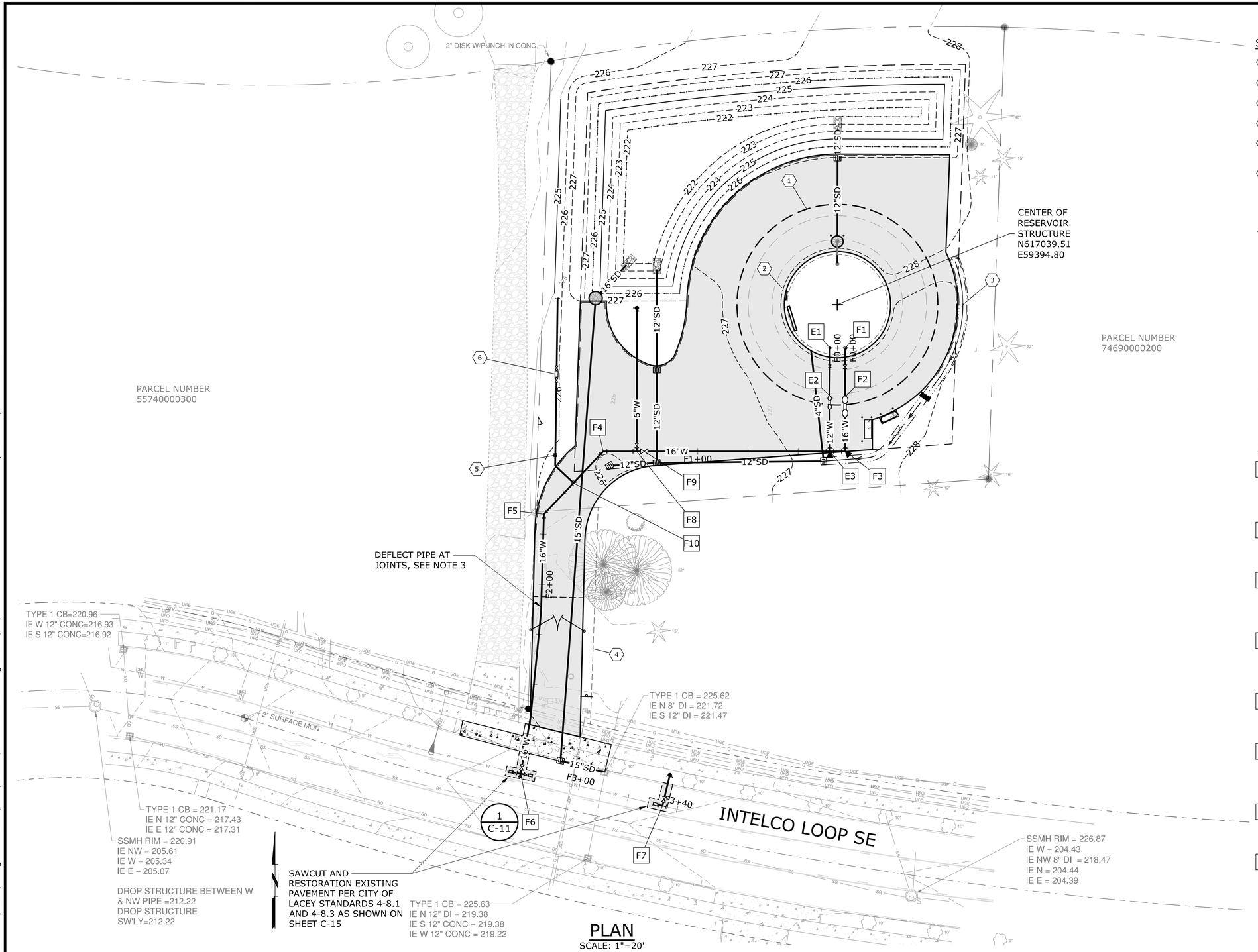
RESERVOIR ACCESS ROAD PLAN AND DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-9

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-C.dwg C-9 9/30/2021 4:40 PM TABATHA.DYE 23.0s (LMS Tech)

SECTION: 32 TOWNSHIP: 18N RANGE: 1W



PLAN
SCALE: 1"=20'

SITE PIPING KEY NOTES:

1. 1.25 MG ELEVATED RESERVOIR
2. 1.25 MG ELEVATED RESERVOIR BASE COLUMN
3. DITCH, SEE DET 4, SHT C-14
4. EXIST ACCESS AND UTILITY ESMT
5. 1 ½" IRRIGATION SERVICE METER PER CITY STD DWG 6-4.7 AS SHOWN ON SHEET L-3
6. BACKFLOW PREVENTOR, ACCORDING TO SPECIFICATION

NOTES:

1. ALL MJ FITTINGS SHALL BE RESTRAINED WITH WEDGE TYPE RESTRAINER, EBAA MEGALUG, OR EQUAL.
2. ALL DI PIPE SHALL BE CLASS 52, RESTRAINED.
3. MAXIMUM PIPE JOINT DEFLECTION SHALL BE LIMITED TO ONE-HALF OF MANUFACTURER'S ALLOWABLE DEFLECTION.
4. DOUBLE-BALL FLEXIBLE EXPANSION JOINTS (DBFEJ) SHALL BE BACKFILLED WITH PEA GRAVEL PER MANUFACTURER'S REQUIREMENTS, AND SHALL HAVE MINIMUM EXPANSION OF 4" FOR 12" DBFEJ AND 8" FOR 16" DBFEJ.
5. SEE SHEET C-5 FOR DRAINAGE PIPING PLAN.
6. SEE SHEET C-11 FOR WATER PIPING PROFILES.

WATER SCHEDULE:

E1 STA E0+00
N617022.30, E59391.79
FURNISH & INSTALL:
INLET PIPING ELBOW, SEE SHTS M-2 AND M-9

E2 STA E0+19
N617003.20, E59391.62
FURNISH & INSTALL:
1-12" DBFEJ, MJ, SEE NOTE 4

E3 STA E0+41=F0+47
N616981.06, E59391.76
FURNISH & INSTALL:
1-16"x12" DI TEE, MJ
1-TB

F1 STA F0+00
N617022.30, E59397.97
FURNISH & INSTALL:
OUTLET PIPING ELBOW, SEE SHTS M-2 AND M-9

F2 STA F0+19
N617003.10, E59397.90
FURNISH & INSTALL:
1-16" DBFEJ, MJ, SEE NOTE 4

F3 STA F0+41
N616981.06, E59397.97
FURNISH & INSTALL:
1-16" 90° DI BEND, MJ
1-TB

F4 STA F1+38
N616981.06, E59301.53
FURNISH & INSTALL:
1-16" 45° DI BEND, MJ

F5 STA F1+72
N616956.02, E59277.93
FURNISH & INSTALL:
1-16" 45° DI BEND, MJ W/ DEFL

F6 STA F2+76
N616852.60, E59268.67
FURNISH & INSTALL:
1-16" DI TEE, FLG
2-12" DI LONG BODY SLEEVE
2-16"x12" DI RDCR, FLG
2-12" GV, FLGxMJ
1-16" GV, FLGxMJ
2-12" DI SPOOL, APPROX 2 LF
1-TB
CONNECT TO EXIST 12" DI W, SEE DET 1, SHT C-12

F7 STA F3+34
N616839.90, E59325.14
FURNISH & INSTALL:
1-12"x6" DI CUT-IN TEE, FLG
1-6" FH ASSY
PER CITY STD DWG 6-8 SHOWN ON SHT C-12
1-12" DI LONG BODY SLEEVE
1-12" DI SPOOL, APPROX 2 LF
1-6" GV, FLGxRMJ

F8 STA F1+24, 57' RT
N617038.15, E59314.98
FURNISH & INSTALL:
1-16"x6" DI TEE, FLG
1-6" FH ASSY
PER CITY STD DWG 6-8 SHOWN ON SHT C-12
1-6" GV, FLGxRMJ

F9 STA F1+21
N616981.06, E59317.87
FURNISH & INSTALL
1-16" DI GV, FLGxMJ
1-16" ADAPTER, FLGxMJ

F10 STA F1+ 55
N616968.51, E59289.70
FURNISH & INSTALL:
1- 1 ½" SERVICE SADDLE ROMAC 202S W/STAINLESS STEEL STRAPS

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
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MWH DESIGNED
BAW DRAWN
YQ CHECKED

Matthew L Hicks
STATE OF WASHINGTON
49686
REGISTERED PROFESSIONAL ENGINEER

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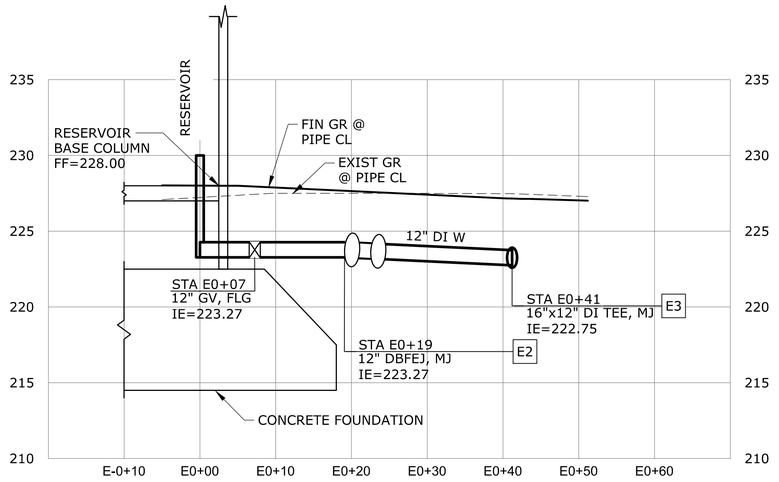
**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

SITE PIPING PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

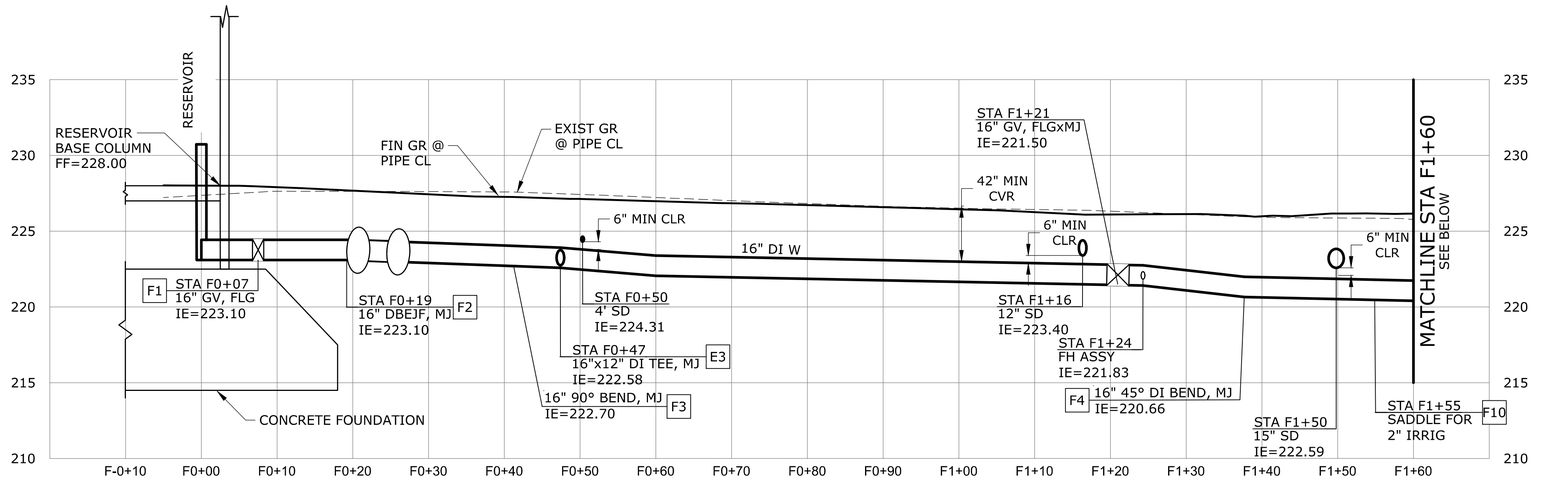
SHEET
C-10
15 of 63

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-C.dwg C-10 9/30/2021 4:40 PM TABATHA.DYE 23.0s (LMS Tech)



12'' RESERVOIR INLET PROFILE - 'E'

SCALE: 1"=10' HORIZ; 1"=5' VERT

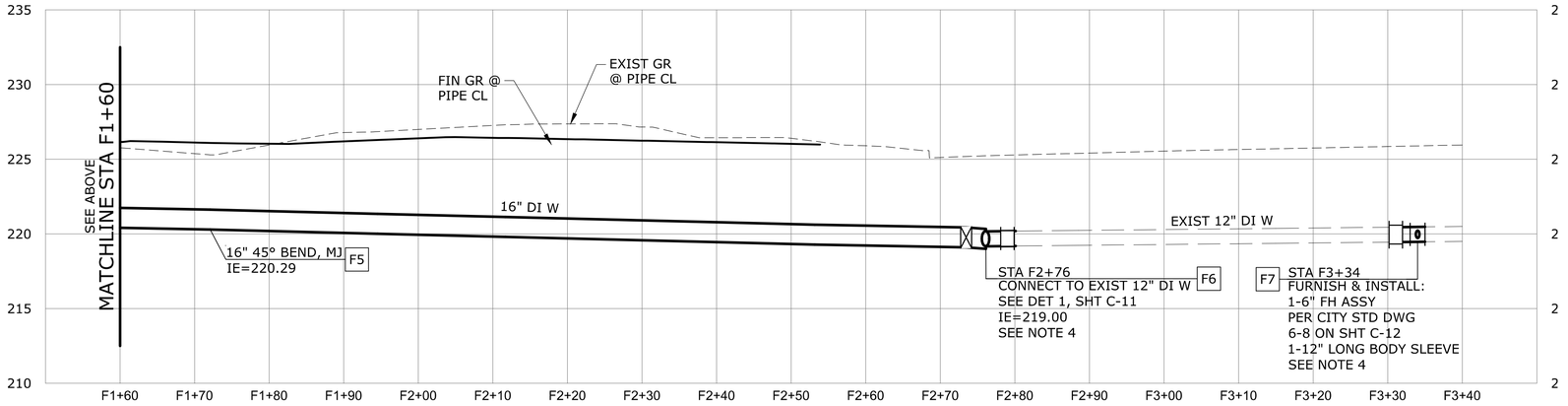


16'' RESERVOIR OUTLET PROFILE - 'F'

SCALE: 1"=10' HORIZ; 1"=5' VERT

NOTES:

1. SEE SHEET C-10 FOR WATER PIPING PLAN.
2. ALL DI PIPE SHALL BE CLASS 52, RESTRAINED.
3. MAXIMUM PIPE JOINT DEFLECTION SHALL BE LIMITED TO ONE-HALF OF MANUFACTURER'S ALLOWABLE DEFLECTION.
4. CONTRACTOR SHALL POTHOLE AND VERIFY LOCATIONS, SIZES, AND DEPTHS OF ALL EXISTING UTILITIES. NOTIFY ENGINEER OF POTENTIAL CONFLICTS MINIMUM 72 HOURS IN ADVANCE OF INSTALLATION TO ALLOW FOR CHANGES IN ALIGNMENT, GRADE.



16'' RESERVOIR OUTLET PROFILE - 'F' (CONT)

SCALE: 1"=10' HORIZ; 1"=5' VERT

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
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BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER
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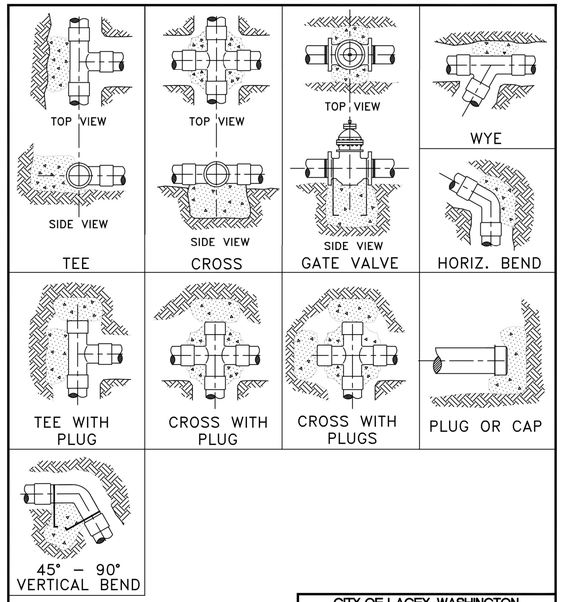
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

WATERLINE PROFILES

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
C-11
16 of 63

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-C.dwg C-11 9/30/2021 4:40 PM TABATHA.DYE 23.0s (LMS Tech)



GENERAL NOTES:
1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. PLASTIC BARRIER SHALL BE PLACED BETWEEN ALL THRUST BLOCKS AND FITTINGS.
3. ANCHOR REBAR SHALL BE 5/8" MINIMUM DIAMETER

DG3-14.DWG

CITY OF LACEY, WASHINGTON DEPT. OF PUBLIC WORKS			
STANDARD BLOCKING DETAIL			
APPROVED CITY ENGINEER			DWG. NO. 3-14
DES	DWN	CKD	DATE
WHO	WHO	RAS	12/15/2014

THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:
1. BLOCKING SHALL BE COMMERCIAL CONCRETE POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.
2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
   EXAMPLE : 12" – 90° BEND IN SAND AND GRAVEL
   32,000 LBS ÷ 3000 LB/S.F. = 10.7 S.F. OF AREA
3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.
4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

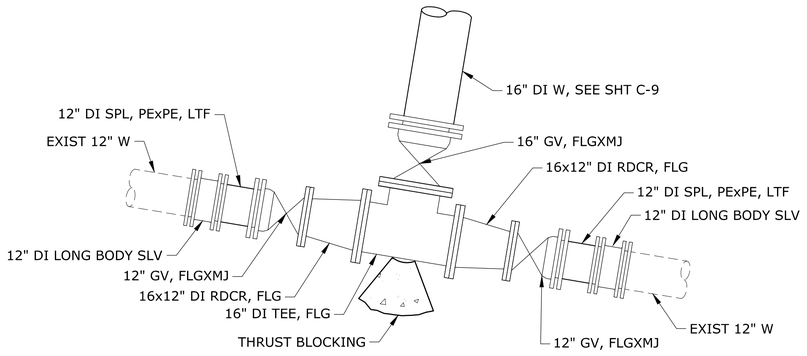
SAFE SOIL BEARING LOADS

FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

DG3-15.DWG

CITY OF LACEY, WASHINGTON DEPT. OF PUBLIC WORKS			
THRUST LOADS			
APPROVED CITY ENGINEER			DWG. NO. 3-15
DES	DWN	CKD	DATE
WHO	WHO	RAS	12/15/2014



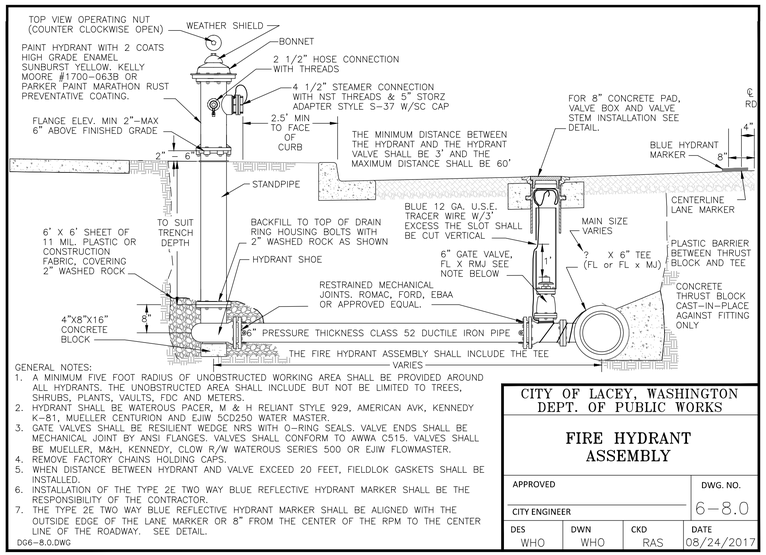
NOTE:

1. SEE CITY OF LACEY STANDARD DRAWINGS THIS SHEET.

CONNECTION DETAIL

SCALE: NTS

1 / C-10



GENERAL NOTES:
1. A MINIMUM FIVE FOOT RADIUS OF UNOBSTRUCTED WORKING AREA SHALL BE PROVIDED AROUND ALL HYDRANTS. THE UNOBSTRUCTED AREA SHALL INCLUDE BUT NOT BE LIMITED TO TREES, SHRUBS, PLANTS, VAULTS, FDC AND METERS.
2. HYDRANT SHALL BE WATEROUS PACER, M & H RELIANT STYLE 929, AMERICAN AVK, KENNEDY K-81, MUELLER CENTURION AND EJIW 5CD250 WATER MASTER.
3. GATE VALVES SHALL BE RESILIENT WEDGE NRS WITH O-RING SEALS. VALVE ENDS SHALL BE MECHANICAL JOINT BY ANSI FLANGES. VALVES SHALL CONFORM TO AWWA C515. VALVES SHALL BE MUELLER, M&H, KENNEDY, CLOW R/W WATEROUS SERIES 500 OR EJIW FLOWMASTER.
4. REMOVE FACTORY CHAINS HOLDING CAPS.
5. WHEN DISTANCE BETWEEN HYDRANT AND VALVE EXCEED 20 FEET, FIELDLOK GASKETS SHALL BE INSTALLED.
6. INSTALLATION OF THE TYPE 2E TWO WAY BLUE REFLECTIVE HYDRANT MARKER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. THE TYPE 2E TWO WAY BLUE REFLECTIVE HYDRANT MARKER SHALL BE ALIGNED WITH THE OUTSIDE EDGE OF THE LANE MARKER OR 8" FROM THE CENTER OF THE RPM TO THE CENTER LINE OF THE ROADWAY. SEE DETAIL.

DG6-8.0.DWG

CITY OF LACEY, WASHINGTON DEPT. OF PUBLIC WORKS			
FIRE HYDRANT ASSEMBLY			
APPROVED CITY ENGINEER			DWG. NO. 6-8.0
DES	DWN	CKD	DATE
WHO	WHO	RAS	08/24/2017

NO.	DATE	BY	REVISION

NOTICE
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YQ CHECKED

Matthew L Hickey
STATE OF WASHINGTON
MATTHEW L HICKEY
49666
REGISTERED PROFESSIONAL ENGINEER

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CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

WATERLINE DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-12
17 of 63

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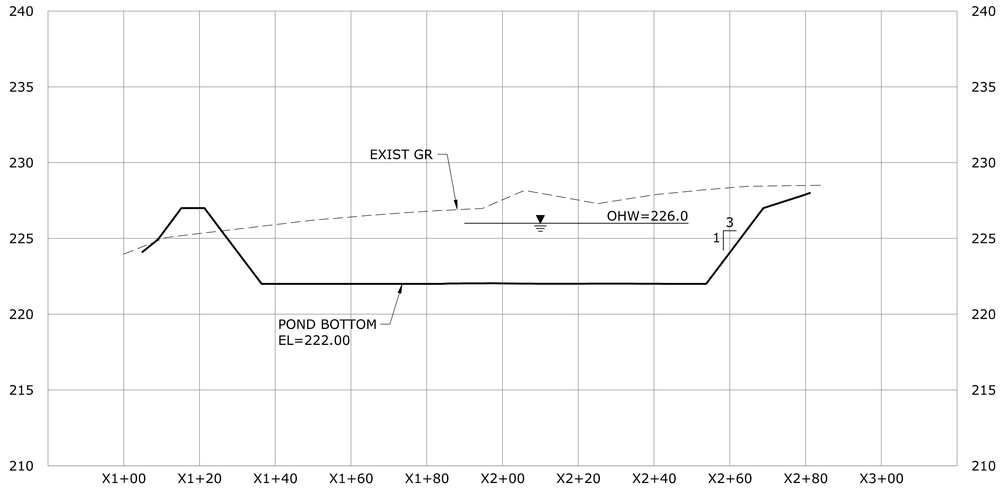
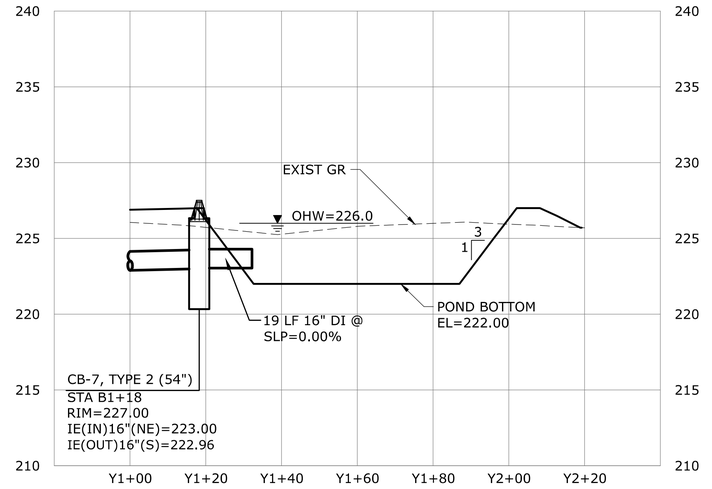


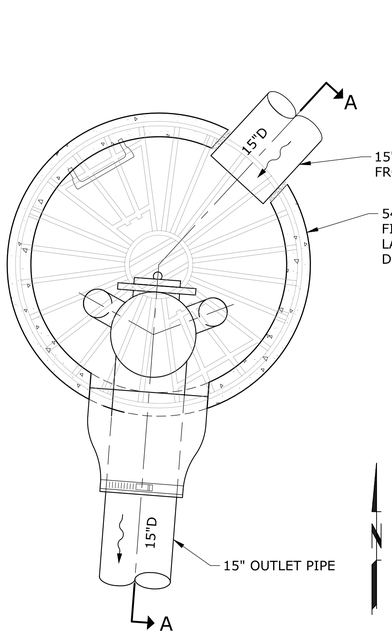
DETENTION POND SECTION (X / C-5)

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

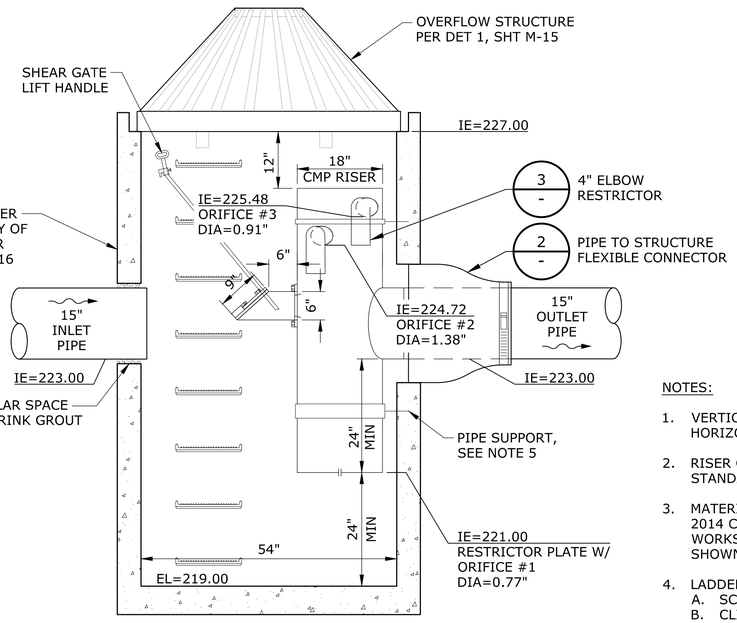


DETENTION POND SECTION (Y / C-5)

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



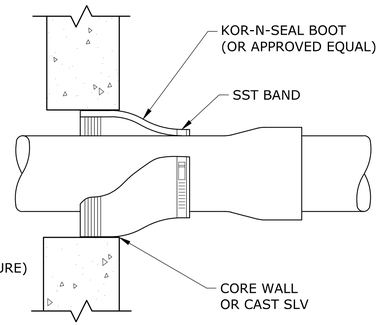
PLAN



SECTION A-A

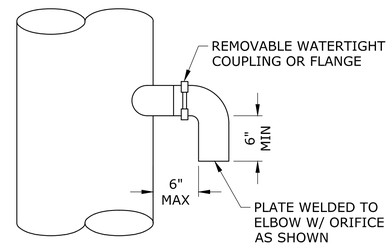
POND CONTROL STRUCTURE (1 / C-4)

SCALE: 3/4"=1'-0"



PIPE TO STRUCTURE FLEXIBLE CONNECTOR DETAIL (2 / -)

SCALE: NTS



4" ELBOW RESTRICTOR DETAIL (3 / -)

SCALE: NTS

NOTES:

1. VERTICAL RISER SECTIONS SHALL BE ALIGNED PLUMB VERTICALLY, HORIZONTAL SECTION SHALL MATCH OUTLET PIPE SLOPE.
2. RISER OUTLET SHALL BE CONNECTED TO STORM PIPE WITH A STANDARD COUPLING BAND.
3. MATERIALS AND CONSTRUCTION DETAILS SHALL BE ACCORDING TO 2014 CITY OF LACEY DEVELOPMENT GUIDELINES AND PUBLIC WORKS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE SHOWN.
4. LADDER OR STEPS SHALL BE OFFSET SO THAT:
   A. SCREW-TYPE SHEAR GATE IS VISIBLE FROM THE TOP.
   B. CLIMB DOWN SPACE IS CLEAR OF RISER AND
   C. SHEARGATE HANDLE SHALL BE ACCESSIBLE FROM SURFACE OR THROUGH SEPARATE VALVE BOX.
5. SECURE RISER TO STRUCTURE WITH 8 GAUGE ALUMINUM STRAPS, MINIMUM ONE STRAP ABOVE AND BELOW OUTLET. ANCHOR TO WALL AT 3' MAX SPACING BY 5/8" DIA SST EXPANSION BOLTS OR EMBEDDED 2" IN WALL, TACK WELD TO RISER.

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
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BAW DRAWN
YQ CHECKED

MATTHEW L. HICKOK — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER
Matthew L Hickok

murraysmith

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

STORMWATER DETENTION POND FACILITY SECTIONS AND DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-13

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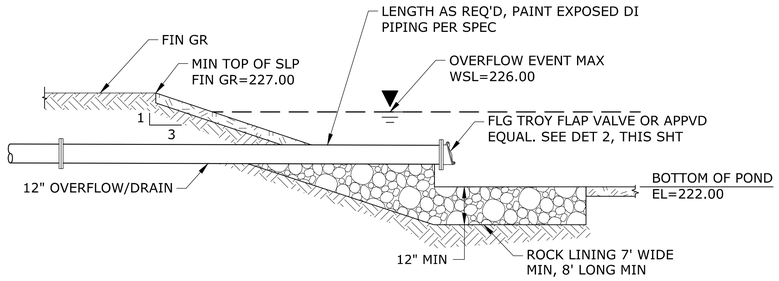
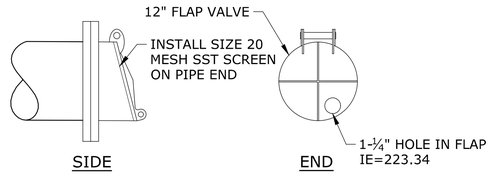


RESERVOIR OVERFLOW/DRAIN DISCHARGE TO POND

SCALE: 1/4"=1'-0"

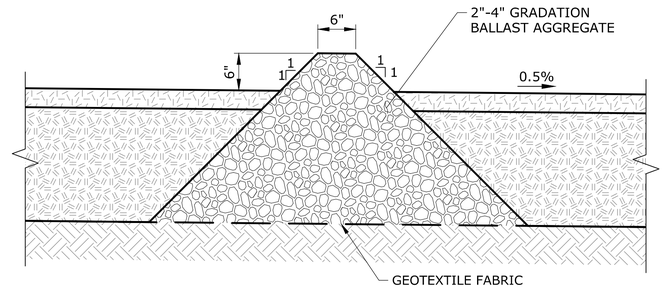
1 / C-5



OVERFLOW FLAP VALVE DETAIL

SCALE: 1"=1'-0"

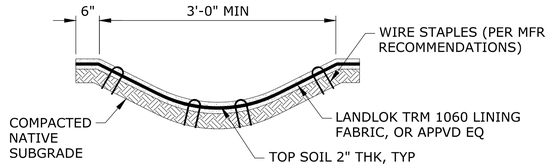
2 / -



TYPICAL CHECK DAM

SCALE: 1"=1'-0"

3 / C-5



NOTE:

GEOTEXTILE FABRIC SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS USING U-SHAPED WIRE STAPLES.

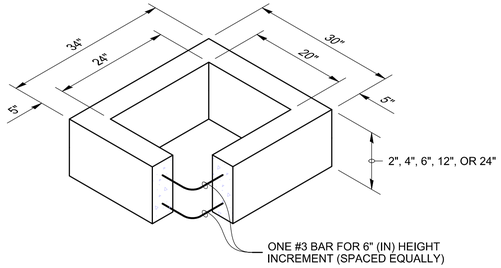
GRASS-LINED DRAINAGE DITCH SECTION

SCALE: NTS

4 / C-4

C-5

FRAME AND VANED GRATE



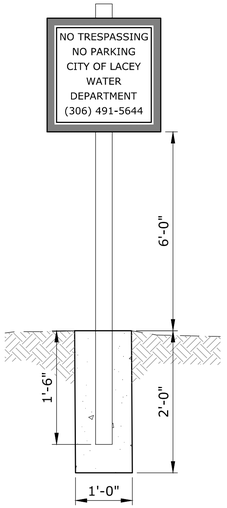
RECTANGULAR ADJUSTMENT SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	**MAXIMUM INSIDE DIAMETER (INCHES)**
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP ✱ (STD. SPEC. SECT. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. SECT. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. SECT. 9-05.12(2))	15"

✱ CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. AS ACCEPTABLE ALTERNATIVES TO THE REBAR SHOWN IN THE PRECAST BASE SECTION, FIBERS (PLACED ACCORDING TO THE STANDARD SPECIFICATIONS), OR WIRE MESH HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT SHALL BE USED WITH THE MINIMUM REQUIRED REBAR SHOWN IN THE ALTERNATIVE PRECAST BASE SECTION. WIRE MESH SHALL NOT BE PLACED IN THE KNOCKOUTS.
2. THE KNOCKOUT DIAMETER SHALL NOT BE GREATER THAN 20" (IN). KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" (IN) MINIMUM TO 2.5" (IN) MAXIMUM. PROVIDE A 1.5" (IN) MINIMUM GAP BETWEEN THE KNOCKOUT WALL AND THE OUTSIDE OF THE PIPE. AFTER THE PIPE IS INSTALLED, FILL THE GAP WITH JOINT MORTAR IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 9-04.3.
3. THE MAXIMUM DEPTH FROM THE FINISHED GRADE TO THE LOWEST PIPE INVERT SHALL BE 5' (FT).
4. THE FRAME AND GRATE MAY BE INSTALLED WITH THE FLANGE DOWN, OR INTEGRALLY CAST INTO THE ADJUSTMENT SECTION WITH FLANGE UP.
5. THE PRECAST BASE SECTION MAY HAVE A ROUNDED FLOOR, AND THE WALLS MAYBE SLOPED AT A RATE OF 1 : 24 OR STEEPER.
6. THE OPENING SHALL BE MEASURED AT THE TOP OF THE PRECAST BASE SECTION.
7. ALL PICKUP HOLES SHALL BE GROUTED FULL AFTER THE BASIN HAS BEEN PLACED.



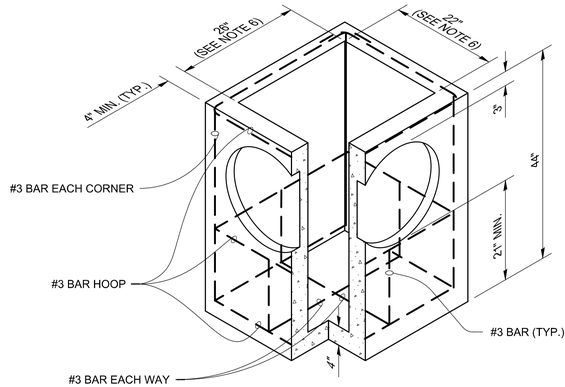
NOTES:

1. SIGN SIZE SHALL BE 2'x2' MOUNTED ON 4"x4" PRESSURE TREATED POST.
2. SIGN SHALL BE PROVIDED BY THE CITY. CONTRACTOR SHALL INSTALL POST AND MOUNT SIGN TO THE POST.

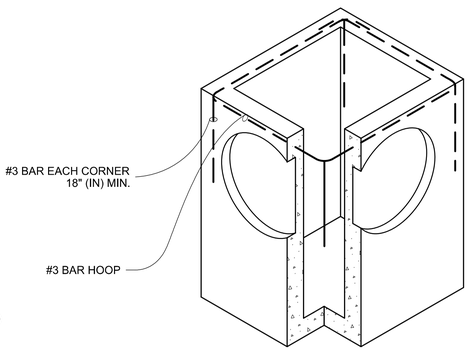
ACCESS SIGN

SCALE: NTS

5 / C-4



PRECAST BASE SECTION



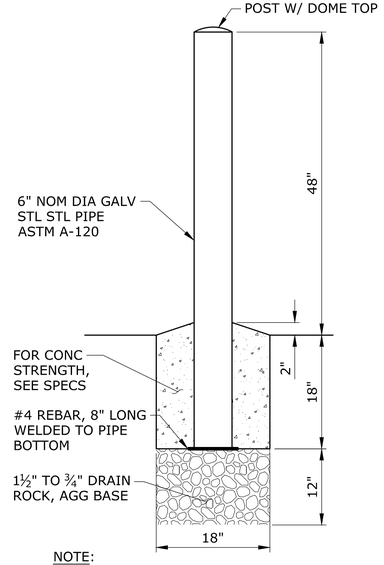
(SEE NOTE 1)

ALTERNATIVE PRECAST BASE SECTION

TYPE 1 CATCH BASIN

SCALE: NTS

6 / C-5



NOTE:

1. BOLLARD SHALL BE PAINTED SAFETY YELLOW.

EXTERIOR BOLLARD

SCALE: NTS

7 / C-4

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED

BAW DRAWN

YQ CHECKED

Matthew L. Hicks 49656 REGISTERED PROFESSIONAL ENGINEER STATE OF WASHINGTON

murraysmith

Shaping our community together

CITY OF LACEY

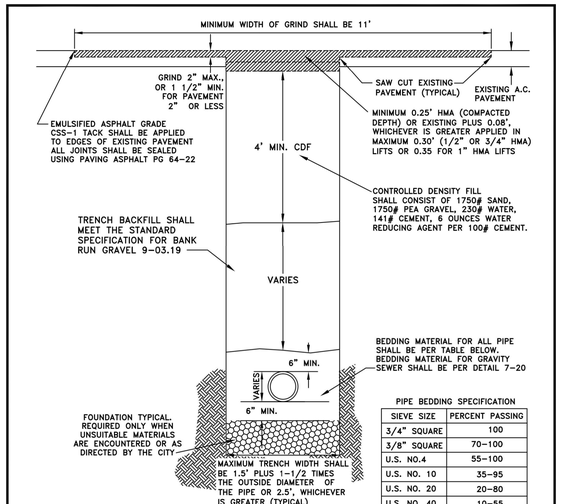
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

MISCELLANEOUS SITE DETAILS - 1

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-14

19 of 63



PIPE BEDDING SPECIFICATION

SIEVE SIZE	PERCENT PASSING
3/4" SQUARE	100
3/8" SQUARE	70–100
U.S. NO.4	55–100
U.S. NO. 10	35–95
U.S. NO. 20	20–80
U.S. NO. 40	10–55
U.S. NO. 100	0–10
U.S. NO. 200	0–03

GENERAL NOTES:
1. ALL MATERIALS EXCEPT H.M.A. SHALL BE COMPACTED IN 6-INCH MAXIMUM LIFTS TO 95% DENSITY AS DETERMINED BY ASTM D1557.
2. ALL MATERIALS, WORKMANSHIP, AND INSTALLATION SHALL BE IN CONFORMANCE WITH THE WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AS AMENDED BY CITY OF LACEY STANDARDS.
3. KEEP TRENCH BOTTOM COMPACTED WITH UNIFORM GRADE. NO TEMPORARY SUPPORTS, I.E. BLOCKS, WILL BE ALLOWED TO SUPPORT PIPE. TRENCH BOTTOM SHALL BE TO GRADE PRIOR TO PIPE INSTALLATION.
4. SAW CUT PAVEMENT TO MAX. TRENCH WIDTH. BACKFILL AND PAVE TO TOP OF EXISTING PAVEMENT FOR TRENCH WIDTH. ALLOW 24 HOURS MINIMUM FOR TRENCH PATCH TO CURE. GRIND AND PAVE FINAL PATCH AS SHOWN.

DG4-8.1.DWG

CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS

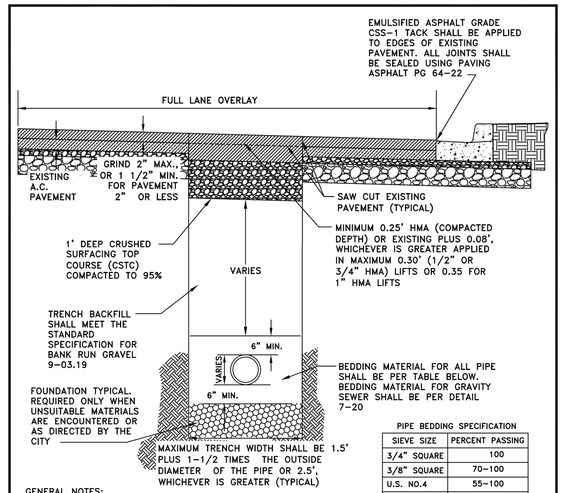
PERPENDICULAR TRENCH RESTORATION

ARTERIALS, BLVDS. & COLLECTORS

APPROVED CITY ENGINEER — DWG. NO. 4-8.1

DES	DWN	CKD	DATE
WHO	WHO	RAS	12/15/2014

PERPENDICULAR TRENCH RESTORATION (2)
SCALE: NTS



PIPE BEDDING SPECIFICATION

SIEVE SIZE	PERCENT PASSING
3/4" SQUARE	100
3/8" SQUARE	70–100
U.S. NO.4	55–100
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GENERAL NOTES:
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2. ALL MATERIALS, WORKMANSHIP, AND INSTALLATION SHALL BE IN CONFORMANCE WITH THE WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AS AMENDED BY CITY OF LACEY STANDARDS.
3. KEEP TRENCH BOTTOM COMPACTED WITH UNIFORM GRADE. NO TEMPORARY SUPPORTS, I.E. BLOCKS, WILL BE ALLOWED TO SUPPORT PIPE. TRENCH BOTTOM SHALL BE TO GRADE PRIOR TO PIPE INSTALLATION.
4. SAW CUT PAVEMENT TO MAX. TRENCH WIDTH. BACKFILL AND PAVE TO TOP OF EXISTING PAVEMENT FOR TRENCH WIDTH. ALLOW 24 HOURS MINIMUM FOR TRENCH PATCH TO CURE. GRIND AND PAVE FINAL PATCH AS SHOWN.
5. EXISTING SURFACES PAVED WITH PERMEABLE MATERIALS SHALL BE REPLACED IN-KIND WHERE FEASIBLE IN CONFORMANCE WITH 4B.180 TRENCH BACKFILL AND RESTORATION.

DG4-8.3.DWG

CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS

PARALLEL TRENCH RESTORATION

ARTERIALS, BLVDS. & COLLECTORS

APPROVED CITY ENGINEER — DWG. NO. 4-8.3

DES	DWN	CKD	DATE
WHO	WHO	RAS	08/24/2017

PARALLEL TRENCH RESTORATION (3)
SCALE: NTS

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-C.dwg C-15 9/30/2021 4:40 PM TABATHA.DYE 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MWH DESIGNED
BAW DRAWN
YQ CHECKED

MATTHEW L. HICKEY — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER
Matthew L Hickey

murraysmith

Shaping our community together
CITY OF LACEY

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

MISCELLANEOUS SITE DETAILS - 2

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET C-15

C:\Users\PSE-020-PC\AppData\Local\Temp\AcPublish_21032\2022_01_18 EXTERNAL CET Reservoir Drawings - ADDENDUM 4 1902-0076.dwg S-1 1/20/2022 12:03 PM ########## 23.0s (LMS Tech)

STRUCTURAL SHEETS:

GENERAL STRUCTURAL NOTES:

1. THESE NOTES ARE GENERAL IN NATURE AND ARE INTENDED TO SET MINIMUM STANDARDS FOR CONSTRUCTION. THE CONTRACTOR SHALL BE COMPLETELY FAMILIAR WITH THE CONTRACT DOCUMENTS AND HAVE A COPY OF THEM ON SITE AT ALL TIMES.
2. FOR ANY PORTION OF THE CONSTRUCTION WHICH THE CONTRACTOR IS UNABLE TO ASCERTAIN THE REQUIRED CONSTRUCTION OR WHERE CONFLICTS EXIST, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REQUEST ADDITIONAL INFORMATION (RFIs) AND/OR CLARIFICATIONS BEFORE CONSTRUCTION.
3. ALL WORK SHALL BE IN STRICT CONFORMANCE WITH THE 2018 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE STATE OF WASHINGTON & AWWA D107–16.
4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
5. THE CONTRACTOR, SUBCONTRACTORS AND SUPPLIERS SHALL ENSURE COORDINATION OF CONTRACTOR SUPPLIED/DESIGNED ELEMENTS AND DEFERRED SUBMITTALS WITH ALL DESIGN DISCIPLINES WITHIN THE CONSTRUCTION SET. COORDINATION SHALL IDENTIFY AND RECONCILE CONFLICTS BETWEEN THE CONTRACTOR SUPPLIED/DESIGNED ELEMENTS AND THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION AND DELIVERY TO THE PROJECT SITE. THE PROJECT ENGINEER SHALL BE NOTIFIED IF CONFLICTS EXIST.
6. THE CONTRACT STRUCTURAL DRAWINGS REPRESENT THE FINISHED STRUCTURE. METHODS, PROCEDURES, AND SEQUENCE OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION.
7. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN LIVE LOAD FOR THE STRUCTURE. PROVIDE SHORING AND/OR BRACING WHERE LOADS EXCEED DESIGN CAPACITY AND WHERE STRUCTURES HAVE NOT ATTAINED DESIGN STRENGTH.
8. CIVIL, GRADING, MECHANICAL FEATURES AND PIPING ARE BY OTHERS AND ARE OUTSIDE THE STRUCTURAL SCOPE OF WORK. ANY DEPICTION OF SUCH FEATURES ON THE STRUCTURAL DRAWINGS ARE NOT INTENDED TO BE USED FOR CONSTRUCTION. REPRESENTATION OF SUCH FEATURES ON THESE DRAWINGS MAY OR MAY NOT BE ACCURATE. REFER TO CIVIL AND MECHANICAL DRAWINGS AND/OR SPECIFICATIONS.
9. THE FOLLOWING DOCUMENTS HAVE BEEN GENERATED FOR THE CONSTRUCTION OF A 1.25 MILLON GALLON COMPOSITE CONCRETE BASE AND STEEL TANK WATER RESERVOIR.

JOB SITE CONDITIONS AND SAFETY:

1. CONTRACTOR AGREES THAT THEY SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE ENGINEER AND IT'S REPRESENTATIVE HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE ENGINEER.

DESIGN LOADS: PER 2018 IBC, ASCE 7–16, AND AWWA D107–16

RISK CATEGORY	CATEGORY IV
1603.1.1 – FLOOR LOADS:	
DEAD LOAD, GRATING	15 PSF
LIVE LOAD, MEZZANINE	125 PSF
LIVE LOAD, STAIR & EXIT WAYS	100 PSF, DISTRIBUTED/300 LB, POINT
LIVE LOAD, HAND/GUARD RAIL	50 PLF, LINE/200 LB, POINT
1603.1.2 – ROOF LOADS:	
LIVE LOAD	20 PSF
1603.1.3 – SNOW LOADS:	
GROUND SNOW LOAD, Pg	15 PSF
FLAT–ROOF SNOW LOAD, Pf	18 PSF, CAT. IV
AWWA D107 ROOF SLOPE FACTOR	1.0
MINIMUM SNOW LOAD	25 PSF (MINIMUM DESIGN LOAD)
1603.1.4 – WIND DESIGN CRITERIA:	
ULTIMATE DESIGN WIND SPEED, Vult	108 MPH, CAT. IV
WIND EXPOSURE	EXPOSURE C
ANALYSIS PROCEDURE	SIMPLIFIED METHOD PER AWWA D107
1603.1.5 – EARTHQUAKE DESIGN CRITERIA:	
SEISMIC IMPORTANCE FACTOR, I_E	1.5
SPECTRAL ACCELERATION, S_s	1.373 g
SPECTRAL ACCELERATION, S_1	0.506 g
SITE CLASS	C
SPECTRAL RESPONSE COEFFICIENT, S_{DS}	1.099 g
SPECTRAL RESPONSE COEFFICIENT, S_{D1}	0.504 g
SEISMIC DESIGN CATEGORY	CATEGORY D
DESIGN BASE SHEAR	3700 KIPS (COMPOSITE RESERVOIR – FULL)
SEISMIC RESPONSE COEFFICIENT(S), C_S	0.300
RESPONSE MODIFICATION FACTOR(S), R	3.0
ANALYSIS PROCEDURE	METHOD PER AWWA D107

PSE
PETERSON STRUCTURAL ENGINEERS
708 BROADWAY SUITE 110
TACOMA, WASHINGTON 98402
(253) 830–2140

CONCRETE:

1. ALL CONCRETE SHALL BE ANGULAR HARD ROCK (NO ROUND) CONCRETE MEETING REQUIREMENTS OF ACI–301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS". MIX PROPORTIONS SHALL BE PER ACI–301, METHOD 2 OR THE ALTERNATE PROCEDURE. SUBMIT MIX DESIGN FOR REVIEW BY STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
2. STRUCTURAL CONCRETE SHALL ATTAIN THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS TO MEET DESIGN AND DURABILITY CRITERIA FOR FREEZE/THAW AND ENVIRONMENTAL FACTORS:

	DURABILITY REQUIREMENTS							
TYPE	FX	SX	WX	CX	f'c	SLUMP	w/c	AIR
FOUNDATION	F2	S0	W0	C1	4,500 psi	1–4"	0.45	5%±1½%
PEDESTAL WALL	F2	S0	W0	C1	4,500 psi	1–4"	0.45	5%±1½%
SLAB	F1	S0	W0	C1	4,500 psi	1–4"	0.45	5%±1½%

3. AIR ENTRAINMENT SHALL BE IN CONFORMANCE WITH ASTM C260 AND C494 EXCEPT FOR WALL CONCRETE WHICH SHALL NOT BE AIR–ENTRAINED.
4. COLD WEATHER PLACEMENT SHALL CONFORM TO ACI–306. HOT WEATHER PLACEMENT SHALL CONFORM TO ACI–305. MECHANICALLY VIBRATE ALL FORMED CONCRETE. DO NOT OVER–VIBRATE. PLACE CONCRETE MONOLITHICALLY BETWEEN CONSTRUCTION OR CONTROL JOINTS. PROTECT ALL CONCRETE FROM PREMATURE DRYING.
5. CHAMFER ALL EXTERIOR CORNERS 1/2" UNLESS SHOWN OTHERWISE.
6. SLUMP LIMITS MAY BE INCREASED BY ADDITION OF ADMIXTURES PROVIDED THAT THE WATER/CEMENT RATIO OF THE ORIGINAL MIX DESIGN IS NOT EXCEEDED. WATER REDUCING ADMIXTURE SHALL BE IN CONFORMANCE WITH ASTM494, USED IN CONFORMANCE WITH MANUFACTURER'S INSTRUCTIONS. SUBMIT ADMIXTURES TO ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.
7. CEMENT SHALL BY TYPE II IN CONFORMANCE WITH ASTM C150. AGGREGATES SHALL BE IN CONFORMANCE WITH ASTM C33. COARSE AGGREGATES SHALL NOT EXCEED 1½". WATER SHALL BE CLEAN AND POTABLE. CEMENTATIOUS MATERIAL SHALL ONLY BE PORTLAND CEMENT OR ASTM CERTIFIED FLY ASH AS DIRECTED BY THE PROJECT SPECIFICATIONS. BLAST FURNACE SLAG AND OTHER SLAG PRODUCTS ARE NOT ALLOWED.
8. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60. GRADE 40 MAY BE USED FOR #3 AND SMALLER TIES AND STIRRUPS. DETAIL AND PLACE ACCORDING TO ACI MANUAL SP–66.
9. UNLESS OTHERWISE NOTED, MINIMUM COVER SHALL BE 1 1/2" FOR #5 AND SMALLER BARS, 2" FOR #6 AND LARGER BARS AND 3" WHEN POURED AGAINST EARTH. SUPPORT REINFORCEMENT WITH APPROVED CHAIRS, SPACERS, OR TIES.
10. PROVIDE MINIMUM 48 BAR DIAMETERS AT SPLICES, UNLESS OTHERWISE NOTED. NO MORE THAN 50% OF REINFORCING SHALL BE SPLICED AT ANY LOCATION. UNLESS OTHERWISE NOTED, BEND ALL HORIZONTAL REINFORCING A MINIMUM OF 2'–0" AT CORNERS AND FOOTING INTERSECTIONS WITH MIN. EMBEDMENT BEYOND INTERFACE PER DEVELOPMENT LENGTH SPECIFIED IN ACI 318.
11. FORMWORK SHALL BE IN ACCORDANCE WITH ACI–347 "RECOMMENDED PRACTICE FOR CONCRETE FORMWORK". FORMS SHALL BE DESIGNED BY THE CONTRACTOR. BRACING SHALL BE PROVIDED AS REQUIRED OR UNTIL THE CONCRETE HAS REACHED ITS SPECIFIED 28–DAY STRENGTH. ALL SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. FORMWORK, SUPPORTS, AND SHORING SHALL PROVIDE FINISHED CONCRETE SURFACES AT ALL FACES: LEVEL, PLUMB, AND TRUE TO DIMENSIONS AND ELEVATIONS SHOWN IN THE DRAWINGS. FORMS SHALL BE CLEAN AND FREE OF DEBRIS AND ALL WIRE TIES BENT AWAY FROM FINISHED SURFACES PRIOR TO CONCRETE INSTALLATION.
12. POST–INSTALLED ANCHORS AND REINFORCING BAR DOWELS SHALL BE INSTALLED WITH AN EPOXY ADHESIVE MEETING SPECIFICATION REQUIREMENTS. INSTALL BARS AND ANCHORS PER MANUFACTURER'S RECOMMENDATIONS.

POST–INSTALLED CONCRETE ANCHORS:

1. ADHESIVE:
   - 1.1. ADHESIVE ANCHORS SHALL BE INSTALLED BY QUALIFIED PERSONNEL TRAINED TO INSTALL ADHESIVE ANCHORS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND WITH STRICT ADHERENCE TO THE PROVISIONS WITHIN THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.
   - 1.2. AT THE TIME OF ANCHOR INSTALLATION, IN ACCORDANCE WITH ACI 318–14 SECTION 17.1.2, ADHESIVE ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS.
   - 1.3. WHERE THE AUTHORITY HAVING JURISDICTION OVER THIS PROJECT REQUIRES ADHERENCE TO ACI 318–14 SECTION 17.8.2.2, INSTALLATION OF ADHESIVE ANCHORS IN HORIZONTAL TO VERTICALLY OVERHEAD ORIENTATION SHALL BE DONE BY A CERTIFIED ADHESIVE ANCHOR INSTALLER (AAI) AS CERTIFIED THROUGH ACI AND IN ACCORDANCE WITH ACI 318–14 SECTION 17.8.2.2. PROOF OF CURRENT CERTIFICATION SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF INSTALLATION.
2. MECHANICAL:
   - 2.1. MECHANICAL ANCHORS SHALL BE INSTALLED BY QUALIFIED PERSONNEL TRAINED TO INSTALL MECHANICAL ANCHORS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND WITH STRICT ADHERENCE TO THE PROVISIONS WITHIN THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.

STRUCTURAL STEEL:

1. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING MINIMUM GRADES, UNLESS NOTED OTHERWISE ON THE PLANS:

MEMBER	STANDARD GRADE	STAINLESS GRADE
PLATES & SHEETS	ASTM A36	ASTM A666; TYPE 316
BARS & SHAPES	ASTM A36	ASTM A276; TYPE 316
TUBES	ASTM A500, GRADE C (Fy = 50 ksi)	ASTM A269; TYPE 316
PIPE	ASTM A53, GRADE B	ASTM A240; TYPE 316
HSS (RECTANGULAR)	ASTM A500, GRADE C (Fy = 50 ksi)	ASTM A554; TYPE 316 ⚠
HSS (ROUND)	ASTM A500, GRADE C (Fy = 46 ksi)	ASTM A269; TYPE 316
W–SECTIONS	ASTM A992	
M/S–SHAPES	ASTM A36	
HP–SHAPES	ASTM A572, GRADE 50 (Fy = 50 ksi)	
CHANNELS & ANGLES	ASTM A36	ASTM A276; TYPE 316

2. WELD ACCORDING TO CURRENT AWS STANDARDS WITH E70XX ELECTRODES. FOR STAINLESS STEEL, AWS D1.6 FOR ELECTRODE TYPE REQUIRED FOR MATERIAL BEING WELDED
3. WELD SIZES SHOWN ON THE DESIGN DRAWINGS ARE CONSIDERED EFFECTIVE WELD SIZES AND SHALL BE INCREASED IN ACCORDANCE WITH AWS AS REQUIRED BY GAPS OR SKEWS BETWEEN COMPONENTS.
4. ALL STEEL EXPOSED TO WEATHER SHALL BE PAINTED OR HOT–DIP GALVANIZED, UNLESS NOTED OTHERWISE.
5. ALL STRUCTURAL CONNECTION BOLTS SHALL BE ASTM F3125 GRADE A325, UNLESS NOTED OTHERWISE. HOOKED, HEADED, THREADED, AND NUTTED ANCHOR RODS SHALL BE ASTM F1554 (Fy = 36 ksi), UNLESS NOTED OTHERWISE. FOR STAINLESS STEEL USE TYPE 316, CLASS 2; ASTM A193 FOR BOLTS AND A194 FOR NUTS
6. CONTACT BETWEEN DISSIMILAR METALS SHALL BE ISOLATED USING PHENOLIC OR OTHERWISE APPROVED ISOLATION HARDWARE

FOUNDATIONS:

1. THE GEOTECHNICAL REPORT WAS PREPARED BY HWA GEOSCIENCES, INC. OF 21312 30TH DR SE, BOTHELL, WASHINGTON. PHONE: (425) 774–0106, DATED MARCH 22, 2021 (HWA PROJECT NO. 2019–090–21). THE CONTRACTOR SHALL BE FAMILIAR WITH THAT REPORT AND CONFORM TO THE RECOMMENDATIONS CONTAINED THEREIN.
2. ALL FOUNDATIONS TO BEAR ON UNDISTURBED NATIVE MATERIAL, OR GRANULAR COMPACTED ENGINEERED FILL, PER THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. EXCAVATIONS FOR FOUNDATIONS SHALL BE OBSERVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING OF CONCRETE FOR FOUNDATION.
3. SOIL DESIGN CRITERIA, PER GEOTECHNICAL ENGINEER:
   - 3.1. SOIL BEARING – 8,000 PSF – STATIC (FOR AN ASSUMED FOUNDATION DEPTH OF APPROX. 7' BELOW GRADE, PER GEOTECH REPORT) 11,000 PSF – DYNAMIC
   - 3.2. SITE CLASS – C
   - 3.3. FRICTION COEFFICIENT – 0.45
   - 3.4. DIFFERENTIAL SETTLEMENT – L/800

GEOTECHNICAL GENERAL NOTES:

1. EXCAVATION:
   - 1.1. MATERIALS NOT DESIGNATED FOR REUSE SHALL BE BROKEN UP, LOADED, AND LEGALLY DISPOSED OF BY THE CONTRACTOR. CARE SHALL BE TAKEN WHEN REMOVING ITEMS TO ENSURE THAT DAMAGE DOES NOT OCCUR TO THE EXISTING TREES AND IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE. ALL STRUCTURAL REMOVALS SHALL BE ACCOMPLISHED BY MAKING A NEAT VERTICAL SAWCUT AT THE LIMITS OF REMOVAL. ADJACENT MATERIALS DESIGNATED TO REMAIN THAT ARE DAMAGED BY THE CONTRACTOR DURING THE WORK SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
   - 1.2. SPRINKLE EXCAVATED MATERIAL AND ACCESS ROADS AS NECESSARY TO LIMIT DUST TO THE LOWEST PRACTICABLE LEVEL. DO NOT USE WATER TO SUCH AN EXTENT AS TO CAUSE FLOODING, CONTAMINATED RUNOFF, OR ICING.
   - 1.3. IN THE EVENT THE CONTRACTOR ENCOUNTERS UTILITY LINES NOT SHOWN ON THE SITE PLAN OR OTHERWISE INDICATED TO BE SAVED, REMOVED, OR ABANDONED, THE LOCATION OF SUCH LINES SHALL BE MARKED IN FIELD AND THE OWNER'S REPRESENTATIVE NOTIFIED.
2. FILL MATERIALS:
   - 2.1. IF ANY FILL IS ANTICIPATED TO BE BROUGHT TO THE SITE, THE APPLICANT SHALL SUBMIT A SOURCE STATEMENT CERTIFIED BY A PROFESSIONAL ENGINEER OR GEOLOGISTS LICENSED IN THE STATE OF WASHINGTON MEETING THE REQUIREMENTS OF RMC 4–4–060N.4 OR PROVIDE DOCUMENTATION THAT FILL WILL BE OBTAINED FROM A WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) APPROVED SOURCE AS ALLOWED BY RMC 4–4–060N4.G
   - 2.2. ALL MATERIAL WHICH IS PROPOSED TO BE USED AS FILL, BEDDING OR BACKFILL SHALL BE GRADED AND TESTED FOR MOISTURE CONTENT AND COMPACTABILITY. GRADATION AND TEST RESULTS SHALL BE SUBMITTED FOR REVIEW AND ACCEPTANCE BY THE OWNER'S REPRESENTATIVE PRIOR TO PLACEMENT OF FILL AND APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER AS SUITABLE FOR THE INTENDED APPLICATION.
   - 2.3. MATERIAL USED IN FILLING SHALL BE APPROPRIATE TO THE SITE AND THE INTENDED USE OF THAT PORTION OF THE SITE.
   - 2.4. TOPSOIL SHALL NOT BE USED AS A FILL MATERIAL.
   - 2.5. NO FROZEN OR THAWING MATERIAL SHALL BE USED IN FILL.
   - 2.6. GRAVEL BORROW: PER SECTION 9–03.14(1) OF WSDOT.
   - 2.7. STRUCTURAL FILL SHALL BE CLEAN, FREE–DRAINING GRANULAR NON–ORGANIC SOIL, ACCEPTABLE TO THE OWNER'S REPRESENTATIVE, PLACE IN MAXIMUM 8–INCH LOOSE LIFTS, WITH EACH LIFT BEING COMPACTED TO AT LEAST 95% OF THE MODIFIED PROCTOR MAXIMUM DENSITY USING ASTM: D1557. STRUCTURAL FILL SHALL BE PLACED AND COMPACTED WITHIN 2% OF THE OPTIMUM MOISTURE CONTENT. THE NATIVE SOILS AT THE SITE ARE NOT SUITABLE FOR REUSE AS STRUCTURAL FILLS AND SHALL NOT BE USED.
3. COMPACTION:
   REQUIRED COMPACTION: COMPACT FILLS AND BACKFILLS TO THE FOLLOWING MINIMUM RELATIVE COMPACTION (PERCENTAGE OF MAXIMUM DRY DENSITY DETERMINED IN ACCORDANCE WITH ASTM D1557).

LOCATIONS	REQUIRED MINIMUM RELATIVE COMPACTION
UTILITY TRENCHES:	95%
UNDER WALKS AND PAVING:	95%
AGAINST WALL:	90%
PLANTING AND LANDSCAPE AREAS:	85%
PERMEABLE PAVEMENT SUBGRADE:	90–92%
OTHER:	95%

4. FIELD QUALITY CONTROL:
   - 4.1. THE OWNER'S TESTING AGENCY SHALL PERFORM TESTING TO VERIFY CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS FOR QUALITY ASSURANCE. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE WORK PROCESS AND MATERIALS MEET THE REQUIREMENTS OF THE SPECIFICATIONS AND THE CITY.

GEOTECHNICAL GRADING NOTES:

1. ALL WORK SHALL BE IN CONFORMANCE WITH THE GEOTECHNICAL REPORT FOR THE TERRY CARGIL–337 RESERVOIR IN LACEY, WA PREPARED BY HWA GEOSCIENCES, INC. OF 21312 30TH DR SE, BOTHELL, WASHINGTON. PHONE: (425) 774–0106, DATED MARCH 22, 2021 (HWA PROJECT NO. 2019–090–21).
2. THE PROJECT GEOTECHNICAL ENGINEER OF RECORD OR HIS/HER REPRESENTATIVE MUST BE ONSITE DURING CRITICAL EARTHWORK OPERATIONS. THE GEOTECHNICAL ENGINEER SHALL OBSERVE ALL EXCAVATIONS AND FILL AREAS. IN ADDITION, THE ENGINEER SHALL INSPECT THE SOIL CUTS PRIOR TO CONSTRUCTION OF FOUNDATIONS AND INSPECT THE COMPACTION IN FILL AREAS. FIELD REPORTS SHALL BE SUBMITTED IN WRITING TO THE CITY TECHNICAL INSPECTOR FOR SOILS VERIFICATION AND FOUNDATION CONSTRUCTION. ALL EARTHWORK SHOULD BE IN CONFORMANCE WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT.
3. THE GEOTECHNICAL ENGINEER MUST BE PRESENT AT THE PRE–CONSTRUCTION MEETING(S). IN ADDITION, THE FOLLOWING CONSTRUCTION STAGES MUST BE INSPECTED, MONITORED, AND TESTED AS NECESSARY BY THE GEOTECHNICAL ENGINEER OF RECORD:
   - 3.1. SITE CLEARING AND STRIPPING OF ORGANIC TOPSOIL FOR ALL AREAS TO RECEIVE STRUCTURAL FILL, PAVEMENTS, OR FOUNDATIONS.
   - 3.2. CUT SLOPES OVER FOUR FEET HIGH.
   - 3.3. BENCHING FOR FILL TO BE PLACED ON SLOPES.
   - 3.4. INSPECTION OF PROPOSED IMPORT FILL MATERIAL, PRIOR TO PLACEMENT.
   - 3.5. PLACEMENT OF STRUCTURAL FILL, INCLUDING OBSERVATION OF PROPER MOISTURE CONTENT, LIFT THICKNESS, AND MINIMUM COMPACTION.
   - 3.6. SUBGRADES FOR FOUNDATIONS.
   - 3.7. INSTALLATION OF SUBSURFACE DRAINAGE FACILITIES.
   - 3.8. UTILITY TRENCH BEDDING AND BACKFILL, INCLUDING OBSERVATION OF PROPER MOISTURE CONTENT, LIFT THICKNESS, AND MINIMUM COMPACTION.
   - 3.9. ANY UNUSUAL SEEPAGE, SLOPE, OR SUBGRADE CONDITION AS DELINEATED IN THE GEOTECHNICAL REPORT OR DISCOVERED IN THE FIELD.
4. AT THE END OF CONSTRUCTION, THE GEOTECHNICAL ENGINEER SHALL SUBMIT A FINAL SUMMARY LETTER VERIFYING THAT CRITICAL STAGES OF CONSTRUCTION HAVE BEEN INSPECTED AND ARE IN CONFORMANCE WITH GEOTECHNICAL REPORT.

GRATING AND STAIR TREADS:

1. MEZZANINE LANDING GRATING SHALL BE EITHER GALVANIZED STEEL BAR GRATING OR FIBER–REINFORCED PLASTIC (FRP) GRATING. GRATING SHALL BE ABLE TO WITHSTAND 125 PSF WITH A MAXIMUM DEFLECTION OF L/240. SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW & APPROVAL.
2. STAIR TREAD AND STAIR LANDING GRATING SHALL BE FIBER–REINFORCED PLASTIC (FRP) TREADS ABLE TO WITHSTAND 100 PSF, OR A POINT LOAD OF 300 LB AT ANY LOCATION, WITH A MAXIMUM DEFLECTION OF L/240. SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW & APPROVAL.
3. GRATING SHALL BE CLIPPED TO STRUCTURE PER MANUFACTURER'S RECOMMENDATIONS. ANY UNSUPPORTED EDGES SHALL BE CLIPPED TOGETHER. ⚠2

APPURTENANCES NOTES:

1. WHERE APPURTENANCES REQUIRE ANCHORS TO BE PLACED ON THE WALL, DRILL AND PLACE PER MANUFACTURER'S REQUIREMENTS. TAKE EXTREME CARE TO AVOID DAMAGING THE REINFORCING.
2. USE ASTM A316 STAINLESS STEEL BOLTS AND ANCHORS UNLESS OTHERWISE NOTED. WHERE BOLTS OR ANCHORS ARE IN CONTACT WITH DISSIMILAR METALS, USE INSULATING SLEEVES AND WASHERS.

NO.	DATE	BY	REVISION
2	1/20/22	GRL	ADDENDUM 4
1	12/23/21	EFL	ADDENDUM 1

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

GRL DESIGNED
GRL DRAWN
TGM CHECKED

TRAVIS GREGORY MCFARLAND STATE OF WASHINGTON 45617 REGISTERED PROFESSIONAL ENGINEER 01/21/2022

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CITY OF LACEY

**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

GENERAL STRUCTURAL NOTES

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
S-1
20 of 63

QUALITY ASSURANCE PLAN:

SHOP DRAWINGS & SUBMITTALS:

SHOP DRAWINGS, CALCULATIONS, SUBMITTALS AND/OR MILL CERTIFICATES FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER OF RECORD FOR REVIEW A MINIMUM OF 21 DAYS PRIOR TO FABRICATION:

1. COMPOSITE RESERVOIR STRUCTURAL CALCULATIONS AND SHOP DRAWINGS
2. CONCRETE REINFORCING SHOP DRAWINGS FOR ALL FOUNDATION ELEMENTS
3. CONCRETE REINFORCING SHOP DRAWINGS FOR ALL WALL ELEMENTS
3. CONCRETE REINFORCING SHOP DRAWINGS FOR ALL STRUCTURAL SLAB ELEMENTS
2. CMU REINFORCING SHOP DRAWINGS
3. CMU/MORTAR/GROUT MATERIAL SUB FOR UNIT STRENGTH COMP. W/f'm REQUIREMENT
4. GROUT MIX DESIGN
5. SHORING SYSTEMS
6. CONCRETE MIX DESIGNS AND PROPOSED ADMIXTURES
7. HATCHES AND VENTS
8. ACCESS STAIRWAYS AND APPURTENANCES
9. ACCESS LANDING STEEL SHOP DRAWINGS
10. GRATING PRODUCT CUT SHEETS AND SHOP DRAWINGS
11. CALCULATIONS AND/OR SHOP DRAWINGS REGARDING ANY APPROVED STRUCTURAL MODIFICATIONS OR DEVIATIONS SIGNED BY AN STRUCTURAL ENGINEER LICENSED IN THE STATE OF WASHINGTON.

QUALITY ASSURANCE FOR SEISMIC RESISTANCE:

QUALITY ASSURANCE FOR THE STRUCTURE'S MAIN LATERAL FORCE RESISTING SYSTEM SHALL BE PROVIDED BY SPECIAL INSPECTION AND MATERIAL TESTING OF THE FOLLOWING:

STRUCTURAL OBSERVATION REQUIREMENTS:

1. THE OWNER SHALL EMPLOY THE ENGINEER OF RECORD OR AN ALTERNATE WASHINGTON LICENSED PROFESSIONAL ENGINEER, APPROVED BY THE ENGINEER OF RECORD, TO PERFORM STRUCTURAL OBSERVATIONS IN ACCORDANCE WITH SECTION 1704.5 OF THE INTERNATIONAL BUILDING CODE.

2. STRUCTURAL OBSERVATION IS THE VISUAL OBSERVATION OF THE STRUCTURAL SYSTEM BY A REGISTERED DESIGN PROFESSIONAL FOR GENERAL CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS AT SIGNIFICANT CONSTRUCTION STAGES AND AT COMPLETION OF THE STRUCTURAL SYSTEM. STRUCTURAL OBSERVATION DOES NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR ANY OTHER INSPECTION CRITERIA, INCLUDING SPECIAL INSPECTION, AS REQUIRED BY THE BUILDING OFFICIAL OR AS INDICATED WITHIN THE INTERNATIONAL BUILDING CODE.

3. DEFICIENCIES SHALL BE REPORTED IN WRITING TO THE OWNER AND THE BUILDING OFFICIAL (AND THE ENGINEER OF RECORD IF AN ALTERNATE ENGINEER IS USED FOR STRUCTURAL OBSERVATION). AT THE CONCLUSION OF THE STRUCTURAL WORK INCLUDED WITHIN THE PERMIT, THE STRUCTURAL OBSERVER SHALL SUBMIT TO THE BUILDING OFFICIAL AND THE OWNER (AND THE ENGINEER OF RECORD IF AN ALTERNATE ENGINEER IS USED FOR STRUCTURAL OBSERVATION) A WRITTEN STATEMENT THAT THE SITE VISITS HAVE BEEN MADE AND IDENTIFY ANY REPORTED DEFICIENCIES WHICH, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE, HAVE NOT BEEN RESOLVED.

4. THE CONTRACTOR SHALL MAKE AVAILABLE ALL MEANS AND METHODS NECESSARY FOR THE STRUCTURAL OBSERVER TO PERFORM THE REQUIRED STRUCTURAL OBSERVATIONS. IN ADDITION, THE CONTRACTOR SHALL NOTIFY THE OWNER AND STRUCTURAL OBSERVER A MINIMUM OF 48 HOURS BEFORE THE TIME AT WHICH THE SPECIFIED STRUCTURAL OBSERVATIONS MAY BE PERFORMED. IN ADDITION THE CONTRACTOR SHALL UPDATE THE STRUCTURAL OBSERVER OF THE CONSTRUCTION PROGRESS.

5. STRUCTURAL OBSERVATIONS SHALL BE PERFORMED FOR THE FOLLOWING AREAS OF WORK:
   - 5.1. FOLLOWING THE INSTALLATION OF 50% OF THE FOOTING REINFORCING AND STEM REBAR.
   - 5.2. FOLLOWING THE COMPLETION OF FOOTING REINFORCING AND ANY CAST-IN ITEMS, BUT BEFORE THE FIRST CONCRETE POUR.
   - 5.3. FOLLOWING THE ERECTION OF FIRST WALL FORM AND REINFORCING BUT BEFORE CLOSING FORMS.
   - 5.4. FOLLOWING REINFORCING AROUND PERSONNEL DOOR AND GARAGE DOOR.
   - 5.5. FOLLOWING WALL CONSTRUCTION UP TO TOP TO CHECK ANCHORS.
   - 5.6. FOLLOWING DOME REINFORCEMENT BEFORE CONCRETE POUR.
   - 5.4. FOLLOWING THE CMU WALL REINFORCING, PRIOR TO THE FIRST GROUT POUR
   - 5.5. FOLLOWING A REPRESENTATIVE CMU LINTEL INSTALLATION AND REINFORCING, PRIOR TO THE GROUT POUR
   - 5.6. FOLLOWING CONSTRUCTION OF LANDING.
   - 5.7. FOLLOWING THE COMPLETION OF ALL STRUCTURAL ELEMENTS CONTAINED HEREIN

SPECIAL INSPECTIONS:

1. AN INDEPENDENT TESTING LABORATORY, SELECTED AND ENGAGED BY THE OWNER, SHALL PROVIDE SPECIAL INSPECTIONS IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE AND OF THE TYPE AND FREQUENCY OUTLINED IN THE QUALITY CONTROL SECTION OF THESE GENERAL STRUCTURAL NOTES.

2. EACH SPECIAL INSPECTION AND MATERIAL TESTING REPORT SHALL BE DISTRIBUTED TO THE OWNER, CONTRACTOR, BUILDING OFFICIAL, AND ENGINEER OF RECORD IN A TIME FASHION.

3. THE CONTRACTOR SHALL MAKE AVAILABLE ALL MEANS AND METHODS NECESSARY FOR THE SPECIAL INSPECTOR TO PERFORM THE REQUIRED INSPECTIONS. IN ADDITION, THE CONTRACTOR SHALL NOTIFY THE OWNER AND SPECIAL INSPECTOR A MINIMUM OF 48 HOURS BEFORE THE TIME AT WHICH THE SPECIFIED SPECIAL INSPECTIONS MAY BE PERFORMED.

4. EACH CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF THE SEISMIC RESISTING SYSTEM SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE ENGINEER OF RECORD, OWNER, AND BUILDING OFFICIAL IN COMPLIANCE WITH IBC SECTION 1704.3 PRIOR TO THE COMMENCEMENT OF WORK ON THAT SYSTEM.

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PETERSON STRUCTURAL ENGINEERS
708 BROADWAY SUITE 110
TACOMA, WASHINGTON 98402
(253) 830-2140

INSPECTIONS:
SPECIAL INSPECTIONS IN ACCORDANCE WITH IBC 1704 AND AWWA D107 SECTION 9 SHALL BE PROVIDED FOR THE FOLLOWING ITEMS.

REQUIRED STRUCTURAL SPECIAL INSPECTIONS					
SYSTEM or MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
SOILS					
VERIFY MATERIALS BELOW SHALLOW FOUNDATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	TABLE 1705.6	GEOTECHNICAL REPORT		X	BY THE GEOTECHNICAL ENGINEER
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL				X	
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS				X	
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL			X		
PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY				X	

REQUIRED STRUCTURAL SPECIAL INSPECTIONS					
STEEL					
SYSTEM or MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
FABRICATION OF STRUCTURAL ELEMENTS	1704.2.5	AISC 360 N2		X	REFER TO INSPECTION OF FABRICATOR REQUIREMENTS
MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS		AISC 360 A3.3 AISC 360 N 3.3 ASTM STANDARDS SPECIFIED IN CONSTRUCTION DOCUMENTS RCSC 2.1		X	APPROVAL BASED ON NATIONALLY RECOGNIZED ACCREDITING AUTHORITY MANUFACTURE'S CERTIFIED TEST REPORTS
SNUG-TIGHT JOINT HIGH-STRENGTH BOLT INSTALLATION		RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM F3125 Gr. A325 OR A490 BOLTS SECTION 9 AISC 360, SECTION M2.5, N5.5g		X	ALL CONNECTIONS INSPECTED AND VERIFIED SNUG
MATERIAL VERIFICATION OF STRUCTURAL STEEL	1705.2.1 2203.1	ASTM A6 ASTM STANDARDS SPECIFIED IN CONSTRUCTION DOCUMENTS AISC 360 N2.1 AISC 360 N3.2 AISC 360 A3.1		X	CERTIFIED MILL TEST REPORTS
MATERIAL VERIFICATION OF WELD FILLER METALS		AISC 360 M2.4 AISC 360 A3.5 APPLICABLE AWS A5 DOCUMENTS		X	MANUFACTURER'S CERTIFICATION OF COMPLIANCE
MULTIPASS FILLET WELDS		AISC 360 TABLE N5.4-1 (PRIOR TO WELDING) TABLE N5.4-2 (DURING WELDING) TABLE N5.4-3 (AFTER WELDING) AWS D1.1 SECTION 6	X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1.6.9
SINGLE PASS FILLET WELDS GREATER THAN 5/16"			X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1.6.9
PLUG AND SLOT WELDS			X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1.6.9
SINGLE PASS FILLET WELDS LESS THAN OR EQUAL TO 5/16"				X	ALL WELDS VISUALLY INSPECTED PER AWS D1.1.6.9
MATERIAL VERIFICATION OF ANCHOR BOLTS AND THREADED RODS		AISC 360 N3.2 AISC 360 A3.4 ASTM STANDARDS SPECIFIED IN CONSTRUCTION DOCUMENTS		X	MANUFACTURER'S CERTIFIED TEST REPORTS
VERIFYING USE OF PROPER WPS'S		AISC 360 N5.4			COPY OF WELDING PROCEDURE SPECIFICATIONS
VERIFYING WELDER AND WELDING INSPECTOR QUALIFICATIONS		AISC 360 N3.2		X	COPY OF QUALIFICATION CARDS

REQUIRED STRUCTURAL SPECIAL INSPECTIONS					
SYSTEM or MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
CONCRETE					
INSPECTION OF ANCHORS CAST IN CONCRETE	TABLE 1705.3	ACI 318: 17.8.2		X	
INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE A. ADHESIVE ANCHORS INSTALL IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION TO REISSTE SUSTAINED TENSION LOADS B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED ABOVE	TABLE 1705.3	ACI 318: 17.8.2.4 ACI 318: 17.8.2	X	X	SPECIAL INSPECTIONS APPLY TO ANCHOR PRODUCT NAME, TYPE, AN DIMENSIONS, HOLE DIMENSIONS, COMPLIANCE WITH DRILL BIT REQUIREMENTS, CLEANLINESS OF THE HOLE AND ANCHOR, ADHESIVE EXPIRATION DATE, ANCHOR/ADHESIVE INSTALLATION, ANCHOR EMBEDMENT, AND TIGHTENING TORQUE
REINFORCING STEEL	1908.4	ACI 318: CH: 20, 25.2, 25.3, 26.6.1-26.6.3		X	TOLERANCES AND REINFORCING PLACEMENT PER ACI 26.6.2; SPACING LIMITS FOR REINFORCING ACI 25.2 PROTECTION OF REINFORCEMENT PER ACI 20.6.1
VERIFYING USE OF REQUIRED MIX DESIGN(S)	TABLE 1705.3 1904.1 1904.2 1908.2 1908.3	ACI 318: CH 19, 26.4.3, 26.4.4		X	
CONCRETE PLACEMENT	1908.6 1908.7 1908.8	ACI 318: 264.5	X		
CONCRETE CURING	TABLE 1705.3 1908.9	ACI 318: 26.5.3-26.5.5		X	
VERIFICATION OF IN-SITU CONCRETE PRIOR TO REMOVAL OF FORMS AND SHORES	TABLE 1705.3	ACI 318: 26.11.2		X	
VERIFICATION OF FORMWORK	TABLE 1705.3	ACI 318: 26.11.1.2(b)		X	SPECIAL INSPECTIONS APPLY TO SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED

TESTING:
MATERIALS TESTING IN ACCORDANCE WITH IBC 1704 AND AWWA SECTION 11 SHALL BE PROVIDED FOR THE FOLLOWING ITEMS.

REQUIRED STRUCTURAL SPECIAL INSPECTIONS					
SYSTEM or MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
CONCRETE					
AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	TABLE 1705.3 1908.10	ASTM C 172 ASTM C 31 ACI 318: 26.5, 26.12	X		FABRICATE SPECIMENS AT TIME FRESH CONCRETE IS PLACED PER SPECIFICATION SCHEDULE FOR SLABS
CONCRETE STRENGTH	TABLE 1705.3 1908.10	ASTM C39	X		
CONCRETE SLUMP	TABLE 1705.3	ASTM C143	X		
CONCRETE AIR CONTENT		ASTM C231	X		
CONCRETE TEMPERATURE		ASTM C1064	X		
WELDED STEEL TANKS					
RADIOGRAPHIC TESTING (RT) OF WELDS		AWWA D100 11.5 & 11.6 AWS D1.1 SECTION 6 API 650 6.1 API 620 5.15.1	AT SHELL JOINTS - NUMBER AND SPACING PER THE STANDARD		PERFORM WELD RADIOGRAPHIC TESTING PER AWS D1.1 PART E. SPECIAL INSPECTIONS APPLY TO REVIEW OF THE RADIOGRAPHS AND THE ASSOCIATED REPORT INTERPRETING THE RADIOGRAPHS
GEOTECHNICAL					
GEOTECHNICAL ENGINEER TO PERFORM TESTING OF COMPACTED FILL MATERIALS	1803				TESTING PER GEOTECHNICAL REPORT
FILL IN-PLACE DENSITY OR PREPARED SUBGRADE DENSITY	1705.6	VARIES: MINIMUM PER IBC APPENDIX J107.5		X	BY THE GEOTECHNICAL ENGINEER
MATERIAL VERIFICATION		VARIES: CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS		X	BY THE GEOTECHNICAL ENGINEER

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

GRL DESIGNED
GRL DRAWN
TGM CHECKED

TRAVIS GREGORY MCKERON STATE OF WASHINGTON 25617 STRUCTURAL PROFESSIONAL ENGINEER

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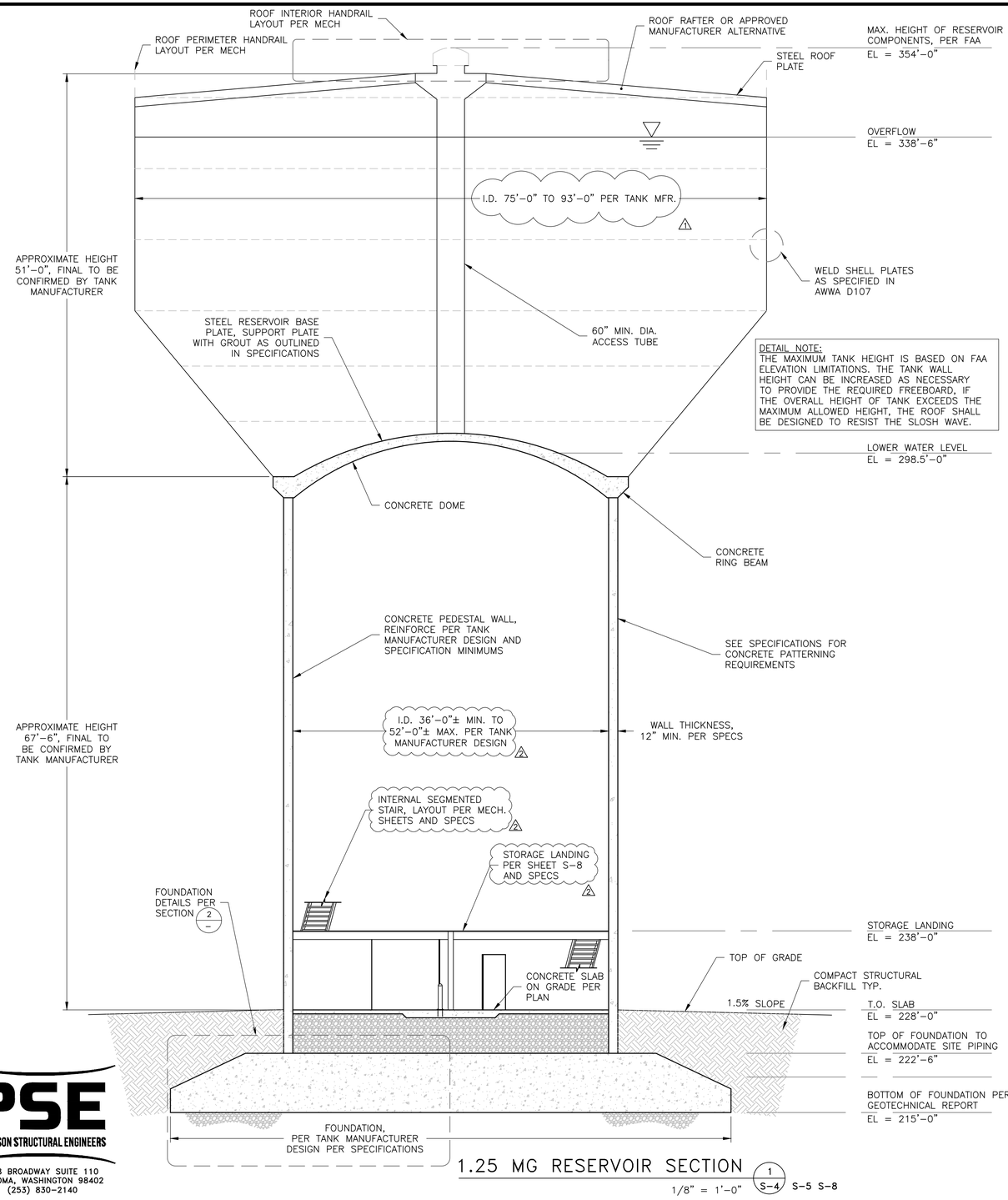
CITY OF LACEY

**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

QUALITY ASSURANCE PLAN

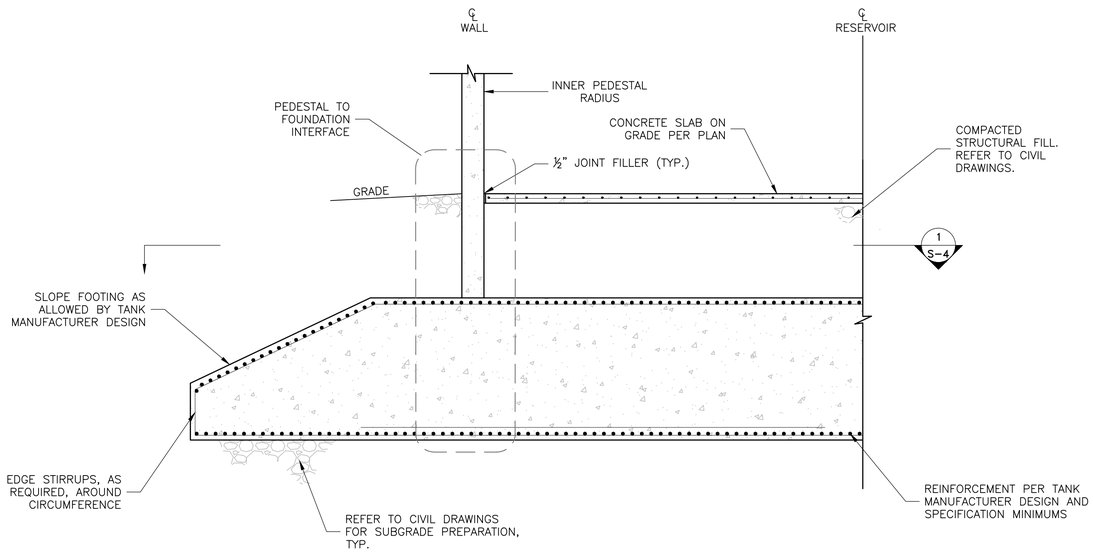
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
S-2



1.25 MG RESERVOIR SECTION

1/8" = 1'-0" (1 / S-4) S-5 S-8



FOUNDATION SECTION

1/4" = 1'-0" (2 / –)

FDN. RING WALL SECTION

1/2" = 1'-0" (3 / –)

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708 BROADWAY SUITE 110
TACOMA, WASHINGTON 98402
(253) 830-2140

NO.	DATE	BY	REVISION
2	1/20/22	GRL	ADDENDUM 4
1	12/23/21	EFL	ADDENDUM 1

NOTICE
0 ½ 1
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GRL DESIGNED
GRL DRAWN
TGM CHECKED

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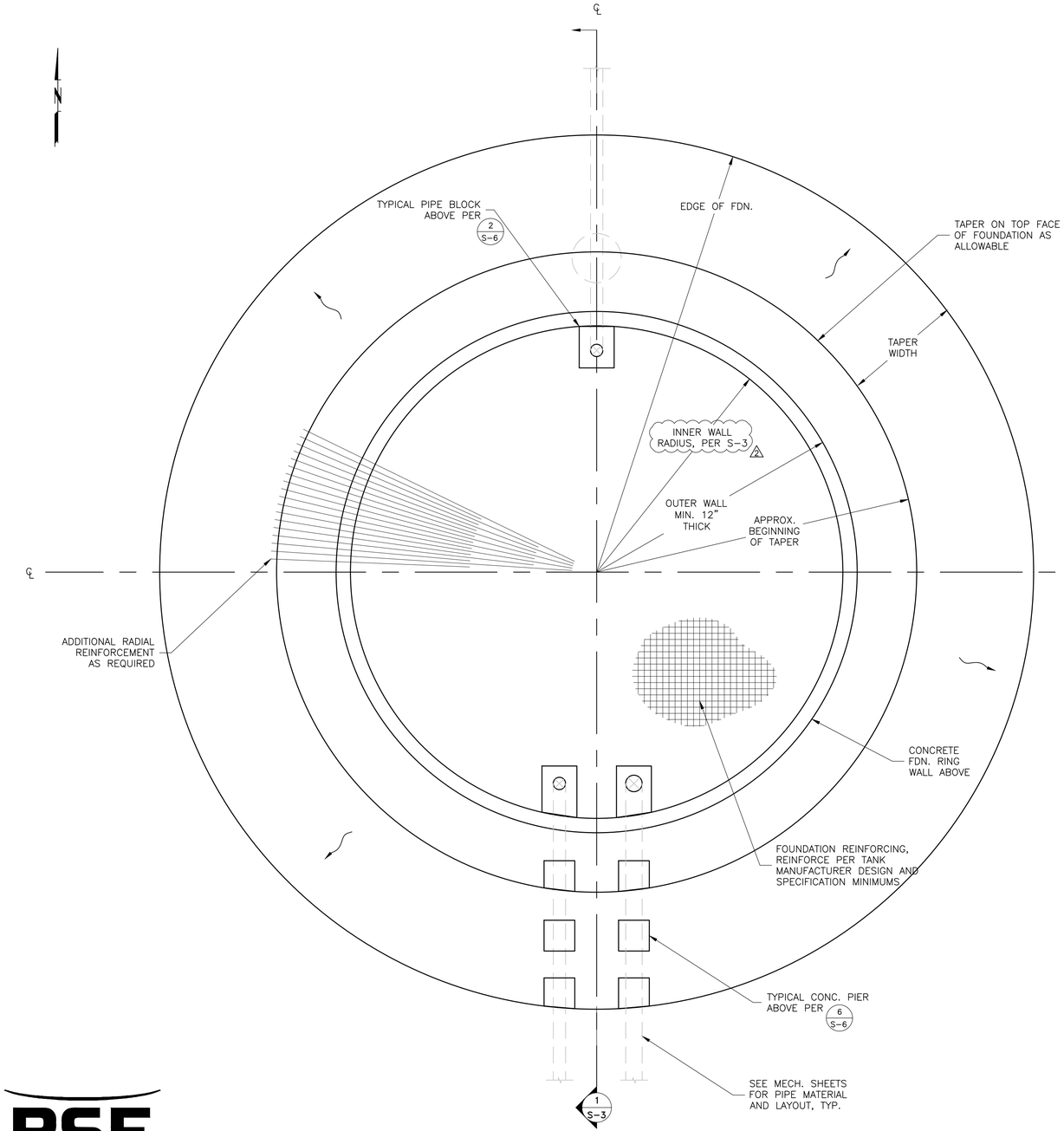
CITY OF LACEY

CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

ELEVATIONS AND SECTIONS

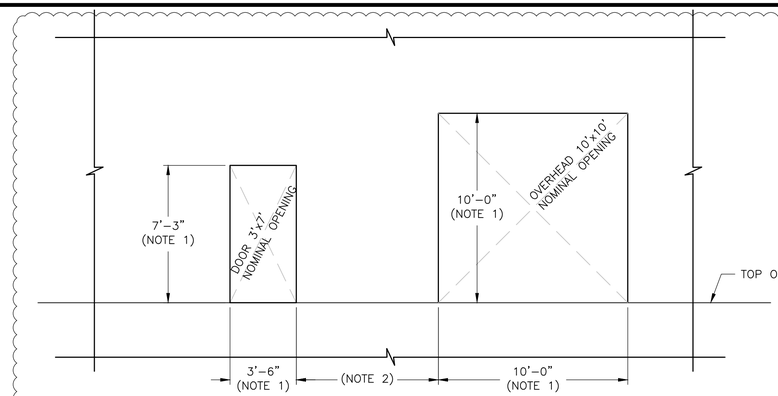
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-3



FOUNDATION PLAN 1/S-3

3/16" = 1'-0"

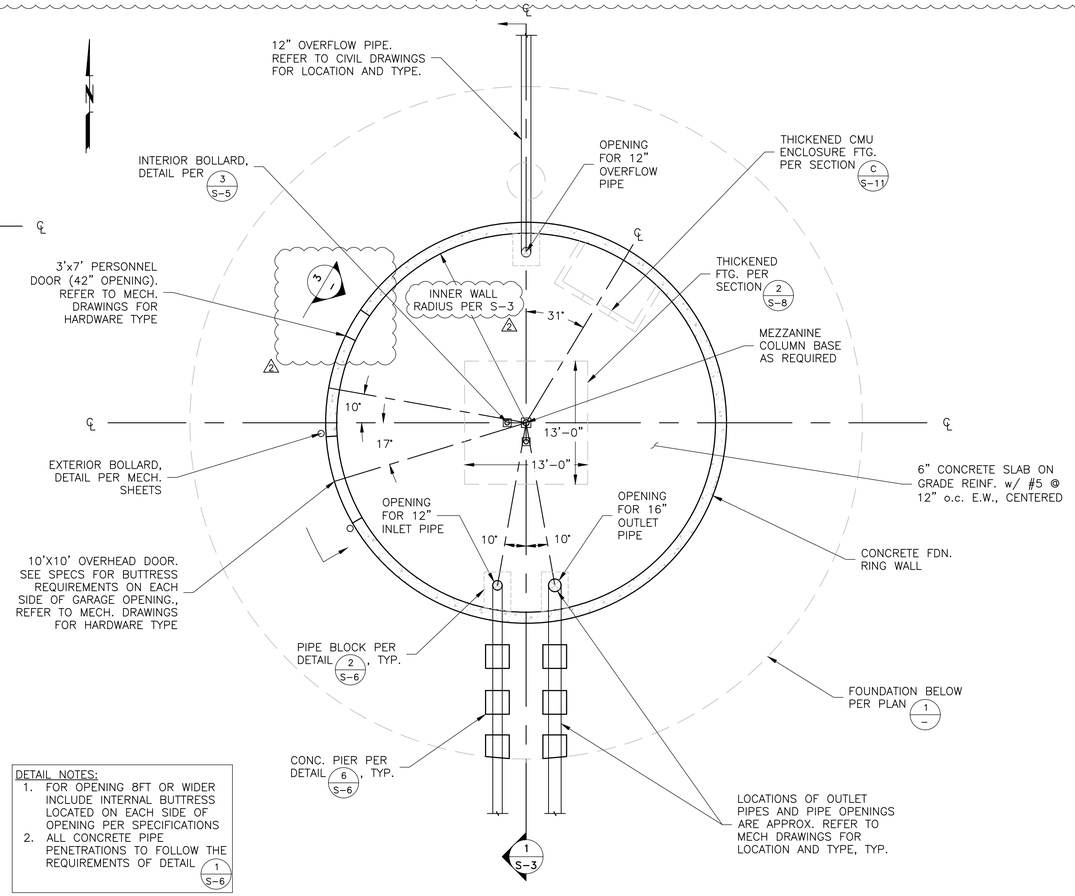


OVERHEAD & PERSONNEL DOOR REINF. 3/—

1/4" = 1'-0"

DETAIL NOTES:
1. NOMINAL OPENING DIMENSIONS ARE PROVIDED. ADJUST ACTUAL OPENING SIZES FOR PROPOSED DOOR/GARAGE DOOR HEIGHT AND WIDTH REQUIREMENTS
2. PLACE PERSONNEL DOOR AS CLOSE AS STRUCTRUAL FEASIBLE TO THE OVERHEAD DOOR.
   2.1. ENSURE FINAL DOOR LOCATION MAINTAINS ACCESS TO STAIRWAYS, VALVES, AND INSTRUMENTS WITHING THE PEDESTAL
3. FOR OPENING 8FT OR WIDER INCLUDE INTERNAL BUTTRESS LOCATED ON EACH SIDE OF OPENING PER SPECIFICATIONS
4. INCLUDE ADDTIONAL STIRRUPS AND DIAGONAL BARS AS NEEDED AROUND ACCESS OPENINGS.

REINFORCING NOTE:
SEE S-6 FOR NOTES ON HOOKS AND TIES



DETAIL NOTES:
1. FOR OPENING 8FT OR WIDER INCLUDE INTERNAL BUTTRESS LOCATED ON EACH SIDE OF OPENING PER SPECIFICATIONS
2. ALL CONCRETE PIPE PENETRATIONS TO FOLLOW THE REQUIREMENTS OF DETAIL 1/S-6

INTERIOR SLAB PLAN 2

1/8" = 1'-0"

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708 BROADWAY SUITE 110
TACOMA, WASHINGTON 98402
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NO.	DATE	BY	REVISION
2	1/20/22	GRL	ADDENDUM 4
1	12/23/21	EFL	ADDENDUM 1

NOTICE
0 ½ 1
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GRL DESIGNED
GRL DRAWN
TGM CHECKED

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CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

FOUNDATION PLAN AND INTERIOR SLAB PLAN

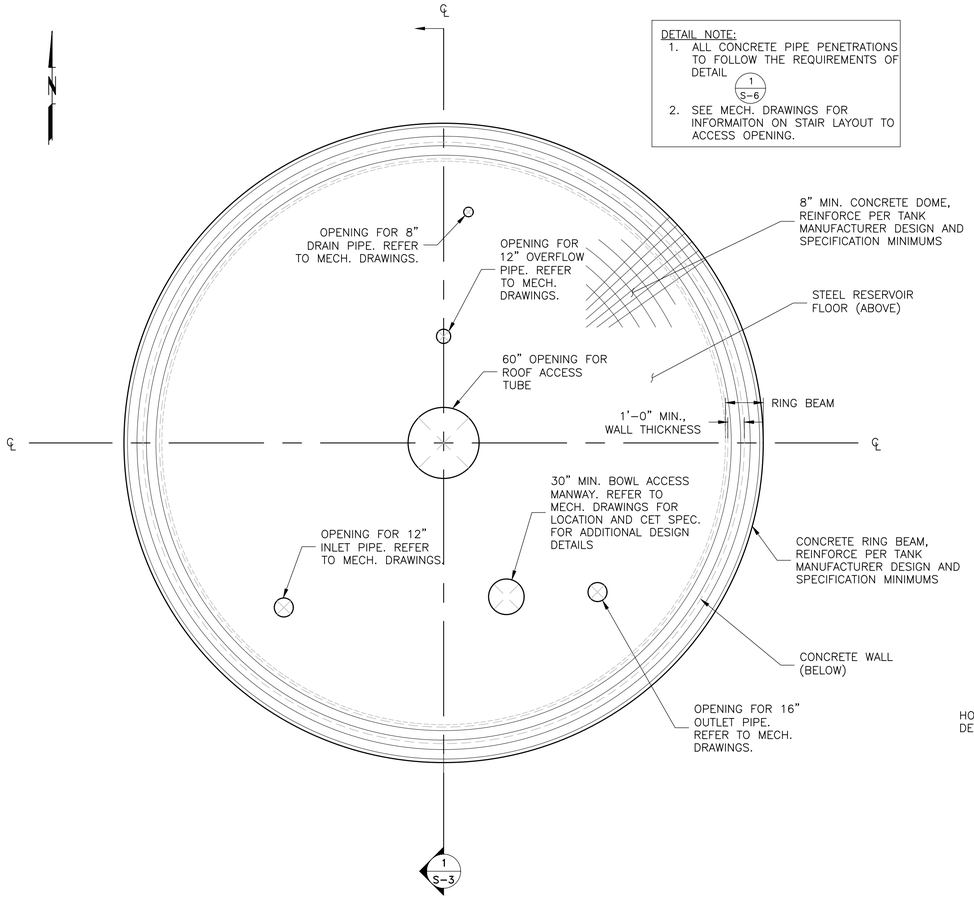
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-4

23 of 63

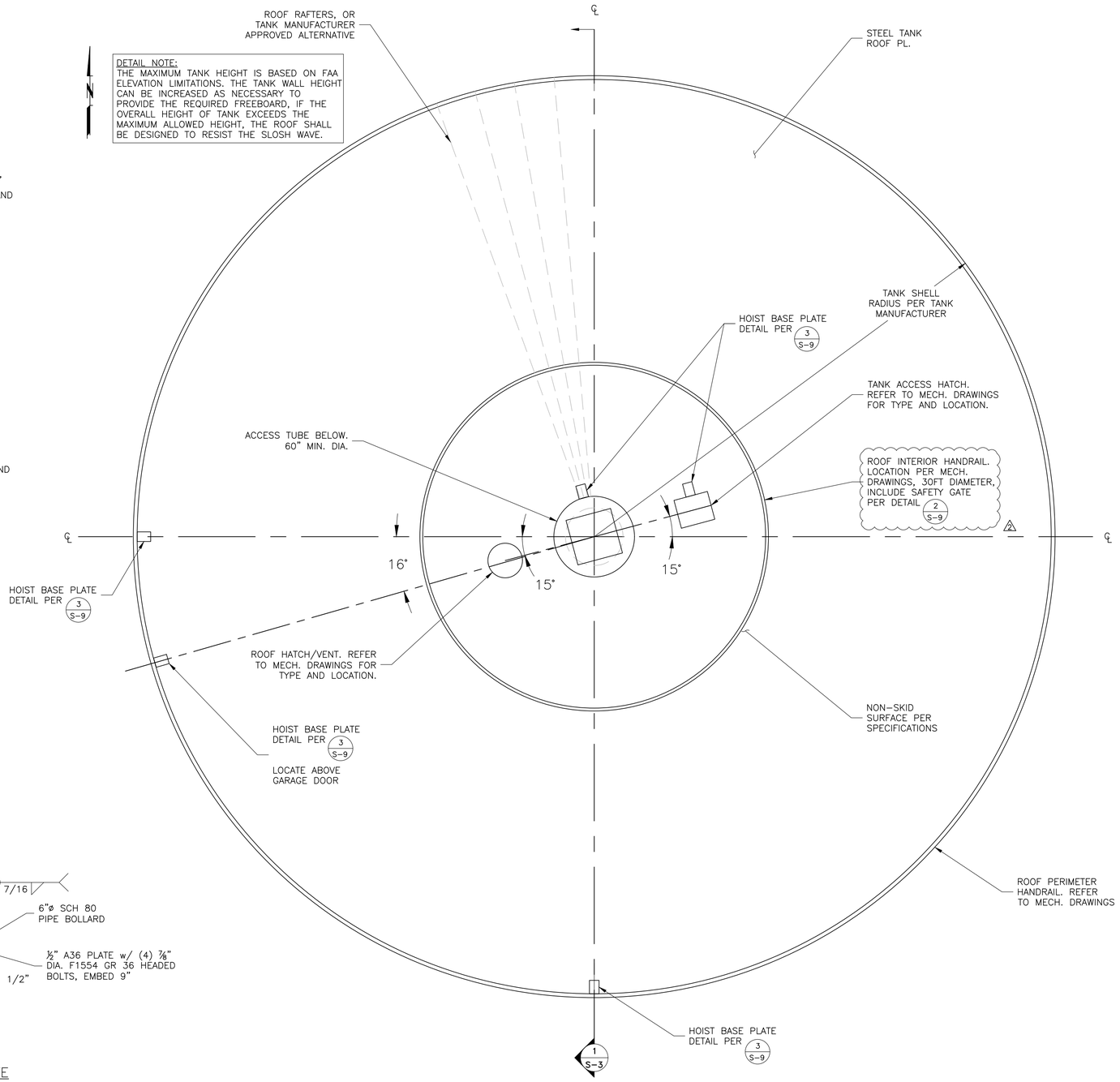
C:\Users\PSE-020-PC\AppData\Local\Temp\AcPublish_21032\2022_01_18 EXTERNAL CET Reservoir Drawings - ADDENDUM 4 1902-0076.dwg S-4 1/20/2022 12:03 PM ########## 23.0s (LMS Tech)

DETAIL NOTE:
1. ALL CONCRETE PIPE PENETRATIONS TO FOLLOW THE REQUIREMENTS OF DETAIL 1/S-6
2. SEE MECH. DRAWINGS FOR INFORMAITON ON STAIR LAYOUT TO ACCESS OPENING.

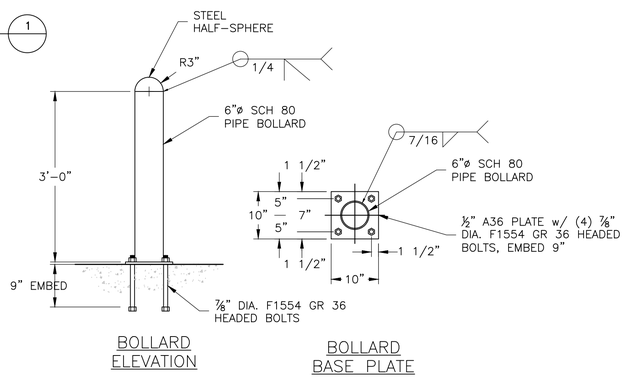


REINF. CONC. DOME PLAN 1
3/16" = 1'-0"

DETAIL NOTE:
THE MAXIMUM TANK HEIGHT IS BASED ON FAA ELEVATION LIMITATIONS. THE TANK WALL HEIGHT CAN BE INCREASED AS NECESSARY TO PROVIDE THE REQUIRED FREEBOARD, IF THE OVERALL HEIGHT OF TANK EXCEEDS THE MAXIMUM ALLOWED HEIGHT, THE ROOF SHALL BE DESIGNED TO RESIST THE SLOSH WAVE.



STEEL ROOF PLAN 2
3/16" = 1'-0"



BOLLARD DETAIL 3
3/4" = 1'-0" 3/S-4 S-8

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NO.	DATE	BY	REVISION
2	1/20/22	GRL	ADDENDUM 4
1	12/23/21	EFL	ADDENDUM 1

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

GRL DESIGNED
GRL DRAWN
TGM CHECKED

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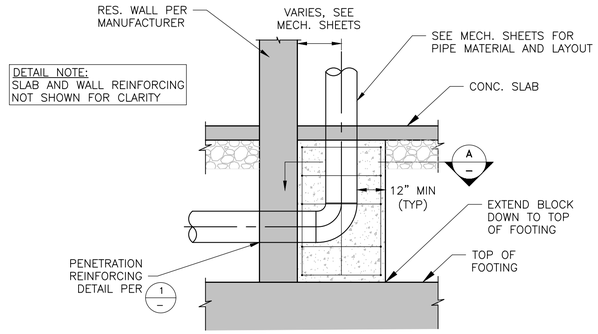
CONCRETE SLAB PLAN AND ROOF PLAN

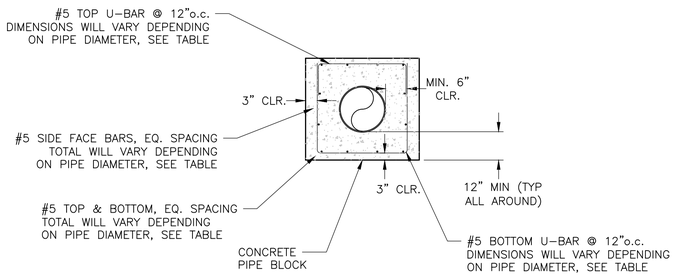
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-5



TYP. PIPE BLOCK DETAIL (2 / S-4)

3/8" = 1'-0"

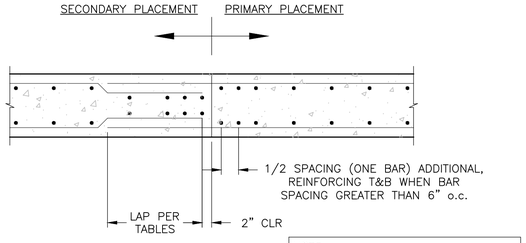


TYPICAL PIPE BLOCK SECTION (A / –)

3/8" = 1'-0"

PIPE BLOCK DETAIL NOTES:

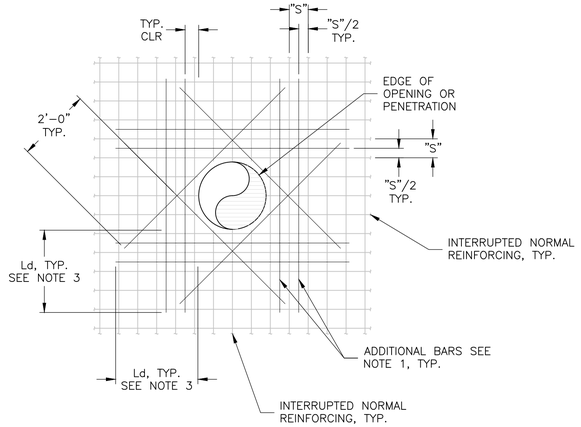
PIPE DIAMETER	T&B BARS	SIDE FACE BARS	TOP U-BAR MAIN	TOP U-BAR LEG	BOTTOM U-BAR MAIN	BOTTOM U-BAR LEG
12"	4	2	2'-6"	12"	2'-6"	2'-0"
16"	4	2	2'-10"	12"	2'-10"	2'-6"



NOTE: APPLIES AT CONSTRUCTION JOINTS WHERE FRESH CONCRETE IS PLACED AGAINST HARDENED CONCRETE

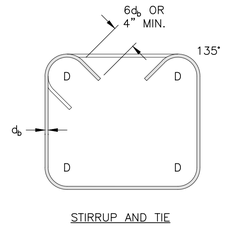
CONSTRUCTION JOINT (4 / NTS)

NOTE:
1. NUMBER OF ADDITIONAL REINFORCING BARS AT EACH SIDE OF OPENING SHALL EQUAL HALF THE NUMBER OF INTERRUPTED BARS IN EACH LAYER OF REINFORCING
2. SIZE OF ADDITIONAL REINFORCING BARS TO EQUAL SIZE OF INTERRUPTED REINFORCING BARS
3. PROVIDE STANDARD HOOKS FOR BARS IF LAP LENGTH EXTENSION CANNOT BE OBTAINED AT JOINTS OR OTHER OBSTRUCTIONS. PLACE ADDITIONAL BARS IN SAME PLANES AS INTERRUPTED REINFORCING.
4. SIZE OF DIAGONAL BARS SHALL BE THE SIZE OF THE LARGEST NORMAL REINFORCING BAR CUT, U.N.O. LOCATE DIAGONALS IN EACH LAYER FOR REINFORCING.
5. PLACE DIAGONAL BARS INSIDE NORMAL REINFORCING.
6. ALL REINFORCING TO CLEAR OPENING OR FLANGE COLLARS BY 2".



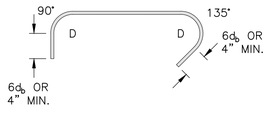
SUPPLEMENTAL REINF. AT PENETRATIONS (1 / –, S-4, S-5)

NTS



STIRRUP AND TIE

D = 6d_b FOR #3 THRU #8



CROSS TIE

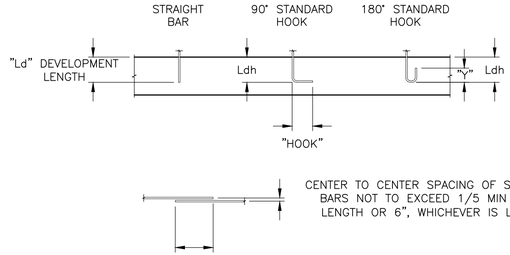
STANDARD HOOKS & BENDS (3 / S-3, S-4)

NTS

BAR SIZE	DIAMETER (db) (INCHES)	DEVELOPMENT AND CLASS B LAP SPLICES (INCHES)		90° STANDARD HOOK (INCHES)		180° STANDARD HOOK "Y"
		"TOP" BARS	OTHER	HOOK	Ldh	
		REINFORCING BARS IN TENSION				
#3	0.375	36	25	6	8	4
#4	0.5	41	29	8	9	5
#5	0.625	50	36	10	11	5
#6	.75	60	43	12	13	6
#7	.875	69	50	14	16	7
#8	1	80	58	16	18	8
#9	1.125	89	64	20	20	11
#10	1.25	99	71	22	22	12
#11	1.375	108	78	24	24	13
		REINFORCING BARS IN COMPRESSION				
#3	0.375	12		HOOKED BARS SHALL NOT BE USED IN COMPRESSION		
#4	0.5	15				
#5	0.625	19				
#6	.75	23				
#7	.875	27				
#8	1	30				
#9	1.125	34				
#10	1.25	38				
#11	1.375	42				

f'c = 4500 psi fy = 60,000 psi BAR SPACING ≥ 6" MIN

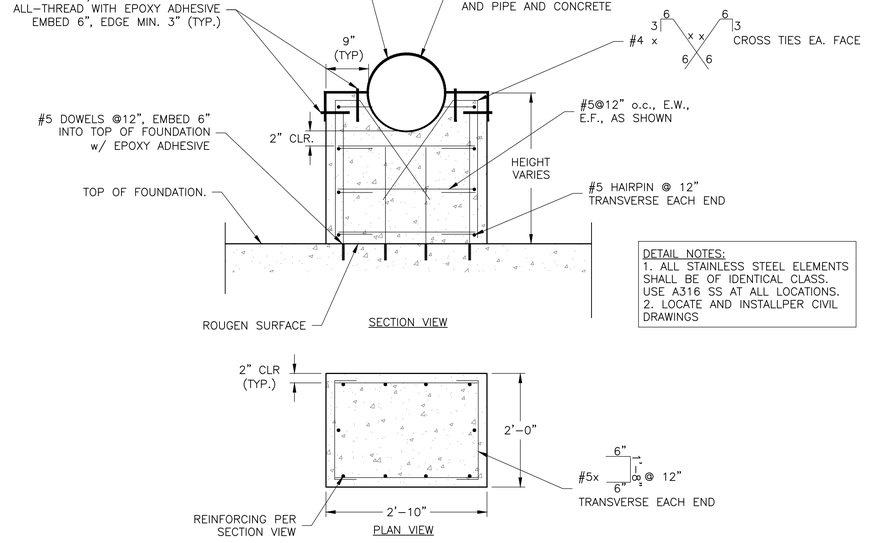
BAR SIZE	DIAMETER (db) (INCHES)	DEVELOPMENT AND CLASS B LAP SPLICES (INCHES)		90° STANDARD HOOK (INCHES)		180° STANDARD HOOK "Y"
		"TOP" BARS	OTHER	HOOK	Ldh	
		REINFORCING BARS IN TENSION				
#3	0.375	36	25	6	8	4
#4	0.5	41	29	8	9	5
#5	0.625	50	36	10	11	5
#6	.75	60	43	12	13	6
#7	.875	88	68	14	16	7
#8	1	115	89	16	18	8
#9	1.125	145	111	20	20	11
#10	1.25	179	137	22	22	12
#11	1.375	215	166	24	24	13
		REINFORCING BARS IN COMPRESSION				
#3	0.375	12		HOOKED BARS SHALL NOT BE USED IN COMPRESSION		
#4	0.5	15				
#5	0.625	19				
#6	.75	23				
#7	.875	27				
#8	1	30				
#9	1.125	34				
#10	1.25	38				
#11	1.375	42				



NOTE:
1. "TOP" BARS SHALL BE HORIZONTAL REINFORCEMENT PLACES SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE.
2. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED SHALL
   2.1. NOT BE LESS THAN db, HAVE CLEAR COVER NOT LESS THAN db, AND STIRRUPS OR TIES THROUGHOUT Ldh NOT LESS THAN THE CODE MINIMUM OR;
   2.2. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2db AND CLEAR COVER NOT LESS THAN db.
3. WHERE db = DIAMETER OF REINFORCING BAR AND Ldh = DEVELOPMENT LENGTH.
4. ALL LAP SPLICES SHALL BE CLASS B UNLESS NOTED OTHERWISE.
5. WHEN SPLICING BAR OF DIFFERENT SIZE, THE LENGTH OF THE LAP SHALL BE GOVERNED BY THE LARGER DIAMETER BAR.
6. SPLICES ARE TO BE MADE SO THAT THE GIVEN DISTANCES TO FACE OF CONCRETE WILL BE MAINTAINED.
7. SPLICES SHALL BE STAGGERED TO GIVE 12" CLEAR BETWEEN ENDS OF ADJACENT SPLICES, IF BARS ARE SPACED CLOSER THAN 6" OR 6 BAR DIAMETERS.

CONCRETE HOOK AND REBAR LAP SPLICES (5)

NTS



PIPE SUPPORT DETAIL (6 / S-4)

3/4" = 1'-0"

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NO.	DATE	BY	REVISION

NOTICE
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GRL DRAWN
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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

REINFORCED CONCRETE DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-6

DETAIL NOT USED

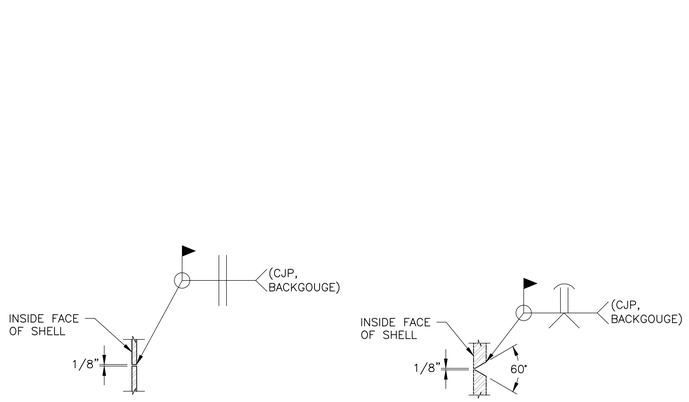
DETAIL NOT USED

DETAIL NOT USED

RING BEAM DETAIL (1)
1/2" = 1'-0"

ROOF EDGE DETAIL (2)
3" = 1'-0"

CENTER SUPPORT DETAIL (4 / S-3)
3" = 1'-0"

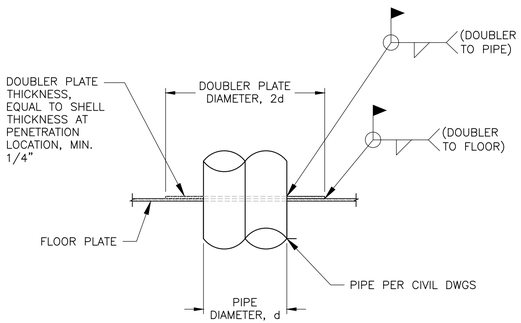


THICKNESS < 3/8"

THICKNESS ≥ 3/8"

DETAIL NOTE:
BASE METAL SHALL BE PREHEATED TO A TEMPERATURE OF 100°F WITHIN A DISTANCE OF FOUR TIMES THE PLATE THICKNESS FROM THE LOCATION OF THE WELD WHEN THE BASE METAL TEMPERATURE IS BELOW 32°F

SHELL BUTT JOINTS (5 / S-3)
NTS



DOUBLER PLATE NOTES:
UNLESS NOTED OTHERWISE
1. FOR DOUBLERS LOCATED ON THE FLOOR PLATE, PLACE ON THE INTERIOR FACE OF THE PLATE

FILLET WELD NOTES:
1. ALONG EDGES OF MATERIAL LESS THAN 1/4" THICK; NOT GREATER THAN THE THICKNESS OF THE THINNER MEMBER JOINED.
2. ALONG EDGE OF MATERIAL 1/4" OR MORE IN THICKNESS; EQUAL TO THE THINNER PART MINUS 1/16".

TANK PENETRATION DETAIL (3)
NTS

DETAIL NOT USED

SHELL TRANISION DETAIL (6)
3" = 1'-0"

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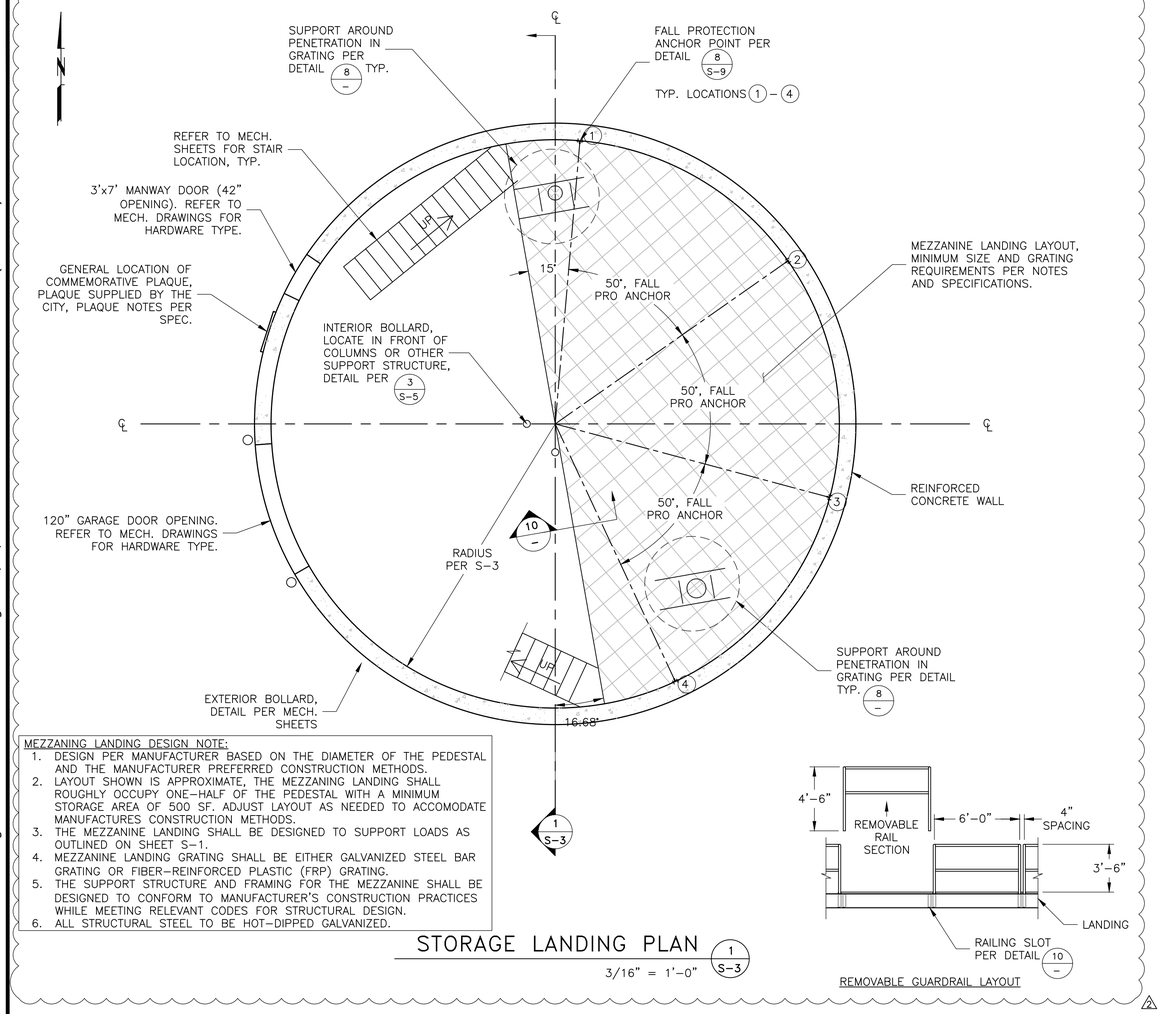
TANK STRUCTURAL DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-7

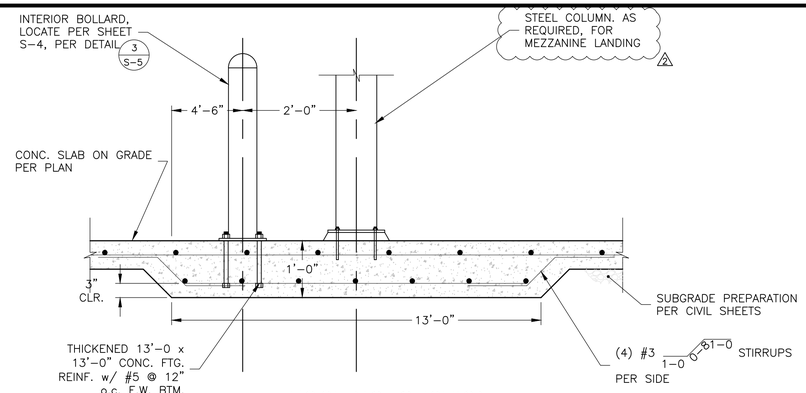


MEZZANING LANDING DESIGN NOTE:

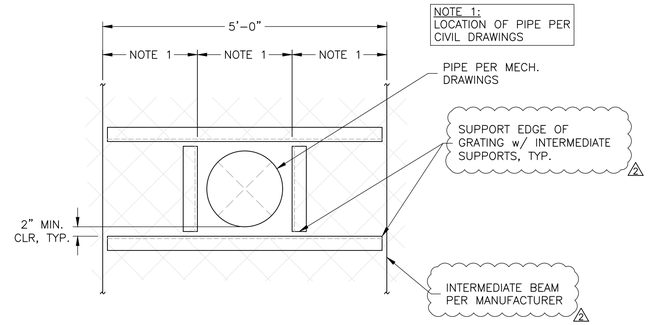
1. DESIGN PER MANUFACTURER BASED ON THE DIAMETER OF THE PEDESTAL AND THE MANUFACTURER PREFERRED CONSTRUCTION METHODS.
2. LAYOUT SHOWN IS APPROXIMATE. THE MEZZANING LANDING SHALL ROUGHLY OCCUPY ONE-HALF OF THE PEDESTAL WITH A MINIMUM STORAGE AREA OF 500 SF. ADJUST LAYOUT AS NEEDED TO ACCOMODATE MANUFACTURES CONSTRUCTION METHODS.
3. THE MEZZANINE LANDING SHALL BE DESIGNED TO SUPPORT LOADS AS OUTLINED ON SHEET S-1.
4. MEZZANINE LANDING GRATING SHALL BE EITHER GALVANIZED STEEL BAR GRATING OR FIBER-REINFORCED PLASTIC (FRP) GRATING.
5. THE SUPPORT STRUCTURE AND FRAMING FOR THE MEZZANINE SHALL BE DESIGNED TO CONFORM TO MANUFACTURER'S CONSTRUCTION PRACTICES WHILE MEETING RELEVANT CODES FOR STRUCTURAL DESIGN.
6. ALL STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED.

STORAGE LANDING PLAN 1/S-3
3/16" = 1'-0"

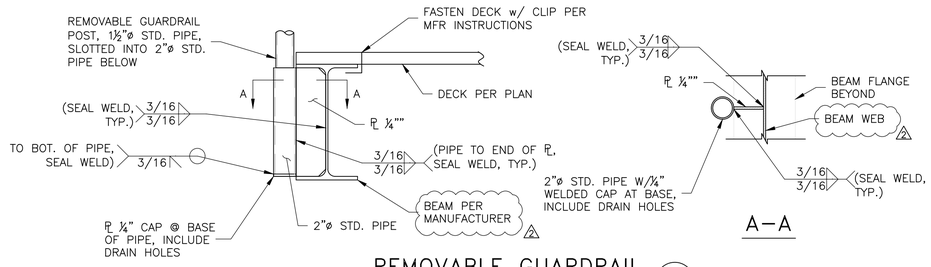
REMOVABLE GUARDRAIL LAYOUT



FOOTING SECTION 2/S-4
NTS



GEN. GRATING PENETRATION DETAIL 8/–
3/4" = 1'-0"



A–A

REMOVABLE GUARDRAIL 10/–
1-1/2" = 1'-0"

DETAIL NOT USED

LANDING BEAM SECTION 4/–
1-1/2" = 1'-0"

DETAIL NOT USED

CONN. SECTION 3/–
1-1/2" = 1'-0"

DETAIL NOT USED

CONN. SECTION 5/–
1-1/2" = 1'-0"

DETAIL NOT USED

LANDING PLATE DETAIL 7/–
1-1/2" = 1'-0"

DETAIL NOT USED

MTL. DECK CONN. 9/–
3" = 1'-0"

DETAIL NOT USED

BASE PLATE DETAIL 6/– S-4
1-1/2" = 1'-0"

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2	1/20/22	GRL	ADDENDUM 4
1	12/23/21	EFL	ADDENDUM 1

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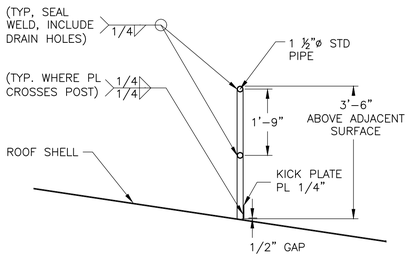
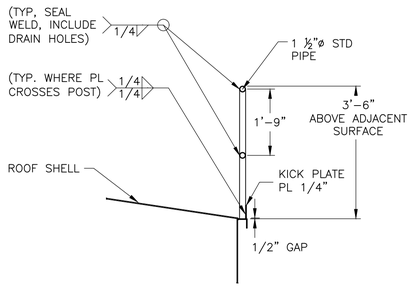
STORAGE LANDING PLAN AND STRUCTURAL DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

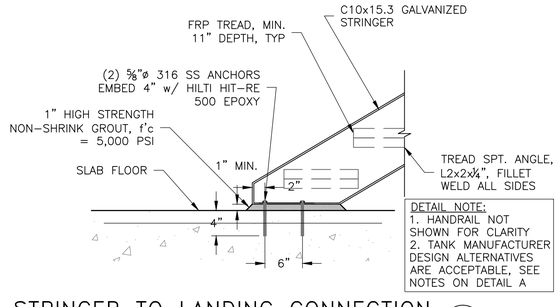
SHEET S-8
27 of 63





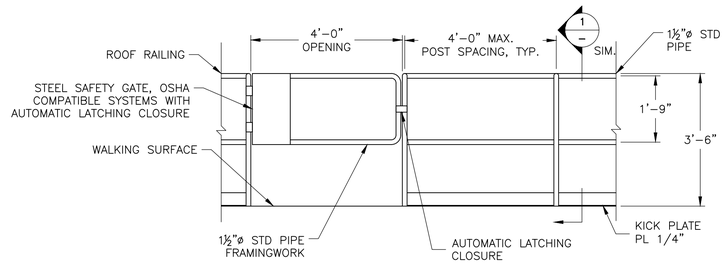
TYP. RAILING DETAILS (1)

1/2" = 1'-0"



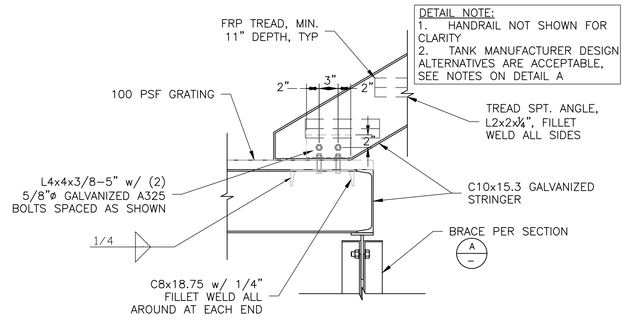
STRINGER TO LANDING CONNECTION (4)

1" = 1'-0"



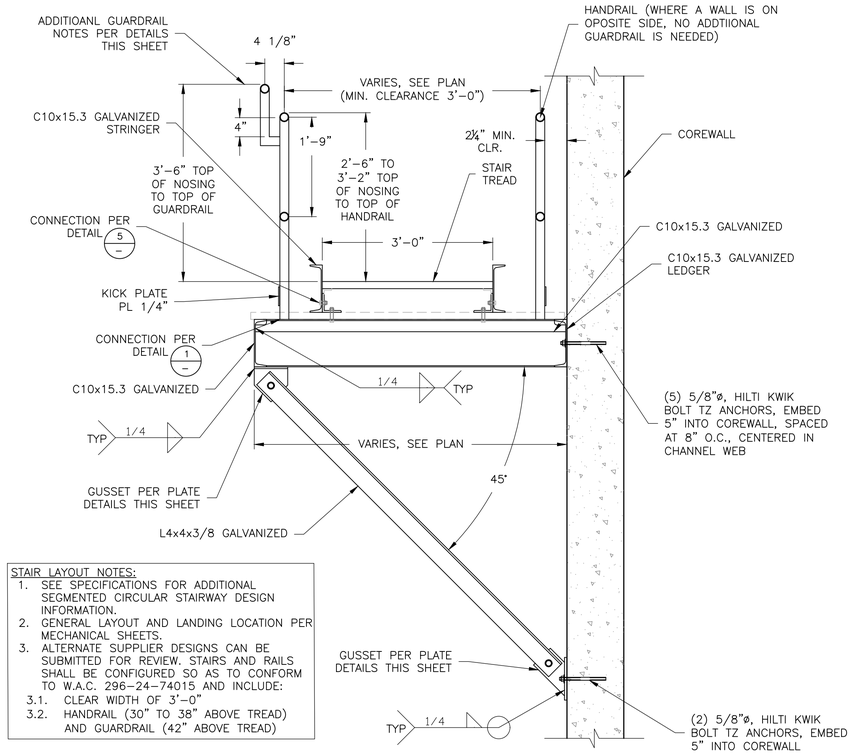
SAFETY GATE AND RAILING ELEVATION (2, S-5)

1/2" = 1'-0"



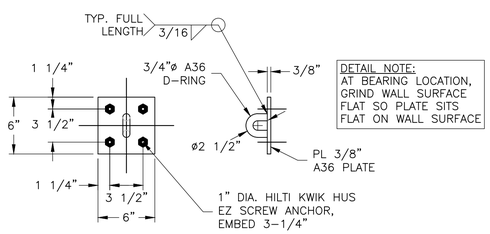
STRINGER TO LANDING CONNECTION (5)

1" = 1'-0"



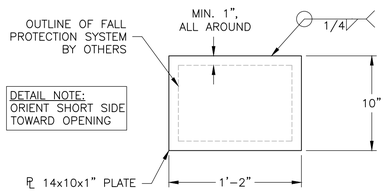
LANDING SECTION (A)

3/4" = 1'-0"



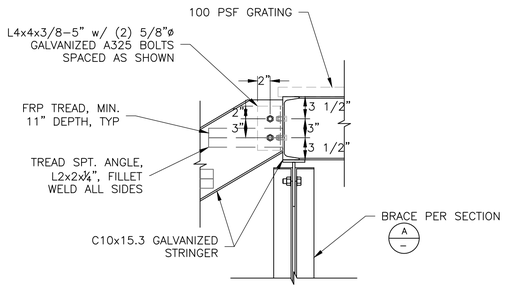
FALL PRO PLATE DETAIL (8, S-8)

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



FALL PRO MOUNTING PLATE (3, S-5)

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



STRINGER TO LANDING CONNECTION (6)

1" = 1'-0"

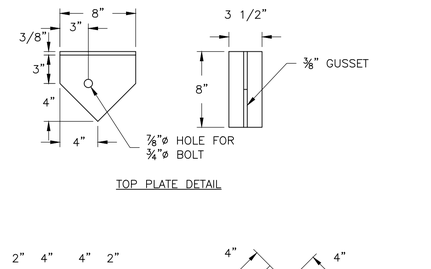


PLATE DETAILS (7)

NTS

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

STAIR AND ADDITIONAL DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-9
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QUALITY ASSURANCE PLAN:

SHOP DRAWINGS & SUBMITTALS:

SEE SHEET S-2

QUALITY ASSURANCE FOR SEISMIC RESISTANCE:

STRUCTURAL OBSERVATION REQUIREMENTS:

SEE SHEET S-2

CONCRETE MASONRY (CMU):

1. CONCRETE MASONRY UNITS SHALL BE MEDIUM WEIGHT UNITS CONFORMING TO ASTM C90. THEY SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI. CONTRACTOR TO VERIFY PER UNIT STRENGTH METHOD.
2. MORTAR SHALL BE TYPE M OR S WITH A MINIMUM COMPRESSIVE STRENGTH OF 1,800 PSI.
3. GROUT SHALL CONFORM TO ASTM C476 AND SHALL BE EQUAL TO 2,500 PSI MIN.
4. FOR GROUT LIFTS EXCEEDING FIVE (5) FEET, CLEAN OUTS SHALL BE PROVIDED AT THE BOTTOM OF EACH CELL AND AT NO MORE THAN 32" APART. GROUT SHALL ONLY BE INSTALLED IN CELLS CONTAINING REINFORCING STEEL OR AS INDICATED IN THESE PLANS. NO SOLID GROUTING UNLESS NOTED OTHERWISE.
5. UNIT STRENGTH METHOD SHALL BE USED TO VERIFY MINIMUM COMPRESSIVE STRENGTH OF MASONRY f'_m = 1,900 PSI.

SOLID SAWN LUMBER:

1. STRUCTURAL LUMBER SHALL BE DOUGLAS FIR CONFORMING TO WWPA GRADING RULES.
2. MINIMUM GRADES ARE, EXCEPT AS NOTED OTHERWISE:

   STRUCTURAL JOISTS – #2
3. DOUBLE JOISTS BENEATH ALL PARALLEL WALLS AND/OR PARTITIONS.
4. NOTCHING IS NOT PERMITTED IN JOISTS, RAFTERS, BEAMS, LINTELS, COLUMNS, TRUSSES, AND BRACING MEMBERS.
5. PRESSURE TREATED LUMBER SHALL CONFORM TO THE AWPA AND SHALL BEAR THE QUALITY MARK OF AN ACCREDITED ALSC INSPECTION AGENCY. MINIMUM TREATING STANDARDS (RETENTION LBS./CU. FT) SHALL BE AS FOLLOWS:

APPLICATION	ACQ/ACZA	CA–B
ABOVE GROUND	0.25	0.10

6. ALL LUMBER IN CONTACT WITH CONCRETE SHALL BE PRESSURE TREATED WITH ACZA TO A MINIMUM RETENTION OF 0.25 POUNDS PER CUBIC FOOT BY ASSAY.
7. NAILING SHALL BE IN CONFORMANCE WITH THE 2018 IBC UNLESS NOTED OTHERWISE. FASTENERS FOR PRESERVATIVE–TREATED WOOD SHALL BE OF HOT–DIPPED ZINC–COATED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER. THE COATING WEIGHTS FOR ZINC–COATED FASTENERS SHALL BE IN ACCORDANCE WITH ASTM A–153. 5/8–INCH DIAMETER STEEL ANCHOR BOLTS & LARGER NEED NOT BE GALVANIZED, UNLESS NOTED OTHERWISE.
8. PROVIDE STANDARD 3"x3"x¼" PLATE WASHERS UNDER ALL INTERMEDIATE ANCHOR BOLT HEADS AND NUTS AT THE SILL PLATE. USE STANDARD WASHERS FOR ALL OTHER BOLT HEADS AND NUTS IN CONTACT WITH WOOD.

SHEATHING:

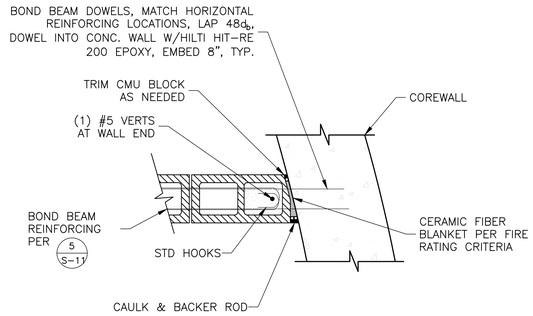
1. WOOD STRUCTURAL PANELS SHALL BE APA RATED EXPOSURE 1 PLYWOOD, AND COVERED IN DOC PS 1 AND PS 2, UNLESS NOTED OTHERWISE.
2. MINIMUM PANEL THICKNESS SHALL BE 15/32", OR AS INDICATED IN THESE PLANS. PARTICLEBOARD IS NOT PERMITTED.
3. MINIMUM NAILING IS 8d@6" AT PANEL EDGES AND 8d@12" IN THE FIELD. ALL NAILS SHALL BE COMMON OR GALVANIZED BOX NAILS. BLOCKING IS REQUIRED WHERE NOTED ON THE PLANS.

PREMANUFACTURED CONNECTION HARDWARE:

1. CONNECTION HARDWARE IS BY THE SIMPSON COMPANY OF SAN LEANDRO, CA. ALL STEEL CONNECTORS SHALL BE GALVANIZED OR BY SOME METHOD MADE CORROSION RESISTANT, UNLESS OTHERWISE INDICATED.
2. PROVIDE BOLTED OR NAILED CONNECTIONS FOR THE MAXIMUM CAPACITY UNLESS NOTED OTHERWISE.
3. CONNECTORS IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE EITHER POST HOT–DIP GALVANIZED OR STAINLESS STEEL. FASTENERS SHALL BE OF THE SAME MATERIAL OR PROTECTIVE COATING AS THE CONNECTORS, DO NOT MIX DIFFERING METALS IN THE SAME CONNECTION.
4. CONTRACTOR MAY SUBSTITUTE WITH EQUIVALENT HARDWARE WITH THE ENGINEER OF RECORD'S APPROVAL. SUBMIT ICC APPROVALS FOR EACH PRODUCT PRIOR TO INSTALLATION.

INSPECTIONS:
SPECIAL INSPECTIONS IN ACCORDANCE WITH IBC 1704 AND AWWA D107 SECTION 9 SHALL BE PROVIDED FOR THE FOLLOWING ITEMS.

MASONRY LEVEL C QUALITY ASSURANCE					
TEST					
VERIFICATION OF f'_m AND f'_{AAC} IN ACCORDANCE WITH SPECIFICATION ARTICLE 1.4 B PRIOR TO CONSTRUCTION AND FOR EVERY 5,000 SQ. FT (465 SQ. M) DURING CONSTRUCTION					
VERIFICATION OF PROPORTIONS OF MATERIALS IN PREMIXED OR PREBLENDED MORTAR, PRESTRESSING GROUT, AND GROUT OTHER THAN SELF–CONSOLIDATING GROUT, AS DELIVERED TO THE PROJECT SITE					
VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) AS DELIVERED TO THE PROJECT SITE IN ACCORDANCE WITH ARTICLE 1.5 B.1.B.3 FOR SELF–CONSOLIDATING GROUT					
INSPECTION					
INSPECTION TASK	REFERENCE CODE OR STANDARD FOR CRITERIA		FREQUENCY		REMARKS
	TMS402/ACI 530/ASCE 5	TMS602/ACI503.1/ASCE6	CONTINUOUS	PERIODIC	
1. VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS		ART 1.5		X	
2. VERIFY THAT THE FOLLOWING ARE IN COMPLIACE:					
A. PROPORTIONS OF SITE–MIXED MORTAR, GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS		ART. 2.1, 2.6 A, 2.6 B, 2.6 C, 2.4 G.1.B		X	
B. GRADE, TYPE, AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHORAGES	SEC. 1.16	ART. 2.4, 3.4		X	
C. PLACEMENT OF MASONRY UNITS AND CONSTRUCTION OF MORTAR JOINTS		ART. 3.3 B		X	
D. PLACEMENT OF REINFORCEMENT, CONNECTORS, AND PRESTRESSING TENDONS AND ANCHORAGES	SEC. 1.16	ART. 3.2 E, 3.4, 3.6 A	X		
E. GROUT SPACE PRIOR TO GROUTING		ART. 3.2 D, 3.2 F	X		
F. PLACEMENT OF GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS		ART. 3.5, 3.6 C	X		
G. SIZE AND LOCATION OF STRUCTURAL ELEMENTS		ART. 3.3 F		X	
H. TYPE, SIZE, AND LOCATION OF ANCHORS INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION	SEC. 1.16.4.3, 1.17.1		X		
J. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F (4.4°C)) OR HOT WEATHER (TEMPERATURE ABOVE 90°F (32.2°C))		ART. 1.8 C, 1.8 D		X	
3. OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS		ART. 1.4 B.2.A.3, 1.4 B.2.B.3, 1.4 B.2.C.3, 1.4 B.3, 1.4 B.4	X		



CMU/CONCRETE WALL JOINT DETAIL 1/S-11
1" = 1'–0"

PSE
PETERSON STRUCTURAL ENGINEERS
708 BROADWAY SUITE 110
TACOMA, WASHINGTON 98402
(253) 830–2140

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
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GRL DRAWN
TGM CHECKED

TRAVIS GREGORY MCARTOR STATE OF WASHINGTON 25612 STRUCTURAL PROFESSIONAL ENGINEER

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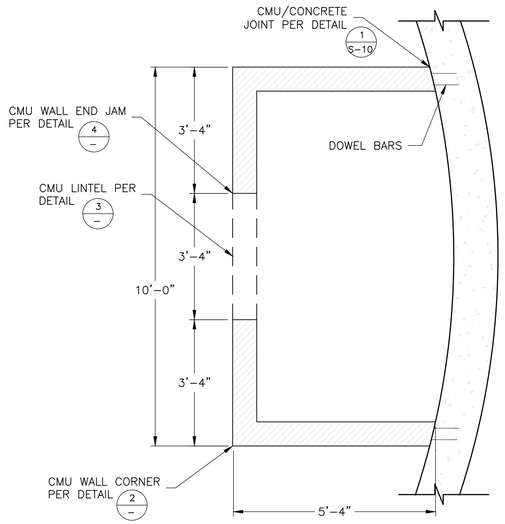
**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

CMU SCADA ENCLOSURE, , STRUCTURAL NOTES AND QUALITY ASSURANCE PLAN

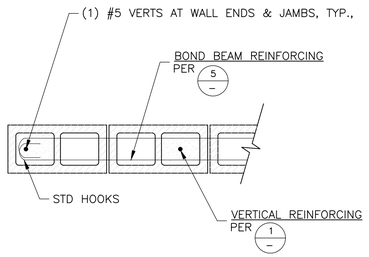
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
S-10



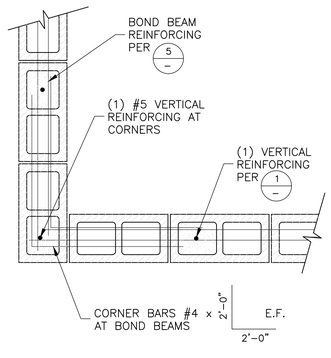
CMU ENCLOSURE PLAN A

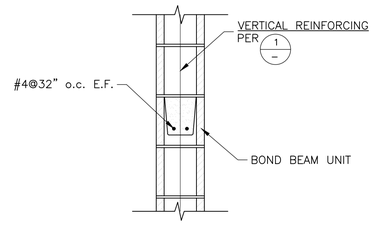
1/2" = 1'-0"



JAMB OR END OF WALL DETAIL 4 –

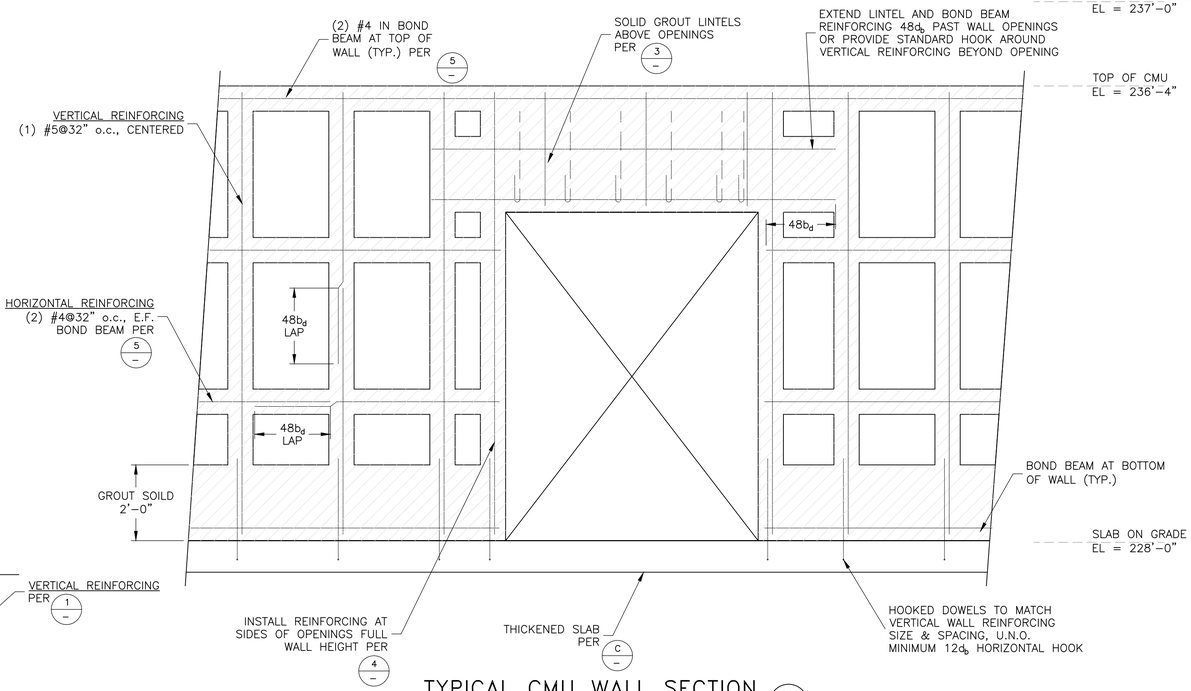
1" = 1'-0"





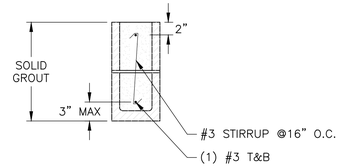
BOND BEAM DETAIL 5 – S-10

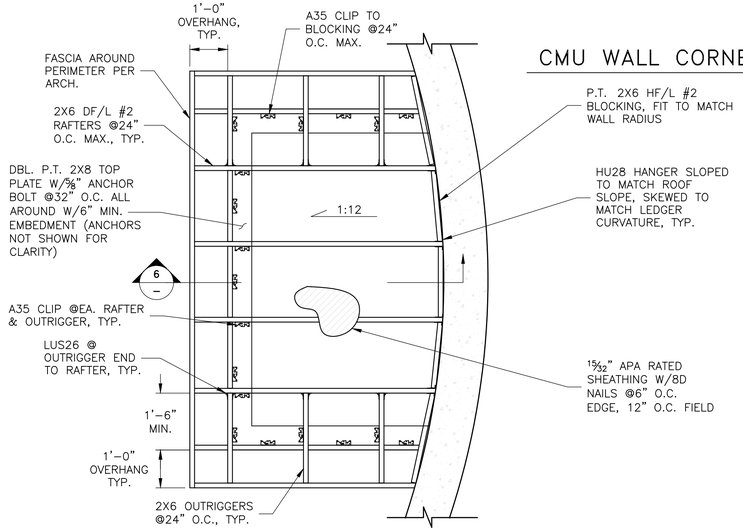
1" = 1'-0"



TYPICAL CMU WALL SECTION 1 –

NOT TO SCALE



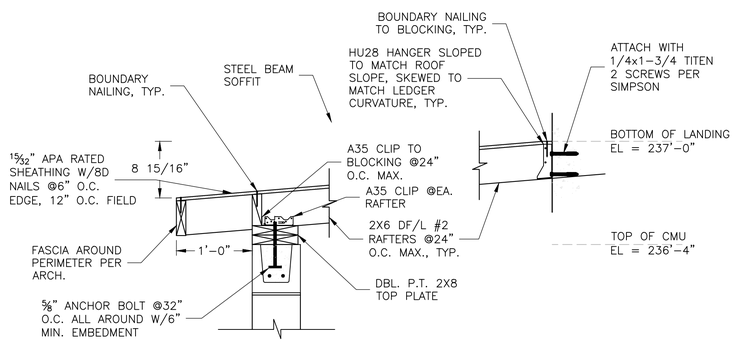


CMU WALL CORNER DETAIL 2 –

1" = 1'-0"

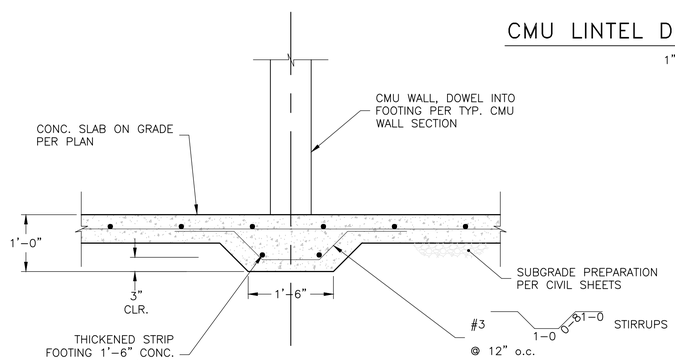
ENCLOSURE ROOF PLAN B

1/2" = 1'-0"



RAFTER CONNECTION DETAILS 6 –

1" = 1'-0"



CMU LINTEL DETAIL 3 –

1" = 1'-0"

WALL FOOTING SECTION C – S-4

3/4" = 1'-0"

PSE
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708 BROADWAY SUITE 110
TACOMA, WASHINGTON 98402
(253) 830-2140

NO.	DATE	BY	REVISION

NOTICE
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GRL DRAWN
TGM CHECKED

TRAVIS GREGORY ARCHERON STATE OF WASHINGTON 25612 STRUCTURAL PROFESSIONAL ENGINEER

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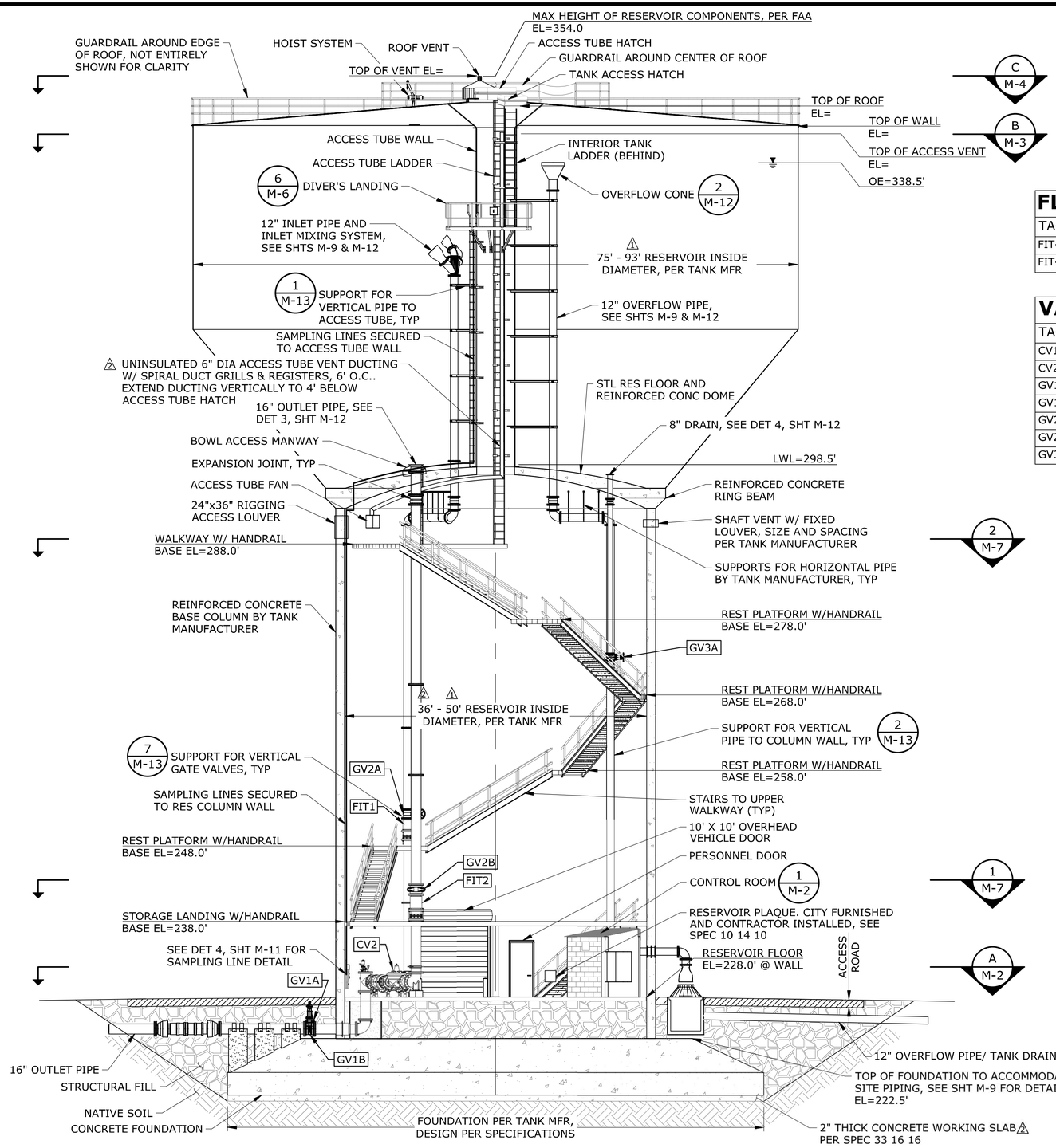
CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

CMU SCADA ENCLOSURE

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET S-11



FLOW METER SCHEDULE

TAG NO.	DESCRIPTION	LOCATION	TYPE	SIZE	PRESSURE RATING	SPECIFICATION
FIT-1	METERS FLOW TO THE RESERVOIR	248' LANDING	MAG METER	12 - INCHES	150 PSI	40 67 00
FIT-2	METERS FLOW TO THE 337 ZONE	STORAGE LANDING	MAG METER	16 - INCHES	150 PSI	40 67 00

VALVE SCHEDULE

TAG NO.	TYPE	SIZE, INCHES	PRESSURE RATING	OPERATOR TYPE	SPECIFICATION
CV1	ALTITUDE VALVE	12	150 PSI	SOLENOID	40 05 23.73
CV2	SEISMIC VALVE/CHECK VALVE	16	150 PSI	SOLENOID	40 05 23.73
GV1A	GATE	12	150 PSI	MANUAL, NUT	40 05 13
GV1B	GATE	16	150 PSI	MANUAL, NUT	40 05 13
GV2A	GATE	12	150 PSI	MANUAL, HANDWHEEL	40 05 13
GV2B	GATE	16	150 PSI	MANUAL, HANDWHEEL	40 05 13
GV3A	GATE	8	150 PSI	MANUAL, HANDWHEEL	40 05 13

NOTE:

1. MECHANICAL SHEETS WERE DEVELOPED USING A 3D MODEL. SELECT RESERVOIR APPURTENANCES WERE REMOVED FROM SOME VIEWS FOR CLARITY.
2. STORAGE LANDING, LANDINGS, AND WALKWAY RAILINGS AND SUPPORTS NOT SHOWN FOR CLARITY. SEE SHEET S-8 FOR DETAILS.
3. PRELIMINARY DESIGN FOR BIDDING PURPOSES. CONTRACTOR TO PROVIDE FINAL DESIGN OF COMPOSITE ELEVATED TANK AND FOUNDATION.

RESERVOIR SECTION (A / -)
SCALE: NTS

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4
1	12/23/21	MLH	ADDENDUM 1

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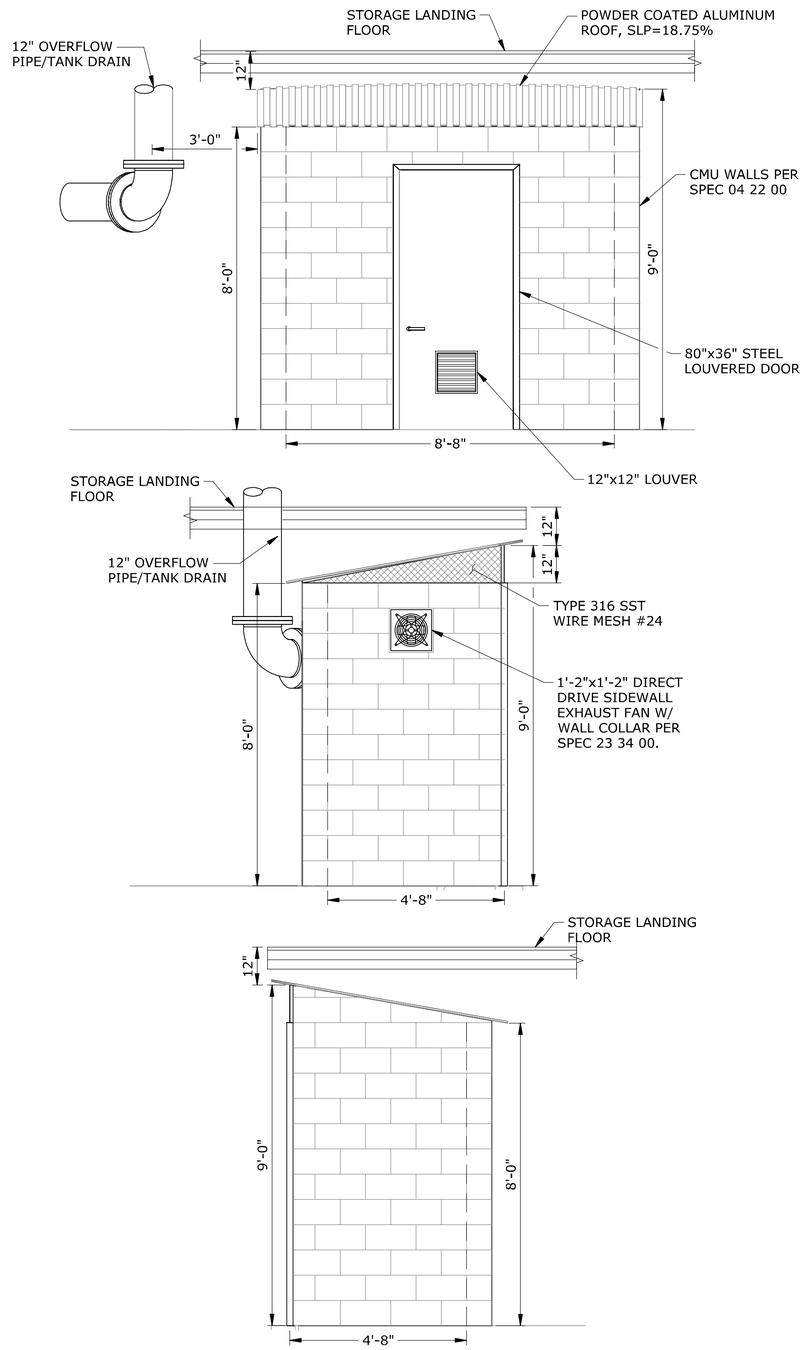
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR SECTION AND DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

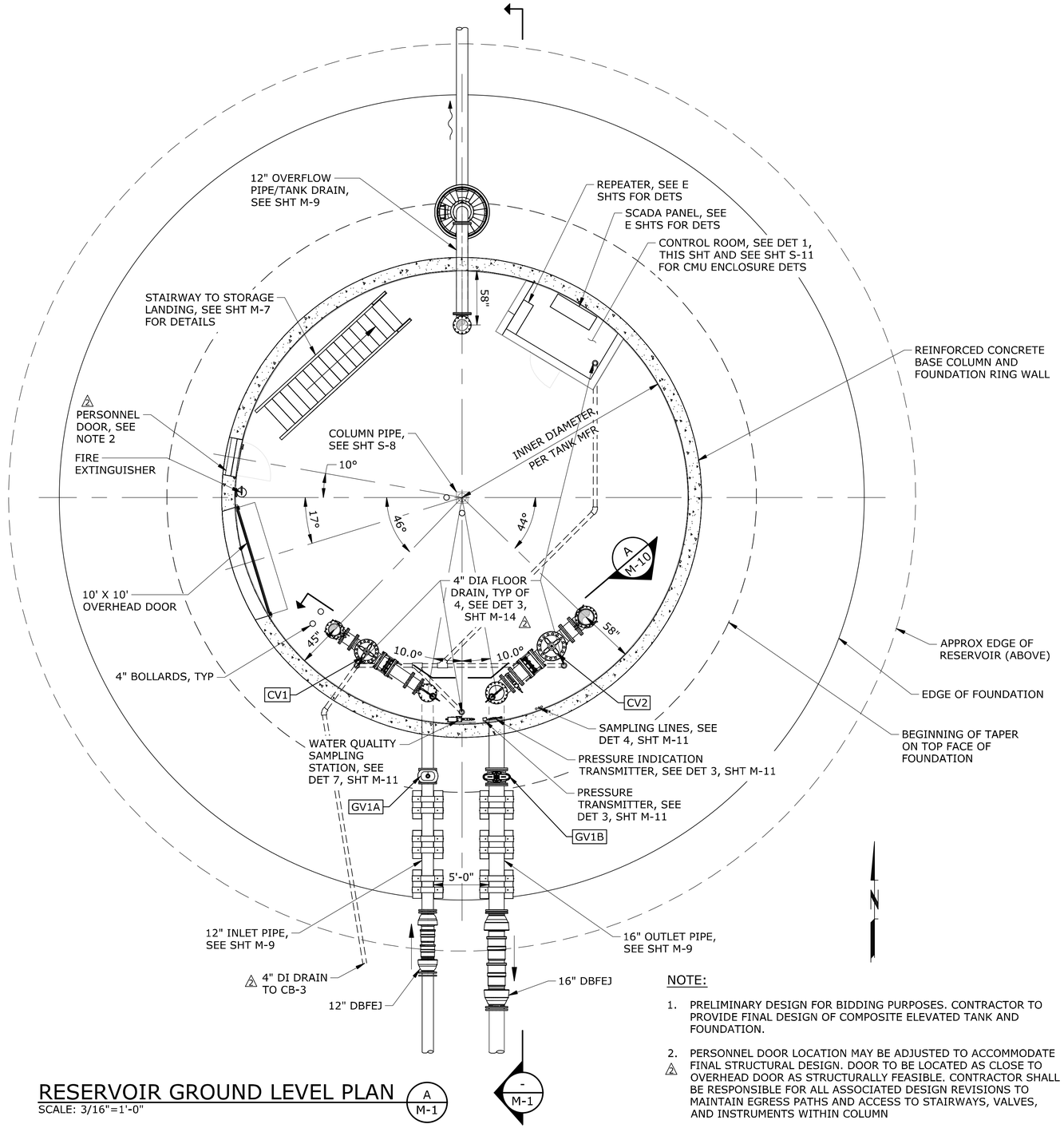
SHEET M-1
32 of 63



CONTROL ROOM ELEVATIONS

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

1 / -



RESERVOIR GROUND LEVEL PLAN

SCALE: 3/16"=1'-0"

A / M-1

- / M-1

NOTE:

1. PRELIMINARY DESIGN FOR BIDDING PURPOSES. CONTRACTOR TO PROVIDE FINAL DESIGN OF COMPOSITE ELEVATED TANK AND FOUNDATION.
2. 2 PERSONNEL DOOR LOCATION MAY BE ADJUSTED TO ACCOMMODATE FINAL STRUCTURAL DESIGN. DOOR TO BE LOCATED AS CLOSE TO OVERHEAD DOOR AS STRUCTURALLY FEASIBLE. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASSOCIATED DESIGN REVISIONS TO MAINTAIN EGRESS PATHS AND ACCESS TO STAIRWAYS, VALVES, AND INSTRUMENTS WITHIN COLUMN

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4

NOTICE

0 ½ 1

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CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

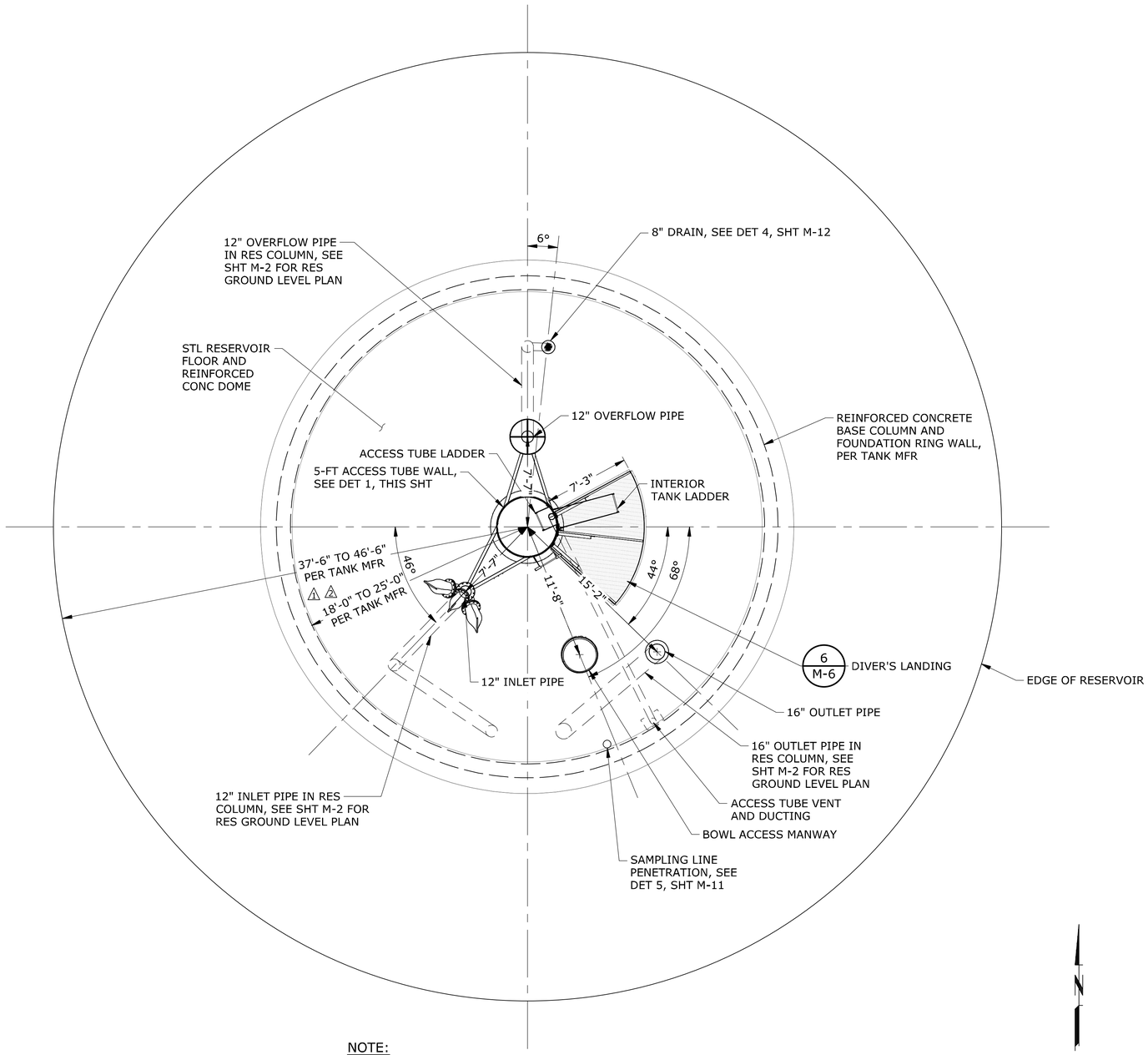
RESERVOIR GROUND LEVEL PLAN AND CONTROL ROOM ELEVATIONS

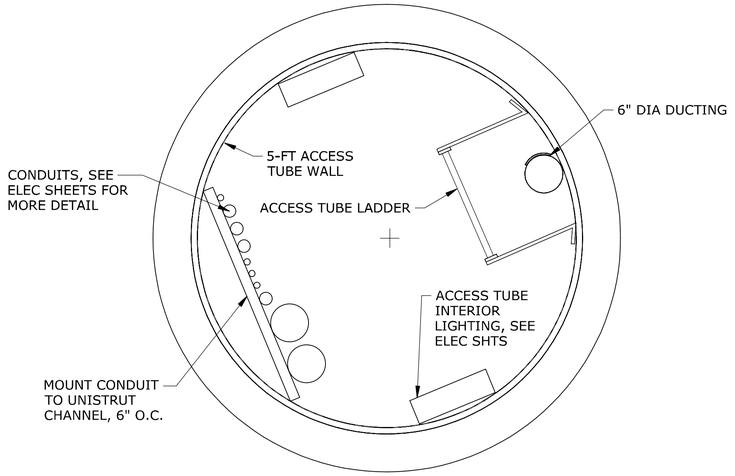
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET M-2

33 of 63

K:\tac_projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-M.dwg M-2 1/21/2022 3:27 PM NATHAN.ROSTAD 23.0s (LMS Tech)





ACCESS TUBE DETAIL

SCALE: 1"=1'-0"

1
-

NOTE:

1. FOR PIPE PENETRATION THROUGH TANK, SEE DETAIL 3, SHEET S-7.
2. PRELIMINARY DESIGN FOR BIDDING PURPOSES. CONTRACTOR TO PROVIDE FINAL DESIGN OF COMPOSITE ELEVATED TANK AND FOUNDATION.

RESERVOIR BOWL PLAN

SCALE: 3/16"=1'-0"

B
M-1

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4
1	12/23/21	MLH	ADDENDUM 1

NOTICE

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HCM
DRAWN

MLH
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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

RESERVOIR BOWL PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
M-3
34 of 63

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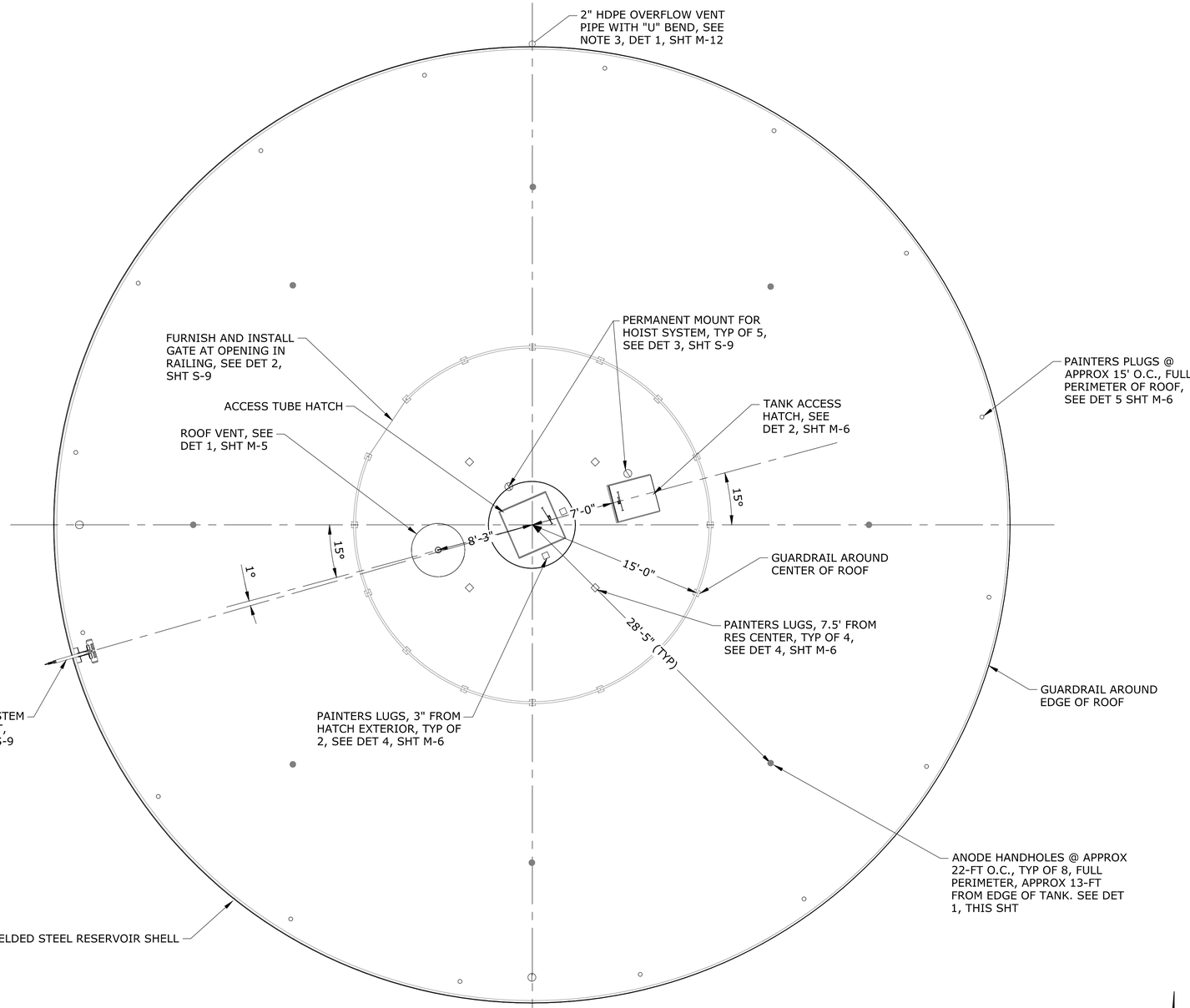


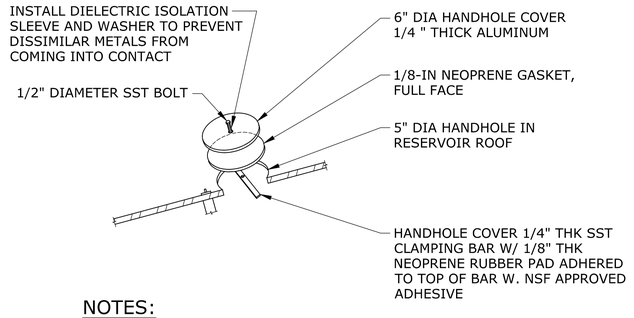
NOTES:

1. FOR GUARDRAILS, SEE SHEET S-9.
2. SPACING BETWEEN ACCESS TUBE HATCH, TANK ACCESS HATCH, AND ROOF VENT MAY BE ADJUSTED TO ACCOMMODATE RESERVOIR STRUCTURAL DESIGN, PROVIDED SAFE ENTRY AND EGRESS PATHS FROM HATCHES ARE MAINTAINED. HATCHES AND VENT SHALL REMAIN WITHIN INTERIOR GUARDRAIL AROUND CENTER OF ROOF.

RESERVOIR ROOF PLAN

SCALE: 3/16"=1'-0"

C / M-1



NOTES:

1. ALL EDGES OF CUTS IN RESERVOIR ROOF SHALL BE SMOOTHED OF ALL ROUGH OR SHARP SURFACES AND BE PAINTED WITH SAME 3 COAT EPOXY SPECIFIED FOR THE INTERIOR COATING.
2. DRILL 1/9" DIAMETER HOLE IN 1/2" DIAMETER STAINLESS STEEL BOLT AT BOTTOM END OF BOLT AND INSTALL A COTTER PIN TO PREVENT CLAMPING BAR FROM DISCONNECTING FROM THE BOLT.

CATHODIC PROTECTION AND ANODE HANDHOLE

NTS

1 / -

NO.	DATE	BY	REVISION
⚠	12/23/21	MLH	ADDENDUM 1

NOTICE
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HCM DRAWN
MLH CHECKED

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Digitally signed by Matt Hickey
Date: 2021.12.23 08:07:06 -08'00'

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CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

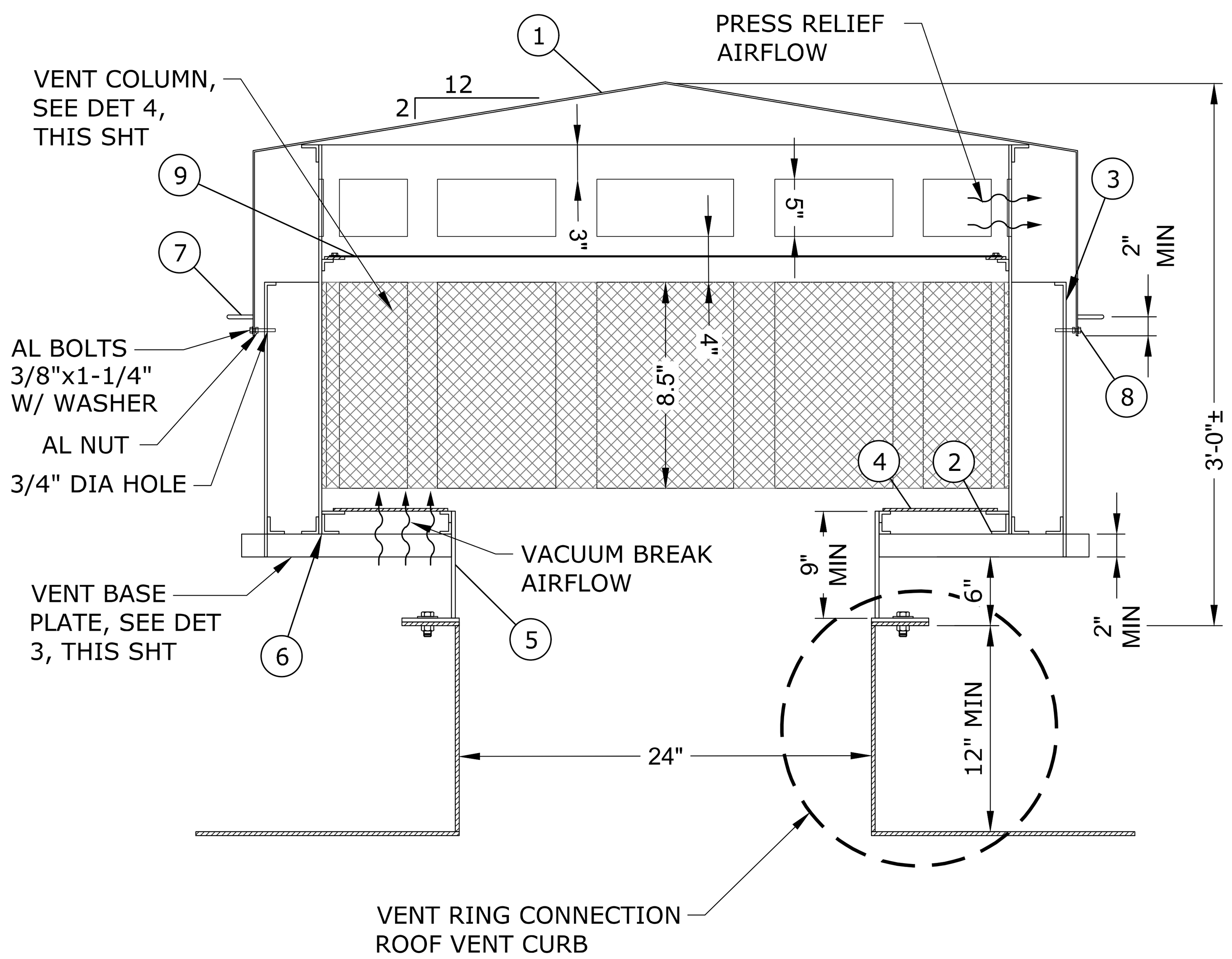
RESERVOIR ROOF PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET M-4

35 of 63

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-M.dwg M-4 12/23/2021 8:38 AM HCM 23.0s (LMS Tech)



RESERVOIR PRESSURE VACUUM VENT

SCALE: NTS

1 / M-4 / M-6

ROOF VENT PARTS LIST:

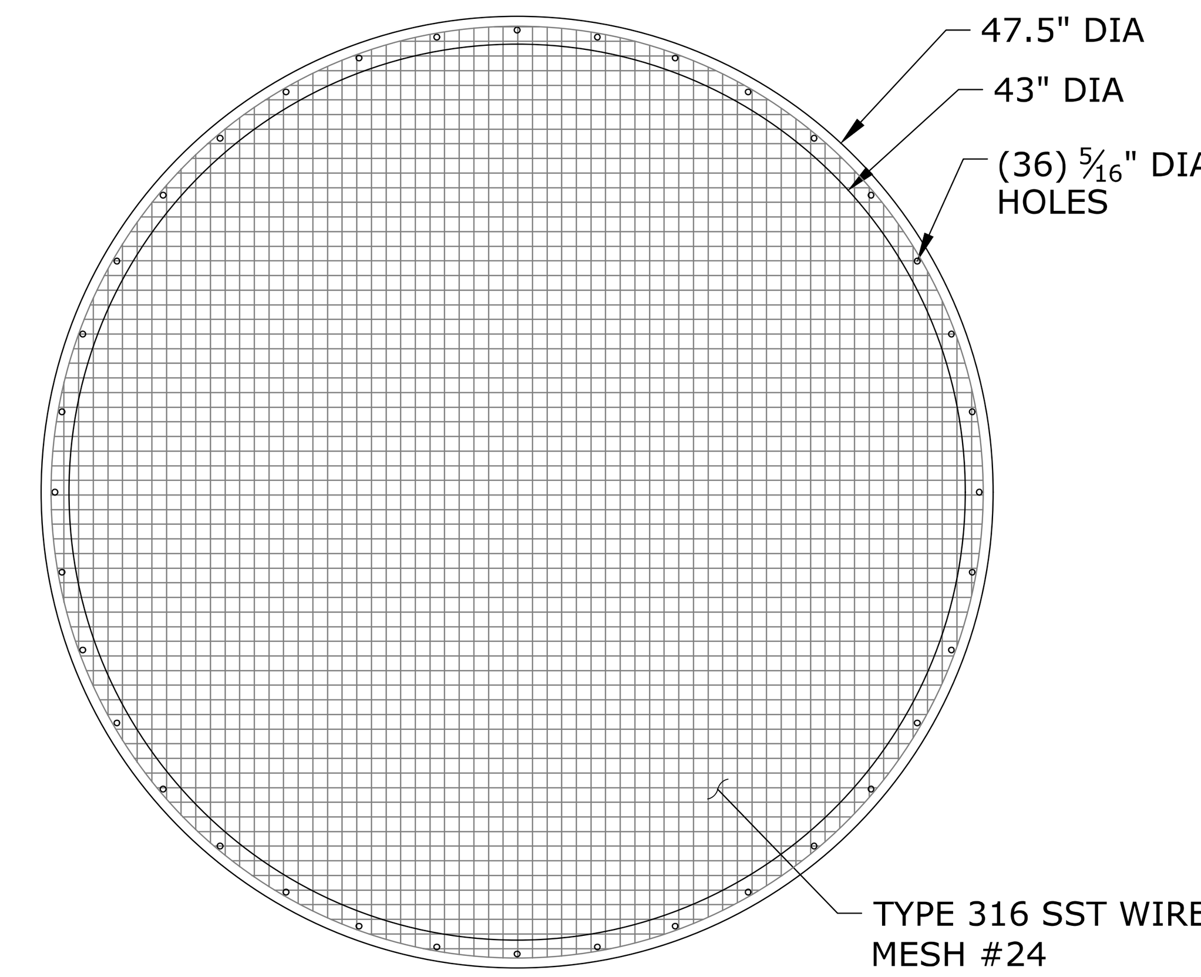
1. UPPER SHROUD, ⅛" THICK, 55" DIA, CONE PEAK TO 6:1 SLOPE
2. L2"x2"x¼" BRACKET W/ 7⁄16" DIA HOLES EACH SIDE, CENTERED
3. LOWER SHROUD, 54" DIA W/ PERFORATIONS, SEE DET 5, THIS SHT
4. LINEAR HIGH DENSITY POLY VACUUM PALLET, 46"ODx23"ID
5. BASE COLUMN, 24" DIA
6. STIFFENERS, L1½"x1½"x¼"
7. LIFTING HANDLE, 1"Øx6" W, TYP OF 8
8. SHROUD LATCH, TYP OF 8
9. PRESSURE PALLET, SEE DET 2, THIS SHT

NOTE:

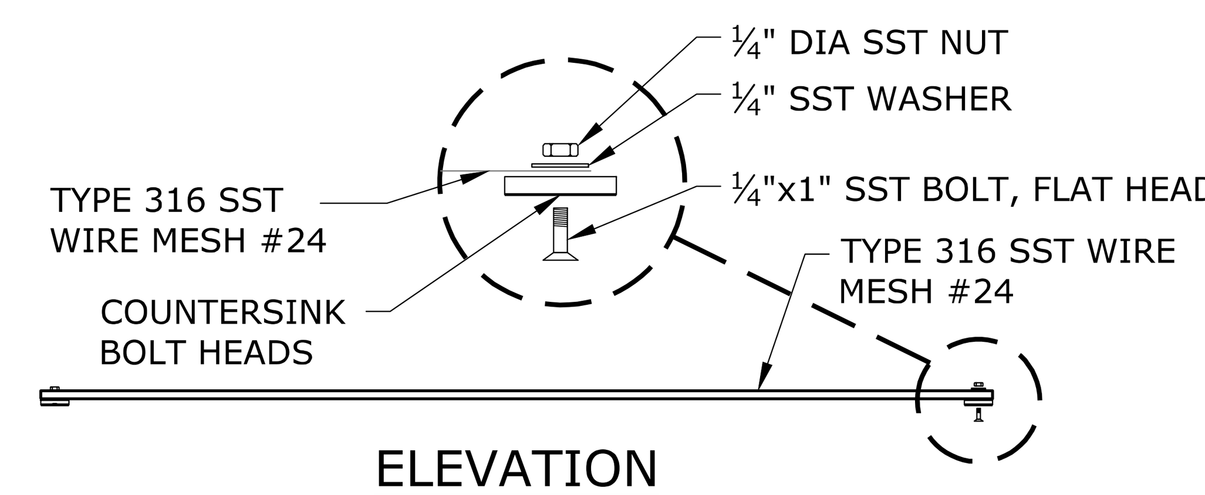
1. ALL MATERIAL SHALL BE 3063 OR SO52 ALUMINUM UNLESS OTHERWISE SHOWN.

2. PROVIDE STAINLESS STEEL HARDWARE WITH INSULATING WASHERS AND SLEEVES WHEN IN CONTACT WITH ALUMINUM.

3. FINAL DESIGN TO BE PROVIDED BY TANK MANUFACTURER.



PLAN VIEW

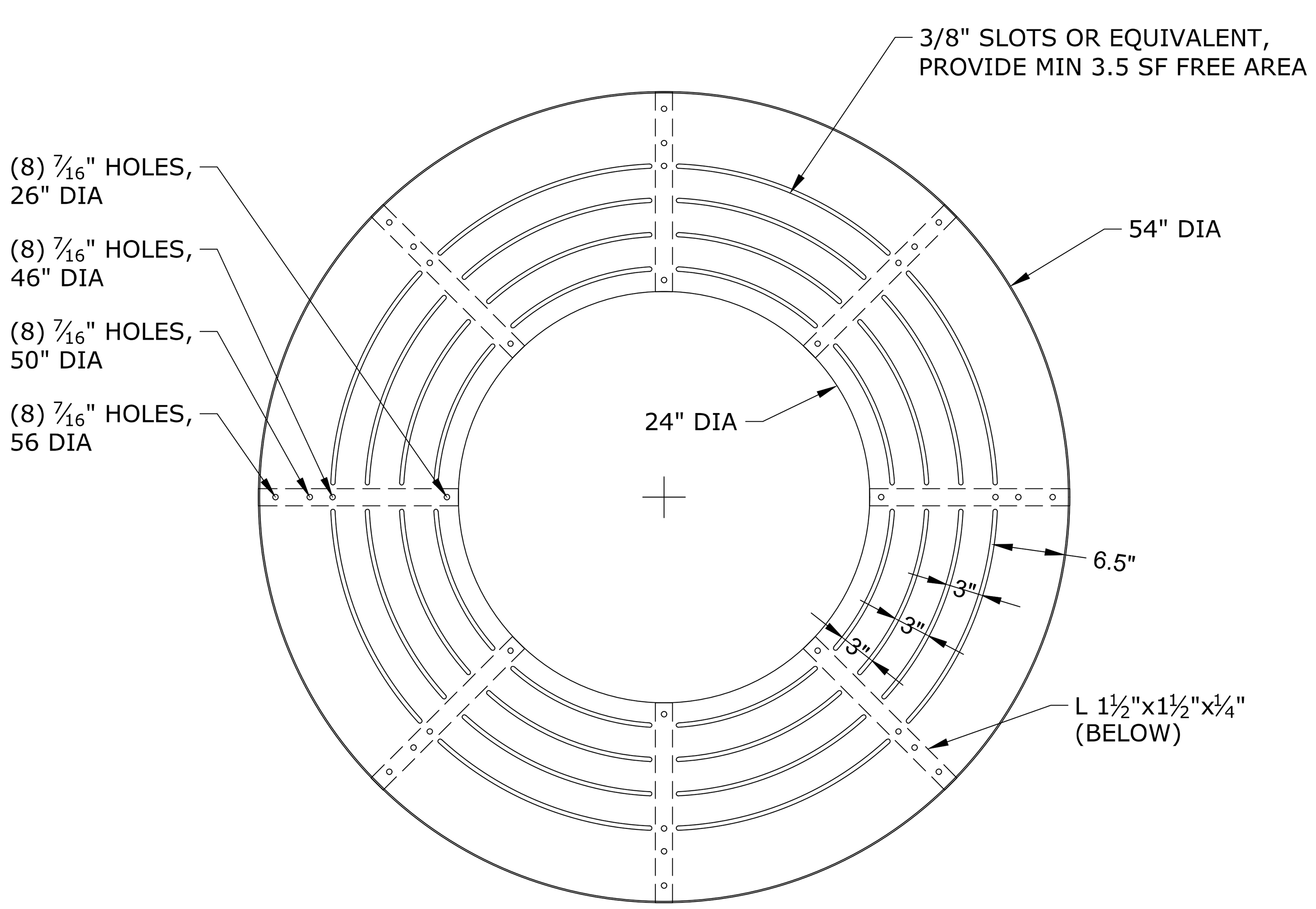


ELEVATION

PRESSURE PALLET DETAIL

SCALE: NTS

2 / -



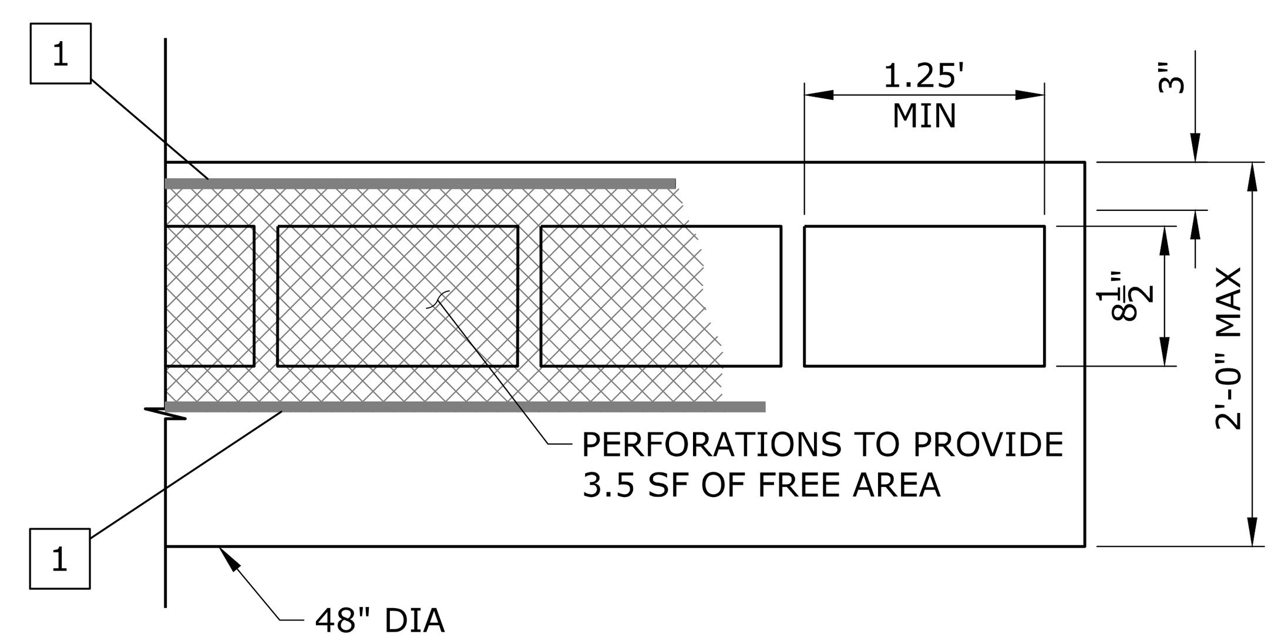
VENT BASE PLATE DETAIL

SCALE: NTS

3 / -

VENT COLUMN PARTS LIST:

1. SST 316 0.025" x ½" PERFORATED BAND W/ SST 316 AERO SEAL "BREEZE" GRIPPING STRAP & ADJUSTABLE WORM DRIVE CLAMP (2 TOTAL), INSTALL CLAMPING RINGS AFTER SCREEN IS IN PLACE



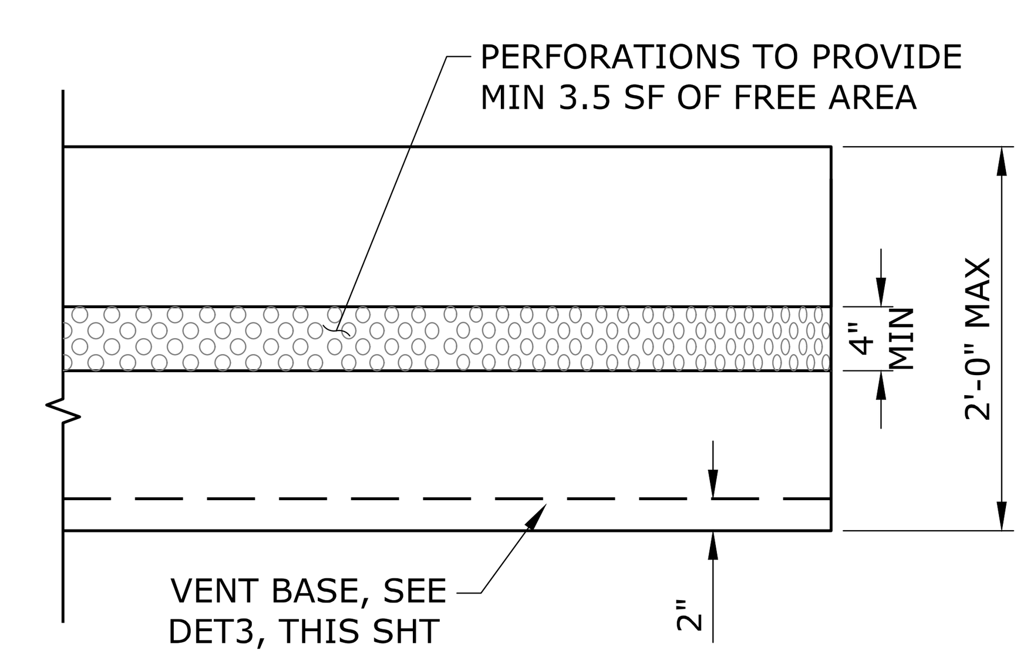
NOTE:

1. PROVIDE GASKETS AGAINST ALL STAINLESS STEEL SURFACES WITH INSULATED WASHER AND INSULATING SLEEVES ON BOLTS.

VENT COLUMN DETAIL

SCALE: 1"=1'-0"

4 / -



LOWER SHROUD DETAIL

SCALE: NTS

5 / -

NO.	DATE	BY	REVISION

NOTICE

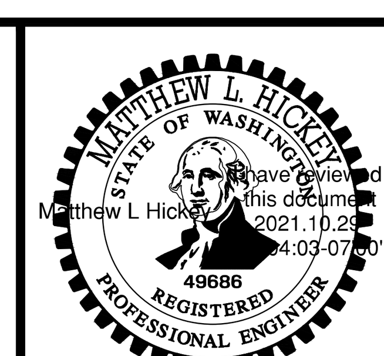
0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MRO/TED
DESIGNED

HCM
DRAWN

MLH
CHECKED



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CITY OF LACEY

CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

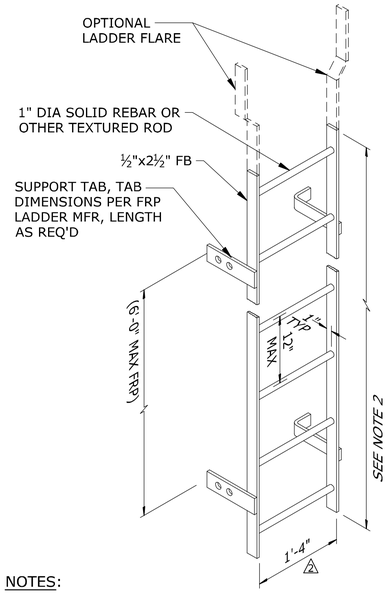
RESERVOIR VENT DETAIL

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET

M-5

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-M.dwg M-5 10/29/2021 12:46 PM HCM 23.0s (LMS Tech)



NOTES:

1. ALL LADDERS SHALL BE EQUIPPED WITH FALL PREVENTION SYSTEM, SEE SPECIFICATIONS.

2. FABRICATE SECTION LENGTHS AS DETERMINED BY CONTRACTOR, SPLICE AS PER SPECS SECTION 05 50 00.

3. HANDRAILS AND EXTERIOR LADDER TO BE PAINTED PER SPECIFICATIONS.

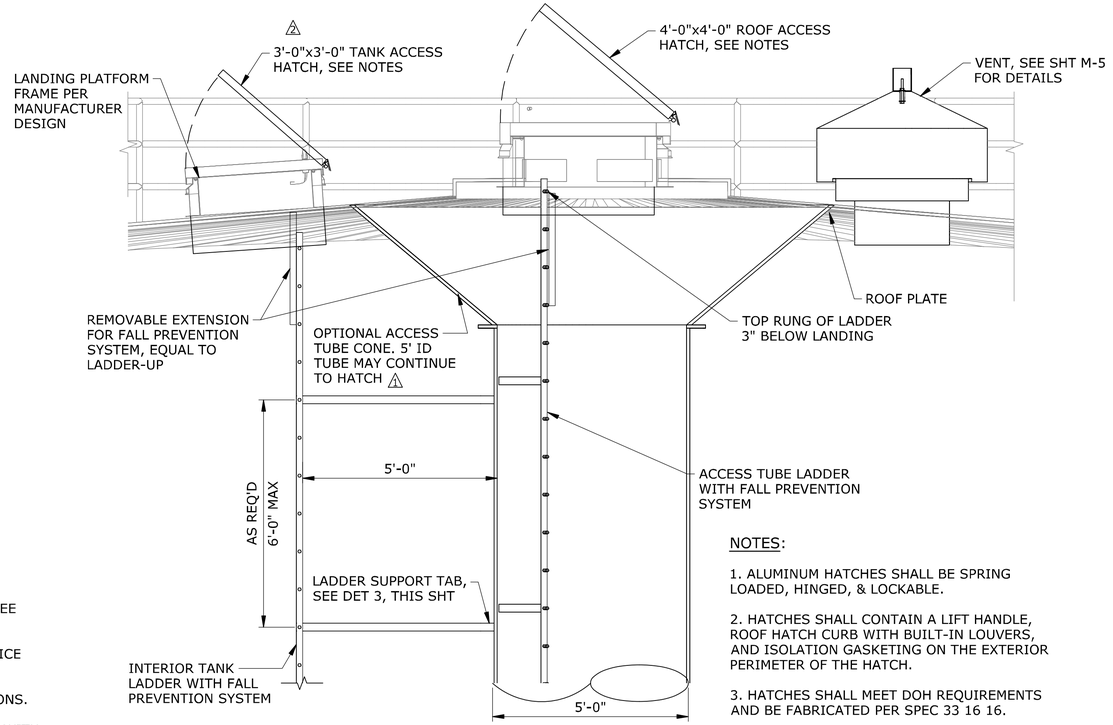
4. ALL INTERIOR LADDERS, SHALL BE FIBER-REINFORCED PLASTIC (FRP) WITH NATIONAL SANITATION FOUNDATION (NSF) 61 APPROVAL.

5. ALL WELDED CONNECTIONS TO RESERVOIR SHALL BE SEAL WELDED.

6. DIMENSIONS FOR INTERIOR LADDER SHALL BE IN ACCORDANCE WITH DETAIL 1 ON THIS SHEET. SIZE OF FRP LADDER MEMBERS SHALL BE PER LADDER MANUFACTURER.

7. FRP LADDER SHALL BE CAPABLE OF WITHSTANDING 18-INCH DROP OF A 500 -POUND WEIGHT PER OSHA 1929.29 (I). ACCEPTABLE MANUFACTURERS FIBERGRATE, OR EQUAL.

TYPICAL LADDER 1/-
SCALE: NTS



NOTES:

1. ALUMINUM HATCHES SHALL BE SPRING LOADED, HINGED, & LOCKABLE.

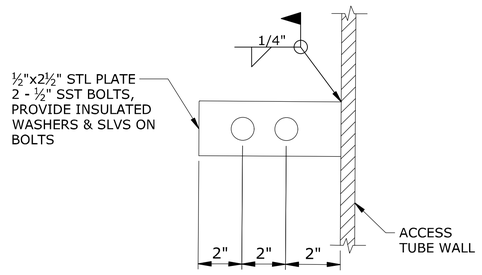
2. HATCHES SHALL CONTAIN A LIFT HANDLE, ROOF HATCH CURB WITH BUILT-IN LOUVERS, AND ISOLATION GASKETING ON THE EXTERIOR PERIMETER OF THE HATCH.

3. HATCHES SHALL MEET DOH REQUIREMENTS AND BE FABRICATED PER SPEC 33 16 16.

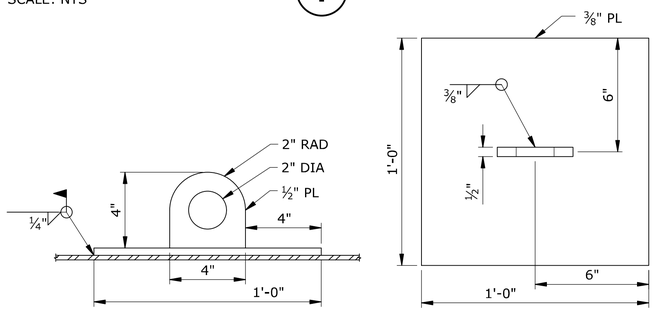
LADDER SECTION 2/-
SCALE: NTS

NOTE:

1. MECHANICAL SHEETS WERE DEVELOPED USING A 3D MODEL. SELECT RESERVOIR APPURTENANCES WERE REMOVED FROM SOME VIEWS FOR CLARITY.



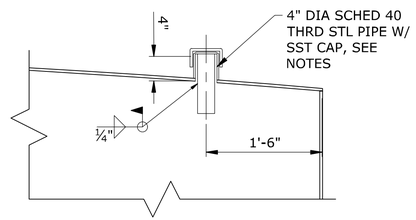
LADDER SUPPORT TAB 3/-
SCALE: NTS



NOTES:

1. ALL LUG MATERIAL SHALL BE ASTM A36 STEEL COATED PER SPECIFICATIONS.

PAINTERS LUG 4/M-4
SCALE: 3"=1'-0"



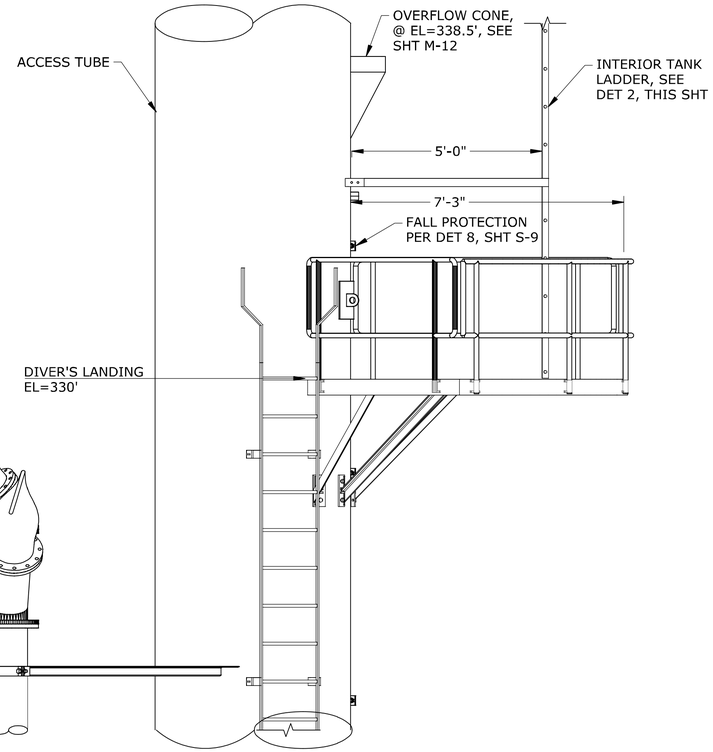
NOTES:

1. PAINTER'S PLUGS SHOWN SHALL BE SPACED APPROXIMATELY 15' ON CENTER.

2. THREADS ON PAINTER'S PLUG SHALL BE COMPLETELY COVERED BY CAP. NO EXPOSED THREADS ARE ALLOWED.

3. PROVIDE NSF-61 APPROVED GREASE ON THREADS.

PAINTER'S PLUG 5/M-4
SCALE: NTS



DIVER'S LANDING 6/M-1
SCALE: 1/2"=1'-0"

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4
1	12/23/21	MLH	ADDENDUM 1

NOTICE
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HCM DRAWN
MLH CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49686 REGISTERED PROFESSIONAL ENGINEER
Matt Hickey

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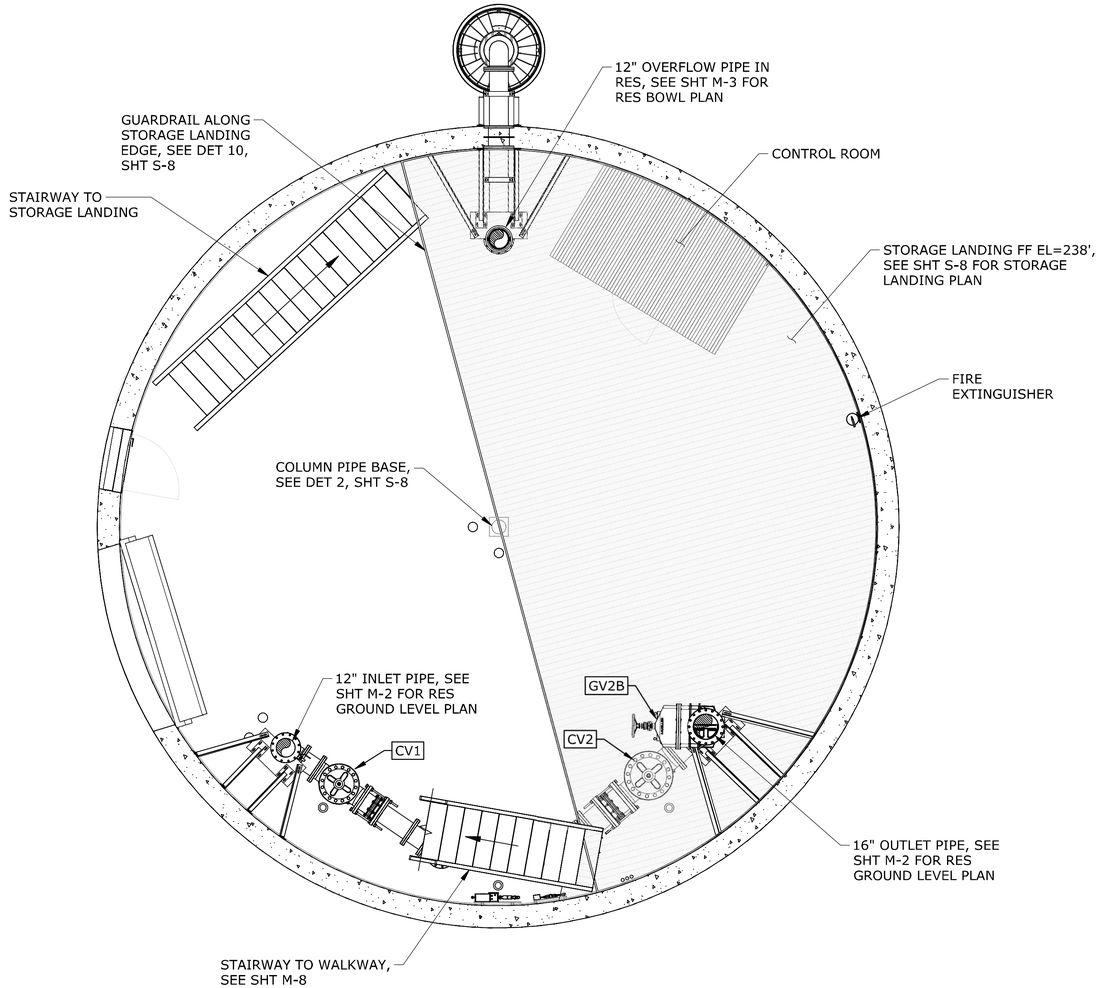
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR
LADDER AND ACCESS DETAILS

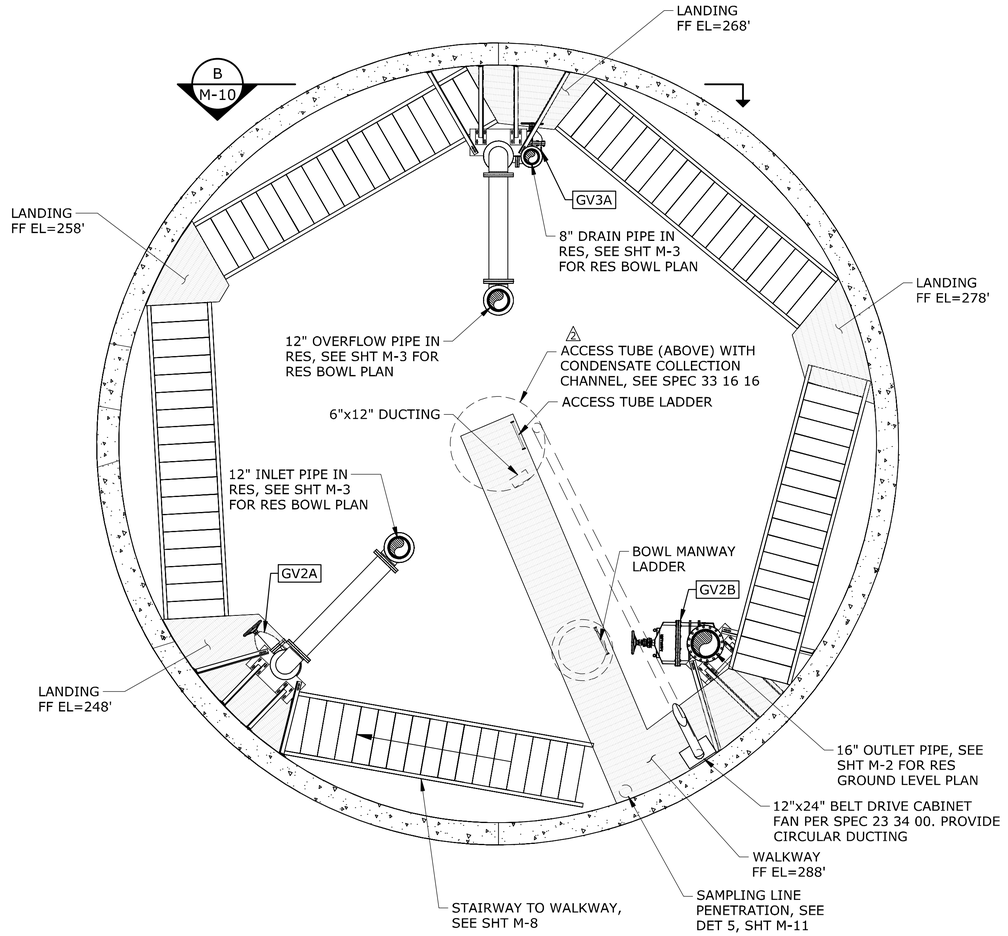
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
M-6
37 of 63

K:\tac_projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-M.dwg M-6 1/21/2022 3:42 PM NATHAN.ROSTAD 23.0s (LMS Tech)



FLOOR PLAN AT EL=243.5'
SCALE: 1/4"=1'-0"
1 / M-1



FLOOR PLAN AT EL=290'
SCALE: 1/4"=1'-0"
2 / M-1

NOTES:

1. LANDINGS, AND WALKWAY RAILINGS AND SUPPORTS NOT SHOWN FOR CLARITY. SEE SHEET S-8 FOR DETAILS.
2. FOR LANDINGS, AND WALKWAY ELEVATIONS SEE SHEET M-1.
3. FOR PIPE PENETRATION THROUGH GRATING, SEE DETAIL 8, SHEET S-9.

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4

NOTICE
0 ½ 1
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MRO/TED DESIGNED
HCM DRAWN
MLH CHECKED

MATTHEW L. HICKEY — STATE OF WASHINGTON — 49680 — REGISTERED PROFESSIONAL ENGINEER
Digitally signed by Matt Hickey 2022.01.24 08:02

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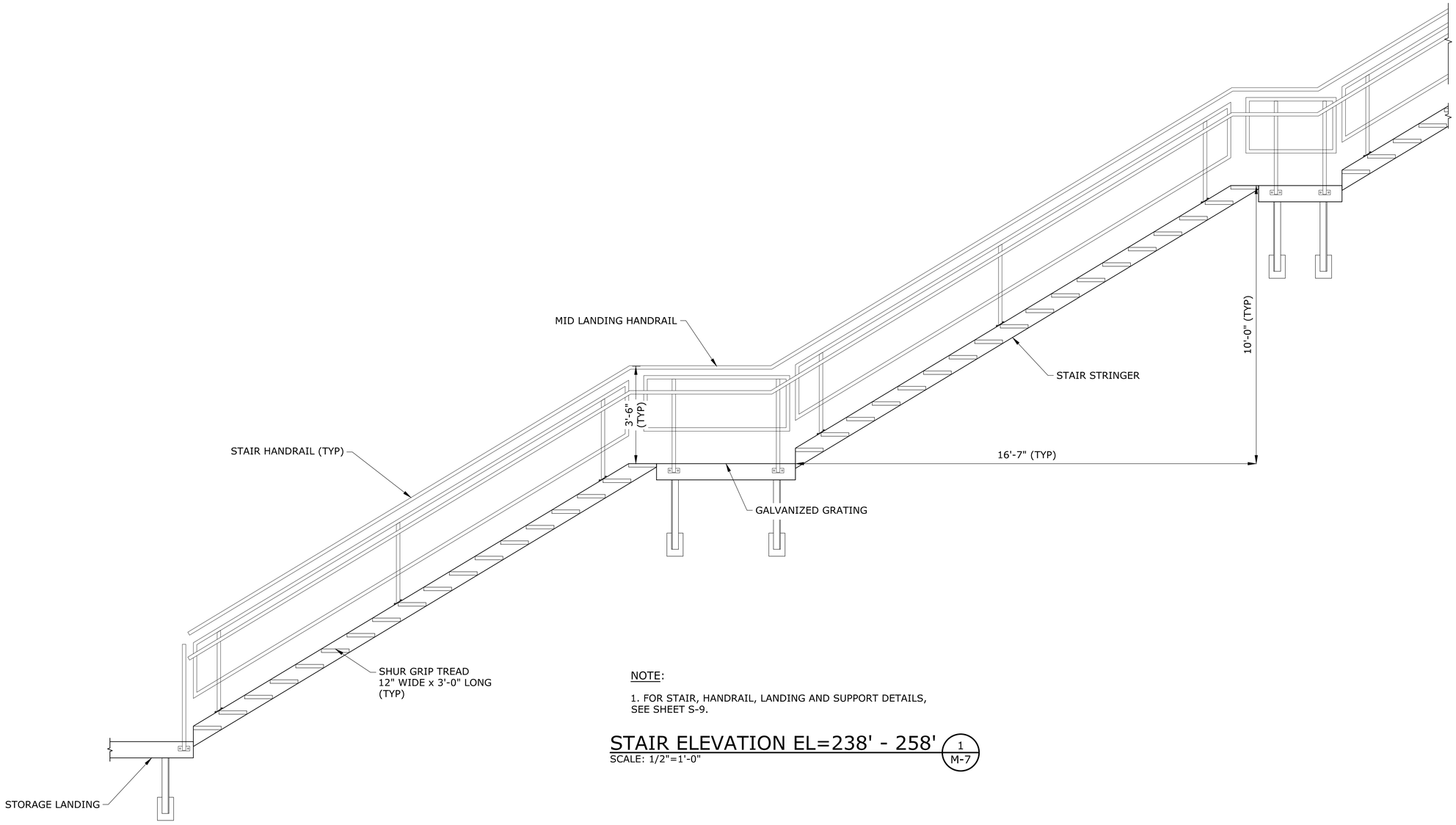
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR STAIRWAY PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
M-7
38 of 63



NOTE:

1. FOR STAIR, HANDRAIL, LANDING AND SUPPORT DETAILS, SEE SHEET S-9.

STAIR ELEVATION EL=238' - 258'

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

1 / M-7

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

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MLH CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49686 REGISTERED PROFESSIONAL ENGINEER

Matthew L Hickey

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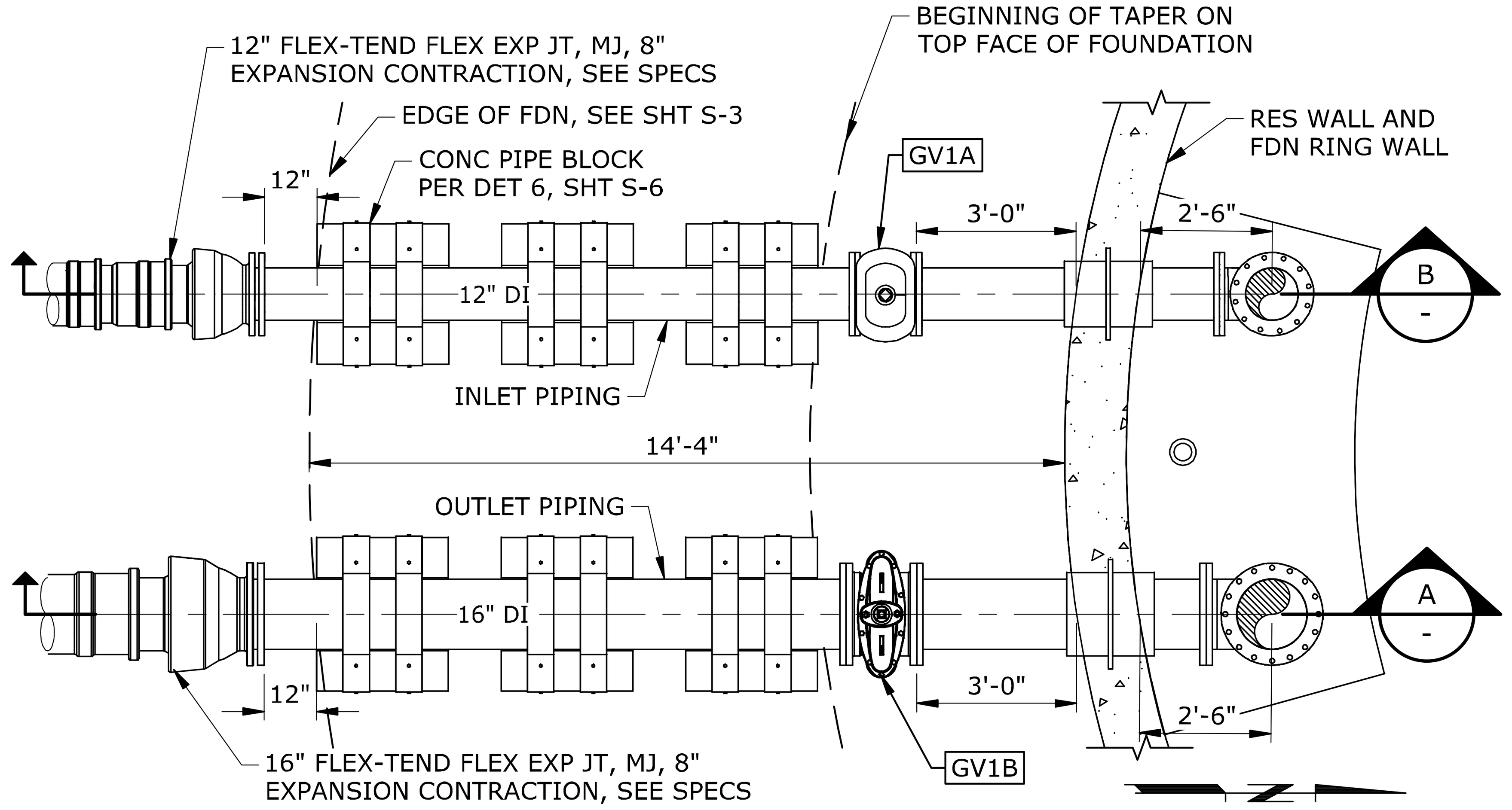
CITY OF LACEY

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR
STAIRWAY DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

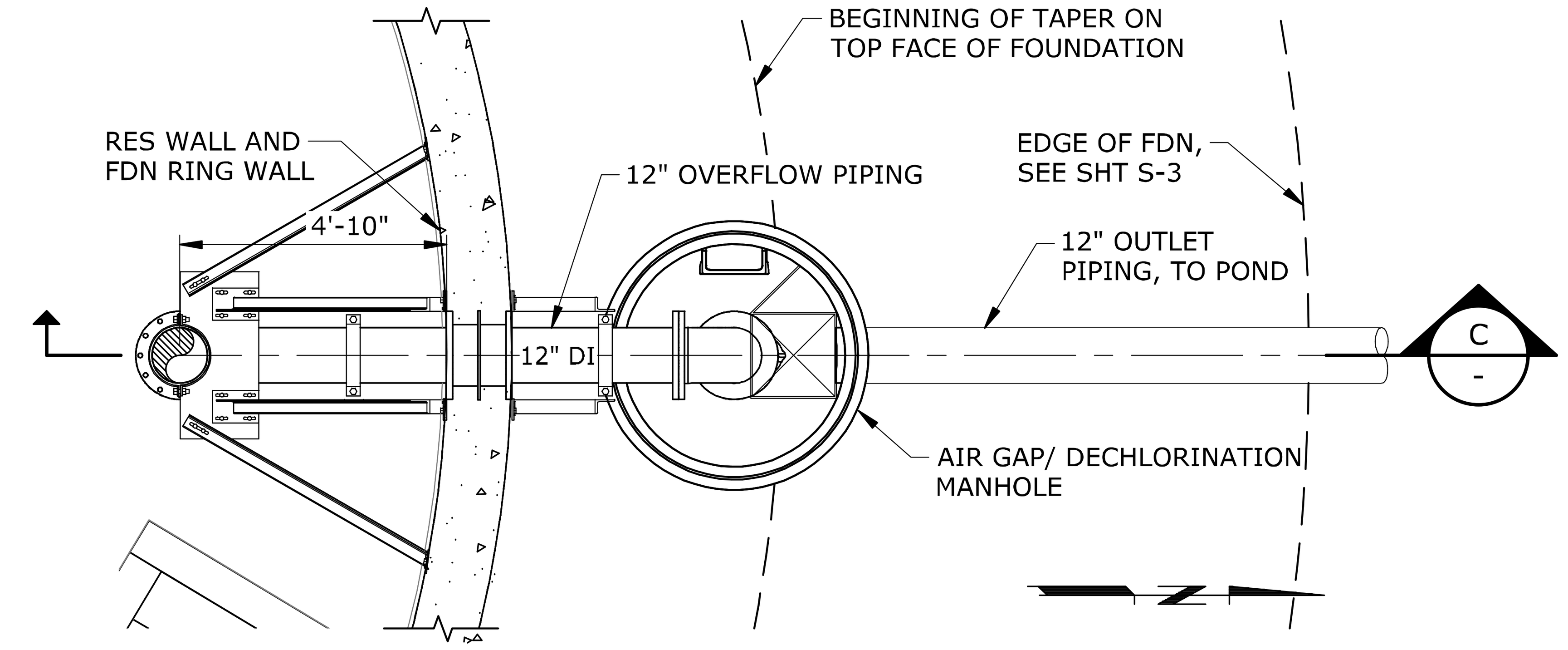
SHEET M-8



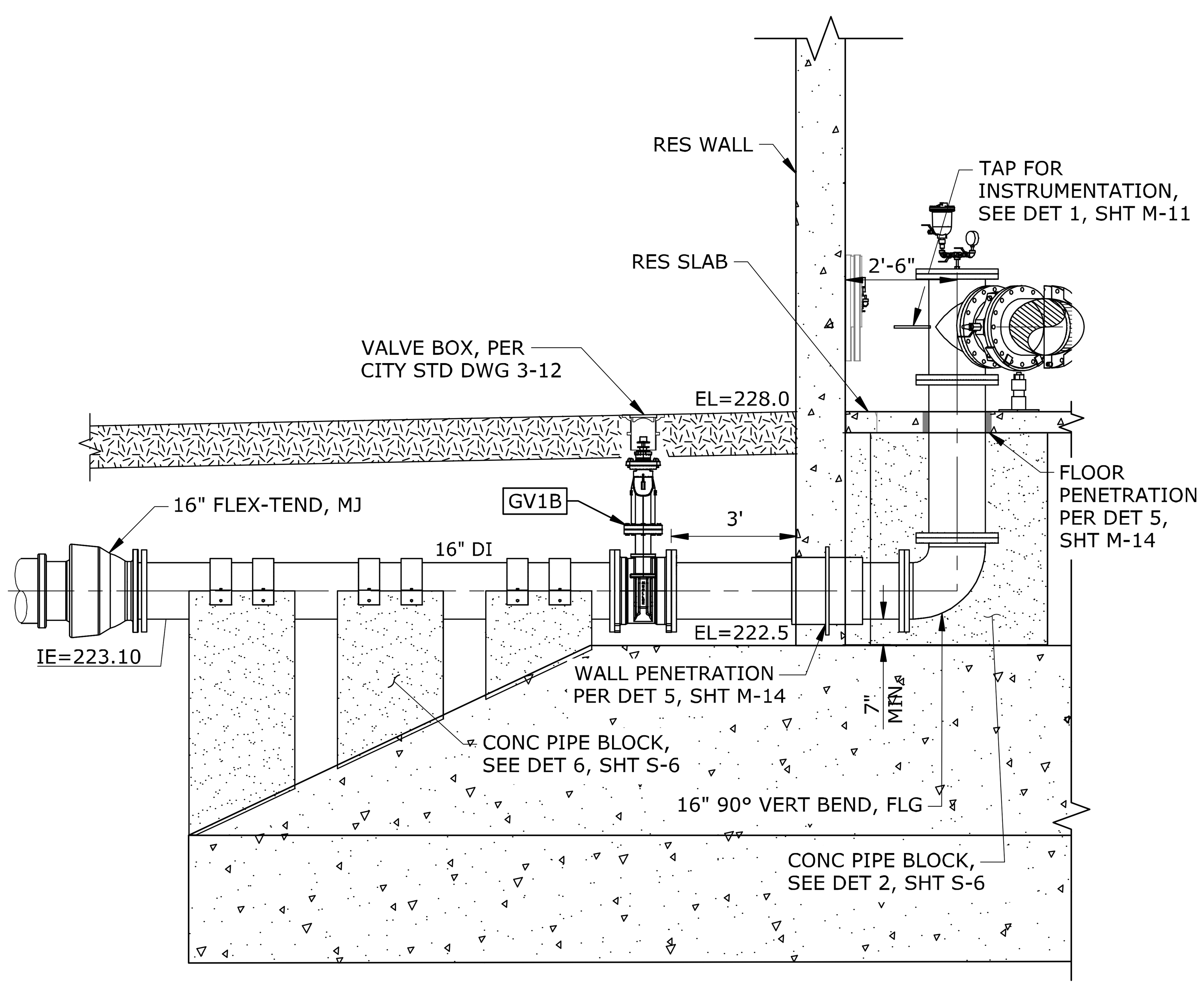
12" INLET AND 16" OUTLET ENTRANCE PLAN
SCALE: 3/8"=1'-0"
1
-

SHEET NOTES:

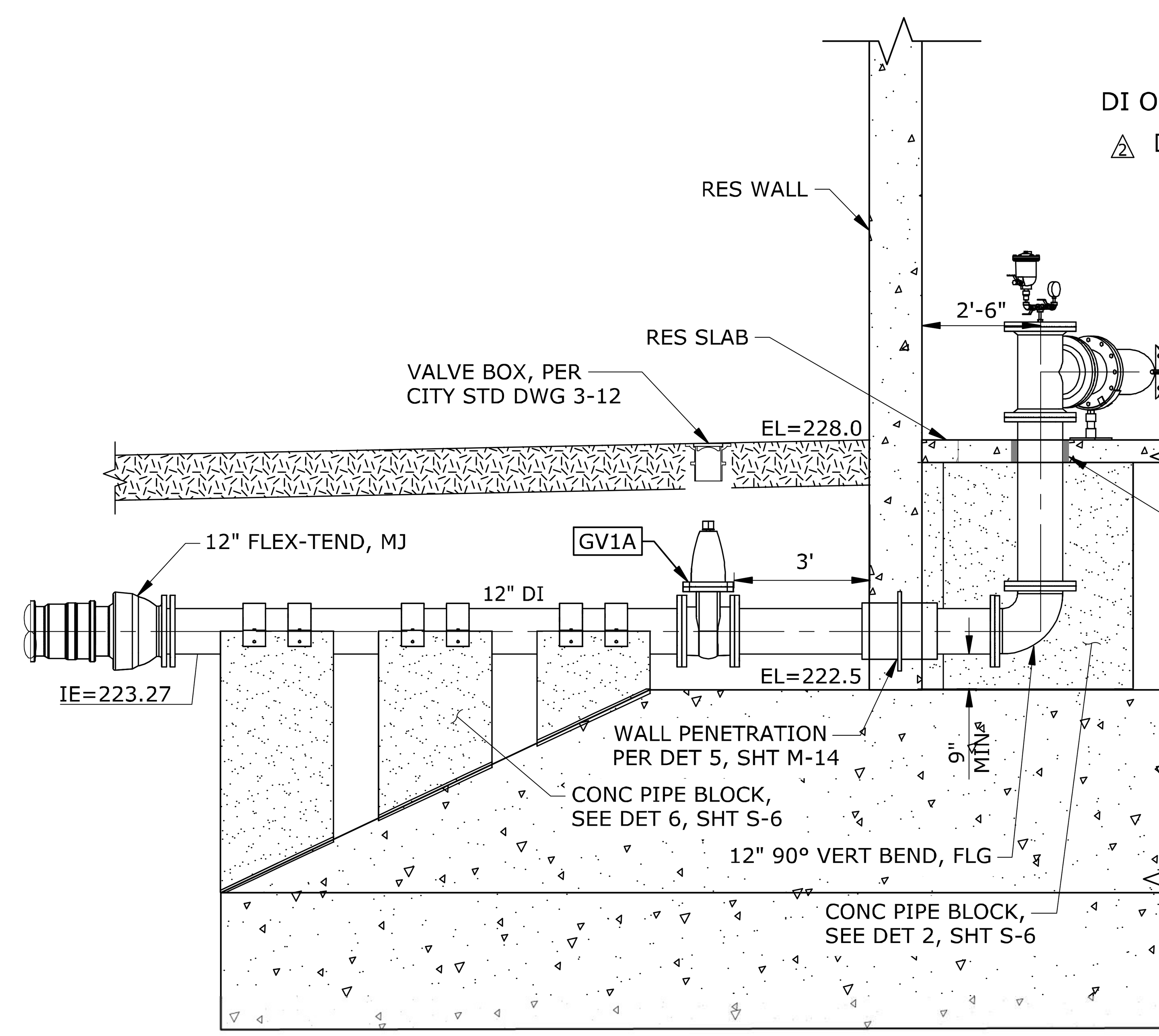
1. PIPING ENCASED IN CONCRETE TO BE FLANGED DUCTILE IRON PIPE UNLESS OTHERWISE NOTED.
2. ALL PIPING IN RESERVOIR SHALL BE PAINT-LINED AND COATED STEEL PIPE UNLESS OTHERWISE NOTED, SEE SPECIFICATION 09 90 00. DUCTILE IRON PIPE IN BASE COLUMN SHALL BE PAINT-COATED, SEE SPECIFICATION 09 90 00. EXTEND COATING A MINIMUM OF 6" INTO CONCRETE AT FLOOR PIPING PENETRATIONS.
3. PIPE SHALL NOT CONTACT REINFORCING STEEL IN CONCRETE.
4. FLEXIBLE EXPANSION JOINTS TO HAVE MINIMUM 8-INCH EXPANSION AND BE WRAPPED IN POLYETHYLENE PER MANUFACTURER'S REQUIREMENTS
5. CONTRACTOR SHALL TAKE CARE TO ENSURE NO PAINT COMES INTO CONTACT WITH ANY STAINLESS STEEL.
6. MECHANICAL SHEETS WERE DEVELOPED USING A 3D MODEL. RESERVOIR APPURTENANCES REMOVED FOR CLARITY.
7. PRELIMINARY DESIGN FOR BIDDING PURPOSES. CONTRACTOR TO PROVIDE FINAL DESIGN OF COMPOSITE ELEVATED TANK AND FOUNDATION.
8. PROVIDE INSULATED FLANGE JOINT BETWEEN DISSIMILAR PIPE MATERIALS, SEE SPECIFICATIONS AND DETAIL 4, SHEET M-14.



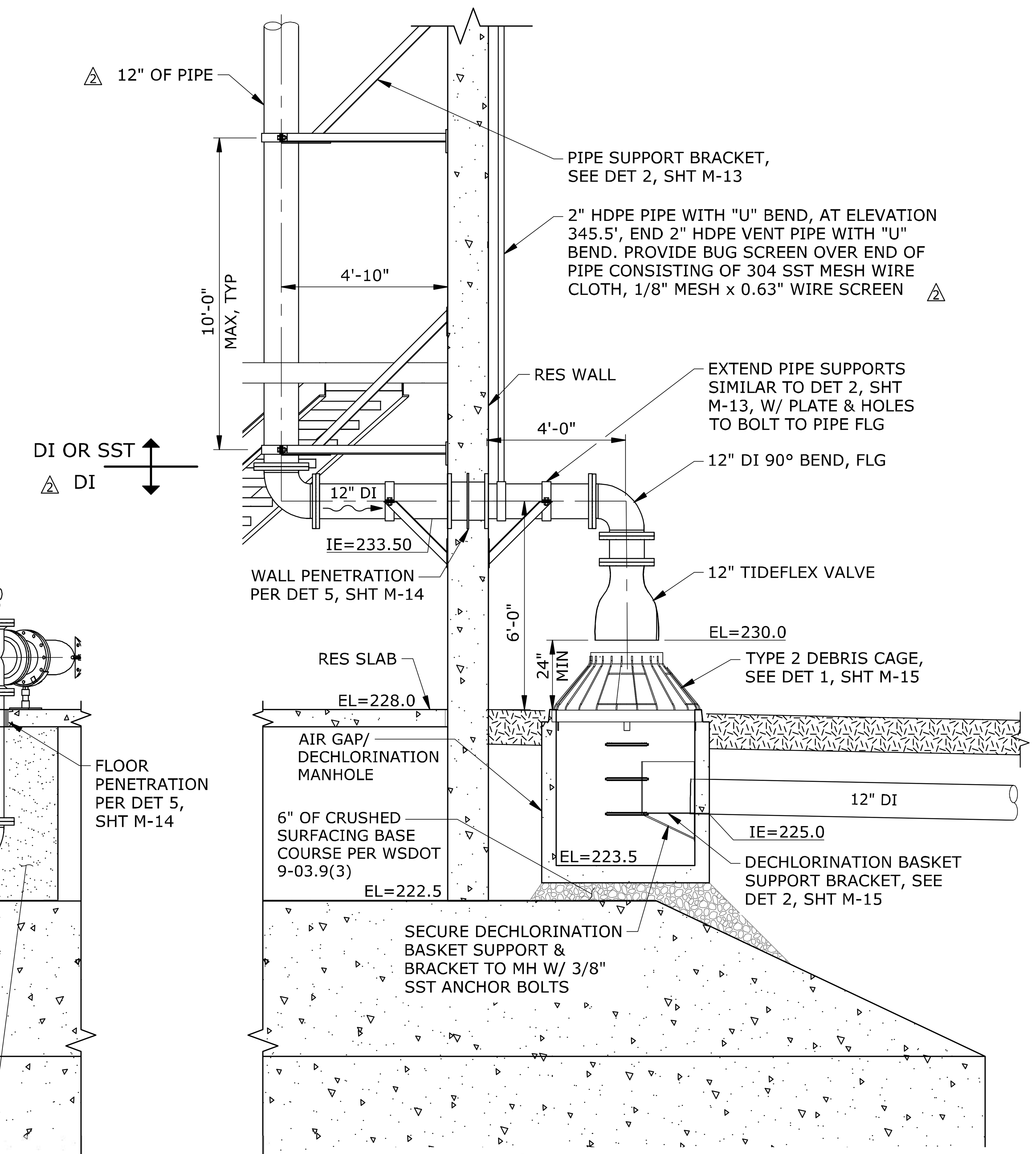
12" OVERFLOW/TANK DRAIN EXIT PLAN
SCALE: 3/8"=1'-0"
2
-



16" OUTLET SECTION
SCALE: 3/8"=1'-0"
A
-



12" INLET SECTION
SCALE: 3/8"=1'-0"
B
-



AIR GAP/ DECHLORINATION MANHOLE - 12" OVERFLOW/TANK DRAIN SECTION
SCALE: 3/8"=1'-0"
C
-

NO.	DATE	BY	REVISION
2	1/21/22	MLH	ADDENDUM 4

NOTICE
0 ½ 1
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MRO/TED — DESIGNED
HCM — DRAWN
MLH — CHECKED

MATTHEW L. HICKEY, STATE OF WASHINGTON, 49686, REGISTERED PROFESSIONAL ENGINEER
Digitally signed by Matt Hickey Date: 2022.01.24 14:19:...-08'00'

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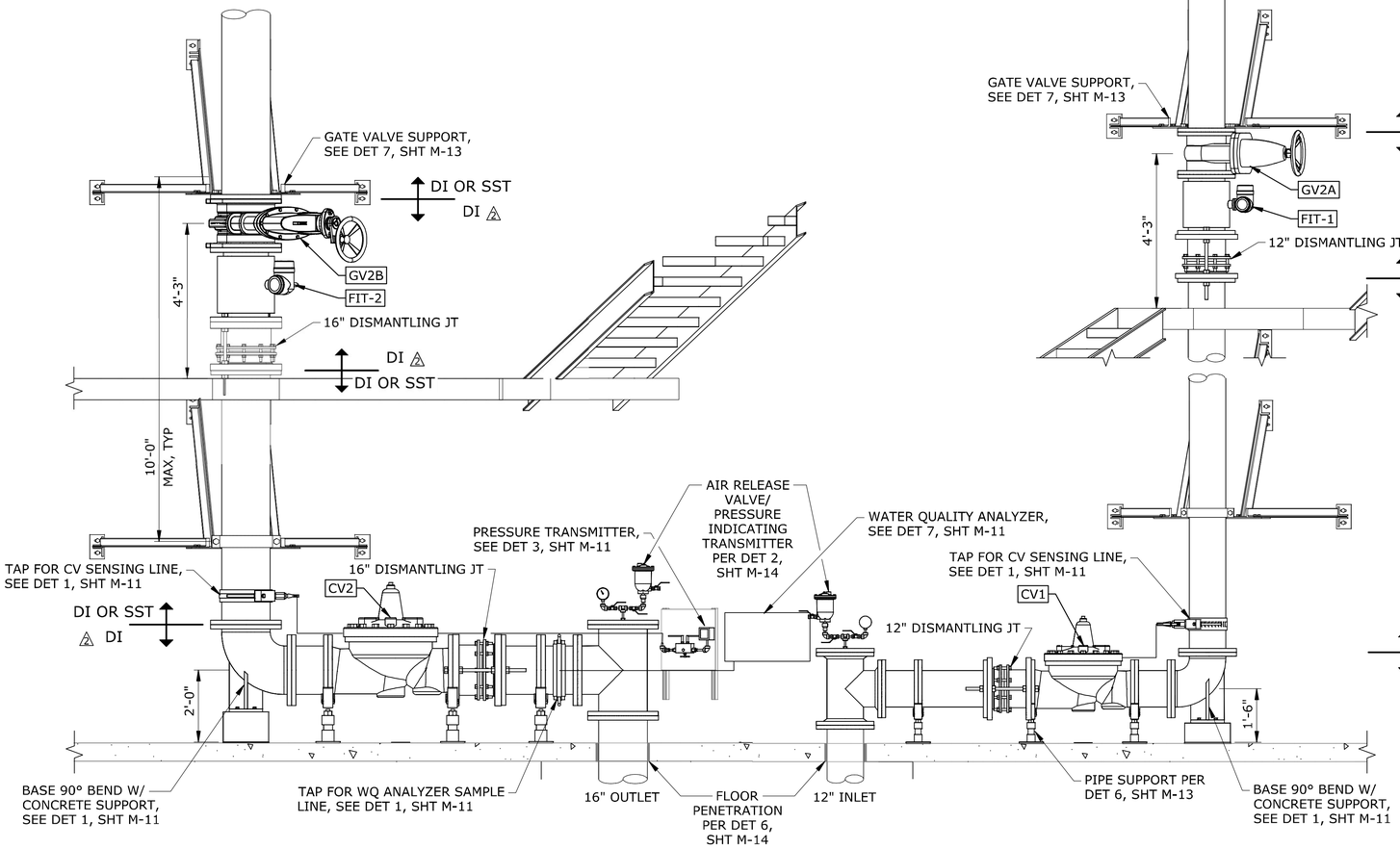
CITY OF LACEY — Shaping our community together

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR
INLET AND OUTLET PIPING
PLAN, SECTIONS AND DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

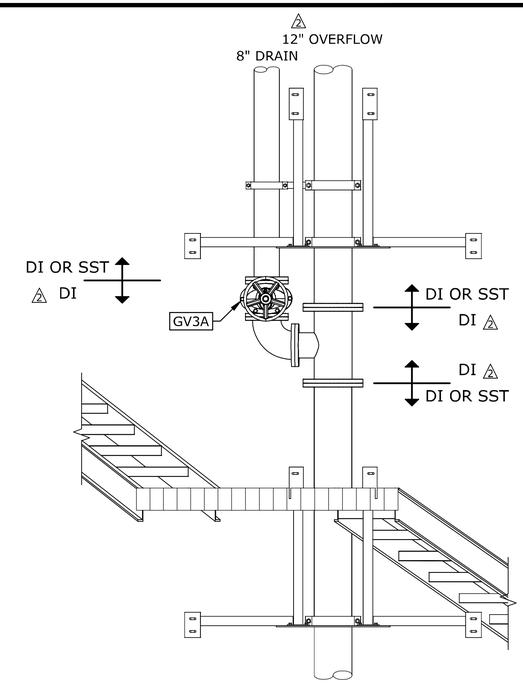
SHEET
M-9



INLET/OUTLET PIPING SECTION

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

A / M-2



DRAIN/OUTLET PIPING SECTION

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

B / M-7

NOTE:

△2 1. PROVIDE INSULATED FLANGE JOINT BETWEEN DISSIMILAR PIPE MATERIALS, SEE SPECIFICATIONS AND DETAIL 4, SHEET M-14.

NO.	DATE	BY	REVISION
△2	1/21/22	MLH	ADDENDUM 4

NOTICE
0 ½ 1
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HCM DRAWN
MLH CHECKED

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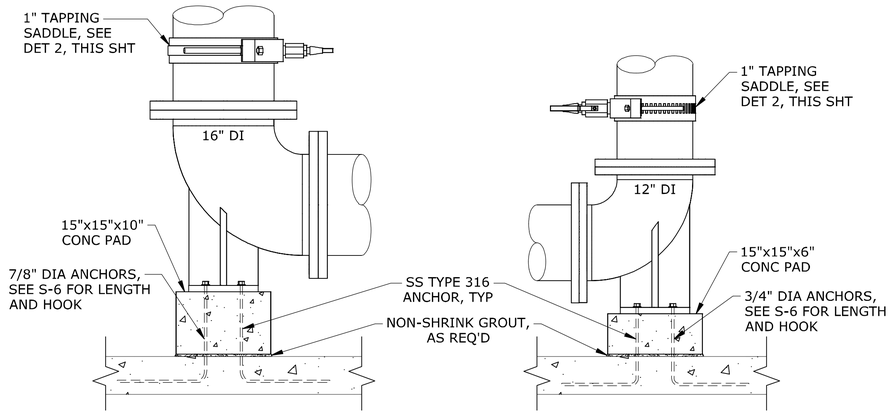
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR INTERNAL PIPING CONFIGURATION AND DETAILS

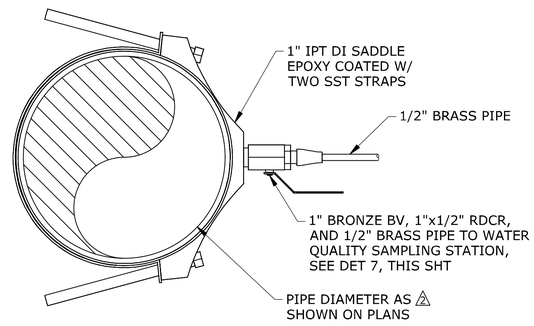
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET M-10



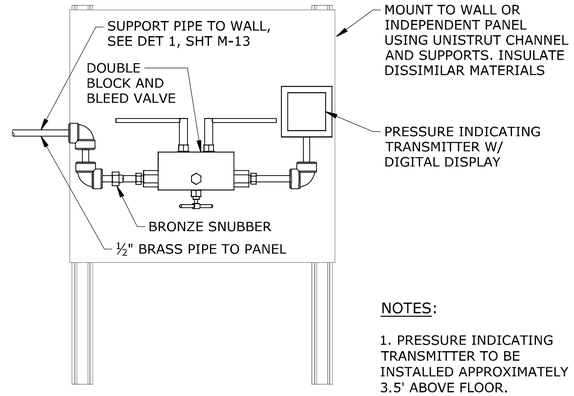
BASE 90° BEND WITH CONCRETE SUPPORT DETAIL (1 / M-10)

SCALE: 1" = 1'-0"



TAP DETAIL (2 / M-10)

SCALE: NTS



NOTES:

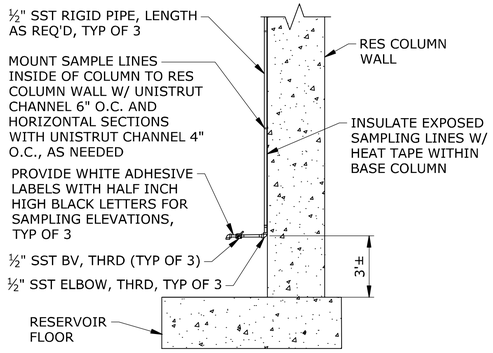
1. PRESSURE INDICATING TRANSMITTER TO BE INSTALLED APPROXIMATELY 3.5' ABOVE FLOOR.

PRESSURE INDICATING TRANSMITTER DETAIL (3 / M-2)

SCALE: NTS

M-10

ELEVATION OF SAMPLE TAPS	
ELEVATION	RESERVOIR (AFF)
302'	5'
317'	20'
327'	30'



SECTION

NOTES:

1. PROVIDE DIELECTRIC ISOLATION BETWEEN ALL DISSIMILAR METALS.
2. PROVIDE NSF-61 CERTIFIED GASKETING MATERIAL BETWEEN ALL BOLTED METAL TO METAL CONTACTS INSIDE RESERVOIR.
3. COAT ALL CARBON STEEL IN ACCORDANCE WITH RESERVOIR PAINTING SPECIFICATIONS.

SAMPLING LINE DETAIL (4 / M-1)

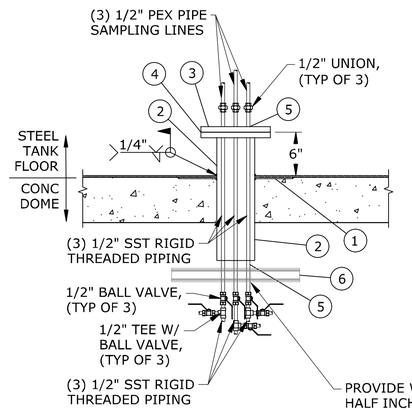
SCALE: NTS

KEY NOTES:

1. 24" DIA STL DOUBLER PLATE, MATCH THICKNESS OF SHELL AND ROLL TO MATCH TANK RADIUS
2. 8" STL SPL, FLGxPE, 18" MIN LONG
3. 8" SST BLIND FLG, TAPPED FOR (3) 1/2" DIA THRD CONNS. SEE DET 6, THIS SHT
4. 8" FLG IJ, SEE DET 4, SHT M-14
5. SST SPOOLS WITH TAPERED THREADS
6. UNISTRUT SUPPORT

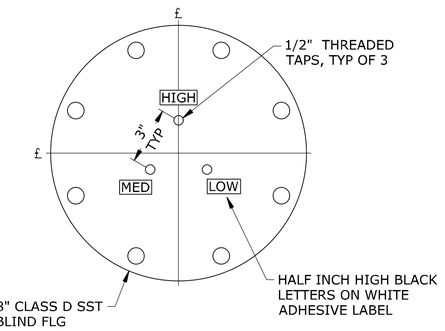
NOTES:

1. SEE SPECIFICATION SECTION 40 05 13 FOR PIPING REQUIREMENTS. ALL STEEL PIPING SHALL BE INTERIOR LINED AND COATED PER SECTION 09 90 00. REPAIR ALL DAMAGE TO LINING FROM FIELD WELDING. WELD STEEL FLANGE TO PLAIN END AS REQUIRED.
2. ALL HARDWARE IN THE RESERVOIR SHALL BE STAINLESS STEEL WITH DIELECTRIC ISOLATION TO PREVENT DISSIMILAR METALS FROM COMING IN CONTACT.
3. ALL THREADS SHALL HAVE TEFLON TAPE



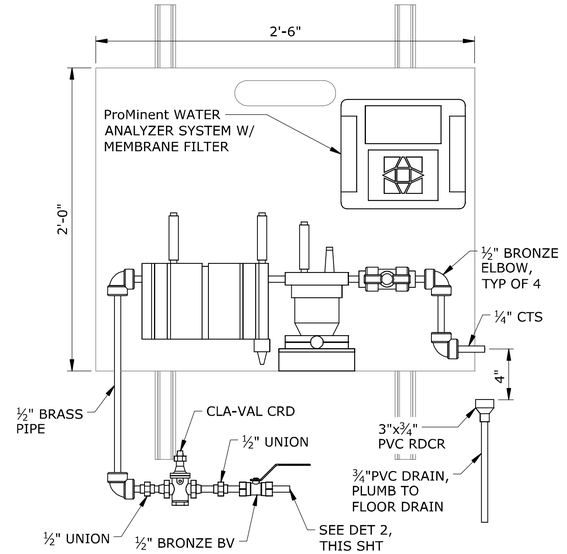
SAMPLING LINE RESERVOIR FLOOR PENETRATION DETAIL (5 / M-1)

SCALE: NTS



TAPPED BLIND FLANGE DETAIL (6 / -)

SCALE: 3"=1'-0"



WATER QUALITY SAMPLING DETAIL (7 / M-2)

SCALE: 2"=1'-0"

M-10

NO.	DATE	BY	REVISION
1	1/21/22	MLH	ADDENDUM 4

NOTICE

0 ½ 1

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MLH CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49688 REGISTERED PROFESSIONAL ENGINEER

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CITY OF LACEY

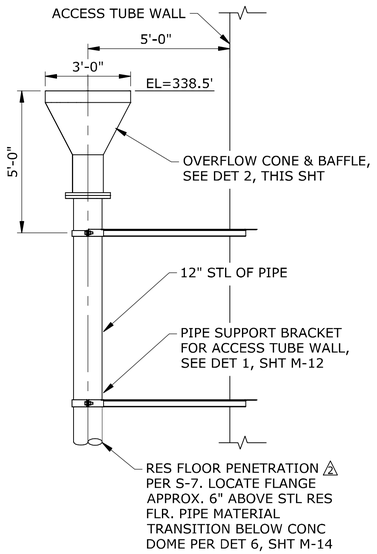
CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

RESERVOIR SMALL DIAMETER PIPING DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET M-11

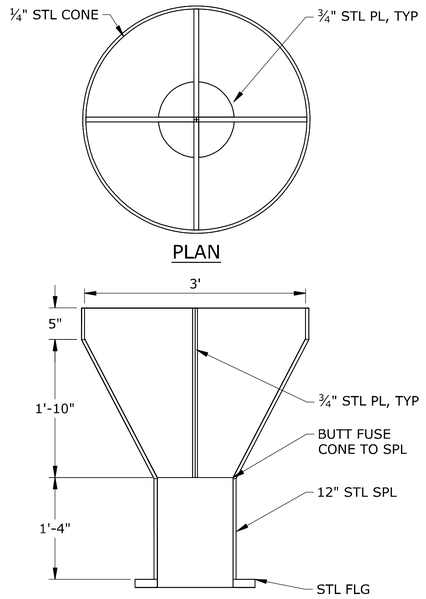
42 of 63



SECTION - RESERVOIR

12" OVERFLOW PIPING DETAIL ⚠2

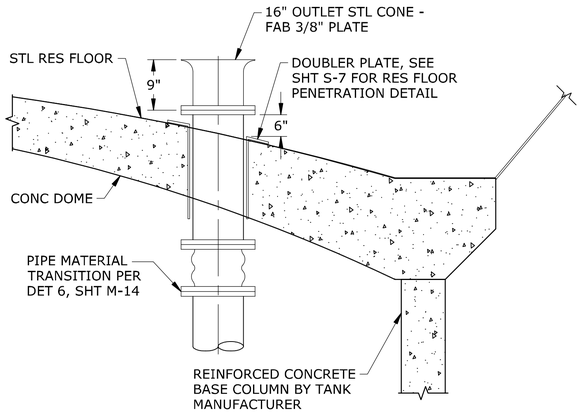
SCALE: NTS — 1 / M-1



ELEVATION

CONE & BAFFLE DETAIL

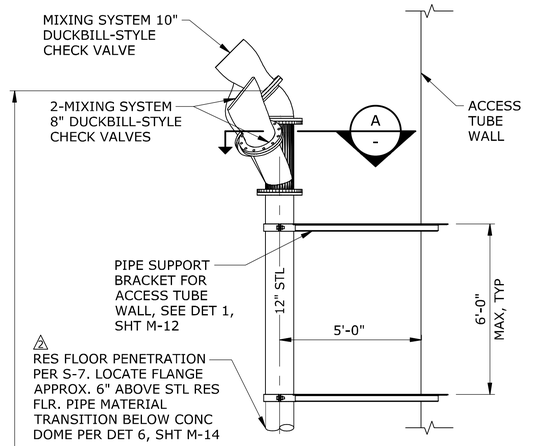
SCALE: NTS — 2 / -



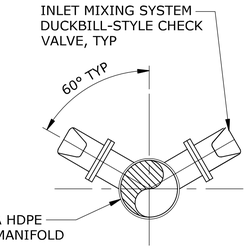
SECTION - RESERVOIR

16" OUTLET PIPING DETAIL

SCALE: NTS — 3 / M-1



SECTION - RESERVOIR

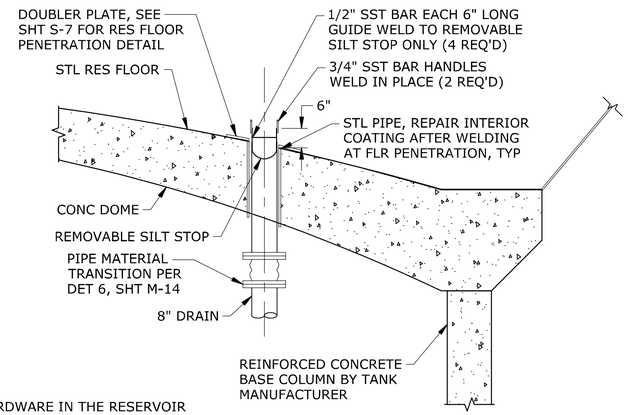


TANK FILLING ASSEMBLY SECTION

SCALE: NTS — A / -

SHEET NOTES:

1. DO NOT DRILL INTO RESERVOIR FLOOR.
2. ALL STEEL JOINTS SHALL BE SEAL WELDED.
3. ALL STRUCTURAL STEEL FOR SUPPORTS SHALL BE ASTM A36. PROVIDE DIELECTRIC ISOLATION BETWEEN CARBON STEEL SUPPORTS AND STAINLESS STEEL HARDWARE.
4. ALL BOLTS, NUTS, AND FASTENERS SHALL BE 316 STAINLESS STEEL. LENGTH OF BOLTS AS REQUIRED TO DEVELOP FULL GRIP. PROVIDE WASHERS ON BOLTS TO PROTECT COATINGS ON SUPPORTS AND PIPING. PROVIDE DIELECTRIC ISOLATION (FLANGE ISOLATION KITS) BETWEEN CARBON STEEL AND STAINLESS STEEL HARDWARE.
5. PIPE SUPPORT ASSEMBLIES SHALL BE SHOP FABRICATED UNLESS OTHERWISE INDICATED. ALL HOLES SHALL BE DRILLED IN SHOP, NOT CUT OR FABRICATED IN FIELD.
6. PIPE SUPPORTS SHALL BE PAINTED AND SHALL BE SEAL WELDED TO WALL. LINE SADDLE WITH NSF APPROVED GASKET MATERIAL PAD ALL THE WAY AROUND THE PIPE. ADHERE PAD TO SADDLE WITH SIKAFLEX 1A OR APPROVED EQUAL.
7. PAINT SIMILAR TO PIPE. NO CUTTING OR DRILLING OF STEEL PERMITTED FOLLOWING PAINTING.
8. PROVIDE NSF APPROVED DIELECTRIC WASHERS BETWEEN STEEL WASHERS AND PAINTED STEEL.
9. BRACKETS SHALL BE PAINTED STEEL.
10. FINAL DESIGN OF MIXING SYSTEM TO BE SUBMITTED BY CONTRACTOR TO ENGINEER FOR REVIEW AND APPROVAL.
11. ⚠2 PRESSURE TEST INLET PIPE PRIOR TO CONNECTING MIXING SYSTEM MANIFOLD TO INLET PIPE.
12. PROVIDE STAINLESS STEEL HARDWARE AND BACKING RING AT ALL HDPE FLANGE LOCATIONS.
13. SEE SPECIFICATION 09 90 00 FOR PAINTING AND COATING.
14. PRELIMINARY DESIGN FOR BIDDING PURPOSES. CONTRACTOR TO PROVIDE FINAL DESIGN OF COMPOSITE ELEVATED TANK AND FOUNDATION.



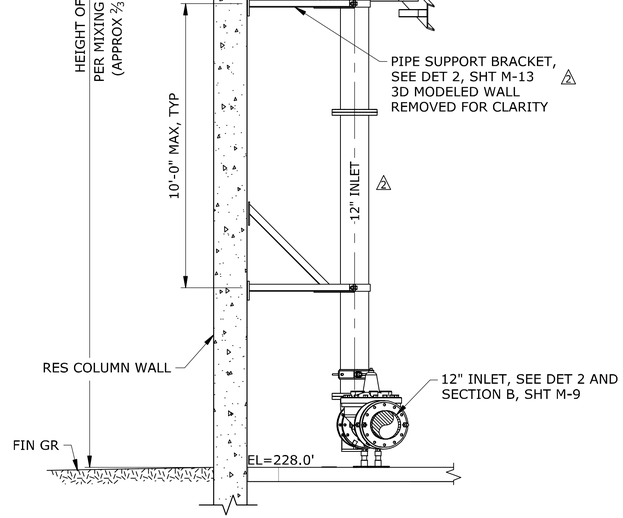
NOTE:

1. ALL HARDWARE IN THE RESERVOIR SHALL BE TYPE 316 STAINLESS STEEL WITH DIELECTRIC ISOLATION TO PREVENT DISSIMILAR METALS FROM COMING IN CONTACT.

SECTION - RESERVOIR

8" DRAIN W/ REMOVABLE SILT STOP

SCALE: NTS — 4 / M-1



SECTION - BASE COLUMN

12" INLET PIPING DETAIL

SCALE: NTS — 5 / M-1

NOTE:

1. MECHANICAL SHEETS WERE DEVELOPED USING A 3D MODEL. SELECT RESERVOIR APPURTENANCES WERE REMOVED FROM SOME VIEWS FOR CLARITY.

NO.	DATE	BY	REVISION
⚠2	1/21/22	MLH	ADDENDUM 4

NOTICE: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE (0 ½ 1)

MRO/TED DESIGNED | HCM DRAWN | MLH CHECKED

MATTHEW L. HINCKLEY — STATE OF WASHINGTON — 49686 — REGISTERED PROFESSIONAL ENGINEER

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Shaping our community together — CITY OF LACEY

CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

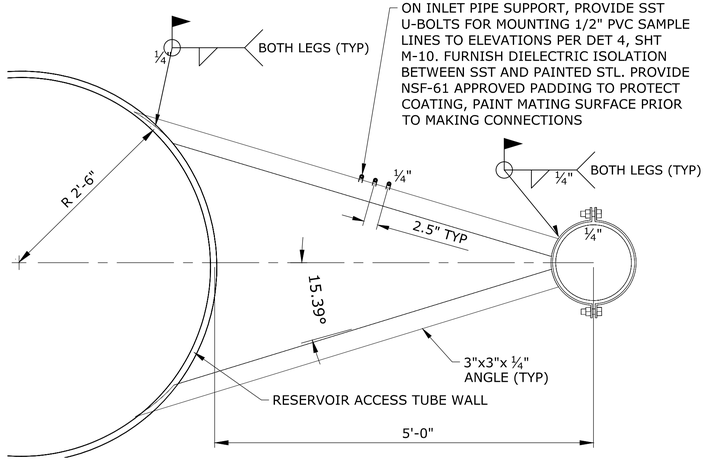
RESERVOIR INLET MIXING SYSTEM AND MISCELLANEOUS DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

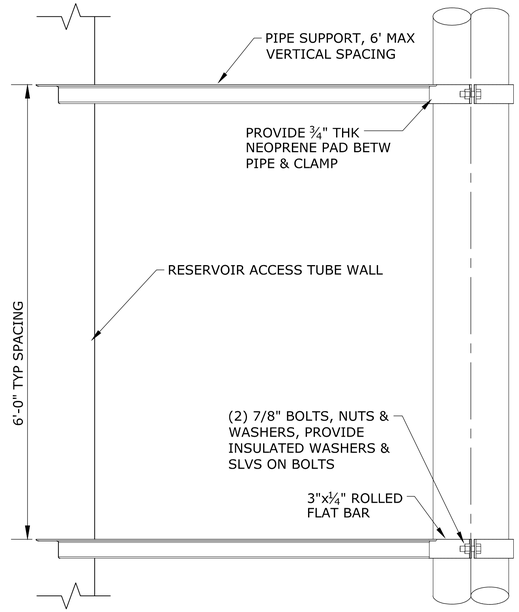
SHEET M-12

NOTE:

1. MECHANICAL SHEETS WERE DEVELOPED USING A 3D MODEL. RESERVOIR APPURTENANCES REMOVED FOR CLARITY.



PLAN



SIDE ELEVATION

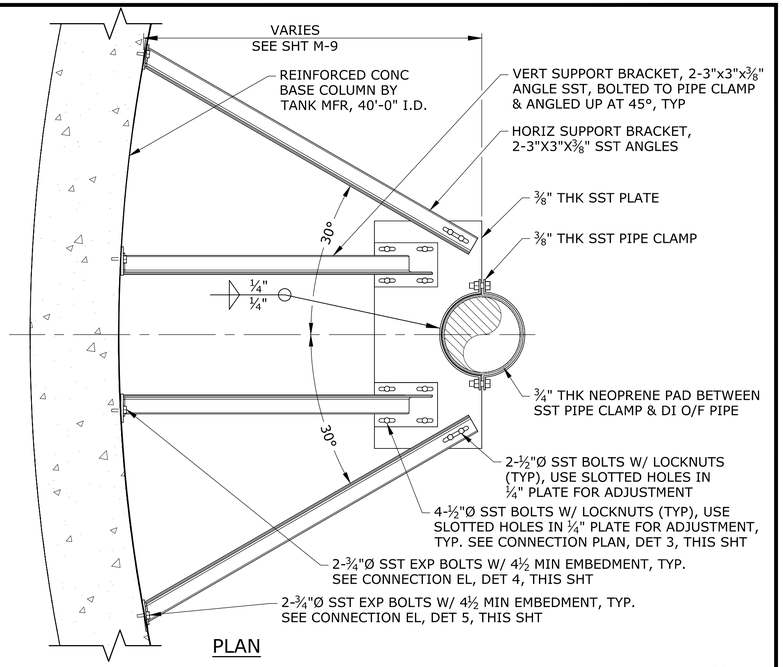
PIPE SUPPORT DETAIL FOR ACCESS TUBE WALL

SCALE: NTS

1 / M-1

DET 1 NOTES:

1. ALL STEEL JOINTS SHALL BE SEAL WELDED.
2. ALL STRUCTURAL STEEL FOR SUPPORTS SHALL BE ASTM A36. PROVIDE DIELECTRIC ISOLATION BETWEEN CARBON STEEL SUPPORTS AND STAINLESS STEEL HARDWARE.
3. ALL BOLTS, NUTS, AND FASTENERS SHALL BE 316 STAINLESS STEEL. LENGTH OF BOLTS AS REQUIRED TO DEVELOP FULL GRIP. PROVIDE WASHERS ON BOLTS TO PROTECT COATINGS ON SUPPORTS AND PIPING. PROVIDE DIELECTRIC ISOLATION (FLANGE ISOLATION KITS) BETWEEN CARBON STEEL SADDLES AND STAINLESS STEEL HARDWARE.
4. PIPE SUPPORT ASSEMBLIES SHALL BE SHOP FABRICATED UNLESS OTHERWISE INDICATED. ALL HOLES SHALL BE DRILLED IN SHOP, NOT CUT OR FABRICATED IN FIELD.
5. PIPE SUPPORTS SHALL BE PAINTED AND SHALL BE SEAL WELDED TO WALL. LINE SADDLE WITH NSF APPROVED GASKET MATERIAL PAD ALL THE WAY AROUND THE PIPE. ADHERE PAD TO SADDLE WITH SIKAFLEX 1A OR APPROVED EQUAL.
6. PAINT SIMILAR TO PIPE. NO CUTTING OR DRILLING OF STEEL PERMITTED FOLLOWING PAINTING.
7. PROVIDE NSF APPROVED DIELECTRIC WASHERS BETWEEN STEEL WASHERS AND PAINTED STEEL.
8. BRACKETS TO BE PAINTED STEEL.

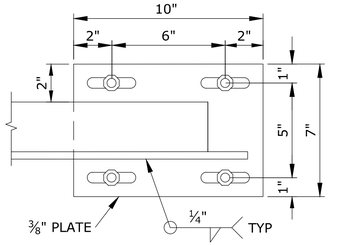


PLAN

PIPE STRAP DETAIL FOR RESERVOIR COLUMN WALL

SCALE: 1" = 1'-0"

2 / M-9



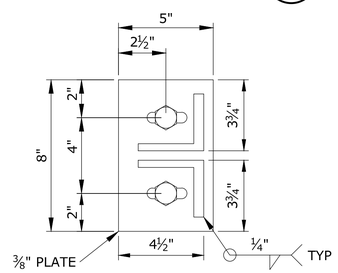
PIPE BRACKET NOTES (DETAILS 3, 4 & 5):

1. ALL INTERIOR RESERVOIR MATERIAL FOR SHIM PLATES, PIPE BRACKET AND ANGLE SUPPORTS TO BE STAINLESS STEEL 316.
2. USE STAINLESS STEEL 316 FOR ALL BOLTS NOT FULLY ENCASED IN CONCRETE UNLESS NOTED OTHERWISE.
3. WHERE STAINLESS STEEL BOLTS ARE IN CONTACT WITH DISSIMILAR METALS, USE INSULATING SLEEVES AND PHENOLIC WASHERS TO ELECTRICALLY ISOLATE THE BOLTS.
4. ALL EXTERIOR RESERVOIR MATERIALS FOR SHIM PLATES, PIPE BRACKETS, BOLTS, NUTS AND CLAMPS SHALL BE HOT DIPPED GALVANIZED STEEL.

CONNECTION PLAN

SCALE: 3"=1'-0"

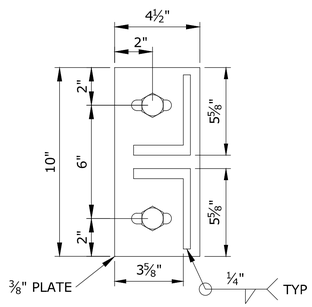
3 / -



CONNECTION ELEVATION

SCALE: 3"=1'-0"

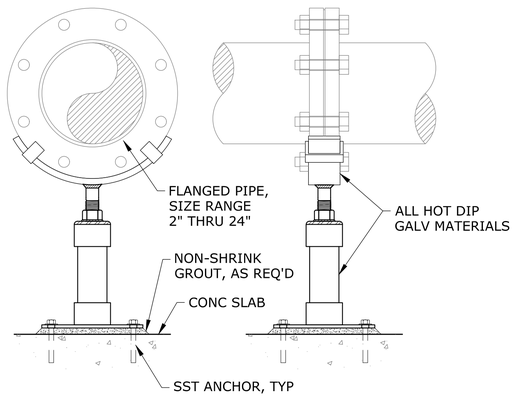
4 / -



CONNECTION ELEVATION

SCALE: 3"=1'-0"

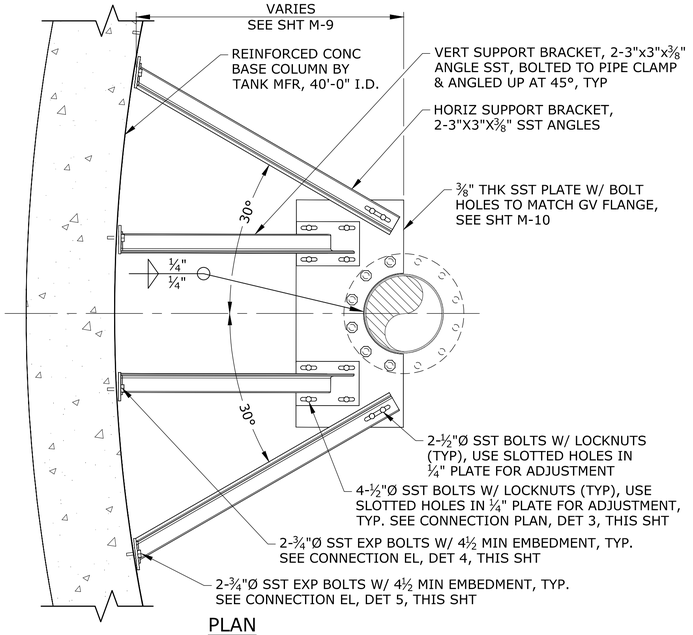
5 / -



S-96 PIPE SUPPORT DETAIL

SCALE: NTS

6 / M-10



PLAN

PIPE STRAP DETAIL FOR GATE VALVE SUPPORT

SCALE: 1" = 1'-0"

7 / M-10

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

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MRO/TED DESIGNED

HCM DRAWN

MLH CHECKED

MATTHEW L. HICKEY STATE OF WASHINGTON 49688 REGISTERED PROFESSIONAL ENGINEER

Matthew L Hickey

murraysmith

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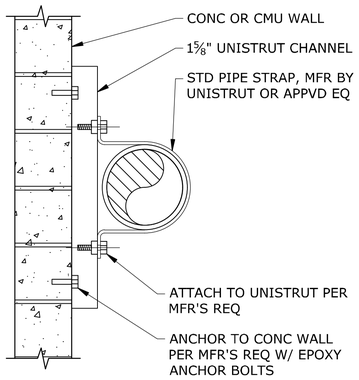
CITY OF LACEY

CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

RESERVOIR MISCELLANEOUS AND PIPE SUPPORT DETAILS - 1

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

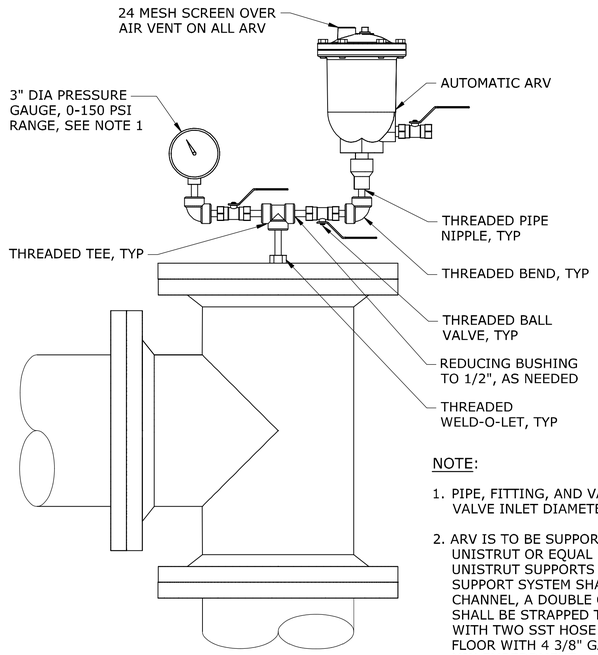
SHEET M-13



NOTES:

1. ORIENT UNISTRUT CHANNEL VERTICALLY OR HORIZONTALLY DEPENDING ON APPLICATION.
2. SUPPORT PIPE HORIZONTALLY EVERY 6 FEET (MINIMUM), AND VERTICALLY AT EVERY 10 FEET (MINIMUM).
3. ALL SUPPORT MATERIALS SHALL BE SST TYPE 316.

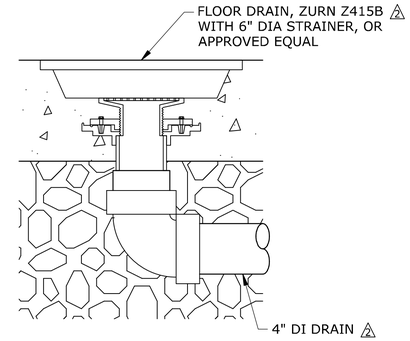
PIPE STRAP SUPPORT (1 / M-10)
SCALE: NTS



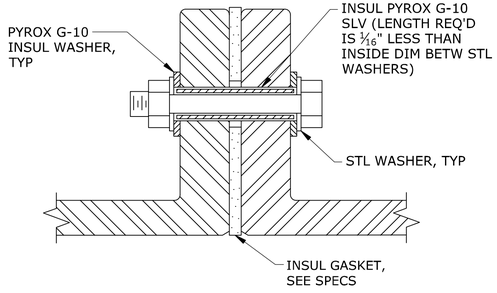
NOTE:

1. PIPE, FITTING, AND VALVE SIZES SHALL MATCH AIR VALVE INLET DIAMETER UNLESS NOTED OTHERWISE.
2. ARV IS TO BE SUPPORTED AS NECESSARY BY UNISTRUT OR EQUAL PIPE SUPPORT MATERIALS. UNISTRUT SUPPORTS TO HOT DIPPED GALVANIZED. SUPPORT SYSTEM SHALL INCLUDE A DOUBLE CHANNEL, A DOUBLE CHANNEL BASE. THE ARV SHALL BE STRAPPED TO THE DOUBLE CHANNELS WITH TWO SST HOSE CLAMPS. ANCHOR BASE TO FLOOR WITH 4 3/8" GALV ANCHOR BOLTS WITH 3" MIN EMBEDDMENT.

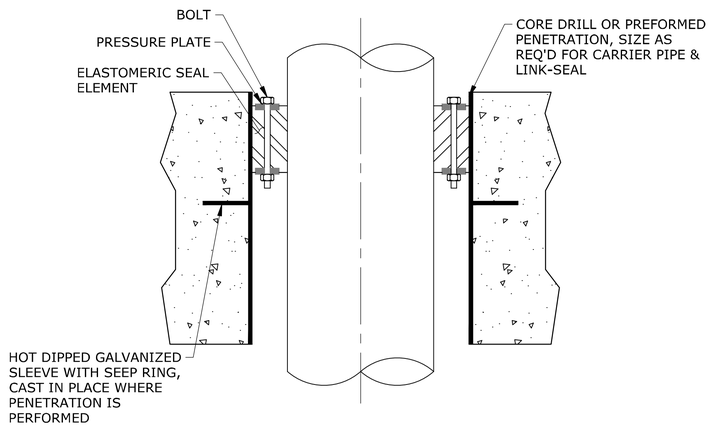
AIR RELEASE OR COMBINATION AIR/VAC VALVE (2 / M-10)
SCALE: NTS



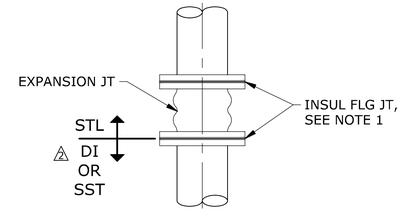
TYPICAL FLOOR DRAIN (3 / M-2)
SCALE: NTS



FLANGE ISOLATION JOINT (4 / -)
SCALE: NTS



FLOOR/WALL PENETRATION DETAIL (5 / -)
SCALE: NTS



SECTION - RESERVOIR

NOTE:

1. PROVIDE INSULATED FLANGE JOINT BETWEEN DISSIMILAR PIPE MATERIALS, SEE SPECIFICATIONS AND DETAIL 4, THIS SHEET.

△2 2. MATERIAL TRANSITION TYPICAL FOR INLET, OUTLET, OVERFLOW, AND DRAIN PIPE

PIPE MATERIAL TRANSITION DETAIL (6 / M-12)
SCALE: NTS

NO.	DATE	BY	REVISION
△2	1/21/22	MLH	ADDENDUM 4

NOTICE
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HCM DRAWN
MLH CHECKED

MATHEW L. HICKEY STATE OF WASHINGTON 49686 REGISTERED PROFESSIONAL ENGINEER

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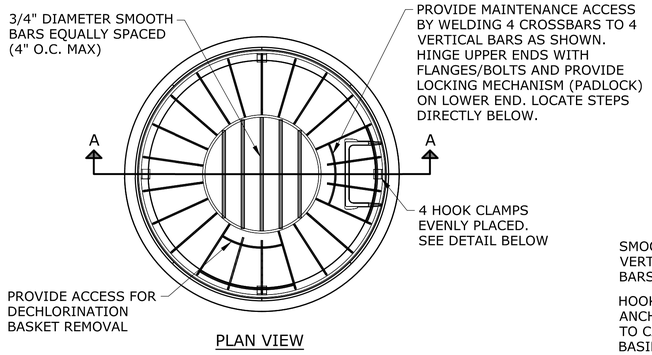
CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR MISCELLANEOUS AND PIPE SUPPORT DETAILS - 2

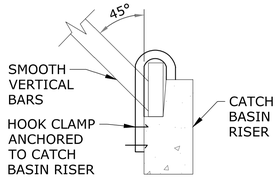
PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET M-14

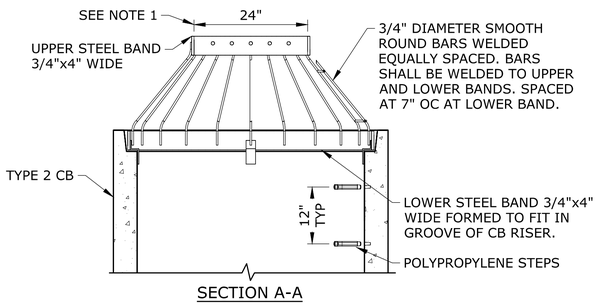
45 of 63



PLAN VIEW



HOOK CLAMP DETAIL



SECTION A-A

NOTES:

1. METAL PARTS MUST BE CORROSION RESISTANT; STEEL BARS MUST BE GALVANIZED.

2. THIS DEBRIS BARRIER IS ALSO RECOMMENDED FOR USE ON THE INLET TO ROADWAY CROSS-CULVERTS WITH HIGH POTENTIAL FOR DEBRIS COLLECTION (EXCEPT ON TYPE 2 STREAMS).

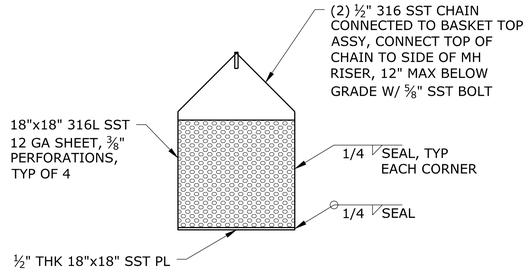
3. STEPS IN THE MANHOLE SHALL HAVE 6" MINIMUM CLEARANCE.

TYPE 2 DEBRIS CAGE (1 / M-9)

SCALE: NTS

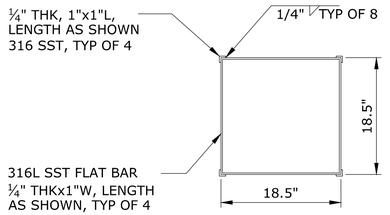
NOTE:

1. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE FABRICATION AND INSTALLATION OF THE DECHLORINATION BASKET AND SUPPORT SYSTEM AND ENSURING THE INTENDED FUNCTION OF THE BASKET. THE BASKET SHALL ALLOW AT LEAST 200 GPM OF FLOW THROUGH THE INCOMING PIPE AND BASKET PENETRATIONS.



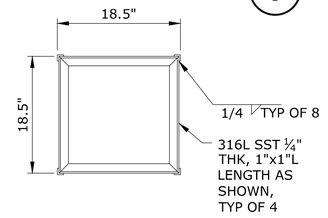
DECHLORINATION BASKET (2 / M-9)

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



SUPPORT SECTION-UPPER (B / -)

SCALE: 1"=1'-0"



SUPPORT SECTION-LOWER (C / -)

SCALE: 1"=1'-0"

K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-M.dwg M-15 9/30/2021 8:36 AM HCM 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR
MISCELLANEOUS AND PIPE SUPPORT DETAILS - 3

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
M-15

TBD

KENNYDALE RESERVOIR

W:\WF\483_Murray Smith Assoc\138_Lacey 337 Res\002_60% Dsn\DWG\E-1.dwg E-1 5/20/2021 9:32 AM HEIDIS 19.1s (LMS Tech)

ELECTRICAL LEGEND

- WALL MOUNTED LUMINAIRE
- POLE MOUNTED LUMINAIRE
- EXIT LUMINAIRE
- SURFACE MOUNTED LUMINAIRE
- SURFACE MOUNTED LUMINAIRE W/ BATTERY BACKUP
- PC — PHOTOCELL
- OC — OCCUPANCY SENSOR
- SD — SMOKE DETECTOR
- MD — MOTION DETECTOR
- M — METER BASE W/METER
- $ — WALL SWITCH
- $D — DOOR SWITCH (INTRUSION)
- $M — MOTOR RATED SWITCH
- $O — OCCUPANCY SWITCH
- GFI WP — DUPLEX RECEPTACLE - GROUND FAULT INTERRUPTING, NORMAL, WEATHER-PROOF
- CONNECTION TO SPECIAL EQUIPMENT OR OUTLET AS SHOWN
- 5 — MOTOR CONNECTION
- 30 30 — DISCONNECT SWITCH, RATING SHOWN
- ELECTRICAL EQUIPMENT
- J — JUNCTION BOX
- ETHERNET DATA CONNECTION (DUPLEX RJ45)
- P4 — HOME RUN, ELECTRICAL PANEL DESTINATION SHOWN.
- CONDUIT CONCEALED UNDERFLOOR OR UNDERGROUND.*
- CONDUIT CONCEALED IN WALL OR ABOVE CEILING IN FINISHED AREAS, EXPOSED IN PROCESS AND EQUIPMENT AREAS.*

*NOTES:

1. RUNS MARKED WITH CROSS-HATCHES INDICATE NUMBER OF NO. 12 WIRE. LARGER GAUGES ARE SHOWN OR NOTED ELSEWHERE. LONG CROSS HATCH INDICATES NEUTRAL, REVERSE SLANT INDICATES GREEN GROUND WIRE.
2. FOR UNMARKED CONDUIT RUNS, CONTRACTOR SHALL INSTALL REQUIRED NUMBER OF WIRES FOR POWER AND/OR CONTROL OF ELEMENTS IN CIRCUIT(S) SHOWN. SIZE OF WIRE SHALL BE NO. 12, UNLESS OTHERWISE NOTED OR REQUIRED BY CODE.
3. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.

- THERMAL MAGNETIC CIRCUIT BREAKER
- 15AC 90AT — MAGNETIC ONLY CIRCUIT BREAKER (MOTOR CIRCUITS ONLY) CONTINUOUS CURRENT RATING AND TRIP SETTINGS SHOWN

- 1 — DRAWING NOTE
- 1 — ELECTRICAL CIRCUIT IDENTIFICATION
- 1 2 3 4 — MULTIPLE ELECTRICAL CIRCUITS, SEPARATE CONDUITS
- 1"C — 1 2 3 4 — MULTIPLE ELECTRICAL CIRCUITS, COMMON CONDUIT (SIZE SHOWN)
- CURRENT TRANSFORMER
- TRANSFORMER
- GROUND CONNECTION PER NEC ARTICLE 250
- LINE OR LOAD REACTOR. % IMPEDANCE SHOWN.
- CR CR — CONTROL RELAY OR CONTACTOR, DIODE SHOWN AT RIGHT
- CR CR — RELAY CONTACTS
- HAND OFF AUTO — SELECTOR SWITCH, 3 POS. SHOWN.
- PUSHBUTTON, OR SELECTOR SWITCH CONTACTS
- TEMPERATURE SWITCH OR T-STAT CONTACTS
- LIMIT SWITCH CONTACTS
- LEVEL SWITCH CONTACTS
- ETM — ELAPSED TIME METER
- 400A — FUSE
- MOTION SENSOR OR PHOTOCELL
- ISR — INTRINSICALLY SAFE RELAY
- ISB — INTRINSICALLY SAFE BARRIER

ABBREVIATIONS

A	AMPERES
AC	ALTERNATING CURRENT
AIC	AMPERE INTERRUPTING CAPACITY
AFF	ABOVE FINISHED FLOOR
A.G.	ABOVE GRADE
ANIN	ANALOG INPUT
ATS	AUTOMATIC TRANSFER SWITCH
BFV	BUTTERFLY VALVE
B.G.	BELOW GRADE
BLDG	BUILDING
BLU	BLUE
CAD	CAPTIVE AIR DEVICE
CB	CIRCUIT BREAKER
CGD	COMBUSTIBLE GAS DETECTOR
CHH	CONTROL HANDHOLE
CKT	CIRCUIT
CO	CONDUIT ONLY
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DIN	DISCRETE INPUT
DOUT	DISCRETE OUTPUT
E	EMERGENCY
EF	EXHAUST FAN
EH	ELECTRIC HEATER
ETM	ELAPSED TIME METER
EXT	EXTERIOR
F, FU	FUSE
FCV	FLOW CONTROL VALVE
FIT	FLOW INDICATING TRANSMITTER
FLUOR	FLUORESCENT
FM	FLOW METER
FVNR	FULL VOLTAGE NON-REVERSING
G, GND	GROUND
GFI	GROUND FAULT INTERRUPTER
GRS	GALVANIZED RIGID STEEL CONDUIT
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
IC	INTERRUPTING CAPACITY, ISOLATION CONTACTOR
INT	INTERIOR
ISB	INTRINSICALLY SAFE BARRIER
J, JB	JUNCTION BOX
KAIC	THOUSAND AMPERE INTERRUPTING CAPACITY
KVA	KILO VOLT-AMP
KW	KILOWATT
LC	LIGHTING CONTACTOR
LCP	LIGHTING CONTROL PANEL
LB	LOAD BANK
LEL	LOWER EXPLOSIVE LIMIT
LOS	LOCK-OUT-STOP
LP	LIGHTING PANEL
MB	METER BASE
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MD	MAIN DISCONNECT MOTION DETECTOR
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTS	MANUAL TRANSFER SWITCH
N, NEUT	NEUTRAL
NEC	NATIONAL ELECTRIC CODE
NO	NUMBER
OC	OPERATION COUNTER OCCUPANCY SENSOR
OL	OVERLOAD RELAY
ORN	ORANGE
PC	PHOTOCELL
PCV	PUMP CONTROL VALVE
PDP	PUMP DISCONNECT PANEL
PFR	PHASE FAIL RELAY
PH, Ø	PHASE
PHH	POWER HANDHOLE
PIT	PRESSURE INDICATING TRANSMITTER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PM	POWER MONITOR
PNL	PANEL
PVC	POLYVINYL CHLORIDE
PVC-RGS	PVC COATED RGS
RCPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RTM	RUN TIME METER
SCP	STATION CONTROL PANEL
SD	SMOKE DETECTOR
SF	SUPPLY FAN
SIM	SIMILAR
SPD	SURGE PROTECTOR DEVICE
SS	STAINLESS STEEL
SSPC	SMALL STATION PUMP CONTROLLER
SSRV	SOLIDE STATE REDUCED VOLTAGE STARTER
TB	TERMINAL BLOCK
TDR	TIME DELAY RELAY
TJB	TERMINAL JUNCTION BOX
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TTB	TELEPHONE TERMINAL BOARD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UPS	UNINTERRUPTIBLE POWER SUPPLY
USLC	ULTRASONIC LEVEL CONTROLLER
V	VOLT
VA	VOLT-AMP
VFD	VARIABLE FREQUENCY DRIVE
VP	VAPOR PROOF
W	WATT, WIRE
WH	WATER HEATER
WP	WEATHERPROOF
XDCR	TRANSDUCER
XFMR	TRANSFORMER
XMTR	TRANSMITTER

NOTE: NOT ALL ABBREVIATIONS OR SYMBOLS USED.

R&W ENGINEERING, INC. "Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
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HMS
DESIGNED
R&W
DRAWN
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JEFFREY L. HOWARD — STATE OF WASHINGTON — 842171 — REGISTERED PROFESSIONAL ENGINEER
2021.05.24 08:55:02-07'00'

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CITY OF LACEY

**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

ELECTRICAL LEGEND AND ABBREVIATIONS

PROJECT NO.: 19-2640 SCALE: AS SHOWN DATE: MAY 2021

SHEET
E-1
47 of 63

TBD

KENNYDALE RESERVOIR

LOAD SUMMARY					DATE: 03/09/21
QTY.	DESCRIPTION			LOAD	
	MOTOR LOADS	MOTOR SIZE			
1	ROLL-UP DOOR	0.25	HP	1.2	kVA
1	EF-1	0.05	HP	0.2	kVA
1	EF-2	0.05	HP	0.2	kVA
1	Misc Future Motor	20	HP	12.3	kVA
	NON-MOTOR LOADS				
	LIGHTS			1.0	kVA
	RECEPTACLES			2.5	kVA
	HEAT			1.5	kVA
	MISC. (SCADA PANEL, INSTRUMENTATION)			3.0	kVA
	SUBTOTAL			22.0	kVA
	LARGEST MOTOR x 25%			3.1	kVA
	NON-MOTOR LOADS x 25%			2.0	kVA
	SPARE CAPACITY (25%)			6.8	kVA
	NEW LOAD TOTAL:			33.8	kVA 93.9 AMPS
	TOTAL:			33.8	kVA 93.9 AMPS
	SERVICE SIZE @ 208V, 3-PH:				100 AMPS

LUMINAIRE SCHEDULE

TYPE	COUNT	LOCATION	MANUFACTURER	WATTS	DESCRIPTION
A	2	PARKING LOT	CREE XSPSM-D-HT-4ME-8L-40K7-UL-XA-SPR3BLS OR APPROVED	60	AREA LUMINAIRE, TYPE 4ME DISTRIBUTION, 8,000 LUMEN PACKAGE, 40K, 70 CRI, 120-277V, BACKLIGHT CONTROL SHIELD AND PHOTOCELL RECEPTACLE. HORIZONTAL TENON MOUNTED.
B1	5	STAIRCASE	LITHONIA #DSXF1-LED-P1-40K-HMF-MVOLT-YKC62 OR APPROVED	21	LED FLOOD LUMINAIRE, HORIZONTAL MEDIUM FLOOD. 40K COLOR TEMPERATURE, 2575 LUMENS. DIE CAST ALUMINUM HOUSING W/BRONZE FINISH, YOKE MOUNTED.
B2	4	SECOND FLOOR	LITHONIA #DSXW1-LED-20C-1000-40K-T3M-MVOLT-SF-DDBXD OR APPROVED	73	LED FLOOD LUMINAIRE, TYPE 3 MEDIUM DISTRIBUTION, 40K COLOR TEMPERATURE, 7573 LUMENS, 1000mA ENGINE, SINGLE FUSE. DIE CAST ALUMINUM HOUSING W/BRONZE FINISH.
C	6	FIRST FLOOR	LITHONIA #VAP-8000LM-FST-MD-MVOLT-40K-90CRI-SF OR APPROVED	67	MOISTURE/DUST RESISTANT LED LUMINAIRE. FROSTED POLYCARBONATE LENS, MEDIUM DISTRIBUTION, 40K, 8000 LUMENS, 90CRI, MVOLT, SURFACE MOUNT.
D1	1	ABOVE EXTERIOR DOOR	LITHONIA #DSXW1-LED-10C-530-40K-T2M-MVOLT-SF-DDBXDOR APPROVED	19	WALL MOUNT LUMINAIRE. 10 LED, 530mA ENGINE, 40K COLOR TEMPERATURE, TYPE 2 MEDIUM DISTRIBUTION, 2102 LUMENS, SINGLE FUSE. WEATHER RESISTANT ALUMINUM HOUSING W/DARK BRONZE FINISH AND CLEAR POLYCARB LENS.
D2	1	TOP OF RESERVOIR	LITHONIA #DSXWPM LED-10C-530-40K-T2M-MVOLT-SF-DDBXD OR APPROVED	20	POLE MOUNT LUMINAIRE. 10 LED, 530mA ENGINE, 40K COLOR TEMPERATURE, TYPE 2 MEDIUM DISTRIBUTION, 2102 LUMENS, SINGLE FUSE. WEATHER RESISTANT ALUMINUM HOUSING W/DARK BRONZE FINISH AND CLEAR POLYCARB LENS.
F	3	ACCESS TUBE	LUMINAIRE LED #ARV13-MIN10-25W-40K-120-OP-BRZ OR APPROVED	25	SURFACE MOUNT LUMINAIRE. 40K COLOR TEMPERATURE, 2358 LUMENS, DIMMABLE. VANDAL RESISTANT POLYCARBONATE HOUSING W/DARK BRONZE FINISH AND OPAL POLYCARBONATE LEN.

SHEET NOTES:

A. ALL CONDUCTORS ARE COPPER, UNLESS SPECIFICALLY NOTED OTHERWISE.

B. GROUNDING METHOD SHALL BE VIA RACEWAY AND EQUIPMENT GROUNDING CONDUCTOR PER NEC ARTICLE 250.

C. ALL RECEPTACLES SHALL BE LISTED "WEATHER-RESISTANT" TYPE, PER NEC 406.9.

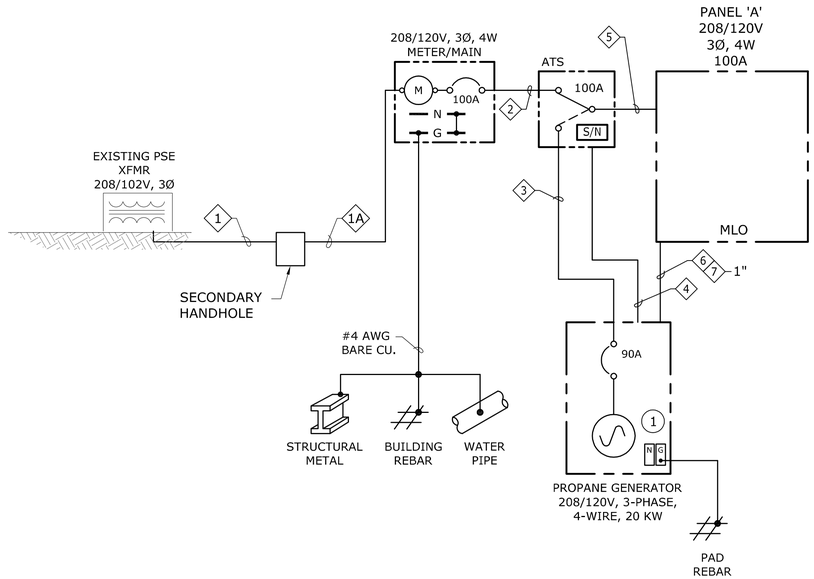
KEYED NOTES:

(1) REMOVE NEUTRAL-GROUND STRAP. SYSTEM IS SOLIDLY GROUNDED THROUGH ATS AND IS NOT A SEPARATELY DERIVED SYSTEM.

PANEL: B'	BUS: 100 A	DATE: 05/19/21	VOLTAGE: 120 / 208 VOLTS, 3 PHASE, 4 WIRE
FEEDER: SEE ONE-LINE DIAGRAM	MAIN BRKR: NONE		MOUNTING: SURFACE

CKT NO.	CIRCUIT DESCRIPTION	CKT BKR AMPS/POLE	LOAD TYPE	LOAD VA	PHASE	LOAD VA	LOAD TYPE	CKT BKR AMPS/POLE	CIRCUIT DESCRIPTION	CKT NO.
1	ROLL-UP DOOR	1-20	M	648	A	947	L	1-30	LIGHTING INVERTER	2
3	FAN - ACCESS TUBE (EF-2)	1-20	M	100	B			1-20	SPARE	4
5	FAN - CONTROL ROOM (EF-1)	1-20	M	100	C	900	R	1-20	RECEPTS - GROUND LEVEL	6
7	SCADA PANEL	1-20	Z	1500	A	540	R	1-20	RECEPTS - STORAGE PLATFORM	8
9	REPEATER PANEL (FUTURE)	1-30	Z	2400	B	1080	R	1-20	RECEPTS - PLATFORM & TOP OF RESERVOIR	10
11	CL2/pH MONITORING SYSTEM	1-20	Z	500	C	1500	H	1-20	HEATER	12
13	SEISMIC CONTROLLER	1-20	Z	500	A			1-20	SPARE	14
15	GENERATOR BATTERY CHARGER	1-20	Z	1200	B			1-20	SPARE	16
17	GENERATOR BLOCK HEATER	1-20	Z	1500	C			1-20	SPARE	18
19	SPACE				A				SPACE	20
21	SPACE				B				SPACE	22
23	SPACE				C				SPACE	24
25	SPACE				A				SPACE	26
27	SPACE				B				SPACE	28
29	SPACE				C				SPACE	30
31	SPACE				A				SPACE	32
33	SPACE				B				SPACE	34
35	SPACE				C				SPACE	36
37	SPACE				A				SPACE	38
39	SPACE				B				SPACE	40
41	SPACE				C				SPACE	42

	CONNECTED LOAD		.....NOTES.....
LOAD PER PHASE (VA)	A=	4,135 VA	1.
	B=	4,780 VA	
	C=	4,500 VA	2.
LOAD PER PHASE (AMPS)	A=	34.5 A	3.
	B=	39.8 A	
	C=	37.5 A	4.
TOTAL LOAD (KVA)		13.4 KVA	5.
TOTAL LOAD AMPS		37.2 A	



ONE-LINE DIAGRAM

SCALE: NTS

1 / E-2

R&W ENGINEERING, INC.
"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION

NOTICE

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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PROFESSIONAL ENGINEER
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**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

ONE-LINE DIAGRAM AND PANEL SCHEDULE

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET E-2

W:\WF\483_Murray Smith Assoc\138_Lacey 337 Res\002_60% Dsn\DWG\E-2.dwg E-2 5/20/2021 1:13 PM HEIDIS 19.1s (LMS Tech)

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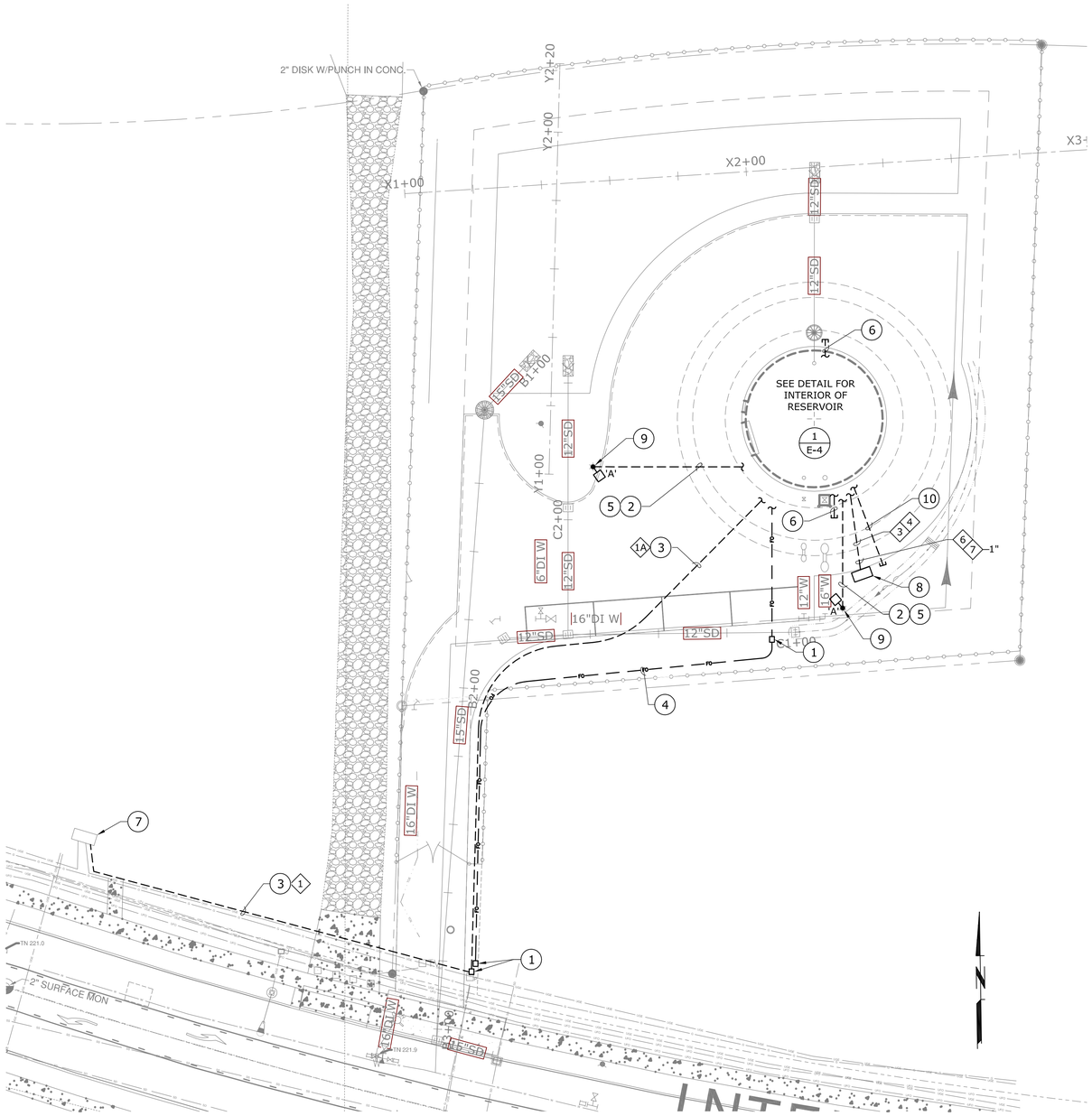
KENNYDALE RESERVOIR



SITE POWER SERVICE PLAN

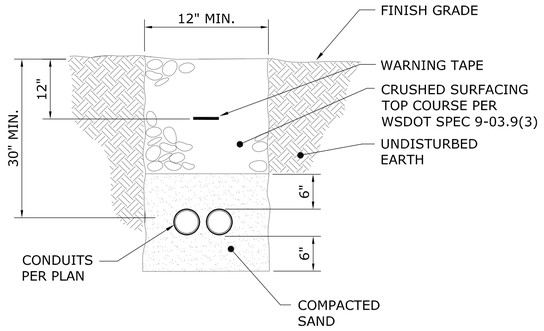
SCALE: 1" = 20'-0"

1

-

20 10 0 20 40

SCALE IN FEET



TYPICAL CONDUIT TRENCH

SCALE: NTS

2

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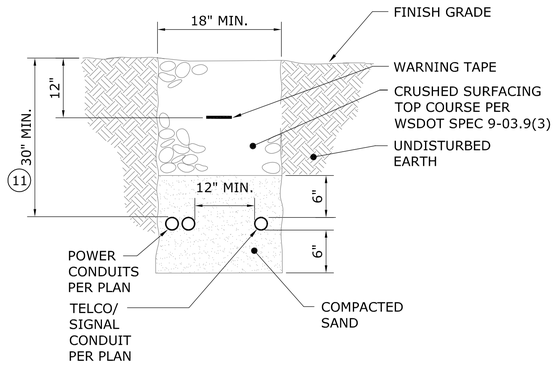

JOINT USE CONDUIT TRENCH

SCALE: NTS

3

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SHEET NOTES:

A. ALL RECEPTACLES SHALL BE LISTED "WEATHER-RESISTANT" TYPE, PER NEC 406.9.

B. PROVIDE CONDUIT EXPANSION JOINTS AS MAY BE REQUIRED.

KEYED NOTES:

1. PROPOSED WSDOT 233 STANDARD DUTY PULLBOX FOR UTILITY.
2. INSTALL 1"C, W/(1) 10 AWG, P; (1) 10 AWG, N; & (1) 10 AWG, G TO POWER PARKING LOT LIGHTS. EXTEND CONDUITS BACK TO PANEL 'A'.
3. INCOMING POWER SERVICE. VERIFY TRENCHING REQUIREMENTS WITH PSE.
4. INSTALL 2"C, W/PULL-STRING, FOR INCOMING FIBER SERVICE. SOURCE TO BE DETERMINED.
5. INSTALL 2"C, W/PULL-STRING, FROM LIGHT POLE TO INTERIOR OF RESERVOIR FOR FUTURE POLE MOUNTED EXTERIOR CAMERA.
6. INSTALL 2"C., W/PULL-STRING, FOR CATHODIC PROTECTION. STUB FOR FUTURE USE.
7. EXISTING PSE TRANSFORMER.
8. LIQUID PROPANE GENERATOR. LIQUID PROPANE TANK TO BE LOCATED A MINIMUM OF 10-FT AWAY FROM GENERATOR. COORDINATE LOCATION WITH OWNER.
9. AREA LIGHT WITH PHOTOCELL RECEPTACLE. INSTALL PHOTOCELL (ACUITY DLL127-1.5 OR APPROVED) AND CONNECT PER MANUFACTURE RECOMMENDATION. REFER TO LUMINAIRE SCHEDULE ON SHEET E-2 AND LIGHT POLE DETAIL ON SHEET C-3 FOR ADDITIONAL INFORMATION.
10. INSTALL 2-6"C., W/PULL-STRING, FOR SPARES. STUB IN GRASSY AREA EAST OF THE GENERATOR.
11. VERIFY TRENCH DEPTH AND COVERING FOR INCOMING SERVICE CONDUIT WITH LOCAL UTILITY AND CIVIL DISCIPLINE FOR INTERSECTING PIPES.

R&W ENGINEERING, INC.
"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

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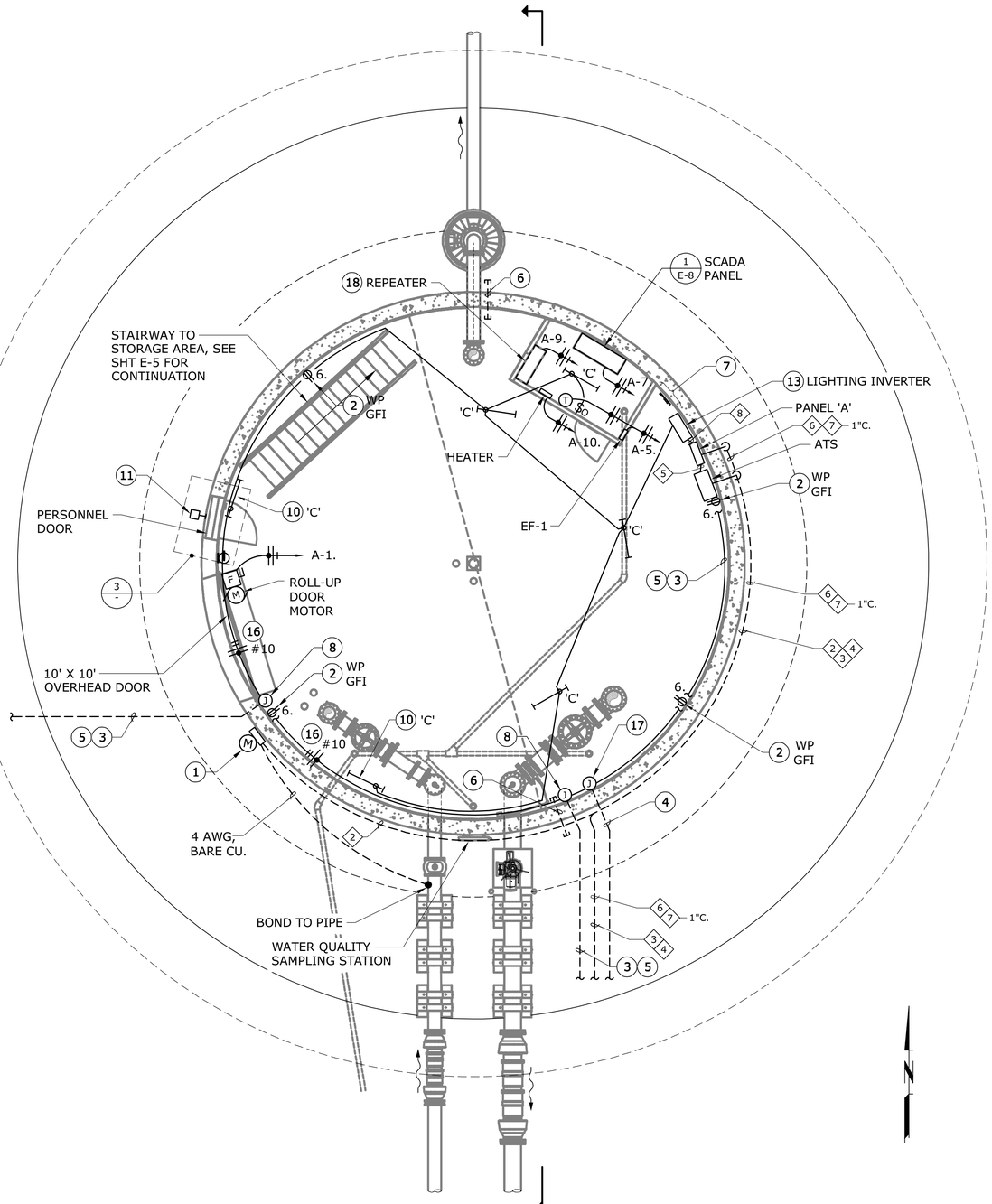
CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

SITE POWER PLANS

PROJECT NO.: 19-2640 SCALE: AS SHOWN DATE: MAY 2021

SHEET E-3



RESERVOIR GROUND LEVEL PLAN - POWER

SCALE: 3/16"=1'-0"

1 / E-4

- / E-7

SHEET NOTES:

A. ALL RECEPTACLES SHALL BE LISTED "WEATHER-RESISTANT" TYPE, PER NEC 406.9.

B. PROVIDE CONDUIT EXPANSION JOINTS AS MAY BE REQUIRED.

C. BOND ALL STRUCTURAL METAL (INCLUDING STAIRWAYS, CATWALKS, ACCESS TUBE LADDER, SAFETY RAILS) AND REBAR TO GROUNDING ELECTRODE SYSTEM, PER NEC.

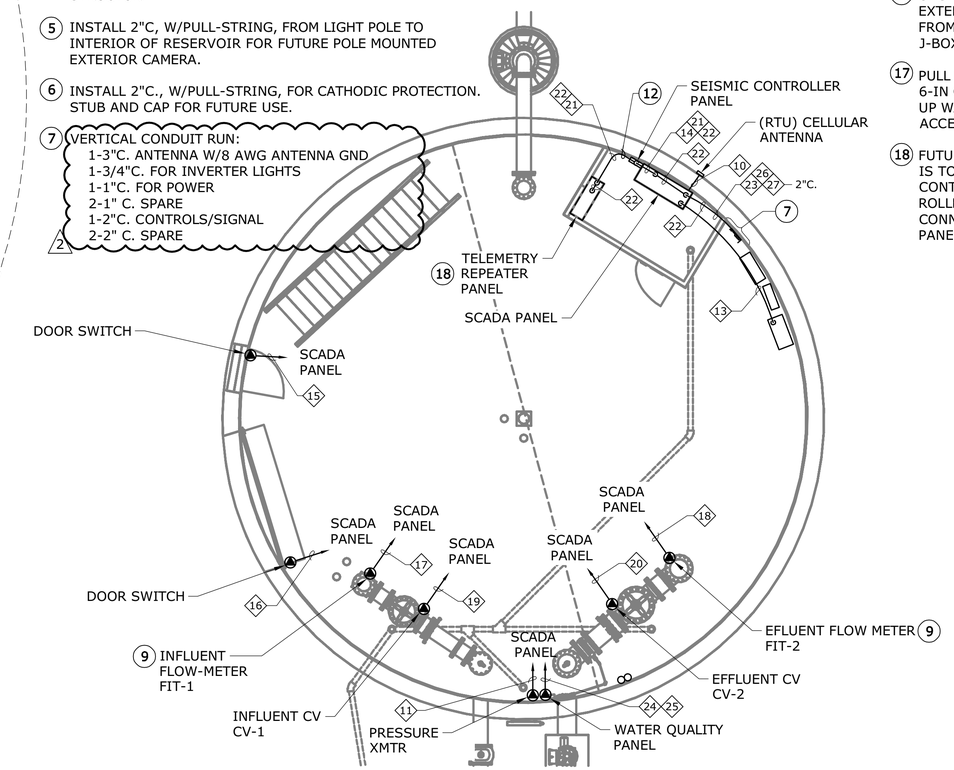
D. ALL CONDUCTORS FOR LIGHTS, RECEPTACLES, AND FAN SHALL BE 10 AWG.

E. LIGHTING LAYOUT IS DESIGNED TO PROVIDE THE FOLLOWING AVERAGE ILLUMINANCE: GROUND FLOOR 28 FC, STORAGE PLATFORM 25 FC, STAIRS 15 FC.

F. ALTERNATE OPTION: CONTRACTOR MAY INSTALL (4) 4-IN "SPARE" CONDUITS IN LIEU OF THE (2) 6-IN "SPARE" CONDUITS CALLED OUT IN KEYED NOTES 4 AND 17. MAKE SIZE ADJUSTMENTS TO PULL BOX(ES) AS REQUIRED. FOR PULL BOX(ES) IN VERTICAL RUN, PER KEYED NOTE 17, CONTRACTOR MAY USE ONE PULL BOX AND TERMINATE ALL FOUR 4-IN CONDUITS IN BOX, USE TWO PULL BOXES AND TERMINATE (2) 4-IN CONDUITS PER BOX, OR USE FOUR INDIVIDUAL PULL BOXES. CONTRACTOR MAY USE WIREWAYS AS PULL BOXES. PULL BOX(ES) TO BE SIZED PER NEC 314.28. SEE ALSO SHEET E-13.

KEYED NOTES:

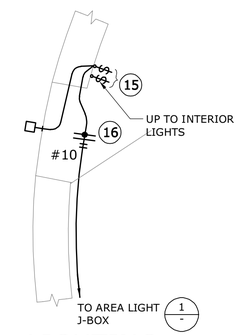
1. PROVIDE AND INSTALL METER/MAIN PER PSE REQUIREMENTS.
2. RECEPTACLES LOCATED INSIDE RESERVOIR STRUCTURE.
3. INSTALL 1"C, W/(1) 10 AWG, P; (1) 10 AWG, N; & (1) 10 AWG, G TO POWER PARKING LOT LIGHTS. EXTEND CONDUITS BACK TO INVERTER.
4. INSTALL 2-6"C., W/PULL-STRING, FROM TOP OF RESERVOIR TO GRASSY AREA SOUTH OF RESERVOIR AS SPARES. SEE SHEET E-7 FOR ROUTING INSIDE STRUCTURE.
5. INSTALL 2"C, W/PULL-STRING, FROM LIGHT POLE TO INTERIOR OF RESERVOIR FOR FUTURE POLE MOUNTED EXTERIOR CAMERA.
6. INSTALL 2"C., W/PULL-STRING, FOR CATHODIC PROTECTION. STUB AND CAP FOR FUTURE USE.
7. VERTICAL CONDUIT RUN:
   1-3"C. ANTENNA W/8 AWG ANTENNA GND
   1-3/4"C. FOR INVERTER LIGHTS
   1-1"C. FOR POWER
   2-1" C. SPARE
   1-2"C. CONTROLS/SIGNAL
   2-2" C. SPARE
8. STUB-UP AND CAP FUTURE CAMERA CONDUIT INSIDE OF BUILDING, NEAR J-BOX FOR EXTERIOR LIGHTING CIRCUIT.
9. FLOW METER MOUNTED IN VERTICAL SECTIONS OF PIPE, AT APPROX. ELEVATION 240' AND 250' (SEE MECHANICAL PLANS).
10. INSTALL TYPE 'C' LUMINAIRE @ 12' ABOVE FINISHED FLOOR. WALL MOUNT AT ANGLE USING MOUNTING BRACKET, SEE DETAIL 8/E-7. CONNECT TO CKT A-2.
11. INSTALL TYPE 'D' LUMINAIRE ABOVE DOOR. CONNECT TO INVERTER.
12. REPEATER PANEL ANTENNA CABLE WIRING INSTALLED. MOUNT CONDUIT TO UNI-STRUT. MOUNT STRUT ON 5' CENTER.
13. EMERGENCY LIGHTING INVERTER SYSTEM, UNIT SHALL BE UL924 LISTED, NFPA 101 SELF-TESTING COMPLIANT AND COMPATIBLE WITH LED LIGHTING LOADS. UNIT SHALL MEET OR EXCEED THE FOLLOWING MINIMUM REQUIREMENTS: 98% EFFICIENT; 1.2 KVA (KW) POWER RATING; (2) 20 AMP, 1-POLE CB'S; 3% THD (LINEAR LOADS), MAXIMUM; AND 90-MINUTE RUN TIME. UNIT SHALL BE 1-PHASE WITH 120V INPUT AND 120V OUTPUT, AND SHALL HAVE DRY CONTACTS FOR MONITORING ALARMS AND/OR STATUS. UNIT SHALL BE MYERS ILLUMINATOR CM OR EQUIVALENT. PROVIDE FACTORY START-UP.
14. NOT USED.
15. INSTALL AN EMERGENCY SHUNT RELAY (ESR) WITH (2) CONTACTS, IN A SEPARATE 1-GANG BOX ADJACENT TO LIGHT SWITCHES. ESR TO BE POWERED FROM NEAREST RECEPTACLE (NORMAL POWER) CKT. SEE DETAIL 5/E-8.
16. UNSWITCHED HOT FROM PANEL "A" TO EXTERIOR LIGHT SWITCH; SWITCHED HOT FROM LIGHT SWITCH TO AREA LIGHTS (VIA J-BOXES).
17. PULL BOX(ES) IN VERTICAL RUN OF BOTH 6-IN CONDUITS. CONDUITS ARE ROUTED UP WALL AND FOLLOW STAIRCASE TO ACCESS TUBE.
18. FUTURE REPEATER PANEL. ANTENNA CABLE IS TO BE INSTALLED AS PART OF THE CONTRACT. LEAVE 36-IN "PIGTAIL" ROLLED UP IN SCADA ROOM FOR CONNECTING TO "FUTURE" REPEATER PANEL.



RESERVOIR GROUND LEVEL PLAN - SIGNAL

SCALE: 3/16"=1'-0"

2 / E-4



LIGHTING CONTROLS AT DOOR

SCALE: NTS

3 / E-4

R&W ENGINEERING, INC.
"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION
2	01/21/22	JLH	ADDENDUM NO. 4
1	12/23/21	JLH	ADDENDUM NO. 1

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

RESERVOIR GROUND LEVEL POWER & SIGNAL PLANS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET
E-4
50 of 63

KENNYDALE RESERVOIR TBD

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KENNYDALE RESERVOIR

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SHEET NOTES:

A. INDIVIDUAL CONDUIT TAPS TO LIGHTS AND RECEPTACLES NOT SHOWN FOR CLARITY. CONTRACTOR TO INSTALL J-BOXES/CONDULETS AS REQUIRED TO CONNECT LIGHTS, RECEPTACLES, AND FAN.

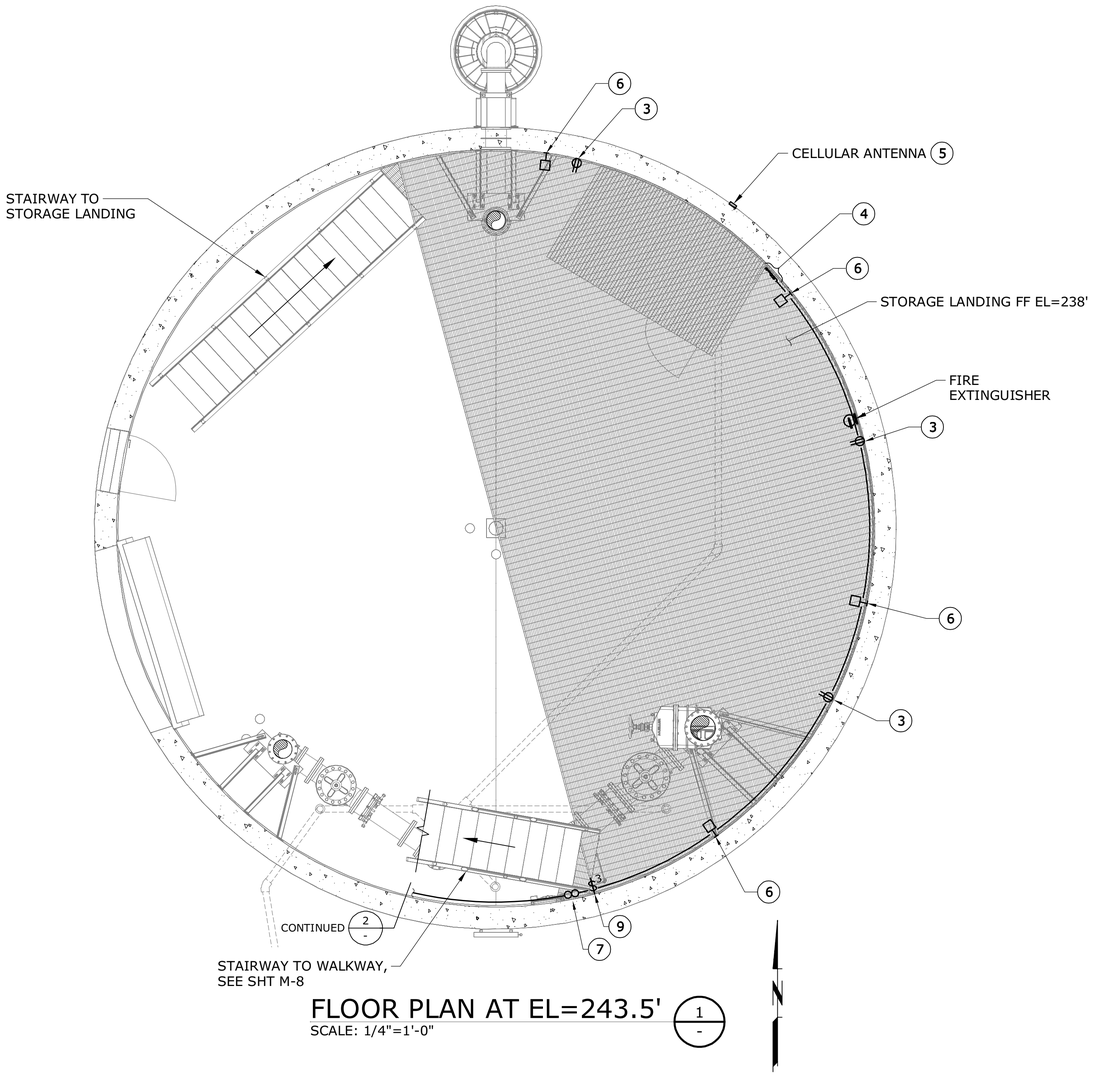
B. ALL CONDUCTORS FOR LIGHTS, RECEPTACLES, AND FAN SHALL BE 10 AWG.

C. BOND ALL STRUCTURAL METAL (INCLUDING STAIRWAYS, CATWALKS, ACCESS TUBE LADDER, SAFETY RAILS) AND REBAR TO GROUNDING ELECTRODE SYSTEM, PER NEC.

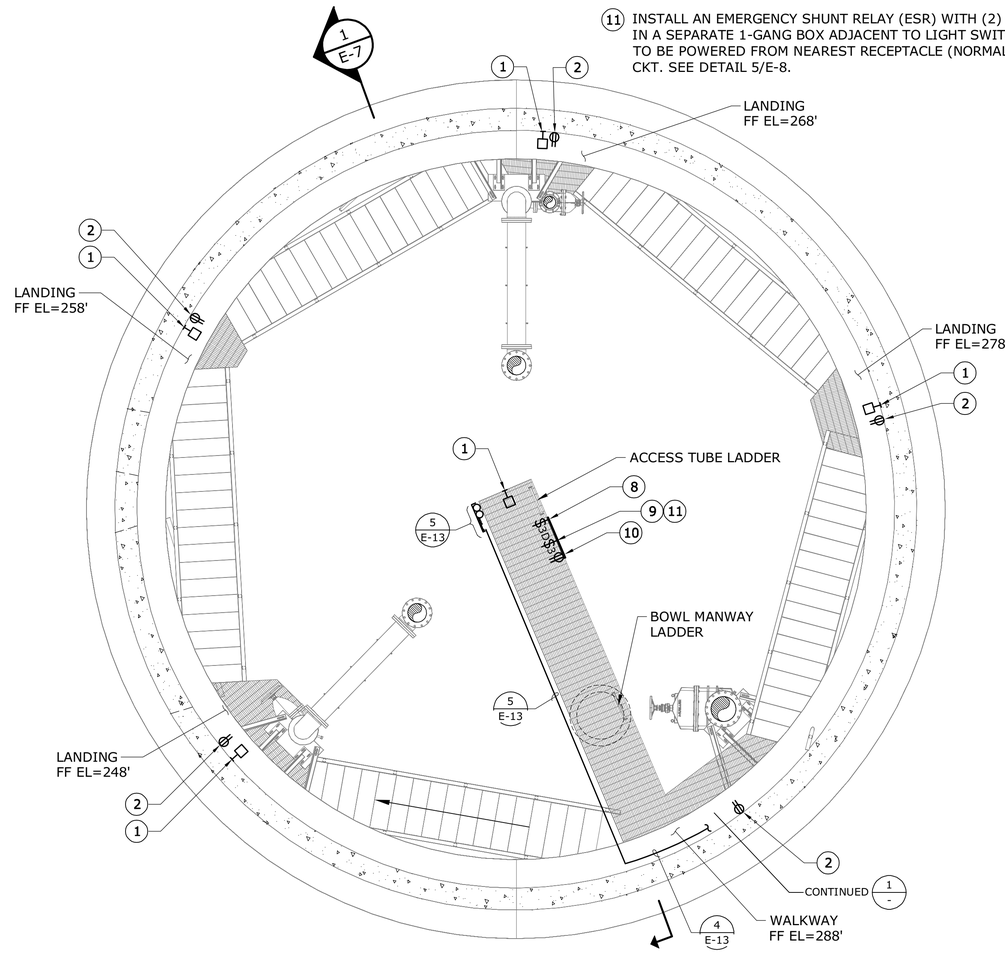
D. LIGHTING LAYOUT IS DESIGNED TO PROVIDE THE FOLLOWING AVERAGE ILLUMINANCE: GROUND FLOOR 28 FC, STORAGE PLATFORM 25 FC, STAIRS 15 FC.

KEYED NOTES:

1. INSTALL TYPE 'B1' LUMINAIRE @ 8' ABOVE PLATFORM. VERIFY MOUNTING METHOD WITH OWNER PRIOR TO INSTALL. CONNECT TO INVERTER. SEE SHEET E-8 FOR INVERTER PANEL SCHEDULE.
2. PROVIDE CONVENIENCE RECEPTACLE AT EACH LANDING. CONNECT TO CKT A-10.
3. PROVIDE CONVENIENCE RECEPTACLE ON STORAGE PLATFORM. CONNECT TO CKT A-8.
4. VERTICAL CONDUIT RUN (SEE KEY NOTE 7, SHEET E-4.) 1
5. MOUNT CELLULAR ANTENNA ON THE EXTERIOR WALL DIRECTLY BEHIND THE RTU PANEL. SEE SHEET E-8 FOR MOUNTING DETAIL - PANORAMA ANTENNA CABLE LENGTH = 16-FEET.
6. INSTALL TYPE 'B2' LUMINAIRE @ 8' ABOVE PLATFORM IN STORAGE AREA. VERIFY MOUNTING METHOD WITH OWNER PRIOR TO INSTALL. CONNECT TO INVERTER. SEE SHEET E-8 FOR INVERTER PANEL SCHEDULE.
7. RUN (2) 6-IN CONDUIT SPARES DOWN TO LOWER FLOOR, UNDERSLAB, AND OUT TO GRASSY AREA. RUN UP, ALONG WALL, FOLLOWING STAIRWAY TO TOP OF RESERVOIR ACCESS TUBE. SEE DETAILS ON SHEET E-13.
8. DIMMABLE 3-WAY SWITCH, STRUT MOUNTED, FOR ACCESS TUBE LIGHTING. MOUNT 48" ABOVE CATWALK.
9. 3-WAY SWITCH, STRUT MOUNTED, FOR STAIRWAY LIGHTING. MOUNT 48" ABOVE CATWALK. LOCATE ESR BOX BELOW SWITCH.
10. RECEPTACLE, STRUT MOUNTED. RUN TAP FROM RECEPTACLE TO LIGHT SWITCH FOR SENSING REGULAR POWER.
11. INSTALL AN EMERGENCY SHUNT RELAY (ESR) WITH (2) CONTACTS, IN A SEPARATE 1-GANG BOX ADJACENT TO LIGHT SWITCHES. ESR TO BE POWERED FROM NEAREST RECEPTACLE (NORMAL POWER) CKT. SEE DETAIL 5/E-8.



FLOOR PLAN AT EL=243.5' 1/-
SCALE: 1/4"=1'-0"



FLOOR PLAN AT EL=290' 2/-
SCALE: 1/4"=1'-0"

R&W ENGINEERING, INC.
"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
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NO.	DATE	BY	REVISION
1	01/21/22	JLH	ADDENDUM NO. 4

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

RESERVOIR POWER PLAN

PROJECT NO.: 19-2640 SCALE: AS SHOWN DATE: MAY 2021

SHEET
E-5
51 of 63

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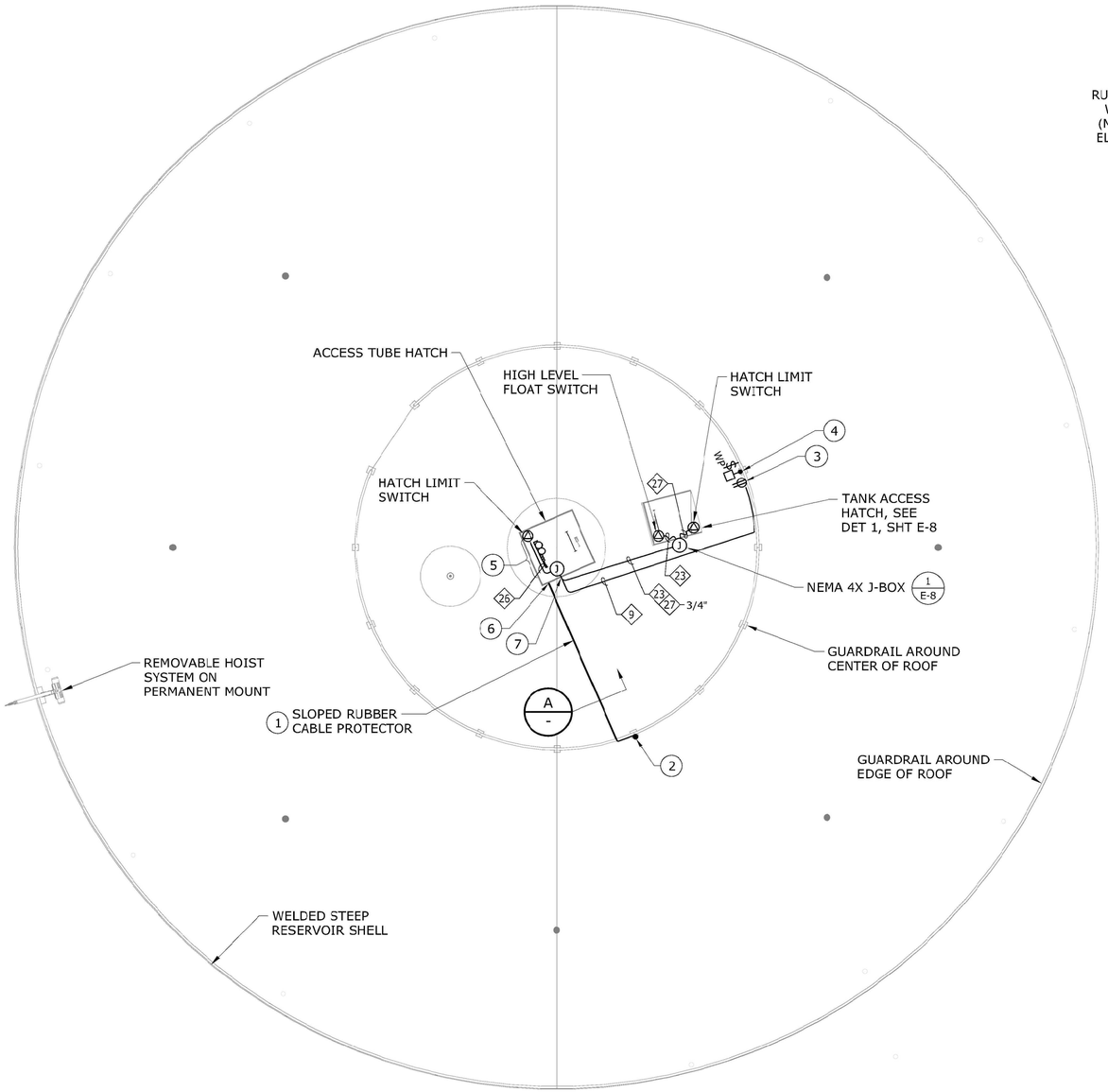
KENNYDALE RESERVOIR

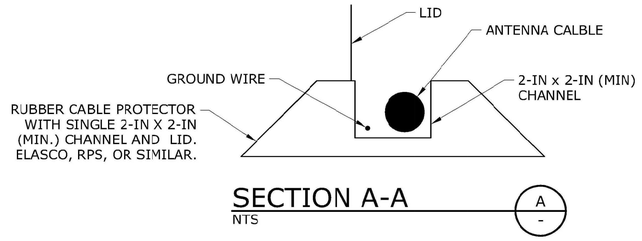
W:\WF483_Murray Smith Assoc\138_Lacey 337 Res\002_60% Dsn\DWG\E-6.dwg E-5 5/20/2021 3:01 PM HEIDIS 19.1s (LMS Tech)



RESERVOIR ROOF PLAN

SCALE: 3/16"=1'-0"

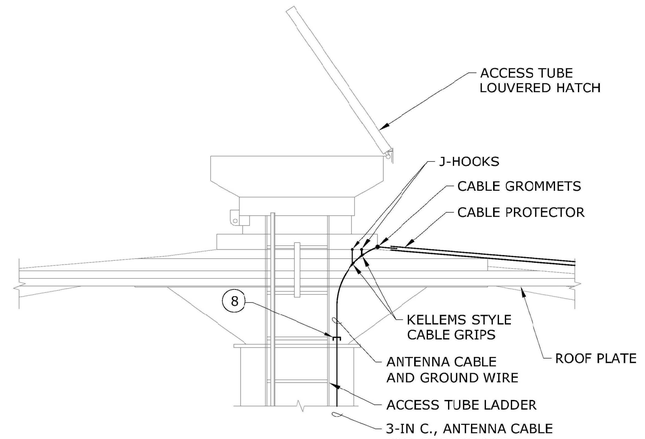
1 / E-6



SECTION A-A

NTS

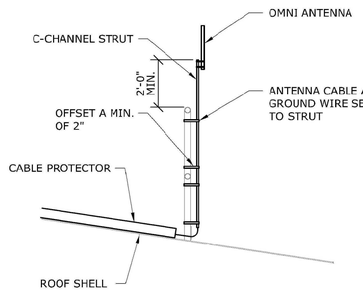
A / -



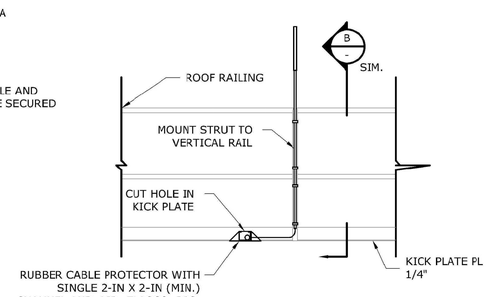
LADDER SECTION - ANTENNA

SCALE: NTS

1 / -



SECTION B-B



RAILING DETAIL - ANTENNA

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

3 / -

SHEET NOTES:

A. ALL CONDUCTORS FOR LIGHTS, RECEPTACLES, AND FAN SHALL BE 10 AWG.

B. BOND ALL STRUCTURAL METAL (INCLUDING STAIRWAYS, CATWALKS, ACCESS TUBE LADDER, SAFETY RAILS) AND REBAR TO GROUNDING ELECTRODE SYSTEM, PER NEC.

KEYED NOTES:

1. ROUTE CABLE FOR ANTENNA AND GROUND IN SURFACE MOUNTED CABLE PROTECTOR.
2. ANTENNA, MOUNTED TO HANDRAIL.
3. PROVIDE CONVENIENCE RECEPTACLE.
4. INSTALL TYPE 'D2' LUMINAIRE. SEE DETAIL 2/E-13 FOR RAILING MOUNTING DETAIL.
5. VERTICAL CONDUIT RUN, SEE DETAIL 5/E-13.
6. WATER-TIGHT, THROUGH BULKHEAD TYPE CABLE GLAND THROUGH SIDE WALL OF HATCH.
7. PROVIDE AND INSTALL THROUGH BULKHEAD FOR CONDUIT EXITING ACCESS TUBE HATCH. INSTALL LB CONDUIT ON BULKHEAD FITTING AND ROUTE CONDUIT ALONG HATCHES, ON TOP OF RESERVOIR OVER TO RAILING FOR CONNECTION TO FLOOD LIGHT AND RECEPTACLE.
8. CONDUIT BUSHING.

R&W ENGINEERING, INC. "Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 1C7
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION

NOTICE

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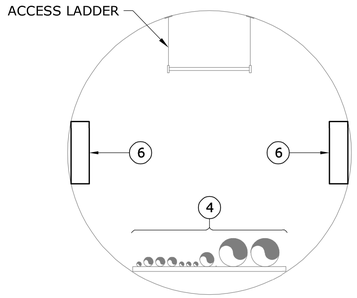
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

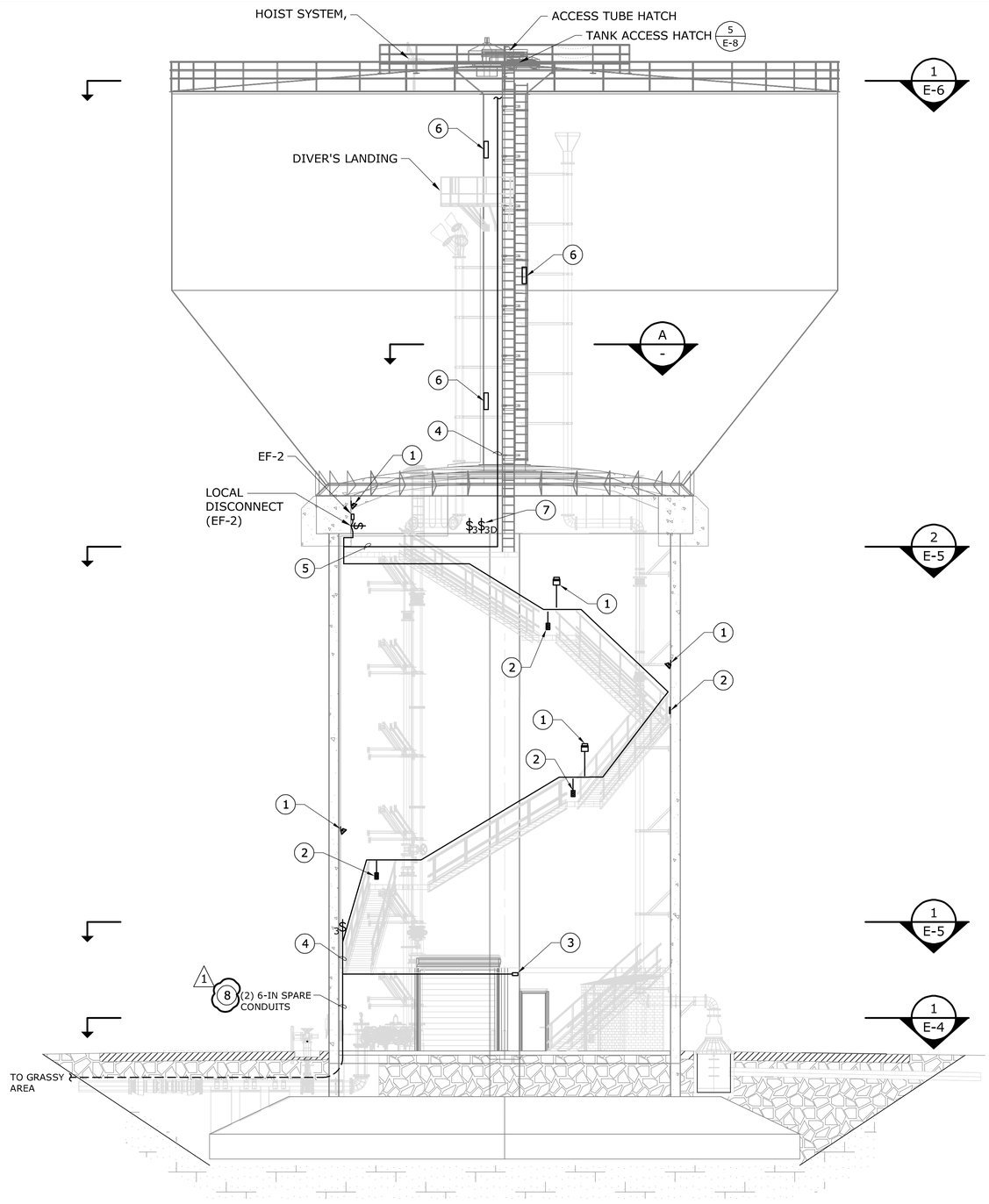
RESERVOIR POWER PLAN

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET
E-6
52 of 63



SECTION A-A
SCALE: 3/4"=1'-0"



RESERVOIR SECTION
SCALE: 1/8"=1'-0"

SHEET NOTES:

A. INDIVIDUAL CONDUIT TAPS TO LIGHTS AND RECEPTACLES NOT SHOWN FOR CLARITY. CONTRACTOR TO INSTALL J-BOXES/CONDULETS AS REQUIRED TO CONNECT LIGHTS, RECEPTACLES, AND FAN TO PANEL 'A' ON MAIN FLOOR. ALL LIGHTS ON SAME CIRCUIT. ALL RECEPTACLES ON SAME CIRCIT. FAN ON DEDICATED CIRCUIT. RUN ALL CIRCUITS IN SAME 1-INCH CONDUIT.

B. ALL CONDUCTORS FOR LIGHTS, RECEPTACLES, AND FAN SHALL BE 10 AWG.

C. BOND ALL STRUCTURAL METAL (INCLUDING STAIRWAYS, CATWALKS, ACCESS TUBE LADDER, SAFETY RAILS) AND REBAR TO GROUNDING ELECTRODE SYSTEM, PER NEC.

KEYED NOTES:

1. INSTALL TYPE 'B' LUMINAIRE @ 8' ABOVE STAIR PLATFORM. VERIFY MOUNTING METHOD WITH OWNER PRIOR TO INSTALL.
2. PROVIDE CONVENIENCE RECEPTACLE AT EACH LANDING.
3. MOUNT J-BOX ON UNDER SIDE OF FLOOR/CEILING. ROUTE CONDUITS UP FROM MAIN FLOOR ALONG WALL SEE ALSO E-4.
4. ROUTE CONDUIT ALONG WALL, FOLLOWING STAIRS UP TO TOP PLATFORM. ROUTE ALONG PLATFORM, OVER TO CENTRAL SHAFT ACCESS TUBE AND CONTINUE UP TO TOP OF RESERVOIR. SEE 5/E-13.
5. ROUTE ALONG WALKWAY OVER TO CENTRAL SHAFT, OPPOSITE OF LADDER.
6. INSTALL (3) TYPE 'F' LUMINAIRE IN TUBE, EVENLY SPACED IN A STAGGERED PATTERN. VERIFY MOUNTING METHOD WITH OWNER PRIOR TO INSTALL.
7. PROVIDE STRUT MOUNTED 3-WAY SWITCHES, ADJACENT TO LADDER; ONE FOR STAIRWAT LIGHTS, ONE FOR ACCESS TUBE LIGHTS. INSTALL SECOND 3-WAY SWITCH NEAR TOP OF LADDER (NOT SHOWN FOR CLARITY) FOR ACCESS TUBE LIGHTS.
8. ALTERNATE OPTION: CONTRACTOR MAY INSTALL (4) 4-IN "SPARE" CONDUITS IN LIEU OF THE (2) 6-IN "SPARE" CONDUITS. SEE SHEET E-13

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"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

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1	12/23/21	JLH	ADDENDUM NO. 1

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842171
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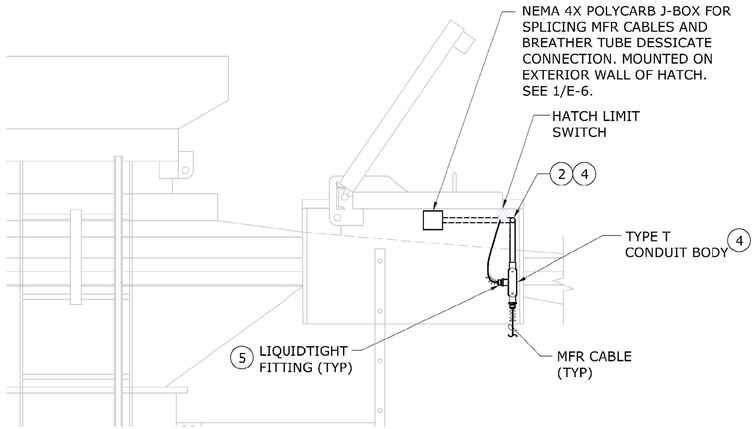
RESEVOIR SECTION

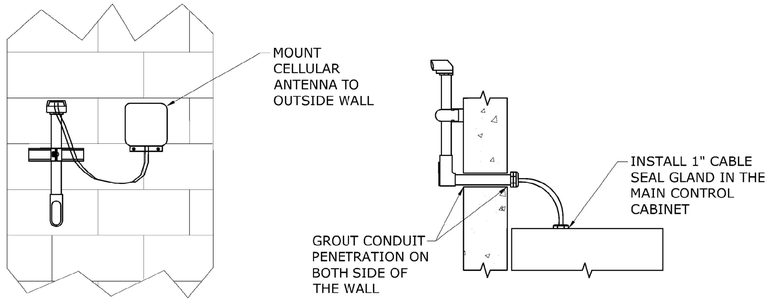
PROJECT NO.: 19–2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET
E-7
53 of 63

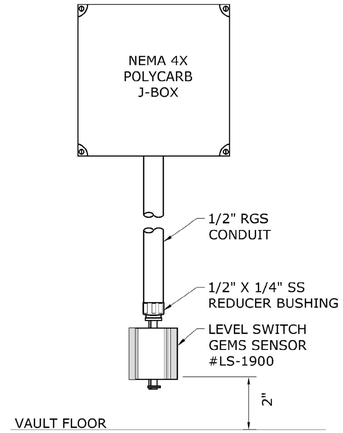


CONDUIT BODY

RESERVOIR INSTRUMENT DETAIL
SCALE: NTS — 1 / E-8



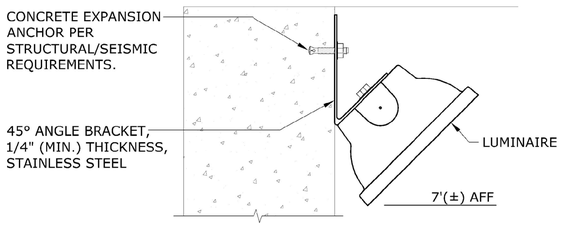
CELLULAR ANTENNA MOUNTING DETAIL
SCALE: NTS — 2 / E-8



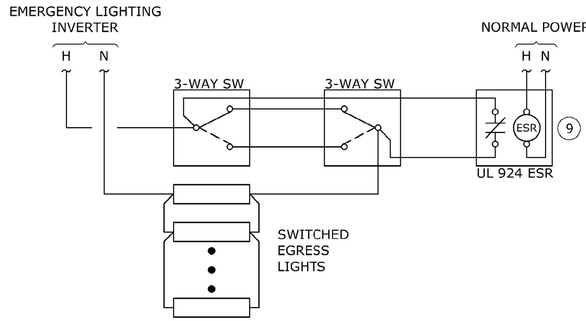
FLOOD SWITCH DETAIL
SCALE: NTS — 4 / E-8

KEY NOTES:

1. NOT USED.
2. PROVIDE AND INSTALL MYERS THROUGH BULKHEAD FITTING FOR WATER-TIGHT CONDUIT PENETRATION INTO RESERVOIR.
3. PROVIDE AND INSTALL 2" PVC CONDUIT FOR LEVEL TRANSDUCER STILLING WELL. MOUNT TO RESERVOIR INTERIOR LADDER STAND-OFFS WITH FRP STRUT AND POLYURETHANE FASTENERS. TRANSDUCER ELEVATION TO BE 1" ABOVE FLOOR.
4. ALL CONDUIT AND FITTINGS ENTERING THE RESERVOIR TO BE PVC COATED OR NYLON.
5. NYLON FITTING, NON METALLIC MESH, LIQUIDTIGHT DELUXE CORD GRIP.
6. RADIO ANTENNA TERMINATION. THE CONTRACTOR SHALL MAKE ALL TERMINATIONS WEATHER-TIGHT. PROVIDE HEAT-SHRINK INSULATION OVER TERMINATION.
7. GROUND ANTENNA AND CONDUIT USING 10 AWG EQUIPMENT GROUNDING CONDUCTOR.
8. CONNECT 10 AWG EQUIPMENT GROUNDING CONDUCTOR AND TERMINATE 4 AWG BARE CU. BONDING CONDUCTOR TO GROUNDING HUB.
9. PROVIDE ESR WITH (2) CONTACT. FOR ESR LOCATED NEAR BUILDING DOOR, CONNECT ONE CONTACT TO THE INTERIOR LIGHTING 3-WAY SWITCHED, AS SHOWN; CONNECT OTHER CONTACT TO EXTERIOR LIGHT SWITCH. FOR EST LOCATED AT BOTTOM OF ACCESS TUBE (UPPER PLATFORM), CONNECT ONE CONTACT TO TUBE ACCESS LIGHTING 3-WAY SWITCHED, AND OTHER CONTACTOR TO STAIRWAY 3-WAY SWITCHES, AS SHOWN.



LUMINAIRE BRACKET DETAIL
4 / E-8



STAIRWELL LIGHTING CONTROL
SCALE: NTS — 5 / E-8

PANEL: LIGHTING INVERTER			BUS: 20A				VOLTAGE: 120V, 1PH, 3 WIRE		
FEEDER: SEE POWER RISER	MAIN BRKR:		NONE				MOUNTING: FREE-STANDING FLOOR		
CKT NO. CIRCUIT DESCRIPTION	CKT BREAKER POLES/AMPS	LOAD Type	Volt-Amps	PHASE	LOAD Volt-Amps	Type	CKT BREAKER POLES/AMPS	CIRCUIT DESCRIPTION	CKT NO.
1 EXTERIOR LTS	1-20	L	138	A	694	L	1-20	MAIN & STORAGE LEVEL LTS	2
3 TOP OF RESERVOIR LTS/RECPT	1-20	L	108	A		L	1-20	SPARE	4
	CONNECTED LOAD				TOTAL LOAD			.....NOTES.....	
LOAD PER PHASE (VA)	A=		940	A=	971		1.		
LOAD PER PHASE (AMPS)	A=		7.83	A=	8.09		2.		
TOTAL LOAD (KVA)			0.94		0.97		3.		
SPARE CAPACITY	10.00%		0.09	DATE	15-Apr-21				

LIGHTING INVERTER PANEL
SCALE: NTS — 6 / E-8

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"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

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LACEY CONTRACT #PW 2019-32**

ELECTRICAL DETAILS

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SHEET
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54 of 63

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KENNYDALE RESERVOIR

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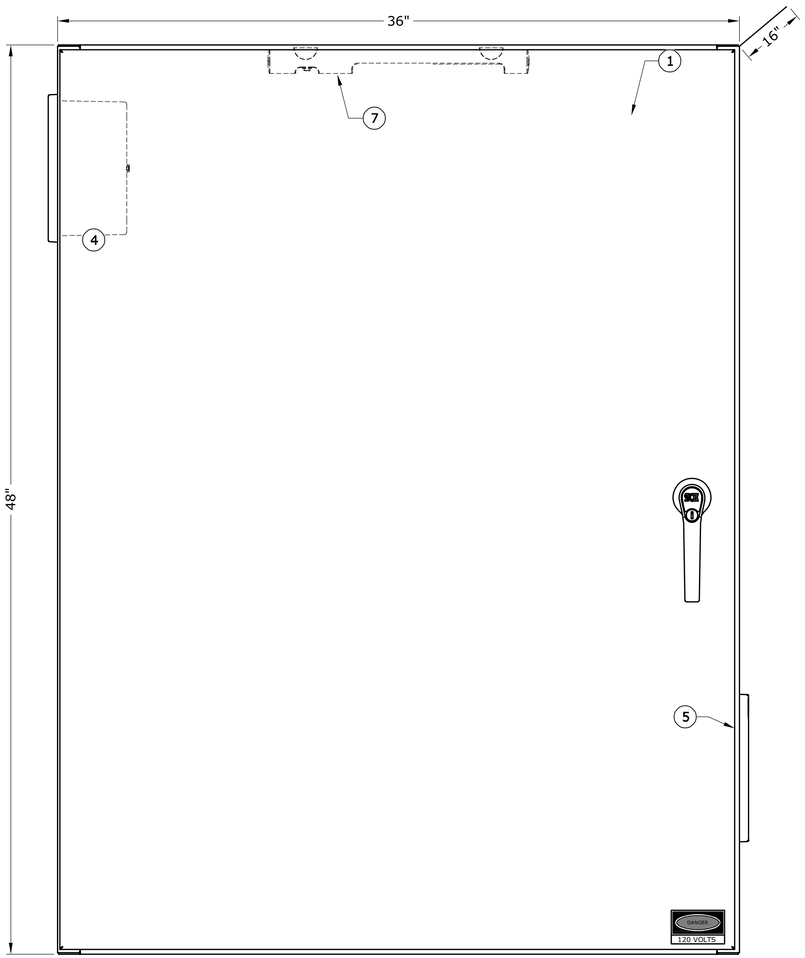
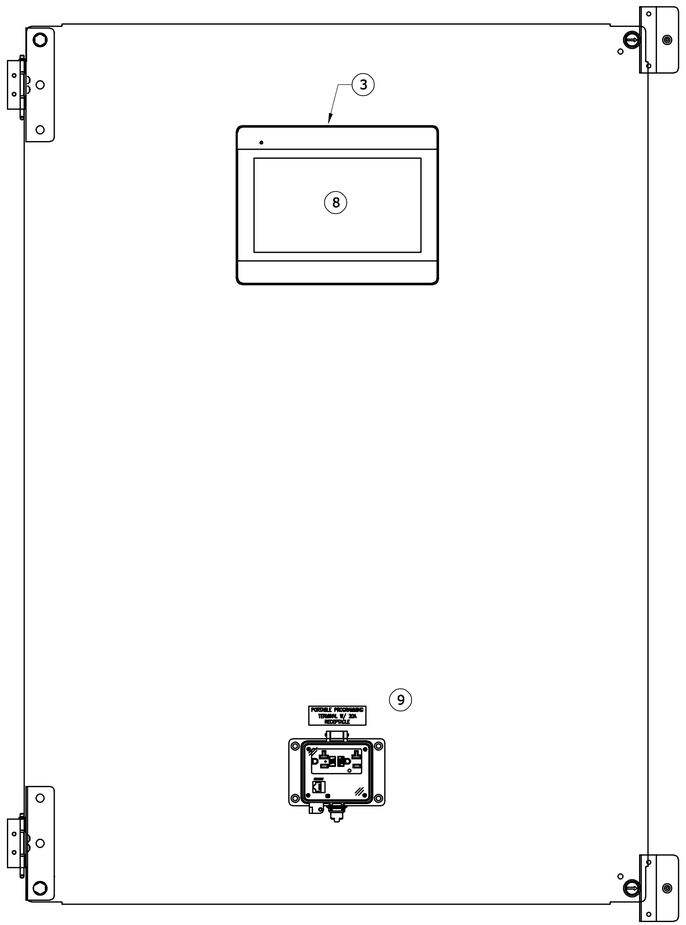
KEY NOTES:

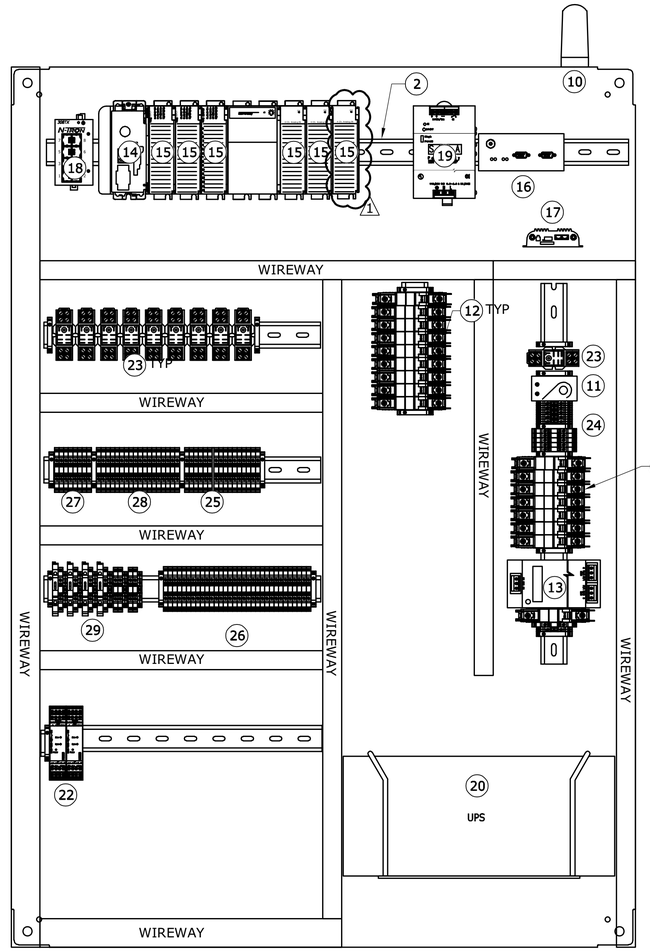
1. NEMA 12 STEEL ENCLOSURE
2. INNER PANEL
3. SWING-OUT PANEL
4. EXHAUST FAN
5. INTAKE FILTER GRILL
6. NOT USED
7. PANEL LIGHT W/SWITCH
8. OPERATOR INTERFACE
9. GFCI/ENET COMBINATION
10. (RTU) RADIO ANTENNA
11. EXHAUST FAN T-STAT
12. CIRCUIT BREAKERS
13. SURGE PROTECTIVE DEVICE
14. PROGAMMABLE CONTROLLER
15. I/O MODULES
16. RADIO
17. (RTU) CELLULAR MODEM
18. ETHERNET SWITCH
19. 24VDC POWER SUPPLY
20. AC UPS
21. NOT USED
22. LOOP ISOLATOR
23. CONTROL RELAYS
24. AC TERMINALS
25. DC TERMINALS
26. INPUT TERMINALS
27. OUTPUT TERMINALS
28. RELAY TERMINALS
29. OUTPUT TERMINALS AND FUSING



PANEL DOOR LAYOUT
SCALE: NTS



SWING PANEL LAYOUT
SCALE: NTS



INNER PANEL LAYOUT
SCALE: NTS

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9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION
1	01/21/22	JLH	ADDENDUM NO. 4

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SCADA PANEL LAYOUT

PROJECT NO.: 19-2640 SCALE: AS SHOWN DATE: MAY 2021

SHEET
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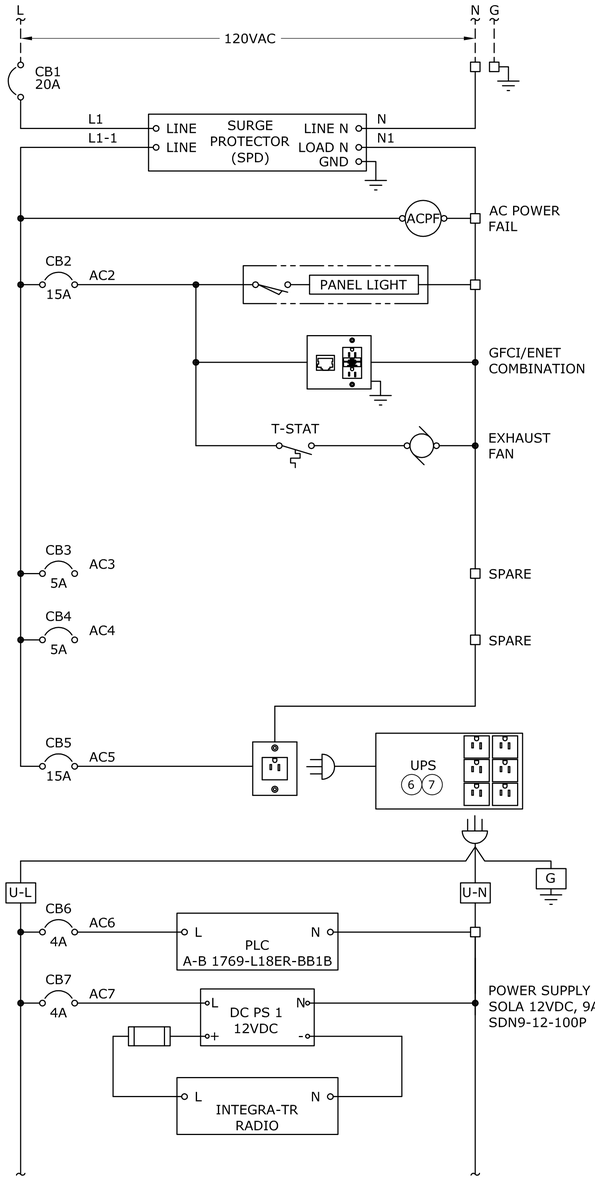
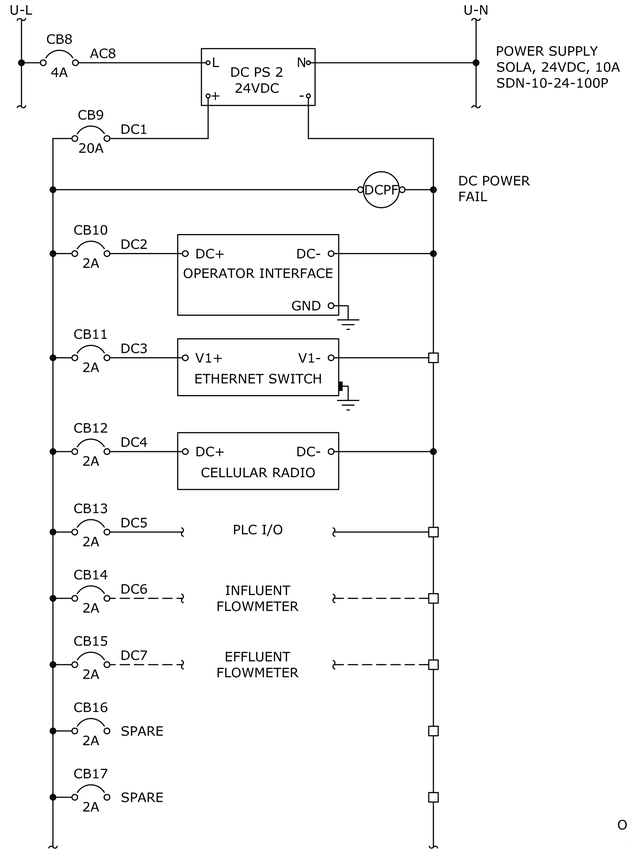
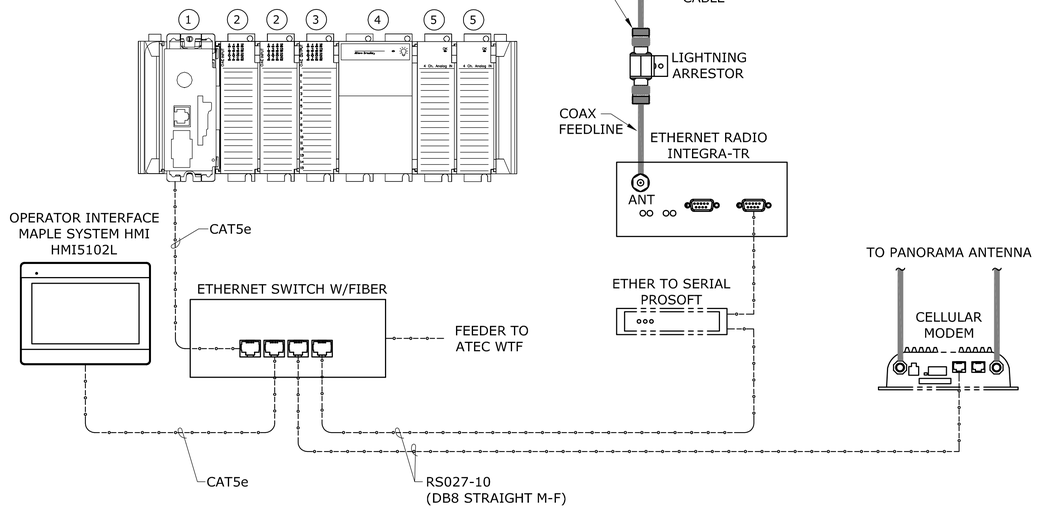
55 of 63





KEY NOTES:

1. CPU.
2. DIGITAL INPUTS, SEE SHEET E-11 FOR WIRING.
3. DIGITAL OUTPUTS, SEE E-11 FOR WIRING..
4. POWER SUPPLY.
5. ANALOG INPUTS, SEE SHEET E-11 FOR WIRING.
6. SEE DRAWING E-10 THRU E-11 FOR PLC I/O CONNECTIONS.
7. INSTALL DRY CONTACT I/O CARD IN THE UPS TO PROVIDE "UPS FAULT" AND "UPS ON BATTERY" SIGNALS.
8. MOUNT ANTENNA THROUGH THE TOP OF THE RTU ENCLOSURE.



COMMUNICATION DIAGRAM

SCALE: NTS

POWER DIAGRAM

SCALE: NTS

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"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
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SCADA PANEL POWER AND COMMUNICATION DIAGRAMS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET
E-10
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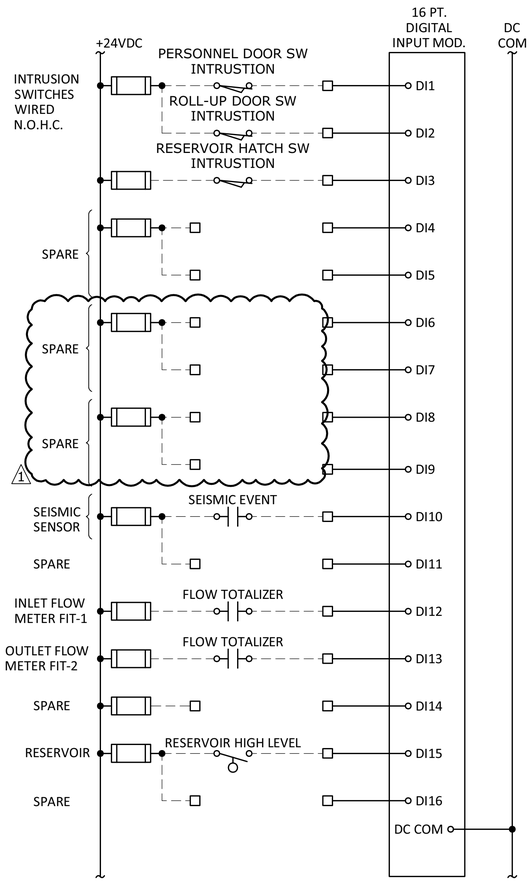
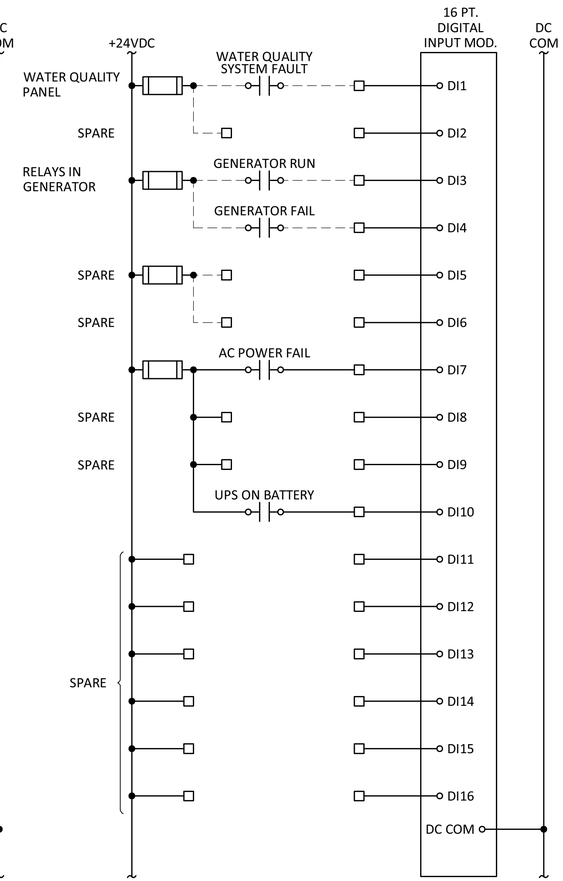
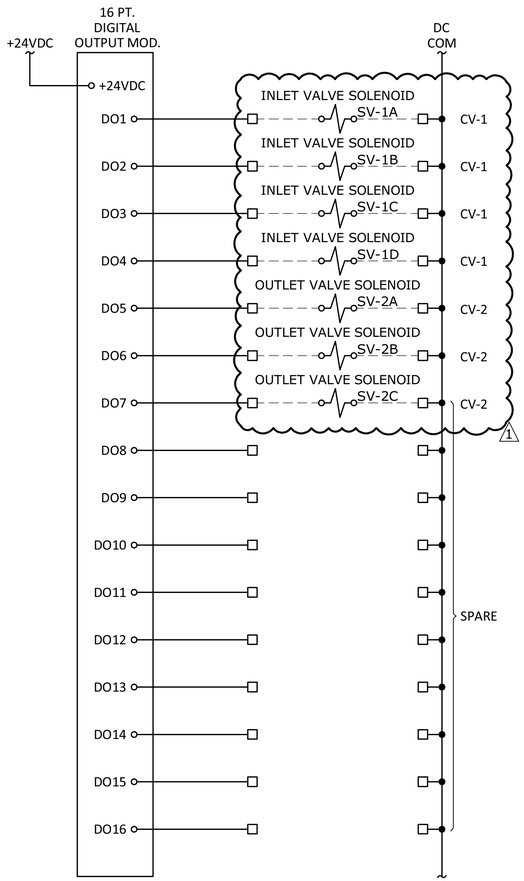




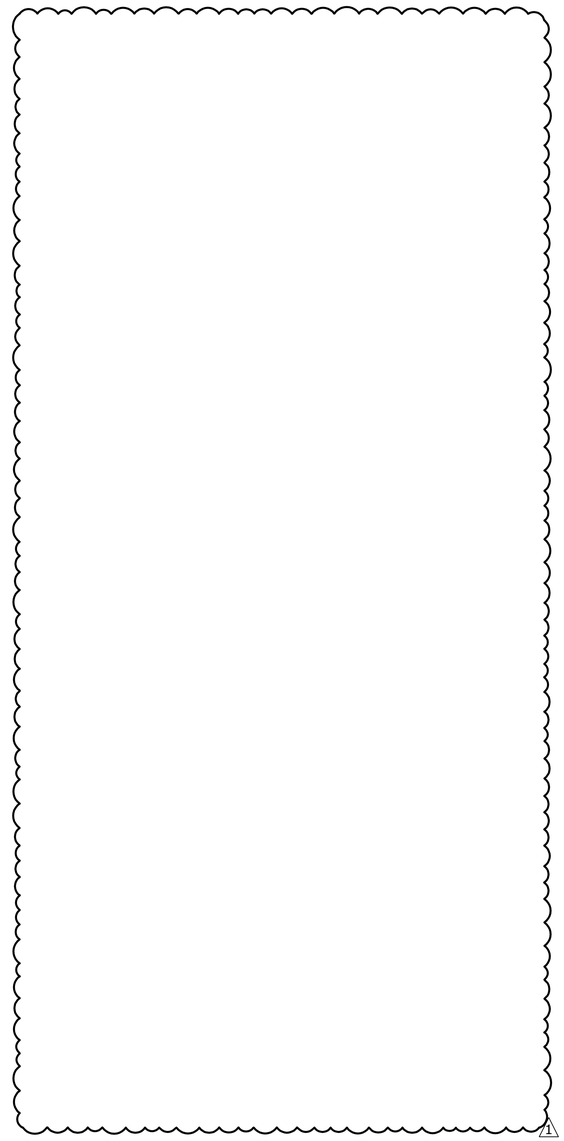
GENERIC DIGITAL INPUTS

SCALE: N.T.S.



GENERIC DIGITAL OUTPUTS

SCALE: N.T.S.



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SCADA PANEL I/O WIRING

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

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57 of 63

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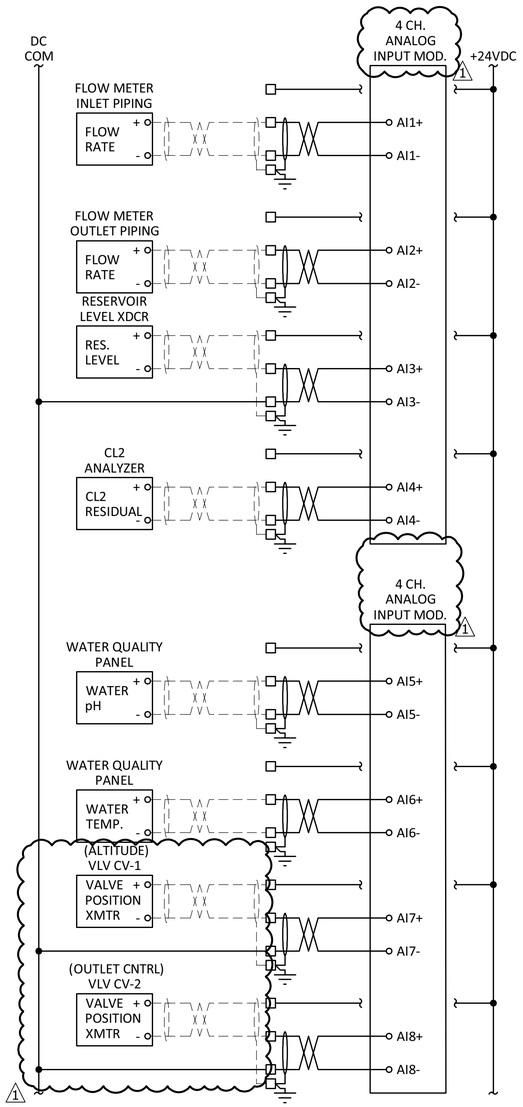
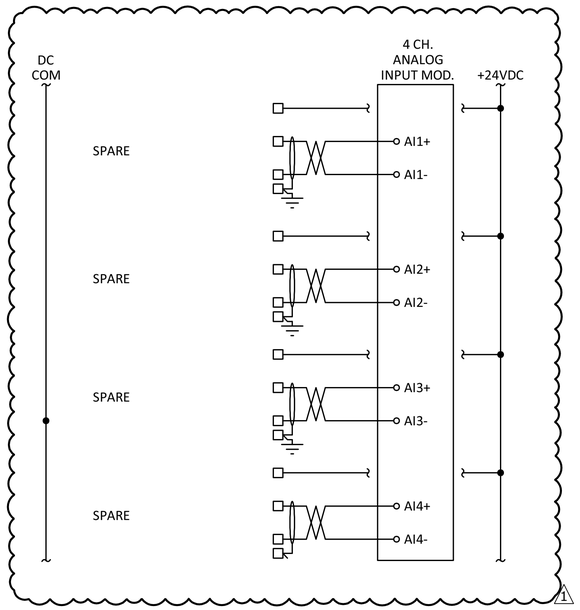
"Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD





GENERIC ANALOG INPUTS

SCALE: N.T.S.

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"Engineering Integrated Solutions"
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Suite 107
Beaverton, Oregon 97005
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Fax: (503) 726-3326
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CITY OF LACEY

CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

SCADA PANEL I/O WIRING-2

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET
E-11A
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1

TERRY CARGIL RESERVOIR
ELECTRICAL CIRCUIT SCHEDULE

ALL CIRCUITS ARE IDENTIFIED ON THE PLANS WITH THE DIAMOND SYMBOL. CONDUCTOR SIZES ARE BASED ON COPPER CONDUCTORS. CONDUIT SIZES ARE SHOWN FOR CASES WHEN CIRCUIT CONDUCTORS ARE RUN WITHOUT OTHER CIRCUITS. MULTIPLE CIRCUITS RUN IN COMMON CONDUITS ARE SHOWN ON PLANS AND SUPERSEDE THE BASIC CONDUIT SIZE SHOWN.

RACEWAY SIZES ARE IN INCHES WITH QUANTITIES IN EXCESS OF (1) SHOWN IN ADJACENT PARENTHESIS. CONDUCTOR CONFIGURATIONS ARE CODED AS FOLLOWS: P- FOR POWER CONDUCTORS, G - FOR GROUND CONDUCTORS, N - FOR NEUTRAL CONDUCTORS, C - FOR CONTROL CONDUCTORS, AND SP - FOR SPARE CONDUCTORS.

CIRCUITS REVISED SINCE LAST ISSUE ARE INDICATED BY AN ASTERISK(*).

CIRCUIT NUMBER	FROM	TO	CONDUCTORS	RACEWAY	NOTES
1	UTILITY XMFR	PSE PULL BOX	(3) 4/0 AWG, P (1) 4/0 AWG, N	3	COORDINATE INSTALLATION WITH PUGET SOUND ENERGY (PSE)
1A	PSE PULL BOX	METER/MAIN	(3) 4/0 AWG, P (1) 4/0 AWG, N	3	COORDINATE INSTALLATION WITH PUGET SOUND ENERGY (PSE)
2	METER/MAIN	AUTOMATIC TRANSFER SWITCH (ATS)	(3) 2 AWG, P (1) 2 AWG, N (1) 4 AWG, G	1.5	
3	GENERATOR (POWER)	AUTOMATIC TRANSFER SWITCH (ATS)	(3) 2 AWG, P (1) 2 AWG, N (1) 4 AWG, G	1.5	
4	GENERATOR (SIGNAL)	AUTOMATIC TRANSFER SWITCH (ATS)	(6) 14 AWG, C (8) 14 AWG, SP (1) 12 AWG, G	1.5	GEN CALL, GEN RUN, GEN FAULT
5	AUTOMATIC TRANSFER SWITCH (ATS)	PANEL "A"	(3) 2 AWG, P (1) 2 AWG, N (1) 4 AWG, G	1.5	
6	PANEL "A"	GENERATOR (BATTERY CHARGER)	(1) 12 AWG, P (1) 12 AWG, N (1) 12 AWG, G	1	
7	PANEL "A"	GENERATOR (BLOCK HEATER)	(1) 12 AWG, P (1) 12 AWG, N (1) 12 AWG, G	1	
8	PANEL "A"	LIGHTING INVERTER	(1) 12 AWG, P (1) 12 AWG, N (1) 12 AWG, G	1	
9	PANEL "A"	TOP OF RESERVOIR LIGHT & RECEPTACLE	(1) 12 AWG, P (1) 12 AWG, N (1) 12 AWG, G	1	
10	RTU CELLULAR ANTENNA	SCADA PANEL	COAX (1) 10 AWG, G	1	VERIFY CABLE TYPE AND SIZE PRIOR TO INSTALLATION
11	PRESSURE TRANSMITTER	SCADA PANEL	(1) 18 TSP, C (2) 14 AWG, SP (1) 12 AWG, G	1	
12	NOT USED				
13	AUTOMATIC TRANSFER SWITCH (ATS) (SIGNALS)	SCADA PANEL	(6) 14 AWG, C (6) 14 AWG, SP (1) 12 AWG, G	1	GEN RUN, GEN FAULT, AND ATS IN GEN POSITION
14	SEISMIC SENSOR PANEL	SCADA PANEL	(6) 14 AWG, C (1) 12 AWG, G	3/4	ARMED, TRIPPED STATUS, AND INTERLOCK W/CV-2 SOLENOID
15	PERSONNEL DOOR SWITCH	SCADA PANEL	(2) 14 AWG, C (1) 12 AWG, G	3/4	
16	ROLL-UP DOOR SWITCH	SCADA PANEL	(2) 14 AWG, C (1) 12 AWG, G	3/4	
17	INFLUENT FLOW METER FIT-1	SCADA PANEL	(2) 14 AWG, P (2) 14 AWG, C (1) 18 TSP, C (1) 12 AWG, G	1	24VDC POWER FLOW TOTALIZER PULSE FLOW RATE
18	EFFLUENT FLOW METER FIT-2	SCADA PANEL	(2) 14 AWG, P (2) 14 AWG, C (1) 18 TSP, C (1) 12 AWG, G	1	24VDC POWER FLOW TOTALIZER PULSE FLOW RATE
19	SCADA PANEL	INFLUENT CONTROL VALVE CV-1	(8) 14 AWG, C (1) 18 TSP, C (1) 12 AWG, G	1	SOLENOID POWER AND VALVE POSITION
20	SCADA PANEL	EFFLUENT CONTROL VALVE CV-2	(6) 14 AWG, C (1) 18 TSP, C (1) 12 AWG, G	1	SOLENOID POWER AND VALVE POSITION
21	SCADA PANEL	TELEMETRY REPEATER PANEL	COMM CABLE (1) 12 AWG, G	1	
22	TELEMETRY REPEATER PANEL	ANTENNA ON TOP OF RESERVOIR	COAX (1) 8 AWG, G	3	USE AVA7-50A 1-5/8"O.D. HELIAX CABLE
23	HIGH LEVEL FLOAT	SCADA PANEL	(2) 14 AWG, C (1) 12 AWG, G	3/4	RUN TO J-BOX ON TOP OF RESERVOIR
24	SCADA PANEL	WATER QUALITY PANEL (POWER)	(1) 12 AWG, P (1) 12 AWG, N (1) 12 AWG, G	3/4	
25	WATER QUALITY PANEL (SIGNALS)	SCADA PANEL	(3) 18 TSP, C (2) 14 AWG, C (4) 14 AWG, SP (1) 12 AWG, G	1.25	CL2 RESIDUAL, pH, AND TEMPERATURE (ANALOG) FAULT/ALARM
26	ACCESS TUBE HATCH SWITCH	SCADA PANEL	(2) 14 AWG, C (1) 12 AWG, G	3/4	RUN TO J-BOX ON TOP OF RESERVOIR
27	RESERVOIR HATCH SWITCH	SCADA PANEL	(2) 14 AWG, C (1) 12 AWG, G	3/4	RUN TO J-BOX ON TOP OF RESERVOIR

R&W ENGINEERING, INC. "Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION
1	01/21/22	JLH	ADDENDUM NO. 4

NOTICE
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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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JEFFREY L. HOWARD — STATE OF WASHINGTON — 24217 — REGISTERED PROFESSIONAL ENGINEER
2022.01.21 11:23:05-08'00'

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**CITY OF LACEY, WASHINGTON
TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32**

CIRCUIT SCHEDULE

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET
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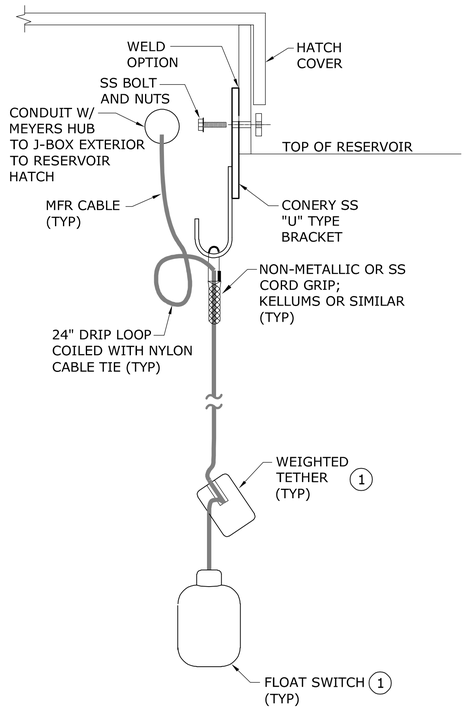
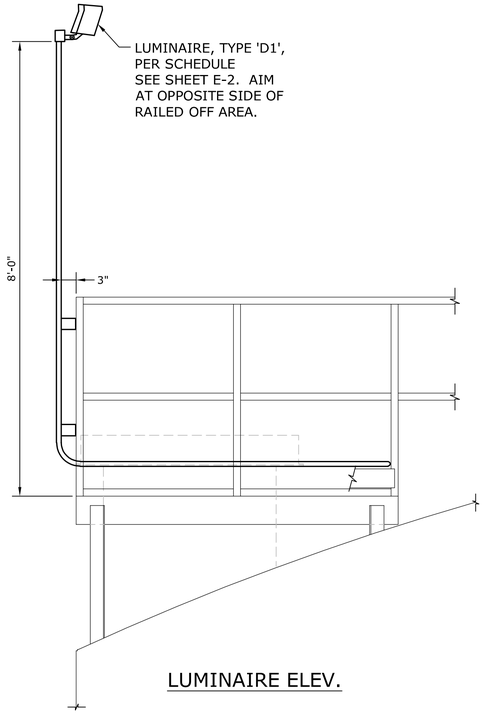


FLOAT MOUNTING DETAIL

SCALE: NTS

1 / E-13

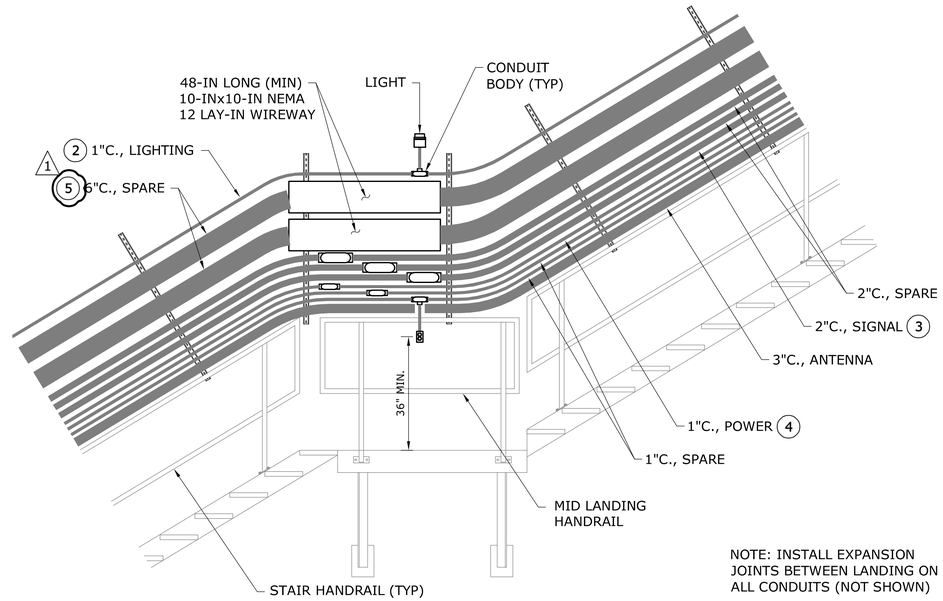


LUMINAIRE ELEV.

LIGHTING @ TOP OF RESERVOIR

SCALE: NTS

2 / E-13

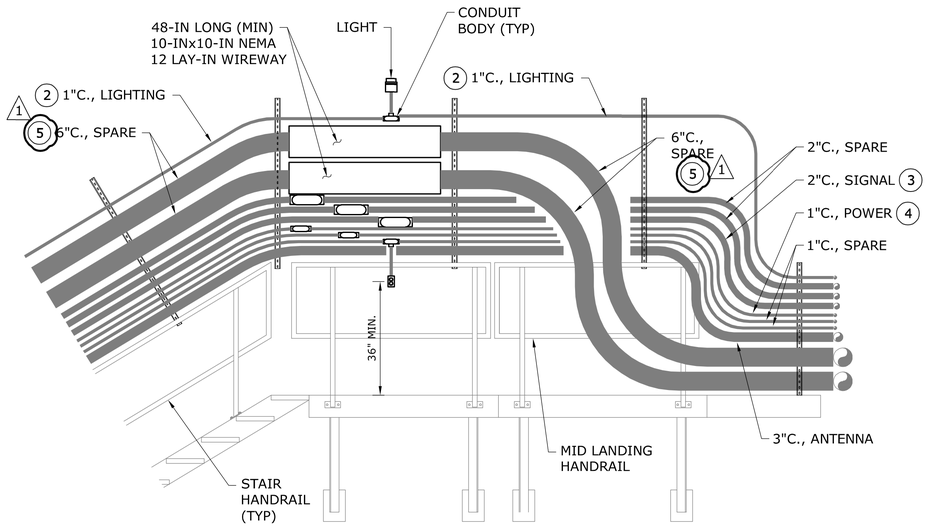


NOTE: INSTALL EXPANSION JOINTS BETWEEN LANDING ON ALL CONDUITS (NOT SHOWN)

CONDUITS OVER STAIR LANDING (TYP)

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

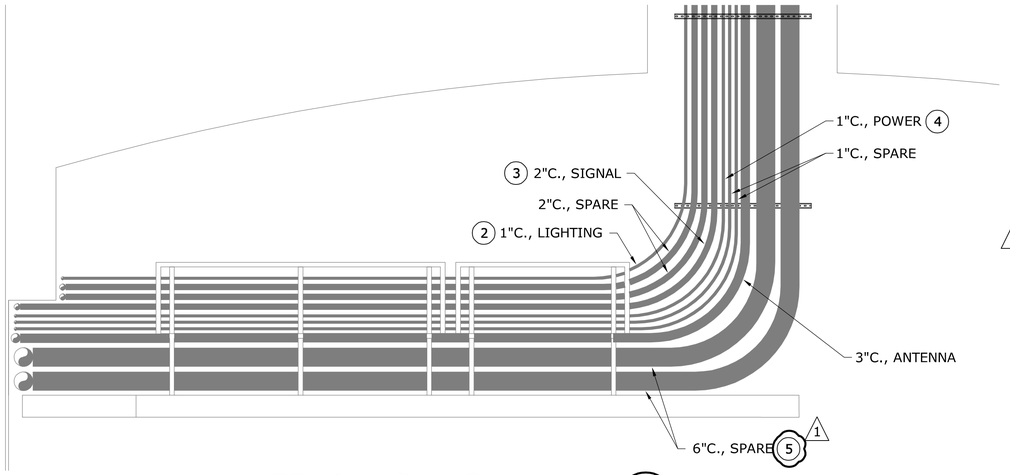
3 / E-13



CONDUITS AT TOP LANDING

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

4 / E-13



CONDUITS AT CATWALK

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

5 / E-13

KEY NOTES:

1. FLOAT SWITCHES AND WEIGHT KIT MUST BE LISTED FOR POTABLE WATER USE.
2. LIGHTING CONDUIT CONTAINS:
   - (1) #10 P
   - (1) #10 N
   - (1) #10 G
   - (2) #10 C
3. SIGNAL CONDUIT CONTAINS:
   - (6) #14 C
   - (1) #12 G
   - (1) COAX
4. POWER CONDUIT CONTAINS:
   - (2) #12 P
   - (2) #12 N
   - (1) #12 G
1 5. ALTERNATE OPTION: CONTRACTOR MAY INSTALL (4) 4-IN "SPARE" CONDUITS IN LIEU OF THE (2) 6-IN "SPARE" CONDUITS. MAKE ADJUSTMENTS TO WIREWAYS (PULL BOXES) AS REQUIRED. CONTRACTOR MAY TERMINATE (2) 4-IN "SPARE" CONDUITS PER WIREWAY OR USE (4) INDIVIDUAL WIREWAYS. WIREWAYS (PULL BOXES) TO BE SIZED PER NEC 314.28.

R&W ENGINEERING, INC. "Engineering Integrated Solutions"
9615 S.W. Allen Boulevard
Suite 107
Beaverton, Oregon 97005
Phone: (503) 292-6000
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 483.138.002 Contact: JEFF HOWARD

NO.	DATE	BY	REVISION
1	12/23/21	JLH	ADDENDUM NO. 1

NOTICE

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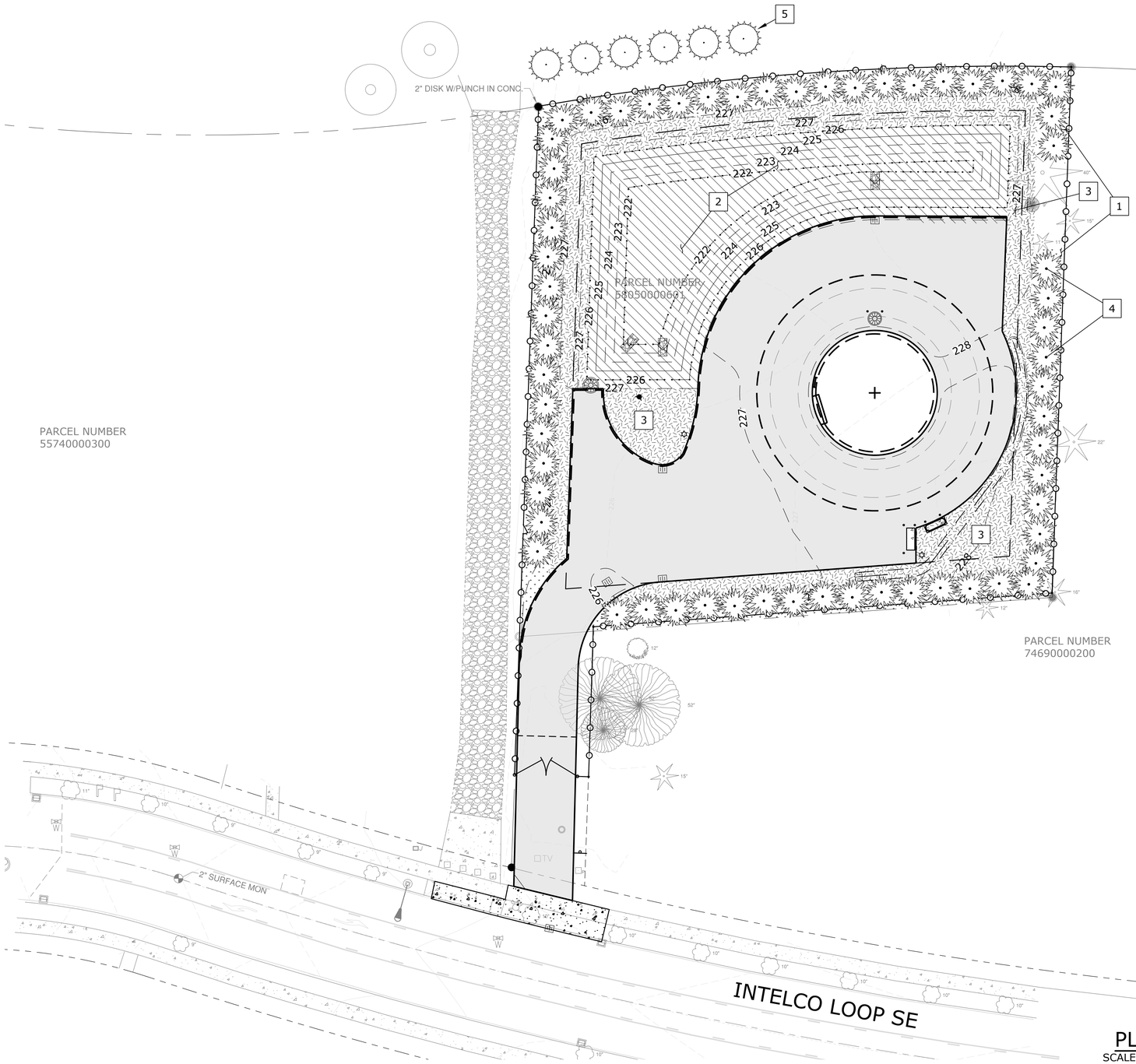
CITY OF LACEY, WASHINGTON TERRY CARGIL RESERVOIR LACEY CONTRACT #PW 2019-32

ELECTRICAL DETAILS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: MAY 2021

SHEET E-13

SECTION: 32 TOWNSHIP: 18N RANGE: 1W



PLAN
SCALE: 1"=20'

PLANT SCHEDULE:

1 TREE AND SHRUB LANDSCAPED AREA, AREA = APPROX 5,924 SF, SEE SHT L-2

2 HYDROSEED, BIOSWALE SEED MIX, 40% TURF-TYPE TALL FESCUE, 30% PERENNIAL RYEGRASS, 25% CREEPING RED FESCUE, 5% COLONIAL BENTGRASS, 4-5 LBS PER 1,000 SF

3 HYDROSEED, SPECIAL SHADE MIX, 60% PERENNIAL RYEGRASS, 40% FINE FESCUE, 5-7 LBS PER 1,000 SF

4 CONIFEROUS TREES, TOTAL <61> TREES
(PLANTED 10 FT ON-CENTER, 10 FT FROM SITE BOUNDARY)

5 CONIFEROUS TREES, TOTAL <6> TREES
(PLANTED 13.5 FT ON-CENTER, 13.5 FT NORTH OF SITE BOUNDARY)

PROPOSED TREE TYPES:

QUANTITY	COMMON NAME	BOTANICAL NAME	SIZE
- <61>	ARBOR VITAE	(Thuja Occidentelis)	2' - 3'
- <6>	INCENSE CEDAR or DOUGLAS FIR	(Calocedrus macrolepis) (Pseudotsuga menziesii)	2' - 3' 2' - 3'

NOTES:

1. CONTRACTOR SHALL PREPARE AND SUBMIT IRRIGATION PLAN PRIOR TO CONSTRUCTION.
2. ALL PLANT INSTALLATION TO TAKE PLACE BETWEEN OCTOBER 15 - MARCH 1ST AS SPECIFIED IN SECTION 32 93 00 UNLESS AUTHORIZED BY THE ENGINEER AND OWNER.
3. THE CONTRACTOR SHALL BEGIN MAINTENANCE IMMEDIATELY FOLLOWING INSTALLATION. ENHANCEMENT SITE WILL BE ADDED TO THE FOREST MANAGEMENT MAINTENANCE INVENTORY AND WILL BE WATERED AND MAINTAINED THROUGH THE END OF THE ONE-YEAR WARRANTY PERIOD.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL COMPLETE PLANT COUNTS TO COVER AREAS AT THE SPECIFIED SPACING.

NO.	DATE	BY	REVISION

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MATTHEW L. HICKS STATE OF WASHINGTON 49086 REGISTERED PROFESSIONAL ENGINEER
Mathew L Hicks

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

LANDSCAPE SITE PLAN, GENERAL NOTES AND SYMBOLS

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET
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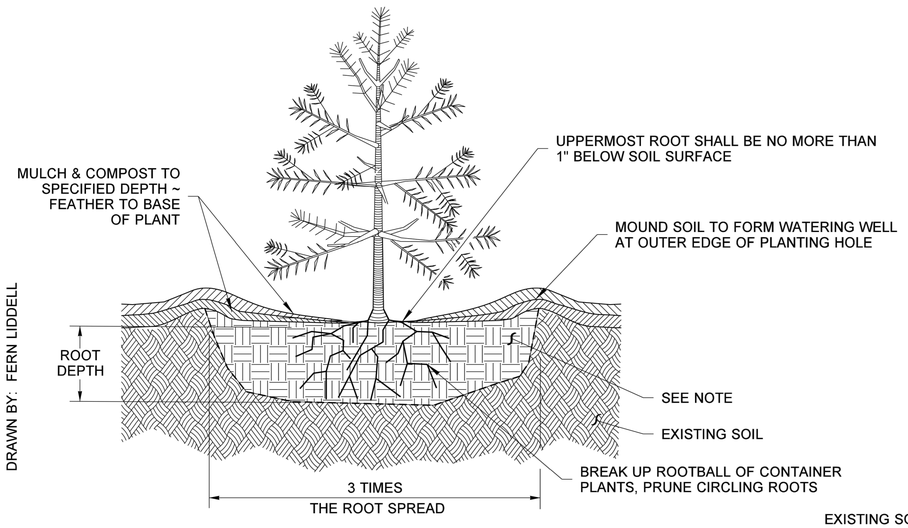
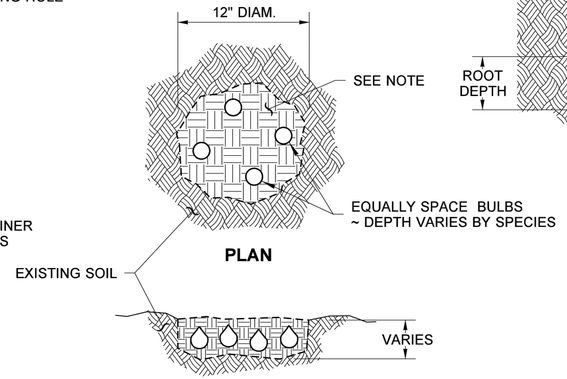
K:\TAC_Projects\19\2640 - Lacey Terry Cargil Reservoir\CAD\Sheets\19-2640-WA-L.dwg L-1 9/17/2021 8:40 AM HCM 23.0s (LMS Tech)



SHRUB, TREE AND GROUND COVER PLANTING DETAIL



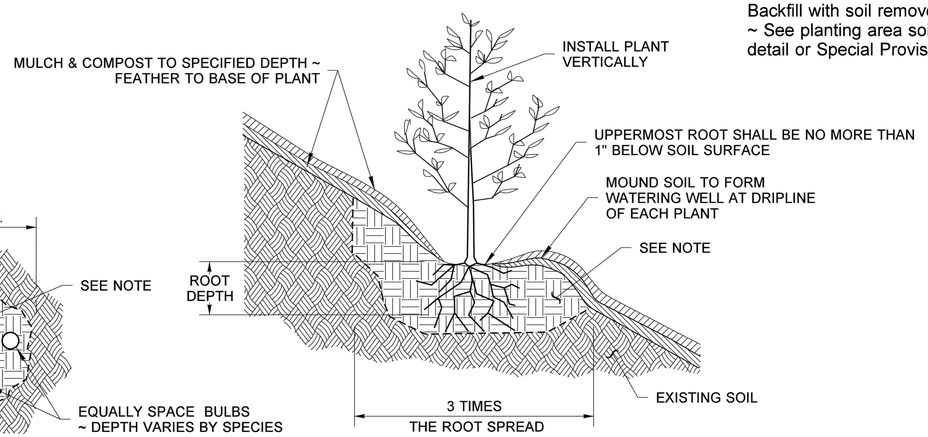
PLAN

SECTION

BULB PLANTING DETAIL

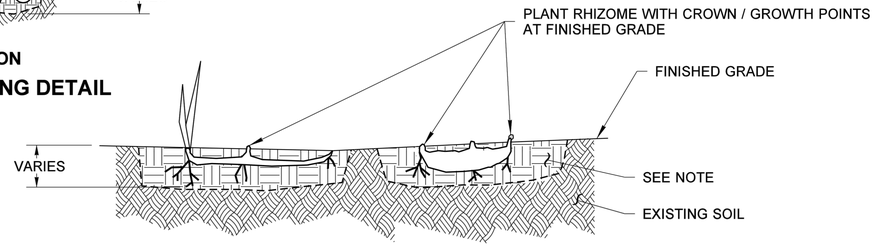
NOTE

Backfill with soil removed from hole ~ See planting area soil preparation detail or Special Provisions.

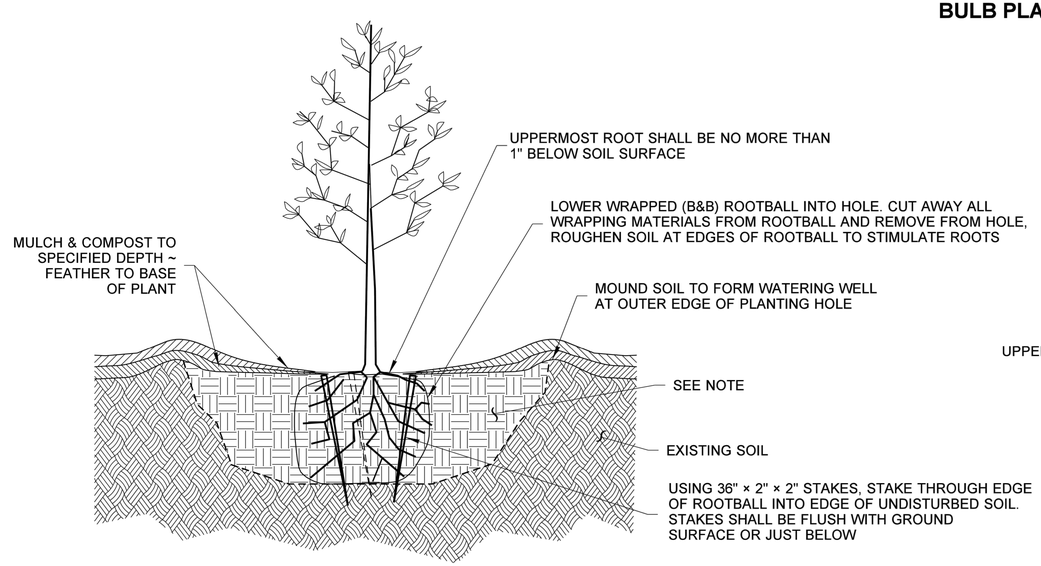


SLOPE PLANTING DETAIL

(INCLUDES ALL PLANTS ON SLOPES)

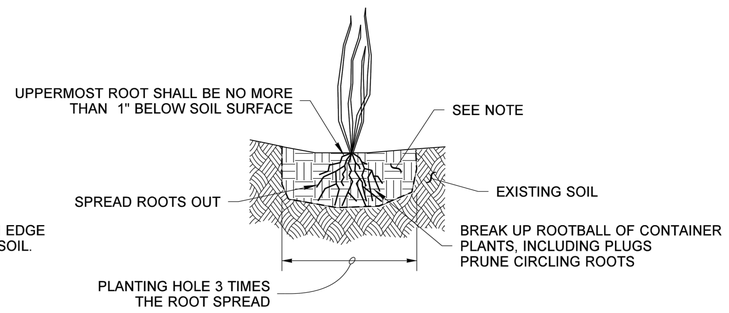


TUBER OR RHIZOME PLANTING DETAIL



STREET TREE PLANTING AND STAKING DETAIL

(APPLIES TO CONTAINER, BALL AND BURLAPPED, (B&B) DECIDUOUS AND CONIFERS)



EMERGENT PLANTING DETAIL

NO.	DATE	BY	REVISION

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TERRY CARGIL RESERVOIR
LACEY CONTRACT #PW 2019-32

LANDSCAPE DETAILS - 1

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET L-2

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DRAWN BY: FERN LIDDELL

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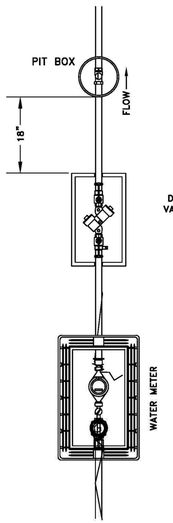
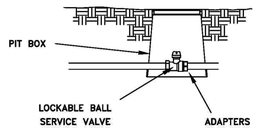
LINE SIZE	BALL VALVE	VALVE BOX
3/4"	FORD FOB11-333W	CARSON MODEL 910-12
1"	FORD FOB11-444W	
1 1/2"	FORD FOB11-666W	
2"	FORD FOB11-777W	
2 1/2"	FORD FOB11-788W	



PIT BOX DETAIL



GENERAL NOTES:
1. THIS CONFIGURATION IS REQUIRED FOR AN IRRIGATION SYSTEM THAT HAS IT'S OWN WATER METER SUCH AS COMMERCIAL SITES.
2. DO NOT INSTALL IN AREAS SUBJECT TO FLOODING.
3. ALL PIPING SHALL BE BLUE POLY PIPE.

DG6-4.7.DWG

CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS

IRRIGATION SERVICE FOR COMMERICAL SITES TYPE II

CITY ENGINEER

DWG. NO. 6-4.7

DES.	DWN.	CK'D.	DATE
WHO	WHO	RAS	12/15/2014

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Matthew L Hickey

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LACEY CONTRACT #PW 2019-32

LANDSCAPE DETAILS - 2

PROJECT NO.: 19-2640 | SCALE: AS SHOWN | DATE: SEPTEMBER 2021

SHEET L-3