

WATER & WASTEWATER IMPROVEMENTS GRAHAM CAVE STATE PARK DANVILLE, 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: X2321-01

SITE NUMBER: 5210

ASSET NUMBER: 7815210016 - PUMP HOUSE WELL #1
7815210017 - PUMP HOUSE WELL #2
7815210025 - LAGOON SERVICE AREA

LOCATION MAP



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D104 - WELL HOUSE DEMOLITION PLAN - PARK OFFICE
D105 - PAVILLION/PLAYGROUND DEMOLITION PLAN

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C202 - WELL HOUSE SITE PLAN - CAMPGROUND
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E-101 - WELL HOUSE EQUIPMENT PLAN
E-102 - 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:

CROCKETT

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www.crockettengineering.com

Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#2000151301

SHEET NUMBER:

G-001

1 OF 21 SHEETS
SEPTEMBER 9, 2024

LOCATES:

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

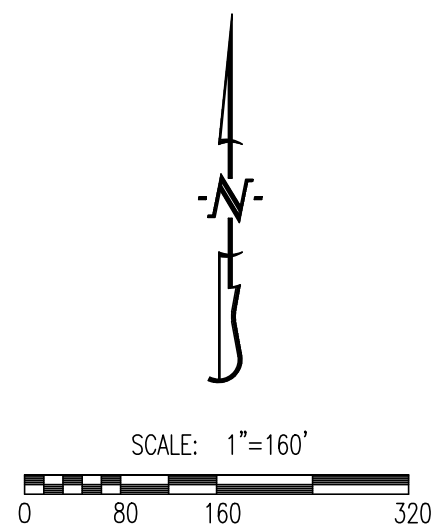


TELEPHONE:

AT&T
2210 HIGHWAY K
O'FALLON, MO 63368
314-420-1973

ELECTRIC:

CONSOLIDATED ELECTRIC CO-OP
3940 E. LIBERTY STREET
MEXICO, MO 65265
573-581-3630



GENERAL CAMPGROUND WORK AREA. REFER TO THE FOLLOWING PLAN SHEETS FOR WORK IN THIS AREA:

- 1) D-101 SEWER DEMOLITION PLAN - CAMPGROUND
- 2) D-102 WELL HOUSE DEMOLITION PLAN - CAMPGROUND
- 3) C-101 SEWER GRADING PLAN - CAMPGROUND
- 4) C-201 SEWER DRIP IRRIGATION PLAN - CAMPGROUND
- 5) C-202 WELL HOUSE SITE PLAN - CAMPGROUND
- 6) C-301 DRIP IRRIGATION DETAILS
- 7) C-302 SITE CONSTRUCTION DETAILS
- 8) S-101 WELL HOUSE CODE REQUIREMENTS
- 9) S-102 WELL HOUSE BUILDING PLAN & ELEVATIONS
- 10) S-103 WELL HOUSE STRUCTURAL DETAILS
- 11) E-101 WELL HOUSE EQUIPMENT PLAN
- 12) E-102 WELL HOUSE ELECTRICAL PLAN

NOTE: CAMPGROUND WATER IS REQUIRED TO BE FUNCTIONAL FROM APRIL 1ST THROUGH NOVEMBER 1ST. WORK THAT SHUTS DOWN THE WELL HOUSE MUST BE COMPLETED BETWEEN NOVEMBER 1ST AND APRIL 1ST. SEWER TANKS SHOULD BE INSTALLED NO LATER THAN APRIL 1ST. IF THE SYSTEM IS NOT COMPLETE AND TURNED OVER BY APRIL 1ST, THE CONTRACTOR SHALL PUMP AND HAUL SEPTIC WASTE AS NEEDED TO A PERMITTED TREATMENT FACILITY UNTIL SYSTEM IS FULLY FUNCTIONAL.

CONTROL POINT #2583 - PK NAIL IN ASPHALT

PARK OFFICE SEWER WORK AREA. REFER TO THE FOLLOWING PLAN SHEETS FOR WORK IN THIS AREA:

- 1) D-103 SEWER DEMOLITION - PARK OFFICE
- 2) C-101 SEWER GRADING PLAN - PARK OFFICE
- 3) C-203 DRIP IRRIGATION PLAN - PARK OFFICE
- 4) C-300 DRIP IRRIGATION DETAILS
- 5) C-301 SITE CONSTRUCTION DETAILS

NOTE: THE EXISTING LAGOON SHALL NOT BE DECOMMISSIONED PRIOR TO INSTALLATION OF THE SEPTIC TANK. THE CONTRACTOR SHALL PROVIDE PERIODIC PUMP-OUT OF THE TANK AND HAUL-OFF TO A PERMITTED FACILITY WHILE THE NEW DRIP IRRIGATION FIELD IS UNDER CONSTRUCTION.

PARK OFFICE WELL HOUSE WORK AREA. REFER TO THE FOLLOWING PLAN SHEETS FOR WORK IN THIS AREA:

- 1) D-104 WELL HOUSE DEMOLITION - PARK OFFICE
- 2) C-204 PARK OFFICE WELL HOUSE SITE PLAN
- 3) C-301 SITE CONSTRUCTION DETAILS
- 4) S-101 WELL HOUSE CODE REQUIREMENTS
- 5) S-102 WELL HOUSE BUILDING PLAN & ELEVATIONS
- 6) S-103 WELL HOUSE STRUCTURAL DETAILS
- 7) E-101 WELL HOUSE EQUIPMENT PLAN
- 8) E-102 WELL HOUSE ELECTRICAL PLAN

NOTE: PARK OFFICE WATER IS REQUIRED TO BE LEFT ON AS LONG AS FEASIBLE. THE NEW WELL HOUSE SHOULD BE CONSTRUCTED PRIOR TO DEMOLITION OF THE EXISTING WELL HOUSE. THE PUMP AND WELL HEAD SHOULD BE MODIFIED AND CONNECTED TO THE NEW FACILITY AS QUICKLY AS POSSIBLE, AND IN COORDINATION WITH THE PARK STAFF.

PLAYGROUND AND PAVILLION WORK AREA. REFER TO THE FOLLOWING PLAN SHEETS FOR WORK IN THIS AREA:

- 1) D-105 PAVILLION/PLAYGROUND DEMOLITION PLAN
- 2) C-205 PAVILLION/PLAYGROUND WATER PLAN
- 3) C-201 SITE CONSTRUCTION DETAILS

BOAT DOCK AREA. NO WORK IN THIS LOCATION

LOUTRE RIVER

CONTROL POINT #3260 - PK NAIL IN ASPHALT

CONTROL POINTS:

CP 1241 - PK NAIL IN ASPHALT NEAR PARK OFFICE

- NORTHING = 1120782.21
- EASTING = 1903066.32
- ELEVATION = 758.39

CP 2582 - PK NAIL IN ASPHALT NEAR CAMPGROUND

- NORTHING = 1121694.31
- EASTING = 1901803.51
- ELEVATION = 755.47

CP 3260 - PK NAIL IN ASPHALT NEAR PAVILLION/PLAYGROUND

- NORTHING = 1119025.31
- EASTING = 1903197.92
- ELEVATION = 580.48

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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730 TRUMAN BUILDING
301 WEST HIGH STREET
POST OFFICE BOX 809
JEFFERSON CITY, MO 65102

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217 HIGHWAY TT
DANVILLE, MO 63361

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CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

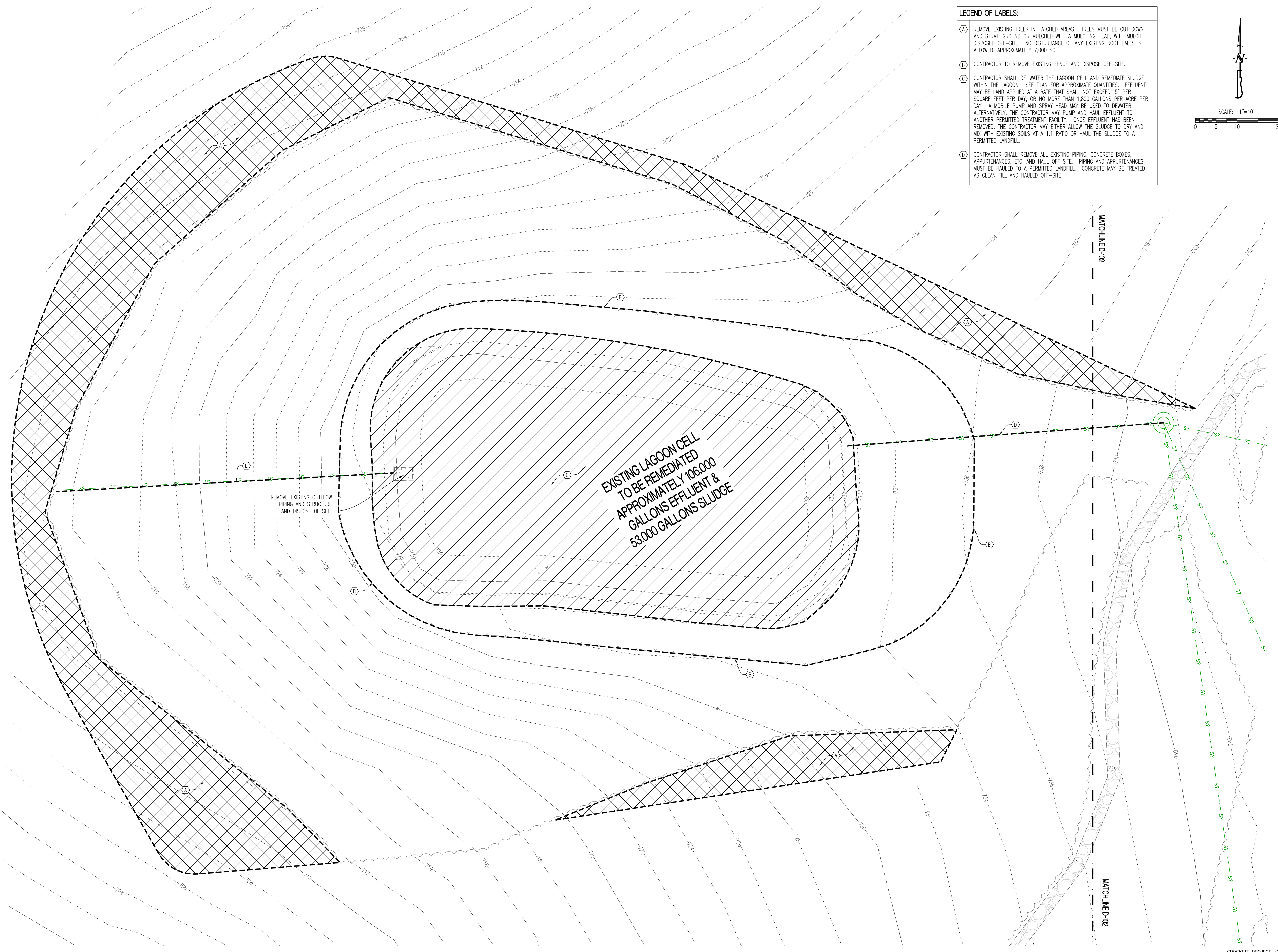
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SITE LOCATION &
CONTROL PLAN

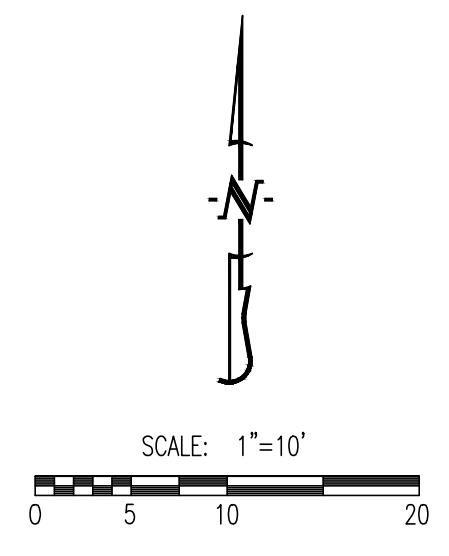
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G-002

SHEET 2 OF 21



- LEGEND OF LABELS:**
- (A) REMOVE EXISTING TREES IN HATCHED AREAS. TREES MUST BE CUT DOWN AND STUMP GROUND OR MULCHED WITH A MULCHING HEAD, WITH MULCH DISPOSED OFF-SITE. NO DISTURBANCE OF ANY EXISTING ROOT BALLS IS ALLOWED. APPROXIMATELY 7,000 SOFT.
 - (B) CONTRACTOR TO REMOVE EXISTING FENCE AND DISPOSE OFF-SITE.
 - (C) CONTRACTOR SHALL DE-WATER THE LAGOON CELL AND REMEDIATE SLUDGE WITHIN THE LAGOON. SEE PLAN FOR APPROXIMATE QUANTITIES. EFFLUENT MAY BE LAND APPLIED AT A RATE THAT SHALL NOT EXCEED .5" PER SQUARE FEET PER DAY, OR NO MORE THAN 1,800 GALLONS PER ACRE PER DAY. A MOBILE PUMP AND SPRAY HEAD MAY BE USED TO DEWATER. ALTERNATIVELY, THE CONTRACTOR MAY PUMP AND HAUL EFFLUENT TO ANOTHER PERMITTED TREATMENT FACILITY. ONCE EFFLUENT HAS BEEN REMOVED, THE CONTRACTOR MAY EITHER ALLOW THE SLUDGE TO DRY AND MIX WITH EXISTING SOILS AT A 1:1 RATIO OR HAUL THE SLUDGE TO A PERMITTED LANDFILL.
 - (D) CONTRACTOR SHALL REMOVE ALL EXISTING PIPING, CONCRETE BOXES, APPURTENANCES, ETC. AND HAUL OFF SITE. PIPING AND APPURTENANCES MUST BE HAULED TO A PERMITTED LANDFILL. CONCRETE MAY BE TREATED AS CLEAN FILL AND HAULED OFF-SITE.



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MO LICENSE #200000968
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MULTIPLE ASSETS

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217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210025 - LAGOON SERVICE AREA

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ISSUE DATE: 09/09/2024

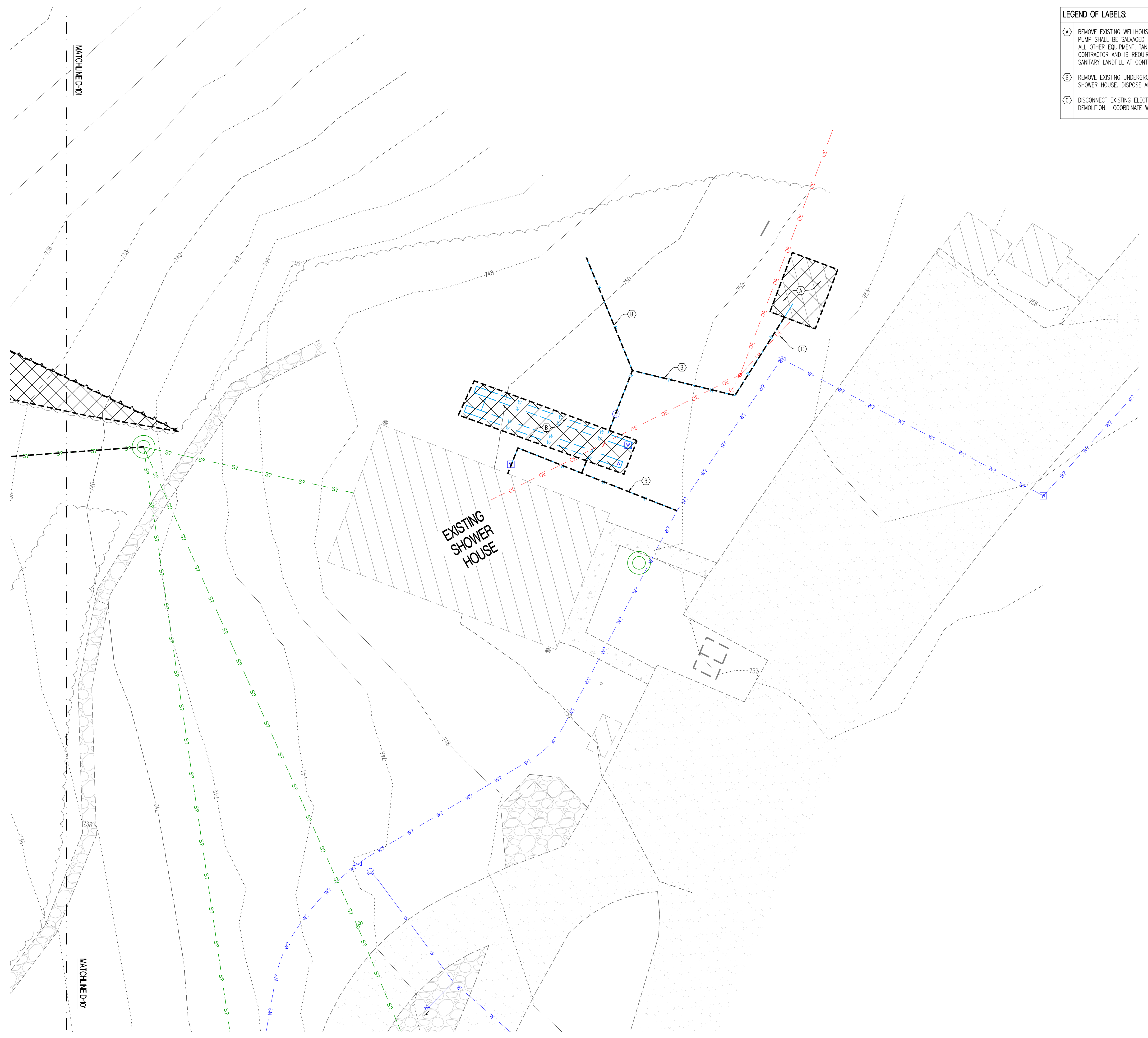
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SHEET TITLE:

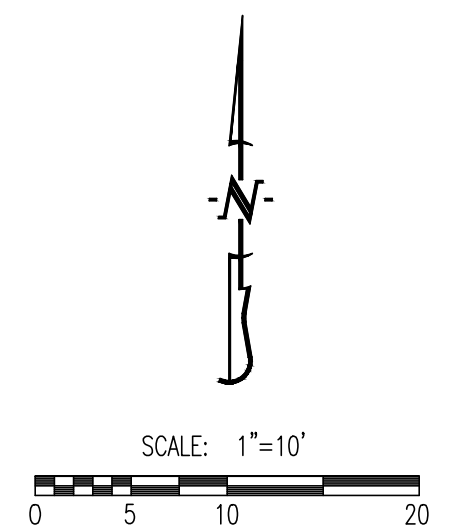
SEWER DEMOLITION
PLAN- CAMPGROUND

SHEET NUMBER:

D-101



- LEGEND OF LABELS:**
- (A) REMOVE EXISTING WELLHOUSE STRUCTURE AND FOUNDATION. THE EXISTING PUMP SHALL BE SALVAGED FOR RE-USE. PROTECT EXISTING WELL CASING. ALL OTHER EQUIPMENT, TANKS ETC. SHALL BECOME PROPERTY OF THE CONTRACTOR AND IS REQUIRED TO BE REMOVED OFF-SITE OR HAULED TO A SANITARY LANDFILL AT CONTRACTOR'S EXPENSE.
 - (B) REMOVE EXISTING UNDERGROUND PIPING BETWEEN EXISTING WELLHOUSE AND SHOWER HOUSE. DISPOSE ALL PIPING MATERIAL OFF-SITE.
 - (C) DISCONNECT EXISTING ELECTRICAL SERVICE TO WELLHOUSE PRIOR TO DEMOLITION. COORDINATE WITH CONSOLIDATED ELECTRIC.



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DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: S210
ASSET NUMBER:
7815210016 - PUMP HOUSE WELL #1
7815210017 - PUMP HOUSE WELL #3

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

ISSUE DATE: 09/09/2024

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

WELL HOUSE
DEMOLITION PLAN -
CAMPGROUND

SHEET NUMBER:

D-102



- LEGEND OF LABELS:**
- (A) REMOVE EXISTING TREES IN HATCHED AREAS. TREES MUST BE CUT DOWN AND STUMP GROUND OR MULCHED WITH A MULCHING HEAD, WITH MULCH DISPOSED OFF-SITE. NO DISTURBANCE OF ANY EXISTING ROOT BALLS IS ALLOWED. APPROXIMATELY 17,000 SQFT.
 - (B) CONTRACTOR TO REMOVE EXISTING FENCE AND DISPOSE OFF-SITE.
 - (C) CONTRACTOR SHALL DE-WATER THE LAGOON CELL AND REMEDIATE SLUDGE WITHIN THE LAGOON. SEE PLAN FOR APPROXIMATE QUANTITIES. EFFLUENT MAY BE LAND APPLIED AT A RATE THAT SHALL NOT EXCEED 5" PER SQUARE FEET PER DAY, OR NO MORE THAN 1,800 GALLONS PER ACRE PER DAY. A MOBILE PUMP AND SPRAY HEAD MAY BE USED TO DEWATER. ALTERNATIVELY, THE CONTRACTOR MAY PUMP AND HAUL EFFLUENT TO ANOTHER PERMITTED TREATMENT FACILITY. ONCE EFFLUENT HAS BEEN REMOVED, THE CONTRACTOR MAY EITHER ALLOW THE SLUDGE TO DRY AND MIX WITH EXISTING SOILS AT A 1:1 RATIO OR HAUL THE SLUDGE TO A PERMITTED LANDFILL.
 - (D) CONTRACTOR SHALL REMOVE ALL EXISTING PIPING, CONCRETE BOXES, APPURTENANCES, ETC. AND HAUL OFF SITE. PIPING AND APPURTENANCES MUST BE HAULED TO A PERMITTED LANDFILL. CONCRETE MAY BE TREATED AS CLEAN FILL AND HAULED OFF-SITE.
 - (E) DISCONNECT AND REMOVE EXISTING ELECTRICAL SERVICE CONDUIT AND WIRING BACK TO OVERHEAD POLE.

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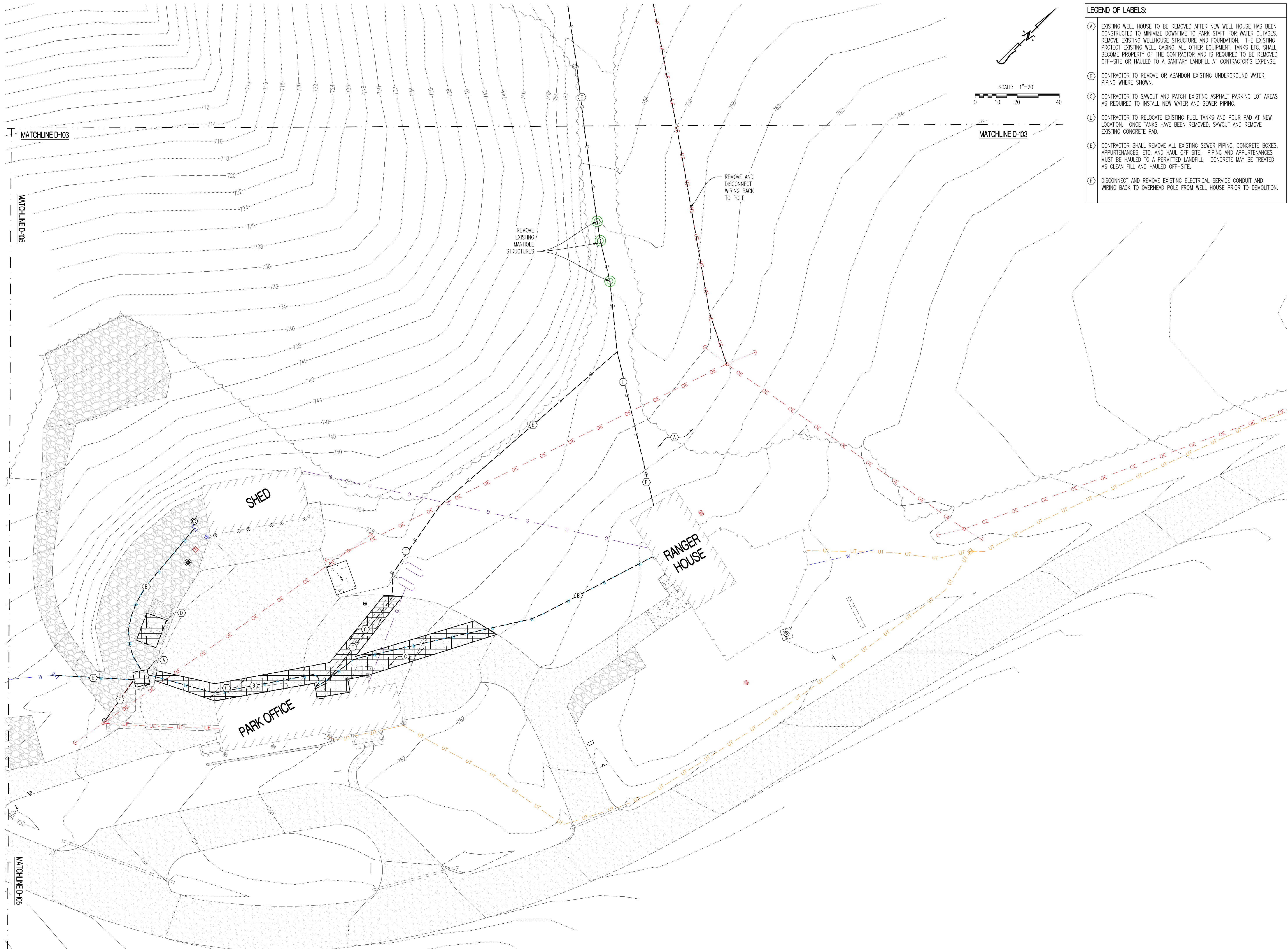
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DESIGNED BY: JRS

SHEET TITLE:

SEWER DEMOLITION
PLAN - PARK OFFICE

SHEET NUMBER:

D-103



- LEGEND OF LABELS:**
- (A) EXISTING WELL HOUSE TO BE REMOVED AFTER NEW WELL HOUSE HAS BEEN CONSTRUCTED TO MINIMIZE DOWNTIME TO PARK STAFF FOR WATER OUTAGES. REMOVE EXISTING WELLHOUSE STRUCTURE AND FOUNDATION. THE EXISTING PROTECT EXISTING WELL CASING. ALL OTHER EQUIPMENT, TANKS ETC. SHALL BECOME PROPERTY OF THE CONTRACTOR AND IS REQUIRED TO BE REMOVED OFF-SITE OR HAULED TO A SANITARY LANDFILL AT CONTRACTOR'S EXPENSE.
 - (B) CONTRACTOR TO REMOVE OR ABANDON EXISTING UNDERGROUND WATER PIPING WHERE SHOWN.
 - (C) CONTRACTOR TO SAWCUT AND PATCH EXISTING ASPHALT PARKING LOT AREAS AS REQUIRED TO INSTALL NEW WATER AND SEWER PIPING.
 - (D) CONTRACTOR TO RELOCATE EXISTING FUEL TANKS AND POUR PAD AT NEW LOCATION. ONCE TANKS HAVE BEEN REMOVED, SAWCUT AND REMOVE EXISTING CONCRETE PAD.
 - (E) CONTRACTOR SHALL REMOVE ALL EXISTING SEWER PIPING, CONCRETE BOXES, APPURTENANCES, ETC. AND HAUL OFF SITE. PIPING AND APPURTENANCES MUST BE HAULED TO A PERMITTED LANDFILL. CONCRETE MAY BE TREATED AS CLEAN FILL AND HAULED OFF-SITE.
 - (F) DISCONNECT AND REMOVE EXISTING ELECTRICAL SERVICE CONDUIT AND WIRING BACK TO OVERHEAD POLE FROM WELL HOUSE PRIOR TO DEMOLITION.

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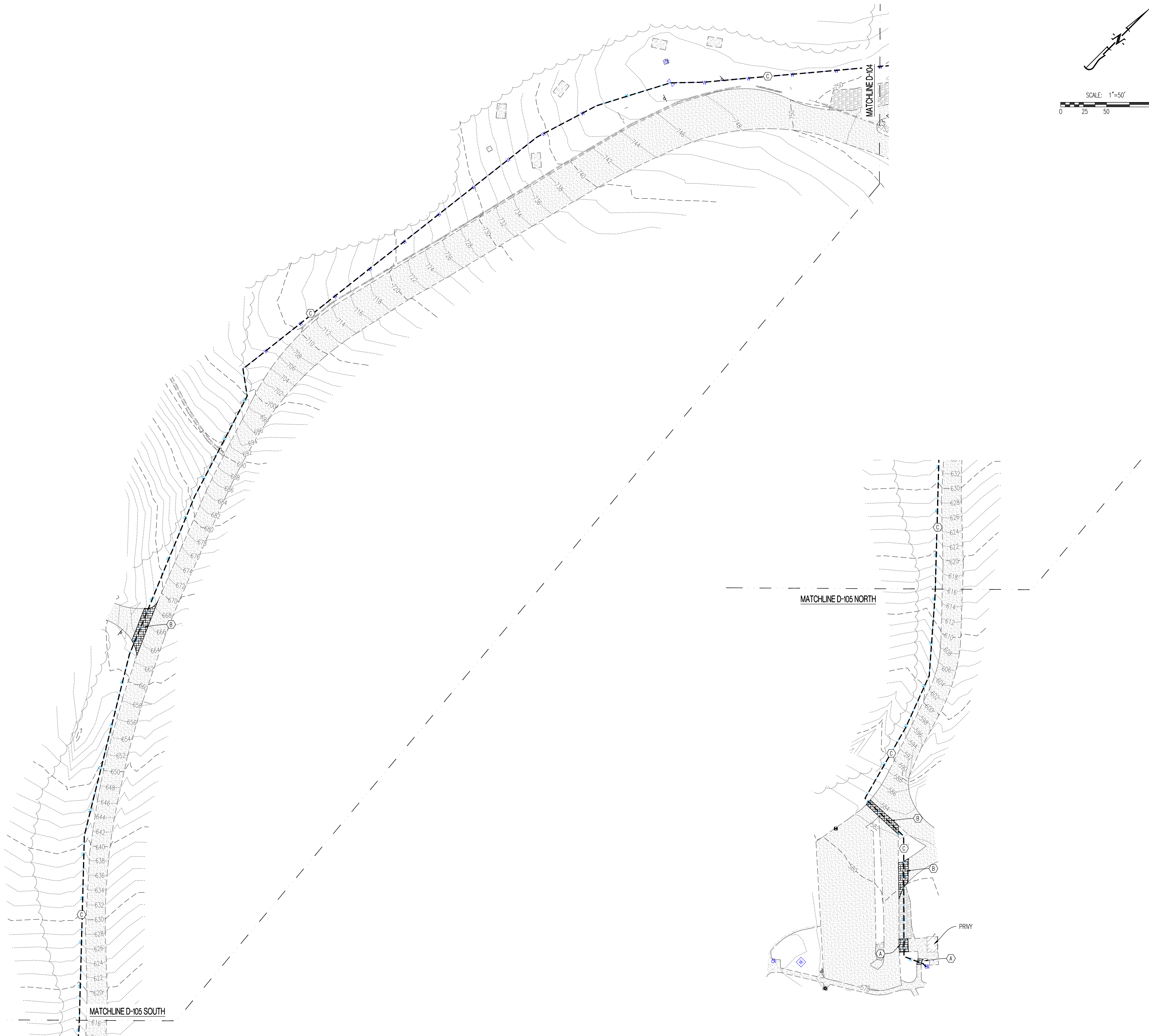
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DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:
WELL HOUSE DEMOLITION PLAN
PARK OFFICE

SHEET NUMBER:

D-104



LEGEND OF LABELS:

(A)	CONTRACTOR TO SAWCUT AND PATCH EXISTING CONCRETE SIDEWALK AREAS AS REQUIRED TO INSTALL NEW WATER PIPING.
(B)	CONTRACTOR TO SAWCUT AND PATCH EXISTING ASPHALT PARKING LOT AREAS AS REQUIRED TO INSTALL NEW WATER PIPING.
(C)	CONTRACTOR TO ABANDON OR REMOVE EXISTING METAL WATER PIPING IF IT IS IN THE WAY OF NEW POLY WATERLINE INSTALLATION. ANY REMOVED PIPING SHOULD BE HAULED OFF-SITE.

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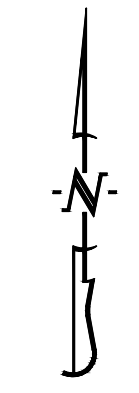
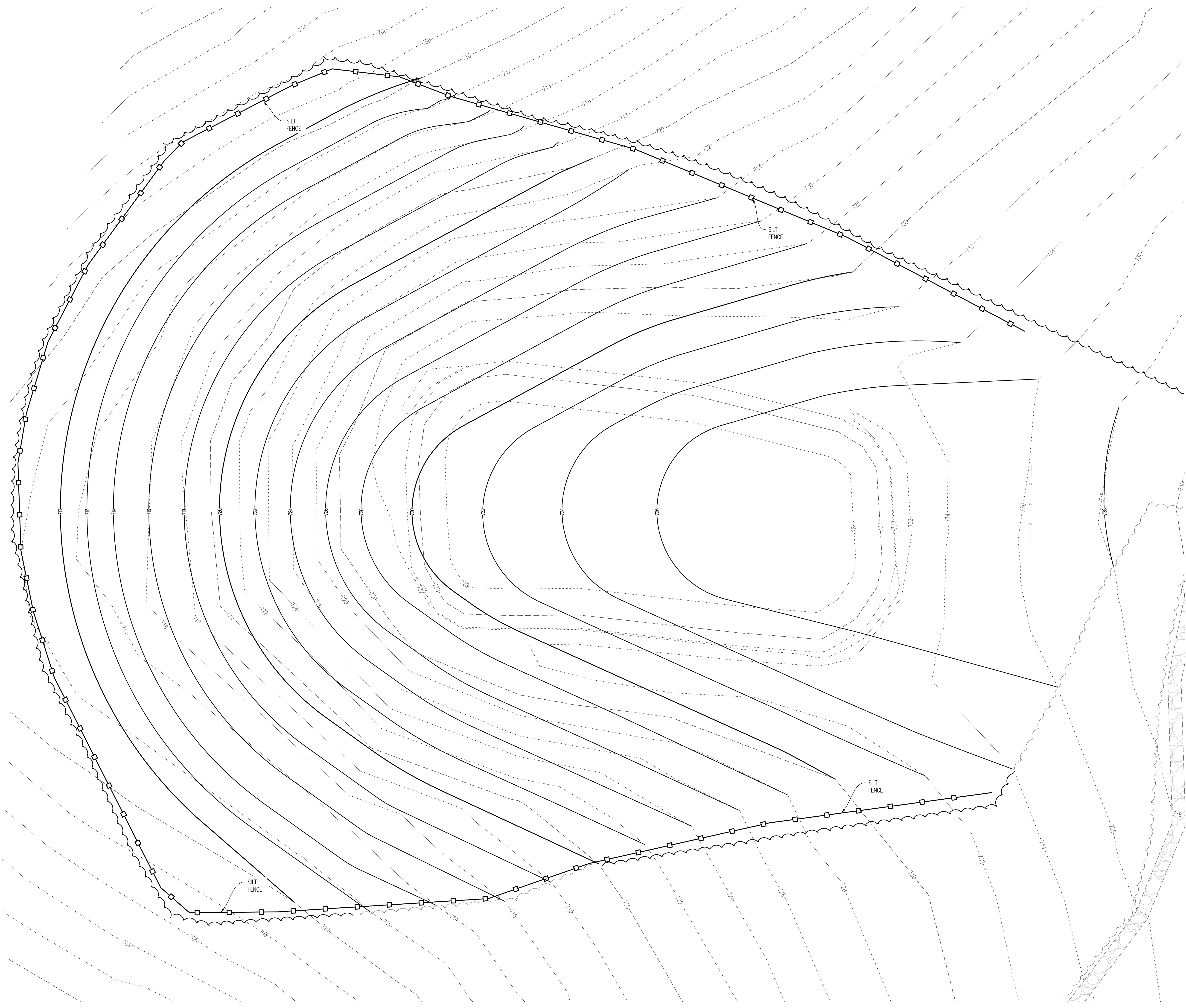
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SHEET TITLE:

PAVILLION/PLAYGROUND
DEMOLITION PLAN

SHEET NUMBER:

D-105



SCALE: 1"=10'
0 5 10 20

LEGEND OF SYMBOLS:

- XXX--- EXISTING MINOR CONTOUR
- - - - - EXISTING MAJOR CONTOUR
- XXX— PROPOSED MINOR CONTOUR
- XXX— PROPOSED MAJOR CONTOUR

GRADING AND EROSION NOTES

- 1) THE AREA SHALL BE REGRADED TO THE GRADES SHOWN. AFTER LAGOON EFFLUENT AND SLUDGE HAVE BEEN REMEDIATED.
- 2) THE TOP 24" OF SOIL SHALL BE AN IMPORTED SANDY LOAM OR SILT LOAM MATERIAL. THE CONTRACTOR SHALL PROVIDE TESTING OF THE SAMPLE MATERIAL BEING IMPORTED AND TEST RESULTS FOR THE ENGINEER TO REVIEW AND APPROVE VERIFYING THE MATERIAL MEETS THESE REQUIREMENTS. ALL IMPORTED FILL SHALL BE LIGHTLY COMPACTED WITH A TRACK SKIDSTEER. NO HEAVY WHEEL LOADS ALLOWED ON SOIL. CONTRACTOR SHALL ROTO-TILL THE EXISTING SOIL PRIOR TO PLACING ANY FILL MATERIAL.
- 3) SILT FENCE SHALL BE PLACED DOWNHILL AND ALONG THE TREE-LINE TO PREVENT SILT FROM LEAVING THE CONSTRUCTION AREA. AFTER THE SITE IS STABILIZED, THE CONTRACTOR IS REQUIRED TO COME BACK AND REMOVE THE SILT FENCE. SEE DETAIL ON C-302
- 4) CONTRACTOR SHALL SEED AND MULCH THE DISTURBED AREAS PER THE TURF AND GRASS SPECIFICATIONS. PLACE LANDLOK S-1 STAW MAT NETTING OR APPROVED EQUAL OVER THE DISTURBED AREAS.
- 5) APPROXIMATE LIMITS OF DISTURBANCE IS 0.75 ACRES.

STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR



JESSE RAY STEPHENS
MO LICENSE # 200000968
SITE/CIVIL ENGINEER:
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DESIGN AND CONSTRUCTION

730 TRUMAN BUILDING
301 WEST HIGH STREET
POST OFFICE BOX 809
JEFFERSON CITY, MO 65102

IMPROVEMENTS TO WATER
AND WASTEWATER SYSTEM
MULTIPLE ASSETS

GRAHAM CAVE STATE PARK
217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210025 - LAGOON SERVICE AREA

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

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

SEWER GRADING
PLAN - CAMPGROUND

SHEET NUMBER:

C-101



JESSE RAY STEPHENS
MO LICENSE - 200000968

SITE/CIVIL ENGINEER:



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CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
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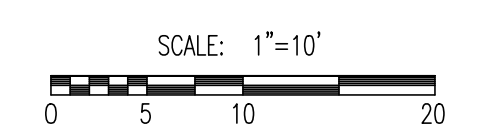
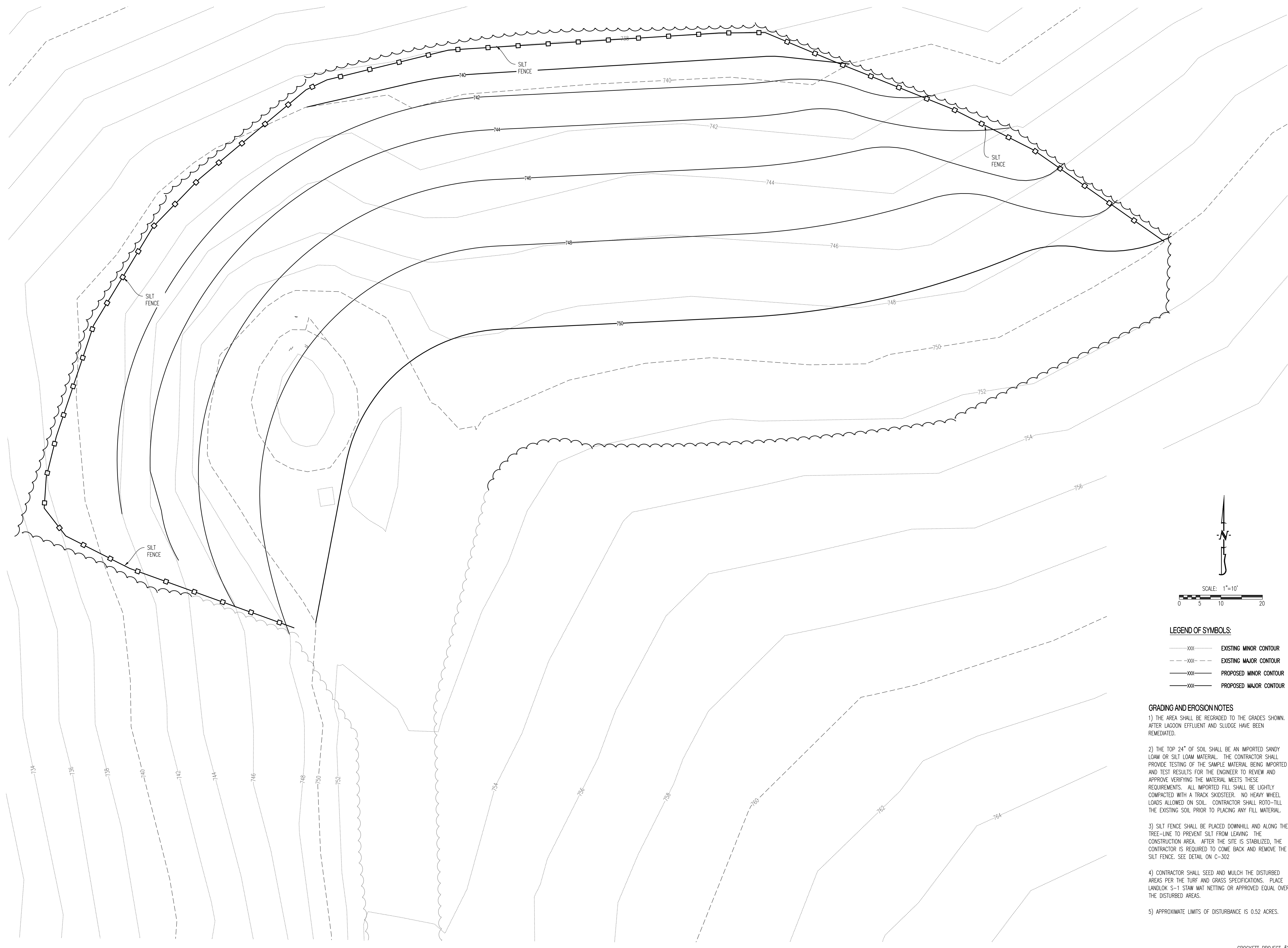
SHEET TITLE:

SEWER GRADING
PLAN - PARK OFFICE

SHEET NUMBER:

C-102

SHEET 9 OF 21



LEGEND OF SYMBOLS:

- xxx--- EXISTING MINOR CONTOUR
- - -xxx- - - EXISTING MAJOR CONTOUR
- xxx— PROPOSED MINOR CONTOUR
- xxx— PROPOSED MAJOR CONTOUR

GRADING AND EROSION NOTES

- 1) THE AREA SHALL BE REGRADED TO THE GRADES SHOWN. AFTER LAGOON EFFLUENT AND SLUDGE HAVE BEEN REMEDIATED.
- 2) THE TOP 24" OF SOIL SHALL BE AN IMPORTED SANDY LOAM OR SILT LOAM MATERIAL. THE CONTRACTOR SHALL PROVIDE TESTING OF THE SAMPLE MATERIAL BEING IMPORTED AND TEST RESULTS FOR THE ENGINEER TO REVIEW AND APPROVE. VERIFYING THE MATERIAL MEETS THESE REQUIREMENTS. ALL IMPORTED FILL SHALL BE LIGHTLY COMPACTED WITH A TRACK SKIDSTEER. NO HEAVY WHEEL LOADS ALLOWED ON SOIL. CONTRACTOR SHALL ROTO-TILL THE EXISTING SOIL PRIOR TO PLACING ANY FILL MATERIAL.
- 3) SILT FENCE SHALL BE PLACED DOWNHILL AND ALONG THE TREE-LINE TO PREVENT SILT FROM LEAVING THE CONSTRUCTION AREA. AFTER THE SITE IS STABILIZED, THE CONTRACTOR IS REQUIRED TO COME BACK AND REMOVE THE SILT FENCE. SEE DETAIL ON C-302.
- 4) CONTRACTOR SHALL SEED AND MULCH THE DISTURBED AREAS PER THE TURF AND GRASS SPECIFICATIONS. PLACE LANDLOK S-1 STAW MAT NETTING OR APPROVED EQUAL OVER THE DISTURBED AREAS.
- 5) APPROXIMATE LIMITS OF DISTURBANCE IS 0.52 ACRES.



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IMPROVEMENTS TO WATER
AND WASTEWATER SYSTEM
MULTIPLE ASSETS

GRAHAM CAVE STATE PARK
217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210025 - LAGOON SERVICE AREA

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

ISSUE DATE: 09/09/2024

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

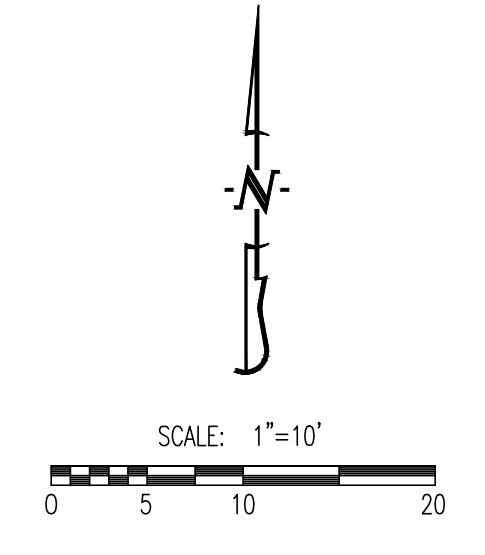
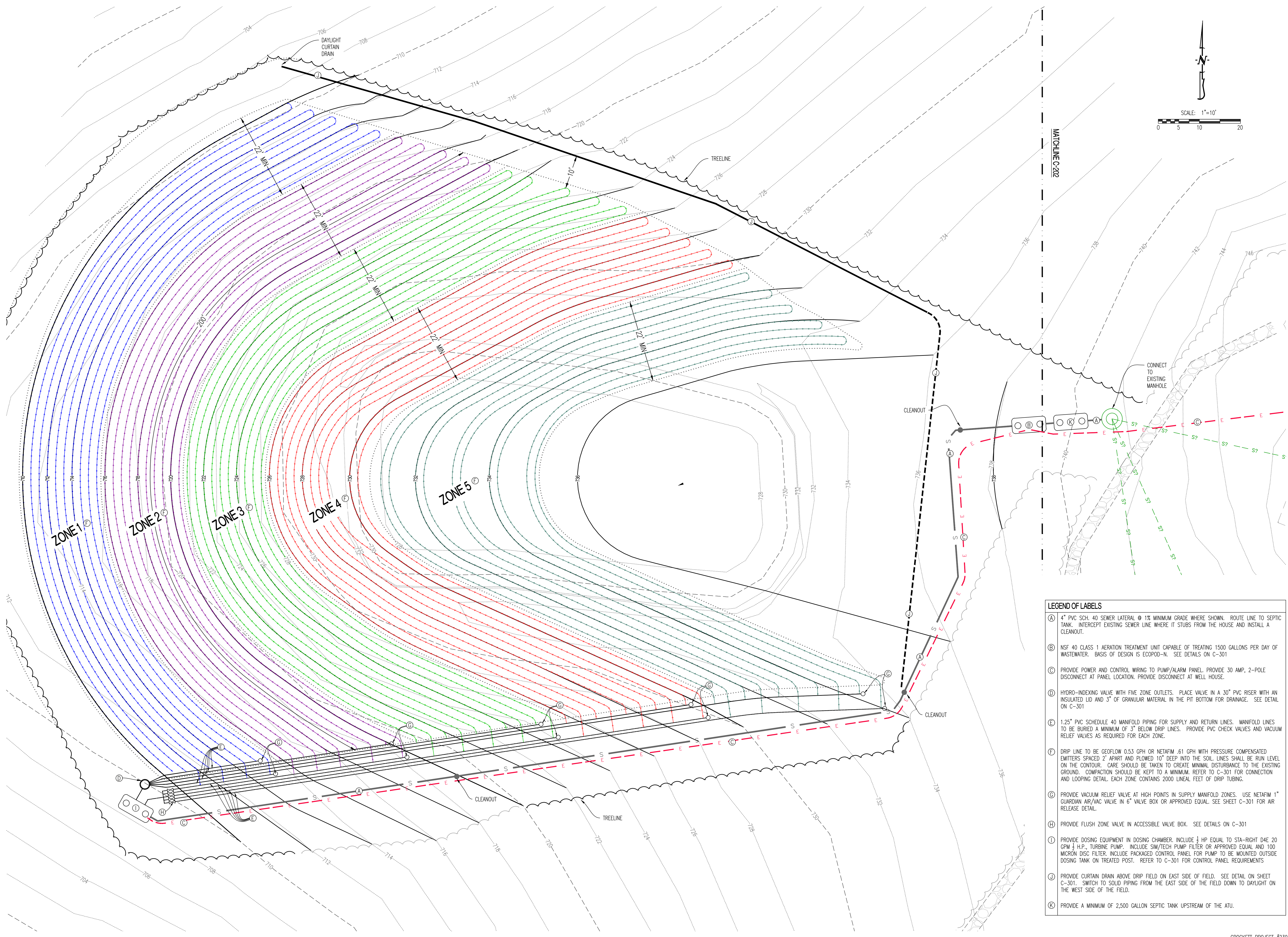
SHEET TITLE:

SEWER DRIP
IRRIGATION PLAN -
CAMPGROUND

SHEET NUMBER:

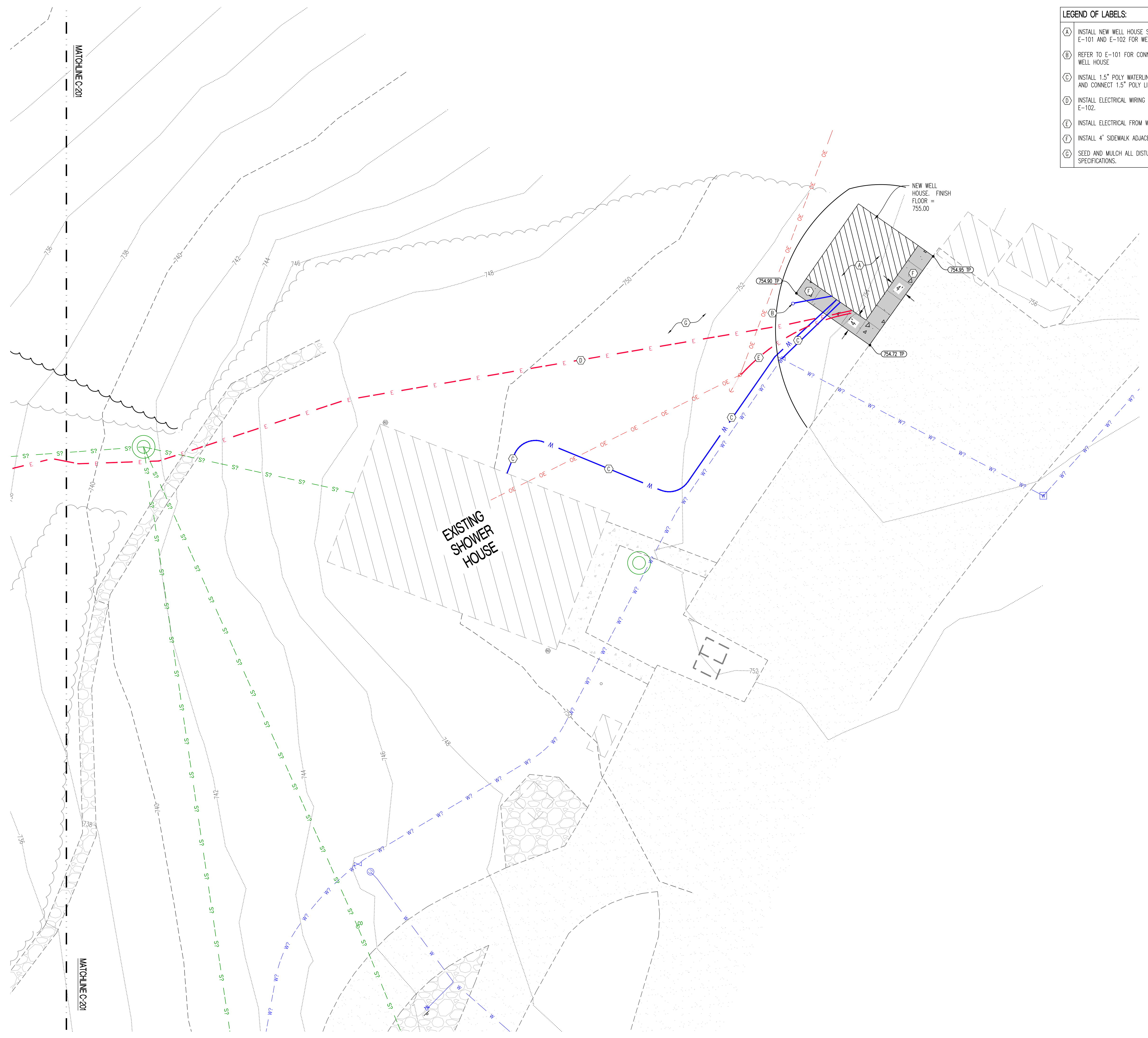
C-201

SHEET 10 OF 21

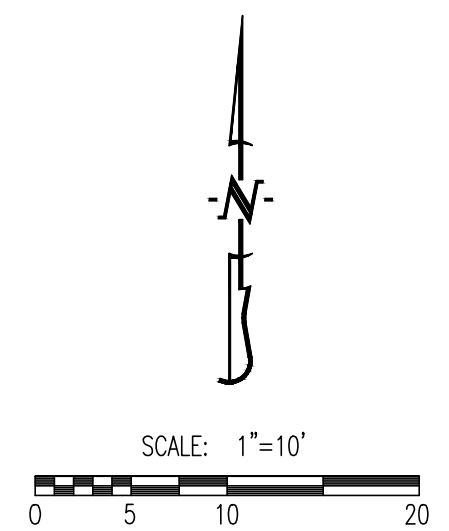


MATCHLINE C-202

- LEGEND OF LABELS**
- (A) 4" PVC SCH. 40 SEWER LATERAL @ 1% MINIMUM GRADE WHERE SHOWN. ROUTE LINE TO SEPTIC TANK. INTERCEPT EXISTING SEWER LINE WHERE IT STUBS FROM THE HOUSE AND INSTALL A CLEANOUT.
 - (B) NSF 40 CLASS 1 AERATION TREATMENT UNIT CAPABLE OF TREATING 1500 GALLONS PER DAY OF WASTEWATER. BASIS OF DESIGN IS ECOPOD-N. SEE DETAILS ON C-301
 - (C) PROVIDE POWER AND CONTROL WIRING TO PUMP/ALARM PANEL. PROVIDE 30 AMP, 2-POLE DISCONNECT AT PANEL LOCATION. PROVIDE DISCONNECT AT WELL HOUSE.
 - (D) HYDRO-INDEXING VALVE 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 ON C-301
 - (E) 1.25" PVC SCHEDULE 40 MANIFOLD PIPING FOR SUPPLY AND RETURN LINES. MANIFOLD LINES TO BE BURIED A MINIMUM OF 3" BELOW DRIP LINES. PROVIDE PVC CHECK VALVES AND VACUUM RELIEF VALVES AS REQUIRED FOR EACH ZONE.
 - (F) DRIP LINE TO BE GEOWEAVE 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-301 FOR CONNECTION AND LOOPING DETAIL. EACH ZONE CONTAINS 2000 LINEAL FEET OF DRIP TUBING.
 - (G) PROVIDE VACUUM RELIEF VALVE AT HIGH POINTS IN SUPPLY MANIFOLD ZONES. USE NETAFIM 1" GUARDIAN AIR/VAC VALVE IN 6" VALVE BOX OR APPROVED EQUAL. SEE SHEET C-301 FOR AIR RELEASE DETAIL.
 - (H) PROVIDE FLUSH ZONE VALVE IN ACCESSIBLE VALVE BOX. SEE DETAILS ON C-301
 - (I) PROVIDE DOSING EQUIPMENT IN DOSING CHAMBER. INCLUDE 1/2 HP EQUAL TO STA-RIGHT D4E 20 CFM 1/2 H.P., TURBINE PUMP. INCLUDE 5M/Tech PUMP FILTER OR APPROVED EQUAL AND 100 MICRON DISC FILTER. INCLUDE PACKAGED CONTROL PANEL FOR PUMP TO BE MOUNTED OUTSIDE DOSING TANK ON TREATED POST. REFER TO C-301 FOR CONTROL PANEL REQUIREMENTS
 - (J) PROVIDE CURTAIN DRAIN ABOVE DRIP FIELD ON EAST SIDE OF FIELD. SEE DETAIL ON SHEET C-301. SWITCH TO SOLID PIPING FROM THE EAST SIDE OF THE FIELD DOWN TO DAYLIGHT ON THE WEST SIDE OF THE FIELD.
 - (K) PROVIDE A MINIMUM OF 2,500 GALLON SEPTIC TANK UPSTREAM OF THE ATU.



- LEGEND OF LABELS:**
- (A) INSTALL NEW WELL HOUSE STRUCTURE. REFER TO S-101; S-102; S-103; E-101 AND E-102 FOR WELL HOUSE DETAILS.
 - (B) REFER TO E-101 FOR CONNECTION FROM EXISTING WELL HEAD TO NEW WELL HOUSE.
 - (C) INSTALL 1.5" POLY WATERLINE FROM WELLHOUSE TO EXISTING BATH HOUSE AND CONNECT 1.5" POLY LINE TO EXISTING EXTERIOR WATER LOOP.
 - (D) INSTALL ELECTRICAL WIRING FROM WELL HOUSE TO SEWER SYSTEM. SEE E-102.
 - (E) INSTALL ELECTRICAL FROM WELL HOUSE TO EXISTING POLE. SEE E-102.
 - (F) INSTALL 4' SIDEWALK ADJACENT TO WELL HOUSE. SEE C-302.
 - (G) SEED AND MULCH ALL DISTURBED AREAS PER TURF AND GRASS SPECIFICATIONS.



STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR



JESSE RAY STEPHENS
MO LICENSE #200000968
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POST OFFICE BOX 809
JEFFERSON CITY, MO 65102

IMPROVEMENTS TO WATER
AND WASTEWATER SYSTEM
MULTIPLE ASSETS

GRAHAM CAVE STATE PARK
217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210016 - PUMP HOUSE WELL #1
7815210017 - PUMP HOUSE WELL #2

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

ISSUE DATE: 09/09/2024

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

WELL HOUSE SITE
PLAN - CAMPGROUND

SHEET NUMBER:

C-20



JESSE RAY STEPHENS
MO LICENSE - 200000968

SITE/CIVIL ENGINEER:

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217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210025 - LAGOON SERVICE AREA

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

ISSUE DATE: 09/09/2024

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

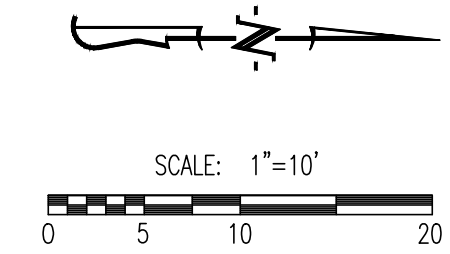
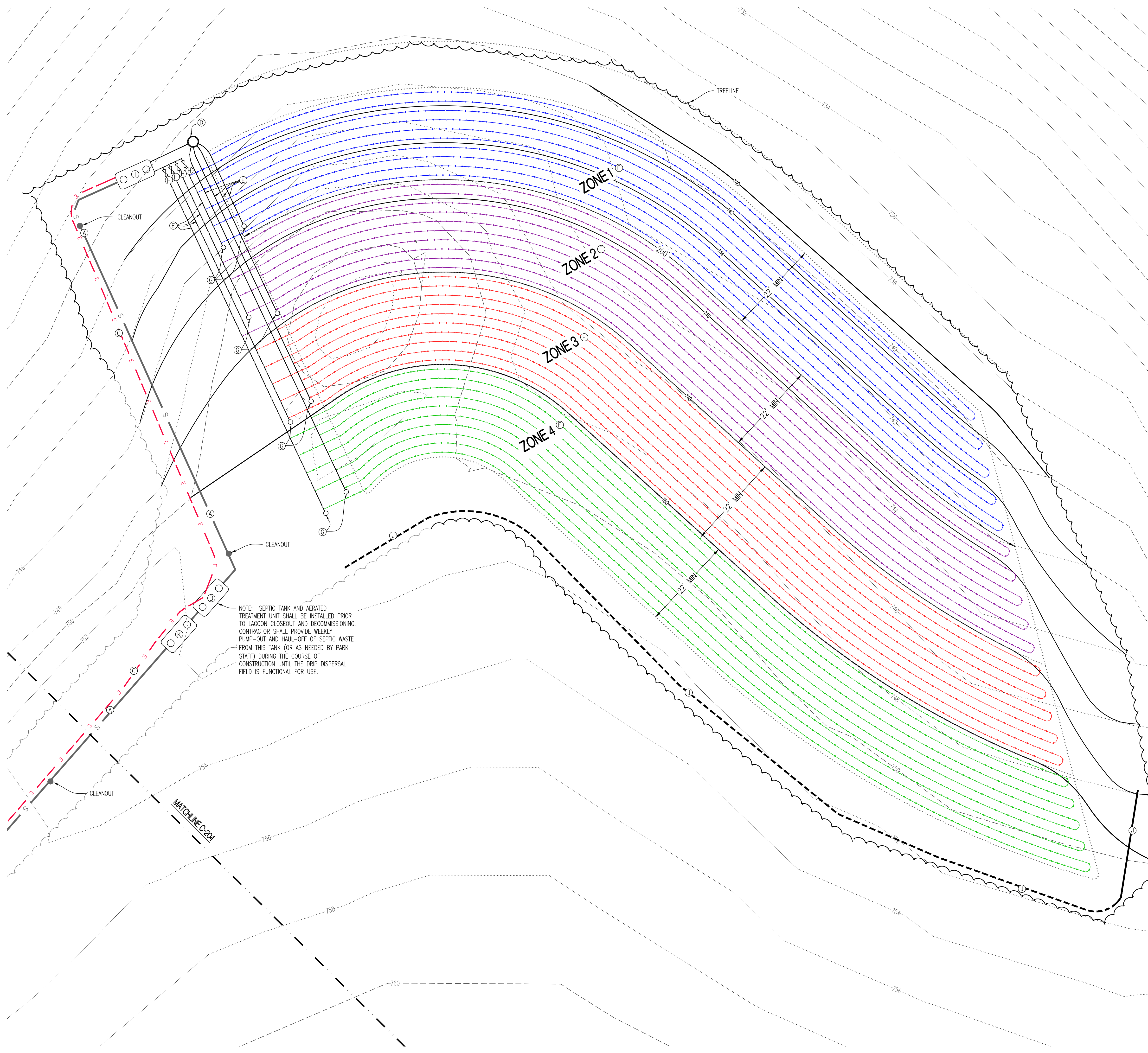
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SEWER DRIP
IRRIGATION PLAN -
PARK OFFICE

SHEET NUMBER:

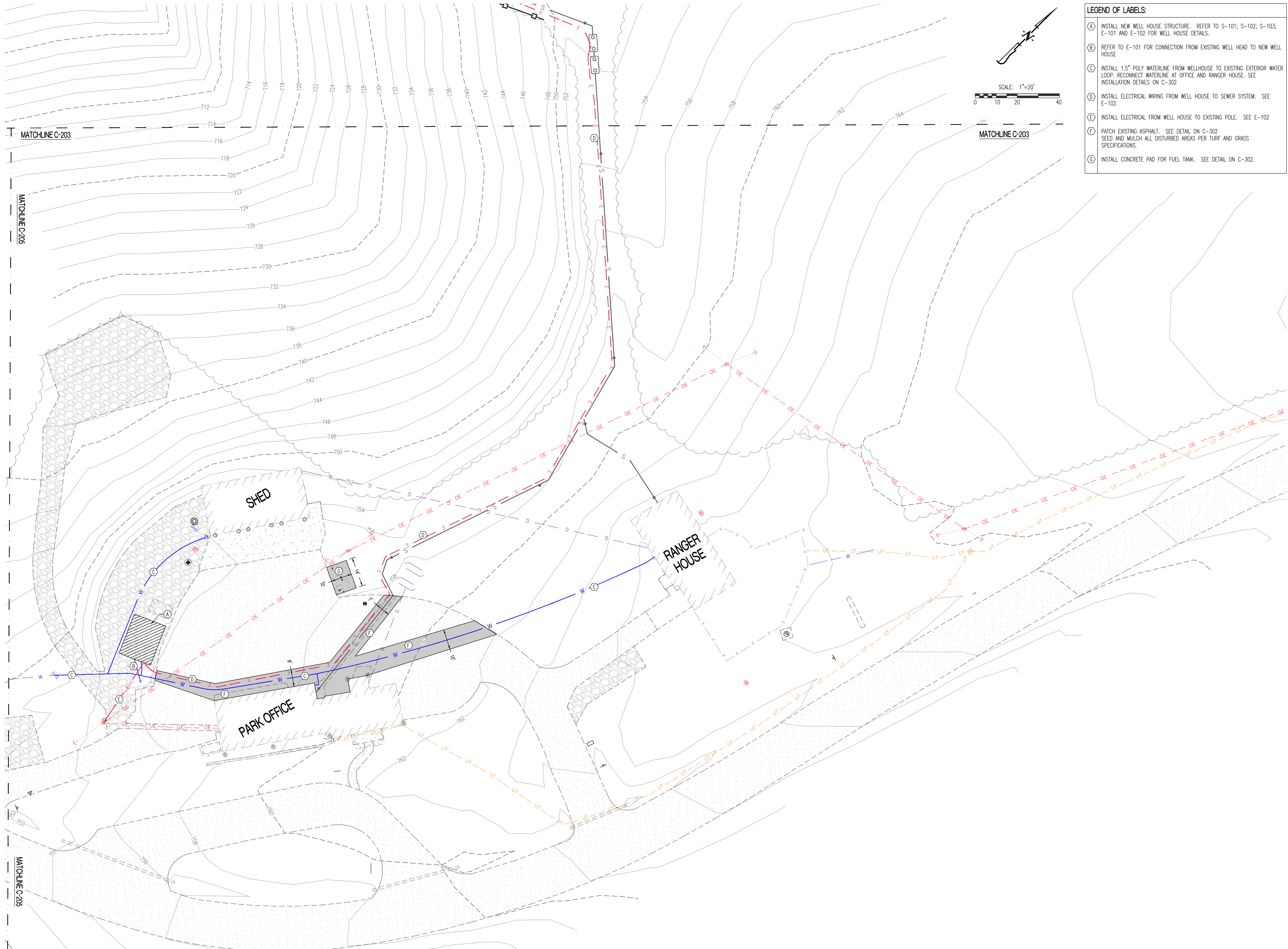
C-203

SHEET 12 OF 21



NOTE: SEPTIC TANK AND AERATED TREATMENT UNIT SHALL BE INSTALLED PRIOR TO LAGOON CLOSEOUT AND DECOMMISSIONING. CONTRACTOR SHALL PROVIDE WEEKLY PUMP-OUT AND HAUL-OFF OF SEPTIC WASTE FROM THIS TANK (OR AS NEEDED BY PARK STAFF) DURING THE COURSE OF CONSTRUCTION UNTIL THE DRIP DISPERSAL FIELD IS FUNCTIONAL FOR USE.

- LEGEND OF LABELS**
- (A) 4" PVC SCH. 40 SEWER LATERAL @ 1% MINIMUM GRADE WHERE SHOWN. ROUTE LINE TO SEPTIC TANK. INTERCEPT EXISTING SEWER LINE WHERE IT STUBS FROM THE HOUSE AND INSTALL A CLEANOUT.
 - (B) NSF 40 CLASS 1 AERATION TREATMENT UNIT CAPABLE OF TREATING 1000 GALLONS PER DAY OF WASTEWATER. BASIS OF DESIGN IS ECOPOD-N. SEE DETAILS ON C-301
 - (C) PROVIDE POWER AND CONTROL WIRING TO PUMP/ALARM PANEL. PROVIDE 30 AMP, 2-POLE DISCONNECT AT PANEL LOCATION. PROVIDE DISCONNECT AT WELL HOUSE.
 - (D) HYDRO-INDEXING VALVE WITH FOUR 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 ON C-301
 - (E) 1.25" PVC SCHEDULE 40 MANIFOLD PIPING FOR SUPPLY AND RETURN LINES. MANIFOLD LINES TO BE BURIED A MINIMUM OF 3" BELOW DRIP LINES. PROVIDE PVC CHECK VALVES AND VACUUM RELIEF VALVES AS REQUIRED FOR EACH ZONE.
 - (F) DRIP LINE TO BE GEOWEAVE 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-301 FOR CONNECTION AND LOOPING DETAIL. EACH ZONE CONTAINS 2000 LINEAL FEET OF DRIP TUBING.
 - (G) PROVIDE VACUUM RELIEF VALVE AT HIGH POINTS IN SUPPLY MANIFOLD ZONES. USE NETAFIM 1" GUARDIAN AIR/VAC VALVE IN 6" VALVE BOX OR APPROVED EQUAL. SEE SHEET C-301 FOR AIR RELEASE DETAIL.
 - (H) PROVIDE FLUSH ZONE VALVE IN ACCESSIBLE VALVE BOX. SEE DETAILS ON C-301
 - (I) PROVIDE DOSING EQUIPMENT IN DOSING CHAMBER. INCLUDE 1/2 HP EQUAL TO STA-RIGHT DAE 20 GPM 1/2 H.P., TURBINE PUMP. INCLUDE SM/TECH PUMP FILTER OR APPROVED EQUAL AND 100 MICRON DISC FILTER. INCLUDE PACKAGED CONTROL PANEL FOR PUMP TO BE MOUNTED OUTSIDE DOSING TANK ON TREATED POST. REFER TO C-301 FOR CONTROL PANEL REQUIREMENTS
 - (J) PROVIDE CURTAIN DRAIN ABOVE DRIP FIELD ON EAST SIDE OF FIELD. SEE DETAIL ON SHEET C-301. SWITCH TO SOLID PIPING FROM THE EAST SIDE OF THE FIELD DOWN TO DAYLIGHT ON THE NORTH SIDE OF THE FIELD.
 - (K) PROVIDE A MINIMUM OF 2,500 GALLON SEPTIC TANK UPSTREAM OF THE ATU.



LEGEND OF LABELS:

- (A) INSTALL NEW WELL HOUSE STRUCTURE. REFER TO S-101; S-102; S-103; E-101 AND E-102 FOR WELL HOUSE DETAILS.
- (B) REFER TO E-101 FOR CONNECTION FROM EXISTING WELL HEAD TO NEW WELL HOUSE
- (C) INSTALL 1.5" POLY WATERLINE FROM WELLHOUSE TO EXISTING EXTERIOR WATER LOOP; RECONNECT WATERLINE AT OFFICE AND RANGER HOUSE. SEE INSTALLATION DETAILS ON C-302
- (D) INSTALL ELECTRICAL WIRING FROM WELL HOUSE TO SEWER SYSTEM. SEE E-102.
- (E) INSTALL ELECTRICAL FROM WELL HOUSE TO EXISTING POLE. SEE E-102
- (F) PATCH EXISTING ASPHALT. SEE DETAIL ON C-302
SEED AND MULCH ALL DISTURBED AREAS PER TURF AND GRASS SPECIFICATIONS.
- (G) INSTALL CONCRETE PAD FOR FUEL TANK. SEE DETAIL ON C-302.

STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR



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MULTIPLE ASSETS

GRAHAM CAVE STATE PARK
217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210016 - PUMP HOUSE WELL #1
7815210017 - PUMP HOUSE WELL #2

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

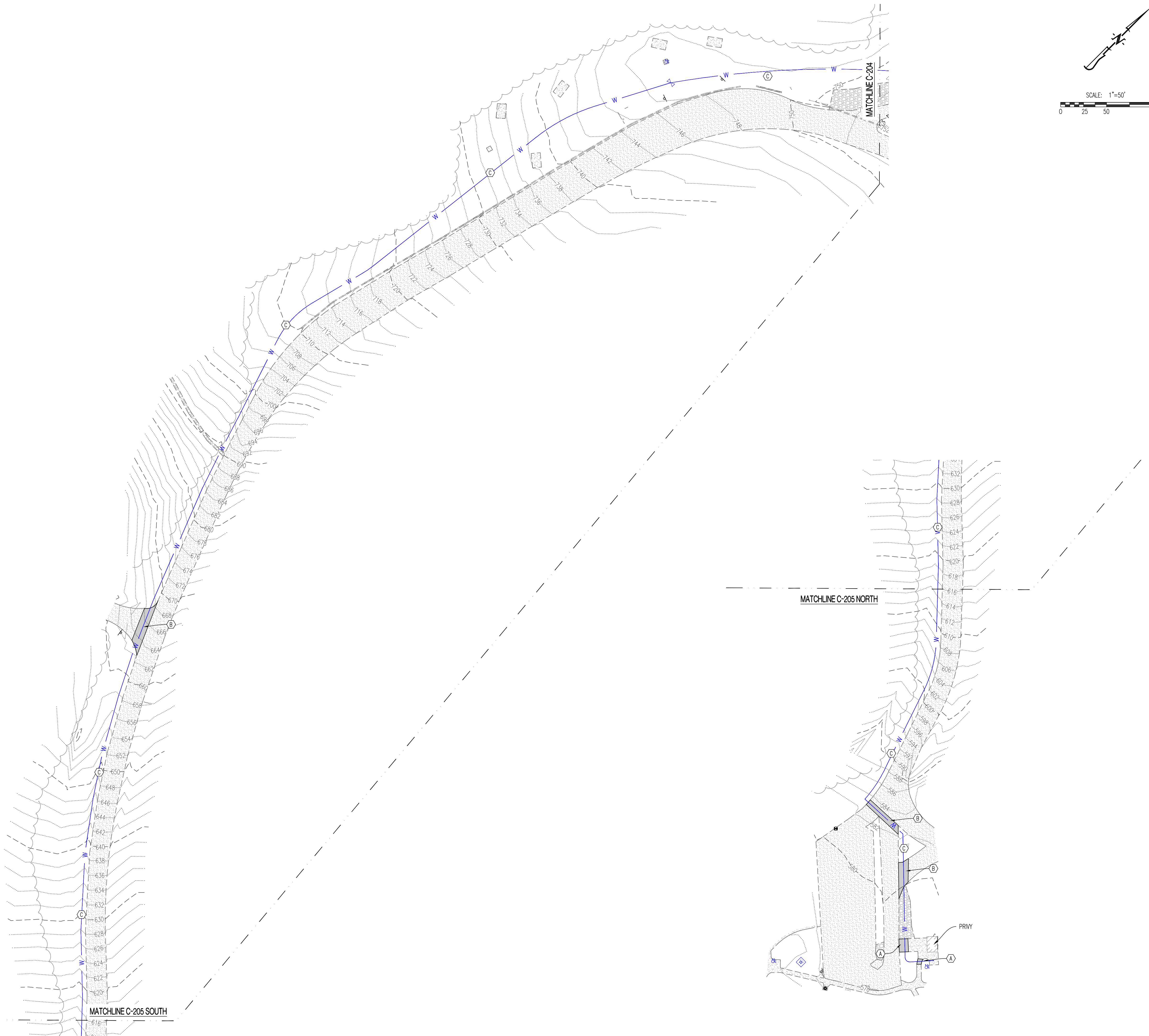
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DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

WELL HOUSE SITE
PLAN - PARK OFFICE

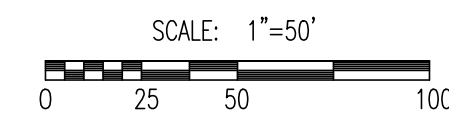
SHEET NUMBER:

C-204



LEGEND OF LABELS:

(A)	CONTRACTOR TO SAWCUT AND PATCH EXISTING CONCRETE SIDEWALK AREAS AS REQUIRED TO INSTALL NEW WATER PIPING. SEE DETAIL ON C-302
(B)	CONTRACTOR TO SAWCUT AND PATCH EXISTING ASPHALT PARKING LOT AREAS AS REQUIRED TO INSTALL NEW WATER PIPING. SEE DETAIL ON C-302
(C)	INSTALL NEW 1.5" POLY WATERLINE FROM WELL HOUSE TO PAVILLION.



STATE OF MISSOURI
MICHAEL L. PARSON,
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PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210016 - PUMP HOUSE WELL #1
7815210017 - PUMP HOUSE WELL #2

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

ISSUE DATE: 09/09/2024

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

PAVILLION/PLAYGROUND
WATER PLAN

SHEET NUMBER:

C-205



JESSE RAY STEPHENS
MO LICENSE - 200000868

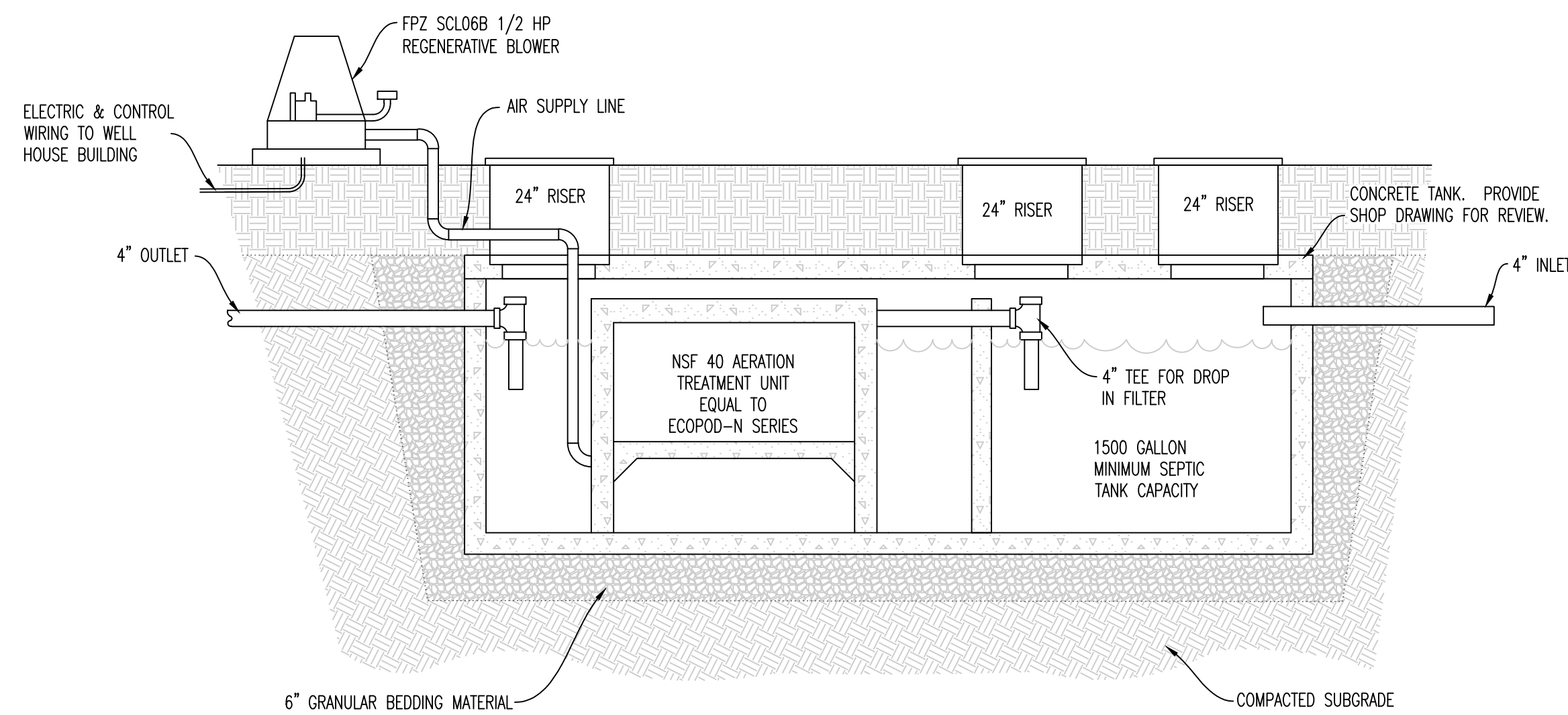
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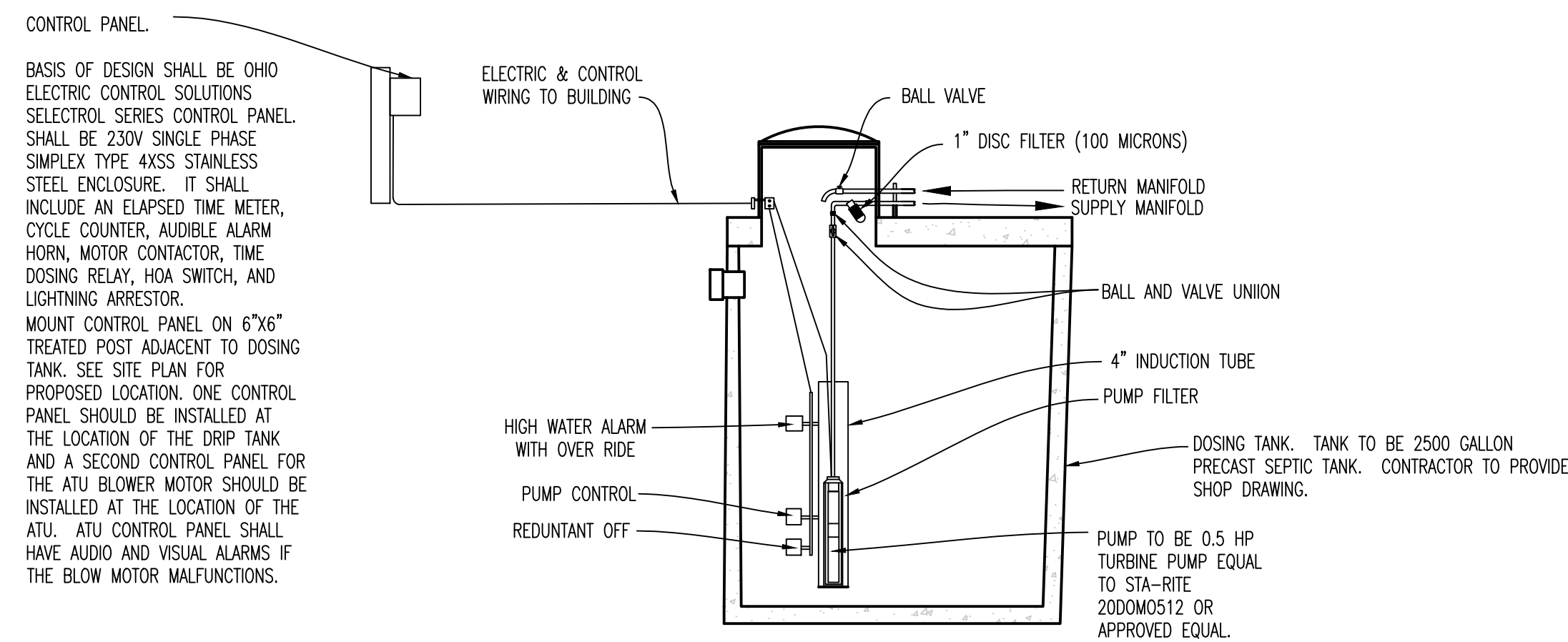
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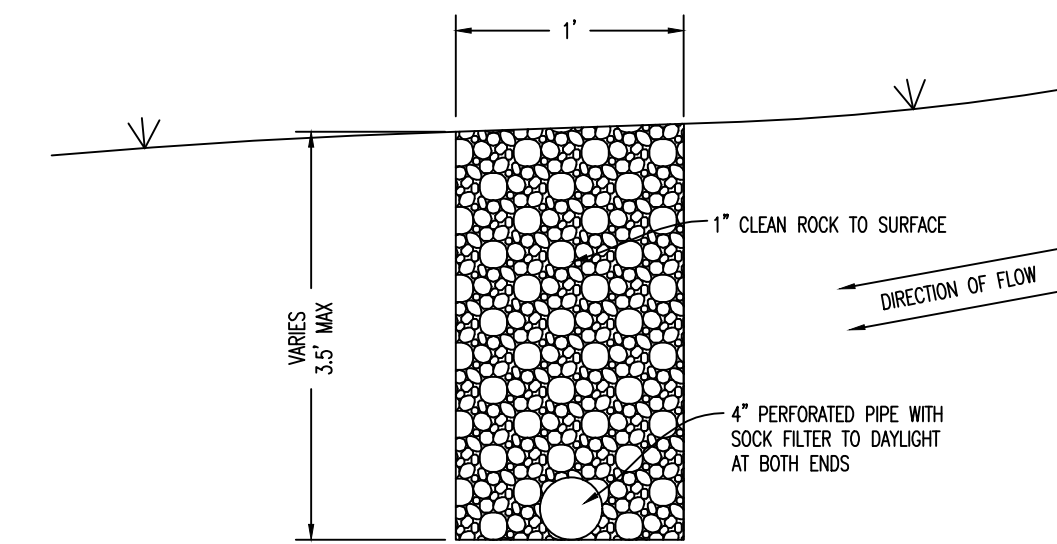
1. AERATION TREATMENT UNIT SHALL BE DESIGNED TO TREAT 750 GALLONS PER DAY OF DOMESTIC SEWAGE AT THE PARK OFFICE AND 1000 GALLONS PER DAY AT THE CAMPGROUND AREA.
2. EQUIPMENT SUPPLIER SHALL PROVIDE SHOP DRAWINGS FOR APPROVAL BY ENGINEER. SUBSTITUTIONS TO BE APPROVED IN WRITING BY ENGINEER PRIOR TO BIDDING.
3. ANTI-FLOTATION ANCHORING AND/OR ANTI-FLOTATION CALCULATION SHOWING TANK CANNOT FLOAT SHALL BE PROVIDED.

AERATION TREATMENT UNIT DETAIL 1

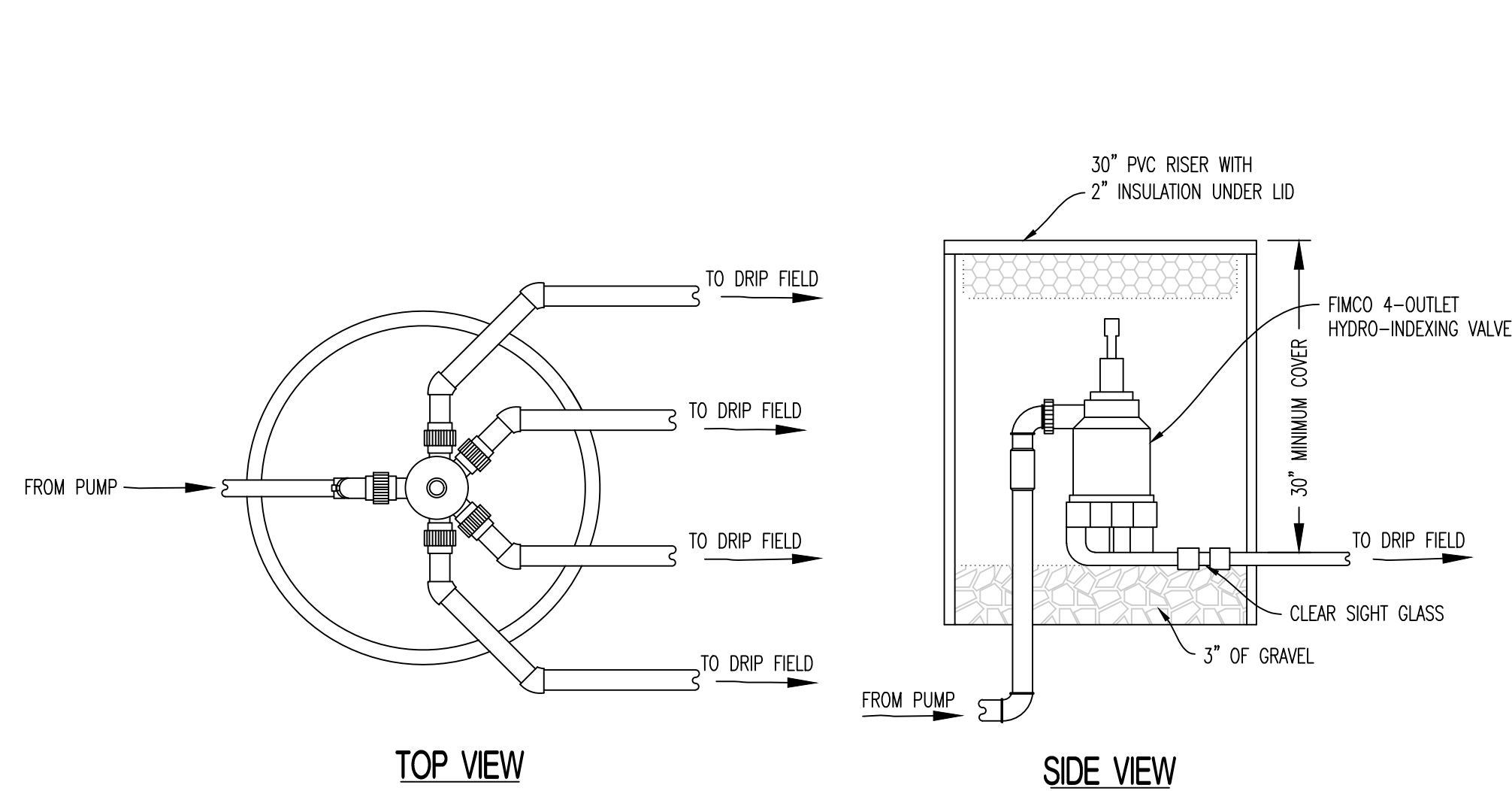


CONTROL PANEL.
BASIS OF DESIGN SHALL BE OHIO ELECTRIC CONTROL SOLUTIONS SELECTROL SERIES CONTROL PANEL. SHALL BE 230V SINGLE PHASE SIMPLEX TYPE 4XSS STAINLESS STEEL ENCLOSURE. IT SHALL INCLUDE AN ELAPSED TIME METER, CYCLE COUNTER, AUDIBLE ALARM HORN, MOTOR CONTACTOR, TIME DOSING RELAY, HOA SWITCH, AND LIGHTNING ARRESTOR. MOUNT CONTROL PANEL ON 6"X6" TREATED POST ADJACENT TO DOSING TANK. SEE SITE PLAN FOR PROPOSED LOCATION. ONE CONTROL PANEL SHOULD BE INSTALLED AT THE LOCATION OF THE DRIP TANK AND A SECOND CONTROL PANEL FOR THE ATU BLOWER MOTOR SHOULD BE INSTALLED AT THE LOCATION OF THE ATU. ATU CONTROL PANEL SHALL HAVE AUDIO AND VISUAL ALARMS IF THE BLOWER MOTOR MALFUNCTIONS.

DOSING TANK DETAIL 2

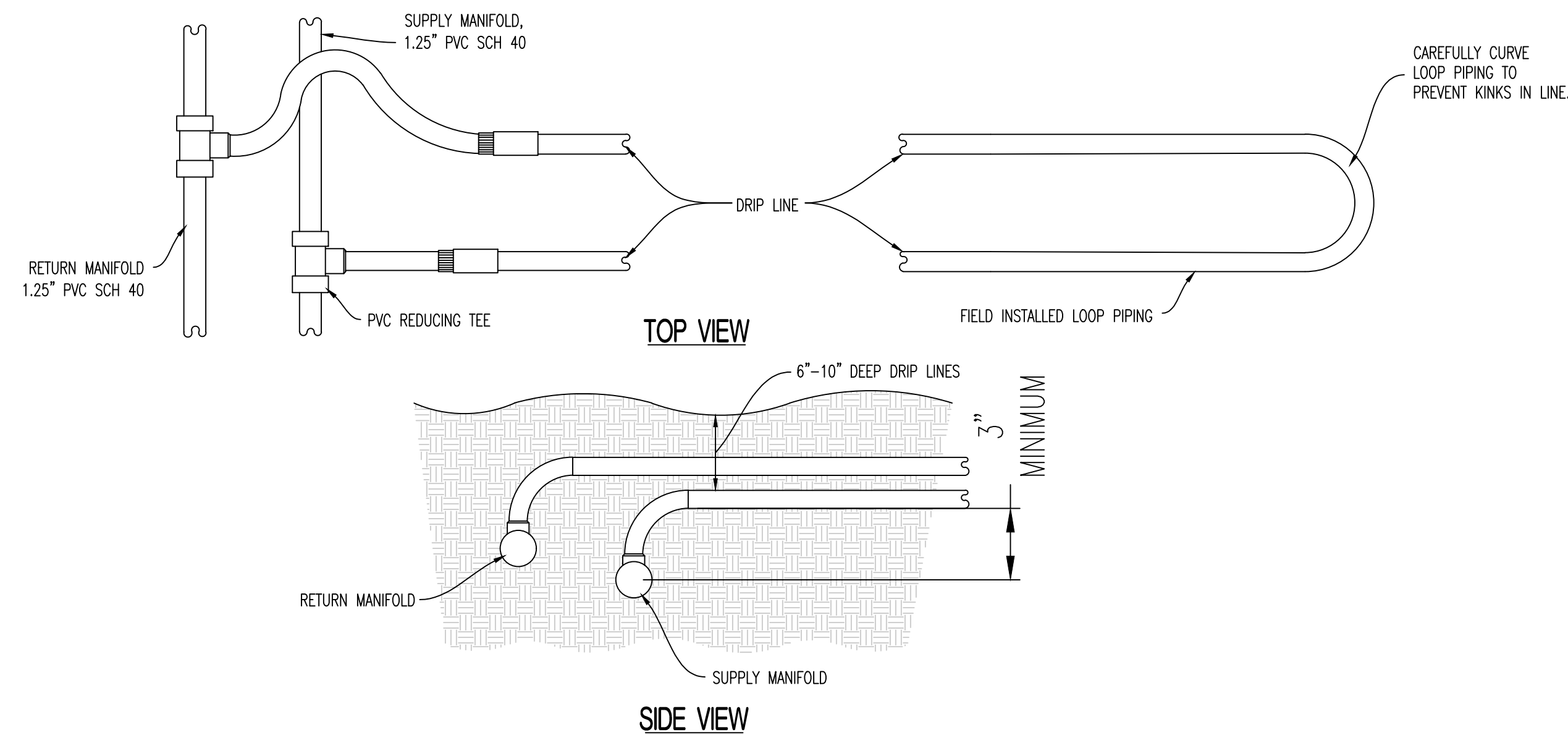


CURTAIN DRAIN DETAIL DETAIL 3

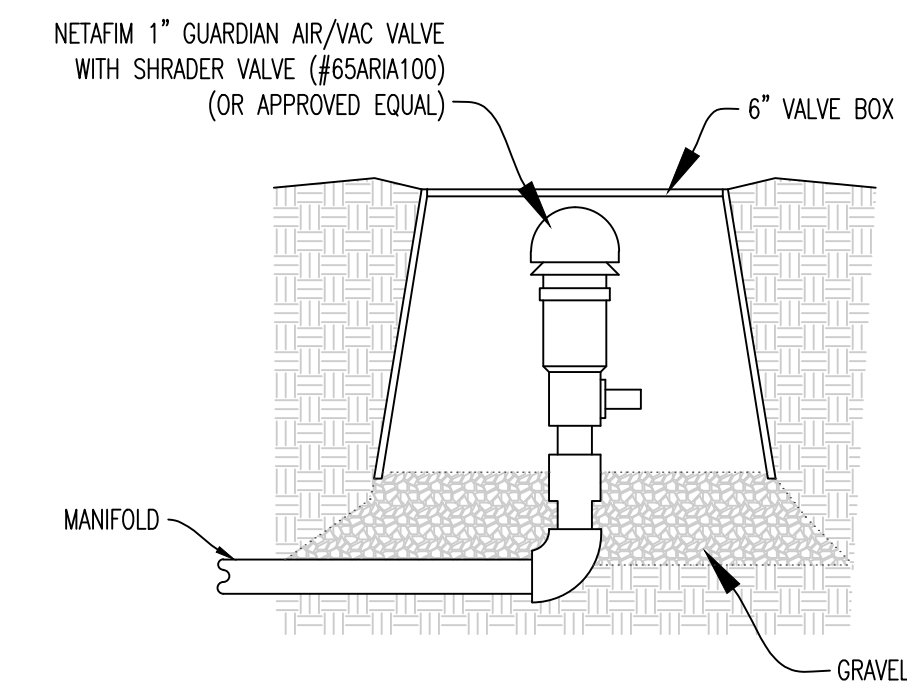


NOTE:
1. REFER TO PLANS FOR QUANTITY OF VALVE OUTLETS

HYDRO-INDEXING VALVE IN PIT DETAIL 4



DRIP LINE CONNECTIONS TO MANIFOLDS WITH DRIP LOOP CONNECTIONS DETAIL 5



NOTE:
1. VACUUM VALVE TO BE INSTALLED AT HIGH POINT IN EACH ZONE MANIFOLD.

AIR/VACUUM RELIEF VALVE DETAILS DETAIL 6

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IMPROVEMENTS TO WATER
AND WASTEWATER SYSTEM
MULTIPLE ASSETS

GRAHAM CAVE STATE PARK
217 HIGHWAY TT
DANVILLE, MO 63361

PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210025 - LAGOON SERVICE AREA

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

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:

DRIP IRRIGATION
DETAILS

SHEET NUMBER:

C-301



JESSE RAY STEPHENS
MO LICENSE - 201000393

SITE/CIVIL ENGINEER:

CROCKETT
ENGINEERING CONSULTANTS

1000 W. Niang Blvd., Bldg. 1
Columbia, Missouri 65203
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PROJECT # X2321-01
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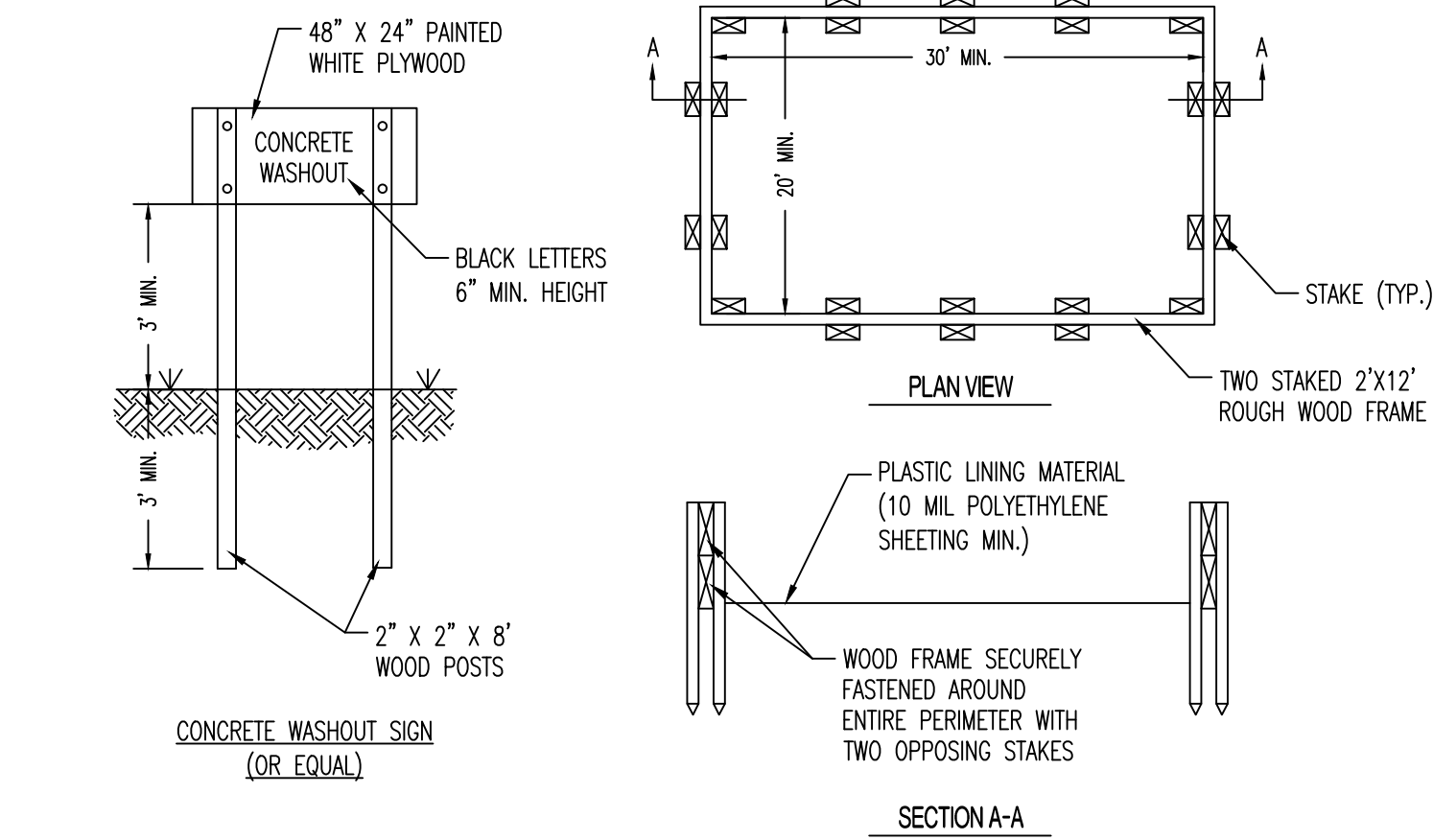
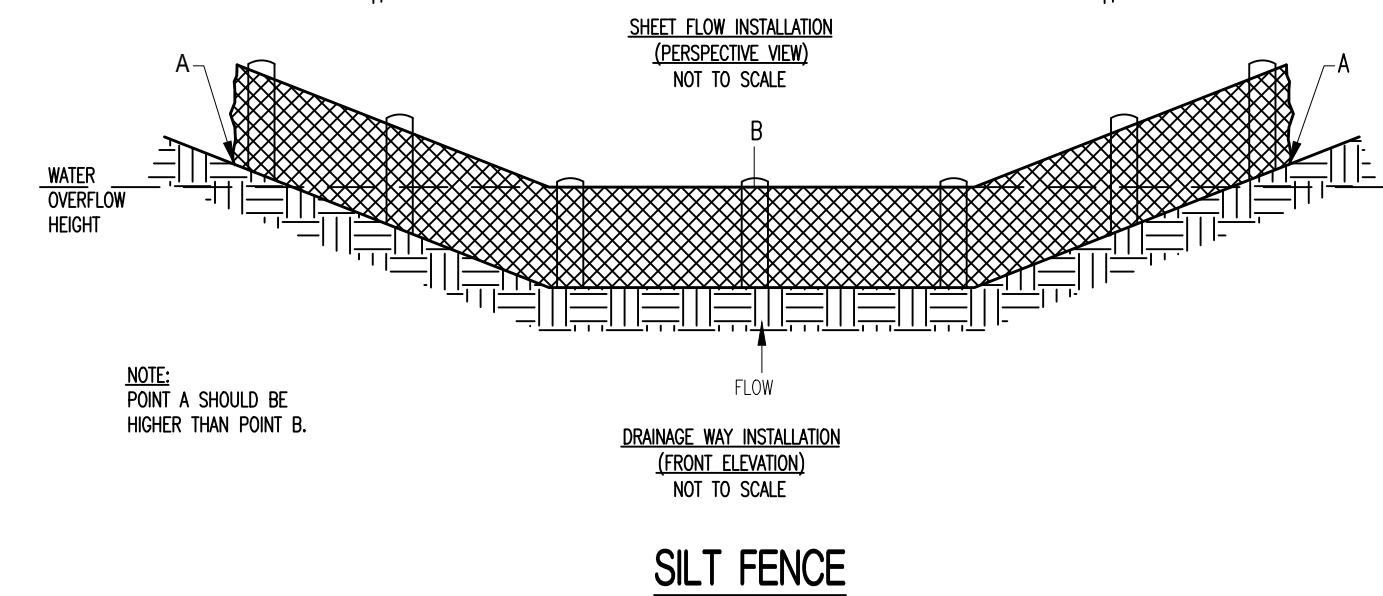
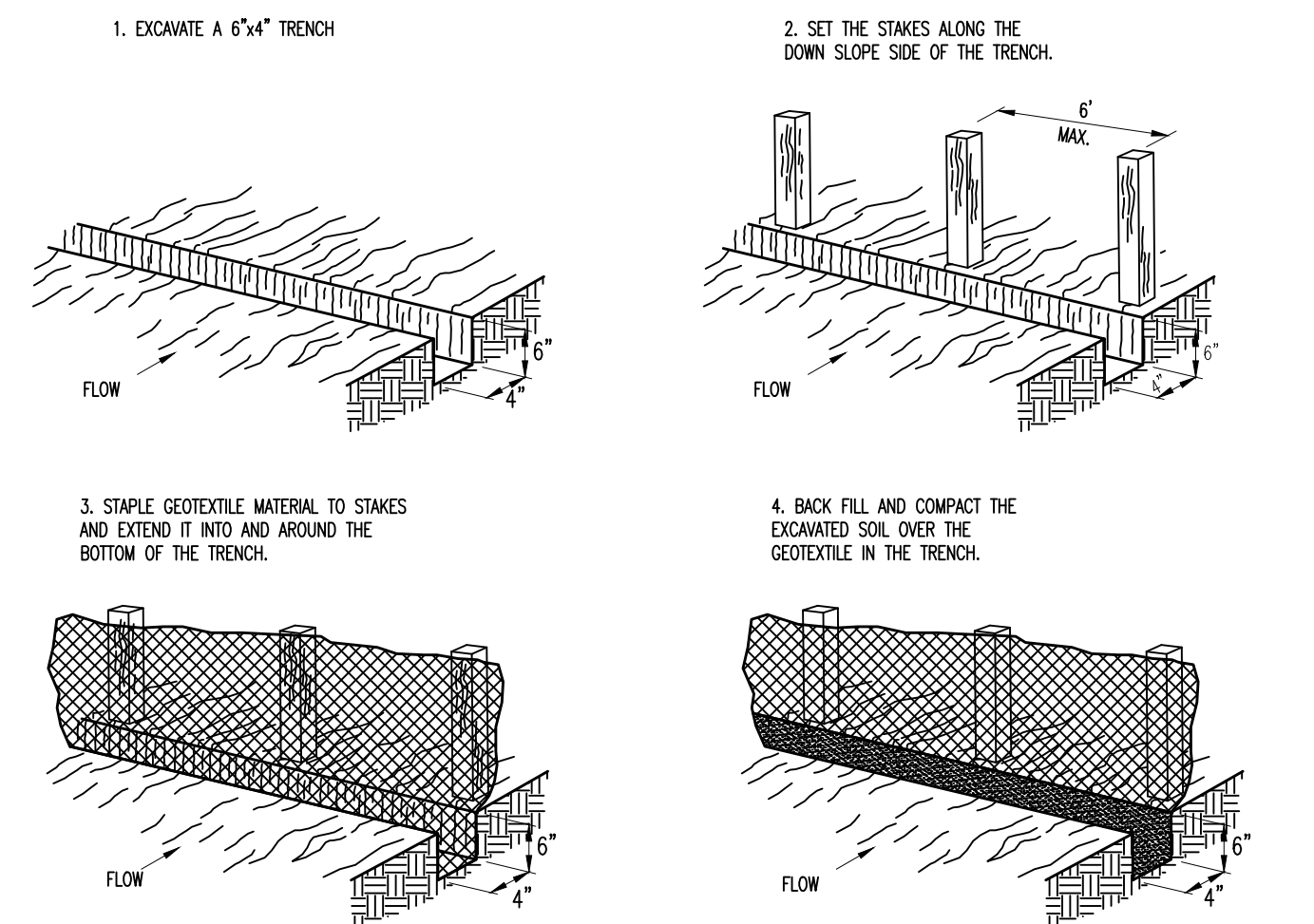
ISSUE DATE: 09/09/2024

CAD DWG FILE: 230188_GRAHAM.CIVIL
DRAWN BY: JRS
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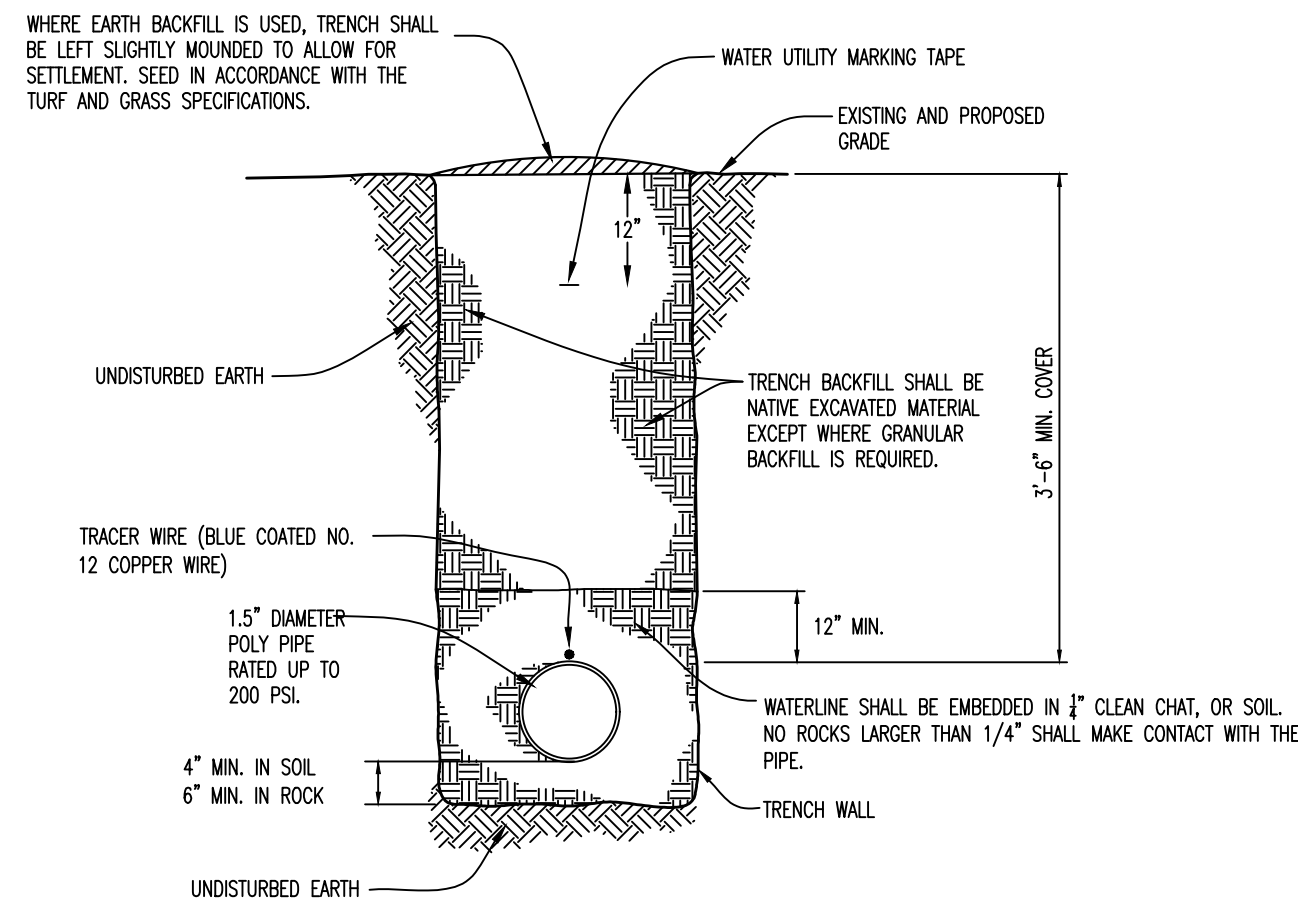
SITE
CONSTRUCTION
DETAILS

SHEET NUMBER:

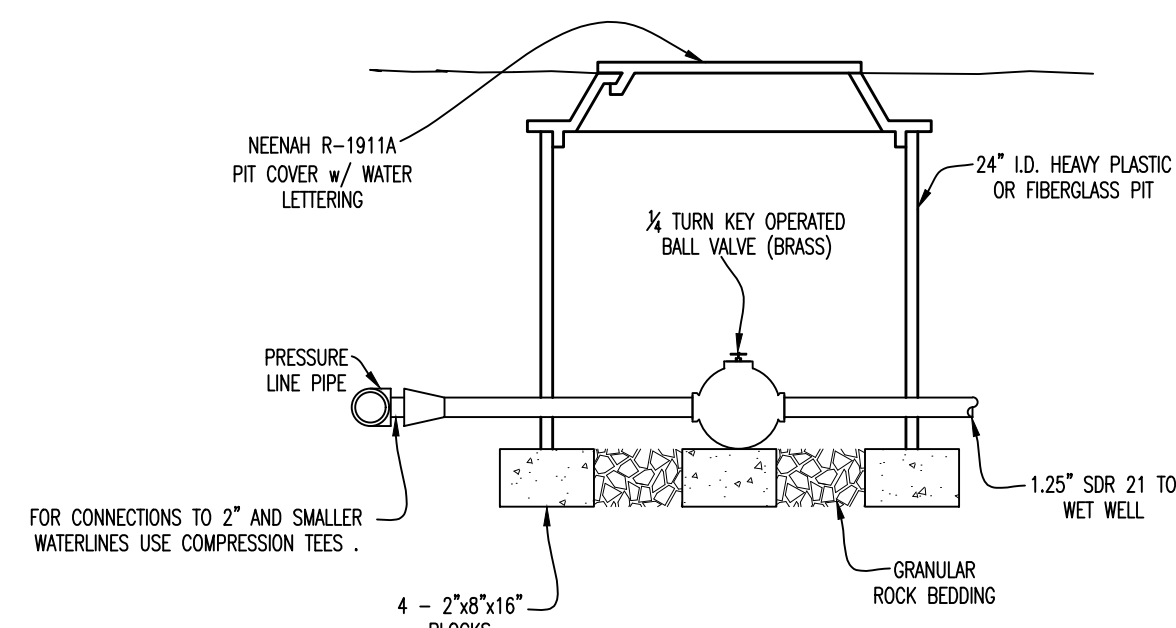


- CONSTRUCTION NOTES:**
1. CONCRETE WASHOUT SHALL BE AT LEAST 50' FROM ANY STORM SEWER INLET.
 2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

CONCRETE WASHOUT

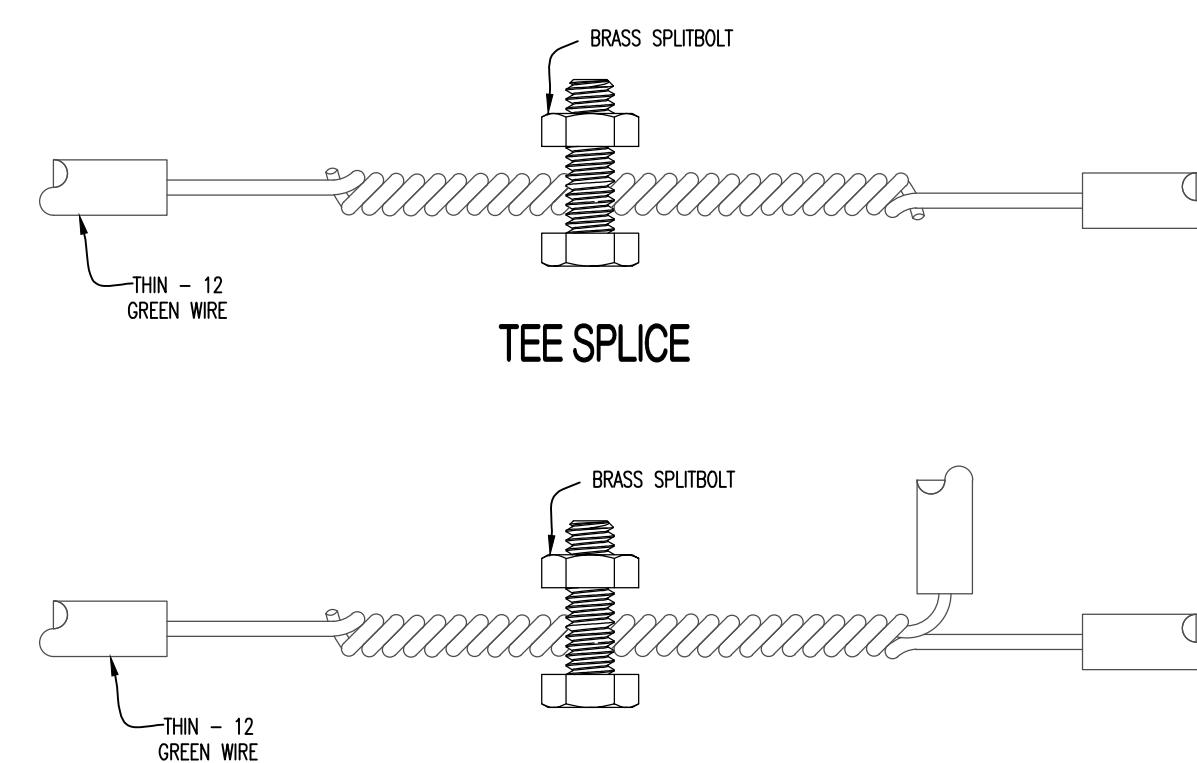


WATER LINE INSTALLATION



- NOTES:**
1. ANY HORIZONTALLY DRILLED OR BORED PIPE SHALL USE RESTRAINED JOINT PIPE.
 2. ALL UNITS SHALL BE CLEARLY LOCATED BY T-POST OR VERTICAL PVC PIPE UNTIL CONSTRUCTION COMPLETE.
 3. ALL BALL VALVES TO BE 1/2 TURN BRASS VALVE OR APPROVED EQUAL, SIZE COMMENSURATE WITH PIPE SHOWN.
 4. ALL LOCATOR WIRE SHALL BE BLUE COATED, NO. 12 COPPER WIRE.
 5. LOOP LOCATOR WIRE IN ALL PITS.

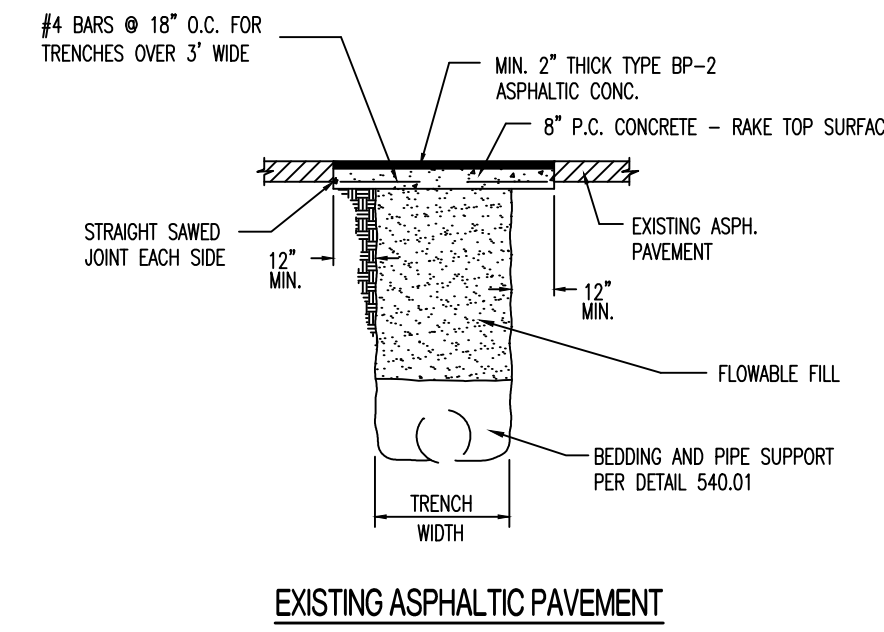
WATER LINE SHUT-OFF



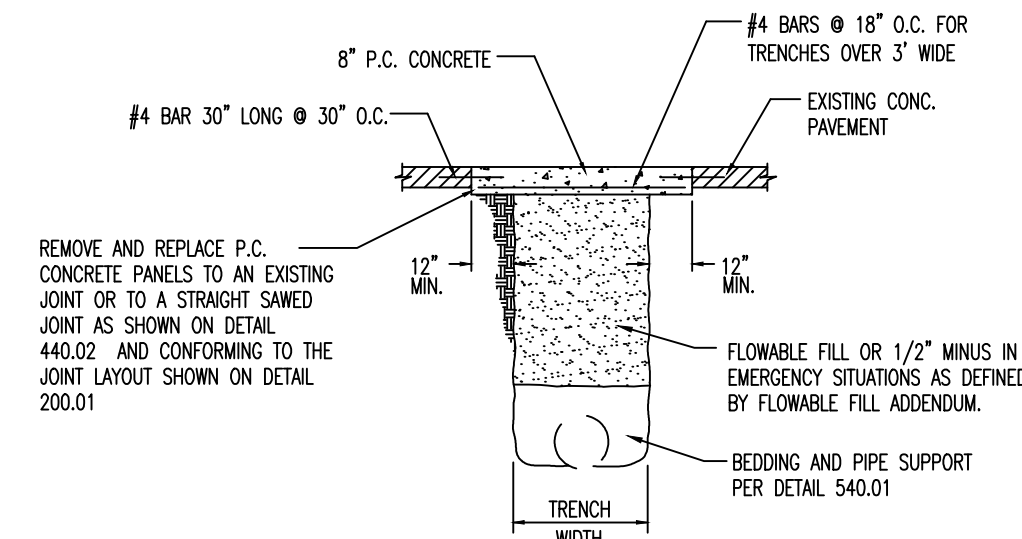
TEE INTERSECTION

- 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 1/2\"/>

TRACER WIRE SPLICE



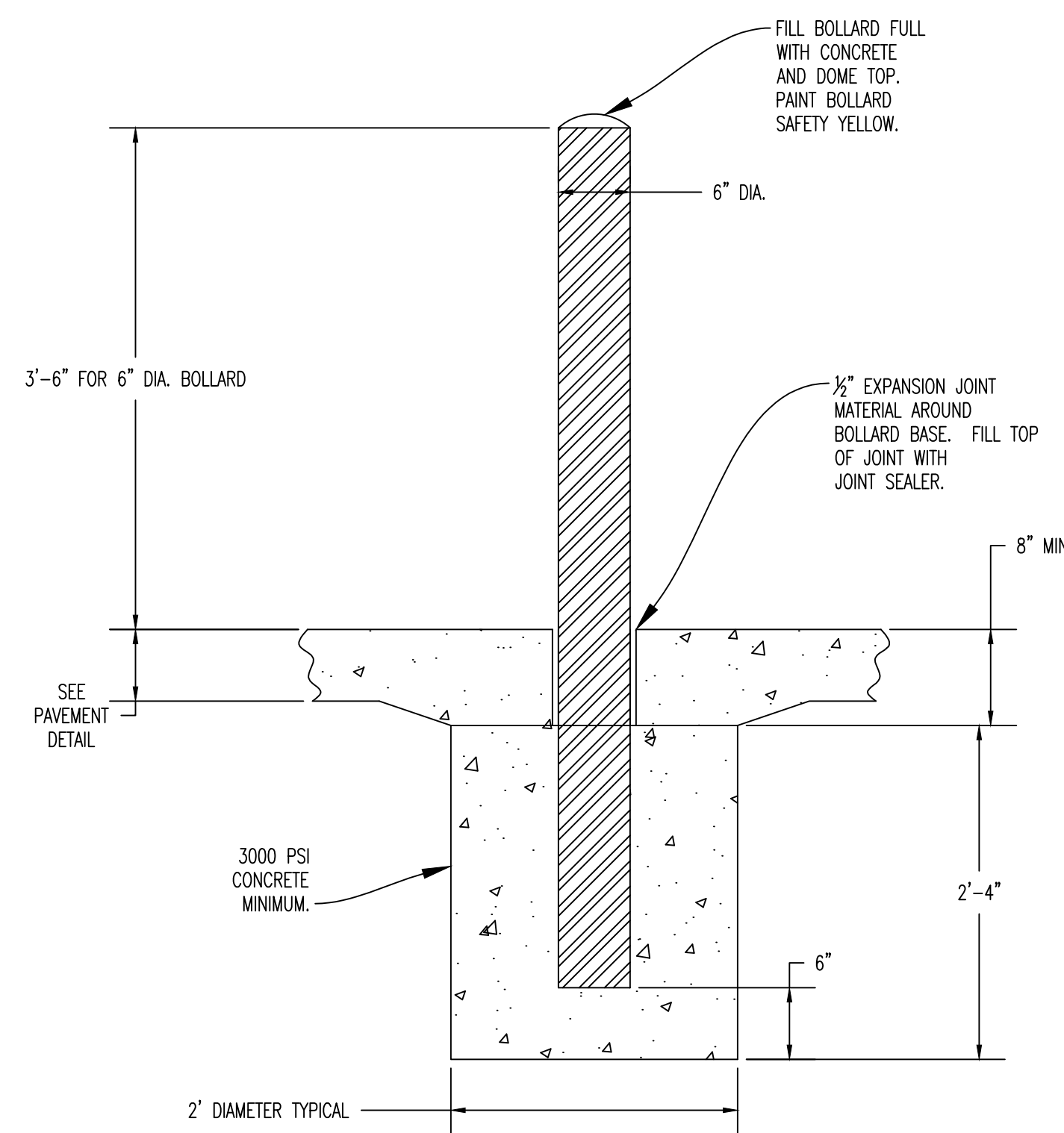
EXISTING ASPHALTIC PAVEMENT



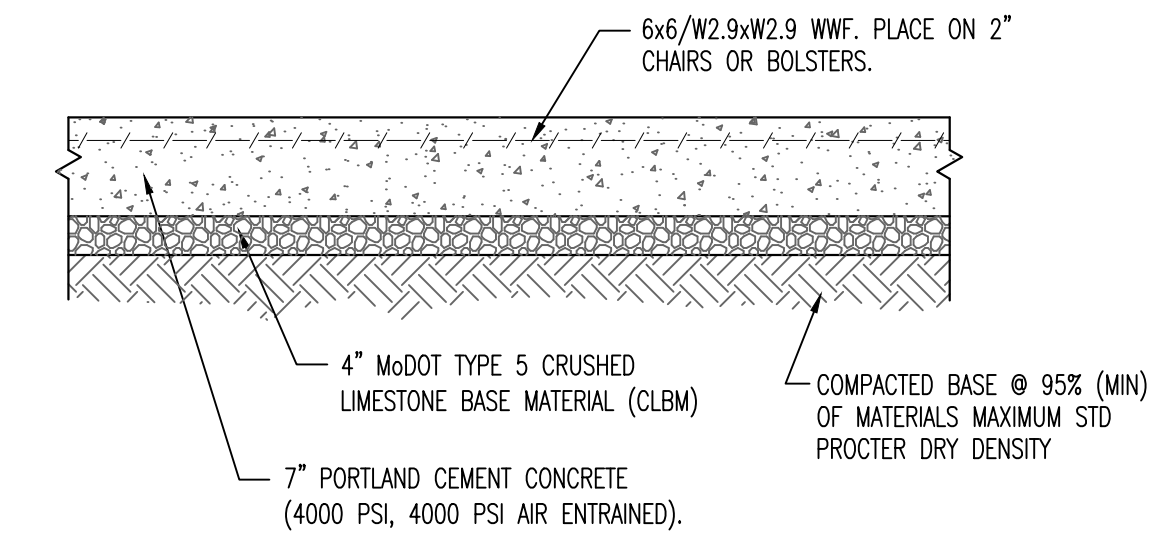
EXISTING CONCRETE PAVEMENT

- NOTES:** CONCRETE SHALL BE 4000 PSI, 5% AIR ENTRAINED. REINFORCING STEEL SHALL BE GRADE 60.

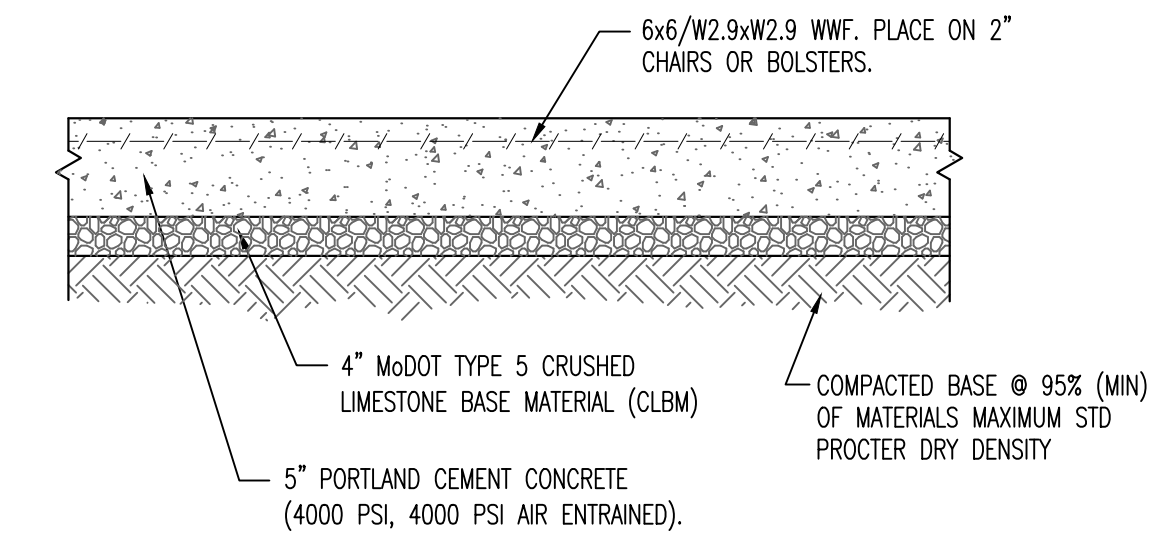
PATCHING PAVED DRIVEWAYS



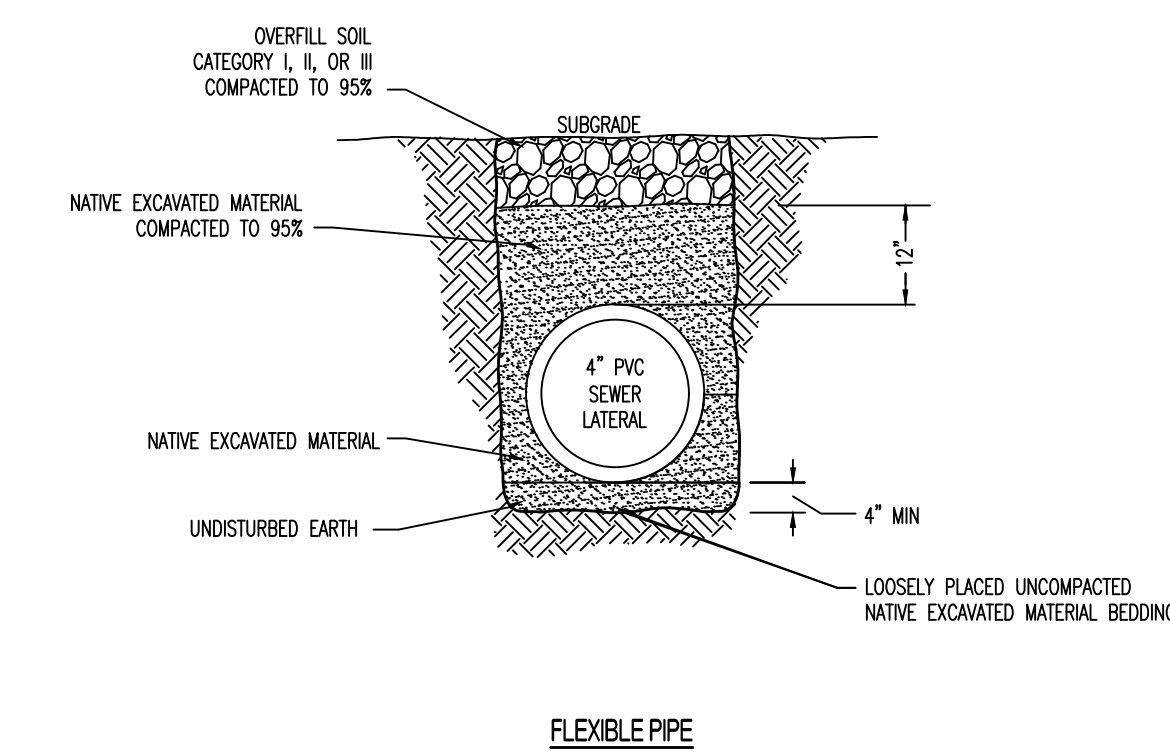
BOLLARD INSTALLATION DETAIL



FUEL TANK PAD



CONCRETE SIDEWALK



SANITARY SEWER LATERAL INSTALLATION

GENERAL NOTES

ELEVATION DATUM

SEE GRADING PLAN FOR ELEVATIONS

DESIGN SPECIFICATIONS

2021 INTERNATIONAL BUILDING CODE

EARTHWORK

EARTHWORK OPERATIONS SHALL BE PERFORMED UNDER THE DIRECTION OF A PROFESSIONAL TESTING AGENCY TO ASSURE COMPLIANCE WITH THE MINIMUM BEARING CAPACITY FOR FOUNDATIONS SPECIFIED BELOW.

CONCRETE

CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF THE CURRENT ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS, ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 305 SPECIFICATIONS FOR HOT WATER CONCRETE, AND ACI 306 SPECIFICATIONS FOR COLD WEATHER CONCRETE, ACI 350-06 CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES, WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:

1. CONCRETE SHALL DEVELOP THE FOLLOWING 28-DAY MINIMUM COMPRESSIVE STRENGTH:
 BUILDING FOUNDATIONS - 3,000 PSI
 GENERAL USE CONCRETE - 4,000 PSI
 EXTERIOR SLABS, WALLS AND CURBS - 4,000 PSI
2. ALL FOOTINGS SHALL BEAR ON UNDISTURBED SOIL OR ENGINEERED FILL.
3. CHLORIDE-BASED ADMIXTURES ARE PROHIBITED IN ALL REINFORCED CONCRETE.
4. REINFORCING STEEL SHALL CONFORM TO ASTM A615, A616, OR A617, GRADE 60.
5. ALL CONTINUOUS REINFORCING STEEL THAT MEETS AT A CORNER SHALL BE TIED TOGETHER WITH A CORNER BAR THAT HAS SUFFICIENT LAP DISTANCE IN EACH DIRECTION
6. CONTINUOUS REINFORCING BARS LAP LENGTH SHALL BE A MINIMUM OF 48 BAR DIAMETERS UNLESS NOTED OTHERWISE
7. CONCRETE SLUMP SHALL BE A MAXIMUM OF 4' +/- 1' (ASTM C- 143) AS DELIVERED IN THE FIELD. CONTRACTOR MAY USE CHEMICAL ADMIXTURES TO ATTAIN A MAXIMUM SLUMP OF 8' FOR WORKABILITY. NO WATER MAY BE ADDED TO THE CONCRETE MIX ON SITE UNLESS WATER IS WITHHELD AT THE BATCHING FACILITY. IF WATER IS WITHHELD AT THE BATCHING FACILITY IT SHOULD BE REFLECTED ON THE LOAD TICKET. THE TOTAL AMOUNT OF WATER IN THE MIX SHALL NOT EXCEED WHAT IS NOTED ON THE APPROVED MIXED. THIS SHALL BE NOTED IN THE SPECIAL INSPECTOR'S RECORDS.
8. CONCRETE EXPOSED TO WEATHER, VEHICLES, AND/OR DEICING CHEMICALS SHALL BE AIR-ENTRAINED WITH 6% (+/-) 1.5% ENTRAINED AIR BY VOLUME AT POINT OF DISCHARGE. DO NOT ALLOW AIR CONTENT OF TROWELED FINISHED FLOORS OR TANK STRUCTURES TO EXCEED 3%.
9. SUBMIT CONCRETE MIX PROPORTIONS PRIOR TO START OF WORK. DO NOT BEGIN CONCRETE PRODUCTION UNTIL MIXES HAVE BEEN REVIEWED AND ARE ACCEPTABLE TO THE ENGINEER.
10. READY MIX CONCRETE SHALL COMPLY WITH REQUIREMENTS OF ASTM C94, TO 1.1.
11. CONCRETE WORK EXECUTION
 - A. CONSTRUCT FORMS TO CORRECT SIZE, SHAPE, ALIGNMENT, ELEVATION AND POSITION; AND TO SUPPORT VERTICAL AND LATERAL LOADS.
 - B. POSITION, SUPPORT, AND SECURE REINFORCEMENT AGAINST DISPLACEMENT. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE, UNLESS NOTED OTHERWISE ON THE DRAWINGS:
 CAST AGAINST AND EXPOSED TO EARTH.....3 INCHES
 EXPOSED TO EARTH OR WEATHER.....2 INCHES
 NOT EXPOSED TO WEATHER OR IN CONTACT WITH EARTH.....1 1/2 INCHES
 - C. PROVIDE CONTROL JOINTS IN SLABS-ON-GRADE AT NOT GREATER THAN 15 FEET ON CENTER IN EACH DIRECTION. SAW CUT CONTROL JOINTS MINIMUM 1/4 OF SLAB DEPTH, AS SOON AFTER SLAB FINISHING WITHOUT DISLODING AGGREGATE. DO NOT SAW CUT TANK FLOORS.
 - D. STEEL TROWEL FINISH ALL INTERIOR CONCRETE SLABS, BROOM FINISH ALL EXTERIOR CONCRETE SLABS.
 - E. CURE ALL CONCRETE IN COMPLIANCE WITH ACI 301, USING A LIQUID TYPE MEMBRANE, NON-RESIDUAL, CURING COMPOUND COMPLYING WITH ASTM C309. ASSURE COMPATIBILITY WITH FINISH FLOOR COVERING.

WOOD FRAMING

WOOD FRAMING WORK SHALL CONFORM TO ALL REQUIREMENTS OF THE CURRENT ANSI/AF&PA NATIONAL DESIGN SPECIFICATION (NDS) FOR WOOD CONSTRUCTION, WITH THE FOLLOWING SUPPLEMENTAL REQUIREMENTS:

1. FOR COMMON MEMBER SIZES, THE SPECIES AND GRADES SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:
 - A. 2X4 SPF No.1/No.2
 - B. 2X6 SPF No.1/No.2
 - C. 2X8 DF-L No.2
 - D. 2X10 DF-L S.S.
 - E. 2X12 DF-L S.S.

EQUIVALENT (OR BETTER) GRADES & SPECIES MAY BE SUBMITTED FOR THE ENGINEER'S APPROVAL.

2. SIZES SHOWN FOR LUMBER ARE NOMINAL SIZES.
3. TIMBER EXPOSED TO WEATHER OR GROUND, OR IN CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESSURE-IMPREGNATED BY AN APPROVED PROCESS AND PRESERVATIVE.
4. SPLICING OF JOISTS, STUDS, OR HEADERS IS PROHIBITED EXCEPT AS SHOWN.
5. BOLTS SHALL CONFORM TO ASTM A307. HOLES SHALL BE DRILLED PER SECTION 11.1.2 OF THE 2005 ANSI/AF&PA NDS FOR WOOD CONSTRUCTION.
6. LAG SCREWS AND WOOD SCREWS SHALL BE INSTALLED PER SECTIONS 11.1.3 AND 11.1.4, RESPECTIVELY, OF THE 2005 ANSI/AF&PA NDS FOR WOOD CONSTRUCTION.
7. COMMON NAILS SHALL BE USED, UNLESS NOTED OTHERWISE. IN ADDITION, NAILS SHALL BE GALVANIZED, IF EXPOSED TO WEATHER OR MOISTURE. TOE-NAILS SHALL BE DRIVEN PER SECTION 11.1.5.4 OF THE 2005 ANSI/AF&PA NDS FOR WOOD CONSTRUCTION.
8. FASTENING SHALL BE PER THE IBC MINIMUM FASTENING SCHEDULE, TABLE 2304.9.1, UNLESS NOTED OTHERWISE.
9. CONNECTIONS/CONNECTORS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
10. PROVIDE TEMPORARY AND PERMANENT BRACING ON ALL MEMBERS, AS REQUIRED TO PROVIDE MEMBER.

POST-INSTALLED ANCHORS

1. ALL POST-INSTALLED ANCHORS SHALL MEET THE REQUIREMENTS OF ACI 318, APPENDIX 'D', AND SHALL BE ACCEPTABLE FOR BOTH CRACKED AND UNCRACKED CONCRETE.
2. EXPANSION ANCHORS HAVE BEEN DESIGNED AS HILTI KWIK BOLT TZ ANCHORS, UNLESS NOTED OTHERWISE.
3. ADHESIVE ANCHORS HAVE BEEN DESIGNED TO USE HILTI HIT HY 200 ADHESIVE IN CONCRETE OR SOLID MASONRY, UNLESS NOTED OTHERWISE.
4. EQUIVALENT ANCHORS MAY BE SUBMITTED FOR THE ENGINEER'S APPROVAL. SUBMITTALS ARE THE CONTRACTOR'S RESPONSIBILITY AND MUST INCLUDE EVALUATION REPORTS FROM THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO).
5. EMBEDMENT DEPTH IS DEFINED AS THE DISTANCE FROM THE SURFACE OF THE LOAD-BEARING BASE MATERIAL TO THE DEEPEST PART OF THE ANCHOR AFTER THE ANCHOR HAS BEEN DRIVEN INTO THE HOLE BUT NOT YET EXPANDED.
6. ADHESIVE ANCHORS SHALL BE ACCEPTABLE FOR LONG-TERM LOADING. WHEN BASE MATERIAL TEMPERATURES ARE BELOW 40 DEG F, ONLY NON-EPOXY-BASED ADHESIVES SHALL BE USED.
7. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED ON THE DRAWINGS. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLANE ANCHORS. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING BARS. HOLES SHALL BE DRILLED AND CLEANED PER ANCHOR MANUFACTURER'S SPECIFICATIONS.
8. STAINLESS STEEL ANCHORS ARE REQUIRED AT ALL PERMANENTLY EXPOSED WEATHER CONDITIONS.

SPECIAL INSPECTIONS

THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE.

- a. PLACING OF CONCRETE AND REINFORCING STEEL (CONTINUOUS OF CONCRETE SAMPLING / PERIODIC OF REINFORCING)
- b. BOLTS & ANCHORS EMBEDDED IN CONCRETE (PERIODIC)
- c. STRUCTURAL STEEL FABRICATIONS (UNLESS AISC APPROVED) (PERIODIC)
- d. STRUCTURAL STEEL BOLTING & WELDING (PERIODIC)
- e. POST INSTALLED ANCHORS IN CONCRETE (CONTINUOUS)
- f. IN-SITU SOILS, EXCAVATIONS, FILLING & COMPACTION (PERIODIC)

THE CONTRACTOR SHALL REQUEST SPECIAL INSPECTION OF THE ITEMS LISTED ABOVE PRIOR TO THOSE ITEMS BECOMING INACCESSIBLE AND UNOBSERVABLE DUE TO PROGRESSION OF THE WORK.

DESIGN CRITERIA

BUILDING OCCUPANCY CATEGORY	II
ROOFL LOAD	
LIVE LOAD	20
TOP CHORD DEAD/COLLATERAL LOAD	10
TOP CHORD FUTURE SOLAR	5
BOTTOM CHORD DEAD/COLLATERAL LOAD	10
TOTAL TO TRUSS	45 lba/sqft
ROOF SNOW LOAD: (*UNBALANCED & DRIFTING SNOW TO BE DETERMINED IN ADDITION TO UNIFORM LOAD, WHERE APPLICABLE)	
P _s =	20 lba/sqft
C _e =	10
I _e =	10
C _i =	10
P _s =	20 lba/sqft
P _s =	20 lba/sqft
BASIC DESIGN WIND LOAD	
V =	107 MPH (3-SECOND GUST)
I _w =	10
EXPOSURE	C
INTERNAL PRESSURE COEFFICIENT =	± 0.18
MAXIMUM COMPONENTS & CLADDING WIND	± 33.75 lba/sqft
EARTHQUAKE DESIGN DATA	
S _{ps} =	0.167
S _p =	0.093
S _{o3} =	0.178
S _{o2} =	0.149
SITE CLASS D (ASSUMED)	
SEISMIC DESIGN CATEGORY C	
BASIC SEISMIC-FORCE-RESISTING SYSTEM =	
LIGHT-FRAMED WALLS SHEATHED WITH STRUCTURAL PANELS	
R =	6.5
Ω ₂ =	3.0
C _d =	4.0
I _e =	10
EQUIVALENT LATERAL FORCE PROCEDURE	
V =	0.0274W
NET ALLOWABLE SOIL BEARING	1500 lba/sqft**
(**ASSUMED PER IBC TABLE 1906.1 PRESUMPTIVE LOAD-BEARING VALUES)	

**STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR**



JESSE RAY STEPHENS
MO LICENSE #200000968

SITE/CIVIL ENGINEER:



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DESIGNED BY: JRS

SHEET TITLE:

WELL HOUSE BUILDING
CODE CRITERIA

SHEET NUMBER:

S-101



JESSE RAY STEPHENS
MO LICENSE: 200000868

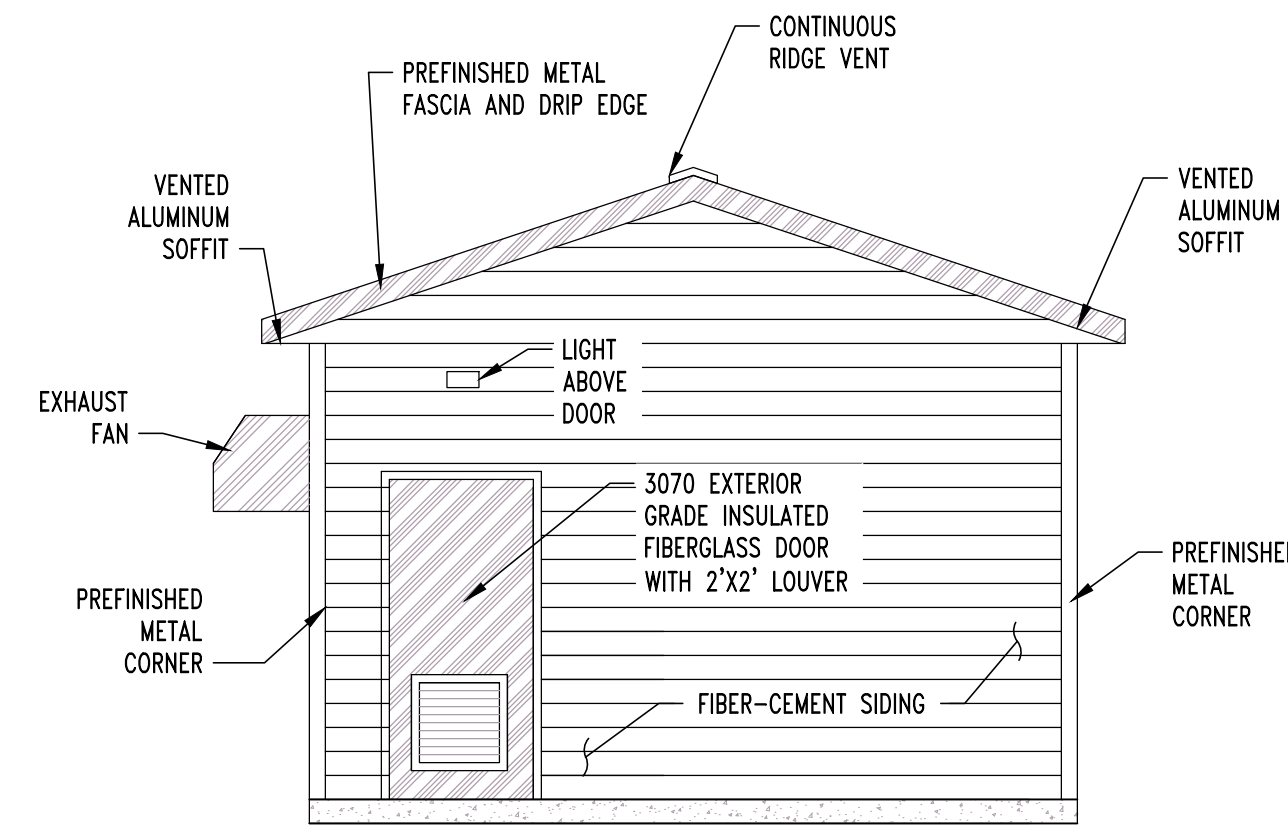
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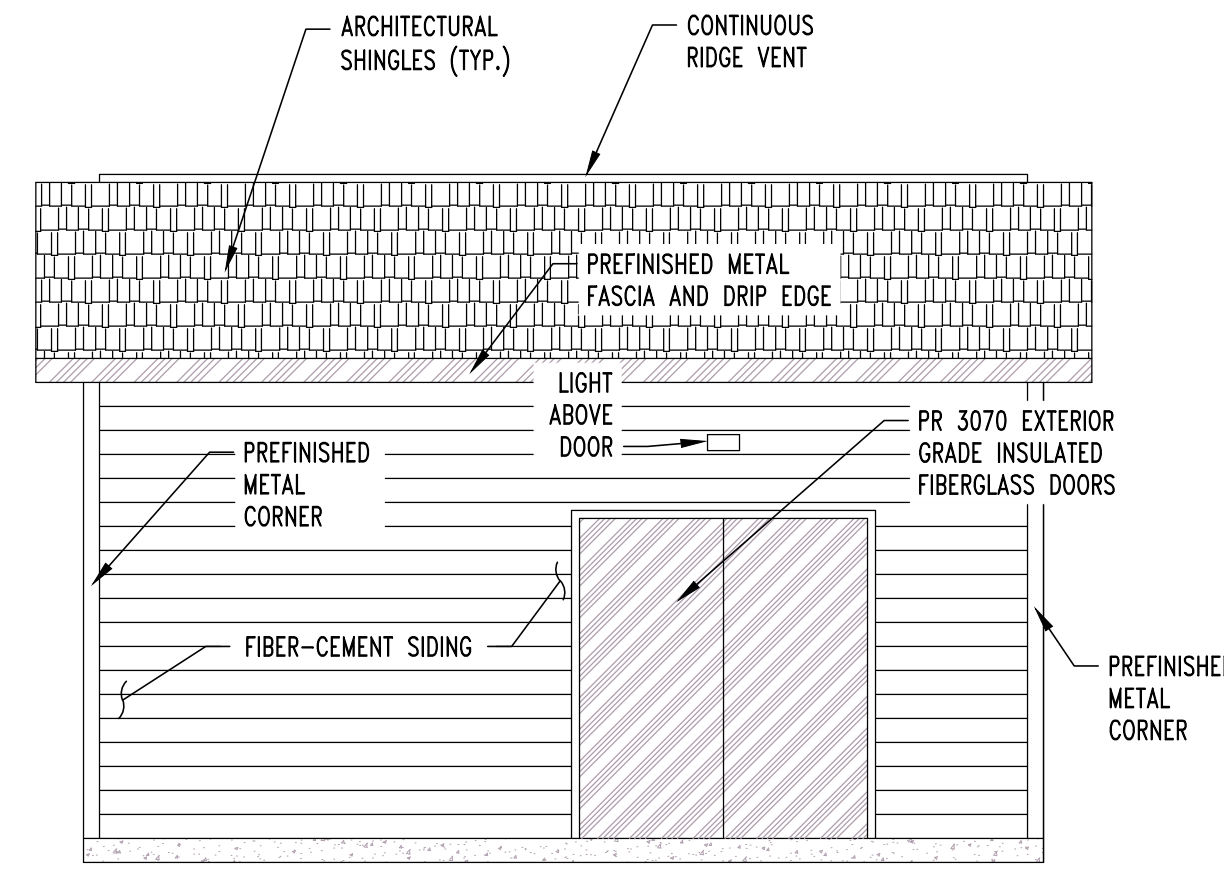
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GENERAL NOTES

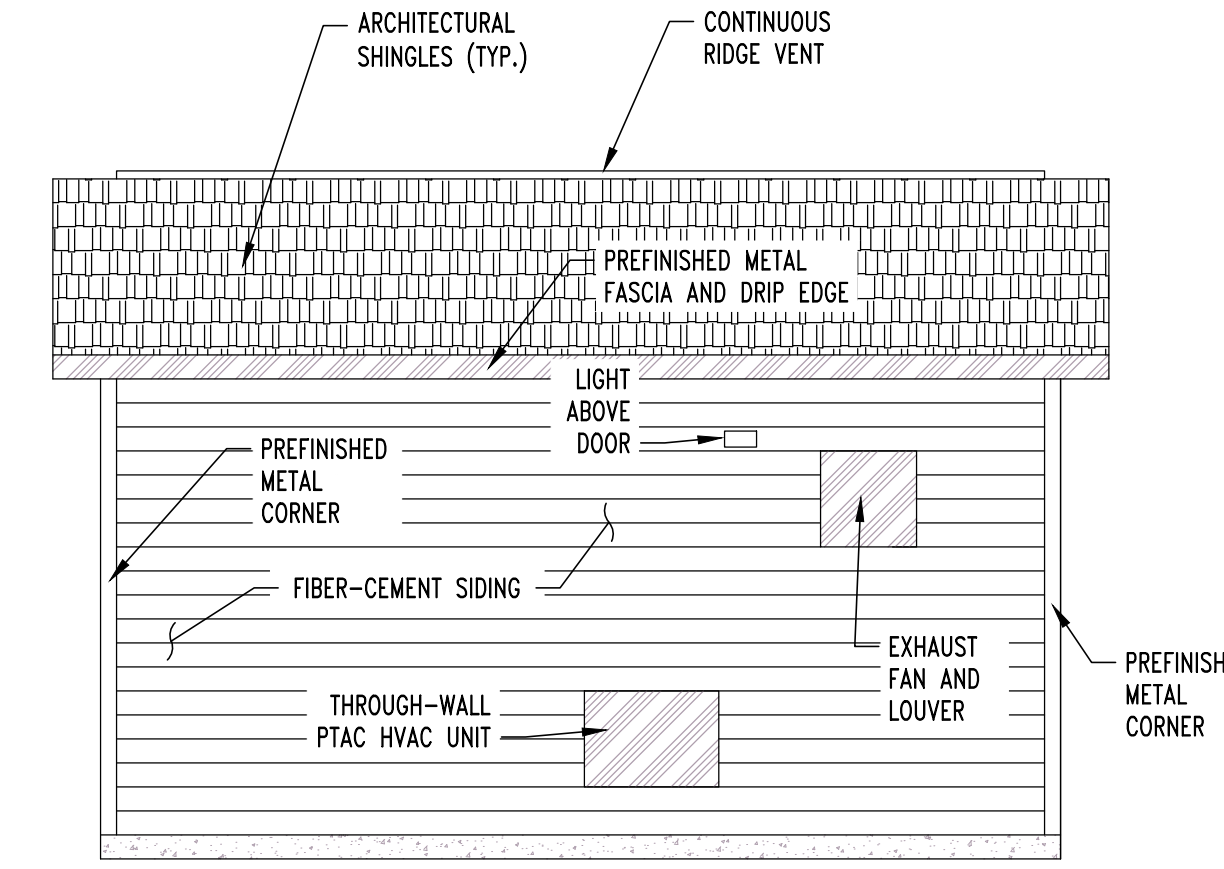
- TWO WELL HOUSES ARE TO BE BUILT. ONE IS LOCATED ADJACENT TO THE PARK RANGER STATION AND THE OTHER IS LOCATED ADJACENT TO THE PLAYGROUND. THE PARK RANGER STATION WELL HOUSE MUST BE CONSTRUCTED PRIOR TO DEMOLITION OF THE EXISTING WELL HOUSE AT THE RANGER STATION. DOWN TIME BETWEEN THE SWITCHOVER SHALL BE KEPT TO LESS THAN 48 HOURS OR AS SCHEDULED WITH THE PARK STAFF. POTABLE WATER SHALL BE MAINTAINED TO THE PARK OFFICE.
- ALL INTERIOR WALLS SHALL BE CLAD WITH $\frac{5}{8}$ " THICK CDX PLYWOOD. PLYWOOD SHOULD BE SMOOTH AND FREE OF SPLINTERS. SAND AS NEEDED TO PROVIDE SMOOTH SURFACE.
- INTERIOR PLYWOOD SHOULD BE PAINTED WITH A MINIMUM OF TWO COATS OF WHITE SATIN PAINT PRIOR TO INSTALLATION OF ANY SURFACE MOUNTED EQUIPMENT.
- THE INTERIOR WALL BETWEEN THE CHLORINE DOSING ROOM AND THE PUMP ROOM SHALL BE INSULATED THE SAME AS THE EXTERIOR WALLS.
- THE EXTERIOR FIBER CEMENT SIDING SHALL BE PAINTED WITH A MINIMUM OF TWO COATS OF EXTERIOR GRADE PAINT IN A COLOR TO BE SELECTED BY THE PARK STAFF.
- ALUMINUM SOFFIT AND FASCIA MATERIAL TO BE SELECTED FROM MANUFACTURERS STANDARD RANGE OF COLORS.
- SHINGLE COLOR AND STYLE TO BE SELECTED FROM MANUFACTURERS STANDARD RANGE OF COLORS.
- THE FIBERGLASS DOOR AT THE CHLORINE ROOM SHALL CONTAIN AN INTEGRAL 2'X2' VENTED LOUVER. THE DOOR HARDWARE SHALL BE A CLASSROOM STYLE LOCKSET. LOCK SHALL BE KEYPED TO MATCH THE EXISTING PARK KEYING SYSTEM.
- THE PAIR OF FIBERGLASS DOORS AT THE PUMP ROOM SHALL CONTAIN A FLUSHBOLT OR EQUIVALENT TO MAKE THE LEFT LEAF OF THE DOOR NORMALLY CLOSED. PROVIDE WEATHERSTRIPPING, THRESHOLD, AND CLASSROOM LOCKSET KEYPED TO MATCH THE EXISTING PARK KEYING SYSTEM.



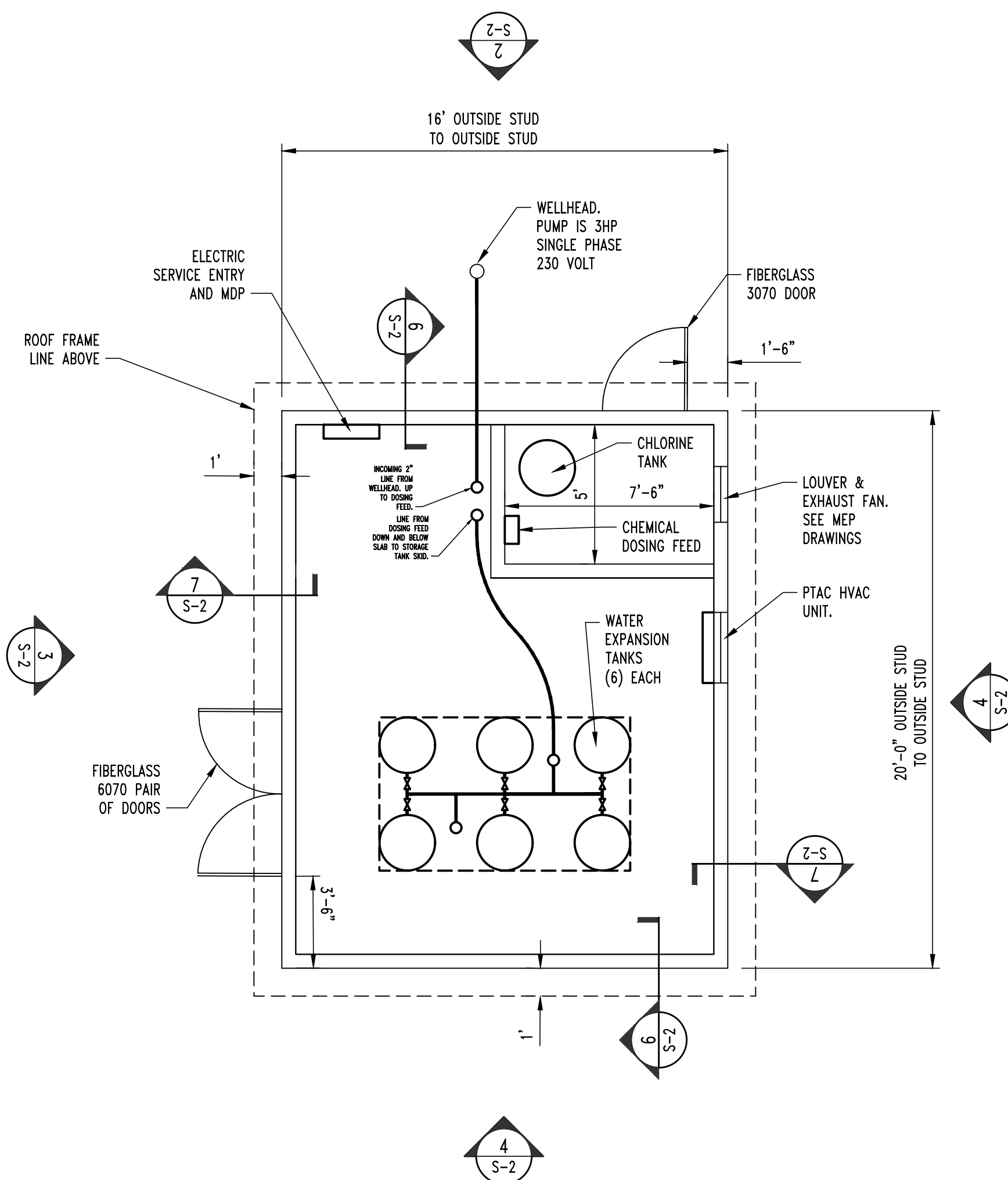
2
S-2 WELLHOUSE BUILDING ELEVATION LOOKING NORTH
SCALE: 1/4" = 1'-0"



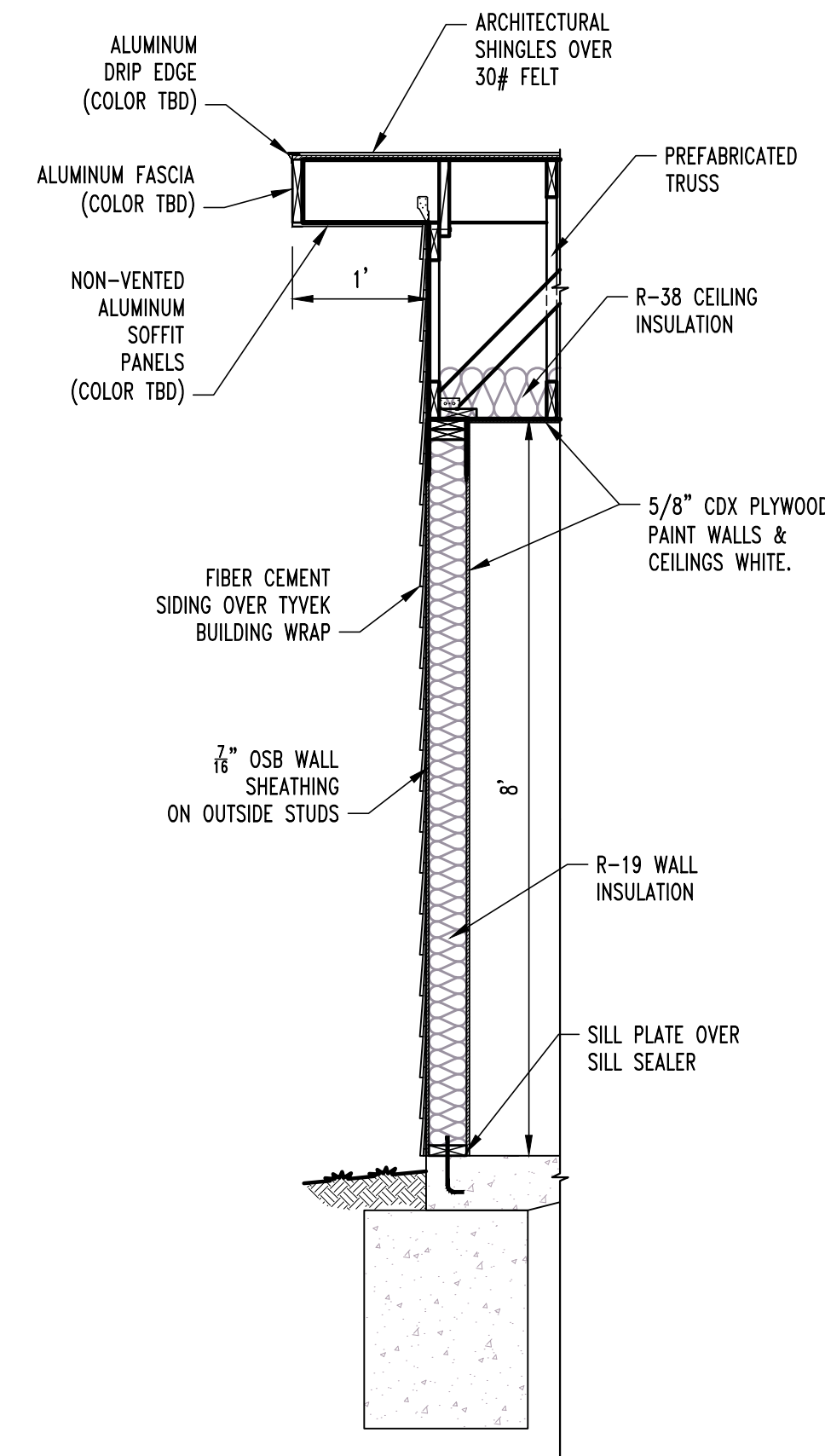
3
S-2 WELLHOUSE BUILDING ELEVATION LOOKING WEST
SCALE: 1/4" = 1'-0"



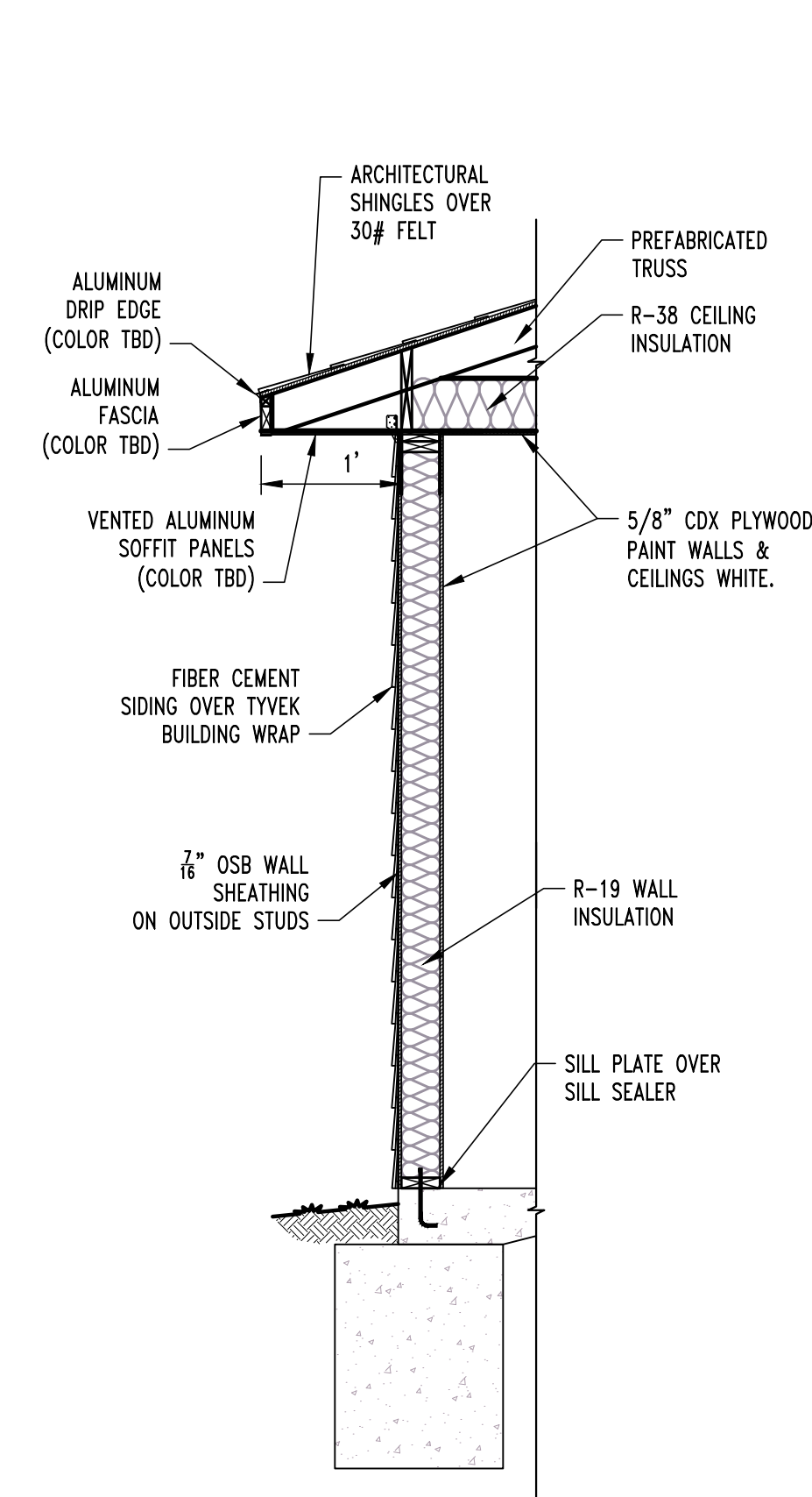
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S-2 WELLHOUSE BUILDING ELEVATION LOOKING EAST
SCALE: 1/4" = 1'-0"



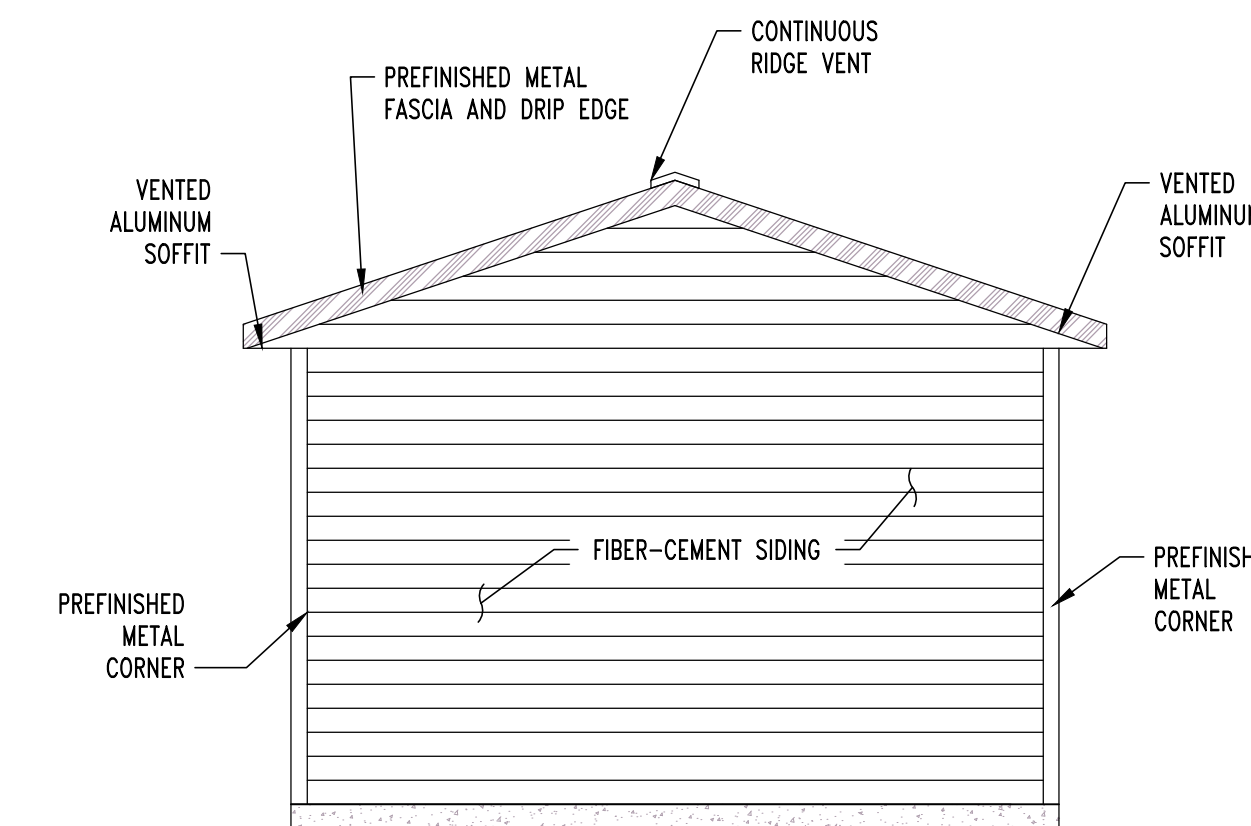
1
S-2 WELLHOUSE BUILDING FLOOR PLAN
SCALE: 1/4" = 1'-0"
PLAN NORTH



6
S-6 WELLHOUSE BUILDING ELEVATION LOOKING EAST
SCALE: 3/4" = 1'-0"



7
S-6 WELLHOUSE BUILDING ELEVATION LOOKING EAST
SCALE: 3/4" = 1'-0"



5
S-2 WELLHOUSE BUILDING ELEVATION LOOKING SOUTH
SCALE: 1/4" = 1'-0"

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BUILDING PLAN &
ELEVATIONS

SHEET NUMBER:



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DESIGN AND CONSTRUCTION

730 TRUMAN BUILDING
301 WEST HIGH STREET
POST OFFICE BOX 809
JEFFERSON CITY, MO 65102

IMPROVEMENTS TO WATER
AND WASTEWATER SYSTEM
MULTIPLE ASSETS

GRAHAM CAVE STATE PARK
217 HIGHWAY TT
DANVILLE, MO 63361

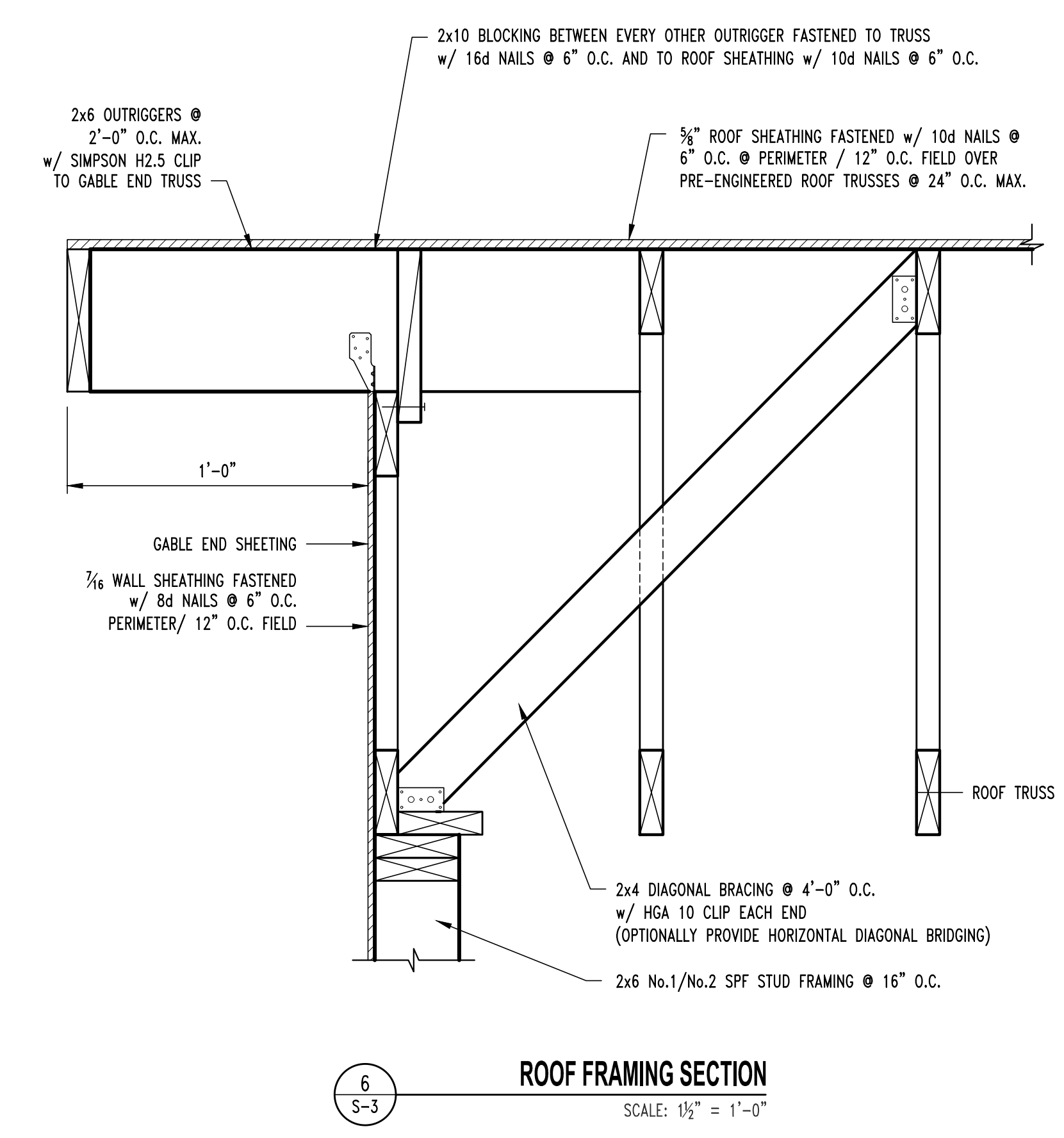
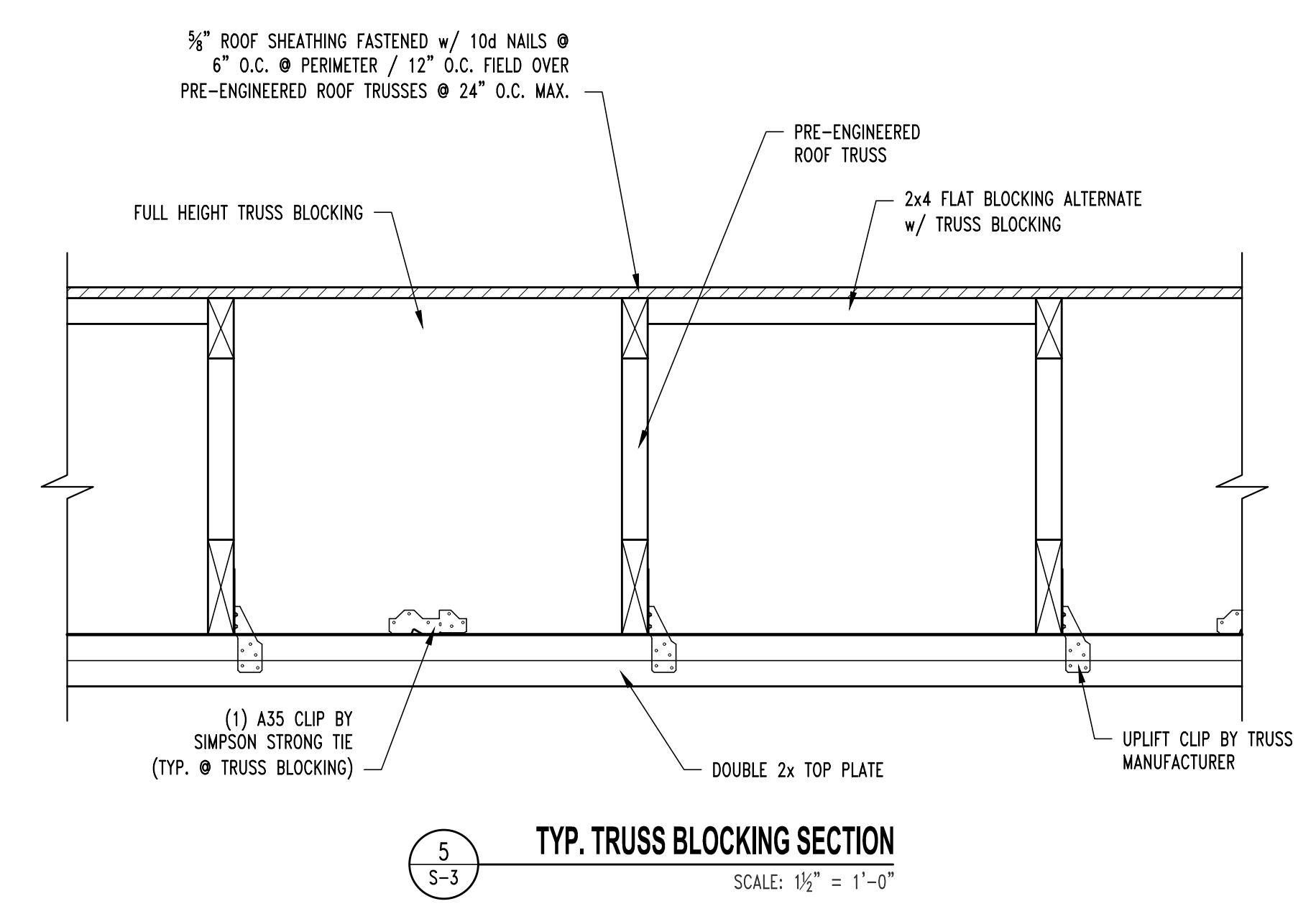
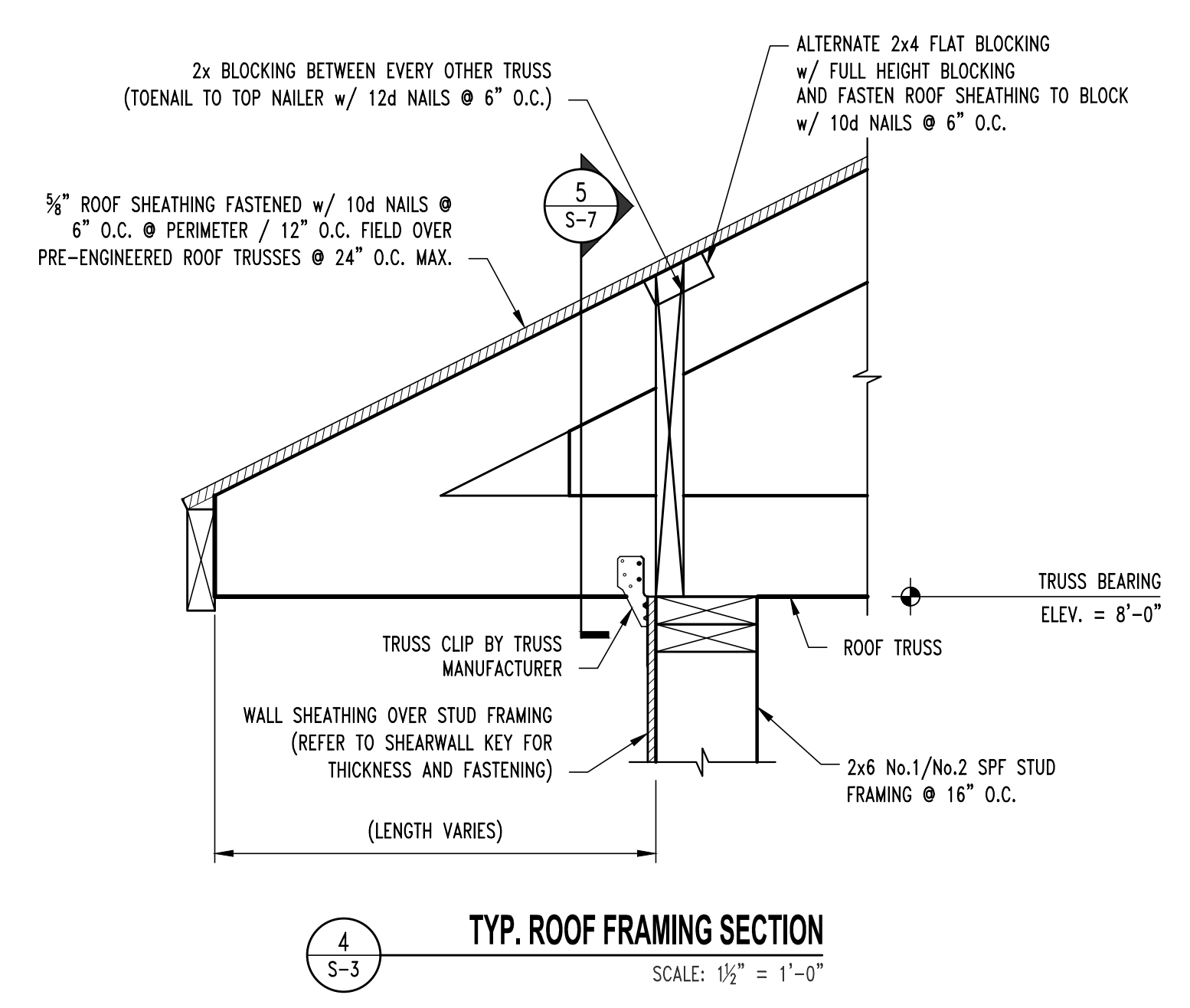
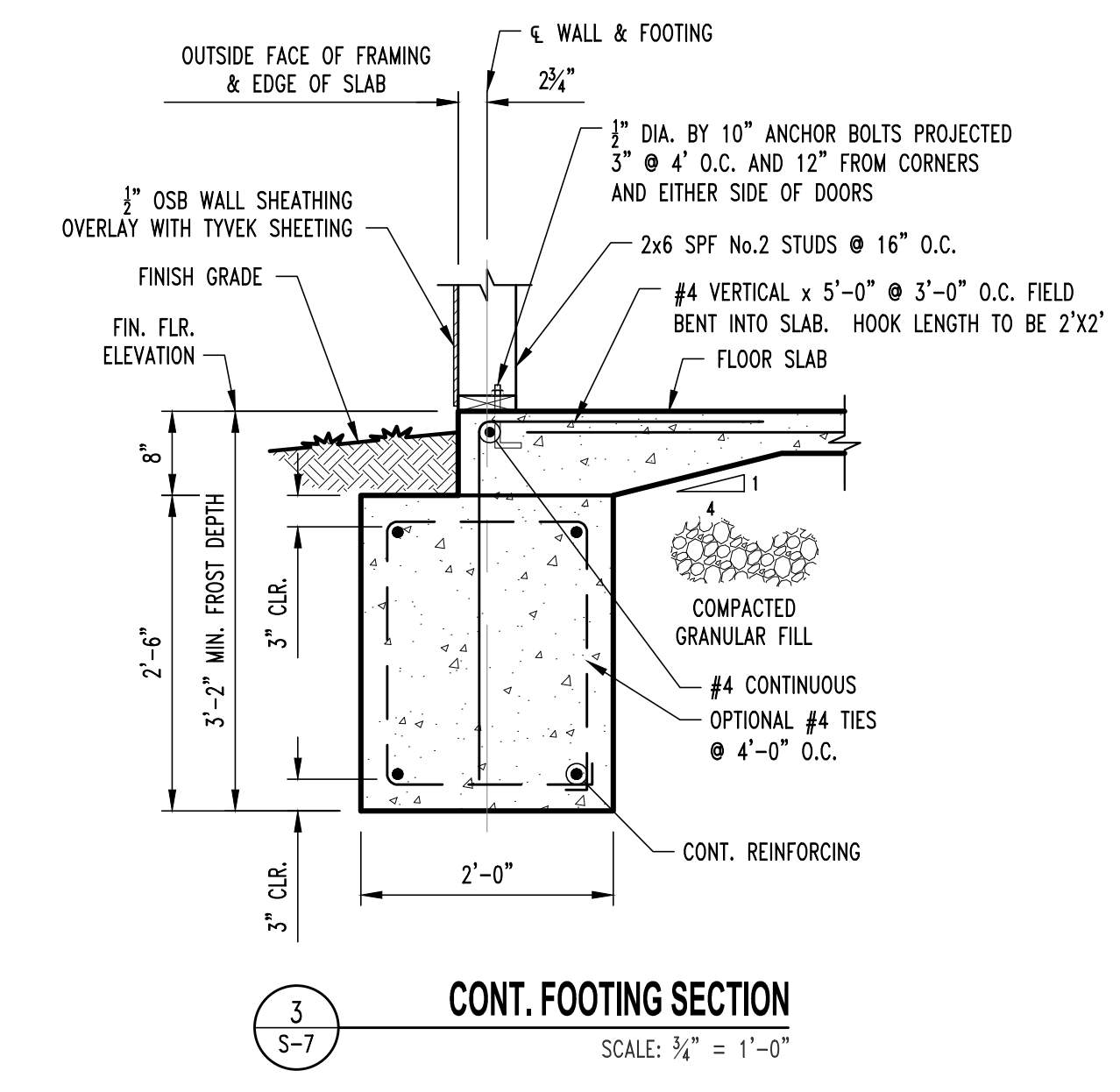
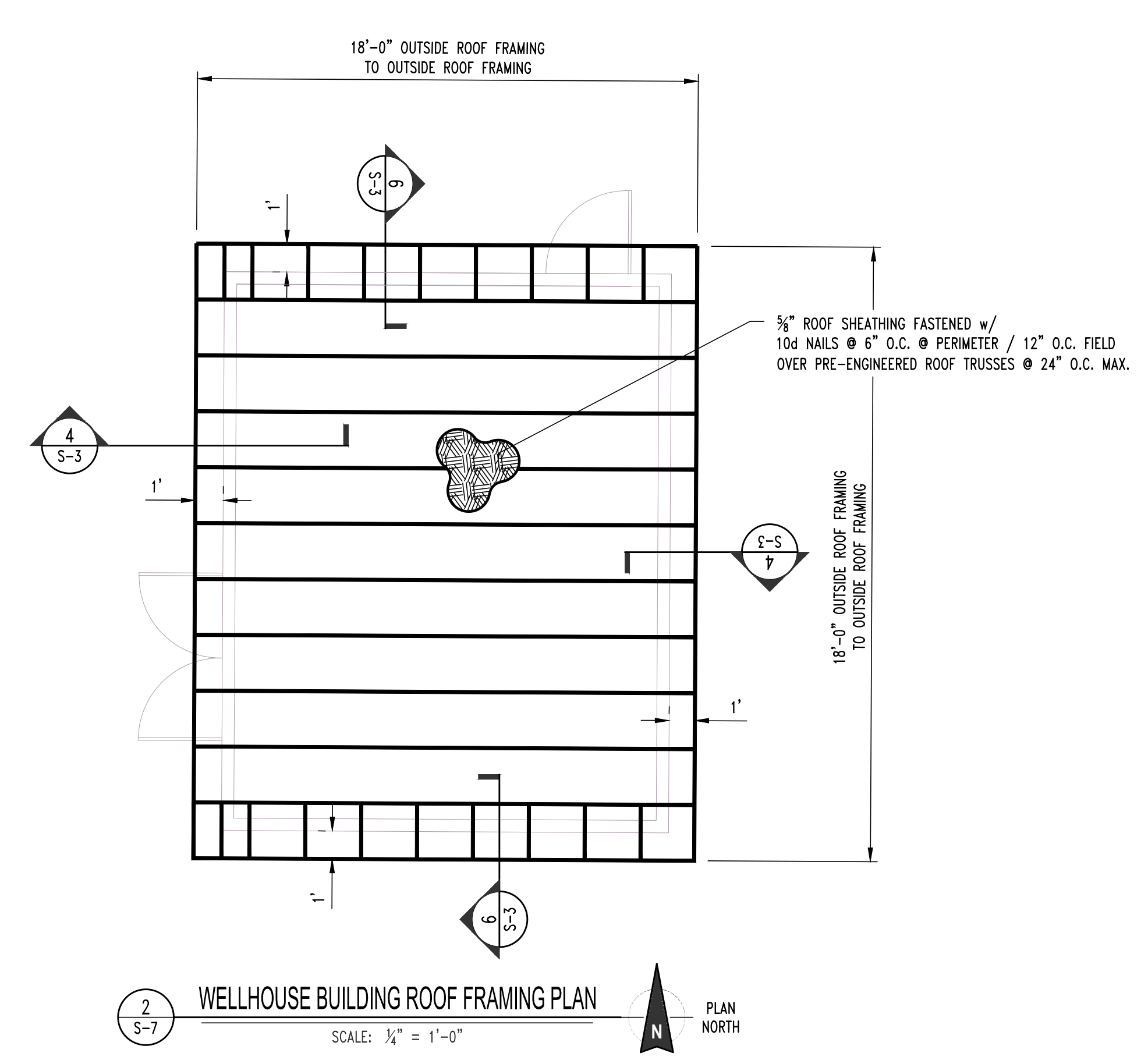
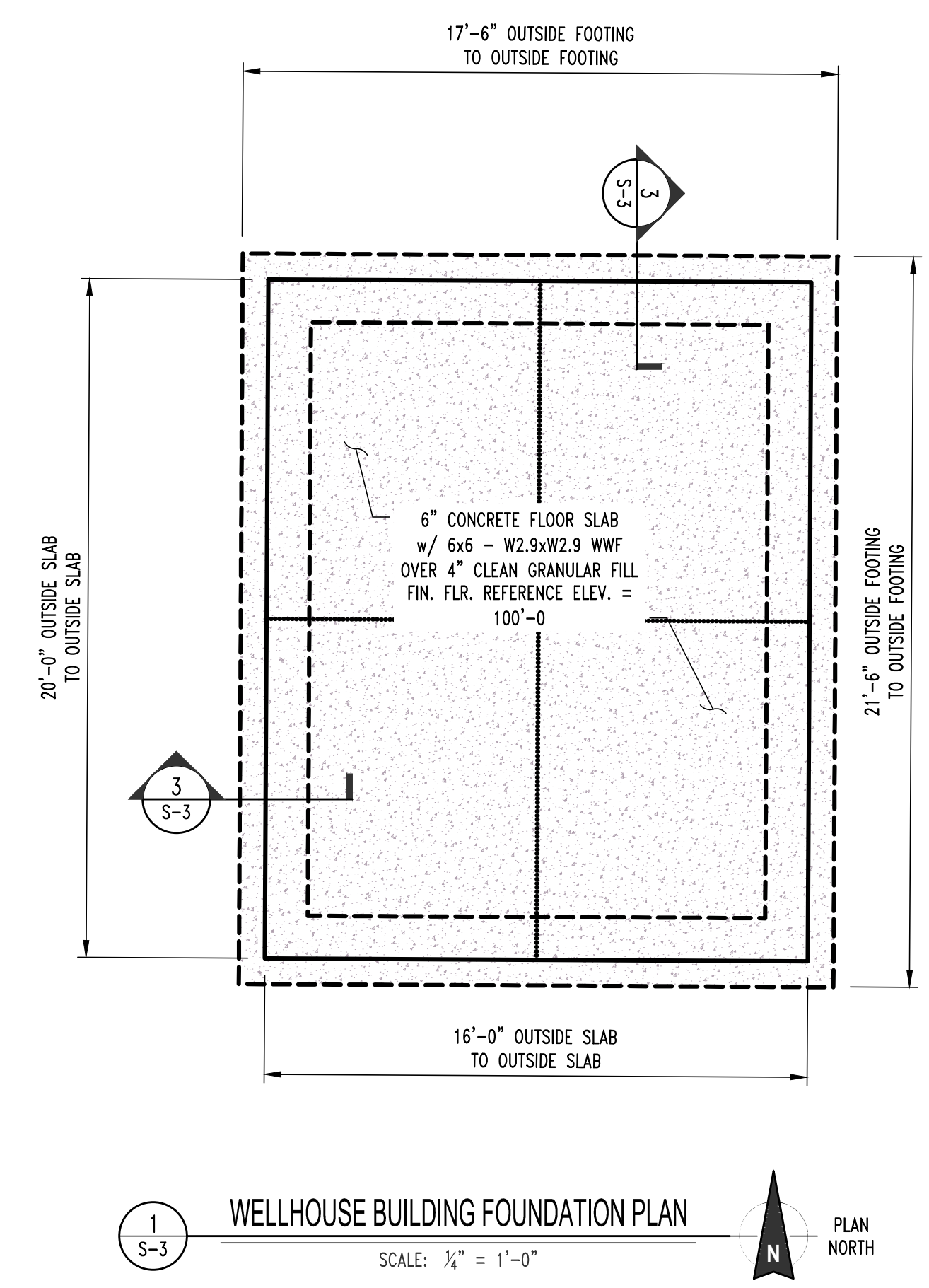
PROJECT # X2321-01
SITE NUMBER: 5210
ASSET NUMBER:
7815210016 - PUMP HOUSE WELL #1
7815210017 - PUMP HOUSE WELL #2

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

CAD DWG FILE: 230188 - GRAHAM CIVIL
DRAWN BY: JRS
CHECKED BY: ATG
DESIGNED BY: JRS

SHEET TITLE:
**WELL HOUSE
STRUCTURAL
DETAILS**

SHEET NUMBER:





JESSE RAY STEPHENS
MO LICENSE # 201000959

SITE/CIVIL ENGINEER:

CROCKETT

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Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#200151301

OFFICE OF ADMINISTRATION
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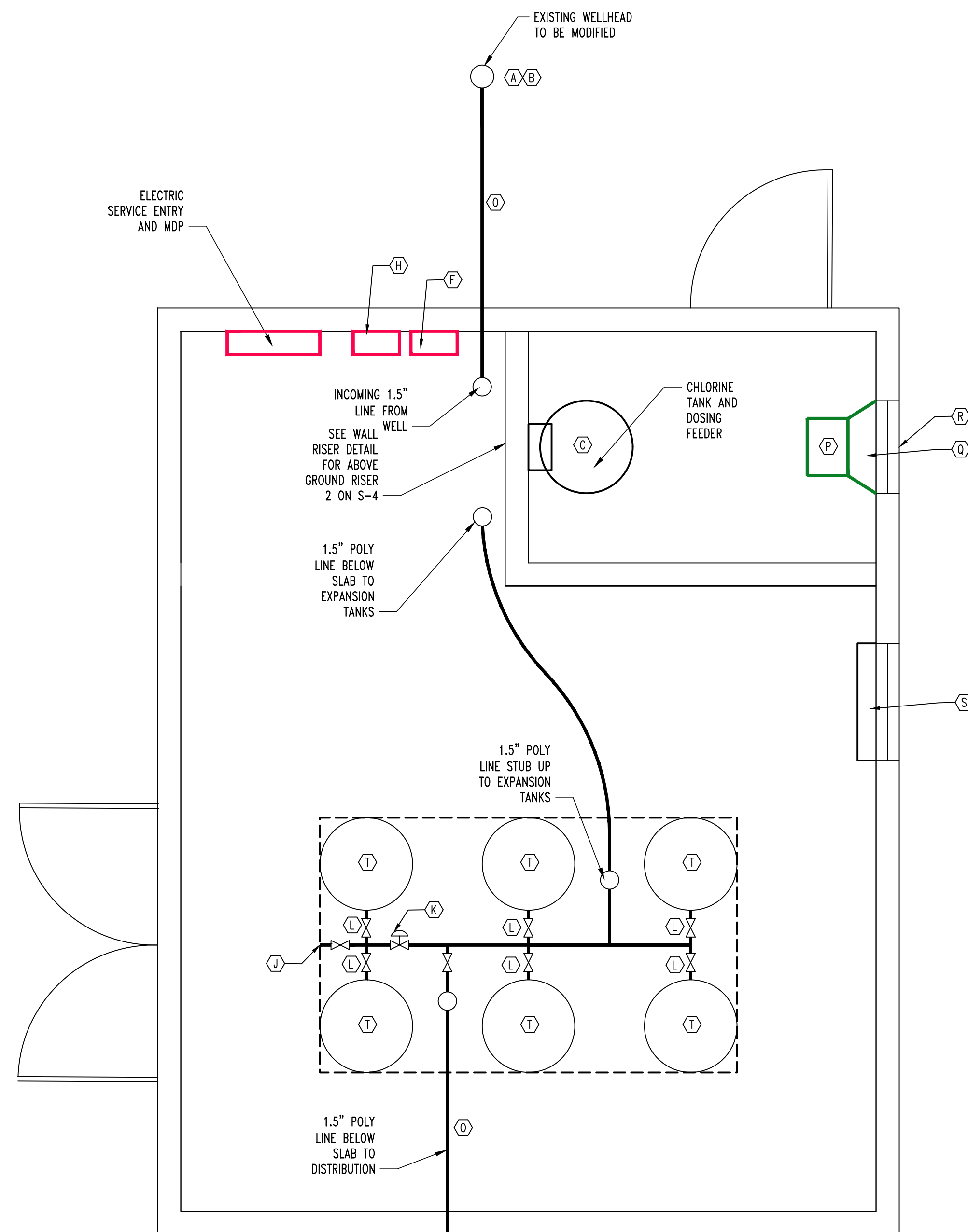
WELL HOUSE
EQUIPMENT PLAN

SHEET NUMBER:

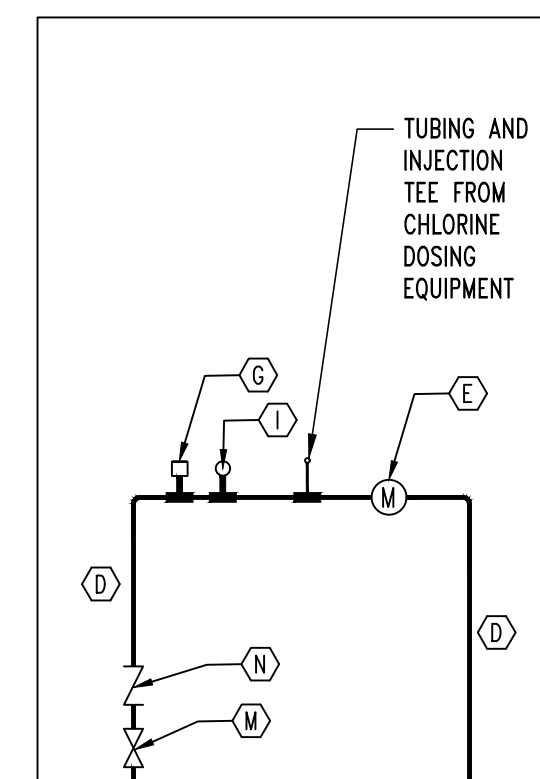
E-101

SHEET 20 OF 21

CROCKETT PROJECT #230188



1
E-1
WELLHOUSE EQUIPMENT PLAN
SCALE: 1/2" = 1'-0"
PLAN NORTH



2
E-1
WELLHOUSE WALL RISER
SCALE: 1/2" = 1'-0"

LEGEND OF LABELS:

- (A) EXTEND EXISTING WELL CASING ABOVE GRADE AND PROVIDE AND INSTALL A WATERTIGHT WELL CAP WITH WELL SEAL. ALSO PROVIDE A PITLESS ADAPTER BELOW GRADE BELOW THE FROST LINE AT A MINIMUM OF 4' DEEP. PITLESS ADAPTER BY BAKER OR APPROVED EQUAL. PITLESS ADAPTER SHALL BE BRASS.
- (B) INSTALL NEW 3 HORSEPOWER FRANKLIN TRI-SEAL PUMP OR APPROVED EQUAL. PUMP SHALL PUMP 25 GALLONS PER MINUTE AND OPERATE AT 230 VOLTS. BASIS OF DESIGN IS FRANKLIN 93822530-25FA3S4-PE. ANY SUBSTITUTIONS SHALL BE APPROVED BY THE ENGINEER IN WRITING. NEW PUMP IS REQUIRED AT THE OFFICE WELLHOUSE. PROVIDE NEW CHECK VALVE AND TORQUE ARRESTOR DIRECTLY ABOVE THE PUMP. THE EXISTING 5 HORSEPOWER FRANKLIN TRI-SEAL PUMP AT THE CAMPGROUND MAY REMAIN. EXTEND AND PROVIDE NEW WIRING AS REQUIRED TO CONNECT TO NEW WELLHOUSE.
- (C) PROVIDE AND INSTALL NEW PROPORTIONAL FEED WELL WATER CHLORINATOR EQUAL TO J-PRO-22 AS MANUFACTURED BY CLEAN WATER SYSTEMS OR APPROVED EQUAL. SYSTEM SHALL INCLUDE A MINIMUM OF A 35 GALLON TANK FOR STORING LIQUID CHLORINE. SYSTEM SHALL BE CAPABLE OF CHLORINATING FOR FLOWS OF UP TO 50 GALLONS PER MINUTE. ROUTE CHEMICAL FEED TUBING THROUGH WALL AND INSTALL SCHEDULE 80 INJECTION TEE.
- (D) PROVIDE 1.5" SCHEDULE 80 PVC PIPING INSIDE BUILDING PRESSURE RATED AT 200 PSI. PROVIDE WALL SUPPORTS AND STANDOFFS AT A MINIMUM OF 3' ON CENTER. PROVIDE FLOOR STAND-OFFS A MINIMUM OF 3' ON CENTER.
- (E) INSTALL WATER METER EQUAL TO BADGER RECORDALL METER OR APPROVED EQUAL. BASIS OF DESIGN IS BADGER 70-BRONZE.
- (F) CONTRACTOR TO PROVIDE NEMA 4 DISCONNECT FOR WELL PUMP. MOUNT ADJACENT TO PUMP CONTROLLER.
- (G) CONTRACTOR TO INSTALL PRESSURE SWITCH. CONNECT PRESSURE SWITCH TO WATERLINE AND ROUTE CONTROL WIRING TO THE PUMP CONTROLLER. PRESSURE SWITCH SHALL BE EQUAL TO SQUARE-D HIGH PRESSURE SWITCH TYPE G-HEAVY DUTY 50 / 70 PSI.
- (H) INSTALL PUMP SAVER CONTROL PANEL. EQUIPMENT SHALL BE EQUAL TO FRANKLIN ELECTRIC PUMPTEC-PLUS PUMP PROTECTOR. IT SHALL BE RATED FOR PUMPS FROM 0.5 HP UP TO 5 HP. BASIS OF DESIGN IS FRANKLIN PUMPTEC-PLUS MODEL 5800060100. PROVIDE LIGHTNING ARRESTOR.
- (I) PROVIDE WATER PRESSURE GAUGE IN-LINE RATED UP TO 200 PSI.
- (J) INSTALL BALL VALVE AND GARDEN HOSE CONNECTION FOR SYSTEM BLEED-DOWN. FITTINGS SHALL BE BRASS WITH MALE ADAPTERS. PVC ADAPTERS SHALL BE FEMALE ADAPTERS ONLY.
- (K) INSTALL PRESSURE RELIEF VALVE RATED AT 100 PSI. PVC ADAPTERS SHALL BE FEMALE ADAPTERS ONLY. FITTINGS SHALL BE BRASS WITH MALE ADAPTERS. PVC ADAPTERS SHALL BE FEMALE ADAPTERS ONLY.
- (L) INSTALL TEE AND BALL VALVE FROM WATERLINE TO EXPANSION TANKS. FITTINGS SHALL BE BRASS WITH MALE ADAPTERS. PVC ADAPTERS SHALL BE FEMALE ADAPTERS ONLY.
- (M) PROVIDE BALL VALVE AT ENTRANCE TO BUILDING AND EXIT FROM BUILDING. FITTINGS SHALL BE BRASS WITH MALE ADAPTERS. PVC ADAPTERS SHALL BE FEMALE ADAPTERS ONLY.
- (N) INSTALL CHECK VALVE. FITTINGS SHALL BE BRASS WITH MALE ADAPTERS. PVC ADAPTERS SHALL BE FEMALE ADAPTERS ONLY.
- (O) PROVIDE 1.5" DIAMETER POLYETHYLENE PIPING FROM NEW WELL HOUSE TO EXTERIOR DISTRIBUTION SYSTEM. PROVIDE BRASS COMPRESSION COUPLINGS AT PIPING TRANSITIONS.
- (P) 800 CFM INLINE EXHAUST FAN EQUAL TO SOLER AND PALAU TO SERIES WITH BACKDRAFT DAMPER. FLOW RATED AT 1/2" STATIC. EXHAUST FAN TO BE CONNECTED TO SWITCH ADJACENT TO DOOR.
- (Q) INSTALL TRANSITIONAL DUCTWORK BETWEEN EXHAUST FAN AND LOUVER.
- (R) LOUVER SHALL BE 18"X18" EQUAL TO POTTORFF EFD-445 OR APPROVED EQUAL. THIS SHALL BE MOUNTED A MINIMUM OF 72" ABOVE FINISHED FLOOR.
- (S) INSTALL PTAC HVAC UNIT THROUGH-WALL. UNIT SHALL BE EQUAL TO AMANA DCP 153A50AA AND HAVE INTEGRAL 5KW HEATER AND 15,000 BTU AIR CONDITIONING CAPACITY. FLASH AND CAULK AROUND UNIT FOR AIR-TIGHT SEAL.
- (T) INSTALL FLEXCON PRO-LITE PRESSURE TANK OR APPROVED EQUAL. BASIS OF DESIGN IS FLEXCON CSS-120. EACH WELL HOUSE SHALL HAVE 6 EXPANSION TANKS FLOOR MOUNTED.

GENERAL NOTES

1. THE EXISTING WELLHOUSE AT THE PARK OFFICE SHALL REMAIN FUNCTION UP UNTIL THE POINT THE NEW WELL HOUSE IS COMPLETE.
2. ONCE THE NEW WELL HOUSE IS COMPLETE, DEMOLISH THE EXISTING WELL HOUSE AND MODIFY THE WELLHEAD AS SHOWN ON THIS PLAN AND MAKE ALL FINAL CONNECTIONS TO NEW WELL HOUSE AND DISTRIBUTION SYSTEM.



JESSE RAY STEPHENS
MO LICENSE #200000868

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Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
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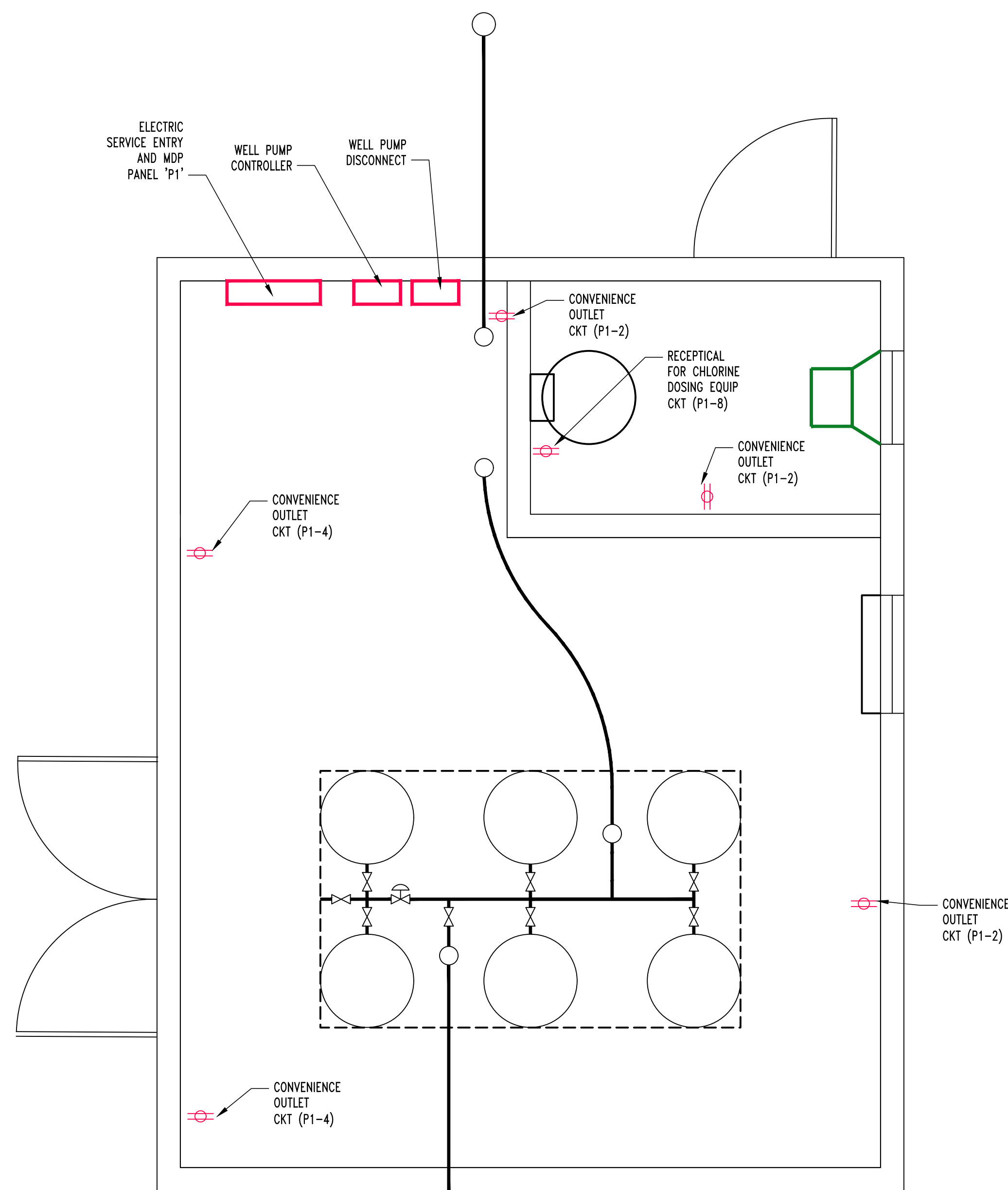
SHEET TITLE:

ELECTRICAL PLAN

SHEET NUMBER:

E-102

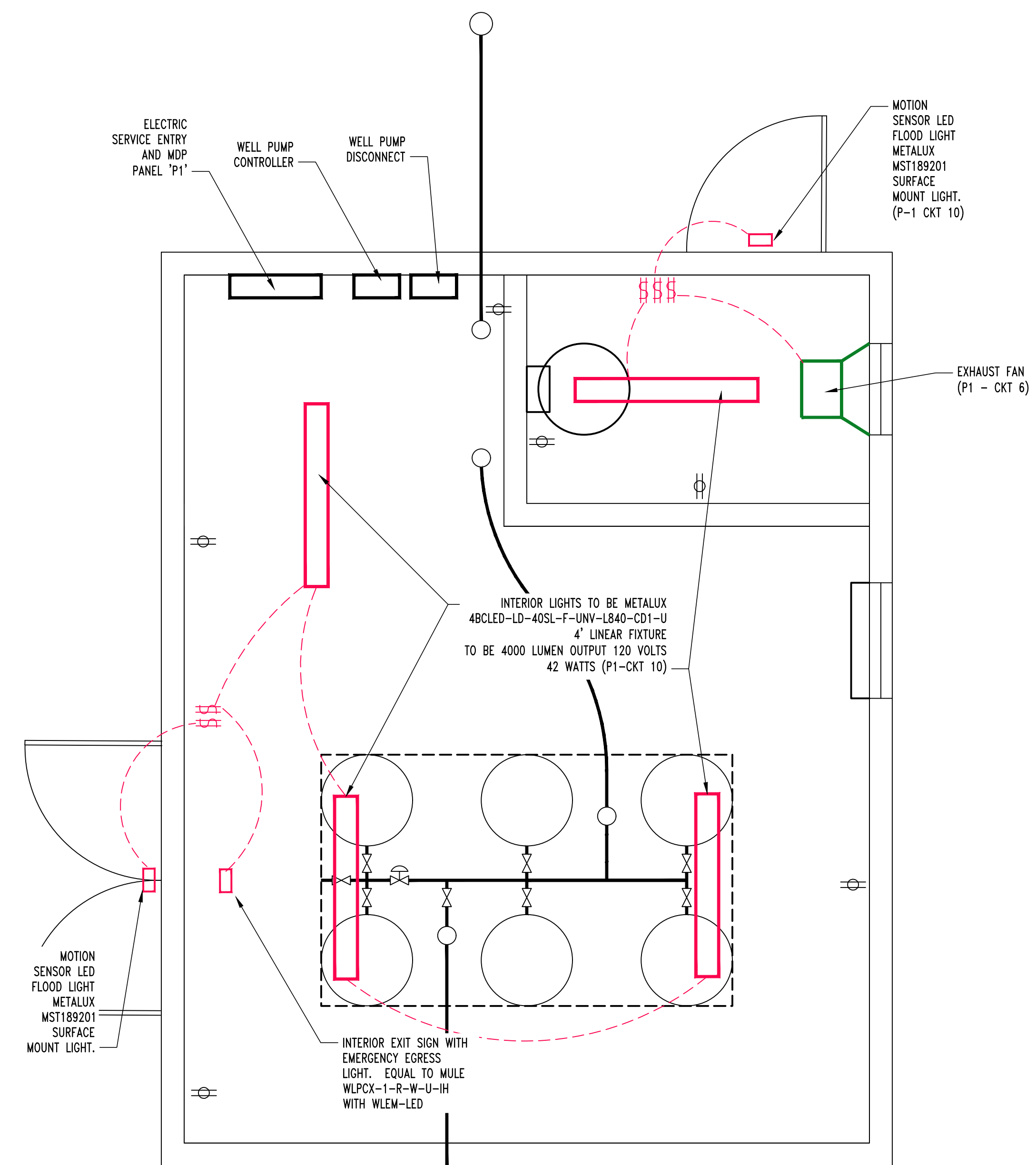
SHEET 21 OF 21



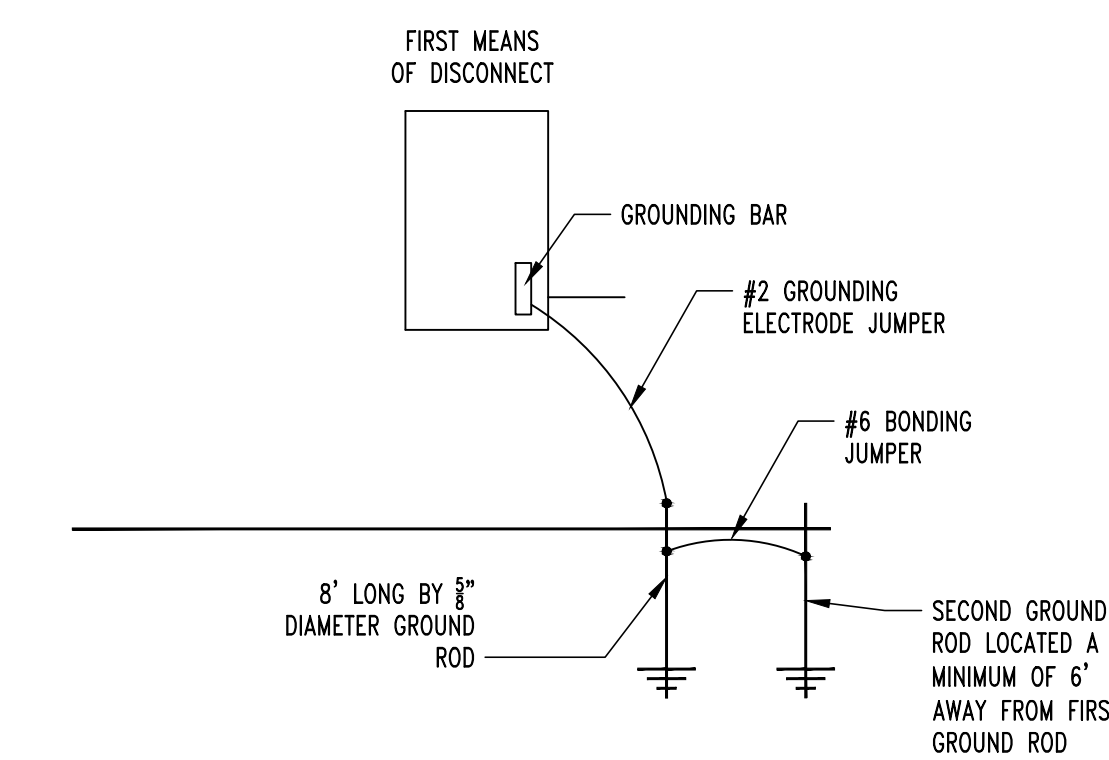
PANEL P1 SCHEDULE									
VOLTAGE	PANEL SIZE	MOUNTING		AIC RATING		LOAD			
120/230	200 AMP	SURFACE		22,000		62			
CIRCUIT NUMBER	DESCRIPTION	BREAKER SIZE	AMPS	AMPS	BREAKER SIZE	DESCRIPTION	CIRCUIT NUMBER		
1	WELL PUMP	30-2	12	4.5	20-1	CONVENIENCE RECEPT.	2		
3	\			3	20-1	CONVENIENCE RECEPT.	4		
5	SEWER SYSTEM	30-2	15	2	20-1	EXHAUST FAN	6		
7	\			2	20-1	CHLORINE DOSING	8		
9	PTAC HVAC	30-2	20	3	20-1	LIGHTS	10		
11	\						12		
13							14		
15							16		
17							18		
19							20		
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41							42		

PANEL NOTES

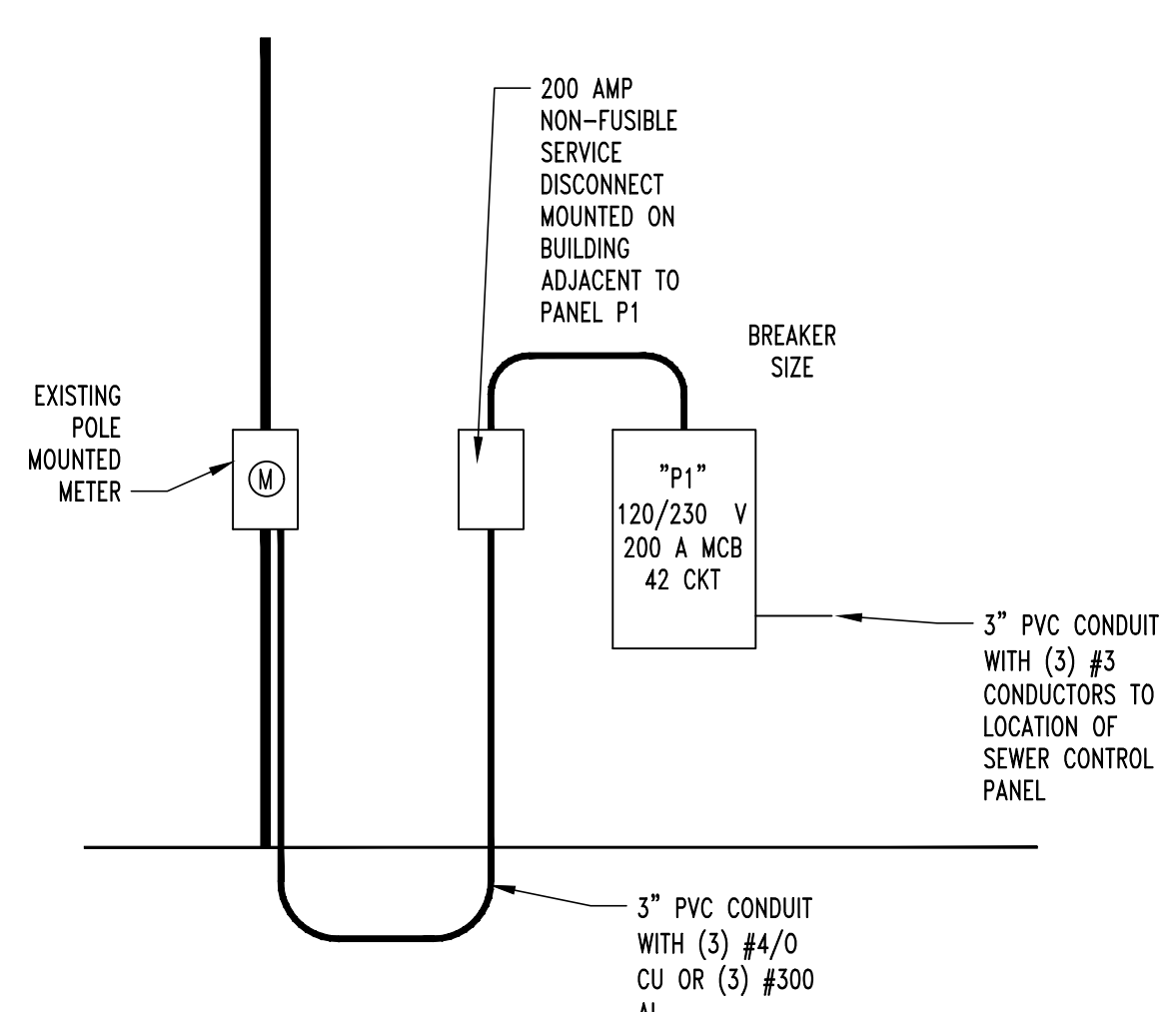
1. THE PANEL SHALL BE EQUAL TO SQUARE D MODEL "QO" OR APPROVED EQUAL.
2. ELECTRICIAN TO VERIFY BREAKER WITH EQUIPMENT PRIOR TO PURCHASE AND INSTALL.
3. AFTER COMPLETION OF WORK, ELECTRICIAN SHALL PROVIDE A TYPE WRITTEN PANEL DIRECTORY INSIDE THE NEW PANEL.
4. AT THE CAMPGROUND WELLHOUSE THE WELL PUMP IS A 5 HP PUMP. THE SAME BREAKERS ARE NEEDED.



1 E-102 WELLHOUSE POWER PLAN SCALE: 1/2" = 1'-0" PLAN NORTH



4 E-102 GROUNDING DETAIL NO SCALE



3 E-102 ELECTRIC RISER DIAGRAM NO SCALE

2 E-102 WELLHOUSE LIGHTING PLAN SCALE: 1/2" = 1'-0" PLAN NORTH

GENERAL NOTES

1. THE ENTIRE ELECTRICAL SYSTEM SHALL BE CONTINUOUSLY GROUNDING. EVERY BRANCH CONDUIT SHALL INCLUDE A GREEN GROUND CONDUCTOR SIZED PER NEC.
2. ARC-FAULT CIRCUITS SHALL BE RUN WITH A DEDICATED NEUTRAL AS REQUIRED BY THE MANUFACTURER.
3. PROVIDE PERMANENT ARC-FLASH LABEL AFFIXED TO EVERY DISCONNECT AND PANEL.
4. PROVIDE TYPE-WRITTEN PANEL SCHEDULE FOR ALL PANELS.
5. ALL CONDUCTOR SIZES SHOWN ON PLANS ARE FOR COPPER UNLESS NOTED OTHERWISE.
6. ABOVE GRADE CONDUCTORS SHALL BE THIN COPPER. BELOW GRADE CONDUCTORS SHALL BE XHHW-2.
7. MINIMUM CONDUCTOR SIZE SHALL BE #12 UNLESS NOTED OTHERWISE. 120V, 20 AMP CIRCUITS WITH CONDUCTOR LENGTH GREATER THAN 100' SHALL BE A MINIMUM OF #10.
8. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR MEASURING EXACT CONDUCTOR LENGTH AND INCREASING CONDUCTOR SIZE TO COMPENSATE FOR VOLTAGE DROP AS REQUIRED BY NEC.
9. SCHEDULE 40 PVC CONDUIT SHALL BE USED FOR SERVICE WIRING, BELOW GRADE APPLICATIONS, OR INSIDE THE CHLORINE ROOM. IN OTHER APPLICATIONS, EMT OR MC CABLE IS ACCEPTABLE WHERE CONDUCTORS ARE PROTECTED FROM DAMAGE, ENCLOSED IN BUILDING MATERIALS, AND CONSTRUCTION IS OF A PERMITTED TYPE. NM CABLE MAY BE USED.
10. CONTRACTOR TO PROVIDE J-BOXES, COVER PLATES, AND ANY ACCESSORIES REQUIRED TO PROVIDE A COMPLETE SYSTEM.
11. DUPLEX RECEPTACLES SHALL BE TAMPER RESISTANT, 20 AMP, EQUAL TO LEVITON CR20.
12. TOGGLE WALL SWITCHES SHALL BE EQUAL TO LEVITON CS120-2
13. DIMMER SWITCHES SHALL BE TESTED WITH FIXTURES AND LAMPS FOR COMPATIBILITY.
14. THE BRANCH CIRCUIT FEEDING THE EMERGENCY FIXTURES SHALL BE THE SAME BRANCH AS THE CIRCUITS THAT IS SERVING THE NORMAL LIGHTING IN THE AREA AND CONNECTED AHEAD OF ANY LOCAL SWITCHES.
15. OCCUPANCY AND VACANCY SENSORS SHOULD BE INSTALLED WITHIN BOTH ROOMS IN THE WELL HOUSE SO THAT LIGHTS WILL TURN OFF AFTER 20 MINUTES OF INACTIVITY.
16. COORDINATE INSTALLATION TO EXISTING METERS WITH CONSOLIDATED ELECTRIC.