

SEWER RENOVATIONS MARK TWAIN STATE PARK FLORIDA, MISSOURI

OWNER: STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR

DEPARTMENT OF
NATURAL RESOURCES
MISSOURI STATE PARKS

PROJECT
MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

PROJECT NUMBER: X2333-01

SITE NUMBER: 5110
ASSET NUMBER: 7815110014

LOCATION MAP



SHEET INDEX

G001 - COVER SHEET
G002 - SITE LOCATION PLAN AND GENERAL NOTES

D101 - DEMOLITION PLAN

C101 - DRIP IRRIGATION SITE PLAN

C201 - FILTRATION EQUIPMENT DETAILS
C202 - SEPTIC TANK AND PUMP VAULT DETAILS
C203 - DRIP IRRIGATION DETAILS (1 OF 2)
C204 - DRIP IRRIGATION DETAILS (2 OF 2)

E-101 - ELECTRICAL PLAN

DESIGNER:

Crockett Engineering
1000 W. Nifong Building 1
Columbia, MO 65203
573-447-0292



JESSE RAY STEPHENS
MO LICENSE - 201000868

SITE/CIVIL ENGINEER:

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Columbia, Missouri 65203
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www.crockettengineering.com

Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#2000151301

SHEET NUMBER:

G-001

1 OF 9 SHEETS
SEPTEMBER 27, 2024

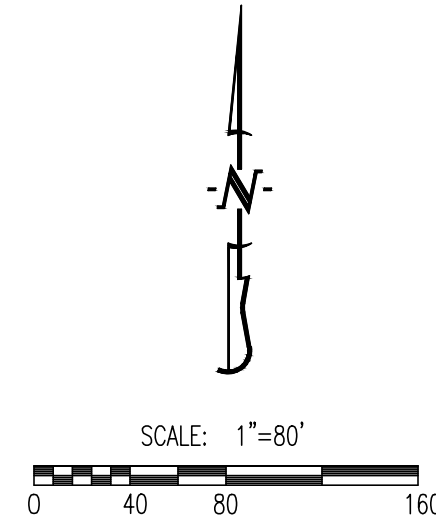
LOCATES:
MISSOURI ONE CALL INC.
1022 B NORTHEAST DRIVE
JEFFERSON CITY, MO 65109
1-800-344-7483



WATER:
CANNON WATER SUPPLY DISTRICT
126 E. MAIN STREET
PERRY, MO 63462
573-565-2656

ELECTRIC:
RALLS COUNTY ELECTRIC CO-OP
17594 HIGHWAY 19
NEW LONDON, MO 63459
573-985-8711

TELEPHONE/DATA:
BRIGHTSPEED
625 CHERRY STREET
COLUMBIA, MO 65205
573-886-3700



WATER/SEWER SYSTEM DESIGN LOADS:

CAMPGROUND AREA

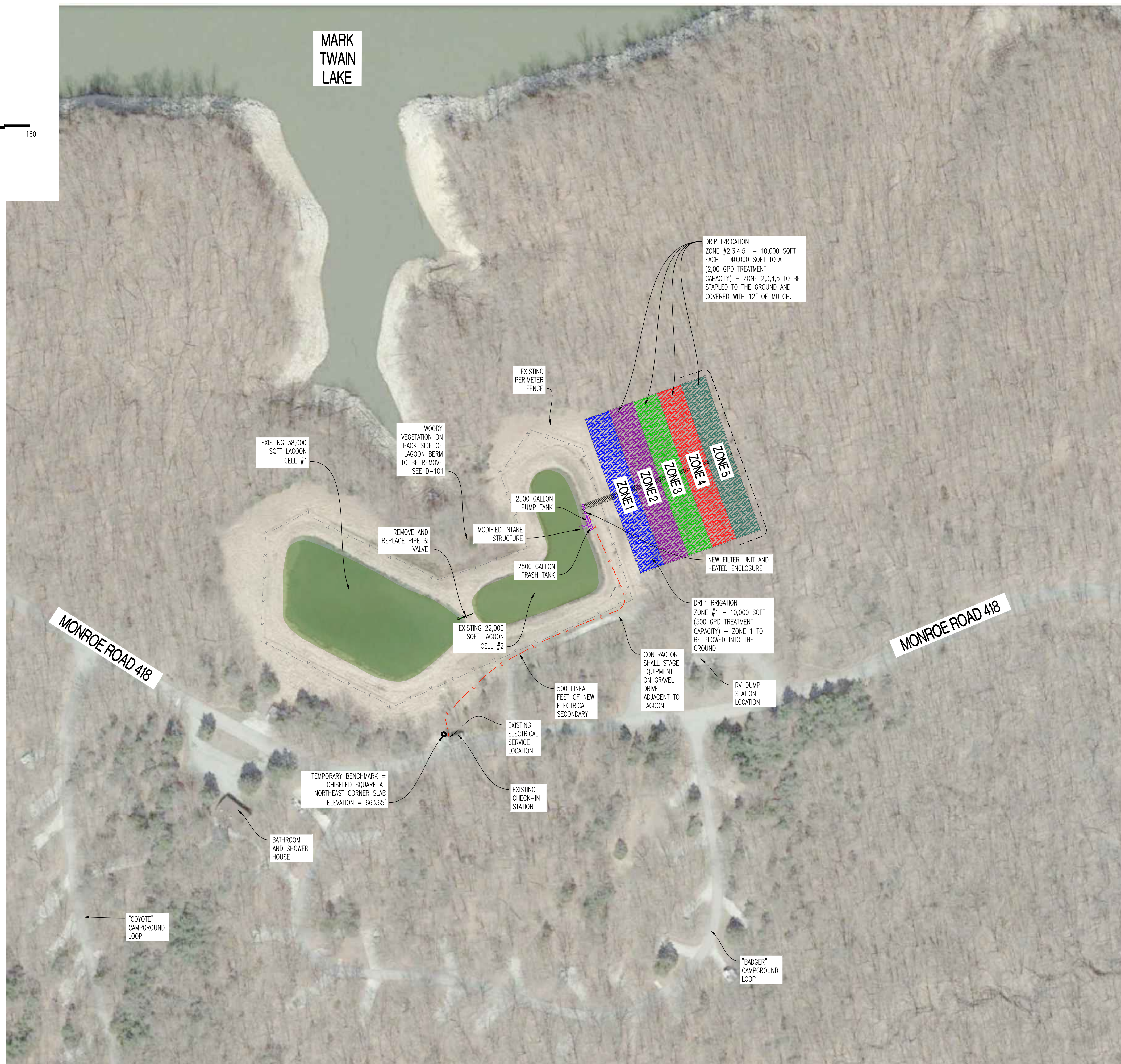
- PUBLIC PARK PATRONS WITH BATHHOUSE (113 EACH @ 15 GPD) = 1695 GPD - BASED ON CURRENT EXISTING WATER METER DATA
- TOTAL ACTUAL SEWER LOAD ASSUMED = 2000 GALLONS PER DAY

2500 GPD DRIP FIELD BEING DESIGNED FOR EXTRA CAPACITY

SOILS INFORMATION: SOILS LOADING DESIGN RATE IS .05 GALLONS PER SQUARE FOOT PER DAY ON AVERAGE FOR DRIP IRRIGATION.

OVERALL WETTED APPLICATION AREA REQUIREMENTS:

BUZZARDS ROOST CAMPGROUND = 2500/.05 = 50,000 SQUARE FEET



LEGEND OF SYMBOLS:

- | | | | |
|-----|---------------------------------------|---|---------------------------------------|
| --- | EXISTING CURB | ○ | EXISTING SIGNS |
| --- | PROPOSED CURB | ⊗ | EXISTING POWER POLE |
| ▨ | RIP RAP | ⊗ | EXISTING GAS VALVE |
| □ | EXISTING STRUCTURE | ⊗ | EXISTING WATER VALVE |
| ~ | EXISTING TREELINE | ⊗ | EXISTING GAS METER |
| ~ | PROPOSED TREELINE | ⊗ | EXISTING WATER METER |
| — | EDGE OF WATERWAY | ⊗ | EXISTING FIRE HYDRANT |
| --- | EXISTING WATERLINE | ⊗ | MANHOLE |
| --- | PROPOSED WATERLINE | — | EXISTING SANITARY SEWER LATERAL |
| --- | EXISTING GAS LINE | — | PROPOSED SANITARY SEWER LATERAL |
| --- | PROPOSED GAS LINE | ⊗ | PROPOSED TRACER WIRE TEST STATION BOX |
| --- | EXISTING UNDERGROUND TELEPHONE | ⊗ | EXISTING AIR CONDITIONER |
| --- | EXISTING UNDERGROUND CABLE TELEVISION | ⊗ | EXISTING TELEPHONE PEDESTAL |
| --- | EXISTING HIGH VOLTAGE ELECTRIC | ⊗ | EXISTING ELECTRICAL TRANSFORMER |
| --- | EXISTING OVERHEAD ELECTRIC | ⊗ | EXISTING ELECTRIC METER |
| --- | EXISTING UNDERGROUND ELECTRIC | ⊗ | EXISTING LIGHT POLE |
| --- | EXISTING OVERHEAD ELEC. & TV | → | EXISTING GUY WIRE |
| --- | EXISTING OVERHEAD ELEC., TV & TELE. | | |
| --- | EXISTING SANITARY SEWER | | |
| --- | PROPOSED SANITARY SEWER | | |
| --- | EXISTING MINOR CONTOUR | | |
| --- | EXISTING MAJOR CONTOUR | | |
| --- | PROPOSED MINOR CONTOUR | | |
| --- | PROPOSED MAJOR CONTOUR | | |
| --- | 100 YEAR FLOOD PLAIN | | |
| --- | FLOODWAY | | |
| --- | ORDINARY HIGH WATER MARK | | |
| --- | STREAM SIDE BUFFER | | |
| --- | OUTER STREAM BUFFER | | |

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MARK TWAIN STATE PARK
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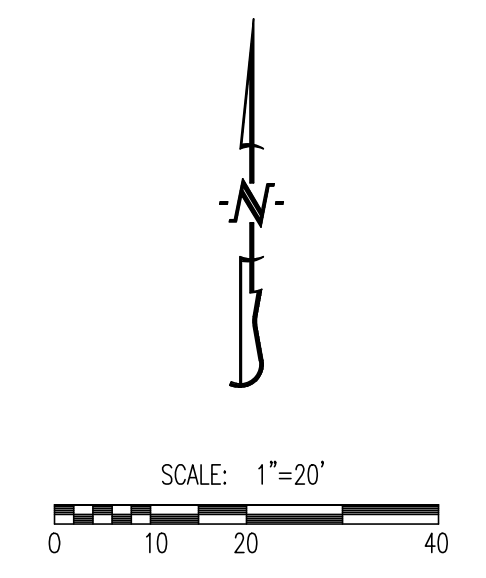
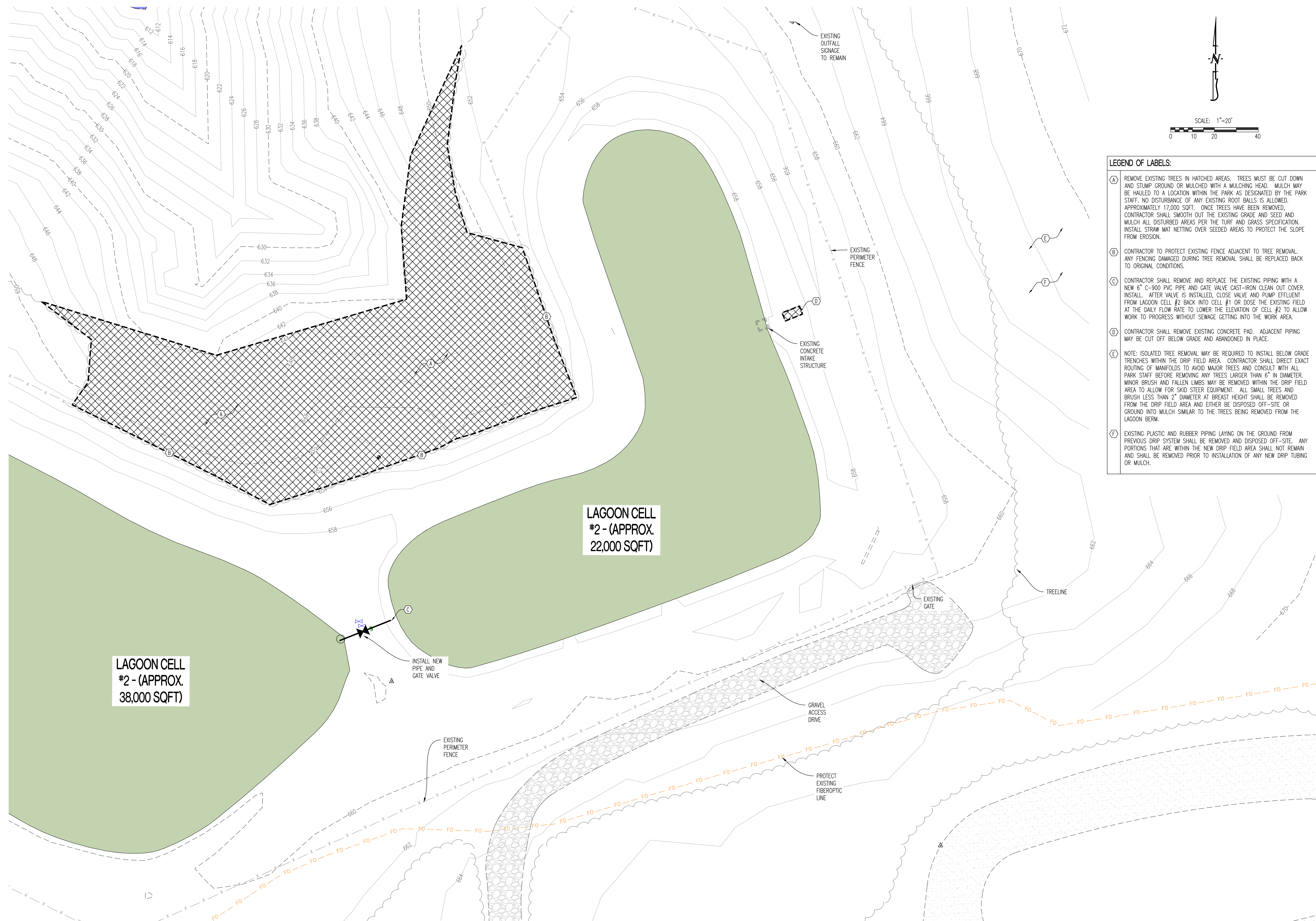
CAD DWG FILE: C-SIT-G002
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

SITE LOCATION PLAN
AND GENERAL NOTES

SHEET NUMBER:

G-002



- LEGEND OF LABELS:**
- (A) REMOVE EXISTING TREES IN HATCHED AREAS. TREES MUST BE CUT DOWN AND STUMP GROUND OR MULCHED WITH A MULCHING HEAD. MULCH MAY BE HAULED TO A LOCATION WITHIN THE PARK AS DESIGNATED BY THE PARK STAFF. NO DISTURBANCE OF ANY EXISTING ROOT BALLS IS ALLOWED. APPROXIMATELY 17,000 SQFT. ONCE TREES HAVE BEEN REMOVED, CONTRACTOR SHALL SMOOTH OUT THE EXISTING GRADE AND SEED AND MULCH ALL DISTURBED AREAS PER THE TURF AND GRASS SPECIFICATION. INSTALL STRAW MAT NETTING OVER SEEDED AREAS TO PROTECT THE SLOPE FROM EROSION.
 - (B) CONTRACTOR TO PROTECT EXISTING FENCE ADJACENT TO TREE REMOVAL. ANY FENCING DAMAGED DURING TREE REMOVAL SHALL BE REPLACED BACK TO ORIGINAL CONDITIONS.
 - (C) CONTRACTOR SHALL REMOVE AND REPLACE THE EXISTING PIPING WITH A NEW 6" C-900 PVC PIPE AND GATE VALVE CAST-IRON CLEAN OUT COVER. INSTALL. AFTER VALVE IS INSTALLED, CLOSE VALVE AND PUMP EFFLUENT FROM LAGOON CELL #2 BACK INTO CELL #1 OR DOSE THE EXISTING FIELD AT THE DAILY FLOW RATE TO LOWER THE ELEVATION OF CELL #2 TO ALLOW WORK TO PROGRESS WITHOUT SEWAGE GETTING INTO THE WORK AREA.
 - (D) CONTRACTOR SHALL REMOVE EXISTING CONCRETE PAD. ADJACENT PIPING MAY BE CUT OFF BELOW GRADE AND ABANDONED IN PLACE.
 - (E) NOTE: ISOLATED TREE REMOVAL MAY BE REQUIRED TO INSTALL BELOW GRADE TRENCHES WITHIN THE DRIP FIELD AREA. CONTRACTOR SHALL DIRECT EXACT ROUTING OF MANIFOLDS TO AVOID MAJOR TREES AND CONSULT WITH ALL PARK STAFF BEFORE REMOVING ANY TREES LARGER THAN 6" IN DIAMETER. MINOR BRUSH AND FALLEN LIMBS MAY BE REMOVED WITHIN THE DRIP FIELD AREA TO ALLOW FOR SKID STEER EQUIPMENT. ALL SMALL TREES AND BRUSH LESS THAN 2" DIAMETER AT BREAST HEIGHT SHALL BE REMOVED FROM THE DRIP FIELD AREA AND EITHER BE DISPOSED OFF-SITE OR GROUND INTO MULCH SIMILAR TO THE TREES BEING REMOVED FROM THE LAGOON BERM.
 - (F) EXISTING PLASTIC AND RUBBER PIPING LAYING ON THE GROUND FROM PREVIOUS DRIP SYSTEM SHALL BE REMOVED AND DISPOSED OFF-SITE. ANY PORTIONS THAT ARE WITHIN THE NEW DRIP FIELD AREA SHALL NOT REMAIN AND SHALL BE REMOVED PRIOR TO INSTALLATION OF ANY NEW DRIP TUBING OR MULCH.

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CAD DWG FILE: C-SIT-D101
DRAWN BY: JRS
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DESIGNED BY: JRS

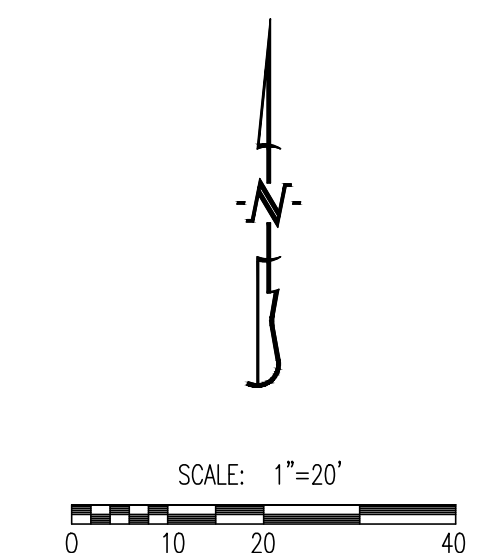
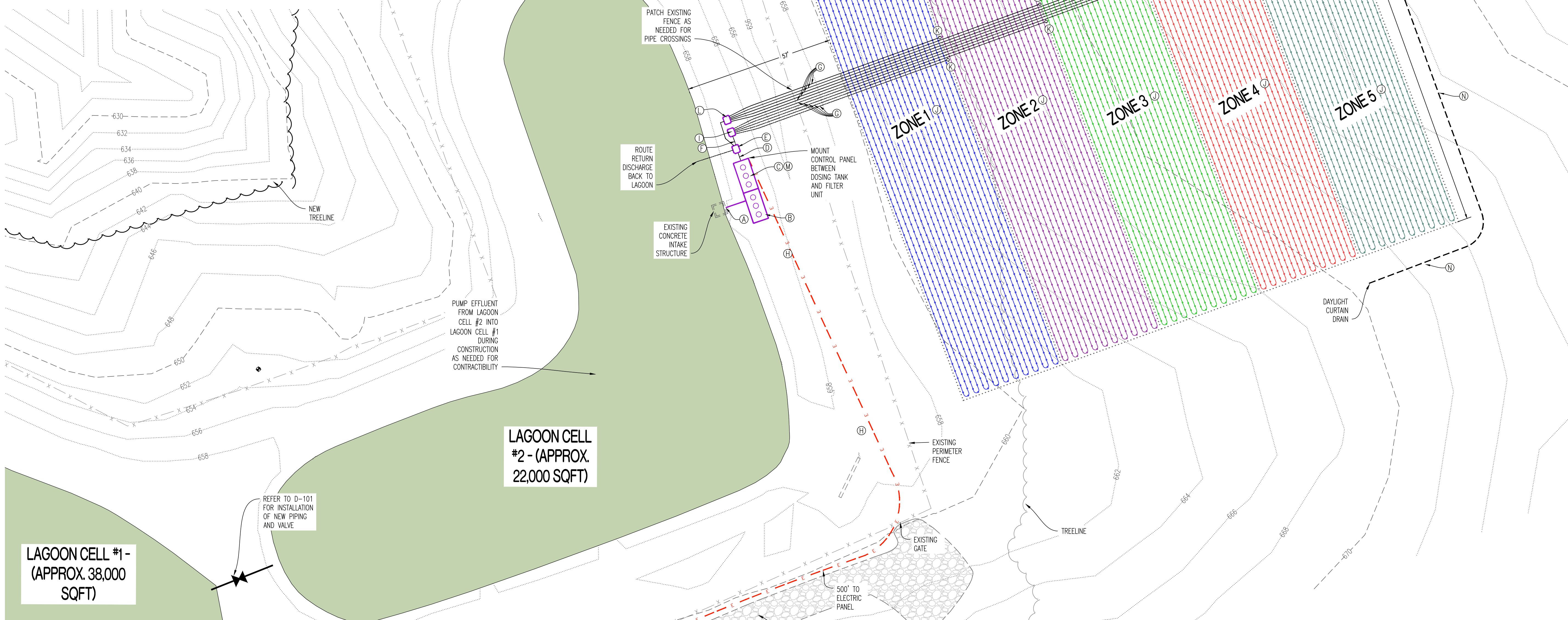
SHEET TITLE:

DEMOLITION PLAN

SHEET NUMBER:

D-101

- LEGEND OF LABELS**
- (A) CORE HOLE FOR 4" SCHEDULE 40 PVC PIPE FROM EXISTING INTAKE STRUCTURE TO NEW SEPTIC TANK. INSTALL 4" SCHEDULE 40 PIPE BETWEEN STRUCTURES. SEE DETAIL 1 ON C-202.
 - (B) INSTALL 2500 GALLON SEPTIC TRASH TANK. SEE DETAIL 2 ON C-202.
 - (C) INSTALL 2500 GALLON DOSING TANK WITH PUMP ASSEMBLY. SEE DETAIL 2 ON C-202.
 - (D) INSTALL 1.5" DIAMETER SDR21 PIPING FROM DOSING TANK TO FILTRATION CHAMBER.
 - (E) INSTALL DRIPTECH C-200 SELF CONTAINED FILTRATION UNIT AND CONTROL PANEL. CHAMBER SHALL HAVE A MINIMUM OF TWO REDUNDANT 100-MICRON SELF-CLEANING DISC FILTERS. PRODUCT AS MANUFACTURED BY JNM TECHNOLOGIES. SEE DETAILS ON C-201
 - (F) INSTALL 1.5" DIAMETER SDR 21 PIPING FROM FILTRATION UNIT TO SUPPLY AND RETURN VALVE CHAMBERS.
 - (G) INSTALL 1.5" DIAMETER SDR 21 PIPING FROM SUPPLY AND RETURN VALVE CHAMBERS TO DRIP ZONES IN FIELD.
 - (H) PROVIDE POWER AND CONTROL WIRING TO PUMP/ALARM PANEL. REFER TO E-101 FOR ELECTRICAL PLAN AND DETAILS.
 - (I) SOLENOID CONTROL VALVES WITH FIVE ZONE OUTLETS. PLACE VALVE IN A 30" PVC RISER WITH AN INSULATED LID AND 3" OF GRANULAR MATERIAL IN THE PIT BOTTOM FOR DRAINAGE. SEE DETAIL 1 ON C-204.
 - (J) DRIP LINE TO BE GEOFLOW 0.53 GPH OR NETAfim .61 GPH WITH PRESSURE COMPENSATED EMITTERS SPACED 2' APART AND PLOWED 10" DEEP INTO THE SOIL. LINES SHALL BE RUN LEVEL ON THE CONTOUR. CARE SHOULD BE TAKEN TO CREATE MINIMAL DISTURBANCE TO THE EXISTING GROUND. COMPACTION SHOULD BE KEPT TO A MINIMUM. REFER TO C-204 FOR CONNECTION AND LOOPING DETAIL. DRIP TUBING INSTALLED AMONGST THE TREES SHALL BE STAPLED DOWN AND COVERED WITH 12" OF HARDWOOD MULCH.
 - (K) PROVIDE VACUUM RELIEF VALVE AT HIGH POINTS IN SUPPLY MANIFOLD ZONES. USE NETAfim 2" GUARDIAN AIR/VAC VALVE IN 6" VALVE BOX. PROVIDE GREEN FIBERGLASS MARKER ADJACENT TO VALVE BOX. SEE DETAIL 3 ON C-203.
 - (L) PROVIDE RETURN CHECK VALVES IN ACCESSIBLE VALVE BOX. SEE DETAIL 2 ON C-204.
 - (M) PROVIDE DOSING EQUIPMENT IN DOSING SEPTIC TANK CHAMBER. INCLUDE (2) REDUNDANT 3/4 HP PUMPS EQUAL TO FRANKLIN 20 GPM 3/4 H.P., TURBINE PUMP. INCLUDE SIM/TECH PUMP FILTER OR APPROVED EQUAL. ROUTE POWER AND FLOAT WIRING TO CONTROL PANEL AS SUPPLIED BY JNM TECHNOLOGIES AND PURCHASED BY THE CONTRACTOR.
 - (N) INSTALL CURTAIN DRAIN A MINIMUM OF 10' UPHILL OF DRIP FIELD. REFER TO DETAIL 6 ON C-203. ROUTE CURTAIN DRAIN TO DAYLIGHT.



NOTE: THE SPECIFICATIONS REQUIRE 50 CUBIC YARDS OF TRENCH ROCK EXCAVATION BE INCLUDED IN THE BASE BID IN THE EVENT ROCK IS ENCOUNTERED WHILE INSTALLING THE MANIFOLD PIPING. REFER TO THE UNIT PRICE AND ALLOWANCE SPECIFICATIONS

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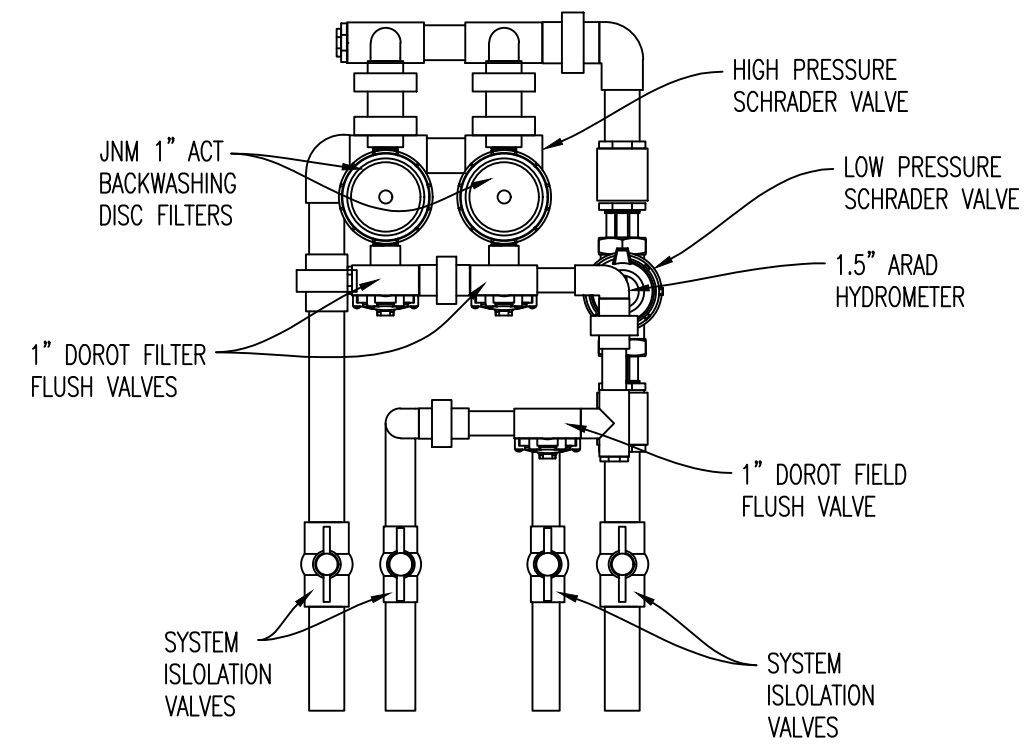
PROJECT # X2333-01
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ASSET # 7815110014

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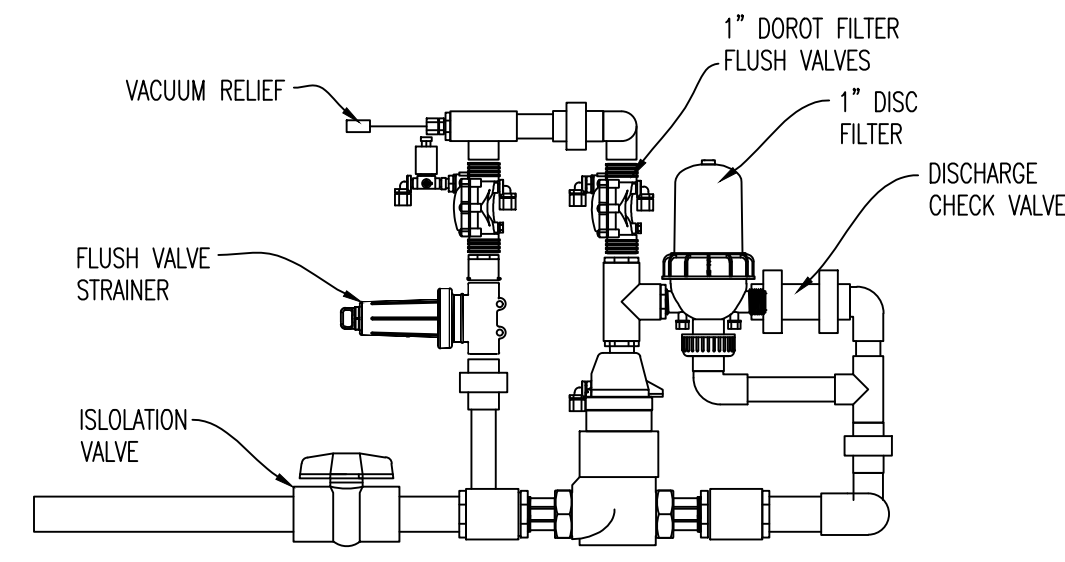
CAD DWG FILE: C-SIT-C101
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:
DRIP IRRIGATION SITE
PLAN

SHEET NUMBER:
C-101

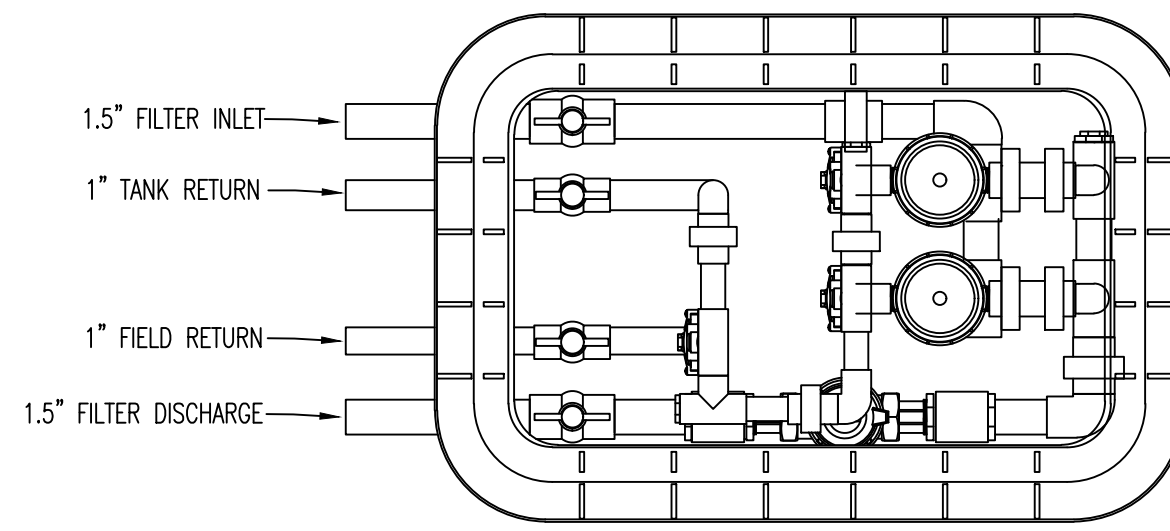


01 DRIP-TECH C200 - PLAN VIEW
SCALE: NONE

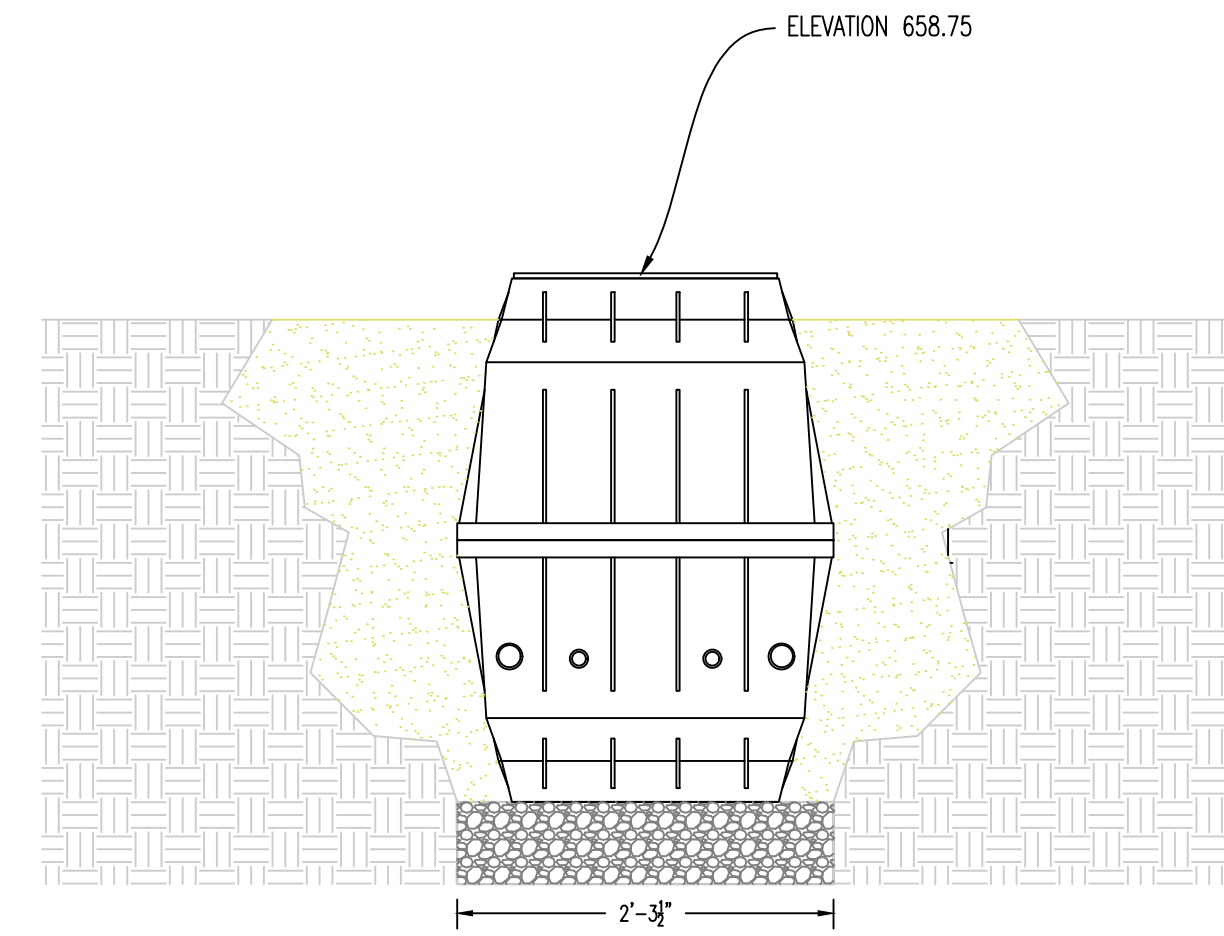


NOTES:
1) AN EXTRA DISC FILTER ASSEMBLY SHALL BE PROVIDED TO PARK STAFF AS ATTIC STOCK.

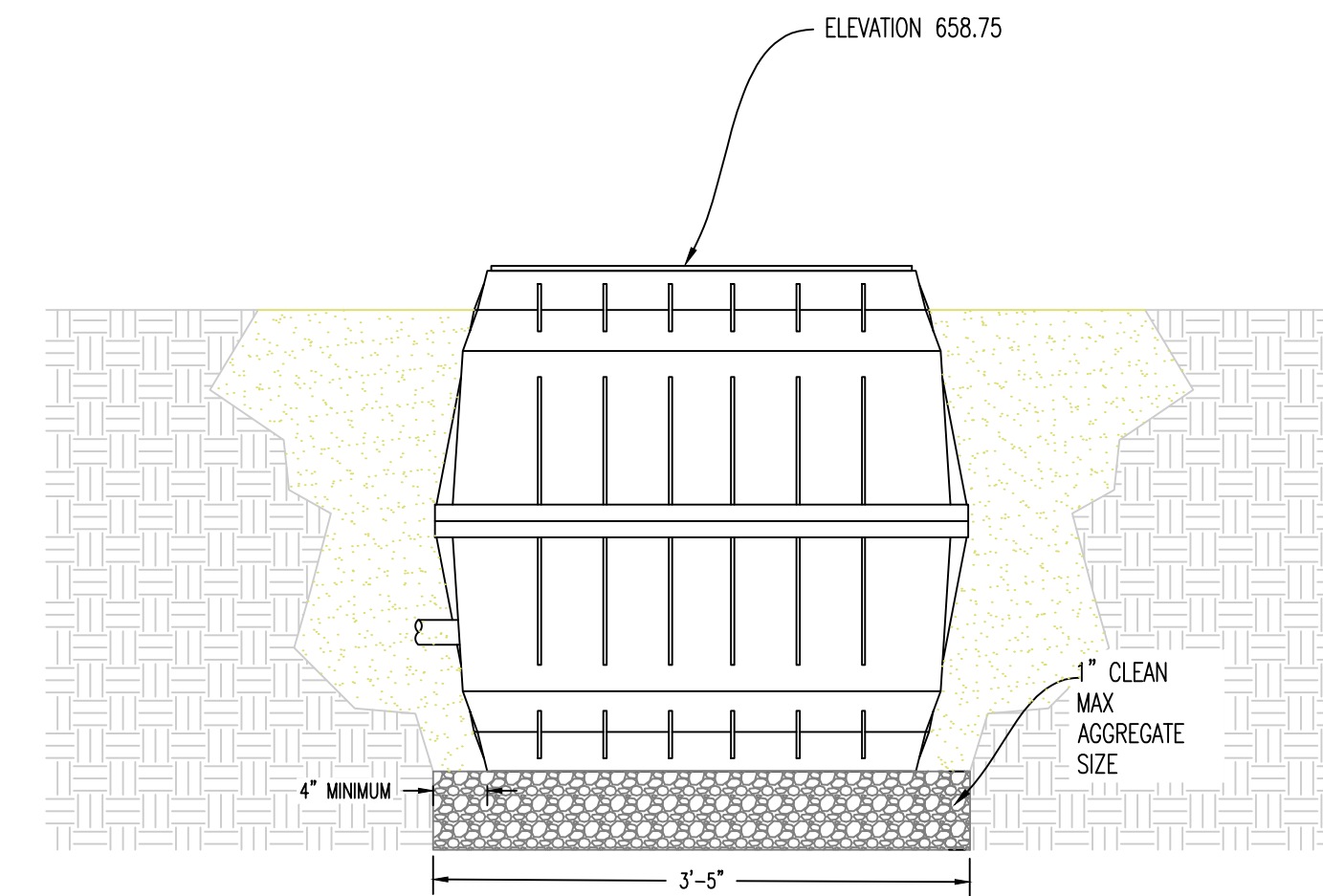
02 DRIP-TECH C200 - PROFILE VIEW
SCALE: NONE



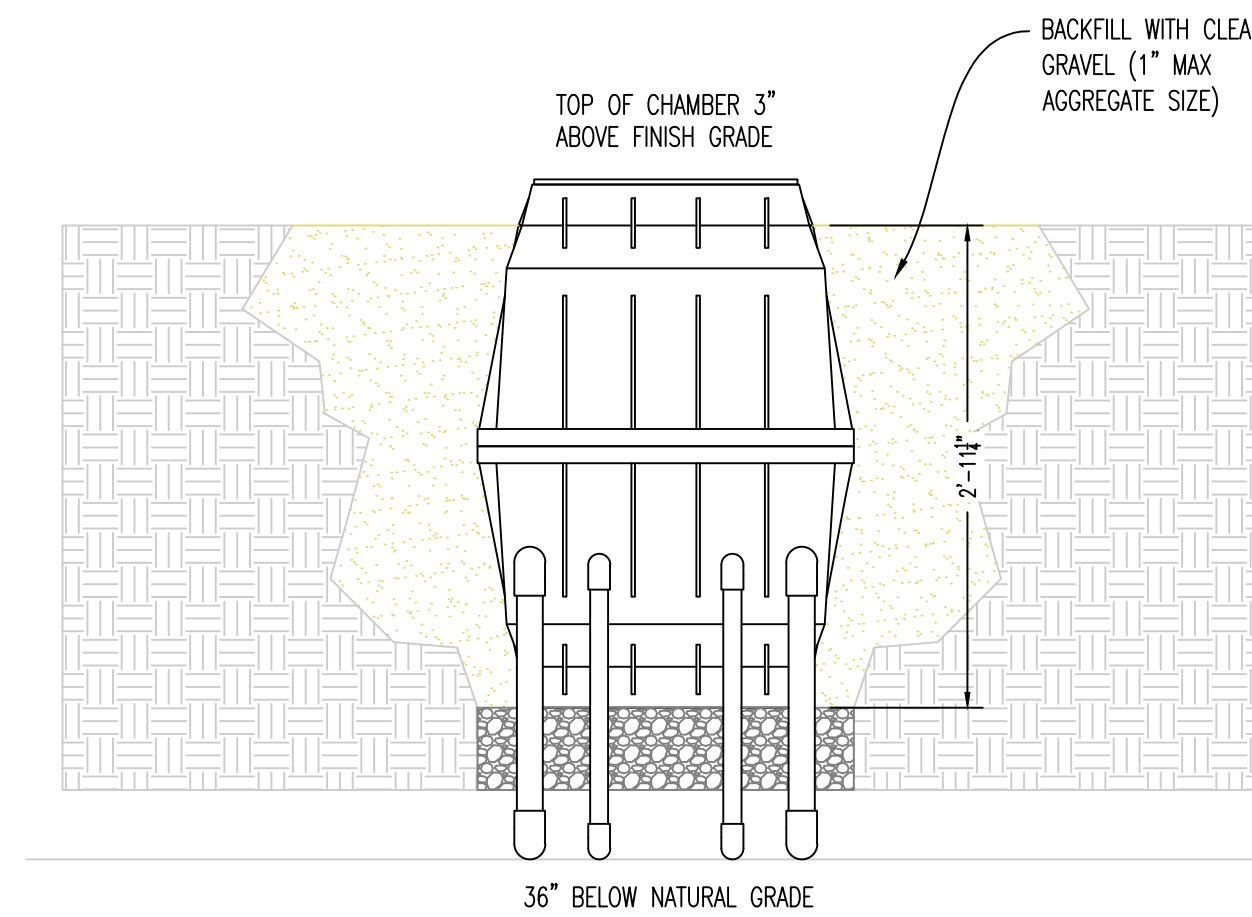
03 DRIP-TECH C200 - ENCLOSURE PLAN VIEW
SCALE: NONE



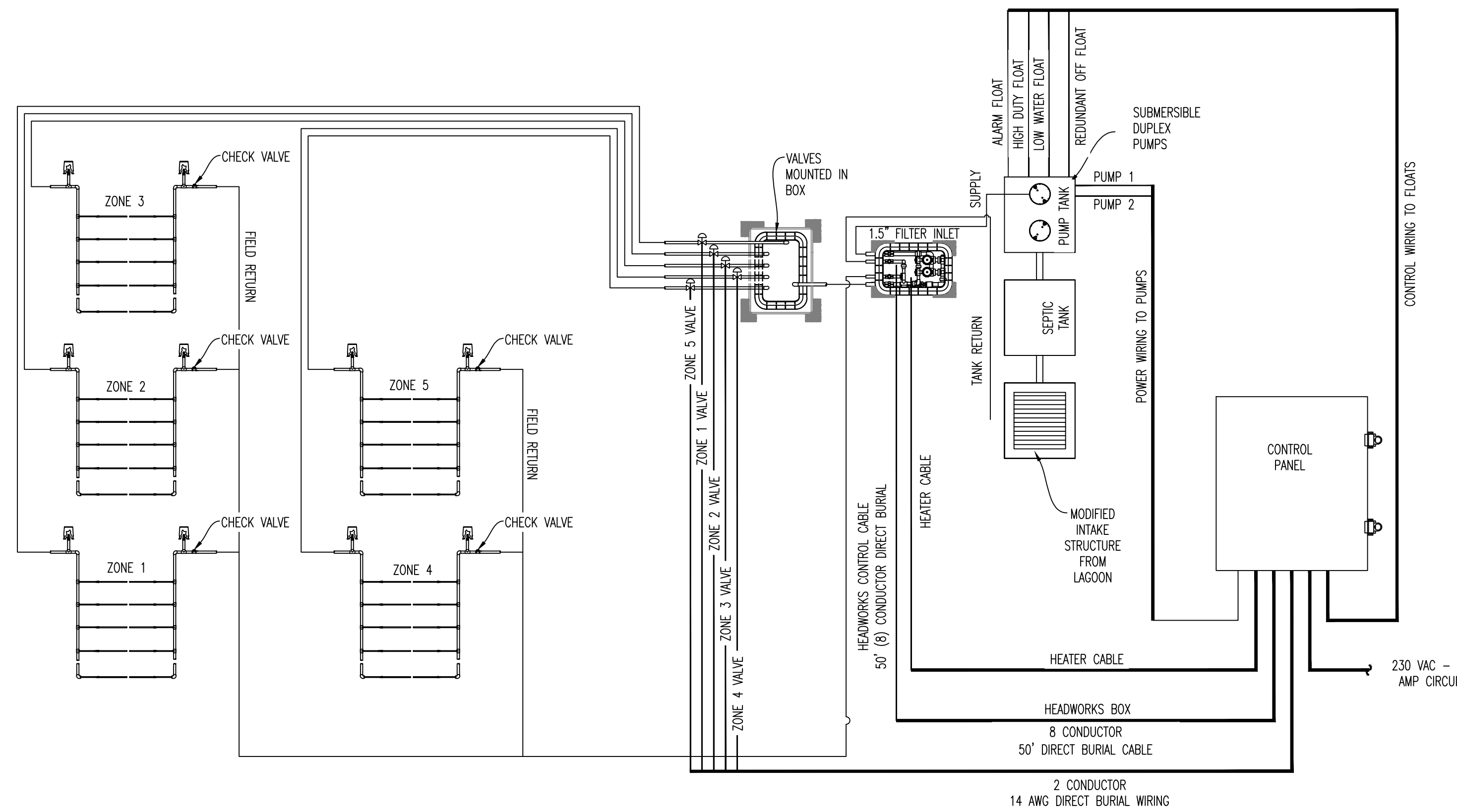
04 DRIP-TECH C200 - ELEVATION #1
SCALE: NONE



05 DRIP-TECH C200 - ELEVATION #2
SCALE: NONE



06 DRIP-TECH C200 - ELEVATION #3
SCALE: NONE



NOTES:
1) PUMP CONTROL PANEL TO BE PROVIDED BY JNM TECHNOLOGIES.
2) CONTROLS SHALL BE HOUSED IN A STAINLESS STEEL NEMA 4X ENCLOSURE
3) A SHOP DRAWING OF THE PUMP CONTROL PANEL AND OPERATIONAL SEQUENCE TO BE PROVIDED TO THE ENGINEER FOR REVIEW
4) ALL BELOW GROUND PITS CONTAINING VALVES AND PIPING SHALL BE PROVIDED WITH A 60 WATT HEAT TRACE CIRCUIT FOR WINTER OPERATION

07 DRIP-TECH C200 - ZONE SCHEMATIC
SCALE: NONE



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CAD DWG FILE: C-SIT-C201
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DESIGNED BY: JRS

SHEET TITLE:

FILTRATION
EQUIPMENT
DETAILS

SHEET NUMBER:

C-201



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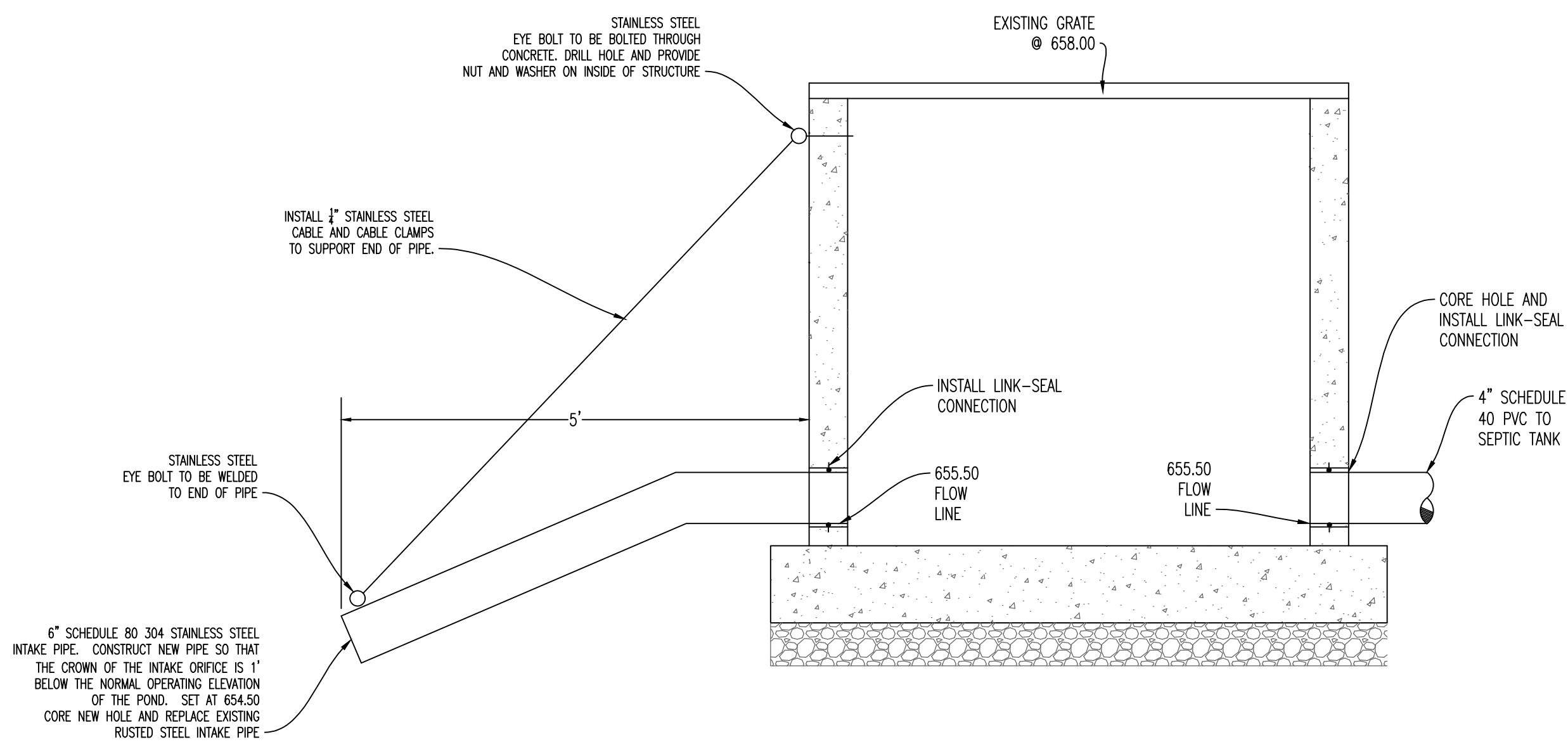
SHEET TITLE:

SEPTIC TANK AND PUMP
VAULT DETAILS

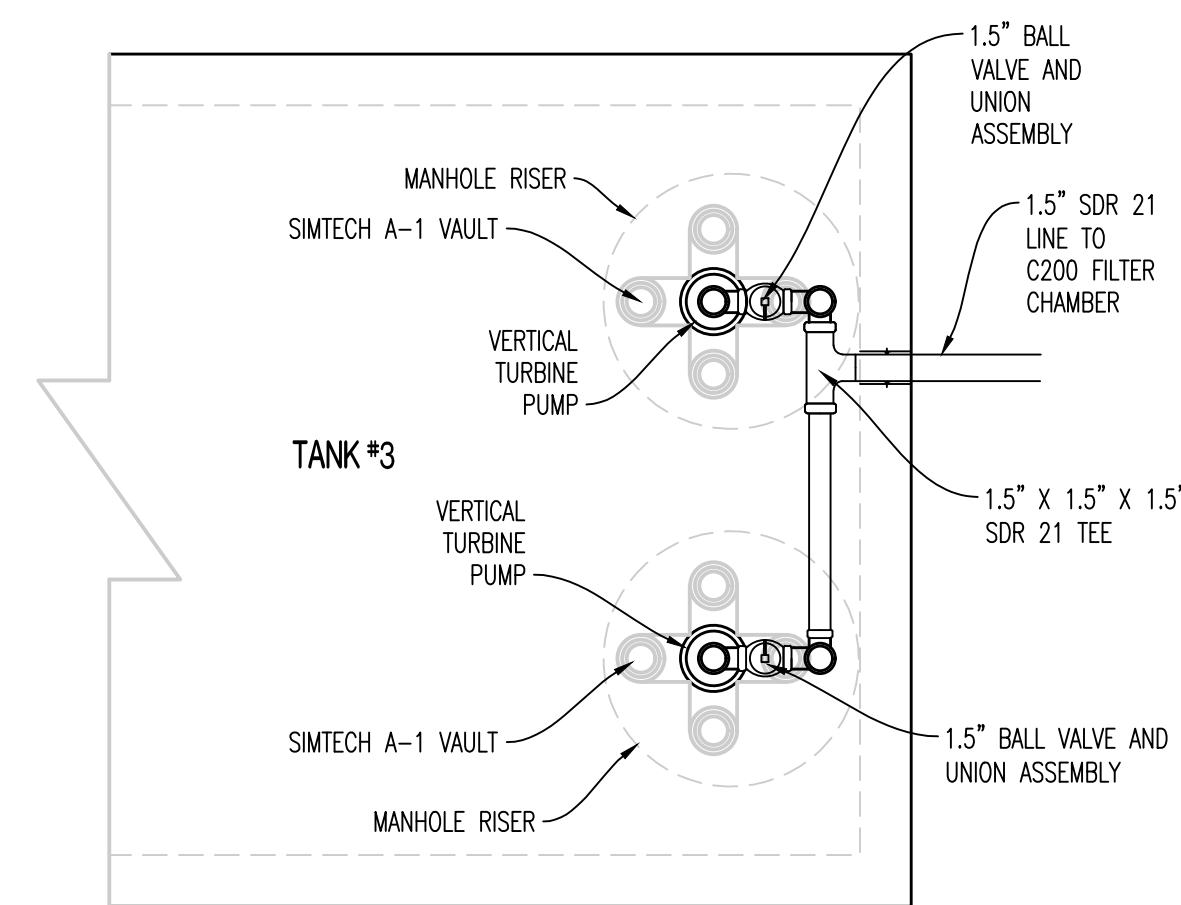
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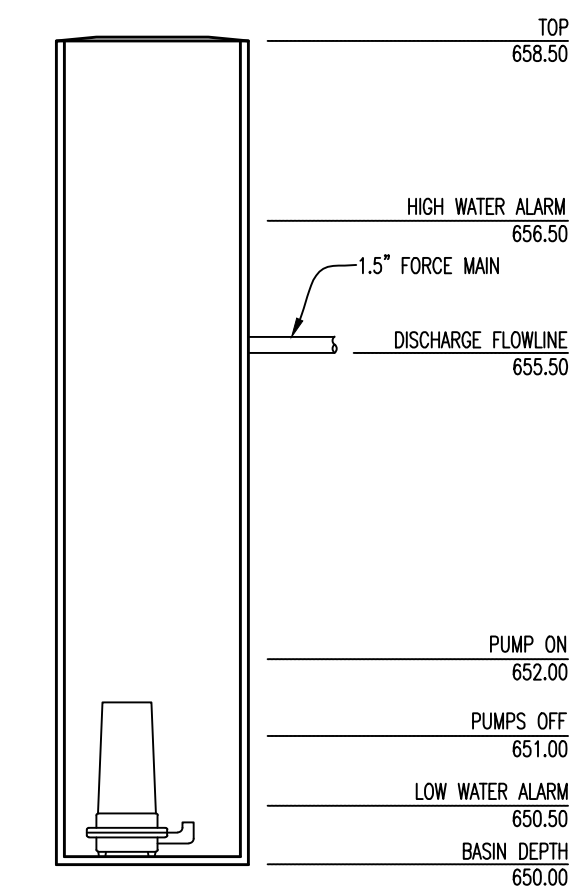
6 of 9 SHEETS



01 INTAKE STRUCTURE MODIFICATION DETAIL
SCALE: NONE

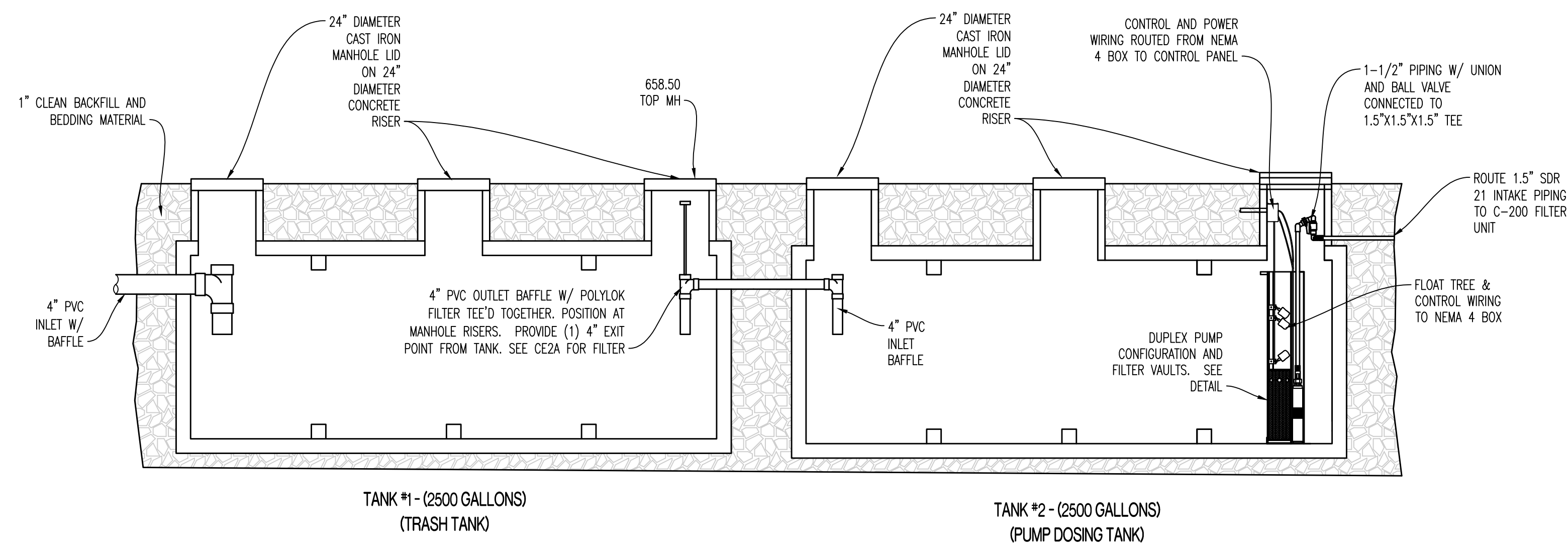


03 DOSING PUMP FILTERS DETAIL
SCALE: NONE



04 FLOAT ELEVATIONS
SCALE: NONE

NOTES:
1) FINAL FLOAT ELEVATIONS MAY BE REVISED AFTER REVIEW OF SEPTIC TANK SHOP DRAWINGS



02 SEPTIC TANK AND PUMP SCHEMATIC
SCALE: NONE

GENERAL NOTES:

CONTRACTOR SHALL PROVIDE (2) 2500 GALLON PRECAST CONCRETE SEPTIC TANKS WITH CONCRETE RISERS AND CAST IRON LIDS. PROVIDE A-LOK OR LINK SEAL PIPING CONNECTIONS AT ALL PENETRATIONS. PROVIDE SHOP DRAWING FOR EACH TANK AND PROVIDE ANTI-FLOTATION ANCHORAGE OR CALCULATIONS PROVING FLOTATION IS NOT POSSIBLE.

BOTH PUMPS SHALL BE FRANKLIN E-SERIES 3/4 H.P. FILTERED EFFLUENT PUMP - 230 VOLT SINGLE PHASE.

CONTRACTOR SHALL PROVIDE ALL NECESSARY SCHEDULE 80 PVC PIPING, COUPLINGS, FITTINGS, VALVES, AND ALL APPURTENANCES, EXCAVATING, BACKFILL, ETC. TO COMPLETE THE PUMP INSTALLATION AND CONSTRUCTION.

ALL ELECTRIC WORK SHALL COMPLY WITH NATIONAL ELECTRIC CODE. PUMP SUPPLIER SHALL PROVIDE WIRING DIAGRAMS FOR ALL COMPONENTS.

ALL BOLTS, NUTS, FASTENERS, BRACKETS, MOUNTS AND OTHER APPURTENANCES IN THE WET WELL SHALL BE STAINLESS STEEL.

PUMP SUPPLIER TO PROVIDE LEVEL CONTROL FLOATS AS SHOWN ON WET WELL SCHEMATIC. THESE FLOATS SHALL INTEGRATE WITH THE CONTROL PANEL AND EQUIPMENT AS PROVIDED BY JNM TECHNOLOGIES.

PUMP STATION CONTROL PANEL ASSEMBLY SHALL INCLUDE A 120 VOLT GFCI DUPLEX SERVICE OUTLET, EXTERIOR ALARM WITH HORN AND STROBE, & LIGHTNING PROTECTION.

ALL PUMP EQUIPMENT AND INSTALLATION SHALL BE CERTIFIED BY THE EQUIPMENT SUPPLIER. PUMP MANUFACTURER AND CONTRACTOR SHALL PROVIDE A FACTORY START-UP AND TRAINING IN THE PRESENCE OF THE OWNERS REPRESENTATIVE.

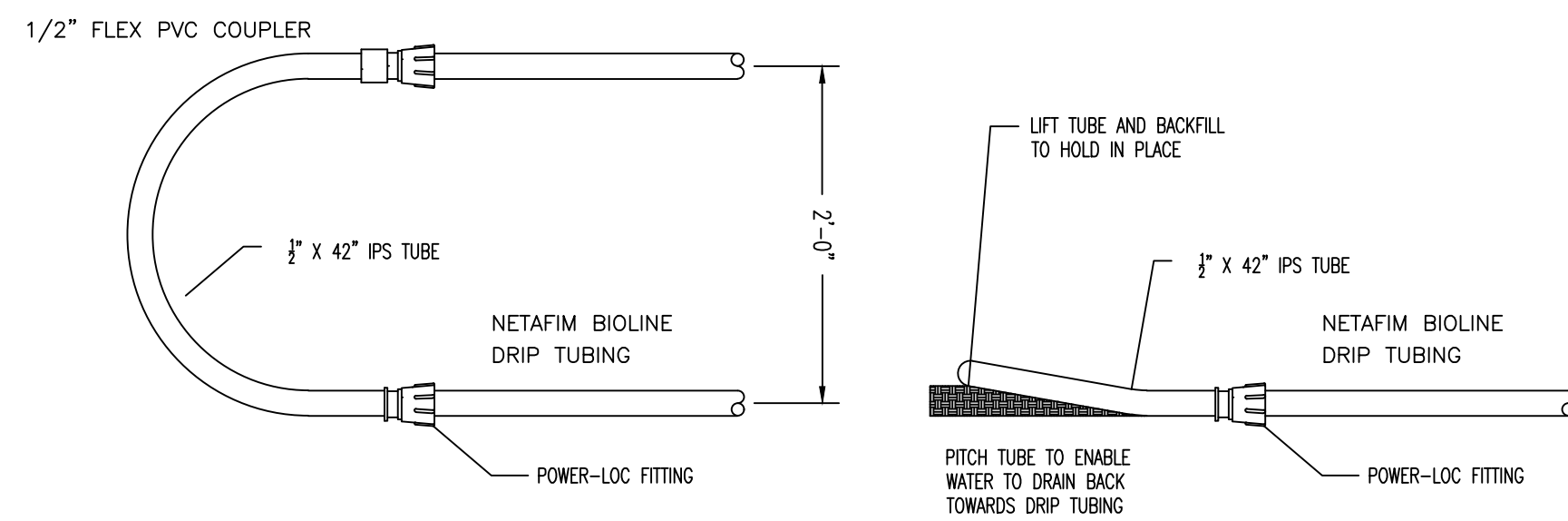
THE CONTRACTOR SHALL WARRANTY THE PUMPS FOR A PERIOD OF ONE YEAR FOLLOWING START-UP.

COMPLETE OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED TO THE OWNERS REPRESENTATIVE PRIOR TO ACCEPTANCE OF PUMPS.

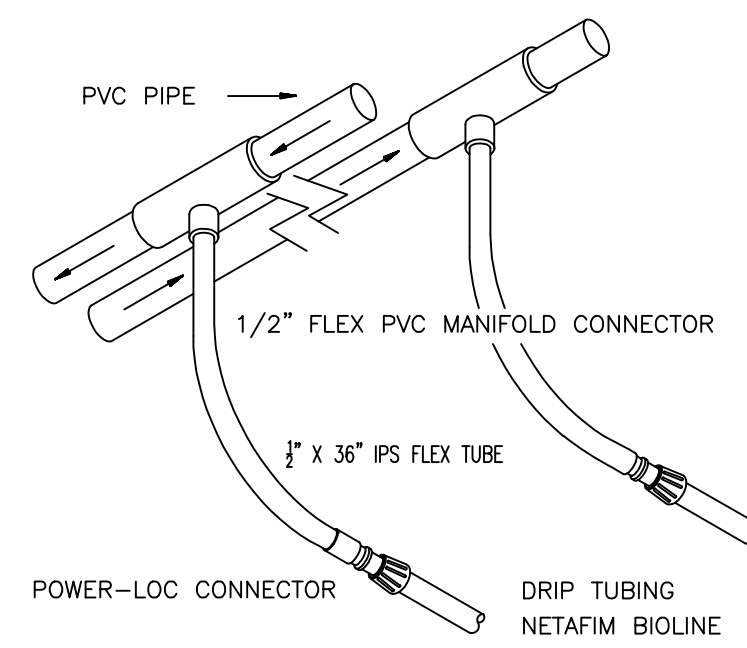
SEPTIC TANK LIDS SHALL BE CAST IRON. ALL TANK RISERS SHOULD BE CONCRETE.

CONTROL PANEL SHALL BE CONFIGURED WHERE BOTH PUMPS ARE TO ALWAYS BE ALTERNATING AND NOT RUN SIMULTANEOUSLY UNLESS THERE IS A CALL FOR FIELD OR FILTER FLUSHING. IT IS REQUIRED FOR PUMPS TO ALTERNATE USAGE TO ENSURE EVEN WEAR ON THE PUMPS.

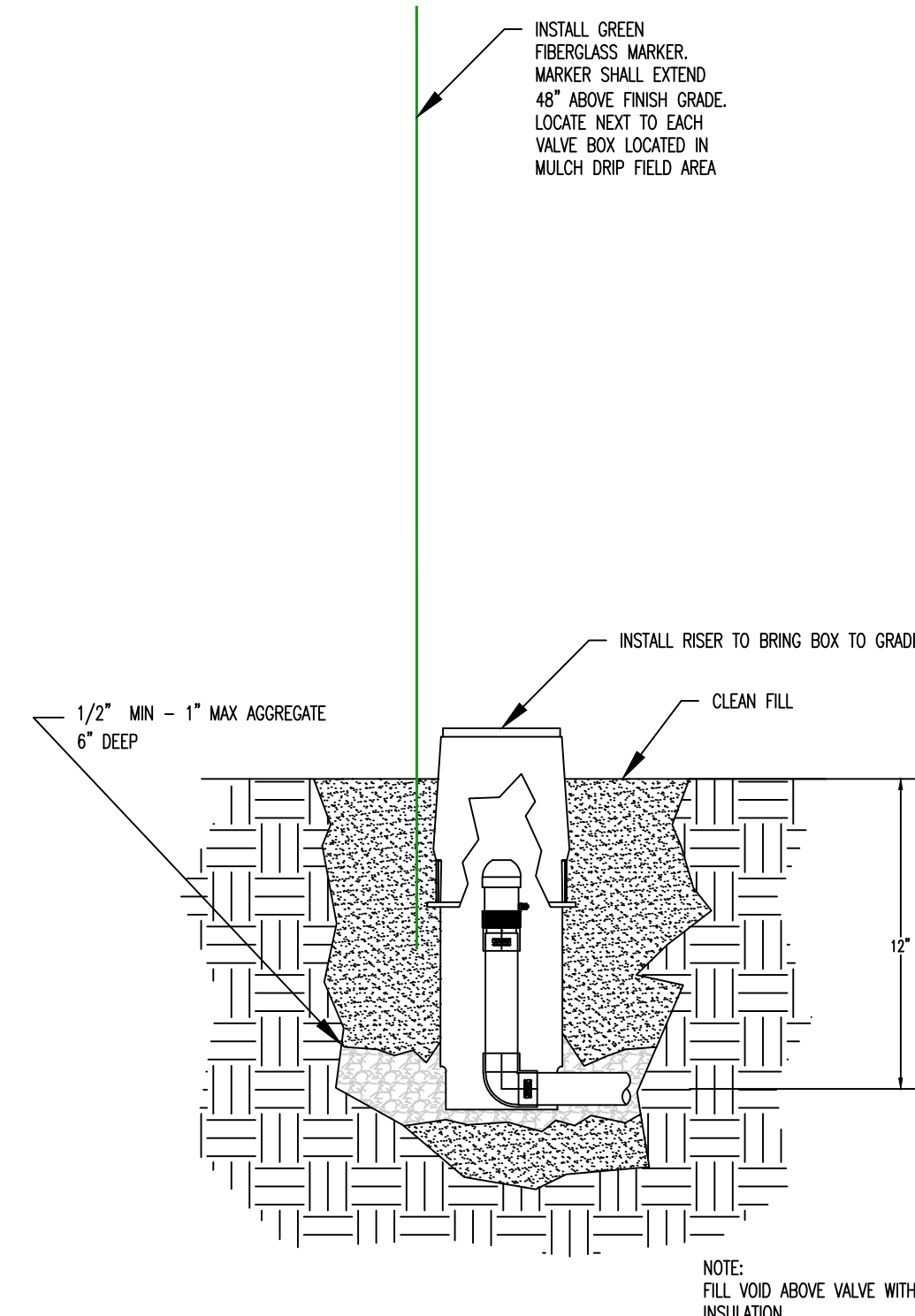
NEW PIPE PENETRATIONS IN CONCRETE SHALL HAVE A LINK SEAL AT EACH PIPE PENETRATION.



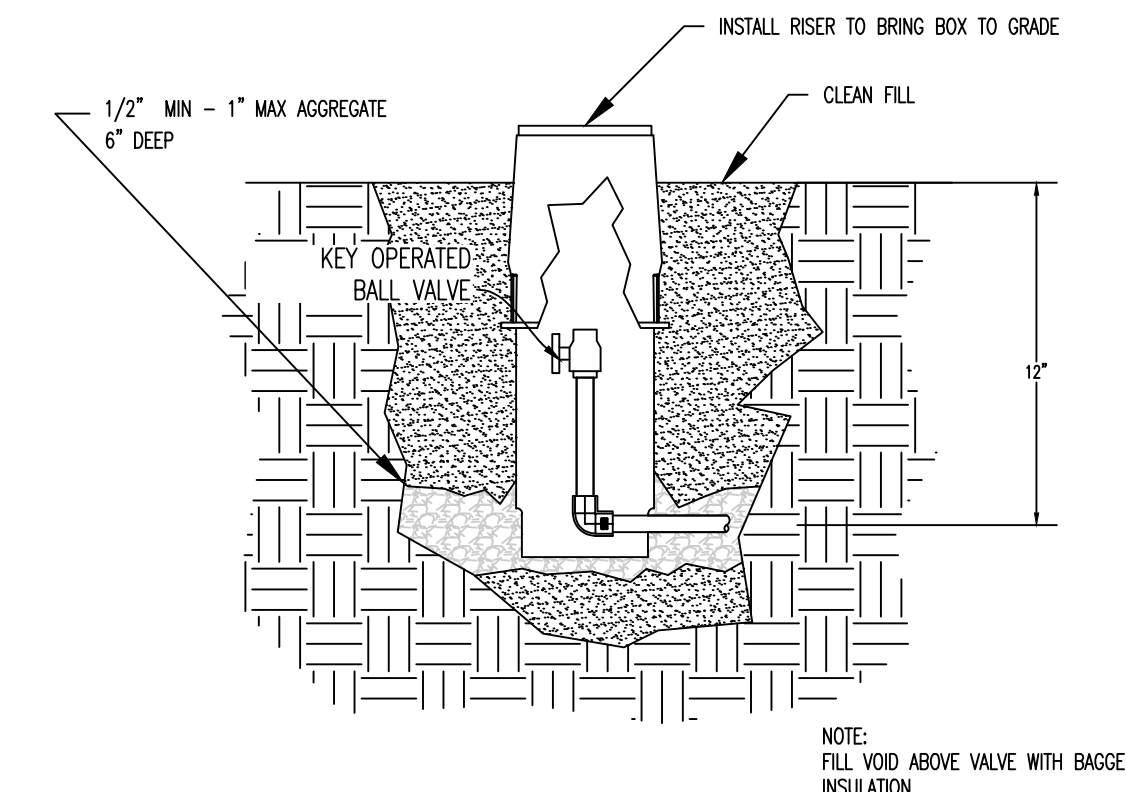
01 TYPICAL 2 FT LOOP INSTALLATION DETAIL
SCALE: NONE



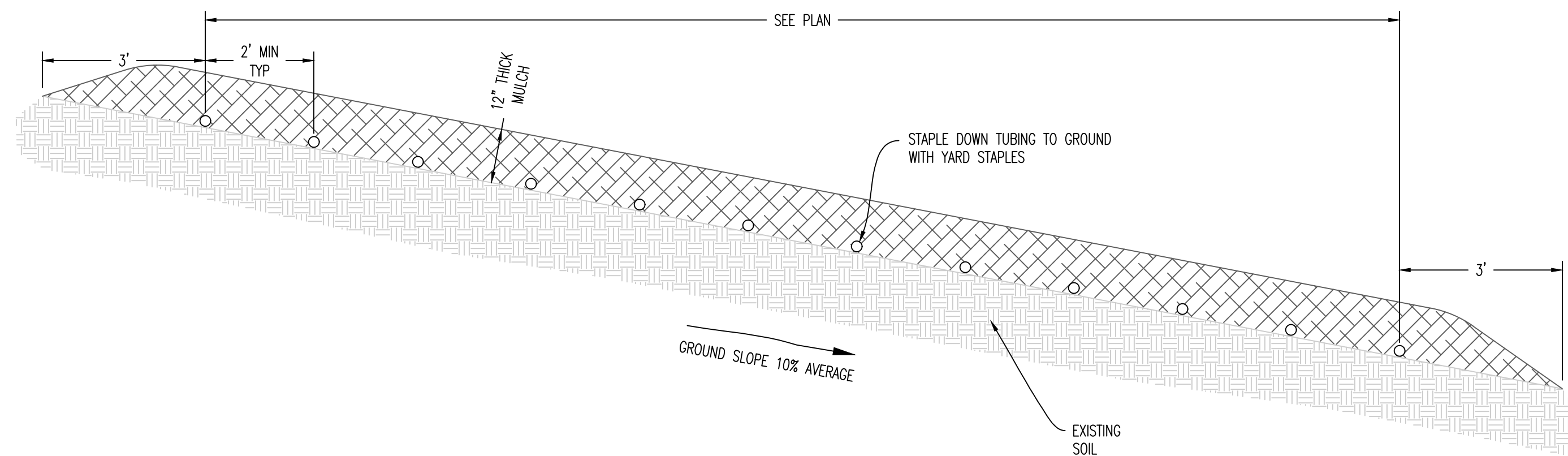
02 MANIFOLD CONNECTION LOOPED FIELD
SCALE: NONE



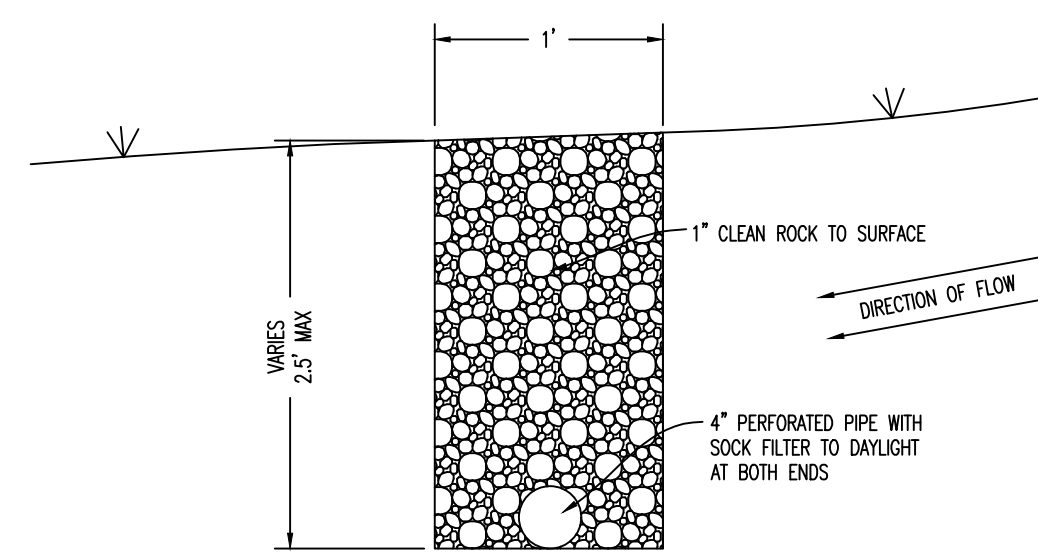
03 2' ARI GUARDIAN AV DETAIL
SCALE: NONE



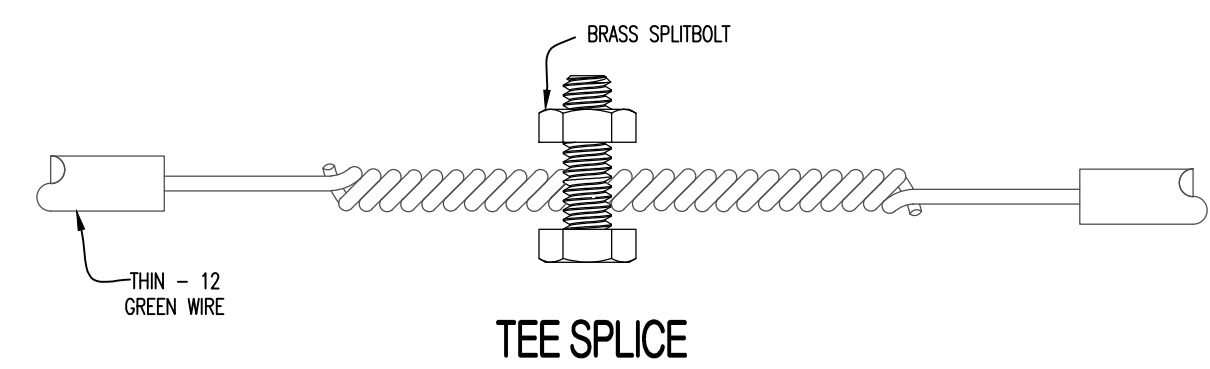
04 CLEAN OUT DETAIL
SCALE: NONE



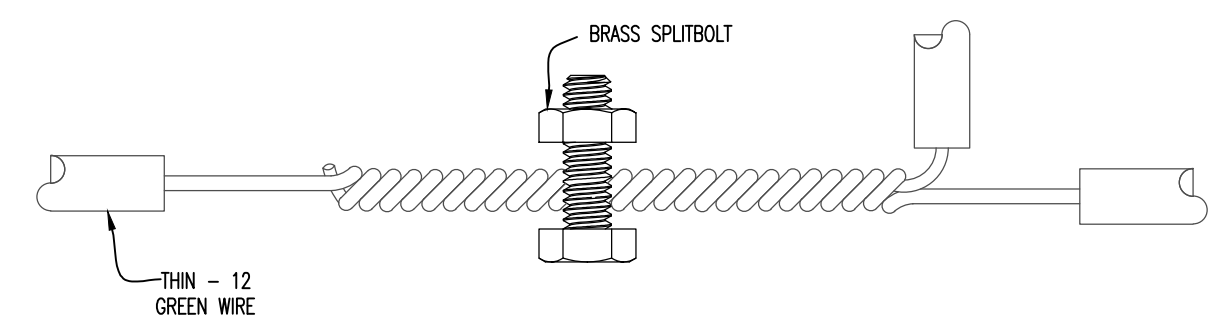
05 MULCH COVER DETAIL
SCALE: NONE



06 CURTIAN DRAIN DETAIL
SCALE: NONE



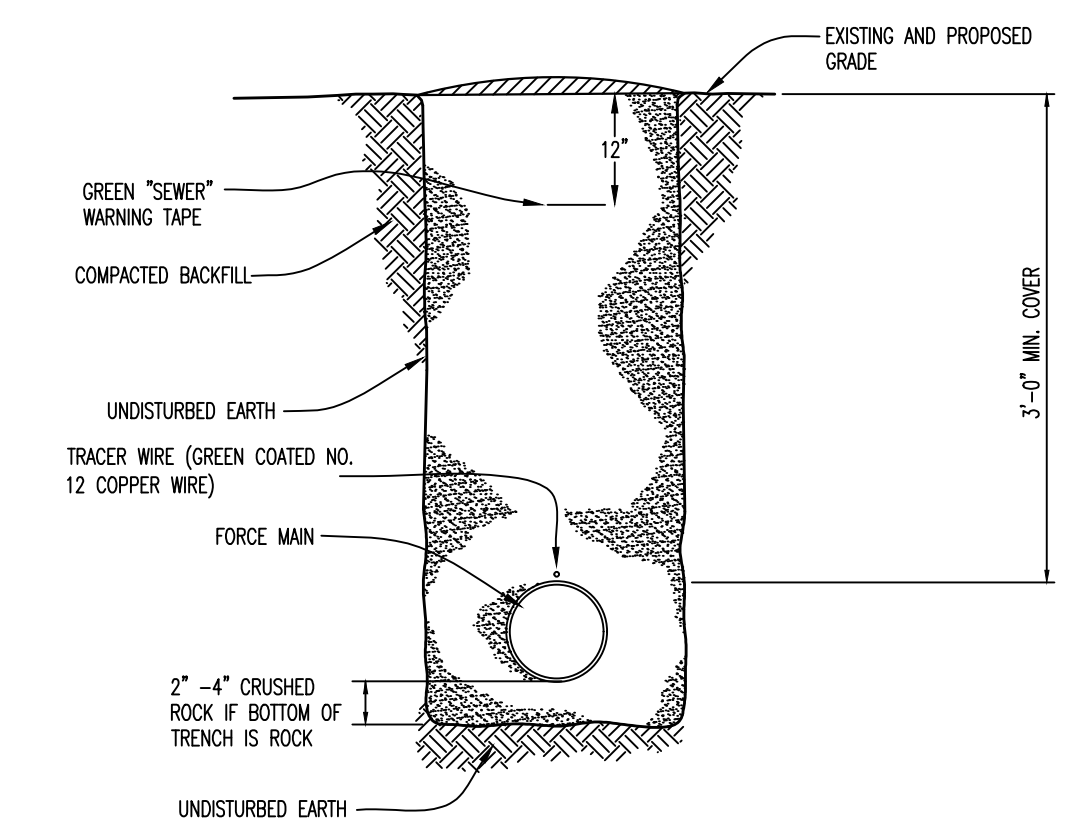
TEE SPLICE



TEE INTERSECTION

NOTE: AT TEE INTERSECTION, REMOVE INSULATION ONLY. DO NOT CUT MAIN LOCATOR WIRE.
WIRE TO BE 12 GAUGE SOLID COPPER WITH THIN GREEN INSULATION.
SPLICE OR CONNECTION TO BE DOUBLE WRAP TAPED WITH 3/4\"

07 TRACER WIRE SPLICING
SCALE: NONE



08 DISTRIBUTION AND RETURN MAINS TRENCH DETAIL
SCALE: NONE



JESSE RAY STEPHENS
MO LICENSE - 200000968
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Crockett Engineering Consultants, LLC
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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES
MANAGEMENT,
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DEPARTMENT OF
NATURAL RESOURCES
MISSOURI STATE PARKS

SEWER RENOVATIONS
MARK TWAIN STATE PARK
& MARK TWAIN BIRTHPLACE

MARK TWAIN STATE PARK
37352 SHRINE ROAD
FLORIDA, MO 65283

PROJECT # X2333-01
SITE # 5110
ASSET # 7815110014

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 09/27/2024

CAD DWG FILE: C-SIT-C203
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

DRIP IRRIGATION
DETAILS (1 OF 2)

SHEET NUMBER:

C-203



JESSE RAY STEPHENS
MO LICENSE # 200000968

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PROJECT # X2333-01
SITE # 5110
ASSET # 7815110014

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____

ISSUE DATE: 09/27/2024

CAD DWG FILE: C-SIT-C204
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

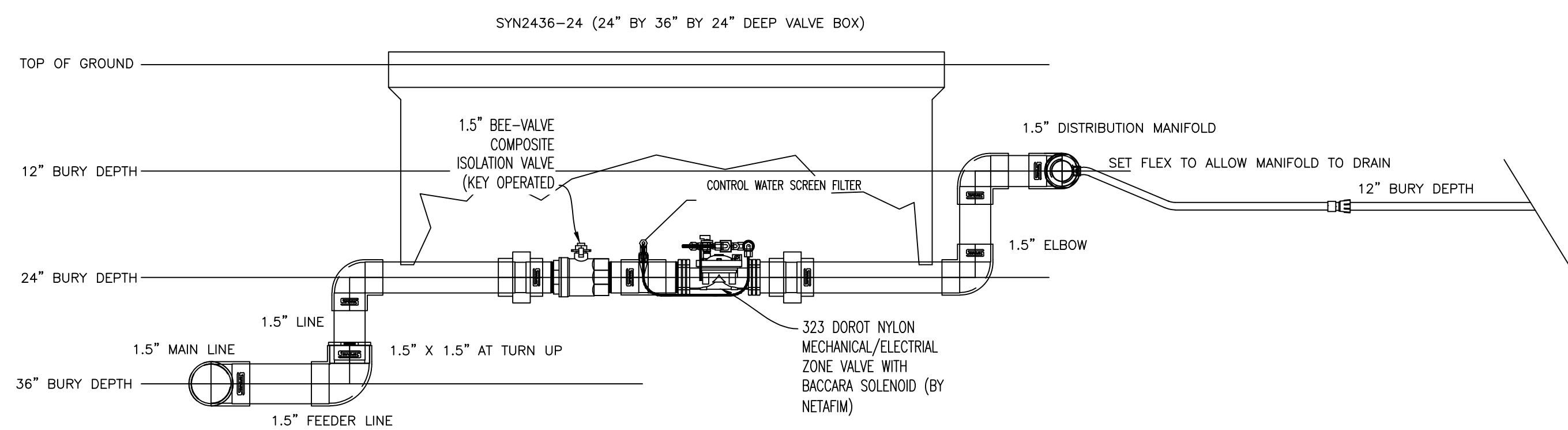
SHEET TITLE:

DRIP IRRIGATION
DETAILS (2 OF 2)

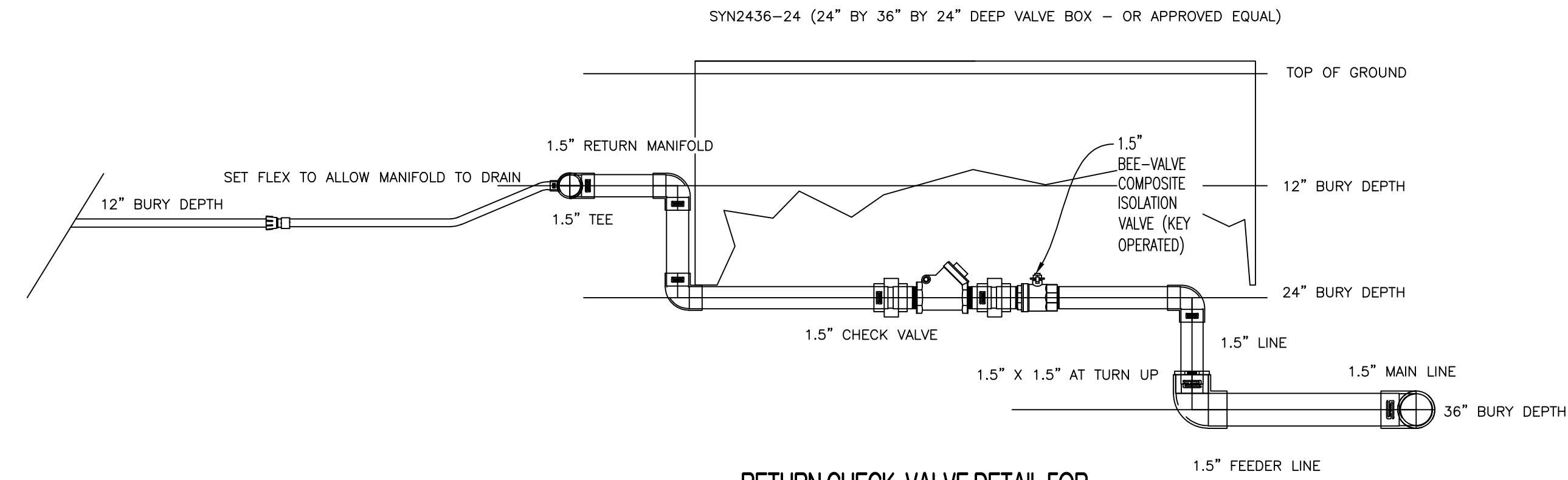
SHEET NUMBER:

C-204

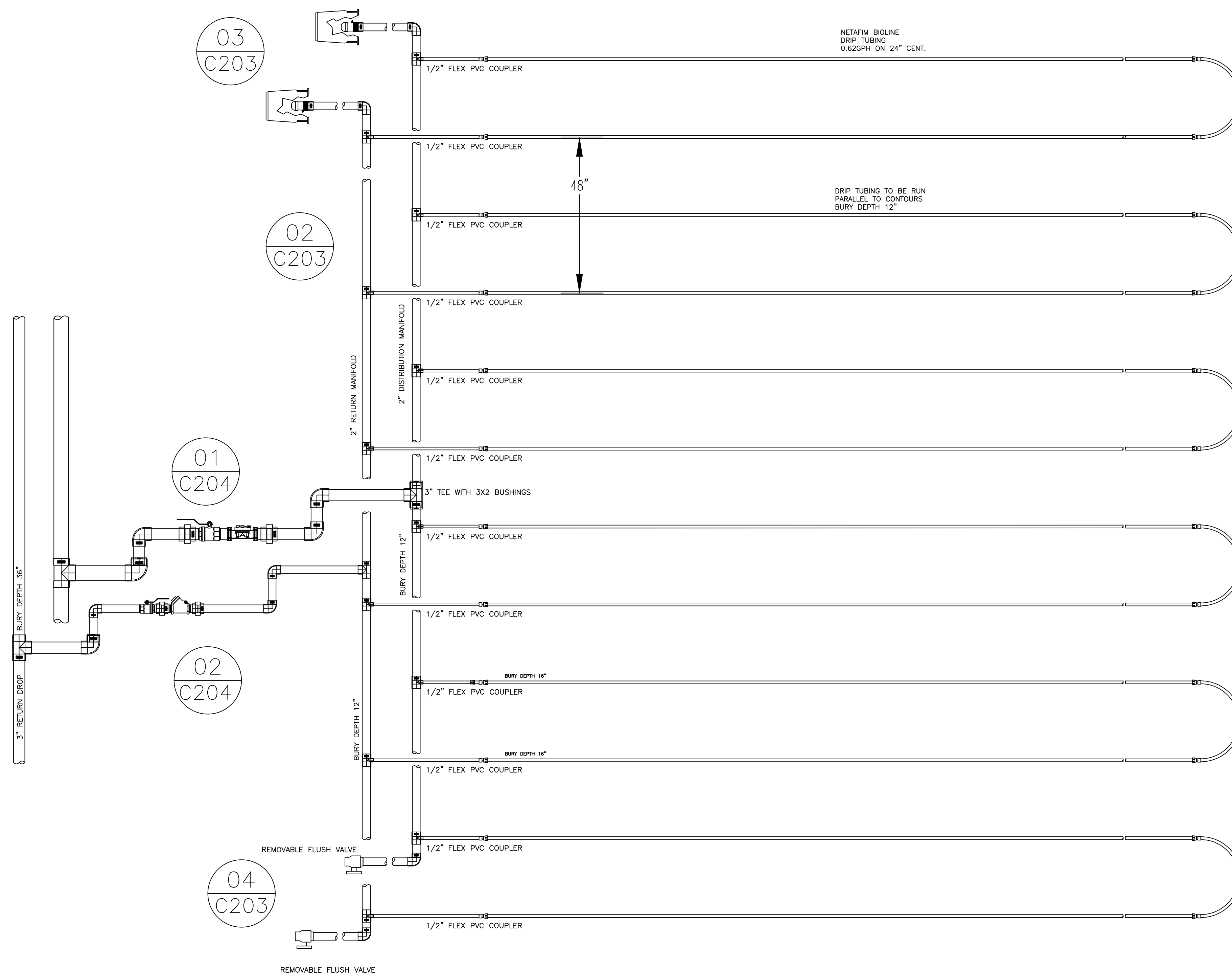
8 of 9 SHEETS



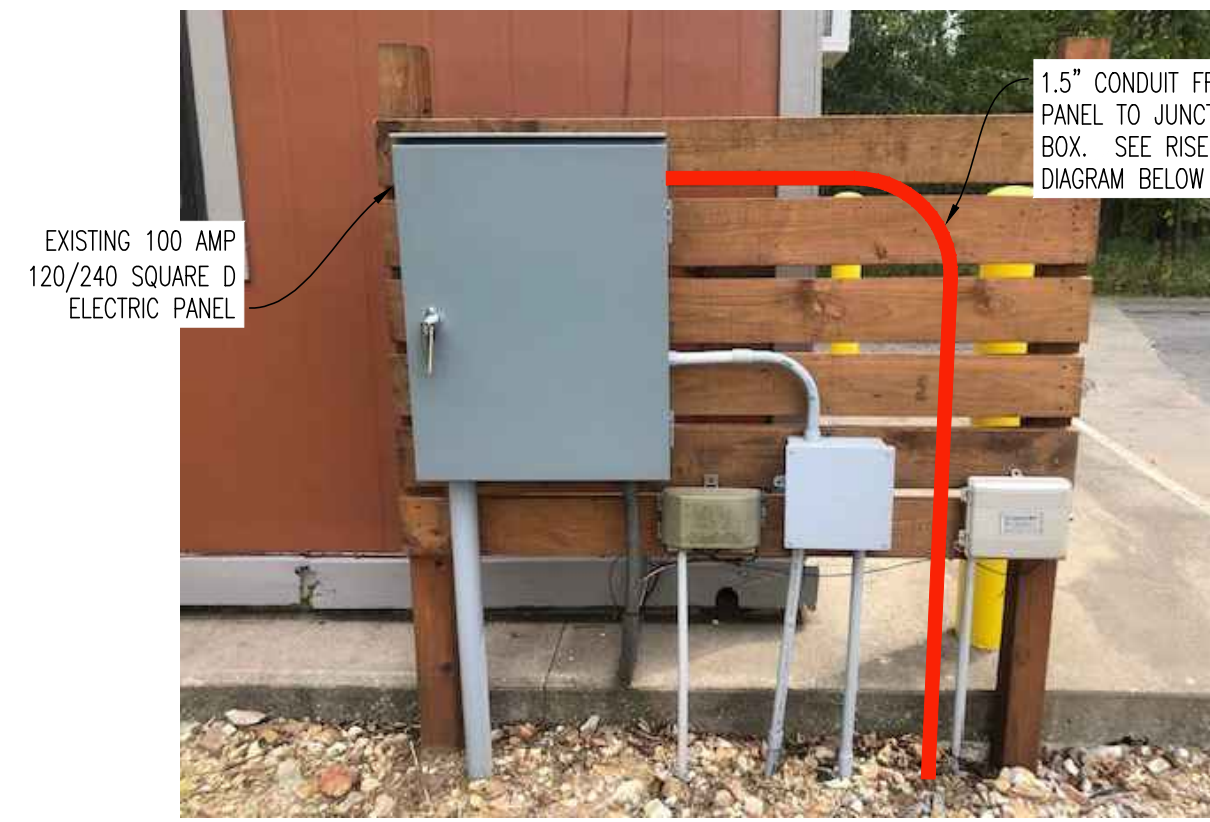
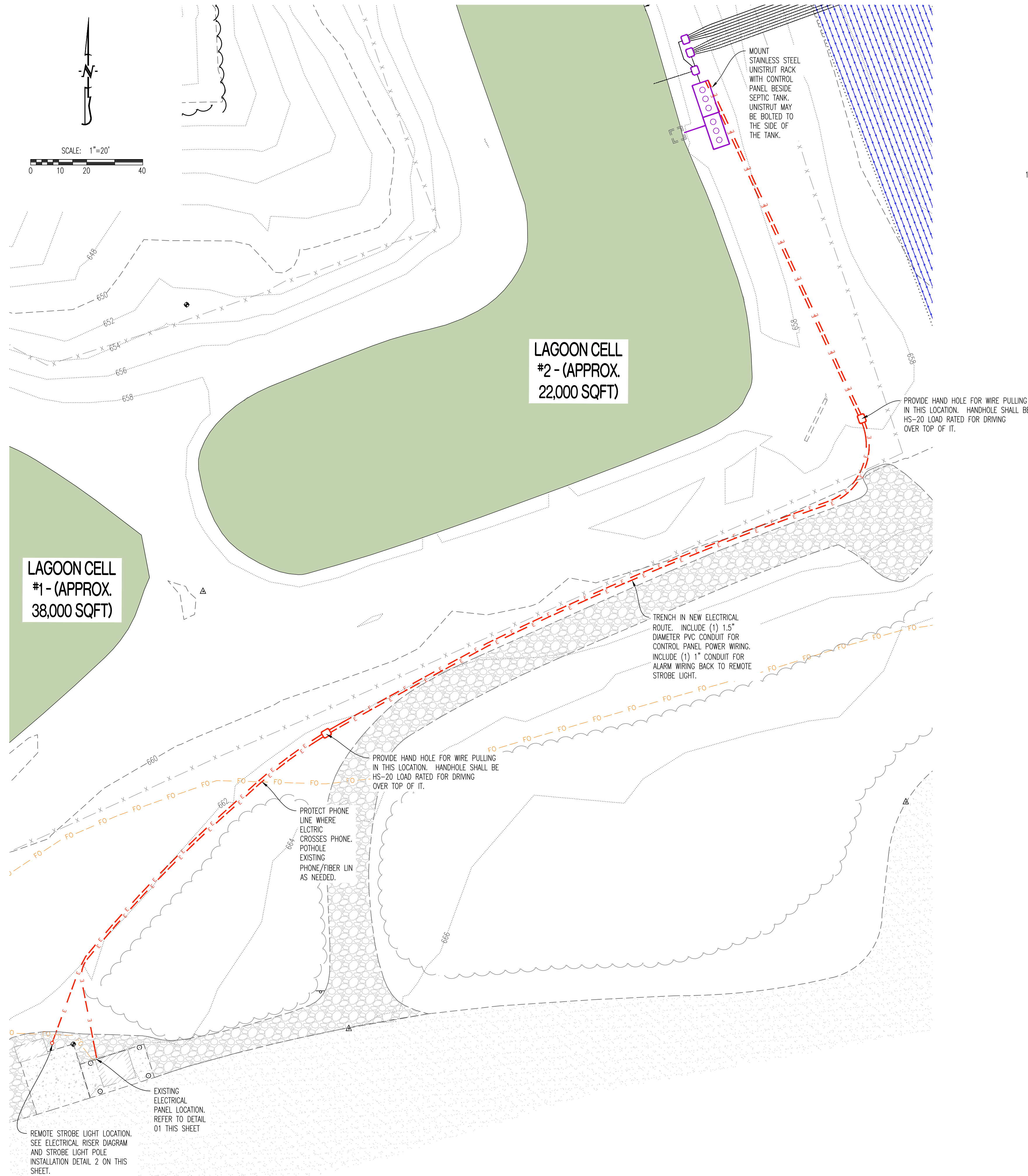
01 SUPPLY VALVE DETAIL FOR
TYPICAL STANDARD MANIFOLD
SCALE: NONE



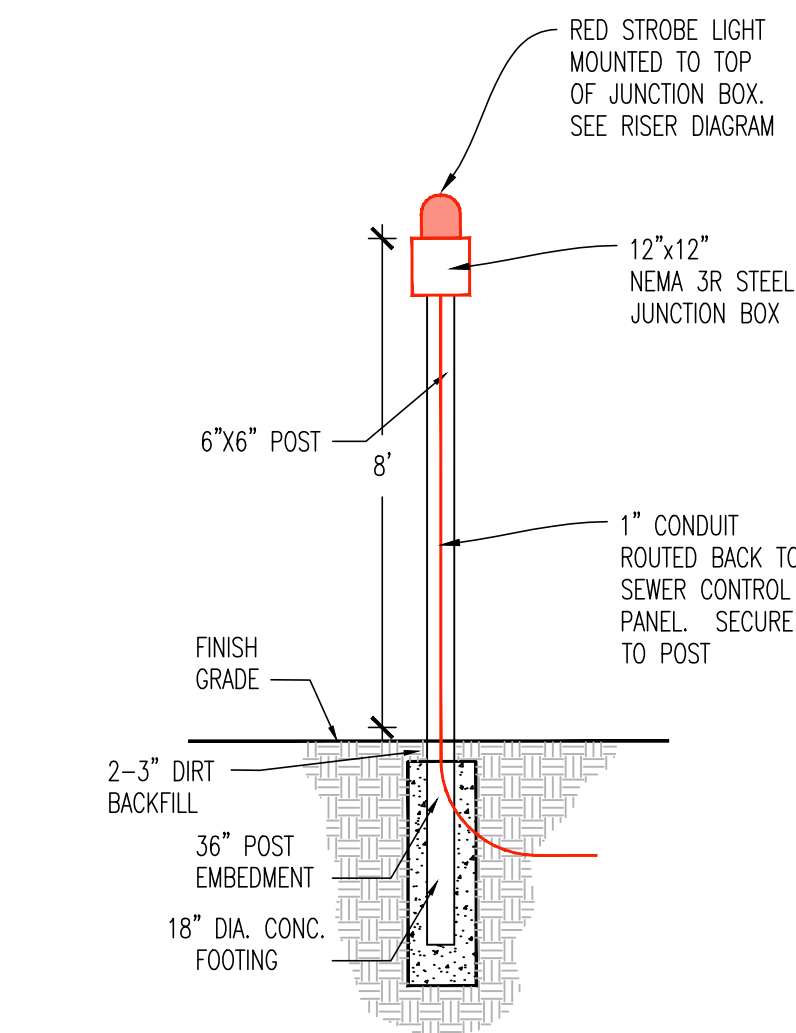
02 RETURN CHECK VALVE DETAIL FOR
TYPICAL STANDARD MANIFOLD
SCALE: NONE



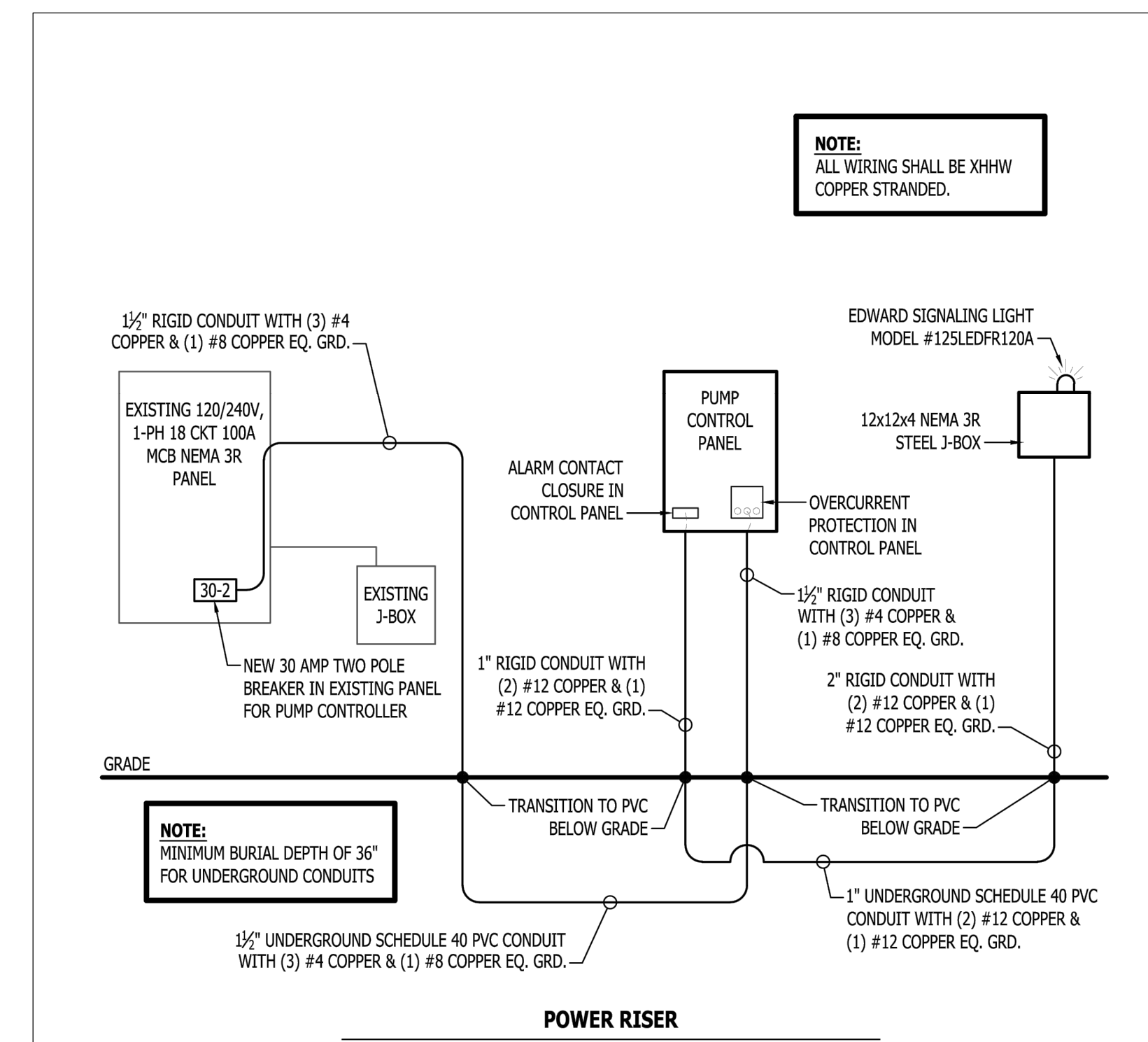
03 TYPICAL STANDARD MANIFOLD LOOPED
SCALE: NONE



01 PANEL CONNECTION DETAIL
SCALE: NONE



02 STROBE LIGHT POST DETAIL
SCALE: NONE



	J-SQUARED ENGINEERING 2400 Bluff Creek Drive, Suite 101 Columbia, Missouri 65201 573 - 234 - 4492 phone www.j-squaredeng.com	SHEET TITLE
	PROJECT: Mark Twain State Park Sewer Pump J2 PROJECT No: J21406 J2 DESIGN: JAP DATE: 09 - 25 - 2024 SHEET: 1 of 1	NEW SEWER PUMP POWER RISER SHEET NUMBER E101

STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR



JESSE RAY STEPHENS
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REVISION: _____
DATE: _____
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DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 09/27/2024

CAD DWG FILE: C-SIT-E101
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

ELECTRICAL
PLAN

SHEET NUMBER:

E-101