CITY OF TULSA STANDARD DETAILS AND SPECIFICATIONS USED IN THIS PROJECT

TULSA METROPOLITAN UTILITY AUTHORITY

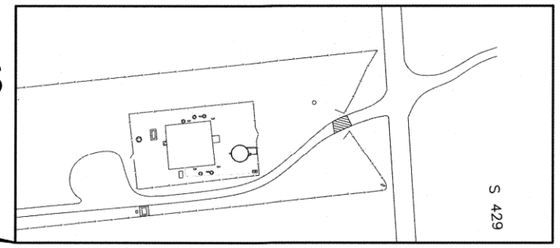
CITY OF TULSA, OKLAHOMA

ACCOUNT NO. 2331W00005.WATERCAP.7417400.6021

PROJECT NO. TMUA-W 21-04, PROJECT 136514

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

MARCH 2025

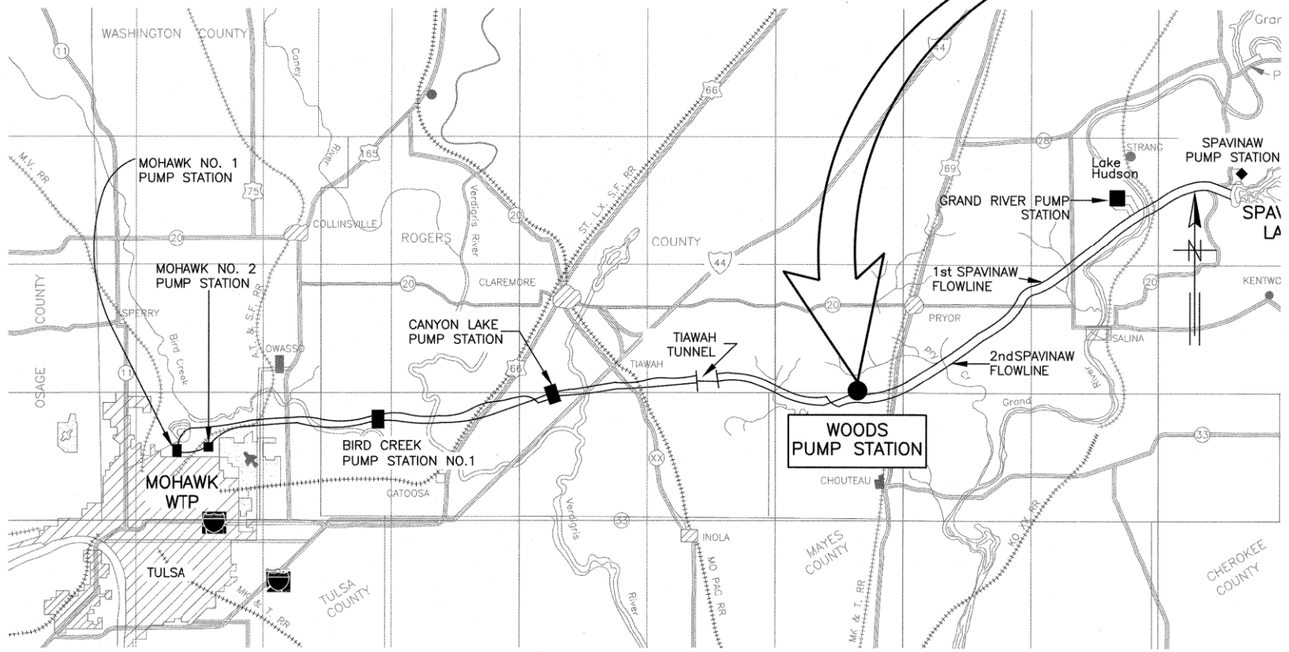


PROJECT LOCATION MAP

SCALE: NOT TO SCALE
ADDRESS: 4316 S. 429
CHOUTEAU, OK 74337

PROJECT COORDINATION/CONTACTS		
ORGANIZATION	NAME	NUMBER
CITY OF TULSA, WATER DESIGN LEAD ENGINEER	CHERYL WILSON	918-596-9559
CITY OF TULSA, PM	CODY SHULTS	918-596-1208
CITY OF TULSA, SR. SPECIAL PROJECTS ENGINEER	RACHEL WATTS	918-596-2412
CITY OF TULSA, RAW WATER MANAGER	JEREMY LEDBETTER	918-596-8101
CITY OF TULSA, UTILITY COORDINATOR	TONY GLYNN	918-596-9245

UTILITY CONTACTS		
COMPANY	NAME	NUMBER
OKLAHOMA NATURAL GAS CO.	CRAIG POWELL	918-831-8261
AT&T	ALFRED NICHOLS	539-444-1069
COX COMMUNICATIONS	JASON HOLT	918-830-7238
ONG	CODY YOST	918-831-8292
AEP-PSO	CHRIS WILLIAMS	918-476-2715
COT UTILITY COORDINATOR	CHRIS KOVAC	918-596-9649



VICINITY MAP

SCALE: NOT TO SCALE

ENTIRE PROJECT IS NOT WITHIN CORPORATE LIMITS OF THE CITY OF TULSA (COT).

CURRENT CITY OF TULSA STANDARD SPECIFICATIONS AND STANDARD DETAILS GOVERN. ALL OTHER CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 2009 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

THIS PROJECT COMPLIES WITH ALL OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ) REQUIREMENTS

PREPARED BY:

GREELEY AND HANSEN
A TYLin Company

312 South Boston Ave, Suite 300
Tulsa, Oklahoma 74103-3311
Ph 800-837-9779

Certificate of Authorization No. 1975
Certificate Expires JUNE 30, 2026

SEAL AFFIXED
MARCH 18, 2025
APPROVED

APPROVED BY: _____ DATE: 3-27-2025

DIRECTOR, WATER AND SEWER DEPARTMENT

ADVERTISEMENT DATE: 3-28-2025

T:\O\GH-TULL\TULSA OFFICE_PROJECTS\0141_TMUA\0141G_RAW WATER PS ASSESSMENT\04-CAD_BIM GIS\CIVIL3D (MULTIPLE CONTRACTS)\01 WOODS PUMP STATION\0141G_COD 2025/03/11 10:40 AM MATTHEW RODENBECK

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

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MECHANICAL		
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8	M02	FLOW LINE DIAGRAM
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10	M04	DEMOLITION SECTIONS
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ELECTRICAL		
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24	E09	ROOF POWER PLAN
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INSTRUMENTATION		
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28	N02	SCADA ARCHITECTURE BLOCK DIAGRAMS
29	N03	WOODS PUMP STATION P&ID
30	N04	INSTALLATION DETAILS

GENERAL ABBREVIATIONS

A	
@	AT
&	AND
*	VERIFY IN FIELD
AB	ANCHOR BOLT
ABAND	ABANDON(ED)
ABC	AGGREGATE BASE COURSE
AC	ASPHALTIC CONCRETE
ACP	ASBESTOS CEMENT PIPE
ADDL	ADDITIONAL
ADMIN	ADMINISTRATION
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE\or\ALTERNATIVE
ALUM	ALUMINUM
APPROX	APPROXIMATE / APPROXIMATELY
ARCH	ARCHITECTURAL
ARV	AIR RELEASE VALVE
ASPH	ASPHALT
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
AUX	AUXILIARY
AVE.	AVENUE
AVG	AVERAGE
B	
B/	BOTTOM OF
BF	BLIND FLANGE
BFV	BUTTERFLY VALVE
BL	BASELINE
BLDG	BUILDING
BP	BOOSTER PUMP, BYPASS
BPS	BOOSTER PUMP STATION
BRG	BEARING
BOT	BOTTOM
BC	BACK OF CURB
BM	BENCHMARK
BMPs	BEST MANAGEMENT PRACTICES
BSMT	BASEMENT
BTWN	BETWEEN
BVC	BEGIN VERTICAL CURVE
BV	BALL VALVE
C	
CAP	CORRUGATED ALUMINUM PIPE
CB	CATCH BASIN
CEN	CENTER
CHEM	CHEMICAL
CI	CAST IRON
CIPM	CURED IN PLACE MANHOLE LINING
CIPP	CURED IN PLACE PIPE LINING
CIP	CAST IRON PIPE / CAST IN PLACE
CIR.	CIRCLE
CJ	CONTROL JOINT / CONSTRUCTION JOINT
CKV	CHECK VALVE
CL	CENTERLINE
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COL	COLUMN
CONN	CONNECTION
CONC	CONCRETE
CONT	CONTINUOUS
CONT'D	CONTINUED
COORD	COORDINATE
CP	CONTROL POINT
CPVC	CHLORINATED POLYVINYL CHLORIDE
CS	COMBINED SEWER
CU	CUBIC
CY	CUBIC YARD
D	
D	DRAIN, DEPTH
DB	DUCT BANK
DBL	DOUBLE
DEG	DEGREE
DEMO	DEMOLISH / DEMOLITION
DIA or Ø	DIAMETER
DIAG	DIAGONAL
DI	DUCTILE IRON
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DISCH	DISCHARGE
DMS	DRY MIX SHOTCRETE
DN	DOWN
DR.	DRIVE
DWG	DRAWING (S)
E	
E	EAST
EA	EACH
ECC	ECCENTRIC
EF	EACH FACE
EFL	EFFLUENT
EG	EXISTING GRADE
EHH	ELECTRIC HAND HOLE
EJ	EXPANSION JOINT
EL/ELEV	ELEVATION
ELEC	ELECTRIC / ELECTRICAL
EMH	ELECTRIC MANHOLE
EO	EDGE OF
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EX or EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
F	
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FDN	FOUNDATION
FEP	FLUORINATED ETHYLENE PROPYLENE
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOOR
FLG	FLANGE (D)
FM	FORCE MAIN
FND	FOUND
FPS	FEET PER SECOND
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET
FTG	FOOTING
FWY.	FREEWAY
G	
GA	GAUGE
GAL	GALLON
GB	GRADE BREAK
GM	GAS MAIN
GPM	GALLONS PER MINUTE
GR	GRADE
GV	GATE VALVE
H	
H	HEIGHT
HDD	HORIZONTAL DIRECTIONAL DRILLING
HDPE	HIGH DENSITY POLYETHYLENE
HORIZ	HORIZONTAL
HP	HIGH POINT
HPI	HORIZONTAL POINT OF INTERSECTION
HW	HEADWALL
HWL	HIGH WATER LEVEL
HWY.	HIGHWAY
HYD	HYDRANT
I	
ID	INSIDE DIAMETER
I.F.	INSIDE FACE
IN.	INCHES
INF	INFLUENT
INLT	INLET
INT	INTERIOR
INV	INVERT
IP	INLET PROTECTION
IPS	IRON PIPE STRAIGHT (THREAD)
IR	IRRIGATION
J	
JB	JUNCTION BOX
JT	JOINT
K	
KGV	KNIFE GATE VALVE
L	
L	LENGTH
LB(S)	POUND(S)
LF	LINEAR FOOT / FEET
LN.	LANE
LOC	LIMIT OF CONSTRUCTION
LOD	LIMIT OF DISTURBANCE
LP	LOW PRESSURE / LOW POINT / LIGHT POST
LR	LONG RADIUS
LS	LIFT STATION
LT	LEFT
LWL	LOW WATER LEVEL
M	
MAX	MAXIMUM
MFR	MANUFACTURER
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
ML	MONUMENT LINE
N	
N	NORTH
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
N/A	NOT APPLICABLE
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO. or #	NUMBER
NOM	NOMINAL
NPT	NATIONAL PIPE THREAD
NTP	NOTICE TO PROCEED
NTS	NOT TO SCALE
O	
OC	OVERHEAD COMMUNICATION
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OE	OVERHEAD ELECTRIC
OF	OVERHEAD FIBER
O.F.	OUTSIDE FACE
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OT	OVERHEAD TELEPHONE
OTV	OVERHEAD TELEVISION
P	
PB	PULLBOX
PC	POINT OF CURVATURE
PE	PLAIN END
PKWY.	PARKWAY
PL	PLACE / PLATE / PROPERTY LINE
PMP	PUMP
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVE
Ph	POTENTIAL OF HYDROGEN
PH	POTHOLE
PRC	POINT OF REVERSE CURVATURE
PRV	PRESSURE REDUCING VALVE
PS	PUMPING STATION
PSF	PRESSURE PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSV	PRESSURE SUSTAINING VALVE
PT	POINT OF TANGENCY / PRESSURE TREATED
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVR	PRESSURE VACUUM RELIEF
PW	POTABLE WATER
Q	
QS	QUARTER SECTION
QTY	QUANTITY
R	
R	RADIUS
RCA	RESTRAINED COUPLING ADAPTER
RCP	REINFORCED CONCRETE PIPE
RD.	ROAD
RED	REDUCER
RECIRC	RECIRCULATION
REF	REFERENCE
REINF	REINFORCED/REINFORCEMENT
REQ'D	REQUIRED
RES	RESERVOIR
RFCA	RESTRAINED FLANGED COUPLING ADAPTER
RJ	RESTRAINED JOINT
ROW	RIGHT OF WAY
RMA	RESOURCE MANAGEMENT AREA
RPA	RESOURCE PROTECTION AREA
RR	RAILROAD
RT	RIGHT
RTU	ROOF TOP UNIT
S	
S	SOUTH / SLOPE
SB	SOIL BORING
SBL	SURVEY BASE LINE
SCH	SCHEDULE
SD	STORM DRAIN
SDR	STANDARD DIMENSTION RATIO
SF	SQUARE FOOT / FEET
SHGC	SOLAR HEAT GAIN COEFFICIENT
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION(S)
SS	SANITARY SEWER
SST	STAINLESS STEEL
ST	STORM SEWER
ST.	STREET
STL	STEEL
STA	STATION
STR	STRUCTURE
S/W	SIDEWALK
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
SY	SQUARE YARD
SYM	SYMMETRICAL
T	
T	TANGENT
T/	TOP OF
T&B	TOP AND BOTTOM
TB	THRUST BLOCK CONCRETE
TBD	TO BE DETERMINED
TBM	TEMPORARY BENCHMARK
TC	TOP OF CURB
TEL	TELEPHONE
TEMP	TEMPORARY / TEMPERATURE
THK	THICK(NESS)
TOB	TOP OF BANK
TOC	TOP OF CONCRETE
T.O.P.	TOP OF PIPE
TOW	TOP OF WALL
TP	TREE PROTECTION
TS	TRAFFIC SIGNAL
TV	TELEVISION
TYP	TYPICAL
U	
UC	UNDERGROUND COMMUNICATION
UE	UNDERGROUND ELECTRIC
UF	UNDERGROUND FIBER
UT	UNDERGROUND TELEPHONE
UTV	UNDERGROUND TELEVISION
UNK	UNKNOWN
UON	UNLESS OTHERWISE NOTED
UV	ULTRA VIOLET
V	
V	VOLUME / VELOCITY
VB	VALVE BOX
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VLT	VALVE VAULT
VPI	VERTICAL POINT OF INTERSECTION
W	
W	WEST / WIDE
W/	WITH
W/O	WITHOUT
WM	WATER MAIN
WP	WORKPOINT
WS	WATER STOP, WATER SURFACE, WELDED STEEL
WSE	WATER SURFACE ELEVATION
WT	WEIGHT / WATER TIGHT
WTP	WATER TREATMENT PLANT
WWF	WELDED WIRE FABRIC
WWTP	WASTE WATER TREATMENT PLANT
X	
X	COORDINATE VALUE (EAST-WEST DIRECTION)
XFR	TRANSFORMER
Y	
Y	COORDINATE VALUE (NORTH-SOUTH DIRECTION)
YD	YARD
YH	YARD HYDRANT
YR	YEAR

BEFORE YOU DIG 811 OKIE ONE-CALL SYSTEM, INC. CALL OKIE

LICENSED PROFESSIONAL ENGINEER
JOSEPH M. TEUSCH
24406
OKLAHOMA

Joseph Teusch

GENERAL DRAWING INDEX AND ABBREVIATIONS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company
312 SOUTH BOSTON AVE, SUITE 300
TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD	
DESIGNED	BB	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	JCW	3/25
FIELD MGR.		3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: G01
DATE: MARCH 2025
ATLAS PAGE NO:
SHEET 2 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

PAY ITEM NOTES:

WATER:

1. SEE SPECIFICATION SECTION 01 29 50 - CONTRACT ITEMS FOR ADDITIONAL REQUIREMENTS.
2. ALL ESTIMATED QUANTITIES SHOWN ARE APPROXIMATE AND ARE TO BE USED ONLY (A) AS A BASIS FOR ESTIMATING THE PROBABLE COST OF THE WORK, AND (B) FOR THE PURPOSE OF COMPUTING THE BIDS SUBMITTED FOR THE WORK. THE ACTUAL AMOUNTS OF WORK DONE AND MATERIALS FURNISHED UNDER THE UNIT PRICE ITEMS MAY DIFFER FROM THE ESTIMATED QUANTITIES. THE BASIS OF PAYMENT FOR WORK AND MATERIALS WILL BE THE ACTUAL AMOUNT OF WORK DONE AND MATERIALS FURNISHED. CONTRACTOR AGREES THAT IT WILL MAKE NO CLAIM FOR DAMAGES, ANTICIPATED PROFITS, OR OTHERWISE ON ACCOUNT OF ANY DIFFERENCE BETWEEN THE AMOUNTS OF WORK ACTUALLY PERFORMED AND MATERIALS ACTUALLY FURNISHED AND THE ESTIMATED AMOUNTS THEREOF.
3. CONTRACTOR IS REMINDED TO BACKFILL ALL TRENCHES EXCAVATED ACROSS ANY EXISTING OR PROPOSED DRIVING OR PARKING SURFACE WITH 1½-IN TYPE A AGGREGATE BASE, PLACED IN 8-INCH MAXIMUM LIFTS AND COMPACTED TO 95% MODIFIED PROCTOR DENSITY. COST TO BE INCLUDED IN COST OF EXCAVATION AND BACKFILL. NO ADDITIONAL PAYMENT SHALL BE MADE.
4. THE PAY ITEM FOR SEEDING INCLUDES THE QUANTITIES FOR PLACEMENT AND COMPACTION OF SUITABLE BACKFILL AND PLACING GRASS SEED AT EXISTING GRASS AREAS WHICH MAY BE DAMAGED DURING CONSTRUCTION AND WATERING AND FERTILIZING. FERTILIZERS SHALL BE 10-20-10 AND SHALL BE APPLIED A T THE RATE OF 1.5 LBS PER 10 SQ YDS. FERTILIZER SHALL BE APPLIED PER SECTION OF 230.04H OF ODOT STANDARD SPECIFICATIONS. WATERING SHALL BE APPLIED AS NECESSARY UNTIL VEGETATION IS ESTABLISHED OR UNTIL THE WORK IS ACCEPTED AS COMPLETE. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF DAMAGE TO EXISTING GRASS THAT EXCEEDS WORK ARE LIMITS SHOWN ON PLANS.
5. THE "OWNER ALLOWANCE" CAN BE USED FOR VARIOUS WORK AND MISCELLANEOUS ITEMS NOT IDENTIFIED IN THE CONTRACT DOCUMENTS WITH THE FOLLOWING PROVISIONS: THE ALLOWANCE SHALL BE USED FOR COST OF MATERIALS, LABOR, INSTALLATION AND OVERHEAD AND PROFIT FOR ADDITIONAL WORK AND MISCELLANEOUS ITEMS THAT ARE NOT IDENTIFIED IN THE CONSTRUCTION DOCUMENTS AND PLANS, AND NOT INCLUDED IN THE BID ITEMS OF THE CONTRACT.

A. THE ALLOWANCE SHALL BE USED ONLY AT THE DISCRETION OF THE CITY. ANY ALLOWANCE BALANCE REMAINING AT THE COMPLETION OF THE PROJECT WILL BE CREDITED BACK TO THE CITY ON THE FINAL APPLICATION FOR PAYMENT SUBMITTED BY THE CONTRACTOR.
B. THE CONTRACTOR SHALL PROVIDE, TO THE CITY, A WRITTEN REQUEST FOR THE USE OF ANY ALLOWANCE, WITH A SCHEDULE OF VALUES, AND ALL ASSOCIATED BACKUP INFORMATION, INCLUDING ANY TIME EXTENSIONS REQUIRED TO PERFORM THE WORK.
C. THE CONTRACTOR SHALL PROCEED WITH THE WORK INCLUDED IN THE ALLOWANCE ONLY AFTER RECEIVING A WRITTEN ORDER, FROM THE ENGINEER AND CITY AUTHORIZING SUCH WORK. PROCEEDING WITH WORK IN THE ALLOWANCE WITHOUT A WRITTEN ORDER FROM THE CITY WILL BE AT THE CONTRACTOR'S EXPENSE.

REMOVAL / ADJUSTMENT PAY ITEM NOTES:

1. WASTE MATERIAL TO BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE IN A MANNER APPROVED BY THE ENGINEER.
2. ALL SAW CUTTING AND REMOVAL SHALL BE INCLUDED IN THE COST OF THE ITEM TO BE ADJUSTED, REMOVED, REPAIRED, OR REPLACED.
3. PAY ITEM INCLUDES REMOVAL OF ALL STRUCTURES AND OBSTRUCTIONS WITHIN PROJECT LIMITS NOT SPECIFIED BY OTHER ITEMS OF WORK.
4. INCLUDES SAWING NOT INCLUDED IN OTHER ITEMS OF WORK.
5. SHALL INCLUDE ALL COSTS ASSOCIATED WITH PLUGGING/ PATCHING HOLES IN EXISTING STRUCTURES TO REMAIN.
6. INCLUDES DRAINING OF THE EXISTING LINE, DEMOLITION, DISCONNECTING AND RELOCATING. VALVE RELOCATION ALSO INCLUDES THE CLEANING AND REPAINTING OF THE EXISTING VALVE AND OPERATOR. MAKE RELOCATIONS SHOWN TO MATCH THE MATERIAL AND QUALITY OF THE FACILITY, CONSTRUCTION OR WORK TO BE RELOCATED. RELOCATIONS SHOWN ARE TO BE ARRANGED AS REQUIRED TO PRODUCE PERFORMANCE, UTILITY AND ACCESS EQUAL TO THE EXISTING WORK.

EARTHWORK / EROSION CONTROL / SITE PREPARATION:

1. ALL COSTS FOR REMOVING TREES, SHRUBS, STUMPS, POSTS, AND ALL OTHER DEBRIS AND/OR OBSTRUCTIONS NOT COVERED BY A SEPARATE PAY ITEM ARE INCLUDED IN THE PRICE BID.
2. ALL EXISTING DRAINAGE STRUCTURES SHALL BE CLEANED AND CLEARED OF ALL SEDIMENTATION AND DEBRIS TO THE RIGHT OF WAY. COST OF CLEARING SHALL BE INCLUDED IN THE PRICE BID.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROL AND MAINTENANCE OF THE STORM WATER DRAINAGE FROM THE CONSTRUCTION SITE. STORM WATER PONDING ON THE CONSTRUCTION SITE THAT IS THE RESULT OF CONSTRUCTION WILL NOT BE ALLOWED. ALL COST ASSOCIATED WITH STORM WATER MANAGEMENT, AS WELL AS REMOVAL OF ALL SILT AND DEBRIS FROM ALL DRAINAGE STRUCTURES, STORM SEWER PIPES AND APPURTENANCES WITHIN THE PROJECT LIMITS AT END OF PROJECT, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THIS ITEM.
4. EROSION PROTECTION SHALL BE PLACED AS FOLLOWS:

A. AROUND INLETS TO PREVENT INFLOW OF ERODED MATERIAL INTO STORM SEWER SYSTEM;
B. IN LOCATIONS THROUGHOUT PROJECT SITE, AS DETERMINED BY THE ENGINEER, TO PREVENT WASH OF ERODED MATERIAL ONTO ADJACENT PROPERTY;
C. FOR ENTIRE DURATION OF PROJECT, WITH MAINTENANCE AND REPLACEMENTS, AS DIRECTED BY THE ENGINEER;
D. WITH PERIODIC REMOVAL OF SEDIMENT IN ACCORDANCE WITH STORMWATER MANAGEMENT PLAN.
E. ALL COST FOR ITEMS A-D ABOVE SHALL BE INCLUDED IN UNIT PRICE BID FOR THIS ITEM.

5. PRICE BID SHALL INCLUDE MAINTENANCE, SEDIMENT REMOVAL, DISPOSAL, AND REMOVAL OF FILTERS AT PROJECT COMPLETION.
6. PRICE BID SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND PERMITTING NECESSARY TO SATISFY THE STATE, LOCAL AND FEDERAL SWPPP REQUIREMENTS THROUGHOUT THE COURSE OF THE CONSTRUCTION ACTIVITIES.

PAY QUANTITIES

BID ITEM	SPEC NO.	DESCRIPTION	PAY ITEM NOTE	UNIT	QTY
1	01 29 50	MOBILIZATION/DEMOBILIZATION	1	EA	1
2	01 29 50	CONSTRUCTION ALLOWANCE	5	ALLOW	100,000
3	01 29 50	SWPPP/SOIL PROTECTION AND SITE RESTORATION	1, 3, 4	EA	1
4	02 41 00	EXISTING PUMP MOTOR / GEAR REDUCER DEMOLITION	1	EA	2
5	02 41 00	AIR INTAKE / EXHAUST PIPING DEMOLITION AND ROOF REPAIR	1	EA	2
6	02 41 00	CAPACITY AND SCADA CONTROL PANEL DEMOLITION	1	EA	2
7	02 41 00	ELECTRICAL DEMOLITION	1	EA	1
8	23 81 26	HVAC EQUIPMENT	1	EA	2
9	26 05 19	ELECTRICAL FEEDERS	1, 2	LF	2,000
10	26 05 43	CONCRETE DUCTBANK	1, 2, 3	LF	110
11	26 05 80	480V ELECTRIC MOTORS	1	EA	2
12	26 08 80	ELECTRICAL EQUIPMENT STARTUP AND TESTING	1	EA	1
13	26 22 00	50kVA 480 V - 120/240V EXTERIOR TRANSFORMER	1	EA	1
14	26 24 13	480V SWITCHBOARD	1	EA	1
15	26 24 16	MAIN DISTRIBUTION PANELBOARD	1	EA	1
16	26 24 16	EMERGENCY DISTRIBUTION PANELBOARD	1	EA	1
17	26 29 23	400HP 480V AFDS	1	EA	2
18	26 36 23	AUTOMATIC TRANSFER SWITCH; 240V, 150A	1	EA	1
19	40 90 00	OIT WITH PROGRAMMING (APPROXIMATELY 5 SCREENS EACH)	1	EA	3
20	40 90 00	SCADA HMI PROGRAMMING (APPOXIMATELY 5 SCREENS)	1	EA	5
21	40 96 13	PLC CONTROL PANEL (APPROXIMATELY 350 I/O POINTS)	1	EA	3
22	40 98 00	TESTING, COMMISSIONING & DRAWINGS	1	EA	1

BID ALTERNATES

BID ITEM	SPEC NO.	DESCRIPTION	PAY ITEM NOTE	UNIT	QTY
23	01 29 50	CONSTRUCTION ALLOWANCE (BID ALTERNATE)	5	ALLOW	100,000
24	26 29 23	400HP 480 VFD SPARE (BID ALTERNATE)	1	EA	1
25	26 32 13	35KW GENERATOR (BID ALTERNATE)	1	EA	1
26	43 21 17	PUMP REFURBISHMENT (BID ALTERNATE)	1	EA	2

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER
JOSEPH M. TEUSCH
24406
OKLAHOMA

REVISION	BY	DATE

GENERAL
PAY ITEMS
AND PAY ITEM NOTES

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD		APPROVED:
DESIGNED	BB		
SURVEY			
PROJ. MGR.	CS	3/25	
LEAD ENGR.	[illegible]	3/25	
FIELD MGR.	[illegible]	3/25	
RECOMMENDED DESIGN MANAGER	[illegible]		

DWG NAME: G02 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 3 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

DESCRIPTION OF WORK

1. THE WORK TO BE DONE UNDER THIS CONTRACT CONSISTS OF THE CONSTRUCTION OF IMPROVEMENTS AT RAW WATER FACILITIES AS SHOWN AND SPECIFIED IN THE CONTRACT DOCUMENTS ENTITLED "WOODS PUMP STATION IMPROVEMENTS RAW WATER PS ASSESSMENTS", PROJECT NUMBER TMUA-W 21-04.
2. WOODS PUMP STATION IS LOCATED AT 4316 S. 429, CHOUTEAU OKLAHOMA 74337. WOODS PUMP STATION IMPROVEMENTS INCLUDE PUMP REHABILITATION, ELECTRIC MOTORS, VARIABLE FREQUENCY DRIVES, PUMP CONTROL PANELS, GENERATOR AND TRANSFER SWITCH, AND ALL GENERAL, STRUCTURAL, ARCHITECTURAL, LANDSCAPING, MECHANICAL HEATING AND VENTILATING, INSTRUMENTATION AND CONTROL, AND ELECTRICAL WORK AS SHOWN OR SPECIFIED IN THE CONTRACT DOCUMENTS.
3. CONTRACTOR SHALL MAKE AN ON-SITE INSPECTION OF THE FACILITY AND RELATED CONDITIONS PRIOR TO BIDDING THIS CONTRACT.

SEQUENCE OF WORK:

THE CONTRACT DOCUMENTS ARE INTENDED TO ALLOW THE CONTRACTOR FLEXIBILITY IN CONSTRUCTION OF THE WORK, HOWEVER THE FOLLOWING CONSTRAINTS APPLY:

1. REPLACE ONE PUMP AND ASSOCIATED NATURAL GAS ENGINE AT A TIME. COMPLETE SATISFACTORY 100-HOUR TEST AND OWNER APPROVAL BEFORE STARTING ANOTHER PUMP-ENGINE SYSTEM.
2. NO WORK WHICH INTERFERES WITH CRITICAL OPERATIONS OF FACILITIES SHALL BE DONE BETWEEN APRIL 1 AND OCTOBER 1.
3. OWNER WILL ALLOW USE OF BRIDGE CRANE PROVIDED NO LIFTED LOADS EXCEED 50% OF THE RATED CAPACITY OF THE CRANE. PRIOR TO COMMENCING THE WORK, SUBMIT TO THE ENGINEER FOR INFORMATION, ANTICIPATED LIFTS AND LOADING AS WELL AS PERFORM AN INITIAL INSPECTION INDICATING ANY DEFECTS OR DAMAGE TO THE OVERHEAD CRANE AND ALL ASSOCIATED COMPONENTS. CONTRACTOR WILL BE HELD RESPONSIVE FOR ANY DAMAGE RESULTING FROM USE OF THE CRANE. IF ANY LOAD EXCEEDS 50% OF THE RATED CAPACITY OF THE CRANE, THE CONTRACTOR WILL PROVIDE A LOAD TEST AND INSPECTION OF THE CRANE PERFORMED BY AN OSHA CERTIFIED CRANE AND HOIST INSPECTION COMPANY PRIOR TO COMMENCING THE WORK AND MUST PASS A LOAD TEST AND INSPECTION UPON COMPLETION OF THE WORK. LOAD TEST AND INSPECTION SHALL BE AT THE CONTRACTOR'S EXPENSE.
4. MAINTAIN ACCESS ROAD AND PARKING LOT IN GOOD CONDITION AT ALL TIMES TO FACILITATE CITY OF TULSA OPERATION AND MAINTENANCE OF WOODS PUMPING STATION.

GENERAL NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT CITY OF TULSA STANDARD SPECIFICATIONS AND STANDARD DETAILS AND THE 2009 OKLAHOMA DEPARTMENT OF TRANSPORTATION (ODOT) STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL LAWS GOVERNING SAFETY, HEALTH, AND SANITATION. THE CONTRACTOR SHALL PROVIDE ALL SAFEGUARDS, SAFETY DEVICES AND PROTECTIVE EQUIPMENT, AND TAKE ANY OTHER NEEDED ACTION ON AS HIS/HER OWN RESPONSIBILITY OR AS THE ENGINEER MAY DETERMINE REASONABLY NECESSARY TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACT.
3. PAY ITEMS SHALL BE AS SPECIFIED ON THE CITY OF TULSA OR ON THE ODOT STANDARD DRAWINGS EXCEPT AS MODIFIED BY THE CONTRACT.
4. THE SITE AND/OR RIGHTS-OF-WAY UPON WHICH THE WORK IS TO BE PERFORMED IS SHOWN ON THE DRAWINGS. THE CONTRACTOR AGREES THAT THE SITE AND/OR RIGHTS-OF-WAY PROVIDED IS ADEQUATE FOR THE PERFORMANCE OF THE WORK. IF ANY ADDITIONAL WORKING AREA IS REQUIRED, THE CONTRACTOR SHALL, AT HIS/HER EXPENSE, MAKE ARRANGEMENTS FOR SUCH WORKING AREA. THE CITY WILL NOT BE LIABLE FOR ADDITIONAL COMPENSATION AS A RESULT OF ANY DELAY IN OBTAINING RIGHTS-OF-WAY. THE EXACT LOCATION OF PROJECT SITES ARE SHOWN ON THE DRAWINGS.
5. LOCATIONS AND ELEVATIONS SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATIONS OF ALL UTILITIES AND STRUCTURES BEFORE COMMENCING WORK IN EACH AREA. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT RESULT FROM HIS/HER FAILURE TO LOCATE AND PRESERVE ANY AND ALL UTILITIES. SEE TITLE SHEET FOR CONTACT INFORMATION.
6. ALL BROKEN CONCRETE, WASTE MATERIAL, AND OTHER DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE LIMITS OF THE PROJECT AND DISPOSED OF IN A MANNER APPROVED BY THE ENGINEER. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE DISPOSAL OF THIS MATERIAL.
7. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY QUALITY CONTROL TESTING TO ENSURE THAT PROJECT REQUIREMENTS ARE MET.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL AND MAINTENANCE OF THE STORMWATER DRAINAGE. STORMWATER PONDING ON THE CONSTRUCTION SITE THAT IS THE RESULT OF CONSTRUCTION WILL NOT BE ALLOWED.
9. STRAW OR HAY BALES AS STORMWATER BEST MANAGEMENT PRACTICES ARE NO LONGER ALLOWED ON CONSTRUCTION PROJECTS.
10. CONTRACTOR SHALL NOT STORE EQUIPMENT OR MATERIALS IN THE FLOODPLAIN.
11. CONTRACTOR SHALL DOCUMENT PRE-CONSTRUCTION SITE CONDITIONS BY MEANS OF PHOTOGRAPHS AND VIDEO TAPE WITH CITY REPRESENTATIVE BEFORE THE START OF CONSTRUCTION. COST SHALL BE CONSIDERED AS INCIDENTAL AND NO SEPARATE PAYMENT SHALL BE MADE.
12. THE CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING:
    A. ANY PERMITS OR LICENSES REQUIRED FOR CONSTRUCTION.
    B. PROPER NOTIFICATION OF ALL NECESSARY AGENCIES PRIOR TO CONSTRUCTION AND FOR REQUIRED INSPECTIONS.
    C. DETERMINING THE EXACT LOCATION OF ANY UTILITIES. EXISTING UTILITIES TO REMAIN IN SERVICE AT ALL TIMES. SERVICE DISRUPTION TO BE AT CONTRACTOR'S RISK AND EXPENSE.
17. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING STRUCTURES, UTILITIES AND EQUIPMENT, AND TO MAINTAIN UNINTERRUPTED OPERATION. PROVIDE ALL TEMPORARY SUPPORTS, BRACES SHEETING AND SHORING AS NECESSARY TO PROTECT AND MAINTAIN ALL STRUCTURES, PIPING, EQUIPMENT AND APPURTENANCES. ANY DAMAGE RESULTING FROM THE ACTIONS, OR LACK OF ACTIONS BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT HIS/HER EXPENSE.
18. THE REQUIRED WORK WILL TAKE PLACE WITHIN AN OPERATING RAW WATER FACILITY, AND THE WORK WILL REQUIRE MODIFICATION AND REHABILITATION OF EXISTING EQUIPMENT, PIPING AND STRUCTURES. EXISTING EQUIPMENT, PIPING AND STRUCTURES WILL BE IN SERVICE UNTIL THEY ARE TAKEN OUT OF SERVICE EITHER PERMANENTLY OR TEMPORARILY AS REQUIRED FOR THE CONTRACTOR'S WORK. PROVIDE LABOR AND MATERIALS TO CLEAN AND OTHERWISE PREPARE WORK AREAS AS REQUIRED.
19. CERTAIN FACILITIES MAY BE TAKEN OUT OF SERVICE TEMPORARILY ONLY WITH PRIOR APPROVAL OF THE OWNER. UNDER THESE CONDITIONS, ONLY WATER OPERATIONS SHALL OPERATE VALVES OR EQUIPMENT. CONTRACTOR SHALL NOTIFY OWNER A MINIMUM OF 72 HOURS IN ADVANCE IF THE CONTRACTOR REQUIRES OPERATION OF ANY VALVES, PUMPS, OR OTHER EQUIPMENT TO FACILITATE CONSTRUCTION ACTIVITIES.
20. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO OWNER OF ANY WORK REQUIRING CHANGES IN OPERATING PROCEDURES OR REMOVAL OF EQUIPMENT OR STRUCTURES FROM SERVICE A MINIMUM OF 30 DAYS IN ADVANCE TO THE REQUIRED DATE.
21. LIMIT OPERATIONS GENERALLY TO THE AREA AROUND THE FACILITIES IN THIS CONTRACT. ACCESS OF WORK REQUIRED IN OTHER AREAS OF THE SITE SHALL BE ARRANGED AND COORDINATED WITH THE ENGINEER. ALL EMPLOYEES OF THE CONTRACTOR AND HIS/HER SUBCONTRACTORS SHALL BE REQUIRED TO OBTAIN CITY OF TULSA ID BADGE. EACH EMPLOYEE SHALL SUBMIT A COMPLETED CITY OF TULSA ACCESS CARD/IDENTIFICATION CARD/DRIVER'S LICENSE AND KEY REQUEST FORM TO CITY OF TULSA PUBLIC FACILITIES SECURITY. EACH EMPLOYEE SHALL SUBMIT COMPLETED APPLICATION FOR CITY OF TULSA SECURITY BACKGROUND AND PRESCREEN INVESTIGATION FORM.
22. ACCESS TO SOME AREAS OF WORK MAY BE LIMITED AND MAY NOT BE EASILY ACCESSIBLE BY SOME TYPES OF CONSTRUCTION EQUIPMENT FROM EXISTING ROADS. INSPECT THE SITE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND PROVIDE ANY AND ALL EQUIPMENT REQUIRED TO PERFORM THE WORK. SUBMIT STRUCTURAL LOAD CALCULATIONS AND WORKING DRAWINGS PREPARED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF OKLAHOMA FOR PRIOR APPROVAL SHOWING ALL CONSTRUCTION LOADS ON EXISTING STRUCTURES AND FACILITIES AND DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER THAT THE CAPACITY OF EXISTING STRUCTURES AND FACILITIES WILL NOT BE EXCEEDED BY ANY LOAD DEVELOPED DURING CONSTRUCTION.
23. MAKE ALL MEASUREMENTS NECESSARY TO LOCATE, FABRICATE, ERECT, CONSTRUCT AND OTHERWISE INSTALL ALL NEW WORK IN EXISTING AND NEW LOCATIONS AND RELOCATE AND REWORK EXISTING WORK ALL TO THE ARRANGEMENTS, GUIDANCE AND INSTRUCTIONS SHOWN AND REQUIRED FOR A COMPLETE TROUBLE-FREE OPERATING INSTALLATION.
24. PROVIDE ALL SUPPORT OR ANCILLARY ITEMS AND WORK FOR ITEMS SUBMITTED AS EQUIVALENT TO SPECIFIED ITEMS THAT ARE REQUIRED TO PROVIDE THE SAME FUNCTIONAL, OPERATIONAL AND CONTROL CAPABILITIES, NEEDS AND REQUIREMENTS SHOWN AND SPECIFIED FOR THE SPECIFIED ITEM. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO SUBMIT ALL SUPPORT AND ANCILLARY ITEMS AND WORK WITH HIS/HER SUBMITTAL OF THE PROPOSED EQUIVALENT ITEM AND TO SHOW THAT THE PROPOSED EQUIVALENT ITEM HAS BEEN PROPERLY COORDINATED, INTERFACED AND OTHERWISE INCORPORATED INTO THE WORK. PROVIDE ALL SUCH SUPPORT OR ANCILLARY ITEMS AND WORK WHETHER THE NEED FOR THEM HAS BEEN DETERMINED BEFORE, DURING OR AFTER APPROVAL OR ACCEPTANCE OF THE EQUIVALENT ITEM.
25. SECTION CUTTING PLANES ARE IDENTIFIED WITH A SECTION NUMBER AND THE DRAWING NUMBER ON WHICH THE SECTION IS SHOWN, I.E. 1/BM3. SECTION TITLES INCLUDE A FRACTION, WHERE THE NUMERATOR SHOWS THE SECTION IDENTIFYING NUMBER, AND THE DENOMINATOR INDICATES THE DRAWING ON WHICH THE SECTION IS CUT, I.E. SECTION 1/BM1.
26. DETAILS ARE IDENTIFIED WITH A NUMBER FOLLOWED BY THE DRAWING ON WHICH THE DETAIL IS SHOWN, I.E. 1/BM3. DETAIL TITLES INCLUDE A FRACTION, WHERE THE NUMERATOR SHOWS THE DETAIL NUMBER AND THE DENOMINATOR INDICATES THE DRAWING ON WHICH THE DETAIL IS CROSS-REFERENCED, I.E. DETAIL 3/S1.
27. A DISTINCTION BETWEEN NEW AND EXISTING MATERIALS, EQUIPMENT AND STRUCTURES HAS BEEN MADE ON THE DRAWINGS BY LINE WEIGHT. HEAVY REPRESENTS NEW, LIGHT REPRESENTS EXISTING.
28. AN ASTERISK (*) AT NEW CONSTRUCTION DENOTES LOCATIONS, ELEVATIONS, DIMENSIONS AND OTHER INFORMATION DEPENDENT ON THE CONTRACTOR'S SUBMITTALS. DEVELOP AND SHOW THE INFORMATION MARKED WITH AN ASTERISK (*) ON SUBMITTALS, DEVELOP AND PROVIDE SUCH INFORMATION FOR ALL ASTERISKS (*) WITHIN OR INTERFACING WITH ANY SUBMITTALS AND BETWEEN SUBMITTALS. THIS REQUIREMENT ALSO EXTENDS TO CONDITIONS OR SITUATIONS WHERE A LOCATION, DIMENSION, ELEVATION OR OTHER ITEM IS INDICATED TO BE DETERMINED AFTER FINAL SELECTION OF EQUIPMENT AND/OR APPURTENANCES. ALL INFORMATION FOR ASTERISK (*) AND EQUIPMENT/- APPURTENANCES SITUATIONS DESCRIBED HEREIN ARE THE RESPONSIBILITY OF THE CONTRACTOR TO DEVELOP AND ASSURE COMPATIBLE INTERFACING FOR A COMPLETE, COORDINATED AND TROUBLE-FREE OPERATING INSTALLATION. ALL REQUIREMENTS HEREIN SHALL BE BASED ON FINAL PROCESSING AND/OR REVIEW OF THE CONTRACTOR'S SUBMITTALS OR SELECTIONS.
29. LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING PIPING, EQUIPMENT, STRUCTURES AND OTHER EXISTING WORK ARE BASED ON INFORMATION FURNISHED BY THE CITY EXISTING RECORD DRAWINGS AND CONTRACT DOCUMENTS AND IN SOME INSTANCES FIELD MEASUREMENTS BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. LOCATIONS, ELEVATIONS AND DIMENSIONS OF NEW WORK CONNECTING OR ADJACENT TO OR INTERFACING WITH EXISTING WORK HAVE BEEN DEVELOPED AND ARRANGED BASED ON THE FOREGOING INFORMATION AND FIELD MEASUREMENTS. THE CONTRACTOR IS RESPONSIBLE TO FIELD CHECK AND MEASURE LOCATIONS, ELEVATIONS AND DIMENSIONS AND TO FIT AND OTHERWISE INSTALL THE NEW WORK TO ACTUAL EXISTING LOCATIONS, ELEVATIONS AND DIMENSIONS FOR A COMPLETE AND TROUBLE-FREE OPERATING FACILITY.
30. IF THERE IS DISAGREEMENT IN WORK SHOWN BETWEEN THE DRAWINGS AND PROJECT MANUAL PROVIDE THE MINIMUM WORK NEEDED TO SATISFY FUNCTIONAL, CONTROL AND INTERFACING REQUIREMENTS AND PROVIDE A TROUBLE-FREE OPERATING INSTALLATION.
31. NEW WORK INCLUDES ALL WORK SHOWN AS SUCH IN ANY MANNER ON THE PLANS, SPECIFIED AND OTHERWISE INDICATED IN THE CONTRACT DOCUMENTS. EXISTING WORK SHALL BE REMOVED TO THE EXTENT SHOWN AND SPECIFIED AND AS NEEDED TO BE COMPATIBLE AND ACCOMMODATE NEW WORK OR REPLACEMENT WORK.
32. ALL SHOP AND WORKING DRAWING SUBMITTALS SHALL BE PREPARED BY THE CONTRACTOR TO INCORPORATE ALL REQUIREMENTS AND RESPONSIBILITIES OF THESE GENERAL, PAY ITEM AND CONSTRUCTION NOTES.
33. CONTRACTOR SHALL PROVIDE ALL DESIGNS, LABOR, EQUIPMENT AND SERVICES NEEDED FOR COMPLIANCE WITH PLANS AND SPECIFICATIONS. ALL COSTS ASSOCIATED WITH COMPLIANCE SHALL BE INCLUDED IN THE VARIOUS CONTRACT ITEMS, AND NO SEPARATE PAYMENT WILL BE MADE THEREFORE.

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER
JOSEPH M. TEUSCH
24406
OKLAHOMA

GENERAL

GENERAL NOTES

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD	
DESIGNED	BB	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.		3/25
FIELD MGR.		3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: G03
DATE: MARCH 2025
ATLAS PAGE NO:
SHEET 4 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

HATCH LEGEND

EXISTING

- GRADING RIP RAP
- GRAVEL (PLAN VIEW)
- CONCRETE (SECTION VIEW)
- CONCRETE (PLAN VIEW)
- PAVEMENT

NEW

- GRADING RIP RAP
- GRAVEL (PLAN VIEW)
- CONCRETE (SECTION VIEW)
- CONCRETE (PLAN VIEW)
- PAVEMENT
- LIMITS OF DEMOLITION AND REMOVAL
- LIMITS OF ABANDONMENT IN PLACE

PIPING LABELS

EXISTING

8" PVC SS

8" PVC SS

ABANDON PIPE PER THIS CONTRACT

ABANDON 8" PVC SS

ABANDON 8" PVC SS

MISCELLANEOUS SITE LINES

EXISTING

- MAJOR CONTOUR (5 FT INTERVAL)
- MINOR CONTOUR (1 FT CONTOUR)
- FENCELINE X (CHAINLINK)
- FENCELINE BOX (METAL/WOOD POST)
- FENCELINE CIRCLE (GUARDRAIL)
- TOP OF BANK
- TOE OF SLOPE
- CHANNEL FLOW (TYPE 1)
- CHANNEL FLOW 2 (TYPE 2)
- TREELINE
- TRACKS (TYPE 1)
- TRACKS (TYPE 2)
- TRACKS (TYPE 3)

NEW

- MAJOR CONTOUR (5 FT INTERVAL)
- MINOR CONTOUR (1 FT CONTOUR)
- FENCELINE X (CHAINLINK)
- FENCELINE BOX (METAL/WOOD POST)
- FENCELINE CIRCLE (GUARDRAIL)
- TOP OF BANK
- TOE OF SLOPE
- CHANNEL FLOW (TYPE 1)
- CHANNEL FLOW 2 (TYPE 2)
- LIMITS OF CONSTRUCTION (TYPE 1)
- LIMITS OF CONSTRUCTION (TYPE 2)
- LIMITS OF DISTURBANCE

NOTE:

1. THIS IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF THE CIVIL DRAWINGS. ALL SYMBOLS MAY NOT BE USED IN THIS SET OF CIVIL DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR ITEMS REQUIRED.

SINGLE LINE YARD PIPE

EXISTING

- UC — UNDERGROUND COMMUNICATION
- UE — UNDERGROUND ELECTRIC
- UF — UNDERGROUND FIBER OPTIC
- UT — UNDERGROUND TELEPHONE
- UTV — UNDERGROUND TV
- UTR — UNDERGROUND TRAFFIC SIGNAL
- OC — OVERHEAD COMMUNICATION
- OE — OVERHEAD ELECTRIC
- OF — OVERHEAD FIBER OPTIC
- OT — OVERHEAD TELEPHONE
- OTV — OVERHEAD TV
- UNK — UNKNOWN UTILITY
- OTR — OVERHEAD TRAFFIC SIGNAL
- IR — IRRIGATION MAIN
- GM — GAS MAIN
- WM — WATER MAIN
- FM — FORCE MAIN
- ST — STORM SEWER
- STORM SEWER (OPTIONAL FOR LARGE DIAMETER)
- SS — SANITARY SEWER
- CS — COMBINED SEWER
- IS — INTERCEPTOR SEWER
- D — D — PLANT DRAIN
- CW — CITY WATER/CHILL WATER
- PW — PLANT WATER
- HW — HOT WATER

NEW

- UC — UNDERGROUND COMMUNICATION
- UE — UNDERGROUND ELECTRIC
- UF — UNDERGROUND FIBER OPTIC
- UT — UNDERGROUND TELEPHONE
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- CS — COMBINED SEWER
- IS — INTERCEPTOR SEWER
- D — D — PLANT DRAIN
- CW — CITY WATER/CHILL WATER
- PW — PLANT WATER
- HW — HOT WATER
- HORIZONTAL DIRECTIONAL DRILL (HDD)

THREE LINE YARD PIPING

EXISTING

- BURIED PIPE
- ABOVE GROUND PIPE

NEW

- BURIED PIPE
- ABOVE GROUND PIPE

JURISDICTION LINES

- PROPERTY LINE
- RIGHT OF WAY LINE
- QUARTER/SECTION LINE
- EASEMENT

MATCHLINES

MATCHLINE - SEE DWG C1 — DRAWING MATCHLINE

CONSTRUCTION KEY NOTES & MATCHLINES

- 1 — DEMOLITION KEY NOTE
- 1 — NEW CONSTRUCTION KEY NOTE
- 1, 1, 1 — THESE KEY NOTES ARE AVAILABLE IF THE CLIENT OR MUNICIPALITY REQUIRES DIFFERENT KEY NOTES SPLIT VIA INFRASTRUCTURE DESIGN ELEMENTS (SUCH AS, SANITARY SEWER, STORM SEWER & GRADING, WATER & PAVING)
- 1 — TRAFFIC CONTROL KEY NOTE

CIVIL SITE SYMBOLS

NOTE:
SCREENED (GREY) LINES DEPICT EXISTING ITEMS ON PLANS AND DARK (BLACK) LINES DEPICT NEW ITEMS ON PLANS.

- GENERAL MANHOLE (TO BE USED AS NEW)
- GENERAL MANHOLE (TO BE USED AS EXISTING)
- SANITARY MANHOLE
- SANITARY CLENOUT
- COMBINED SEWER MANHOLE
- ODOR CONTROL MANHOLE
- TELEPHONE MANHOLE
- ELECTRICAL MANHOLE
- STORM MANHOLE
- TRAFFIC MANHOLE
- CATCH BASIN
- PULL BOX
- POT HOLE
- BOLLARD
- LIGHT POST
- COMMUNICATION CABINET
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECITON
- WATER VALVE
- GAS VALVE
- IRRIGATION VALVE
- WATER MANHOLE/WET WELL
- GENERAL BURIED VALVE
- AIR RELEASE VALVE
- BLOW OFF VALVE
- WATER HOUSE SERVICE
- SEWER HOUSE SERVICE
- VERTICAL BENDS (PLAN VIEW)
- PIPE BREAK
- PIPELINE CAP
- ELECTRICAL CABINET
- PARKING CURB
- REDUCER
- WATER METER
- WATER VAULT
- ABOVE GROUND BACKFLOW PREVENTER
- GAS METER
- ELECTRIC JUNCTION BOX
- ELECTRIC METER
- TRANSFORMER
- AIR CONDITIONING UNIT
- TELEPHONE JUNCTION BOX
- TRAFFIC SIGNAL JUNCTION BOX
- 1.00% NEW GRADING FLOW ARROW
- 1.00% EXISTING GRADING FLOW ARROW
- GRADING SLOPE LINE
- STREET LIGHT
- TRAFFIC SIGNAL (NO ARM)
- TRAFFIC SIGNAL (WITH ARM)
- UTILITY HANDHOLE
- SIGN
- BRASS CAP
- BRASS CAP IN HANDHOLE
- SURVEY MONUMENT (AS NOTED)
- SB# SOIL BORING
- CP# CONTROL POINT
- WOODEN POWER POLE
- STEEL OR CONCRETE POWER POLE
- GUY WIRE
- GRADE BREAK
- TC 10.50 FL 10.00 — NEW SPOT ELEVATION
- TC 10.50 FL 10.00 — EXISTING SPOT ELEVATION

EROSION AND SEDIMENT CONTROL LEGEND

- CD — ROCK CHECK DAM
- TP — TREE PROTECTION
- TR — TREE REMOVAL
- IP — INLET PROTECTION
- IR — INLET REMOVAL
- CIP — CULVERT INLET PROTECTION
- SF — SILT FENCE
- SAF — SAFETY FENCE
- FD — TEMPORARY FILL DIVERSION
- MU — MULCHING (EXTENDS)
- PS — PERMANENT SEEDING (EXTENDS)
- TS — TEMPORARY SEEDING (EXTENDS)
- CE — CONSTRUCTION ENTRANCE
- DC — DUST CONTROL
- BT — BARRIER TAPE
- TC — TURBIDITY CURTAIN
- LIMITS OF DISTURBANCE
- TREE PROTECTION LIMITS
- IP — IP — INLET PROTECTION BARRIER
- TP — TP — TREE PROTECTION BARRIER
- X — X — X — X — SILTFENCE (TYPE 1)
- SF — SF — SF — SILTFENCE (TYPE 2)
- XR — XR — XR — SILTFENCE AND REPTILE FENCE
- R — R — R — R — REPTILE FENCE
- RMA LIMITS
- RPA LIMITS
- TEMPORARILY IMPACTED WETLAND
- WETLAND CONVERSION IMPACT

SOIL LEGEND

- SOIL BOUNDARY
- 378 — TURBEVILLE FINE SANDY LOAM
- 40 — UDORTHENTS-DUMPS COMPLEX

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LICENSED PROFESSIONAL ENGINEER JOSEPH M. TEUSCH 24406 OKLAHOMA

CIVIL

SYMBOL LEGEND

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

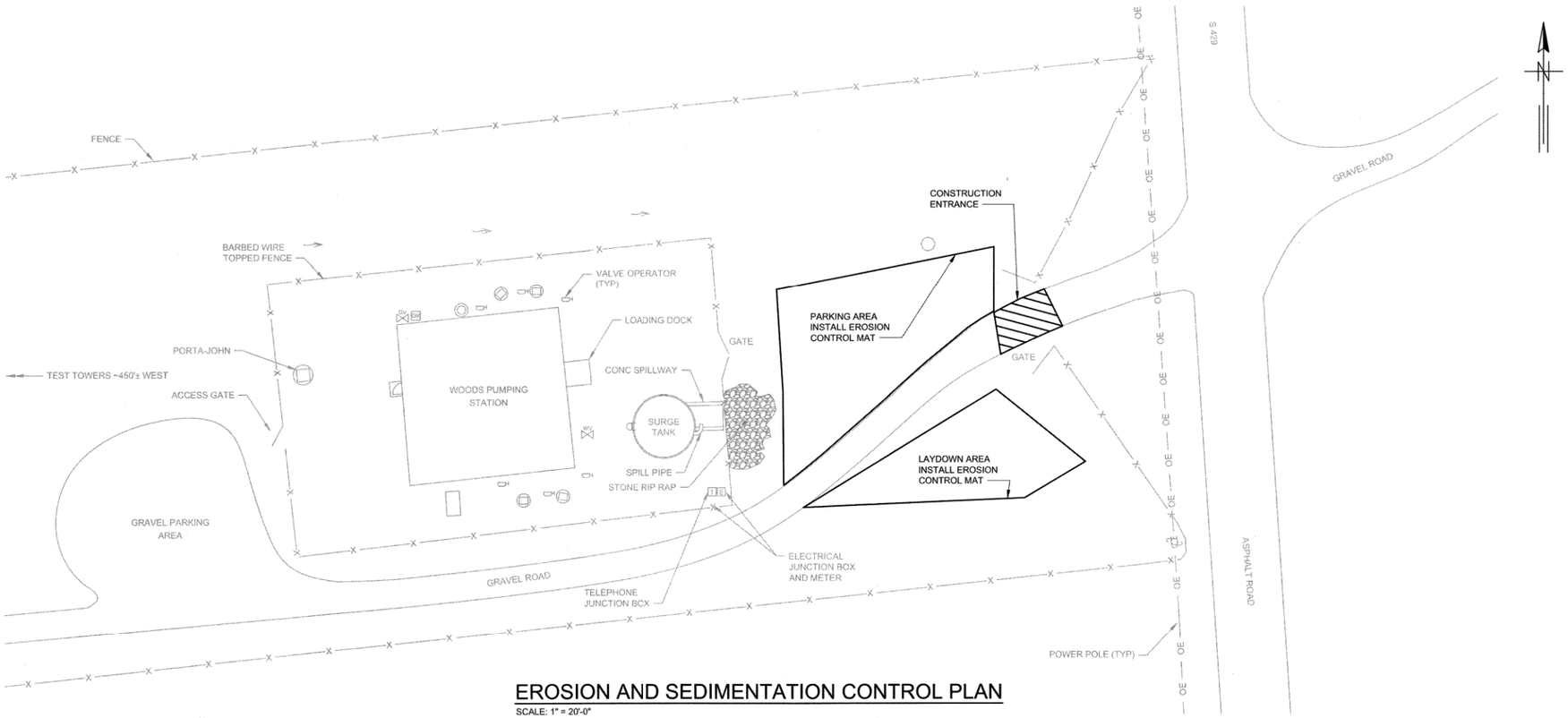
PLAN SCALE:	DRAWN	TD	
	DESIGNED	BB	
	SURVEY		
PROFILE SCALE:	PROJ. MGR.	CS	3/25
HORIZONTAL:	LEAD ENGR.		3/25
	FIELD MGR.		3/25
VERTICAL:	RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: C01 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 5 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

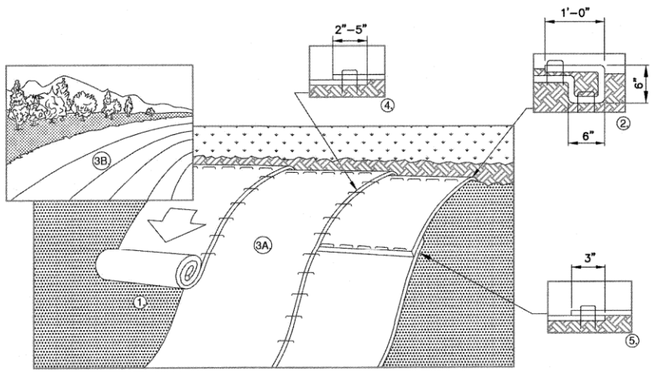


EROSION AND SEDIMENTATION CONTROL PLAN

SCALE: 1" = 20'-0"

NOTES:

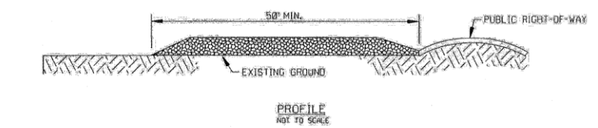
1. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING SITE SECURITY.
2. ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER FROM THE BEGINNING OF CONSTRUCTION UNTIL AN ACCEPTABLE VEGETATIVE COVER IS ESTABLISHED. INSPECTION BY THE CONTRACTOR AND ANY NECESSARY REPAIRS SHALL BE PERFORMED ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCH AS RECORDED BY A NON-FREEZING RAIN GAUGE TO BE LOCATED ON SITE. POTENTIALLY ERODABLE AREAS, DRAINAGEWAYS, MATERIAL STORAGE, STRUCTURAL DEVICES, CONSTRUCTION ENTRANCES AND EXITS ALONG WITH EROSION AND SEDIMENT CONTROL LOCATIONS ARE EXAMPLES OF SITES THAT NEED TO BE INSPECTED.
3. CONTRACTOR TO RESTORE SITE TO PRE-CONSTRUCTION CONDITIONS. THIS INCLUDES RESTORATION OF LAYDOWN AREAS, LEVELING AND FILLING ALL RUTS FOR GRAVEL DRIVE AND REMOVAL AND RESTORATION OF TEMPORARY CONSTRUCTION ENTRANCE. CONTRACTOR MUST MAINTAIN GRAVEL ACCESS ROAD IN GOOD CONDITION AT ALL TIMES TO FACILITATE CITY OF TULSA ACCESS AND OPERATION.
4. ALL CONSTRUCTION EQUIPMENT MUST BE STORED INSIDE THE DESIGNATED LAYDOWN AREA.



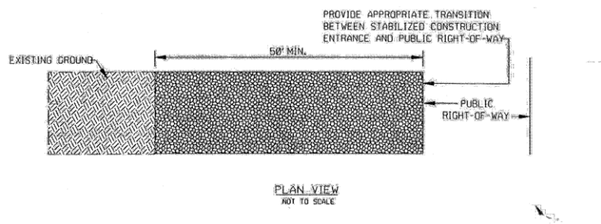
INSTALLATION GUIDE

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"–5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.
   NOTE: *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL MAT



PROFILE
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

NOTE:

1. STONE SIZE AASHTO DESIGNATION M43, SIZE NO. 2 (2-1/2" TO 1-1/2"). USE CRUSHED STONE.
2. LENGTH - AS EFFECTIVE, BUT NOT LESS THAN 50 FEET.
3. THICKNESS - NOT LESS THAN EIGHT (8) INCHES.
4. WIDTH - NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
5. WASHING - WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH, OR WATERCOURSE THROUGH USE OF SANDBAGS, GRAVEL, BOARDS, OR OTHER APPROVED METHODS.
6. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHT-OF-WAYS MUST BE REMOVED IMMEDIATELY BY THE CONTRACTOR.

STABILIZED CONSTRUCTION ENTRANCE DETAIL

SCALE: NOT TO SCALE

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER
JOSEPH M. TEUSCH
24406
OKLAHOMA

CIVIL
EROSION AND SEDIMENTATION CONTROL PLAN AND DETAILS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:
HORIZONTAL:
VERTICAL:
PROFILE SCALE:

DRAWN	TO		APPROVED:
DESIGNED	BB		
SURVEY			
PROJ. MGR.	CS	3/25	
LEAD ENGR.	CEW	3/25	
FIELD MGR.		3/25	
RECOMMENDED DESIGN MANAGER			

DWG NAME: C02 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 6 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

VALVE SYMBOLS

DESCRIPTION	SCHEMATIC	THREE LINE	SINGLE LINE
GATE			
BUTTERFLY			
PLUG			
CHECK (SWING)			
CONE			
BALL			
DIAPHRAGM			
GLOBE			
ANGLE			
THREE WAY			
FOUR WAY			
FLAP			
PRESSURE RELIEF			
AUTO AIR AND VACUUM RELEASE	AVR	AVR	AVR
AUTO AIR RELEASE	AR	AR	AR
AUTO VACUUM RELEASE	VR	VR	VR
PRESSURE REDUCING			
HOSE			
STOP AND DRAIN			

TEST TOWER W/SLUICE GATES

PIPE FITTINGS

DESCRIPTION	SCHEMATIC	THREE LINE	SINGLE LINE
CROSS	NA		
CROSS	NA		
TEE	NA		
TEE	NA		
TEE	NA		
SIDE OUTLET TEE	NA		
SIDE OUTLET TEE	NA		
LATERAL	NA		
90° ELBOW	NA		
90° ELBOW	NA		
90° ELBOW	NA		
90° ELBOW (LONG RADIUS)	NA	LR	LR
45° ELBOW	NA		
45° ELBOW	NA		
45° ELBOW	NA		
45° ELBOW (LONG RADIUS)	NA	LR	LR
SIDE OUTLET ELBOW	NA		
SIDE OUTLET ELBOW	NA		
BASE ELBOW	NA		

VALVE OPERATORS

X — PLACE KEY FOR OPERATOR IN PLACE OF X

NONE MANUAL
C CHAINWHEEL
D DIAPHRAGM
F FLOAT
G GEAR
H HYDRAULIC CYLINDER
M MOTOR (ELECTRIC)
P PNEUMATIC CYLINDER
S SOLENOID
A AIR MOTOR
N NUT

PIPE FITTINGS

DESCRIPTION	SCHEMATIC	THREE LINE	SINGLE LINE
UNION (SCREWED)			
REDUCER			
REDUCER - ECCENTRIC (OFFSET VIEW)	NA		
BLIND FLANGE			
SLEEVE TYPE COUPLING			
SLEEVE TYPE COUPLING (HARNESSED)	H	H	H
GROOVED TYPE COUPLING	GC	GC	GC
EXPANSION JOINT RUBBER BELLOWS TYPE			
EXPANSION JOINT METAL BELLOWS TYPE			
VENTURI METER			
METER	M	M	M
STRAINER			
DUPLEX STRAINER			
LUBE OIL FILTER		NA	
MOISTURE SEPARATOR		NA	
SCALE TRAP		NA	
FLAME TRAP			
VENT			
THERMOSTAT (TEMPERATURE REGULATOR)	T	T	T
PRESSURE GAUGE			
THERMOMETER			
WATER LEVEL ALARM	HWL OR LWL	HWL OR LWL	HWL OR LWL
DIFFERENTIAL PRESSURE GAUGE			

PIPE JOINTS

DESCRIPTION	SCHEMATIC	THREE LINE	SINGLE LINE
FLANGE	NA		
MECHANICAL JOINT	NA		
MECHANICAL JOINT (RESTRAINED)	NA	R	R
PUSH ON OR BELL AND SPIGOT	NA		
PUSH ON OR BELL AND SPIGOT (RESTRAINED)	NA	R	R
WELDED	NA		NA
SCREWED	NA		
JOINT IN CONCRETE PIPE	NA		NA

NOTES:

1. THIS IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF THE DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR ITEMS REQUIRED.
2. VALVES AND PIPE FITTINGS ARE SHOWN WITH FLANGED JOINTS. ITEMS ARE AVAILABLE WITH VARIOUS JOINTS AND ARE SHOWN AS REQUIRED.
3. NA MEANS NOT APPLICABLE.

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER
JOSEPH M. TEUSCH
24406
OKLAHOMA

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

MECHANICAL

SYMBOL LEGEND

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

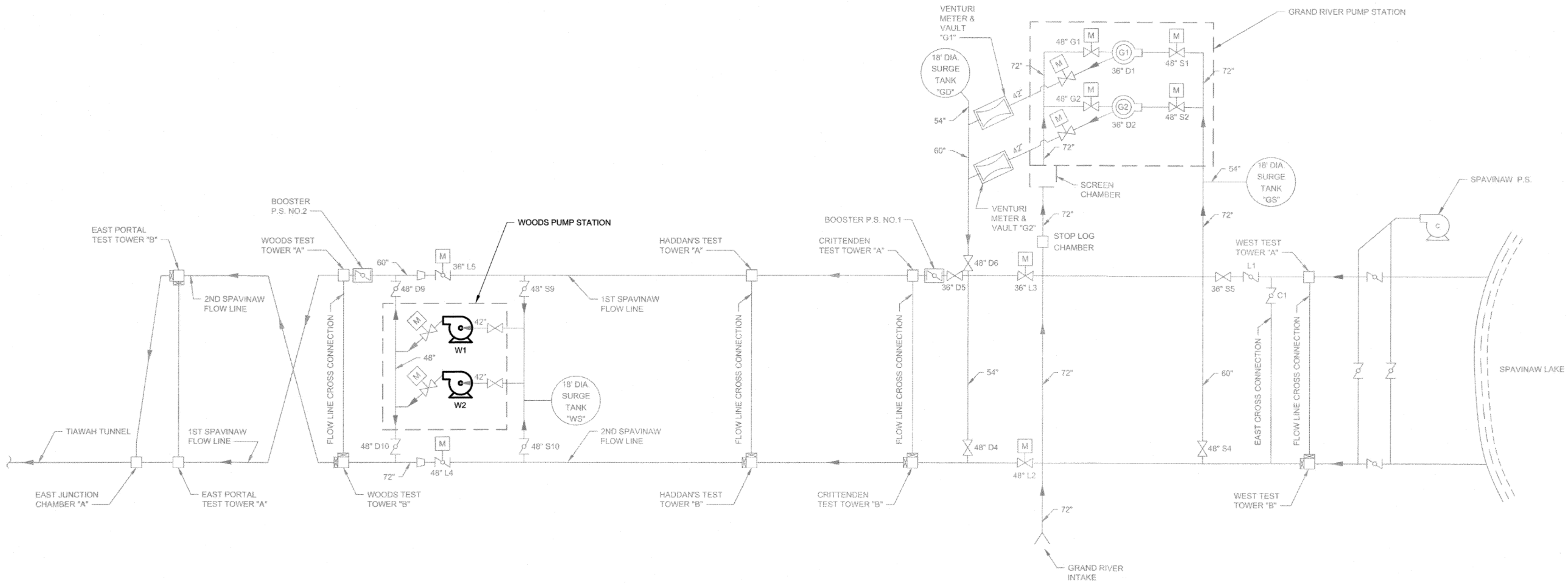
REVISION	BY	DATE

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD	
DESIGNED	BB	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	BB	3/25
FIELD MGR.	DM	3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: M01
DATE: MARCH 2025
ATLAS PAGE NO:
SHEET 7 OF 30 SHEETS



FLOW LINE DIAGRAM - SPAVINAW LAKE TO TIAWAH TUNNEL

NO SCALE

LICENSED PROFESSIONAL ENGINEER
JOSEPH M. TEUSCH
24406
OKLAHOMA

MECHANICAL

FLOW LINE DIAGRAM

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:	DRAWN	TD	
	DESIGNED	BB	
	SURVEY		
PROFILE SCALE:	PROJ. MGR.	LS	3/25
HORIZONTAL:	LEAD ENGR.	CGW	3/25
	FIELD MGR.		3/25
VERTICAL:	RECOMMENDED DESIGN MANAGER		

APPROVED:

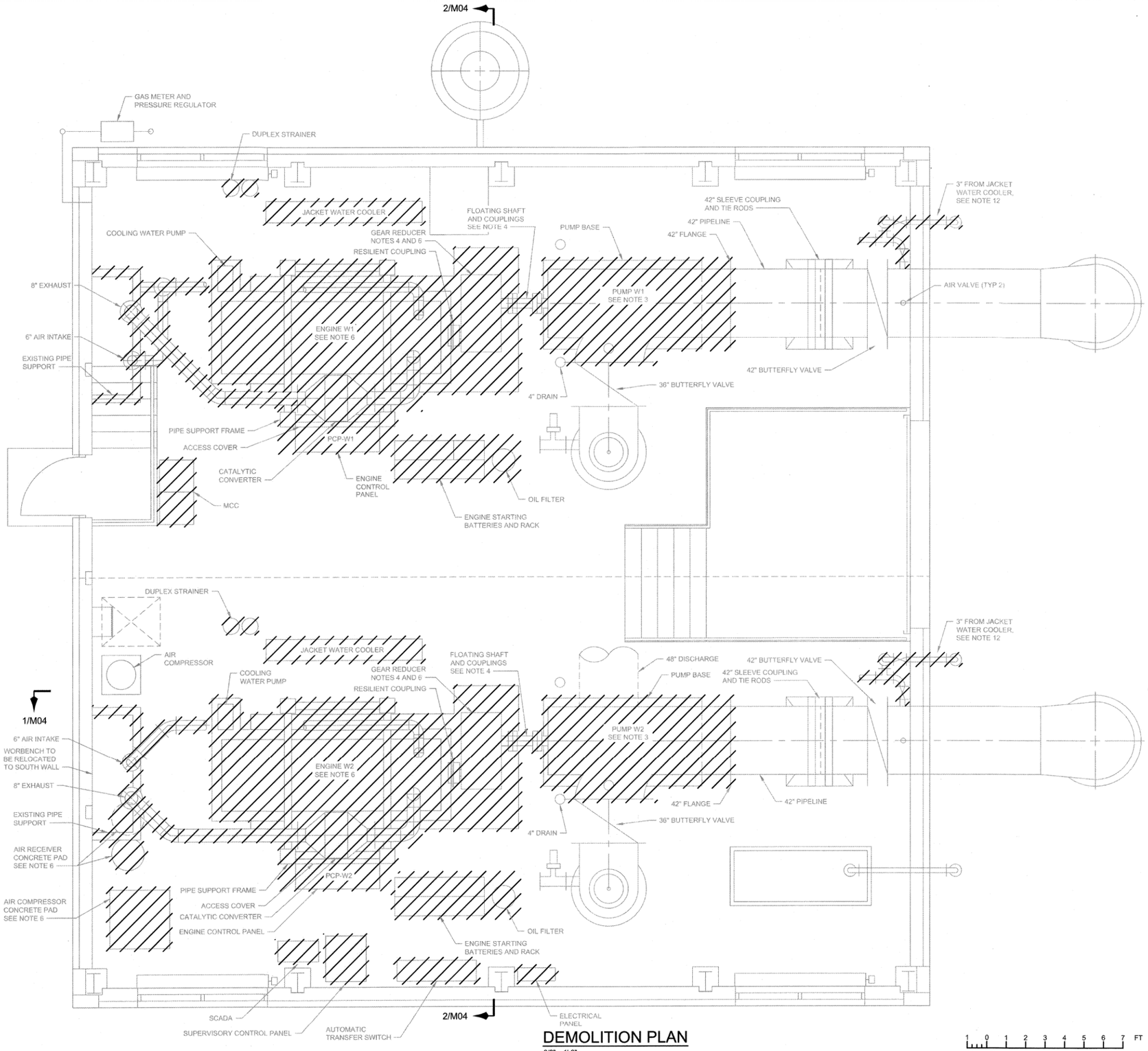
DWG NAME: M02

DATE: MARCH 2025

ATLAS PAGE NO:

SHEET 8 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



DEMOLITION PLAN

3/8" = 1'-0"

1 0 1 2 3 4 5 6 7 FT

3/8"=1'-0"

NOTES:

1. REMOVE PUMP AND ASSOCIATED ENGINE ONE AT A TIME, MAINTAINING PUMPING STATION IN-SERVICE DURING CONSTRUCTION.
2. REMOVE ENGINES W1 AND W2 INCLUDING JACKET WATER COOLERS, LUBE OIL COOLERS, COOLING WATER PUMPS, COOLING SYSTEM PIPING, INTAKE AIR AND EXHAUST PIPING.
3. EXISTING PUMPS TO BE REMOVED, REHABILITATED, AND REINSTALLED. SEE SPECIFICATION SECTION 43 21 17 - PUMP REFURBISHMENT FOR ADDITIONAL REQUIREMENTS.
4. REMOVE GEAR REDUCERS, DRIVE COUPLINGS AND FLOATING SHAFTS FOR PUMPS W1 AND W2.
5. REMOVE ENGINE STARTING BATTERIES AND RACK.
6. REMOVE EQUIPMENT PADS FOR ENGINES W1 AND W2. REMOVE GEAR REDUCER, AIR COMPRESSOR, AIR RECEIVER, ENGINE CONTROL PANEL EQUIPMENT PADS, AND ASSOCIATED PIPING AND CONDUIT SUPPORTS. REMOVE EACH PAD DOWN TO STATION FL EL 630.25. AIR COMPRESSOR SHALL BE SALVAGED AND RELOCATED.
7. DRAIN AND DISPOSE OF ENGINE AND GEAR REDUCER COOLING AND LUBRICATING FLUIDS.
8. DISCONNECT AND REMOVE ENGINE CONTROL PANELS, ALL ACCESSORY AND CONTROL DEVICES, PIPING AND WIRING ASSOCIATED WITH THE REMOVED EQUIPMENT.
9. PATCH WITH NON-SHRINK GROUT ALL FLOOR AND WALL OPENING CREATED BY REMOVAL OF EXISTING PIPING AND CONDUITS AND NOT USED FOR THE NEW EQUIPMENT.
10. REMOVE EMPTY ELECTRICAL ENCLOSURES, UNUSED CONDUITS AND SUPPORTS.
11. DISCONNECT AND CAP ENGINE GAS FUEL SUPPLY LINES.
12. DISCONNECT AND CAP JACKET WATER COOLER SUPPLY AND RETURN CONNECTIONS
13. CUT INSULATION AND EXISTING ROOFING MEMBRANE AROUND OPENING AS BIG AS NECESSARY TO PERFORM PATCHING WORK BUT MAINTAINING ROOF DISTURBANCE TO A MINIMUM. CUT MATERIALS TO OBTAIN SHARP AND CLEAN EDGES. COVER SLAB HOLE FROM THE TOP WITH AN ASTM A36 STEEL PLATE AS THICK AS NECESSARY TO SPAN THE OPENING WITHOUT BENDING, BUT NO LESS THAN 1/8-INCH THICK. AT CONTRACTORS' OPTION 6061 TYPE ALUMINUM PATE COULD BE USED. DIMENSION COVER PLATE TO OVERLAP OPENING NO LESS THAN 4-INCHES ON ALL SIDES. ANCHOR PLATE TO TOP OF SLAB WITH NO LESS THAN FOUR 304 STAINLESS STEEL TYPE EXPANSION ANCHOR BOLTS ONE AT EACH CORNER. AT CONTRACTOR'S OPTION, 304 STAINLESS STEEL TYPE SELF-DRILLING SCREWS COULD BE USED. PRIME AND PAINT PLATE IN BLACK OR DARK GRAY COLOR ACCORDING TO SPECIFICATION SECTION 09900.INFILL VOID LEFT IN ROOF WITH INSULATION IN KIND AND TYPE TO MATCH EXISTING TYPE AND R VALUE. RESTORE ROOF SLOPE, WATERTIGHTNESS AND WATERPROOFING OF ROOFING WITH MATERIALS IN KIND TO MATCH SURROUNDING.

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER JOSEPH M. TEUSCH 24406 OKLAHOMA

REVISION	BY	DATE

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

PLAN SCALE: 3/8" = 1'-0"	DRAWN	OEV		APPROVED:
	DESIGNED	BB		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	CS	3/25	
HORIZONTAL:	LEAD ENGR.	KEW	3/25	
	FIELD MGR.			
VERTICAL:	RECOMMENDED DESIGN MANAGER			

DWG NAME: M03 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 9 OF 30 SHEETS

MECHANICAL

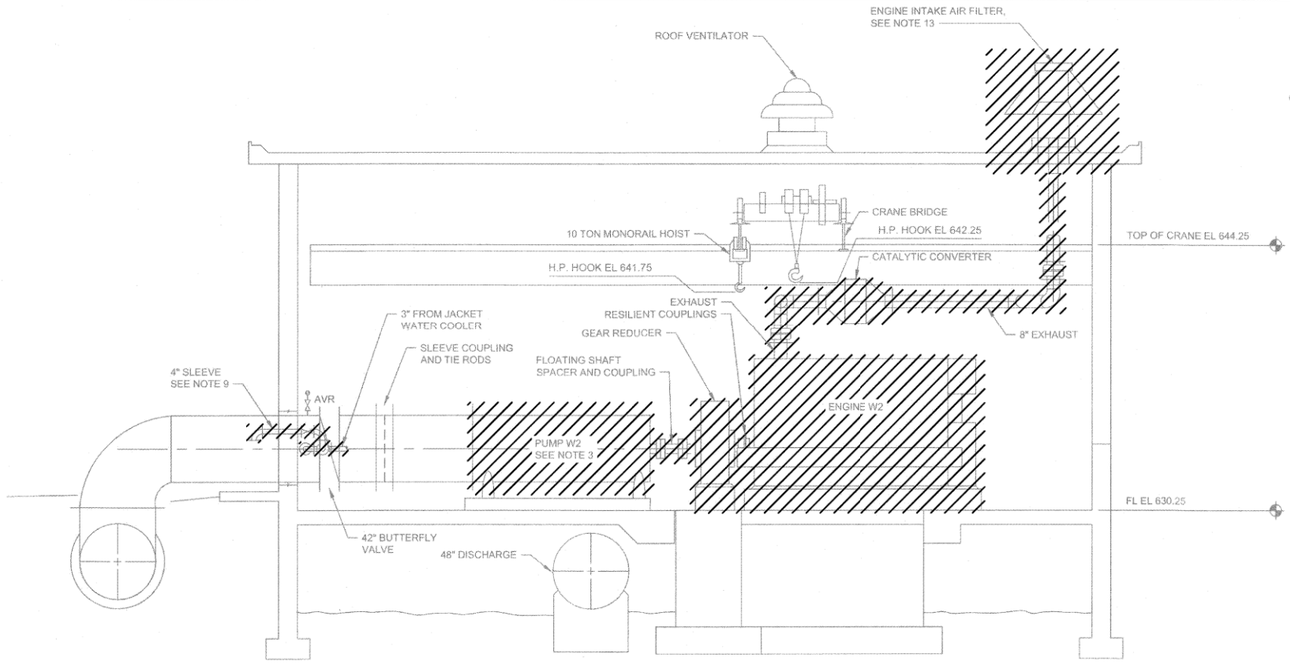
DEMOLITION PLANS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

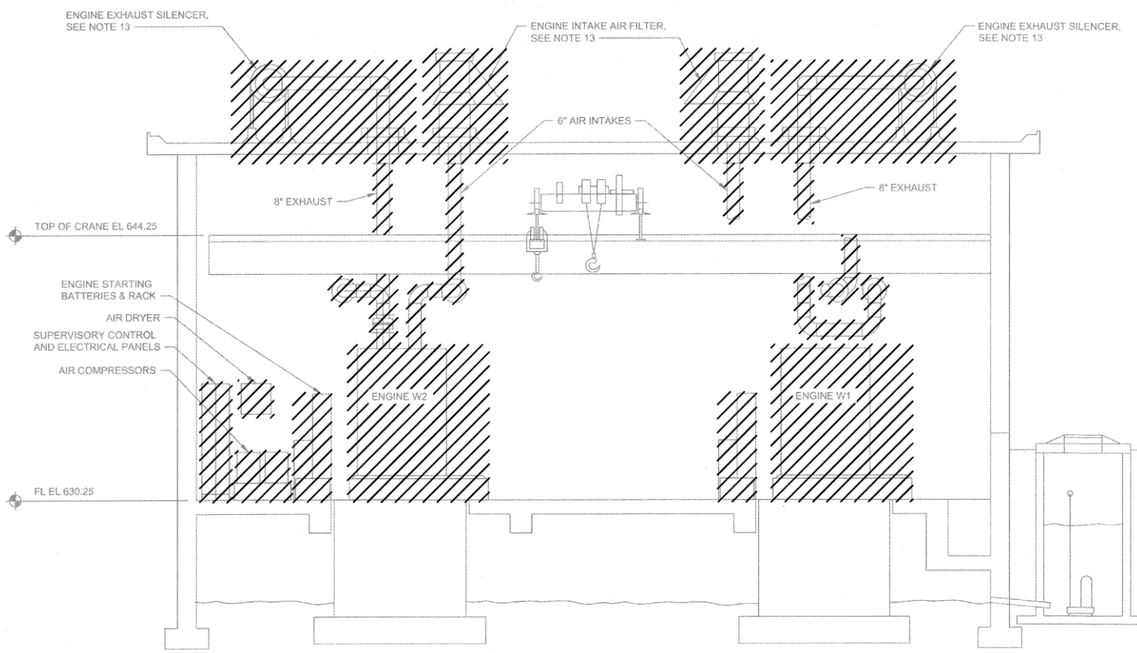
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



SECTION 1/M04

1/4" = 1'-0"



SECTION 2/M04

1/4" = 1'-0"

4 0 4 8 FT

1/4"=1'-0"

NOTES:

1. REMOVE PUMP AND ASSOCIATED ENGINE ONE AT A TIME, MAINTAINING PUMPING STATION IN-SERVICE DURING CONSTRUCTION.
2. REMOVE ENGINES W1 AND W2 INCLUDING JACKET WATER COOLERS, LUBE OIL COOLERS, COOLING WATER PUMPS, COOLING SYSTEM PIPING, INTAKE AIR AND EXHAUST PIPING.
3. EXISTING PUMPS TO BE REMOVED, REHABILITATED, AND REINSTALLED. SEE SPECIFICATION SECTION 43 21 17 - PUMP REFURBISHMENT FOR ADDITIONAL REQUIREMENTS.
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9. PATCH WITH NON-SHRINK GROUT ALL FLOOR AND WALL OPENING CREATED BY REMOVAL OF EXISTING PIPING AND CONDUITS AND NOT USED FOR THE NEW EQUIPMENT.
10. REMOVE EMPTY ELECTRICAL ENCLOSURES, UNUSED CONDUITS AND SUPPORTS.
11. DISCONNECT AND CAP ENGINE GAS FUEL SUPPLY LINES.
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BEFORE YOU DIG 811 1-800-522-OKIE CALL OKIE

LICENSED PROFESSIONAL ENGINEER JOSEPH M. TEUSCH 24406 OKLAHOMA

REVISION	BY	DATE

MECHANICAL

DEMOLITION SECTIONS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

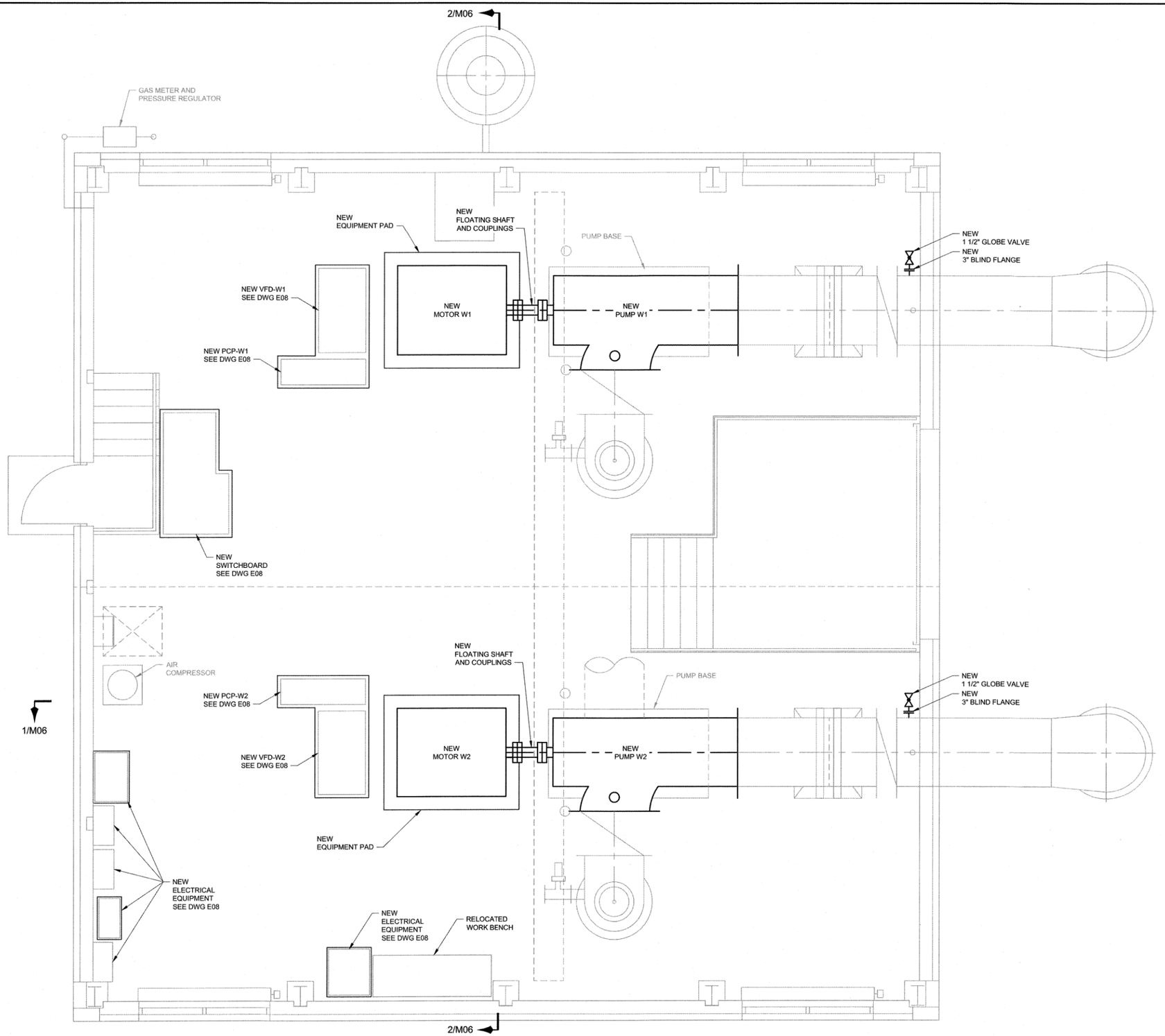
PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

PLAN SCALE: 1/4" = 1'-0"	DRAWN	OEV		APPROVED:
	DESIGNED	BB		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	CS	3/25	
HORIZONTAL:	LEAD ENGR.	KEW	3/25	
	FIELD MGR.	BWL	3/25	
VERTICAL:	RECOMMENDED DESIGN MANAGER			

DWG NAME: M04 DATE: MARCH 2025

ATLAS PAGE NO: SHEET 10 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



NEW PLAN

3/8" = 1'-0"

1 0 1 2 3 4 5 6 7 FT

3/8"=1'-0"

NOTES:

1. REFURBISHED EQUIPMENT INCLUDES PUMPS W1 AND W2. REFURBISHED EQUIPMENT TO BE INSTALLED BY CONTRACTOR. SEE SPECIFICATION SECTION 43 21 17 - PUMP REFURBISHMENT FOR ADDITIONAL REQUIREMENTS.
2. PROVIDE NEW ELECTRIC MOTORS.
3. AIR COMPRESSOR SHALL BE SALVAGED AND RELOCATED.

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER JOSEPH M. TEUSCH 24406 OKLAHOMA

MECHANICAL

NEW PLANS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

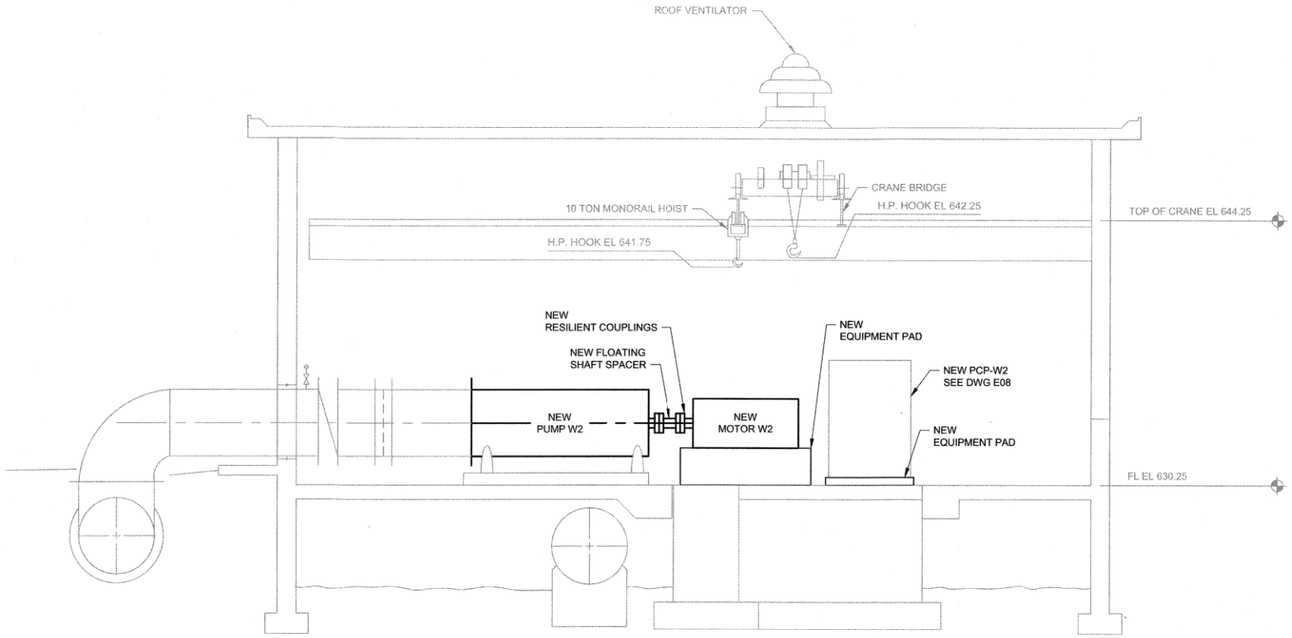
REVISION	BY	DATE

PLAN SCALE: 3/8" = 1'-0"
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	OEV		APPROVED:
DESIGNED	BB		
SURVEY			
PROJ. MGR.	CS	3/25	
LEAD ENGR.	LEW	3/25	
FIELD MGR.		3/25	
RECOMMENDED DESIGN MANAGER			

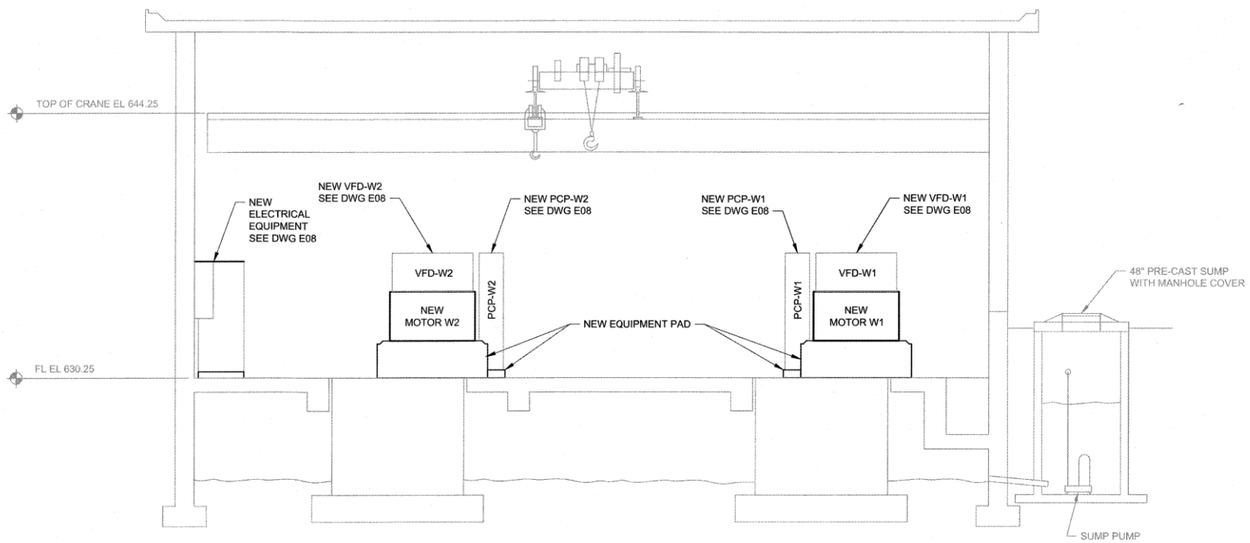
DWG NAME: M05
ATLAS PAGE NO:
DATE: MARCH 2025
SHEET 11 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



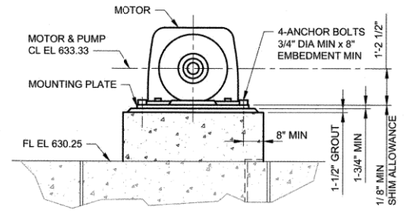
SECTION 1/M06

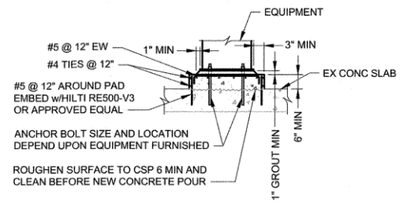
1/4" = 1'-0"



SECTION 2/M06

1/4" = 1'-0"





NOTE:

CONTRACTOR TO SELECT EMBEDMENT TO MEET REQUIREMENTS OF SELECTED MOTOR. CONTRACTOR TO AVOID DAMAGE TO EXISTING REINFORCING. CONTRACTOR TO LOCATE AND AVOID EXISTING REINFORCING.

MOTOR MOUNTING DETAIL

NOT TO SCALE

NOTES:

1. REFURBISHED EQUIPMENT INCLUDES PUMPS W1 AND W2. REFURBISHED EQUIPMENT TO BE INSTALLED BY CONTRACTOR.
2. PROVIDE NEW ELECTRIC MOTORS.
3. AIR COMPRESSOR SHALL BE SALVAGED AND RELOCATED.

4 0 4 8 FT

1/4"=1'-0"

BEFORE YOU DIG 811 OKIE STATE ONE CALL OKIE

LICENSED PROFESSIONAL ENGINEER JOSEPH M. TEUSCH 24406 OKLAHOMA

MECHANICAL

NEW SECTIONS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE: 1/4" = 1'-0"
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	OEV	
DESIGNED	BB	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	OEV	3/25
FIELD MGR.	BMW	3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: M06
ATLAS PAGE NO:

DATE: MARCH 2025
SHEET 12 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

DUCTWORK SYMBOLS

DESCRIPTION	SYMBOL
DUCT WIDTH X DEPTH (FIRST DIMENSION IS DIMENSION SEEN)	W x D
CHANGE OF ELEVATION RISE(R) DROP(D)	R
VOLUME DAMPER	VD
REGISTER OR GRILLE	* 48X12 3000 CFM; * 48X12 3000 CFM
* SEE MISCELLANEOUS DESIGNATIONS	
RECTANGULAR DIFFUSER (SIZE GIVEN REFERS TO NECK SIZE)	D L X W ___ CFM
ROUND DIFFUSER (SIZE GIVEN REFERS TO NECK SIZE)	D ___ CFM
LINEAR DIFFUSER	
OUTLET AIR DIRECTION	
INLET AIR DIRECTION	
DUCT SECTION * S=SUPPLY AIR * OA=OUTSIDE AIR	
DUCT SECTION * E=EXHAUST AIR * RA=RETURN AIR	
ROUND DUCT WITH TRANSITION TO RECTANGULAR DUCT	
SPLITTER DAMPER (WITH ROD & LOCK)	
TURNING VANES	
DEFLECTING (SPLITTER) DAMPER WITH ROD & LOCK	

DESCRIPTION	SYMBOL
AIR EXTRACTOR WITH ROD & LOCK	
SUPPLY DUCT DOWN	
EXHAUST OR RETURN DUCT UP	
FLEXIBLE DUCT CONNECTION	
FLEXIBLE DUCT	
ACCESS DOORS IN DUCT	(FAR SIDE); AD (SIZE)
DIRECTION OF AIR FLOW IN DUCT	
DUCT SOUND ATTENUATOR	DSA
FIRE DAMPER	
FIRE/SMOKE DAMPER	
ACOUSTICAL LINING INSULATION	

EQUIPMENT SYMBOLS

DESCRIPTION	SYMBOL
CENTRIFUGAL FAN	
IN-LINE FAN	
PROPELLER FAN	
LOUVERED ROOF FAN EXHAUST, SUPPLY	
ROOF MOUNTED FAN EXHAUST, SUPPLY	
GRAVITY ROOF VENTILATOR EXHAUST, INTAKE	
UNIT HEATER	

PIPING SYMBOLS

DESCRIPTION	SYMBOL
HEATING WATER SUPPLY	HWS
HEATING WATER RETURN	HWR
COOLING WATER SUPPLY	CWS
COOLING WATER RETURN	CWR
CHILLED WATER SUPPLY	CHWS
CHILLED WATER RETURN	CHWR
LOW PRESSURE STEAM	LPS
LOW PRESSURE CONDENSATE	LPC
MEDIUM PRESSURE STEAM	MPS
MEDIUM PRESSURE CONDENSATE	MPC
HIGH PRESSURE STEAM	HPS
HIGH PRESSURE CONDENSATE	HPC
FUEL OIL SUPPLY	FOS
FUEL OIL RETURN	FOR
FUEL OIL FILL	FOF
FUEL OIL VENT	FOV
BOILER FEED	BF
NATURAL GAS	NG
LIQUIFIED PETROLEUM GAS	LPG
REFRIGERANT LIQUID	RL
REFRIGERANT SUCTION	RS
REFRIGERANT DISCHARGE	RD
CONDENSATE PUMP DISCHARGE	CPD
COMPRESSED AIR	A
GLYCOL SUPPLY	GLS
GLYCOL RETURN	GLR
PRESSURE & TEMPERATURE TEST PLUG	P&T
BALANCING VALVE	
MANUAL BALANCING & FLOW MEASURING VALVE	
AUTOMATIC BALANCING & FLOW MEASURING VALVE	
TRIPLE DUTY VALVE	
RELIEF VALVE	
INLINE PUMP	
BASE MOUNTED PUMP	
PIPE GUIDE	
PIPE ANCHOR	
FLOAT & THERMOSTATIC TRAP	
EXPANSION JOINT	

DESCRIPTION	SYMBOL
PIPE FLOW DIRECTION	
PIPE PITCH DOWN (WITH RESPECT TO FLOW)	DN
PIPE PITCH UP (WITH RESPECT TO FLOW)	UP
PIPE CAPPED	
MANUAL AIR VENT	
AUTOMATIC AIR VENT	
PUMP SUCTION DIFFUSER	PSD

MISCELLANEOUS DESIGNATIONS

DESCRIPTION	DESIGNATION
BOTTOM OF DUCT ELEVATION	B/D EL
TOP OF DUCT ELEVATION	T/D EL
INVERT ELEVATION	INV EL
CENTERLINE ELEVATION	CL EL
CUBIC FEET PER MINUTE	CFM
THOUSAND BTU PER HOUR	MBH
GRAVITY DAMPER	GD
SPLITTER DAMPER	SD
BACKDRAFT DAMPER	BDD
BALL JOINT	BJ
NOT TO SCALE	NTS
OUTSIDE AIR INTAKE	OAI
NORMALLY OPEN	N.O.
NORMALLY CLOSED	N.C.
TYPICAL	TYP
FLAT ON TOP	FOT
FLAT ON BOTTOM	FOB
STAINLESS STEEL	SST
DIFFUSER	D
REGISTER	R
CEILING DIFFUSER	CD
SUPPLY DIFFUSER	SD
CEILING REGISTER	CR
GRILLE	G
WALL GRILLE	WG
CEILING GRILLE	CG
TRANSFER GRILLE	TG
DRUM LOUVER	DL
WALL DIFFUSER	WD
WALL REGISTER	WR

TEMPERATURE CONTROL SYMBOLS

DESCRIPTION	SYMBOL
MOTOR ACTUATOR	M
SOLENOID ACTUATOR	S
PNEUMATIC ACTUATOR	
2-WAY CONTROL VALVE (WITH SOLENOID ACTUATOR)	S
3-WAY CONTROL VALVE (WITH PNEUMATIC ACTUATOR)	
BUTTERFLY CONTROL VALVE (WITH MOTOR ACTUATOR)	M
OPPOSED BLADE CONTROL DAMPER (WITH MOTOR ACTUATOR)	M
PARALLEL BLADE CONTROL DAMPER (WITH PNEUMATIC ACTUATOR)	
SPACE TEMPERATURE SENSOR/THERMOSTAT	T
SPACE HUMIDITY SENSOR/HUMIDISTAT	H
TEMPERATURE SENSOR WITH RIGID ELEMENT	T
TEMPERATURE SENSOR WITH AVERAGING ELEMENT	T
PRESSURE SENSOR	P
DIFFERENTIAL PRESSURE SENSOR	DPS
HUMIDITY SENSOR	H
DEW POINT TEMPERATURE SENSOR	DW
CFM AIR MEASURING STATION	AM
HIGH TEMPERATURE THERMOSTAT	HT
LOW TEMPERATURE THERMOSTAT	LT
SPACE SMOKE DETECTOR	S
DUCT SMOKE DETECTOR	S
FLOW SWITCH	FS FS
DIFFERENTIAL PRESSURE FLOW SWITCH	DP
HAZARDOUS GAS DETECTOR (* INDICATES GAS)	*

DESCRIPTION	SYMBOL
TEMPERATURE CONTROL PANEL	TCP
AIR MONITORING PANEL	AMP

NOTES:

1. THIS IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF THE DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR REQUIRED ITEMS.
2. FOR OTHER VALVE, EQUIPMENT AND PIPING SYMBOLS SEE PIPING AND EQUIPMENT SYMBOLS AND PLUMBING LEGEND.
3. * - DENOTES DIMENSIONS TO BE DETERMINED AFTER EQUIPMENT APPROVAL.
4. ALL DUCT DIMENSIONS ARE CLEAR DIMENSIONS OF FACE SHOWN OR INDICATED.
5. THE DRAWINGS DO NOT GUARANTEE THE COMPLETENESS OR ACCURACY OF THE INFORMATION ON THE EXISTING DRAWINGS. FIELD VERIFY EXISTING CONDITIONS AND COORDINATE NEW WORK TO AVOID INTERFERENCES WITH EXISTING STRUCTURE, PIPING, ETC.
6. FIELD VERIFY THE EXTENT OF DEMOLITION DURING INSPECTION OF THE SITE BEFORE BIDDING. REMOVE ALL SUPPORTS, VALVES, AND PIPING ACCESSORIES ASSOCIATED WITH COMPONENTS TO BE REMOVED.
7. EQUIPMENT SIZE AND LOCATIONS ARE APPROXIMATE. ACTUAL DIMENSIONS OF EQUIPMENT AND APPURTENANCES, NOT LIMITED TO DUCT PLENUMS, TRANSITIONS, PIPING CONNECTIONS, AND EQUIPMENT PADS, TO BE DETERMINED BY EQUIPMENT FURNISHED.
8. PROVIDE DUCTWORK SUPPORTS FROM EXISTING STRUCTURES PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
9. PROVIDE INSULATING BOARDS BEHIND ALL THERMOSTATS MOUNTED ON EXTERIOR WALLS AND COLUMNS.
10. FURNISH AND INSTALL ALL WORK IN ACCORDANCE WITH APPLICABLE CODES, STANDARDS, AND LOCAL RULES AND REGULATIONS.
11. PROVIDE ALL REQUIRED LABOR, MATERIAL AND EQUIPMENT TO ACHIEVE COMPLETE INSTALLATION.

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER JOSEPH E. DINKEL 33265 OKLAHOMA

HVAC

SYMBOL LEGEND

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

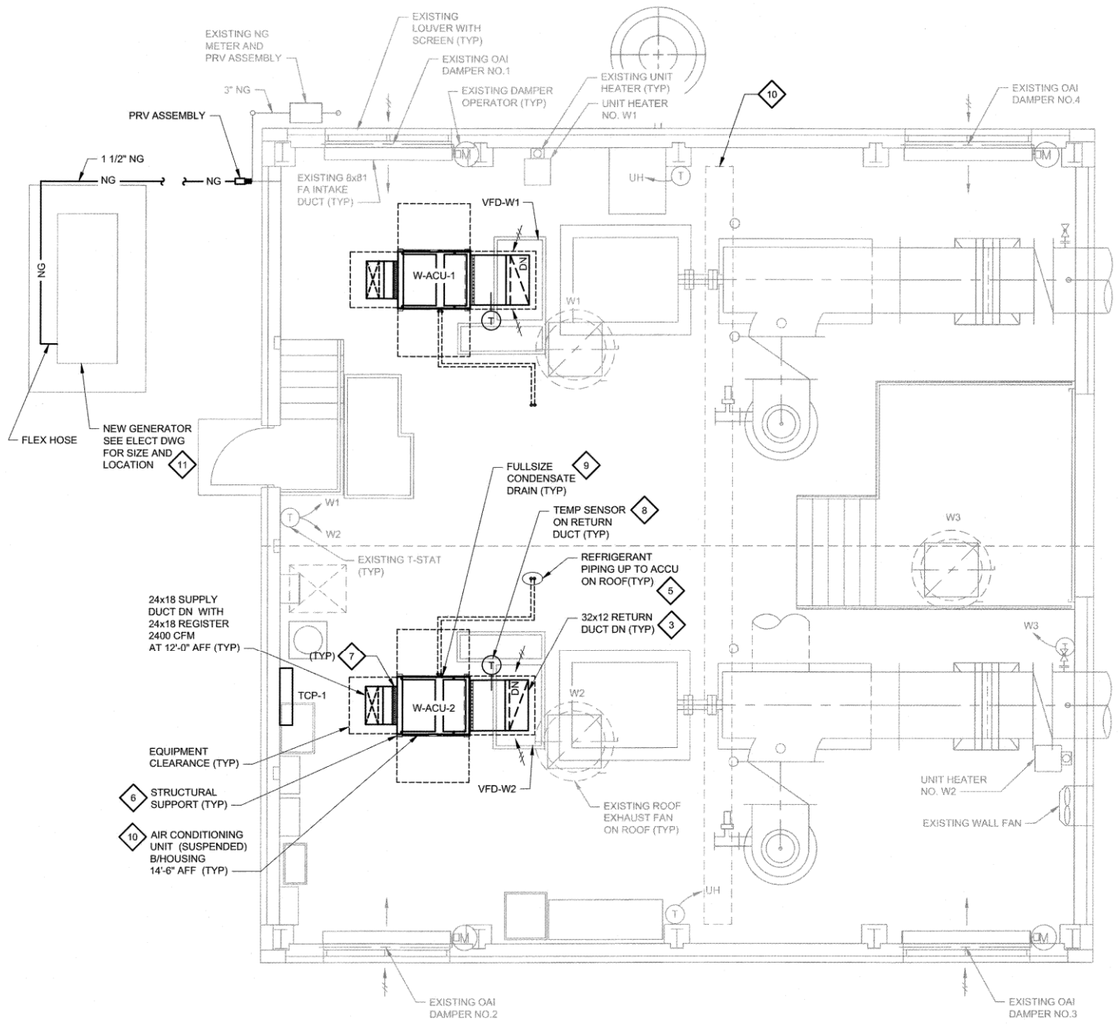
PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	GS	
DESIGNED	MP	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	CSW	3/25
FIELD MGR.		3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

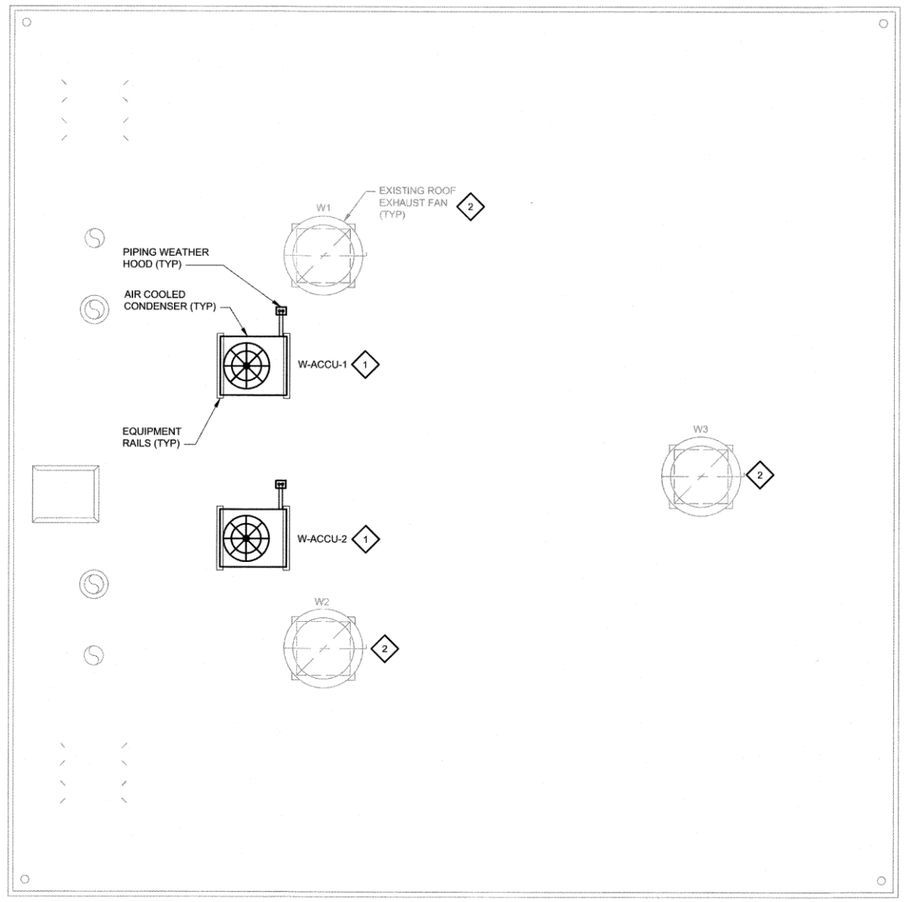
DWG NAME: H01
DATE: MARCH 2025
ATLAS PAGE NO:
SHEET 13 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



NEW WORK PLAN AT EL 630'-3"

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



NEW WORK ROOF PLAN

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

KEY NOTES:

1. INSTALL NEW CONDENSING UNIT (CU) ON NEW CURB. SECURE CU TO CURB. INSTALL CU PER MANUFACTURE'S RECOMMENDATIONS.
2. EXISTING EXHAUST FAN (TYP).
3. CONNECT RETURN DUCT TO VENT CONNECTIONS(S) ON TOP VARIABLE FREQUENCY DRIVE (VFD). COORDINATE CONNECTION LOCATION WITH VFD MANUFACTURER.
4. PROVIDE CRANE STOP TO AVOID DAMAGE TO SUSPENDED AC UNIT. COORDINATE LOCATION OF STOPPER AS REQUIRED WITH AC UNIT INSTALLATION.
5. NEW LIQUID AND SUCTION REFRIGERANT LINES. ROUTE LINES THROUGH ROOF TO NEW ACCU'S. SIZE ALL LINES PER MANUFACTURE'S AS RECOMMENDATIONS. PROVIDE ALL ACCESSORIES AND TRAPS AS RECOMMENDED BY MANUFACTURER'S. INSULATE SUCTION LINES WITH CLOSED CELL FOAM INSULATION PER MANUFACTURER'S RECOMMENDATIONS SUPPORT PIPING ON ROOF AS NECESSARY.
6. PROVIDE NEW STEEL SUPPORTS TO SECURE NEW ACU TO THE EXISTING STRUCTURE. MAINTAIN ALL CLEARANCES TO ELECTRICAL EQUIPMENT AND OVERHEAD CRANE.
7. FLEXIBLE DUCT CONNECTION. MATCH FULL SIZE OPENING OF AC UNIT SUPPLY AND RETURN AIR OPENING SIZE.
8. DUCT MOUNTED TEMPERATURE SENSOR. DIVISION 26 TO WIRE SENSOR TO CONTROL PANEL ON AC UNIT. AC UNIT SUPPORT FAN SHALL BE INTERLOCKED TO RUN WHEN THE VFD IS RUNNING. THE DUCT MOUNTED TEMPERATURE SENSOR. SETPOINT SHALL BE ADJUSTABLE AND SET BY OWNER.
9. CONDENSATE DRAIN, REFER TO DETAIL ON H-03. ROUTE DOWN AND THROUGH EXISTING OPENING IN EXTERIOR WALL.
10. AIR CONTROLLER TO GENERATE ALARM TO PLC SYSTEM UPON AIR CONDITIONING SYSTEM FAILURE.
11. REFER TO MANUFACTURERS NATURAL GAS PIPING REQUIREMENTS INCLUDING CONNECTION LOCATION, PIPE SIZE, FLEX HOSE, STRAIGHT PIPE LENGTH, SEDIMENT TRAP, PRV REQUIREMENTS, VALVE LOCATIONS, ETC.

4 0 4 8 FT

1/4"=1'-0"

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LICENSED PROFESSIONAL ENGINEER JOSEPH E. DINKEL 33265 OKLAHOMA

HVAC

NEW PLANS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:	DRAWN	GS		APPROVED:
	DESIGNED	MP		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	CS	3/25	
HORIZONTAL:	LEAD ENGR.	GW	3/25	
	FIELD MGR.	BM	3/25	
VERTICAL:	RECOMMENDED DESIGN MANAGER			

DWG NAME: H02 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 14 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

AIR CONDITIONING UNIT (SPLIT SYSTEM)

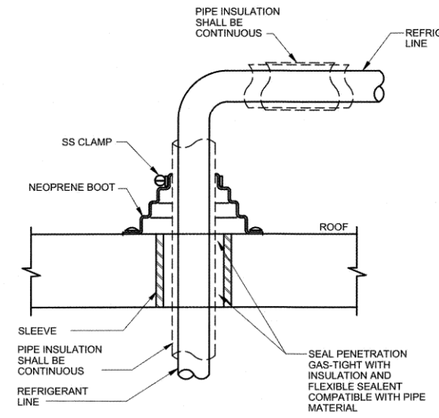
UNIT I.D.	LOCATION	AREA(S) SERVED	TYPE	SUPPLY FAN	STATIC PRESSURE	EVAPORATOR COIL		HEATING	COOLING	ELECTRICAL			MANUFACTURER	WEIGHT (LBS)	REMARKS/NOTES
				CFM	"WG"	EAT	MBH	MBH	MBH	V/PH/HZ	MOP	TOT KW	MODEL NO		
						LAT (DB/WB)	TONS		TON		FLA				
W-ACU-1	RAW WATER PUMP STATION	RAW WATER PUMP STATION	SUSPENDED INDOOR UNIT	2400	0.5"	80 / 67	72	--	72	480/3/60	15	-	TRANE	373	1, 2, 3, 4
						58 / 57	6	--	6		4		TWE072		
W-ACU-2	RAW WATER PUMP STATION	RAW WATER PUMP STATION	SUSPENDED INDOOR UNIT	2400	0.5"	80 / 67	72	--	72	480/3/60	15	-	TRANE	373	1, 2, 3, 4
						58 / 57	6	--	6		4		TWE072		

NOTES: 1. STAINLESS STEEL DRAIN PAN WITH 3/4 " NPT CONNECTION. 3. EVAPORATOR AND CONDENSER COILS WITH DUAL CIRCUIT. 3. DIGITAL THERMOSTAT WITH 24 VAC LOCAL SYSTEM CONTROL MODULE. 4. FURNISH AND INSTALL REFRIGERANT LINE SETS AS RECOMMENDED BY EQUIPMENT MANUFACTURER.

AIR COOLED CONDENSING UNIT (SPLIT SYSTEM)

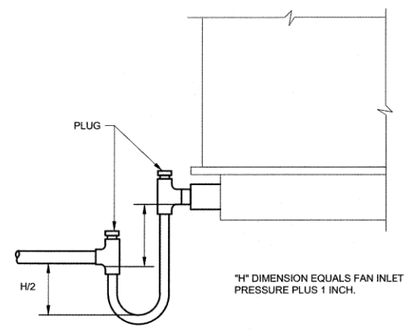
UNIT I.D.	LOCATION	SYSTEM	ENT.AIR TEMP. °F	REFRIG. TYPE	CONDENSER				ELECTRICAL			MANUFACTURER	WEIGHT (LBS)	REMARKS/NOTES
					NO. FANS	MBH	CFM	RLA	V/PH/HZ	MCA	TOT. KW	MODEL NO		
						TONS				MOP				
W-ACCU-1	ROOF	W-ACU-1	105	R-454B	1	72	--	--	480/3/60	16	--	TRANE	316	1, 2, 3, 4, 5
						6				20		TTA072		
W-ACCU-2	ROOF	W-ACU-1	105	R-454B	1	72	--	--	480/3/60	16	--	TRANE	316	1, 2, 3, 4, 5
						6				20		TTA072		

NOTES. 1. EVAPORATOR AND CONDENSER COILS WITH DUAL CIRCUITS. LOW AMBIENT CONTROL DOWN TO 20 DEG F. 2. FURNISH AND INSTALL REFRIGERANT LINE SETS AS RECOMMENDED BY EQUIPMENT MANUFACTURER. 3. HIGH AND LOW PRESSURE SWITCHES. 4. UNIT MOUNTED DISCONNECT. 5 .TEFC CONDENSER MOTOR. 5. LOW AMBIENT TEMPERATURE ACCESSORY



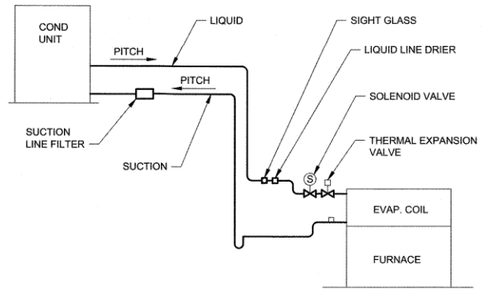
REFRIGERANT PIPE THRU ROOF DETAIL

NOT TO SCALE



DRAIN PAN TRAP FOR DRAW-THRU UNIT

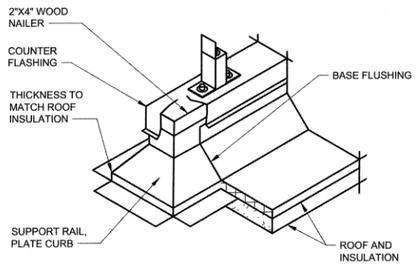
NOT TO SCALE



MOTE: MANUFACTURER'S RECOMMENDATION FOR REFRIGERANT LINES ACCESSORIES SHALL SUPERSEDE DETAIL.

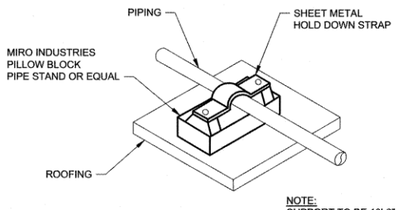
REFRIGERANT PIPING DETAIL

NOT TO SCALE (EVAPORATOR BELOW CONDENSING UNIT)



PREFABRICATED ROOF EQUIPMENT RAIL

NOT TO SCALE



NOTE:
SUPPORT TO BE 10'-0" CENTER TO CENTER, MAXIMUM.

PIPE SUPPORT DETAIL

NOT TO SCALE

BEFORE YOU DIG CALL OKIE 811

JOSEPH E. DINKEL 33265 LICENSED PROFESSIONAL ENGINEER OKLAHOMA

HVAC

EQUIPMENT SCHEDULES AND DETAILS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE: DRAWN GS; DESIGNED MP; SURVEY
PROFILE SCALE: PROJ. MGR. GS 3/25
HORIZONTAL: LEAD ENGR. [illegible] 3/25
VERTICAL: FIELD MGR. [illegible] 3/25
RECOMMENDED DESIGN MANAGER
APPROVED:

DWG NAME: H03 DATE: MARCH 2025

ATLAS PAGE NO: SHEET 15 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

POWER, LIGHTING AND MISCELLANEOUS PLAN SYMBOLS

SYMBOL	DESCRIPTION
	EXPOSED CONDUIT RUN
	CONCEALED CONDUIT RUN ABOVE CEILING OR IN WALLS
	CONCEALED CONDUIT RUN IN OR BELOW FLOOR SLAB
UE	UNDERGROUND CONDUIT (CONCRETE ENCASED)
DB	UNDERGROUND CONDUIT (DIRECT BURIED)
C	UNDERGROUND CABLE (DIRECT BURIED)
	CONDUIT CAPPED
	CONDUIT UP
	CONDUIT DOWN
	CONDUIT WITH HOT, NEUTRAL AND GROUND WIRES (LONG LINE DENOTES NEUTRAL; LONG LINE WITH DOT DENOTES GROUND)
XXX	HOME RUN TO EQUIPMENT XXX INDICATES CONDUIT TAG
	FLEXIBLE CONDUIT OR CABLE
	GROUNDING CONDUCTOR
	NEUTRAL CONDUCTOR
	EQUIPMENT ENCLOSURE AS INDICATED ON PLAN
	LIGHTING PANELBOARD 480Y/277V, 208Y/120V OR 120/240V
T	DRY TYPE TRANSFORMER
	JUNCTION BOX, PULL BOX OR TERMINAL BOX
	MANUALLY OPERATED DISCONNECTING SWITCH (SEE SPECIFICATIONS)
RS	MANUAL REVERSING DRUM SWITCH, FORWARD-OFF-REVERSE, MAINTAINED CONTACTS
	FULL VOLTAGE MAGNETIC STARTER OR CONTACTOR
	COMBINATION CIRCUIT BREAKER STARTER
	MOTOR - THREE PHASE
	MOTOR - SINGLE PHASE
M	MOTOR OPERATED VALVE OR SLUICE GATE WITH INTEGRAL CONTROLLER AND CONTROL STATION
	CONTROL STATION (SEE SCHEMATIC DIAGRAMS FOR ASSOCIATED DEVICES)
X	CONTROL STATION AND FIELD CONTROL DEVICES (SEE ONE LINE DIAGRAMS AND SCHEMATICS FOR DETAILS)
	GROUND ROD
	GROUND ROD WITH ACCESS BOX
	LIGHTNING ROD
M	METER SOCKET
WH	WATER HEATER
	UNIT HEATER
CP	CONTROL PANEL
SPD	SURGE PROTECTIVE DEVICE
	LIGHT LINE DENOTES EXISTING WORK
	HEAVY LINE DENOTES NEW WORK
	HATCHING DENOTES WORK TO BE DEMOLISHED

SYMBOL	DESCRIPTION
A / 1A	WALL OR CEILING MOUNTED INCANDESCENT OR HID LIGHTING FIXTURE UPPER LETTER DENOTES FIXTURE TYPE NUMBER DENOTES CIRCUIT NUMBER AND LETTER DENOTES SWITCH CONTROLLING FIXTURE
	EMERGENCY LIGHTING FIXTURE
	WALL OR CEILING MOUNTED EXIT OR DIRECTIONAL SIGN (SHADED SIDE DENOTES ILLUMINATED FACE ARROW INDICATES DIRECTION)
	EMERGENCY EXIT LIGHT COMBO, BATTERY POWERED, WALL MOUNT
	POLE MOUNTED LIGHTING FIXTURE
	FLOODLIGHT
	LED STRIP LIGHTING FIXTURE
	LED LIGHTING FIXTURE
	EMERGENCY LED LIGHTING FIXTURE
T	REMOTE TEST PUSHBUTTON AND "ON" INDICATING LIGHT FOR BATTERY EQUIPPED LIGHTING FIXTURES
	EMERGENCY BATTERY PACK WITH TWO LIGHTING HEADS
	EMERGENCY BATTERY PACK - REMOTE HEAD
PC	PHOTOELECTRIC CELL
	SPECIALTY PLUG PER DRAWING
	SINGLE RECEPTACLE 2 POLE, 3 WIRE, 120 VOLT, 20A, OR AS NOTED
	DUPLEX RECEPTACLE 2 POLE, 3 WIRE, 120 VOLT, 20A, OR AS NOTED
	DUPLEX RECEPTACLE 2 POLE, 3 WIRE, 208 VOLT, 20A, OR AS NOTED
	FLOOR OUTLET BOX WITH DUPLEX RECEPTACLE 2 POLE, 3 WIRE, 120 VOLT, 20A, OR AS NOTED
	SINGLE RECEPTACLE - SINGLE PHASE (RATING AS NOTED)
	SINGLE RECEPTACLE - THREE PHASE (RATING AS NOTED)
	CLOCK WITH RECEPTACLE
TYPE	SINGLE POLE SWITCH UNLESS NOTED OTHERWISE 2P - TWO POLE 3 - THREE WAY 4 - FOUR WAY D - DOOR SWITCH M - MOMENTARY CONTACT MS - MOTOR STARTING PL - WITH PILOT LIGHT T - THERMAL OVERLOAD TS - TIME SWITCH
	INTERCOM TELEPHONE OUTLET
	INTERCOM TELEPHONE FLOOR OUTLET
	PUBLIC TELEPHONE OUTLET
	PUBLIC TELEPHONE FLOOR OUTLET
S	SPEAKER
S	BI-DIRECTIONAL SPEAKER
S	INTERCOMMUNICATION SPEAKER
V	INTERCOMMUNICATION SPEAKER VOLUME CONTROL
TV	CLOSED CIRCUIT TELEVISION CAMERA
	ALARM HORN
	ALARM BELL
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
F	MANUAL PULL STATION
S	SMOKE DETECTOR
H	HEAT DETECTOR
	PHOTOELECTRIC BEAM SMOKE DETECTOR TRANSMITTER
	PHOTOELECTRIC BEAM SMOKE DETECTOR RECEIVER
A	AUDIBLE/VISUAL INDICATING DEVICE WITH HORN
A	AUDIBLE/VISUAL INDICATING DEVICE WITH BELL
A	VISUAL INDICATING DEVICE
FS	SPRINKLER SYSTEM FLOW SWITCH
TS	SPRINKLER SYSTEM TAMPER SWITCH
M	MAGNETIC DOOR SWITCH
PI	PASSIVE INFRARED MOTION DETECTOR
	INFRARED BEAM MOTION DETECTION TRANSMITTER

ONE LINE AND SCHEMATIC DIAGRAM SYMBOLS

SYMBOL	DESCRIPTION
	INCOMING FEEDER
	OUTGOING FEEDER
	CONDUCTORS CONNECTED
	GROUNDING CONNECTION
	LIGHTNING OR SURGE ARRESTOR
	RECTIFIER OR DIODE
	SURGE CAPACITOR
	POWER TRANSFORMER
CPT	CONTROL POWER TRANSFORMER
2 CT	CURRENT TRANSFORMER (NUMBER DENOTES QUANTITY REQUIRED)
CT	CURRENT TRANSFORMER 3 PHASE WINDOW TYPE
2 PT	POTENTIAL TRANSFORMER (NUMBER DENOTES QUANTITY REQUIRED)
52	MEDIUM VOLTAGE DRAWOUT TYPE CIRCUIT BREAKER
	DISCONNECTING OR DRAWOUT DEVICE
800 AF/600 AT	LOW VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER 800A FRAME AND 600A TRIP
100A TYPE	LOW VOLTAGE AIR CIRCUIT BREAKER WITH 100A TRIP 2P - TWO POLE
225AF/125AT	LOW VOLTAGE AIR CIRCUIT BREAKER 225A FRAME AND 125A TRIP
225AF/150AT	LOW VOLTAGE AIR CIRCUIT BREAKER WITH COORDINATED CURRENT LIMITING FUSES - 225A FRAME AND 150A TRIP
	KEY INTERLOCK - DASHED LINE WITH ARROWS INDICATES MOVEMENT OF KEY DURING INTERLOCK PROCEDURE
M	FULL VOLTAGE MAGNETIC COMBINATION STARTER WITH MOTOR CIRCUIT PROTECTOR, CONTROL TRANSFORMER AND OVERLOAD RELAYS (M - OPERATING COIL)
F R	FULL VOLTAGE MAGNETIC COMBINATION REVERSING STARTER WITH MOTOR CIRCUIT PROTECTOR, CONTROL TRANSFORMER AND OVERLOAD RELAYS (F - FORWARD, R - REVERSE)
H L	FULL VOLTAGE MAGNETIC COMBINATION TWO SPEED STARTER WITH MOTOR CIRCUIT PROTECTOR, CONTROL TRANSFORMER AND OVERLOAD RELAYS (H - HIGH, L - LOW, F - FAST, S - SLOW)
2S 1S R TR	REDUCED VOLTAGE MAGNETIC COMBINATION AUTOTRANSFORMER STARTER WITH MOTOR CIRCUIT PROTECTOR, CONTROL TRANSFORMER AND OVERLOAD RELAYS (R - RUN, TR - TIMER, 1S & 2S - TRANSITION)
SOLID STATE STARTER	SOLID STATE REDUCED VOLTAGE COMBINATION STARTER WITH MOTOR CIRCUIT PROTECTOR AND CONTROL TRANSFORMER
5	MOTOR - THREE PHASE (NUMBER DENOTES HORSEPOWER)
G	GENERATOR

SYMBOL	DESCRIPTION
M	OPERATING COIL (C-CONTACTOR, F-FAST, F-FORWARD, H-HIGH, L-LOW, M-MOTOR STARTER, R-REVERSE, S-SLOW)
AR XX	RELAY COIL (AR-AUXILIARY RELAY, CR-CONTROL RELAY, LOR-LOCKOUT RELAY, TR-TIME DELAY RELAY WHERE `XX` DENOTES RELAY FUNCTION OR NUMBER)
	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT
OL	OVERLOAD RELAY CONTACT
X-X-O	NORMALLY OPEN (SHOWN) OR NORMALLY CLOSED RESET TIMER CONTACT (X-X-O - DENOTES TIMER SEQUENCE FOR RESET-TIMING-TIMED OUT PERIODS. X INDICATES CONTACT CLOSED)
TC	NORMALLY OPEN CONTACT WITH TIME DELAY CLOSING (ON DELAY)
TC	NORMALLY CLOSED CONTACT WITH TIME DELAY CLOSING (OFF DELAY)
TO	NORMALLY CLOSED CONTACT WITH TIME DELAY OPENING (ON DELAY)
TO	NORMALLY OPEN CONTACT WITH TIME DELAY OPENING (OFF DELAY)
LS	LIMIT SWITCH
F	FLOAT SWITCH
P OR V	PRESSURE OR VACUUM SWITCH
FL	FLOW SWITCH
T	TEMPERATURE SWITCH
TO	TORQUE SWITCH
LOR U L L U	LATCHING RELAY WITH CLEARING CONTACTS
	SELECTOR SWITCH
	NORMALLY OPEN PUSHBUTTON
	NORMALLY CLOSED PUSHBUTTON
	PUSHBUTTON STATION (ONE, TWO OR THREE UNIT)
R	INDICATING LIGHT (A-AMBER, B-BLUE, G-GREEN, R-RED, W-WHITE)
	THERMAL OVERLOAD ELEMENT (OL)
	ON-OFF SWITCH
R	RESISTOR
	FUSE
+ -	BATTERY
	HEATING ELEMENT
PULL ON PUSH OFF	MAINTAINED CONTACT PUSHBUTTON WITH MUSHROOM HEAD OPERATOR
HAND OFF AUTO XOO	SELECTOR SWITCH X INDICATES CONTACT CLOSED IN CORRESPONDING SWITCH POSITION
CS	CURRENT SENSOR TRIP SWITCH

SYMBOL	DESCRIPTION
27	PROTECTIVE RELAYS: 25 - SYNCHRONIZING CHECK 27 - UNDERVOLTAGE 32 - REVERSE POWER 43 - SELECTOR SWITCH 47 - PHASE SEQUENCE 49 - THERMAL 50 - INSTANTANEOUS OVERCURRENT 51 - AC TIME OVERCURRENT 52 - AC CIRCUIT BREAKER 59 - OVERVOLTAGE 60 - VOLTAGE OR CURRENT BALANCE 62 - TIME DELAY 64 - GROUND 67 - DIRECTIONAL OVERCURRENT 86 - LOCKOUT 87 - DIFFERENTIAL CURRENT 810 - OVERFREQUENCY 81U - UNDERFREQUENCY BF - BREAKER FAILURE DBX - DEAD BUS AUXILIARY G - DEVICE IN GROUND CIRCUIT GSR - GROUND SENSING IR - INTERPOSING LOR - LOCKOUT N - DEVICE IN NEUTRAL CIRCUIT P - PHASE PSR - PHASE SENSING X - AUXILIARY
DP	CONTROL DEVICES: DP - DIFFERENTIAL PRESSURE SWITCH F - FLOAT SWITCH FL - FLOW SWITCH LL - LEVEL SWITCH LS - LIMIT SWITCH P - PRESSURE SWITCH RDS - REVERSING DRUM SWITCH ST - SHUNT TRIP S - SOLENOID VALVE T - THERMOSTAT TQ - TORQUE SWITCH T - TEMPERATURE SWITCH VIB - VIBRATION SWITCH V - VACUUM SWITCH XS - TAMPER SWITCH
A	METER, INSTRUMENT OR INSTRUMENT SWITCHES: A - AMMETER AS - AMMETER SWITCH AT - CURRENT TRANSDUCER CS - BREAKER CONTROL SWITCH DT - DUTY TRANSFER SWITCH FPR - FEEDER PROTECTION RELAY LPR - LINE PROTECTION RELAY MMS - MICROPROCESSOR METERING SYSTEM MPR - MOTOR PROTECTION RELAY MSH - MOTOR SPACE HEATER PF - POWER FACTOR METER POT - POTENTIOMETER SI - SPEED INDICATOR SS - SELECTOR SWITCH TM - ELAPSED TIME METER TMR - TIMER V - VOLTMETER VAR - VARMETER VART - VARS TRANSDUCER VS - VOLTMETER SWITCH VT - VOLTAGE TRANSDUCER W - WATTMETER WH - WATTHOUR METER WHD - WATTHOUR DEMAND METER WT - WATTS TRANSDUCER ZT - POSITION TRANSMITTER

ABBREVIATIONS

A - AMPS
ACM - ASBESTOS CONTAINING MATERIAL
AFF - ABOVE FINISHED FLOOR
ATC - AUTOMATIC TRANSFER CONTROLLER
ATS - AUTOMATIC TRANSFER SWITCH
BCP - BREAKER CONTROL PANEL
BKR - BREAKER
BLDG - BUILDING
BOD - BOTTOM OF DUCT
CL - CENTERLINE
CKT - CIRCUIT
CS - CONTROL SWITCH
CT - CURRENT TRANSFORMER
DIA - DIAMETER
DP - DISTRIBUTION PANELBOARD
DPCS - DISTRIBUTED PROCESS CONTROL SYSTEM
ECC - EXTERNAL CONTROL CABINET
EMH - ELECTRICAL MANHOLE
FO - FIBER OPTIC
FVNR - FULL VOLTAGE NON-REVERSING
GFCI - GROUND FAULT CIRCUIT INTERRUPTER
GND - GROUND
GRS - GALVANIZED RIGID STEEL
HH - HANDHOLE
IPL - INDIANAPOLIS POWER AND LIGHT COMPANY
JB - JUNCTION BOX
KVA - KILO-VOLT-AMPERE
LBP - LEAD BASED PAINT
LCS - LOCAL CONTROL STATION
LCP - LIGHTING CONTROL PANEL
L/L - LEAD/LAG
LP - LIGHTING PANELBOARD
LOR - LOCAL OFF REMOTE
LT - LIGHTING TRANSFORMER
MCC - MOTOR CONTROL CENTER
MH - MOUNTING HEIGHT
MIN - MINIMUM
MM - MULTIMODE
O/O - ON/OFF
PB - PULL BOX
PLC - PROGRAMMABLE LOGIC CONTROLLER
PT - POTENTIAL TRANSFORMER
RECEPT - RECEPTACLE
RST - RESET
RTU - REMOTE TERMINAL UNIT
RVSS - REDUCED VOLTAGE SOLID STATE STARTER
SCCR - SHORT CIRCUIT CURRENT RATING
SP - SPARE
STP - SHIELDED TWISTED PAIR
TB - TERMINAL BOX
TYP - TYPICAL
V - VOLTS

NOTES:
1. THIS IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF THE ELECTRICAL DRAWINGS. ALL SYMBOLS MAY NOT BE USED IN THIS SET OF ELECTRICAL DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR ITEMS REQUIRED.

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REVISION	BY	DATE

ELECTRICAL
SYMBOL LEGEND
PROJECT NO. TMUA-W 21-04
RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

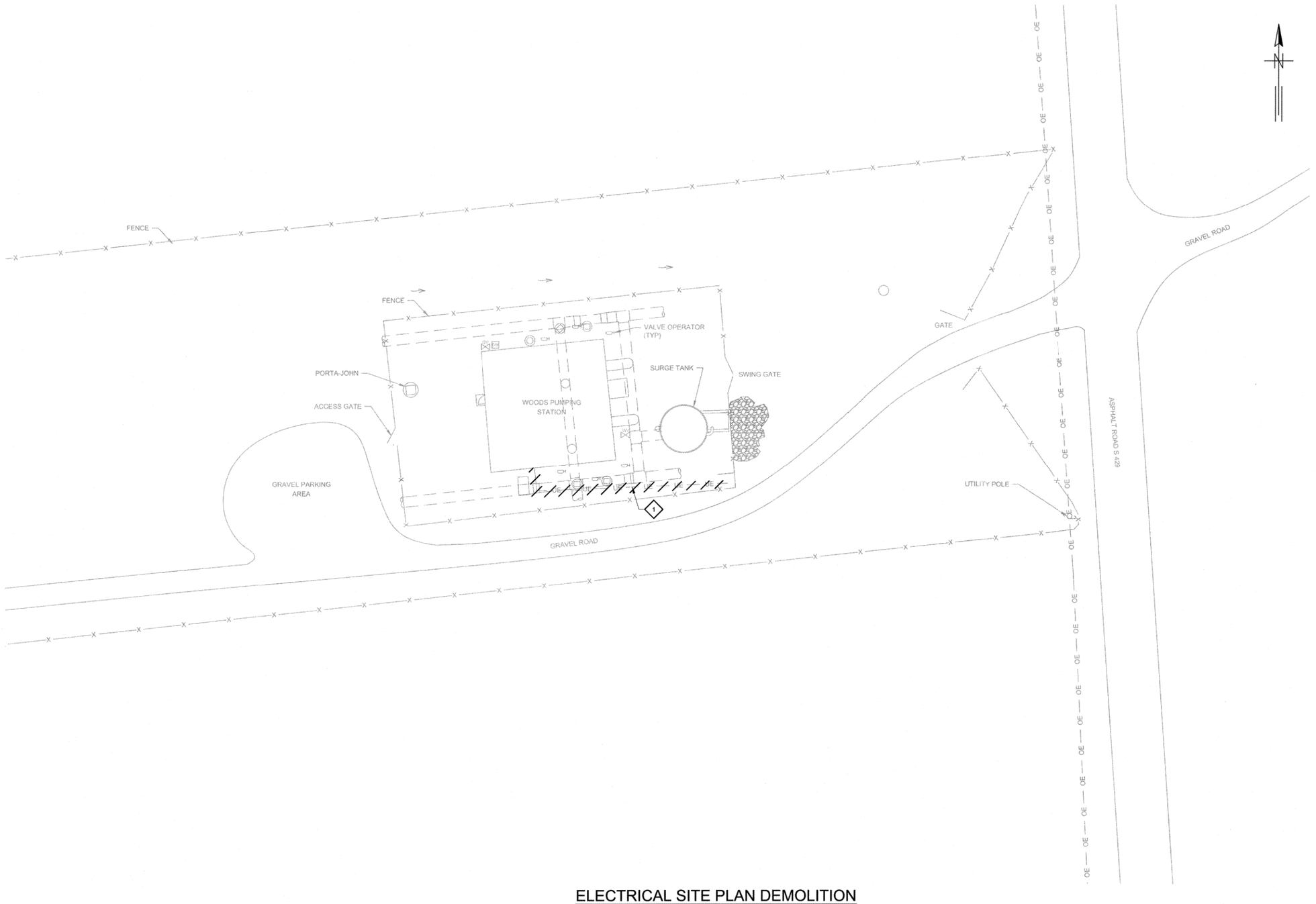
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

PLAN SCALE:	DRAWN	TD	APPROVED:
	DESIGNED	MM	
	SURVEY		
PROFILE SCALE:	PROJ. MGR.	CS	3/25
HORIZONTAL:	LEAD ENGR.	CS	3/25
	FIELD MGR.		3/25
VERTICAL:	RECOMMENDED DESIGN MANAGER		

DWG NAME: E01 — DATE: MARCH 2025
ATLAS PAGE NO: — SHEET 16 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



ELECTRICAL SITE PLAN DEMOLITION

SCALE: 1" = 20'-0"

20 0 20 40 FT

1"=20'

KEY NOTES:

1. DEMOLISH EXISTING UTILITY SERVICE ONCE NEW SERVICE HAS BEEN INSTALLED. COORDINATE WITH OWNER AND PSO.

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ELECTRICAL

ELECTRICAL SITE PLAN DEMOLITION

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

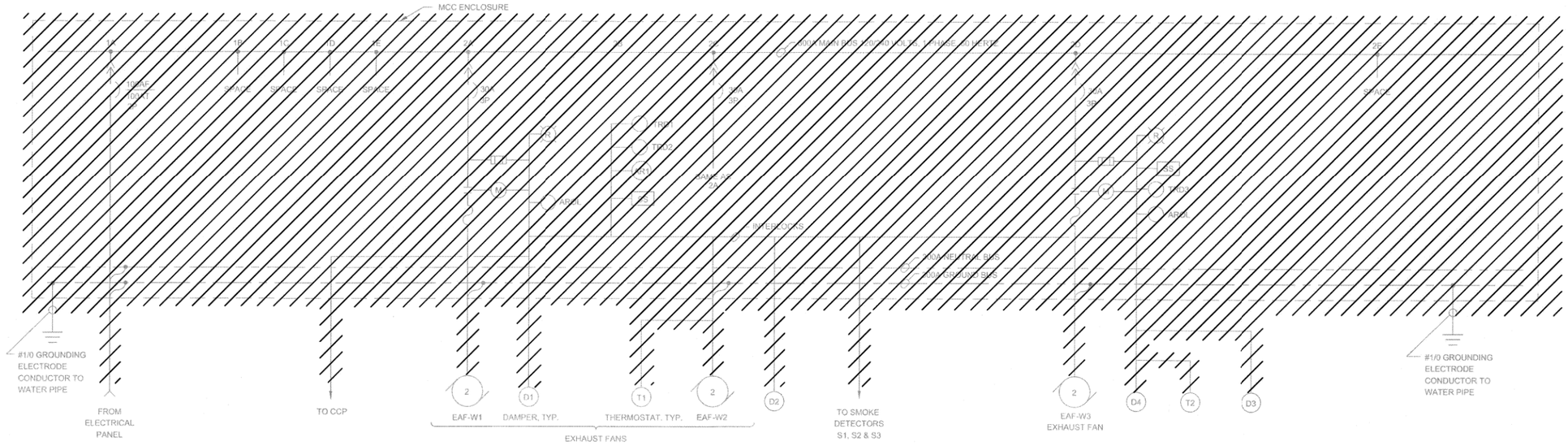
PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD		APPROVED:
DESIGNED	FF		
SURVEY			
PROJ. MGR.	CS	3/25	
LEAD ENGR.	KEW	3/25	
FIELD MGR.	BAH	3/25	
RECOMMENDED DESIGN MANAGER			

DWG NAME: E02 | DATE: MARCH 2025

ATLAS PAGE NO: | SHEET 17 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



MOTOR CONTROL CENTER MCC-W1

NO SCALE

EXISTING ELECTRICAL PANEL

120/240 VOLTS, 1 PHASE, 60 Hz

MOTOR CONTROL CENTER MCC-W1 FRONT ELEVATION

NO SCALE

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ONE LINE DIAGRAM DEMOLITION

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

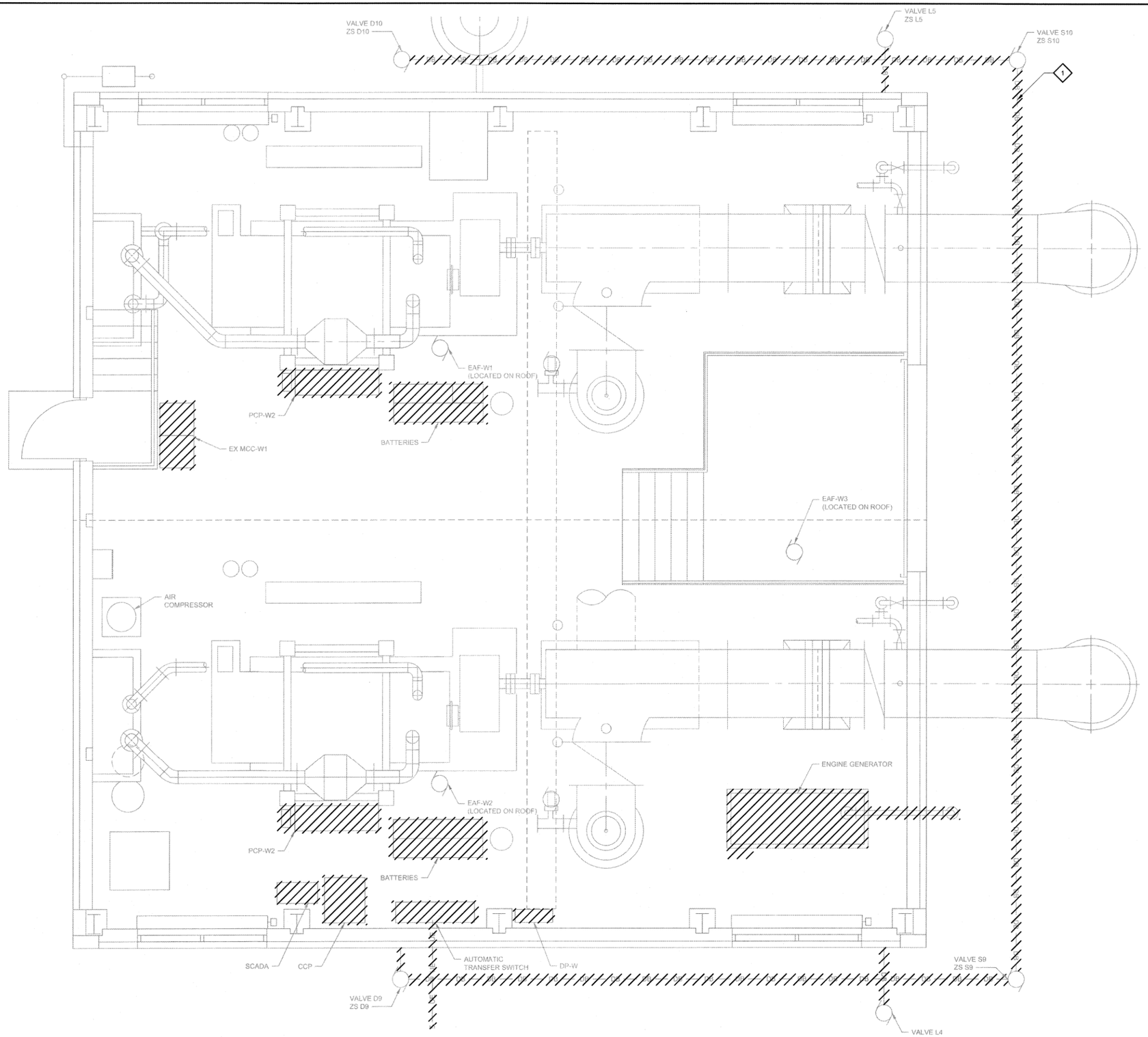
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND
ESTIMATES
PREPARED BY:
GREELEY AND HANSEN
A TYLin Company
312 SOUTH BOSTON AVE, SUITE 300
TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:	DRAWN	TD		APPROVED:
	DESIGNED	FF		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	CS	3/25	
HORIZONTAL:	LEAD ENGR.	CKW	3/25	
	FIELD MGR.		3/25	
VERTICAL:	RECOMMENDED Thomas J. [illegible] DESIGN MANAGER			
DWG NAME: E03				DATE: MARCH 2025
ATLAS PAGE NO:				SHEET 18 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



DEMOLITION PLAN AT EL 630'-3"

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

1 0 1 2 3 4 5 6 7 FT

3/8"=1'-0"

N

NOTES:

1. DEMOLISH EXISTING CONDUIT, CONDUCTORS, AND ASSOCIATED JUNCTION BOXES AS SHOWN ON E03.
2. DEMOLISH EQUIPMENT ONCE PUMP STATION IS OFFLINE FOR THE SEASON.
3. RETURN CONTENTS OF ALL EXISTING PUMP CONTROL PANELS (PCP-W1, PCP-W2), CAPACITY CONTROL PANEL AND SCADA PANEL TO OWNER/RAW WATER SUPPLY FOR REPURPOSING.

KEY NOTES:

1 DEMOLISH DIRECT BURIED CONDUIT AND JUNCTION BOXES, TYP.

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TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

ELECTRICAL

DEMOLITION PLAN

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

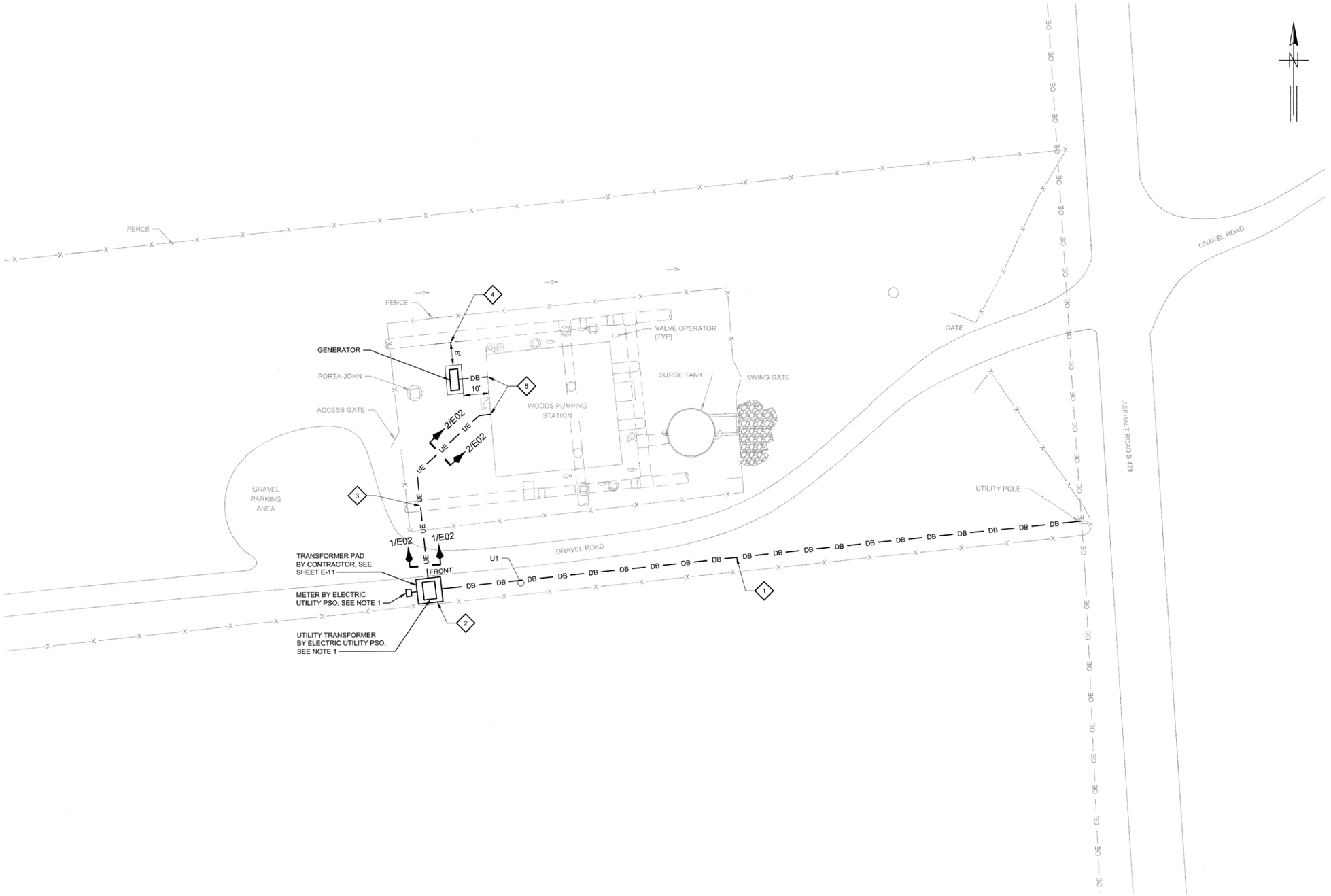
PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:	DRAWN	TD	APPROVED:
	DESIGNED	FF	
	SURVEY		
PROFILE SCALE:	PROJ. MGR.	CS 3/25	
HORIZONTAL:	LEAD ENGR.	LEW 3/25	
	FIELD MGR.	Paul 3/25	
VERTICAL:	RECOMMENDED DESIGN MANAGER		

DWG NAME: E04 — DATE: MARCH 2025

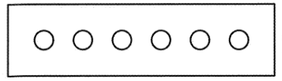
ATLAS PAGE NO: — SHEET 19 OF 30 SHEETS



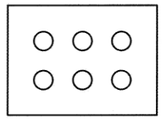
ELECTRICAL SITE PLAN

SCALE: 1" = 20'-0"

20 0 20 40 FT 1"=20'



1 E02 DUCTBANK SECTION
NOT TO SCALE



2 E02 DUCTBANK SECTION
NOT TO SCALE

NOTES:

1. ALLOW 10' CLEARANCE IN FRONT OF TRANSFORMER, SEE DETAIL ON SHEET E-11.
2. SEE PSO'S DESIGN SERVICE GUIDE FOR INFORMATION ON INSTALLATION.
3. CONSTRUCT NEW SERVICE PRIOR TO DEMOLISHING EXISTING SERVICES.
4. ELECTRICAL UTILITY TO PROVIDE AND INSTALL CABLE FROM UTILITY POLE TO TRANSFORMER. UTILITY TO PROVIDE AND INSTALL TRANSFORMER. CONTRACTOR RESPONSIBLE FOR ALL OTHER ELECTRICAL WORK.

KEY NOTES:

1. DIRECT BURY CONDUIT AT 48" DEPTH.
2. COORDINATE WITH PSO TO INSPECT PAD REINFORCEMENTS PRIOR TO CONCRETE POUR.
3. INSTALL DUCT BANK 12" ABOVE 72" WATER LINE.
4. INSTALL GENERATOR PAD A MINIMUM OF 8' FROM EDGE OF 72" WATER LINE.
5. FOR CONTINUATION SEE E08.

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ELECTRICAL SITE PLAN

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

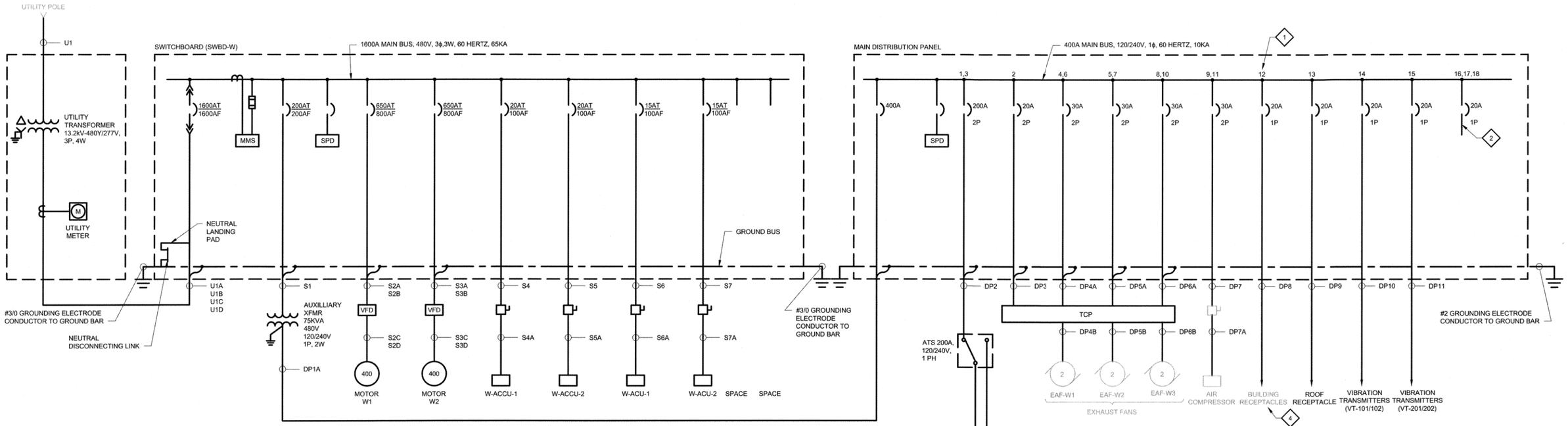
PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE: DRAWN TD; DESIGNED FF; SURVEY
PROFILE SCALE: PROJ. MGR. CS 3/25
HORIZONTAL: LEAD ENGR. 3/25
VERTICAL: FIELD MGR. 3/25
RECOMMENDED DESIGN MANAGER
APPROVED:

DWG NAME: E05 DATE: MARCH 2025
ATLAS PAGE NO: SHEET 20 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

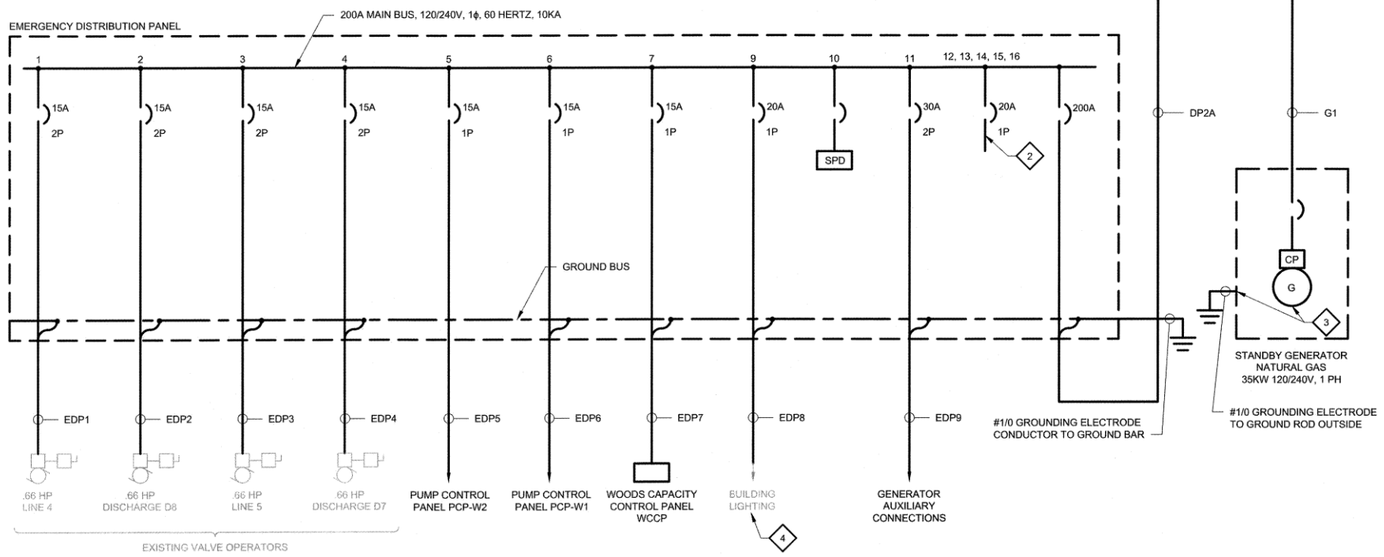


SWBD-W ONE LINE DIAGRAM

NO SCALE

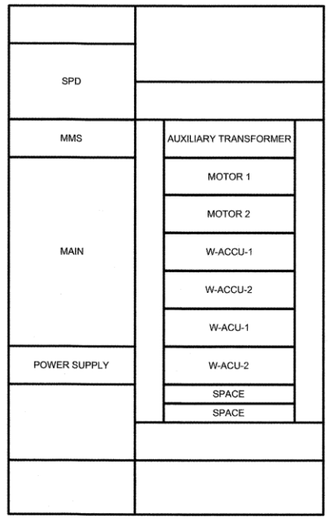
MDP-W ONE LINE DIAGRAM

NO SCALE



EDP-W ONE LINE DIAGRAM

NO SCALE



SWBD-W ELEVATION

NO SCALE

KEY NOTES:

1. UTILIZE SPARE BREAKERS AS NECESSARY SO AS NOT TO EXCEED 10 RECEPTACLES PER CIRCUIT.
2. PROVIDE A MINIMUM 20% SPARE BREAKER CAPACITY.
3. DO NOT BOND NEUTRAL TO GROUND AT GENERATOR. BOND GENERATOR FRAME TO GROUND ROD.
4. DEMOLISH LIGHTING AND RECEPTACLE CONDUCTORS AND CONDUIT FROM EXISTING PANEL TO JUNCTION BOX CLOSEST TO PANEL. INSTALL NEW CONDUIT AND CONDUCTORS FROM ELECTRICAL PANEL AND SPLICE WITH EXISTING AT JUNCTION BOX.

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ONE LINE DIAGRAMS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

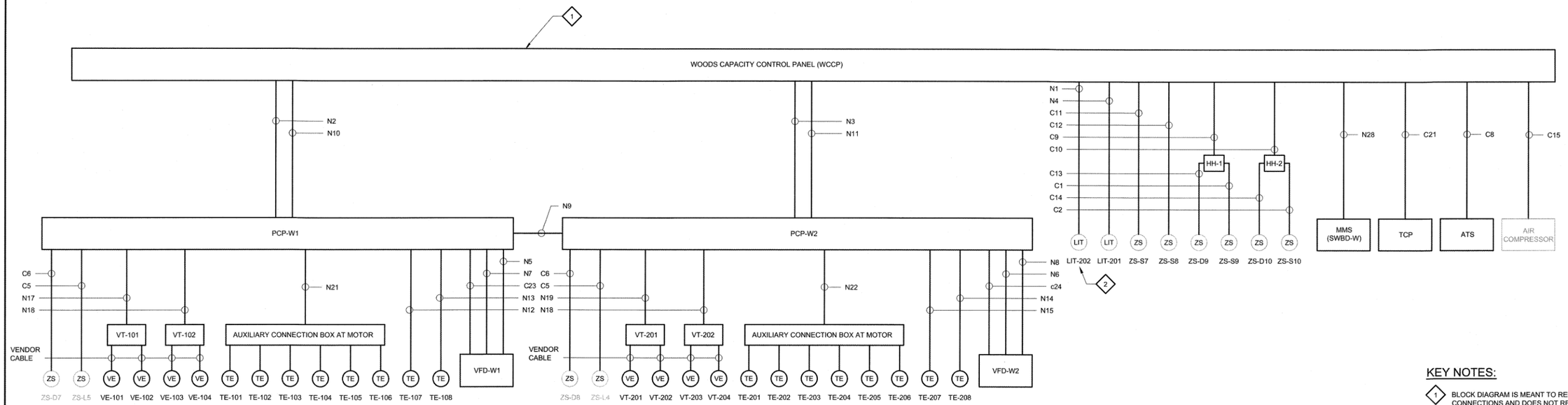
PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD		APPROVED:
DESIGNED	FF		
SURVEY			
PROJ. MGR.	CS	3/25	
LEAD ENGR.	CSW	3/25	
FIELD MGR.		3/25	
RECOMMENDED DESIGN MANAGER			

DWG NAME: E06 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 21 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



INSTRUMENTATION AND CONTROL BLOCK DIAGRAM

NO SCALE

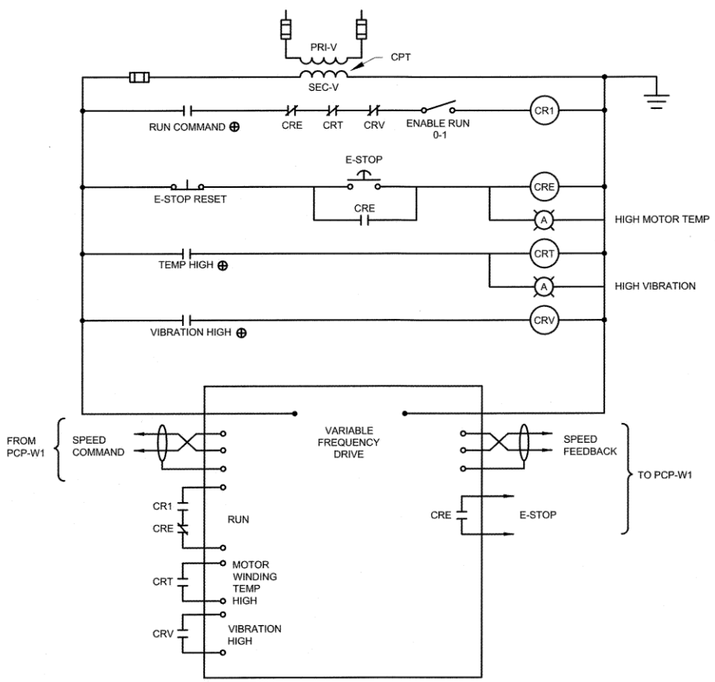
KEY NOTES:

1. BLOCK DIAGRAM IS MEANT TO REPRESENT HIGH-LEVEL CONNECTIONS AND DOES NOT REPRESENT ALL CONDUIT ROUTING.
2. CONTRACTOR TO VERIFY ALL EXISTING INSTRUMENT LOCATIONS IN FIELD, TYP.

LEGEND:

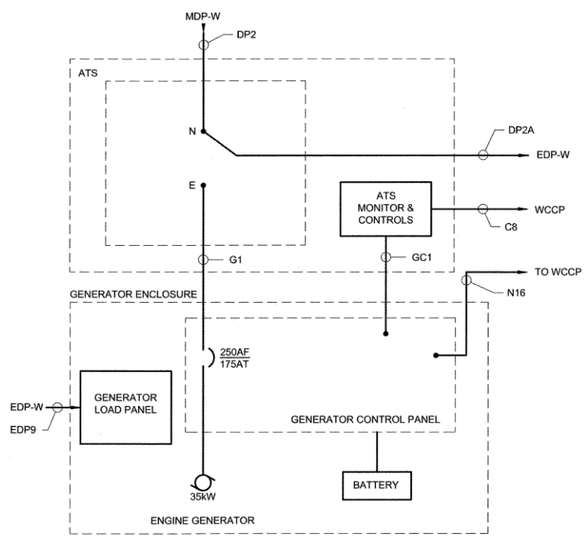
▲ LOCATED AT THE PUMP

⊕ LOCATED AT THE PUMP CONTROL PANEL



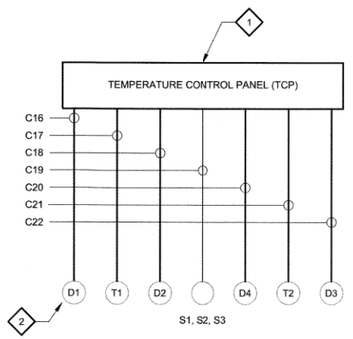
VFD-W1 SCHEMATIC DIAGRAM

SIMILAR FOR VFD-W2



GENERATOR ONE-LINE DIAGRAM

NO SCALE



TEMPERATURE CONTROL PANEL BLOCK DIAGRAM

NO SCALE

REVISION	BY	DATE

ELECTRICAL

SCHEMATIC AND BLOCK DIAGRAMS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300 TULSA, OKLAHOMA 74103-3311

PLAN SCALE:	DRAWN	TD	APPROVED:
	DESIGNED	FF	
	SURVEY		
PROFILE SCALE:	PROJ. MGR.	CS 3/25	
HORIZONTAL:	LEAD ENGR.	CSW 3/25	
	FIELD MGR.	BWH 3/25	
VERTICAL:	RECOMMENDED DESIGN MANAGER		

DWG NAME: E07 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 22 OF 30 SHEETS

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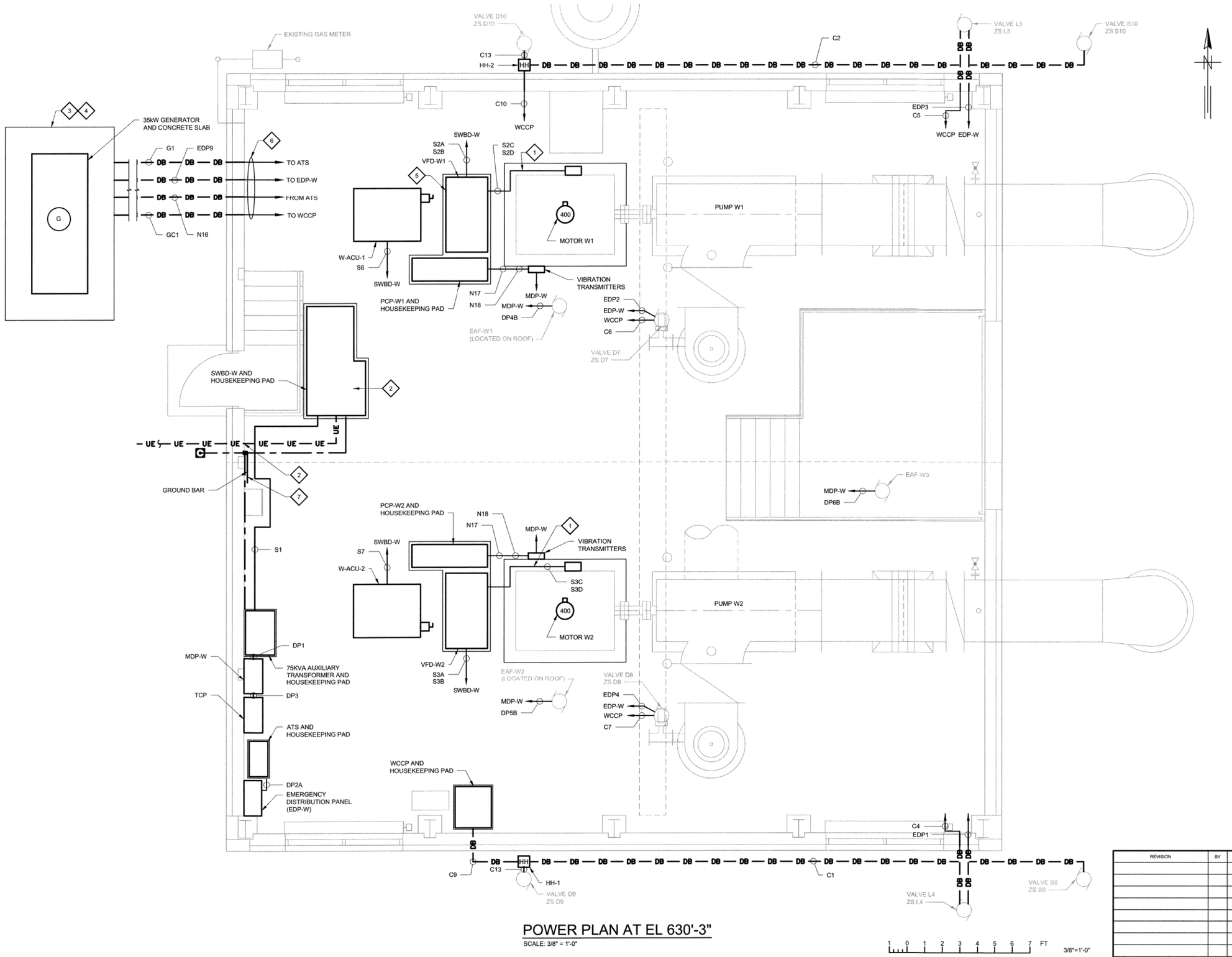
TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



POWER PLAN AT EL 630'-3"

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

KEY NOTES:

1. ROUTE TO BE COORDINATED TO NOT OBSTRUCT CRANE OPERATION AND OTHER TRADES.
2. REFER TO SINGLE CONDUIT LINES THRU WALL/SLAB DETAIL ON DWG E11.
3. REFER TO MANUFACTURER'S INSTALLATION GUIDE FOR GENERATOR INSTALLATION AND ALL CONDUIT STUB UPS IN CONCRETE PAD.
4. REFER TO E05 FOR SPECIFIC GENERATOR SITE LOCATION.
5. PROCURE A SPARE VFD, COORDINATE WITH OWNER REGARDING STORAGE.
6. RUN CONDUITS TIGHT AGAINST WALL AND CEILING TO PROVIDE SUFFICIENT CLEARANCE ABOVE STAIRS.
7. PROVIDE AND INSTALL ONE 4" X 18" X 0.25" GROUND BAR WITH INSULATED MOUNTING POSTS, REFER TO E06 FOR GROUND CONNECTIONS.

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25161
OKLAHOMA

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

REVISION	BY	DATE

ELECTRICAL

POWER PLAN

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

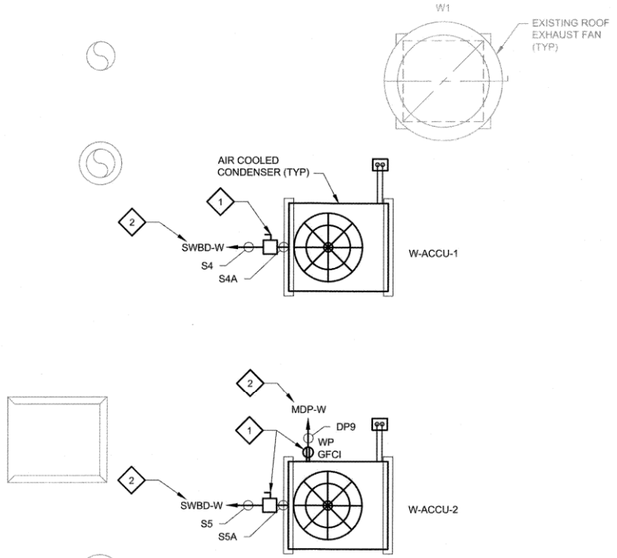
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

PLAN SCALE:	DRAWN	TD		APPROVED:
	DESIGNED	FF		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	CS	3/25	
HORIZONTAL:	LEAD ENGR.	CEW	3/25	
	FIELD MGR.			
VERTICAL:	RECOMMENDED DESIGN MANAGER		3/25	

DWG NAME: E08 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 23 OF 30 SHEETS



ROOF PLAN

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

1 0 1 2 3 4 5 6 7 FT

3/8"=1'-0"

N

KEY NOTES:

1. MOUNT ON STRUT CHANNEL FRAME. AVOID INTERFERENCE OF MAINTENANCE OF AIR CONDENSING UNITS.
2. REFER TO PIPE THRU ROOF DETAIL ON H03.

BEFORE YOU DIG 811 CALL OKIE

LICENSED PROFESSIONAL ENGINEER
NORBERT VIRANYI
25161
OKLAHOMA

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

ELECTRICAL

ROOF POWER PLAN

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD	
DESIGNED	FF	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	CSW	3/25
FIELD MGR.	[illegible]	3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: E09

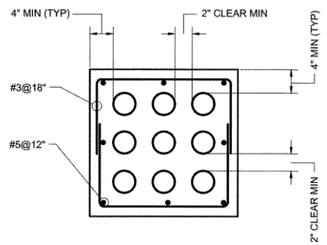
DATE: MARCH 2025

ATLAS PAGE NO:

SHEET 24 OF 30 SHEETS

CONDUIT NAME	CONDUIT SIZE	CONDUCTOR QUANTITY AND SIZE	FROM	TO
U1	6"	BY ELECTRIC UTILITY	UTILITY POLE	UTILITY TRANSFORMER
U1A	4"	4-600KCMIL, 1#1/0G	UTILITY DISCONNECT	SWBD-W
U1B	4"	4-600KCMIL, 1#1/0G	UTILITY DISCONNECT	SWBD-W
U1C	4"	4-600KCMIL, 1#1/0G	UTILITY DISCONNECT	SWBD-W
U1D	4"	4-600KCMIL, 1#1/0G	UTILITY DISCONNECT	SWBD-W
S1	2"	2#3/0,1#6G	SWBD-W	TRANSFORMER
S2A	3"	3-500KCMIL, 1#1/0G	SWBD-W	VFD-W1
S2B	3"	3-500KCMIL, 1#1/0G	SWBD-W	VFD-W1
S2C	3"	3-400KCMIL, 1#1/0G	VFD-W1	MOTOR W1
S2D	3"	3-400KCMIL, 1#1/0G	VFD-W1	MOTOR W1
S3A	3"	3-500KCMIL, 1#1/0G	SWBD-W	VFD-W2
S3B	3"	3-500KCMIL, 1#1/0G	SWBD-W	VFD-W2
S3C	3"	3-400KCMIL, 1#1/0G	VFD-W2	MOTOR W2
S3D	3"	3-400KCMIL, 1#1/0G	VFD-W2	MOTOR W2
S4	3/4"	2#12, 1#12G	SWBD-W	W-ACCU-1 DISCONNECT
S4A	3/4"	2#12, 1#12G	W-ACCU-1 DISCONNECT	W-ACCU-1
S5	3/4"	2#12, 1#12G	SWBD-W	W-ACCU-2 DISCONNECT
S5A	3/4"	2#12, 1#12G	W-ACCU-2 DISCONNECT	W-ACCU-2
S6	3/4"	2#12, 1#12G	SWBD-W	W-ACU-1 DISCONNECT
S6A	3/4"	2#12, 1#12G	W-ACU-1 DISCONNECT	W-ACU-1
S7	3/4"	2#12, 1#12G	SWBD-W	W-ACU-2 DISCONNECT
S7A	3/4"	2#12, 1#12G	W-ACU-2 DISCONNECT	W-ACU-2
DP1	2"	3#3/0, 1#1/0G	TRANSFORMER	MDP-W
DP1A	2"	3#3/0, 1#1/0G	TRANSFORMER	MDP-W
DP2	2"	3#3/0, 1#6G	MDP-W	ATS
DP2A	2"	3#3/0, 1#6G	ATS	EDP-W
DP3	3/4"	2#12, 1#12G	MDP-W	TCP
DP4A	3/4"	2#10, 1#12G	MDP-W	TCP
DP4B	3/4"	2#10, 1#12G	TCP	EAF-W1
DP5A	3/4"	2#10, 1#12G	MDP-W	TCP
DP5B	3/4"	2#10, 1#12G	TCP	EAF-W2
DP6A	3/4"	2#10, 1#12G	MDP-W	TCP
DP6B	3/4"	2#10, 1#12G	TCP	EAF-W3
DP7	3/4"	2#10, 1#12G	MDP-W	AIR COMPRESSOR DISCONNECT
DP7A	3/4"	2#10, 1#12G	AIR COMPRESSOR DISCONNECT	AIR COMPRESSOR
DP8	3/4"	2#12, 1#12G	MDP-W	BUILDING RECEPTACLES
DP9	3/4"	2#12, 1#12G	MDP-W	ROOF RECEPTACLE
DP10	3/4"	2#12, 1#12G	MDP-W	VIBRATION TRANSMITTER (PUMP W1)
DP11	3/4"	2#12, 1#12G	MDP-W	VIBRATION TRANSMITTER (PUMP W2)
G1	2"	3#3/0, 1#6G	GENERATOR	ATS
EDP1	3/4"	2#12, 1#12G	EDP-W	LINE VALVE 4
EDP2	3/4"	2#12, 1#12G	EDP-W	DISCHARGE VALVE D8
EDP3	3/4"	2#8, 1#10G	EDP-W	LINE VALVE 5
EDP4	3/4"	2#12, 1#12G	EDP-W	DISCHARGE VALVE D7
EDP5	3/4"	2#12, 1#12G	EDP-W	PCP-W2
EDP6	3/4"	2#8, 1#10G	EDP-W	PCP-W1
EDP7	1"	3#3, 1#8G	EDP-W	WCCP
EDP8	3/4"	2#12, 1#12G	EDP-W	BUILDING LIGHTS
EDP9	3/4"	2#10, 1#12G	EDP-W	GENERATOR AUXILIARY CONNECTIONS
GC1	3/4"	2#14, 1#12G	ATS	GENERATOR CONTROL PANEL
DPC7	1 1/2"	16#14, 1#12G	MDP-W	WCCP
C1	1"	3#14, 1#12G	ZS-S9	HANDHOLE HH-1
C2	1"	3#14, 1#12G	ZS-S10	HANDHOLE HH-2
C4	3/4"	6#14, 1#12G	WCCP	ZS-L4
C5	3/4"	6#14, 1#12G	WCCP	ZS-L5
C6	3/4"	6#14, 1#12G	PCP-W1	ZS-D7
C7	3/4"	6#14, 1#12G	PCP-W2	ZS-D8
C8	3/4"	6#14, 1#12G	ATS	WCCP
C9	1"	6#14, 1#12G	HANDHOLE HH-1	WCCP
C10	1"	6#14, 1#12G	HANDHOLE HH-2	WCCP
C11	3/4"	3#14, 1#12G	ZS-S7	WCCP
C12	1"	3#14, 1#12G	ZS-S8	WCCP
C13	1"	3#14, 1#12G	ZS-D9	HANDHOLE HH-1
C14	3/4"	3#14, 1#12G	ZS-D10	HANDHOLE HH-2
C15	3/4"	4#14, 1#12G	AIR COMPRESSOR	WCCP
C16	3/4"	2#14, 1#12G	D1	TCP
C17	3/4"	2#14, 1#12G	T1	TCP
C18	3/4"	2#14, 1#12G	D2	TCP
C19	3/4"	6#14, 1#12G	S1, S2, S3	TCP
C20	3/4"	2#14, 1#12G	D4	TCP
C21	3/4"	6#14, 1#12G	T2	TCP
C22	3/4"	2#14, 1#12G	D3	TCP
C23	3/4"	8#14, 1#12G	PCP-W1	VFD-W1
C24	3/4"	8#14, 1#12G	PCP-W2	VFD-W2

CONDUIT NAME	CONDUIT SIZE	CONDUCTOR QUANTITY AND SIZE	FROM	TO
N1	3/4"	1-2/C #16 STP	LIT-202	WCCP
N2	1"	2-2/C #16 STP	WCCP	PCP-W1
N3	1"	2-2/C #16 STP	WCCP	PCP-W2
N4	3/4"	1-2/C #16 STP	LIT-201	WCCP
N5	1"	2-2/C #16 STP	PCP-W1	VFD-W1
N6	1"	2-2/C #16 STP	PCP-W2	VFD-W2
N7	3/4"	CAT 6 ETHERNET	VFD-W1	PCP-W1
N8	3/4"	CAT 6 ETHERNET	VFD-W2	PCP-W2
N9	3/4"	CAT 6 ETHERNET	PCP-W1	PCP-W2
N10	3/4"	CAT 6 ETHERNET	WCCP	PCP-W1
N11	3/4"	CAT 6 ETHERNET	WCCP	PCP-W2
N12	3/4"	1-3/C #16 STP	TE-107	PCP-W1
N13	3/4"	1-3/C #16 STP	TE-108	PCP-W1
N14	3/4"	1-3/C #16 STP	TE-208	PCP-W2
N15	3/4"	CAT 6 ETHERNET	MMSD (SWBD-W)	WCCP
N16	3/4"	CAT 6 ETHERNET	GENERATOR CONTROL PANEL	WCCP
N17	3/4"	2-2/C #16 STP	VT-101	PCP-W1
N18	3/4"	2-2/C #16 STP	VT-102	PCP-W1
N19	3/4"	2-2/C #16 STP	VT-201	PCP-W2
N20	3/4"	2-2/C #16 STP	VT-202	PCP-W2



TYPICAL REINFORCING FOR CONCRETE ENCASTED ELECTRICAL CONDUITS

NOT TO SCALE

NOTES:

1. UTILITY TO PROVIDE AND INSTALL CABLE; CONTRACTOR TO PROVIDE AND INSTALL CONDUIT AND DUCT BANK.

BEFORE YOU DIG 811 OKIE CALL OKIE

LICENSED PROFESSIONAL ENGINEER NORBERT VIRANYI 25161 OKLAHOMA

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

ELECTRICAL

SCHEDULES AND DETAILS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD	
DESIGNED	FF	
SURVEY		
PROJ. MGR.	LS	3/25
LEAD ENGR.	KEW	3/25
FIELD MGR.		3/25
RECOMMENDED DESIGN MANAGER		

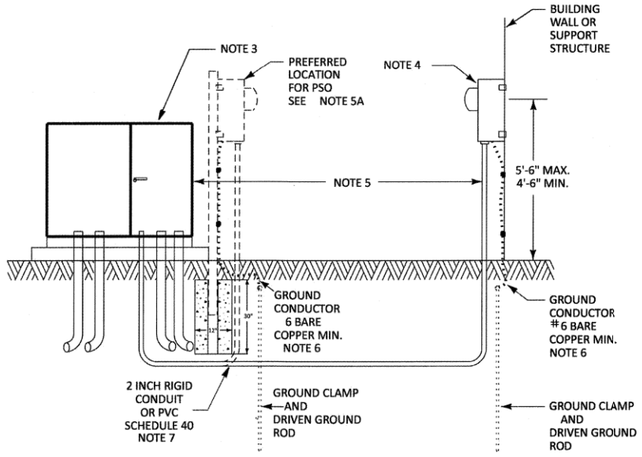
APPROVED:

DWG NAME: E10

DATE: MARCH 2025

ATLAS PAGE NO:

SHEET 25 OF 30 SHEETS



NOTES:

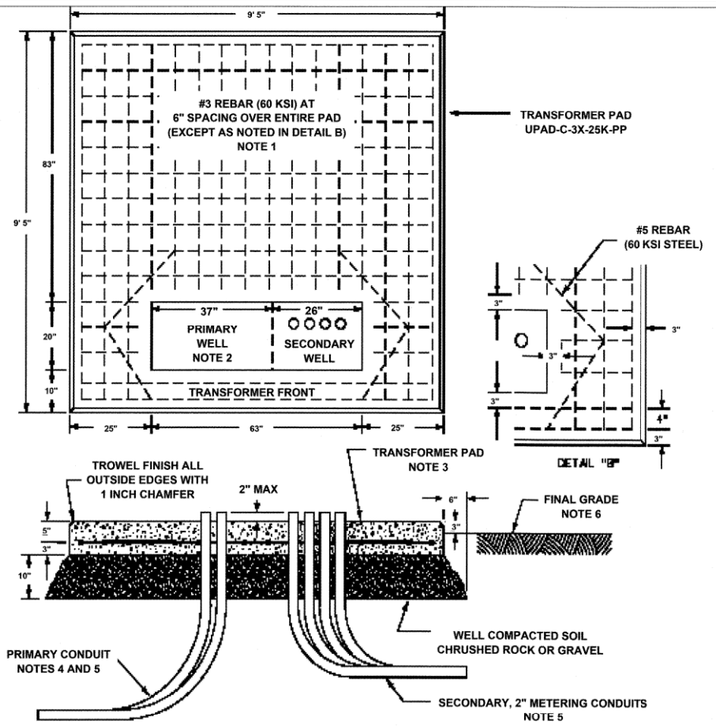
1. INSTRUMENT TRANSFORMERS (CTS) ARE FURNISHED AND INSTALLED BY COMPANY PRIOR TO CONNECTION OF CUSTOMER SERVICE CABLES.
2. CONTRACTOR SHALL PROVIDE NEMA TYPE TERMINAL LUGS FOR CUSTOMER OWNED SERVICE CONDUCTORS WHERE REQUIRED. POWER COMPANY TO SECURE CABLE TERMINATIONS. STACKING LUGS MAY BE REQUIRED TO ACCOMMODATE THE NUMBER OF SERVICE CONDUCTORS PER TRANSFORMER BUSHING.
3. THIS STANDARD IS APPLICABLE FOR A SINGLE CUSTOMER PAD-MOUNTED TRANSFORMER.
4. COMPANY PROVIDES METER SOCKET TO BE INSTALLED BY CUSTOMER, OR CONTRACTOR, IN A PLUMB POSITION AT LOCATION, USING REMOVABLE CORROSION RESISTANT FASTENERS, REFER TO FIGURE 14. FOR WORKING DISTANCE CLEARANCES REFER TO FIGURE 20.
5. TRANSFORMER PAD LOCATION AND LOCATION OF CONDUITS FOR CONDUCTOR/METER CONTROL CABLE TO BE SPECIFIED BY AEP. THE METER LOCATION IS TO BE A MINIMUM OF 3 FEET AWAY AND WITHIN 25 FEET OF THE TRANSFORMER PAD LOCATION. WHEN THE BUILDING IS LOCATED AT A DISTANCE GREATER THAN 25 FEET FROM THE TRANSFORMER PAD LOCATION, THE METER IS TO BE MOUNTED ON A SUPPORT STRUCTURE AT A LOCATION WHERE THE DISTANCE FROM THE TRANSFORMER PAD LOCATION IS NOT GREATER THAN 25 FEET. FOR FREE STANDING METERING FACILITIES REQUIREMENTS, REFER TO FIGURE 14.

5A. PSO REQUIRES THE METER LOCATION TO BE SECURED TO THE SIDE OF THE PAD WITH AN ANCHORING SYSTEM ON THE SECONDARY SIDE OF THE TRANSFORMER PAD, IN ADDITION TO BEING ENCASED IN CONCRETE OR LOCATED ON THE BUILDING STRUCTURE, IF WITHIN 25 FEET OF THE TRANSFORMER PAD LOCATION. REFER TO FIGURE 14."

6. THE METER SOCKET SHALL BE GROUNDED. THE METER SOCKET SHALL BE BONDED THROUGH A SEPARATE EQUIPMENT-GROUNDING CONDUCTOR CONNECTED TO THE GROUNDED SERVICE CONDUCTOR (USUALLY THE NEUTRAL). IN SOME JURISDICTIONS THE GROUNDING OF THE METER SOCKET WILL BE SUPPLEMENTED WITH THE USE OF A DRIVEN GROUND ROD IN ADDITION TO BONDING TO THE GROUNDED SERVICE CONDUCTOR.
7. SCHEDULE 80 RIGID CONDUIT REQUIRED FOR DRIVEWAYS AND PARKING LOTS.
8. CONTRACTOR WILL BE RESPONSIBLE TO PULL CONTROL CABLE AND EQUIPMENT GROUND IN CONDUIT FROM METER SOCKET TO PAD MOUNT TRANSFORMER. IF CONTROL CABLE IS NOT AVAILABE, A PULL STRING WILL BE PROVIDED BY THE CUSTOMER.

PAD-MOUNT TRANSFORMER METERING INSTALLATION DETAIL

NOT TO SCALE
THIS IS THE LATEST STANDARD FROM PSO, CONTRACTOR MUST OBTAIN LATEST STANDARD.

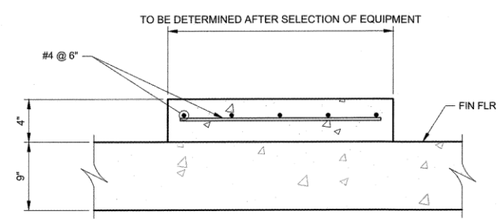


NOTES:

1. PROVIDE 3,500 PSI CONCRETE WITH A MINIMUM 3 INCH COVER OVER ALL REBAR.
2. THE NUMBER AND PLACEMENT OF CONDUITS TO BE DETERMINED BY ENGINEERING. SECONDARY CONDUIT MAY EXTEND IN ANY DIRECTION AS REQUIRED BY THE CUSTOMER.
3. FOR TRANSFORMER PAD AND GUARD POST LOCATIONS REFER TO D.S.2050
4. PRIMARY CONDUIT NUMBER, SIZE, LOCATION AND DIRECTION TO BE SPECIFIED BY ENGINEERING. CONDUIT TO BE RIGID STEEL OR PVC WITH LONG RADIUS STEEL 90 DEGREE ELLS. TO AVOID DISTURBING THE GROUND UNDER THE REAR OF PAD AND TO MINIMIZE SETTLING, BRING CONDUITS TO THE FRONT OR SIDES WHENEVER POSSIBLE AND MARK THE CONDUIT END LOCATIONS.
5. BURIAL DEPTH IS DEFINED AS THE DISTANCE BETWEEN FINAL GRADE TO THE TOP OF THE BURIED CABLE OR CONDUIT. PRIMARY CABLES SHALL BE INSTALLED AT A DEPTH OF NOT LESS THAN 48". SECONDARY CABLES SHALL BE INSTALLED AT A DEPTH OF NOT LESS THAT 36". AND SERVICE CABLES SHALL BE INSTALLED AT A DEPTH OF NOT LESS THAN 30".
6. FINAL GRADE SHALL BE ESTABLISHED BEFORE INSTALLATION OF PAD.

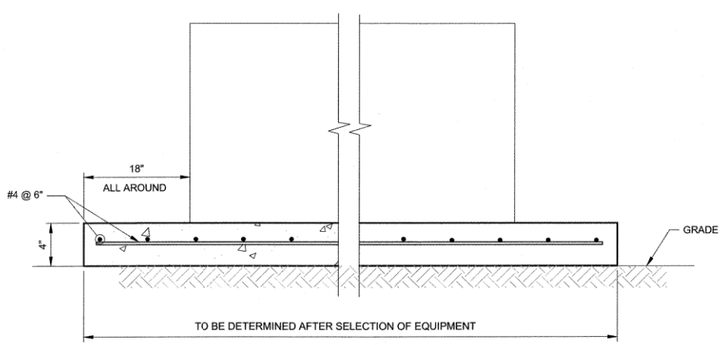
CONCRETE PAD FOR THREE PHASE PAD MOUNT TRANSFORMERS DETAIL

NOT TO SCALE
THIS IS THE LATEST STANDARD FROM PSO, CONTRACTOR MUST OBTAIN LATEST STANDARD.



ELÉCTRICAL EQUIPMENT MOUNTING PAD DETAIL

NOT TO SCALE



GENERATOR PAD DETAIL

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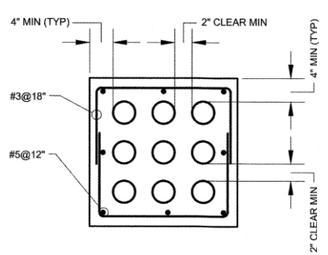
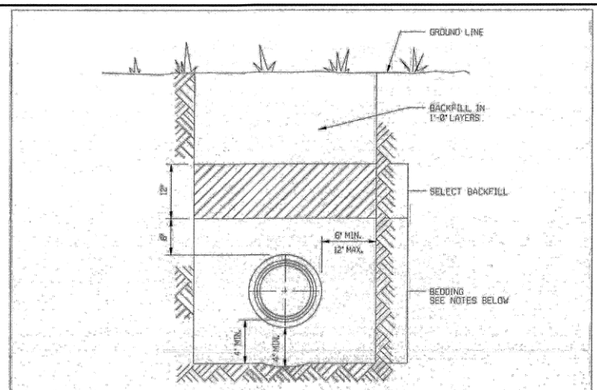


TYPICAL REINFORCING FOR CONCRETE ENCASTED ELECTRICAL CONDUITS

NOT TO SCALE



TRENCH CROSS-SECTION

NOTE:

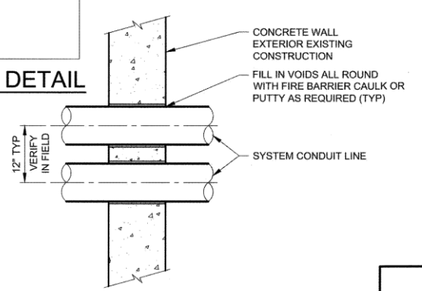
1. BEDDING SHALL BE SAND, COMPACTED TO 95% STANDARD PROCTOR DENSITY BY TAMPING OR VIBRATING. COMPACTION SHALL BE FIELD TESTED BY AN INDEPENDENT LABORATORY TO INSURE 95% PROCTOR DENSITY. CONTRACTOR SHALL BEAR ALL COSTS OF TESTING.
2. AS AN ALTERNATIVE, BEDDING MAY BE A CLEAN CRUSHED STONE, 1/4" TO 1 1/2", (GRAD. #7). THE CRUSHED STONE SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED 12 INCHES IN THICKNESS, AND THEN COMPACTED. COMPACTION PROCEDURE AND RESULTS SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
3. FOR PAVED AREAS, SEE STANDARD 713 AND 731 FOR PAVEMENT REMOVAL AND REPLACEMENT DETAILS.
4. COMPACTION SHALL BE 95% STANDARD PROCTOR DENSITY PER AASHTO T-99 IN 6" LIFTS.

FLEXIBLE PIPE:

1. PRETENSIONED CONCRETE - AWWA C303
2. STEEL - AWWA C200
3. PVC - AWWA C900 - (POTABLE WATER ONLY)*
4. HDPE - AWWA C906-21.
5. DUCTILE IRON - AWWA C151

*SEE STANDARD 951 FOR SANITARY SEWER

BEDDING DETAIL FLEXIBLE PIPE	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: RMB	APPROVED:
CHECKED BY: HAS	
DATE: AUGUST 2022	
NOT TO SCALE	STANDARD NO. 735



NOTES:

1. LOCATE EXISTING WALL OR SLAB REINFORCING PRIOR TO CORE DRILLING HOLES FOR CONDUIT LINES.
2. CORE DRILLED HOLES SHALL BE CENTERED IN REINFORCEMENT MAT WITH ONLY ONE HOLE PER ASSUMED 12"x12" REINFORCEMENT SPACING. HOLES SHALL BE SIZED AND LOCATED TO MAINTAIN 2" MINIMUM OF CONCRETE COVER AROUND EXISTING REINFORCEMENT.

SINGLE CONDUIT LINES THRU WALL/SLAB

NOT TO SCALE

BEFORE YOU DIG CALL OKIE 811

LICENSED PROFESSIONAL ENGINEER NORBERT VIRANYI 25161 OKLAHOMA

ELECTRICAL DETAILS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:	DRAWN	TD		APPROVED:
	DESIGNED	FF		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	LS	3/25	
HORIZONTAL:	LEAD ENGR.		3/25	
	FIELD MGR.		3/25	
VERTICAL:	RECOMMENDED DESIGN MANAGER			

DWG NAME: E11 — DATE: MARCH 2025

ATLAS PAGE NO: — SHEET 26 OF 30 SHEETS

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

INSTRUMENT TAGGING AND LABELING

(#) PSL XXX — INSTRUMENT - FIELD MOUNTED

(#) — QUANTITY WHEN SHOWN FOR CLARITY. SEE INSTRUMENT LIST.

PIT XXX — INSTRUMENT - PANEL MOUNTED

FR XXX / AR XXX — SINGLE INSTRUMENT HOUSING CONTAINING TWO (OR MORE) INSTRUMENT FUNCTIONS (CIRCLES TOUCHING)

X FY XXX — INSTRUMENT RELAY MOUNTED IN REAR OF PANEL (BROKEN LINE). ACTIVATES AND DEACTIVATES CONTROL AND/OR ALARM SWITCHES AT PREST SIGNAL VALUES. SEE BELOW FOR FUNCTION TYPES (X).

Δ	DIFFERENCE
>	HIGH SELECTOR
<	LOW SELECTOR
S/I	FREQUENCY/CURRENT CONVERTER
I/I	CURRENT/CURRENT REPEATER (ISOLATOR)
AV	AVERAGE
%	RATIO

Y AE XXX — ANALYSIS INSTRUMENT SEE BELOW FOR FUNCTION TYPES (Y)

CH_4	METHANE
Cl_2	CHLORINE
CO_2	CARBON DIOXIDE
COMB	COMBUSTIBLES
DO	DISSOLVED OXYGEN
$FeCl_3$	FERRIC CHLORIDE
F	FLUORIDE
H_2S	HYDROGEN SULFIDE
H_3PO_4	PHOSPHORIC ACID
H_2SO_4	SULFURIC ACID
$Na_2S_2O_5$	SODIUM METHA-BISULFATE
NaClO	SODIUM HYPOCHLORITE
NH_3	AMMONIA
O_2	OXYGEN
ORP	OXIDATION REDUCTION POTENTIAL
pH	HYDROGEN ION CONCENTRATION (-LOG)
PO_4	PHOSPHATE

— INTERLOCK # = SEE SCHEDULE FOR DESCRIPTION

YL XXX Z — LED INDICATING LIGHT SEE BELOW FOR COLOR DESIGNATIONS (Z)

A	= AMBER	=	WARNING
B	= BLUE	=	LOCK OUT RELAY TRIPPED
G	= GREEN	=	ON/RUNNING/OPEN
R	= RED	=	OFF/STOPPED/CLOSED
R	= RED	=	ALARM/FAULT
W	= WHITE	=	POWER AVAILABLE

XYZ HS XXX — HAND SELECTOR SWITCH

XYZ PB XXX — PUSHBUTTON

SEE BELOW FOR HAND SELECTOR SWITCH AND PUSHBUTTON FUNCTIONS (XYZ)

ACK	ACKNOWLEDGE
AM	AUTO-MANUAL
CO	CLOSE-OPEN
COA	CLOSE-OPEN-AUTO
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
FR	FOWARD-REVERSE
FOR	FOWARD-OFF-REVERSE
HOA	HAND-OFF-AUTO
HOC	HAND-OFF-COMPUTER
LA	LOCAL-AUTO
LOC	LOCAL-OFF-COMPUTER
LOR	LOCAL-OFF-REMOTE
LOS	STOP W/LOCKOUT
LR	LOCAL-REMOTE
MOA	MANUAL-OFF-AUTO
OOA	ON-OFF-AUTO
O/O	ON-OFF
OSC	OPEN-STOP-CLOSE
POT	SPEED POTENTOMETER
PTT	PUSH-TO-TEST
RS	RESET
ROL	RAISE-OFF-LOWER
R/O	RUN-OFF
S	STOP
S/R/S	START-RUN-STOP
SS	START-STOP
SS/L	START-STOP W/ LOCKOUT
1-2	SELECT DEVICE 1-2
SIL	SILENCE ALARM

MISCELLANEOUS ABBREVIATIONS

ACP	ACCESS CONTROL PANEL
FOPP	FIBER OPTIC PATCH PANEL
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
RLL	RELAY LADDER LOGIC

INPUT/OUTPUT (I/0) TAGGING AND LABELING

DISCRETE INPUT

DISCRETE OUTPUT

ANALOG INPUT

ANALOG OUTPUT

NOTES:

1. THIS DRAWING IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF THE DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR REQUIRED ITEMS.

INSTRUMENT IDENTIFICATION LEGEND

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER FLAME			CLOSE, STOP, DECREASE	OFF
C	CONDUCTIVITY (ELECTRICAL)	COMPUTER		CONTROL	
D	DENSITY (MASS) OR SPECIFIC GRAVITY	DIFFERENTIAL		OPEN, START, INCREASE	
E	VOLTAGE (EMF)		PRIMARY ELEMENT		
F	FLOW RATE	RATIO (FRACTION)		FORWARD	FAIL
G	GAUGING (DIMENSIONAL)		GLASS, GAUGE, GATE		
H	HAND (MANUALLY INITIATED)				HIGH, OPEN
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME OR TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW, CLOSED
M	MOISTURE OR HUMIDITY	MANUAL	MOMENTARY	MOTOR	MIDDLE OR INTERMEDIATE
N	INTRUSION				ON, OPERATE, RUNNING
O			ORIFICE (RESTRICTION)		OVERLOAD
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)	PUMP	
Q	QUANTITY	INTEGRATE OR TOTALIZE			
R	RADIOACTIVITY		RECORD OR PRINT	REVERSE	
S	SPEED, FREQUENCY, MOTION	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION			VALVE, DAMPER OR LOUVER	
W	WEIGHT, FORCE, TORQUE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT STATUS	Y AXIS		RELAY OR COMPUTE	
Z	POSITION	Z AXIS		DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENTS	

MISC INSTRUMENT SYMBOLS

— STROBE LIGHT/ROTATING BEACON SEE BELOW FOR COLOR DENOMINATIONS (#)
A - AMBER
W - WHITE
R - RED
G - GREEN

H — ALARM OR WARNING HORN

FE M — MAGNETIC FLOW METER

FE T — THERMAL MASS FLOW METER

FE — INSERTION TYPE FLOW METER

FE — VENTURI METER

FE — VORTEX SHEDDING FLOW METER

DIAPHRAGM SEAL (SEE DETAIL DRAWINGS FOR COMPLETE INSTALLATION DETAILS)

ISOLATOR RING

LE — RADAR LEVEL SENSOR

LE — ULTRASONIC LEVEL SENSOR

SUBMERSIBLE LEVEL SENSOR

VALVE SYMBOLS

GATE VALVE

K — KNIFE GATE VALVE

GLOBE VALVE

PLUG VALVE

BUTTERFLY VALVE

BALL VALVE

CHECK VALVE

PINCH VALVE

HOSE/COUPLING CONNECTION

3-WAY VALVE

RELIEF VALVE

PRESSURE REGULATING VALVE

BACK-PRESSURE REGULATING VALVE

S — SOLENIOD VALVE

S — 4-WAY SOLENIOD VALVE

NEEDLE VALVE

MAIN PROCESS LINE

ELECTRIC (ELECTRONIC) SIGNAL LINE

FO FO FO FO FO — DATA LINK (FIBER OPTIC)

DATA LINK (CAT6)

COMMUNICATION LINK (GENERIC)

DATA LINK (SERIAL)

PNEUMATIC SIGNAL

CAPILLARY LINE

HYDRAULIC SIGNAL

AS — INSTRUMENT AIR SUPPLY

N — PROCESS FLOW LINE CONTINUED ON ANOTHER DRAWING:
* - DRAWING REFERENCE
N - INTERFACE ID

N — PROCESS SIGNAL LINE CONTINUED ON ANOTHER DRAWING:
* - DRAWING REFERENCE
N - INTERFACE ID

PROCESS FLOW LINE CONTINUED OUTSIDE SCOPE OF DRAWINGS

AUXILIARY SYSTEM FLOW

CIRCUIT BREAKER

CR — CONTROL RELAY

X — INDICATING LIGHT (A-AMBER, B-BLUE, G-GREEN, R-RED, W-WHITE)

LIMIT SWITCH

NORMALLY OPEN CONTACT

NORMALLY CLOSED CONTACT

TEMPERATURE SWITCH

NORMALLY OPEN PUSHBUTTON

NORMALLY CLOSED PUSHBUTTON

HEATING ELEMENT

FLOAT SWITCH

PULSATION DAMPENER ACCUMMULATION

XX — GATE
XX: SG SLUICE GATE
SLG SLIDE GATE

DAMPER

M — ELECTRIC MOTOR ACTUATOR

DIAPHRAGM ACTUATOR

S — SOLENOID ACTUATOR

XX — CLYLINDER ACTUATOR
XX: FO FAIL OPEN
FC FAIL CLOSED
FLP FAIL LAST POSTION

FI XXX — IN-LINE FLOW INDICATOR

CALIBRATION COLUMN

M — ELECTRIC MIXER

PROCESS MIXER

PARSHALL FLUME

M VS — CENTRIFUGAL PUMP
VS VARIABLE SPEED

M VS — CENTRIFUGAL FAN/BLOWER/COMPRESSOR
VS VARIABLE SPEED

M VS — PD BLOWER/COMPRESSOR (ROTARY)
VS VARIABLE SPEED

M VS — PD BLOWER/COMPRESSOR (RECIPROCATING)
VS VARIABLE SPEED

VS — PROGRESSIVE CAVITY PUMP
VS VARIABLE SPEED

M VS — CHEMICAL METERING PUMP
VS VARIABLE SPEED

M VS — SUBMERSIBLE PUMP
VS VARIABLE SPEED

DIAPHRAGM PUMP

CAMERA

REVISION	BY	DATE

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LICENSED PROFESSIONAL ENGINEER — NORBERT VIRANYI — 25161 — OKLAHOMA

INSTRUMENTATION AND CONTROLS

SYMBOL LEGEND

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company — 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

PLAN SCALE:	DRAWN	TD		APPROVED:
	DESIGNED	AG		
	SURVEY			
PROFILE SCALE:	PROJ. MGR.	LS	3/25	
HORIZONTAL:	LEAD ENGR.	CEJ	3/25	
	FIELD MGR.	Brun	3/25	
VERTICAL:	RECOMMENDED DESIGN MANAGER	Jenna M. Mo		

DWG NAME: N01 — DATE: MARCH 2025

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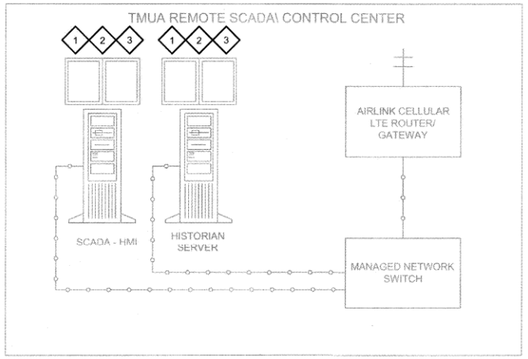
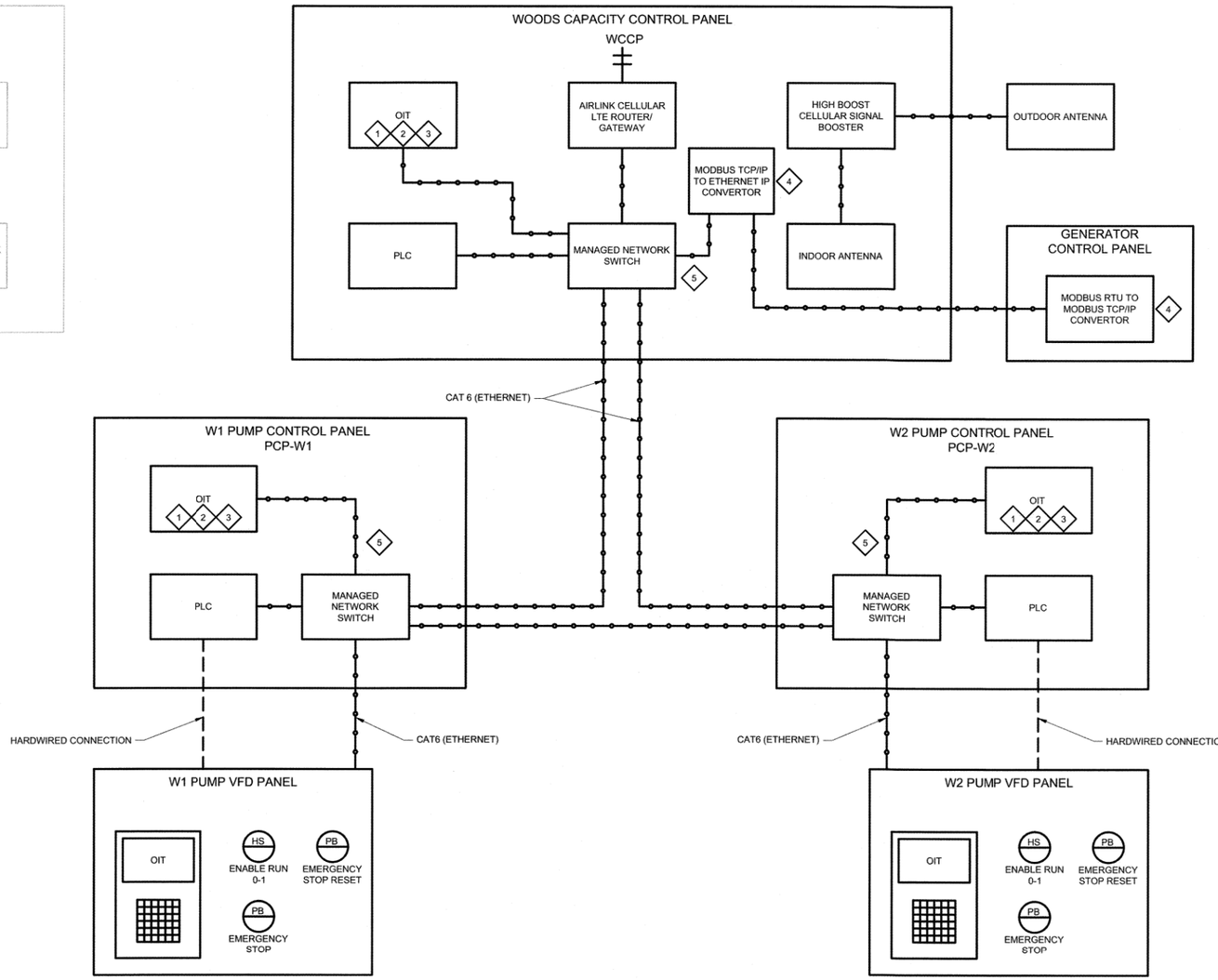
TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514



NOTE 2



WOODS PUMP STATION SCADA ARCHITECTURE DIAGRAM

NO SCALE

NOTES:

1. CONTRACTOR TO PROVIDE,WIRE AND CONFIGURE HIBOOST CELLULAR SIGNAL BOOSTER INTO THE NEW WOODS CAPACITY CONTROL PANEL. LOCATE AND WIRE THE INDOOR AND OUTDOOR ANTENNAS TO THE HIBOOST CELLULAR SIGNAL BOOSTER SUCH THAT STRONG CELLULAR SERVICE IS MAINTAINED AT THE FACILITY. CELLULAR SIGNAL CONNECTIVITY AND STRENGTH TEST REPORTS TO BE PROVIDED TO OWNER AND ENGINEER FOR APPROVAL.
2. THE WOOD CAPACITY CONTROL PANEL COMMUNICATES WITH TMUA REMOTE SCADA CONTROL ROOM VIA AIR LINK CELLULAR LTE ROUTER/GATEWAY TO ALLOW REMOTE MONITORING OF THE TMUA WOODS PUMP STATION. CONTRACTOR TO SUBMIT SIGNAL STRENGTH AND CONNECTIVITY TEST REPORTS TO OWNER AND ENGINEER FOR APPROVAL.

KEY NOTES:

1. CONTRACTOR TO DEVELOP NEW OIT SCREENS AT THE CONTROL PANELS. UPDATE AND MODIFY EXISTING SCADA HMI SCREENS AT THE REMOTE TMUA SCADA/CONTROL ROOM TO REFLECT THE CHANGES MADE AT TMUA WOODS PUMP STATION. THE DEVELOPED SCREENS SHALL MATCH EXISTING GRAPHICAL ELEMENTS I.E. COLOR SCHEME, FONTS AND OVERALL VISUAL STYLE USED AT CLIENT OWNED AND OPERATED BIRD CREEK AND CANYON LAKE PUMP STATION.
2. THE OIT SCREENS AND SCADA SCREENS SHALL INCLUDE REAL TIME MONITORING, TRENDING AND DATA RECORDING CAPABILITIES. TRENDING FEATURES SHALL INCLUDE HISTORICAL DATA ANALYSIS FOR SELECTABLE TIME RANGES AND TREND LINES FOR MULTIPLE PARAMETERS.
3. CONTRACTOR TO TEST AND VERIFY ALL NEW SCREENS AT THE OITS AND THE REMOTE SCADA HMI AND VERIFY ALL ASSOCIATED FUNCTIONALITY. CONTRACTOR TO IDENTIFY AND ADDRESS ANY DISCREPANCIES DURING THE TESTING PHASE.
4. GENERATOR MANUFACTURER TO PROVIDE PROTOCOL CONVERTOR TO COMMUNICATE WITH WOODS CAPACITY CONTROL PANEL VIA ETHERNET I/P PROTOCOL. IF THE GENERATOR CONTROL PANEL IS NOT CAPABLE OF COMMUNICATING IN ETHERNET I/P, CONTRACTOR TO PROVIDE APPROPRIATE PROTOCOL CONVERTOR TO FACILITATE COMMUNICATION BETWEEN THE GENERATOR CONTROL PANEL AND THE WOODS CAPACITY CONTROL PANEL VIA ETHERNET I/P.
5. ALL NETWORK SWITCHES INSTALLED AT WOODS PUMPING STATION SHALL INCLUDE ATLEAST 25% SPARE PORTS FOR FUTURE EXPANSION.

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LICENSED PROFESSIONAL ENGINEER
NORBERT VIRANYI
25161
OKLAHOMA

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

INSTRUMENTATION AND CONTROLS

SCADA ARCHITECTURE BLOCK DIAGRAMS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300 TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE:
PROFILE SCALE:
HORIZONTAL:
VERTICAL:

DRAWN	TD		APPROVED:
DESIGNED	AG		
SURVEY			
PROJ. MGR.	CS	3/25	
LEAD ENGR.	[illegible]	3/25	
FIELD MGR.	[illegible]	3/25	
RECOMMENDED DESIGN MANAGER			

DWG NAME: N02 — DATE: MARCH 2025

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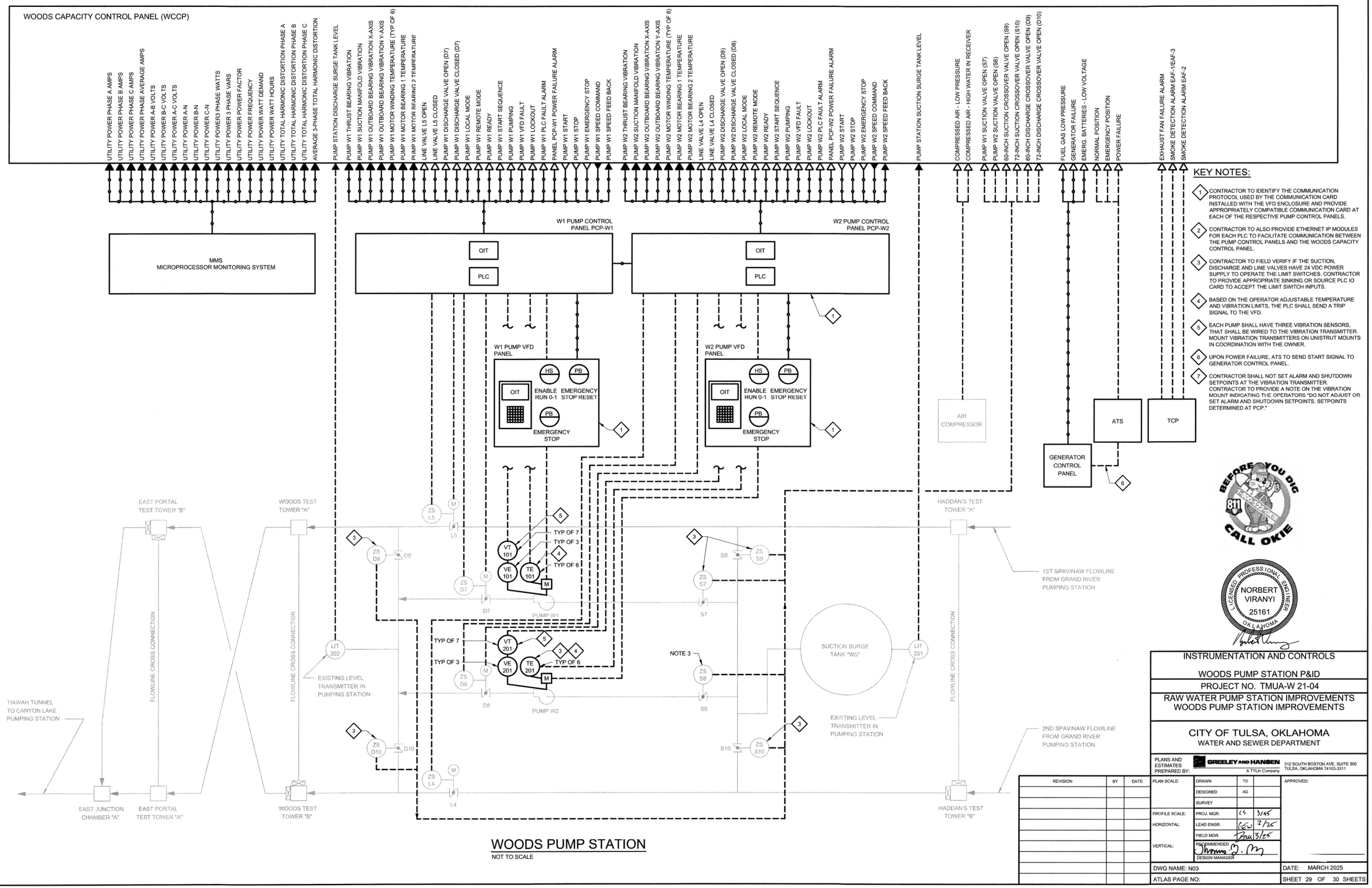

WOODS PUMP STATION

NOT TO SCALE

KEY NOTES:

1. CONTRACTOR TO IDENTIFY THE COMMUNICATION PROTOCOL USED BY THE COMMUNICATION CARD INSTALLED WITH THE VFD ENCLOSURE AND PROVIDE APPROPRIATELY COMPATIBLE COMMUNICATION CARD AT EACH OF THE RESPECTIVE PUMP CONTROL PANELS.
2. CONTRACTOR TO ALSO PROVIDE ETHERNET IP MODULES FOR EACH PLC TO FACILITATE COMMUNICATION BETWEEN THE PUMP CONTROL PANELS AND THE WOODS CAPACITY CONTROL PANEL.
3. CONTRACTOR TO FIELD VERIFY IF THE SUCTION, DISCHARGE AND LINE VALVES HAVE 24 VDC POWER SUPPLY TO OPERATE THE LIMIT SWITCHES. CONTRACTOR TO PROVIDE APPROPRIATE SINKING OR SOURCE PLC IO CARD TO ACCEPT THE LIMIT SWITCH INPUTS.
4. BASED ON THE OPERATOR ADJUSTABLE TEMPERATURE AND VIBRATION LIMITS, THE PLC SHALL SEND A TRIP SIGNAL TO THE VFD.
5. EACH PUMP SHALL HAVE THREE VIBRATION SENSORS, THAT SHALL BE WIRED TO THE VIBRATION TRANSMITTER. MOUNT VIBRATION TRANSMITTERS ON UNISTRUT MOUNTS IN COORDINATION WITH THE OWNER.
6. UPON POWER FAILURE, ATS TO SEND START SIGNAL TO GENERATOR CONTROL PANEL.
7. CONTRACTOR SHALL NOT SET ALARM AND SHUTDOWN SETPOINTS AT THE VIBRATION TRANSMITTER. CONTRACTOR TO PROVIDE A NOTE ON THE VIBRATION MOUNT INDICATING THE OPERATORS "DO NOT ADJUST OR SET ALARM AND SHUTDOWN SETPOINTS. SETPOINTS DETERMINED AT PCP."

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TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

INSTRUMENTATION AND CONTROLS

WOODS PUMP STATION P&ID

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE. SUITE 300, TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

PLAN SCALE: PROFILE SCALE: HORIZONTAL: VERTICAL:

DRAWN	TD	
DESIGNED	AG	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	KEW	3/25
FIELD MGR.		3/25
RECOMMENDED DESIGN MANAGER		

APPROVED:

DWG NAME: N03 DATE: MARCH 2025

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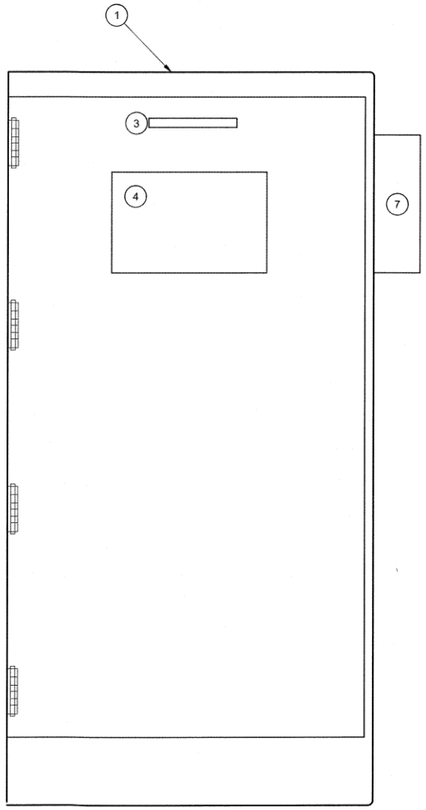
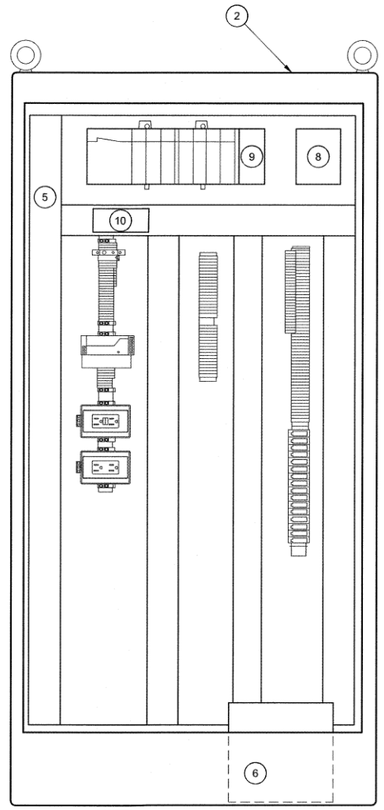


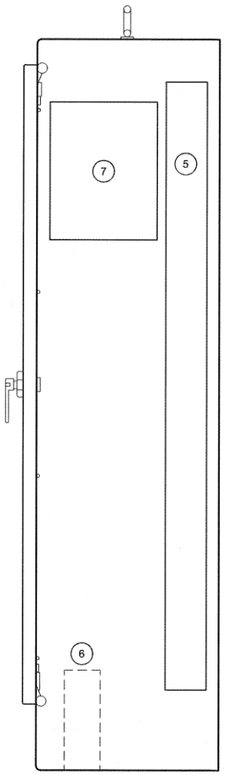
FRONT VIEW

NOT TO SCALE
TYPICAL FOR:
PUMP W1 CONTROL PANEL (PCP-W1)
PUMP W2 CONTROL PANEL (PCP-W2)
WOOD CAPACITY CONTROL PANEL (WCCP)



FRONT VIEW (DOOR REMOVED)

NOT TO SCALE
TYPICAL FOR:
PUMP W1 CONTROL PANEL (PCP-W1)
PUMP W2 CONTROL PANEL (PCP-W2)
WOOD CAPACITY CONTROL PANEL (WCCP)



SIDE VIEW

NOT TO SCALE
TYPICAL FOR:
PUMP W1 CONTROL PANEL (PCP-W1)
PUMP W2 CONTROL PANEL (PCP-W2)
WOOD CAPACITY CONTROL PANEL (WCCP)

NOTES:

1. CONTRACTOR TO IDENTIFY AND PROVIDE APPROPRIATE QUANTITIES OF PLC COMMUNICATION MODULES TO FACILITATE COMMUNICATION BETWEEN THE VFDS AND THE PCPS, COMMUNICATION BETWEEN THE PCPS AND THE WOODS CAPACITY CONTROL PANEL.

LEGEND

	QTY	ITEM DESCRIPTION
1	1	FREE-STAND, SINGLE ACCESS, NEMA 12 ENCLOSURE
2	1	SUB PANEL FOR NEMA 12 ENCLOSURE
3	A/R	NAMEPLATES
4	1	PANELVIEW PLUS 7 15" DISPLAY
5	A/R	WHITE WIRE DUCT WITH COVER
6	1	UPS
7	1	AIR CONDITIONING UNIT
8	1	MANAGED ALLEN BRADLEY NETWORK SWITCH
9	1	MODBUS TCP/IP MODULE OR ETHERNET IP MODULE
10	A/R	24 VDC POWER SUPPLY

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OKLAHOMA

TMUA PROJECT NO. TMUA-W-21-04 WOODS PUMP STATION IMPROVEMENTS, CONTRACT NO. 136514

INSTRUMENTATION AND CONTROLS

INSTALLATION DETAILS

PROJECT NO. TMUA-W 21-04

RAW WATER PUMP STATION IMPROVEMENTS
WOODS PUMP STATION IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: GREELEY AND HANSEN, A TYLin Company, 312 SOUTH BOSTON AVE, SUITE 300, TULSA, OKLAHOMA 74103-3311

REVISION	BY	DATE

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VERTICAL:

DRAWN	TD	
DESIGNED	AG	
SURVEY		
PROJ. MGR.	CS	3/25
LEAD ENGR.	[illegible]	3/25
FIELD MGR.	[illegible]	3/25
RECOMMENDED DESIGN MANAGER	[illegible]	

APPROVED:

DWG NAME: N04
DATE: MARCH 2025
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