

Construction Plans  
for

NWRF - RECLAIMED  
WATER MAIN EXTENSION  
AND PUMP STATION IMPROVEMENTS

TERESA S. JACOBS  
Mayor

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Utilities Department Director

UTILITIES DEPARTMENT  
ORANGE COUNTY, FLORIDA

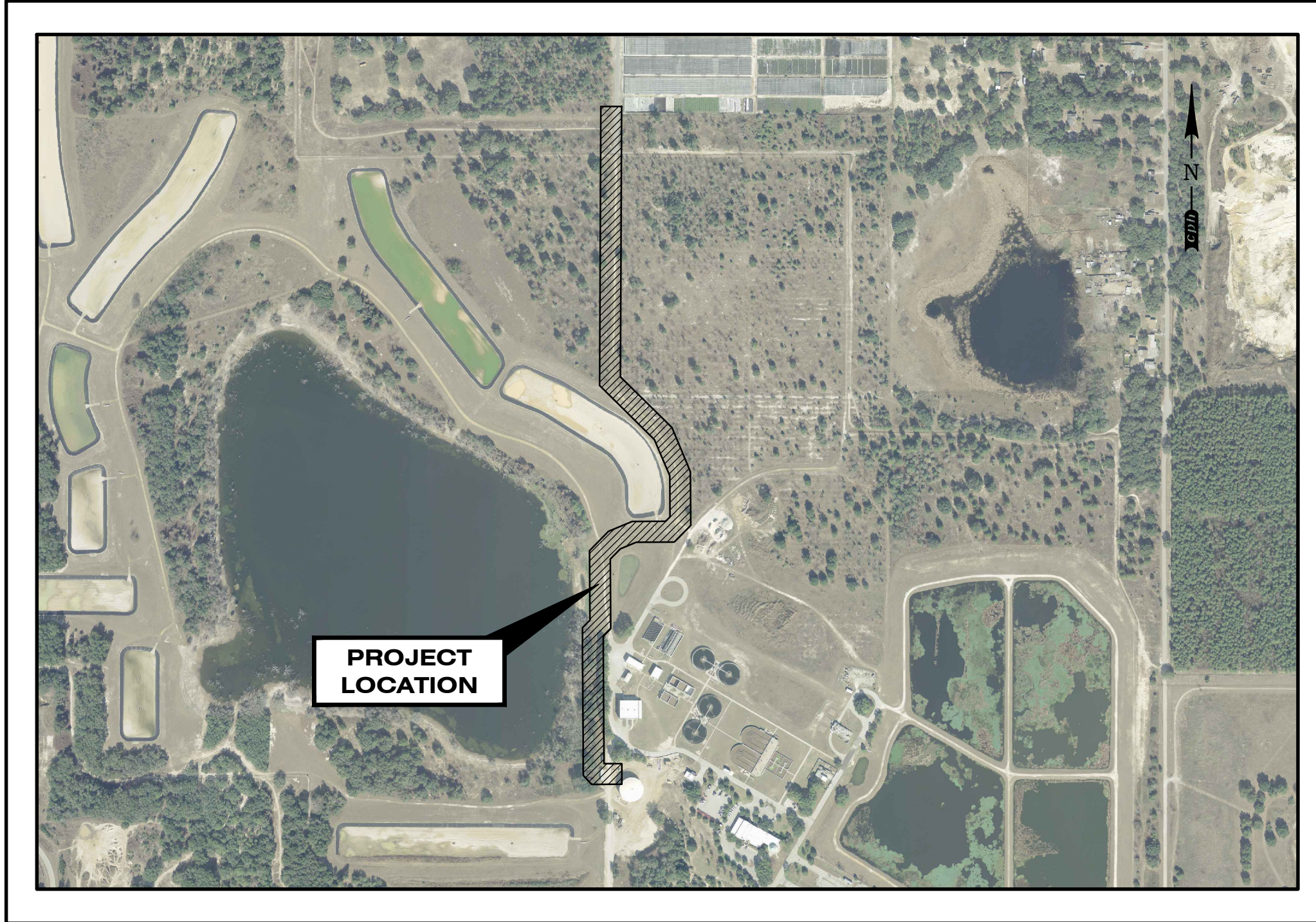
May 2015

PREPARED BY

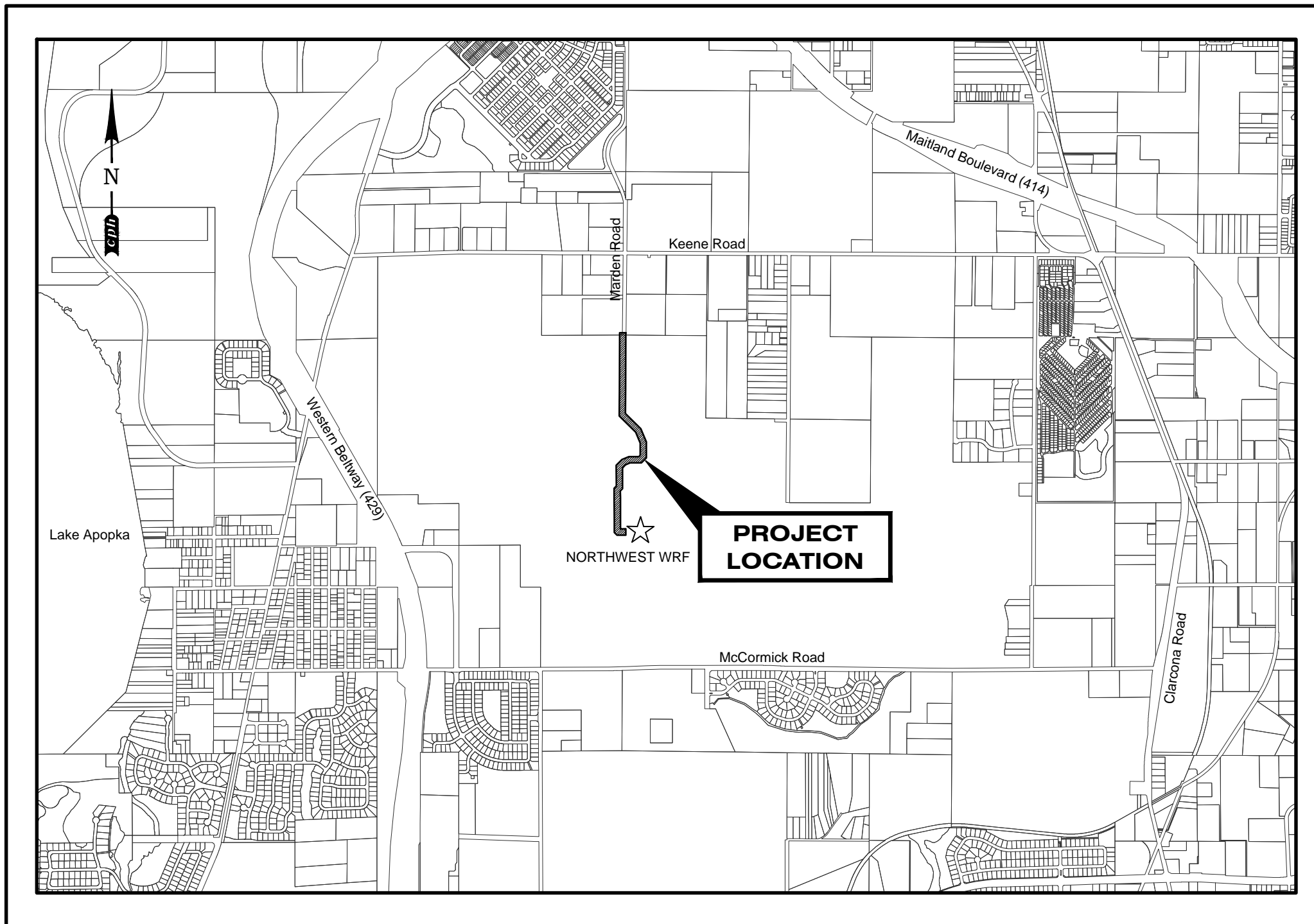


BID SET  
CAP NO. 1435-06  
ORANGE COUNTY UTILITIES  
PROJECT SEQUENCE NO. 76665  
CONTRACT NO.





**VICINITY MAP**  
NOT TO SCALE



**LOCATION MAP**  
NOT TO SCALE

**PIPING SYMBOLS**

	EXISTING PIPE (EXPOSED)
	EXISTING PIPE (HIDDEN)
	FUTURE PIPE
	PROPOSED PIPE (EXPOSED)
	PROPOSED PIPE (HIDDEN)
	MECHANICAL JOINT
	FLANGED JOINT
	FLEXIBLE COUPLING W/ THRUST TIES
	FLANGED COUPLING ADAPTER
	FLEXIBLE COUPLING
	ELBOW UP (FLANGED)
	ELBOW DOWN (FLANGED)
	CONCENTRIC REDUCER (FLANGED)
	ECCENTRIC REDUCER (FLANGED)
	TEE DOWN (FLANGED)
	TEE UP (FLANGED)
	UNION
	BLIND FLANGE
	CAP OR PLUG (MECHANICAL)
	PRESSURE GAUGE LOCATIONS
	PUSH ON JOINT
	BALL JOINT

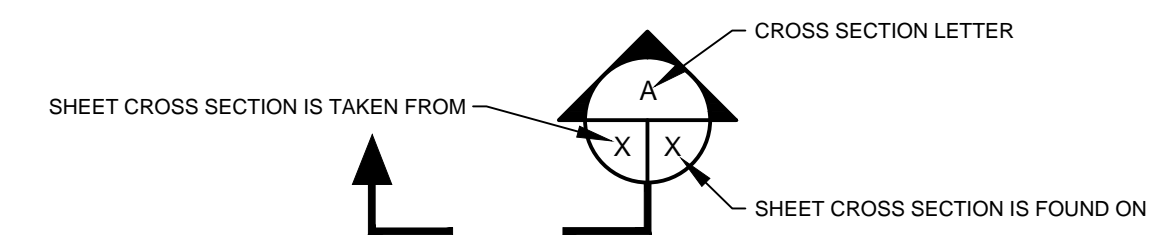
**VALVE SYMBOLS**

	GATE VALVE
	BALL OR GLOBE VALVE
	PLUG VALVE
	CHECK VALVE
	BUTTERFLY VALVE
	SOLENOID VALVE
	PRESSURE REGULATING VALVE

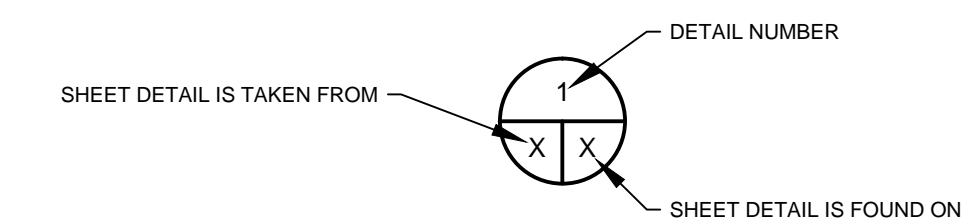
**STANDARD ABBREVIATIONS**

AL or ALLUM.	ALUMINUM	MAX.	MAXIMUM
ASPH.	ASPHALT	MANF.	MANUFACTURER
BLDG.	BUILDING	MAT.	MATERIAL
BT	BURIED TELEPHONE	NG	NATURAL GRADE
BM	BENCH MARK	NPL	NON-POTABLE WATER
B.V.	BALL VALVE	NWL	NORMAL WATER LEVEL
B.V.	BUTTERFLY VALVE	NTS	NOT TO SCALE
CI or CI	CAST IRON PIPE	OC	ON CENTER
CONC.	CONCRETE	OHE	OVERHEAD ELECTRIC
CONT.	CONTINUED	PL	PLATE
CMU	CONCRETE MASONRY UNIT	PW	POTABLE WATER
CONST.	CONSTRUCTION	PS	PUMP STATION
C.V.	CHECK VALVE	PROP.	PROPOSED
DIP or DI	DUCTILE IRON PIPE	PVMT.	PAVEMENT
DIA.	DIAMETER	PP	POWER POLE
DOT	DEPT. OF TRANSPORTATION	PT	PRESSURE TREATED
DR. OR DW.	DRIVE or DRIVEWAY	P.V.	PLUG VALVE
EQUIP.	EQUIPMENT	PVC	POLYVINYL CHLORIDE
ED	EQUIPMENT DRAIN	PAV.	PAVING
ESMT	EASEMENT	PE	PLAIN END
EFF.	EFFLUENT	RCP	REINFORCED CONCRETE PIPE
EXP.	EXPANSION	RW	REUSE WATER
ELEV. or EL.	ELEVATION	RT.	RIGHT
EXIST.	EXISTING	R	RADIUS
ELEC.	ELECTRICAL	RED.	REDUCER
EF	EACH FACE	REINF.	REINFORCED
EXT.	EXTENDED	REQD	REQUIRED
EW	EACH WAY	R/W	RIGHT-OF-WAY
FD	FLOOR DRAIN	STA.	STATION
FM	FLOOR MAIN	SPEC.	SPECIFICATION
FLG.	FLANGED	SS	STAINLESS STEEL
FLEX.	FLEXIBLE	SS	STAINLESS STEEL
GM	GAS MAIN	SQ.	SQUARE
GM	GALLONS PER MINUTE	SS	STAINLESS STEEL
GS	GALVANIZED STEEL	STN. STL.	STAINLESS STEEL
GSP	GALVANIZED STEEL PIPE	SAN.	SANITARY
GALV.	GALVANIZED	T	TELEPHONE CABLE
G.V.	GATE VALVE	TBM	TEMPORARY BENCHMARK
HB	HOSE BIB	TOP	TOP OF FLOOR
HORIZ.	HORIZONTAL	TYP.	TYPICAL
HP	HIGH PRESSURE	TRANS.	TRANSFORMER
HPAC	HIGH PRESSURE AIR COPPER	UE	UNDERGROUND ELECTRIC
HPAG	HIGH PRESSURE AIR GALVANIZED	UG	UNDERGROUND
HWL	HIGH WATER LEVEL	UT	UNDERGROUND TELEPHONE
IP	IRON PIPE	VCP	VITRIFIED CLAY PIPE
INF.	INFLUENT	VERT.	VERTICAL
INV.	INVERT	WL	WATER LINE
ID	IDENTIFICATION	WM	WATER MAIN

**SECTION IDENTIFICATION**



**DETAIL IDENTIFICATION**



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**UTILITY CONTACTS**

<b>WATER:</b> ORANGE COUNTY UTILITIES 3150 CURRY FORD ROAD ORLANDO, FL 32825 (407) 836-2777 ATTN: ORANGE COUNTY UTILITIES CONSTRUCTION INSPECTOR EMERGENCY DISPATCH	<b>TELEPHONE:</b> AT&T 450 N GOLDENROD ROAD ORLANDO, FL 32807 (407) 380-0938 ATTN: GLEN PRUNYI
<b>SEWER:</b> ORANGE COUNTY UTILITIES 3150 CURRY FORD ROAD ORLANDO, FL 32825 (407) 836-2777 ATTN: ORANGE COUNTY UTILITIES CONSTRUCTION INSPECTOR EMERGENCY DISTATCH	<b>GAS:</b> TECO-PEOPLES GAS 630 W. ROBINSON ST. ORLANDO, FL 32802 (407)420-6609 ATTN: DENNIS MASCHISNOT
<b>POWER:</b> DUKE ENERGY 2801 W.S.R. 426 OVIEDO, FL 32765 (407) 359-4418	<b>CABLE:</b> BRIGHTHOUSE NETWORKS 844 MAGUIRE ROAD OCOE, FL 34761 (407) 532-8509 ATTN: MARVIN USRY

No.	Date	Revision	By	No.	Date	Revision	By

**cph** A Full Service A & E Firm  
Architects M / E / P  
Engineers Planners  
Environmental Surveyors  
Landscape Architects Traffic/Transportation

Offices In:	JRM	Date:	5/01/2015
• Florida	Drawn by:	DGH	Scale: AS NOTED
• Puerto Rico	Checked by:	DEM	
• Connecticut	Approved by:	JRM	
• Maryland	Job No.	O28409	©2015
• Texas			

**ORANGE COUNTY GOVERNMENT**  
**NWRF - RECLAIMED WATER MAIN EXTENSION AND PUMP STATION IMPROVEMENTS**  
ORANGE COUNTY UTILITIES UTILITIES ENGINEERING DIVISION

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JAMES R. MORRIS, J.R., P.E.  
REG-# 62384

**STANDARD ABBREVIATIONS, SYMBOLS AND LOCATION MAPS**

Sheet No.  
**2**

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**GENERAL NOTES**

ALL WORK AND REQUIREMENTS FROM THE NOTES IN THIS PAGE SHALL BE A REQUIREMENT OF THE CONTRACT AND EXECUTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO ORANGE COUNTY.

- ALL COORDINATION AND COMMUNICATIONS WITH ORANGE COUNTY STAFF SHALL BE MADE THROUGH THE ORANGE COUNTY UTILITIES CONSTRUCTION DIVISION RPR. CONTACT THE OCU DISPATCH DURING EMERGENCIES.
- CONTRACTOR TO OBTAIN A CONSTRUCTION ASSISTANCE REQUEST (CAR) FOR THE COUNTY RPR AT LEAST SEVEN (7) DAYS PRIOR TO ANY CONSTRUCTION ACTIVITY, OR PRIOR TO ANY ACTIVITY REQUIRING THE PRESENCE OF OR AN ACTION BY UTILITIES STAFF SUCH AS SCHEDULING VALVE OPERATION, PRESSURE TESTING, PIPE CONNECTION, PUMP STATION OPERATIONS OR SHUTDOWNS, ETC.
- ORANGE COUNTY UTILITIES DEPARTMENT TELEPHONE NUMBERS:  

ORANGE COUNTY UTILITIES DISPATCH	407-836-2777
ORANGE COUNTY UTILITIES CONSTRUCTION DIVISION	407-254-9798
ORANGE COUNTY UTILITIES WATER RECLAMATION DIVISION	407-254-9880
ORANGE COUNTY UTILITIES WATER DIVISION	407-254-8850
ORANGE COUNTY UTILITIES ENGINEERING DIVISION	407-254-9900
NWRF OPERATION STAFF	407-254-6780
- WATER, WASTEWATER AND RECLAIMED WATER VALVES, PUMP STATIONS OR OTHER UTILITY INFRASTRUCTURE ARE TO OPERATED ONLY BY ORANGE COUNTY UTILITIES PERSONNEL. ALL VALVES BEING INSTALLED ARE TO REMAIN CLOSED DURING CONSTRUCTION
- ALL EXISTING WATER MAINS, FORCE MAINS, GRAVITY PIPES AND OTHER UTILITY FACILITIES WITHIN THE LIMITS OF THE PROJECT WILL BE SUPPORTED AND PROTECTED AGAINST DAMAGE DURING CONSTRUCTION.
- LOCATIONS OF EXISTING UTILITIES AS SHOWN AS APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY THE EXISTENCE AND LOCATION OF ALL ABOVEGROUND AND UNDERGROUND UTILITIES AND DETERMINE THE STATUS OF SAID UTILITY, PRIOR TO ANY DEMOLITION OR CONNECTION OF PROPOSED UTILITIES. CONTRACTOR SHALL CONTACT UTILITY OWNERS, INCLUDING FIBER OPTICS COMPANIES, AT LEAST SEVEN (7) DAYS PRIOR TO CONSTRUCTION AND A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION. EXTREME CAUTION SHALL BE EXERCISED IN AREAS OF FIBER OPTICS.
- IMMEDIATELY AT ONSET OF CONSTRUCTION, CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES CRITICAL TO COMPLETING THE PROJECT (INCLUDING WATER, SEWER, RECLAIMED WATER, POWER, TELEPHONE, GAS AND CABLE TV) AND SHALL EVALUATE POTENTIAL CONFLICTS IN A WRITTEN REPORT. ANY CONFLICTS SHALL BE REPORTED TO ENGINEER/OWNER IMMEDIATELY UPON DISCOVERY AND DETAILED IN THE REPORT.
- CONTRACTOR SHALL COORDINATE WITH ALL OTHER UTILITY OWNERS FOR RESOLUTION OF CONFLICTS. CONTRACTOR SHALL HAVE 48 HOURS TO DETERMINE THE RESOLUTION OF ANY UNKNOWN OR UNFORESEEN CONFLICTS. COSTS INCURRED SHALL BE BORNE BY THE UTILITY OWNER AND/OR CONTRACTOR AND NO CLAIMS MAY BE MADE AGAINST ORANGE COUNTY OR THE ENGINEER FOR THESE CONFLICTS. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR THE PERIOD OF TIME TO RESOLVE ANY CONFLICTS.
- ALL UTILITIES CONSTRUCTION CONNECTING TO THE ORANGE COUNTY UTILITIES SYSTEM SHALL CONFORM TO THE CURRENT ORANGE COUNTY MANUAL OF STANDARDS AND SPECIFICATIONS FOR WASTEWATER AND WATER MAIN CONSTRUCTION UNLESS OTHERWISE NOTED. ALL MATERIALS USED IN CONSTRUCTION SHALL BE ON THE APPROVED 'APPENDIX D' LIST FROM THE CURRENT STANDARDS MANUAL MENTIONED PREVIOUSLY.
- SUPPORT AND PROTECT ALL EXISTING UTILITIES. CONTRACTOR SHALL CONTACT UTILITY OWNERS FOR LOCATION OF ALL EXISTING FACILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY OWNERS AND BE RESPONSIBLE FOR PROVIDING TEMPORARY SUPPORT FOR UTILITY POLES AND ALL OTHER UTILITIES DURING CONSTRUCTION.
- THE UTILITY IMPROVEMENTS AND ADJUSTMENTS SHOWN ON THESE DRAWINGS ARE INTENDED TO MAINTAIN THE INTEGRITY OF THE ORANGE COUNTY WATER, WASTEWATER AND RECLAIM WATER SYSTEMS. THE DRAWINGS DO NOT INCLUDE WORK PERFORMED ON OR FOR UTILITY SYSTEMS OWNED BY OTHERS, UNLESS STATED OTHERWISE ON THE DRAWINGS.

- FLUSHING AND HYDROSTATIC TESTING OF THE RECLAIMED WATER MAIN SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH AWWA SPECIFICATIONS C-600, C-651 AND APPLICABLE SECTIONS OF THE CURRENT ORANGE COUNTY STANDARDS AND SPECIFICATIONS MANUAL. CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT, MATERIALS AND MANPOWER TO ACCOMPLISH THESE OPERATIONS. AUTHORIZED ORANGE COUNTY UTILITIES DIVISION PERSONNEL SHALL BE PRESENT DURING THE TEST. COORDINATE WITH THE ORANGE COUNTY INSPECTOR AT LEAST SEVEN (7) DAYS PRIOR TO START OF THIS WORK.
- ALL NEW AND EXISTING VALVES AND VALVE BOXES SHALL BE PROTECTED AND ADJUSTED TO FINISH GRADE AS SHOWN ON THE DRAWINGS. VALVE AND VALVE BOXES SHALL REMAIN ACCESSIBLE AT ALL TIMES.
- ALL DUCTILE IRON RECLAIM WATER MAIN SHALL CONFORM TO ANSI/AWWA A21.51/C151. PIPE SHALL BE PRESSURE CLASS 250. PIPE SHALL BE COLOR CODED WITH PANTONE PURPLE, S22-C WITH TAPE. THE TAPE (2" MIN.) SHALL BE AFFIXED TO THE TOP OF THE PIPE. FITTINGS SHALL BE DUCTILE IRON WITH FUSION BONDED EPOXY COATING IN ACCORDANCE WITH ANSI / AWWA C116 OR CEMENT MORTAR WITH A SEAL COAT IN ACCORDANCE WITH ANSI / AWWA A21.4 / C104. REFER TO FDEP F.A.C. FOR NUMBER OF STRIPES BASED ON SIZE OF PIPE.
- ALL PIPE, PIPE FITTINGS AND APPURTENANCES INSTALLED UNDER THIS PROJECT WILL BE COLOR CODED OR MARKED IN ACCORDANCE WITH SUBPARAGRAPH 62-555.320 (21) (B) 3, FAS, USING PURPLE AS PREDOMINANT COLOR FOR RECLAIMED WATER.
- ALL BACKFILL SHOWN ON PLANS TO BE COMPACTED TO NOT LESS THAN 98% OF MAXIMUM DRY DENSITY AS MEASURED BY AASHTO T-180 METHOD 'D' TEST (MODIFIED PROCTOR) UNDER ASPHALT OR CONCRETE PAVEMENT AND WITHIN 3-FT OF PAVEMENT. ALL SOIL TESTING TO BE CONDUCTED BY THE COUNTY. THE CONTRACTOR SHALL PROVIDE ALL REASONABLE ASSISTANCE DURING THE SOIL TESTING.
- PIPE LENGTHS SHOWN ON PLANS ARE APPROXIMATE. ACTUAL LENGTHS ARE TO BE DETERMINED DURING CONSTRUCTION.
- ALL STATIONS AND OFFSETS REFER TO BASELINE OF STATIONING.
- ALL MAINS SHALL BE CONSTRUCTED AS SHOWN ON PLANS. A MINIMUM COVER OF 36 INCHES SHALL BE MAINTAINED ON ALL MAINS, WHERE IT IS NOT OTHERWISE SPECIFIED ON PLANS OR DIRECTED BY ENGINEER. FOR DUCTILE IRON PIPE, ALL DIRECTION CHANGES IN THE PIPE BOTH HORIZONTAL AND VERTICAL SHALL BE BY JOINT DEFLECTION UNLESS OTHERWISE NOTED OR DIRECTED BY ENGINEER. JOINT DEFLECTION FOR DUCTILE IRON PIPE SHALL NOT EXCEED 50% OF THE MANUFACTURER'S RECOMMENDED DEFLECTION.
- ALL PIPES SHALL BE RESTRAINED IN ACCORDANCE WITH THE RESTRAINT TABLES SHOWN ON DETAIL SHEETS. IN ADDITION, ALL FITTINGS SHALL BE MECHANICAL JOINT RESTRAINED. NO THRUST BLOCKS SHALL BE PERMITTED. RESTRAIN EXISTING PIPE WHERE REQUIRED IN ACCORDANCE WITH THE RESTRAINT TABLE.
- PIPE SIZES SHOWN ON PLANS ARE MINIMUM INSIDE DIAMETER.
- ALL CONNECTIONS TO EXISTING MAINS SHALL BE MADE BY THE CONTRACTOR ONLY AFTER THE PROPOSED CONNECTION PROCEDURE AND WORK SCHEDULE HAVE BEEN REVIEWED AND ACCEPTED BY THE OWNER. THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST TO THE OWNER A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO SCHEDULING ANY CONNECTIONS. THE REQUEST SHALL REFERENCE THE PROFESSIONAL LAND SURVEYOR CERTIFIED COMPLETED AS-BUILT RECORD DRAWINGS PREVIOUSLY SUBMITTED AND SHALL OUTLINE THE FOLLOWING:
  - POINTS OF CONNECTION, FITTINGS TO BE USED, METHODS OF FLUSHING AND DISINFECTION AND VERIFICATION OF RESTRAINT ON EXISTING PIPE.
  - ESTIMATED CONSTRUCTION TIME FOR THE CONNECTIONS.

THE OWNER SHALL REVIEW THE SUBMITTAL WITHIN FIVE (5) WORKING DAYS AFTER RECEIVING IT AND INFORM THE CONTRACTOR REGARDING APPROVAL OR DENIAL OF THE REQUEST. IF THE OWNER REJECTS THE REQUEST, THE CONTRACTOR SHALL RESUBMIT THE REQUEST MODIFYING IT IN A MANNER ACCEPTABLE TO THE OWNER. ALL CONNECTIONS SHALL ONLY BE MADE ON THE AGREED UPON DATE AND TIME. SHOULD THE CONTRACTOR NOT INITIATE AND COMPLETE THE CONNECTION WORK IN THE AGREED UPON MANNER, HE SHALL BE REQUIRED TO RESCHEDULE THE CONNECTION BY FOLLOWING THE PROCEDURE OUTLINED ABOVE. THE CONTRACTOR SHALL NOT OPERATE ANY VALVES IN THE SYSTEM, MAINS SHALL NOT BE PLACED IN SERVICE UNTIL CLEARANCE IS RECEIVED FROM FDEP; AS-BUILT DRAWINGS MUST BE COMPLETED AND SUBMITTED PRIOR TO WATER MAIN CHLORINATION.
- CONTRACTOR SHALL ADVISE ENGINEER IMMEDIATELY UPON DISCOVERY OF A POTENTIAL CONFLICT. CONTRACTOR SHALL PROVIDE DETAILED AS-BUILT DRAWINGS OF ALL UTILITIES UNCOVERED IN TRENCHES. THE AS-BUILT SHALL RECORD LOCATION, SIZE, TYPE, ELEVATION AND OWNER OF ALL UTILITY FACILITIES UNCOVERED.
- ALL PROPOSED DUCTILE IRON PIPES SHALL BE WRAPPED WITH 8 MIL POLYETHYLENE, COLOR PURPLE.
- ALL PIPE JOINTS TO BE RESTRAINED.
- GOPHER TORTOISE RELOCATION BY OTHERS.
- NO TOBACCO IS PERMITTED ON ORANGE COUNTY PROPERTY.
- A LIST OF ALL PERSONNEL SHALL BE SUBMITTED TO ORANGE COUNTY FOR SITE ACCESS.
- RESTORE ALL DISTURBED EARTH WITH SOD.
- ALL MATERIALS FROM TREE REMOVAL, CLEARING, OR GRUBBING SHALL BE PROPERLY HAULED AND DISPOSED TO A PERMITTED OFF-SITE DISPOSAL FACILITY.

**OCU GENERAL NOTES:**

APPENDIX A FIGURE GN

- THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATION IN PROXIMITY OF WATER MAINS, WASTEWATER FORCE MAINS, GRAVITY MAINS AND RECLAIMED WATER MAINS MAIN LOCATIONS SHOWN ON PLANS MAY NOT BE EXACT. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING UTILITY LOCATIONS.
- SHOULD A PIPE EMERGENCY OCCUR, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OCU DISPATCH OPERATOR (407) 836-2777) AND THE OCU INSPECTOR.
- THE CONTRACTOR SHALL NOTIFY THE OCU CONSTRUCTION DIVISION AT LEAST SEVEN DAYS PRIOR TO COMMENCEMENT OF THE CONSTRUCTION PROJECT BY CALLING (407)-254-9798.
- THE CONTRACTOR SHALL NOTIFY THE OCU CONSTRUCTION DIVISION AT LEAST 48 HOURS PRIOR TO ANY UTILITIES CONSTRUCTION BY CALLING (407)254-9798.
- THE MATERIALS, PRODUCTS, AND CONSTRUCTION OF ALL UTILITIES CONNECTION TO THE OCU SHALL BE IN CONFORMANCE WITH THE OCU STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL.
- ALL OCU MAINS AND FACILITIES WITHIN THE LIMITS OF THE PROJECT SHALL BE SUPPORTED AND PROTECTED AGAINST DAMAGE DURING CONSTRUCTION.
- THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE, SHALL IMMEDIATELY REPAIR ALL DAMAGES TO OCU MAINS AND FACILITIES, IF THE REPAIR IS NOT MADE IN A TIMELY MANNER, AS DETERMINED BY OCU. OCU MAY PERFORM REQUIRED REPAIRS AND CLEANUP. THE CONTRACTOR WILL BE CHARGED FOR ALL EXPENSES ASSOCIATED WITH THE REPAIR.
- THE CONTRACTOR SHALL ADJUST ALL EXISTING OCU MAINS AND FACILITIES IN CONFLICT WITH GRADE. NEW OR ALTERED ROADWAYS, SIDEWALKS, DRIVEWAYS, OR STORM WATER IMPROVEMENTS: OCU FACILITIES TO BE ADJUSTED INCLUDE, BUT ARE NOT LIMITED TO PIPELINES, PUMP STATIONS, VALVE BOXES, AIR RELEASE VALVES, FIRE HYDRANTS, MANHOLE COVERS AND METERS.
- ONLY OCU SHALL OPERATE OCU WATER, WASTEWATER, AND RECLAIMED WATER VALVES. THE CONTRACTOR SHALL COORDINATE VALVE OPERATION WITH THE OCU INSPECTOR. FOR OPERATION OF MAINS NOT OWNED BY OCU, IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE APPROPRIATE UTILITY REPRESENTATIVE.
- CONSTRUCTION ACTIVITIES SHALL NOT CAUSE INTERRUPTIONS IN WATER, WASTEWATER, OR RECLAIMED WATER SERVICE. THE CONTRACTOR SHALL COORDINATE PER-APPROVED INTERRUPTIONS OF SERVICE WITH THE OCU INSPECTOR 7 WORKING DAYS IN ADVANCE.
- THE CONTRACTOR SHALL PROVIDED FOR BYPASSING AND/OR HAULING WASTEWATER DURING APPROVED INTERRUPTIONS OF WASTEWATER FLOWS AND CONNECTIONS. THE CONTRACTOR SHALL SUBMIT A BYPASS PLAN SIGNED AND SEALED BY A PROFESSIONAL ENGINEER TO OCU DEVELOPMENT ENGINEERING FOR APPROVAL PRIOR TO IMPLEMENTATION BY CONTRACTOR.
- ALL VALVES INSTALLED AS PART OF THE CONSTRUCTION PROJECT SHALL REMAIN CLOSED DURING CONSTRUCTION. KEEP VALVES ON ALL WET TAPS CLOSED UNTIL CLEARANCE BY FDEP. DO NOT CONNECT NEWLY CONSTRUCTED WATER MAINS TO ANY EXISTING WATER MAINS UNLESS CLEARED BY FDEP AND OCU.
- THE CONTRACTOR SHALL PROVIDE A JUMPER ASSEMBLY WITH A BACKFLOW PREVENTER FOR MAKING TEMPORARY CONNECTIONS TO AN EXISTING POTABLE WATER SOURCE IN ORDER TO CHLORINATE AND FLUSH NEW WATER MAINS WITH POTABLE WATER. ANY TEMPORARY POTABLE WATER CONNECTIONS TO RECLAIMED WATER OR FORCE MAIN SHALL ALSO BE EQUIPPED WITH AN APPROVED BACKFLOW PREVENTER.
- FOR NON-PVC PIPE THAT WILL BE OWNED AND MAINTAINED BY OCU, LONG RADIUS CURVES, EITHER HORIZONTAL OR VERTICAL, MAY BE INSTALLED WITH STANDARD PIPE BY DEFLECTIONS AT THE JOINTS. MAXIMUM DEFLECTIONS AT PIPE JOINTS, FITTINGS AND LAYING RADIUS FOR THE VARIOUS PIPE LENGTHS SHALL NOT EXCEED 50 PERCENT OF THE PIPE MANUFACTURER'S RECOMMENDATION.

**EROSION CONTROL:**

EROSION AND SILTATION CONTROL MEASURES ARE TO BE PROVIDED AND INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION. THESE MEASURES ARE TO BE INSPECTED BY THE CONTRACTOR ON A REGULAR BASIS AND ARE TO BE MAINTAINED OR REPAIRED ON AN IMMEDIATE BASIS, AS REQUIRED. REFER TO ST. JOHNS RIVER WATER MANAGEMENT DISTRICT PERMIT FOR ADDITIONAL REQUIREMENTS FOR EROSION CONTROL AND SURFACE DRAINAGE.

AN EROSION CONTROL PLAN SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE COUNTY'S ENGINEER FOR APPROVAL PRIOR TO THE PRE-CONSTRUCTION MEETING. THE CONTRACTOR SHALL EXECUTE ALL MEASURES NECESSARY TO LIMIT THE TRANSPORT OF SEDIMENTS OUTSIDE THE LIMITS OF THE PROJECT TO THE VOLUME AND AMOUNT AS THAT ARE EXISTING PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THIS CONDITION WILL BE SATISFIED FOR THE TOTAL ANTICIPATED CONSTRUCTION PERIOD. PROVISION MUST BE MADE TO PRESERVE THE INTEGRITY AND CAPACITY OF CHECK WEIRS, SEDIMENT BASINS, SLOPE DRAINS, GRADING PATTERNS, ETC. REQUIRED TO MEET THIS PROVISION THROUGHOUT THE LIFE OF THE CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE SYNTHETIC BALES, SILT BARRIERS, TEMPORARY GRASSING, ETC. AS REQUIRED TO FULLY COMPLY WITH THE INTENT OF THIS SPECIFICATION.

**STOCKPILING MATERIAL**

NO EXCAVATED MATERIAL SHALL BE STOCKPILED IN SUCH A MANNER AS TO DIRECT RUNOFF DIRECTLY OFF THE PROJECT SITE OR INTO ANY ADJACENT WATER BODY OR STORMWATER COLLECTION FACILITY

**EXPOSED AREA LIMITATION**

THE SURFACE AREA OF OPEN, RAW ERODABLE SOIL EXPOSED BY CLEARING AND GRUBBING OPERATIONS OR EXCAVATION AND FILLING OPERATIONS SHALL BE CONTROLLED, SO THAT THIS OPERATION WILL NOT SIGNIFICANTLY AFFECT OFFSITE DEPOSIT SEDIMENTS.

**INLET PROTECTION**

INLETS AND CATCH BASINS SHALL BE PROTECTED FROM SEDIMENT LADEN STORMWATER RUNOFF UNTIL THE COMPLETION OF ALL CONSTRUCTION OPERATIONS THAT MAY CONTRIBUTE SEDIMENT TO THE INLET.

**TEMPORARY SEEDING**

AREAS OPENED BY CONSTRUCTION OPERATIONS THAT ARE NOT ANTICIPATED TO BE DRESSED OR RECEIVE FINAL GRASSING TREATMENT WITHIN THIRTY (30) DAYS SHALL BE SEEDDED WITH A QUICK GROWING GRASS SPECIES WHICH WILL PROVIDE AN EARLY COVER, DURING THE SEASON WHICH IT IS PLANTED. TEMPORARY SEEDING SHALL BE CONTROLLED SO AS TO NOT ALTER OR COMPLETE WITH PERMANENT GRASSING. THE RATE OF GRASSING SHALL BE 30 POUNDS PER ACRE.

**TEMPORARY SEEDING AND MULCHING**

SLOPES STEEPER THAN 6:1 THAT FALL WITHIN THE CATEGORY ESTABLISHED IN 4 ABOVE, SHALL ADDITIONALLY RECEIVE MULCHING OF APPROXIMATELY TWO (2) INCHES, LOOSE MEASURE, OF MULCH MATERIAL CUT INTO THE SOIL OF THE SEEDED AREA TO A DEPTH OF FOUR (4) INCHES.

**TEMPORARY GRASSING**

THE SEEDED OR SEEDED AND MULCHED AREA(S) SHALL BE ROLLED AND WATERED AS REQUIRED TO ASSURE OPTIMUM GROWING CONDITIONS FOR THE ESTABLISHMENT OF A GOOD GRASS COVER.

**TEMPORARY RE-GRASSING**

IF, AFTER 14 DAYS, THE TEMPORARY GRASSED AREAS HAVE NOT ATTAINED A MINIMUM OF 75% GOOD GRASS COVER, THE AREA WILL BE REWORKED AND ADDITIONAL SEEDS APPLIED TO ESTABLISH THE DESIRED VEGETATION COVER.

**MAINTENANCE**

ALL FEATURES OF THE PROJECT SHALL BE CONSTRUCTED TO PREVENT EROSION AND SEDIMENT AND SHALL BE MAINTAINED DURING THE LIFE OF THE CONSTRUCTION SO AS TO FUNCTION PROPERLY WITHOUT THE TRANSPORT OF SEDIMENTS OUTSIDE THE LIMITS OF THE PROJECT.

TEMPORARY SILT FENCES AND STAKED SILT BARRIERS, SHALL BE IN ACCORDANCE WITH FDOT STANDARD SPECIFICATIONS, SEC. 104.6, 104.7 AND SEC. 985

THE CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH THE EPA NPDES (NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM) REGULATIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR MUST ALSO PREPARE AND SUBMIT A NOTICE OF INTENT (NOI) FORM, TO FDEP 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.

UNDER PROVISIONS OF THE CLEAN WATER ACT, OPERATOR(S) OF CONSTRUCTION SITES, PERSUANT TO CONDITIONS OF THE NPDES PERMIT, MUST SUBMIT A NOI TO OBTAIN COVERAGE UNDER THE NPDES STORM WATER CONSTRUCTION GENERAL PERMIT.

NOI'S MUST BE SENT TO THE FOLLOWING ADDRESS

NPDES STORMWATER PROGRAM  
2600 BLAIR STONE ROAD MAIL STATION 2500  
TALLAHASSEE, FL 32399  
PHONE (850) 245-7522

No.	Date	Revision	By	No.	Date	Revision	By
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 Checked by: DEM  
 Approved by: JRM  
 Job No. O28409

Date: 5/01/2015  
 Scale: AS NOTED

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**ORANGE COUNTY GOVERNMENT**

**NWRF - RECLAIMED WATER MAIN EXTENSION AND PUMP STATION IMPROVEMENTS**

ORANGE COUNTY UTILITIES UTILITIES ENGINEERING DIVISION

Plans Prepared By:  
**CPH, Inc.**  
 1117 E. Robinson St. Orlando, FL 32801  
 Ph: 407.425.8452  
 Licenses:  
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 Survey L.B. No. 7143 Landscp. Lic. No. LC0000298

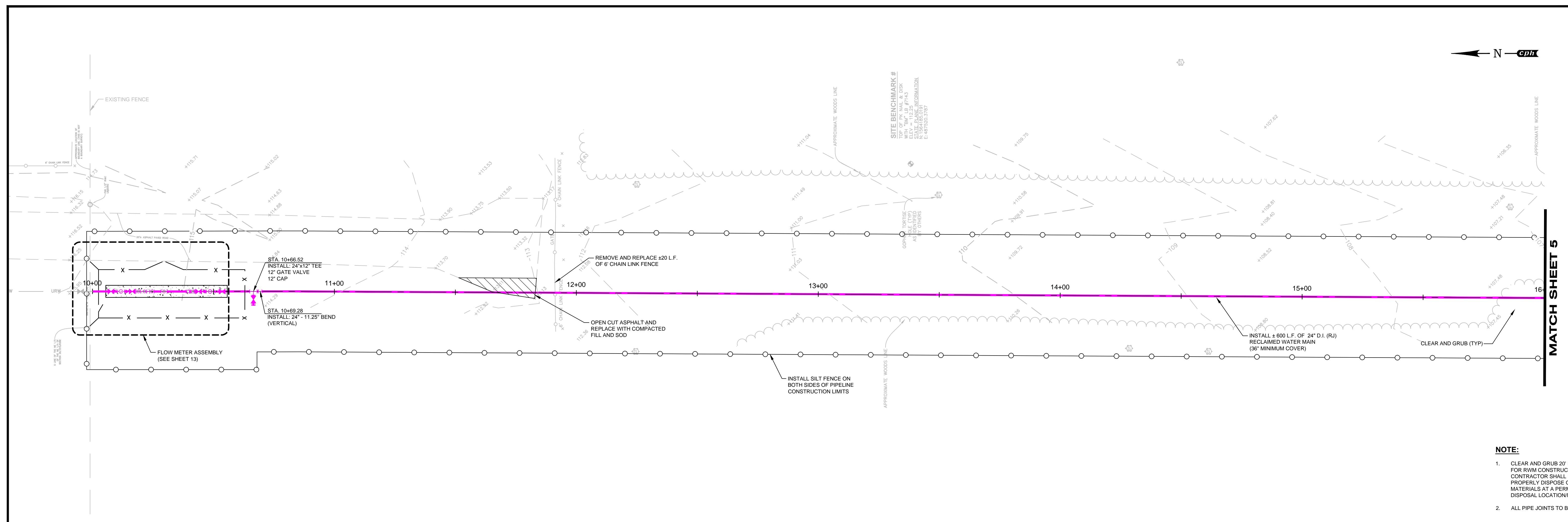
JAMES R. MORRIS, J.R., P.E.  
 REG-# 62384

**GENERAL NOTES**

Sheet No.  
**3**

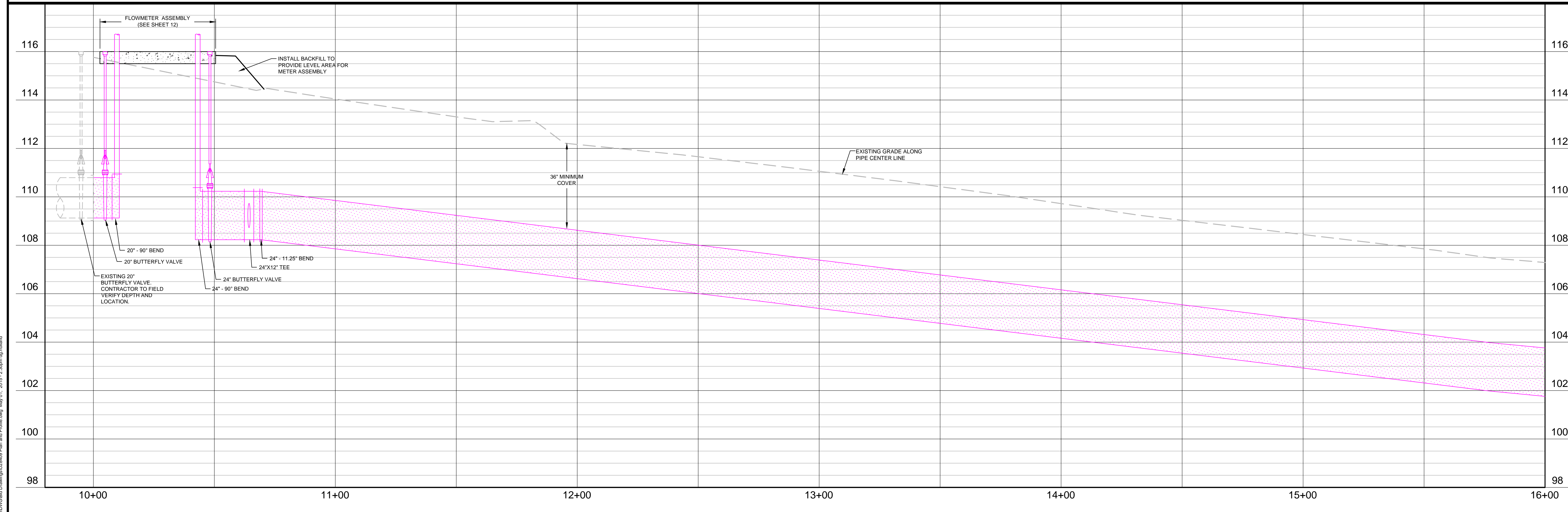
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**MATCH SHEET 5**

- NOTE:**
- CLEAR AND GRUB 20' PATH AS NEEDED FOR RWM CONSTRUCTION. CONTRACTOR SHALL HAUL AND PROPERLY DISPOSE OF ALL CLEARED MATERIALS AT A PERMITTED OFF-SITE DISPOSAL LOCATION/FACILITY.
  - ALL PIPE JOINTS TO BE RESTRAINED.



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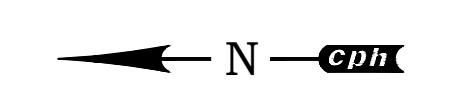
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Sheet No.  
**4**

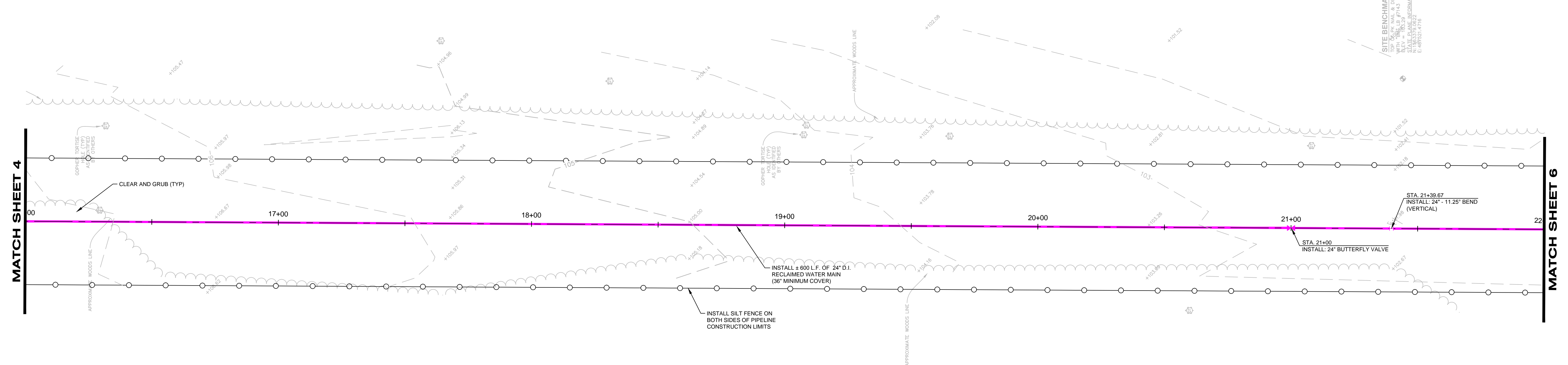
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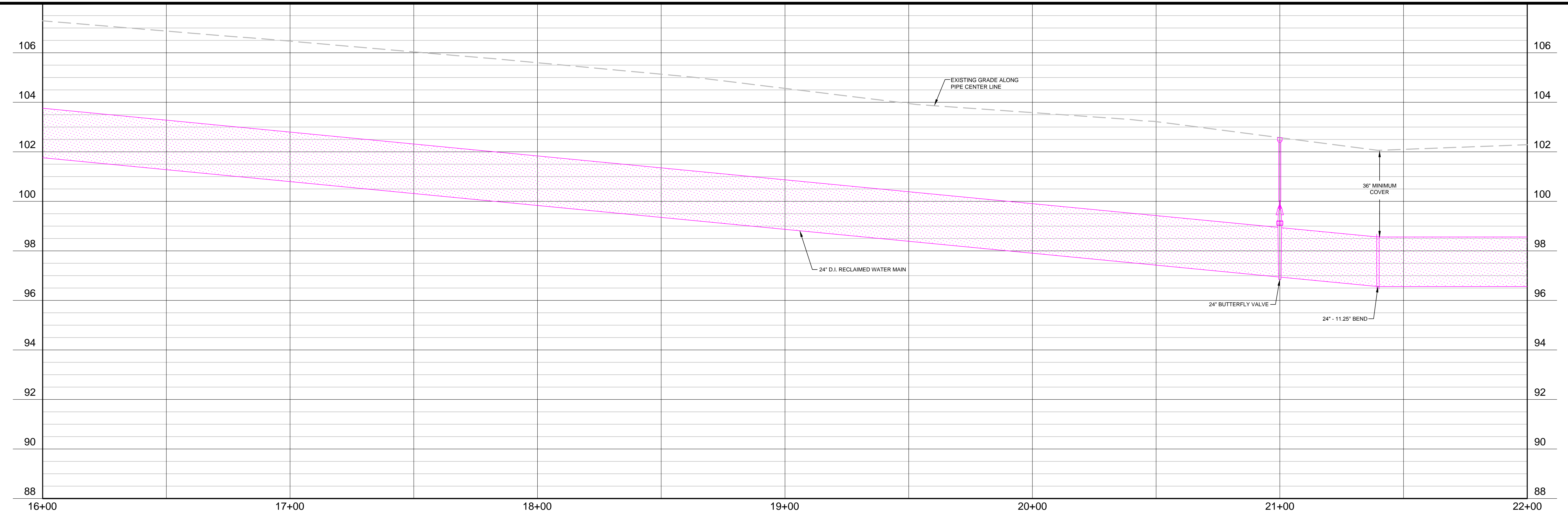




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 PH: 407.425.3452  
 LICENSES:  
 ENGR. C.O.A. NO. 3215 ARCH. LIC. NO. AA2600926  
 SURVEY L.B. NO. 7143 LANDSCP. LIC. NO. LC0000298  
 JAMES R. MORRIS, J.R., P.E.  
 REG-# 62384



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 ORANGE COUNTY UTILITIES UTILITIES ENGINEERING DIVISION

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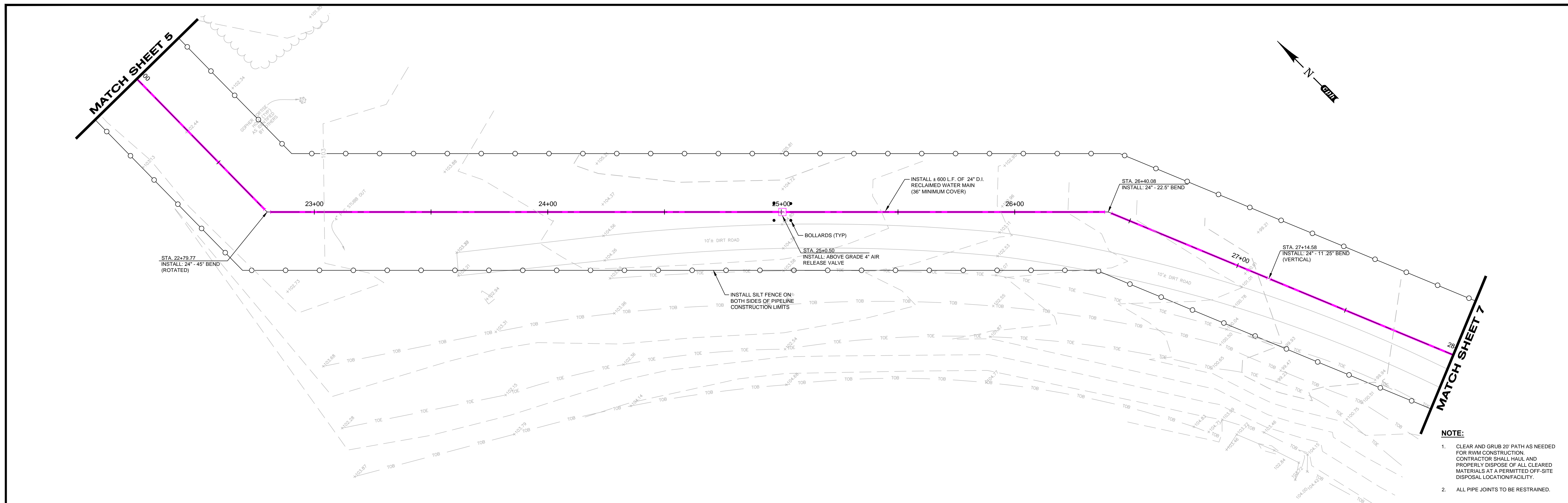
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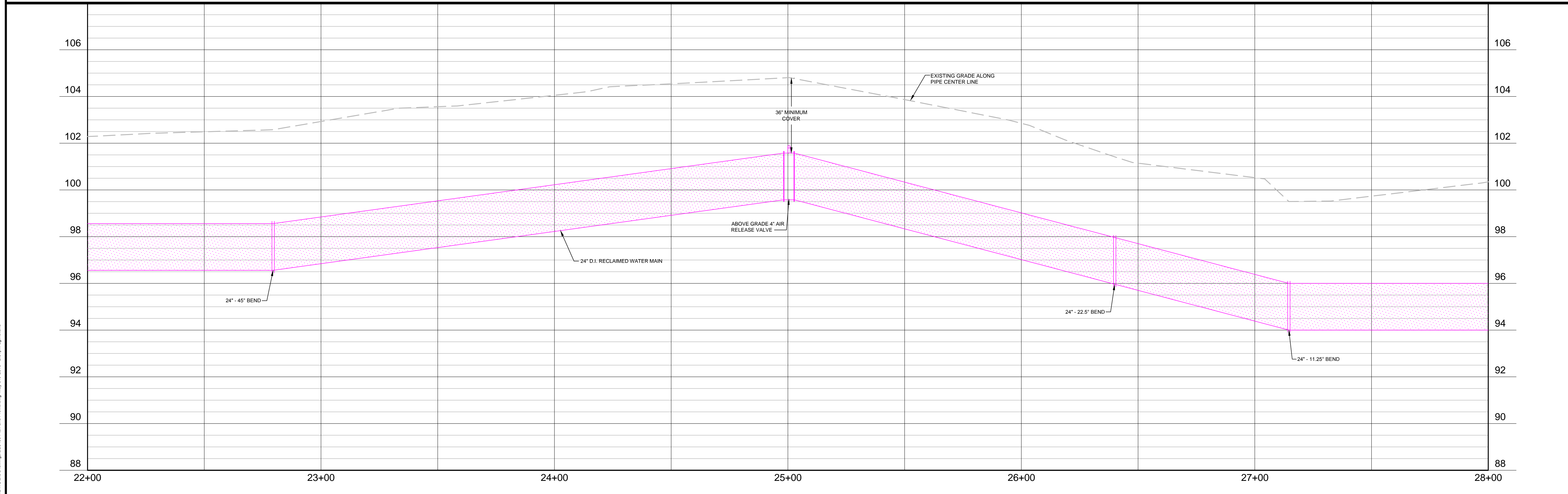
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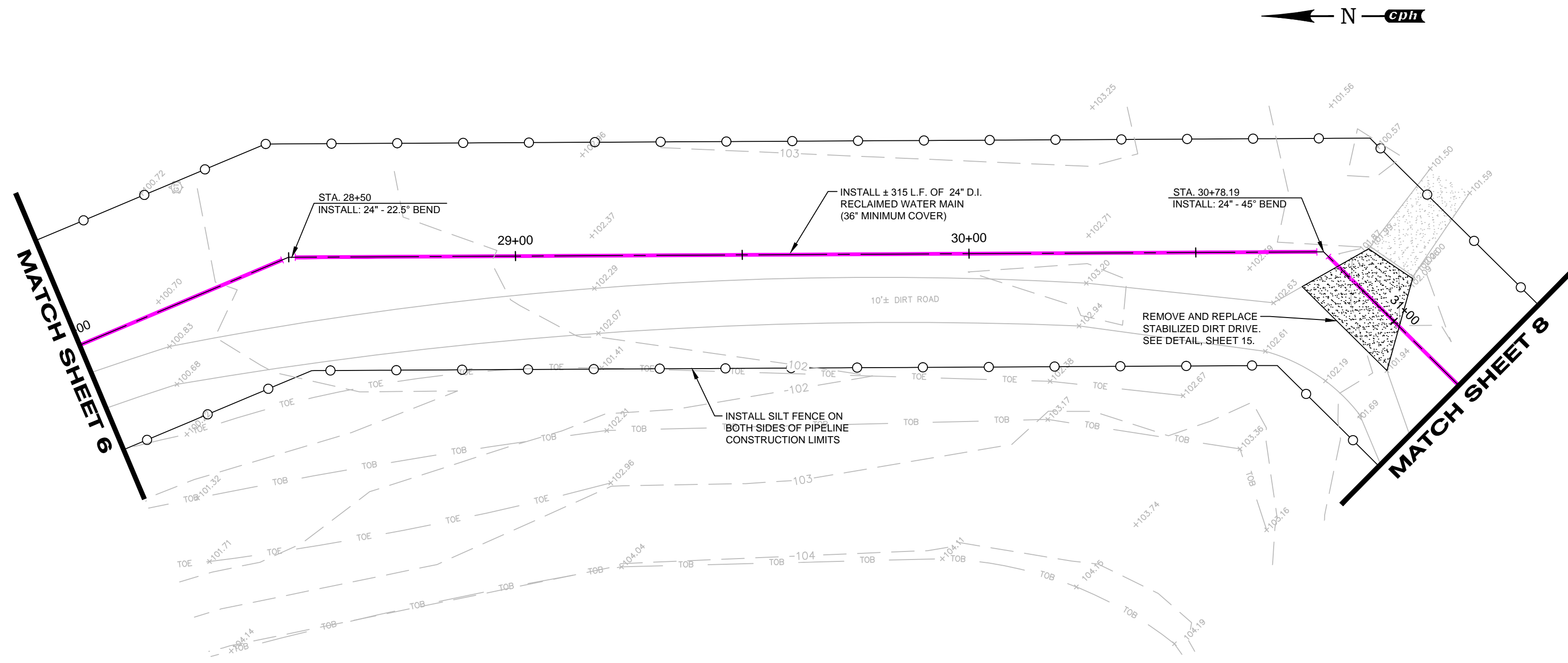
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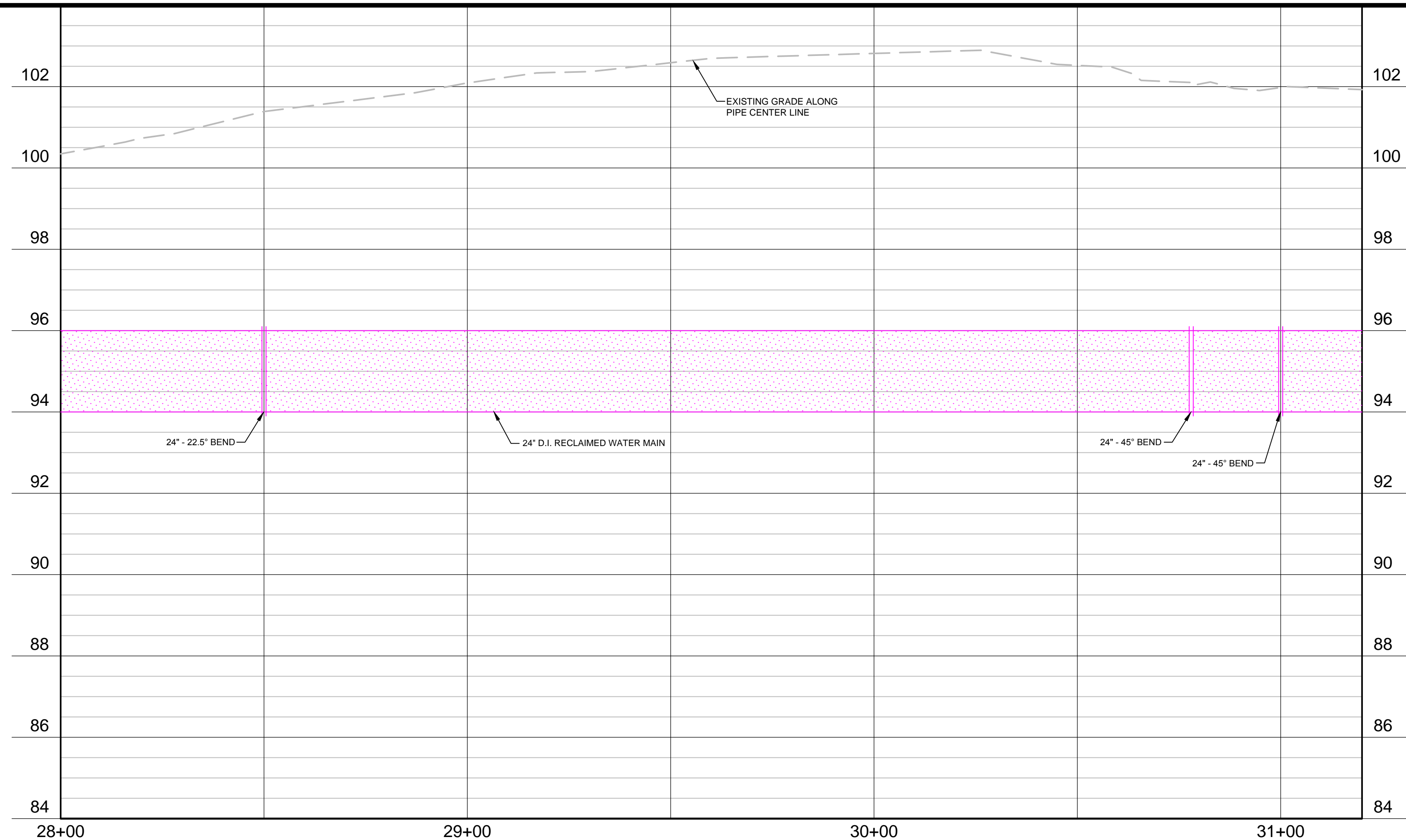
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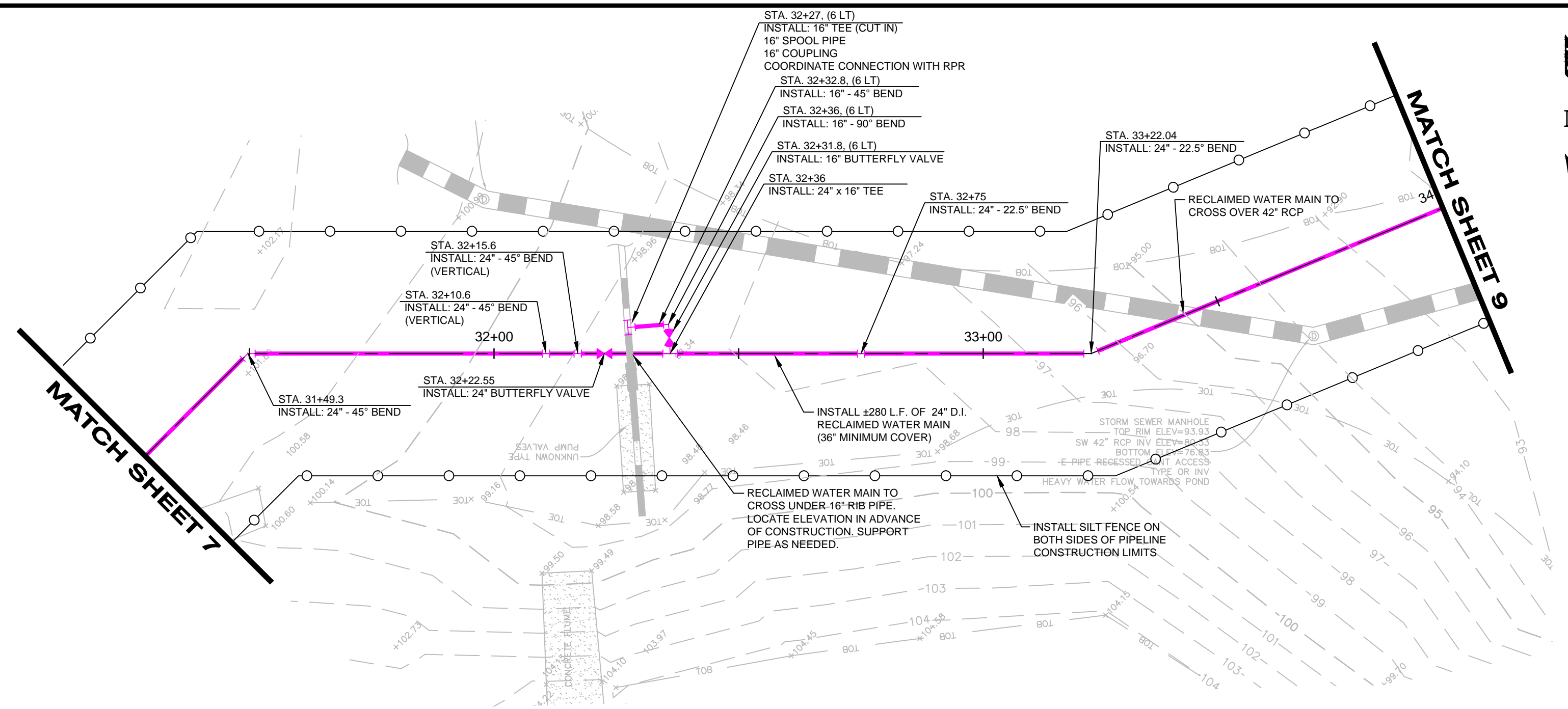
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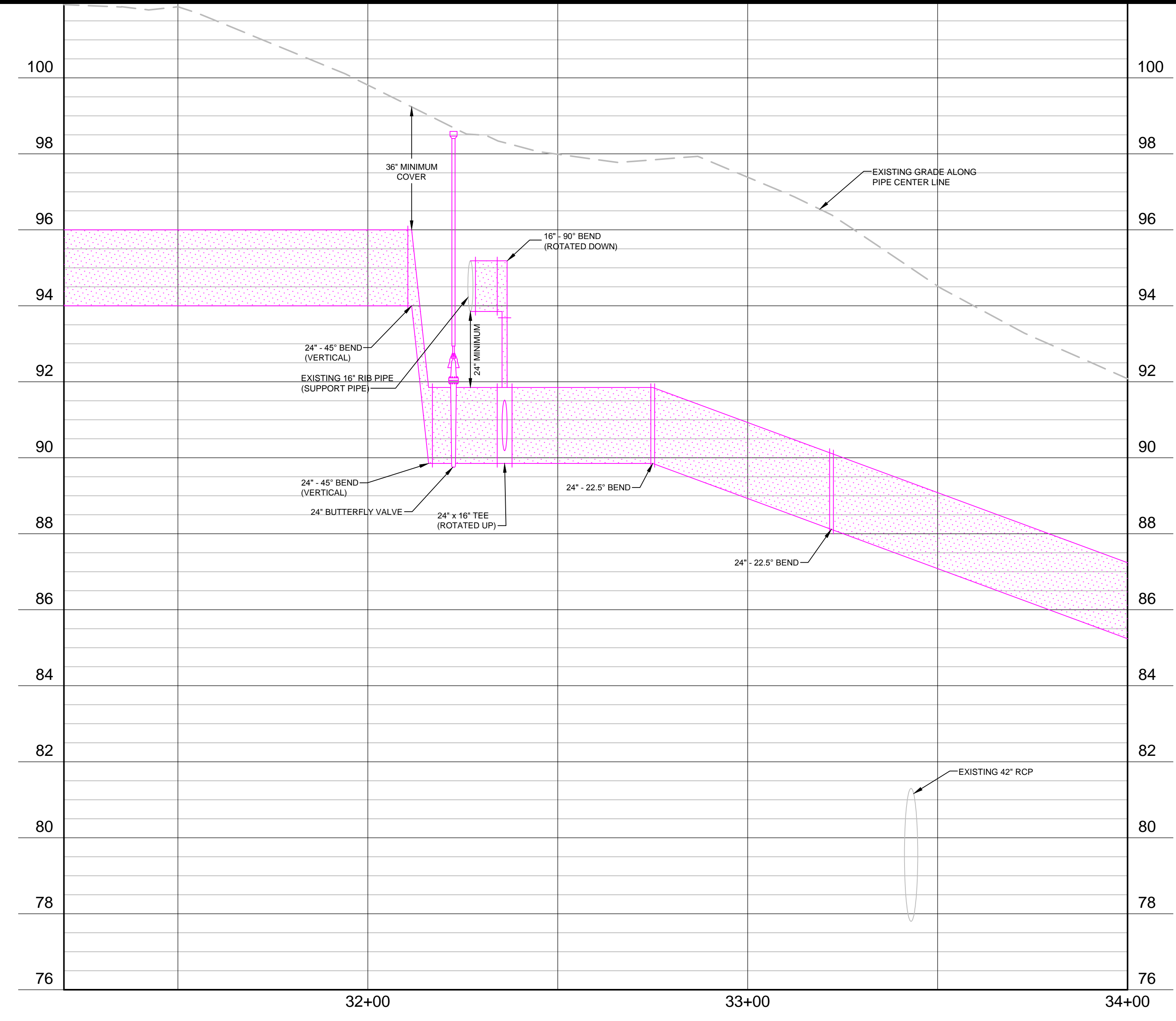
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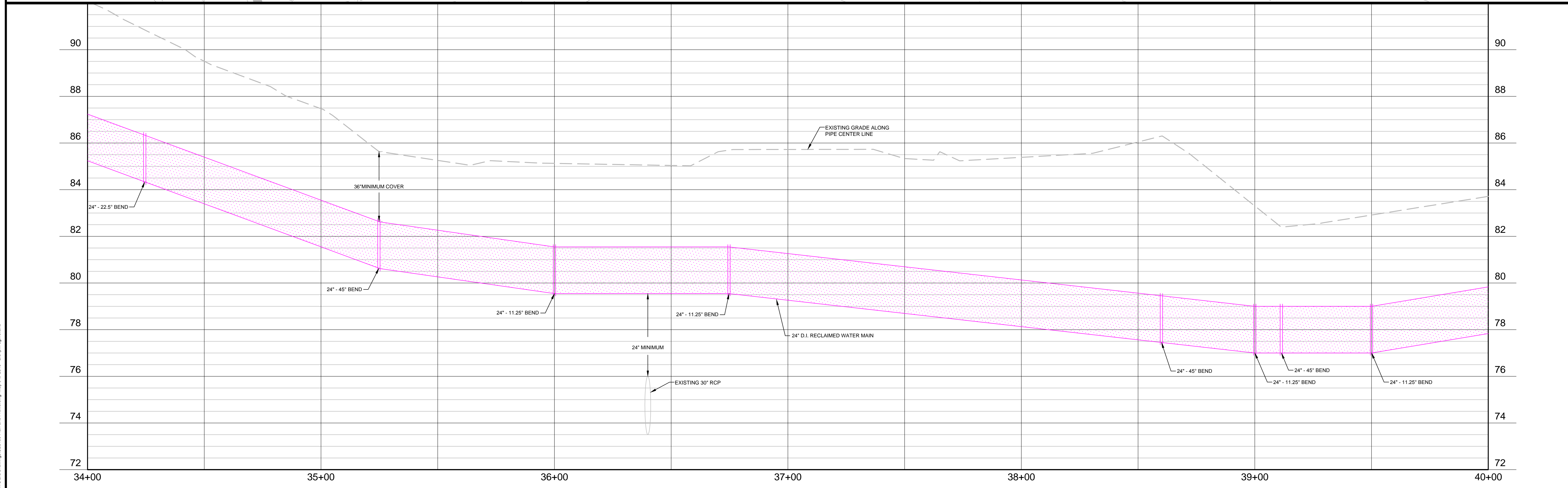
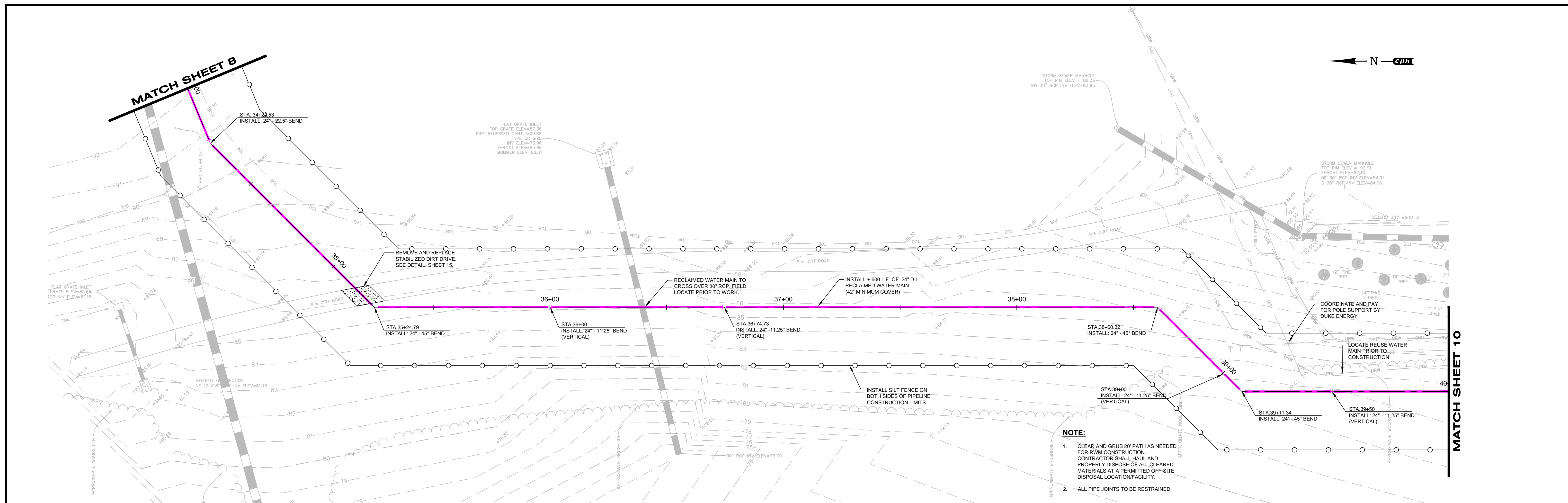
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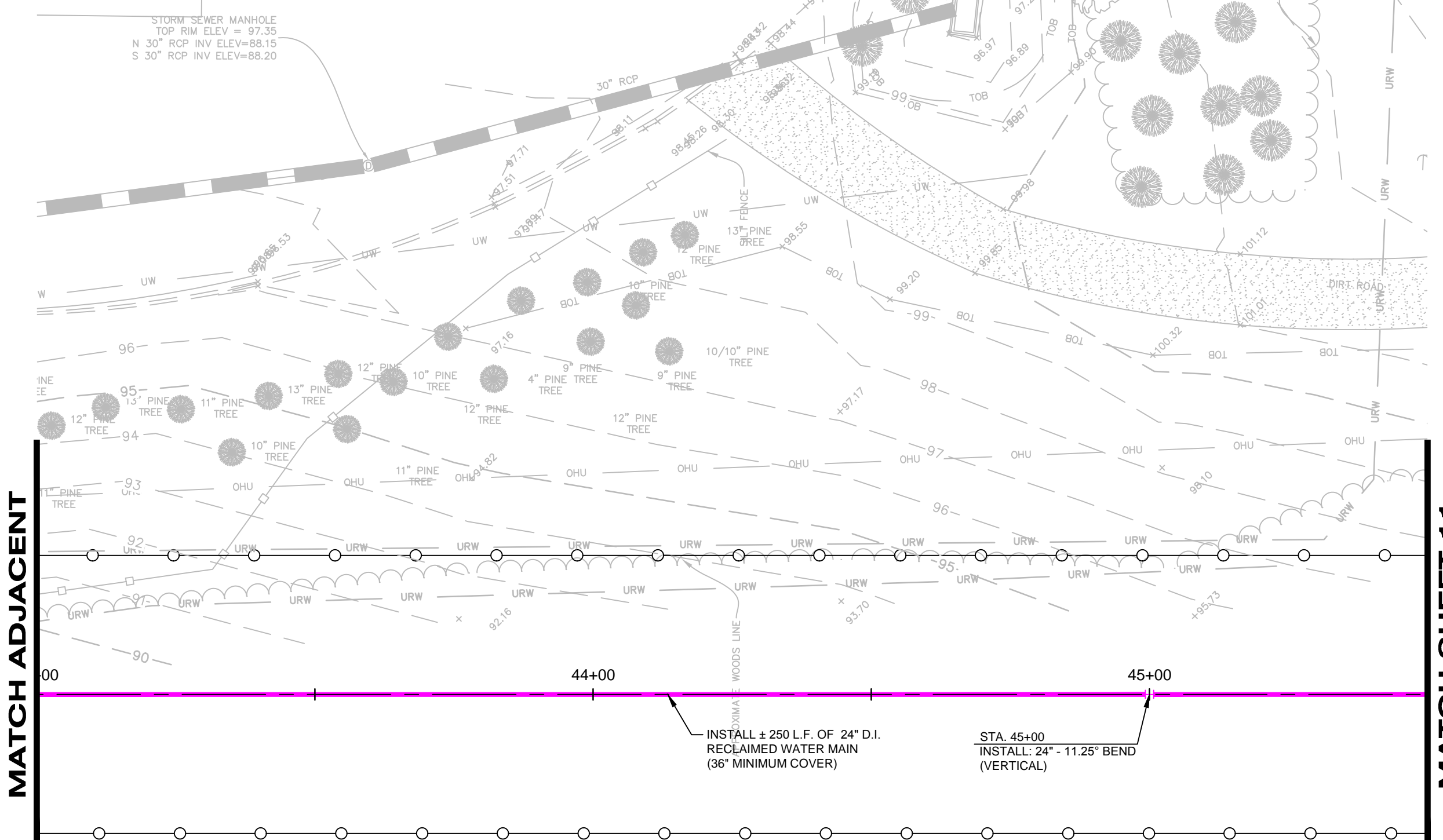
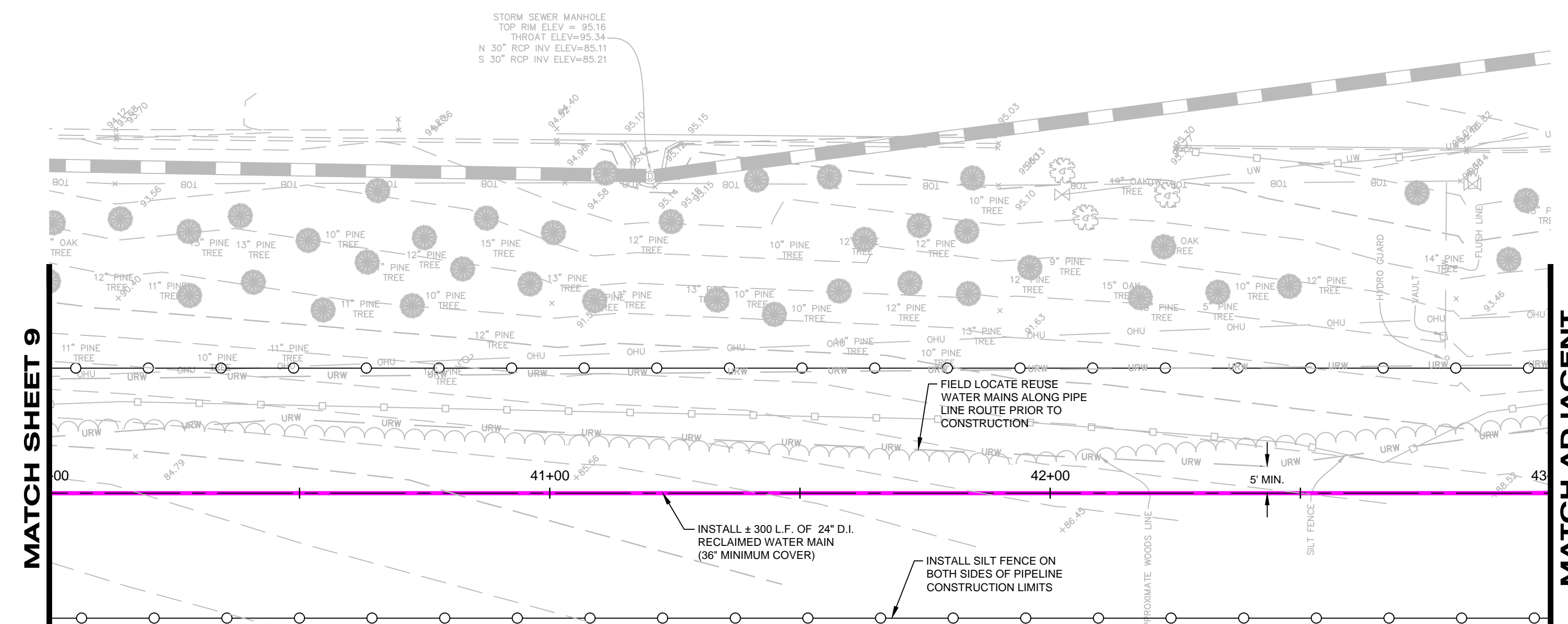
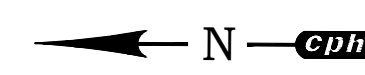
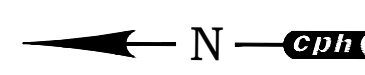
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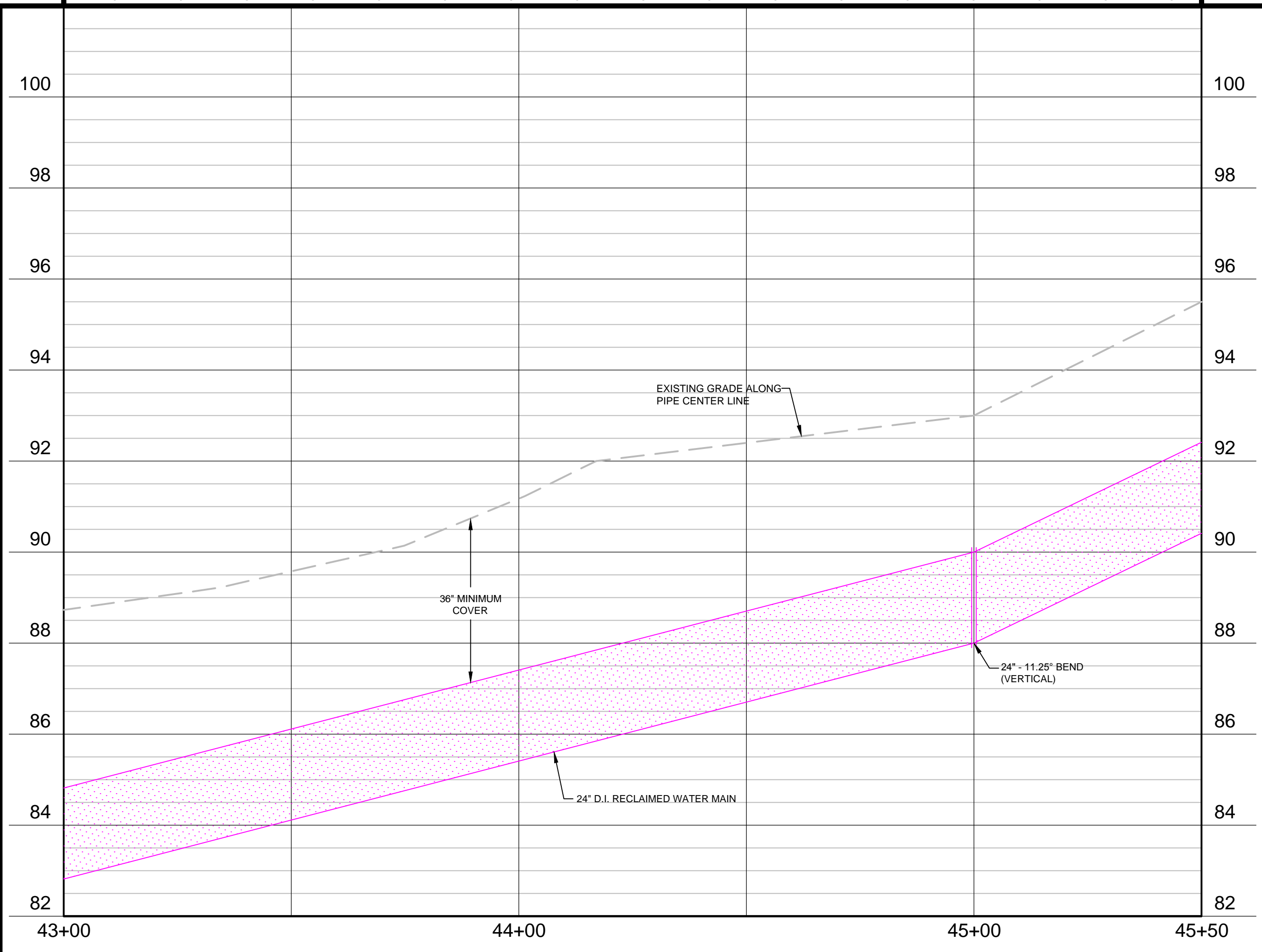
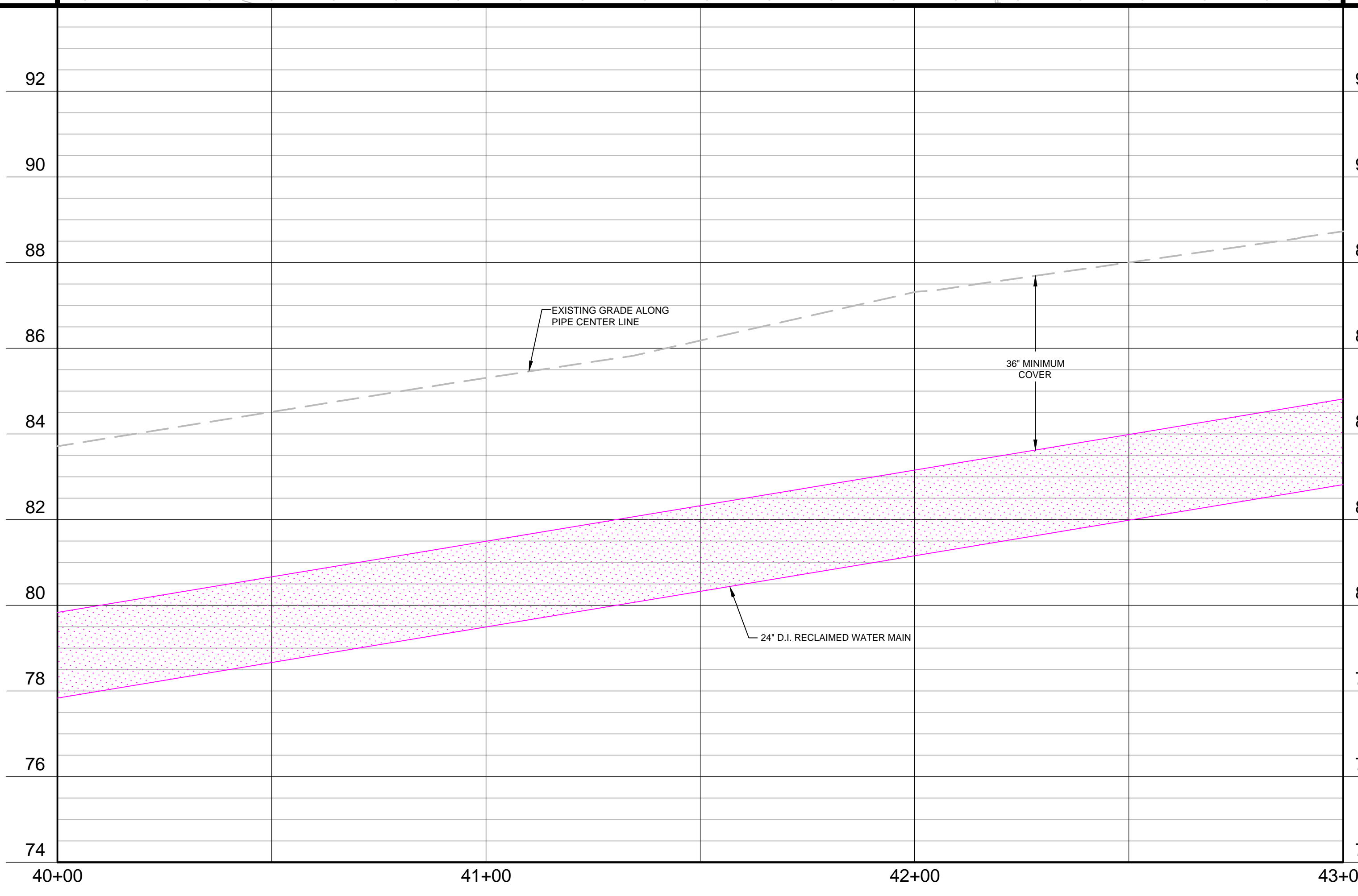
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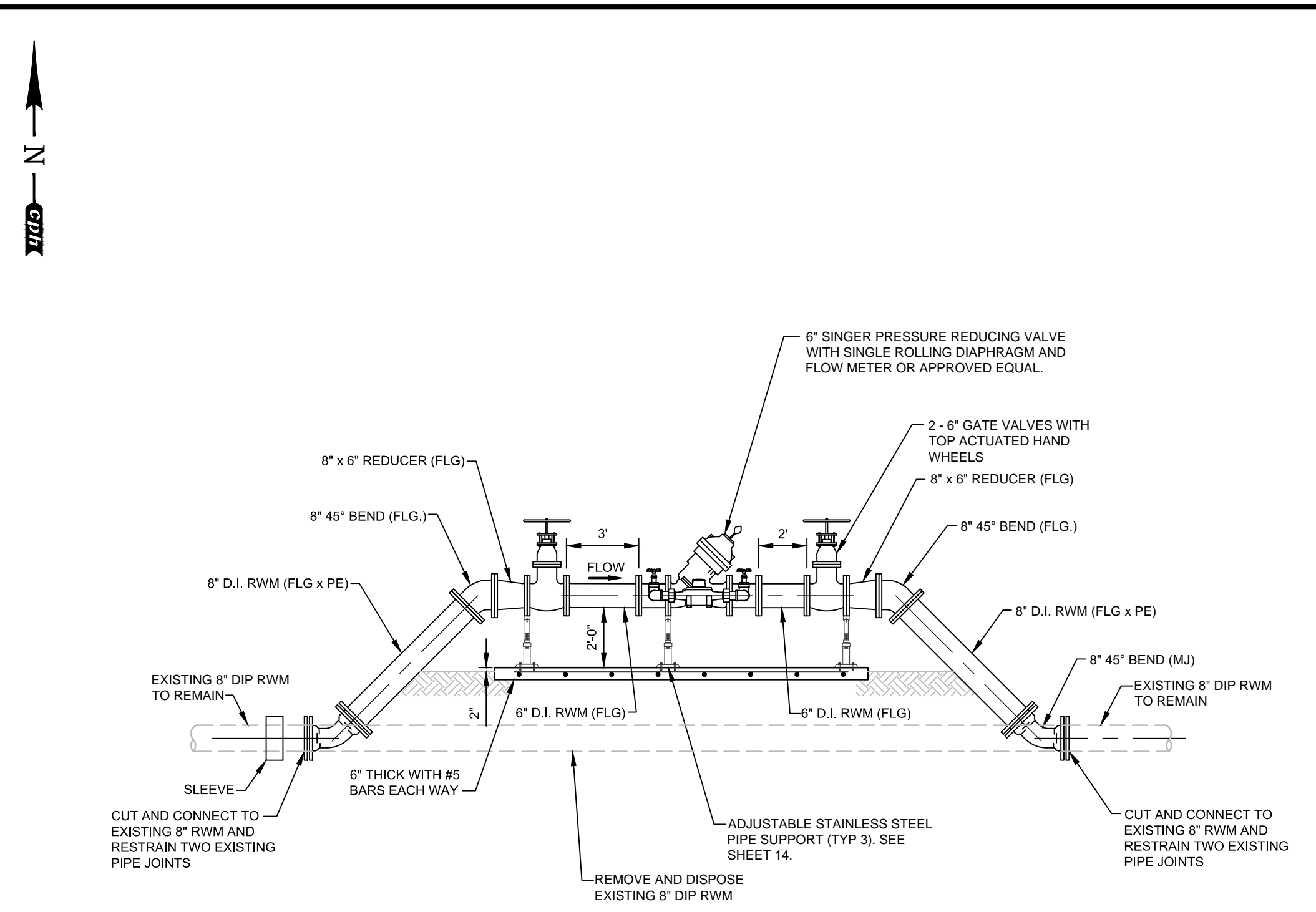
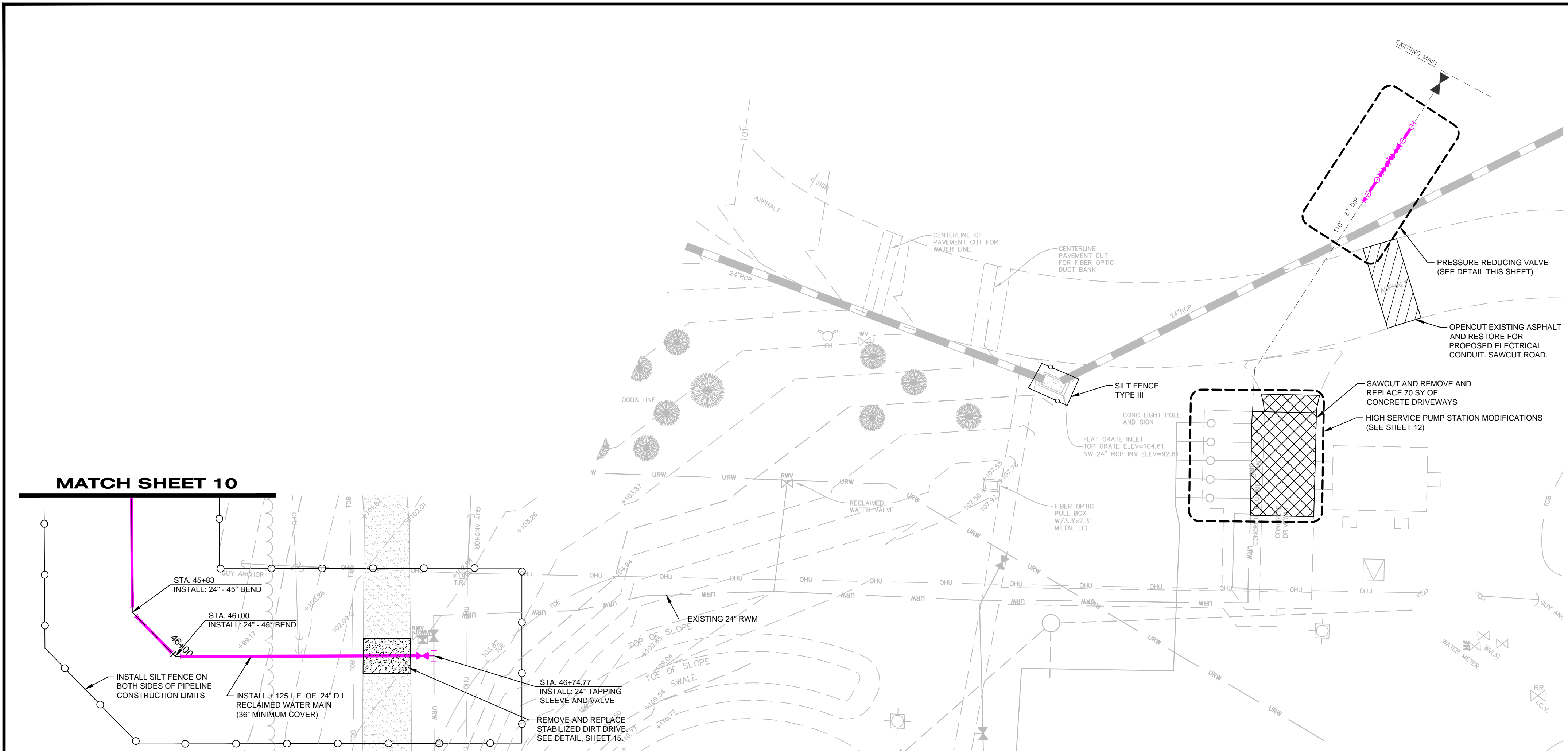
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**10**

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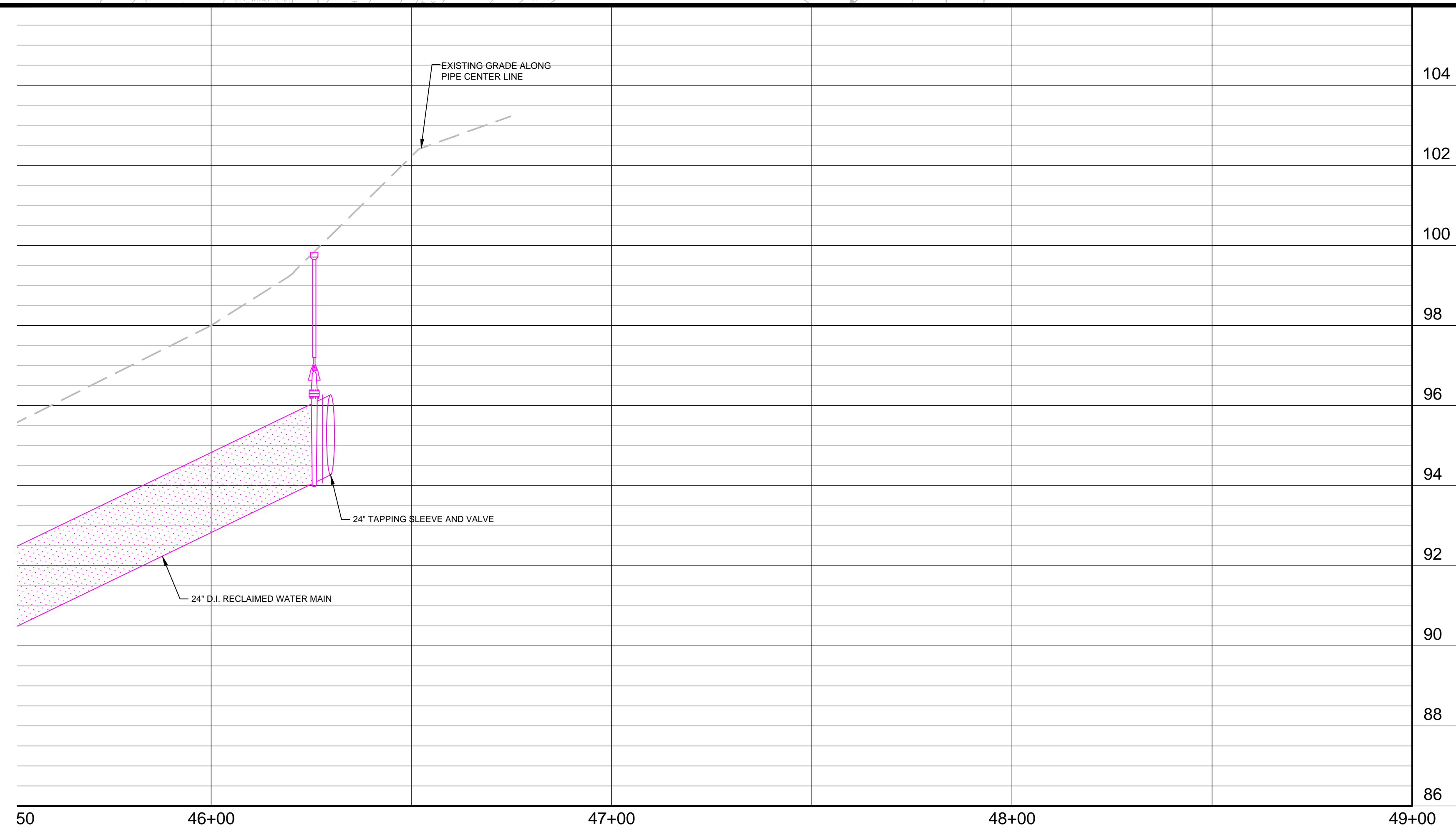
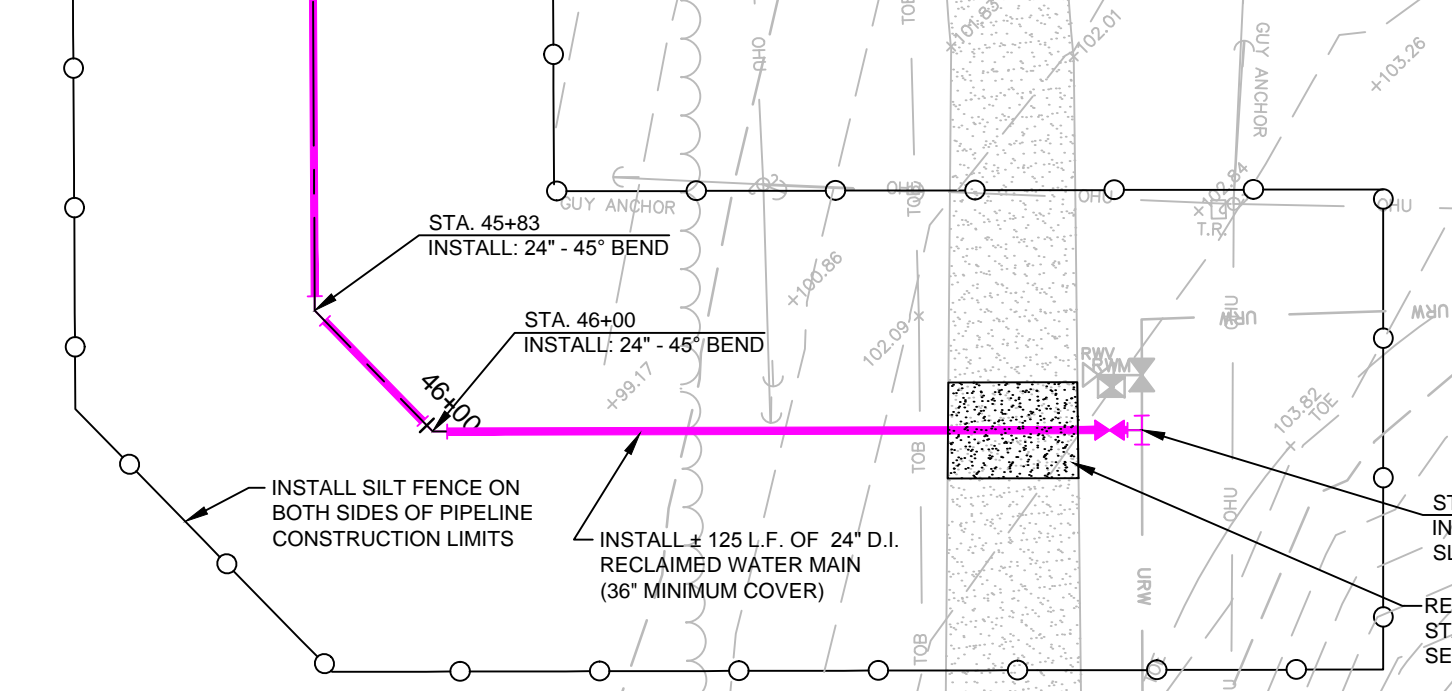




**PRESSURE REDUCING VALVE DETAIL**  
NOT TO SCALE

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**MATCH SHEET 10**



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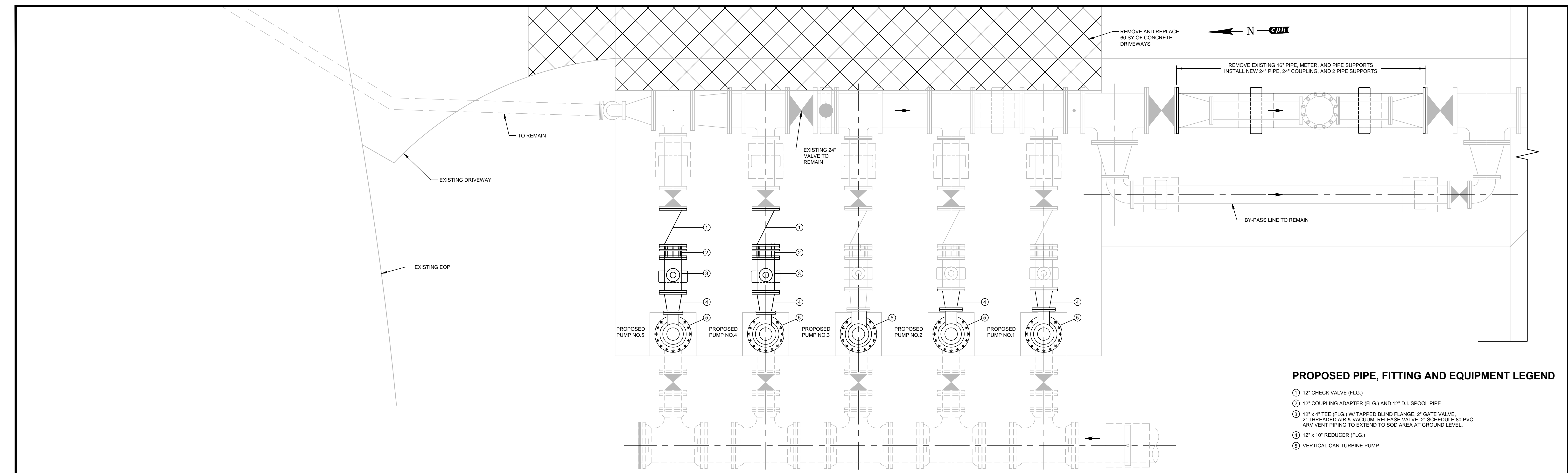
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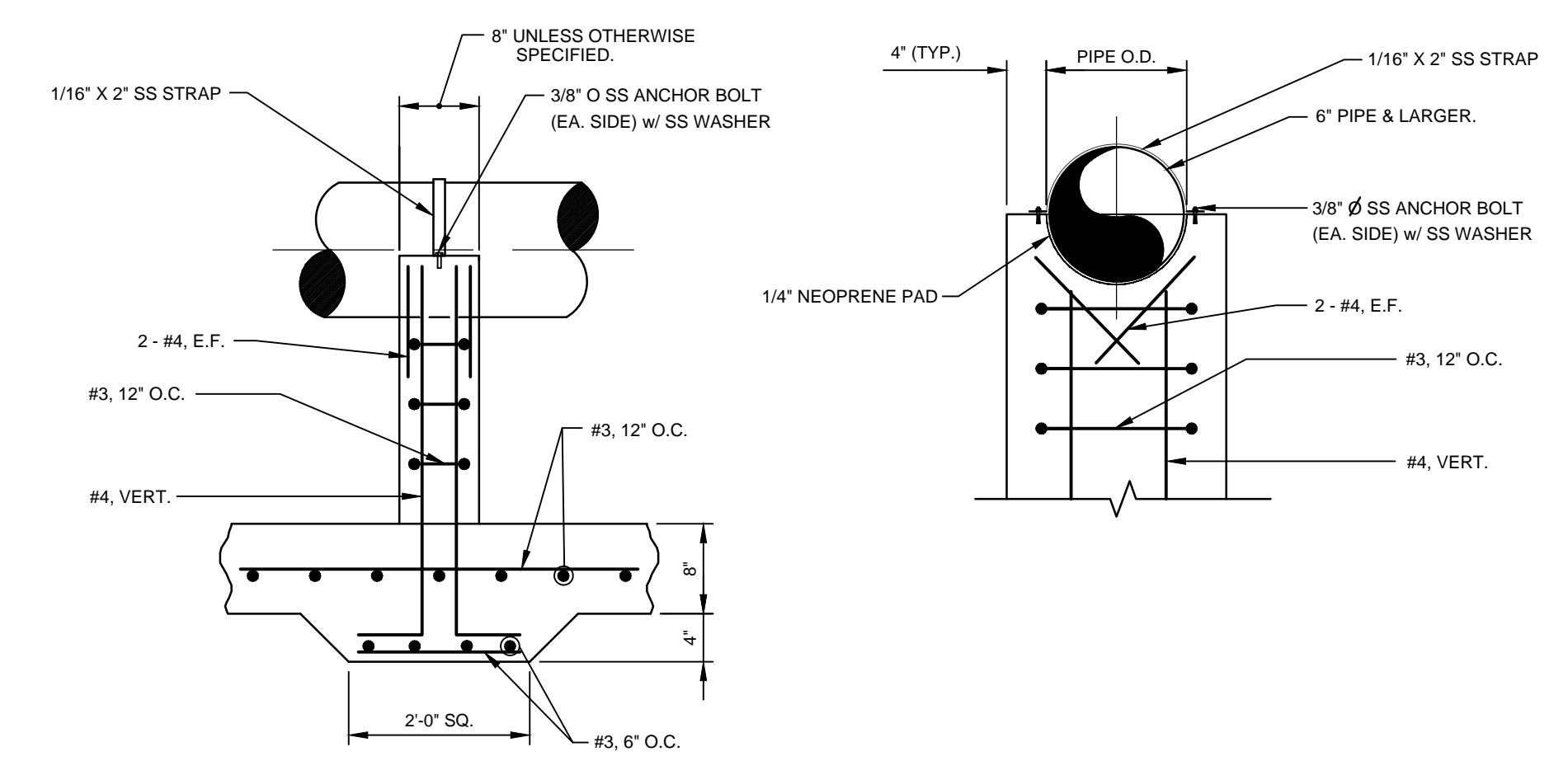


**PROPOSED PIPE, FITTING AND EQUIPMENT LEGEND**

- ① 12" CHECK VALVE (FLG.)
- ② 12" COUPLING ADAPTER (FLG.) AND 12" D.I. SPOOL PIPE
- ③ 12" x 4" TEE (FLG.) W/ TAPPED BLIND FLANGE, 2" GATE VALVE, 2" THREADED AIR & VACUUM RELEASE VALVE, 2" SCHEDULE 80 PVC ARV VENT PIPING TO EXTEND TO SOD AREA AT GROUND LEVEL.
- ④ 12" x 10" REDUCER (FLG.)
- ⑤ VERTICAL CAN TURBINE PUMP

- NOTES**
1. REMOVE EXISTING PUMPS (1, 2, & 3).
  2. PROVIDE NEW PIPE SEALS FOR PUMP NO. 3.
  3. ALL ABOVE GROUND PIPING AND APPURTENANCES TO BE PAINTED FOLLOWING INSTALLATION.

**HIGH SERVICE PUMP MODIFICATIONS**  
SCALE: 3/8" = 1' - 0"



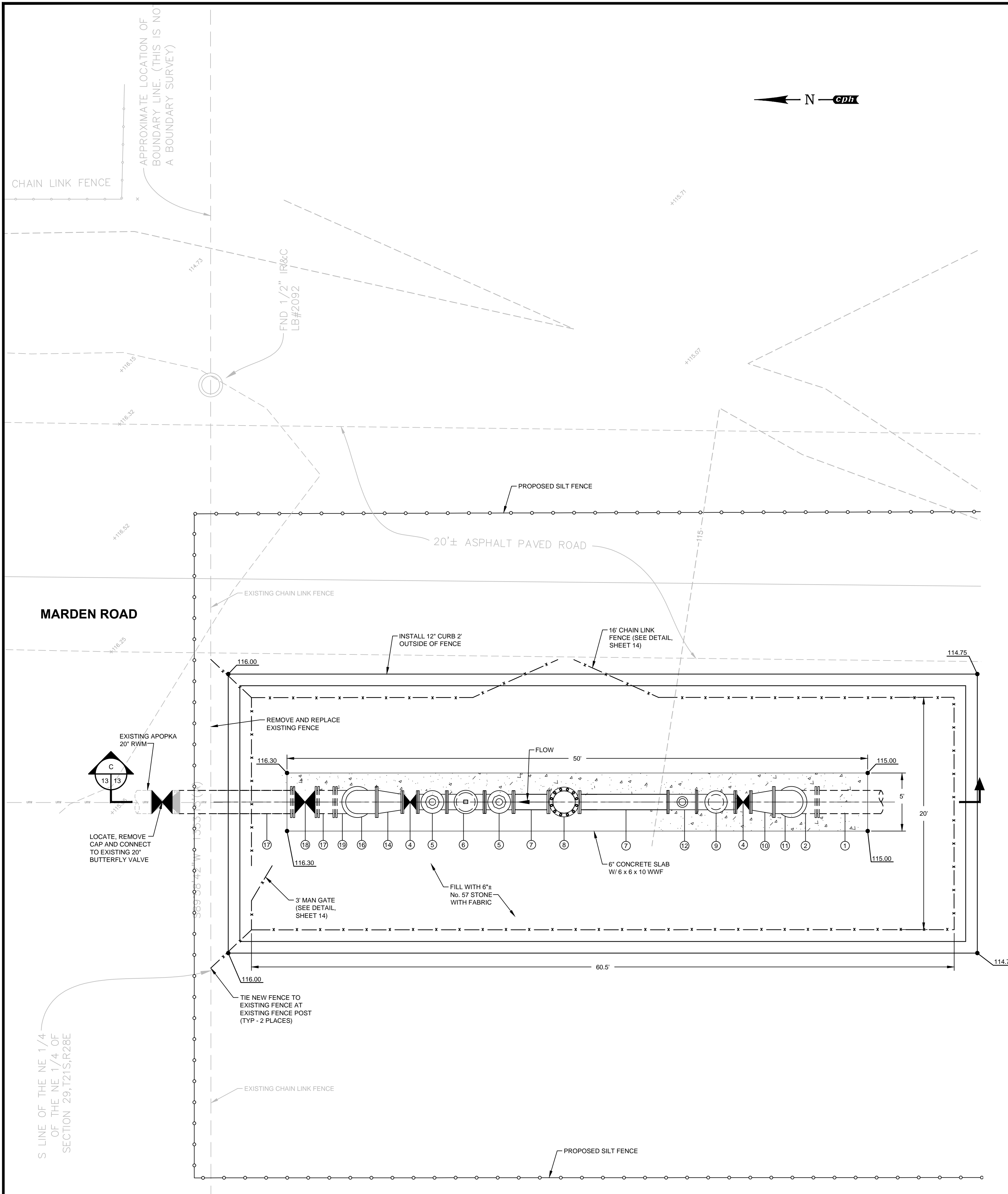
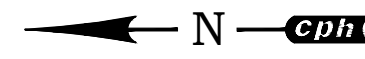
- NOTES:**
1. ALL METAL ACCESSORIES ASSOCIATED WITH PIPE SUPPORTS SHALL BE HOT DIPPED GALVANIZED UNLESS OTHERWISE INDICATED.
  2. PROVIDE NEOPRENE WAFFLE ISOLATED PAD BETWEEN PIPE AND BRACKET.
  3. CONTRACTOR TO FIELD VERIFY LOCATION OF PROPOSED PIPE SUPPORTS PRIOR TO CONSTRUCTION OF SUPPORTS. HE IS TO VERIFY SUPPORTS ARE NOT IN CONFLICT WITH FLANGES, PIPE BOLTS, VALVES OR OTHER APPURTENANCES
  4. ON EXISTING SLAB, DOWEL #5 REBAR 6" DEEP AND SECURE WITH EPOXY.
  5. FOR SUPPORTS ON SHEET 12, USE 6" THICK SLAB WITH ADDITIONAL 4" AT PIPE SUPPORT.

**CONCRETE PIPE SUPPORT**  
NOT TO SCALE

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No.	Date	Revision	By	No.	Date	Revision	By	<p><b>A Full Service A &amp; E Firm</b></p> <p>Architects M / E / P Engineers Planners Environmental Surveyors Landscape Architects Traffic/Transportation</p> <p>www.cphcorp.com</p>	<p>Offices In:</p> <ul style="list-style-type: none"> <li>• Florida</li> <li>• Puerto Rico</li> <li>• Connecticut</li> <li>• Maryland</li> <li>• Texas</li> </ul>	<p>Designed by: JRM</p> <p>Drawn by: DGH</p> <p>Checked by: DEM</p> <p>Approved by: JRM</p> <p>Job No. O28409</p>	<p>Date: 5/01/2015</p> <p>Scale: AS NOTED</p>	<p><b>ORANGE COUNTY GOVERNMENT</b></p> <p>NWRF - RECLAIMED WATER MAIN EXTENSION AND PUMP STATION IMPROVEMENTS</p>	<p>Plans Prepared By:</p> <p><b>CPH, Inc.</b></p> <p>1117 E. Robinson St. Orlando, FL 32801 Ph: 407.425.9452</p> <p>Licenses: Eng. C.O.A. No. 3215 Arch. Lic. No. AA2600926 Survey L.B. No. 7143 Landscp. Lic. No. LC0000298</p>	<p>JAMES R. MORRIS, J.R., P.E. REG-# 62384</p>	<p><b>HIGH SERVICE PUMP STATION MODIFICATIONS</b></p>	<p>Sheet No.</p> <p style="font-size: 2em; font-weight: bold;">12</p>

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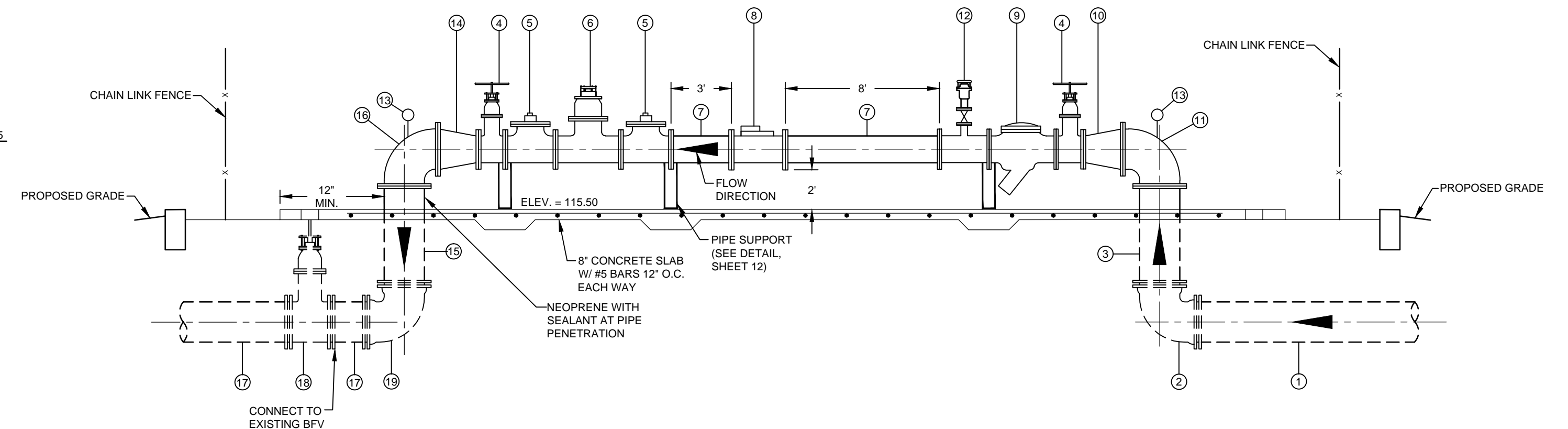


**METER ASSEMBLY SITE PLAN**

SCALE: 1" = 5'

**PIPE, FITTING AND EQUIPMENT LEGEND**

- ① 24" DIP (M.J.)
- ② 24" 90° BEND (M.J.)
- ③ 24" DIP (FLG. x P.E.)
- ④ 16" GATE VALVE (FLG.)
- ⑤ 16" TEE W/ BLIND FLANGE WITH TAPPED HOLE AND PRESSURE TRANSDUCER (FLG.)
- ⑥ 16" PRESSURE REDUCING / SUSTAINING VALVE (FLG.)
- ⑦ 16" DIP SPOOL PIECE AS REQUIRED (FLG.)
- ⑧ 16" FLOW METER (FLG.)
- ⑨ 16" WYE STRAINER W/ MANUAL FLUSH (FLG.)
- ⑩ 24" x 16" REDUCER (FLG.)
- ⑪ 24" 90° BEND (FLG.)
- ⑫ 16" x 4" TEE (FLG.) WITH BLIND FLANGE 2" TAP FOR 2" GATE VALVE AND 2" AIR RELEASE VALVE
- ⑬ PRESSURE GAUGE
- ⑭ 20" x 16" REDUCER (FLG.)
- ⑮ 20" DIP (FLG. x P.E.)
- ⑯ 20" 90° BEND (FLG.)
- ⑰ 20" DIP (M.J.)
- ⑱ 20" BUTTERFLY VALVE (M.J.)
- ⑲ 20" 90° BEND (M.J.)



**METER ASSEMBLY SECTION**

SCALE: 1" = 5'

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No.	Date	Revision	By	No.	Date	Revision	By

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 Checked by: DEM  
 Approved by: JRM  
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**ORANGE COUNTY GOVERNMENT**  
 NWRP - RECLAIMED WATER MAIN EXTENSION AND PUMP STATION IMPROVEMENTS  
 ORANGE COUNTY UTILITIES UTILITIES ENGINEERING DIVISION

Plans Prepared By:  
**CPH, Inc.**  
 1117 E. Robinson St. Orlando, FL 32801  
 Ph: 407.425.9452  
 Licenses:  
 Eng. C.O.A. No. 3215 Arch. Lic. No. AA2600926  
 Survey L.B. No. 7143 Landscp. Lic. No. LC0000298

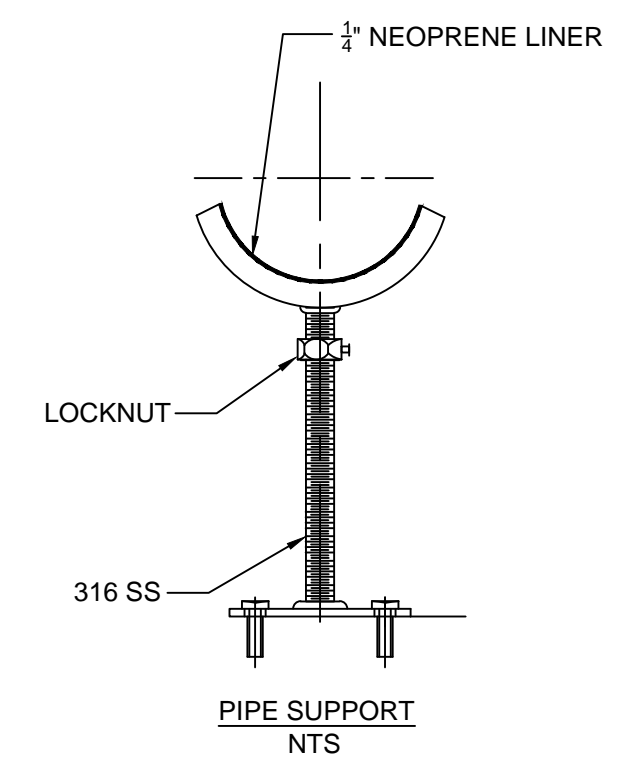
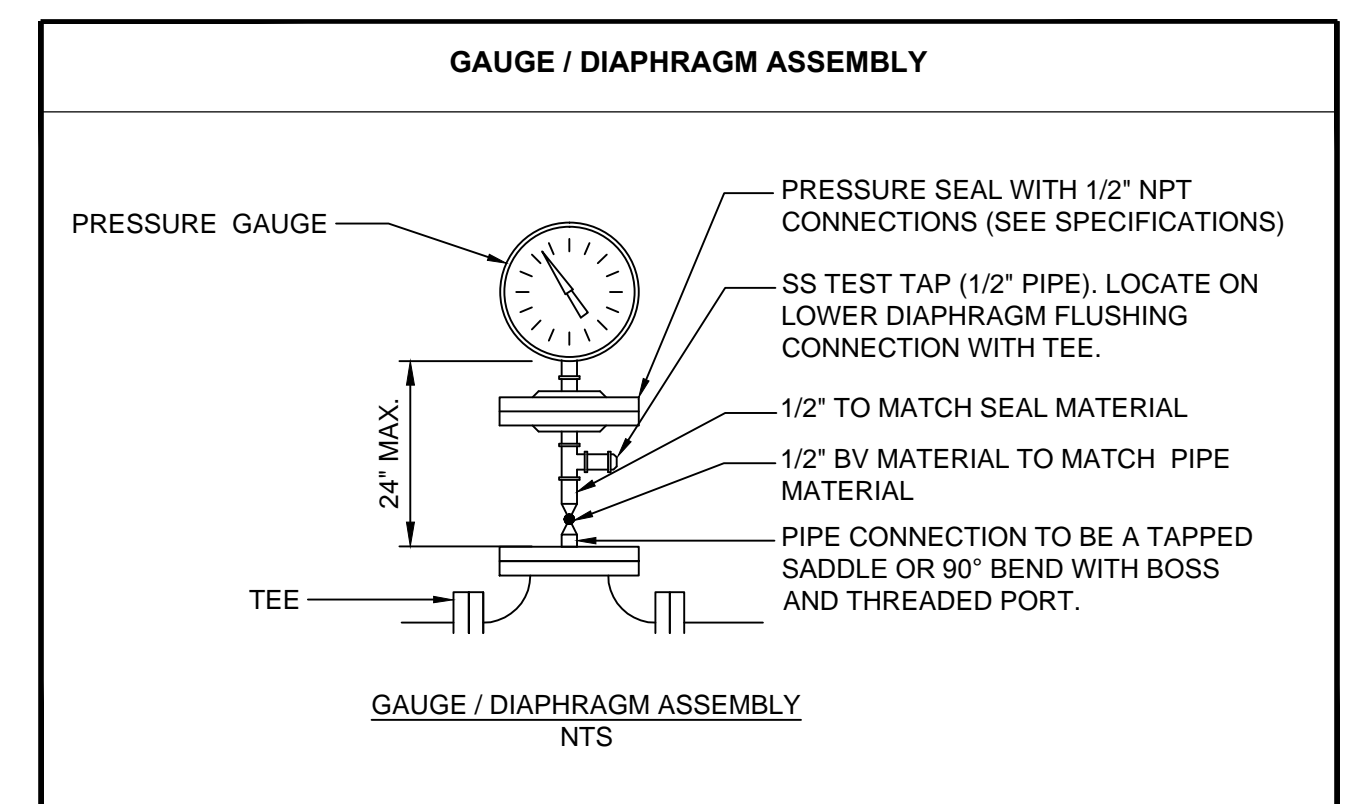
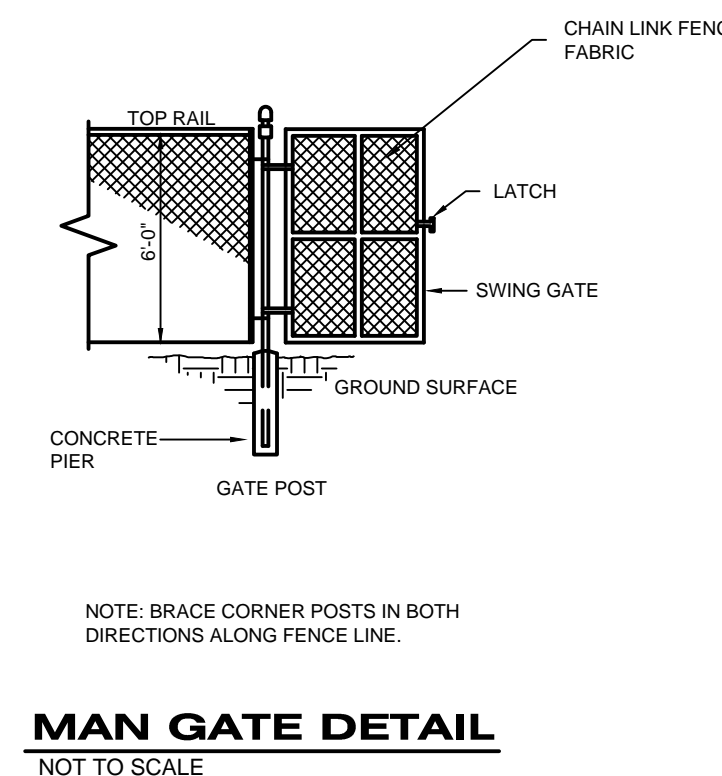
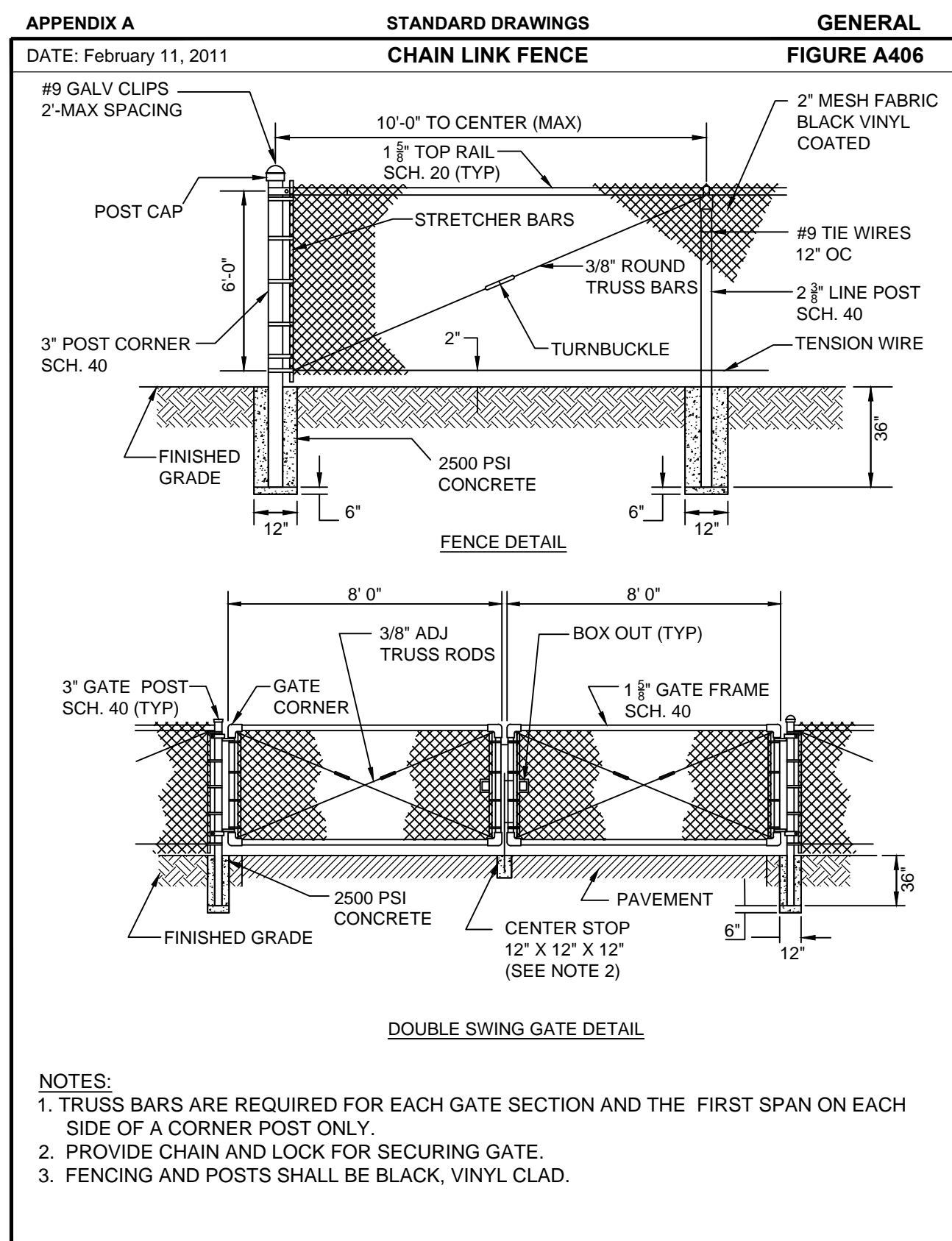
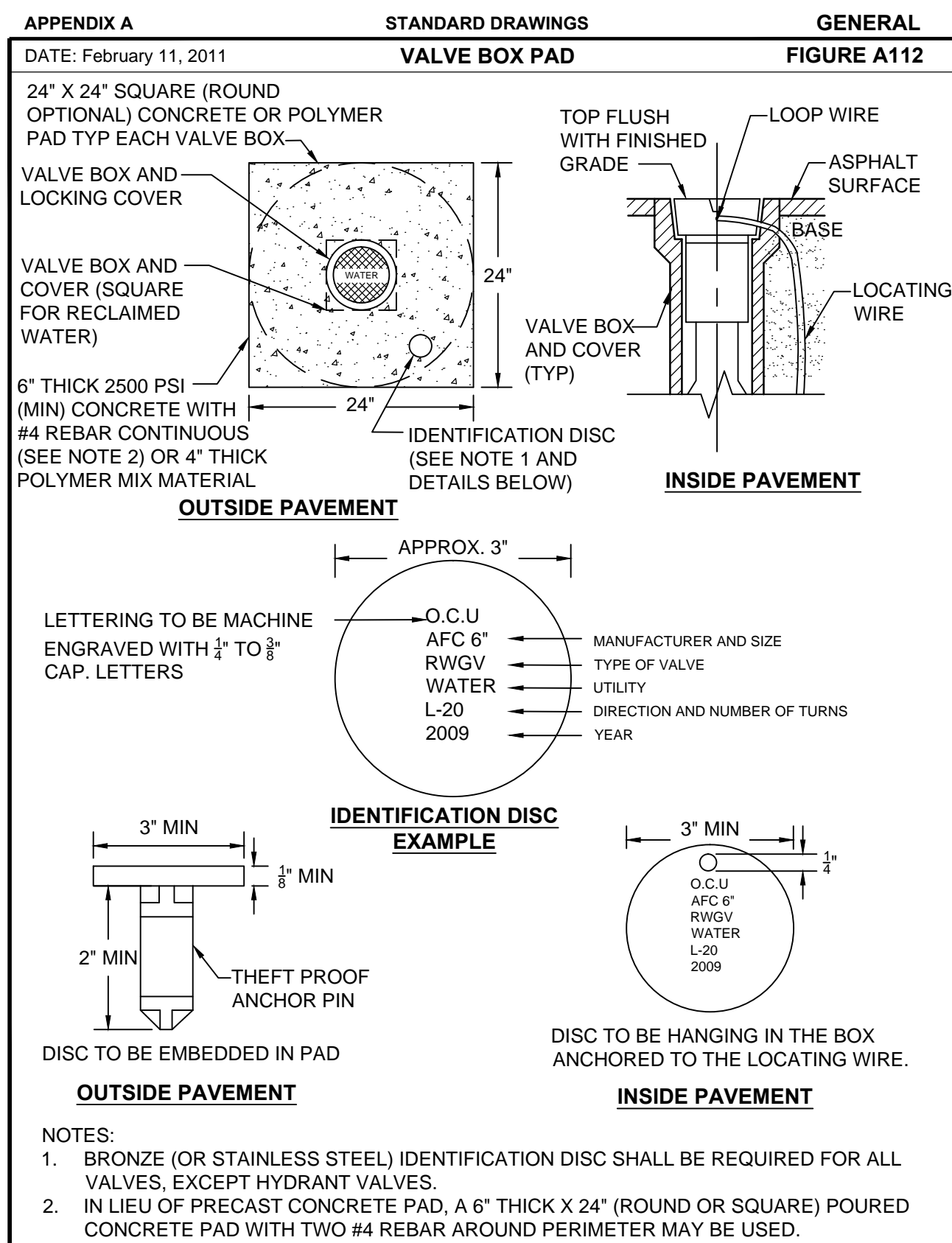
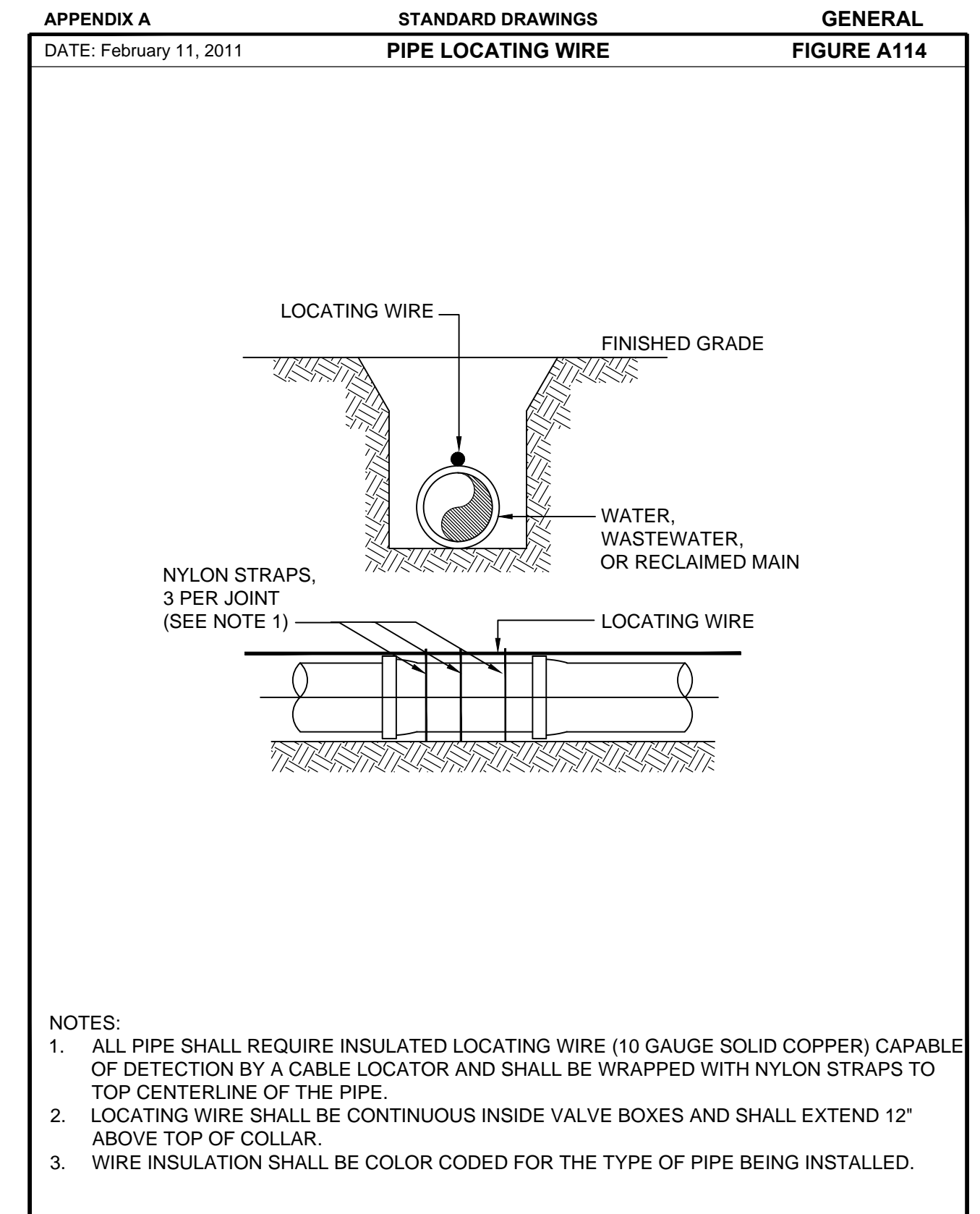
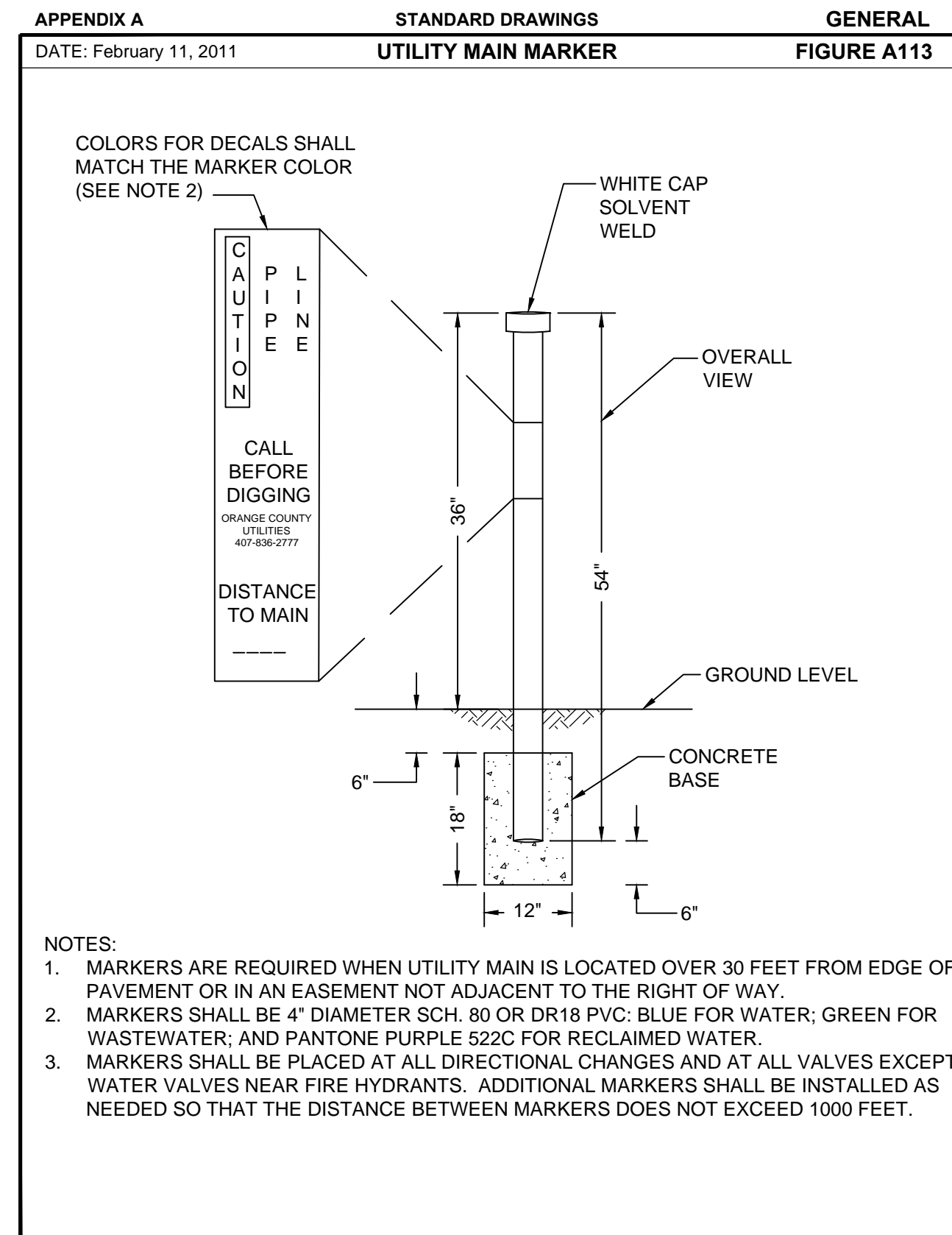
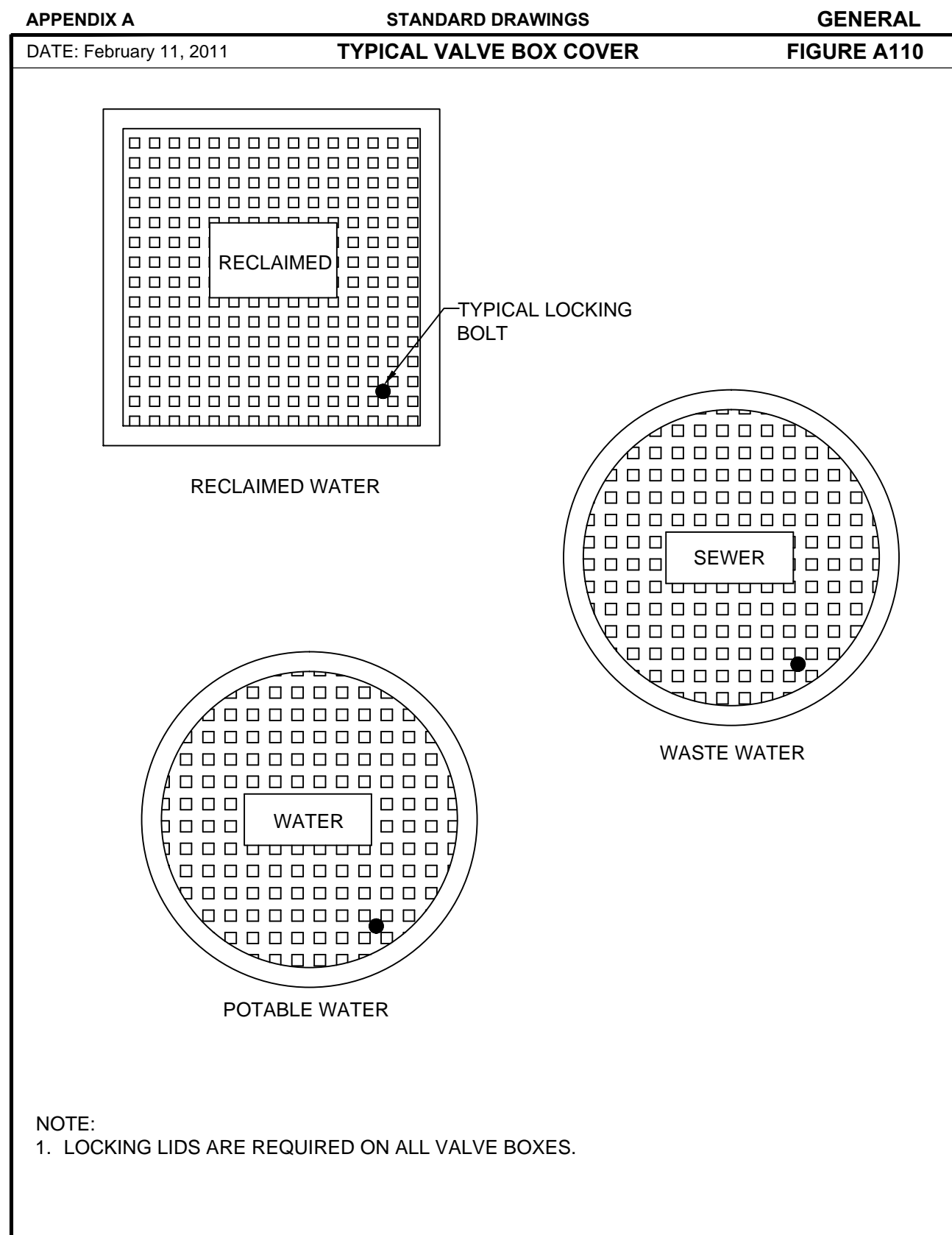
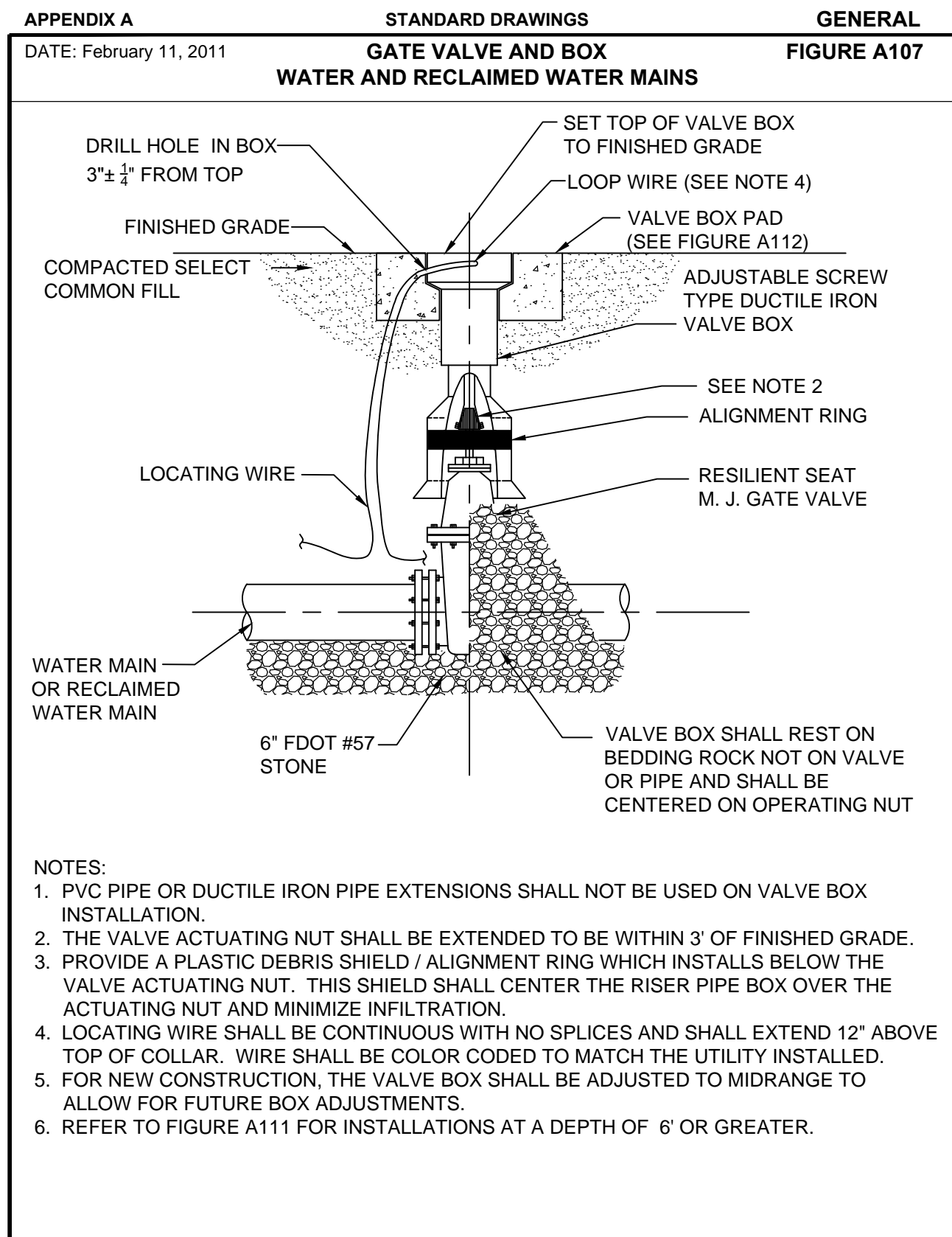
JAMES R. MORRIS, J.R., P.E.  
 REG-# 62384

**METER SITE PLAN**

Sheet No.  
**13**

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No.	Date	Revision	By	No.	Date	Revision	By

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Approved by: JRM  
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**ORANGE COUNTY**  
NWRP - RECLAIMED WATER MAIN EXTENSION AND PUMP STATION IMPROVEMENTS

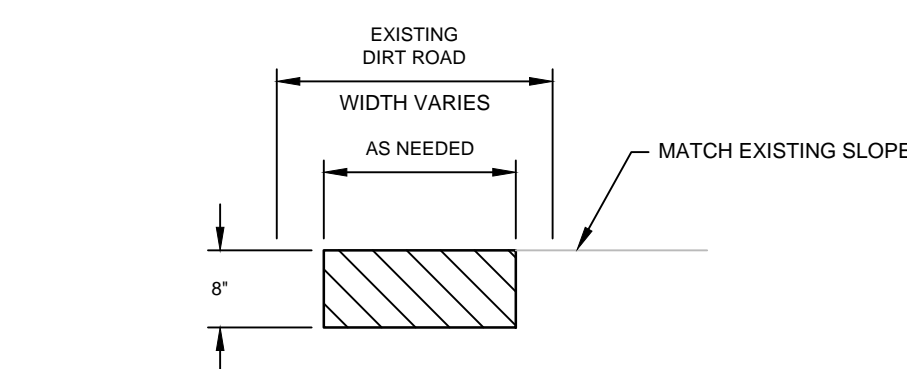
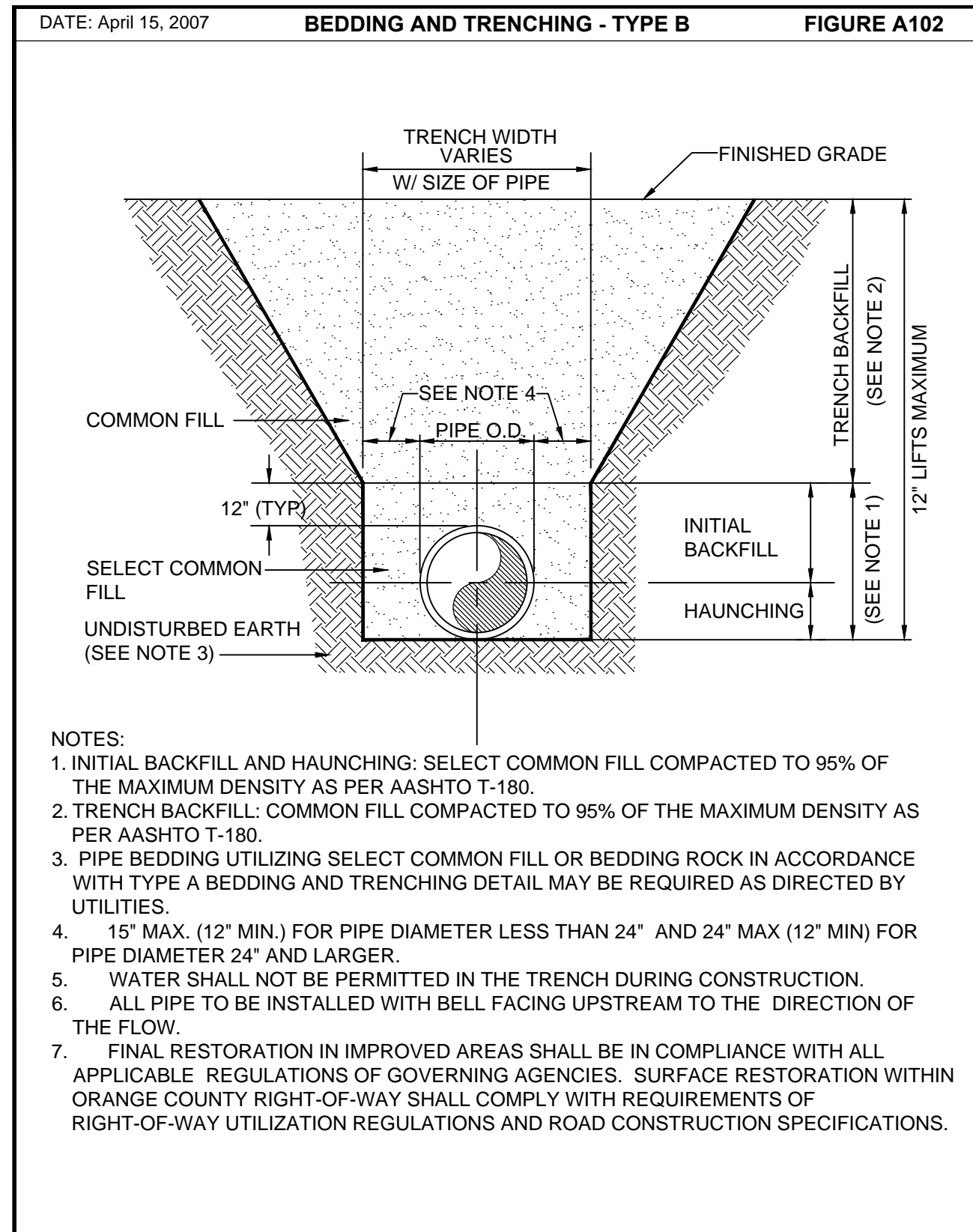
Plans Prepared By:  
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REG-# 62384

**DETAILS**

Sheet No.  
**14**

BID SET



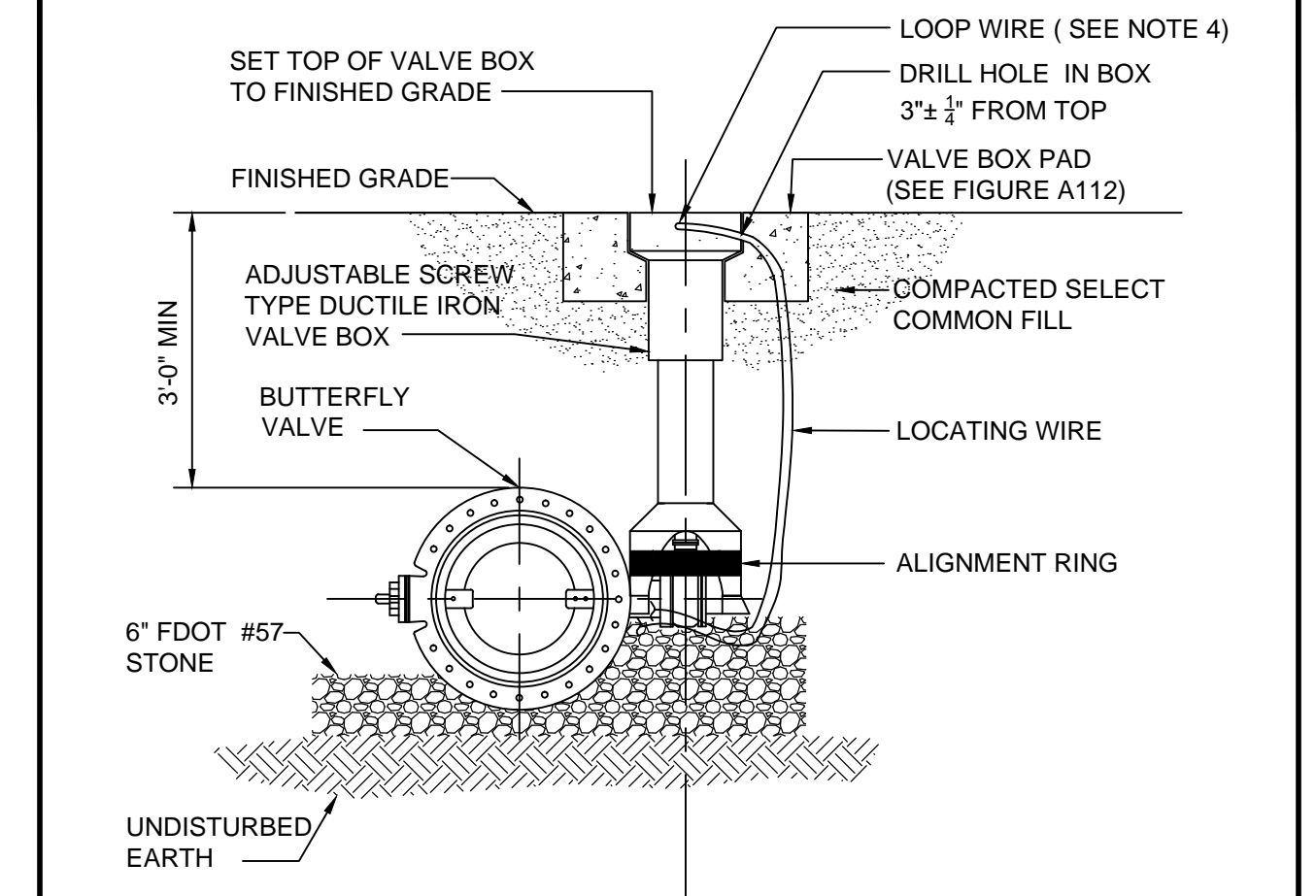
- NOTES**
- RECONSTRUCT A MINIMUM 8' WIDE, 8" THICK SOIL CEMENT ROAD ON EXISTING STABILIZED ROAD (CENTERED ON EXISTING ROAD). TACK AND SAND TO FINISH.
  - COMPACT EXISTING (REMAINING) STABILIZED ROAD ON 98% MODIFIED PROCTOR, TACK AND SAND PRIOR TO CONSTRUCTION OF SOIL CEMENT ROAD.
  - CONTRACTOR TO RECONSTRUCT STABILIZED ROAD UPON COMPLETION OF 24"-INCH RECLAIMED WATER MAIN.

APPENDIX A **STANDARD DRAWINGS** **GENERAL**  
DATE: February 11, 2011 **SEPARATION REQUIREMENTS FOR WATER, WASTEWATER AND RECLAIMED WATER MAINS** **FIGURE A116**

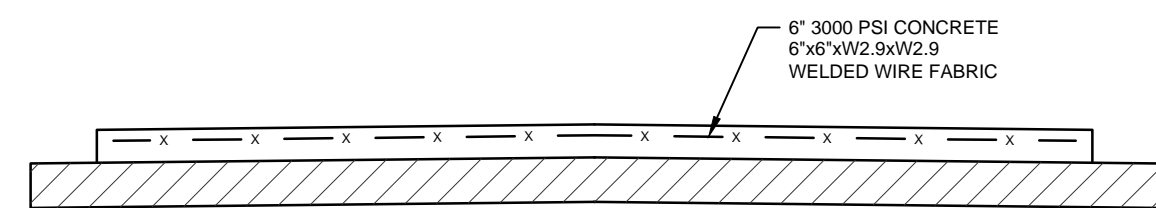
PROPOSED UTILITY	POTABLE WATER		RECLAIMED WATER		WASTEWATER (GRAVITY & FM)		STORM SEWER	
	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT
POTABLE WATER	3' NOTE 1	12"	3' NOTE 1 & 3	12" NOTE 3	6' NOTE 3	12" NOTE 3	3' NOTE 1 & 3	12"/18" NOTE 2 & 3
RECLAIMED WATER	3' NOTE 1 & 3	12" NOTE 3	3' NOTE 1	12"	3' NOTE 1	12"	3' NOTE 1	12"/18" NOTE 2
WASTEWATER (GRAVITY AND FM)	6' NOTE 3	12" NOTE 3	3' NOTE 1	12"	3' NOTE 1	12"	3' NOTE 1	12"/18" NOTE 2
RIGHT OF WAY	3' NOTE 1	N/A	3' NOTE 1	N/A	3' NOTE 1	N/A	N/A	N/A

- NOTES:**
- THIS SEPARATION REQUIREMENT IS TO PROVIDE ACCESSIBILITY FOR CONSTRUCTION AND MAINTENANCE. THREE FEET OF HORIZONTAL SEPARATION IS THE MINIMUM FOR PIPES WITH THREE FEET OF COVER. FOR PIPES INSTALLED AT GREATER DEPTHS, PROVIDE AN ADDITIONAL FOOT OF SEPARATION FOR EACH ADDITIONAL FOOT OF DEPTH.
  - THE 18-INCH SEPARATION REQUIREMENT APPLIES WHEN THE STORM PIPE CROSSES ABOVE THE OCW MAIN, AND WHEN THE STORM PIPE HAS A DIAMETER EQUAL TO OR GREATER THAN 24 INCHES. OTHERWISE, THE REQUIRED SEPARATION IS 12 INCHES.
  - THIS SEPARATION REQUIREMENT COMPLIES WITH MINIMUM FDEP SEPARATION REQUIREMENTS OUTLINED IN 62-555.314, FAC. VARIANCES FROM THE FDEP REQUIREMENTS MUST COMPLY WITH 62-555.314(5), FAC AND MUST BE APPROVED INDIVIDUALLY BY BOTH FDEP AND OCW.
  - DISTANCES GIVEN ARE FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE.
  - NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF SANITARY OR STORM WATER MANHOLE OR STRUCTURE.

APPENDIX A **STANDARD DRAWINGS** **GENERAL**  
DATE: February 11, 2011 **BUTTERFLY VALVE AND BOX WATER AND RECLAIMED WATER MAINS** **FIGURE A108**

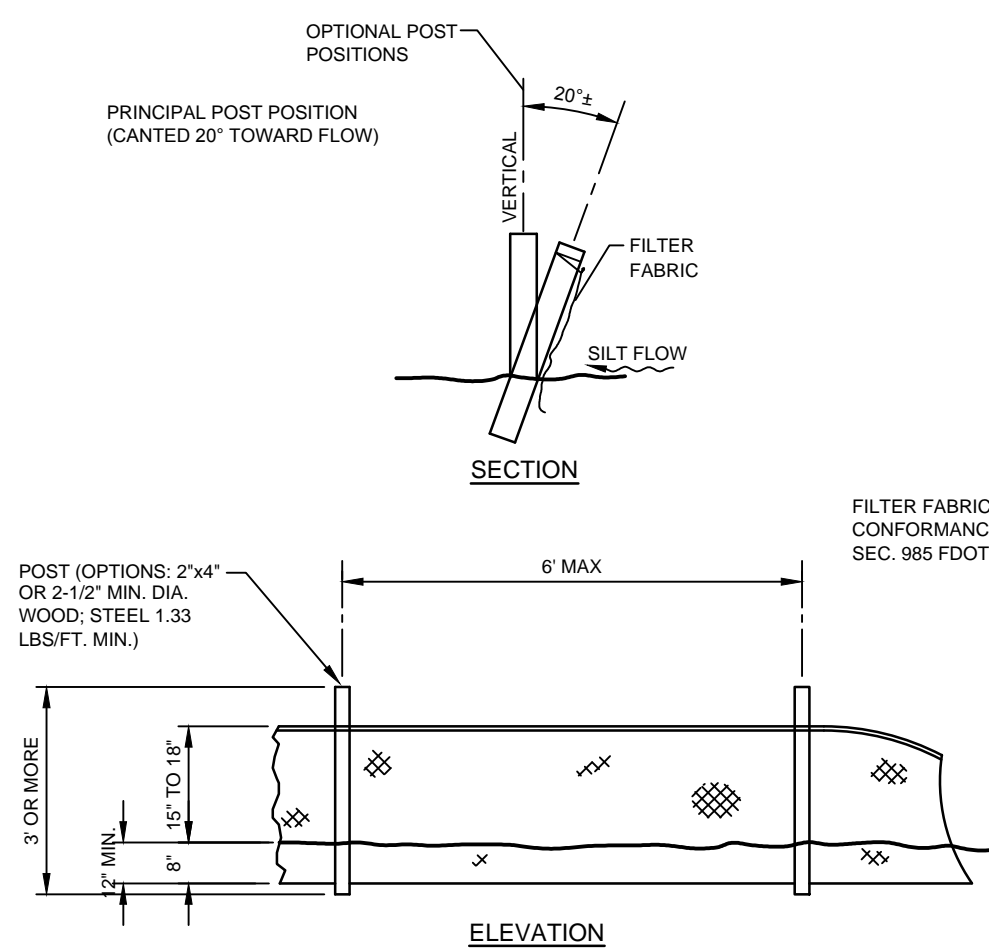


- NOTES:**
- PVC PIPE OR DUCTILE IRON PIPE EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
  - THE VALVE ACTUATING NUT SHALL BE EXTENDED TO BE WITHIN 3' OF FINISHED GRADE.
  - PROVIDE A PLASTIC DEBRIS SHIELD / ALIGNMENT RING WHICH INSTALLS BELOW THE VALVE ACTUATING NUT. THIS SHIELD SHALL CENTER THE RISER PIPE BOX OVER THE ACTUATING NUT AND MINIMIZE INFILTRATION.
  - LOCATING WIRE SHALL BE CONTINUOUS WITH NO SPLICES AND SHALL EXTEND 12" ABOVE TOP OF COLLAR. WIRE SHALL BE COLOR CODED TO MATCH THE UTILITY INSTALLED.
  - FOR NEW CONSTRUCTION, THE VALVE BOX SHALL BE ADJUSTED TO MIDRANGE TO ALLOW FOR FUTURE BOX ADJUSTMENTS.
  - REFER TO FIGURE A111 FOR INSTALLATIONS AT A DEPTH OF 6' OR GREATER.

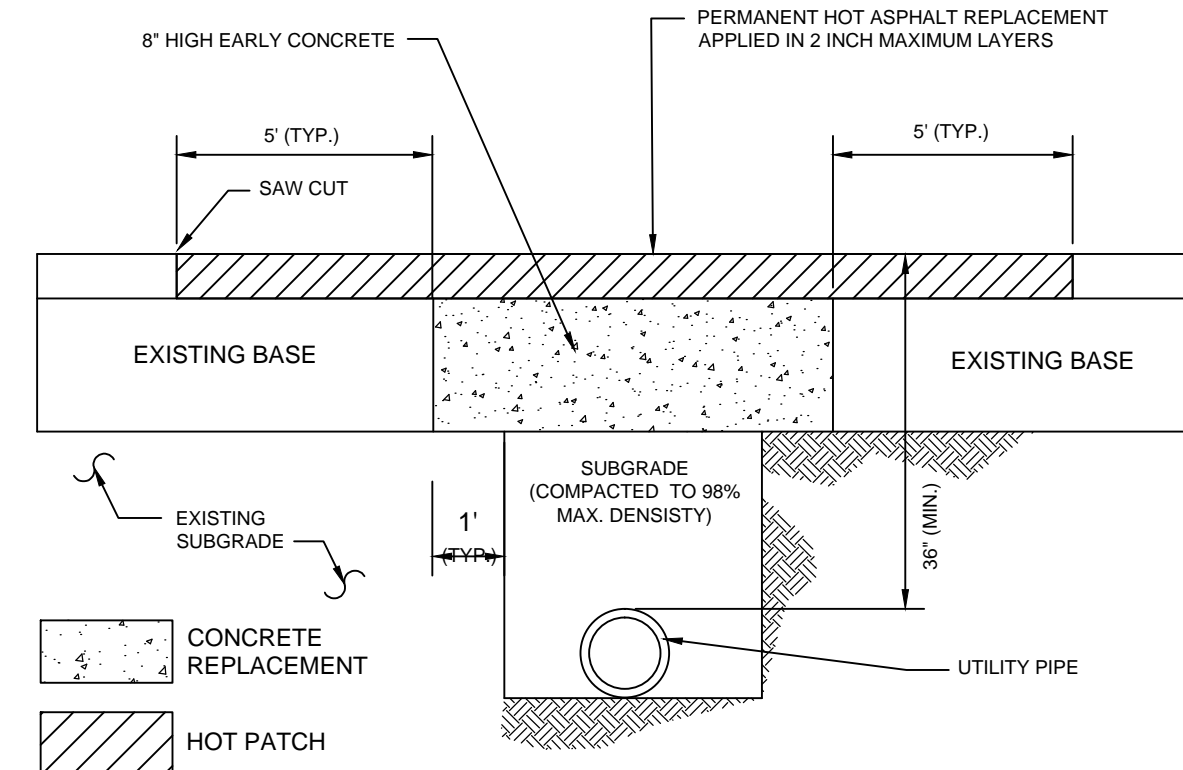


- NOTES**
- DRIVEWAY AND APPROACH SUBGRADE TO BE 8" THICK, SUBGRADE TO BE COMPACTED TO A MINIMUM DENSITY 98% OF THE MAX DENSITY AS DETERMINED BY ASTM D1557.
  - DRIVEWAY AND APPROACH TO BE A MINIMUM OF 6" THICK CONCRETE.
  - CHANGE FROM STANDARDS SHALL REQUIRE ENGINEER'S APPROVAL.
  - EXPANSION JOINTS EVERY 20 LINEAL FEET.
  - MATCH EXISTING GRADES.

**CONCRETE DRIVEWAY TYPICAL SECTION**  
NOT TO SCALE



**TYPE III SILT FENCE DETAIL**  
SCALE: NONE



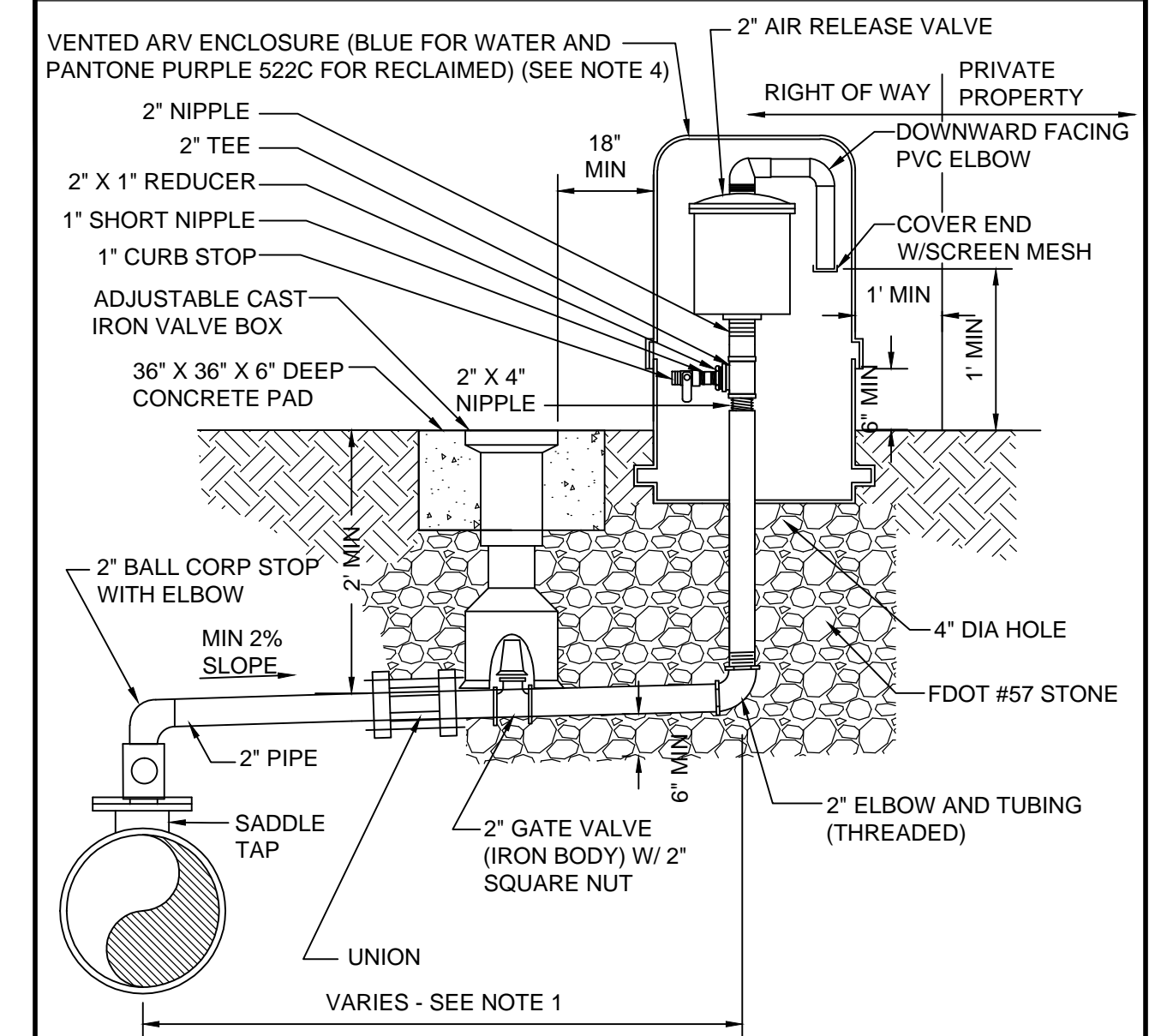
**STANDARD ROADWAY OPEN CUT DETAIL**  
NOT TO SCALE

TEMPORARY COLD PATCH OVER CONCRETE BASE - TYPICAL OF MAJOR OPEN CUTS

- GENERAL NOTES:**
- BASE REPLACEMENT SHALL BE 3000 PSI HIGH EARLY STRENGTH CONCRETE.
  - ASPHALTIC CONCRETE SURFACE MATERIAL SHALL BE REPLACED WITH THE SAME TYPE OF MATERIAL THAT EXISTED AT THE TIME OF REMOVAL.
  - MINIMUM ASPHALTIC CONCRETE SURFACE OVERLAY THICKNESS SHALL BE (1"-5") INCHES, OR AS APPROVED BY THE COUNTY ENGINEER.
  - ALL JOINT CUTS SHALL BE MECHANICALLY SAW-CUT.
  - SUB-GRADE TO BE COMPACTED TO 98% MAX. DENSITY AS DETERMINED BY AASHTO T-180. CUT TO BE REPLACED WITH 3000 PSI HIGH EARLY CONCRETE TO TOP OF EXISTING BASE. CUT AREA TO BE PLATED OR PROTECTED ON DAY OF POUR. EXISTING SURFACE TO BE SAW CUT TO AN AREA 5 FEET BEYOND BASE CUT.

- PAVEMENT RESTORATION**
- LONGITUDINAL CUTS MAY REQUIRE MILLING AND OVERLAY/SURFACING OF THE COMPLETE WIDTH OF THE TRAVELLED WAY.

APPENDIX A **STANDARD DRAWINGS** **GENERAL**  
REV: APRIL 25, 2011 **AIR OR COMBINATION AIR/VACUUM RELEASE VALVE FOR WATER AND RECLAIMED WATER** **FIGURE A115-1**



- NOTES:**
- OFFSET DISTANCE TO BE FIELD DETERMINED AND AS CLOSE TO THE RIGHT OF WAY AS POSSIBLE AND CLEAR OF PEDESTRIAN WALKWAYS. IF PIPE AT RIGHT OF WAY LINE, NO OFFSET REQUIRED.
  - ABOVE DETAIL APPLIES TO A 2" ARV. FOR LARGER ARVS, PIPE DIAMETER SHALL BE EQUAL TO THE SIZE OF THE ARV.
  - ALL PIPING, VALVES, AND APPURTENANCES TO BE BRASS OR 316 S.S. EXCEPT WHERE SPECIFIED OTHERWISE.
  - THE ENCLOSURE VENTS MUST BE CAPABLE OF ALLOWING AT LEAST THE SAME AMOUNT OF AIRFLOW AS THE VALVE.

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No.	Date	Revision	By	No.	Date	Revision	By

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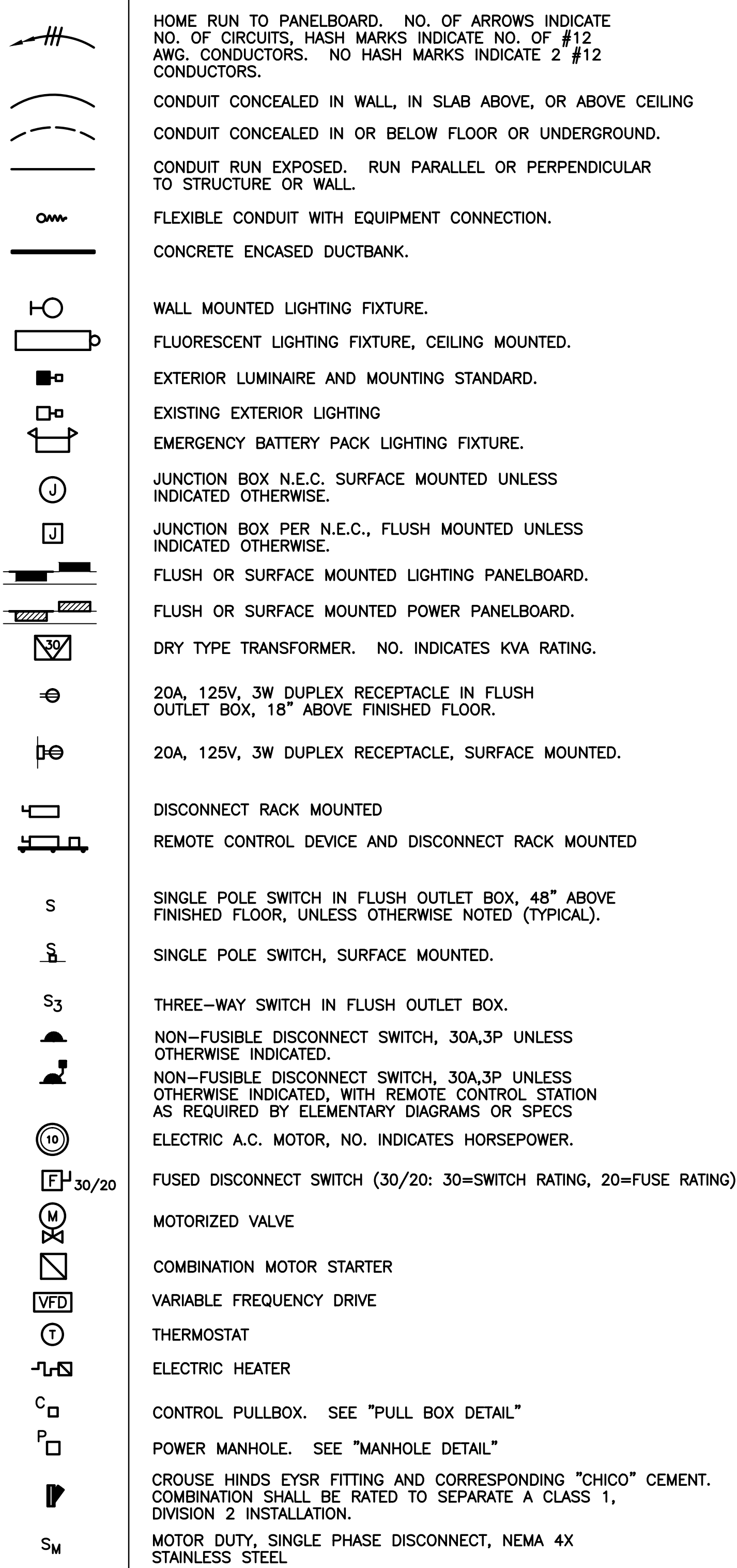
**DETAILS**

Sheet No.  
**15**

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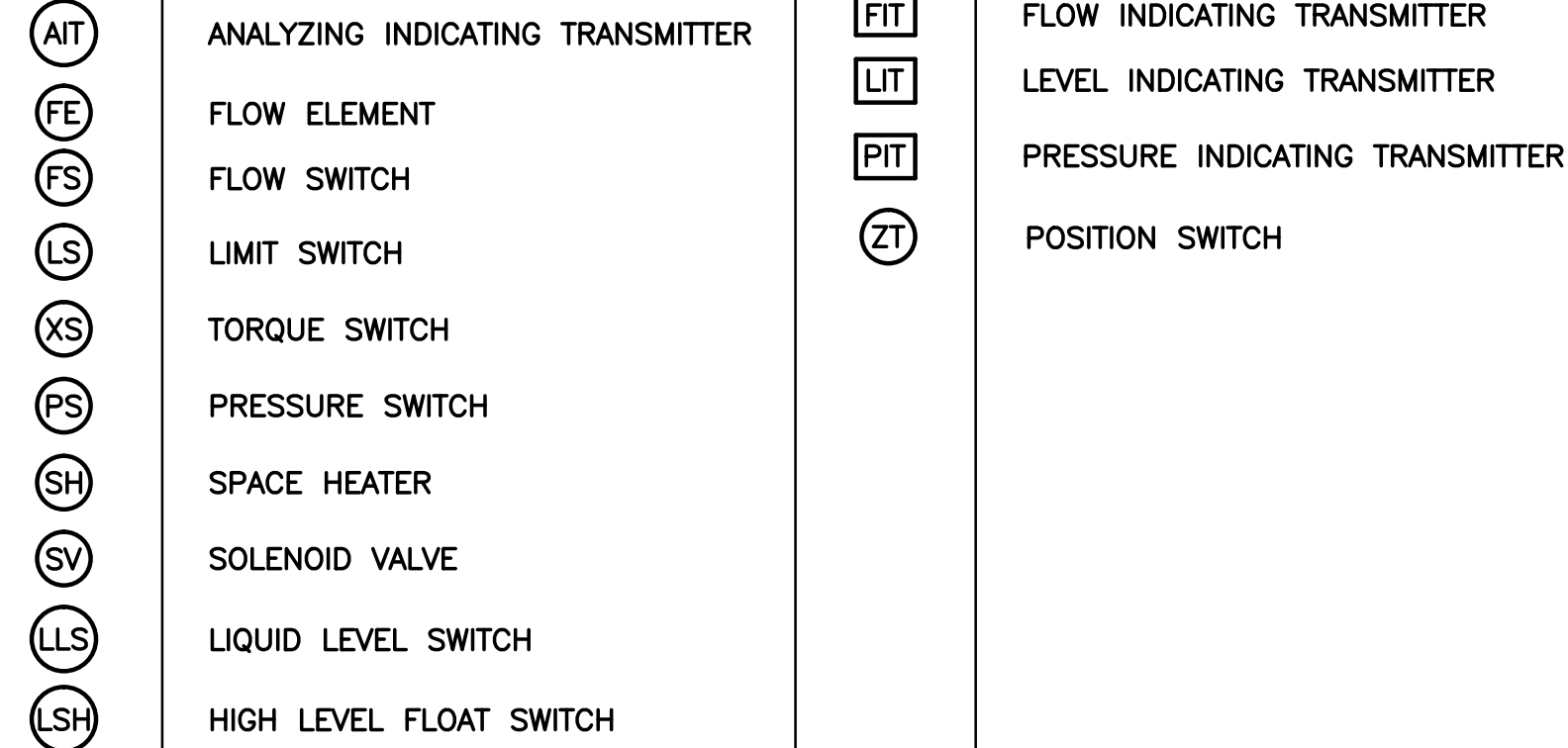


PLAN SYMBOLS

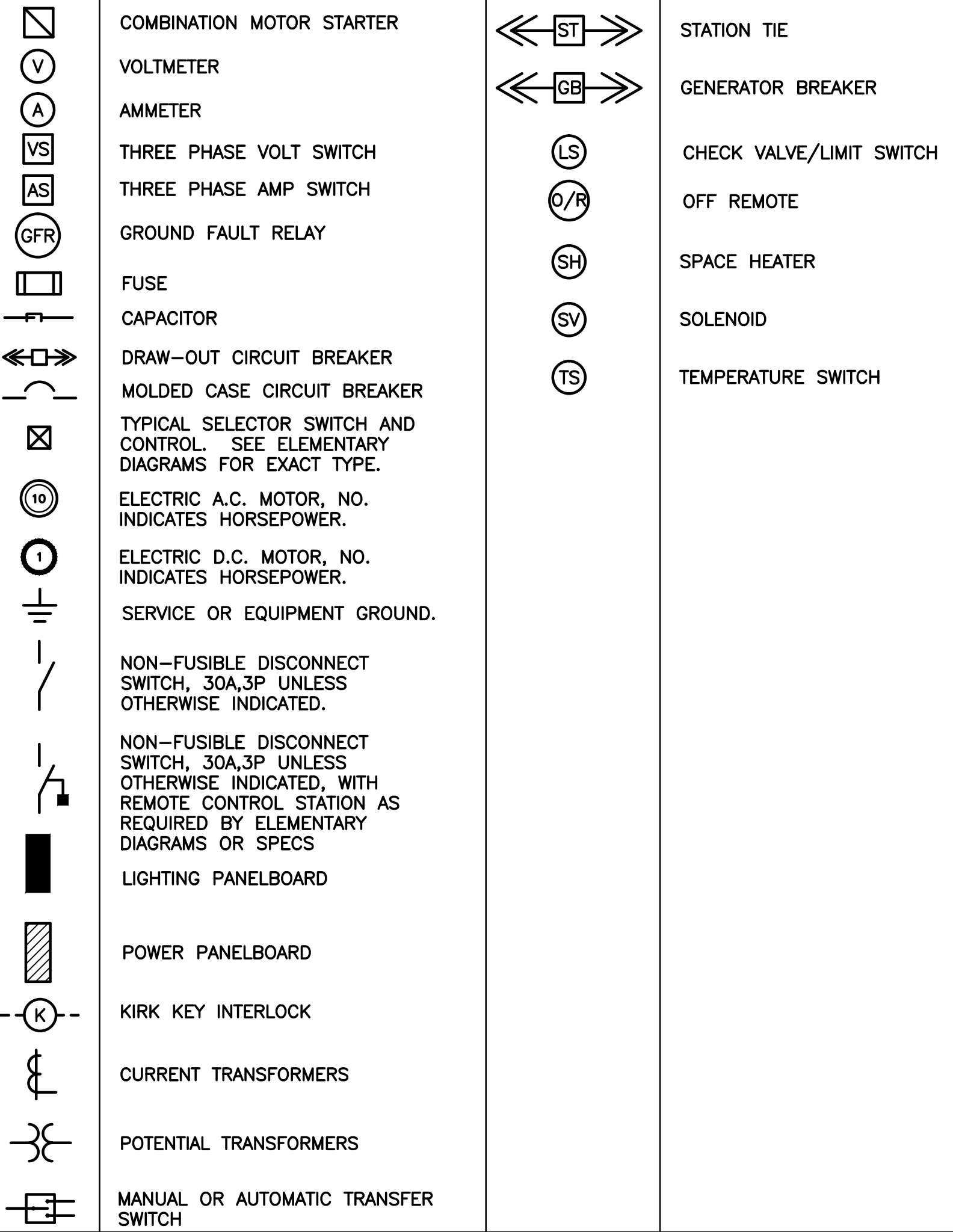


HOME RUN TO PANELBOARD. NO. OF ARROWS INDICATE NO. OF CIRCUITS, HASH MARKS INDICATE NO. OF #12 AWG. CONDUCTORS. NO HASH MARKS INDICATE 2 #12 CONDUCTORS.  
 CONDUIT CONCEALED IN WALL, IN SLAB ABOVE, OR ABOVE CEILING  
 CONDUIT CONCEALED IN OR BELOW FLOOR OR UNDERGROUND.  
 CONDUIT RUN EXPOSED. RUN PARALLEL OR PERPENDICULAR TO STRUCTURE OR WALL.  
 FLEXIBLE CONDUIT WITH EQUIPMENT CONNECTION.  
 CONCRETE ENCASED DUCTBANK.  
 WALL MOUNTED LIGHTING FIXTURE.  
 FLUORESCENT LIGHTING FIXTURE, CEILING MOUNTED.  
 EXTERIOR LUMINAIRE AND MOUNTING STANDARD.  
 EXISTING EXTERIOR LIGHTING  
 EMERGENCY BATTERY PACK LIGHTING FIXTURE.  
 JUNCTION BOX N.E.C. SURFACE MOUNTED UNLESS INDICATED OTHERWISE.  
 JUNCTION BOX PER N.E.C., FLUSH MOUNTED UNLESS INDICATED OTHERWISE.  
 FLUSH OR SURFACE MOUNTED LIGHTING PANELBOARD.  
 FLUSH OR SURFACE MOUNTED POWER PANELBOARD.  
 DRY TYPE TRANSFORMER. NO. INDICATES KVA RATING.  
 20A, 125V, 3W DUPLEX RECEPTACLE IN FLUSH OUTLET BOX, 18" ABOVE FINISHED FLOOR.  
 20A, 125V, 3W DUPLEX RECEPTACLE, SURFACE MOUNTED.  
 DISCONNECT RACK MOUNTED  
 REMOTE CONTROL DEVICE AND DISCONNECT RACK MOUNTED  
 SINGLE POLE SWITCH IN FLUSH OUTLET BOX, 48" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED (TYPICAL).  
 SINGLE POLE SWITCH, SURFACE MOUNTED.  
 THREE-WAY SWITCH IN FLUSH OUTLET BOX.  
 NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED.  
 NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED, WITH REMOTE CONTROL STATION AS REQUIRED BY ELEMENTARY DIAGRAMS OR SPECS  
 ELECTRIC A.C. MOTOR, NO. INDICATES HORSEPOWER.  
 FUSED DISCONNECT SWITCH (30/20: 30=SWITCH RATING, 20=FUSE RATING)  
 MOTORIZED VALVE  
 COMBINATION MOTOR STARTER  
 VARIABLE FREQUENCY DRIVE  
 THERMOSTAT  
 ELECTRIC HEATER  
 CONTROL PULLBOX. SEE "PULL BOX DETAIL"  
 POWER MANHOLE. SEE "MANHOLE DETAIL"  
 CROUSE HINDS EYSR FITTING AND CORRESPONDING "CHICO" CEMENT. COMBINATION SHALL BE RATED TO SEPARATE A CLASS 1, DIVISION 2 INSTALLATION.  
 MOTOR DUTY, SINGLE PHASE DISCONNECT, NEMA 4X STAINLESS STEEL

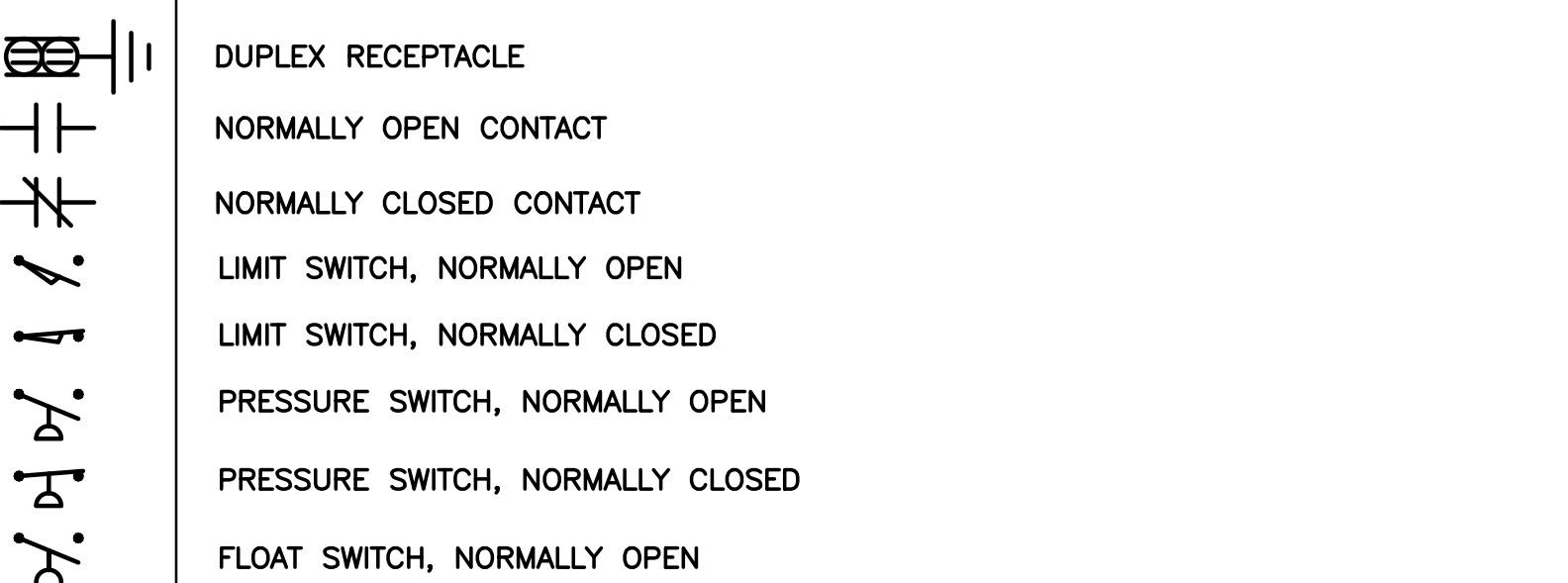
PLAN SYMBOLS (CONTINUED)



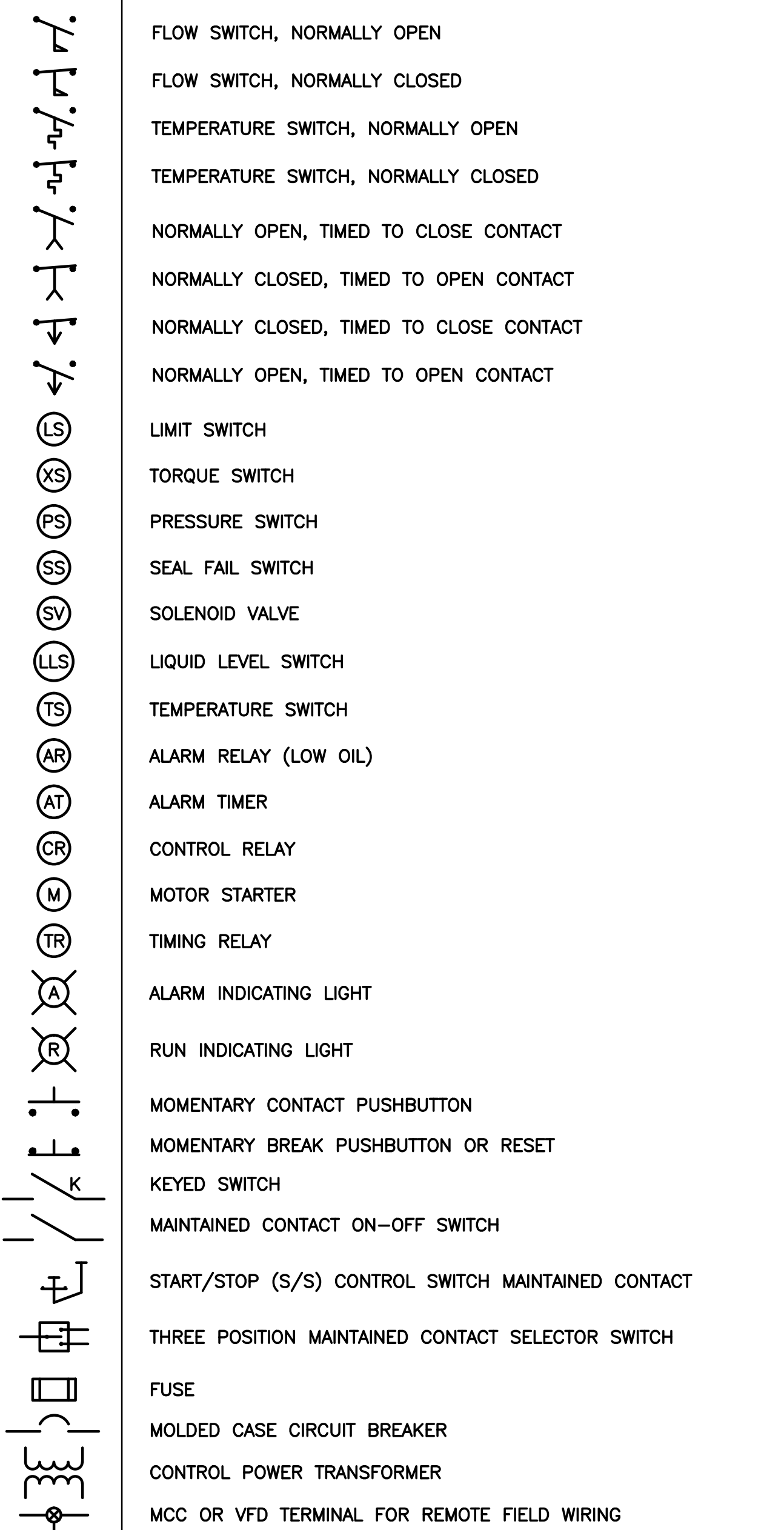
SINGLE LINE DIAGRAM SYMBOLS



CONTROL DIAGRAM SYMBOLS



CONTROL DIAGRAM SYMBOLS (CONTINUED)



ABBREVIATIONS

A ACCU  
 AE AIR COOLED CONDENSING UNIT  
 AFF ANALYZER ELEMENT  
 AHU ABOVE FINISHED FLOOR  
 AIC AIR HANDLING UNIT  
 AUX AMPS INTERRUPTING CURRENT  
 BKR ANALYZER INDICATING TRANSMITTER  
 BLDG AUXILIARY  
 CAB BREAKER  
 CB BUILDING  
 CMH CABINET  
 CP CIRCUIT BREAKER  
 CU CONTROL MANHOLE  
 DE CONTROL PANEL  
 DH COPPER  
 DISC DUKE ENERGY  
 DO DATA HIGHWAY  
 DPDT DISCONNECT  
 DPST DIGITAL OUTPUT  
 EA DOUBLE POLE DOUBLE THROW  
 EFF DIFFERENTIAL PRESSURE INDICATING TRANSMITTER  
 ELEC DOUBLE POLE SINGLE THROW  
 EACH  
 EFFLUENT  
 ELECTRICAL

ABBREVIATIONS (CONTINUED)

ELR EMERGENCY LOCK-OUT RELAY  
 EM EMERGENCY  
 ENCL ENCLOSURE  
 EP EXPLOSION PROOF  
 ESSB ENERGY SAVING BALLAST  
 ETM ELAPSED TIME METER  
 EUH ELECTRIC UNIT HEATER  
 EVA ELECTRIC VALVE ACTUATOR  
 EXH EXHAUST  
 EXIST EXISTING  
 FE FLOW ELEMENT  
 FIT FLOW INDICATING TRANSMITTER  
 FOPP FIBER OPTIC PATCH PANEL  
 FRU FLOW RECEIVING UNIT  
 FSL FLOW SWITCH LOW  
 FVNR FULL VOLTAGE CONTACTOR  
 GEN FULL VOLTAGE NON-REVERSING GENERATOR  
 GFI GROUND FAULT INTERRUPTER  
 GND GROUND  
 GRS GALVANIZED RIGID STEEL  
 HOA HAND-OFF-AUTOMATIC  
 HOLR HAND-OFF-LOCAL-REMOTE  
 HOR HAND-OFF-REMOTE  
 HP HORSEPOWER  
 HPS HIGH PRESSURE SODIUM  
 HWY HIGHWAY  
 INSTR INSTRUMENTATION  
 KVA KILOVOLT-AMPERES  
 KW KILOWATT  
 LTG LIGHTING  
 MAX MAXIMUM  
 MCC MOTOR CONTROL CENTER  
 MFR MANUFACTURER  
 MH METAL HALIDE  
 MIN MINIMUM  
 MLO MAIN LUGS ONLY  
 MR MOTOR RUNNING  
 MSC MANUFACTURER SUPPLIED CABLE MOUNTED  
 MTS MANUAL TRANSFER SWITCH  
 NEC NATIONAL ELECTRIC CODE  
 NEUT NEUTRAL  
 NTS NOT TO SCALE  
 OC ON CENTER  
 OH OVERHEAD  
 P POLE  
 PC PUMP CALL  
 PCP PUMP CONTROL PANEL  
 PIT PRESSURE INDICATING TRANSMITTER  
 PM PHASE MONITOR  
 PNL PANEL  
 PS PUMP STATION  
 PVC POLYVINYL CHLORIDE  
 RA RIGID ALUMINUM  
 RCP REMOTE CONTROL PANEL  
 RECPT RECEPTACLE  
 RS RAPID START  
 RSU REMOTE SENSING UNIT  
 RVNR REDUCED VOLTAGE NON-REVERSING  
 SH SHIELDED  
 SS STAINLESS STEEL  
 SSC SOLID STATE CONTACTOR  
 SSM SOLID STATE MODE  
 SSS SOLID STATE STARTER  
 STR STARTER  
 SUPP SUPPRESSOR  
 SW SWITCH  
 SWBD SWITCHBOARD  
 TBR TO BE REMOVED  
 TC TERMINATION CABINET  
 TR TRANSFORMER  
 TYP TYPICAL  
 UG UNDERGROUND  
 UON UNLESS OTHERWISE NOTED  
 UPS UNINTERRUPTIBLE POWER SUPPLY  
 V VOLT  
 VFD VARIABLE FREQUENCY DRIVE  
 W WATT  
 W/ WITH  
 WP WEATHERPROOF  
 φ PHASE

NOTES

- ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ALL NEW ELECTRICAL WORK INDICATED.
- ELECTRICAL CONTRACTOR SHALL VISIT JOB SITE AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING ELECTRICAL INSTALLATION AND MAKE PROVISIONS AS TO THE COST THEREOF. EXISTING CONDITIONS OF ELECTRICAL EQUIPMENT, LIGHT FIXTURES, ETC... THAT ARE PART OF THE FINAL SYSTEM SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO SUBMITTING HIS BID.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE, ORANGE COUNTY STANDARDS, THE FLORIDA BUILDING CODE AND SHALL COMPLY WITH ALL LOCAL RULES AND ORDINANCES.
- MINIMUM WIRE SIZE SHALL BE #12 A.W.G. EXCLUDING CONTROL WIRING, UNLESS OTHERWISE NOTED. ALL CONDUCTORS SHALL BE COPPER.
- IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS NECESSARY FOR THE EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- ELECTRICAL SYSTEM SHALL BE COMPLETE AND EFFECTIVELY GROUNDED AS REQUIRED BY THE LATEST EDITION OF THE N.E.C. OR LOCAL CODES. ALL CONDUITS SHALL HAVE A BOND WIRE SIZED PER TABLE 250 OF THE NATIONAL ELECTRIC CODE.
- ALL MATERIALS SHALL BE NEW AND BEAR UNDERWRITERS' LABELS WHERE APPLICABLE.
- ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR IN A FIRST CLASS WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE AND ACCEPTED BY ENGINEER/OWNER.
- CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FREE FROM DEFECTS FOR A PERIOD OF NOT LESS THAN TWO YEARS FROM DATE OF ACCEPTANCE.
- CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ADDITIONAL CHARGE AND SHALL INCLUDE REPLACEMENT OR REPAIR OF ANY OTHER PHASE OF THE INSTALLATION WHICH MAY HAVE BEEN DAMAGED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED OF HIS WORK.
- ELECTRICAL CONTRACTOR SHALL LABEL ALL PANELS W/ TYPE WRITTEN DIRECTORIES (NEW & EXISTING).
- ALL ELECTRICAL WIRING SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- REFER TO THE MECHANICAL DRAWINGS AND THE APPROVED MANUFACTURER'S SHOP DRAWINGS FOR THE EXACT LOCATION OF ALL EQUIPMENT.
- SHADED/SANITATED TEXT DENOTES EXISTING EQUIPMENT OR STRUCTURES. NON-SHADED TEXT DENOTES NEW EQUIPMENT, STRUCTURES AND WORK. SLANTED TEXT (NOT SHADED) DENOTES FUTURE EQUIPMENT, STRUCTURES AND WORK.
- PROVIDE 4 INCH CONCRETE EQUIPMENT PADS FOR ALL FREE- STANDING PANELS, MCC'S ETC.



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ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS

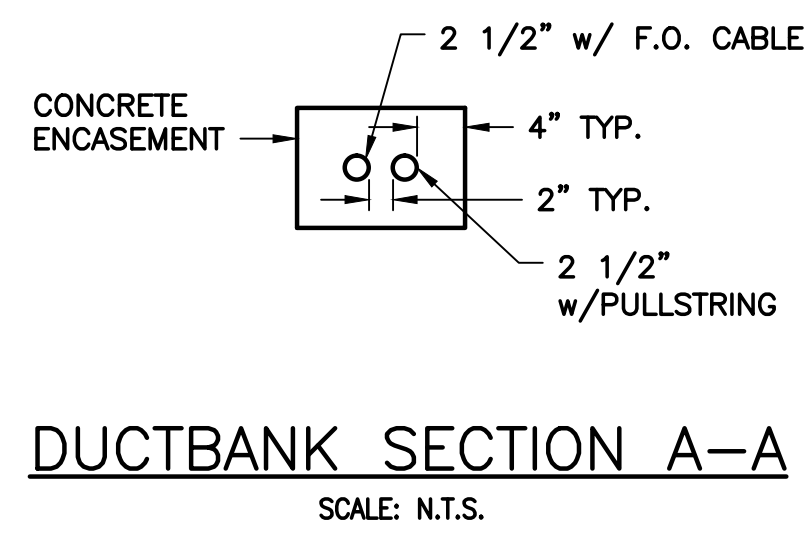




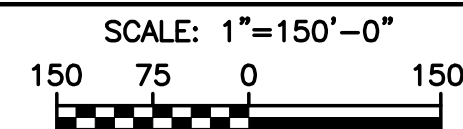
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E-2 **FIGURE NO. 1**  
**AREA 65 FOPP EXT**  
**FIBER PATCH PANEL**  
SCALE: N.T.S.



**2**  
E-2 **FIGURE NO. 2**  
**AREA 65 FOPP EXT**  
**FIBER PATCH PANEL**  
SCALE: N.T.S.



**OVERALL ELECTRICAL SITE PLAN**



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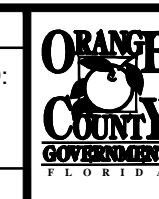
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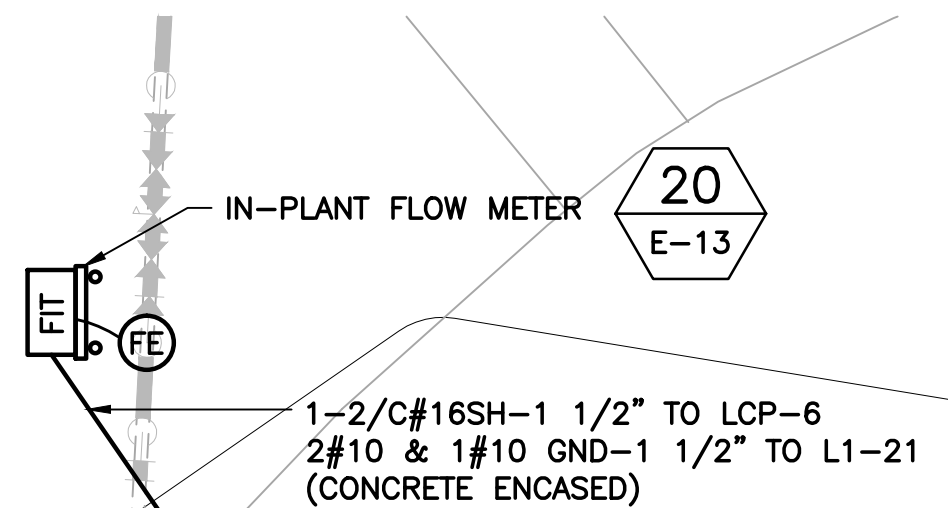
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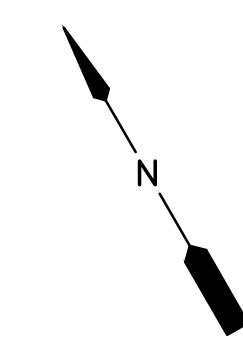
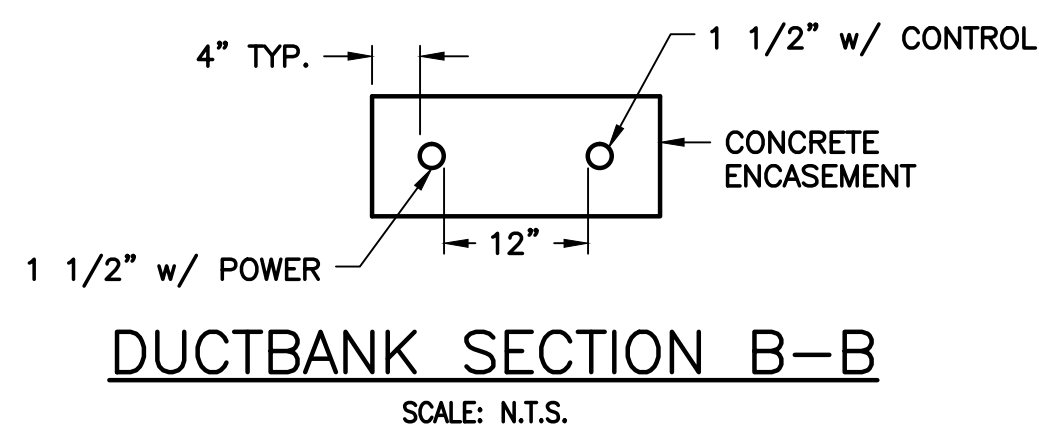
**OVERALL ELECTRICAL SITE PLAN**

Sheet No.  
**E-2**

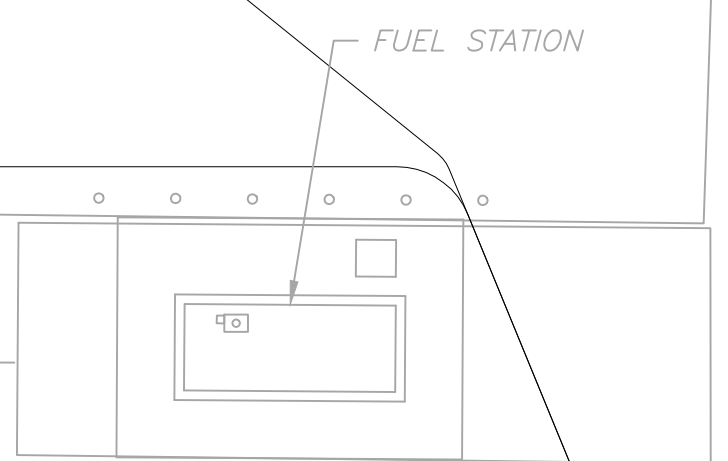
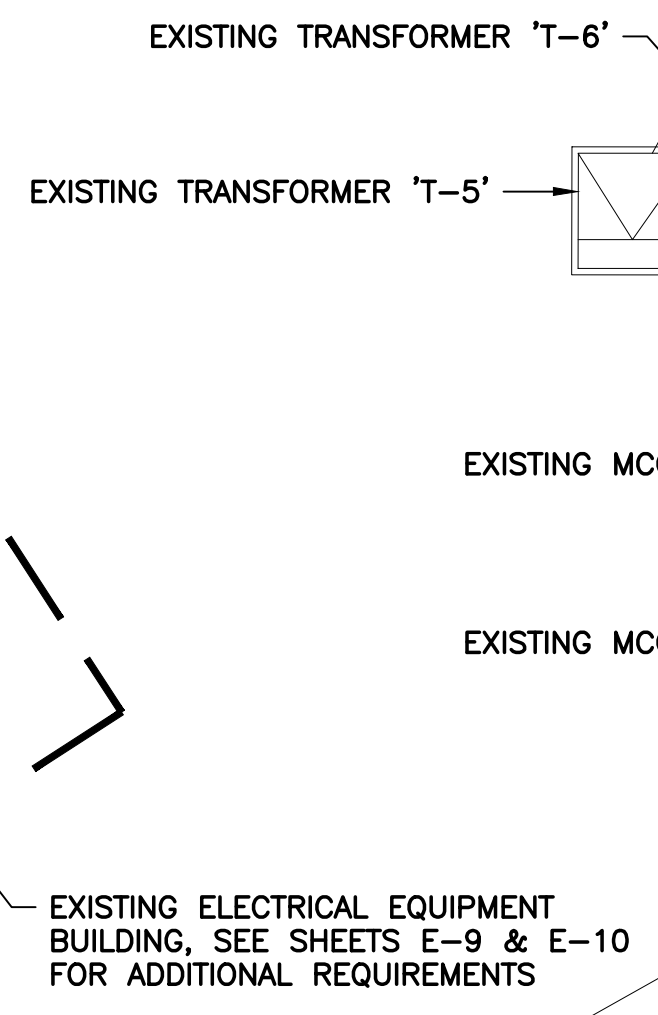
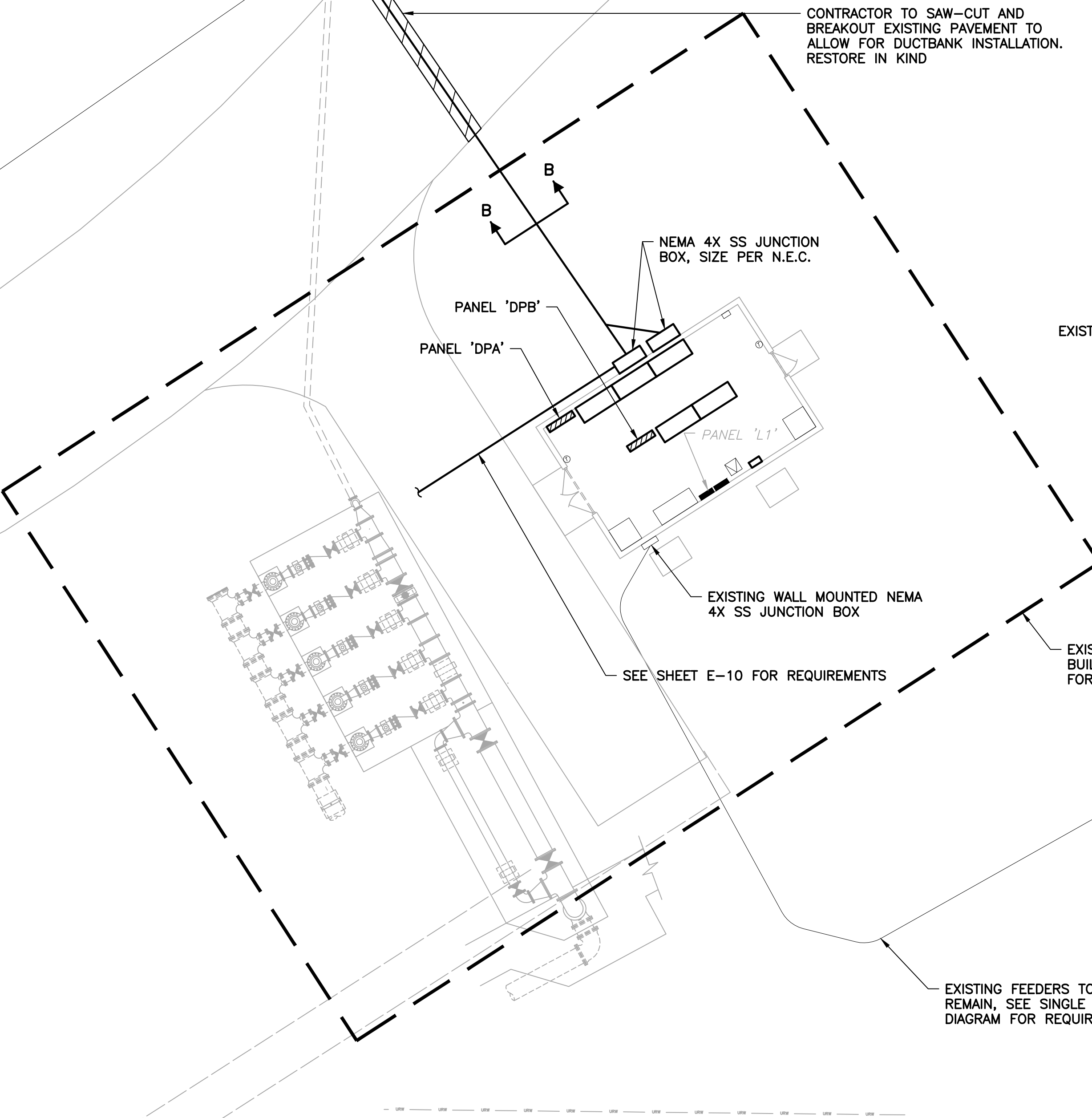




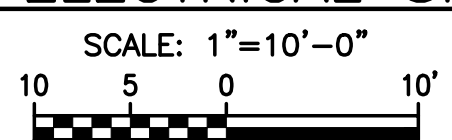
20  
E-13



**NOTES:**  
① REFER TO SINGLE LINE DIAGRAM FOR ADDITIONAL CONDUIT AND WIRE REQUIREMENTS.



**PARTIAL ELECTRICAL SITE PLAN**



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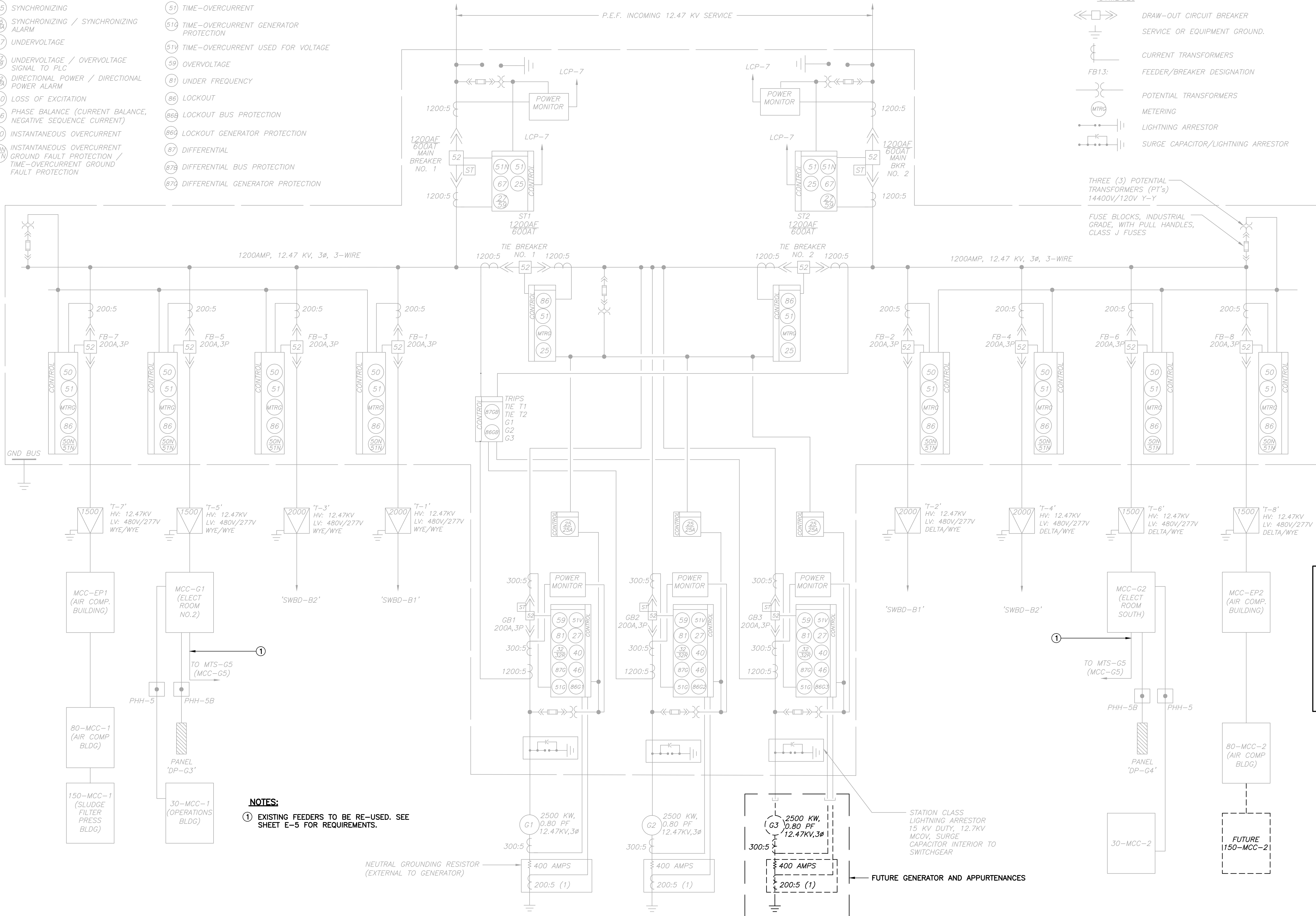
Sheet No.  
**E-3**

**PROTECTIVE RELAYS**

- (25) SYNCHRONIZING
- (26) SYNCHRONIZING / SYNCHRONIZING ALARM
- (27) UNDERVOLTAGE
- (32) UNDERVOLTAGE / OVERVOLTAGE SIGNAL TO PLC
- (33) DIRECTIONAL POWER / DIRECTIONAL POWER ALARM
- (40) LOSS OF EXCITATION
- (46) PHASE BALANCE (CURRENT BALANCE, NEGATIVE SEQUENCE CURRENT)
- (50) INSTANTANEOUS OVERCURRENT
- (51) INSTANTANEOUS OVERCURRENT GROUND FAULT PROTECTION / TIME-OVERCURRENT GROUND FAULT PROTECTION
- (51) TIME-OVERCURRENT
- (51G) TIME-OVERCURRENT GENERATOR PROTECTION
- (51V) TIME-OVERCURRENT USED FOR VOLTAGE
- (59) OVERVOLTAGE
- (81) UNDER FREQUENCY
- (86) LOCKOUT
- (86B) LOCKOUT BUS PROTECTION
- (86G) LOCKOUT GENERATOR PROTECTION
- (87) DIFFERENTIAL
- (87G) DIFFERENTIAL BUS PROTECTION
- (87G) DIFFERENTIAL GENERATOR PROTECTION

**SYMBOLS**

- ⏏ DRAW-OUT CIRCUIT BREAKER
- ⏏ SERVICE OR EQUIPMENT GROUND.
- ⏏ CURRENT TRANSFORMERS
- FB13: FEEDER/BREAKER DESIGNATION
- ⏏ POTENTIAL TRANSFORMERS
- MTRG METERING
- ⏏ LIGHTNING ARRESTOR
- ⏏ SURGE CAPACITOR/LIGHTNING ARRESTOR



THREE (3) POTENTIAL TRANSFORMERS (PT's)  
14400V/120V Y-Y  
FUSE BLOCKS, INDUSTRIAL GRADE, WITH PULL HANDLES, CLASS J FUSES

LOAD TABULATION 12.47V-3Φ-3W	
DESCRIPTION	AMPACITY
SWBD-B1	= 137.34 AMPS
SWBD-B2	= 128.08 AMPS
MCC-G1	= 62.12 AMPS
MCC-G2	= 62.18 AMPS
MCC-EP1	= 52.48 AMPS
MCC-EP2	= 55.13 AMPS
<b>CONNECTED LOAD</b>	<b>= 497.33 AMPS</b>
<b>DEMAND LOAD @ 60%</b>	<b>= 298.39 AMPS</b>

**NOTES:**  
① EXISTING FEEDERS TO BE RE-USED. SEE SHEET E-5 FOR REQUIREMENTS.

**MV-SWGR SINGLE LINE DIAGRAM**

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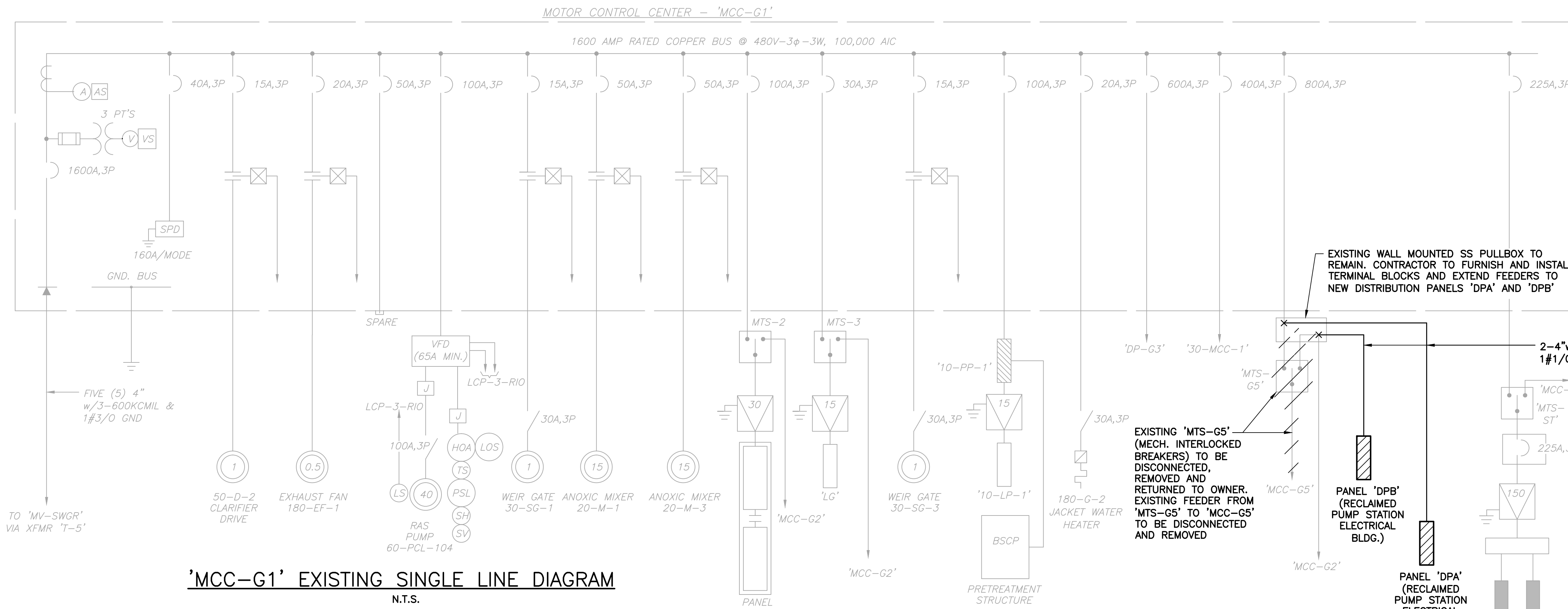
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Sheet No. **E-4**



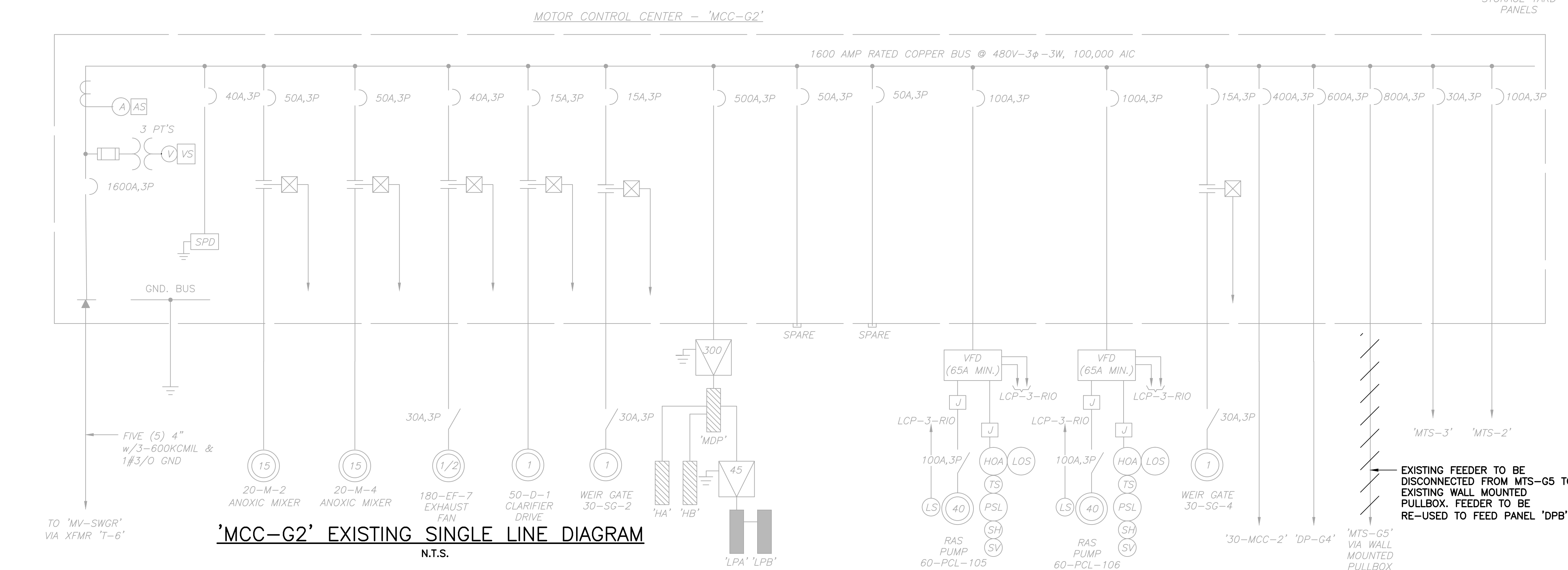


**'MCC-G1' EXISTING SINGLE LINE DIAGRAM**  
N.T.S.

### MCC-G1 LOAD TABULATION

480V-3φ-3W

DESCRIPTION	LOAD	AMPACITY
PANEL '10-PP-1'	-	= 80.00 AMPS
① CLARIFIER DRIVE 50-D-2	1 @ 1 HP	= 2.10 AMPS
① EXHAUST FAN 180-EF-1	1 @ 0.5 HP	= 1.10 AMPS
① RAS PUMP 60-P-5	1 @ 40 HP	= 52.00 AMPS
① ANOXIC MIXER 20-M-1	1 @ 15 HP	= 21.00 AMPS
① ANOXIC MIXER 20-M-3	1 @ 15 HP	= 21.00 AMPS
① WEIR GATE 30-SG-1	1 @ 1 HP	= 2.10 AMPS
① WEIR GATE 30-SG-3	1 @ 1 HP	= 2.10 AMPS
PANEL LG	-	= 14.00 AMPS
PANEL LG2	-	= 28.00 AMPS
JACKET WATER HTR 180-G-2	-	= 10.00 AMPS
DP-G3	-	= 334.10 AMPS
30-MCC-1	-	= 360.00 AMPS
PANEL 'DPA'	-	= 506.20 AMPS
MTS-ST	-	= 180.00 AMPS
<b>CONNECTED LOAD</b>		<b>= 1613.70 AMPS</b>
② SERVICE ENTRANCE		= 1613.70 AMPS + (0.25)(52.00) = <b>1626.70 AMPS</b>
<b>NOTES:</b>		<b>DEMAND LOAD @ 60% = 976.02 AMPS</b>
① AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRIC CODE.		
② SERVICE ENTRANCE MINIMUM SIZE AS PER ARTICLE 230 OF THE NATIONAL ELECTRIC CODE.		



**'MCC-G2' EXISTING SINGLE LINE DIAGRAM**  
N.T.S.

### MCC-G2 LOAD TABULATION

480V-3φ-3W

DESCRIPTION	LOAD	AMPACITY
PANEL 'MDP'	-	= 250.00 AMPS
① CLARIFIER DRIVE 50-D-1	1 @ 1 HP	= 2.10 AMPS
① EXHAUST FAN 180-EF-7	1 @ 0.5 HP	= 1.10 AMPS
① ANOXIC MIXER 20-M-2	1 @ 15 HP	= 21.00 AMPS
① ANOXIC MIXER 20-M-4	1 @ 15 HP	= 21.00 AMPS
① WEIR GATE 30-SG-2	1 @ 1 HP	= 2.10 AMPS
① WEIR GATE 30-SG-4	1 @ 1 HP	= 2.10 AMPS
① RAS PUMP 60-P-4	1 @ 40 HP	= 52.00 AMPS
① RAS PUMP 60-P-6	1 @ 40 HP	= 52.00 AMPS
MTS-2	-	= 28.00 AMPS
MTS-3	-	= 14.00 AMPS
30-MCC-2	-	= 360.00 AMPS
DP-G4	-	= 282.10 AMPS
PANEL 'DPB'	-	= 348.10 AMPS
MTS-ST	-	= 180.00 AMPS
<b>CONNECTED LOAD</b>		<b>= 1615.10 AMPS</b>
② SERVICE ENTRANCE		= 1615.10 AMPS + (0.25)(52.00) = <b>1628.60 AMPS</b>
<b>NOTES:</b>		<b>DEMAND LOAD @ 60% = 977.16 AMPS</b>
① AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRIC CODE.		
② SERVICE ENTRANCE MINIMUM SIZE AS PER ARTICLE 230 OF THE NATIONAL ELECTRIC CODE.		

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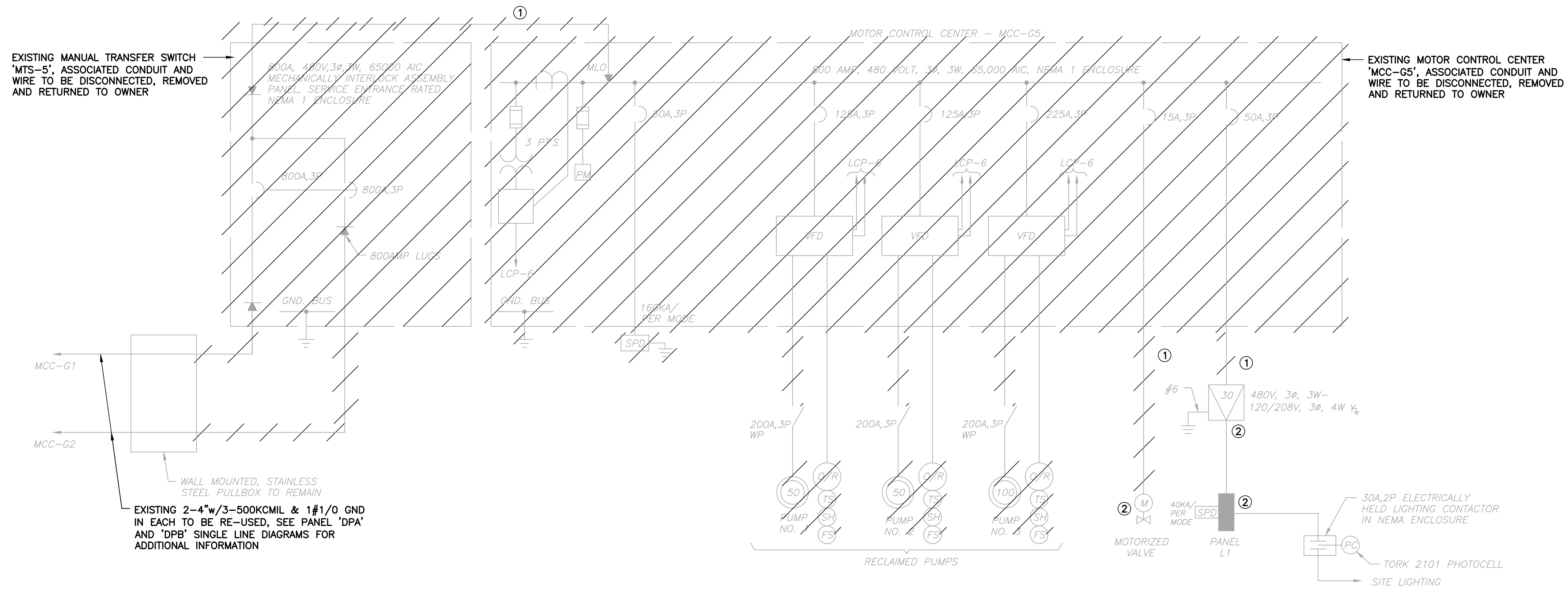
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**NOTES:**

- ① EXISTING FEEDERS TO BE DISCONNECTED AND REMOVED. ALL CONDUIT IN THE SLAB AND/OR WALL TO BE CUT AT THE POINT OF CONCEALMENT, THREADED AND CAPPED TYPICAL.
- ② EXISTING EQUIPMENT TO REMAIN AND TO BE RE-FED, SEE SHEET E-7.

**'MCC-G5' DEMOLITION SINGLE LINE DIAGRAM**

N.T.S.



**3** **FIGURE NO. 1 - MCC-G5 FRONT VIEW**  
E-6 N.T.S.



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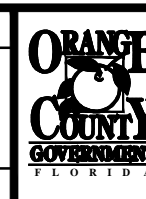
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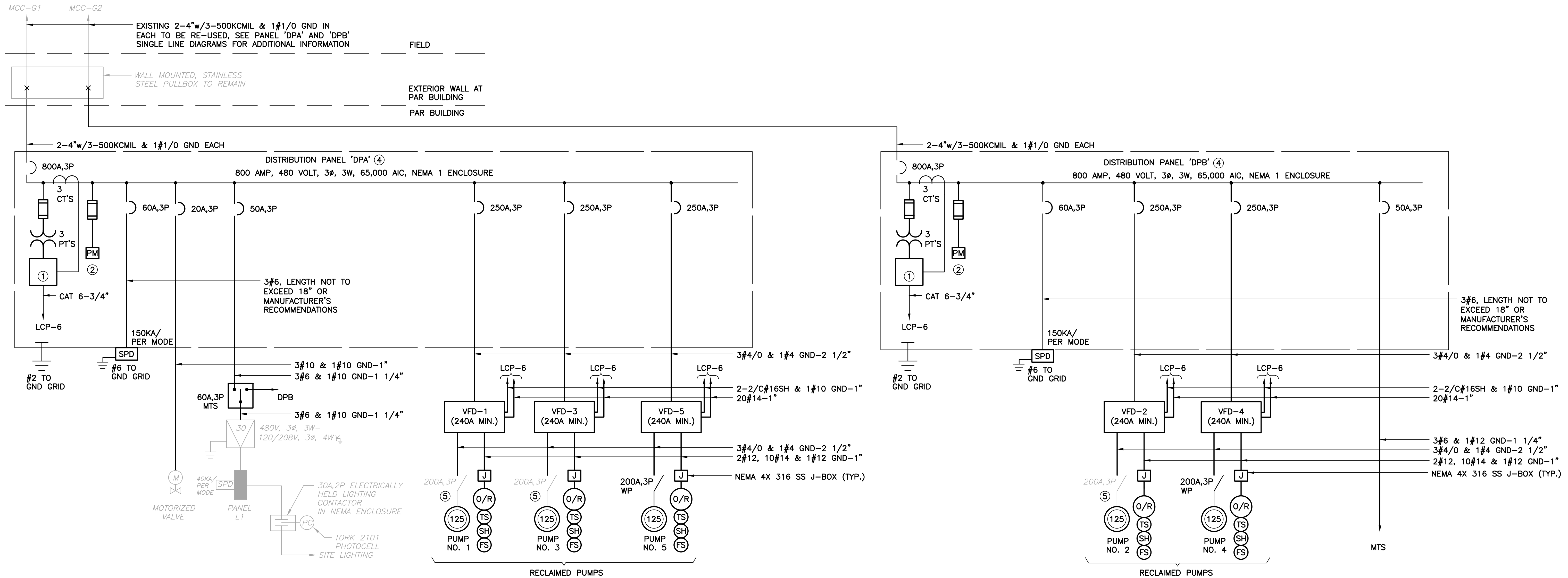
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**SINGLE LINE DIAGRAM**

Sheet No.  
**E-6**





**SINGLE LINE DIAGRAM**  
N.T.S.

- NOTES:**
- ① SQUARE D POWER LOGIC POWER MONITOR.
  - ② PROVIDE 2#14-3/4" FROM PHASE MONITOR TO PHASE MONITOR CONTROLS IN LCP-6. PHASE MONITOR SHALL BE DIVERSIFIED SLA-440-ASO.
  - ③ CONTRACTOR TO UPDATE SHORT CIRCUIT/ARC FLASH STUDY TO REFLECT PROPOSED IMPROVEMENTS. REVISED STUDY TO BE SUBMITTED PRIOR TO RELEASING GEAR ORDER. CURRENT STUDY COMPLETED UNDER THE PHASE 3A IMPROVEMENTS TO BE MADE AVAILABLE TO THE CONTRACTOR.
  - ④ PANELBOARD TO BE AN I-LINE HCM TYPE PANELBOARD, 800A, 3P MH-FRAME MAIN BREAKER WITH TOTAL BREAKER MOUNTING SPACE TO BE NOT LESS THAN 72 INCHES, RATED AT 65,000 AIC. BRANCH BREAKERS RATED AT 65,000 AIC.  
\* 15A - 100A FC FRAME  
\* 100A - 250A LX FRAME
  - ⑤ EXISTING DISCONNECT AND OFF/REMOTE TO REMAIN.

**DPA LOAD TABULATION**  
480V-3φ

DESCRIPTION	LOAD	AMPACITY
① RECLAIMED PUMP	3 @ 125 HP	= 468.00 AMPS
① MOTORIZED VALVE	1 @ 1 HP	= 2.10 AMPS
LIGHTING PANEL L1	-	= 36.10 AMPS
CONNECTED LOAD		= 506.20 AMPS
② SERVICE ENTRANCE = 506.20 AMPS + (0.25)(156.00)		= <b>387.10</b> AMPS

**NOTES:**

- ① AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRICAL CODE.
- ② SERVICE ENTRANCE MINIMUM SIZE AS PER ARTICLE 230 OF THE NATIONAL ELECTRICAL CODE.

**DPB LOAD TABULATION**  
480V-3φ

DESCRIPTION	LOAD	AMPACITY
① RECLAIMED PUMPS	2 @ 125 HP	= 312.00 AMPS
PANEL L1 VIA MTS	-	= 36.10 AMPS
CONNECTED LOAD		= 348.10 AMPS
② SERVICE ENTRANCE = 348.10 AMPS + (0.25)(156.00)		= <b>387.10</b> AMPS

**NOTES:**

- ① AMPACITIES PER TABLE 430-250 OF THE NATIONAL ELECTRICAL CODE.
- ② SERVICE ENTRANCE MINIMUM SIZE AS PER ARTICLE 230 OF THE NATIONAL ELECTRICAL CODE.

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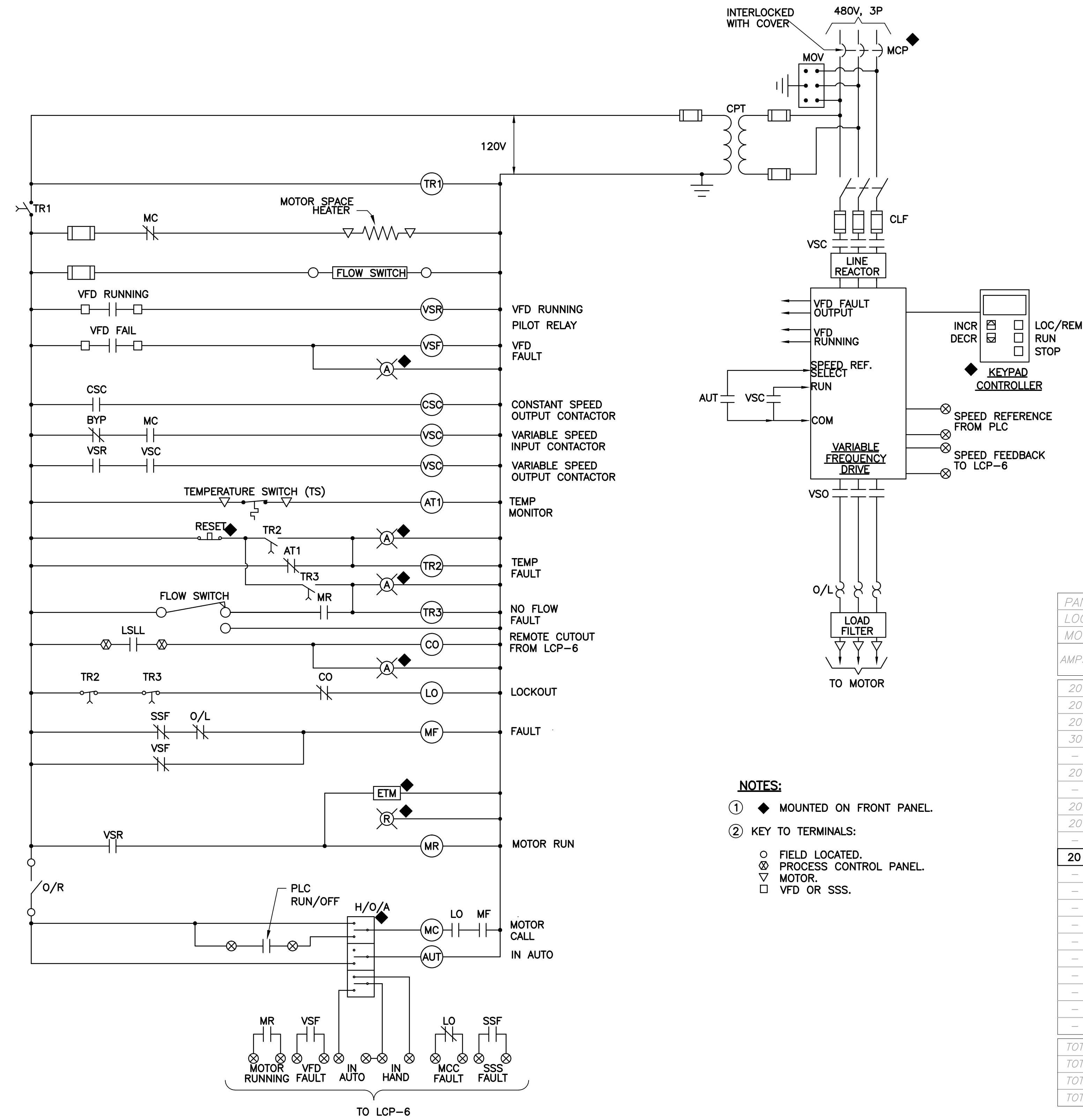
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**BID SET**  
SINGLE LINE DIAGRAM

Sheet No. **E-7**

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- NOTES:**
- ① ◆ MOUNTED ON FRONT PANEL.
  - ② KEY TO TERMINALS:
    - FIELD LOCATED.
    - ⊗ PROCESS CONTROL PANEL.
    - ▽ MOTOR.
    - VFD OR SSS.

PANEL: 'L1'		BUS: 125 AMP		VOLT: 120/208-3φ-4W																			
LOCATION: ELECTRICAL ROOM		MAINS: 100A, MB		REMARKS: -																			
MOUNTING: SURFACE		POLES: 42		A.I.C. SYMM: -																			
AMPS	POLE	WIRE	GND.	COND.	LOAD SERVED	BUS KVA			LOAD SERVED			WIRE	GND.	COND.	POLE	AMPS							
						A	B	C	A	B	C												
20	1	-	-	-	PCP	0.50			1	2	0.72						RECEPTACLES	-	-	-	1	20	
20	1	-	-	-	RECEPTACLES		0.54		3	4		0.50					LIGHTING	-	-	-	1	20	
20	1	-	-	-	EMER./EXIT LIGHTING			0.52	5	6		0.50					EXTERIOR LIGHTING	-	-	-	1	20	
30	2	-	-	-	ACCU-1	1.56			7	8	0.25						AHU-2	-	-	-	2	20	
-	-	-	-	-			1.56		9	10		0.25							-	-	-	-	-
20	2	-	-	-	AHU-1			0.25	11	12		1.56					ACCU-2	-	-	-	2	30	
-	-	-	-	-			0.25		13	14	1.56								-	-	-	-	-
20	1	-	-	-	SITE LIGHTING		0.30		15	16		0.20					FIT	-	-	-	1	20	
20	1	-	-	-	CL2 ANALYZER			0.36	17	18		0.32					FIT TRANSMITTER	-	-	-	1	20	
-	-	-	-	-	SPACE				19	20							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				21	22							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				23	24							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				25	26							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				27	28							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				29	30							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				31	32							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				33	34							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				35	36							SPACE	-	-	-	-	-	
-	-	-	-	-	SPACE				37	38	0.10						SURGE PROTECTION DEVICE	-	-	-	3	30	
-	-	-	-	-	SPACE				39	40		0.10						-	-	-	-	-	
-	-	-	-	-	SPACE				41	42		0.10						-	-	-	-	-	
<b>TOTAL (PHASE):</b>						2.31	2.60	1.13				2.63	1.05	2.48	<b>NOTES:</b>								
<b>TOTAL KVA:</b>															-								
<b>TOTAL AMPS:</b>															-								
<b>TOTAL DEMAND AMPS:</b>															-								

VFD ELEMENTARY DIAGRAM  
(TYPICAL 5)



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ELEMENTARY CONTROL DIAGRAM

Sheet No.

**E-8**





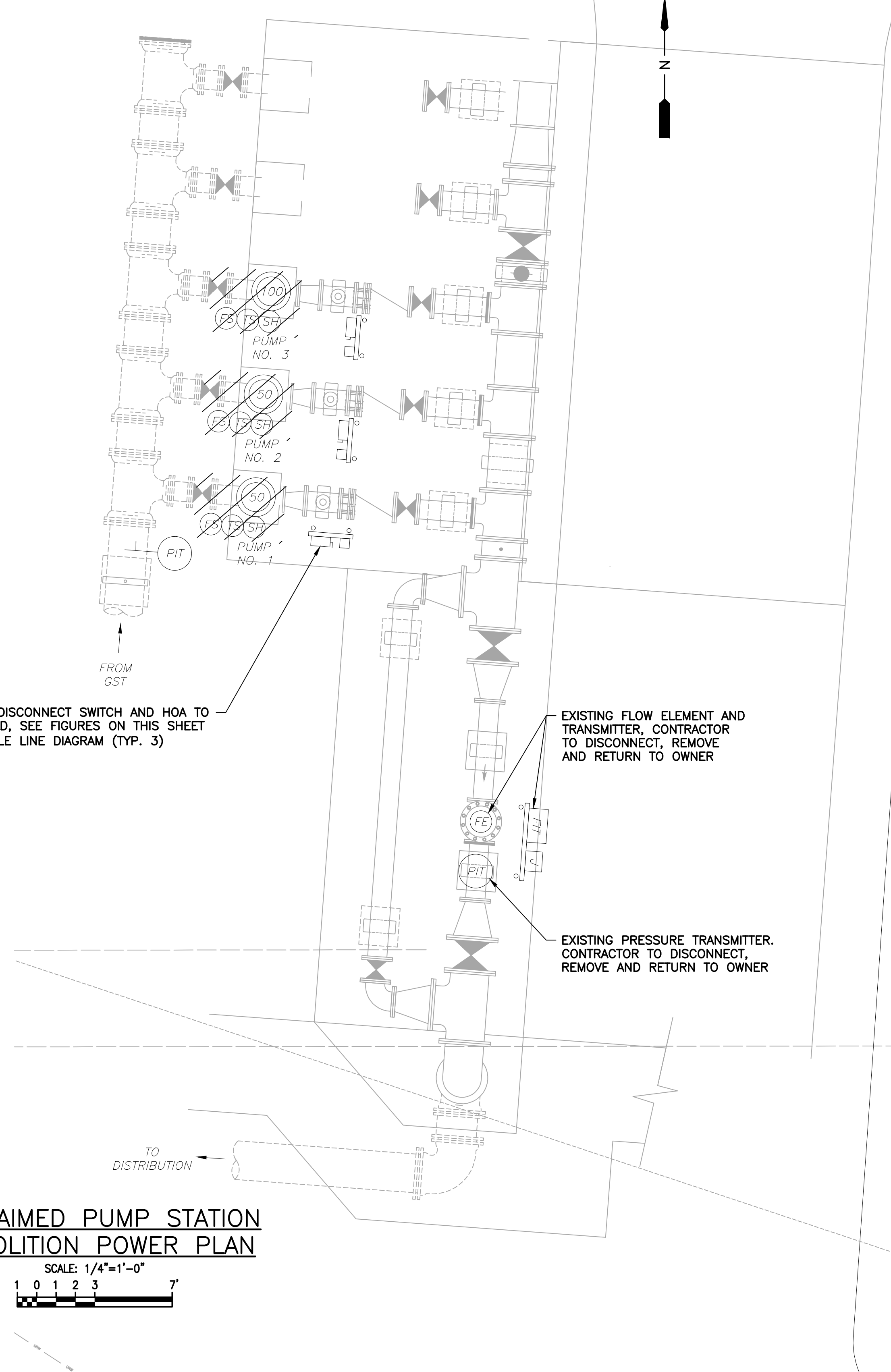
**4**  
E-9  
**FIGURE NO. 2**  
**PUMP NO. 1**  
**DISCONNECT/HOA**  
SCALE: N.T.S.



**5**  
E-9  
**FIGURE NO. 3**  
**PUMP NO. 2**  
**DISCONNECT/HOA**  
SCALE: N.T.S.



**6**  
E-9  
**FIGURE NO. 4**  
**PUMP NO. 3**  
**DISCONNECT/HOA**  
SCALE: N.T.S.



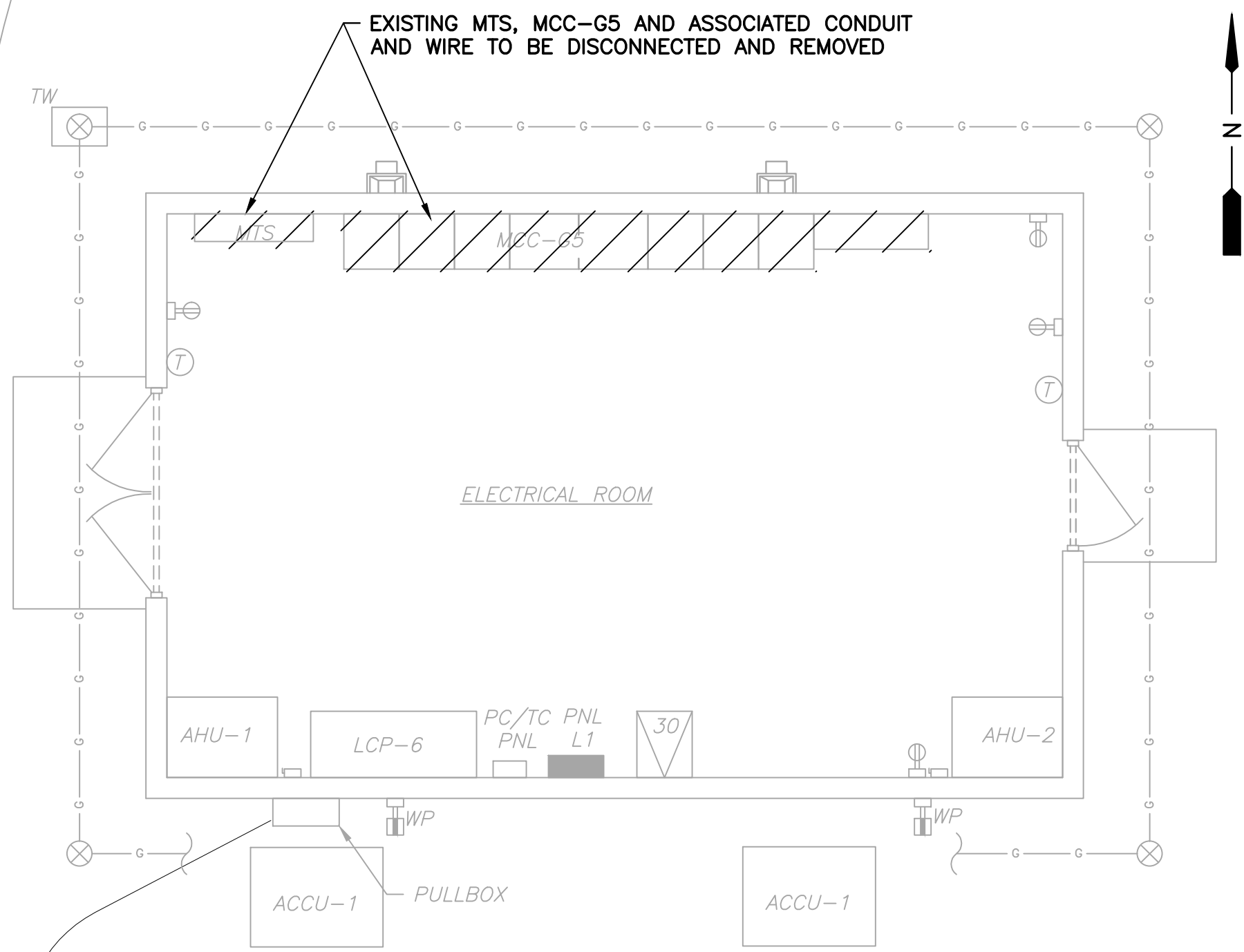
EXISTING DISCONNECT SWITCH AND HOA TO BE REUSED, SEE FIGURES ON THIS SHEET AND SINGLE LINE DIAGRAM (TYP. 3)

EXISTING FLOW ELEMENT AND TRANSMITTER, CONTRACTOR TO DISCONNECT, REMOVE AND RETURN TO OWNER

EXISTING PRESSURE TRANSMITTER, CONTRACTOR TO DISCONNECT, REMOVE AND RETURN TO OWNER

**RECLAIMED PUMP STATION**  
**DEMOLITION POWER PLAN**

SCALE: 1/4"=1'-0"  
1 0 1 2 3 4 5 6 7



**ELECTRICAL BLDG. NOTES:**

- ① ALL CONDUITS IN THE SLAB AND/OR WALL NO LONGER IN USE TO BE CUT AT THE POINT OF CONCEALMENT, THREADED AND CAPPED, TYPICAL.
- ② EXISTING HIGH SERVICE PUMP STATION SHALL REMAIN IN SERVICE AT ALL TIMES.
- ③ COORDINATE WITH PLANT STAFF PRIOR TO ANY DEMOLITION OF EQUIPMENT IN ORDER TO KEEP THE SYSTEM OPERATIONAL DURING CONSTRUCTION.

**EXISTING ELECTRICAL BLDG.**  
**ELECTRICAL DEMOLITION PLAN**

SCALE: 1/4"=1'-0"  
1 0 1 2 3 4 5 6 7

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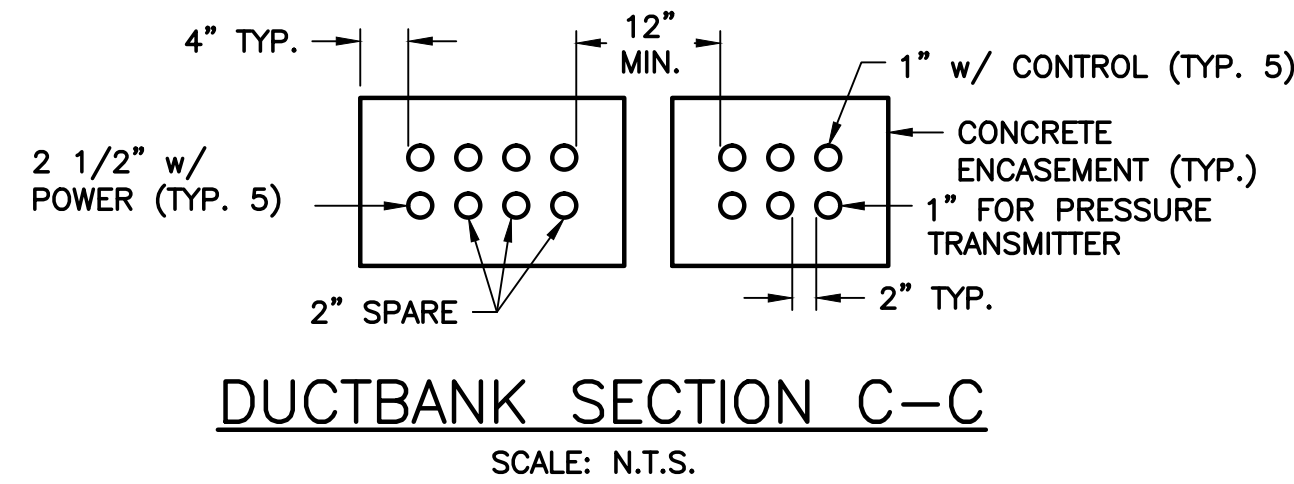
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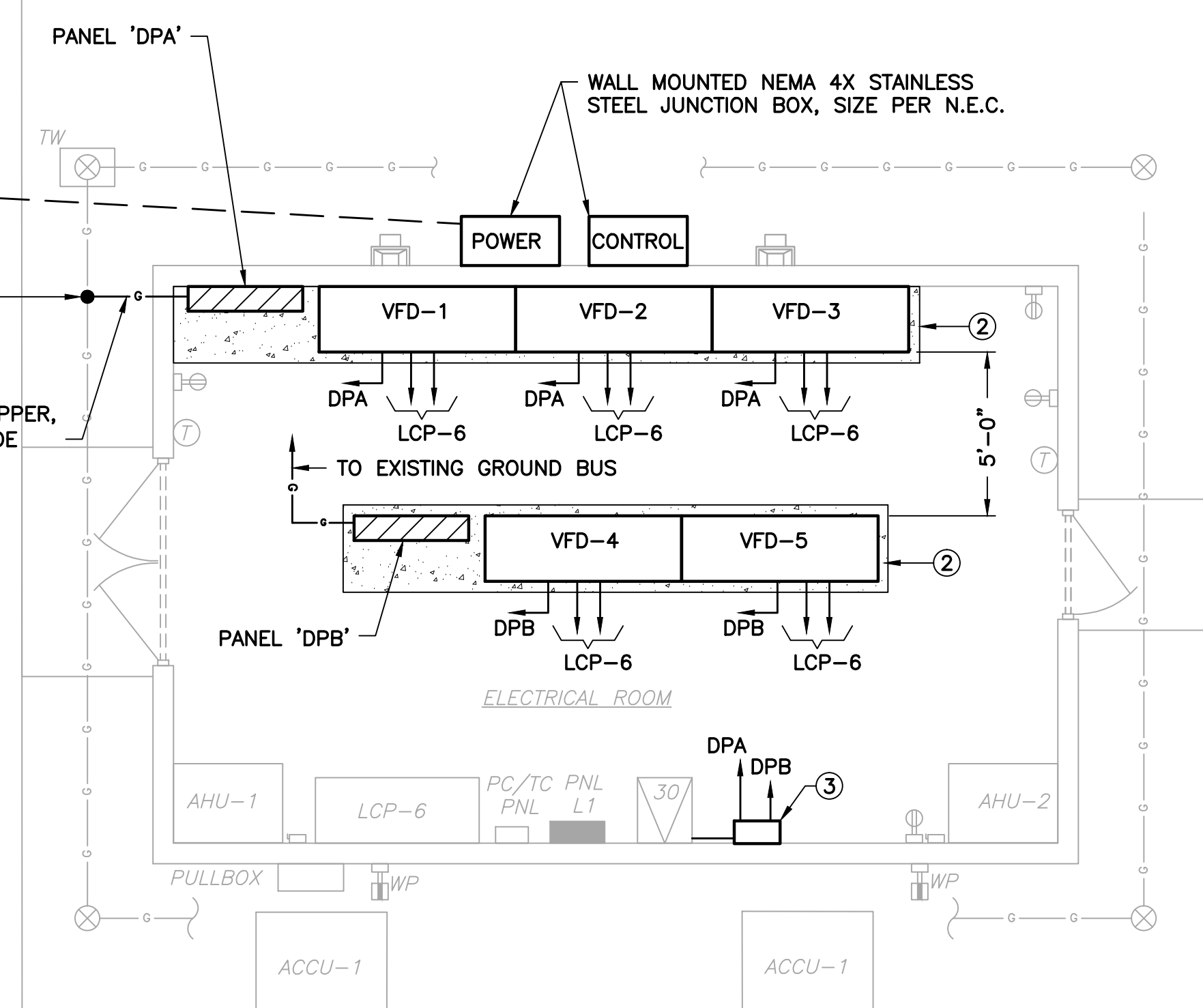
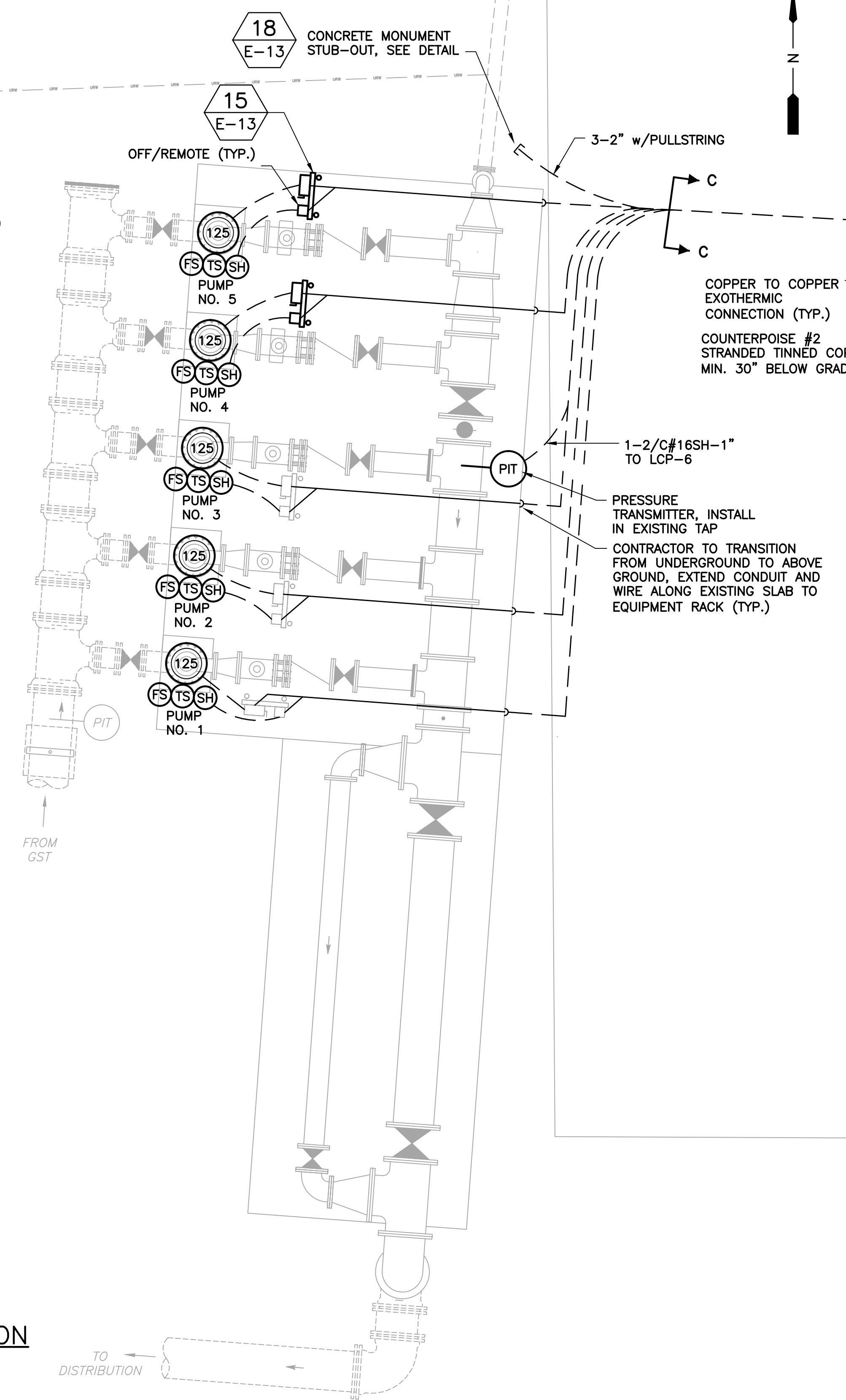
**PARTIAL ELECTRICAL SITE PLAN**

Sheet No.  
**E-9**

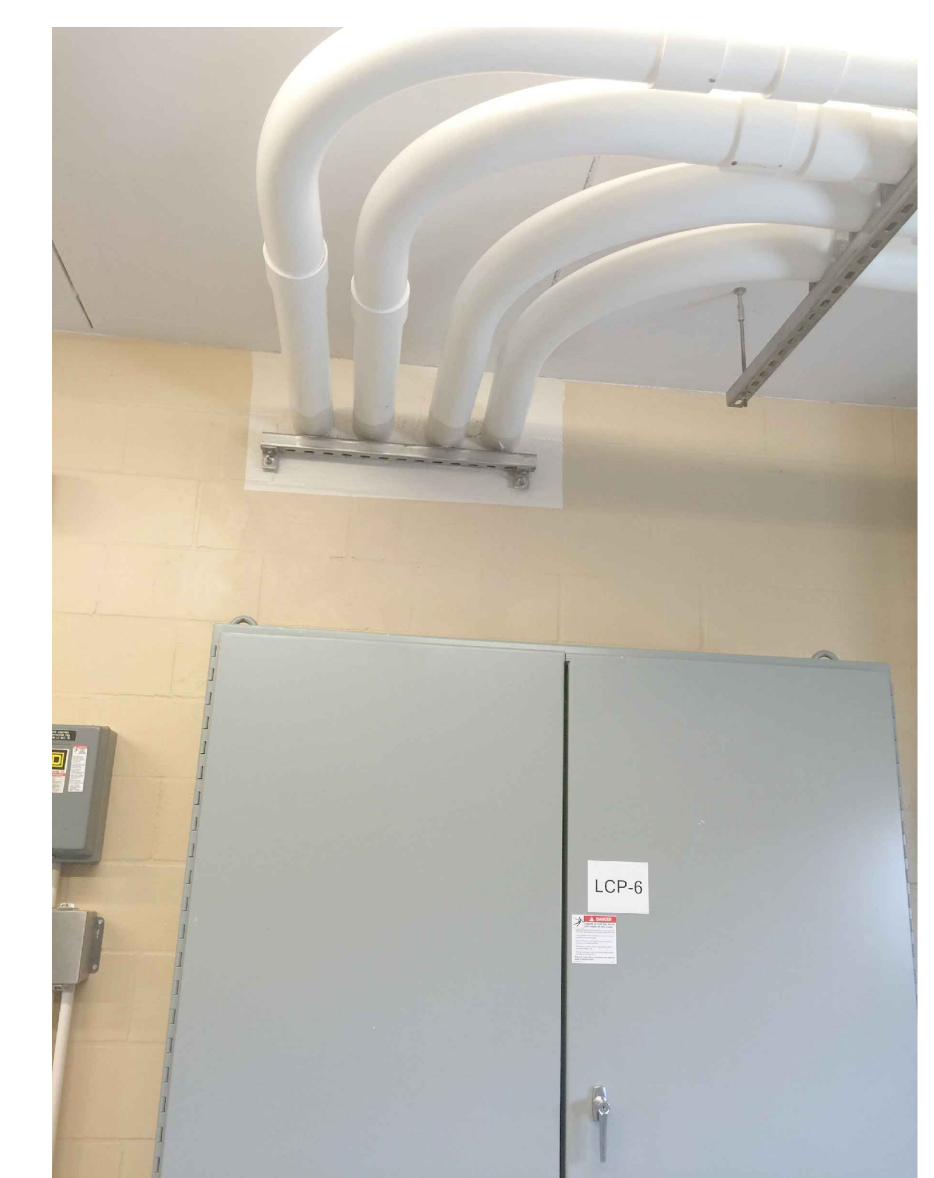




**RECLAIMED STATION NOTES:**  
 ① REFER TO SINGLE LINE DIAGRAM FOR CONDUIT AND WIRE REQUIREMENTS.



- ELECTRICAL BLDG. NOTES:**
- ① SEE SINGLE LINE DIAGRAM FOR ADDITIONAL CONDUIT AND WIRE REQUIREMENTS.
  - ② ALL FLOOR MOUNTED ELECTRICAL EQUIPMENT SHALL BE MOUNTED ON AN EQUIPMENT HOUSEKEEPING PAD. SEE STRUCTURAL SHEET FOR EQUIPMENT PAD DETAIL.
  - ③ MANUAL TRANSFER SWITCH (MTS).
  - ④ ALL CONDUITS IN THE SLAB AND/OR WALL NO LONGER IN USE TO BE CUT AT THE POINT OF CONCEALMENT, THREADED AND CAPPED, TYPICAL.
  - ⑤ EXISTING HIGH SERVICE PUMP STATION SHALL REMAIN IN SERVICE AT ALL TIMES.
  - ⑥ COORDINATE WITH PLANT STAFF PRIOR TO ANY DEMOLITION OF EQUIPMENT IN ORDER TO KEEP THE SYSTEM OPERATIONAL DURING CONSTRUCTION.
  - ⑦ CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCE PHASING PLAN FOR ENGINEER APPROVAL. SEQUENCE SHALL INCLUDE THE FOLLOWING RECOMMENDATION AS A MINIMUM:
    - a. INSTALL PANEL 'DPB', VFD NO. 4 & VFD NO. 5. NEW EQUIPMENT SHALL BE TESTED AND FULLY OPERATIONAL BEFORE WORK IN THE NEXT STEP MAY BEGIN.
    - b. DISCONNECT AND REMOVE EXISTING MTS & MCC-G5. RETURN TO OWNER.
    - c. INSTALL PANEL 'DPA', VFD NO. 1, VFD NO. 2 AND VFD NO. 3.
  - ⑧ ALL CONDUIT WITHIN THE BUILDING TO SURFACE MOUNTED. COORDINATE WITH EXISTING LIGHTING.



7  
E-10  
FIGURE NO. 7  
SCALE: N.T.S.

RECLAIMED PUMP STATION  
POWER PLAN  
SCALE: 1/4"=1'-0"

EXISTING ELECTRICAL BLDG.  
PROPOSED ELECTRICAL PLAN  
SCALE: 1/4"=1'-0"

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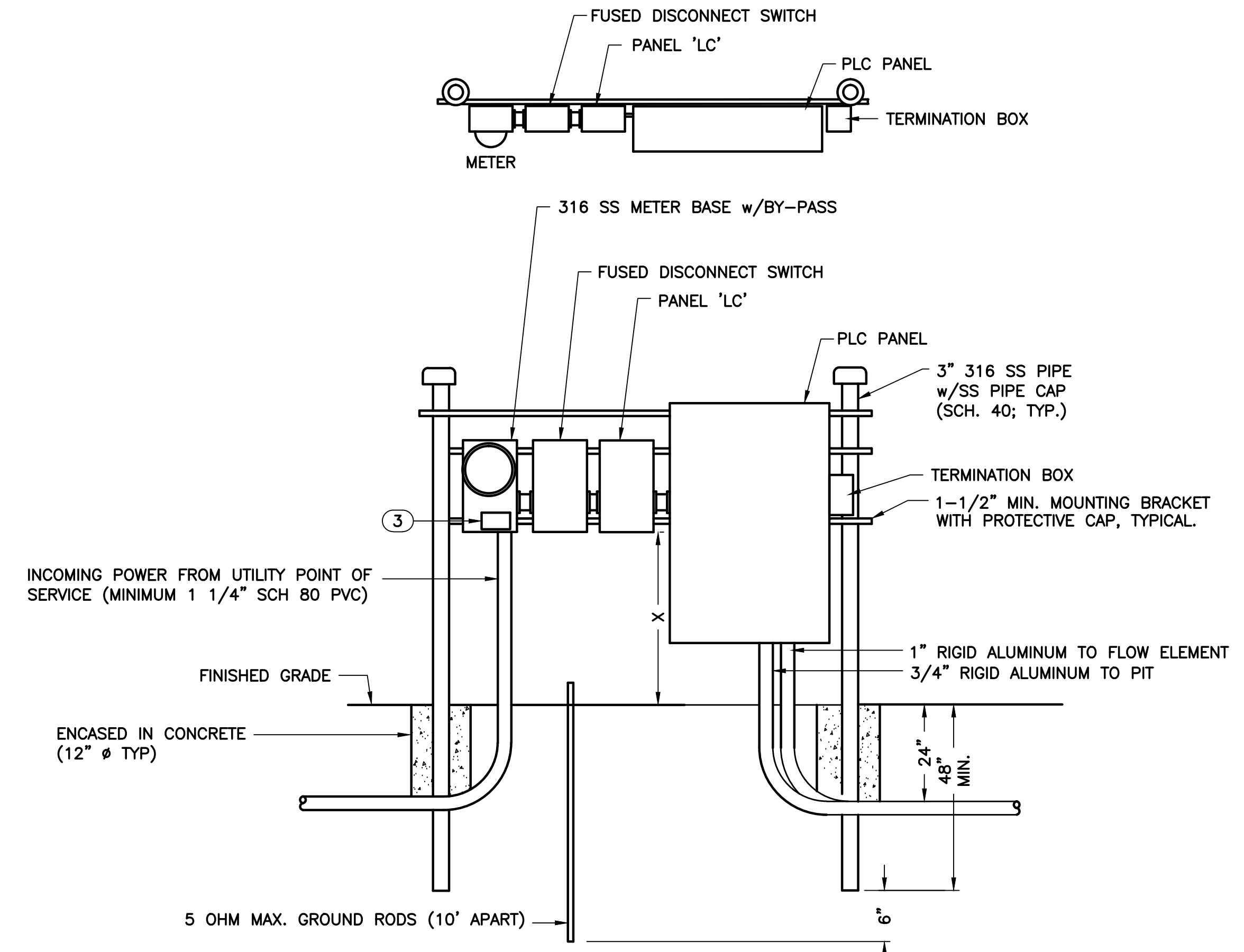
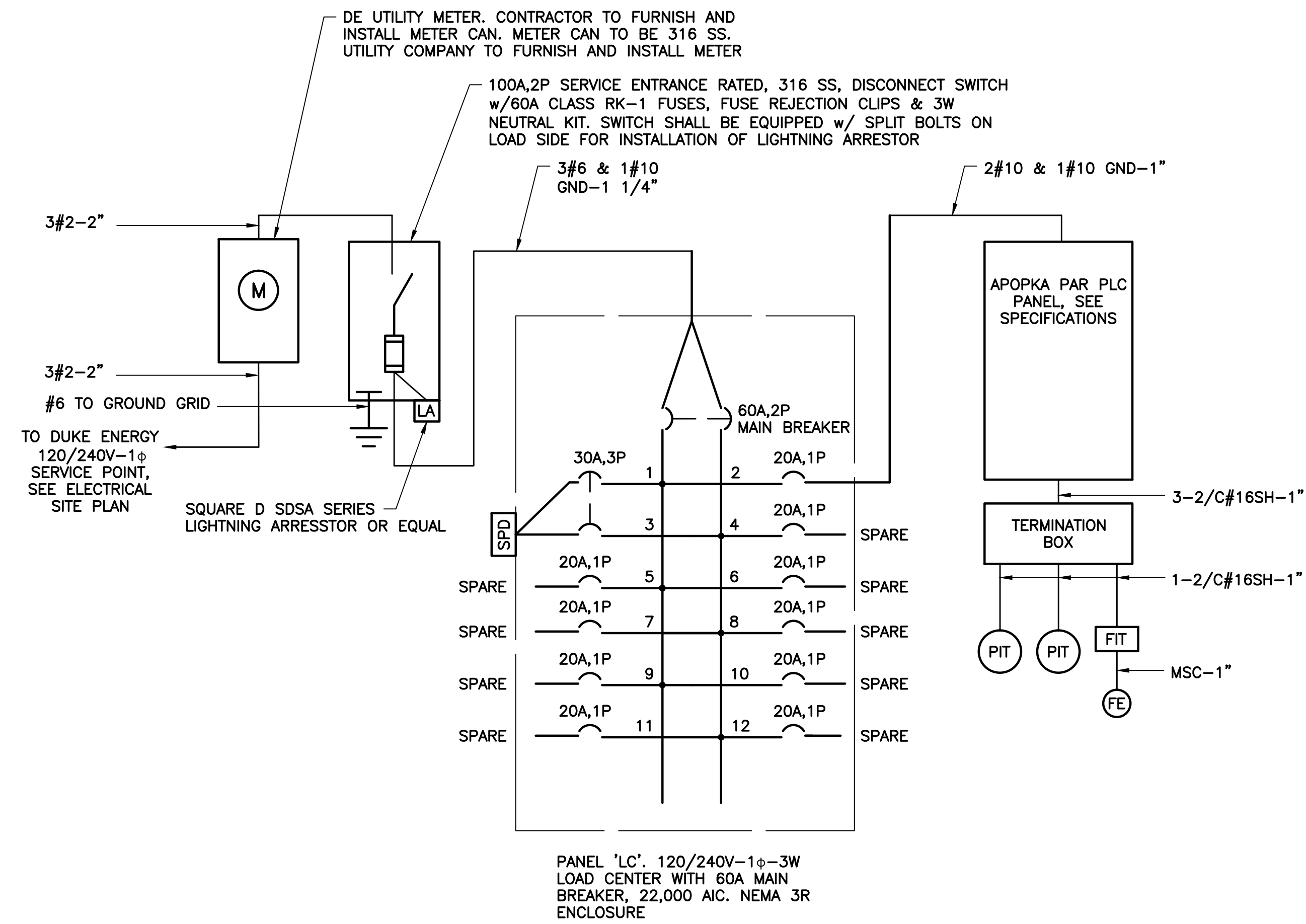
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Sheet No. **E-10**





8  
E-11

EQUIPMENT RACK  
N.T.S.

DIST "X"	PANEL HEIGHT
36"	36"
30"	42"
24"	48"
24"	60"

FOR PANELS NOT LISTED ADJUST MOUNTING HEIGHTS ACCORDINGLY

LOAD TABULATION		
120/240V-1φ		
DESCRIPTION	LOAD	AMPACITY
FLOW INDICATING TRANS.	-	= 1.00 AMPS
PRESSURE TRANSMITTERS	-	= 1.00 AMPS
PLC	-	= 6.00 AMPS
MISC.	-	= 5.00 AMPS
CONNECTED LOAD		= 13.00 AMPS
① SERVICE ENTRANCE	= 13.00 AMPS + (0.25)(6.00)	= 14.50 AMPS

NOTES:  
① SERVICE ENTRANCE MINIMUM SIZE AS PER ARTICLE 230 OF THE NATIONAL ELECTRICAL CODE.

PLC SINGLE LINE DIAGRAM  
SCALE: N.T.S.

PANEL INSTALLATION NOTES:

- POWER SUPPLY SHALL BE UNDERGROUND ON THE SITE AND SHALL BE 1-PHASE, FROM A 1-PHASE SOURCE ONLY.
- AN ELECTRICAL GROUNDING SYSTEM SHALL BE INSTALLED AS PER THE NATIONAL ELECTRICAL CODE, LOCAL CODES AND ORDINANCES, AN UNDERGROUND PERIMETER CABLE GROUNDING SYSTEM SHALL BE INSTALLED WITH CONNECTIONS TO AT LEAST CONTROL PANELS, UTILITY COMPANY TRANSFORMER, FUSED DISCONNECT SWITCH AND METAL FENCE. REFER TO GROUNDING DETAILS.
- THE SITE NAME, ORANGE COUNTY I.D. NUMBER, AND ADDRESS SHALL BE AFFIXED TO THE FRONT OF THE METER CABINET.
- ALL MOUNTING HARDWARE, BRACKETS AND ELECTRICAL ENCLOSURES SHALL BE 316 STAINLESS STEEL.
- RACK STRUCTURE TO BE CERTIFIED PER FLORIDA BUILDING CODE. CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WIND LOAD CALCULATIONS FROM A STRUCTURAL ENGINEER LICENSED IN THE STATE OF FLORIDA.



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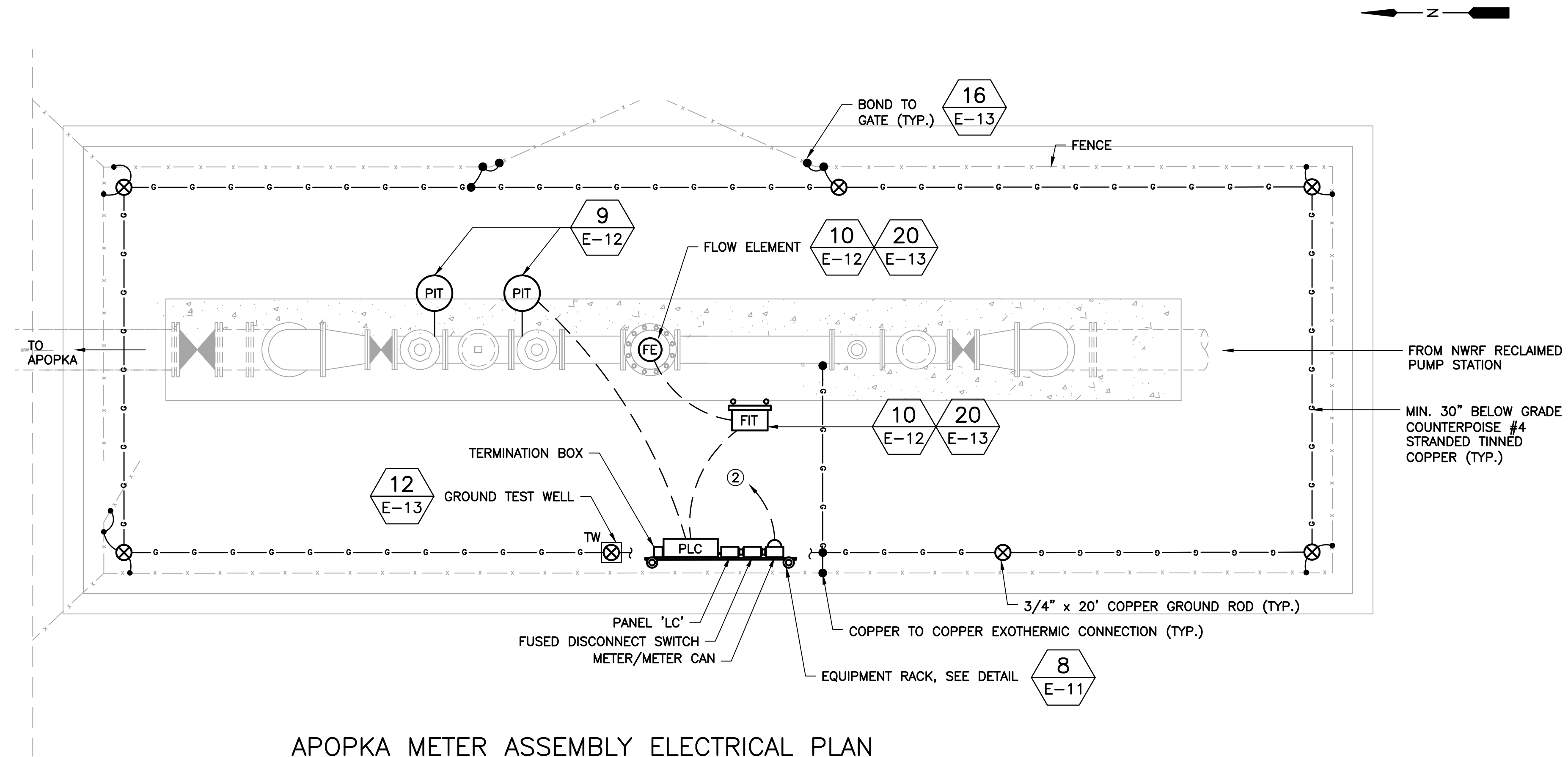
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**SINGLE LINE DIAGRAM AND DETAILS**

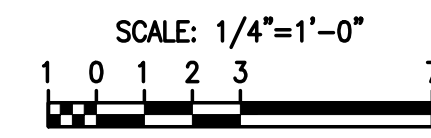
Sheet No.  
**E-11**





- APOKA METER NOTES:**
- ① SEE SINGLE LINE DIAGRAM ON THIS SHEET FOR CONDUIT AND WIRE REQUIREMENTS.
  - ② TO 120/240V-1 $\phi$ -3W DUKE ENERGY SERVICE POINT. SEE OVERALL ELECTRICAL SITE PLAN ON SHEET E-2 FOR LOCATION.

**APOKA METER ASSEMBLY ELECTRICAL PLAN**



**9 E-12** **FIGURE NO. 9 - PRESSURE TRANSMITTER**  
SCALE: N.T.S.



**10 E-12** **FIGURE NO. 10 - FIT**  
SCALE: N.T.S.



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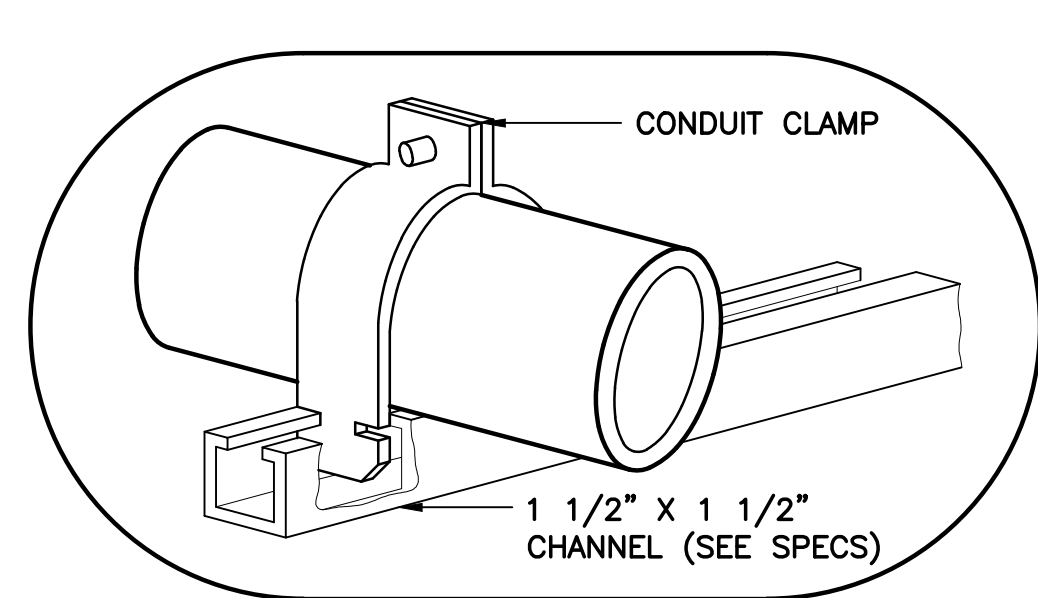
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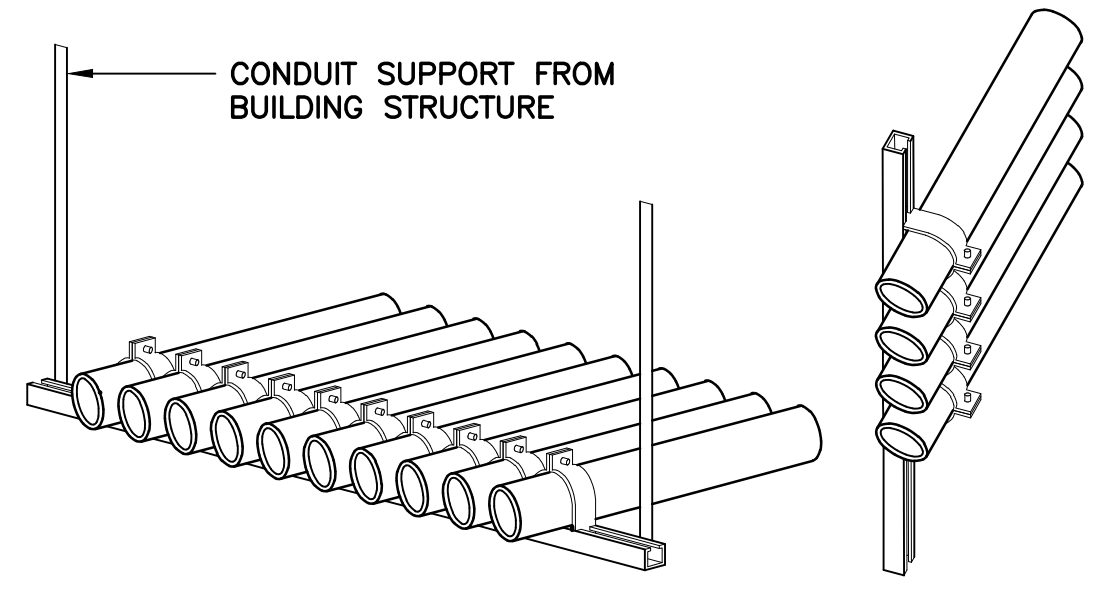
**APOKA METER ASSEMBLY ELECTRICAL PLAN**

Sheet No. **E-12**





ENLARGED VIEW



TRAPEZE ASSEMBLY

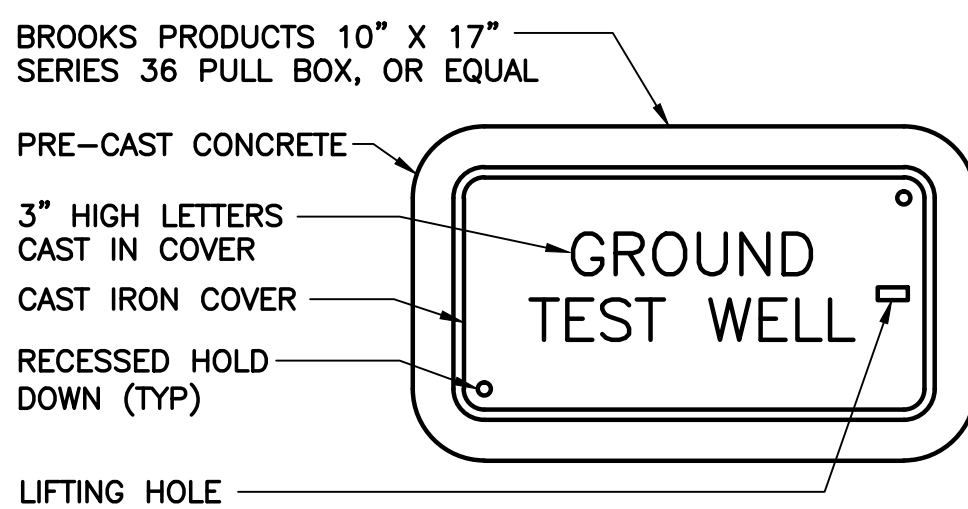
WALKWAY AND WALL MOUNTED

CONDUIT PIPE STRAP MOUNTING DETAILS

11

E-13

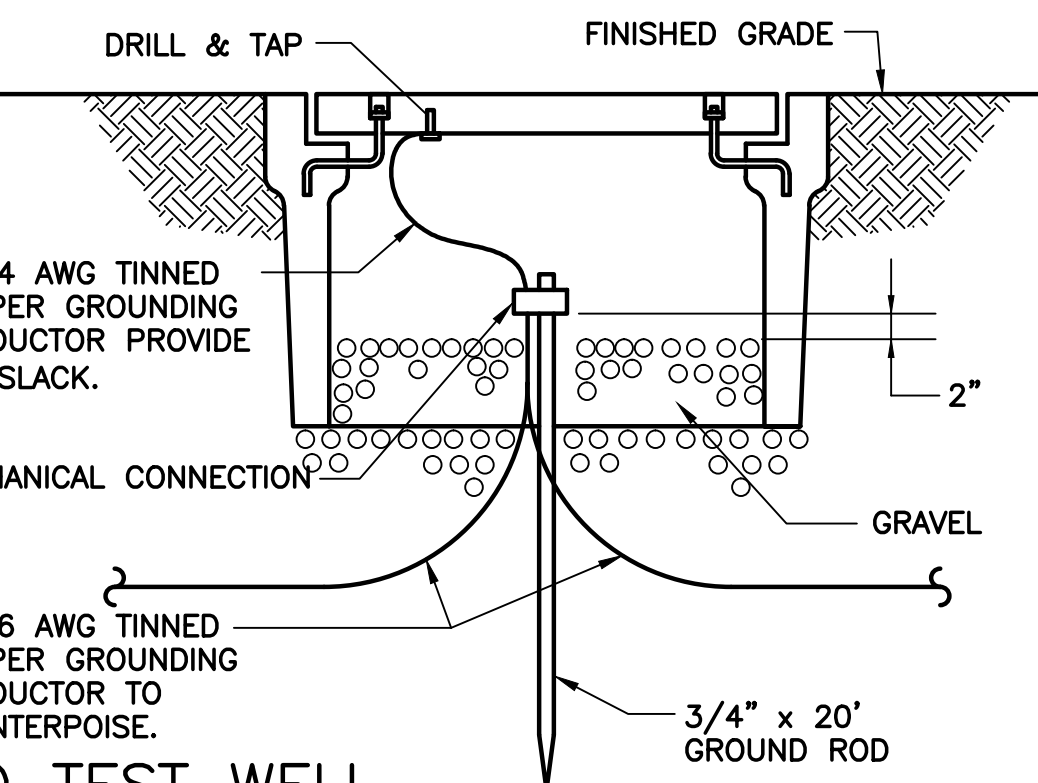
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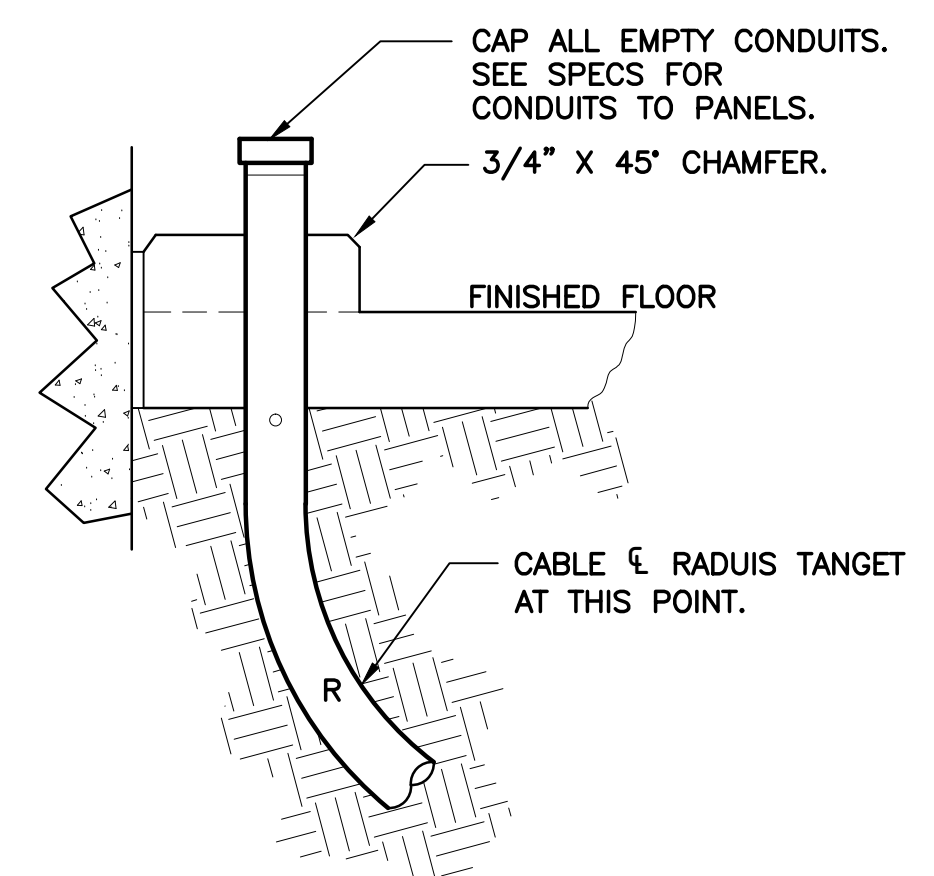
GROUND TEST WELL

12

E-13



N.T.S.

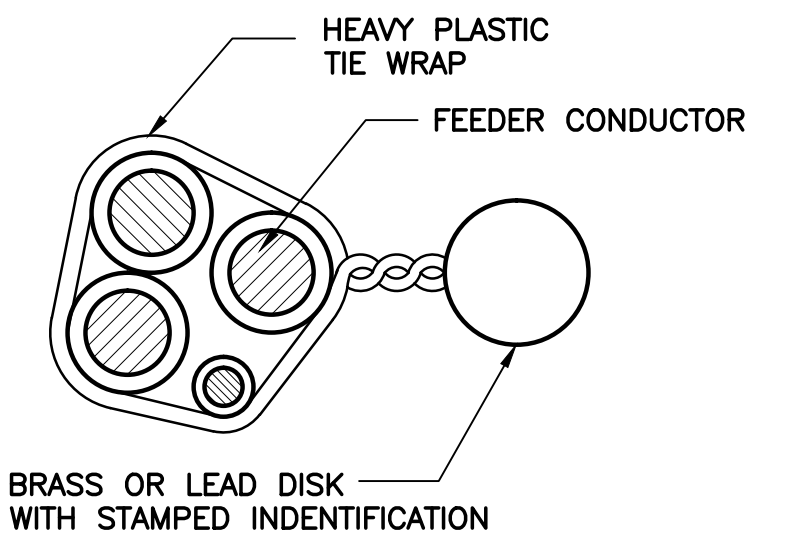


TYPICAL CONDUIT THRU SLAB

13

E-13

N.T.S.

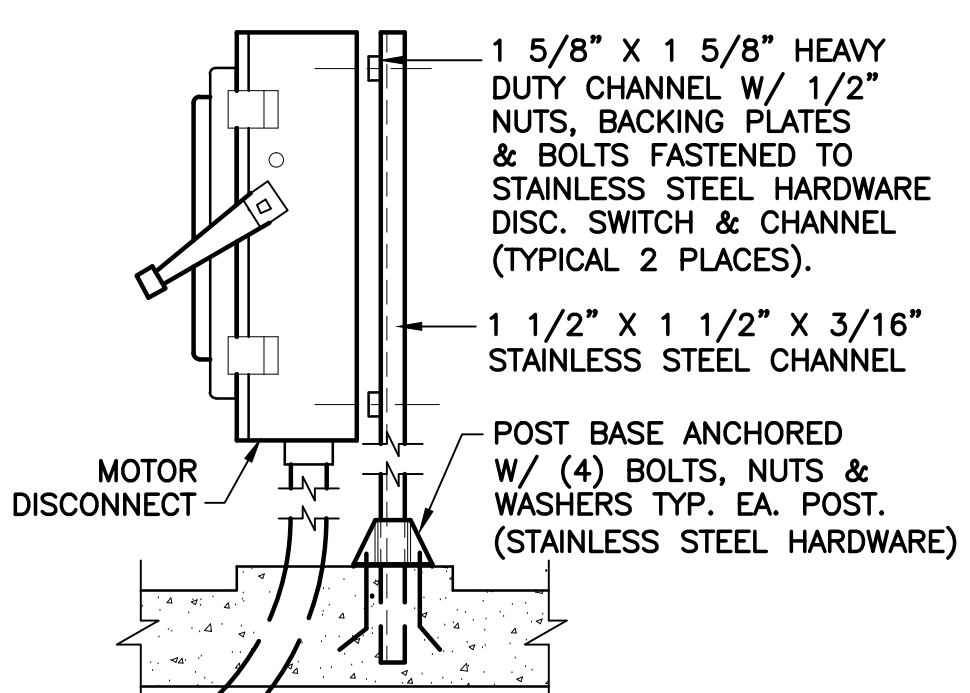


U.G. CABLE TAG DETAIL

14

E-13

N.T.S.

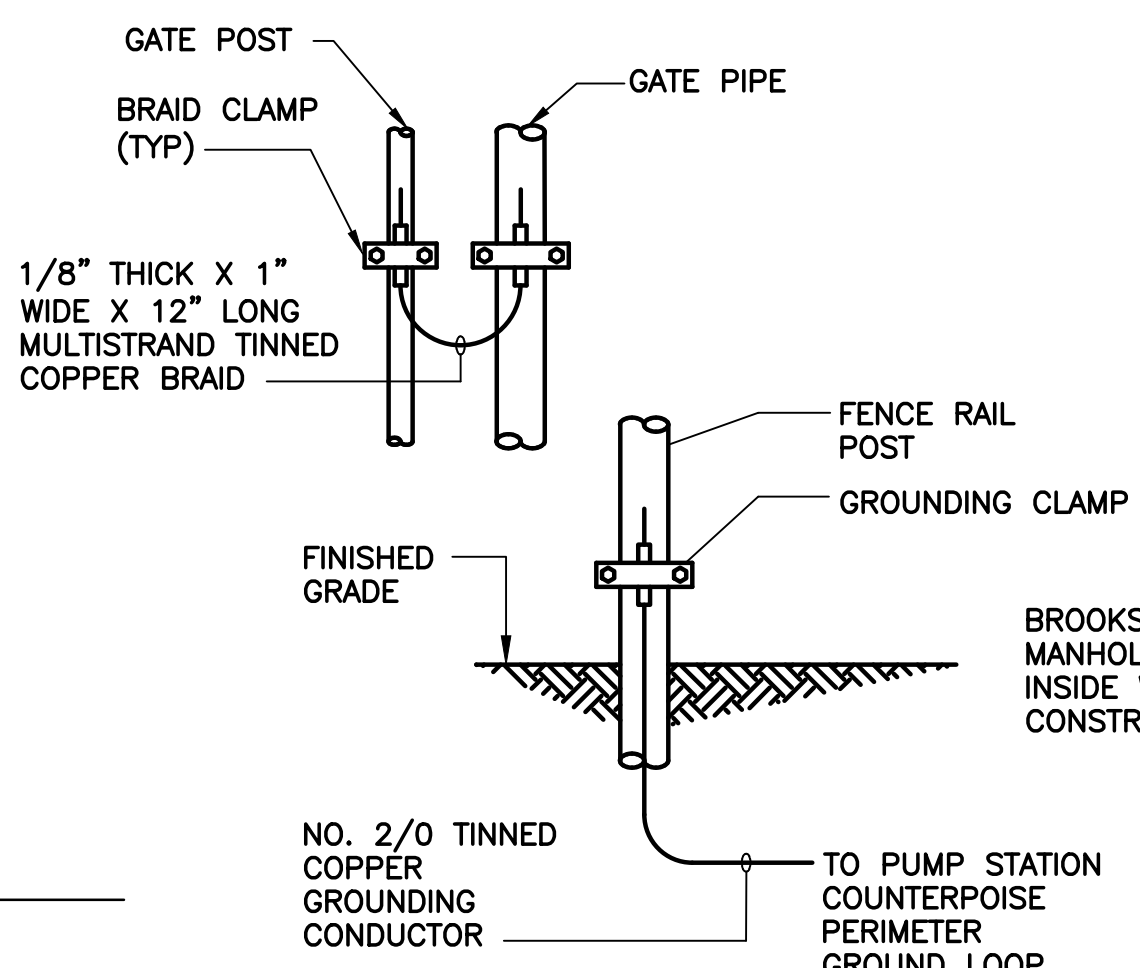


TYPICAL DISCONNECT

15

E-13

N.T.S.

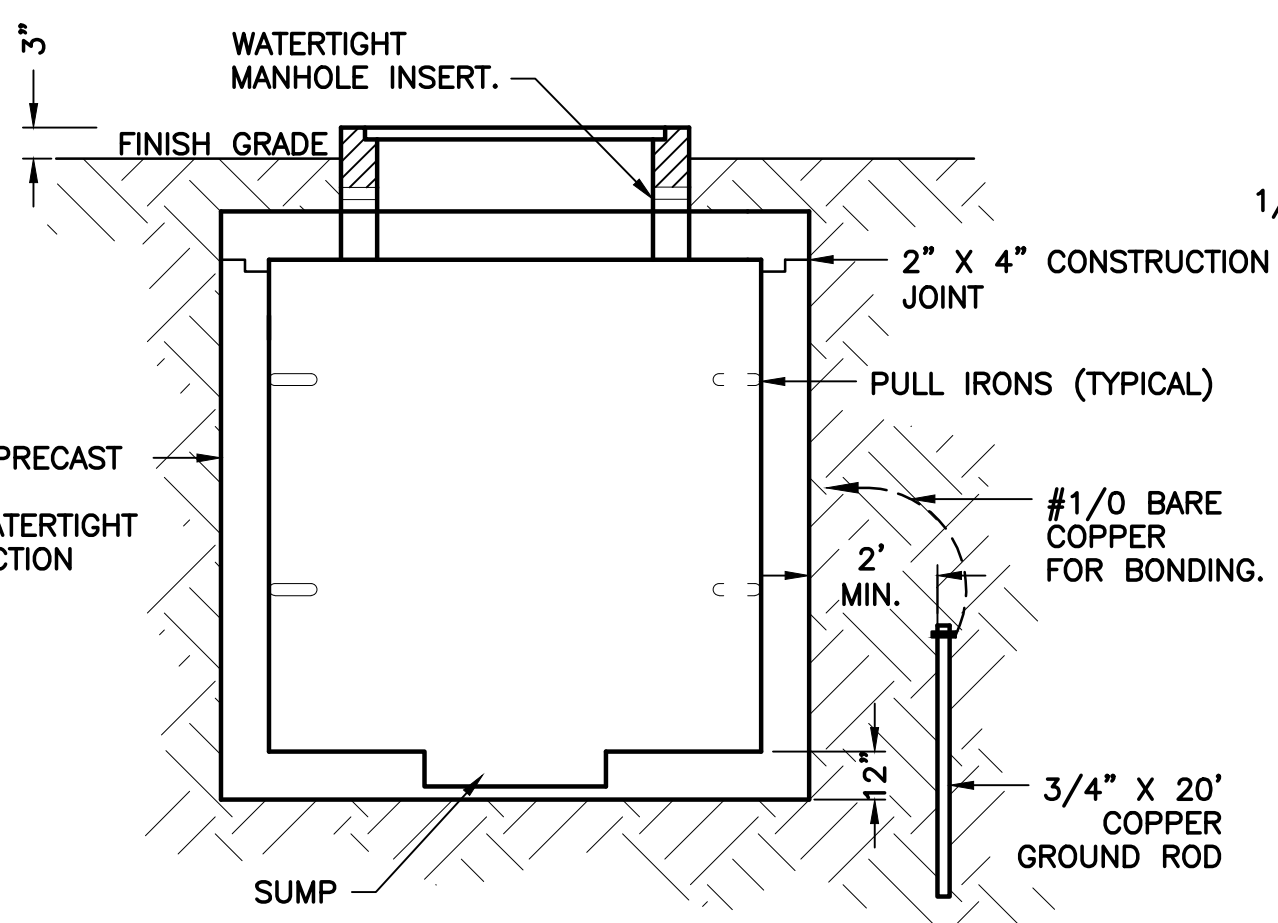


FENCE POST GROUNDING

16

E-13

SCALE: NOT TO SCALE

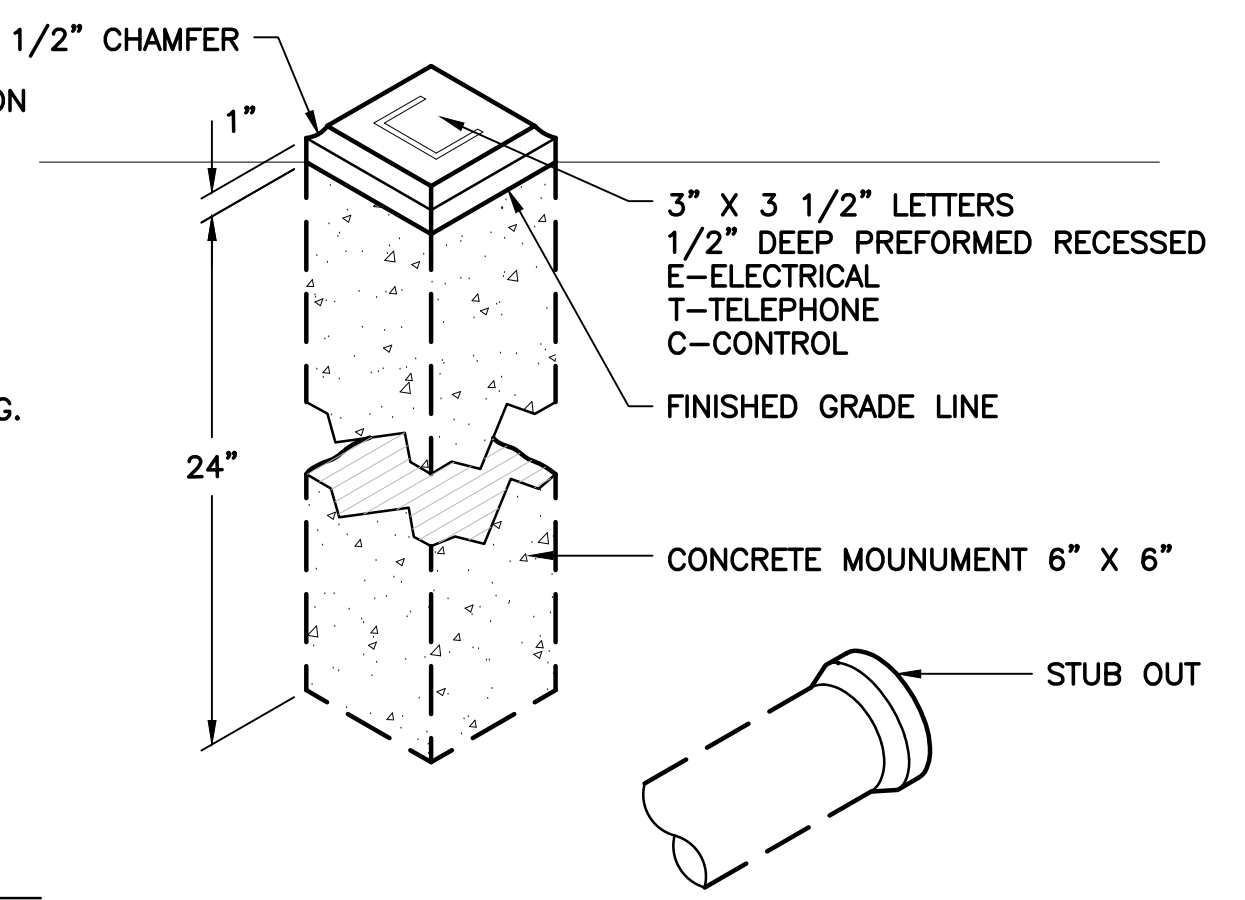


MANHOLE DETAIL

17

E-13

SCALE: N.T.S.

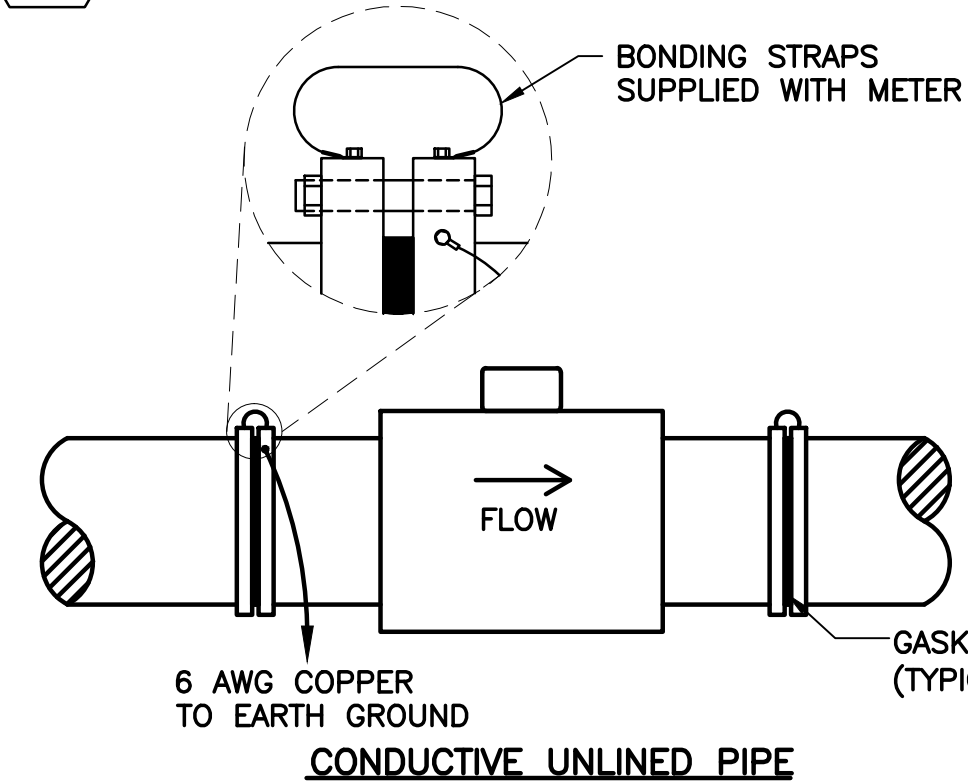


CONDUIT STUB MONUMENT DETAILS

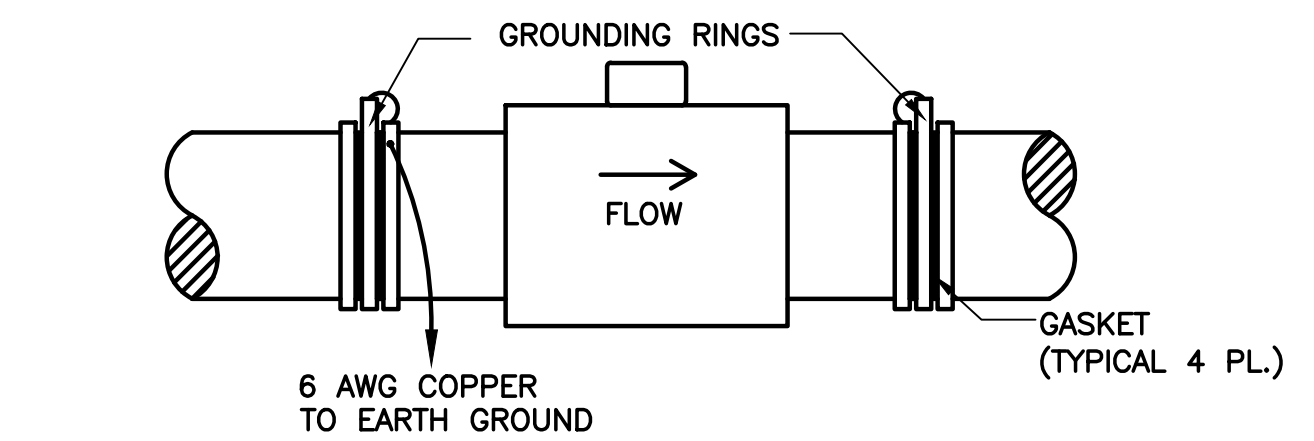
18

E-13

SCALE: N.T.S.



CONDUCTIVE UNLINED PIPE



NON-CONDUCTIVE OR LINED PIPE

NOTES:

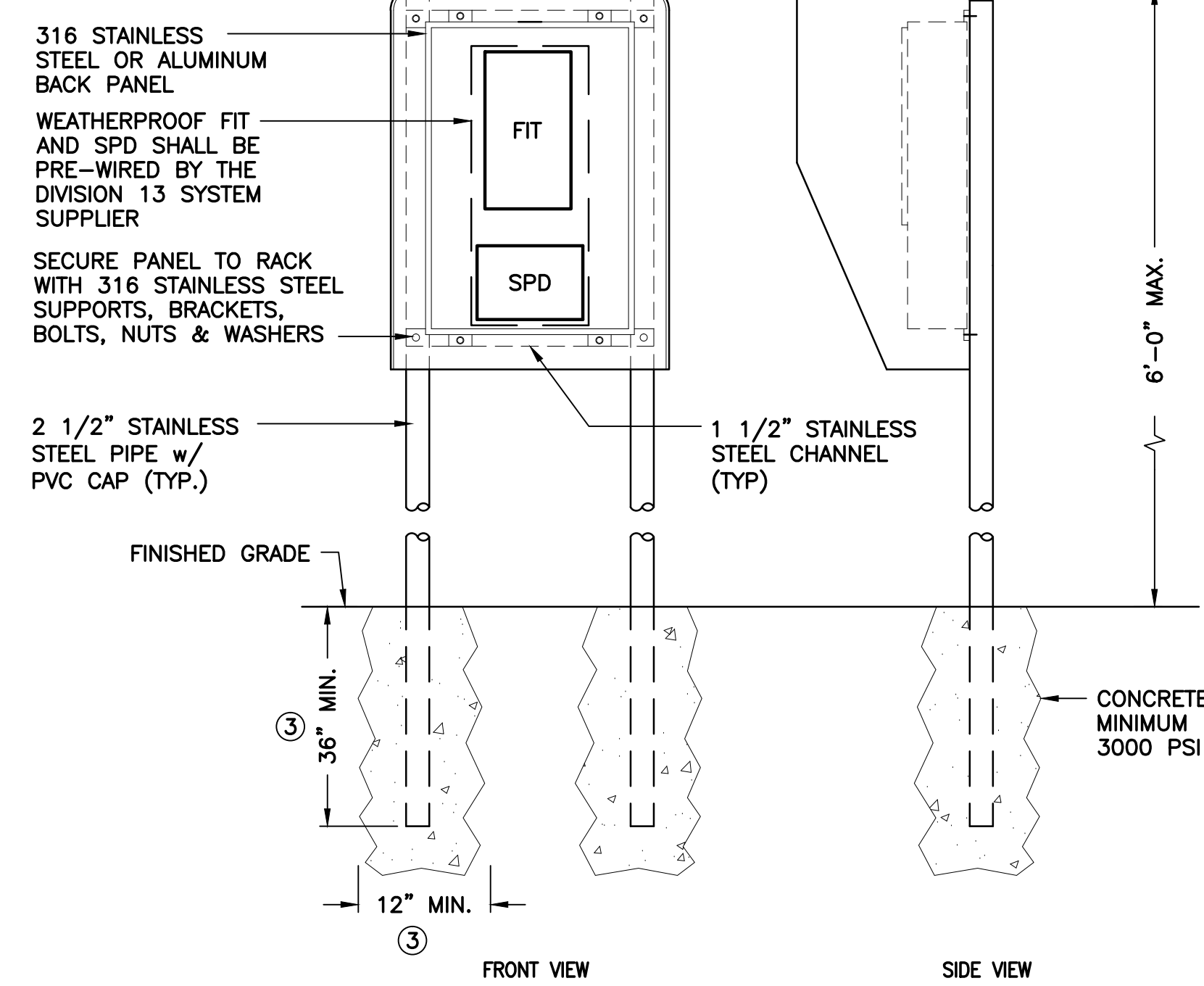
- GROUNDING RINGS NOT REQUIRED FOR SENSORS WITH GROUNDING ELECTRODES.
- GALVANICALLY PROTECTED PIPES REQUIRE SPECIAL CONSIDERATION (REFER TO MANUFACTURER RECOMMENDATIONS)
- MAINTAIN A MINIMUM OF FIVE STRAIGHT PIPE DIAMETERS UPSTREAM AND TWO STRAIGHT PIPE DIAMETERS DOWNSTREAM FROM THE ELECTRODE PLANE.

ELECTROMAGNETIC FLOW SENSOR DETAIL

19

E-13

N.T.S.



ELECTRICAL EQUIPMENT RACK DETAIL

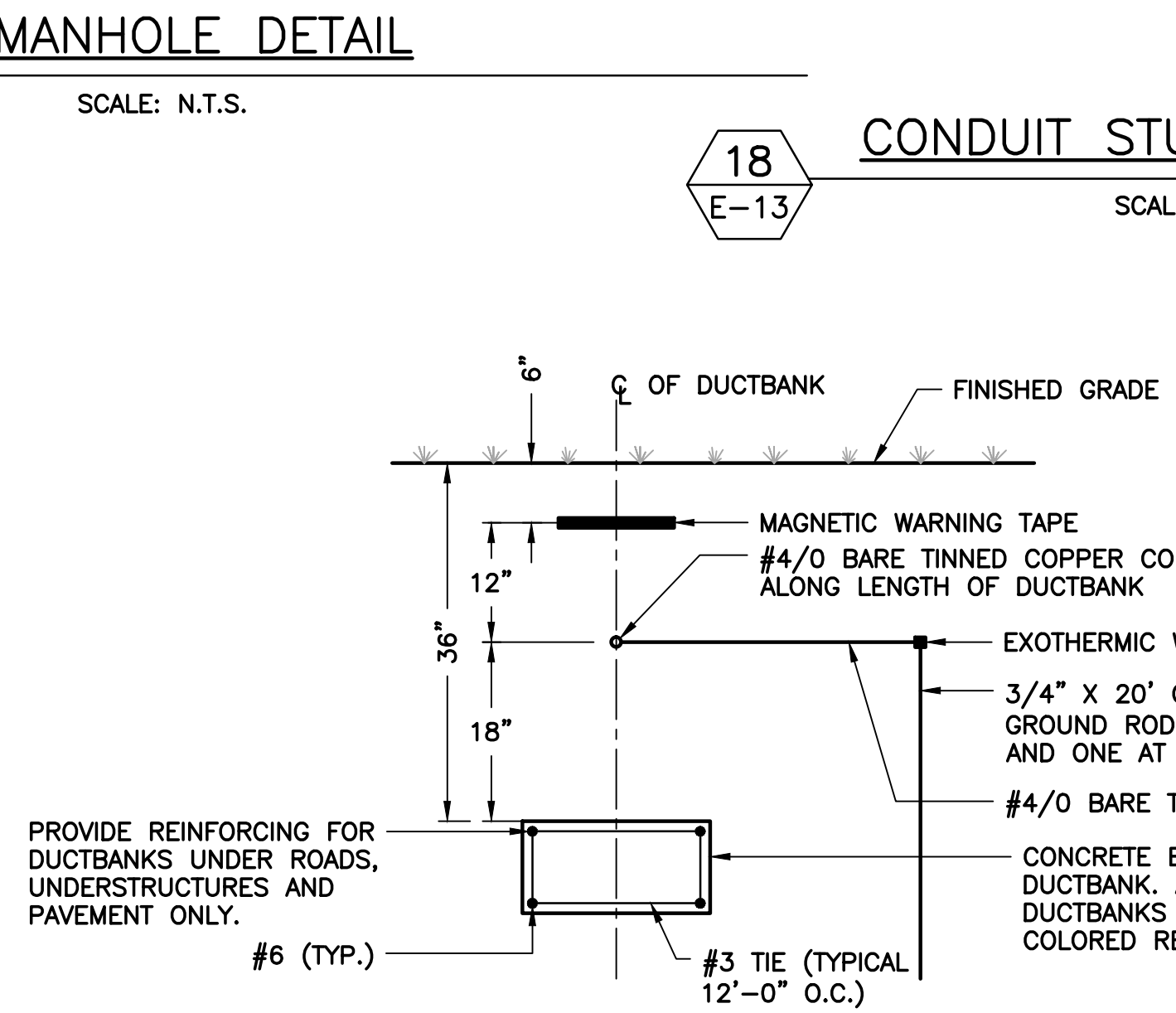
20

E-13

N.T.S.

NOTES:

- ALL EXPOSED EDGES TO BE GROUND SMOOTH AND BURR FREE.
- CONTRACTOR TO PROVIDE STRUCTURAL AND FOOTING DETAILED DRAWINGS AND WIND LOAD CALCULATIONS SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER IN ACCORDANCE WITH THE FLORIDA BUILDING CODE.
- DEPTH AND WIDTH AS REQUIRED TO MEET STRUCTURAL CALCULATIONS.



TYPICAL DUCTBANK DETAIL

21

E-13

N.T.S.

NOTES:

- CONTRACTOR TO SUPPLY, FURNISH AND INSTALL "TRACKER" BALL DEVICE AT 100' INTERVALS, CHANGE OF DIRECTION AND ONE AT EACH END OF EVERY RUN.
- ALL CONDUITS TO BE CONCRETE ENCASED.

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Sheet No. **E-13**

GENERAL INSTRUMENT OR FUNCTION SYMBOLS		PROCESS DEVICE SYMBOLS		PROCESS DEVICE SYMBOLS (CONTINUED)		FUNCTION SYMBOLS & ABBREVIATIONS		
	DISCRETE INSTRUMENT - FIELD MOUNTED		REDUCER OR ENLARGER		VALVE: GLOBE OR OTHER IN-LINE TYPE, UNLESS OTHERWISE INDICATED.	k	PROPORTIONAL GAIN OR ATTENUATE (INPUT:OUTPUT)	HAND SWITCH ABBREVIATIONS: A AUTOMATIC C COMPUTER OR CLOSE H HAND L LOCAL M MODULATE O OFF OR OPEN R REMOTE S START OR STOP
	DISCRETE INSTRUMENT - PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR ①		PRIMARY ELEMENT VENTURI TUBE		BUTTERFLY VALVE	-k	REVERSE PROPORTIONAL GAIN OR ATTENUATE (INPUT:OUTPUT)	
	DISCRETE INSTRUMENT - AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR ①		PRIMARY ELEMENT MAGNETIC FLOWMETER		CHECK VALVE WITH FLOW DIRECTION AS INDICATED	Σ	SUMMING	
	INSTRUMENTS SHARING COMMON HOUSING		PRIMARY ELEMENT ULTRASONIC DOPPLER FLOWMETER		PLUG VALVE	Σ/n	AVERAGING	
	HATCHED ITEMS INDICATE TO BE PROVIDED BY OTHERS		PRIMARY ELEMENT PARSCHALL FLUME		BALL VALVE	Δ	SUBTRACTING	
	NORMALLY INACCESSIBLE OR BEHIND-THE-PANEL DEVICES OR FUNCTIONS MAY BE DEPICTED BY USING THE SAME SYMBOL, BUT WITH DASHED HORIZONTAL BARS.		PRIMARY ELEMENT ORIFICE PLATE		PRESSURE REGULATING VALVE - SELF CONTAINED	√	EXACT SQUARE ROOT	
	CONTROL INTERLOCK		PRIMARY ELEMENT WEIR FLOWMETER		FLOW CONTROL GATE OR GATE VALVE	+	DIVIDE	
	CONTROL SYSTEM I/O INTERFACE - ANALOG SIGNAL. DIRECTION OF TRIANGLE DENOTES WHETHER INPUT OR OUTPUT.		PRIMARY ELEMENT TURBINE OR PROPELLER TYPE METER		CENTRIFUGAL BLOWER	x	MULTIPLY	
	CONTROL SYSTEM I/O INTERFACE - DISCRETE SIGNAL. DIRECTION OF TRIANGLE DENOTES WHETHER INPUT OR OUTPUT.		PRIMARY ELEMENT PITOT TUBE		CENTRIFUGAL PUMP	S	INTEGRATE	
	PNEUMATIC SIGNAL		PRIMARY ELEMENT ROTAMETER		SUBMERSIBLE PUMP	+	BIAS POSITIVE	
	EXISTING EQUIPMENT		PRIMARY ELEMENT STRAP ON ULTRASONIC TRANSIT TIME METER		DIAPHRAGM PUMP & MOTOR	-	BIAS NEGATIVE	
	FUTURE EQUIPMENT		PRIMARY ELEMENT STRAP ON ULTRASONIC DOPPLER METER		DISC FLOW OR PROGRESSIVE CAVITY PUMP	(X)	NONLINEAR OR UNSPECIFIED FUNCTION	
	DIAPHRAGM SEAL		PRIMARY ELEMENT ULTRASONIC FLOW OR LEVEL METER		VERTICAL PUMP	>	HIGH SELECT	
	BUBBLER SYSTEM		FLOAT SWITCH		MOTOR - MAY BE ELECTRIC, HYDRAULIC, OR PNEUMATIC. ARROW DENOTES VARIABLE SPEED.	<	LOW SELECT	
	PURGE OR FLUSHING DEVICE		DRAIN		CHEMICAL INJECTION POINT	‡	HIGH LIMIT	
			MIXER			‡	LOW LIMIT	

### INSTRUMENTATION IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS	ALARM		
B	BURNER, COMBUSTION	EMERGENCY	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE	CLEANER	CONTROL	
D	DENSITY (MASS) OR SPECIFIC GRAVITY	PRIMARY ELEMENT		
E	VOLTAGE (EMF)	GLASS		
F	FLOW RATE			
G	GAUGING (DIMENSIONAL)	INDICATE		
H	HAND (MANUALLY INITIATED)			HIGH OR OPEN
I	CURRENT (ELECTRICAL)			
J	POWER			
K	TIME OR TIME SCHEDULE		CONTROL STATION	
L	LEVEL			LOW OR CLOSED
M	USER'S CHOICE			MIDDLE OR INTERMEDIATE
N	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE	ORIFICE (RESTRICTION)		
P	PRESSURE OR VACUUM	POINT (TEST CONNECTION)		
Q	QUANTITY			
R	RUN	RECORD		
S	SPEED OR FREQUENCY		SWITCH	
T	TEMPERATURE		TRANSMIT	
U	MULTIVARIABLE	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY, VIBRATION		VALVE, DAMPER, OR LOUVER	
W	WEIGHT OR TORQUE	WELL		
X	FAILURE			X AXIS
Y	EVENT, STATE, OR PRESENCE		RELAY, COMPUTE, CONVERT	Y AXIS
Z	POSITION, DIMENSION		DRIVE, ACTUATE, OR UNCLASSIFIED CONTROL ELEMENT	Z AXIS

### GENERAL NOTES

- THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS & ABBREVIATIONS MAY NOT APPLY TO THIS SPECIFIC PROJECT.
- THIS LEGEND APPLIES TO INSTRUMENTATION DIAGRAMS ONLY, & ITS SYMBOLS MAY NOT BE APPLICABLE TO NON-INSTRUMENTATION DRAWINGS.
- THIS LEGEND SHEET & THE INSTRUMENTATION DIAGRAMS & I-DRAWINGS ARE GENERALLY BASED ON THE INSTRUMENT SOCIETY OF AMERICA'S STANDARDS FOR PRACTICES IN INSTRUMENTATION. SOME MODIFICATIONS, ADDITIONS, & ALTERATIONS MAY HAVE BEEN MADE TO ACCOMMODATE INDIVIDUAL PROJECT REQUIREMENTS.
- SOME PROCESS ITEMS (SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC.) WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE INSTRUMENTATION SHEETS.
- SEE ELECTRICAL SHEETS & SPECIFICATIONS FOR ADDITIONAL CONTROL & INTERLOCK REQUIREMENTS FOR EQUIPMENT NOT SHOWN OR NOT PROVIDED BY THE INSTRUMENTATION SUPPLIER.
- SLANTED TEXT DENOTES EXISTING EQUIPMENT OR STRUCTURES. NON-SLANTED TEXT DENOTES NEW EQUIPMENT, STRUCTURES, & WORK. SLANTED TEXT (NOT SHADED) DENOTES FUTURE EQUIPMENT STRUCTURES & WORK.

### VALVE ACTUATOR SYMBOLS

\* AUTOMATIC POSITIONER

VALVE OR GATE ACTUATOR WITH DEFINED AS FOLLOWS:

P: AIR CYLINDER  
S: SOLENOID  
P/O: AIR/OIL CYLINDER  
E: ELECTRIC MOTOR  
H: HYDRAULIC CYLINDER  
EH: ELECTROHYDRAULIC  
Z: MISCELLANEOUS

FOR PRESSURE RELIEF OR SAFETY VALVES ONLY

MANUALLY (HAND) OPERATED

### TAG NUMBER & DESIGNATION EXAMPLE

TYPICAL LOOP NUMBER

ADDITIONAL INSTRUMENT IDENTIFICATION. SEE FUNCTION SYMBOLS & ABBREVIATIONS.

WHEN USED, LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES IN THE SAME INSTRUMENT LOOP



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**BID SET**

No.	Date	Revision	By	No.	Date	Revision	By
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Δ				Δ			
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Approved by: LMR  
Job No. O28409 ©2015

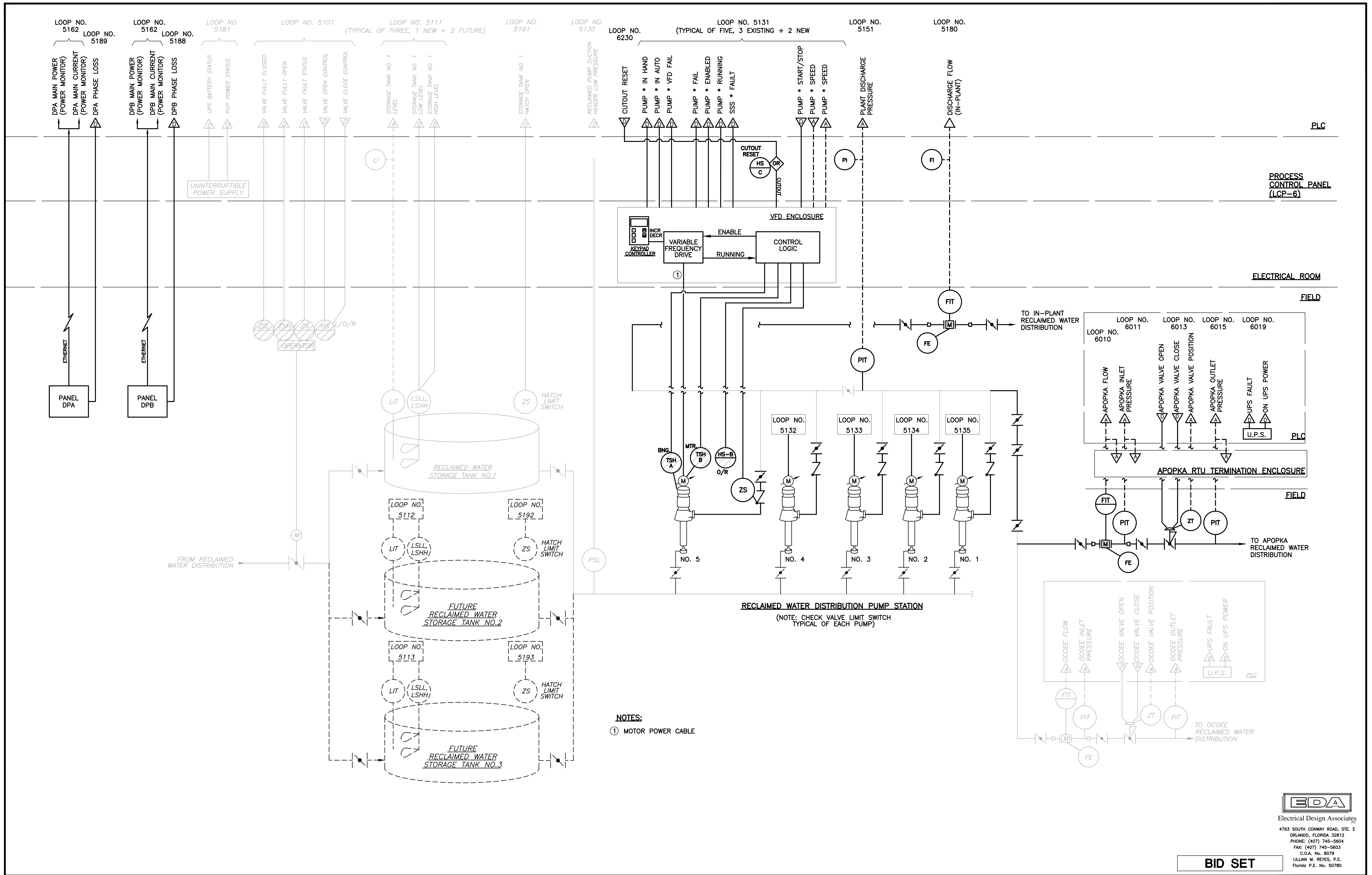
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ORANGE COUNTY UTILITIES UTILITIES ENGINEERING DIVISION

LILLIAN M. REYES, P.E.  
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**INSTRUMENTATION SYMBOLS, NOTES AND ABBREVIATIONS**

Sheet No. **I-1**





**NOTES:**  
 ① MOTOR POWER CABLE

No.	Date	Revision	By	No.	Date	Revision	By

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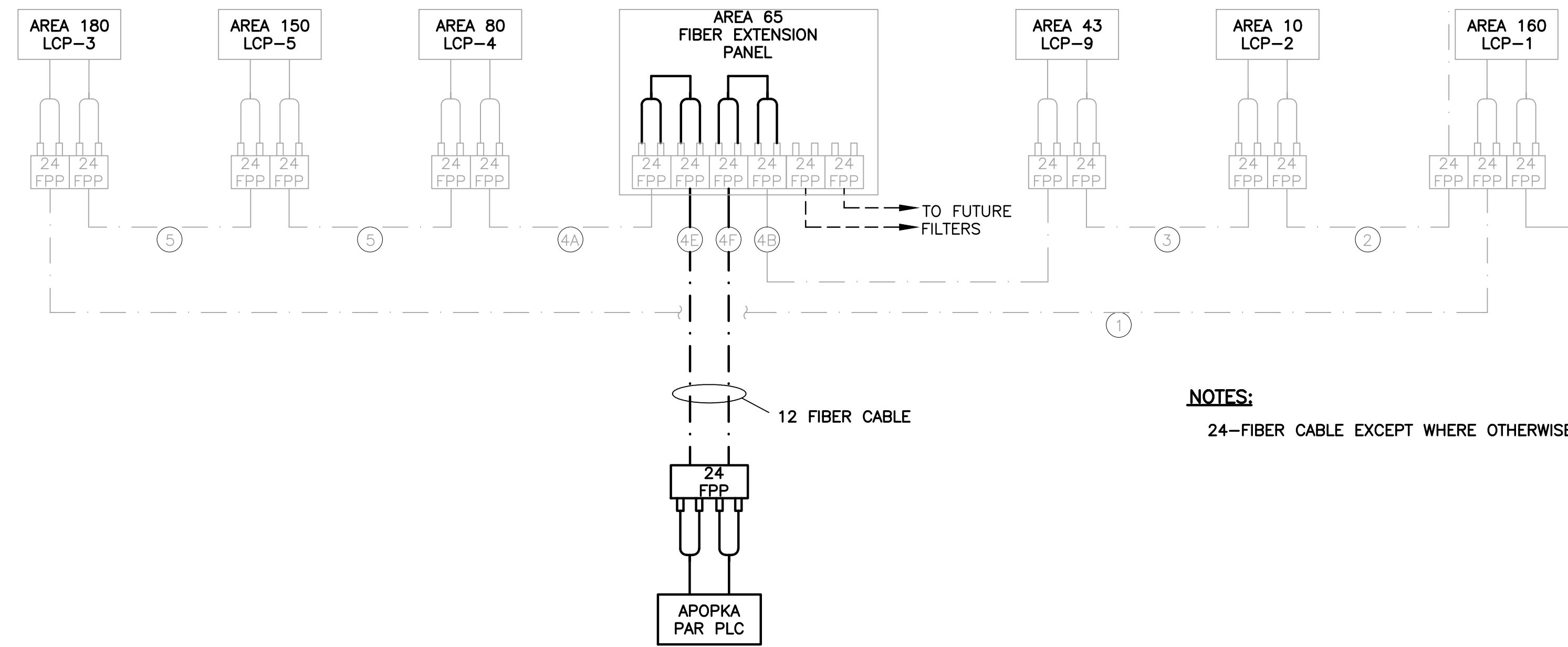
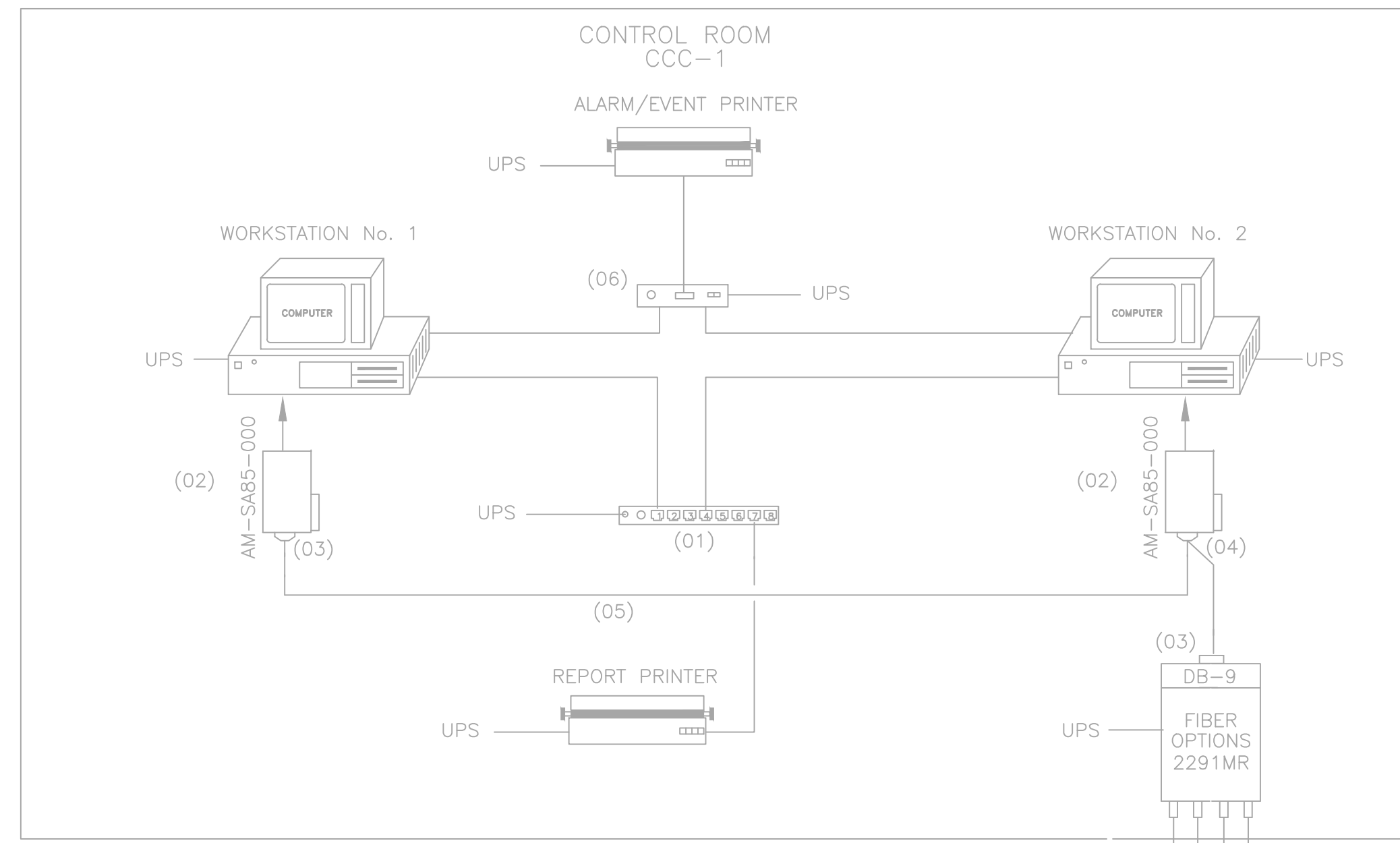
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**BID SET**  
**PROCESS & INSTRUMENTATION DIAGRAM**  
 Sheet No. **I-2**

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**NOTES:**  
24-FIBER CABLE EXCEPT WHERE OTHERWISE NOTED

**SYSTEM BLOCK DIAGRAM**  
SCALE: N.T.S.

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**SYSTEM BLOCK DIAGRAM**

Sheet No.  
**1-3**